**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: Emebet Alemu Wedajo (BSc Nursing )**

Submitted to the School of Graduate Studies of Addis Ababa University in Partial Fulfillment for the Degree of Master of Public Health in Field Epidemiology

March, 2021

Addis Ababa

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Advisors:

Dr. Abiy Girmay (PhD)

Mr. Abdunnasir Abagaro (MPH, PhD Fellow)

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Approval by Examining Board

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Examiner

## Acknowledgement

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## List of abbreviations and acronym

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

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

| | |
|---|---|
| *PV* | *Plasmodium vivax* |
| RDTs | Rapid Diagnostic Tests |
| *RF* | *Relapsing Fever* |
| RHB | Regional Health Bureau |
| RRT | Rapid Response Team |
| SRS | Simple Random Sampling |
| UNICEF | United Nations Children's Emergency Fund |
| WHO | World Health Organization |
| ZHD | Zonal Health Department |

## Executive Summary

In our country. the principal health techniques has prevention of disease so to perform this public Health emergency Management has the core and has been giving specific interest to the manipulate of epidemic inclined diseases, of worldwide subject and ailments on eradication and elimination programs, through surveillance activities. The function of public Health practitioners include ensuring high quality health promotion, disease prevention and manage activities, conducting surveillance on rising public health threats and offering pertinent information to policy makers and public health officials. From October, 2019 to end of Jan, 2021 I have stayed in Field Epidemiology Training Program, School of Public Health-AAU and at both EPHI and Oromia Regional Health Bureau field base. We carried out two outbreak investigations, one surveillance data analysis, one assessment of surveillance system, and one woredas Health profile description, four abstracts for scientific conference, one Disaster assessment, one lookup notion and education as outputs.

**Chapter One:** We performed epidemiological investigations of two outbreaks. We used descriptive and Case Control Study in the course of investigations. We identified several factors that contributed to malaria outbreak in Shebe Sonbo district and observed that Low coverage Indoor Residual Spray and presence of stagnant water have been attributed for the outbreak. We recommended acceptable environmental management through optimized community participation. We also confirmed measles outbreak in Fitche Prison. Being unvaccinated and overcrowded Living circumstance for measles infection had been observed to be risk elements for developing the disease. We recommended use of standard prison and Health policy and for any health campaign measles immunization focused on prison community, and additionally health training on capacity of transmissions, treatment and prevention of measles infection has to be enhanced.

**Chapter Two**: We did Measles surveillance data analysis of six years (2014-2019) of Bale zone to describe by person, Place and time. Less than 5 years was the most affected age group observed through 5-14 years. Enhancing improved events and campaign measles immunization targeting much less than 15 years of age would prevent future risk.

**Chapter Three**: We performed Malaria assessment of surveillance system in East Showa Zone from June 15-30, 2019. The average surveillance system of the area mainly at lower stage used to be weak. Regular monitoring of program unique supportive supervision and continuous feedback system be strengthened for greater enhancement of the completeness and timeliness and/or surveillance system as

a whole.

.**Chapter Four:** We did health profile, health and health associated data, of Lomé Woredas from January 1-18, 2018, health and health related data the major causes of adult morbidity in woredas were acute upper respiratory tract infection acute febrile disease and Diarrhea While in under-five years, non-bloody Diarrhea, acute febrile disease and upper respiratory tract infection were the three leading causes of morbidity.

**Chapter Five:** We did scientific manuscript for peer reviewed journals on Measles outbreak in Fitche Prison, North Showa Zone.

**Chapter Six:** We organized four abstracts for submission to scientific convention in the course of residency time. These are:

- Outbreak of malaria-Shebe Sonbo Jimma Zone Oromia Region, Ethiopia, 2020
- Measles Outbreak-Fitche Prison, North Showa Zone, Oromia Region, Ethiopia, 2019.
- Six years (2014-2019) measles surveillance information analysis Bale Zone, Oromia Region, Ethiopia, 2019.
- Health Profile in Lome Woredas , East Showa Zone , Oromia Region ,2018

**Chapter Seven:** We conducted Natural Disaster (Flooding) assessment (Narrative summary of disaster situation) in Oromia Region to identify humanitarian needs in Flood affected areas from July 22 to August 19, 2020 in Fentale Woredas and Methehara Town of East Showa Zones. Malaria outbreak was happed flood hap pine in zones. Malaria are the most predicted risk in the zones. Food was a major problem after Flood occur for the first thee day.

**Chapter Eight**: We prepared one proposal for research project. The objective of this study is to assess magnitude of childhood measles vaccination status among Child aged12-23 month and determinant factors in Ginner District. We designed cross-sectional community and facility the sample measurement will be calculated using:

$$n = \frac{(Z\ \alpha/2)2\ P\ (1 - P)}{d2}$$

**Chapter Nine:** We did In COVID19 diseases Surveillance case Team and we also did weekly PHEM bulletin of Oromia Region from March 2019 to October 2020.

# CHAPTER–I OUTBREAK INVESTIGATIONS

## 1.1 MEASLES OUTBREAK INVESTIGATION IN FICHE PRISON, NORTH SHEWA ZONE, OROMIA REGION, MARCH 2019

**Executive summary**

**Introduction:** Measles is an extremely infectious respiratory illness transmitted by sneezing and coughing through droplet infection. An epidemic of measles is ongoing in the regions of Ethiopia, according to an official survey. Fiche prison was one of the areas affected by measles outbreaks in the Oromia region in 2019. We examined for effective control measures to confirm and recognize risk factors for outbreak.

**Methods:** We used descriptive study followed by1:2 unmatched case control study from 20/2/2019-/1/3/2019. A case was defined as any person who resided in Fitche Prison with fever and maculopapular (nonvascular) generalized rash and developed any of the following symptoms; cough, coryza or conjunctivitis (red eyes) February 2nd to March 3rd /2019. A sample of 40 case and 80 control were interviewed questionnaire to assess the possible factors associated with developing measles case. Data were entered into Epi-info-version 7.2.4 and analyzed by using SPSS version 24.

**Result**: **Result**: A total of 40 suspected measles cases had been identified with no death. Two out of Six (33%) of the cases were under 5 years, 2.5% greater than 15 years and 95% with unknown vaccination status. Three of five blood samples were positive for measles IgM. Overall attack rate was 2.7per 100 populations for the prison. AOR2.709 [95%CI (1.067_6.880) P=0.036] Over crowded living and contact with case AOR 3.416[95%CI (1.358_8.591) P=0.009 had been independent risk factor for contracting the disease while Adjusted odd ratio AOR 0.323[95% CI = (0.123_0.898) P= 0.022] being vaccinated against measles was protective factor for the disease.

**Conclusion and Recommendation**: A confirmed measles outbreak in Fiche Prison with unknown vaccination status in &greater than 15 year‘s age group. Age specific attack rate for less than five years’ and the highest. Treat and isolate the case, vaccination given for inmates Children, Awareness creation for People in prison the government centered on Prisoners and health standard leavening situation have to be comply with and provide attention

1.1.1 Introduction

Measles is a highly contagious viral disease spread by droplet infection through sneezing and coughing. Over recent months, spikes in case numbers have also occurred in countries with high overall vaccination coverage, including the United States of America as well as Israel, Thailand, and Tunisia, as the disease has spread fast among clusters of unvaccinated people. Measles is one of the world's most contagious diseases, with the potential to be extremely severe(1).

The Most recent year for which estimates are available, measles caused to close to 110,000 deaths even in high income countries, complications result in hospitalization in up to a quarter of case, and can lead to lifelong disability, from brain damage and blindness to hearing loss(2)(3). The disease is almost entirely preventable through two doses of a safe and effective vaccine. For several, however global coverage with the first dose of measles vaccine has stilled at 85 %. This is still short of the 95% needed to prevent outbreaks, and leaves many people, in many communities, at risk. Second dose coverage, while increasing stands at 67% with government and Partners such as the measles Initiative, Gavi the vaccine Alliance, UNICEF and others, response operations are underway to bring country outbreaks under control, Strengthen Health Service, and increase Vaccine Coverage(4).

In London Prison Measles outbreak occurred in July 2016, with more than 1500in mates of which two -thirds were sentenced and one -third constituted new influx. This was the second case of a reported measles outbreak in custodial setting in England. The previous outbreak occurred in Yorkshire prison in 2013. In both outbreak s, the source of infection originated from a member of staff and there was low known immunity of prisoners as well as a staff at a time(5).

Measles is everywhere. All WHO regions are experiencing large, often extended outbreaks exceeds the expected number of cases. As the expected number of cases is specific to the individual country. Outbreaks can range from a few cases in areas where the disease has previously been eliminated to a large number where endemic transmission is ongoing. The risk of measles Virus transmission spreading to affect multiple communities within a country or across international borders is especially concerning .As long as measles is a threat anywhere, it is a threat Every Where(6).

Measles case have continued to climb in to 2019, preliminary global data shows that the reported case rose by 300 Percent in over three months of 2019, compared to the same period in 2018. This follows Consecutive increases over the past two years. While this data is provisional and not yet complete, it indicates a clear trend. Many countries are in the minister sizeable measles out breaks, with all region of the world experiencing sustained rises in case. Current out breaks include the Democratic Republic of the Congo, Ethiopia, Georgia, Kazakhstan, Kyrgyzstan, Madagascar, Myanmar, Philippines, Sudan, Thailand

and Ukraine, Causing many case- Mostly among Young Children. Targeted Vaccination Programs for Migrant Prisoners could reduce the risks of transmission. In fact, Vaccination for measles should ideally be offered to all incoming Prisoners without A reliable Vaccine History. Measles, Mumps and Rubella vaccination should also be offered to Female Prisoners of Child Bering age without a reliable vaccine history, to protect them against rubella. There are combined Measles ,Mumps ,Rubella and Varicella Zoster Vaccine (7).

In developing countries with vaccination coverage, Epidemics often occur every two or three years and usually last between two and three mouths. Although their duration varies according to population size, crowding and the populations low immunity status. According to the official report, an outbreak of measles is occurring throughout the region of Ethiopia. Initial Symptom include high fever and runny Nose followed by a rash descending from the head and neck. Serious complication can develop, specifically in malnourished Patients or in patient with diminished(8).

So, In the context of our study to confirm and assess factors associated with measles outbreak and implement early measles control intervention in Feb 20/2019 measles case was recorded in Fitche prison as Index case he had contact history. The suspected measles cases were reported from North Shewa health office PHEM department on 24 /2/2019. The aim of this investigation was to facilitate rapid implementation of control measures to reduce the extent of disease spread and associated morbidity and mortality and ensure the interruption of virus among the at-risk population, which in turn helps to reach the WHO measles elimination targets planned to eliminate measles in 2020. To describe measles cases by place, time and person characteristics and assess risk factor associated with measles cases combined with targeting control intervention among prison community in Fiche Town, North Shewa zone, Oromia region 2019.

### 1.1.2. Objectives

#### 1.1.2.1. General objective

To describe measles cases by place person and time characteristics and assess risk factor associated with measles cases combined with targeting control intervention among prison community in Fiche Town, North Shewa zone, Oromia region 2019

#### 1.1.2.2. Specific objectives

- To describe measles cases by place person and time.
- To assess possible risk factors contributing for measles outbreak in affected area
- To target measles prevention and control measures to stop the outbreak

### 1.1.3 Methods

#### 1.1.3.1 Study area and period

We prepared line list, reviewed health facility records and identified cases from patient registers in the health facility. The study was conducted from February 2nd to March 3nd/2019. The outbreak investigation was conducted in prison located in Fitche town, in the North Shewa Zone, Oromia region. The study area is located 112 km away from Addis Ababa. We defined cases based on the national public health emergency management guideline, accordingly a suspected measles case was defined as, as any person residing in Fiche prison with maculopapular rash plus cough, conjunctivitis and coryza (running nose) or whom a clinician suspected measles within a period of 21days before onset of rash to 21 days after rash onset. Confirmed cases were those cases whose individuals whom blood sample was tested positive for measles IgM antibodies or a suspect case epidemiologically linked to another confirmed case. We enrolled all measles cases fulfilling the case definition and compiled from the registries of the health facilities in the affected area. We included all cases that fulfil the case definition for measles and eligible for controls. All study units were selected by simple random sampling method.

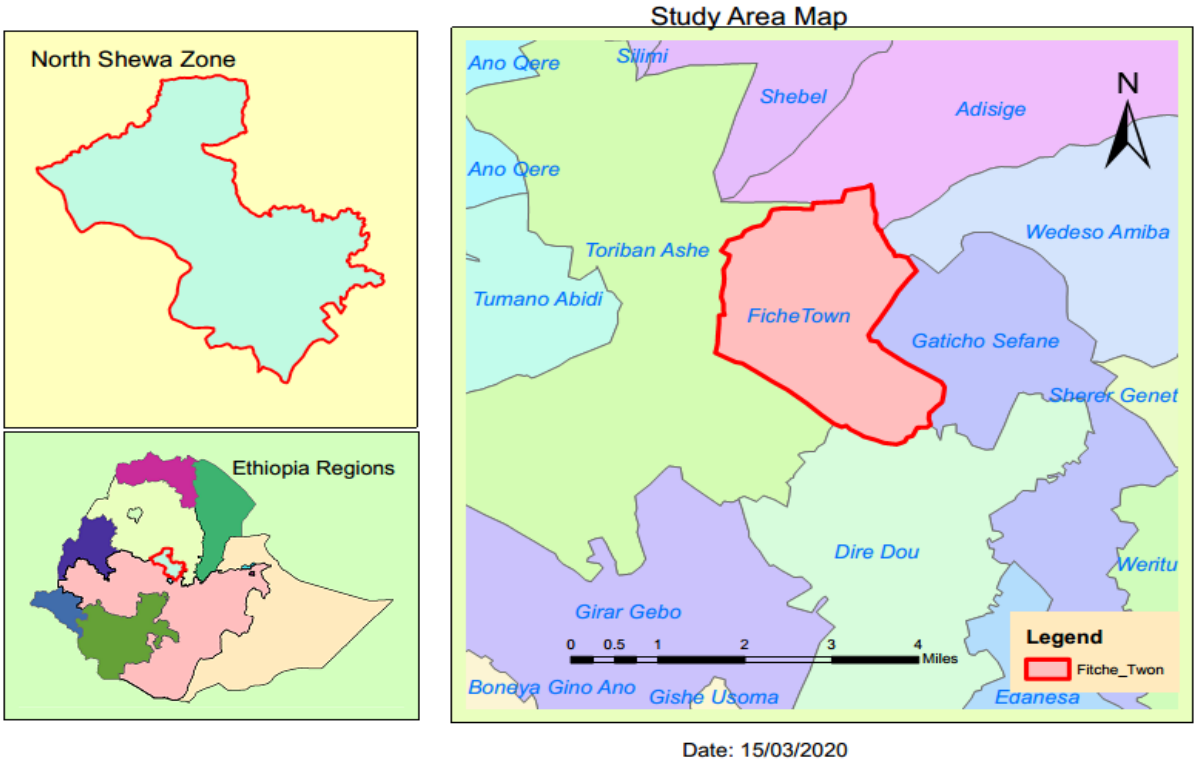



Figure 1-Map of Fiche Town, North Showa, Oromia, Ethiopia 2019

**1.1.3.3. Case definition.**

**Measles suspected cases at community level:** A community member should report any person with rash and fever to a health worker and advise the person to go to a health facility.

**Suspected measles case**: Any person with fever and maculopapular (non-vesicular) generalized rash and one of the coughs, coryza or conjunctivitis (red eyes) or any person in whom a clinician suspects measles.

**Confirmed measles case:** A suspected case with laboratory conformation (positive IgM antibody) or epidemiological link to confirmed cases in an epidemic.

**Measles outbreak:** Is laboratory confirmed when 3 or more laboratory confirmed measles IgM -positive cases Occur in a health facility or district in a month.

**Epidemiologically linked case**: A suspected measles case that has not had a specimen taken for serologic confirmation and is linked (in place, person and time) to a laboratory confirmed case; i.e., living in the same or in an adjacent district with a laboratory confirmed case where there is a likelihood of transmission; onset of rash of the two cases being within 30 days of each other.

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

**A case** was any person who resided in Fitche Prison with fever and maculopapular (nonvascular) generalized rash and developed any of the following symptoms; cough, coryza or conjunctivitis (red eyes) February 2nd to March 3rd /2019.

**A control** was any person who resided in the same community with cases in Fitche Prison who did not have history of signs and symptoms of measles between February 2nd to March 3rd/2019.

**Inclusion criteria**

**Cases:** Any residents of Fitche Prison who had symptoms of measles and agreed to participate from February 2nd to March 1st/2019.

**Controls:** Any residents of Fitche Prison during the study who was a neighbor (in Dormitory) to a case and who did not develop signs and symptoms of measles and agreed to participate was included.

**Exclusion criteria**

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

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

**1.1.3.1. Study design**

A descriptive study design was conducted to describe cases by time, person and places followed by a 1: 2 case control study to identify the possible risk factors associated with the measles outbreak in Fitch Prison.

**1.1.3 .2.Size and Sampling technique**

We enrolled all measles cases (40) compiled from the registries of the health facilities in the affected area. We included cases to control ratio of 1: 2 for the case control study. We included all cases that fulfil the case definition for measles and 80 eligible for controls those could not fulfil the case definition. All controls were selected by simple random sampling method.

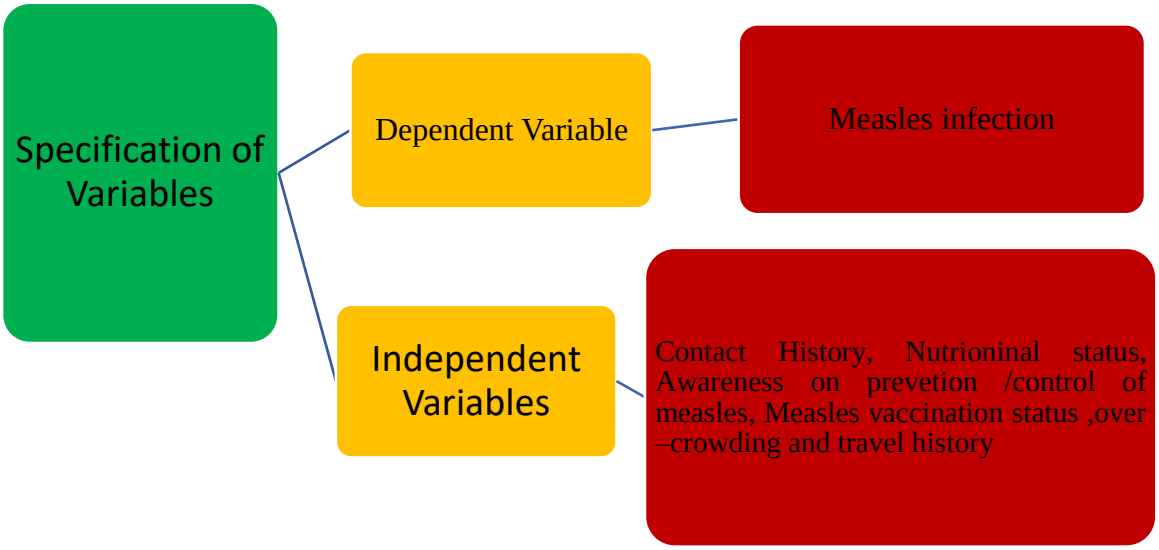
**1.1.3. 3.Data collection tools and Methods**

We reviewed medical record of cases at prison clinic. A face-to-face interview was conducted using structured questionnaire with adult cases and controls and caretakers in case they are children. Local language was used during the interview. We also reviewed the laboratory findings of the first five cases. Moreover, line-lists of cases were collected from Zonal health office to describe the outbreak by place, person and time

**1.1.3.4. Data Analysis**

All collected data were entered and analyzed using statistical software (using epi info-7 and Excel). During the analyses, odds ratio (OR) with 95% confidence interval (CI) was used to assess the association of risk factors.

**1.1.3.5. Variable specification**



**1.1.3.5. Ethical consideration**

Before outbreak investigation, a formal letter was written by Regional Health Bureau to the affected Zonal Health Office and Fiche prison to get permission and facilitate the investigation process. Before data collection, the purpose of investigation clearly informed and an informed consent was taken from case, mothers or caregivers, any information related with personal identification was not used on the report.

**1.1.4 .Results**

**1.1.4.1. Descriptive epidemiology**

The first index case was 18years of age who was neither vaccinated nor previously Measles infected. Before he had been in prison, there was an outbreak in Dara district for the last two weeks before his onset of rash. The Epi-Curve was a single -Peak with sharp rise and gradually fall that indicate propagated types of outbreak

**1.1.4.1. Description of measles cases by time**

The length of the epidemic of measles was one month and four days with irregular intervention during the period. In prison, where there have been occur.

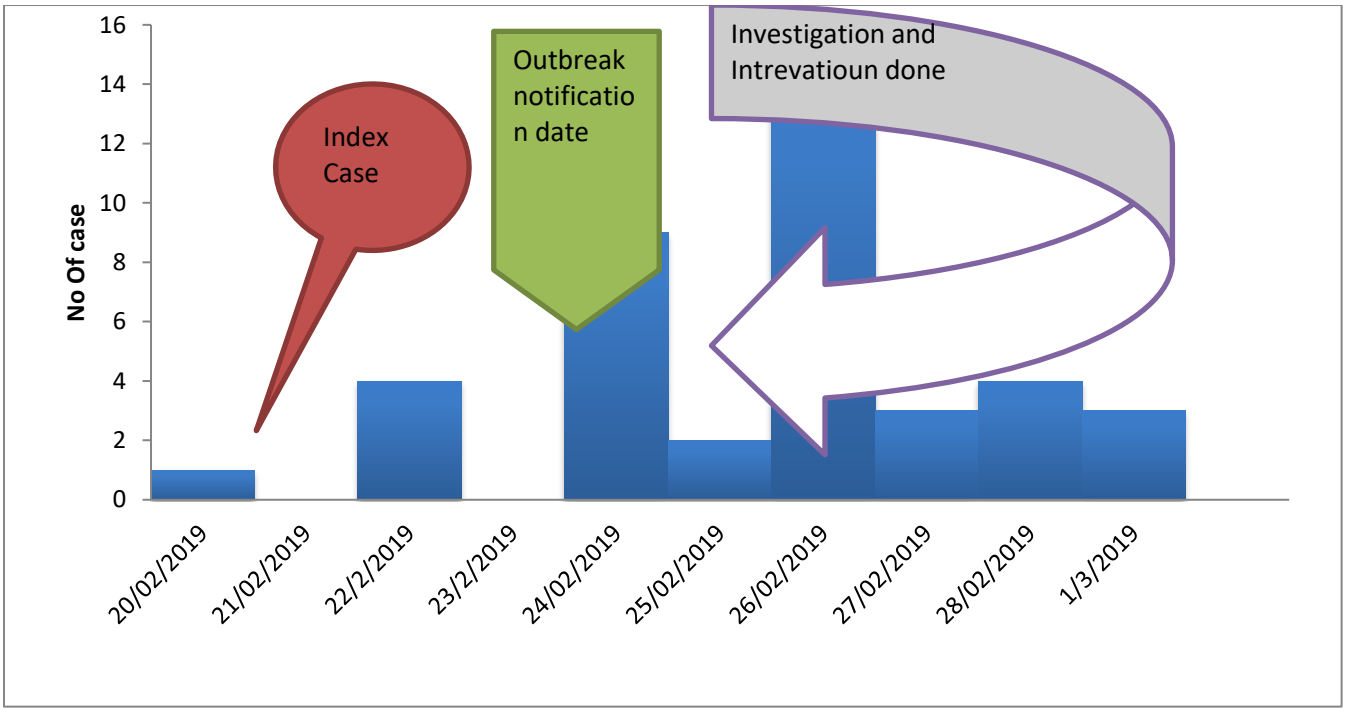



Figure 2-The date onset of Measles outbreak in Fiche prison Fiche Town, North Showa Oromia, Ethiopia 2019'

### 1.1.4.2. Descriptions of measles outbreak cases by person

There were 40 measles suspected case with no death reported. All case was reported from the Fiche prison clinic and team investigator were done properly the five-sample accumulated Send to EPHI and three of them had been confirmed. The weekly aggregated information and the line lists of prison Measles cases confirmed a case About the Epidemic. In discussions with the Zonal PHEM, and Town PHEM a group used to be deployed for an investigation and manage of the Outbreak**.**

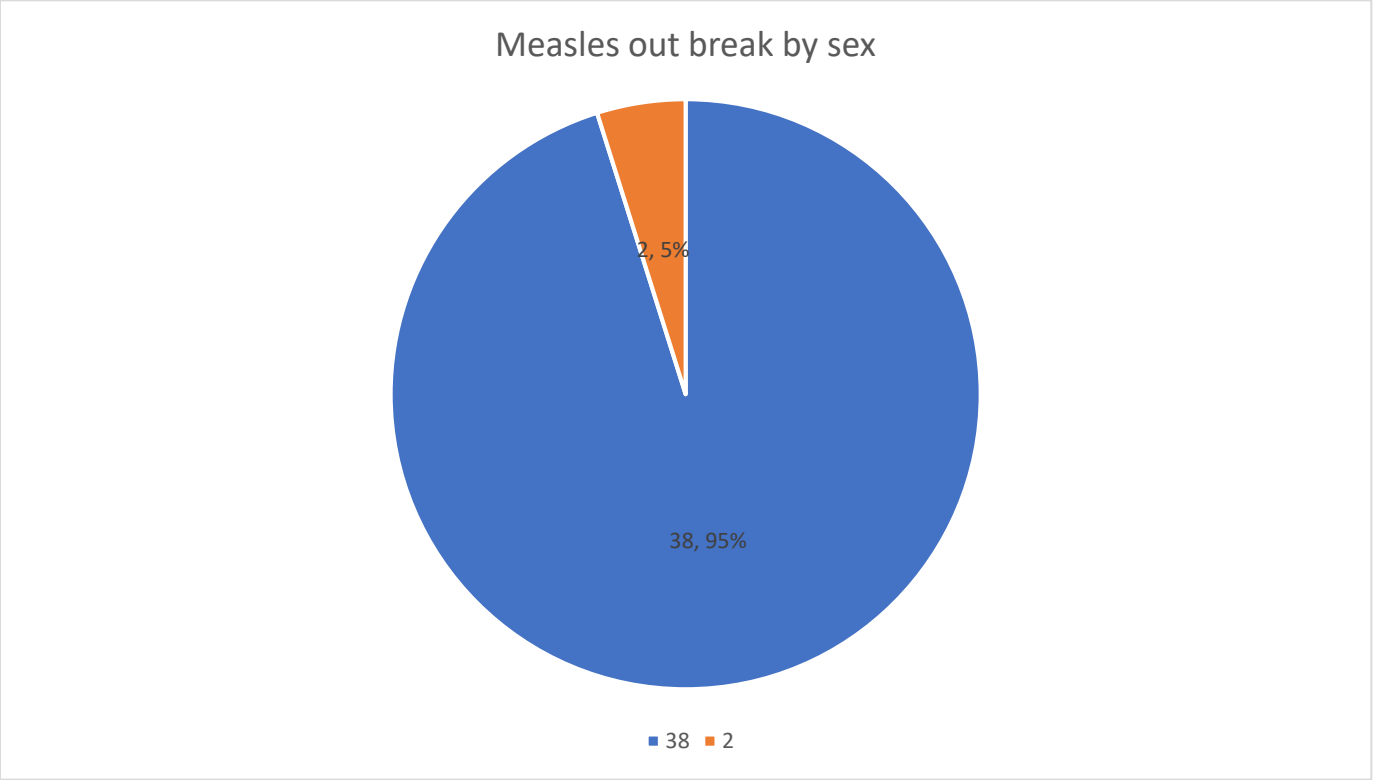



Figure 3-the proportion of male to female measles outbreak in Fiche prison, Fiche Town, North Showa, Oromia Region 2019.

From the complete measles case, ASAR was higher in age group of 0-4 in the prison that tiers from 2571/100,000 to 33,333/100,000 population (Table 1).

Table 1- -Measles Attack Rate per 1000 and Case Fatality Ratio by age and sex Fitche Prison, North Showa Zone, Oromia Region, Ethiopia, 2019

| **Variable** | **Population** | **Number of cases** | **Number of Deaths** | **Attack Rate per 1000** | **Case fatality Ratio ( %)** |
|---|---|---|---|---|---|
| **Age- group** | | | | | |
| 0-4 | 6 | 2 | 0 | 333 | 0 |
| 5-14 | 10 | 0 | 0 | 0 | 0 |
| >15 | 1478 | 38 | 0 | 25.7 | 0 |
| Sex | | | | | |
| Male | 1455 | 38 | 0 | 26.1 | 0 |
| Female | 42 | 2 | 0 | 4.76 | 0 |
| Total | **1497** | **40** | **0** | **26.7** | **0** |

Of the total measles cases included in case control study 2(5%) one doses of Measles Vaccine and 38(95%) have Unknown Vaccination status.

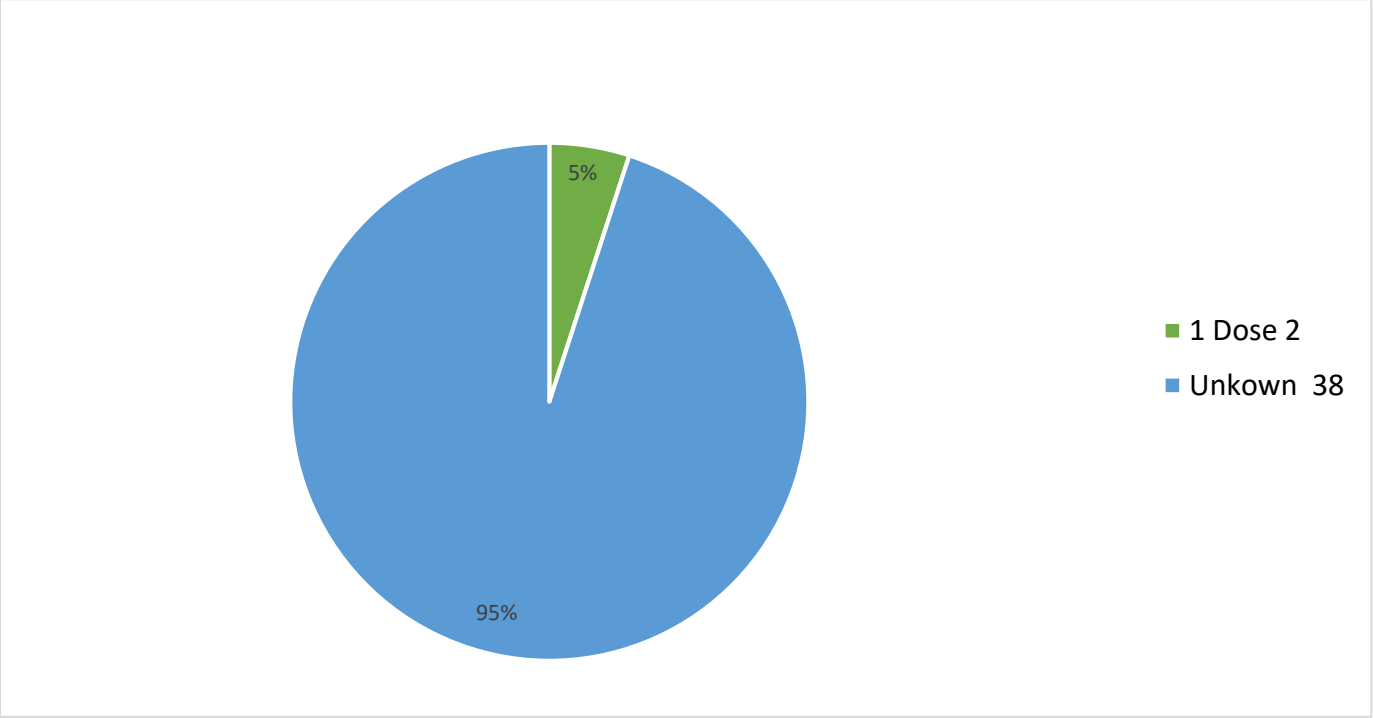



Figure 4- Vaccination status of measles cases in Fitche prison, Oromia, 2019

**1.1.4.3. Descriptions of measles outbreak cases by place (Room)**

This case start in male prisoners room nine then transmit in to different rooms also in female inmates and affected under 5 inmates children.

**1.1.4.4 Analytic epidemiology**

In infected cases, a total of 40 cases and 80 control factors for measles outbreaks. Median age of the cases was 25 years and median age of controls was 30 years. The overall attack rate (AR) 2.67 % and zero case fatality rate. Most measles cases were male with sex specific attack rate of 2.7% and most cases were larger than 15years age group. Almost all measles were reported with rash and fever, 98% had conjunctivitis, 75% had cough, 30% had cough.75 percent with diarrhea of case have lower respiratory tract infection). In the table below identifies the socio-demographic profiles of people in the sample and risk factors for the epidemic of measles.

Table 2-Demographic characteristics in both the case and control of measles at Fiche prison, North Showa District, region of Oromia in Ethiopia, 20/2/2019-1/3/2019

| No | variables | category | Case | Control |
|---|---|---|---|---|
| **1** | Sex | Male | 38(95%) | 75(93.75%) |
| | | Female | 2(5%) | 5(6.25%) |
| **2** | Current marital status | Single | 19(47.5%) | 21(26.25% |
| | | Married | 18(45%) | 53(66.25%) |
| | | Divorced | 1(2.5%) | 3(3.75%) |
| | | Windowed | 0(0%) | 3(3.75%) |
| | | No applicable | 2(5%) | 0(0%) |
| **3** | Occupation | Farmer | 16(40%) | 33(82.5%) |
| | | House Wife's | 0(0%) | 4(5%) |
| | | Student | 16(40%) | 24(30%) |
| | | UnEmploys | 0(0%) | 1(1.25%) |
| | | Daily Laborer | 0(0%) | 4(5%) |
| | | Merchants | 1(2.5%) | 4(5%) |
| | | Government | 2(5%) | 5(6.25%) |
| | | NA | 2(5%) | 1(1.25%) |
| | | Others | 3(7.5%) | 4(5%) |

| | | | | |
|---|---|---|---|---|
| **4** | Ethnic Group | Oromo | 23(75.5%) | 32(40%) |
| | | Gurage | 2(5%) | 12(15%) |
| | | Amara | 14(35%) | 32(40%) |
| | | Tigray | 1(2.5%) | 3(3.75%) |
| | | Other | 0(0%) | 1(1.25%) |
| **5** | Educational Status | Illiterate | 12(30%) | 22(27.5%) |
| | | Read and Write | 9(22.5%) | 19(23.75%) |
| | | Elementary | 10(40%) | 28(35%) |
| | | Secondary | 7(17.5%) | 8(10%) |
| | | Above Secondary | 1(2.5%) | |
| | | Not Applicable | 1(2.5%) | 1(1.25%) |
| **6** | Religion | Muslim | 10(40%) | 26(32.5%) |
| | | Protestant | 6(15%) | 13(16.25%) |
| | | Orthodox | 21(52.5%) | 40(50%) |
| | | Catholic | 3(7.5%) | 1(1.25%) |

Table 3--Bivariate Analisis of measles Outbreak in Fitche prison, Fitche Town, North Showa Zone, Oromia Region, 20/2/2019-1/3/2019

| **S/N** | **Variables** | **Category** | **Case** | **Control** | **Bivariate** | |
|---|---|---|---|---|---|---|
| | | | | | COR (95%CI) | P.VALUE |
| **1** | Age | yes | 2(5%) | 17(21%) | 0.195(0.043-0.891) | 0.021 |
| | | No[1] | 38(95%) | 63(79%) | | |
| **2** | Sex | Yes | 38(95%) | 75(93.7%) | 1.256(0.234-8.345) | 0.782 |
| | | No[1] | 2(5%) | 5(6.25%) | | |
| **3** | Awareness of Measles Transmission | Yes | 19(47.5%) | 59(73.75%) | 0.322 (0.145-0.714) | 0.005 |
| | | No[1] | 21(52.5%) | 21(26.25%) | | |
| **4** | Contact with Case | Yes | 27(67.5%) | 22(27.5%) | 5.476(2.402_12479) | <0.001 |
| | | No[1] | 13(32.5%) | 58(72.5%) | | |
| **5** | Ventilation Condition | Yes | 25(62.5%) | 68(85%) | 0.294(0.121_0.714) | 0.007 |
| | | No[1] | 15(37.5%) | 12(15%) | | |
| **6** | Being Vaccinated | Yes | 9(22.5%) | 47(58.75%) | 0.204(0.086_0.484) | <0.001 |
| | | No[1] | 31(77.5%) | 33(41.25%) | | |
| **7** | Over Crowded | Yes | 29(72.5%) | 30(47.5%) | 4.394(1.919_10.063) | <0.001 |

| | | |
|---|---|---|
| No[1] | 11(27.5%) | 50(52.5%) |

**Overcrowded Slept in One Room person HH /5m5**

By multivariate analysis, being vaccinated was a protective factor for developing the disease and statistically significant with and Adjusted odd ratio AOR 0.323[95% CI = (0.123_0.898) P= 0.022]. In addition to this, contact with case and Over Crowded Living, prior to two risk factors for developing the diseases and statistically significant with AOR2.709[95%CI(1.067_6.880) P=0.036]and AOR 3.416[95%CI(1.358_8.591) P=0.009] respectively.

Table 4- Multivariate regression of cases and controls for the individual measles outbreak element. From 20/2/2019-1/3/2019, Fitche Prison, Oromia Region

| Vriables | Case (40) | Control (80) | COR (95%CI) | AOR (95%CI) | P-Value |
|---|---|---|---|---|---|
| **Awareness of Measles** | | | | | |
| **Yes** | 19(47.5%) | 59(73.75%) | 0.322(0.145-0.714) | 0.546(0.218 -1.365) | 0.195 |
| **No[1]** | 21(52.5%) | 21(26.25%) | | | |
| **Ventilation Condition** | | | | | |
| **Yes** | 25(62.5%) | 68(85%) | 0.294(0.121_0.714) | 0.446(0.162-1.230) | 0.119 |
| **No[1]** | 15(37.5%) | 12(15%) | | | |
| **Being Vaccinated** | | | | | |
| **Yes** | 9(22.5%) | 47(58.75%) | 0.204(0.086_0.484) | 0.323(0.123-0.898) | 0.022** |
| **No[1]** | 31(77.5%) | 33(41.25%) | | | |
| **Over Crowded** | | | | | |
| **Yes** | 29(72.5%) | 30(47.5%) | 4.394(1.919_10.063) | 2.709(1.067-6.880) | 0.036** |
| **No[1]** | 11(27.5%) | 50(52.5%) | | | |
| **Contact With Case** | | | | | |
| **Yes** | 27(67.5%) | 22(27.5%) | 5.476(2.402_12479) | 3.416(1.358_8.591) | 0.009** |
| **No[1]** | 13(32.5%) | 58(72.5%) | | | |

**Note: Overcrowd: Slept in One Room person HH /5m5. 1Reference **P-value <0.05**

### 1.1.5 Interventions Taken

We recognized and characterized the measles outbreak. Technical help was given for health workers on case management, recording and reporting situation. Cases were handled to prevent further spread and decrease morbidity and mortality attributed to measles the usage of medicinal drugs (Anti biotic, ORS, TTC, Vitamin A) both at Prison and health facility level. Routine surveillance was improved and the situation was carefully followed at each stage on a daily basis. We gave health education different Topic

like, Measles, Food coping with and hygiene, Environmental, Housing situation and Vaccination for the prisoners and body of workers in areas where the Prisoners are in the main assembled like, church, schools, working place, nearby conferences as properly as at Dormitory level while searching for active cases to prevent the transmission of the disease, encourage health looking for behavior and treatment if there is sign and symptoms of measles.

The region has started carefully working with the affected prison and the city administration to prevent/control the outbreak from spreading to different areas, and alarming Neighboring the community, health extension worker and community leader to strength the local surveillance system. In addition, active surveillance has been carried out in neighboring kebeles of the Town. Vaccination give for inmate's children and for under 15 age the prison community, the measles vaccination coverage was reviewed and bordering villages with low vaccination coverage were vaccinated.

**1.1.5. Discussion**

According to Study performed in specific Nation in the world Measles outbreak was highly contagious viral disease in even in developed countries like USA and Other European Country(2). According to the countrywide measles guideline, three or more laboratory confirmed case were needed to declare an outbreak of measles. Among the whole case AR 26.7/1000(40) And 60%IgM positive clinically measles suspected case the first five case consisting of index case confirmed three case out of Five sample check in Fitche prison from 20/12019-3/1/2019. When to evaluate of measles in Fitche prison was higher to the country wide measles policy that targeted as one measles per1000person (6).

Measles Outbreak had quite accelerated in the world due to the fact of measles vaccination status According to WHO and UNICEF reported in 2019, 86%Childern are acquired the first dose of measles and 69%the 2nd dose of measles(10). Also, in this learn about the only 5% of case had received the first dose of measles vaccine and the different 95% had unknown vaccine status. The age Specific attach rate 333/1000 under five compared to the study done in other part of Oromia region (7).

In case of Prison Context each London and Yorkshire prisons the source of contamination originated from a member of team of workers in Fitche prison the source of the case was different from the study that means the source of the case was from the Prisoners. And there was distinct chance like the contact of case, overcrowded living and unventilated situation also contribute to the occurrence of measles outbreak in Fitches prison (8).

As multivariate analysis this study indicates being vaccinated was shielding elements for developing disease comparable to find out about accomplished in South Africa. In addition to this, overcrowded residing unventilated condition and contact with case, prior to three risk factors for developing diseases

and statically significant for developing disorder with Adjusted. This Study had comparable to the study achieved in Addis Ababa Kechame Medhanioalem Orphanage center (9).

This all factors may make contributions to measles epidemic happened in Fiche Prison. As a reaction to an epidemic, cases were handled similarly to forestall spread; and morbidity and mortality due to decreased measles (11). Continuous intensive control of febrile-rash diseases surveillance used to be enhanced and persisted in the Prisoners with the aid of health worker and the situation was carefully followed at each level on an everyday basis. And on a regular basis, the condition was closely followed at each stage. And at each stage, the condition was closely followed on a regular basis. Health care Training was once delivered on the style of prison for the prison contributors of the affected and adjacent room.Transmission, care, ways of avoidance, to decorate their health looking for behavior and Vaccination.

### 1.1.7. Limitation

The omission or/and incompleteness of information (data). And some prisoners were not happy to have any details.

### 1.1.6. Conclusions

A confirmed measles outbreak in fiche Prison contact with infected Person, the major risk factors being accumulation of susceptible unimmunized children. Female more affected than male and age specific attack rate for less than five years' age and the highest .Being Vaccinated had protected and overcrowded living and contact with case were risk of outbreak.

### 1.1.8. Recommendation

Give attention on prisoner's community vaccination. Active case search, Awareness creation for prison people, the government targeted on prison and health standard living condition and give attention for regular health situation in prison according to the standard of prison and health policy.

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## 1.2. INVESTIGATION OF THE MALARIA EPIDEMIC IN SHEBE SONBO DISTRICT, JIMMA ZONES, OROMIA, ETHIOPIA, OCTOBER, 2020.

**Abstract**

Introduction:-Malaria is endemic throughout the tropical areas of the world with the highest prevalence found in sub-Saharan Africa, India, and Southeast Asia. In Ethiopia, malaria is highly seasonal in many communities with epidemic-prone transmission pattern. We investigate malaria outbreak to describe the magnitude of morbidity, mortality and contributing factors and to apply appropriate intervention measures in the district.

Method:-We conducted 1:1 case control study, cases were defined depending on PHEM guide line definition from a line list and one neighbourhood controls per case in Shebe Sonbo district from 11/30/2020-12/12/2020. We identified cases by reviewing health facility records and, a pretested semi-structured questionnaire adapted from WHO Malaria guidelines. We used to collect data from cases and controls. We use SPSS to calculate (COR) and (AOR) to identify risk factors.

Result: - Among the total of 226 Confirmed cases were 138(61%) male. The attack rate was 1.41 per 1000 population and malaria death was not recorded. Age greater than15 years were most affected with an attack rate of 28.4%. Using of IRS were protective with AOR of 0.306(0.115-0.813). Presence of stagnant and intermittent water were identified risk with an AOR of 5.863(2.227-15.612), 5.571(2.507-12.383) respectively.

**Conclusion**: - low performance of IRS and presence of stagnant water were attributed for the outbreak. We recommended proper Indoor residual spray (IRS) and environmental management through optimized community participation.

### 1.2.1. Introduction

In the tropical areas of the world, malaria is endemic, with the highest outbreak in Sub-Saharan Africa. In 2020, about 229 million malaria cases were registered worldwide in Africa, India, and Southeast Asia. The WHO African Region accounted for 215 million or 94 percent of malaria cases in 2019, led by 5 percent of malaria cases in 2019 in the WHO South-East Asia Region, Globally, with an unprecedented 409,000 malaria fatalities. The WHO African Region accounted for 95 percent of all deaths from malaria in 2019(1) (2).

It is acknowledged that malaria kills children 67 % death due to malaria affects over 87 coastal and tropical states. Sub-tropical areas of the country it is now a significant public health problem in Ethiopia, which has repeatedly been one of the three leading causes of morbidity and mortality (3). *Plasmodium* and *P. vivax* of *Falciparum* Of relative frequencies of about 60 percent and relative frequencies of around 40percent, Ethiopia's two main malaria-causing parasite species are 60 percent and 40%, respectively.. This proportion varies from place to place and season to season. In cases of malaria infection, P. falciparum is the individual, the dominant parasite species, and this species causes extreme and complex manifestations and almost all malaria death. (4)

Falciparum has a remarkable biodiversity, including the potential to quickly establish resistance to many antimalarial medications, posing a significant obstacle in supplying successful malaria to patients with this infection. Chemo-therapy Malaria accounts for over three quarters of the Ethiopian landmass, and 68% of the population is at risk of malaria, depending mainly on altitude and season In Ethiopia, there are about 565 malaria-threatening districts with an estimated at-risk population of 54.9 million people under the new stratification (5) Household altitudes below 2,000 meters are the best available proxy for local malaria transmission risk in Ethiopia. Since malaria (unless there are weather abnormalities and widespread epidemics) is rarely transmitted at higher elevations.). Many districts have variable topographical features, with some households within communities located above and below 2,000 meters. Due in part to household locations at various altitudes and distances from efficient malaria vector breeding sites, malaria risk is unevenly distributed within many districts and Kebeles. This signifies acritical Public health concern in severely resource-limited country. A wide spread extreme malaria epidemics have existed in much of Ethiopia's highlands and lowlands. Epidemics of malaria may due to fluctuations or shifts in infection rate and population immunity, they occur (6).

Generally, epidemics arise in areas where malaria transmission is poor and insecure, and where people low to no immunity thresholds generally, epidemics occur in places where there is low and unstable malaria transmission, and where People have low or no immunity. However, if degradation occurs,

epidemics in high transmitting areas may occur. The health sector, the destruction of anti-malaria initiatives or the movement of non-immune people, for example, the migration of the people to these areas in search of jobs. Other activating aspects include: Unusual local weather Phenomena and behaviors that result in environmental changes that expand the population of vectors; Population risk from hunger and malnutrition; destruction of anti-malarial steps that have been introduced held malaria in check, The incidence It is considered that malaria infection peaks at an early age with a rise up to the age of 5 years in areas with high endemicity, accompanied by a sharp reduction in age groups of 10-15 Years and a steady decrease with growing age. The age-related status of anti-malaria immunity is the product of this prevalence pattern. Immunity produced under proven malaria endemicity due to persistent malaria infections (7).

Oromia is one of the regions that is vulnerable to the country's malaria outbreak. Of the 337 districts, 75 were recognized as malaria disease hot spot areas. More than 23 million people in the country live in areas at risk of malaria infection. Transmission of malaria in Ethiopia is seasonal, lasting for around three months So Oromia region is one of the epidemic types of malaria in the Region from September to December and peaks in October and November (8).

Recently, Because of environmental and climatological factors such as chloroquine-resistant falciparum malaria, high population movements, and the expansion of malaria regions' agro-industrial innovations and irrigation systems, the incidence of malaria epidemics has become more frequent in Oromia Regional State(9)

In the Jimma Zone, malaria is the most prevalent disease, with epidemics occurring regularly in the past as well as the present. The transmission is seasonal and generally peaks during the rainy summer season. From September to December. While not well known, malaria epidemics of varying degrees affected 44 percent of the district in Jima Zone in the Shebe Sonbo district, the climate situation for most locations. The average decline in rain was higher in most areas. The level is 2000m Shebe Sonbo distract and represents the Jima Zone's most epidemic-prone malaria area. With 117,889 (100 percent) populations at risk for malaria, all 100 percent kebeles (24kebeles) of Shebe Sonbo district are malaria. EFY in 2012, roughly 4270 reported patients were tested for malaria by RDT or microscopy. In this, 226 (31.4 percent) cases in the district were positive and treated for malaria. In Shebe Sonbo district, there has been a normal pattern of malaria cases over the last 5 years. The Shebe Sonbo district, the Jima Zones and the Oromia Region registered an unprecedented rise in malaria cases in October 2020. After this, teams were sent to this district and the outbreak was investigated.

### 1.2.2. Objective

#### 1.2.2.1. General objective

- To investigate the magnitude of morbidity and mortality and the variables associated with the malaria epidemic in Jima Zone, Shebe Sonbo district, Oromia, Dec 2020.

#### 1.2.2.2. Specifics objective

- ✓ To verify the occurrence of a malaria outbreak in the district of Shebe Sonbo
- ✓ To describing malaria cases by people, place , and time
- ✓ To classify the species of malaria causing the district epidemic
- ✓ To determine risk factors that associated with malaria epidemic in district

### 1.1.2.3 Methods

#### 1.2.3.1 Study area and study period

In Shebe Sonbo district of the Jimma Zone in Oromia Regional State, we conducted the report. It has an average area of 355.43km2 between 717-744 latitude, 3627-3652 longitude and 3100 and 1200 lowest high altitude Shebe Sonbo district's expected population for 2020. There were 159,988 out of the total population, of which 80946 were female and 79042 were male, 26286 out of five children and 5551 were pregnant women. Shebe Sonbo district has 20 rural and 2 urban kebeles. The Shebe town is the largest town in Shebe Sonbo district 52 km away from the Zonal town (Jimma) and 352 km west of Addis Ababa. Ababa. Border shares of Shebe Sabaka district with Seka Woredas in the North, Mena Woredas to the east, and SNNP to the south and Kersa Woredas to the south. The bulk of the district population was ethnic Oromo (66 percent), Amharic (31 percent), Tigray (3 percent) and Muslim (56.8 percent), Orthodox (27.8%) and protestant (13.6%) was the predominant religion in Shebe Sonbo and about 86.5% of populations was engaged in agricultural activities. There are five health centers with the coverage of 71%, 19 health posts with coverage of 59% and no hospital in the district. Almost all the populations of districts are living in malarias areas. The study was conducted between 11/30/2020-12/12/2020.

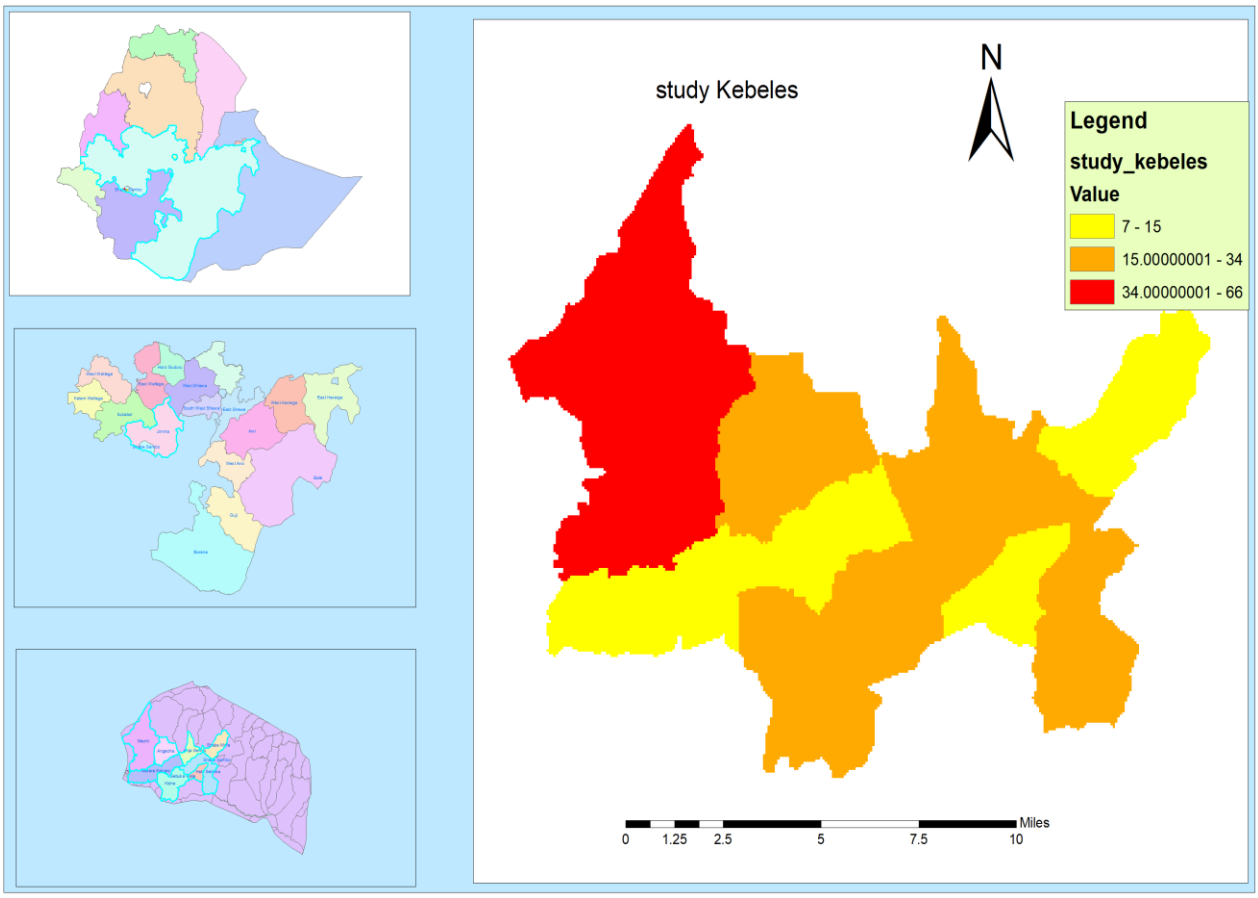


Figure 5--Shebe Sonbo District Map in Jimma Zone, Region of Oromia, 2020

### 1.2.3.2 .Design study for study

#### 1.2.3.2.1 Descriptive epidemiological results

We reviewed malaria data from the previous five years' health data from Shebe district. However, owing to the incompleteness of the findings from the last five years, last year's weekly data for the report of malaria cases is also used to set the outbreak threshold by doubling weekly data and comparing it with comparable data of this year's week. Throughout this outbreak assessment, the number of cases of malaria and deaths were obtained from Health care on a regular or weekly basis. We describe by age, sex, kebele/health have identified the severity of this outbreak by place, week, month and yea

#### 1.2.3.2.2 Case Control Study

We conducted 1:1 unmatched case control study, by using simple random sampling from line list 64 cases identified and 64 controls were selected from neighbourhood to assess the risk factor and interviewed in nine kebele. Cases were selected confirmed cases treated in the different health Facility and controls, were selected from the different kebele and did exhibit clinical features of malaria during

the study period. A have -day training was provided for data collectors, using a structured questionnaire customized from a previous study.

We reviewed medical record of cases at different health centers, conducted using formal face-to-face interviews cases or control including caregiver's questionnaire. The questioner was translated and the interview was conducted by local language. We reviewed the line list of cases registered in the health centers and medical record of cases. Infection with Malaria was considered an outcome variable, independent variables was socio demographic variables (age, sex), stagnant water ,Unprotected Irrigation , overcrowding, travel history to areas affected by Malaria ,Intermittent River Close to the community, Bed net Utilization , Indoor Residual spray , awareness on Malaria mode of transmission, prevention and control measures and nutritional status. All collected data were there, using predictive tools, entered and analyzed (using epi info-7. Odds Ratio (OR) with 95% confidence interval (CI) was used to test associations of risk factors from 11/30/2020-12/12/2020.

#### 1.2.3.2.3 Sample size and sampling method

Sample size was calculated by Epi Info version 7.2 using 0.25 OR, 89.2% control exposure, 95%CI two sided, 1;1 ratio control to case and 80% power (11) and 64 cases and 64 controls were recruited. Community based cases were selected for recently (not more than two weeks before interview) confirmed malaria case patients. Controls were defined as having no malaria signs and symptoms for the last three months. During this investigation a standard checklist was used to assess risk factors.

#### 1.2.3.2.4 Laboratory method

Laboratory technicians had conducted thick and thin smears with a 100× oil immersion microscopy at four Health centers of Shebe Sonbo district. Additionally, RDT (Rapid Diagnostic Test) were also used in this health centers whenever they faced shortage of some reagents and during interruption electric power. Health extension workers also used RDT to identify confirmed malaria cases at health post and Community level during outbreak investigation.

#### 1.2.3.2.5 Environmental assessment

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

**1.2.3.3 Data collection**

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

**1.2.3. Data processing and analysis**

We entered the data in to Epi-info and then imported to Microsoft Excel 2016 and analyzed for identifying association of some risk factors. Microsoft Excel and Epi Info version 7.2.4 was used to describe the disease and analyses associated risk factors. The significance of risk factors for the outbreak was determined through multivariate analysis by calculating Odds Ratio (OR) and 95% Confidence Interval (CI).

**1.2.3 Data quality control**

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

**1.2.4. Dissemination of data**

We prepared written report of soft copies and shared to Addis Ababa University/School of Public Health, Oromia Regional Health Bureau, and Jimma Zone health department, Shebe Sonbo District Health Office, Mentors, Resident Advisors and Coordinator.

**1.2.5. Ethical consideration**

A formal letter was written from Oromia regional health bureau to the Jimma zone health office to investigate the outbreak, the zonal health office accepted that and a support letter was also written from the zonal health office to the respective district health office write support letter to the health facility and assign one person to the team. The purpose of the investigation was briefed to the study Participants, health professionals. Verbal consent was taken from each study participant prior to data collection and data entry was performed anonyms.

**1.2.6. Definitions of Cases**

**1.2.6.1 Definition of the Community case**

Anyone with fatigue, back pain, chills, weakness, sweating, body pain, nausea and fever OR fever By vomiting.

**1.2.6.2. Description of standard case**

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

**Confirmed:** Any suspected case that confirmed by microscopy or RDT for plasm (8)

**Cases:**-were confirmed malaria infected individuals confirmed by microscopy or RDT testes at the selected health centers from October 1 to November 10, 2019.

**Controls:**-were individuals presenting at the same health centers free from malaria infection as diagnosed by microscopy or RDT tests.

**Inclusion criteria:**-We included permanent residents of the district who visited the health centers and screened for malaria infection using microscopy and RDT tests.

**Exclusion criteria:** - Participants unable to provide the required information due to different conditions, like extreme illness and absence of caregivers were excluded.

#### 1.2.3.7 Operational definition

**Knowledge of malaria -** knowledge about, cause and transmission of malaria, sign and symptoms, treatment and prevention methods**.**

**ITNs utilization -** Bed net hanged on sleeping place and regularly use of it**.**

**Presence of stagnant water-** Unmovable water stored in residence areas of households

**Intermittent water –**water source or river near to the community within 1kilmeter radius.

### 1.2.4 Results

#### 1.2.4.1 Description of malaria cases by person

Totally, 226 Confirmed Malaria cases in Shebe Sonbo District were line listed and 138(61%) male. The crude attack rate 1.41/1000 population. All 226-malaria case tested by RDT and Microscopic, from the case 127(56%) *Plasmodium Falciparum*, 97(43%) *Plasmodium Vivax* and3 (1%) *mixed.* All case was cured and no case fatality in this District.

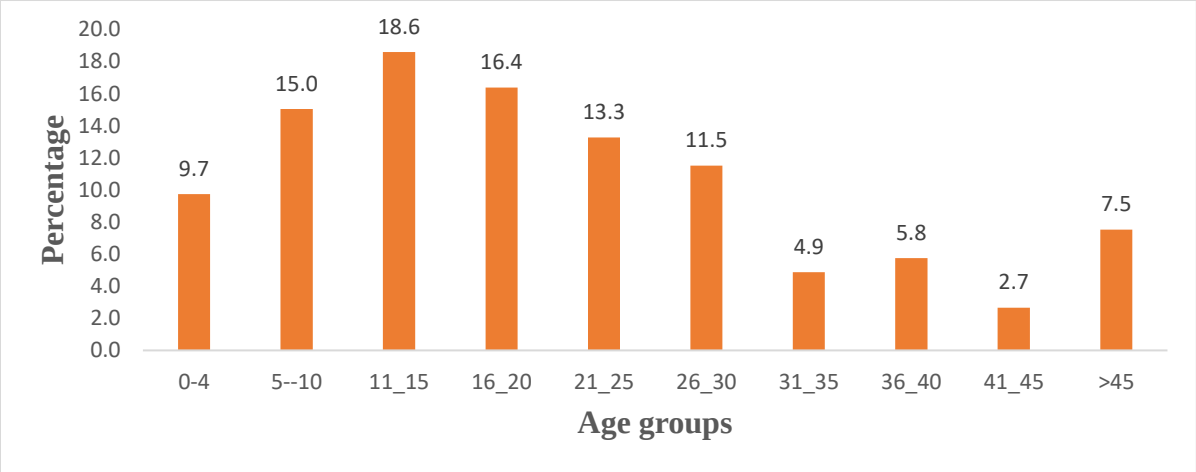


Figure 6-Malaria case by age group in Shebe Sonbo District, Jima Zone, Oromia Region, Ethiopia, 2020

**1.2.4.2. Description, by place, of malaria cases**

Malaria epidemic was detected & reported to Jima Zone health department on October 12th, of 2020. Among the total cases, 226 (100%) were from Shebe Sonbo District .Zero malaria related deaths were also reported by the community from Shebe Sonbo Woredas.

Among the 226-line listed cases, the malaria attack rate by kebele with in the three leading kebeles were Mechi 66(10/1000), Angacha 34(4/1000) and Kishes 34(4/1000) (Fig.7).

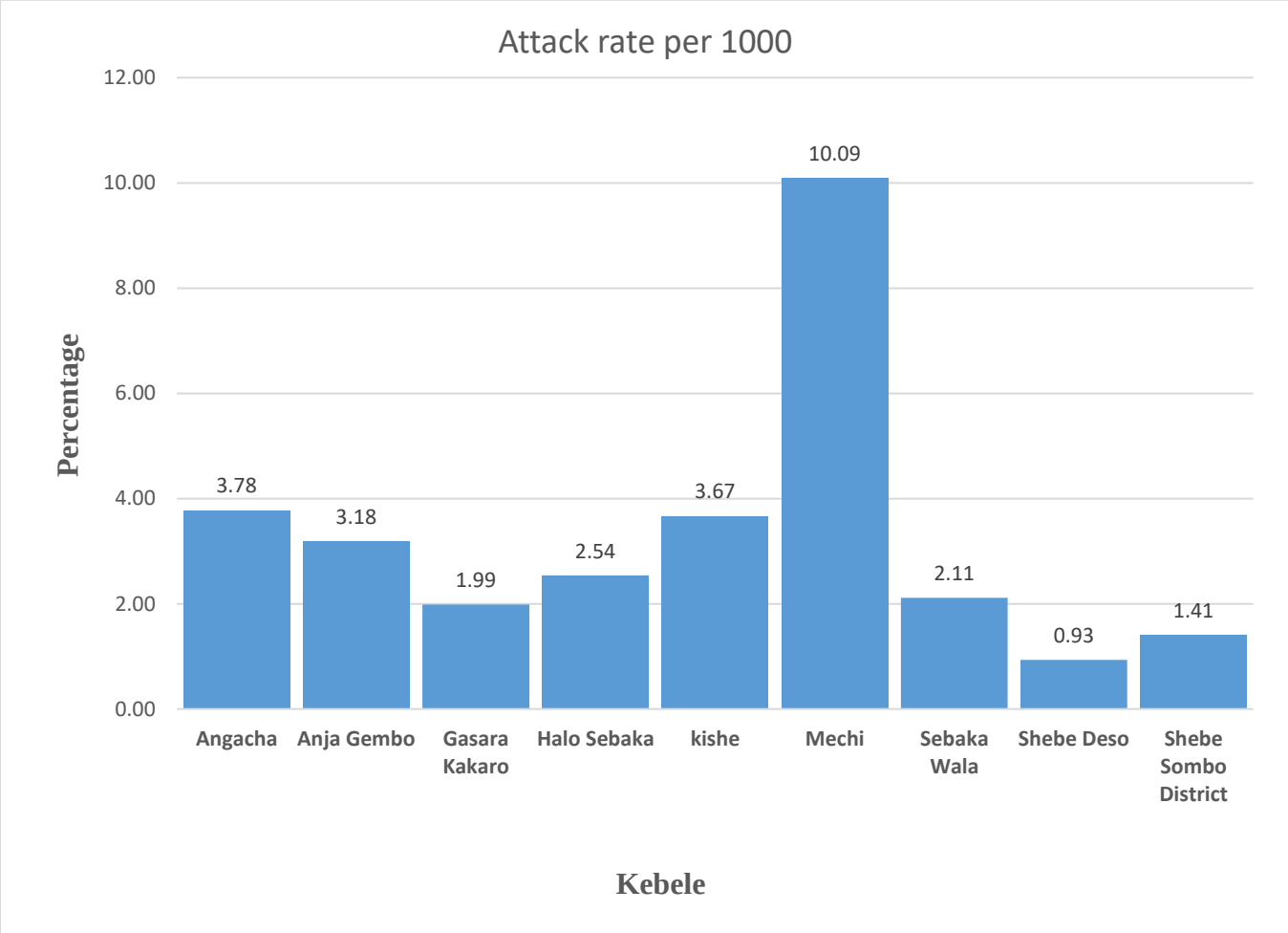


Figure 7-Malaria case by kebele in Shebe Sonbo District, Jima Zone, Oromia Region, Ethiopia, 2020

226 malaria cases by species from the line defined, plasmodium Falciparum 127case (56%), Plasmodium Vivax 96(42%) and 3 case (1%) were Mixed (Fig, 8)

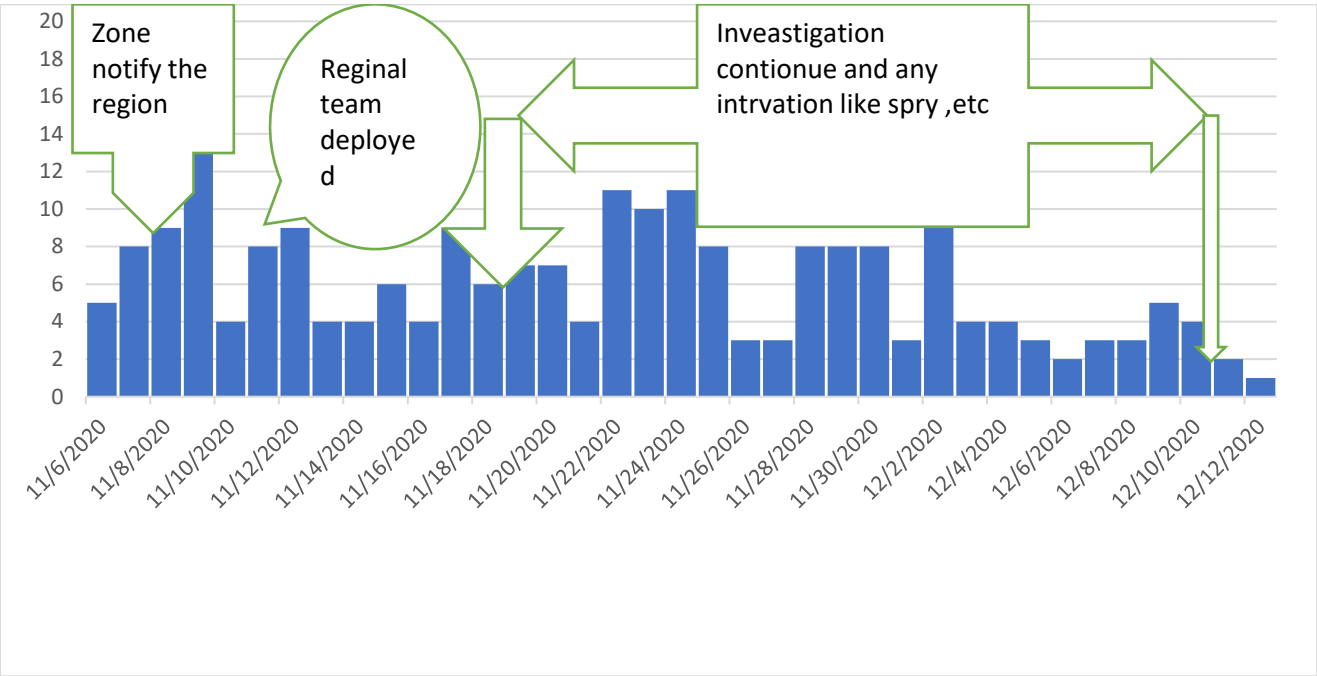


Figure 8--Epi Curve of Malaria showing date of onset in Shebe Sonbo District, Jima Zone, Region of Oromia,11/6/2020-12/12/2020 Ethiopia

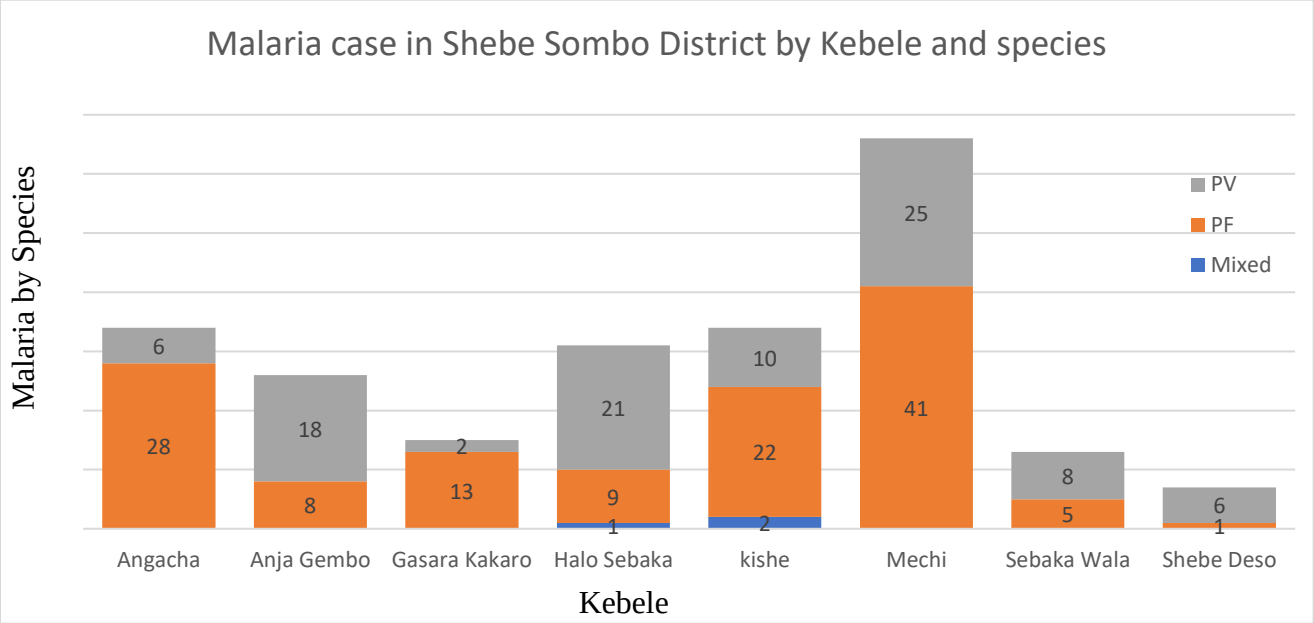


Figure 9--Distribution of malaria cases by Kebele and plasmodium species in Shebe Sonbo district, at Jimma zone, Oromia region, Ethiopia, in 2020.

Most of the overall positive cases of malaria were reported by Mechi Kebele (29.2 percent), followed by By Shebe Sonbo District Angacha kebele (15.04%). Plasmodium falciparum accounts more for causing this epidemic, with the levels of positivity for all kebeles.

**1.2.4.3. Description of malaria cases by time**

During the outbreak period highly peaking between weeks39 upto47and decline in week 51 week (**Fig** 9)

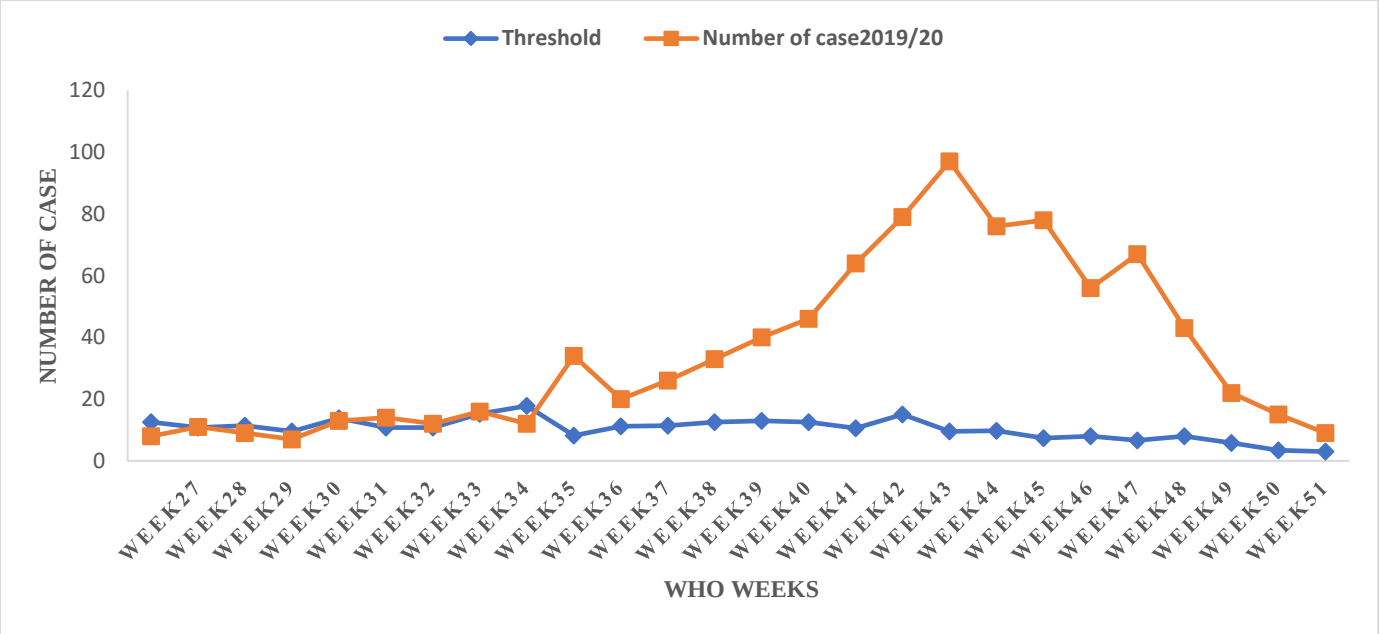


Figure 10-Trends of Malaria case crossing thresholds in Shebe Sonbo district, Jimma Zone, 2020

As we see from the above Epi curve, zonal health department departed to the outbreak area lately, a week after the outbreak started, and interventions was started on October/2020. Regional health bureau and field epidemiology residents were also departed for investigation lately two weeks after the onset of the outbreak. This was due to late notification of outbreak by health facility to the next levels.

**1.2.4.4. The Laboratory**

From October 2$^{nd}$ to Nov12$^{th}$, 2020, a total of 226 blood smear tests were done by microscopy and RDT for suspected malaria cases in four health center, including his catchment health posts, of Shebe Sonbo district. Of the total tested cases, all case (100%) were positive for malaria and treated by malaria case. Among the positive cases, 127 (56%) were *P. falciparum*, 97 (43 %) *P. Vivax* and 3 (1%) were mixed malaria.

### 1.2.4.5. Epidemiology of analysis

Table 5--Sociodemographic status of the cases and controls the study participants, in Shebe Sonbo District, Jima Zone Oromia region, Ethiopia 2020.

| SN | Variables | Category | Cases | | Controls | | Total | |
|---|---|---|---|---|---|---|---|---|
| | | | Count | % | Count | % | Count | % |
| **1** | Age group | <15years | 26 | 40.63% | 7 | 11% | 33 | 26% |
| | | >=15Years | 38 | 59.38% | 57 | 89% | 95 | 74% |
| **2** | Sex | Male | 47 | 73.44% | 36 | 56% | 83 | 65% |
| | | Female | 17 | 26.56% | 28 | 44% | 45 | 35% |
| **3** | Marital Status | Single | 8 | 12.50% | 7 | 11% | 15 | 12% |
| | | Married | 28 | 43.75% | 54 | 84% | 82 | 64% |
| | | Widowed | 1 | 1.56% | 3 | 5% | 4 | 3% |
| | | NA | 27 | 42.19% | 0 | 0% | 27 | 21% |
| **4** | Religion | Orthodox | 21 | 32.81% | 18 | 28% | 39 | 30% |
| | | Protestant | 1 | 1.56% | 3 | 5% | 4 | 3% |
| | | Muslim | 42 | 65.63% | 43 | 67% | 85 | 66% |
| **5** | Ethnicity | Oromo | 42 | 65.63% | 44 | 69% | 86 | 67% |
| | | Amhara | 20 | 31.25% | 15 | 23% | 35 | 27% |
| | | Tigre | 2 | 3.13% | 3 | 5% | 5 | 4% |
| | | Others | 0 | 0.00% | 2 | 3% | 2 | 2% |
| **6** | Educational status | Illiterate | 18 | 28.13% | 31 | 48% | 49 | 38% |
| | | Primary | 39 | 60.94% | 24 | 38% | 63 | 49% |
| | | Secondary | 3 | 4.69% | 7 | 11% | 10 | 8% |
| | | Tertiary | 0 | 0.00% | 2 | 3% | 2 | 2% |
| | | NA | 4 | 6.25% | 0 | 0% | 4 | 3% |
| **7** | Occupational status | Employed | 0 | 0.00% | 2 | 3% | 2 | 2% |
| | | Unemployed | 0 | 0.00% | 1 | 2% | 1 | 1% |
| | | Student | 30 | 46.88% | 6 | 9% | 36 | 28% |
| | | Farmer | 25 | 39.06% | 44 | 69% | 69 | 54% |
| | | Other | 9 | 14.06% | 11 | 17% | 20 | 16% |
| **8** | Family members | <5 | 7 | 10.94% | 10 | 16% | 17 | 13% |
| | | >5 | 57 | 89.06% | 54 | 84% | 111 | 87% |

### 1.2.4.6. Risk factors analysis

The median age of cases and controls was 19years and 30 years respectively. The Study Include 128 Confirmed case 83(64.9%) and45 (35.2%) female. Most of the participant were Greater than Fifty years. Concerning the other socio demographic characteristics shows as below in the greater than 15 years of

age more affected by malaria.

Table 6-Bivariate analysis of independent variable of Malaria outbreak in Shebe Sonbo District, Jimma Zone 2020.

| | Variable | Category | Study subjects | | COR | P-Value |
|---|---|---|---|---|---|---|
| | | | Case | Control | | |
| 1 | Sex | Male | 47(73.44%) | 36(56.25%) | 2.15(1.023-4.519) | 0.041 |
| | | Female | 17(26.56%) | 28(43.75%) | | |
| 2 | Age group | <15 | 26(40.63%) | 7(10.94%) | 5.571(2.198-14.121) | 0.0001 |
| | | >15 | 38(59.38%) | 57(89.06%) | | |
| 3 | Utilization of ITNs | Yes | 32(50%) | 44(76.56%) | 0.455(0.221-0.935) | 0.030 |
| | | No | 32(50%) | 20(31.25%) | | |
| 4 | IRS last years | Yes | 35(54.69%) | 50(78.13%) | 0.338(0.156-0.730) | 0.006 |
| | | No | 29(45.13%) | 14(29.88%) | | |
| 5. | Knowledge of malaria | Yes | 24(34.37%) | 46(62.5%) | 0.235(0.112-0494 | <0.001 |
| | | No | 40(65.63%) | 18(37.5%) | | |
| 6 | Presence of unprotected irrigation | Yes | 54(84.38%) | 36(56.25%) | 4.200(1.820-9.692) | 0.001 |
| | | No | 10(15.63%) | 28(43.75%) | | |
| 7 | Presence intermittent river closer to community | Yes | 52(79.69%) | 28(45.31%) | 5.571(2.507-12.383) | <0.0001 |
| | | No | 12(20.31%) | 36(54.69%) | | |
| 8 | Presence of stagnant water | Yes | 44(68.75%) | 16(25%) | 6.6(3.042-14.315) | <0.0001 |
| | | No | 20(31.25%) | 48(75%) | | |

Table 7--Multivariate analysis of independent variable of Malaria outbreak in Shebe Sonbo District, Jimma Zone 2020.

| **SN** | **Variable** | **Category** | **Study subjects** Case | Control | **AOR** | **P-Value** |
|---|---|---|---|---|---|---|
| **1** | Indoor Residual Spray | yes | 35(54.69%) | 50(78.13%) | 0.306(0.115-0.813) | 0.018 |
| | | No[1] | 29(45.13%) | 14(29.88%) | | |
| **2** | Knowledge of malaria SS | Yes | 24(34.37%) | 46(62.5%) | 0.330(0.134-0.811) | 0.016 |
| | | No[1] | 40(65.63%) | 18(37.5%) | | |
| **3** | Presence intermittent river closer to community | Yes | 52(79.69%) | 28(45.31%) | 7.122(2.082-24.362) | 0.002 |
| | | No[1] | 12(20.31%) | 36(54.69%) | | |
| **4** | | Yes | 44(68.75%) | 16(25%) | 5.863(2.227-15.612) | <0.001 |

| | | | |
|---|---|---|---|
| Presence of stagnant water | | | |
| | No[1] | 20(31.25%) | 48(75%) |

1=Reference

**Multivariate analysis**

By Multivariate analysis, factors that were significantly associated with increased risk of malaria presence of intermittent rivers AOR7.122(2.082-24.362) and stagnant water bodies AOR5.863(2.227-15.612) whereas knowledge on transmission, prevention and control of malaria AOR 0.330(0.134-0.811)and IRS (Indoor Residual spray)0.306(0.115-0.813) were protective factors.

**1.2.7. Public health interventions**

All febrile patients tested to malaria and treated. Abet Chemical spray in the stagnant water body Continues health education given to the community. ITNS distribution were performed. A number of volunteered people were participated on this activity. Communities were mobilized and taught on prevention and control measures of malaria disease. Health professionals were mobilized and assigned to affected kebeles for active case search and early case management at the community and health facility level.

**1.2.5. Discussion**

As we seen the ep –curve the health department response was very late because of different reason one due to Malaria trend not done well in the woredas and health facility. In this study in socio - demographic factor like sex, marital status and Religion is not significantly association on malaria outbreak, Indoor residual spry and awareness on the malaria transmission were protective association on the malaria outbreaks Intermittent river near to the community and stagnant water has significantly risk association in the outbreak this is similar study done Northern Part of Ethiopia (13)

Some factors might be attributed for the occurrence of this outbreak. Multiple risk factors were assessed during the investigation beside intervention activities. Usually, poor personal practice towards malaria prevention, temperature, rainfall and population movement are contributed for the existence of malaria outbreak in this study , Male were more affected by malaria than female and greater than 15years of age were more affected by malaria this result is supported by that study done in Simuda district , this may be due to the fact that age groups are usually engaged in outdoor activity and this finding may be due to the behavior of the work depending to agriculture , exposure to Anopheles mosquito and lack of knowledge on transmission of malaria .one of the significant risk factors of malaria infection in the area ,Stagnant water bodies ,which are risk factor for malaria are one of the places where Malaria vectors breed consequentially ,people near stagnant water bodies are at higher risk for malaria (12)(13) .

Awareness about malaria is an important aspect to prevent disease exposure and its related negative health consequences. A study in Ethiopia revealed that general knowledge about malaria helped the community to prevent and control the disease thereby, it has a significant contribution in the reduction of burden of malaria. Similarly, in the current study, having awareness on means of transmission and prevention and control measures of malaria was a protecting the disease. And controlled the outbreak in the current study area, Similar study finding was also reported from other part of Ethiopia [8),7)].

Anti-malarial spraying, and appropriate use of personal preventative measures such as use of repellent and protective cloth will reduce incidence of malaria. A previous risk factor analysis in Borena zone, Oromia region showed that both spraying and household ownership of a mosquito net were associated with lower risk of febrile illness in children. Findings of our study also exhibited that using of bed net every night is associated with malaria infection(6).

Stagnant water in excavated holes was found to be a major mosquito breeding site in this district. Following this, it was believed that there were mosquito larvae in this stagnant water as observed by investigation team including regional and zonal malaria expertise with naked eye. However, it was challenging to identify species of larvae and measure their quantity technically. Similar analytic approach in Sri Lanka and India indicated that people living nearer to vector breeding Sites were at higher risk for malaria than those living farther away(14). Research conducted in Ghana also showed that plenty of water bodies have been associated with increased larval or mosquito abundance and thus increased risk for malaria transmission in human populations(15).In addition to weak vector control activities, absence of indoor residual spray and ITN distribution during last year was contributed for the outbreak.

**1.2.6. Conclusions**

Outbreak in malaria was com firmed in Shebe Sonbo district age greater than 15 years and male were more affected by Malaria outbreak. Proximity to the stagnant water bodies and Intermittent River near to the community were determine of the malaria infection. However the study identify the control of the malaria vector breeding site like stagnant water and Intermittent River near to the Community. Getting insufficient understanding of the ways of Furthermore, transmission has risk factors for the incidence of the outbreak. Might showed that there was weak monitoring of malaria trends at all levels. Unable to detect the outbreak timely and delayed response such as environmental management, long lasting duration of the outbreak. Presence of stagnant water has been a major mosquito breeding site which was associated with the outbreak.

### 1.2.8. Recommendation

Timely intervention strategies is mandatory and should focus on diagnoses and the treatment of malaria case .Regular health education given to the community, Environmental hygiene, and control malaria breeding site. Trends of malaria cases should be monitored in weekly basis at all levels. For early detection of malaria outbreak, usually, malaria prevention and control will be effective by establishing community ownership, so that, similarly the district administration and different sectors should be participated in malaria control activities.

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# CHAPTER–II SURVEILLANCE DATA ANALYSIS

## 2.1 DATA ANALYSIS OF MEASLES SURVEILLANCE, BALE ZONE, OROMIA REGION, ETHIOPIA, 20014 TO 2019

### 2.1.1 Abstract

Measles is an acute and highly contagious viral disease caused by Paramy xovirus of the genus morbilli virus. This highly contagious virus is transmitted primarily by respiratory droplets or airborne spray to mucus membranes in the upper respiratory tract or the conjunctiva remain a disease of public health important and has been targeted for elimination in many areas of the world. We analyzed six years measles data to identify to identify Pattern by place, person and time and trends in Bale Zone, Oromia region.

**Methods:** Surveillance data analysis of the past six years for Measles was conducted in Bale Zone of Oromia region from January 2014to March1/2019. We conduct Retrospective types study. We analyzed the data using Epi-Info 7.2.4 and Microsoft office Excel 2016.We defined suspected measles as any person with generalized fever and maculopapular rash or coryza or conjunctivitis .we checked completeness of data by excluding case and deaths with incomplete information.

**Result:** We identified a total of 3375 measles cases among them, 844(25%) were male and 2531(75%) Were there. Male to844:2531 female ratio) of almost 1:3 was the proportion of males and females among the cases recorded for the 2014-2019 period. And average annual number of 563 cases (range) and 11deaths (CFR 0.33 percent) 42 to 2625) from among the case. The vaccination status of the child 2446(73%) was unvaccinated 689(20%) 1dose and 330(6’8%) was unknown status.

**Conclusion** Measles was one of the public health problem in Bale zone, Female under one specially zero to eight month were more affected , so the concerned body step by step was done on prevent Children from measles infection, give attention on rootCouse of problem and awareness creation on the community.

**Key word, Measles case, Measles Death, Vaccination, Bale**

### 2.1.1 Introduction

Measles is an acute and extremely infectious viral disease of the genus Morbilli virus, caused by Paramy virus. The highly infectious virus is primarily spread to the mucus membranes through respiratory droplets or airborne mist. Measles remains a significant cause of death among young children globally, despite the accessibility of a safe and effective vaccine. Measles remains an important cause of death among young children globally, despite the availability of a safe and effective vaccine. Between 2000 and 2008, the number of worldwide measles cases reported to the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) declined by 67% (from 852,937 to 278,358). During the same eight year period global measles mortality in all ages was reduced by 78%, from an estimated 733,000 deaths in 2000 to an estimated 164,000 deaths in 2008(1). The largest percent reduction during this time period was in the Eastern Mediterranean where measles mortality decreased by 93%; followed by the Africa Region (92 %reduction), Western Pacific Region92% reduction) and the South East Asian Region (46%) reduction(2). Measles mortality in Ethiopia is also believed to have decreased by 78% since initiation of the catch- up measles campaigns using modeling techniques (3)**.**

Measles is a public health issue that is reemerging. In Europe, outbreaks have been underway in 36 of the 53 member countries of the World Health Organization (WHO), with about 30,000 cases registered in 2011.The number of cases in Africa grew from 36,000 in 2009 to 172,824 in 2010, and outbreaks were reported in 2010.Recorded in countries with active programs for measles control Maintaining measles prevention has become a growing problem, even in countries where vaccinations are readily accessible and public health infrastructure is well-established (4).

Accelerated vaccine activities have had a positive effect on minimizing mortality from measles. Since 2000, more than one billion children worldwide have been vaccinated against the disease in high-risk countries by mass vaccine programs, around 225 million of them in 2011(5), (6). About 4.3 million fatalities were stopped from 2000 to 2008 as a consequence of increased practices worldwide (both increases in routine coverage and implementation of measles campaigns). Per year, measles affects more than 20 million people (7) (8). In countries with low per-capital levels and inadequate health systems worldwide, the crippling majority (more than 95%) of measles deaths occur (9). However, it is estimated that only a limited percentage of the disease burden is identified, owing to factors such as health-care coverage, a lack of successful monitoring, and sociocultural attitudes about measles, among others. . According to coverage-based forecasts (10), the real pressure over this time frame was between 1 million and 1.4 million cases each year. Despite substantial expansion of health services and higher quality

vaccine coverage, unexplained measles outbreak outbreaks are recorded annually in the Oromia Region of Ethiopia.

An review of surveillance data was therefore carried out to identify the epidemiology of measles within the region, define the burden of the disease and establish recommendations for enhancing the efforts to control measles (11) As a result, the study's aim was to determine the country's measles trend, classify measles epidemiologically, and recognize areas with a high number of cases in order to perform more studies and direct interventions.

### 1.2.1. Statement of the Problem

Measles is an extremely infectious, debilitating, virus-induced illness. The disease despite the availability of a safe and reliable vaccine, it remains one of the leading causes of death for young children worldwide (4).Approximately 145,700 in 2013, individuals mainly children under the age of five, died from measles. Measles is caused by a paramyxovirus virus that is transmitted by physical contact and the environment. The virus infects mucous membranes and eventually spreads across the body (4).Measles is a human condition that is not believed to exist in animals., elimination is possible and all regions of the World Health Organization (WHO) except the South-East Asia Region have set an elimination goal to be achieved by 2020 or sooner(4,9) During 2009-2010, Ethiopia was one of the countries in the world that experienced large Outbreaks with 4,235 reported cases (2). One of the four important strategies to eliminate measles Predict outbreaks by considering high-risk geographic areas and age groups; and Case-based measles monitoring is used to evaluate vaccine plans (12). In order to strengthen measles control. Per case is reported using an individual case-report form in this framework. Besides, epidemiology regarding measles and case based data analyses is not available in the Region; Therefore, it is essential to carry out this study to describe the epidemiology of measles and provide information for policy maker‘s for appropriate intervention to be taken.

### 2.1.2. Rationale

A key objective for describing measles epidemiology within the zone is to routinely analyze surveillance data, Characterize the burden of illness, develop guidance to enhance efforts to control measles, monitor disease trends evaluating the effectiveness of programs and policies to control diseases. Significances from data analysis can be important Trigger action for public health.

### 2.1.4. Objective

#### 2.1.4.1. The General objective

**To** analyze weekly reportable measles surveillance secondary data found at Zonal level, describe findings by time, place and person, and generate hypothesis on the factors contributing in measles incidence in the study areas for possible future study.

#### 2.1.4.2. Specific Objectives:

- To describe measles cases by Person, place and time
- To assess possible risk factors contributing for measles outbreak in affected area
- To target measles prevention and control measures to stop the outbreak

### 2.1.5. Method

#### 2.1.5.1. Definition of case

##### 2.1.5.1.1 Suspected measles case

Anyone with a generalized maculopapular rash, headache, and one of the following symptoms: Red eyes or cough or coryza (runny) nose Conjunctivitis, psoriasis

##### 2.1.5.1.2 A verified laboratory case:

A confirmed case that has laboratory findings showing outbreak (IGM positive or measles) Virus virus)

##### 2.1.5.1.1 Epidemiologically cases linked:

Suspected case in association (possibly infected) with a lab-reported case (another epidemiologically confirmed case).

**2.1.5.1.2. Death related with measles**: a death in a person with reported or suspected measles, as determined by clinical, laboratory, or epidemiological data that occurs within thirty days of the onset of the rash and is not caused by any cause, such as chronic disease or trauma.

##### 2.1.5.1.3..Study Area

Bale is an area in the Oromia region of Ethiopia. Bale is located between 5.36O-8.12oNand39O.21E-42.23oEin in the south-eastern part of Ethiopia. It is bounded on the south side of the Ganale Dora River, which separates it from the Guji River on the west side of the Arsi River on the north side of the Arsi River. Northeast of Shebelle River which separate it from West Harare East Harare, and the area of Somalia in the East. Based on a 2007 census conducted by the Ethiopia Central Statistical Agency, (CSA) has an entire area. The population is 1402492, of which 713.517 are male and 688.975 are female. The location is 43690.56 square. Kilometers, Bale has a population density of 32, 10 km. For 166, 758 or 26.20. Percent of these are urban inhabitants, 44,610 or 3.18 per cent are pastoralists. In this zone, a total of 297,081 households were counted., which results in by 90.46%, Amharic was spoken 7.11 per cent and Somalia 1.05

per cent; the remaining 1.38 per cent spoke all other primary languages. The majority of the population was Muslim, with 81.83 per cent of the population reporting that they practiced this belief, while 16.94 per cent of the population professed Ethiopian Orthodox Christianity and 1.04 were Protestant.

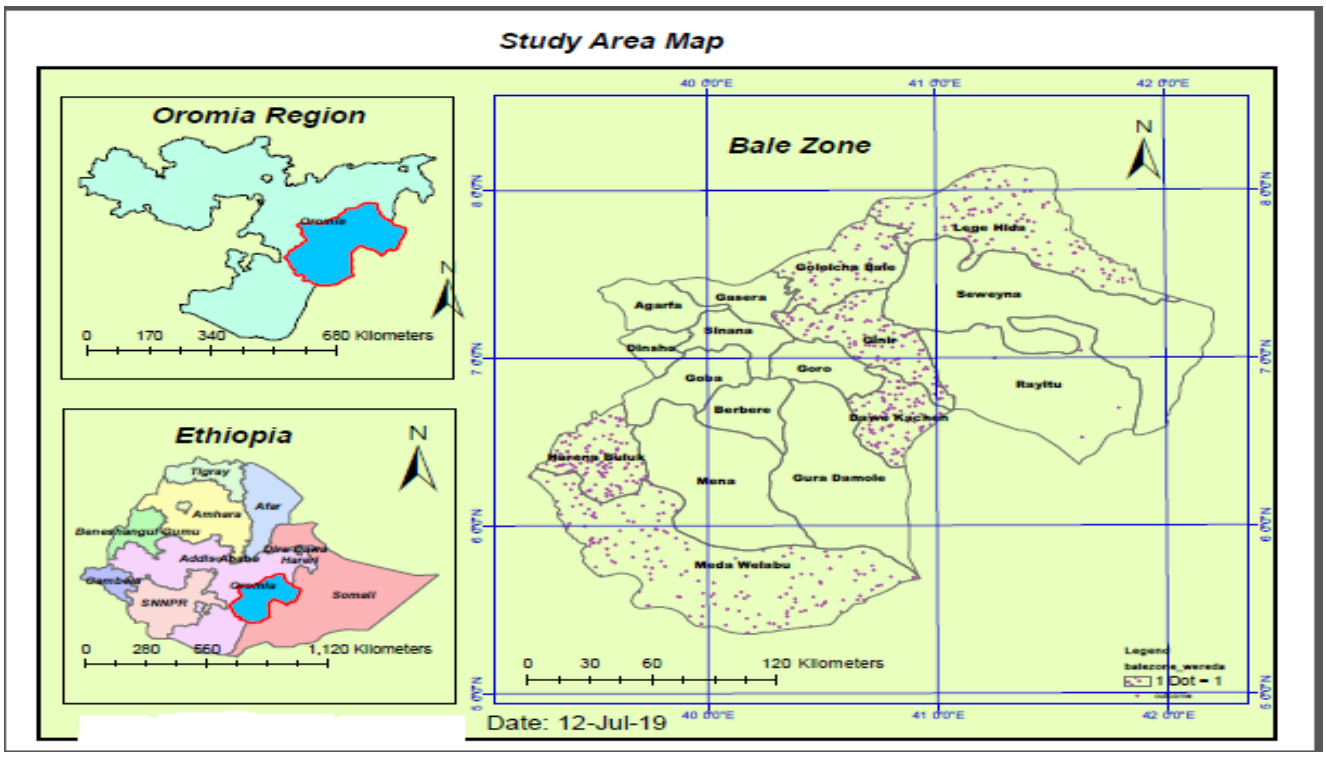


Figure 11-Map of the Bale Zone, Oromia region 2019

### 2.1.5.2. Study Period

Six years monthly reportable surveillance data of measles cases Analyzed and interpreted secondary data collected.

In the case of measles for the last six years (2014-2019G.C) from January 20, 2020 to March 30, 2020

### 2.1.5.3. Design of the study

Descriptive study design was used to analyze five years (2014-2019) of measles data. From the weekly reportable measles surveillance data of Bale Zone, Oromia region

### 2.1.5.4. Subject to study

Both suspicious cases were included in the report (all cases registered on line lists & case-based forms).

### 2.2 Data Collection Methods

Secondary measles data for the last six consecutive years (2014-2019) were reviewed and collected from the PHEM ball zone line lists by means of a structured and case-based checklist

### 2.3. Analysis of data

To better coordinate and analyzation the six-year results, EpiInfo7.2.4 and Microsoft Office Excel 2016 were used.

### 2.4. Criteria for inclusion

Suspected cases of measles and death with complete variables were included.

### 2.5 Criteria for exclusion

Suspected cases of measles and deaths with incomplete variables were exclusive.

### 2.6. Result

Between 2014 and 2019, a total of 3375 cases were recorded. Of these, 844 (25%) were male and 2531 (75 percent) were Female. For the period 2014-2019, the proportion of males and females reported cases was t. Male to female ratio 844:2531) was almost 1:3

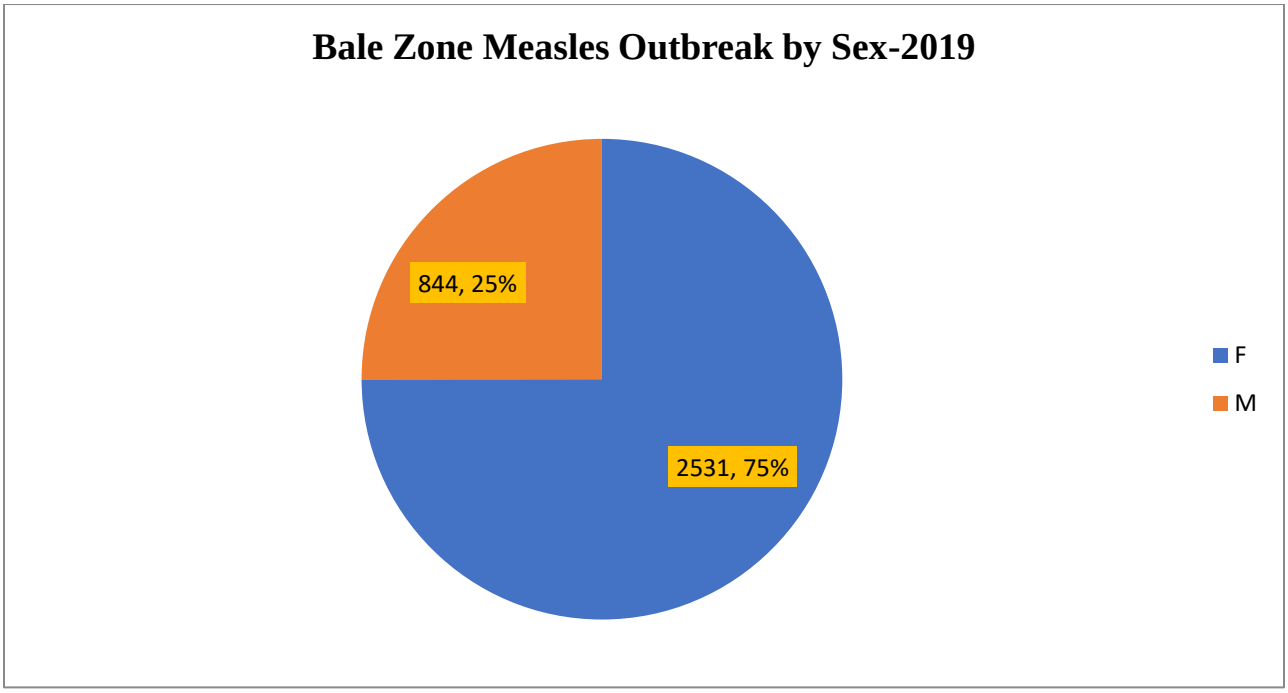


Figure 12-: Measles cases by age groups in the Bale District, Oromia Region, from 2014 to 2019

The median age of the case was 5 years (range: 1 months to 70 years). A higher proportion of cases has been reported Five to Fourteen (5-14) years of age, one to four (1-4) and over 15 years of age, with a proportion of 1342 (39.9%), 853. (25.2%and 634 (18.8%) respectively.

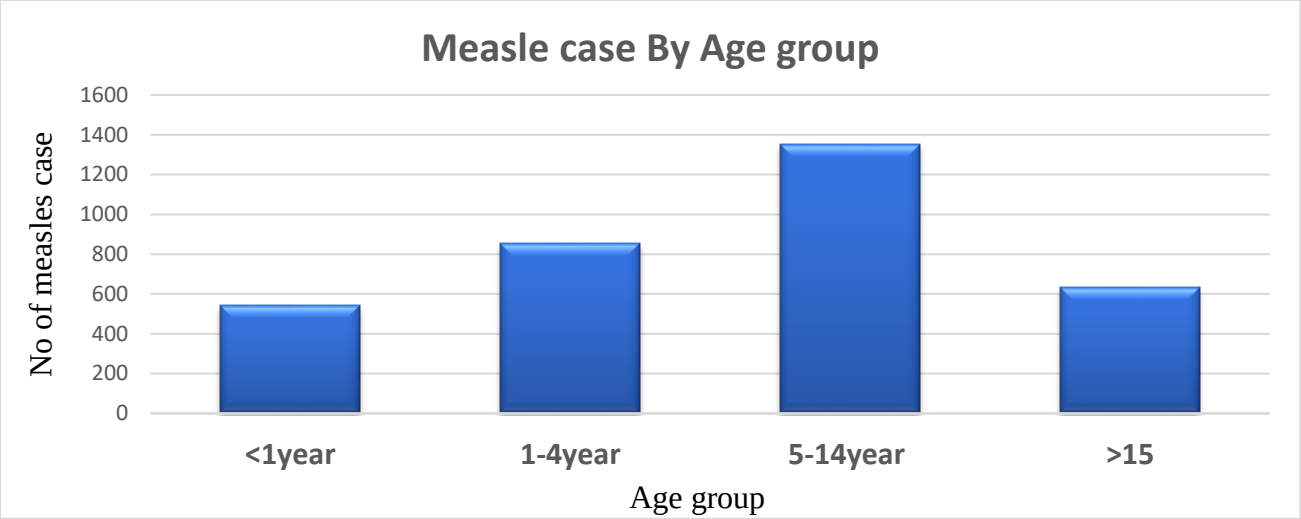


Figure 13-Distribution of the case of measles by age groups in Bale Zone, Oromia Region 2014-2019

Table 8- Case Fatality Rate and Age Specific Incidence for Measles cases from 2014-2019

| Year | Risk Population | Age group | No of case | % | IR/100,000 | Death | CFR |
|---|---|---|---|---|---|---|---|
| **2014** | 9313 | <1 | 38 | 0.41 | 408 | 0 | 0 |
| | 31105 | 1-4 | 42 | 0.14 | 135 | 0 | 0 |
| | 84184 | 5-14 | 23 | 0.03 | 27 | 0 | 0 |
| | 138978 | >15 | 50 | 0.04 | 36 | 0 | 0 |
| | 263580 | Sub total | 153 | 0.06 | 58 | 0 | 0 |
| **2015** | 14356 | <1 | 30 | 0.21 | 209 | 0 | 0 |
| | 47944 | 1-4 | 104 | 0.22 | 217 | 0 | 0 |
| | 129762 | 5-14 | 113 | 0.09 | 87 | 0 | 0 |
| | 212771 | >15 | 45 | 0.02 | 21 | 0 | 0 |
| | 426994 | Sub total | 292 | 0.07 | 68 | 0 | 0 |
| **2016** | 7769 | <1 | 51 | 0.66 | 656 | 0 | 0 |
| | 25947 | 1-4 | 102 | 0.39 | 393 | 1 | 0.98 |
| | 70221 | 5-14 | 32 | 0.05 | 46 | 2 | 6.25 |
| | 127136 | >15 | 25 | 0.02 | 20 | 0 | 0 |
| | 231073 | Sub total | 210 | 0.09 | 91 | 3 | 1.42 |
| **2017** | 7251 | <1 | 9 | 0.12 | 124 | 1 | 11.11 |
| | 24230 | 1-4 | 27 | 0.11 | 111 | 2 | 7.41 |
| | 72820 | 5-14 | 9 | 0.01 | 12 | 0 | 0 |
| | 118713 | >15 | 8 | 0.01 | 7 | 0 | 0 |
| | 215763 | Sub-total | 53 | 0.02 | 25 | 3 | 5.66 |
| **2018** | 5320 | <1 | 5 | 0.09 | 94 | 1 | 20 |
| | 17770 | 1-4 | 19 | 0.11 | 107 | 0 | 0 |
| | 48092 | 5-14 | 17 | 0.04 | 35 | 0 | 0 |
| | 87072 | >15 | 8 | 0.01 | 9 | 0 | 0 |
| | 158254 | Sub- total | 49 | 0.03 | 34 | 1 | 2.04 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **2019** | 51989 | <1 | 718 | 1.38 | 1381 | 0 | 0 |
| | 173634 | 1-4 | 1082 | 0.62 | 623 | 3 | 0.28 |
| | 469932 | 5-14 | 444 | 0.09 | 94 | 2 | 0.45 |
| | 850810 | >15 | 412 | 0.05 | 48 | 0 | 0 |
| | 1546365 | Sub- total | 2652 | 0.17 | 171 | 5 | 0.19 |
| **Average total2014-2019** | 16000 | <1 | 851 | 5.32 | 5318.9 | 3 | 0.35 |
| | 53438 | 1-4 | 1376 | 2.57 | 2574.9 | 7 | 0.51 |
| | 72697 | 5-14 | 638 | 0.88 | 877.6 | 2 | 0.31 |
| | 255913 | >15 | 548 | 0.21 | 214.1 | 0 | 0 |
| | 473672 | total | 3409 | 0.72 | 719.7 | 12 | 0.35 |

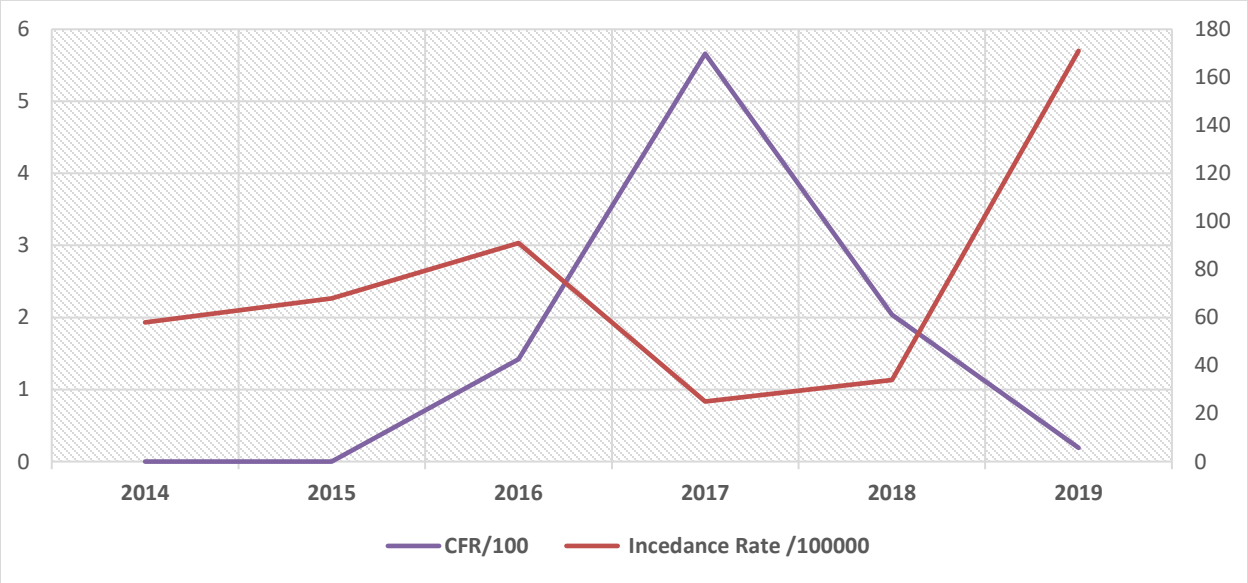


Figure 14-Incidence Rates and Measles Case Fatality Rate in Bale, Oromia Region, 2014-2019

Less than one year of age had the highest overall annual occurrence, followed by 1-4 years of age. 531.89 people per 100,000 and 257.49 people per 100,000, respectively. This suggests that one year of age children less than are at the greatest risk of developing diseases followed by 1 to 4 years.

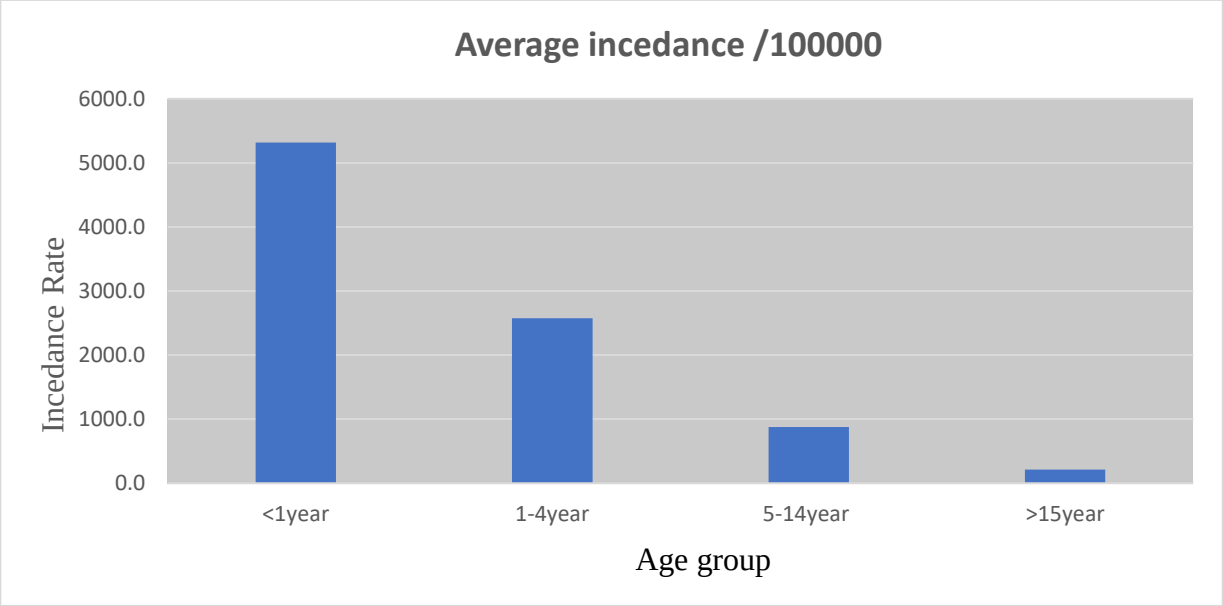


Figure 15-Age Specific Average Annual Measles Incidence Rate for Bale Zone, Oromia Region, 2014-2019.

Fourteen (14) out of the (20) District reported cases of measles among the total Woredas in the zone. Most of it Cases have been reported from three District namely 1192/100,000Ginner 627/100,000and 515/100,000 Dawe Kachen and Dawe Serer Districs The three Highst reported and Agarfa, Dinsho and Sinana 1(0.6/100000), 11(3.6/100000), and 7(25/100000) respectively have the lowest case incidence rate.

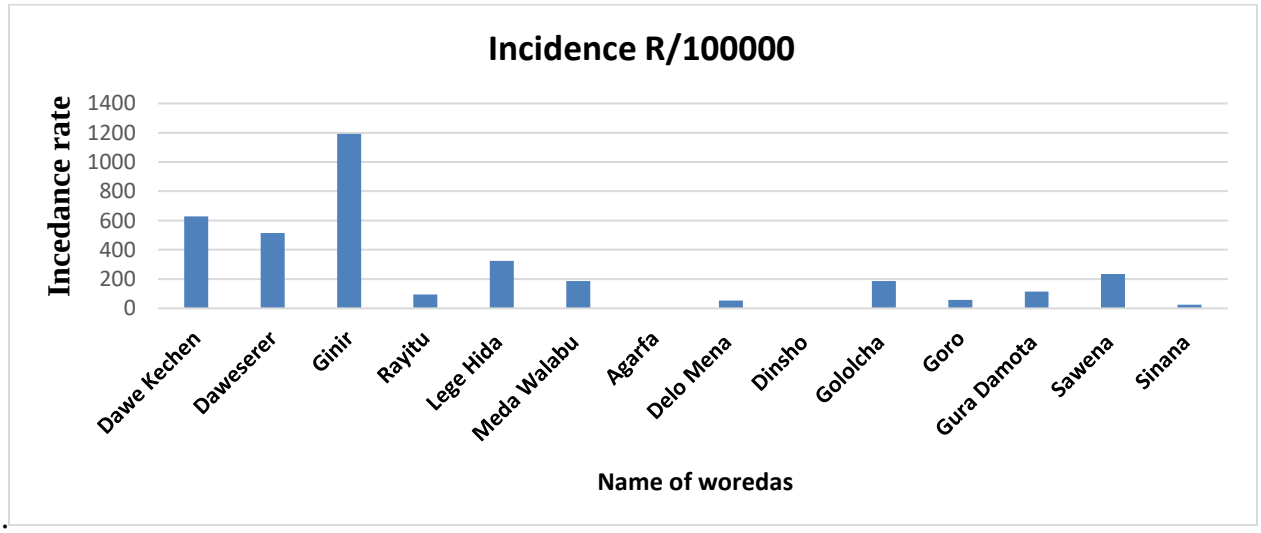


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Figure 16-Woredas Measles Cases incidence Distribution in Bale, Region of Oromia, and 2014-2019

Measles vaccine Coverage of the Bale Region in terms of. For most months, all years are over 90 per cent. (See Figures 16 and 17 for examples.)

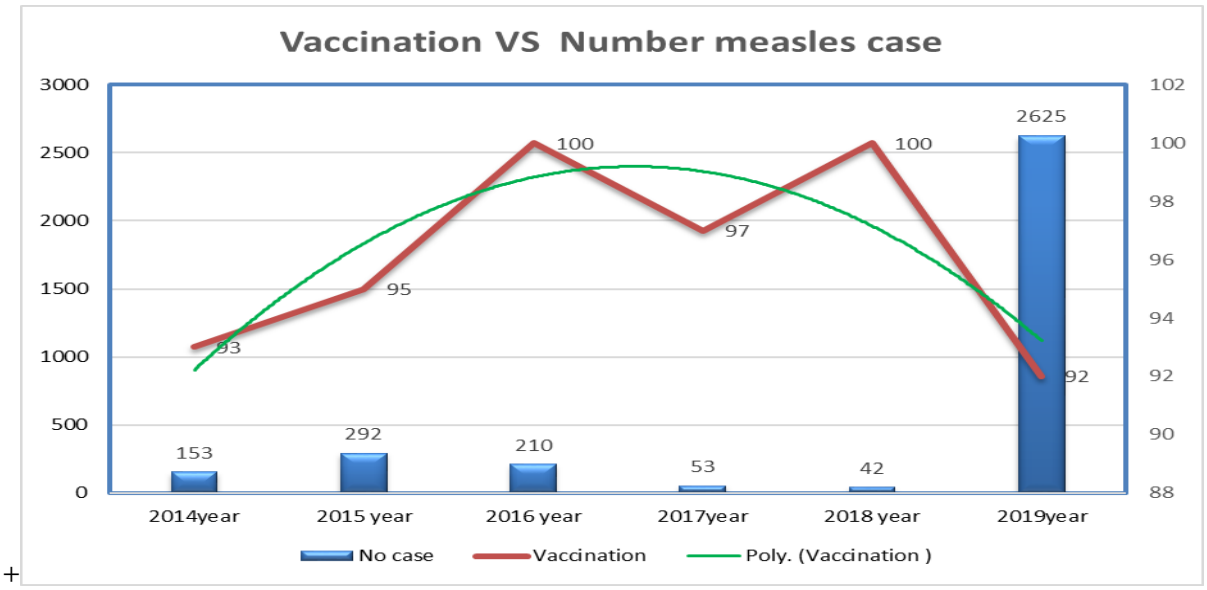


Figure 17-Cases of measles and routine measles immunization in Bale, Oromia Region, 2014-2019.

Out of a total of 3375 cases, 694 (20%) had received measles-containing vaccines. Of which,664 (19.7 per cent) and 30(0.9 per cent) of measles were vaccinated with one and two doses of measles. Well, respectively. 2452 (72.5%) of the cases did not receive the measles vaccine at all and 229 (6.8%) of the cases did not know about their vaccination status for measles (Fig.17).

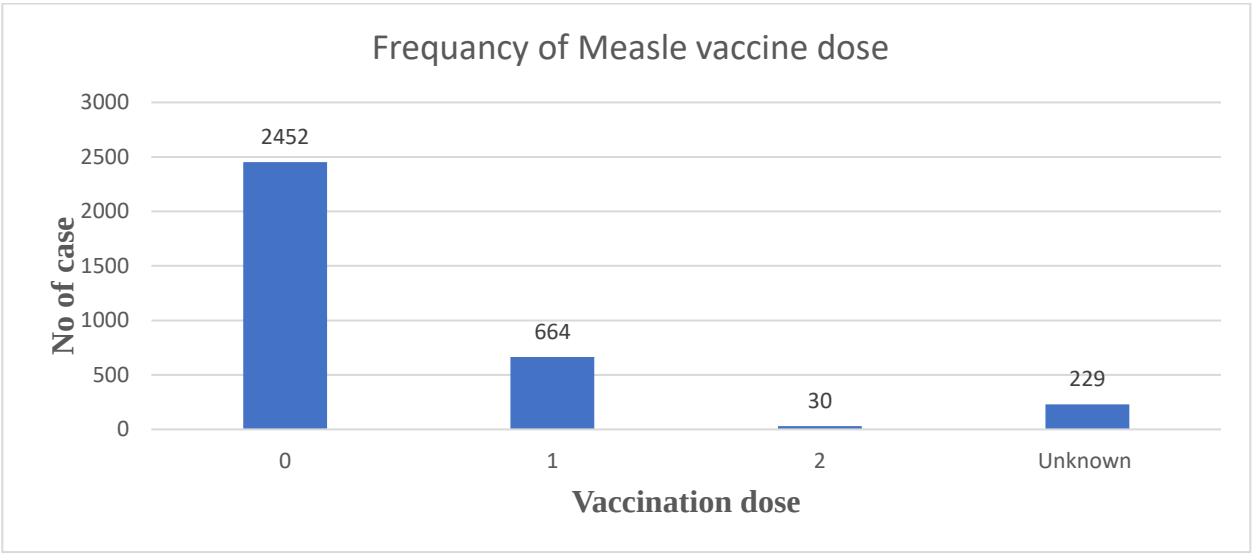


Figure 18- Measles case vaccine dose in Bale Zone, Oromia Region, 2014-2019

According to the charts, the case occurred during the 52nd week of 2018. Weeks 3, 6 and 9/2019, and held until 2019 Week 12. The case reappeared in Week 50 of 2019 as well. (Fig 18).

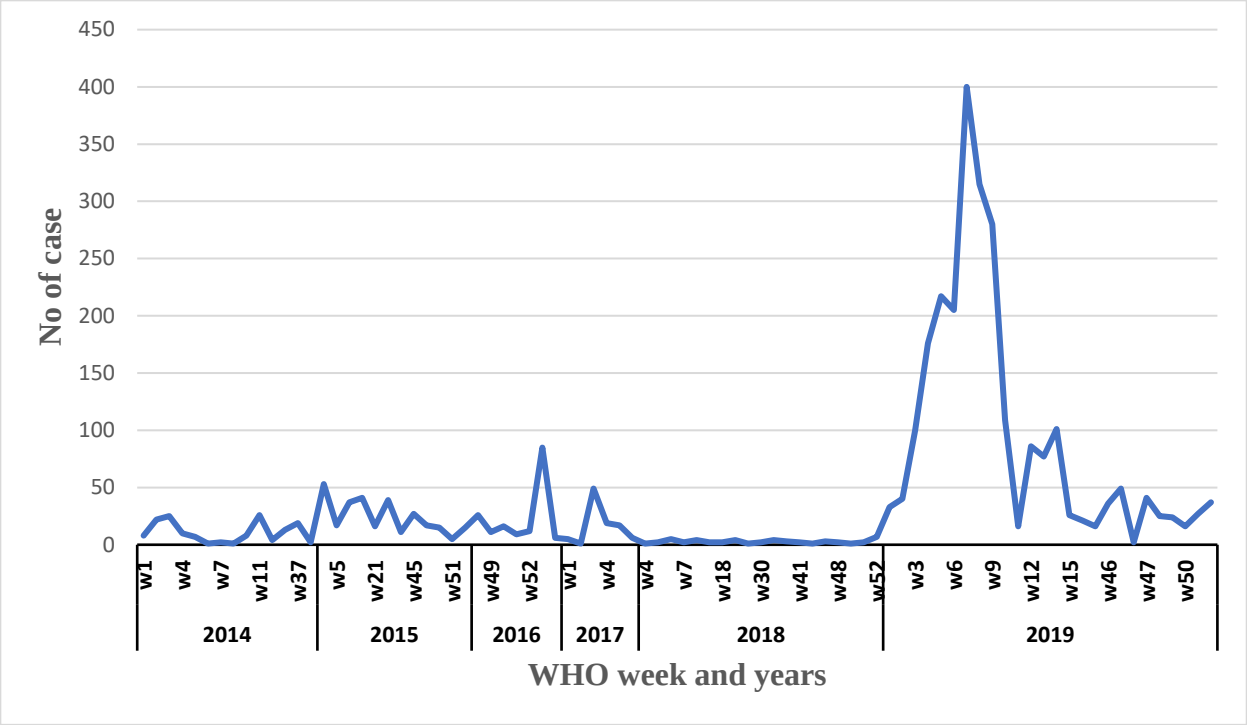


Figure 19-Trends of the case of measles in Bale, Oromia Region from 2014 to 2019

Out of a total of 3375 cases, 11 (2.9 per cent) deaths were reported, with a total CFR of 0.7 per cent. Death rates were greatest among children under the age of one year, with an average annual CFR of 5.32 per100. (Fig.19, 20)

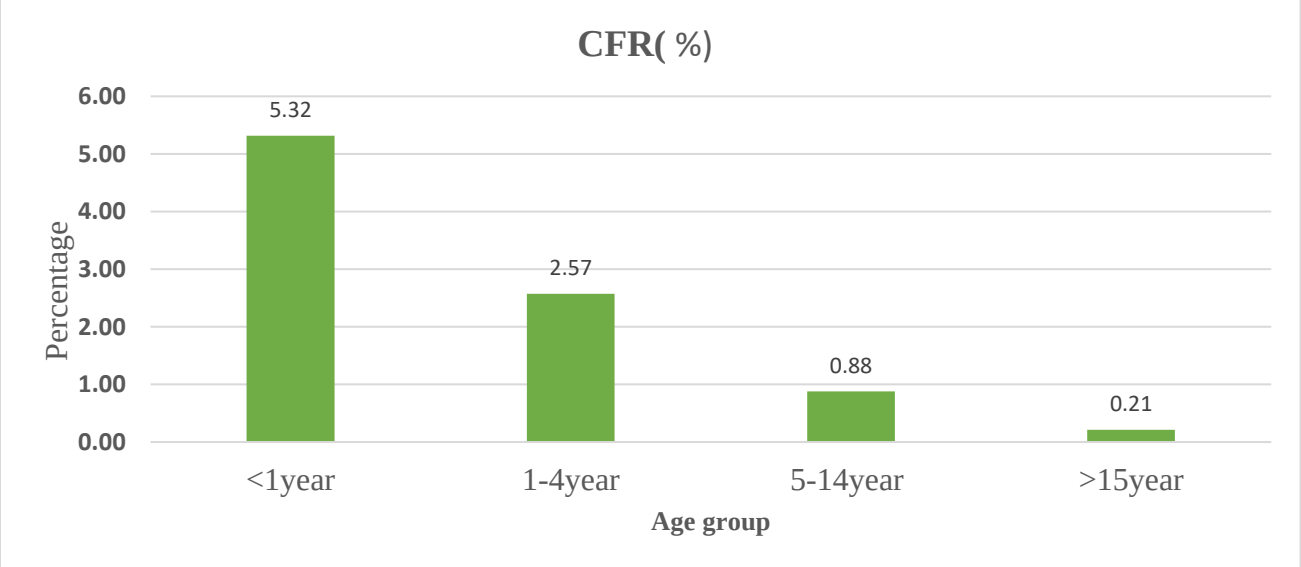


Figure 20-Measles Case Fatality Incidence by Age Group in the Bale Zone of Oromia, 2014–2019

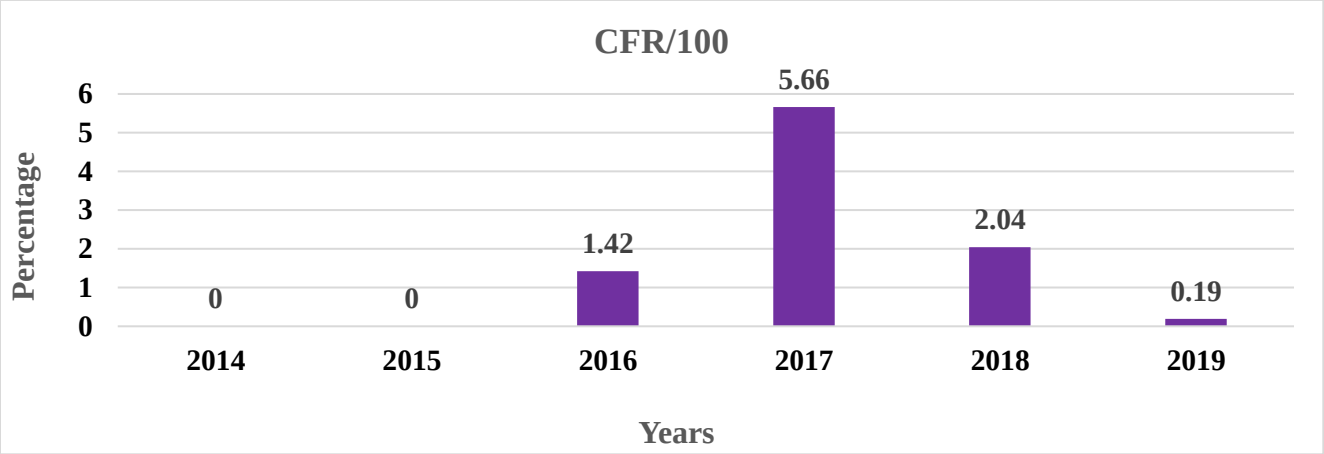


Figure 21-Case Fatality Rate of Measles by year in Bale, Oromia Region, 2014 to 2019

### 2.1.6 Discussion

The most affected age groups were those under the age of five, with 39.9% of them children between ages. Of 5-14 years of age and 10% of children under one year of age, children between 1-4 years and 15 years of age over the years, they represented 28 percent and 21 percent respectively. as well as This study was close to the Zimbabwe study where 23 in measles in which 23.5 per cent of the cases were the most affected age groups below the age of five [(13)].

72.5% of cases did not receive the measles vaccine in this study. This outcome was not similar to the study .Performed at the in 2016, the national average was 43% (not given the measles vaccine) [(14)]. It reveals that it indicates that the outbreak occurred was due to a low coverage of vaccination the highest average case fatality rate is reported in children under one year of age with an average CFR of 5.32.And for every 100 people. This is similar to the study undertaken in Ethiopia showed the highest case-fatality rate in children aged 6 to 11 months. Of age at the highest risk of Infants of malnourishment. The case-fatality rate is similar to the global average for developed countries, which include the predicted case fatality rate in Ethiopia is between 3% and 6% [(15)]

**2.1.7, Limitations:**

Because of the death of measles, the incidence may understate the true lethality of the disease.. A small Details on essential variables was lacking in a limited proportion of surveillance data (i.e. demographics). The end classification of the case and vaccination status) which have made it difficult to review some of these records in a meaningful way.

**2.1.8. Conclusions**

Less than five children were the age group most affected, followed by 5-14 years of age. 1674 (94 percent)

were unvaccinated infants in most cases. Seasonality of measles incidence has been noted, with a rise in the number of cases in the late-early part of the year (December to February).

### 2.1.9 Recommendation

Children under the age of 15 should be targeted for camping. Improved routine and campaigns Immunization of measles with good and regular cold chain management needs to be enhanced It's early. In order to resolve the changes, preparedness and SIA can take place before the end of the year (Dec to Feb). Measles events follow a seasonal trend. Daily refresher courses on EPI should be coordinated, and monitoring should be improved to enhance health personnel's understanding of the surveillance system and cold chain management. To strengthen weak woredas, periodic assessments of provincial surveillance data are required. More study to figure out why those woredas/provinces still don't do well. The tasks linked to the EPI can be made simpler.

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# CHAPTER_ III EVALUATION OF PUBLIC HEALTH SURVEILLANCE SYSTEM

## 3.1 EVALUATION OF PUBLIC HEALTH SURVEILLANCE SYSTEM IN EAST SHOWA ZONE, 2020

**ABSTRACT**

**Introduction:** Public health surveillance is the ongoing, systematic collection, analysis, interpretation and dissemination of health-related event data to help guide public health action and policy development. The main objective of this study is to evaluate the surveillance system of malaria in East Showa and forward solution for improvement

**Methods**: Cross sectional study was conducted from June 15-30, 2020 in East Showa Zone Oromia region. Purposely selected 6 Woreda health office. One town and data collection would be done by face to face interview using questionnaire/checklist and observation of tools for surveillance and secondary data review and data would be collected by interview and record review processed by using the Microsoft Excel.

**Results:** - The East Showa Malaria surveillance system core activities and supportive functions such as the knowledge of the system was found to be 100% at all levels; data reporting was above the recommended standard of 80% at all levels; data analysis, epidemic preparedness and feedback were below the recommended standard of 80%. All assigned focal persons were trained. All levels had the recommended standard reporting form. No analysis of malaria diseases surveillance data was done at the Woredas and health center level. All levels had functioning epidemic management committees but there was no standard, regular rapid response team was available at Woredas level, instead, it was activated when needed. The Zone had a regular supervision system at all levels.

**Conclusions**: Public health surveillance system is basic for population wellbeing. According to the evaluation, the system is in place and help full for detection of the diseases and outbreak. Concerning to the reporting format other than weekly report form, case-based report form, line list report form and log books were found adequately. Most of the visited sites have other surveillance manual also seen in most of the health facilities. Concerning to epidemic preparedness and response plan, there was seen only in Zone and district level,

**Recommendations:** Surveillance data should be analyzed, interpreted at Woredas and Health Facility levels. Epidemic committee should be alerted all the time in respect to preparedness and response.

### 3.1.1 Introduction

Continuous, systematic collecting, study, evaluation and distribution of evidence related to health incidents information to help inform public health actions and policy development. The most important purpose of a surveillance evaluation is to provide continuous comments on program implementation. This evaluation must expose which components of the system are robust and which ones need to be strengthened in order to improve the great of the information (1). In Ethiopia, the health information system for surveillance of communicable and non- communicable diseases is organized in two main categories, the surveillance system under Public Health Emergency Management core process (PHEM) and the Demographic Health Information (DHIS). These systems are set at the central level Ministry of Health (MoH) and extending down to the regions and health facilities (periphery) levels including all governmental, non-governmental and some private health facilities(2)( 3).

The Public Health Emergency Management core process targets 23 selected diseases such as: AFP/Polio, Measles, AHI, Cholera, Guinea Worm, NNT, RVF, SARS, Small Pox, Yellow fever, Anthrax, Maternal Death, VHF and Rabies are to be reported immediately on detection and weekly as zero report. Meningitis, Malaria, Typhoid fever, Epidemic typhus, Relapsing fever, Dysentery and Severe malnutrition are to be reported weekly. The evaluation assessed the surveillance system of one weekly reportable disease (Malaria). In all visited health facilities and health offices, the surveillance of these diseases exist but poorly functioning (4).

The principal investigator conducted a brief meeting with responsible persons (Head of institution, PHEM focal person) before assessing the objective of the study and its significance, and highlighted information after assessment, at all level. This meeting was also an important first step for assessment and recommendations; which will help for the implementation of recommendations and betterment of the surveillance and response of the major priority diseases of the evaluated zone. The Population under surveillance the national public health emergency management targets all the population in the country to be under surveillance for all the twenty-three priority diseases. The East Showa Zone cascade the same structure, with a total population of 1,668,184 in 2017(projected from the 2007 national census.

In 2019/2020, the total number of laboratory tests confirmed 25280 plus suspected l malaria cases was 154664,. In particular, the most sample confirmed in increase in the first five months of the fiscal year reaching the best peak in August, followed by a reduced in February to April. As funding for malaria control programs has increased, countries have invested in strengthening malaria surveillance systems. Conducting an evaluation can probably result in actually understanding of both the country's surveillance

system and its malaria epidemic. The reason of evaluating public health surveillance is to make sure that issues of public health. Importance is being monitored successfully and effectively. Public health surveillance system should be evaluated periodically and the evaluation need to include suggestions for improving great efficiency and usefulness. The evaluation of public health surveillance system need to involve an evaluation of system attributes such as simplicity, flexibility, data quality, accessibility, sensitivity, predictive value positive, representativeness, timeliness and stability

### 3.2. Rationale:

Malaria is a foremost public health issue in Ethiopia. East Showa is one of malarias area from Oromia Region however, malaria instances are diagnosing with in the East Showa Zone excessive as end result of infection acquired disease. The information generated from surveillance evaluation will be essential to understand gaps recommend possible intervention and assist to enhance public health decision making and evaluation of malaria surveillance system.

### 3.3. Objective

#### 3.3.1 General objective.

- To describe core, Supportive function and evaluate key attributes of the Malaria surveillance system in East Shewa zone, Ethiopia 2018

#### 3.3.2. Specific objective(s)

- To describe the core process of the Surveillance System
- To assess Supportive activities of surveillance system
- To evaluate Surveillance key attributes

### 3 .4.Methods

#### 3.4.1 Area of study

It's a study. The study area was East Showa Zone one of the 20 Zone in Oromia Region. It is located in the middle of Oromia, 100 K.M away from Addis Ababa. This Zone is bordered on the south via the west Arsi Zone, On the south west by the southern Nation, Nationalities and people of region In the West The South West Shewa and Oromia special zone around it Finfinnee in the northwest of North Showa, On the north It was the By the Amhara Region On the North East Afar and south east Arsi Zone. The Total population 1.668.184in 343666 house hold, of whom 837614were men and830670Women, 444376 its or26.64% of population were Urban in habitats, in addition 667or 0.05%are pastoralists at a time. The three major ethnic groups reported, Oromo (74.06 per cent, Amhara (15 per cent Gurage (3.82 per cent) and the other Ethnic Group made up (6.73 per cent) of

Afan Oromo. Spoken as the first language was 69.15 percent, Amharic was spoken through 24.29% Guragugna by 2.92%of the population, the remaining3.92 spoke all different major languages reported the Majority of the habitants professed Ethiopian orthodox Christianity with 69.33of the population having they practiced the belief, wheile16.18%of the population had been Muslim, 8.4%of the population professed Protestantism and 5.08practiced Traditional beliefs

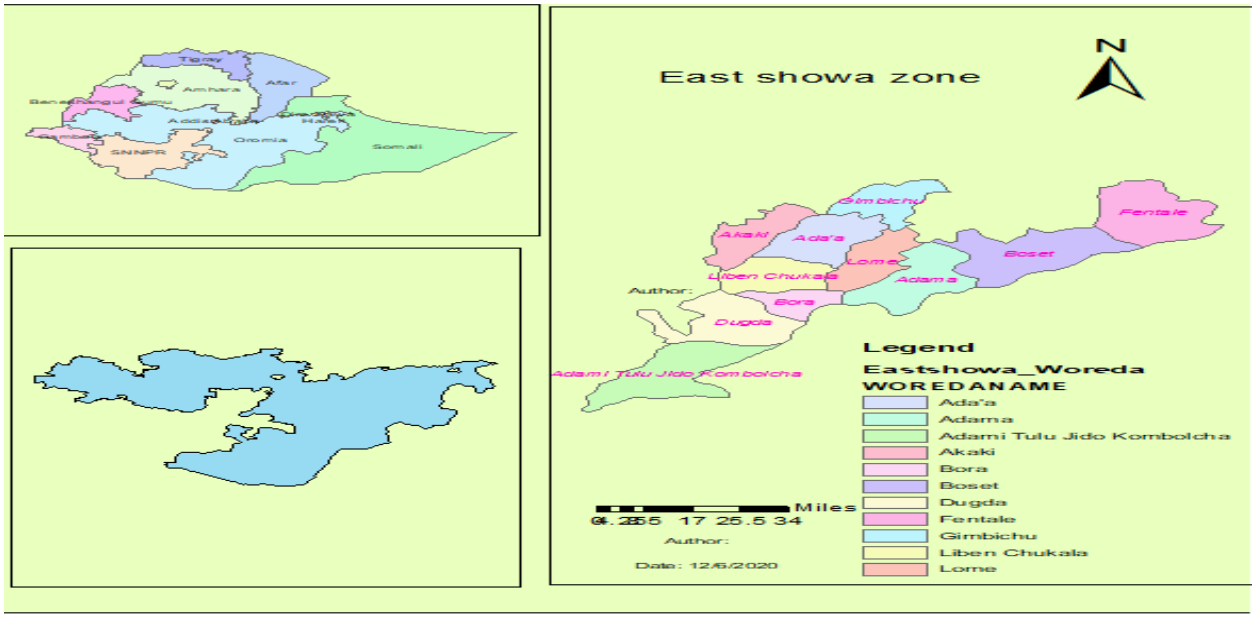



Figure 22-Map of East Shewa Zone, Oromia Region. Ethiopia in 2020.

### 3.4.2 Design study

Cross-sectional study has been conducted from June 15-30, 2020 East Showa Zone Oromia region

### 3.4.2.1Subjects of study

The subjects of the study were Zonal Health Offices (District Health Office), Hospital, Health Centers and Health Posts.

### 3.4.2. 2.Sample size and sampling

From the zone among 7 Woredas we selected 6 District and 01 one Town health office purposely. (Dugida, Fantale, Bora, Liban, Lome, Boset and Methehara Town) and from the 59 total different type of Health centers selected and 18 health post. At the end of the study period, a total of 42 sites were assessed.

### 3.1.3.3 Data collection technique

Data collection would be carried out by face-to-face interview using questionnaire/checklists. Response from the respondents (Health and/or PHEM officers) and Observation of surveillance tools and secondary data review tools. Based on the WHO framework for monitoring and evaluating surveillance and

response systems for Malaria diseases that was used to assess the core activities, supportive functions and quality components in East Showa Zone.

### 3.1.3.4.Data Analysis

Data would be collected by interview and record review processed by using the Microsoft Excel.

### 3.1.3.5. Data dissemination

We would be prepared and shared the written report of both hard and softcopies, to East Showa zonal health office, all visited Districts health offices, Addis Ababa University/School of Public Health and Ethiopia Field Epidemiology Training Program mentor, resident advisor

### 3.1.3.6Case Definition

**Confirmed malaria case**: A suspected case confirmed by microscope or RDT for Plasmodium parasite.

**Malaria suspected case:** - A person with a fever or fever with headache, chills, rigor, back pain, sweats, myalgia, nausea and vomiting diagnosed clinically as malaria.

**Malaria outbreaks:** - Crossing the normal line or doubling the number of malaria cases compared the prior year of reported WHO epidemic week.

**Clinically and confirmed case:** - malaria suspected cases plus confirmed malaria cases

**Acceptability:** -Willingness of persons and organizations to participate in the surveillance system. And it will be measured quantitatively through the reviewing completeness of report forms for the past three months and timeliness of information coverage.

**Accuracy:** - Degree to which a measurement or an appraisal based on measurements represents the genuine value of the attribute that is being evaluated.

**Completeness:** - Proportion of all expected data reports that were actually submitted to the public health surveillance scheme.

**Information Quality:** - Data quality reflects the completeness and timeliness of the data entered into the public health surveillance scheme.

**Flexibility:** - A flexible public health surveillance system can conform to changing data needs or operating conditions with little extra time, staff office, or allocated funds. Flexible systems can accommodate, for instance, new health-associated effects, changes in case definitions or technology, and variations in funding or reporting sources. In accession, organizations that utilize standard data formats (e.g., in electronic data interchange) can be well mixed with other arrangements and therefore might be considered flexible.

**Predictive value positive (PVP):** - PVP is the proportion of reported cases that actually have the health-related event under surveillance.

**Representatives**: - A public health surveillance system that is represented accurately describes the occurrence of a health-related event over time and its distribution in the population by place and person.

**Simplicity:** - The simplicity of a public health surveillance system refers to both its structure and ease of operation. Surveillance systems should be as simple as possible while still meeting their objectives.

**Stability:** - Stability refers to the reliability (i.e., the ability to collect, manage, and provide data properly without failure) and availability (the ability to be operational when it is needed) of the public health surveillance system.

**Timeliness:** - Interval between the occurrence of an adverse health event and (i) the report of the event to the appropriate health agency, (ii) the identification of that intervention of trends or outbreaks, or (iii) the implementation of control measures.

**Usefulness**: - How helpful the system is to public health staff in taking actions as a result of

**Validity**: - Degree to which statistical information correctly describes the phenomena it was designed to measure.

### 3.4, 1. Result

#### 3.4.1.1. Purpose of the surveillance system

Table 9:- Selected woredas and health facilities

| No | Woreda's Name | TotaL pop | HC | Type'A' | Type'B' | Type'C' |
|---|---|---|---|---|---|---|
| 1 | Fentale | 86729 | 4 | 0 | 2 | 2 |
| 2 | Methahra Town | 39585 | 1 | 0 | 1 | 0 |
| 3 | Adama | 206177 | 6 | 0 | 4 | 3 |
| 4 | Bora | 85696 | 3 | 2 | 1 | 0 |
| 5 | Liben | 108846 | 4 | 0 | 1 | 3 |
| 6 | Total | 527033 | 18 | 2 | 9 | 8 |

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

Table 10- the Population under supervision in the assessed zone and administrative offices by Place of residence and number of health facility 2019.

#### 3.1.4.7 Case detection and registration

Assessment of core activities and supportive functions of the Malaria surveillance system the study found that the knowledge of the system was found to be 100% at all levels of the malaria surveillance system of the East Showa Zone. Case definition is vital for the communicable diseases case detection. A manual of disease-specific case definitions has been distributed to the health facility staff in East Showa. All health facilities had an outpatient register, and hospitals had an inpatient register for recording of the cases. All levels had the recommended standard reporting form. All personnel agreed that reporting was easy and was not time consuming - the average time for preparing the weekly reports was one hour at all levels. All surveillance focal personnel at health facilities were trained in preparing the malaria diseases surveillance weekly reports. No analysis of malaria diseases surveillance data was done at the District and health center level.

All District and health facilities had computers for data management of different department not specifically for PHEM department, the District had epidemic threshold for malaria diseases. A case investigation sheet was used by almost all levels. All levels had functioning epidemic management committees but there was no standard, regular rapid response team was no at District level, instead, it was activated when needed. Zone produced a regular feedback report to the lower level. There was no standard format for the feedback at lower levels, and none of the lower levels had well formulated feedback.

Table 11:-The percentage of the performance of malaria surveillance system core activities at different level in East Showa, 2019/20

| **C**<br>**Core activities** | **No Districs & Town** | **%** | **PlanHealth Facility& 1 hospital** | **No HC&Hospital** | **%** |
|---|---|---|---|---|---|
| **Malaria surveillance system manual** | | | | | |
| Presences of malaria Surveillance | 7 | 100 | 19 | 19 | 100 |
| Use of the manual to guide the activity | 7 | 86 | 19 | 15 | 78 |
| Knowledge of disease under surveillance | 7 | 100 | 19 | 19 | 100 |
| Case conformation | | | | | |
| presence of Specimen collection guide line | 7 | 100 | 19 | 19 | 100 |
| Follow up of specimen result | 7 | 100 | 19 | 19 | 100 |
| Keep the specimen result | 7 | 100 | 19 | 19 | 100 |
| Data reporting | 7 | 100 | 19 | 19 | 100 |
| Availability of malaria reporting form | 7 | 100 | 19 | 19 | 100 |
| Average time to prepare the weekly malaria report (1hour) | 7 | 100 | 19 | 19 | 100 |

| | | | | | |
|---|---|---|---|---|---|
| **Data Analysis** | | | | | |
| Update Perform trend analysis | 5 | 71 | 19 | 12 | 63 |
| Use of appropriate source of denominators | 7 | 100 | 19 | 19 | 100 |
| Aggregate case data by demographic category | 5 | 71 | 19 | 13 | 68 |
| Epidemic preparedness and Response | 7 | 100 | 19 | 15 | 100 |
| Involved in outbreak investigation | 7 | 100 | 19 | 19 | 100 |
| Presence of written epidemic preparedness and response plan | 7 | 100 | 19 | 13 | 68 |
| Presence of emergency stock of drug and supplies | 7 | 100 | 19 | 19 | 100 |
| Existence of epidemic management committee | 7 | 100 | 19 | 19 | 100 |
| Presence of epidemic rapid response team | 7 | 100 | 19 | 19 | 100 |
| | | | | | |

In all District level, and 19 health facilities used these guidelines to direct their surveillance activities the Zone had a regular supervision system at all levels. About 7 of the District had documentation that all recommended visits throughout the study period had been performed. The zone used standard checklists for the supervision. On the other hand, some written supervision feedback system existed at Districts levels and health center. Professional and well-trained staff was accessible at the all level. At the health facility level, the system had only two trained staff member conducting surveillance amongst other duties. About100%of the health facilities had functioning communication methods. The weekly epidemiological reports sent them telephone.

Table 12-the Percentage of the performance of malaria surveillance system supportive function at different level in East Showa Zone, 2020

| Core activity | District and Town plan | Performance (%) | Health facility | % |
|---|---|---|---|---|
| **Training** | | | | |
| Training of the rapid response team | 7 | 7 | 12 | 63 |
| Basic training on malaria surveillance system | 7 | 7 | 15 | 78 |
| Post basic training on malaria Surveillances system | 7 | 4 | 10 | 52 |
| **Supervision** | | | | |
| Presence of supervisory visits to the lower level | 7 | 7 | 19 | 100 |
| Existence of Supervisory visits | 7 | 7 | 19 | 100 |
| Written feedback system | 7 | 5 | 15 | 63 |
| Implementation of Supervisory visits | 7 | 5 | 15 | 63 |
| **Feed back** | | | | |
| Received feedback from higher level | 7 | 100 | 19 | 100 |
| Presence of well formulated feedback | 5 | 71 | 15 | 78 |
| **Resources** | | | | |

| | | | | |
|---|---|---|---|---|
| Presence of office | 7 | 7 | 19 | 100 |
| Presence of functioning telephone | 7 | 7 | 19 | 100 |
| Presence of functioning transportation | 7 | 7 | 10 | 52 |
| Availability of Computer | 7 | 5 | 16 | 84 |
| Availability of functioning Photocopier | 7 | 3 | 0 | 0 |
| Availability of disinfection materials | 7 | 7 | 14 | 73 |
| Availability of protection materials | 7 | 5 | 17 | 89 |

**Description of the attributes of the surveillance system**

**3.1.4..1. Usefulness**

Among all health systems visited, respondents share a shared view of the early identification of disease epidemics under monitoring as a significant application of surveillance. More detail on the respondents. Remember that the monitoring device helps to detect on time the outbreak of the chosen epidemic, estimate. The magnitude of morbidity, mortality and factors related to these diseases and the assessment of the impact of the disease Preventive and Control Program.

**3.1.4.2. Detection of cases**

The PHEM surveillance system has been organized in the community, all other health facilities. And the District under This is the MOH will have an active role to play in case detection. However, the dissemination of case definitions of those priorities the selected diseases accounted for 100% of the health facilities visited. Physical provision to health services has been accomplished in all the districts visited, through the dedication of HEW and Voluntary volunteers to build a healthy health-seeking community behavior. In the communities. Data from the health facility were evaluated on laboratory test capability and function in malaria surveillance. East Showa 25280 confirmed malaria cases were recorded between July 2019 and June 2020.Of the total cases, 16268 (64 percent) were plasmodium falciparum 8960. (35 percent) Plasmodium Vivax and 52(0.2) Mixed confirmed malaria cases were reported from the d/t Districts Town and Hospital to East Showa from July 2019 to June 2020. Of these, 25280 positive cases 16268(64%) of positive case were for Plasmodium falciparum

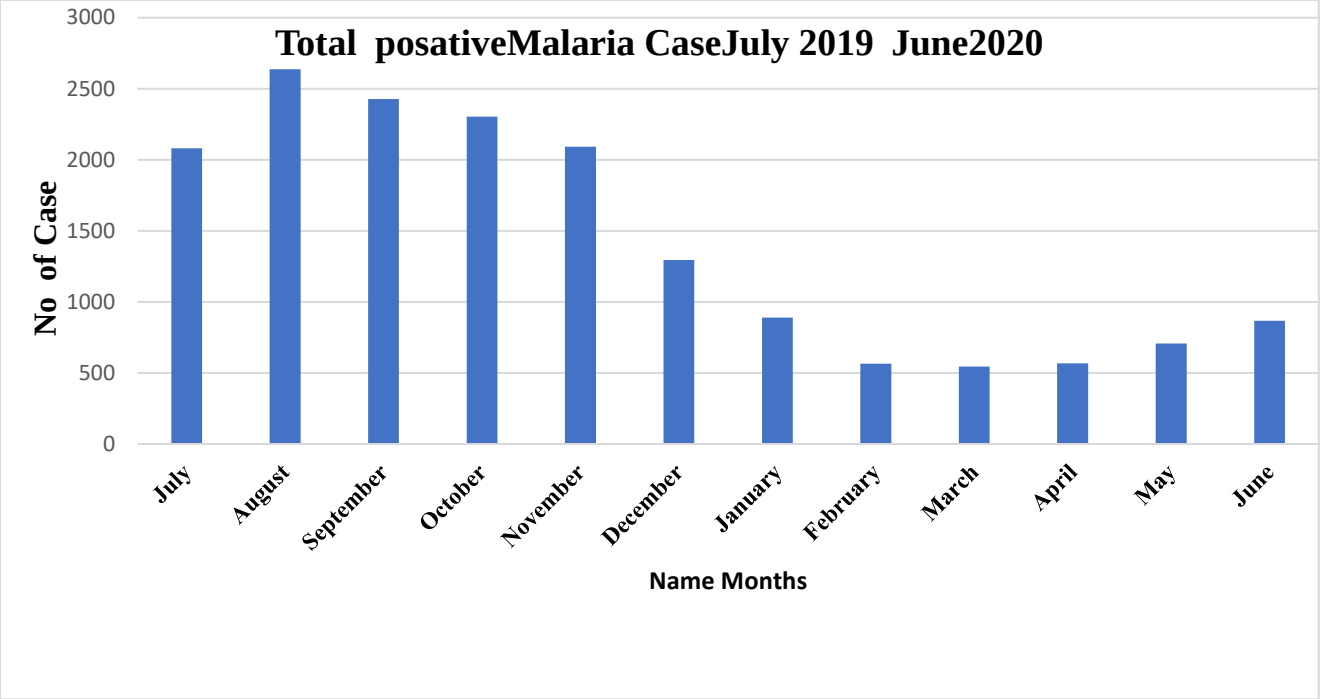



Figure 23-Total malaria cases by in East Showa Zone, July 2019- June 2020

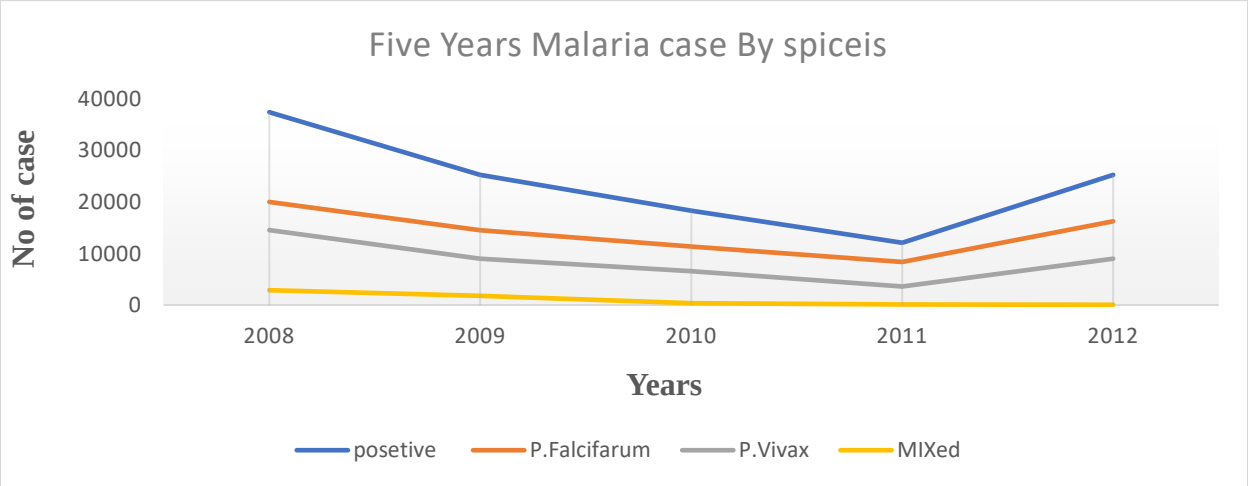



Figure 24-Trends of confirmed malaria cases by species in East Showa Zone, July 2008- June 2012

**3.2.1 Providing effective and quick response to epidemics:** According to the respondents, the District epidemic committee is not evaluating their activities regularly in all the visited District, in the health center RRT will be deployed for cases investigation and management within one day whenever there is a suspected epidemic was reported from the community. The Zonal health office also responded with in 48hrs of report received from the lower level by different means. Generally, the surveillance users are satisfied with the current existing system.

**3.2.2 Simplicity and data flow**

Detect the cases both respondents (100%) acknowledged that the case descriptions of these target diseases for the detection of suspicious cases are easy to understand and can be extended to all layers of health professionals.

**Data follow:** The following data: All (100 per cent) of the sites visited accept that the data flow routine is straightforward and easy, as set out in the PHEM guidance, and that all monitoring agencies were therefore simple and understandable. Staff About 100% of the health center and District had standard weekly reporting formats. Both interviewed workers (100 percent) have replied as a weekly report took an average of 15 to 20 minutes or more to complete a single report. The key problem is not stated by modern means of communication such as e-mail for reporting cases to the next higher bodies, especially from the health center. To Data involved weekly or urgent management of PHEM data from health centers to the respective District Health Office and the Zonal and State Health Departments via telephone and the usage of data was very minimal at district and facility level because the data obtained was not evaluated there. However, the weekly summary received by phone from the District Health Offices was submitted in the regular format and forwarded to the. Zonal health office mostly through telephone. District health office analyzes and disruption by person, place and time to be used for future planning and tracking.

**3, 2. 3. Data management**

Weekly or immediately PHEM data from health facilities were sent to the respective health centers then to the woredas health office and to the zonal and district health offices in telephone or paper form, and the usage of data was also very minimal at the woredas and facility level, as the data obtained was not evaluated there However, the weekly report received by phone from woredas health offices joined the regular format and was sent to RHB often by e-mail and occasionally by call. Both ZHD and RHB analyze and view data by person, location and time to be used for future planning and tracking.

**3.2.4. Flexibility:**

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

Emergency Management (PHEM) system made the reporting format flexible to report other new under immediately reportable case-based conditions

### 3.2.4 The data quality

We assess the quality of the data in all visited sites, stressing the completeness and timeliness of the report. Health facility level there are commonly missed essential variables linkage, sex, Address and other variables of Interest so that only the limited variables indicated on the form have been reported. In certain reporting types, the Age attribute has the same column with different units (year and month). This has its own challenge in the analysis. Of data .At District and All the details required to be recorded in a weekly report format was given. From the health center Complete With zero report included. But Most HEWs were not well trained at the level of the health post, Surveillance device which cannot pay heed to the importance of a component or be perceived as not important as such. All details needed to be published in the weekly report format at the Zonal Health Department Including zero report and complete

### 3.2.5. Acceptability

The acceptability of the surveillance system assessed based on the engagement of the reporting agents and active participation in the case detection and reporting. In the Zone, the engagement of the reporting system and active participation in the case detection and reporting satisfactory seems accepted by the health staffs with 100% reporting rate of the health facilities

### 3.2.6. Representativeness

The representativeness of the surveillance system is related to the health service coverage, the reporting rate of the health facilities, the health seeking behavior of the community, and the technical capacity of the health care providers. The health service converges of the visited District on Average 92%. The health seeking behavior of the communities was also changed from time to time due to awareness creation by HEWs rounding house to house in all of the households

### 3.2.7 Positive predictive value (PVP):

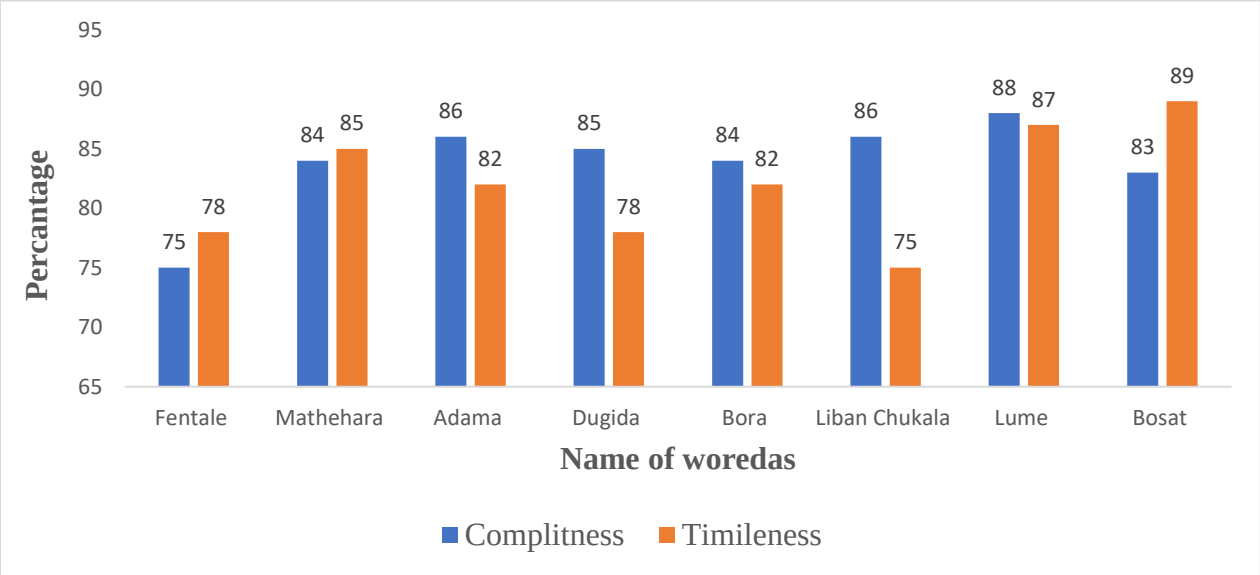
The proportion of reported cases that are certainly subject to surveillance for health-related events. All malaria suspected were examined by using Microscopy or RDT. From 154664 suspected malaria case examined by microscopy and RDT were 16975 positive. Positive predictive value means true positive test for malaria /Total malaria Suspect cases times hundred.

PVP= True malaria positive/ total suspect*100= 6975/154664 *100= 10.9% in East Showa Zone

### 3.2.8. Timeliness and completeness

The timeliness of public health surveillance is usually seen as the interval between the onsets of health-

related surveillance. Event and event reporting to the public health organization responsible for instantaneous reporting Public health monitoring is typically seen as the period before the start of health-related surveillance. Event and event notification to the public health service responsible for this Manipulating effort, preventing persistent advertising or planning the program. The weekly rate for reporting Health services (completeness) of health services were from 19 health facility 16(84%) and excessive among HCs in the health services in the District and Town from Seven site five regularly (85%). The record date sent to the next level was irregularly documented in reports of visited sites and was challenging.




**Visited health offices**

Figure 25-The timeliness and completeness of the PHEM weekly report of the Woredas-East Showa Zone, Oromia Region, and 1st January to 30th June 2020

### 3.2.9, Stability:

The surveillance **system** ensured to function in proper way and according to the standard guideline. As all participants responded that as there were no new restructuring affects the procedure and activities of the Malaria Surveillance , there was no lack of resource that interrupt the system and there were no any time and condition that Malaria surveillance was not fully functioning . Shortage of budget and logistic specific to the system is tacking to undertake supervision and capacity building activities at Zonal, district and Health Facility Level as per the standard

### 3.4.1. Discussions

The evaluation must examine how the public health surveillance system is properly integrated with

others. Systems of surveillance and health information (e.g., exchange and sharing of data in more than one format, and Data Transformation). Streamlining associated systems into associated systems to a built-in the network for Public health monitoring helps individual programs to meet unique data collection standards while addressing duplication of effort and lack of effort Standardization that could emerge from systems that are unbiased. Integration promotes the use of scarcer resources for quality, and it is possible to combine activities using similar surveillance functions, skills, resources and targets. Each of the priority diseases in the zone has case definitions and integrated disease reporting for these purposes. The formats described by the Ministry of Health and WHO are described and health reporting is institutionalized. Health offices and facilities (10).Malaria surveillance system objectives were determined to be clear and well documented at the Zonal level and in some the District level. None of the health facility had written objectives though most of the respondents at these levels have been fully conscious of them. This shows that the system was well established however missed the documentation at the lower levels. The clear written objectives at all levels of the malaria surveillance system are an essential tool to guide success of the system. These have helped the malaria surveillance system in East Showa Zone to function better. Although in a decentralized system all levels must have their very own roles in formulating all system functions, it nonetheless can be acceptable that the goals of the system are formulated at the central level and disseminated to the lower levels.

However, in Zone and District had clear objectives and the staff on the different levels had no written objectives of the system, This may be found to be a rather significant weakness in the surveillance system of the Zonal Malaria, Activities of the surveillance system, staff may lose commitment. The system can lead to poor performance of the malaria surveillance system.

In addition to that, the lack of updating the manual for specific case definitions of disease, most of the district and health facilities studied did not even have the out-of-date malaria guide available, implying that the quality of the case detection faces serious problems. On the other hand, ongoing supervision visits, which are carried out on a regular basis at extraordinary levels, improve this situation. Laboratories are a major part of the IDSR concept adopted by Zone s as the basis for the surveillance of malaria diseases. The connection to the network of laboratories is always well functioning, it was normal and programmed for certain diseases such as malaria. For malaria disease confirmation, the fitness facilities were much higher. Corner stone of the system of surveillance, registration and reporting of precedence diseases, was properly built, since all levels in East Showa used the standard statistics reporting form. It is important that the surveillance data analysis at the first point of its collection is used for action.

However, District health Facilities not yet nicely prepared to perform malaria surveillance system information analysis; however the evaluation carried out at zonal ranges of the system. This would make the Zonal system the same compared to other African countries Functioning epidemic management systems are a challenge for any malaria surveillance system mainly in developing countries. The system in District needs and most important adjustments epidemic management system to provide the preferred functions in controlling epidemics in a standard way in the District ; these changes include epidemic plan, fast response team financing and epidemic reporting system. Further, lower levels of Malaria Surveillance System had no written epidemic management plan, which influences the Effectiveness of organized response to outbreaks. In this respect, the Zonal system is similar to some African countries.

District alert and response device for epidemics is a centralized system, consequently it does not feature in the lower levels. This is a major problem as outbreaks must be handled immediately due to the importance of time factor in District the system is facing shortages of staff at lower stages where the staff habits surveillance activities subsequent to other preventive medicine activities. High work overload at these levels affects the quality of the Malaria surveillance system activities. It has been pointed out that participants in the surveillance system be properly trained for their surveillance tasks; via both initial and ongoing in-service training.

### 3.5.1. Conclusions

National manual for surveillance was available at zonal and woredas health office level. Shortage of reporting format at all visited sites. Poor surveillance (PHEM) specific supportive supervision at all level. Data analysis is limited to zonal health office but nonexistent both at woredas and health facility level. Emergency preparedness and response plans were not prepared at all level. There is no appropriate formal training given to HEWs on surveillance, rather simple onsite orientation. The system was not. Regarding attributes the surveillance system of the zone was representative, acceptable, stable, flexible and useful. Attributes that require attention for improvement of surveillance process were data quality, timeliness and completeness. Due to COVID 19, there are minutes of meetings for the epidemic management committee and all visited sites evaluate their readiness and experience, in accordance with the guiding principle of the national and regional recommendation. High work overload at these levels affects the quality of the Malaria surveillance system activities. A lack of committed resources and budget might have an effect on the stability of a System for public health surveillance. The response to an outbreak has been continuously prioritizing case management instead of risk factor investigation. All of this prevents and Undermines the desirable study and response expected for diseases prone to epidemics.

### 3.6.1 The Recommendation

- Surveillance information will be analyzed, interpreted and used in decision-making District and Healthcare establishment.
- In order to enhance the diagnosis of pathogens, capacity building of health care services at the level of health facilities on the reporting frame work
- To minimize the work load of the Epidemic committee health workers
- Must be alerted all the time to recognize preparedness and response and must be strengthened in addition to submitting epidemic evaluation.
- Continually evaluate the available Epidemic preparedness and response plan
- Specific supportive supervision and continuous feedback system should be strengthened at all level.
- Refreshment and on job training should be given to the surveillance focal persons, health extension worker by regional, zonal and woredas health office.
- Woredas health office and respective health facility should analyze surveillance data and interpreted and used for decision making at all levels.
- Written emergency preparedness and response plans should have to be prepared at all levels of the surveillance system ( supervised by zonal health office)
- Particularly the training needs to be given for health extension workers on surveillance by woredas health office.
- Establishing supplemented system with other sectors should be considered by the Federal/ regional to facilitate surveillance activities.

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# CHAPTER– IV HEALTH PROFILE DESCRIPTION

## 4.1 HEALTH PROFILE DESCRIPTION OF LOME WOREDAS, EAST SHOWA ZONE, OROMIA REGION, ETHIOPIA, 2018

### Executive summary

The health profile is a method for gathering and summarizing health and other health associated activities, the geographical, socio-economic, political and cultural elements of a given place. This summarized and prioritized wellness and health related knowledge is helpful for preparing, executing and reviewing health programs. Therefore, well-described health profiles can be of interest to health program administrators and stakeholders. The purpose of this analysis is to plan the health profile of Lomé by defining the health issues and the general health status of the catchment community. Health and health related data was gathered in Lomé Woredas from January 28 to February 30, 2019. Interviews and questionnaires were used as data collection instruments. Data sources included the Lome Woredas Health Office, the Education Office, the Water Supply Office, the Agriculture Office, the Finance and Economic Development Office and the Administration Office. Data was compiled and analyzed using Micro Soft Excel. Acute Upper Respiratory Tract Infection Acute Febrile Illness, and illness accounted for adult morbidity with 21.30%, 14.18% and 11.50% respectively from total OPD cases. Non bloody diarrhea, and Acute febrile Illness and Acute Upper Respiratory Tract Infection were 19.8%, 16.05% and 14.82% respectively in under-five children. One TB death and one TB defaulter were reported. The ITN distributions is 100 per cent, but malaria is among the top ten diseases. Sever acute malnutrition is a big public health problem. Seventy-five new admissions were registered to OTP locations. Presence of medication failure and default may promote Multi-Drug Resistant (MDR) TB, which is unsafe and very dangerous to handle in nearby health facilities and may result in death IEC/BCC and strong monitoring systems should be developed..

### 4.1.1. Introduction

Health profile is a method for gathering, arranging and summarizing health and other health-related activities to identify health and other health-related conditions, demographic, socio-economic, political, cultural and other aspects of specific geographic areas of interest. The determination of the health profile is both a procedure and a result. It is a method of collecting and analyzing knowledge from various and disparate sources in order to build a profound view of the welfare of the population. It is also a mechanism that uses these findings to establish plans for enhancing the health condition of the population.

The health profile offers an analysis of the situation and patterns of priority health conditions and the health system profile, with a review of the various institutional structures, main issues and challenges

It is necessary to collect appropriate, correct and credible data for a specific geographical region (woredas) in order to establish a full development plan. Organizing, summarizing and reviewing health and health data specific to woredas is necessary in order to prioritize the problems of the region under study and to prepare the problems detected.

This summarized and prioritized data are essential for public health surveillance officials in the preparation, execution and review of public health surveillance programs. As the 2011 California research indicates, health profiles offer fast and convenient access to the most frequently sought health metrics from the California Health Interview Survey (CHIS). The profiles present projections that track trends in insurance status, illness rates, health habits and overall health status over time and allow for regular release of health estimates that will help decision makers, media, health activists and others to properly adapt to current events and the effect of an evolving economic and social environment on health (1).

The Zambian Country Health Profile provides at one location the latest and most recent data to allow success to be measured in improving reproductive, maternal, newborn and child health (RMNCH) and in achieving MDGs 4 and 5. The profile provides the most recent information available on selected population metrics, penetration ratios for priority programs across the spectrum of treatment, and equity, policy funding, human capital and financial flows indices (2).

Its goal is to encourage evidence-based health decision making through a thorough and systematic study of the complexities of the health situations and health systems in the woredas. The key objectives of this paper are therefore to provide collected information on the physical and socio-economic status of the worm and the limitations of its health profile. The key data points used to prepare the paper are the Lome Woredas Administration, Irrigation, Health, Education, Water Supply, Culture and Tourism, and

the Energy and Finance Office. The paper contains nearly all the details and events of the 2018-2019 period and all the years are according to the Gregorian calendar.

### 4.2. The Objectives

#### 4.2.1 General objective

- To Describe health and health related in information of to identify problems for priority setting of Lome district, East Shewa zone ,2017/18

#### 4.2.2. Specific objectives

- To assess disease burden and others health related information
- To identify district health status and prioritize identified problems
- To assess human resources and primary health care coverage of the district
- To Find and justify health and health related information of the District

### 4.3. Methodology

#### 4.3.1 Study's Area

Description of the health profile was performed Lome Woredas, East Shoa district, Oromia region 2017/18.

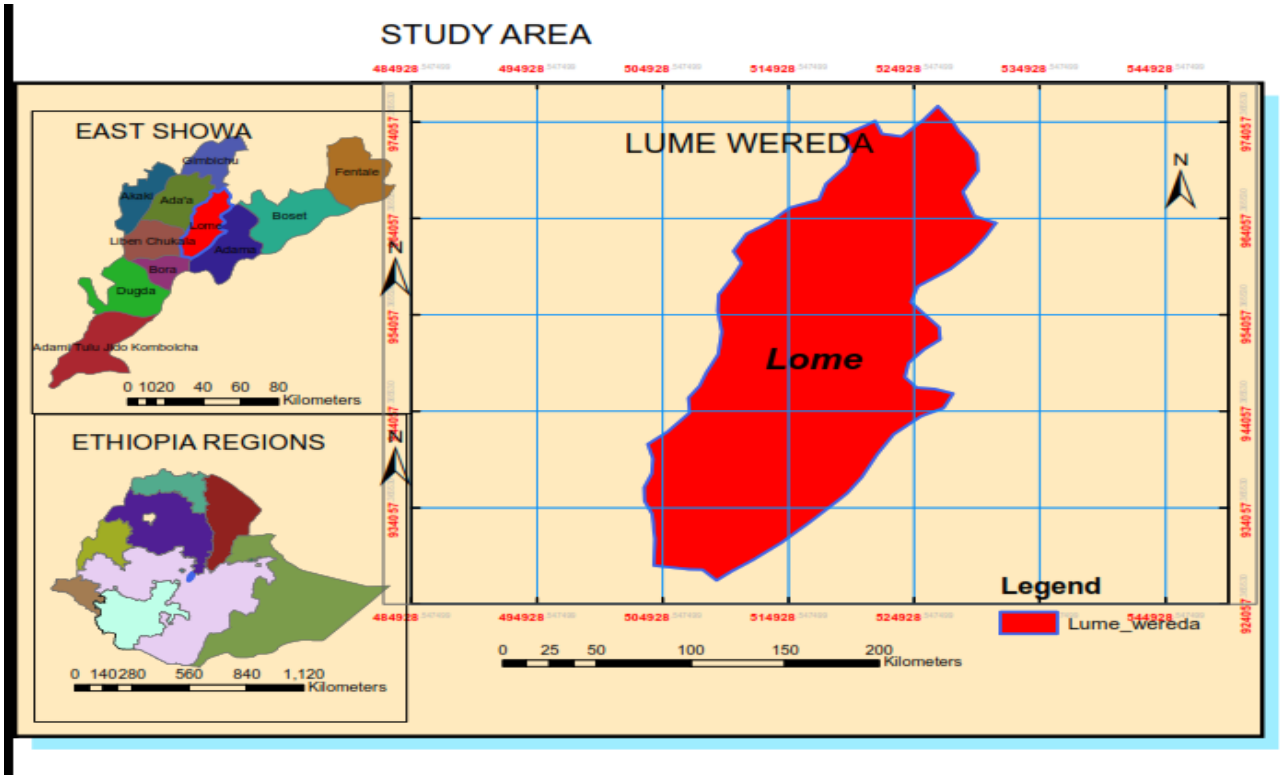


Figure 26--Maps of Lome Woreda, East Shewa District, Oromia Region, Ethiopia 201

**4.3.2. Study Period**

All needed data, that means health performance, socio economic status, cultural, Administrative issue of 2017/2018 Were collected, analyzed and Interpreted from January 28/2019 to Feb30/2019.

**4.3,3 Design of the study**

Descriptive cross-sectional analysis was carried out using the prepared questionnaire, softcopy of available data and review hard copy in the Lome district office as well as interviewing and discussion with concerned body.

**4.3.4 Methods of data collection**

Health and health related data were collected and compile from health office , education., agriculture, water and energy ,culture and truism office and unavailable information from other different publication and literature Standard semi structured questionnaires were used as tools and reviewing available data was used for collecting district health profile. The assessment survey marks the involvement of multiple department offices at various levels to ensure credibility of the findings. Before starting data collection brief discussion with woreda Health office and other offices on the purpose and benefit of this work were takes place.

**4.3.5. Data analysis procedures**

Micro-Soft Excel was used to compile and analyze the collected data. Descriptive statistics like frequencies, percentages and ratio was calculated to describe the collected health profile data. The result is presented in the form of narration; table and figure will be used.

**4.3.6. Ethical Consideration**

A formal letter will be submitted to the data manager at each source organizations in order to get access to the data. Confidentiality was assured and maintained. (Ensuring that information is accessible only to those authorized to have access).

**4.3.7. Dissemination of results**

The result of the study was disseminated to Addis Ababa university school of public health, East Shewa zone Health office and Lome Woredas Health Office

**4.3.7. Operational Definition**

**Contraceptive acceptance Rate (CAR)**: - proportion of women of reproductive age (15-49 years) who are not pregnant who are accepting a modern contraceptive method (new and repeat acceptors).

**Ante natal care 1 (ANC1)**:- Number of pregnant Women received ante natal care at least one time.

**Antenatal care 4 (ANC 4)**:- Number of pregnant Women received ante natal care at least four time.

**Post Natal Care Coverage**: - Proportion of women who seek care, at least once during postpartum (within 42 days after delivery), from a skilled health attendant.

**Still Birth rate**: - proportion of stillbirths from total births attended by skilled health attendants.

**TB treatment cure rate**:-percentage of a cohort of new smear-positive TB cases registered in a specified period that was cured as demonstrated by bacteriologic evidence (a negative sputum smear result recorded during the last month of treatment and on at least on one previous occasion during treatment).

**TB detection Rate**: - TB case detection rate is number of new pulmonary and extra pulmonary (all forms) TB cases detected, among the TB cases estimated to occur countrywide.

**TB treatment success rate**: - a percentage of a cohort of new TB cases registered in a specified period that successfully completed treatment.

**Maternal mortality rate**: - Number of deaths assigned to pregnancy-related causes during a given time interval

**Infant mortality Rate**: - Number of deaths of children < 1 year of age reported during a given time period among Number of live births reported during the same time period.

**Skilled Birth Attendant Delivery**: - delivery which is attended by health professionals in Facility

**Contraceptive acceptance Rate (CAR)**: - proportion of women of reproductive age (15-49 years) who are not pregnant who are accepting a modern contraceptive method (new and repeat acceptors).

## 4.4 Results

### 4.4.1. Historical Background

Lome is one of the woredas found in Oromia region and of woredas found in East Shewa Zone. Lome, who was known as called Lome Miecha who was the land lord of the woredas before the reign Hailesilase government. There is no written document to confirm this. In this woredas different Historical area were present like it has different recreational area like; Holqaa Qoqa (Koka cave), Holqa Finch awe Mariam ,Gara Gango,Malka Taffii and Bosona Biyoo Besakha Mojo holly water were found in the woredas .which are the source of health that believe orthodox religion followers from different area come to that woredas.

### 4.4.2 Geographic's and climate

Lome woredas is 73Km away from Addis Ababa and 19Km away from Adama town the administrative seat of East Shewa Zone. The woredas is found in the eastern part of East Shewa Zone, is surrounded by four woreda's of East Shewa and one woredas of Amara region. The woredas shares border on the North- bounded by Gimbichu district and Amara region, on the South – bounded by Bora and Adama

district, on the East- bounded by Adama district, on the West- bounded by Liban Chukala and Adea district. Towns in woredas include Ejere, Daka bora and Koka Ejersa, Biyo, kemise. Mojo is the administrative seat of the woredas. The total area of the Lome woredas is about 75220.32 hec Area. As a result in east Shewa zone woredas' gets the 2nd rank in terms of area next to Ade'a woredas. According Lome woredas land use and environmental protection office report, total land area of the woredas is 75,220.32 hec. From the total land area of the district potentially cultivable land constitute 51830.4ha, (cultivated) land 47582hac, manmade forest (reforested) 2462ha, uncultivable land (hills) 7523ha, grazing land 361.08ha and others 17272ha. It is found 1600-2500 meter. It is over sea level, with some southern mountains and plateaus accounting for 50 percent of the district. Above 2000m and the rest 50% is < 2000m. Climatically, the district is classified into highland (dega) 5%, midland (windage) 95%. Rain fall is ranges from 800 to 1000mm and Temperature of the woredas estimated between 16c to 24c. According to woredas agriculture office, four major seasons occur per year; only one seasons (mehir) concessive for production of agricultural activities.

### 4.4.3. Administrative and political structure

Administratively, Lome woredas is divided into 41 kebelles (35rural and six urban kebelles) of the smallest administrative units. It has a well-organized political structure and its own counsel that works harmoniously with all governmental sectors of the district and the zone also all administrative offices are found in Mojo town.

### 4.4.4. Demographic Information

The 2007 national census projected 2018 total population for this woredas was 119,016 of whom 62,177 were men and 56,839 were women. From these total population 77% of woreda's population residing in rural areas and 36,655 (33%) Live in Urban area. The majority of Ethiopian Orthodox Christianity is followed by the residents, with this belief was observed by 90.11 percent of the population reporting, while 3. 4 percent of the population practiced traditional beliefs, 3.27 percent of the populations were Protestant, and 2.72% of the population were Muslim.

Table 13-Population estimated by kevels and age category, Lome, East Showa Oromia, 2018

| S.No | Name of Kebele | Total Pop- | M | F | HH (4.8) | <1y(3.16) | 1-5ye(16.43) | 6-15years | ( Women 15-49)47.61 | Rem |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Biyo Biska | 2766 | 1355 | 1411 | 576 | 89 | 365 | 863 | 547 | |
| 2 | Bali Abo | 4951 | 2426 | 2525 | 1031 | 159 | 654 | 1544 | 978 | |
| 3 | Jirmi Insinslole | 3548 | 1739 | 1809 | 739 | 114 | 469 | 1106 | 701 | |
| 4 | Arifeta Jegola | 2709 | 1327 | 1382 | 564 | 87 | 358 | 845 | 535 | |
| 5 | Momoshoki | 3316 | 1625 | 1691 | 691 | 107 | 438 | 1034 | 655 | |
| 6 | Tafi Abo | 3134 | 1536 | 158 | 653 | 101 | 414 | 977 | 619 | |
| 7 | Shera Dibandiba | 3702 | 1814 | 1888 | 771 | 119 | 489 | 1155 | 732 | |
| 8 | Adada Denbela | 2693 | 1320 | 1373 | 561 | 87 | 355 | 840 | 532 | |
| 9 | Melmele | 1363 | 668 | 695 | 284 | 44 | 180 | 425 | 269 | |
| 10 | Tedde Dildima | 3663 | 1795 | 1868 | 763 | 118 | 484 | 602 | 724 | |
| 11 | Golje Dildima | 3170 | 1553 | 1617 | 660 | 102 | 419 | 988 | 626 | |
| 12 | Bola Buta | 3227 | 1581 | 1646 | 672 | 104 | 426 | 1006 | 638 | |
| 13 | Jogo Gudedo | 3605 | 1766 | 1839 | 751 | 116 | 476 | 1124 | 712 | |
| 14 | Koliba Gode | 4235 | 2075 | 2160 | 882 | 136 | 560 | 1320 | 837 | |
| 15 | Dkabora kara | 4817 | 2360 | 2457 | 1004 | 155 | 702 | 1436 | 952 | |
| 16 | Haro Yohanes | 2595 | 1272 | 1323 | 541 | 84 | 342 | 809 | 513 | |
| 17 | Kiltu Baja | 4194 | 2055 | 2139 | 874 | 135 | 554 | 1308 | 829 | |
| 18 | Kunche dalota | 2778 | 1361 | 1417 | 579 | 89 | 367 | 867 | 549 | |
| 19 | Tulurahe Birmaji | 2337 | 1145 | 1192 | 487 | 75 | 309 | 1113 | 462 | |
| 20 | Kora Fichawa | 1812 | 378 | 888 | 378 | 58 | 240 | 729 | 358 | |
| 21 | D/ Shaanbure | 2777 | 1361 | 1416 | 579 | 89 | 367 | 866 | 549 | |
| 22 | Kurma Fatole | 3649 | 1788 | 1861 | 760 | 117 | 483 | 1137 | 721 | |
| 23 | Bika | 1811 | 887 | 924 | 377 | 58 | 240 | 564 | 358 | |
| 24 | Muda Senkele | 2671 | 1309 | 1362 | 556 | 86 | 353 | 833 | 528 | |
| 25 | Ejersa Jora | 3016 | 1478 | 1538 | 628 | 97 | 407 | 932 | 596 | |
| 26 | Derer Denble | 2853 | 1398 | 1455 | 594 | 92 | 377 | 889 | 564 | |
| 27 | Dungugi Bekele | 3222 | 1579 | 1643 | 671 | 104 | 425 | 1005 | 637 | |
| 28 | Koka Nagawo | 2482 | 1216 | 1266 | 517 | 80 | 328 | 774 | 490 | |
| 29 | Koka Ejersa -01 | 4130 | 2024 | 2106 | 860 | 133 | 546 | 1287 | 816 | |
| 30 | Tiliti Garbi | 2264 | 1109 | 1155 | 472 | 73 | 283 | 722 | 447 | |
| 31 | Ejere walkite | 3452 | 1691 | 1761 | 719 | 111 | 556 | 976 | 682 | |
| 32 | Dani Jatani | 2743 | 1344 | 1399 | 571 | 88 | 363 | 855 | 542 | |
| 33 | Fincha'a Mariam | 1416 | 694 | 722 | 295 | 46 | 187 | 441 | 280 | |
| 34 | Ardaga Kordida | 2865 | 1404 | 1461 | 597 | 92 | 379 | 893 | 566 | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 35 | Nanawa | 3040 | 1490 | 1550 | 633 | 98 | 401 | 646 | 601 | |
| 36 | Dildila Gombore | 3658 | 1792 | 1866 | 762 | 118 | 483 | 1141 | 723 | |
| | Total | 119016 | 62177 | 56838 | | | | | | |

**Population Pyramid**

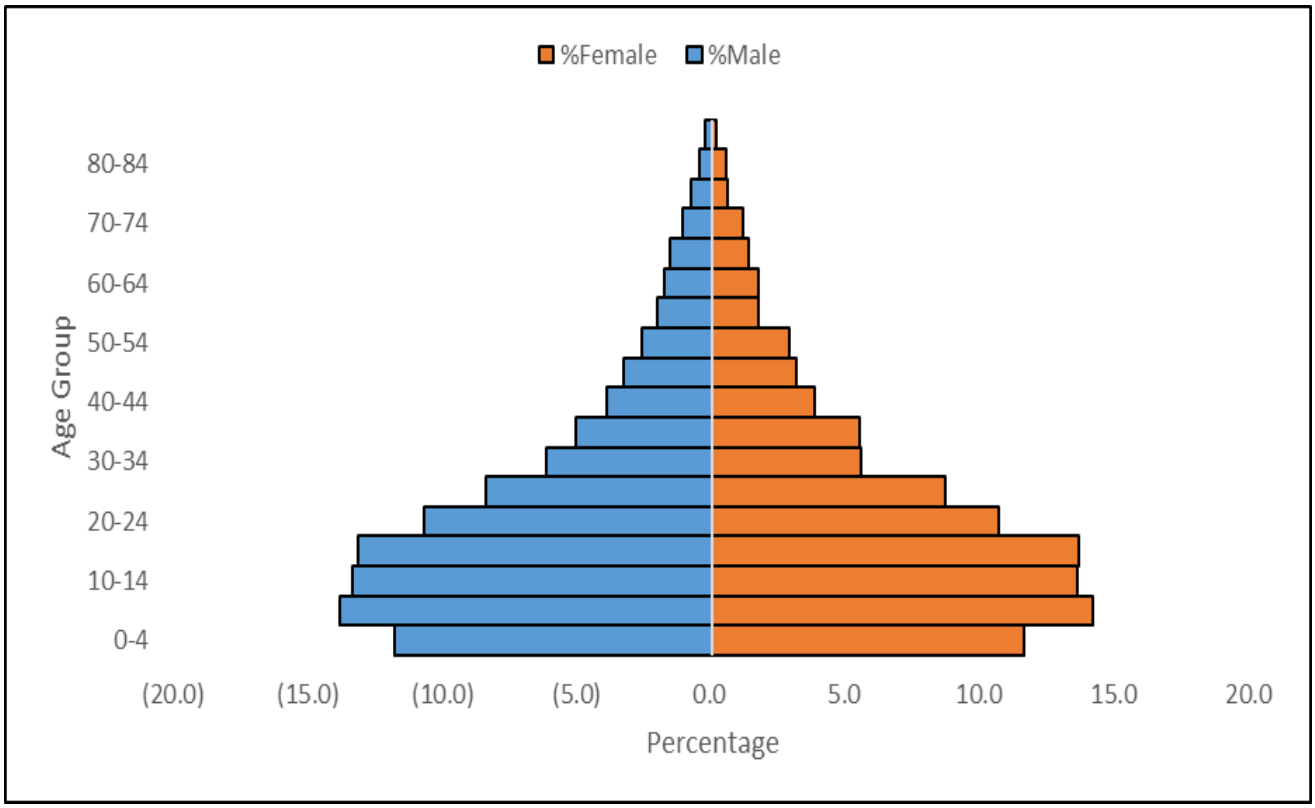


Figure 27-- Population Pyramid of Lomé Woredas, East Zone, Region of Oromia, 2018

### 4.4.5. Productivity and income

Agriculture is the primary income of the woredas. The land density of the woredas is 75,220.32 hectares of the total land cultivated is 47,582 hectors and grazing 361.08 hectors. By annual 1,854, 124 kuntal produced has been produced. Cereals like Teff, Wheat and Woredas were the main annual crops in the woredas. The average total income 2033.33 etc. birr.

### 4.4.6 .Education

In 2010,there are 1-4 )1st cycle 38 school,1-8 2nd cycle 24,secondary (9-10 )3(three)Preparatory (11-12) 2 (two) and 5 (five) non-governmental Kindergarten, 1-4 1cycle 5 (five ). However, there is no Governmental and Non Gove mental college in the woredas. A total of 71 primary and secondary

schools with 300 male&203 female teachers in the woredas education office received data from the woredas education office

Table 14-Number of students enrolled and their teachers by Sex in Lome Woredas, Oromia, 2017/18

| Schools type | Number of school | No of teachers | | | | | | | | | | Gender | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | TTI | | Diploma | | 1st Degree | | 2nd degree | | Total | | | | |
| | | M | F | M | F | M | F | M | F | M | F | M | F | Ratio |
| K.G | 5 | 3 | 8 | | | | | | | | | | | |
| 1-4 | 24 | | | | | | | | | | | 4140 | 4915 | |
| 1-8 | 38 | | | 165 | 174 | 71 | 35 | | | | | 8394 | 7352 | |
| 9-10 | 3 | | | | | 37 | 9 | | | | | 658 | 491 | |
| 11-12 | 2 | | | | | 21 | 3 | 3 | 1 | | | 48 | 59 | |
| Total | | | | | | | | | | 300 | 203 | | | |

Table 15-The reason of dropout of student in Lomé district, East shoa zone Oromia region Feb2017/18

| Sir No | Reason of drop out Student | Male | Female | Total |
|---|---|---|---|---|
| 1 | Marriage | 3 | 29 | 32 |
| 2 | Incoutry displacement | 73 | 69 | 142 |
| 3 | Lake of Family support | 81 | 61 | 142 |
| 4 | Disease | 49 | 35 | 84 |
| 5 | Death | 8 | 2 | 10 |
| 6 | Migration | 4 | 3 | 7 |

### 4.4.7. Facilities/Infrastructures

Lome woredas is 41 kebele from this 6 are urban kebele and 35 rural kebeles are access of electric power15 kebele access to electric &7 (seven ) access to solar the total electric coverage 13.5% only got electric , in accessibility of road to health facility and health post road all are access and the total road accessibility of road can be 95.5% It's Woredas. Consequently. The entire Woredas community served it properly.

### 4.4.8. Health System of Woredas

#### 4.4.8.1 The Woredas Health Office Organization (Oregano gram)

The Five (5) Technical Team and two (2) Supportive Supporting Woredas Health Office The technical team are the head of the woredas health office plan and Budget, Health Insurance, communicable disease control. Regulatory, Human Resource Development and management and supportive secretory recording and Documentation post are present in the woredas. The secretary and recording and documentation are the two supporting teams at the Woredas health office.

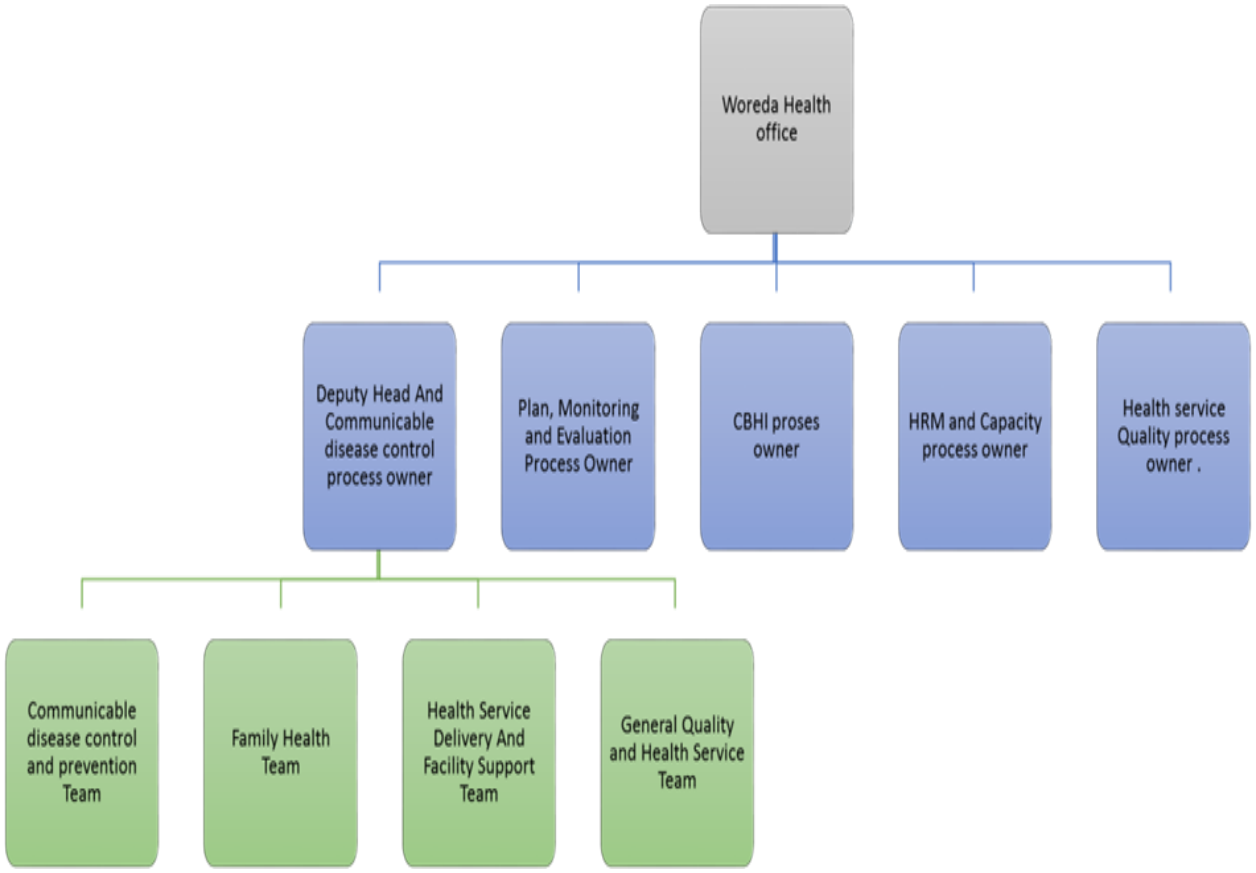


Figure 28--Structure of the organization Lome Woredas, Oromia, 2017/18

### 4.4.8. Health facilities and their services

Regarding health facilities, the primary health care unit is a system designed to improve the connection between health centers and health posts. According to the principle, in this system all health posts activity supported by health center employee's one health center includes five satellite health posts all inpatient and outpatient service health center.

Table 16-Lome Woredas Health Facility Infrastructures, East Showa Zone, Oromia, 2017/18

| Sir No | Kinds of facilities | Health Facilities | |
|---|---|---|---|
| | | No of health center | Number of health post |
| 1 | Electricity power | 5 | 5 |
| 2 | Water Supply | 3 | 6 |
| 3 | Telecommunication Service | 5 | 0 |
| 4 | Road transportation access woreda to town | 5 | 25(all time ),10(Only in winter season |

### 4.4.9. System with cold chain

For vaccine efficacy, a strong cold chain management system is important and avoids outbreaks. Both health centers (five) and now five health centers have working refrigerators.

### 4.4.10 Unit for Main health care Unit in primary health care

A framework for strengthening the connection between health centers and health services is the primary health care unit. In this story, System all activity in health posts supported by health center staff according to principle one health center include five satellite health post All health center Inpatient and outpatient service. The woreda100 percent health coverage by health center and 100 percent by health post

Table 17-List of health facilities and their respective health posts for the catchment, 2018

| No | PHCU | Number of Health Post supported by the catchment | Total pop of the catchment | Male | Female | Remarks |
|---|---|---|---|---|---|---|
| 1 | Biyyoo | 7 | 24126 | 11822 | 12304 | |
| 2 | Tade | 7 | 21956 | 10758 | 11198 | |
| 3 | Daka Bora | 7 | 21310 | 10442 | 10868 | |
| 4 | Koka | 9 | 29993 | 14697 | 15296 | |
| 5 | Ejere | 8 | 21631 | 10599 | 110320 | |

### 4.4.11. Indicators for health and vital statistics

In order to estimate/assess the performance of health activities, health indicators and vital statistics are important. And to lay down policies. Some essential statistics, such as IMR, MMR, NMR, NMR, have no mortality data. PRM, Mortality Rate under Five, and Crude Death Rate.

Table 18-Lome Woredas, Oromia, population and vital statistics, March 2018

| No | Indicators | Pop Data of the District | Percent |
|---|---|---|---|
| 1 | Total pop | 119,016 | 100% |
| 2 | Male | 62177 | 52% |
| 3 | Female | 56839 | 48% |
| 4 | Urban | 36 ,655 | 33% |
| 5 | Rural | 82361 | 77% |
| 6 | Total live birth | 4134 | 3% |
| 7 | Under one years | 3563 | 3% |
| 8 | Under five years | 14789 | 12.4% |
| 9 | Under 15years | 34052 | 28.6% |
| 10 | Women 15-49 | 21867 | 18.4% |

### 4.4.12. Maternal and child immunization coverage

The expanded program of Immunization focuses on diseases preventable by vaccines and includes 11 diseases. With vaccines. In 2017/18, 3297 (79.8 percent) were vaccinated with BCG among 4130 live births in this woredas. Furthermore, 3241(84.6%) of eligible 383 OPV and 3241(84.6%) of eligible 3832 penta3 were immunized.in this year's OPV3 and Penta respectively .Also Measles from eligible of 3832 under one year 3002(78.3 %) were fully immunized .From the total of 3832 under one protected 3386(88.4 %) At birth, they were protected .Her mother was vaccinated two or more times, TT vaccine were taken during pregnancy. Of 22137 planned TT2 and immunize 17547(79.3 %) were immunized during the same years.2017/18.For pregnant mothers plan 3332 performed 3386(>100%) TT2and more were immunize in Lome woredas.

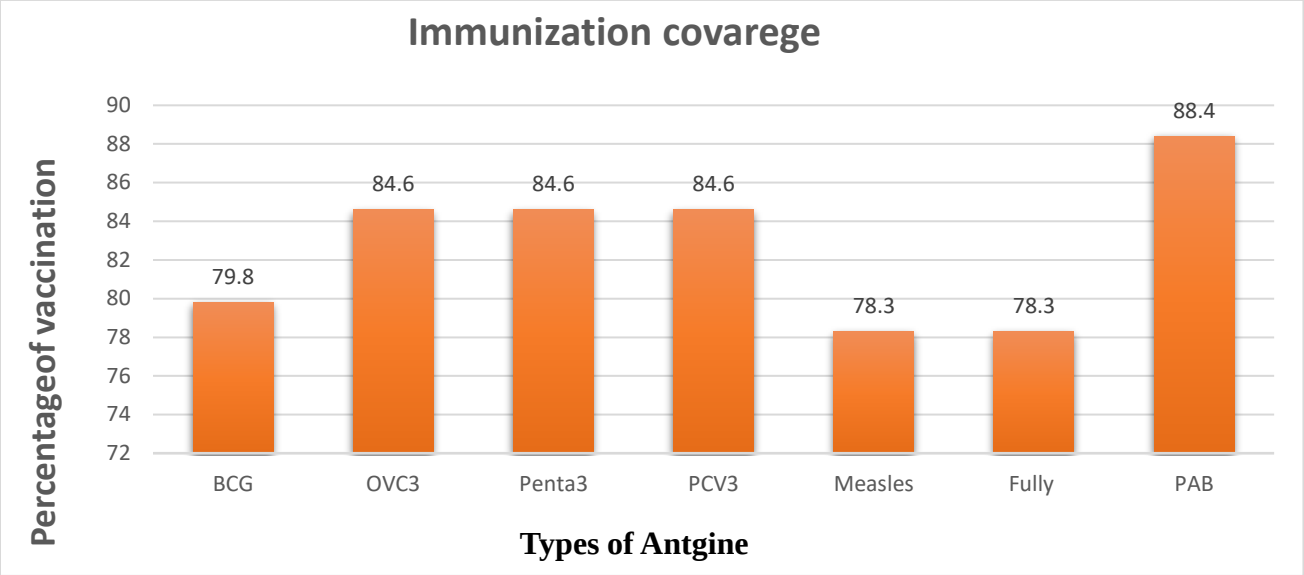


Figure 29-Vaccination coverage of children in Lome Woredas, Oromia Region, 2017/18

### 4.4.2 .Service in Maternal Health

The total Family planning service plan 22137 performed 20960(95%) long acting plan 15493 performed 7162 (46%) , short Family planning plan 22137 performed 13793(62%). Antenatal care service plan 4130 were given for 3065(74 %) mother and skilled delivery were performed or 2327(56%) PMTCT plan 3065 Perform 2457(80%) No real for maternal death in 2017/18.

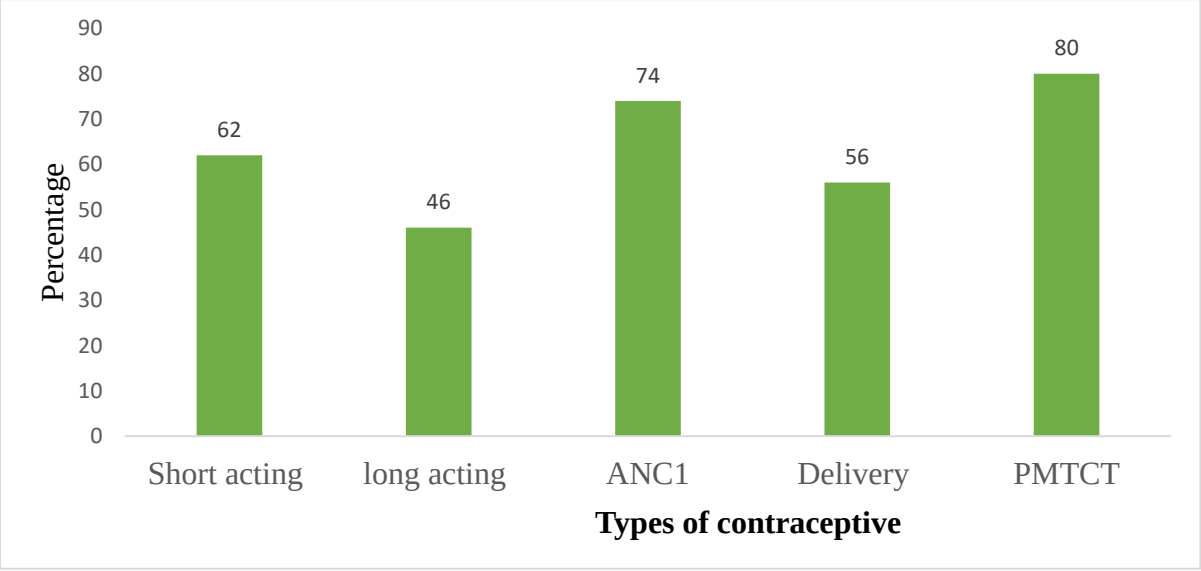


Figure 30-Maternal health coverage in Lome Woredas, East Shewa Zone, and Oromia 2018

Table 19-Types of water source in Lome Woredas, East Shewa District, Oromia, 2017/18**.**

| Functional water source | No. |
|---|---|
| Hand dug | 59 |
| Deep Well | 14 |
| Shallow Well | 1 |
| Total | 73 |

**4.4.2.1 Latrine Coverage and Utilization**

Among the 25522 total house hold 180471(70%) have latrine in 2017/18. Latrine utilization in the woreda72% the Open defecation free) Kebels 5 (five) villagers use their latrine properly.

**4.4.2.2 Top leading triggers of visit by outpatients (Morbidity**)

Acute upper Respiratory and Acute febrile disease is the main cause of ambulatory morbidity in adults and pediatrics in woreda, which is responsible for 4061(21.30 per cent) and2735 (19.8per cent) cases respectively. In 2017/18. Diarrhea and all types of malaria are among top ten diseases that pose outpatient morbidity in the District

Table 20:- Adult Top Ten leading triggers of ambulatory morbidity Lome District, 2017/18

| Ranks | Types Of disease | No | % |
|---|---|---|---|
| 1 | Acute Upper Respiratory infection | 4061 | 21.30% |
| 2 | Acute febrile illness | 2734 | 14.18% |
| 3 | Diarrhea | 2217 | 11.50% |
| 4 | Dyspepsia | 2046 | 10.61% |
| 5 | Malaria | 1061 | 9.00% |
| 6 | Trauma (Injury, Fracture etc) | 1735 | 8.59% |
| 7 | Infection of the skin and subcutaneous tissue | 1553 | 8.06% |
| 8 | Urinary tract infection | 1329 | 6.89% |
| 9 | Pneumonia | 1130 | 5.89% |
| 10 | Other or unspecified disease of the eye | 771 | 4.00% |

Table 21-Woreda, pediatric ten top leading causes of outpatient Lome Zone, Oromia, 2017/18

| Ranks | Types Of disease | No | % |
|---|---|---|---|
| 1 | Diarrhea (non bloody) | 2735 | 19.8% |
| 2 | Acute febrile illness | 2217 | 16.05% |
| 3 | Acute Upper Respiratory infection | 2046 | 14.82% |
| 4 | Malaria | 1735 | 12.56% |
| 5 | Infection of the skin and subcutaneous tissue | 1553 | 11.24% |
| 6 | Trauma (Injury, Fracture etc) | 1329 | 9.62% |

| | | | |
|---|---|---|---|
| 7 | Disease of the musclo skeletal system and connective tissue | 1130 | 8.19% |
| 8 | Urinary tract infection | 1034 | 7.49% |
| 9 | Pneumonia | 925 | 6.7% |
| 10 | Other or unspecified disease of the eye | 802 | 5.8% |

**4.4.2.3. Malaria:**

There are 31 malaria kebels in this woredas with a population at risk of 88,654. In the course of 2018. Any of the households In the case of malaria, kebels (42000) is supplied with ITNs that is 100%coverage in 2007.However, there are no specific details on the coverage on the use of ITNS among the households supplied because ITNS distribution period is more than three years. Indoor Residual spray was done for 1723 (51%) houses in 2017/18 with Deltamethrin. Indoor Residual spray was added to 1723 (51 per cent) homes in 2017/18 with Deltamethrin. Total of 3971 suspected malaria cases 587 Confirmed non-death cases Mentioned to me. No lack of malaria supplies, such as Coarthem and RDT in the woredas, occurred in the same years.

**4.4,2,4 Tuberculosis and leprosy**

A total of 112 tuberculosis case (All form of Tuberculosis) were reported health to the woreda in 2010 EFY. From the total all form of Tuberculosis case 8 negative 98 PTB Positive and 6 Extra PTB. The TB detection rate of the woredas was 48% and 89% of TB cure Rate and 98% TB Treatment success rate respectively. There was 1(one ) Defaulter and1 (one) Death on TB Treatment in the 2018 There Were No Leprosy cases data in the same year in Lome woredas.

**4.4.2.5. HIV/AIDS**

The positive finding has been confirmed. HIV/ADIS prevalence is 0.2 percent. There are 233 PLWHA in the woredas. Of 22 new cases, 22 people have begun the ART service. All Health center give this service in the woredas .In all Kebeles community awareness on prevention and control of HIV done.

**4.4.2.6. Sever acute malnutrition (SAM)**

Sever acute malnutrition (SAM) is a big public health issue for woredas. There were 41 OTP sites and 5 SC sites it was founded in2017/18. Seventy five New admissions have been registered to and-no admissions The SC of the woredas. There were also CBN programs working on Nutritional Practices in 35 kebels, which enrolled 6783 children in the program in 2017/18.

**4.4.2.7 Illness and other disasters;**

There are no outbreaks or disasters in this Woredas that have occurred in the last two years. 2017/201, Consequential years.

**4.4.2.8. Distribution of the budget for woredas health office**

In 2017/18, 98,078,562.00 ETB was planned as woredas. With a gross budget of 13,778,262,513 for the health office. In the budget, it had been allocated to different programs. The woredas had been allocated to salary and to carry out numerous regular tasks. Within the same year 340950.00ETB from d/t donors was allocated to this woredas from the provincial health office for (Wash) Promotion of sanitation and health and others.

**4.4.2.9. Human Resources;**

In this district there are 78 health practitioners, 67 health extension staff and 64 support workers. Were hired. The woredas health office and d/t governmental health institutions.

Table 22-Distribution of human capital for all groups in the Lome Woredas Health Office, 2017/18

| Profession | Level of Education | Number | | |
|---|---|---|---|---|
| | | Male | Female | Total |
| Health Officers | Degree | 8 | 9 | 17 |
| Nurse | Degree | 4 | 13 | 17 |
| | Dip | 8 | 7 | 15 |
| Environmental Health | Degree | 2 | 1 | 3 |
| Laboratory | Degree | 1 | 1 | 2 |
| | Degree | 2 | 2 | 5 |
| Pharmacist | Degree | 1 | 3 | 4 |
| Druggist | Degree | 2 | 3 | 5 |
| Mid- wafers | Degree | 3 | 4 | 7 |
| | Degree | 1 | 1 | 2 |
| HEWs | Certificate | 0 | 67 | 67 |
| PHN | Diploma | 0 | 1 | 1 |
| Supportive staff | Degree , Diploma Certificate | 4 | 64 | 64 |
| Total | | 35 | 117 | 152 |

## 4.5. Discussion

Acute upper respiratory infection is woredas A public health issue with 21, 30 per cent of the overall identified disease Out of the visit. Even if acute febrile illness and diarrhea are among the top ten morbidity .No deaths have been reported due to these diseases in the year of 2018. This may be due to disease awareness of the community increase and the service is near to the community and Improved clinical diagnosis of any fever, such as signs of RDT at post-health stage. Febrile illness (14.18 percent) was ranked 2nd in the adult outpatient and 2nd in the adult outpatient. And Diarrhea was the 3rd leading causes of morbidity in (11.50%) adult OPD and under Five ten top Diarrhea 1$^{st}$, Acute Fiberail illness 2$^{nd}$ Acute Upper Respiratory 3rd according to woredas prioritization setting. Acute upper respiratory

infection is the cause of OPD visited and may be attributed to various reasons in the woredas:-like Environmental Hygiene Small number of ODF kebels, Low Latrine use of woredas. Treatment of acute febrile disease should be accompanied by a clear laboratory Diagnosis to rule out malaria, typhoid fever or other disease with fever such as symptoms that often resemble one over the other. Woredas Tuberculosis Diagnosis Rate was 48 per cent lower than the Regional Case Detection Rate of 2018, which was 65 per cent and below 70 per cent suggested by the WHO, usually in 2018. A total of 112 all types of tuberculosis 112/100,000 population cases have been diagnosed and registered in a woredas that is below 163/100, 000. Of the 13,650 tested for HIV, 22 were positive. This may reveal that there has been a poor health awareness creation from the health professional for all population at risk particularly Commercial sex workers, Long truck driver etc. In most cases Female is more vulnerable than male as we observe a total of PLWHIV 233 in woredas out of 160 in which female 73 were male. Also in PMTCT out of 3065 ANC 2457(80%) obtained the service. According to data from the wore-on HIV positivity rate, it was 0.2% in 2018. The woredas reported sustainable immunization coverage of preventable diseases for children under the age of one year. The total provision of safe (potable) water sources rose from 65.5 per cent in 2018. This is attributable to new additional stand pumps installed in 4 kebels and restored not mechanically shallow and deep well in the rest of the rural kebele. In the case of malnutrition, 35 kebels in the woredas were under the CBN. Forty-one (41) OTP and five (five) SC sites were found in 2018. This could be attributed to the inclusion and functionality of OTP services in all health posts. The TSF and CBN initiative have focused on nutritional practices in 35 kebels, which enrolled 6783 children in 2018. There were no cases admitted to the SC site of the woredas.

### 4.6. Limitation's

Lack of information Consistency and full data, Incompleteness and uncertainty of such evidence related to health (Latrine, ITNS utilization), the lack of mortality Data and other associated health and health information

### 4.6. Problem Identification and Prioritization

Table 23:-Problem identification and prioritization

| Sir No | Identified Problem | Relevance | Availability information | Urgency the problem | Feasibility | Political acceptability | Applicability | Ethical acceptability | Total | Rank |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Low Tb detection Rate | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 19 | 1 |
| 2 | Low Latrine Coverage | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 18 | 2 |
| 3 | Low Antenatal Care | 2 | 2 | 3 | 2 | 3 | 2 | 3 | 17 | 3 |
| 4 | Low HIV positivity Rate | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 15 | 4 |

### 4.8. Conclusion

Upper Respiratory illness and acute febrile disease were the leading cause of adult outpatient morbidity in the case of woredas, respectively, in 2017/18. Diarrhea, malaria and pneumonia are among the top ten leading causes of woredas morbidity for both. In the case of tuberculosis, the incidence of diagnosis of woredas was below the guideline of Woredas Health Office and ORHB.

In addition, one death was reported and one treatment failure due to low attention Diarrhea was the top ten leading morbidity in woredas due to poor use of latrine and only 5 ODF kebels in woredas. Both clients had poor comprehension and negative views on HIV testing services. HIV Screening at the PICT location was small and the average prevalence of HIV infection among the general population was 0.32%. Extreme acute malnutrition is an important public health problem for woredas. A major part of the kebels in the woredas were malnutrition in 6783 children in the same year. ART service was provided only at one health center in the woredas.

### 4.9. Recommendations

- Knowledge development by health extension staff to boost, suggesting a lower awareness of sanitation among the people in the woredas. Even though latrine coverage was 73%.
- Any OPD clients and pregnant mothers attending a health care center should be recommended to be screened or tested for HIV.
- Better attainment in the health service coverage should be encouraged.
- Vital statistics health an indicator occurring in the woredas has to be documented and the surveillance system and its documentation should have to be strengthened and improved.
- Focus on the four Transformation agenda like. Quality of data, Woredas transformation etc.

- Focus on HIV risk group is important

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**CHAPTER–V SCIENTIFIC MANUSCRIPT FOR PEER REVIEWED JOURNALS**

## 5.1. EPIDEMIC INVESTIGATION OF MEASLES-FITHE PRISON, NORTH SHEWA ZONES, OROMIA REGION, ETHIOPIA, DEC2019

**Abstract**

**Introduction:** Measles is an extremely infectious respiratory illness transmitted by sneezing and coughing through droplet infection. An epidemic of measles is ongoing in the regions of Ethiopia, according to an official survey. Fiche prison was one of the areas affected by measles outbreaks in the Oromia region in 2019. We examined for effective control measures to confirm and recognize risk factors for outbreak.

**Methods:** We used descriptive study followed by1:2 unmatched case control study from 20/2/2019-/1/3/2019. A case was defined as any person who resided in Fitche Prison with fever and maculopapular (nonvascular) generalized rash and developed any of the following symptoms; cough, coryza or conjunctivitis (red eyes) February 2nd to March 3rd /2019. A sample of 40 case and 80 control were interviewed questionnaire to assess the possible factors associated with developing measles case. Data were entered into Epi-info-version 7.2.4 and analyzed by using SPSS version 24.

**Result**: A total of 40 suspected measles cases had been identified with no death. Two out of Six (33%) of the cases were under 5 years, 2.5% greater than 15 years and 95% with unknown vaccination status. Three of five blood samples were positive for measles IgM. Overall attack rate was 2.7per 100 populations for the prison. AOR2.709 [95%CI (1.067_6.880) P=0.036] Over crowded living and contact with case AOR 3.416[95%CI (1.358_8.591) P=0.009 had been independent risk factor for contracting the disease while Adjusted odd ratio AOR 0.323[95% CI = (0.123_0.898) P= 0.022] being vaccinated against measles was protective factor for the disease.

**Conclusion and Recommendation**:

A confirmed measles outbreak in Fiche Prison with unknown vaccination status in &greater than 15 year‘s age group. Age specific attack rate for less than five years’ and the highest. Treat and isolate the case, vaccination given for inmates children, Awareness creation for People in prison the government centered on Prisoners and health standard leavening situation have to be comply with and provide attention.

### 5.1.1 Introduction

Measles is a highly contagious viral disease spread by droplet infection through sneezing and coughing. Over recent months, spikes in case numbers have also occurred in countries with high overall vaccination coverage, including the

United States of America as well as Israel, Thailand, and Tunisia, as the disease has spread fast among clusters of unvaccinated people. Measles is one of the world's most contagious diseases, with the potential to be extremely severe(1).

The Most recent year for which estimates are available, measles caused to close to 110,000 deaths even in high income countries, complications result in hospitalization in up to a quarter of case, and can lead to lifelong disability, from brain damage and blindness to hearing loss(2)(3). The disease is almost entirely preventable through two doses of a safe and effective vaccine. For several, however global coverage with the first dose of measles vaccine has stilled at 85 %. This is still short of the 95% needed to prevent outbreaks, and leaves many people, in many communities, at risk. Second dose coverage, while increasing stands at 67% with government and Partners such as the measles Initiative, Gavi the vaccine Alliance, UNICEF and others, response operations are underway to bring country outbreaks under control, Strengthen Health Service, and increase vaccine coverage(4).

In London Prison Measles outbreak occurred in July 2016, with more than 1500in mates of which two -thirds were sentenced and one -third constituted new influx. This was the second case of a reported measles outbreak in custodial setting in England. The previous outbreak occurred in Yorkshire prison in 2013. In both outbreak s, the source of infection originated from a member of staff and there was low known immunity of prisoners as well as a staff at a time(5).

Measles is everywhere. All WHO regions are experiencing large, often extended outbreaks exceeds the expected number of cases. As the expected number of cases is specific to the individual country. Outbreaks can range from a few cases in areas where the disease has previously been eliminated to a large number where endemic transmission is ongoing. The risk of measles virus transmission spreading to affect multiple communities within a country or across international borders is especially concerning .As long as measles is a threat anywhere, it is a threat everywhere(6).

Measles case have continued to climb in to 2019, preliminary global data shows that the reported case rose by 300 Percent in over three months of 2019, compared to the same period in 2018. This follows consecutive increases over the past two years. While this data is provisional and not yet complete, it indicates a clear trend. Many countries are in the minister sizeable measles out breaks, with all region of the world experiencing sustained rises in case. Current out breaks include the Democratic Republic of the Congo, Ethiopia, Georgia, Kazakhstan, Kyrgyzstan, Madagascar, Myanmar, Philippines, Sudan, Thailand and Ukraine, Causing many case- Mostly among

Young Children. Targeted Vaccination Programs for Migrant Prisoners could reduce the risks of transmission. In fact, Vaccination for measles should ideally be offered to all incoming Prisoners without A reliable Vaccine History. Measles, Mumps and Rubella vaccination should also be offered to Female Prisoners of Child Bering age without a reliable vaccine history, to protect them against rubella. There are combined Measles ,Mumps ,Rubella and Varicella Zoster Vaccine (7).

In developing countries with vaccination coverage, Epidemics often occur every two or three years and usually last between two and three mouths. Although their duration varies according to population size, crowding and the populations low immunity status. According to the official report, an outbreak of measles is occurring throughout the region of Ethiopia. Initial Symptom include high fever and runny Nosefollowed by a rash descending from the head and neck. Serious complication can develop, specifically in malnourished Patients or in patient with diminished(8).

So, In the context of our study to confirm and assess factors associated with measles outbreak and implement early measles control intervention in Feb 20/2019 measles case was recorded in Fitche prison as Index case he had contact history. The suspected measles cases were reported from North Shewa health office PHEM department on 24 /2/2019. The aim of this investigation was to facilitate rapid implementation of control measures to reduce the extent of disease spread and associated morbidity and mortality and ensure the interruption of virus among the at-risk population, which in turn helps to reach the WHO measles elimination targets planned to eliminate measles in 2020. To describe measles cases by place, time and person characteristics and assess risk factor associated with measles cases combined with targeting control intervention among prison community in Fiche Town, North Shewa zone, Oromia region 2019.

**5.2. Methods**

**5.2.1. Descriptive epidemiology**

Following a request received from zonal public health emergency management unit, the regional health bureau deployed team to the area to investigate the measles outbreak and implement prevention and control measures. We visited the affected area, described cases by time, place, and person case management study to be conducted determine measles risk factors in Fiche prison. We prepared line list, reviewed health facility records and identified cases from patient registers in the health facility. The study was conducted from February 2nd to March 3rd/2019. The outbreak investigation was conducted in prison located in Fitche town, in the North Shewa Zone, Oromia region. The study area is located 112 km away from Addis

Ababa

### 5.2.2 Case Study

We conducted 1:2 case-control study for the assessment of risk factors. Cases were all confirmed cases treated in the prison clinic and controls, were selected from the same prison, and did not exhibit clinical features of measles during the study period. A one-day training was provided for data collectors, using a structured questionnaire customized from a previous study. We reviewed medical record of cases at prison clinic, Face to face interviews using a formal case and control questionnaire and caregivers. Of children. The questioner was translated and the interview was conducted by local language. We reviewed the line list of cases registered in the prison clinic and medical record of cases. Infection with measles virus was considered an outcome variable, independent variables was socio demographic variables (age, sex), measles vaccination status, overcrowding, travel history to areas affected by measles, contact history with the cases of measles,, awareness on measles mode of transmission, prevention and control measures and nutritional status All the data obtained have been entered Analyzed and analyzed using statistical software (using epi info-7. The odds ratio (OR) of 95% confidence Interval (CI) was used to test the relationship between risk factors.

## 5.3. Result:

### 5.3.1. Description of measles case by person

A total of 40 cases of measles without death have been reported from Fiche prison during 20$^{th}$ Feb t0 1$^{st}$ March 2019. The overall attack rate was [(AR) 42.1/1000 pop], most measles cases 38 (95.5%) were male with higher attack rate [(AR) 26.0/1000 pop] was reported (Table 1). Most cases were reported among age group above 15 years of age (Table 1). The Epi curve was a single peak with sharp rise and gradually decline which indicate propagated types of outbreak (Fig 1). There was an outbreak of measles in adjacent district called Dara woredas two weeks before the prison outbreak. Five blood sample was collected at prison clinic and transported to the national laboratory for conformation and three of the samples tested positive for measles IgM.

Table 24-Distribution of cases of Measles by age, sex in Fitche Prison, North Showa Zone, 20th Feb to 1st March 2019**.**

| **variables** | **Category** | **Total population** | **Cases (%)** |
|---|---|---|---|
| **Sex** | Male | 1455 | 38(95.0%) |
| | Female | 42 | 2(0.5%) |
| **Age** | 0-4 | 6 | 2(5%) |
| | 5-14 | 10 | 0(0%) |
| | >15 | 1478 | 38(95.5%) |

Table 25-Measles Attack Rate per 1000 and Case Fatality Rate by age and sex Fitche Prison, North Showa, Oromia Region, Ethiopia, 2019

| Variable | Population | Number of cases | Number of Deaths | Attack Rate per 1000 | Case fatality Ratio (%) |
|---|---|---|---|---|---|
| Age- group | | | | | |
| 0-4 | 6 | 2 | 0 | 333 | 0 |
| 5-14 | 10 | 0 | 0 | 0 | 0 |
| >15 | 1478 | 38 | 0 | 25.7 | 0 |
| Sex | | | | | |
| Male | 1455 | 38 | 0 | 26.1 | 0 |
| Female | 42 | 2 | 0 | 4.76 | 0 |
| Total | **1497** | **40** | **0** | **26.7** | **0** |

### 5.2.3 The Description of measles cases, by place,

An outbreak of measles was observed and reported Health Department of the North Showa Zone on Feb20, 2019. Of the overall cases, 40 (100 percent) were from. Yea. Of the total incidents, 40 are (100 percent they came from of North Showa Zone with No Measles related deaths were also reported from the prison.

#### 5.1.3.1 Description of measles case by time

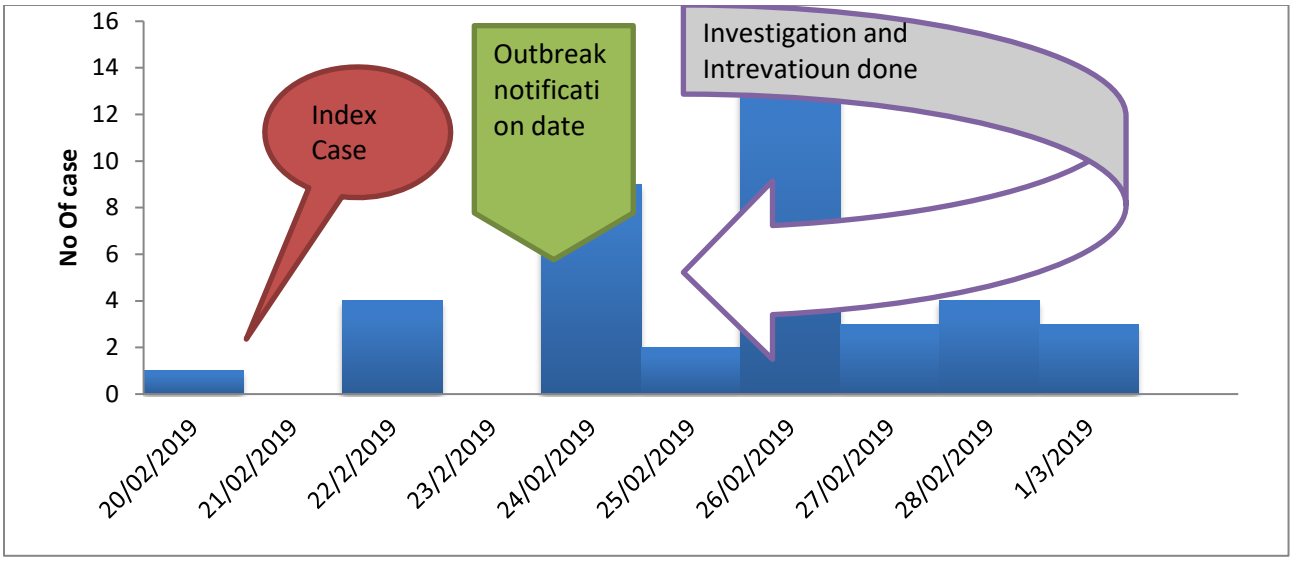


Figure 31- The date onset of Measles outbreak in Fiche prison Fiche Town, North Showa Oromia, Ethiopia 2019 .

#### 5.1.3.2 Laboratory

From Janury 20th Feb to 1st March 2019, a total of five blood sample take and send to EPHI and three of the Positive to Measles Igm.

**Review of Risk Factors**

40 Measles case-patients and 80 community-based monitors were selected and interviewed from this unparalleled case-control sample Fitche prison.

The Prison. Of the 40 cases-patients and 80 controls, 38(95 per cent) and 75 (94 per cent) were males forcase-patients and for controls. Median age of the two cases both cases and controls were 25yrs and 30yrs recpectively of measles. Among the total case AR 26.7/1000(40) And 60%IgM positive clinically measles suspected case the first five case including index case Confirmed three case out of Five sample test in fitche prison from 20/2/2019-3/1/2019. When to compare of measles in fitche prison was higher to the national measles policy, that targeted as One measles per1000person (6). Measles Outbreak had highly

Table 26-Multivariate versus bivariate analysis of risk factors for Measles outbreak-Fithce Prison, North Showa Zone

| Vriables | Case (40) | Control (80) | COR (95%CI) | P-Value | AOR (95%CI) | P.Value |
|---|---|---|---|---|---|---|
| **Awareness of Measles** | | | | | | |
| **Yes** | 19(47.5%) | 59(73.75%) | 0322(0.145-0.714) | 0.005 | 0.546(0.218 _1.365) | 0.195 |
| **No[1]** | 21(52.5%) | 21(26.25%) | | | | |
| **Ventilation Condition** | | | | | | |
| **Yes** | 25(62.5%) | 68(85%) | 0.294(0.121_0.714) | 0.007 | 0.446(0.162_1.230) | 0.119 |
| **No[1]** | 15(37.5%) | 12(15%) | | | | |
| **Being Vaccinated** | | | | | | |
| **Yes** | 9(22.5%) | 47(58.75%) | 0.204(0.086_0.484) | <0.001 | 0.323(0.123_0.898) | 0.022** |
| **No[1]** | 31(77.5%) | 33(41.25%) | | | | |
| **Over Crowded** | | | | | | |
| **Yes** | 29(72.5%) | 30(47.5%) | 4.394(1.919_10.063) | <0.001 | 2.709(1.067_6.880) | 0.036** |
| **No[1]** | 11(27.5%) | 50(52.5%) | | | | |
| **Contact With Case** | | | | | | |
| **Yes** | 27(67.5%) | 22(27.5%) | 5.476(2.402_12479) | <0.001 | 3.416(1.358_8.591) | 0.009** |
| **No[1]** | 13(32.5%) | 58(72.5%) | | | | |

**Note: Overcrowd: Slept in One Room person HH /5m5. 1Reference *P-value <0.05**

## 5.4. Discussiona

According to Study conducted in differentNation in the world Measles outbreak was highly contagious viral disease in even in developed countries like USA and Other European Country. According to National Measles Guideline, 3 or more Laboratory Confirmed cases were required to confirm an epidemic of measles. Increased across the world due to vaccine status of measles According to WHO and UNICEF Reported in 2019, 86%Childern are received the first dose of measles and 69%the second dose of measles. Also, in this study the only 5% of case had received the first dose of measles vaccine and the other 95% had unknown vaccine status. The age Specific attach rate 333/1000 was under Five year similar to the study done in other part of Oromia region(7)

In case of Prison Context both London and

Yorkshire prisons the source of infection originated from a member of staff in fitche prison the source of the case was different from the study that means the source of the case was from the Prisoners. And there was different risk like the contact of case, Overcrowded living and Unventilated condition also contribute to the occurrence of measles outbreak in Fitches prison(8) As multivariate Analysis of this study shows being vaccinated was protective factors for developing disease similar to study done in south Africa. In addition to this, overcrowded living Unventilated condition and contact with case, prior to three risk factors for developing diseases and statically significant for developing disease with Adjusted. This Study had similar to the study done in Addis Ababa Kechame Medhanioalem Orphanage center(9) All of these variables may lead to the outbreak of measles breakage in Fiche Prison. Cases have been viewed as a reaction to and epidemic to deter further action

Spread; and reduce the morbidity and mortality associated with measles. Active febrile-rash continues Disease surveillance has been improved and continued in the prisoners were closely followed by health workers and the situation at each level on a daily basis. Every stage, on a regular basis. Health education for prison members has been provided Influenced and adjacent space for mode of transmission, therapy, methods of prevention, behavior seeking to improve their health.

**5 .5 Limitations**

The omission or/and incompleteness of information (data). And some prisoners were not happy to have any details

**5.6. Response Measure**

The measles outbreak has been recognized and characterized. Technical assistance on case management, recording and reporting situations was provided for health workers. Cases have been treated to help stop morbidity and death due to measles taking drugs (Antibiotic, ORS, TTC, Vitamin A) both at the level of the prison and the health facility was more distributed and reduced. On a regular basis, routine monitoring was improved and the situation was closely watched at each level. We have provided education in health education, in d/t Topic like, Measles, Food handling and hygiene, Environmental, Housing condition and Vaccination For prisoners and workers in places where prisoners are predominantly assembled, such as churches, schools,, working area in, When looking for active cases to prevent the dissemination of the disease, municipal meetings as well as at dormitory level motivate health seeking behavior and care where there are signature signs of measles. The zone also begun to collaborate closely with the infected prison and the town administration to avoid/control the epidemic from spreading to

other Scopes, and alarming Neighboring For strengthening the local surveillance system, the community, extension worker and community leader. In addition, active surveillance was performed in the town's neighboring kebeles.

The coverage of measles vaccination was reviewed and bordering villages with low coverage for vaccination were reviewed.

Having been vaccinated.

### 5.7. Conclusion

A confirmed measles outbreak in fiche Prison contact with infected Person, the major risk factors being accumulation of susceptible unimmunized children. Female more affected than male and age specific attack rate for less than five years' age and the highest .Being Vaccinated had protected and overcrowded living and contact with case were risk of outbreak.

### 5.8 .Recommendation

A confirmed measles outbreak hit in fiche Prison due to Contact with case, only 5% case have first dose not protected from the disease and unknown vaccination status was 95%and Male >15 year 's age group. Age Specific Attack Rate for less than five years' age groups were two to six and the highest. Awareness creation for people prison the government focused on prison and health standard crowded laving condition in and give attention for general health condition in prison according to the standard of prison and health policy.

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# CHAPTER–VI ABSTRACTS FOR SCIENTIFIC PRESENTATION

## 6.1. MEASLES OUTBREAK INVESTIGATION IN FICHE PRISON, NORTH SHEWA ZONE, OROMIA REGION, MARCH 2019

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**Introduction:** Measles is an extremely infectious respiratory illness transmitted by sneezing and coughing through droplet infection. An epidemic of measles is ongoing in the regions of Ethiopia, according to an official survey. Fiche prison was one of the areas affected by measles outbreaks in the Oromia region in 2019. We examined for effective control measures to confirm and recognize risk factors for outbreak.

**Methods:** We used descriptive study followed by1:2 unmatched case control study from 20/2/2019/1/3/2019. A case was defined as any person who resided in Fitche Prison with fever and maculopapular (nonvascular) generalized rash and developed any of the following symptoms; cough, coryza or conjunctivitis (red eyes) February 2nd to March 3rd /2019. A sample of 40 case and 80 control were interviewed questionnaire to assess the possible factors associated with developing measles case. Data were entered into Epi-info-version 7.2.4 and analyzed by using SPSS version 24.

**Result**: A total of 40 suspected measles cases had been identified with no death. Two out of Six (33%) of the cases were under 5 years, 2.5% greater than 15 years and 95% with unknown vaccination status. Three of five blood samples were positive for measles IgM. Overall attack rate was 2.7per 100 populations for the prison. AOR2.709 [95%CI (1.067_6.880) P=0.036] Over crowded living and contact with case AOR 3.416[95%CI (1.358_8.591) P=0.009 had been independent risk factor for contracting the disease while Adjusted odd ratio AOR 0.323[95% CI = (0.123_0.898) P= 0.022] being vaccinated against measles was protective factor for the disease.

**Conclusion and Recommendation**: A confirmed measles outbreak in Fiche Prison with unknown vaccination status in &greater than 15 year‘s age group. Age specific attack rate for less than five years’ and the highest. Treat and isolate the case, vaccination given for inmates Children, Awareness creation for People in prison the government centered on Prisoners and health standard leavening situation have to be comply with and provide attention

**Keywords: Measles, Outbreak, Case-Control, Fiche Prison, Ethiopia**

## 6.2. Malaria outbreak Investigation Shebe sonbo District, Jimma Zone, Oromia Region, Ethiopia, December 2020.

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**Abstract**

Introduction:-Malaria is endemic throughout the tropical areas of the world with the highest prevalence found in sub-Saharan Africa, India, and Southeast Asia. In Ethiopia, malaria is highly seasonal in many communities with epidemic-prone transmission pattern. We investigate malaria outbreak to describe the magnitude of morbidity, mortality and contributing factors and to apply appropriate intervention measures in the district.

Method:-We conducted 1:1 case control study, cases were defined depending on PHEM guide line definition from a line list and one neighbourhood controls per case in Shebe Sonbo district from 11/30/2020-12/12/2020. We identified cases by reviewing health facility records and, a pretested semistructured questionnaire adapted from WHO Malaria guidelines. We used to collect data from cases and controls. We use SPSS to calculate (COR) and (AOR) to identify risk factors.

Result: - Among the total of 226 Confirmed cases were 138(61%) male. The attack rate was 1.41 per 1000 population and malaria death was not recorded. Age greater than15 years were most affected with an attack rate of 28.4%. Using of IRS were protective with AOR of 0.306(0.115-0.813). Presence of stagnant and intermittent water were identified risk with an AOR of 5.863(2.227-15.612), 5.571(2.507-12.383) respectively.

**Conclusion**: - low performance of IRS and presence of stagnant water were attributed for the outbreak. We recommended proper Indoor residual spray (IRS) and environmental management through optimized community participation.

**Keywords: Malaria, Outbreak, Case-Control, Shebe Sonbo, Ethiopia**

### 6.3 Measles Surveillance Data Analysis, Bale Zone, Oromia Region, Ethiopia, 2014 to 2019

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**Abstract**

**Introduction**:-Measles is an acute and highly contagious viral disease caused by Paramy xovirus of the genus morbilli virus. This highly contagious virus is transmitted primarily by respiratory droplets or airborne spray to mucus membranes in the upper respiratory tract or the conjunctiva remain a disease of public health important and has been targeted for elimination in many areas of the world. We analyzed six years measles data to identify to identify Pattern by place, person and time and trends in Bale Zone, Oromia region.

**Methods:** Surveillance data analysis of the past six years for Measles was conducted in Bale Zone of Oromia region from January 2014to March1/2019. We conduct Retrospective types study. We analyzed the data using Epi-Info 7.2.4 and Microsoft office Excel 2016.We defined suspected measles as any person with generalized fever and maculopapular rash or coryza or conjunctivitis .we checked completeness of data by excluding case and deaths with incomplete information.

**Result:** We identified 3375 measles cases among them, 844(25%) were male and 2531(75%) Were there. Male to844:2531 female ratio) of almost 1:3 was the proportion of males and females among the cases recorded for the 2014-2019 period. In addition, average annual number of 563 cases (range) and 11deaths (CFR 0.33 percent) 42 to 2625) from among the case. The vaccination status of the child 2446(73%) was unvaccinated 689(20%) 1dose and 330(6.8%) was unknown status.

**Conclusion and recommendation** Measles was one of the public health problem in Bale zone, Female under one specially zero to eight month were more affected , so the concerned body step by step was done on prevent Children from measles infection, give attention on root Couse of problem and awareness creation on the community.

**Key word, Measles case, Measles Death, Vaccination, Bale**

# CHAPTER– XII NARRATIVE SUMMARY OF DISASTER SITUATION

## DISASTER MANAGEMENT REPORT ON FLOOD IN FANTALE DISTRICT AND METHEHARA TOWN, EAST SHEWA ZONE, OROMIA REGION, 2020

Executive summary

In order to identify humanitarian needs in Flood affected areas of East Showa Zone Oromia Region, a team of one conducted in disaster assessment and response. The rapid assessment helped to explore immediate and future needs of the community in order to make prior identification of the needs. We conducted the assessment conducted from August 26-Sep 10/2020 in the selected Woreda's of East Showa Zones.

The main objective of the assessment was to assess the magnitude of the Flood and identify areas where emergency health and nutrition assistance needed to prevent from further damage Data collection included review of documents, meetings and discussions with Woreda's and zonal preparedness and response task forces, officials and program managers. These was complemented by field visits in selected Woreda's and kebeles to discuss with community to triangulate data and information collected from zone and woreda.

There were no outbreaks in both assessment Districts and town of East Showa Zone but the main problem were displacement of population from seven Fentale District and One kebele from Methehara town around 125,868 population affected 1745 house were Damaged and 945 hectare product were damaged. There for the displaced population need all rounded support. We identify the health related problem like; there was not enough public health emergency drugs and supplies in the assessed district and town of East Showa zones. Generally, malnutrition malaria and COVID were a major problem in all visited Kebeles of the district and town.

Introduction

Background: Disasters were an event, typically occurring suddenly, that causes damage, ecological disruption, loss of human life, deterioration of health and health services, which exceeds the capacity of the affected community on a scale sufficient to require outside assistance). It is an emergency of such severity and magnitude that the resultant combination of deaths, injuries, illness, and property damage cannot be effectively managed with routine procedures or resources (1). Disaster is further defined as an event in which a society or a community undergoes acute deprivation of food and other basic necessities due to natural and manmade calamities to such an extent that the normal function of the society or the community is disrupted and that it cannot subsist without outside intervention. Disasters are classified into different types based on the cause of the hazard as natural, human-induced and Complex Floods are the most common natural disaster in both developed and developing countries. Coastal and riverine flooding may increase in frequency with global climate change(1)(2). In order to make recommendations about public health responses to flooding, as well as address the health relevant impacts of and adaptation to climate change, we have undertaken the first systematic global review of epidemiological research on the health impacts and health-related responses relating to flood events(3). In addition to this , Flood are most frequent and devastating type of natural disaster, accounting (40%) worldwide coping strategies have been used to reduce its impacts (Providing early awareness, evacuation),Most floods occur in developing and tropical regions, especially E/Africa Despite the efforts made, the disaster continues to pose multiple risks on human and livestock health(4)(5). The most important challenge is to change from concentrating solely on post disaster relief and focus on pre disaster preparedness because of various factors, such as strengthening awareness of the community and supplying resources. Evidences showed that for every dollar spent on prevention and preparedness, ~100 dollars or more was needed for relief efforts after the disaster has taken place. Flood preparedness empowers households and communities to respond effectively to hazards associated with flood The health indifferent coping strategies have been used to reduce its impacts (Providing early awareness, evacuation).Despite the efforts made, the disaster continues to pose multiple risks on human and livestock health(6). So that, continuing action at each phase plays a crucial role in reducing the health impacts, following the heavy rains since the month of July-August of 2020. In Nine Zones in Oromia.

From the Nine Zone East Showa had one of the affected zone specially the Fentale district and Mathahra town are most affected area from the East Showa Zone flood has damaged huge hectares of

agricultural crop lands, public infrastructures, community dwellings, displacement and livestock's .Therefore, the objective of this study was to assess flood preparedness of the households and Rapid Response on the affected Fantale district and Mathahra Town

**Objectives**

**General objective**

To assess the magnitude of the Flood and identify areas where emergency health and nutrition assistance needed to prevent from further damage, 2020

**Specific objectives**

- To evaluate the magnitude of the Flood in Fantale district and Methehara town.
- To determine the gap in the capacity of the health system in addressing anticipated risks
- To take public health action and prevent the community from further damages
- To recommend the District, Town and zonal administration regarding the disasters.

Methods

Study Area

Purposively due to the occurrence of Flood during the summer period in the District and Town were selected for the disaster managements. The selected District and Town accounts 25,000(percentage) of District and Town populations.

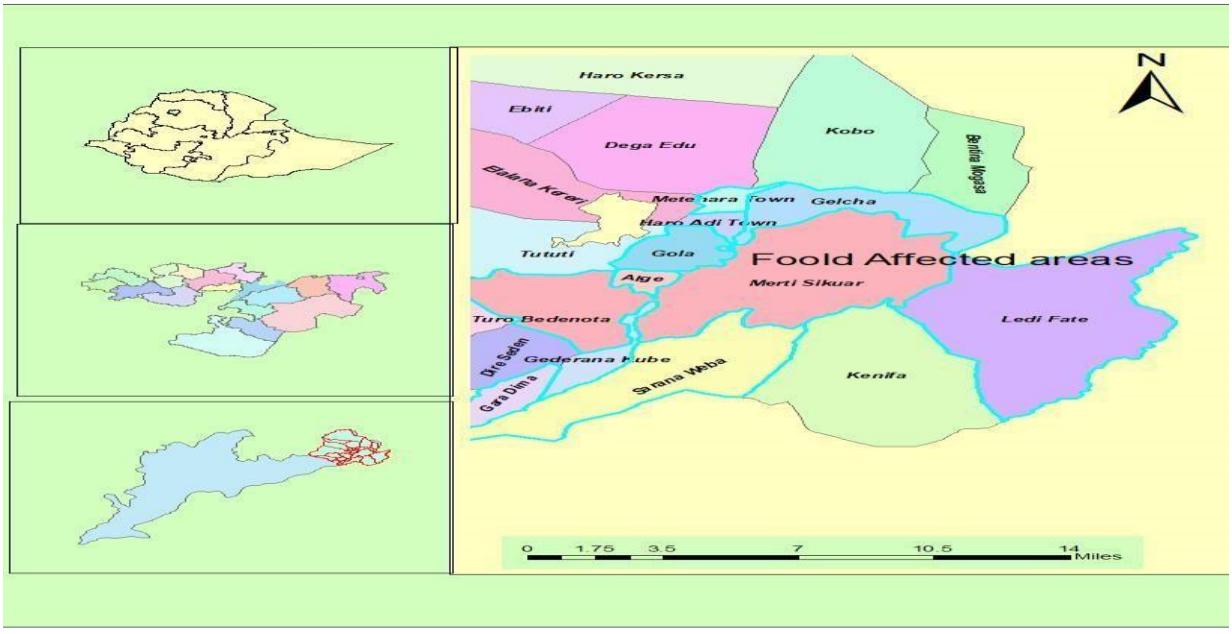


Figure 32:-Map of Fentale District East showa zone Oromia region, Ethiopia, 20 20.

We conducted a cross-sectional descriptive study of affected Fentale District and Methehara Town of East Shewa Zone from August 26/9-15/10/2020.

**Study Subjects**

Communities of the affected Kebeles

**Sample Size and Sampling technique:**

Since the total household affected in the one district and one Town of the zone were 56462 by Flood: we collect information from the entire household by making meeting with all the population. Data were collected by using prepared questionnaires and observing the affected sites with zonal emergency preparedness office as well as committee and the community representative to see the magnitudes of Flood. During these assessments seven-government sectors (Education, Agricultures, Water minerals and energy, rural land, health, Zonal administration, Animal health,) participates to help the community.

**Data analysis**:

Collected data was entered and analyzed by using the Microsoft Office Excel

**Data dissemination**

During and after the assessments of the Flood we communicate with all stakeholders and officials with zonal, District Town and kebele administration. After the completion of the assessment written report of both hard and soft copies were prepared, presented and shared to all team members, sectors that participate on the assessments, as well as for zonal health departments, Oromia regional health bureau, and AAU CHS School of public health Ethiopia Field Epidemiology Training Program mentor and resident advisors.

**Findings Meeting**

During assessment of Flood, we conducted a brief meeting with different stakeholders Head of Zonal administration, Head of zonal District and Town of all sectors included in the assessments, Community leaders, religious leaders and different volunteers. Over view of the Flood. **Results**

The Flood occurs in different kebele's of the district and town It occurs severely in one kebeles of Methehara and Seven kebele Fantale, the affected kebeles were located in the low land area that share boundaries with similar river called Awash the only in land River in Ethiopia Populations living in these area were at risk. These floods affect a total of 5646 households and 125,868 populations in all the eight listed kebeles of both the Fentale district and Methehara Town. From Fantale Seven Affected Kebeles were Galcha , Gola, Taty Lady, Gara Dima, Godo

Fafate , Fara Weba, Algea and Methehara Kebele 01.945hectar agricultural land were damaged and 1745 Hause were totally destroyed.

The displaced people become exposed to different health risk like COVID 19, Malaria, Infection, Measles, Malnutrion and Chronic Disease like Diabetes Malts, Hypertension because there were live in school.

**Top five causes of morbidity**

Table 27:-Under 5 Children causes of morbidity in visited Fentale district And Methehara Town of East Showa Zones, Oromia, Ethiopia, 2020

| **Sir No** | **Five Top Morbidity** | **No case** | |
|---|---|---|---|
| **1** | Diarrheal disease | 1739 | |
| **2** | Pneumonia | 669 | |
| **3** | Acute Reparatory Tract Infection | 468 | |
| **4** | Malaria | 299 | |
| **5** | Infection | 224 | |

Table 28:-Adults causes of morbidity in visited Fentale district And Methehara Town of East Showa Zones, Oromia, Ethiopia, 2020

| **Sir No** | **Five Top Morbidity** | **No case** | |
|---|---|---|---|
| **1** | Acute febrile illness (AFI) | 1488 | |
| **2** | Malaria | 1276 | |
| **3** | Typhoid Fever | 1252 | |
| **4** | Diarrheal disease | 886 | |
| **5** | UTI | 855 | |

**Emergency drugs and supplies**

Table 29:-List of emergency drugs and supplies in Fentale District and Methehara Town East Showa

| S. N | Drugs and supplies | Adequacy for one month (Yes/No | |
|---|---|---|---|
| | | Fentale | Methehara |
| | Ringer Lactate to treat Cholera cases | Yes | Yes |

| | | | |
|---|---|---|---|
| 2 | ORS to treat Cholera cases | Yes | Yes |
| 3 | Doxycycline to treat Cholera cases | Yes | Yes |
| 4 | Syringes and gloves for Cholera mgt | Yes | Yes |
| 5 | Amoxicillinsuspension(measles) | Yes | Yes |
| 6 | Tetracycline ointment (measles) | Yes | Yes |
| 7 | Vitamin A (measles) | No | No |
| | Coartem for malaria | Yes | Yes |
| 9 | Quinine (PO)for malaria | Yes | Yes |
| 10 | Quinine (IV) for malaria | Yes | Yes |
| 11 | Ceftraxione(Mening itis) | Yes | Yes |
| 12 | RDT for malaria | Yes | Yes |
| 13 | Number of CTC kit available | Yes | Yes |
| 14 | Clinical Delivery Assistance kit Part A: Reusable | Yes | Yes |
| 15 | Clinical Delivery Assistance kit Part Drugs and disposable Equipment | Yes | Yes |
| 16 | Mgt of complications of Abortion kit (Manual Vacuum | Yes | Yes |
| 17 | First Aid Kit | Yes | Yes |
| 18 | ITNS | No | No |
| 19 | IRS | No | No |
| 20 | Anti Hypertention , Dm etc | No | No |

**Outbreak Preparedness**

Public health emergency preparedness primarily includes availability of sufficient drugs and supplies, accessibility of emergency fund and availability of trained human power to avert emergency Regarding budget allocation for emergency rapid response, no line for budget allocation in health office for emergency responses, but all district use another budget for the purpose of emergency cases.

At zonal level and Woredas levels, the emergency preparedness plan sectors coordinate all stakeholders with respective health office to respond in the emergence cases. Emergency preparedness plan for the response of the flood that happens and very critical because of the time of COVID19 pandemic. **Risk factors (Major Epidemic prone diseases)**

**Malaria**

In Fentale District and Methehara Town, malaria was an endemic Disease .From the total 28,500 populations were identified as risk in both Fentale and Methehara town. In assessed District and Town ITNs distribution was above 94% but, utilization was lessthan70% and IRS coverage was above 75%. Malaria is the anticipated risk for epidemic to occur due to low utilization coverage of ITNS

In assessed district and town , No cases and death of measles were reported, but in all assessed district and town malaria are endemic and a total of 2195 malaria cases and zero deaths were reported. High numbers of malaria cases were reported during observation period. No outbreak occurred before.

**Meningitis**

There was no epidemic of meningitis in the last three years in Fentale District and Methehara Town in East Showa Zone .No Have meningitis outbreak control guideline. In addition, trained human power on outbreak management in zonal health departments and in Fentale district health office and Methehara Town Health Office.

**Cholera**

In the Last Three Years (2010-2012EFY), No Cholera Epidemic Occurred in Fentale District and Methehara Town.

**Measles**

Supplemental immunization activities (SIA) were conducted in assessed Fentale and Methehara in 2012E.F.Y. Average Measles Vaccine Coverage in Fentale and Methehara Town No Measles Outbreak in the Last Two Years Measles. Measles guideline was distributed to all health facilities in Fentale District and Methehara town.

**COVID 19(Corona) Pandemic**

In the flood affected District and town Corona case were 82 case in both District and town and no death.

**Malnutrition**

Even though there were no high numbers malnutrition problem in the assessed District and Town displaced population makes the situation favorable for the occurrences of malnutrition. All the health facilities in the assessed District and town were ready for OTP and SC services. As a result, a total of 3SC and 09 OTP sites were identified for malnutrition purposes

**Action taken**

Visit the affected sites, resettle the displaced populations, Strengthen local Taskforce and RRTs mobile clinics established and essential health services (treatment, screening malnutrition and supply nutrition food) given, Screening for chronic illness (HTN and DM) were made, Special care . Additional follow-up were made for most vulnerable population (COVID-19), basic needs; food, water ration, water treatment chemical, ITNs and Mask for COVID-19 were provided,

Regular meeting was made with all the assessment team during fieldwork, Follow-up of progressive impacts & action taken were regularly monitored at regional level.

**Discussion**

As the assessment results shows there were no NGOs responding to the Flood in the District and town. Low attention given by all governmental and non-governmental organization for all the affected kebeles that indicated by not allocating budget for the emergency purposes. All the affected community stays in the school in each area. The zonal emergence preparedness Response office was leading the Flood assessment responses a team composed of seven sectors and Oromia regional health Bureau EFETP resident Education, Agricultures, Water minerals and energy, rural land, health, Zonal administration, and Animal health). The assessment was conducted from August 30 to2020- Sep 5, 2020.We assessed five affected kebeles in Fentale District and Methehara Town of the East showa zone Oromia regional state. In the assessed district including zonal level even though have multisectorial coordination forum has no schedule meeting. In assessed Zone and district there were no epidemic preparedness plan and did not allocated budget for anticipated for this emergency .Because Every Body Concerned in to COVID19 and become on the pandemic. Anticipated diseases that have potential to cause outbreaks were measles, Cholera and malaria. In the assessed district and town, ITNs distribution was above 90% but, utilization was less than 70% and IRS coverage was above 94%. Malaria is the anticipated risk for epidemic to occur due to low utilization of ITNs and low coverage of IRS. No Safe drinking water supply in all assessed kebeles and need attention. As the community, members told to the assessing team members there were different primary

triggering factors of flood such as: - over flows of river by heavy rains, Stresses, strains and excess of pore pressures induced by the inertial forces during summer season, and Changes of the natural water flow caused by human activity. After the assessments of these disasters communication and feedback had been given for zonal governor, all responsible political administrations' and different stake holders to give immediate helps for the community in case of health, education ,food, shelters and others community needs.

**Conclusion**

All population must got immediate responses' from all stakeholders and governments' officials starting from kebeles administration to Oromia regional states. Since these all areas were highly affected so many population out of House still living (Shera). Malaria and measles are the anticipated risk for epidemic to occur.

**Recommendation**

All displaced Community by Flood were highly affected in different way; the situation needs great attentions by all concerned bodies. The Local government should need long and short action plan to prevent any life lose. Multi-sectorial preparedness and response planning should timely conducted Effective and efficient resource allocating, and mobilization, should be performed timely.

Joint and coordinated cloth follow up should Conducted at each level of governmental body for immediate interventions, appropriate budget should be allocated for identified emergencies.

And Strengthening the Multi sectorial PHEM coordination forum at all level, Strengthening routine EPI for affected community to prevent measles outbreak, Improving the water supply coverage and supplementary food, timely ITNs should be distributed for kebeles level and increase understanding of the community on utilization and Indoor Residual spray Should be performed in affected kebeles. Generally Give attention for all health and health related condition especially about COVID19 prevention and Treatment for high risk population.

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# CHAPTER-VIII-PROTOCOL/PROPOSALFOREPIDEMIOLOGIC RESEARCH PROJECT

8.1 ASSESSMENT OF THE MAGNITUDE OF CHILDHOOD MEASLES UNVACCINATION STATUS AMONG AGED 12-23 MONTH AND DETERMINANT FACTORS IN GINNER DISTRICT, BALE ZONE, and OROMIA REGION, ETHIOPIA 2020.

### 8.1.1. Executive Summary

**Background:** Ethiopia is one of the country's most vulnerable to measles epidemics in, a highly contagious viral infection, is in various respects the perfect example of a threat to health that respects neither aspirations nor boundaries between developed and developing countries, in Ethiopia is still high above 50 cases/1,000,000 population per year, which is above the national set targets for measles accelerated control by 2012 (<5 cases/1,000,000 population per year) and measles elimination by 2020 (<1 cases/1,000,000 population per year. But the outbreak, in case of the Oromia region are >1case /1000000 also The Bale Zone, the study area is Ginner district. Objective-is to assess magnitude of childhood measles vaccination status among aged 12-23month and determinant factors in Ginner District, Bale Zone, Oromia Region, Ethiopia 2020

**Methods**:-sectional study involving mothers/caregivers and health facility-based interview and observation. The collection of data will begin on March 10, 2020, and end on March 30, 2020. The report will be finished in. The study will be completed in April 30, 2020. The data is entered and processed using Epi Details 7.2.26 and Micro Soft Excel. The Expected Outcome of the study is to identify factors affecting childhood measles Vaccination status that would lead to change in the area, the immunization services particular and in the Zone in general.

**Project plan:** The compilation of information will begin on March 10, 2020 and conclude on March 30, 2020. On April 30, 2020, the study will be finished. **Budget for Accomplishment:** - It was estimated that the required expense for the study was 30.69ET birr needed

### 8.1.1. Introduction

Measles, a viral illness which is particularly infectious,, a highly contagious viral infection, is in quite a number respects the best example of a risk to health that respects neither aspirations nor boundaries between developed and developing countries. Complications of measles infection consist of pneumonia (the most frequent reason of death in children with measles), encephalitis, ear infections that can lead to permanent deafness, and diarrhea. Although a safe and very effective two-dose vaccination schedule has been accessible and widely deployed since the 1960s, the want for very excessive and consistent vaccination coverage to elicit herd immunity ability that the disease burden and harms of measles continue to be substantial. WHO reports that globally, in an obvious uptrend of cases occurring in 2017, measles led to an estimated 110,000 deaths, most in children aged under -five years**.** Tragically, these deaths were unavoidable, given the estimated 20.8 million children in low- and middle-income countries who had not obtained a single dose of measles vaccine through routine programs in that year (1)(2).

In the fifty three high- and middle-income international locations that make up its European region, WHO has indicated that around 82,500 cases of measles had been reported in 2018, an alarmingly excessive number even amongst a population in excess of 900 million people, and a greater than 3fold increase because 2017. There were seventy two reported deaths in children and adults. Here, the European Vaccine Action Plan 2015–2020 acknowledges the want for high and regular levels of vaccine coverage yet acknowledges the difficulties in meeting the challenges of achieving excessive and equitable coverage, owing to the existing stated variations in national and regional coverage with measles vaccination (1)(3).

The Global Action Plan for Vaccines (GVAP) approved by the 2012 World Health Assembly, set targets for vaccination coverage and an aim to achieve measles and rubella removal in 5 of the 6 World Health Organization (WHO) regions by 2020. In 2012, the Measles & Rubella Initiative partners launched the Global Measles and Rubella Strategic Plan 2012–20 with targets aligned to the GVAP Measles-driven policies and elimination strategies can provide possibilities for improving immunization service delivery performance, as properly as strengthening health systems to assist achieve the United Nations Sustainable Development Goals and Universal Health Coverage (4).

The European Vaccine Action Plan 2015-2020 (EVAP) states that at least 95 per cent of individuals in every population want to be immune, through two doses of vaccines or previous exposure to the virus, to guarantee that they are immune. Public protection for all – even infants that are too young to

be vaccinated and those that cannot be immunized due to current illnesses and medical conditions. The EVAP used to be adopted unanimously by using all fifty three Member States in the European Region at the sixty fourth Session of the European Area Committee of the WHO on 18 September 2014 (5).

In March 2014, the WHO WPR Verification Commission for Measles Elimination verified that measles elimination, which is described as no measles case said for 36 months in a country assembly required program Performance indicators, had been performed in Mongolia. However, in March 2015, a couple of laboratory-confirmed measles instances were detected in the capital city, Ulaanbaatar; by June 5, 2015, 11181 suspected cases had been mentioned nationwide from all 21 provinces. The authorities of Mongolia requested that WHO and the US Centers for Disease Control and Prevention, in collaboration with the Ministry of Health and Sports (MOHS), habits an outbreak investigation to assess factors contributing to ongoing transmission and provide recommendations for outbreak response and elimination strategies(6).

Most of these unvaccinated children live in developing countries, particularly Nigeria with a teeming population of about 167 million people, and an annual population growth rate of 2.7%. Receipt of vaccines at the recommended ages and intervals will ensure that children are thoroughly protected from target diseases at all time. This will assist to fast-track success of the Sustainable Development Goal Measles incidence in Ethiopia is still high above 50 cases/1,000,000 population per year, which is above the national set targets for measles accelerated control by 2012 (<5 cases/1,000,000 population per year) and measles elimination by 2020 /<1 cases/1,000,000 population per year. Generally, measles outbreaks comply with a cyclic pattern and occur each 3–4 years as a result of buildup of the susceptible. As the coverage increases, inter epidemic interval will increase as properly as focus shifts towards older age groups as determined in Ginner District.

**8.1.2 Statement of the problems**

Measles is one of the world's leading causes of infant mortality. Until the vaccine against measles became available, in reality in an estimated 130 million cases per year, all persons contract measles. People are those that are the other natural host is Measles, a highly contagious disease caused by a virus and transmitted thru the air, and mainly affects children. There is no special medication because, after three weeks, most persons recover. Nevertheless, particularly in malnourished children and people with decreased immunity, measles may trigger; measles can cause severe neurological sequel. Measles can be correctly prevented through vaccination, and the latest increase in vaccination

coverage globally effectively reduced the mortality of the disease by 74%, accounting for about a quarter of general child mortality from 2000 to 2008 [(6),(7)].

In 2010, the World Health Organization (WHO) defined three major objectives for the eradication of measles by 2020: 90% vaccination coverage in children under one year of age; reducing and maintaining the annual incidence of Measles to less than five cases a million; and a 95% decline in measles mortality in 2015 relative to 2000(3).Generally, measles outbreaks follow a cyclic pattern and occur each 12 months as a result of buildup of the susceptible. As the coverage increases, inter epidemic interval will increase as well as focus shifts toward solder age groups as observed in Ginner District.

**8.1.3. Rationale for the study**

In three consecutive year of 2017, 2018 and 2019 up to now, great numbers of measles cases were reported from Ginner District, 170, forty one and 2675 respectively. This data and different unpublished studies indicate there were accumulations of prone youth in the District. Administrative Measles Coverage in District's (MVC) of the last two years from 2017 and 2018 were 77% and 98% respectively. These coverages appear fairly High compared to Regional Coverage however still much less than the guarantee for herd immunity in the community and again even by 2019 there was a measles outbreak that indicates low vaccination coverage. The Study Aims to identify contributing factors for low vaccination coverage and put appropriate solutions, in Ginner District, Bale Zone, Oromia Region, Ethiopia,2020

**8.2. Literature Review**

In countries where immunization rates are low, virtually all unimmunized children will have been infected with measles by the age of five years. About half the cases occur in children below one year, the age group in which most deaths occur. In more developed and industrialized countries measles is now a disease of older children and young adults, who are unimmunized or in whom primary immunization has failed. At particularly high risk of measles are the urban poor, who live in areas where immunization coverage is low and where overcrowding aids transmission [(5)(9)],.

In 2016, there were 89,780 measles death globally. In many developing countries, measles is already commonplace. Seven million persons were infected by measles in 2016, specifically in areas of Africa and ASIA. Vaccination of measles contributed to a 79 percent reduction in measles mortality globally between 2000 and 2016 (6). However, since then, there has been a substantial increase in measles transmission, mostly in western and central-eastern parts of the Region, with the largest outbreaks

occurring in Bulgaria (2009–2010), France (2009–2011), Romania (2011–2012) and Ukraine (2012). The number of measles cases reported to the WHO European Region was 30 625 in 2010, 37 073 in 2011 and 26 188 in 2012 (as reported by 17 June 2013 and According to WHO report in2018, there were more than 140,000 measles death globally and affected people 353,236, [(5)(3)]. the problem of low immunization coverage has to be analyzed from various angles. Most of the studies have blamed the beneficiaries for partial or non-immunization. Our study yielded many insights into this issue. Our study found that record maintenance was poor in the dispensaries. This reflects the casual behavior of health staff with respect to immunization services. Outreach sessions have not been regularly organized to cater to the needs of immunization of construction sites and slums[(10),(11)].

It becomes evident from the following responses of health workers: In India, health is sought to be delivered as comprehensive health care involving both preventive and curative aspects. Originally, role of medical officers of PHC was conceived as that of a leader for supervising the whole set of comprehensive healthcare services. However, our result indicates that there is change in this kind of thinking. Definitely, there is some paradigm shift in the perception of medical officers regarding their role in public health-related responsibility, via immunization. Our study reveals that medical officers are being involved only in curative aspect of the health care. None of the medical officers had adequate knowledge about age limit of the various vaccinations. There is lack of accountability of medical officers about immunization(10).

There were different studies conducted to dig out factors contributing for childhood low vaccination coverage. As study conducted in Europe believed vaccination for child has get priority due to the following reasons.

**Vaccine-preventable diseases still pose a risk**

Due to effective vaccination programs, most people in industrialized countries have never experienced the devastation of vaccine-preventable diseases. Many people believe that these diseases no longer pose a threat, as they are not as visible as they once were (5). In fact, some consider the vaccine to be more dangerous than the disease. In some countries these misperceptions have led to a decline in coverage and a resurgence of contagious diseases, including Measles, Pertussis, Diphtheria and Rubella[ (5)(2)].

Immunization is cost-effective Immunization is undoubtedly one of the most cost-effective public health achievements of modern times. It costs very little, but offers huge benefits for the health and well-being of populations. Immunization has significant, broader economic impact in addition to

savings on cost of treatment. It protects against the long-term effects of a disease on a person's physical and mental well-being and thereby his or her ability to complete education or training and to carry out work. In this way, the protection provided by immunization offers immeasurable individual and societal benefits in terms of earning capacity, productivity and growth. In other words, immunization prevents death and disability at a fraction of the cost of treatment, to the benefit of both the individual and society as a whole. Effective health policies and related expenditure must be seen as an investment, not a cost. Good health boosts economies while illness drains them.

**Studies conducted in Africa in line with Eradication of measles in Africa- what went wrong?**

Measles is a major cause of child mortality in developing countries. Case fatality ratios of up to 20% have been found in community studies in West Africa. Measles has also been reported to increase morbidity and mortality and to worsen nutritional status for several months after the acute episode. Vitamin A treatment of measles reduces acute case fatality a striking reduction in measles burden in 19 sub-Saharan African countries after wide-age-range mass measles campaign(12).

**Factors affecting eradication of vaccine preventable diseases such as measles in Africa**

Although debate on the possible negative effect of mass vaccination campaigns on routine health services has gone on for decades reports points to an overall positive effect. High-quality mass campaigns usually achieve high vaccination coverage because of high-level political commitment and adequate planning and monitoring of vaccination activities(13).

Measles is endemic in Ethiopia with outbreaks reported annually. Improved outbreak preparedness and response efforts from the Government, as well as measles supplementary immunization activities (SIAs) the most recent of which was in 2017, have helped to significantly reduce measles cases over the years. Despite the reduced incidence, outbreaks at the sub-national level continue to occur(14).

Measles incidence in Ethiopia is still high above 50 cases/1,000,000 population per year, which is above the national set targets for measles accelerated control by 2012 (<5 cases/1,000,000 population per year) and measles elimination by 2020 (<1 cases/1,000,000 population per year. To provide extra-immunity, it is therefore recommended to introduce a second dose of the measles vaccine. This second dose of measles will start to be provided today in the whole of Ethiopia to the children aged 15 months(14).

**The high infectiousness of measles in Ethiopia**

Measles is highly infectious and has a very high attack rate and thus it would be extremely difficult to eradicate the virus altogether through vaccination). In Ethiopia, Measles vaccine is administered under the Expanded Program of Immunization (EPI). Though initiatives such as supplementary immunization campaigns have markedly increased frequency of Measles immunization among target populations, associated factors as low immunization coverage and floating populations are thought to be important causes of high Measles incidence in the country(15). Malnutrition and low vaccine efficacy due to cold chain related issues with poor coverage is known to make Measles endemic in Ethiopia.

### 8.3. Objective

#### 8.3.1 General objectives

To assess magnitude of childhood measles not vaccination status among Child aged12-23 month and determinant factors in Ginner District, Bale Zone, Oromia Region, Ethiopia

#### 8.3.2. Specific objectives

- To assess prevalence of measles un vaccination status of the children in selected kebeles of Ginner District, Bale Zone
- To determine the associated factors contributing for child to be not vaccination.

### 8.4. Material and Method

#### 8.4.1. Study Area

Ginner is one of the twenty Bale Zone districts located in South East part of Oromia Region. The is 580KM far from Addis Ababa in the South East and 150 KM far from Robe Town in east direction. According to population projection from 2007 census, 2009 E C, estimated total population of Ginner is 123,735 of which 63,105 (51%) of them were female. Only 28,076(22.7%) of the people were living in urban. Under one, under five and women of 15- 49 years of age are 3984 and 58811 respectively. Ginner District has thirty-Five rural and two town kebeles. The District has nine health centers, 35 health posts, 76 health extension workers and a total of 92 different health professionals. The district's community care provision was 100 per cent and 100 per cent by health centers and health posts, respectively.

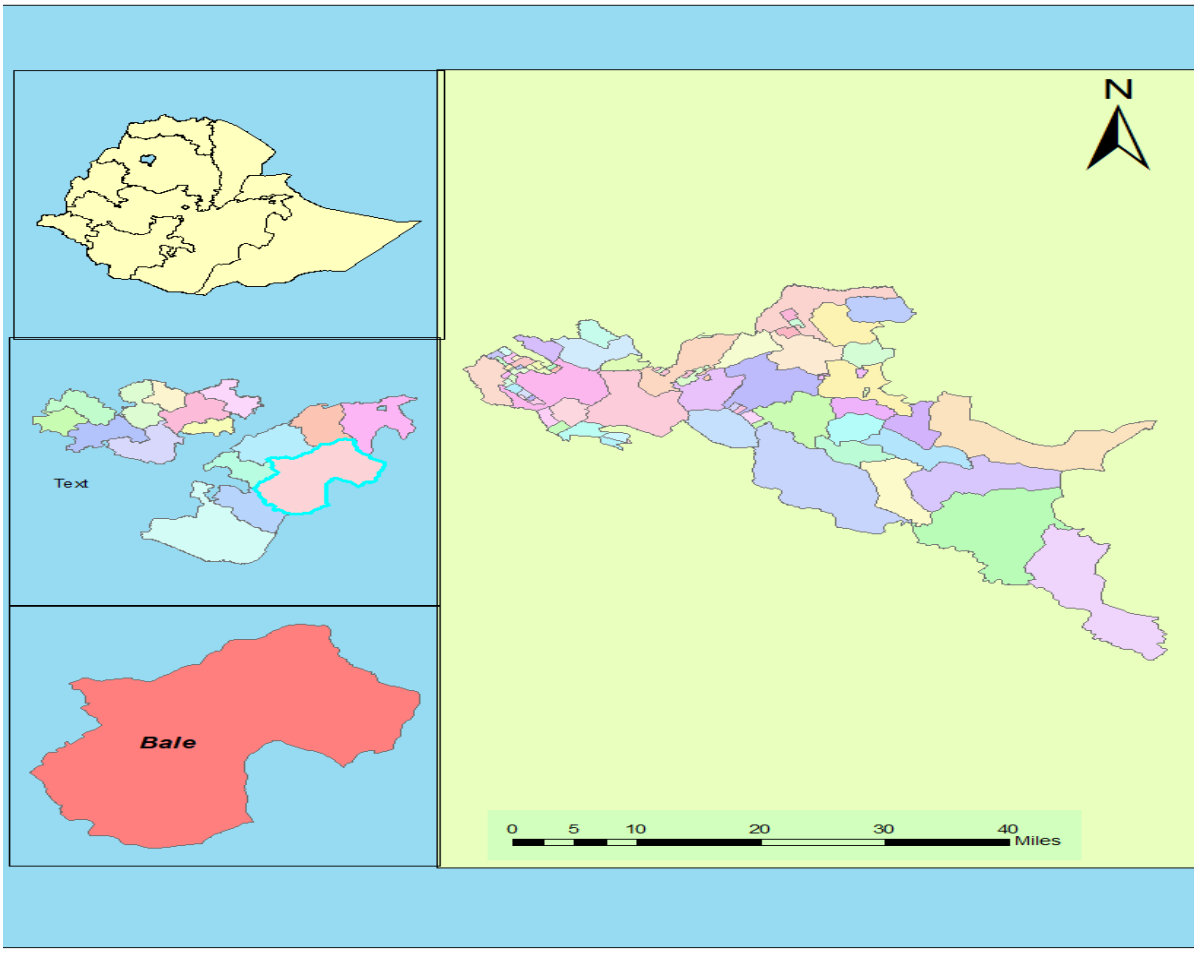


Figure 33-Map of the district of Ginir, Bale zone. Region of Oromia, Ethiopia 2020

### 8.4.2. Study design

Cross-sectional study involving mothers/caregivers and health facility-based interview and observation**.**

### 8.4.3. Study period

Data collection will begin on 10 March 2020 and conclude on 30 March 2020. The analysis will be finished on April 30, 2020.

### 8.4.4. Study population

All mothers/caretakers with 12-23 months age children that residing in selected eight Rural and one urban kebeles of the District will be study population**.**

### 8.4.5. Sample size Determination and Sampling procedure

The sample size will be calculated using Ethiopian Demographic Health Survey (EDHS) 2016

estimation for entirely vaccinated children. Overall, 39 percentage of Ethiopian children are fully vaccinated, while sixteen percentage have not received any vaccination. Following this, the percentage of fully immunized children of 12-23 months for Oromia Region in 2016 was once 24.7% and 22% received no vaccination with 95% confidence interval and absolute precision of 4%. The design effect will be 2.384 as common for immunization cluster survey. Sample size estimation will be 696 using the below formula:

The formula n= (Z α/2)2 P (1 – P/ d2

n = (1.96)2 0.25(1 − 0.25) / (0.05)2

n= 3.8416*0.19/0.0025

n= 292

n= 292*2.384 = 696.

The calculated sample size will be selected using simple random sampling method.

**8.4.6. Data collections procedures**

The questionnaire is prepared in English and translated into the local language. (Afan Oromo). Also, the Afan Oromo version will be translated returned to English to test the Compatibility of the questionnaire. The questionnaire includes children's vaccination records (12-23 months), information of family socio-demographic backgrounds, family/career economic status, child sex, ANC follow-up, position of birth of the child, maternal immunization, accessibility and affordability of vaccination facilities, size of the family, and immunization information for mothers or immediate caregivers.

Child measles vaccine history will be completed during data processing on the basis of watching the In the absence of a vaccine card, mothers and caregivers should remember. Vaccination reports as well as sex records group data for all children aged 12-23 months observed in the selected household will be compiled. The 8 health professionals chosen would be trained on the designed questionnaire for data collection. The training will include general questionnaire material, how to choose the interviewed households and other relevant issues. For its applicability, completeness, usability and upgrading, the questionnaire will be pre-tested in 60 households chosen by neighbor kebele.

**8.4.7. Data Entry and Analysis**

After each respondent's data has been encoded, data will be entered and processed using Microsoft Excel, Epi details version 7.2.24, and SPSS. The prevalence of childhood vaccination status for distinct independent variables will be defined by percentage and number can be used to describe it. Binary logistic regression can be used to measure the odds ratio with both multivariate and bivariate analysis.

### 8.4.8. .Data Quality Control

The questionnaire to be used in the data for this analysis came from the Ethiopian Population and Health Survey (EDHS) as well as other surveys undertaken in other countries.to determine childhood influences. Status of Vaccine. Any questionnaire conducted by data collectors will be reviewed for completeness by field supervisors during data collection .and whether answers were correctly filled in on a regular basis. In revisiting those homes, unfilled questions on the questionnaire will be completed. Data collectors should fill out details on the history of infant vaccination dependent on the vaccination card (if available) and give mothers/care giver time to carry this card. In addition, the principal investigator will review the completed questionnaire and provide input every day before data entry to field managers. And 10 percent random household questionnaire reviews and confirmation will be conducted regularly in each cluster.

### 8.4.9. Inclusion and exclusion criteria

**Exclusion criteria**

This study will not include households with no child who aged 12-23 months

**Inclusion criteria**

All households with at least one child of 12-23 months old will be included in the study**.**

### 8.4.10. The Study variables

**Dependent variable**

• Childhood measles vaccination status.

**Independent Variable**

• Socio demographic characteristics of mothers/caretakers
• Knowledge of mothers/caretakers on benefit of immunization
• ANC follow-up of mother 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,

• Housing condition, (Bed occupancy, window, overall house construction)

• Nutritional Status

**8.4.11. Operational definitions applied in the Study**

**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 measles vaccine.

**Unvaccinated:** a child who didn't receives first dose of measles vaccine.

**Coverage by card only**: coverage determined on documented vaccine and dose without those vaccinated by oral history.

**Coverage by card plus history**: coverage assessed based on documented vaccines on the card and caregivers (recall) history

**Immunization coverage**: - proportion of children took measles vaccination.

**Immunization status**: - being vaccinated or unvaccinated for first dose of measles.

**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 Five KM for health center).

**Coverage by card only**: Coverage calculated with numerator based only on documented dose, excluding from the numerator those vaccinated by history.

**Vaccine Coverage by card plus history:** - Coverage calculated with numerator based on card and mother report.

**House Ventilation:** A living house consist at least one functional window for air ventilation

**Knowing modes of transmission:** A person responds the mode transmission of measles disease from infected person to the uninfected individual through droplet (sneezing, Cough)

**Nutrition al status**: status of children aged 6- 59 months was determined by measuring the middle upper arm circumference (less than 12 cm is taken as malnutrition)

### 8.4.12. 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 Oromia Regional Health Bureau. Then, we will obtain support to conduct the study and participate in the study from Oromia Regional Health Bureau, Bale Zone and Ginner District. The willingness of all study participants will be asked to be a part of the study by using prepared consent form. The English version of participant consent form that will be translated to Afan Oromo is annexed to this document.

### 8.4.13 Dissemination of Findings

The result of this study will be disseminated for Addis Ababa University School of Public Health, Ethiopian Field Epidemiology Training Program, Federal Ministry of Health, Ethiopian Public Health Institute and Oromia Regional Health Bureau. Also Bale Zone and Ginner District 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

### 8.4.14. Expected outcomes

This study will able to document child measles vaccination coverage of Ginner District and identify factors affecting childhood measles vaccination status that could help towards improvement of immunization service in the area as particular and in the region in general. Due to improvement of measles vaccination coverage, decrease morbidity and mortality related to measles (Vaccine preventable disease), outbreaks of vaccine preventable diseases will be dramatically decreased and strategy plan set for measles elimination will be achieved in the District.

## 8.5. Work Schedule

Table 30:-Work schedule for to accomplishment of research in Ginner District, Oromia Regional State, Ethiopia, 2020

| | **Activities** | **Time** | | | | | |
|---|---|---|---|---|---|---|---|
| **S no** | | **Feb** | **March** | **April** | **June** | **July** | **August** |
| 1 | Proposal Writing | | | | | | |
| 2 | Proposal Submission | | | | | | |
| 3 | Review of scientific merit point | | | | | | |
| 4 | Arranging Training and Field Work | | | | | | |
| 5 | Data Collection (Field) | | | | | | |
| 6 | Data Entry | | | | | | |
| 7 | Data Analysis and Interpretation | | | | | | |
| 8 | Writing of Report | | | | | | |
| 9 | Submit final report | | | | | | |

### 8.6. Budget and implementation time

A total of 30690 ET. Birr will be needed to conduct the study. The project will take about six months including data collection and preparation of final report. Bale Zonal health department and Ginner Woredas will be asked for help like car, etc as alternative source whenever we faced budget shortage. Details of budget break down and implementation time is annexed below (Annex: and) time for implementation is included below. (Annex: and).

Table 31:-Budget break down for the accomplishment of research in Ginner District, Oromia Regional State, Ethiopia, 2020.

| Sin. No | Item | Unit (cost) | Remarks |
|---|---|---|---|
| 1 | Translation and back retranslation of questionnaire from English to local from local toEnglish language.10pagesX5times translation X50birr/page | 2500 | |
| 2 | Training of data collectors and supervisor for 2 days | 900 | |
| 3 | Ten data collectors 450*/day*2 days | 900 | |
| 4 | Five supervisors 450*/day*2=4 days | 1800 | |
| 5 | One Evaluator 450*/day*2days | 900 | |
| 6 | OneTrainer for 450*two /day | 900 | |
| 7 | Training hall rent for 2 days | 1000 | |
| 8 | Seventeen pens*10birr/10pc | 100 | |
| 9 | Seventeen pencils*3birr/20pc | 60 | |
| | **Sub Total** | **9060** | |
| 1 | Data collection from 40 non targeted households to pretest the quality of the questionnaire developed (four days activity) 4(20+(5x5)+(5x5 ) | | |
| 2 | Data Collection for 5 days | | |
| 3 | 10data collectors 200bir/day*5 days | 1000 | |
| 4 | 2supervisors *450birr/day*5 days | 4500 | |
| 5 | 1Evaluator *450birr/day*5days | 4500 | |
| 6 | 2 Car rent for 5 days service day | 3000 | |
| 7 | Fuel to the car 2x50/dayX5days | 3000 | |
| 8 | Photo copy paper (210 x 297 mm) x 5packet*400 | 2000 | |
| 9 | Photo copying 10 pages questionnaires for 500 household survey X1 birr/page | 500 | |
| 10 | Printing of translated questionnaires 10pages X 3 | 30 | |
| 11 | | | |

| | | |
|---|---|---|
| 12 | Final report Writing and printing | 1200 |
| 13 | Photo copying the final report | 500 |
| 14 | Binding the final documents 7copies X20birr/document | 900 |

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# CHAPTER IX _OTHER ADDITIONAL OUTPUTS

## 9.1. ORGANIZING WEEKLYPHEMBULLETINANDMALARIATRENDANALYSISOF OROMIA REGION FROM MARCH 2019 TO OCTOBER 2020

### 9.1.1 Weekly IDSR report


**Epidemiological WHO Week 16 (April, 20-26,2020)**

Highlights of Week

- Regional surveillance report completeness and timeliness was 85 % and 74% respectively.

**I. Introduction**

In the region still Measles , Malaria , Cholera has public health emargancy and additionaly COVID19 otherthan others, so This bulletin is used weekly to summarize Data on surveillance and ORHB/PHEM results onEpidemic-prone disorders and other public health conditionsEmergency conditions. It incorporates the completeness of the study,Timeliness, patterns and responses to priority diseasesOperation. It also gives surveillance review WHO Week 16, 2020 events ( Table 30).

Table 32:-Indicators/diseases/conditions reported in WHO week 16, April 2020.

| Indicators | Week 16 |
|---|---|
| Completeness | 85% |
| Timeliness | 74% |
| Suspected malaria Cases | 14764 |
| Confirmed malaria (PF+PV) cases | 1469 |
| Suspected Measles Cases | 364 |
| Cholera/AWD Cases | 2 |

**II. Weekly Surveillance Report**

Surveillance report completeness & Timeliness of government health facilities in the region this week were 85% and 74% respectively. Under target reported zone/towns were, Adama Ambo, Holota, Mojo, Nekemte and Shashamane, including zones Arsi, North Showa and West Showa. Most zones & towns reported timely except,

Borana and East Hararge zones, including Batu, Bishoftu, and Dukam and Shashamane towns. Asela and Burayu town did not report yet at the time of this

bulletin preparation.

Regional /Zonal/towns weekly trend of timeliness and completeness are indicated below in (Fig.1, 2, & 3)

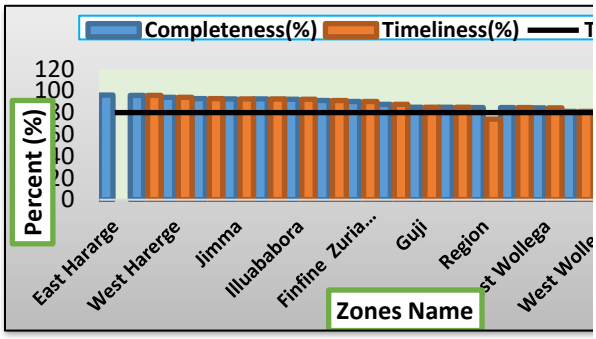


Fig34: Report completeness and timeliness by Zones of Oromia,WHO week 16, April 2020

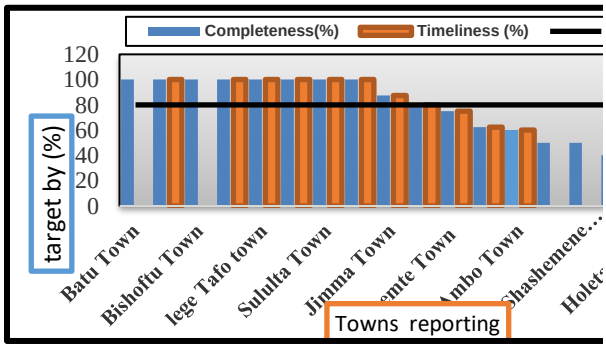


Figure 35: Report completeness and timeliness by Towns of Oromia region, WHO week 16, April 2020.

Regional report completeness and timeliness of the past 15 consecutive weeks were indicated below (Fig.3).

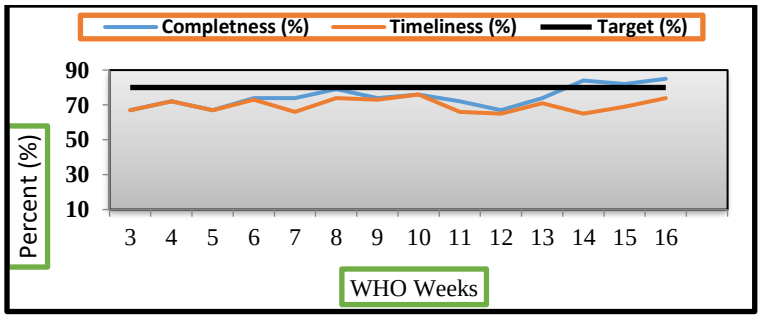


Figure 36: Trends of Regional surveillance report Timeliness and Completeness, WHO Week 3 to 16, 2020.

## III. Diseases or Conditions

### 1. Malaria

A total of 14764 febrile cases were tested in the laboratory, resulting in a 10 percent positivity score .and nine cases' admission reported in this week. A total of 1469 outpatient clinics1119 (76 percent) of these were confirmed and confirmed cases of malaria were Plasmodium falciparum cases. Even if the denominator of confirmed malaria cases from Galana, Jima Horo, Hawa Gelan and El-Waye districts from their respective zones is below 100,it indicates SPR of (32-52). The highest number of confirmed malaria cases were reported from eight districts of five zones which need strict follow up indicated in the table below (Table 2).

Figure 37: Malaria Positivity rate by zones/ & woredas of Oromia Region, WHO week 16, April 2020.

| Zone/Woreda name | Exam.by RDT/ BF | PF+PV | SPR | Rec'd from Reg/Zones |
|---|---|---|---|---|
| W/ Wollega | 2663 | 368 | 14 | 25 |
| Mana Sibu | 446 | 122 | 27 | 33 |
| W/ Guji | 693 | 166 | 24 | 11 |
| Abaya | 164 | 52 | 32 | 31 |
| Galana | 63 | 33 | 52 | 20 |
| Kellem Wollega | 779 | 152 | 20 | 10 |
| Jima Horo | 84 | 27 | 32 | 18 |
| Hawa Gelan | 72 | 23 | 32 | 15 |
| Illubabor | 595 | 127 | 21 | 9 |
| Darimu | 237 | 84 | 35 | |
| Borena | 622 | 107 | 17 | |
| Taltale | 309 | 54 | 17 | |
| El-Waye | 90 | 24 | 27 | |

Confirmed malaria cases were decreased by 361(20%) as compared to WHO Week 15.

A trend of regional confirmed malaria cases for the last 07 consecutive weeks is indicated below (Figure: 4).

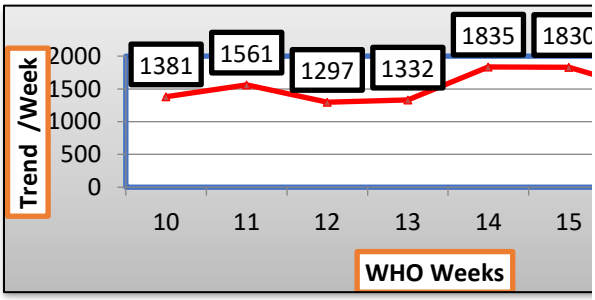


Figure 38: Trends of weekly confirmed malaria cases , Oromia Region, WHO Week 10 to week 16, 2020.

**2. Measles**

In this week, a total of 364 suspected measles cases were reported to the region.

The highest reported number of suspected measles cases were from West Hararge 108(30%) followed by,West Arsi (64), Guji(23),Horo Guduru Wollega (28),East Hararge (29),East Showa (25),West Shawa(19),Bale (12), Batu Town (18), Illubabor ( 14), Adama town (10) ,Arsi (8),Jima zone (4)and Woliso Town*(2).*

Trends of suspected measles cases in the last 08 consecutive WHO weeks were Shown below (Figure:5).

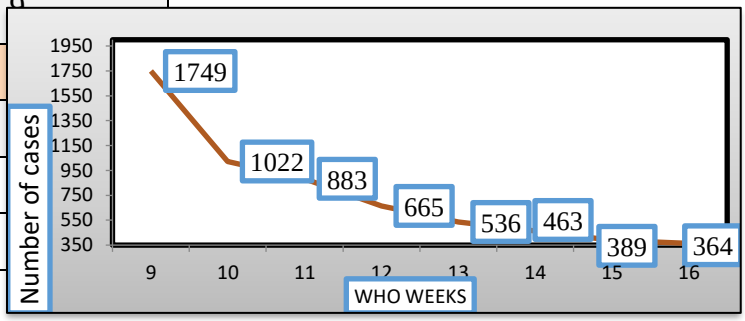


Figure 39:-Trends of measles cases, Oromia Region, WHO Weeks 9 to week 16, 2020.

**3. Acute Watery Diarrhea (AWD)/cholera cases**

Two cases of cholera outbreak were reported from Shashamane of West Arsi zone in this week. However, since 15/5/2019, from the occurrence of Cholera outbreak in the region, updated report of number of cases including WHO week 16 was 1111 and 3 deaths.

**4. Response Activities**

- Based on weekly surveillance report, feedback is usually given to all zones and towns as timely as possible
- Health and nutrition taskforce meeting which was healed every two weeks was interrupted due to the COVID-19 pandemic priority.
- rumors received from any source, verified and risks are communicated as early as possible.
- Cholera outbreak prenvention, control, management and response activities are ongoing .
- The regional EOC acitivated and “Free toll” 6955 working 24/7 days
- Professionals were assigned to accept the free calls from the public and the rumors investigated and responded,
- Isolation of suspected cases for daily follow up and investigation for (COVID-19), in order to protect others and the public at large from being infected. Contact identification and follow up is also conducted daily.
- The information dissemination on prevention of COVID-19 is continually undergoing at all areas in the region.
- Community based surveillance was intiated for COVID-19 and HEWs carry out house to house visit and perform awareness creation activities and report suspected COVID-19 cases.
- The first case was seen in Adama town isolate the case and treat in treatment center and all contact was traced from the contact two of them also psative and treatand tha other all normal.

# LIST OF ANNEXS

## Annex.1.Checklist for measles outbreak investigation of Fiche Prison in North Showa Zone, Oromia Region, Ethiopia, and December 2019

Status of Respondent: 1. Case 2. Control

Patient/Respondent Name_____ Date of Data collection____

Region _____ Zone _____ Woreda_____

Kebele _____ Got _____ Phone_____

Respondent Status Case_____ Mother ____ Father_____ Other_____

**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/respondent | 1. Farmer 2. House wife 3. Student 4. Unemployed<br>5. Daily laborer 6. Merchant 7. Gov't<br>8. NA (for under 5 child) 9. Other (specify)_____ |
| 1.4 | Family Occupation(HH head) | 1. Farmer 2. House wife 3. Student 4. Unemployed<br>5. Daily laborer 6. Merchant 7. Gov't<br>8. Other (specify)_____ |
| 1.5 | Religion | 1. Orthodox 2.Protestant 3.Muslim 4.Catholic<br>5.Other (specify)_____ |
| 1.6 | Ethnic group | 1. Oromo 3.Amahra 2.Gurage 4.Tigry 5.Other (specify)_____ |
| 1.7 | Educational level of the patient /respondent | 1. Illiterate 2.Read and write 3.Elementary<br>4.Secondary 5 Above secondary 6.N/A |
| 1.8 | Educational level of the family | 1. Illiterate 2.Read and write 3.Elementary<br>4.Secondary 5.Above secondary |
| 1.9 | Marital status of parent | 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 | _____ |
| 1.13 | Age(s) of sick person(s) | _____ |

II. Clinical History of Diseases:* for the case only

| | | |
|---|---|---|
| 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 9. Vomiting 10. Others_____ |
| 2.2 | **Ask ONLY if complication** | • Pneumonia: 1.yes 2. No<br>• Cornea: 1. yes 2. no<br>• Blindness: 1. yes 2. no<br>• Convolution 1.Yes 2.No<br>• Otitis media (ear discharge): 1.Yes 2.No<br>• Diarrhea: 1. yes 2. no<br>• Feeding problem 1.Yes2.No<br>• Encephalitis 1. Yes 2. No |
| 2.3 | Date of rash on set | ___/__/___Duration of rash_____ |
| 2.4 | Where the rash was started (location)? | District _____ Kebele_____<br>Got_____ HDA leader _____ |
| 2.5 | Have you (has she/he) Visited health facilities? | 1. yes2. no, |
| 2.6 | If yes, who told to go health facility? | 1. Neighbors 2. HDA leader 3. HCW 4. HEW 5. Kebele leaders 6. FBOs 7. Others (specify) _____ |
| 2.7 | Type of Health Facility visited | 1. Hospital 2. Health center 3. Health post 4.private clinic 5.local drug holder 6. Drug retailer 7.others_____ |

| | | |
|---|---|---|
| 2.8 | Date seen at health facility | __/__/____ |
| 2.9 | Illness duration before visiting the health facility | _____ in days/hours |
| 2.10 | Did you (he/she) take treatment? | 1.Yes 2.No |
| 2.11 | If yes, treatment taken | 1.ORS 2.Antibiotics 3.Vitamin A<br>4. Supplementary food 5. TTC ointment<br>6.Anti pyretics7.Others given_____ |
| 2.12 | Did you (she/he) recovered after the treatment? | 1. Recovered / cure 2. partially improved<br>3. Referred to next level HF 4. disabled after illness<br>4.death |

III. Questions related to Risk factors for measles illness

| | | |
|---|---|---|
| 3.1 | Did you have (she/he has) been vaccinated for measles? | 1.Yes 2.No …… skip to Q3.5<br>3.Unknow 4.Not applicable |
| 3.2 | If yes, last vaccination date | 1.parent recall_____<br>2. vaccination card_____ /____/_____ |
| 3.3 | Number of vaccine doses received | 1. One dose 2. Two dose3.three and above 4. Not know |
| 3.4 | At what age you (she/he) vaccinated first dose of measles vaccination? | _____ |
| 3.5 | If not vaccinated, why? | 1. Health facility far apart<br>2.lack of knowledge about vaccination campaign,<br>3.absence during vaccination campaign,<br>4. Site of vaccination unknown<br>5. Fear of Pain of vaccination<br>6. No need of measles vaccination for child<br>7. She/he took other vaccine differ from measles<br>8. 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<br>If Yes where _____ |

| | | |
|---|---|---|
| 3.7 | Did you contact with a person with measles symptoms within the last 2-3 weeks? | 1. Yes 2. No If yes, where_____ |
| 3.8 | Do you have any travel history four days before and after rash onset | 1. Yes 2. No<br>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<br>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<br>If yes specify_____ |
| 3.12 | Did you ever have measles infection? | 1. Yes 2. No 3. Don't know |
| 3.13 | Nutritional status of the cases (use MUAC and weight for <5 children) | 1.Normal 2.Moderate 3.Severely malnourished |
| 3.14 | What is the estimated area of the house in sq. m? | _____ |
| 3.15 | Is the house well ventilated? | 1. Yes 2. No |
| 3.16 | Distance from house to HC? | 1. <1km 2. Between 1 – 5km 3. >5km |
| 3.17 | Where did you go first when you get ill? | 1. Health Facility 2.Traditional Healers<br>3.Holy Water 4.Stayed at home<br>5. Other :( Specify)_____ |
| 3.18 | How do you think people get measles? | 1. Contact with a virus from ill person<br>2. From God 3.Bad attitude of other people<br>4.Bad weather condition 5.Other(Specify) |
| 3.19 | How could you (she/he) suffer from Measles? | 1. Contact with a virus from ill person<br>2. From God 3.Bad attitude of other people<br>4.Other(Specify) |
| 3.20 | Do you know how could spread /infection of measles be stopped? | 1.By vaccination 2.By modern treatment<br>3. By isolation of infected ones /minimizing contact with infected person<br>4. By doing traditional practice<br>5. By pray /spraying holy water/ |

| | | |
|---|---|---|
| | | 6. by keeping infected one in dark place in the house<br>7. Others specify |
| 3.21 | Do you know measles is vaccine preventable? | 1. Yes 2.No<br>3. I don't Know |
| 3.22 | Who do you think can be affected by measles? | 1. Children of aged less than 5 years<br>2. Children of aged less than 18 years<br>3. Women of any ages<br>4. Any age groups of both male and women<br>5. Other (specify):_____ |
| 3.23 | How do you think measles can be cured? | 1. Using modern medicine<br>2. Using traditional Medicine<br>3. Holly water<br>4. By feeding nutritious foods<br>5. Keeping the sick person indoor<br>6. Other(Specify)_____ |

## Annex2. Questionnaire for Malaria outbreak Investigation in Shebe sonbo District, Jimma Zone, Oromia, Ethiopia, 2020

I. Socio-demographic information**:**

**1.** ID number of respondents_____

**2.** Sex: - M□ F □

**3.** Age in years_____

**4.** Address; Region _____Zone_____ Woreda_____ kebele_____village_____

**5.** Occupation; Employed □ unemployed□ Student□ Pastoralist□ farmer□ Other□

**6.** Total family members' _____

**7.** Ethnicity; □ Oromo □ Amhara □ Tigre□ Gurage □ □ Other □

**8.** Religion; Orthodox□ Protestant, □ Muslim □ Catholic □ Other □

**9.** Marital status; Married □ single □ Widowed □ Divorced□ Not Applicable□

**10.** Educational status; Illiterate □ Primary□ Secondary □ tertiary □ non-formal □

**11.** Case status; a) Case b) Control

**II. Clinical presentations: *(For case only)**

**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: a.Yes □ b.No□, if yes duration of fever____ was it constant fever? a.Yes □ b.No□ or every other days fever? A.Yes □ No□
B. Vomiting: a.Yes □b.No□
C. sweating: a.Yes □ b.No□
D. Diarrhea: a.Yes □ b.No□
E. Anorexia: a.Yes b.No□

**Ask the following signs for complicated malaria only**

A. Altered consciousness a.Yes □ b.No
B. Not able to drink or feed a.yes □ b.No□
C. Convulsion a.Yes □ b.No□
D. Difficult breathing a.Yes □b. No□
E. Bleeding a.Yes □ b.No□
F. Jaundice (yellowish coloration) a.Yes □ b.No□

**4.** Did you visit health facilities? A.Yes□ b.No□, if yes, when did you visit health facilities? DD/MM/YY_____

**5.** Was your blood samples taken? A.Yes-□b. No □

**6.** If yes **Q 5**, what was the result: a.Positive □b.Negative □

**7.** Did you get any treatment? a.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 □, Specific living area_____

**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 you know sign and symptoms of malaria? ----------

---

**22.** How it is transmitted?----------

---

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

---

**Annex3- Questionnaires for evaluation of Surveillance System East Shewa Zone, Oromia, Ethiopia**

Regional and Zonal Level Questionnaire

Respondent_____

Interviewer: _____

Date_____

**General**

1. Is there a national updated Malaria and Measles guide line/manual for surveillance?

   A. Yes B. No C. Unknown

2. Do you have standard case definitions for the Country's priority diseases like AWD,

AFP, malaria, RF, typhoid fever, Epidemic fever and measles? A. Yes B. No C. Unknown

3. If yes, Check the standard case definition for each

   Priority disease_____

4. Is the central level providing surveillance forms to the health facilities?

A. Yes B. No C. Unknown

5. If yes, have you lacked appropriate surveillance forms (Line list, weekly reporting form, and epidemic reporting form, rumor investigation) at any time during the last 6 months?

   A. Yes B. No C. Unknown

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

   a. a. Government health facilities
   b. Private health facilities
   c. NGO health facilities
   d. e. Others (specify) _____

6. Number of reports in the last quarter compared to expected number(Completeness)

   6.1. Weekly: ___/12 times the number of each districts(Timeliness)

   6.2. Immediately**:** -------/times the number of districts

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

A. Yes B. No C. Unknown

8. 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

9. How do you report to the next high level?( Multiple responses are possible)

   A. Mail
   B. Fax
   C. telephone
   D. Paper based
   E. another specify _____

Data Analysis

10. Does the Zonal level describes the data by age, sex, time and places: (case based, outbreaks, and sentinel)?

A. Yes B. No C. Unknown

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

11. Does the Zonal level Perform trend analysis? A. Yes B. No C. Unknown

12. **Ifyes ,**List disease(s)for which in graph is observed

13. Does the zone have an action threshold defined for Cholera, Measles, AFP, and malaria?

A. Yes B. No C. Unknown

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

15. How often do you analyze the collected data?

A. Daily
B. Weekly
C. . Every 2 weeks
D. Monthly
E. Quarterly
F. As needed…….

16. Do you have an appropriate denominators establish the threshold?

A. Yes B. No C. Unknown

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

18. . Do you give feedback for woredas

A. Yes B. No C. Unknown

19. If the answer is yes for Question 18, how often?

A. Daily
B. Every
C. Weekly
D. Monthly
E. Quarterly

## I. Outbreak Investigation

20. Is there any outbreak in the zone in the last year?

    A. Yes B. No C. Unknown

21. Percent of suspected outbreaks that were investigated in the past 6 months_____(# of suspected outbreak)_____(# of investigated) _____ (%)

22. List of diseases: _____.

23. Number of outbreaks investigated and in which risk factors were looked for: ___.

24. Number of outbreaks in which findings were used for action :( observe report) _____.

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

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

## II. Epidemic preparedness (relevant for epidemic prone diseases

27. Dose the zone established epidemic management committee and have?

A. Yes B. No C. Unknown

28. **If yes** for question 27 does the committee have plan for epidemic preparedness and response

A. Yes B. No C. Unknown

29. If yes, check, a written plan of epidemic preparedness and response

30. Has the region/zone experienced shortage of drugs, vaccines or supplies during the most recent epidemic (or outbreak)? A. Yes B. No C. Unknown

31. Does the zone allocate budget for emergency preparedness? A. Yes B. No C. Unknown

32. If yes How many birr (Observe)?

33. Doses the standard case management protocol for Cholera , Malaria, AFP (polio), measles and others exists in all health facilities? A. Yes B. No C. Unknown

34. Does the region/zone have a rapid response team for epidemic? A. Yes B. No C. Unknown

35. If **yes, Obs**. minutes (or report) of meetings of RRT

## III. Response to epidemics

36. Does the epidemic respond within 48 hours of notification from lower level? A. Yes B. No C. Unknown

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

38. Dose a report is regularly produced to disseminate surveillance data from the zone? A. Yes B. No C. Unknown

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

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

41. How many supervisory visits have you made in last 6month? _____

*42.* If no, what is a reason for not making all required supervisory visits? _____

_____

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

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

45. How many of your subordinate staffs trained in surveillance? _____(___%)

## IV. Resources

46. Do you have the following resources for data management

a) Computer & Printer Yes/No

b) Photocopier Yes/No

c) Data manager Yes/No

d) Statistical package Yes/No

e) Others(specify)_____

47. Communications availability

a) Telephone service Yes/No

b) Fax yes/No

c) Radio call Yes/No

d) Internet Yes/No

e) Others (Specify) _____

**V. Budget for surveillance**

48. Is there a budget line for surveillance in at zone? A. Yes B. No C. Unknown

49. ***If yes***, is it sufficient Yes/No

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

Or how could surveillance is improved? _____

_____.

51. What opportunities are there for integration of surveillance activities and

Functions (Core activities, training, supervision, guidelines, resources etc.)?

a._____

b._____

c. _____

VI. **Questionnaire for Attributes**

**A. Usefulness:**

52. Total population under surveillance in the zone by District _____

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

Malaria cases _____Deaths _____

Cholera cases _____Deaths _____

Measles cases _____Deaths _____

Others (Specify) cases_____ Deaths _____

54. Does the surveillance system help?

a) To detect outbreaks of the priority diseases early? A. Yes B. No C. un known

b) To estimate the magnitude of morbidity, mortality and factors related to these diseases? A. Yes B. No C. un known

c) Permit assessment of the effect of prevention and control programs? A. Yes B. No C. un known

d) To Observe (confirm): interventions and diseases trends analyzed

A. Available

B. Not available

**B. Simplicity:**

55. Is the case definition of malaria and measles known by all level health professionals?
A. Yes B. No C. un known
56. Do you feel that additional data collected on a case are time consuming? A. Yes B. No C. un known
57. How long it takes to fill the format?
    a) <5 minute
    b) 10-15minuts
    c) >15 minutes
    d) Un known
58. How long does it take to have laboratory confirmation of Malaria and measles after sample collection?
    a) <5 minute
    b) 10-15minuts
    c) >15 minutes
    d) Un known

**C. Flexibility:**

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

61. **If yes, how?**_____

**D. Data Quality:**

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

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

64. If, **observe (**Review) the last months report of these diseases

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

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

**E. Acceptability:**

67. Do you think all the reporting agents accept and well engaged to the Surveillance activities? Yes/No

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

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

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

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

c) Reporting formats are difficult to understand

d) Report formats are time consuming

e) If Others: _____.

**F. Representativeness:**

70. What is the health service coverage of the district/ **zone**/ region? _____%

71. Do you think, the populations under surveillance have good health seeking behavior for these diseases? A. Yes B. No C. Unknown

72. Who do you think is well represented by the surveillance data? Urban / rural and what is the reason?

**G. Timeliness:**

73. What proportion of districts reports in acceptable time? (By Zone and Woreda)

Report in time ____

Late Report_____

Percentage _____

**H. Stability**

74. Was the new health structuring affect the procedures and activities of the surveillance of the diseases? Yes/No

75. Was there lack of resources that interrupt he surveillance system? Yes/No

1District (Woreda) Questionnaire

District Name _____

Respondent Name _____ Responsibility _____

Date _____

Interviewer name _____

**General Information**

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

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

2. Does the district have the **capacity** to transport specimens to a higher level laboratory?
   A. Yes B. No C. Unknown

   If No, Reason _____

3. Does the district have guidelines Or SOP for specimen collection, handling and transportation to the next level? A. Yes B. No C. Unknown

4. Have you faced lack of forms recommended for the country at any time during the last 6 months? A. Yes B. No C. Unknown

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

   Weekly: _____ /12 times the number of health facilities

   Immediately: _____/ times the number of health facilities

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

7. Number of weekly reports sent on time: ____/12 times to higher level **(Tuesday)**

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

9. Number of immediately reports sent on time: _____/ to higher level ( **within 60 minutes of events)**

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

**a)** Mail

**b)** Telephone

**c)** Fax

**d)** Paper

**e)** Electronic

**f)** Other(specify) _____

11. How can reporting system improved?

    _____

    _____.

12. Did you analysis PHEM data? Yes/No

a) If yes, is data describe by person for any case based, outbreaks or sentinel? Yes/No **If yes, observe** description of data by age and sex

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

c) **If yes, observe**. Description of data by Place.

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

If yes, **observe** observed description of data by time?

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

a) Malaria Yes/ No

b) Cholera Yes/No

c) Measles Yes/No

d) Polio Yes/No

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

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

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

(Observe for 2 priority diseases)_____

15. Did you have appropriate denominators? A. Yes B. No C. Un Known

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

16. Who is responsible for PHEM data analysis? _____

17. How often do you analyze the PHEM data?

a. Daily b. Weekly c. Every 2 weeks

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

**I. Outbreak investigation**

18. Is there any Outbreak or suspected in the district in the past year 6 months?

A. Yes B. No C. Un Known

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

**II. Epidemic preparedness**

19. Dose the district have epidemic preparedness plan? A. Yes B. No C. Un Known

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

20. Has the district had emergency stocks of drugs and supplies at all times in past one Year? A. Yes B. No C. Un Known

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

21. Has the district experienced shortage of drugs, vaccines or supplies during the most recent epidemic (or outbreak)? A. Yes B. No C. Un Known

22. Is there a budget line or access of funds for epidemic response? A. Yes B. No C. Un Known

23. Does the district have a rapid response team for epidemics? A. Yes B. No C. Un Known

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

24. Did epidemic response team evaluate their preparedness and response activities during the past year? A. Yes B. No C. Un Known

25. **If yes,** (observe written report to confirm)

**III. 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. Un Known

27. Present of epidemic that responded by districts within 48 hours of notification of most recently reported outbreak? _____

**IV. Feedback**

28. 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**.

**V. Supervision**

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

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

**(Observe** supervision report)

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

_____

_____

_____

## VI. Training

32. Have you trained on PHEM disease surveillance? Yes/No

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

**33.** What percent of your staffs in the district trained on PHEM surveillance?____%

## VII. Resources

34. Have you Logistics Available

a) Bicycles Yes/No

b) Motor cycles Yes/No

c) Vehicles Yes/No

d) Stationery Yes/No

e) Computer & Printer Yes/No

f) Others(specify) _____

35. Communication available

a) Telephone service Yes/No

b) Fax Yes/No

c) Mail Yes/No

d) Computers that have modems Yes/No

36. Information education and communication materials

a) Posters Yes/No

b) Megaphone Yes/No

c) TV Screen Yes/No

d) Projector (Movie) Yes/No

39. Availability of hygiene and sanitation materials

a) Spray pump Yes/No

b) Disinfectant Yes/No

## VIII. Surveillance

40. Is there PHEM focal person in the district epidemic management committee? Yes/ No

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

42. ***If no***, why? _____.

**Attributes**

**Usefulness**

43. Total population of the district under surveillance_____

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

a) Cholera cases _____Deaths _____

b) Malaria cases _____Deaths _____

c) Measles cases _____Deaths _____

d) Others(Specify) Case ____Death _____

45. Does the surveillance system help?

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

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

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

**Simplicity**:

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

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

**Flexibility:**

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

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

**If yes, how_____.**

**Data Quality:**

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

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

If, Yes/**:** Review the last month's report of these diseases

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

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

**Acceptability:**

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

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

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

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

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

c) Reporting formats are difficult to understand

d) Report formats are time consuming

e) Others (specify) _____.

**Representativeness:**

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

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

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

**Timeliness:**

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

**Stability:**

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

59. If yes, how did you manage it?_____

Health facility Questionnaire (Hospital /Health center)

**Identifiers**

District_____

Name of health facility_____

Type of health facility _____

Respondent_____ _Responsibility _____

Date _____

Interviewer: _____

**General Information**

1. Is there PHEM national Guide line or manual at this site?A. Yes B. No C. Un Known
2. **If yes, check ;** for the existence **PHEM** national guide line or manual

3. Is there a clinical register in health facilities? A. Yes B. No C. Un Known

4. If yes, **observe** the existence of a clinical register

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

6. If yes, **Observe**; the clinical register

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

a) Cholera , Yes/No
b) AFP (polio) Yes/No
c) Measles Yes/No
d) Malaria Yes/No

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

8. Does a health facility use standardized case definitions for the country's priority diseases**?** Yes/ No
9. **I**f yes, check;the respondent correctly diagnosing one of the country's priority diseases using a standard case definition (Interview about of these)

10. Does the health facility have the capacity to collect the following specimens?

a) sputum Y N N/A
b) Stool Y N N/A
c) Blood Y N N/A
d) CSF Y N N/A

11. If yes, Obs the presence of materials required to collect

a) Stool Yes No N/A
b) blood/serum Yes No N/A
c) CSF Yes No N/A

12. Does the health facility have the capacity to handle and transport sample to testing facility?

a) sputum Y N N/A
b) Stool Y N N/A
c) Blood Y N N/A
d) CSF Y N N/A

13. **If yes, check** separate presence of cold chain and presence of sample transport materials for all samples at health facility.
14. Have you lacked appropriate surveillance forms at any time during the last 6 months?

a. Yes b. No c. N/A

**If yes**, what is the reason? _____

15. Observed that the last monthly report agreed with the register for 4 diseases (1 for each targeted group [eradication; elimination; epidemic prone; major public health importance])
    a. Measles Yes No N/A
    b. Malaria Yes No N/A
    c. AFP (polio) Yes No N/A
    d. Cholera Yes No N/A
16. Number of reports in the last 3 months compared to expected number

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

Immediately: _____/--- times the number of health post sites

17. On time (use national guideline)

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

18. How do you report?

a. Telephone b. Fax c. Mail d. Paper e. Electronic f. other (specify) ____

19. How can reporting be improved? Your suggestion

_____

_____

_____

20. Do you analyze data by person, place and time (outbreaks, sentinel) Yes/ No N/A

If yes, Obs data

21. Is there trend analysis Performed? Yes No N/A
    If yes, Obsline graph of cases by time
22. Do you have an action threshold for any of the priority diseases? Yes No N/A
    ***If yes,*** what is it (Ask for 2 priority diseases)?
    Malaria cases ____ % increase
    Measles cases____ % increase
23. Who is responsible for data analysis? _____
24. How often do you analyze the collected data?
    a) Daily b) Weekly c) Every 2 weeks d) Monthly e) Quarterly
    f) As needed……..
25. Presence of demographic data at site (E.g. population <5 yr., population by village, total Population) Yes / No

**Epidemic preparedness**

26. Is there standard case management protocol for epidemic prone diseases at health facilities? Yes/No N/A
27. If yes, Obsthe existence of a written case management protocol for 2 epidemic prone disease

**Epidemic response**

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

**Feedback**

29. Have you received feedback report in the last year from higher level? Yes/No
30. If yes, how many feedback reports has the health facility received in the last year? ___
    **Obs;** at least 1 feedback received
31. Have you conduct meeting with community in the last 6 month? Yes No N/A
32. If yes, how often? a) Weekly b)every two weeks c) monthly d) quarterly e) as needed

**Supervision**

33. Did you supervise health posts in the last 6months? Yes No N/A
34. If yes, how many times have you been supervised in the last 6 months? _____
    **Obs;** supervision report or any evidence of supervision in last 6 months

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

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

**Training**

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

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

Number of Staffs trained in disease surveillance and epidemic management_____.

**Resources**

37. Do you have the following Logistics

a) Electricity Yes/No
b) Bicycles Yes/No
c) Motor cycles Yes/No
d) Vehicles Yes/No

38. For data management

a) Stationery Yes/No
b) Calculator Yes/No
c) Computer Yes/No
d) Software Yes/No
e) Printer Yes/No

39. Communications available

a) Telephone service Yes/No
b) Fax Yes/No
c) Mail Yes/No
d) Computers Yes/No

40. Information education and communication materials

a) Posters Yes/No
b) Megaphone Yes/No
c) TV Yes/No
d) Other: Yes/No

41. Hygiene and sanitation materials

a) Spray pump Yes/No

b) Disinfectant Yes/No

42. List Personal Protection materials (PPE) available in health facility _____ _____ _____

**Attributes**

**Usefulness**

43. Total population of the district under surveillance_____

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

a. Cholera cases _____Deaths _____

b.Malaria cases _____Deaths _____

c.Measles cases _____Deaths _____

45. Does the surveillance system help?

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

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

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

**Simplicity**

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

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

**Flexibility**

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

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

**If yes,** how_____.

**Data Quality**

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

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

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

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

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

**Acceptability**

53. Do you think all the reporting agents accept and well engaged to the surveillance activities? Yes/No
54. **If yes**, how many are active participants (of the expected to)? _____
55. **If no**, what is the reason for their poor participation in the surveillance activity?

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

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

c) Reporting formats are difficult to understand

d) Report formats are time consuming

e) If Others: _____

**Representativeness**

56. What is the health service coverage of the district? _____%
57. Do you think, the populations under surveillance have good health seeking behavior for these priority diseases? Yes/ No
58. Who do you think is well represented by the surveillance data? urban / rural

**Timeliness**

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

**Stability**

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

**General information**

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

   **If yes, Obs PHEM national** guide line or manual:

2. Is the Health Post have a clinical register? Yes No N/A
3. Is a case correctly registered in the health post? Yes No N/A

   If No, state the reason; _____

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

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

   a) AWD Yes No N/A
   b) AFP (polio) Yes No N/A
   c) Measles, Yes No N/A
   d) Malaria Yes No N/A

   **If yes, Obs;** the standard case definition for each priority disease

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

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

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

   Yes/ No

7. Does the health post reported accurately cases from the registry into the summary report for higher level? Yes/No

   **If yes**, the last monthly report agreed with the register for 4 diseases (1 for each targeted group [eradication; elimination; epidemic prone; major public health importance])

   a) Measles Yes No N/A
   b) Malaria Yes No N/A
   c) AFP (polio) Yes No N/A
   d) AWD Yes No N/A

8. 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

9. On time (use national deadlines)

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

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

10. How do you report?

a) Mail b) Fax c) Telephone d) Papers e) Electronic f) Other(Specify)_____

11. Howcanreportingbeimproved?

Suggest_____

_____

_____.

12. Describe data by person, place & time (outbreaks, sentinel) Yes/ No NA

**Epidemic response**

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

**Feedback**

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

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

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

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

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

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

18. If No, list the reason _____

_____

**Supervision**

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

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

**Observe;** supervision report or feedback in last 6 months

**Training**

21. Have you trained in disease surveillance and epidemic management? Yes No N/A
22. Number of staffs trained_____

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

**Resources**

23. Do you have Logistics
    a) Electricity yes No N/A
    b) Bicycles yes No N/A
    c) Motor cycles yes No N/A
24. Data management
    a) Stationery yes No N/A
    b) Calculator yes No N/A
    c) Computer Yes No N/A
    d) Printer Yes No N/A
    e) Others(Specify) Yes No N/A
25. Communications
    a) Telephone service yes No N/A
    b) Fax yes No N/A
    c) Radio call yes No N/A
    d) Computers that have modems Yes No N/A
26. Information education and communication materials
    a) Posters yes No N/A
    b) Megaphone yes No N/A
    c) Flipcharts Image box yes No N/A
    d) Other: yes No N/A
27. **Hygiene and sanitation materials**
    a) Spray pump yes No N/A
    b) Disinfectant Yes No N/A
28. **List of Personal Protective Equipment (PPE) _____.**

**Satisfaction with surveillance system**

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

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

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

**Attributes**

**Usefulness**

31. Total population of the district under surveillance_____

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

a) Cholera cases _____Deaths _____

b) Malaria cases _____Deaths _____

c) Measles cases _____Deaths _____

d) Others cases _____Deaths _____

33. Does the surveillance system help?

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

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

c) Permit assessment of the effect of prevention and control programs?

Yes No N/A

**Simplicity**

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

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

**Flexibility**

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

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

**If yes,** how_____.

**Data Quality**

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

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

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

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

**Acceptability**

42. Do you think all the reporting agents accept and well engaged to the surveillance activities? Yes No N/A

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

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

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

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

c) Reporting formats are difficult to understand

d) Report formats are time consuming

e) If Others: _____.

**Representativeness**

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

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

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

**Timeliness**

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

**Stability**

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

If yes, how did you manage it?_____

49. What do suggest to overcome such problems?

---

Laboratory Assessment Tool

**General information**

| | | |
|---|---|---|
| Name of the laboratory | | |
| Address of the laboratory: | Telephone_____<br>Fax_____<br>e-mail_____ | |
| Level of the Laboratory : | Community<br>Health Facility District<br>Regional<br>National | |
| Affiliation of the Laboratory : | **Public**/Private/Academic<br>Institution / NGO | |

| | | |
|---|---|---|
| Building Facilities and utility services | | |
| Is the laboratory in a free-standing building or part of larger structure? | | |
| How many rooms with bench space are there in the laboratory | | |
| Do the Laboratory have the following services available? | | |
| | Yes No | |
| Electricity<br>Running water | Yes No | |
| Is there a back-up power source in case of power failure like generator? | Yes No | |
| ***If yes***, what systems are protected? | | |
| Refrigerators/freezers | Yes No | |
| Computers | Yes No | |
| Other(specify) | Yes No | |
| What types of communications systems are available? | | |
| Post | Yes No | |
| Telephone | Yes No | |
| Fax | Yes No | |
| Satellite phone | Yes No | |
| E-mail (no. computers) | Yes No | |

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

**Reagents & kits**

| | |
|---|---|
| Where you are getting your reagents? | From a commercial supplier |
| | From another laboratory |
| | Supplied by Regional/Zonal/District/health office |
| Was there shortage of reagents/kits in the last six month which are used for diseases diagnosis? | Yes No |

| | |
|---|---|
| If Yes, What Are the most important reasons? | 1)Not Available in market<br>2)Lack of budget<br>3)Lack of information<br>4)Un prioritizing<br>5)others(specify) |

| What type of water is used for preparation of reagents and media? | | |
|---|---|---|
| Deionized Distilled | Yes | No |
| Distilled | Yes | No |
| Tap water | Yes | No |

**Tests performed at the laboratory**

| **Disease** | **Specimen type** | **Types of tests Performed** | **Yes** | **No** | **Number/ Month** |
|---|---|---|---|---|---|
| Meningitis | CSF | a. Cell count<br>latex agglutination<br>c. Gram stain<br>d. Culture<br>identification tests<br>f.A-M susceptibility | | | |
| AWD | Faeces | Rapid test<br>Culture | | | |
| Malaria | Blood | RDT<br>Thick/Thin film microscopy | | | |
| Measles | Serum<br><br>Throat swab, conjunctiva | IgM by EIA<br>Other serological test<br>Virus isolation | | | |

| | | | | | |
|---|---|---|---|---|---|
| | swab | | | | |
| suspect typhoid or brucellosis | Blood, faeces<br><br>serum | Culture<br>Identification tests<br>A-M susceptibility<br>Serological tests (Widal, brucella agglutinins) | | | |
| Hepatitis | Serum | Anti-HAV IgM<br>Anti-HbsAg<br>Anti-HCV IgM | | | |
| Viral haemorrhagic fevers (any) | Serum<br>Serum, other tissue specimens | IgM<br><br>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 referral logbook/electronic record of all specimens sent for diagnostic testing? | Yes No |
| Are specimens discarded after testing, or are they stored? | Discarded/Stored |
| Does you laboratory refer bacteriology isolates or serum samples to a reference laboratory? | Yes No |
| ***If yes***, reason for referral (all | |
| Confirmation | Yes No |

| | | |
|---|---|---|
| Identification of unknown organism | Yes | No |
| Test not performed on site | Yes | No |
| Number of sample referred in the last six month? _____ | | |
| Types of transport media used (□□all that apply) | | |
| Triple package | Yes | No |
| Trans-isolate | Yes | No |
| Cary and Blair | Yes | No |
| Viral transport medium | Yes | No |
| Other (describe): | | |

**Reporting procedures**

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

**Quality control procedures and programs**

| | | |
|---|---|---|
| Does the laboratory use any system for internal quality control? | Yes | No |
| Does the laboratory participate in any external quality assurance or proficiency schemes? | Yes | No |

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

## Annex 4. Data collection tool for health profile assessment in Lome woredas, East Shewa zone, Oromia Region 2018

**1. Historical Aspects of the District**

Name of the District _____

When the District was established _____

How & why the name given _____

Any other historical aspect_____

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

District map _____Location (distance from Regional city_____
Direction_____ Surface Area _____square kilometer

**District boundaries:-**North, _____ South, _____East _____ West _____Southeast_____

**3. Political and Administrative Organization**

Total no. of villages _____ Rural_____ Urban_____

**4. Population and Population structures**

**A. Demographic data**

Total Population ____ Male _____Female _____ sex ratio male/female _____

- Urban Population_____ Male_____ Female_____ Sex ratio male/Female_____
- Rural Population____ Male_____ Female_____ Sex ratio male/Female_____

- Population under 1yrs _____
- Population under five yrs._____
- Population < 15 years _____
- Population 15-24years _____
- Population 15-59 _____
- Women 15_49 years of age _____
- Total number of estimated pregnancies / Births_____
- Estimated deliveries_____
- Non-pregnant women in fertile age_____
- Total population of >=64 years_____
- Average household size _____

**B. Ethnic/language**

- Sidama___(____%), Oromo ___(___%), Wolayita_____(___%), Others_____(___%)

**C. Religion**

- Muslim ___(___%), Orthodox ____(___%), Protestant____(___%), Other ____(___%)

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

**Main Income Sources**

| SN | Main income sources | Plan | Achievement | % | Remark |
|---|---|---|---|---|---|
| 1 | Government employment | | | | |
| 2 | Agriculture | | | | |
| 3 | NGO employment | | | | |
| 4 | Tourism | | | | |
| 5 | Trade | | | | |
| 6 | Other business | | | | |
| Total | | | | | |

**6. Education and school Health**

**A. Number of educational institution**

K.G ____Primarily and Secondary School _____Preparatory ____College/ University_____ TVET____

Number of educational institution and students enrolled by 2010EFY

| SN | Level of the school | # of schools | Students enrolled to the school | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Male | | | Female | | | Total | | |
| | | | Plan | Achi | % | Plan | Achi | % | Plan | Achi | % |
| 1 | 1-4 Grade | | | | | | | | | | |
| 2 | 5-8 Grade | | | | | | | | | | |
| 3 | 9-10 Grade | | | | | | | | | | |
| | Total | | | | | | | | | | |

**B. Total School Age Children (target) _____**

- Total Enrolment _____Male _____ Female _____
- School dropout in 6 months or year _____

School dropout in 6months or year

| SN | Level of school | Male | Female | Total |
|---|---|---|---|---|
| 1 | 1-4 Grade | | | |
| 2 | 5-8 Grade | | | |
| 3 | 9-10 Grade | | | |
| Total | | | | |

If there is school dropout, why._____

**C. Educational status of the community**

- Total non-Educated people _____ Male _____ Female _____

D. **Number of teacher in the District** _____Male _____Female _____

# of teachers in the District

| | Educational Level of teachers | Male | Female | Total |
|---|---|---|---|---|
| 1 | Certificate | | | |
| 2 | Diploma | | | |
| 3 | Degree | | | |
| Total | | | | |

**7. Facilities**

**A. Transport**

- Road network with respect to health facility_____
- How many villages have access to transportation _____

**B. Telecommunication**

- How many people have access to fixed telephone? _____
- How many people have access to mobile phone? (coverage) _____

**C. Power supply**

How many house hold get power supply _____ (_____%)

**D. Water**

- Total safe water coverage ____ House hold _____Safe water supply coverage by village _____
- Main source of water supply _____
- Population getting safe water _____

**8. District Health system**

- The general health system structure of the District health center (flow chart) _____
- Is there rapid response team (RRT) at District level? Yes/No
- If yes, describe the HMT in detail (composition and function) _____
- Do you have NGOs working on health and health related issues? Yes /No
- List the NGOs and their work in related to health._____

9. **Vital Statistics and Health Indicators**

- Infant Mortality Rate (IMR) (total <1 yr. deaths):2008 E.C ___2009 E.C ___2010 E.C __
- CMR(this year's total <15 yr. Deaths):-2008 E.C____2009 E.C ____2010 E.C ____
- Crude Birth Rate(Total birth):2008 E.C _____2009 E.C _____2010 E.C _____
- Crude Death Rate(total deaths) 2008 E.C_____2009 E.C _____2010 E.C _____
- Maternal Mortality Rate(total maternal deaths):-2008 E.C ___2009 E.C ___2010 E.C ___
- ANC rate 2008 E.C ____2009 E.C ____2010 E.C _____
- ANC rate: 2008 E.C _____2009 E.C _____2010 E.C _____
- Percentage of deliveries attended by skilled birth attendants: 2008 E.C _____2009 E.C _____2010 E.C _____
- PNC 1$^{ST}$ 24Hrs:- 2008 E.C _____2009 E.C _____2010 E.C_____

**Immunization Coverage (for children and Women);**

| VARIABLE | 2008 E.C | 2009E.C | 2010E.C |
|---|---|---|---|

| | plan | Number | % | Plan | Number | % | plan | Number | % |
|---|---|---|---|---|---|---|---|---|---|
| BCG | | | | | | | | | |
| OPV-1 | | | | | | | | | |
| OPV-3 | | | | | | | | | |
| Penta-1 | | | | | | | | | |
| Penta-3 | | | | | | | | | |
| PCV-1 | | | | | | | | | |
| PCV-3 | | | | | | | | | |
| Rota-1 | | | | | | | | | |
| Rota-2 | | | | | | | | | |
| IPV-1 | | | | | | | | | |
| Measles | | | | | | | | | |
| FV | | | | | | | | | |
| PAB | | | | | | | | | |
| Malnutrition screened | | | | | | | | | |
| SAM | | | | | | | | | |
| MAM | | | | | | | | | |
| ANC 1st | | | | | | | | | |
| ANC 4th | | | | | | | | | |
| SBA | | | | | | | | | |
| PNC 1st | | | | | | | | | |

**10.Health Service**

**A. Type and Number of Health Institution**

| Types of HF | Government | NGO | Private | Total | Population Ratio |
|---|---|---|---|---|---|
| Hospital | | | | | |
| Health Center | | | | | |
| Health post | | | | | |
| Medium clinic | | | | | |
| Primary clinic | | | | | |
| Drug stores | | | | | |
| Drug Venders | | | | | |
| Diagnostic Lab only | | | | | |
| Herbal medicine center | | | | | |
| Hospital under construction | | | | | |
| HC under construction | | | | | |
| HP under construction | | | | | |
| | | | | | |

B. **Type and Number of health professionals**

| **Types of H/Professionals** | **Numbers** | |
|---|---|---|

| | Government | NGO | Private | Total | **Population Ratio** |
|---|---|---|---|---|---|
| MD | | | | | |
| HO | | | | | |
| All types of Nurses | | | | | |
| All Types of Mid wives | | | | | |
| Medical lab. | | | | | |
| Pharmacies and druggists | | | | | |
| HEW | | | | | |

**C. Ten Top causes of morbidity and mortality in adults in 2010 E.C**

| No | Diseases | Number | % |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |

**D. Five Top causes of morbidity and mortality of under 5 in 2010 E.C?**

| No | Diseases | Number | % |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| | | | |

**E. Health budget allocation and Utilization**

| Source of Budget | Budget allocation and Utilization | 2008 E.C | | | 2009 E.C | | | 2010 E.C | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Plan | Achi | % | Plan | Achi | % | Plan | Achi | % |
| | Annual of budget allocated for the Zone/ District | | | | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Governme nt | Annual of budget allocated for the Zone/ District Health office | | | | | | | | | |
| | Utilization of health budget | | | | | | | | | |
| Fund/NG O | Budget allocated for health service | | | | | | | | | |
| | Budget utilization for health service | | | | | | | | | |
| For drug and medical supply purpose | | | | | | | | | | |

**F. Core Activities of Primary Health Coverage and SDG**

| **Activities** | **Types** | **2008E.C** | | | **2009E.C** | | | **2010E.C** | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | **Plan** | **Achi** | **%** | **Plan** | **Achi** | **%** | **Plan** | **Achi** | **%** |
| **Family Planning** | LAFP(IUD+Imp) | | | | | | | | | |
| | SAFP(Depo+OC | | | | | | | | | |
| **Hygiene & sanitation** | Improved latrine | | | | | | | | | |
| | Solid waste Management | | | | | | | | | |
| | Liquid waste Management | | | | | | | | | |
| | ODF Coverage | | | | | | | | | |
| **TB/Leprosy** | All form of TB | | | | | | | | | |
| | PTB +Ve | | | | | | | | | |
| | PTB-Ve | | | | | | | | | |
| | Extra PTB | | | | | | | | | |
| | TB Rx completion rate | | | | | | | | | |
| | TB cure rate | | | | | | | | | |
| | TB Defaulter | | | | | | | | | |
| | TB Rx success rate | | | | | | | | | |
| | Death on TB Rx | | | | | | | | | |
| | Total TB patients screened for HIV | | | | | | | | | |
| | Positive for HIV | | | | | | | | | |
| | Total Leprosy cases detected | | | | | | | | | |
| | Leprosy case treated | | | | | | | | | |
| **HIV/AIDS** | Total MARPs screened for HIV | | | | | | | | | |
| | HIV prevalence | | | | | | | | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | HIV Incidence (new cases/yr. | | | | | | | | | | |
| | Total PLWHA | | | | | | | | | | |
| | Current ON ART | | | | | | | | | | |
| | Pre-ART | | | | | | | | | | |
| | CC Preformed on HIV/AIDS | | | | | | | | | | |
| Malaria | Confirmed(BF/RDT) | PF | | | | | | | | | |
| | | PV | | | | | | | | | |
| | | Others | | | | | | | | | |
| | Clinical | | | | | | | | | | |
| | Malaria deaths | | | | | | | | | | |
| | INT utilization | | | | | | | | | | |
| | IRS(Unit Structure) | | | | | | | | | | |
| | Environmental management | | | | | | | | | | |

**Was there shortage of Essential drugs for the last one year? Yes/No**

 Essential Drug _____

_____

_____

**The District Integrated disease surveillance and Report in 2010 E.C**

| PHEM reportable disease | **Case** | **Death** |
|---|---|---|
| Cholera | | |
| Measle | | |
| NNT | | |
| AFP | | |
| Anthrax | | |
| SARS | | |
| Smallpox | | |
| VHF | | |
| YF | | |
| Rabies | | |
| Dracunculiasis/Guinea worm | | |
| Pandemic Influenza | | |
| Malaria | | |
| Meningitis | | |

| | | |
|---|---|---|
| Dysentery | | |
| Relapsing Fever | | |
| Typhoid Fever | | |
| Epidemic Typhus | | |
| SAM | | |
| MDSR | | |

**11. Disaster situation in the District**

- Was there any disaster (natural or manmade) in the District in the last one year?

  If yes what type _____

- Was any recent disease outbreak/other public health emergency

- If yes cases _____ and deaths _____

**Section IV: Nutrition - TFP admissions at woreda level May toAugust, 2020**

| Mont h | Total SAM Cases | Total Number of TFP (OTP/SC) in the woreda | Numbe r of SC. | Numbe r of OTP. | Total Number of OTP/SC Reported. | Therapeutic Supplies enough Y/N (for the next -- mo) | | | Chil dren Disc harg ed from |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | RUT F | | | |
| June | | | | | | | | | |
| July | | | | | | | | | |
| Aug | | | | | | | | | |
| Sept | | | | | | | | | |
| Oct | | | | | | | | | |

**Anycomment**_____

_____

_____

_____

## Annex 5: Semi-structured questionnaires for Assessment of prevalence and determinant factors affecting childhood measles vaccination status in Ginner District, Bale Zone, Oromia Region, Ethiopia 2020

**Introduction:**

Hello, my name is..... . I am Field Epidemiology Training research team member. Thank you for taking the time to speak with me today. We are conducting study on for Assessment of prevalence and determinant childhood measles vaccinations among residents of this kebele and wanted to speak with you. Our goal is to figure out factors affecting the measles vaccination in the community. We are very interested in your experiences and your point of view.

We will start by asking your willingness to participate in the study and clearly explain you the objective, benefit and risks of the study to get your consent. And then we will ask you all a multiple of questions for discussion. Questions are simple and what you are clearly known in your daily activities. Please feel free to speak; your name, position, and anything that could identify you personally will not be used in any official reports or presentations. (Feel consent Form).

Questionnaire for Assessment of prevalence and determinant factors affecting childhood measles vaccination status in Ginner District, Bale Zone, Oromia Region, Ethiopia 2020

**Socio- demography of caretaker and identifying information of children**

**1. Name of the Child/children** 1.1_____

1. 2 _____

1.3_____

1.4_____

1 .5 _____

**2. Sex of children**

2.1 Male Female

2.2 Male Female

2.3 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 Children1. 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. Brothers D. Sister E. Other relative F. Other specify

**6. Age of the Primary caretaker** 1. ___ Years 2. Don‘t knows

7**. Religion of the primary caretaker** 1. Orthodox 2. Muslim 3. Protestant

4. Catholic 5. Wakefa 6. Other

8. Occupation of the primary caretaker1. Farmer 2. Daily Labour 3. Pastoralist

4. House Wife 5. Agro-pastoral 6. Student

7. Merchant 8. If other, specify

**9. Educational status of the primary caretaker** 1. Illiterate.2 Primary

3. Secondary and Above

4. Read and Write 5. If other, specify

**10. Family monthly income in\ETB_____**

**II. Child Immunization history**

1. is there vaccination card or family folder. 1. Yes / No

2. Yes / NO

3. Yes / No

1.1 If yes observe the card

1.2 If No, did you ever receive a card?

1. Yes

2. No

3. Don ‘t remembers

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__ /__/____ __ /__/____ __ /.

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 Meas.__ Vit. A___ Child 2.Meas.__ Vit. A_____Child 3 Meas.___ Vit. A_____

**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? Yes/No/Don‘t knows

2. How long time will take to the nearest health facility? _____

Sometimes vaccinations are given for children when they go to health facility for other purposes rather than vaccination.

1. Have your children ever vaccinated in this situation so far? Yes/ No

2. Have you ever decided **NOT** to take your children to get vaccination? Yes/No

3. If yes, why did you not to take the child to vaccination? _____-

4. Was there any child you taken to a health facility for vaccination but not vaccinated then? Yes/No

5. If yes, why was the child not vaccinated? _____ _____-

6. Have you ever refused vaccination for this child? Yes/No

**I Assess awareness about vaccine**

1. Do you think vaccinating your children is important to prevent diseases? Yes/No

2. Which round vaccination is important to prevent measles infection? _____

3. From where have ever heard message about Measles vaccination? _____

4. What Messages have you about measles immunization? _____

5. When your child is sick, where would you take the child? _____

6. Usually, where do you prefer more to take your child when they sick? _____

**II.Assessment on maternal health care practice**

1. Do you ever see anyone for pregnancy care during your pregnancy? Yes/No

2Were you offered tetanus vaccination during the visit. (Injection in the left upper arm) _____

3. Where did you deliver your last child? _____

4. Who attend the delivery of your last child? _____

**III Assessment of the Health worker in Service**

1. In2019, have you received any Immunization Training Yes /No

2. If You Have Not received the above Training in 2019. When is the last time you received it? How Many Session ----------

3. Measles Specific Training. How many Sessions? _____

4. Did the Measles Specific Training it helps improve your Knowledge/Skills Yes /No?

Declaration

I, the undersigned, declare that, this my original work and never been presented by another person in this or any other university and that all the source material and reference materials used for this thesis have been acknowledged.

Name: Emebet Alemu Wedajo

Signature: ----------

Date: ---------- Date of submission: ----------

The thesis has been submitted for examination with my approval as a university advisor.

Name of Advisor——————————— Signature: ----------

Date: ----------

Name of Advisor———————————————Signature: ----------

Date: ----------