Addis Ababa University

College of Health Sciences

School of Public Health

Ethiopian Field Epidemiology and Laboratory Training Program (EFELTP)

Compiled Body of Works in Field Epidemiology

By

Zerihun Demoze

Submitted to Department of preventive Medicine in partial fulfillment of the Degree of Master of Public Health in Field Epidemiology

June, 2019

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Approved by Examining Board

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Examiner2

June, 2019

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Contents

Acknowledgment iii

Contents iv

List of figures ix

List of tables xi

Acronyms xiii

Executive Summary xv

Chapter I-Outbreak investigation 1

1.1. Rubella outbreak investigation in South Aari district, South Omo zone, Southern Nation Nationalities and Peoples Region (SNNPR), Ethiopia, December, 2018 1

1.1.1. Abstract 1

1.1.2. Introduction 2

1.1.3. Objectives 4

1.1.4. Methods and Materials 5

1.1.5. Results 8

1.1.6. Discussions 12

1.1.7. Conclusion 14

1.1.8. Recommendations 14

1.1.9. References 15

1.2. Anthrax outbreak investigation in Menit Goldia district, Bench Maji zone, Southern Nation Nationalities and Peoples Region (SNNPR), Ethiopia, March, 2019 16

1.2.1. Abstract 16

1.2.2. Introduction 17

1.2.3. Objectives 18

1.2.4. Methods and materials 19

1.2.5. Results 23
1.2.6. Discussions 27
1.2.7. Conclusion 28
1.2.8. Recommendation 28
1.2.9. References 31
Chapter II-Surveillance Data Analysis 32
2.1. Retrospective study on the epidemiology of Measles in the Southern Nations Nationalities and peoples Region (SNNPR), Ethiopia, 2013-2017 32
2.1.1. Abstract 32
2.1.2. Introduction 33
2.1.3. Objective 36
2.1.4. Methods and Materials 37
2.1.5. Results 39
2.1.6. Discussion 46
2.1.7. Conclusion 48
2.1.8. Recommendations 48
2.1.9. Reference 49
Chapter III-Surveillance System Evaluation 50
3.1. Malaria Surveillance System Evaluation of Boricha district, Sidama Zone, SNNPR, Ethiopia, 2018 50
3.1.1. Abstract 50
3.1.2. Introduction 51
3.1.3. Objective 54
3.1.4. Methods and Materials 55
3.1.5. Results 58
3.1.6. Discussions 69

3.1.7. Limitations 71
3.1.8. Conclusion 71
3.1.9. Recommendations 72
3.1.10. References 73
4.1. Health Profile Description of Dale district, Sidama Zone, SNNPR, Ethiopia; 2016/17 74
4.1.1. Abstract 74
4.1.2. Introduction 75
4.1.3. Objectives 77
4.1.4. Methods and Materials 78
4.1.5. Results 79
4.1.6. Discussion 92
4.1.7. Limitation 93
4.1.8. Conclusion 93
4.1.9. Recommendation 93
4.1.10. References 94
Chapter V-Scientific Manuscript 95
5.1. Rubella outbreak investigation in South Aari district, South Omo zone, Southern Nation Nationalities and Peoples Region (SNNPR), Ethiopia, December, 2018 95
5.1.1. Abstract 95
5.1.2. Introduction 96
5.1.3. Objectives 98
5.1.4. Methods and Materials 99
5.1.5. Results 102
5.1.6. Discussions and conclusion 106
5.1.7. References 108

Chapter VI-Scientific Abstract 109

6.1. Rubella outbreak investigation in South Aari district, South Omo zone, Southern Nation Nationalities and Peoples Region (SNNPR), Ethiopia, December, 2018 109

6.2. Anthrax outbreak investigation in Menit Goldia district, Bench Maji zone, Southern Nation Nationalities and Peoples Region (SNNPR), Ethiopia, April, 2019..... 110

Chapter VII-Narrative Summary of Disaster Situation 111

7.1. Rapid Meher Season Health and Nutrition Need Assessment in SNNP Region, Hadiya zone, Kembata Tembaro zones and Halaba special woreda, 2018 111

7.1.1. Executive summary..... 111

7.1.2. Introduction..... 112

7.1.3. Objectives 113

7.1.4. Methods and Materials..... 114

7.1.5. Findings and discussions..... 116

7.1.6. Conclusion 123

7.1.7. Recommendations..... 123

Chapter VIII-Proposal for Epidemiological Research Project..... 124

8.1. Virologic Failure and Associated factors among patients routinely treated with ART in Southern Region of Ethiopia with Regard to the UNAIDS 90-90-90 Treatment Targets 124

8.1.1. Proposal Summary..... 124

8.1.2. Introduction..... 126

8.1.3. Literature review..... 129

8.1.4. Objectives 131

8.1.5. Methods and Materials..... 132

8.1.6. Budget..... 138

8.1.7. Work Plan 140

8.1.8. References 141

Chapter IX-Additional outputs 142

9.1 Measles Outbreak investigation in Arba Minch University, Chamo Campus, Gamo Goffa zone, SNNPR, Ethiopia, 2018 (Co-investigator) 142

9.1.1. Introduction 142

9.1.2. Objectives 143

9.1.3. Methods and Materials 144

9.1.4. Findings and discussion 145

9.1.5. Conclusion and Recommendations 147

9.1.6. References 148

9.2. **Weekly Epidemiological Bulletin, week-03, 2019** 149

Annexes 153

1.1 Rubella investigation checklists 153

1.2 Anthrax Investigation form 158

1.3 Surveillance system evaluation checklists 161

1.4 Health profile checklists 173

1.5 Annexes of proposal summary for epidemiologic research 184

List of figures

Figure 1: Map of South Ari district, South Omo zone, SNNP Region, Ethiopia 5
Figure 2: Distribution of rubella by sex, South Aari district, South Omo zone, SNNPR, Ethiopia 9
Figure 3: Epidemic-curve of the rubella outbreak by Date of Onset of rash in South Aari district, South Omo zone, SNNPR, 2019 10
Figure 4:- Map of Menit Goldia, Bench-Maji Zone, SNNPR, Ethiopia, 2019 19
Figure 5: Anthrax outbreak by date of onset of the illness, Menit Goldia district, Bench-Maji zone, SNNPR, Ethiopia, 2019 23
Figure 6: Distribution of human anthrax cases by gender in Menit Goldia district, Bench-Maji zone, SNNPR, March, 2019 24
Figure 7: Magnitude of Measles per 100,000 populations, SNNPR, from 2013 to 2017 40
Figure 8: Magnitude of measles by Age group per 100,000 populations, SNNPR, 2013-2017 ... 41
Figure 9: Trend of measles per 100,000 populations, SNNPR, 2013-2017 42
Figure 10: Vaccination statuses of measles cases, SNNPR, 2013-2017 43
Figure 11: Non measles febrile rash rate by zones and special wordas, SNNPR, 2017 45
Figure 12: Proportions of woredas that sent at least one serum specimen by zones and special woreda, SNNPR, 2017 45
Figure 13: Map of Boricha district, Sidama zone, SNNPR, Ethiopia, 2018 55
Figure 14: Trend of malaria per 100,000 populations, Sidama zone, SNNPR, Ethiopia, 2013-2018 58
Figure 15 Trend of malaria per 100,000 populations, Boricha district, Sidama zone, SNNPR, Ethiopia, 2013-2018 59
Figure 16 : Seasonal pattern of malaria for Sidama zone and Boricha district, SNNPR, Ethiopia, 2013-2018 60
Figure 17 Flow chart of the surveillance system of Boricha District, Sidama Zone, SNNPR, Ethiopia, 2018 61
Figure 18 Trend of report completeness of Boricha district, Sidama zone, SNNPR, Ethiopia, 2018 67
Figure 19: Map of Dale district, Sidama zone, SNNPR, Ethiopia, 2018 80
Figure 20: population pyramid for Dale district, Sidama zone, SNNPR, 2018 81

Figure 21: organizational structure of Dale District Health office, Sidama zone, SNNPR, Ethiopia 84
Figure 22: Total malaria cases per 100,000 populations, from 2013-2017 87
Figure 23: Seasonal pattern of malaria in Dale district, Sidama zone, SNNPR, 2013-2018 88
Figure 24: OTP and SC cases per 100,000 populations (under five years), 2012-2017 89
Figure 25: Map of South Ari district, South Omo zone, SNNP Region, Ethiopia 99
Figure 26: Distribution of rubella by sex, South Aari district, South Omo zone, SNNPR, Ethiopia 103
Figure 27: Epidemic-curve of the rubella outbreak by Date of Onset of rash in South Aari district, South Omo zone, SNNPR, 2019..... 104
Figure 28: Monthly trend of Scabies in Hadiya zone, Kembata Tembaro zone and Halaba special woreda, 2018..... 116
Figure 29: Trend of Confirmed Malaria in Hadiya, Kembata Tembaro and Halaba special woreda, from 2014-2018..... 117
Figure 30: Confirmed Malaria per 100,000 populations by woredas, Hadiya zone, 2018 118
Figure 31: Confirmed Malaria per 100,000 populations by woredas, Kembata Tembaro zone, 2018..... 118
Figure 32: Trend of SAM in Hadiya, Kembata Tembaro and Halaba special woredas, 2014-2018 121
Figure 33: Monthly trend of SAM in Hadiya, Kembata Tembaro and Halaba special woreda, 2018..... 121
Figure 34: Total SAM cases of Hadiya zone per 100,000 populations, 2018 122
Figure 35: Total SAM cases of Kembata Tembaro zone per 100,000 populations, 2018..... 122
Figure 36: Flow chart showing proportional allocation of sample size to study virologic failure in 15 selected health facilities in SNNP Region from December/2018 to December/2019. .. 134
Figure 37: Distribution of measles cases by sex, Arbaminch University, Chamo Campus, Gamo Gofa zone, SNNPR, Ethiopia, 2018..... 146
Figure 38: Epi-curve showing measles cases by date of onset of rash, Arbaminch University, Chamo campus, Gamo Gofa zone, SNNPR, Ethiopia, 2018..... 146

List of tables

Table 1: Attack rate of rubella by Age Group, South Aari district, South Omo zone, SNNPR, Ethiopia 8
Table 2: Bivariate and Multivariate Analysis of risk factors for rubella (Case=27 and Control=81), South Aari district, South Omo zone, SNNPR, Ethiopia 11
Table 3: Distribution of suspected human anthrax cases and deaths by age group, Menit-Goldia district, Bench-Maji zone, SNNPR, March 2019 24
Table 4: Clinical manifestation of human anthrax cases, in Menit Goldia district, Bench-Maji zone, SNNPR, March, 2019 25
Table 5: surveillance performance of measles, SNNPR, 2013-2017 44
Table 6: Distribution of population group and vital statistics for Dale district, Sidama, SNNPR, Ethiopia, 2016/17 81
Table 7: Plan and achievements of school enrollment of school age children in Dale district, Sidama zone, SNNPR, Ethiopia, 2016/17 83
Table 8: Accessibility of Electric power, safe water and telecommunication service for Health facilities in Dale district, Sidama zone, 2016/17 84
Table 9: Distribution of Health Professionals for Dale district, Sidama Zone, SNNPR, Ethiopia, 2016/17 85
Table 10: Plan and Achievements of Maternal health activities in Dale district, Sidama zone, SNNPR, Ethiopia, 2016/17 86
Table 11: HIV testing service plan and achievement of the Dale District, 2016/17 87
Table 12: Top ten leading causes of Morbidity, OPD, all age group; Dale district, Sidama, SNNPR, Ethiopia, 2016/17 90
Table 13: Top ten leading causes of Morbidity, Age Group 0-4, Dale district, Sidama, 2016/17 91
Table 14: Attack rate of rubella by Age Group, South Aari district, South Omo zone, SNNPR, Ethiopia 102
Table 15: Bivariate and Multivariate Analysis of risk factors for rubella (Case=27 and Control=81), South Aari district, South Omo zone, SNNPR, Ethiopia 105

Table 16: Logistics and other costs budget breakdown for conducting a research on virologic Failure and Human Immunodeficiency Virus Drug Resistance in Southern Ethiopia With Regard to the UNAIDS 90-90-90 Treatment Targets 138
Table 17: Work plan for conducting a research on virologic Failure and Human Immunodeficiency Virus Drug Resistance in Southern Ethiopia With Regard to the UNAIDS 90-90-90 Treatment Targets 140

Acronyms

AIDS	Acquired Immune deficiency Syndrome
ANC	Antenatal care
ART	Anti-retroviral therapy
AWD	Acute Watery Diarrhea
CD	Cluster of differentiation
CDC	Center for Disease Control
CTC	Cholera Treatment Center
DRMFSCO	Federal Disaster Response Management and Food Security Coordination Office
EFETP	Ethiopian Field Epidemiology Training Program
EFY	Ethiopian Fiscal Year
e-IDSR	Electronic Integrated Disease Surveillance and Response
EPHI	Ethiopian Public Health Institute
EPRP	Emergency Preparedness and Response Plan
EQA	External Quality Assessment
FMOH	Federal Ministry of Health
HAART	Highly active antiretroviral therapy
HDA	Health Development Army
HEP	Health Extension Program
HEWs	Health Extension Workers
HIV	Human Immunodeficiency Virus
HIVDRMs	Human immunodeficiency Virus Drug resistance Mutations
HP	Health Post
IDPs	Internally Displaced Persons
IMR	Infant Mortality Rate
IRS	Indoor Residual Spraying
ITN	Insecticide Treated bed Net
LLINS	Long Lasting Insecticides Treated Nets
MAM	Moderate Acute Malnutrition
MCH	Maternal and Child Health
MUAC	Middle Upper Arm Circumference
NGO	Non-Governmental Organization
OPD	Out Patient Department
OTP	Outpatient Therapeutic Program
PHEM	Public Health Emergency Management
PIHCT	Provider Initiated HIV Counseling and Testing
PLW	Pregnant and Lactating Women
PPV	Positive Predictive Value
PVL	Plasma Viral Load
RDT	Rapid Diagnostic Test
RNA	Ribonucleic Acid
RRT	Rapid Response Team

SAM	Severe acute malnutrition
SC	Stabilization Center
SD	Standard deviation
SIAs	Supplementary Immunization Activities
SNNPR	Southern Nations Nationalities Peoples
TLC	Total lymphocyte count
TSFP	Targeted Supplementary Feeding Program
UN	United Nations
VCT	Voluntary Counseling and Testing
VL	Viral load
WHO	World Health Organization

Executive Summary

This compiled body of work comprises of different outputs to be submitted to Addis Ababa University, school of public health for the partial fulfillments of Degree of Masters in Field epidemiology. It has nine chapters, including Outbreak investigation, Surveillance data analysis, Surveillance system evaluation, Narrative summary of disaster situations, Proposal for epidemiologic research project, Manuscript for peer reviewed journal, Abstract for scientific presentation and two additional outputs

Chapter I: two outbreak investigation reports have been included on this chapter; the first is rubella outbreak investigation in South Aari district of South Omo zone. A case-control study was conducted. We identified 53 cases, of which 31 cases (58.5%) were females. The second report was on anthrax outbreak investigation in Menit Goldia district of Bench Maji zone. A descriptive cross sectional study was used. 57 cases and two deaths identified.

Chapter II: it describes about measles surveillance data analysis of SNNP Region from 2013 to 2017**.** A total of 8632 confirmed measles was reported. Konta special woreda was the most affected part of the region.

Chapter III: this chapter presents malaria surveillance system evaluation of Boricha district of Sidama zone. A cross sectional study with secondary data review was applied for this study. Core and supportive functions of surveillance system, and system attributes were assessed.

Chapter IV: Health profile assessment of Dale district**.** A cross sectional study with secondary data review was applied for this study. Dale district is located in Sidama zone with an estimated total population of 235,847 in 2016/17 year.

Chapter V: A manuscript on rubella outbreak investigation prepared for peer review journal.

Chapter VI: Abstract on rubella outbreak investigation prepared for scientific conference presentation.

Chapter VII: Multi-sectoral meher season health and nutrition needs assessment in Hadiya and Kembata Tembaro zones, and Halaba special woreda

Chapter VIII: Proposal for epidemiological research project. The title of the project is virologic failure and associated factors among patients routinely treated with ART in Southern Region of Ethiopia with regards to UNAID 90-90-90 treatment targets.

Chapter IX: two additional outputs which includes report on measles outbreak investigation in Arba Minch University, Chamo campus and Weekly epidemiological bulletin of SNNPR.

Chapter I-Outbreak investigation

1.1. Rubella outbreak investigation in South Aari district, South Omo zone, Southern Nation Nationalities and Peoples Region (SNNPR), Ethiopia, December, 2018

1.1.1. Abstract

Background: The most serious consequence of rubella virus infection can develop when a woman becomes infected during pregnancy that can severely affect the fetus, resulting in miscarriage, fetal death, or the combination of disabling conditions collectively called Congenital Rubella Syndrome (CRS), which includes heart disease, blindness and deafness. The purpose of this outbreak investigation was to identify the source of the outbreak and control further spread of the disease.

Methods: Unmatched Case-control study in the ratio of 1 to 3 was conducted from December 24, 2018 to January-22, 2019. Standard semi-structured questionnaire was used to collect data. Logistic regression was performed to observe statistical association of the dependent variable with the independent variable. Line-list data was also used for descriptive study.

Result: A total of 53 cases of rubella were identified. Of these, 31 cases (58.5%) were females. Children between 5 to 15 years were the most affected. Statistically significant risk factors were household contact with an AOR of 5.09 (95% CI, 1.34-19.4) and exposure to school children with fever and rash with an AOR of 2.77 (95% CI, 1.09-7.05).

Conclusion and recommendations: The occurrence of this outbreak provides an insight regarding the existence of circulating rubella infection in the district. Rubella can cause a life-long damage to infants when it occurs during pregnancy. Therefore, the ministry of health (MOH) should take the leading role to introduce rubella vaccination into the routine immunization program and establish CRS surveillance system across the country.

1.1.2. Introduction

Rubella is an acute, usually mild viral disease traditionally affecting susceptible children and young adults worldwide (1). Rubella virus is classified as a toga virus, genus rub virus. It is an enveloped RNA virus; with a single antigenic type that does not cross-react with other members of the toga virus group (2). Persons with rubella are most infectious when the rash is erupting, but they can shed virus from seven days before to seven days after rash onset. Rubella may be transmitted by persons with mild or no symptoms (up to 50% of all rubella virus infections). Infants with Congenital Rubella Syndrome (CRS) shed large quantities of virus from body secretions for up to one year and can therefore transmit rubella to persons caring for them who are susceptible to the disease (3). The average incubation period is 18 days with a range of 12 to 23 days. There may be a mild prodromal illness involving a low-grade fever, malaise, coryza and mild conjunctivitis. Lymphadenopathy involving post-auricular and sub-occipital glands may precede the rash (4).

The most serious consequence of rubella virus infection can develop when a woman becomes infected during pregnancy that can severely affect the fetus, resulting in miscarriage, fetal death, or the combination of disabling conditions collectively called Congenital Rubella Syndrome (CRS), which includes heart disease, blindness and deafness (5, 6). This is most likely to develop with maternal infection during the first 12 weeks of pregnancy, although isolated birth defects, particularly sensory-neural hearing impairment, can be found in infants with maternal infection at up to 20 weeks of pregnancy. As is the case with measles, the burden of the disease is unevenly distributed across WHO regions (7).

Globally, an estimated 110,000 babies are born with CRS every year, mostly in South East Asia and Africa. Sadly, these children will suffer a lifetime because of birth defects such as blindness, deafness, and heart disease, even though a cost-effective vaccine is widely available to prevent both rubella and CRS. This is why rubella and CRS elimination is a race worth winning (8, 9). However, most countries that introduced RCV under the national immunization program have achieved a remarkable reduction of rubella and CRS burden. After achieving more than 94% of MMR coverage, Australia recently has declared the elimination of rubella and CRS. Likewise, the last time endemic rubella and CRS cases were reported from America was 2009, and the region was verified free of endemic rubella virus transmission in 2015. In the World Health Organization (WHO) European Region, 33 countries had eliminated rubella by 2016. Due to the

steady implementation of rubella immunization over the 21 years, the annual rubella incidence rate remained low in all age groups, and the natural epidemic cycle of rubella has probably been broken in Shandong province of China (9-11).

The measles case-based and lab-supported surveillance system in WHO African Region was established after the Region started accelerated measles control program in 2001, and is being implemented by nearly all countries across the Region since then. The elements of such a case based surveillance system still remain highly relevant and allow for the monitoring of the impact of the strategies on measles epidemiology, as well as for rubella testing of measles lab-negative specimens. In so doing, the system has allowed countries to better understand the epidemiology of rubella as well. However, as the African Region moves towards the elimination target, and with certain countries having achieved a longer period of sustained low incidence for measles, there is a need to make the surveillance system more sensitive, and more tuned to address the emerging issue of rubella control(12).

1.1.3. Objectives

General Objectives

The overall purpose of the outbreak investigation was to describe the magnitude and distribution of the outbreak by person, place and time; and to identify the associated factors in South Aari district of South Omo zone

Specific objectives

- To identify the source of an ongoing outbreak and support outbreak control activities
- To describe the outbreak by person, place and time
- To identify risk factors associated with the outbreak

1.1.4. Methods and Materials

Study Area

The study was conducted in South Aari district, located in South Omo zone. South Omo zone is one of the fourteen zones found in Southern Regional state of Ethiopia. South Aari district, around the zonal capital Jinka, is located in the intensively cultivated middle altitudes, and could be said to mark the south-western limits of the traditional Ethiopian highland ox-plough agriculture. The highest point in the district is Mount Mago (2528 meters). Rivers include the Maki. The Mago National Park covers part of the southwestern corner between the Mago and Neri Rivers. The total population of the district in 2018/19 was estimated to be 254,894. Female population constitutes 128,211 (50.3% of the total). Less than five years population constitute 38,668 (15.61%) and population less than 15 years constitutes 118,579 (47.87%).

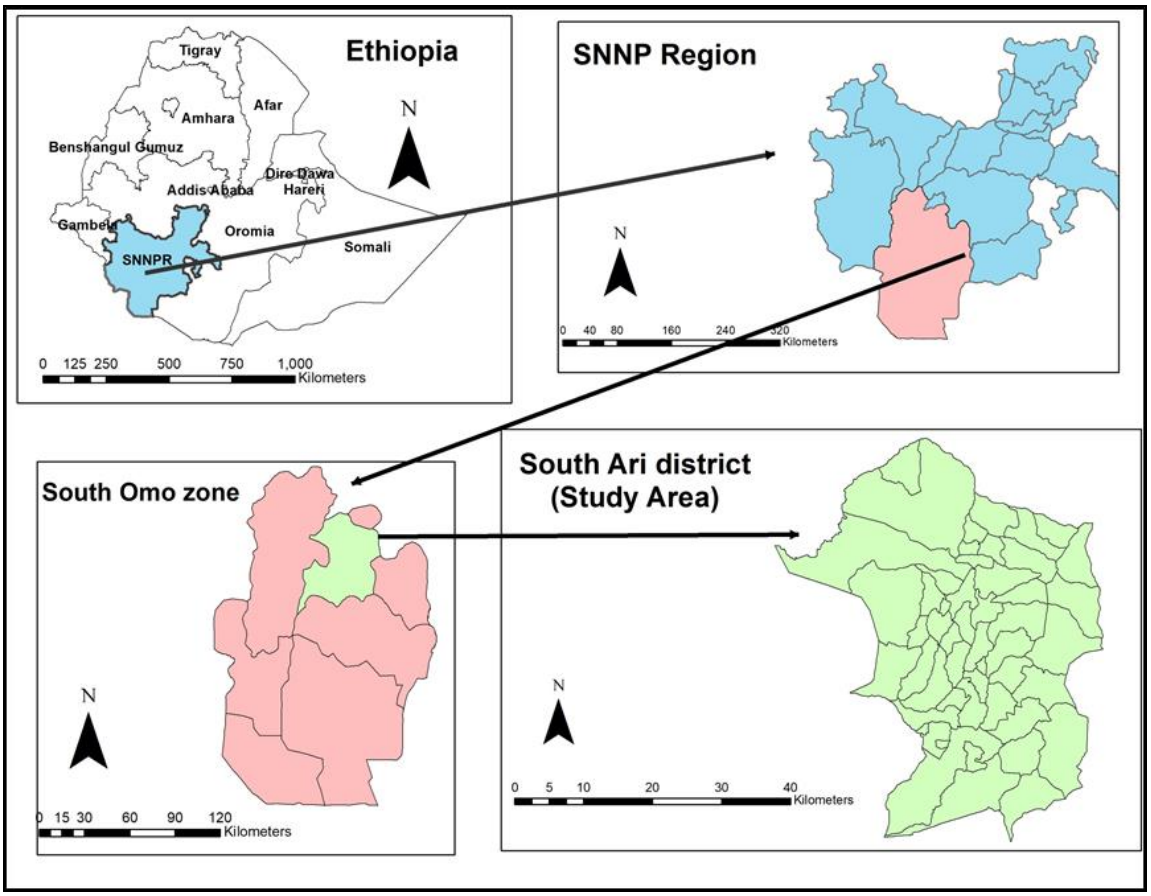

Figure 1: Map of South Ari district, South Omo zone, SNNP Region, Ethiopia

Study design and period

Unmatched Case-control study in the ratio of 1 to 3 (27 cases and 81 controls) was conducted from December 12, 2018 to January 3, 2019. A case was a child aged less than 15 years lived in South Aari district who was tested positive for rubella specific IgM antibodies or that met the clinical case definition and was epidemiologically linked to a laboratory-confirmed case of rubella during the outbreak. A control was a child less than 15 years who lived in the same community without signs and symptoms of rubella. All twenty-seven confirmed cases that were identified during the investigation period were included as cases, whereas three controls against each case were selected. Cases and controls were recruited from the community through active case search. Updated Line list data obtained from the district health office was used for descriptive study purpose.

Data collection

Using standard semi-structured questionnaire information about demographic characteristics, clinical presentations and associated risk factors collected. House to house active case search with the guidance of HDA leader (Health development Army) and HEW (Health Extension Worker) was conducted.

Data entry and Analysis

We used Epi-Info7 and Microsoft Excel 2010 for data entry and analysis. Factors that showed statistically significant associations in bi-variate analysis at P value <0.25 were subsequently analyzed using unconditional logistic regression. Odds ratio (OR) adjusted for multiple confounders was calculated, associations at P value <0.05 and 95% CI was considered significant.

Laboratory Method

The Laboratory analysis was conducted at Hawassa Regional Public Health laboratory. The analysis was based on ELISA (Enzyme-linked immuno-sorbent assay) principle. IgM antibodies in the human serum forms an immune complex with antigen coated on the micro-titer-plate. Unbound immuno-globulins are removed by washing process; and enzyme conjugate attaches to this complex. Unbound conjugate is again removed by washing processes. After adding the substrate solution (TMB), a blue color is produced by the bound enzyme (peroxidase). The color changes to yellow when stopping solution is added. The Intensity of color formed is directly proportional to the concentration of antibodies in the serum. The optical density of the color formed was then measured using ELISA reader.

Operational definitions

Suspected rubella: Any generalized rash illness of acute onset that does not meet the criteria for probable or confirmed rubella or any other illness

Probable rubella: A case that meets the clinical case definition, has no or noncontributory serologic or virologic testing, and is not epidemiologically linked to a laboratory-confirmed case of rubella

Confirmed rubella: A case that is laboratory confirmed (with or without symptoms) or that meets the clinical case definition and is epidemiologically linked to a laboratory-confirmed case of rubella

Ethical clearance

Official permission to conduct the study was obtained from Southern Regional Health bureau, South Omo zone and South Aari district Health departments.

1.1.5. Results

Descriptive study

On December 9, 2018, a suspected measles/rubella outbreak was reported from South Aari district. The index case was a 13 years old girl found during Human Papilloma Virus (HPV) vaccination campaign at Aykamer primary school. Upon further investigation by the district health department, additionally seven suspected cases were identified. The index case had no clear contact history with febrile rash cases. Blood specimens were collected from all the eight suspected cases and sent to Hawasa regional public health laboratory. Five of the eight suspected cases were tested positive for rubella specific IgM. Confirmed rubella outbreak was then declared on December 11, 2018. On December 12, 2018, Field epidemiology Residents from Regional Public Health Emergency Management (PHEM) deployed to the area to investigate the outbreak.

Distribution by Age group and Sex

From December 9, 2018 to January 3, 2019, we identified a total of 53 rubella cases with zero death. Of these, 31 cases (58.5%) were females, with female to male ratio of 1.4 to 1. The age distribution of cases showed, the median age was 6 years, ranging from 2 to 16 years. Children between 5 to 14 years were the most affected with attack rate of 51.3 per 100,000 populations, followed by children less than 5 years of age with attack rate of 28.45 per 100,000 populations.

Table 1: Attack rate of rubella by Age Group, South Aari district, South Omo zone, SNNPR, Ethiopia

S. No	Age group	Number of cases	Attack rate (per 100,000 populations)
1	< 5 years	11	28.45
2	5-14 years	41	51.31
3	≥ 15 years	1	0.73
Total		53	

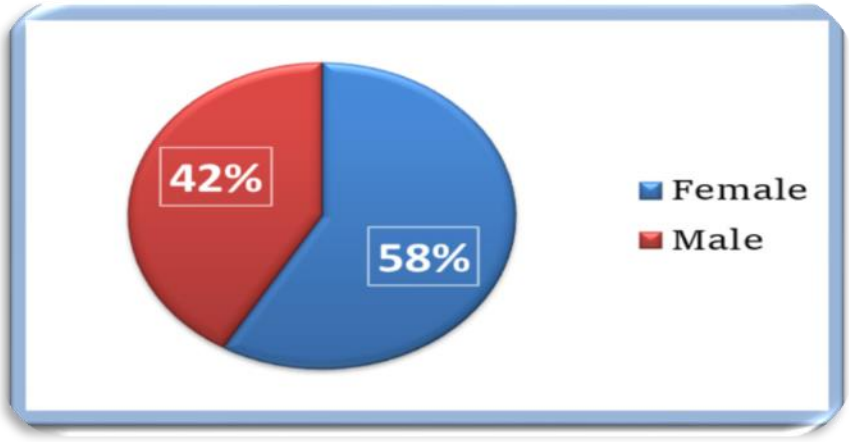

Figure 2: Distribution of rubella by sex, South Aari district, South Omo zone, SNNPR, Ethiopia

Distribution by Time and Place

The highest number was reported from Aykamer kebele with 28 cases (attack rate of 18.3 per 1000), followed by 22 cases (attack rate 13.2 per 1000) from Gedir kebele. With regard to clinical presentations of cases, all cases had rash and fever while 25 cases (92.6%) had conjunctivitis, 21 cases (77.8%) had cough, 24 cases had coryza (runny nose), and 8 cases (29.6%) had vomiting. As illustrated in the epidemic curve, the outbreak was a propagated type which is characterized by person to person transmission. The caseload sharply increased from one case on 9th December to 13 cases on 11th December, at which the peak was observed. The caseload then turned to zero on 16th December and increased again to 6 cases on 23th December. Rubella case was not reported after January 3, 2019 from the district.

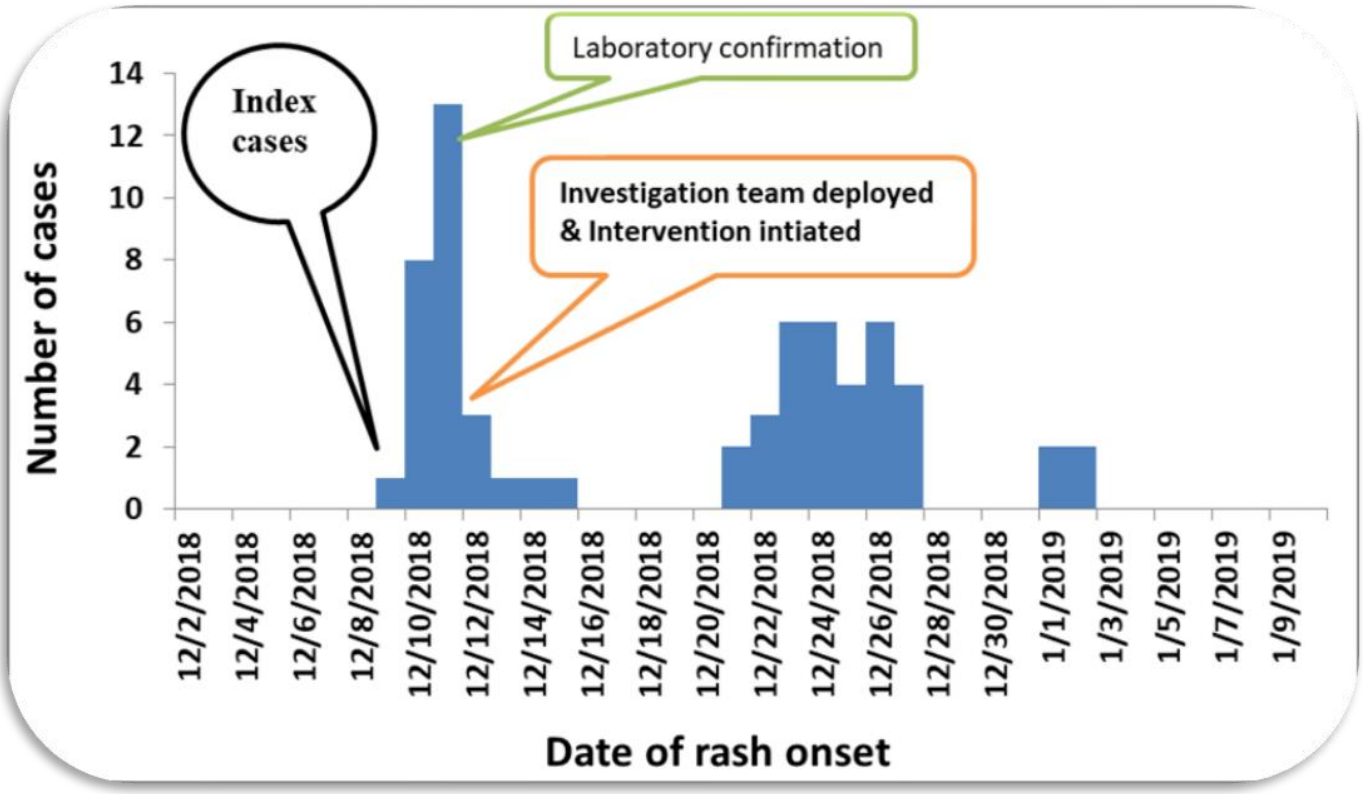

Figure 3: Epidemic-curve of the rubella outbreak by Date of Onset of rash in South Aari district, South Omo zone, SNNPR, 2019

Analytic study

A total of 108 study subjects with 27 cases and 81 controls in the ratio of 1to 3 were recruited. From the 27 cases, 13 (48.2%) were females. The median age of the cases was 4 years, ranging from 1 to 13 years. From 81 controls, 41 (50.6%) were females; the median age of the controls was 6 years ranging from 2 to 13 years. 49 respondents (45.4%) thought that the disease was caused by Bad weather condition, while 33 respondents (30.6%) thought the disease was caused by contact with ill person from the same disease, the rest 26 (24%) said they don't know the cause of the disease. 55 respondents (50.9%) thought that the disease affects children less than 5 years of age, 25 cases (23.1%) thought it affects children less than 18 years while the rest 28 (25.9%) respondents said that it can affect all age group of both male and female. Statistically significant risk factors for contracting rubella were household contact with active febrile rash cases with an AOR of 5.09 (95% CI, 1.34-19.4) and exposure to febrile rash cases at the school with an AOR of 2.77 (95% CI, 1.09-7.05).

Table 2: Bivariate and Multivariate Analysis of risk factors for rubella (Case=27 and Control=81), South Aari district, South Omo zone, SNNPR, Ethiopia

Variables		Cases n=27 (%)	Controls n=81 (%)	Odds Ratio and 95% CI	
				COR*	AOR*
contact at the school	Yes	16 (59.3%)	30 (37%)	2.45 (1.003-6.14)	2.77 (1.09-7.05) **
	No	11 (40.7%)	51 (63%)		
Neighborhood contact	Yes	5 (18.5%)	12 (14.8%)	1.30 (0.38-4.07)	
	No	22 (81.5%)	69 (85.2%)		
Household contact	Yes	6 (22.2%)	5 (6.2%)	4.27 (1.14-16.61)	5.09 (1.34-19.4) **
	No	21 (77.8%)	76 (93.8%)		
Suffered from rubella like illness before	Yes	4 (14.8%)	8 (9.9%)	1.58 (0.38-5.74)	
	No	23 (85.2%)	73 (90.1%)		
Know transmission of rubella	Yes	10 (37%)	40 (49.4%)	0.61 (0.24-1.48)	
	No	17 (63%)	41 (50.6%)		
The house was well ventilated	Yes	6 (22.2%)	18 (22.2%)	1 (0.32-2.81)	
	No	21 (77.8%)	63 (77.8%)		

**Significant association at P value <0.05, *COR: Crude odds ratio; AOR: Adjusted odds ratio

1.1.6. Discussions

Rubella surveillance in Ethiopia is integrated with measles case-based surveillance system. However, rubella generally is a milder disease than measles, and infection is subclinical in 30% to 50% of cases. The primary focus of measles integrated rubella surveillance system is detection of measles cases as well; therefore the surveillance system is much less likely to detect rubella than measles. Besides, CRS surveillance system is not yet established in the country; as a result the true burden of rubella and CRS is under estimated or unknown. Not ignoring this fact, surveillance data of SNNP Region from 2013-2017 showed that 383 laboratory confirmed cases of rubella were reported. Gamo Gofa and South Omo zones reported the highest number with 62 & 51 cases respectively. However, the extent of transmission was not known as line-list information was not well documented.

In this case-control study we identified risk factors associated with rubella outbreak in South Ari district. Household contact with febrile rash cases and exposure to children with febrile rash cases at the school were significantly associated risk factors for contracting rubella. Similar studies in Zimbabwe and China showed exposure to febrile rash cases at school was associated with rubella infection (13, 14). 98% of rubella affected cases were children less than 15 years of age. This finding is consistent with surveillance data analysis in WHO Africa region between 2002 and 2009 that showed 95% of rubella IgM positive cases occurred in children ≤ 15 years of age (15). Similar finding was also reported from Zimbabwe and Kenya in outbreak investigation studies (14, 16). However, the absence of vaccination is the major risk factor for the occurrence of rubella outbreak in various parts of the country; as yet rubella vaccination is not included in the routine immunization program in Ethiopia.

WHO recommends that countries should take the opportunity offered by accelerated measles control and elimination activities to introduce RCVs. Measles vaccine delivery strategies provide an opportunity for synergy and a platform for advancing rubella and CRS elimination. However, it is also important to review the epidemiology of rubella, including the susceptibility profile of the population; assess the burden of CRS; and establish rubella and CRS prevention as a public health priority before introducing RCV into the national immunization program (17). The Measles and Rubella Initiative (M&RI) is a global partnership committed to ensuring that no child dies from measles or is born with CRS. The Global Vaccine Action Plan (GVAP) was

endorsed by the 194 Member States of the World Health Assembly in May 2012. One of the indicators included in the GVAP is that measles and rubella would be eliminated in at least five WHO regions by 2020. This integrated vision of "a world without measles, rubella or congenital rubella syndrome (CRS)" is supported by WHO, UNICEF and other partners in the Global Measles and Rubella Strategic Plan 2012–2020 (4, 17). The number of countries using rubella vaccines in their national program continues to steadily increase. As of December 2016, 152 out of 194 countries had introduced rubella vaccines; however national coverage varies from 13% to 99%. Reported rubella cases declined by 97%, from 670,894 cases in 102 countries in 2000 to 22,361 cases in 165 countries in 2016. CRS rates are highest in the WHO African and South-East Asian regions where vaccine coverage is lowest (18).

Public Health Action

Active surveillance was initiated at the school and in the community. Health workers, school teachers and HDA (Health Development Army) were engaged on the active case search. Health education and awareness creation was conducted at the school and in the communities. During health education session we strongly suggested that febrile rash cases should be isolated from pregnant women. Exclusion of febrile rash cases from school was conducted. Vitamin A was supplemented for cases.

1.1.7. Conclusion

Despite the aforementioned weakness of measles case-based surveillance system to detect 30% to 50% subclinical rubella infection, the occurrence of this outbreak provides an insight regarding the existence of circulating rubella infection in the district. But, this study doesn't tell anything about the burden of CRS. Rubella vaccination is not included into the routine immunization program in Ethiopia so far, which posed the occurrence of rubella outbreak in various parts of the region.

1.1.8. Recommendations

Taking into account that rubella causes a life-long damage to infants when it occurs during pregnancy, the ministry of health (MOH) should take the leading role to introduce rubella vaccination into the routine immunization program. In addition the MOH should also consider the establishment CRS surveillance system. Government bodies at all levels should give more focus for rubella surveillance through the existing case-based measles and rubella surveillance system. In Ethiopian, there is no standalone surveillance and outbreak management guideline for rubella; hence, it is important to develop the surveillance guideline for effective control and prevention of the disease. Overall, it is important to design and implement effective control and prevention strategies for rubella and CRS considering as public health priority diseases.

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1.2. Anthrax outbreak investigation in Menit Goldia district, Bench Maji zone, Southern Nation Nationalities and Peoples Region (SNNPR), Ethiopia, March, 2019

1.2.1. Abstract

Background:

Anthrax is a zoonotic disease of public health importance caused by gram-positive spore-forming and toxin-producing bacterium. We investigated an outbreak of anthrax to verify cases and describe the outbreak.

Methods:

A descriptive across sectional study was conducted from March 17- April 5, 2019 to verify case and describe the outbreak. Information on symptoms and demography was collected by using case definitions and structured questionnaire.

Results:

The index human case was cutaneous anthrax detected on 24th March, 2019 following contact with dead ox suspected for anthrax. It a total of 57 (3.8% AR) cases with 2 (3.5% CFR) deaths (community deaths) reported between 14th _18th of March, 2019. Male were more affected than women. The median age of cases was 25 years, ranging from 1- 40 years.

Conclusion and Recommendations

Index case was cutaneous form which had contact with dead animal suspected for anthrax, there were community death due to suspected anthrax and adults were more affected. We recommend district health administration to improve the awareness of community members in regard to contact with dead animals and to avoid community death enhance earlier cases detection and management at health facility level.

1.2.2. Introduction

Anthrax is a zoonotic disease great public health importance that caused by the gram-positive spore-forming and toxin-producing bacterium B. anthrax is transmitted between animal and human and form approximately 60% of all human infective organisms with a diversity of animal hosts including wild life, pets, and domestic animals (1). Anthrax most commonly occurs in wild and domestic herbivores that ingest or inhale the spores while grazing. Domestic livestock and companion animals are an important sources of transmitting anthrax to human, mostly due to the close interaction between these animals and the people who came in to contact with them(2).

In most industrialized countries, anthrax is a rare disease, and infection in humans is usually due to occupational exposure to infected animals or their products, handling products from infected animals or by inhaling spores from contaminated animal products. B. anthrax is infection can also be acquired by eating contaminated meat from an infected animal (3, 4). Human anthrax occurs in three forms such as: cutaneous (about 95% of all cases o), pulmonary with severe atypical pneumonia, and gastro-intestinal. Symptoms of disease vary depending on how the disease was contracted. The incubation period is usually 1 to 7 days, but can be as long as 60 days(3).

Untreated, the case–fatality rates range from 5 to 20% for cutaneous anthrax, to more than 85% for pulmonary and gastro-intestinal anthrax. Antibiotic treatment is effective and can prevent most deaths in cutaneous cases. However, mortality in pulmonary and gastro-intestinal cases remains high even with treatment(3) .

1.2.3. Objectives

General objective

The overall objective was to describe the magnitude and distribution of human anthrax outbreak in Menit-Goldia district of Bench Maji zone and enhance the control of the outbreak.

Specific objectives

- ✓ To identify the source of the outbreak
- ✓ To describe the outbreak by person, place and time.
- ✓ To identify gaps and support the outbreak response activities

1.2.4. Methods and materials

Study area

Menit_ Goldia is one of the ten districts in Bench-Maji Zone of Southern Ethiopia which is located 800 km from Hawassa (the capital SNNPR) and 679 km from Addis Ababa (a capital city of Ethiopia). It is bounded by Menit Shasha district in the South, Shay Bench and South Bench districts in the west, Sheka zone in the north and South Omo zone in the east. For the administrative purpose the district is divided in to 31 rural and 1 urban Kebles. The population was estimated to be, 118,589. The area affected by human anthrax is Duma kebele; (Dashe-shompo village) located about 112 Kilometers from the administrative Town of Benchi-Maji zone (Mizan Aman town). The total population of the village is 1500 with an estimated of 300 households.

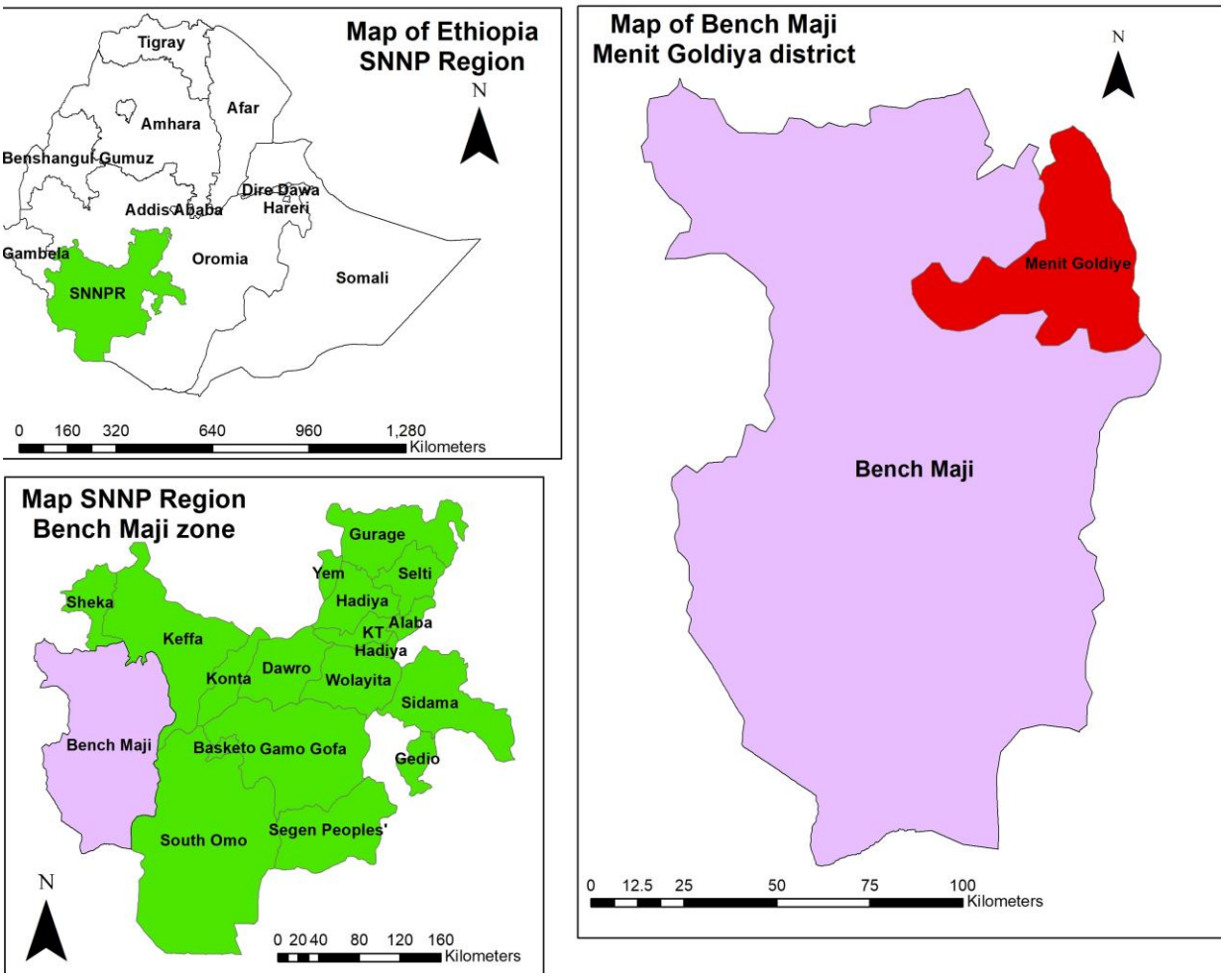

Figure 4:- Map of Menit Goldia, Bench-Maji Zone, SNNPR, Ethiopia, 2019

Study design and period

A descriptive across sectional study was conducted from March 17- April 2, 2019. Data was collected by using structured questionnaire, through interviewing human and animal health professionals of the district, and residents of the affected community. Review of documents and line-list data was done.

Laboratory method

Lesion swap specimens collected from five people suspected for cutaneous anthrax. The specimens then sent to Ethiopian Public Health Institute (EPHI), molecular laboratory department. Laboratory investigation was performed by using polymerase chain reaction (PCR); of which one specimen was tested positive for anthrax. The person who became positive was 20 years old male with cutaneous anthrax.

Data analysis

Microsoft excel 2010 was used for data entry and analysis. Data was analyzed and interpreted descriptively in terms of person, place, and time.

Team composition

One-health approach was used for field investigation in which team members were composed of human and animal health sectors, which includes PHEM officers from the region, zone and district health office, field epidemiology resident, and laboratory personnel from regional public health laboratory, and IDSR focal from health center, health extension worker and animal health professional from the zonal and district agriculture and livestock office.

Operational definitions

Case definitions:

Cutaneous Anthrax: An acute illness, or post-mortem examination revealing a painless skin lesion developing over 2 to 6 days from a papular through a vesicular stage into a depressed black eschar with surrounding edema. Fever, malaise and lymphadenopathy may accompany the lesion.

Inhalation Anthrax: An acute illness, or post-mortem examination revealing a prodrome resembling a viral respiratory illness, followed by hypoxia, dyspnea or acute respiratory distress with resulting cyanosis and shock. Radiological evidence of mediastinal widening or pleural effusion is common.

Gastrointestinal Anthrax: An acute illness, or post-mortem examination revealing severe abdominal pain and tenderness, nausea, vomiting, hematemesis, bloody diarrhea, anorexia, fever, abdominal swelling and septicemia.

Case classification

Confirmed: A clinically compatible illness with one of the following:

- Culture and identification of *B.* anthracis from clinical specimens by the Laboratory Response Network (LRN);
- Demonstration of *B. anthracis* antigens in tissues by immuno-histochemical staining using both *B. anthracis* cell wall and capsule monoclonal antibodies;
- Evidence of a four-fold rise in antibodies to protective antigen between acute and convalescent sera or a fourfold change in antibodies to protective antigen in paired convalescent sera using Centers for Disease Control and Prevention (CDC) quantitative anti-PA IgG ELISA testing;
- Documented anthrax environmental exposure AND evidence of *B. anthracis* DNA (for example, by LRN-validated polymerase chain reaction) in clinical specimens collected from a normally sterile site (such as blood or CSF) or lesion of other affected tissue (skin, pulmonary, reticuloendothelial, or gastrointestinal).

Probable: A clinically compatible illness that does not meet the confirmed case definition, but with one of the following:

- Epidemiological link to a documented anthrax environmental exposure;
- Evidence of *B. anthracis* DNA (for example, by LRN-validated polymerase chain reaction) in clinical specimens collected from a normally sterile site (such as blood or CSF) or lesion of other affected tissue (skin, pulmonary, reticuloendothelial, or gastrointestinal);
- Positive result of clinical serum specimens with the Quick ELISA Anthrax-PA kit;
- Detection of Lethal Factor (LF) in clinical serum specimens by LF mass spectrometry
- Positive result on testing of culture from clinical specimens with the Redline Alert test.

Suspected: An illness that is suggestive of one of the known anthrax clinical forms but no definitive, presumptive, or suggestive laboratory evidence of B. anthracis, or epidemiologic evidence relating it to anthrax.

1.2.5. Results

Suspected human anthrax was reported from Menit Goldia district of Bench Maji zone on 15th of March, 2019. Investigation team from the regional PHEM then deployed to the area on 17th of March, 2019. Upon investigation, we identified a total of 57 cases with 2 deaths (community deaths) with cases fatality rate of 3.5% between 14th _18th of March, 2019. We collected laboratory specimen from five suspected cases of cutaneous anthrax; of which one specimen was tested positive for anthrax by using PCR test. While the rest 56 cases were epidemiologically linked to the same source of exposure with the confirmed case and had clinically compatible illness of anthrax. Meanwhile all human anthrax cases were residents of Dashe-shompo village where anyone of the cases had no any travel history to other places. The outbreak started followed sharing food, and contact with dead ox suspected for anthrax during 12th of March, 2019.

The human index case was 25 years old male with cutaneous anthrax was identified on 14th of March 2019 from Dashe-shompo Village. The epidemic curve revealed that the outbreak was a common source type. There was a sharp increase of cases from one suspected case reported on 14th of March to 27 cases on 16th of March, 2019; the caseload then sharply reduced to four cases on 17th of March. The number of cases started to decline after the deployed team started public health interventions and no cases was reported after 18th of March, 2019.

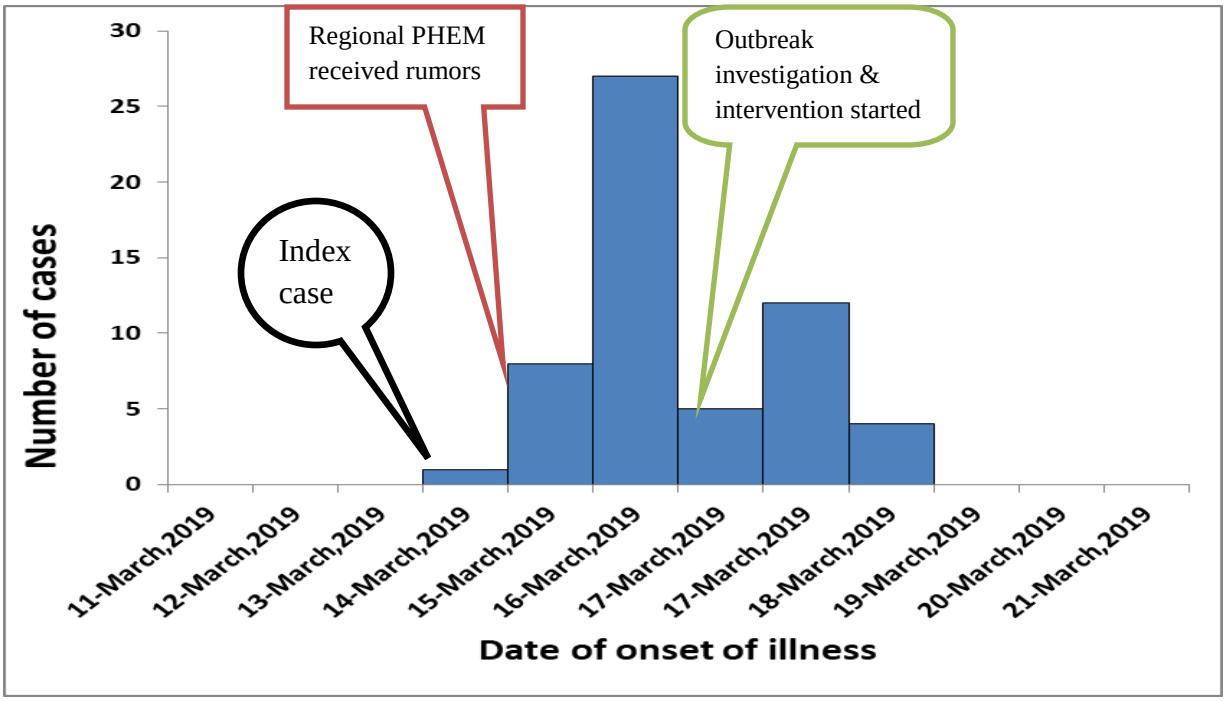

Figure 5: Anthrax outbreak by date of onset of the illness, Menit Goldia district, Bench-Maji zone, SNNPR, Ethiopia, 2019

Distribution by Age-group & Sex

From the total of 57 human anthrax cases, 39 (68%) were males and the remaining 18 (32%) were females. The median age of cases was 25 year, ranging from 1- 40 years. Adults above 14 years of age were most affected by the outbreak with 49 cases (86% of the total). Overall attack rate for all age group was 3.8% (57/1500).

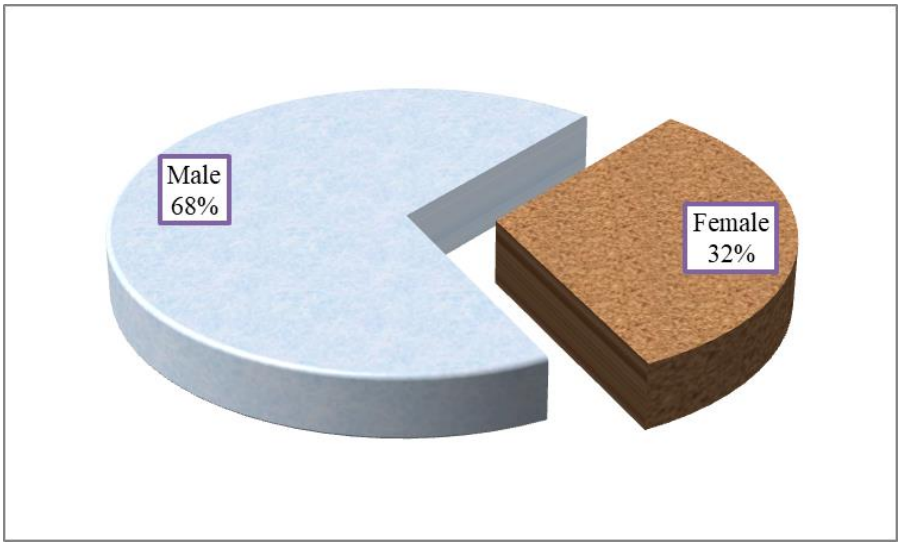

Figure 6: Distribution of human anthrax cases by gender in Menit Goldia district, Bench-Maji zone, SNNPR, March, 2019

Table 3: Distribution of suspected human anthrax cases and deaths by age group, Menit-Goldia district, Bench-Maji zone, SNNPR, March 2019

No	Age Group	Number of cases	Number of deaths
1	0_4year	4	0
2	5_14 year	4	1
3	15_25years	25	0
4	26_35 years	21	1
5	36_45 years	3	0
	Total	**57**	**2**

Clinical Manifestation of cases

As illustrated in the table below, most of the cases (63%) were presented with papule and vesicular lesion over the upper extremity and the trunk. Fever, head ache, vomiting and abdominal cramp graded from high to low level was also the characteristic of the disease. No suspected anthrax case was identified from other nearby villages when the search area was expanded.

Table 4: Clinical manifestation of human anthrax cases, in Menit Goldia district, Bench-Maji zone, SNNPR, March, 2019

No	Sign & Symptom	Frequency	Percentage (%)
1	Skin lesion(Wound)	36	63%
2	Abdominal swelling	18	32%
3	Vomiting	29	51%
4	Abdominal cramp & bloody diarrhea	27	47%
5	Fever	33	58%
6	Head ache	33	58%

Human Death

Human illness and death began after they came in contact with dead ox or consumed the meat from it. The owner of the ox tried to bury the dead ox but neighbors and family members refused to do that. The meat of the dead ox was then distributed among the residents. All the fifty-seven cases had history of exposure to the suspected source either by direct contact with sick animals, or consumed the meat of the dead ox. Two people, including the owner of the ox died after four days of exposure with case fatality rate of 3.5%.

Animal illness and death

The people of Dashe-shompo Village are semi-pastoralist as a result their life style is highly linked with different grazing animals that posed risk of acquiring zoonotic diseases like anthrax. Animal health professionals (veterinarians) investigated and inspected the sick and dead animals and gathered epidemiologic information by interviewing the owners of the animals and the residents in area where human deaths of anthrax was reported from. Upon compilation of information after field investigation, we identified that a total of 12 grazing animals and two dogs were died due to suspected anthrax disease, between 12^{th} _ 16^{th} of March, 2019.

Public health action

Active surveillance was initiated to find peoples affected by the disease. Health extension workers, community members, and deployed team members were involved in the active case search. Case management with appropriate antibiotic was done. Team members from both Human and Animal health sectors conducted health education and awareness creation for the affected community. Residents of the affected community were involved in the control activities, including treatment of sick animals with antimicrobial drugs, vaccination of animals that had contact with infected animals, disposal of carcasses and disposal of meat from the carcasses (burning or deep burial as recommended). Active surveillance was also conducted to identify sick animals. The possible risk areas have been identified, by the zonal and district agriculture and livestock departments conducted vaccination, a total of 18,100 grazing animals have been vaccinated against anthrax in the district.

1.2.6. Discussions

Anthrax is a very contagious zoonotic disease with very high case fatality. Frequent human anthrax outbreak has always been associated with livestock infection in the semi-pastoralist area of Menit Goldia district. This outbreak was occurred in Duma kebele of the district, 57 cases and two deaths were reported. A suspected anthrax outbreak that affected 109 people was reported from this kebele in 2017. Animal vaccination is a vital tool to prevent and control anthrax in animals and, thus, prevent infection in humans. However, animal vaccination was not conducted in Menit Goldia district in the year 2017/18, which may be associated with the occurrence of this outbreak.

Majority of the cases (63%) had cutaneous form of the disease with a painless sore and black center on the skin, which was probably due to skin contact while handling infected carcasses. The rest 37% of the cases showed clinical symptoms compatible with visceral form of the disease which may be due to consuming raw or under cooked meat.

We identified that males were more affected than females; it may be due to that males had more contact with sick animals. In Ethiopian tradition males have more exposure to livestock than females in undertaking most agricultural activities such as plowing, pasturing and slaughtering. People older than 15 years of age were most affected by this outbreak as they had more contact with sick animals while slaughtering and processing raw meat for food. Study conducted in Shaanxi province of China also showed that males had more exposure than females, while the situation in Zambia was different in which females were more affected than males (5, 6).

As with most zoonotic diseases where animals serve as the primary sources of human infection and epidemics (as opposed to zoonoses, where both humans and animals may be infected from common environmental sources), control of anthrax among humans depends on the integration of veterinary and human health surveillance and control program. Routine cross-notification between the veterinary and human health surveillance systems should be part of any zoonotic disease prevention and control program. The One Health approach, involving both human and animal health stakeholders, is used for the promotion of cross-sectoral integration and coordination of activities for the detection, prevention, and response to endemic anthrax (7, 8).

1.2.7. Conclusion

The index case was cutaneous form which had contact with dead animal suspected for anthrax, there were two community deaths with case fatality of 3.5% and males and adults were more affected.

1.2.8. Recommendation

Because of its epidemic potential, associated high morbidity and mortality rates, wide-ranging occurrence in many pastoralist and semi-pastoralist areas of Ethiopia, there should be a surveillance system for anthrax for both human and animal cases. Human anthrax is immediately reportable in the routine PHEM surveillance system. However, there is no standalone surveillance system to track animal cases; therefore the ministry of agriculture and livestock should consider the establishment of surveillance system for anthrax and other zoonotic diseases. Federal Ministry of Health (FMOH) and Ministry of Agriculture and livestock should work together to strengthen the integration and implementation of One-health approach at national, regional, zonal and district levels; and also expand the recently introduced laboratory based case confirmation of anthrax into regional laboratories. Agriculture and livestock offices at regional, zonal and district levels strengthen regular animal vaccination program across the region, especially high risk areas including Menit Goldia district. In addition regular supportive supervision to the district human and animal health sectors by respective zonal and regional offices will be important.

Pictures

Challenges during Outbreak Investigation

Epidemiological Outbreak Investigation in practice

1.2.9. References

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Chapter II-Surveillance Data Analysis

2.1. Retrospective study on the epidemiology of Measles in the Southern Nations Nationalities and peoples Region (SNNPR), Ethiopia, 2013-2017

2.1.1. Abstract

Background: Measles is an acute, highly communicable viral disease; however, it is vaccine preventable. The purpose of this study is to describe and characterize the disease burden in Southern regional state of Ethiopia, and provide guidance to improve measles control efforts.

Method: A retrospective descriptive surveillance data analysis was conducted in southern Nations Nationalities and people (SNNPR). Five years case-based and line-list data (2013-2017) was obtained from regional PHEM and measles vaccination coverage data was obtained from HMIS (health management information system).

Result: From January, 2013- December, 2017, 8632 confirmed measles (epidemiologically linked and laboratory confirmed) was reported the region. Konta special woreda was the most affected part of the region with magnitude of 917.6/100,000. Infants age <1 year were most affected with 1215 cases (212/100,000). The annual pattern of the disease showed variability from year to year. Confirmed measles cases reported in all months of the years. High caseload was reported from October to February; the peak was in February.

Conclusion and recommendation: Despite there was high immunization coverage in the region (>95%), Measles outbreak occurred in most parts of the region that caused high number of morbidity and mortality. Therefore, the regional health bureau and collaborates should work closely to achieve Measles elimination goal of 2020.

2.1.2. Introduction

Measles is an acute, highly contagious and vaccine preventable viral disease. Measles virus (MeV) is the etiologic agent of measles, and for which humans are the only reservoirs (1, 2). Measles Virus is a member of the family Paramyxoviridae, genus Morbillivirus and has a negative-sense, single-stranded RNA genome measuring approximately 15.9 kb. Entry to the host cell is initiated by binding of H to one of three host cell receptors, CD150 (signaling lymphocyte activation marker or SLAM), nectin-4 or CD46, followed by membrane fusion facilitated by F. CD150 is expressed on many cell types of the immune system including dendritic cells, lymphocytes and some macrophages (1)**.** Transmission is primarily person-to-person via aerosolized droplets or by direct contact with the nasal and throat secretions with infected persons. When measles virus is introduced to a non-immune population, nearly 100% of individuals will become infected and develop clinical illness (2).

The estimated global measles case burden exceeded 9.7 million cases in 2015 with 254,928 reported cases across all six regions of the WHO, with an estimated total of 134,200 (95% CI = 74,400–353,600) measles deaths. Incidence varied by WHO region; the African, Eastern Mediterranean and European Regions reported increased incidence in 2014–2015 due to large measles outbreaks. The numbers of reported cases were 98,621 (incidence of 100/million) for the African region, 423 (0.6/million) for the region of the Americas, 21,335 (33/million) for the Eastern Mediterranean region, 25,974 (31/million) for the European Region, 29,109 (17/million) for the South-East Asian region and 65,176 (35/million) for the Western Pacific Region (1).

In Ethiopia, 348 cases had been confirmed and 40 outbreaks reported in Addis Ababa, Afar, Amhara, Oromia, Southern Nations Nationalities and Peoples, Somali and Tigray regions, as of 31 March 2017. The majority of the cases (39 per cent) have occurred among children under five years. Although not yet officially confirmed by the Federal Ministry of Health (FMOH), over 100 cases of measles were additionally reported during the month of April 2017 in Gashamo Woreda, Jarar zone, in Somali region, which would bring total number of cases in 2017 to approximately 450 cases. The Somali region is particularly prone to disasters, and is disproportionately affected by the current drought with high levels of food insecurity, severe acute malnutrition, and acute water shortages as well as significant internal displacement. The high rates of acute malnutrition have increased the vulnerability of local communities to

communicable disease outbreaks, including measles and acute watery diarrhea. A risk analysis conducted in Somali region by UNICEF, the Somali Regional Health Bureau and partners in late April identified five priority zones affected by the complex emergency, including Jarar, Karahey, Nogob, Erer and Dolo (3).

The current measles elimination goals in all WHO regions necessitate case-based surveillance including laboratory confirmation of suspect cases (4). With coordination from the WHO, the Global Measles and Rubella Laboratory Network (GMRLN) perform case-based laboratory surveillance using standardized methods (5). The GMRLN has expanded greatly since its establishment in 2000; currently there are 703 laboratories located in 180 countries in all WHO regions. The network is made up of subnational and national laboratories, regional reference laboratories, and three global specialized laboratories.

Suspected cases that meet the WHO case definition for measles, which requires a finding of acute febrile disease (≥38.3 ◦C) featuring a generalized maculopapular rash lasting three days or longer, and coryza, cough, or conjunctivitis are classified in four groups. A suspected case meets the case definition with attendant suspicion of measles by the examining clinician. A laboratory-confirmed case meets these clinical criteria, with laboratory confirmation of infection, typically by detection of MeV-specific IgM antibodies in serum or by detection of viral RNA by reverse transcription (RT)-PCR. An epidemiologically-linked case meets the clinical criteria and has an epidemiologic link to a laboratory-confirmed case. A clinically-compatible case meets the clinical criteria in the absence of laboratory (4).

Case-based measles surveillance was initiated in Ethiopia in 2003.The number of reported suspected measles cases has increased through the years and this might be partly due to the increased sensitivity of the surveillance system, rather than a failure of the control efforts (6). Therefore, this secondary data analysis is important to describe and characterize the disease burden in the region, and develop guidance to improve measles control efforts.

Rational of the study

Surveillance data analysis guide health personnel in the decision making needed to implement the proper strategies to consolidate measles control and guide the way for the elimination of the disease. Therefore, this secondary data analysis will describe and characterize the disease burden in the region, and develop guidance to improve measles control efforts by revealing main factors associated with the high measles incidence in the Region.

2.1.3. Objective

General objective

- To describe the magnitude and distribution of measles cases across Southern Nations Nationalities and Peoples Region (SNNPR) from 2013 to 2017

Specific objectives

- To describe the magnitude of measles during the study period
- To describe population affected by Measles
- To describe the geographic distribution of cases
- To describe the trend of the disease in the region

2.1.4. Methods and Materials

Study Area

The study was conducted in SNNP regional health bureau from February, 2018 to March, 2018 by reviewing measles case based and line-line data of the region from 2013 to 2017. Southern Nation Nationalities and Peoples Region (SNNPR) is one of the nine regions in the country located in Southern and South-western part of Ethiopia with estimated total population of 19,170,005 in 2016/2017 and covers an area of 110,931 km² which is 10% of the country's total area. The region share international boundaries with South Sudan and Kenya. Administratively the region sub divides into 14 zones, 4 Special woredas and 1 city administration. Zones further divided into 136 woredas and 22 town administrations making a total of 158 woredas and towns. There are 52 functional hospital (2 referral, 11 General and 39 Primary), 723 Health Centers (24 HCs are NGOs) and 3,835 Health Posts. As of June 2017, there were a total of 80 (51% of the total woredas) hotspot woredas in the region where 34 were priority one, 30 were priority two and 16 were priority three hotspot woredas.

Study design and period

A retrospective secondary data (from January, 2013 to December, 2017) was analyzed conducted between February and March, 2018.

Data source

Five years Case based and line-list data was obtained from regional WHO data-base; and immunization coverage data was obtained from the regional HMIS (health management information system) data base.

Operational definition

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

Confirmed measles case: A suspected case with laboratory confirmation (positive IgM antibody) or epidemiologically linked to confirmed cases in an outbreak.

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. All epidemiological linked cases should be line listed with the prepared format and submitted to the next level and stored in the data base.

Laboratory method

Hawasa public health laboratory had received 3185 human serum specimens through case based reporting from different health facilities found in the region. From these, 146 specimens with inadequate quality were rejected. Laboratory analysis was done for 3,039 specimens. The analysis was based on ELISA (Enzyme-linked immuno-sorbent assay) principle. IgM antibodies in the human serum forms an immune complex with antigen coated on the micro-titer plate. Unbound immunoglobulin is removed by washing process; and, enzyme conjugate attaches to this complex. Unbound conjugate is again removed by washing processes. After adding the substrate solution (TMB), a blue color is produced by the bound enzyme (peroxidase). The color changes to yellow when stopping solution is added. The Intensity of color formed is directly proportional to the concentration of antibodies in the serum. The optical density of the color formed was then measured using ELISA reader.

Data analysis

After Data was cleaned, analysis was done by using Microsoft Excel.

Exclusion criteria

Data reported before January 2013 and after December 2017, and data with incomplete information was excluded from the analysis.

Ethical clearance

Official permission to conduct this study was obtained from Regional Public Health Emergency Management (PHEM) Core process.

Data Dissemination

The finding of this study will be submitted to Southern regional Health bureau and Addis Ababa University, department of Preventive Medicine

2.1.5. Results

From January, 2013- December, 2017, Southern regional state reported a total of 10,729 measles cases. From this 3185 were suspected measles cases reported through the routine case-based reporting system with serum specimen for each suspected case. Measles specific IgM test was done for 3,039 specimens and the rest 146 specimens were rejected due to inadequate quality. 1088 cases (10% of the total) were IgM positive for measles (laboratory confirmed), 1901 were tested negative for measles specific IgM and 50 had indeterminate result. Confirmed Measles cases constitutes 8632 (1088 laboratory confirmed and 7544 epidemiologically linked).

Except Basketo and Sheka, all zones and special woredas reported confirmed measles. Wolayita zone reported the highest number with 1937 cases (22.4% of the total confirmed cases), followed by Sidama zone with 1834 cases (21.2%), Gamo Gofa 1158 cases (13.5%) and Konta Special woreda 1059 cases (12.3%). The average annual incidence of measles in the region was 9.1 cases per 100,000 populations. The highest was reported in 2014 with 16.7 cases per 100,000 populations, followed by 12.9/100,000 in 2013 and 10.7/100,000 in 2016. The lowest incidence was reported in 2017 with 0.5/100,000 populations. Konta special woreda was the most affected area with a magnitude of 917.6 cases per 100,000 populations. Wolayita zone with a magnitude of 100.8/100,000, Hawassa city and Bench Maji zone with a magnitude of 88.4/100,000 and 66.5/100,000 populations respectively were the other areas which had high measles burden.

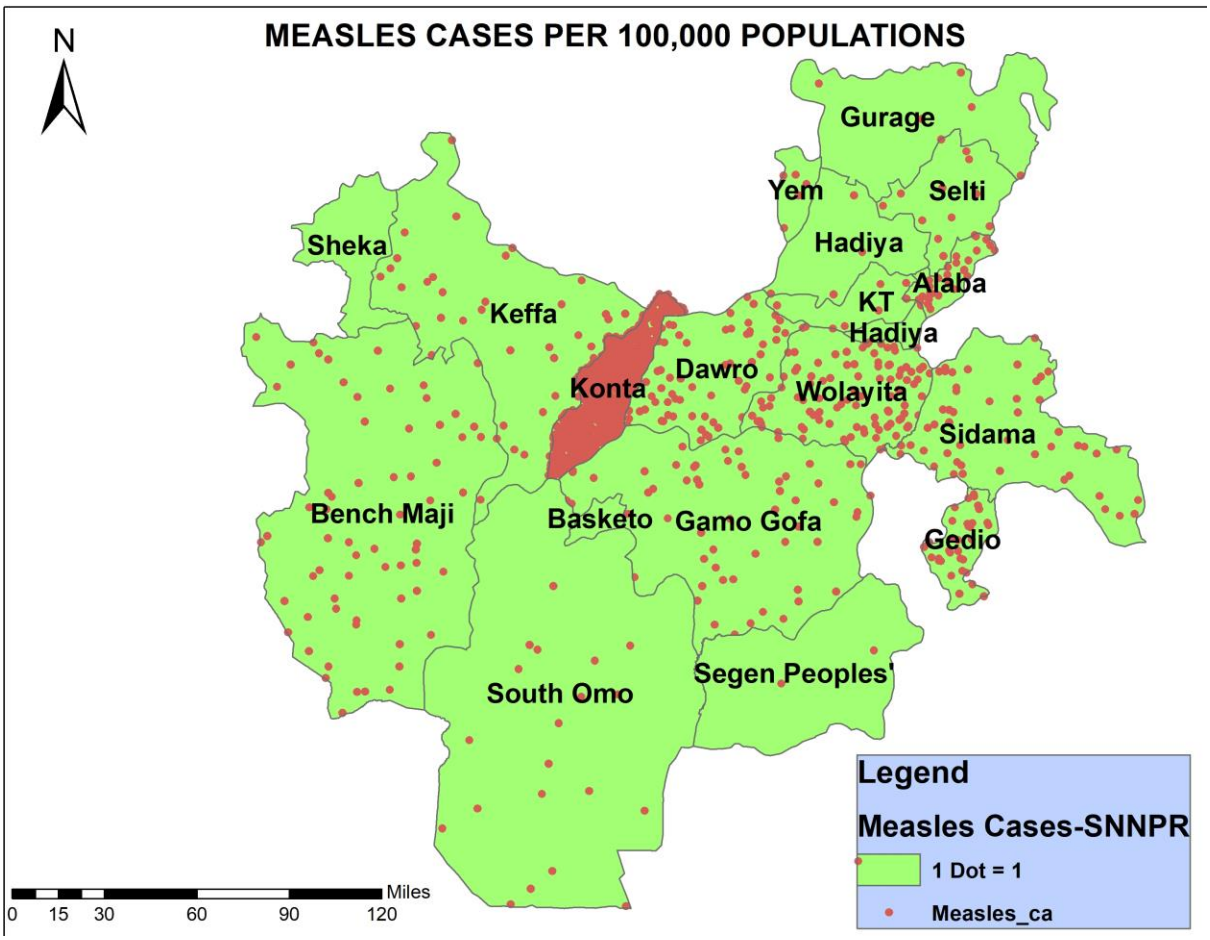

Figure 7: Magnitude of Measles per 100,000 populations, SNNPR, from 2013 to 2017

Distribution of measles cases by age group and sex

Information on sex was available for 2042 confirmed cases; of these 1057 were females and 985 were males. But age was reported for all confirmed cases; infants (age <1 year) were most affected with 1215 cases (magnitude of 212 per 100,000 populations), followed by age group between 1-4 years with 2815 cases (magnitude of 126 per 100,000 populations) and age group between 5-14 years with 3786 cases (magnitude of 65 per 100,000 populations)

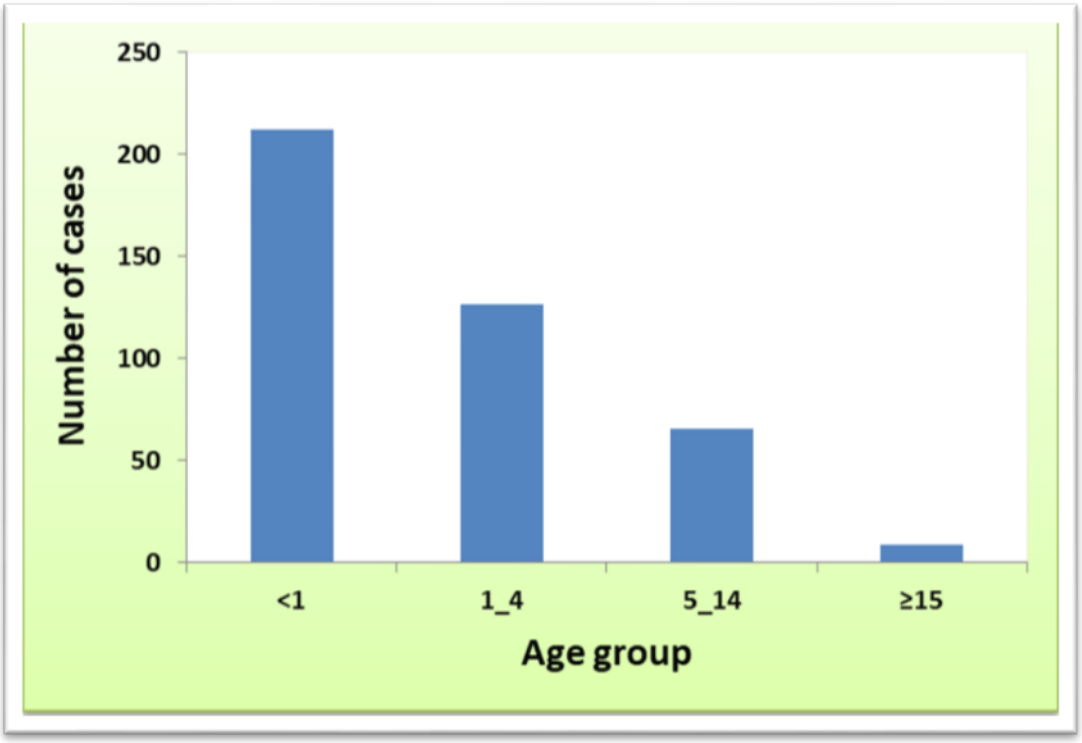

Figure 8: Magnitude of measles by Age group per 100,000 populations, SNNPR, 2013-2017

Annual pattern and seasonal occurrence of measles

The annual pattern of disease occurrence showed variability from year to year. Highest number was reported in 2014 with 3069 (magnitude of 17 per 100,000 populations), followed by 2305 cases with magnitude of 13 per 100,000 populations in 2013. The lowest number was in 2017 with 112 cases with a magnitude of one case per 100,000 populations). When we observe the Monthly distribution of the disease, confirmed measles was reported in all months of the years. High number of cases was reported from October to February, the peak was in February.

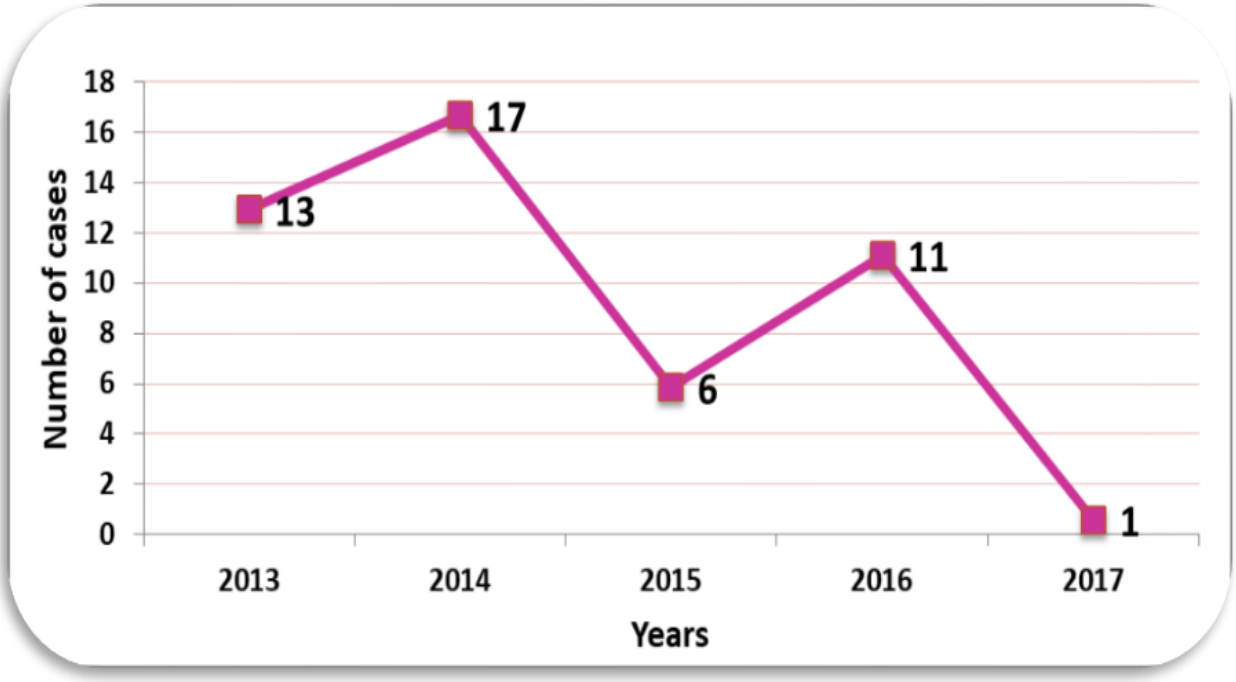

Figure 9: Trend of measles per 100,000 populations, SNNPR, 2013-2017

Vaccination status

With regard to vaccination status, 3432 (39.8%) were not vaccinated, 2412 (27.9%) cases vaccinated with one dose of measles, 855 (9.9%) cases were vaccinated two or more doses and 1933(22.4%) vaccination status not known.

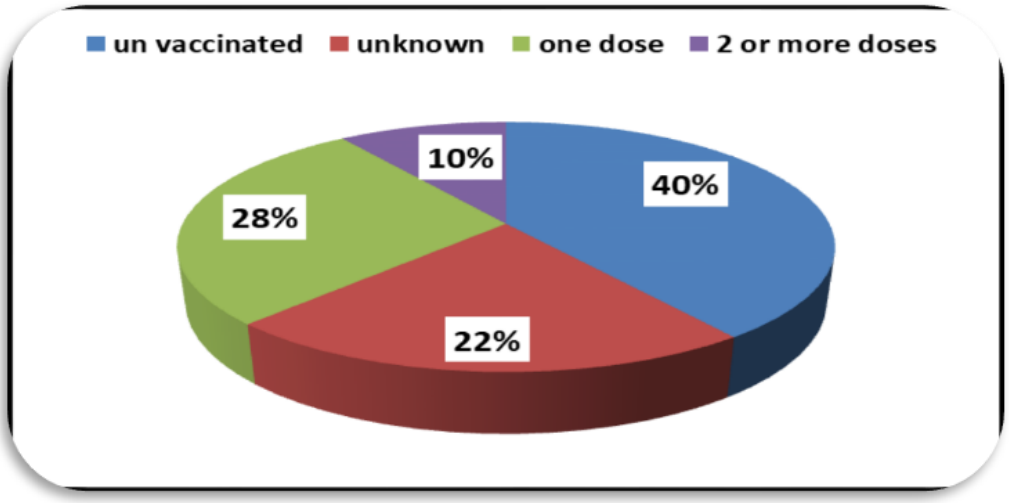

Figure 10: Vaccination statuses of measles cases, SNNPR, 2013-2017

Immunization coverage of Measles in SNNPR

Vaccination coverage for measles in the region was greater than 95% in each year from 2013-2017. However, the coverage in some areas was below the target 90%. Measles coverage of Segen zone had been consistently decreasing from year 2013 to 2017 with 67%, 63%, 52%, 51% and 49% respectively. Next to Segen zone, Sheka zone and Basketo special woreda each with 80% and Yem special woreda 81% had lower coverage.

Measles Surveillance performance indicators

In the year 2017, non-measles febrile rash rate (NMFR) of the region was 2.2; which was above the target (≥2), but some zones and special woredas had NMFR below the target; in this regard, Basketo special woreda was the least performer with zero NMFR; Keffa and B/Maji each had 0.2 and 0.5 NMFR respectively. Proportion of woredas in the region that reported one or more suspected case was 74%, below the target 80%. Basketo special woreda had zero report, followed by Keffa 27% and Hawassa city 50% of woredas reported suspected cases of measles with serum specimen for each case.

Table 5: surveillance performance of measles, SNNPR, 2013-2017

Indicators	Target	2013	2014	2015	2016	2017
Non Measles Febrile Rash Rate	>=2	3.6	1.6	1.5	2.1	2.2
Proportion of Woredas reported one or more suspected measles cases	80%	83%	75%	73%	75%	74%
Annualized measles detection rate	>=2	5.2	3.5	2.8	2.8	2.4
Proportion of Measles IgM+ (%)	< 10	34%	53%	48%	26%	11%
Proportion of Rubella IgM+ (%)	< 10	36%	19%	17%	13%	13%

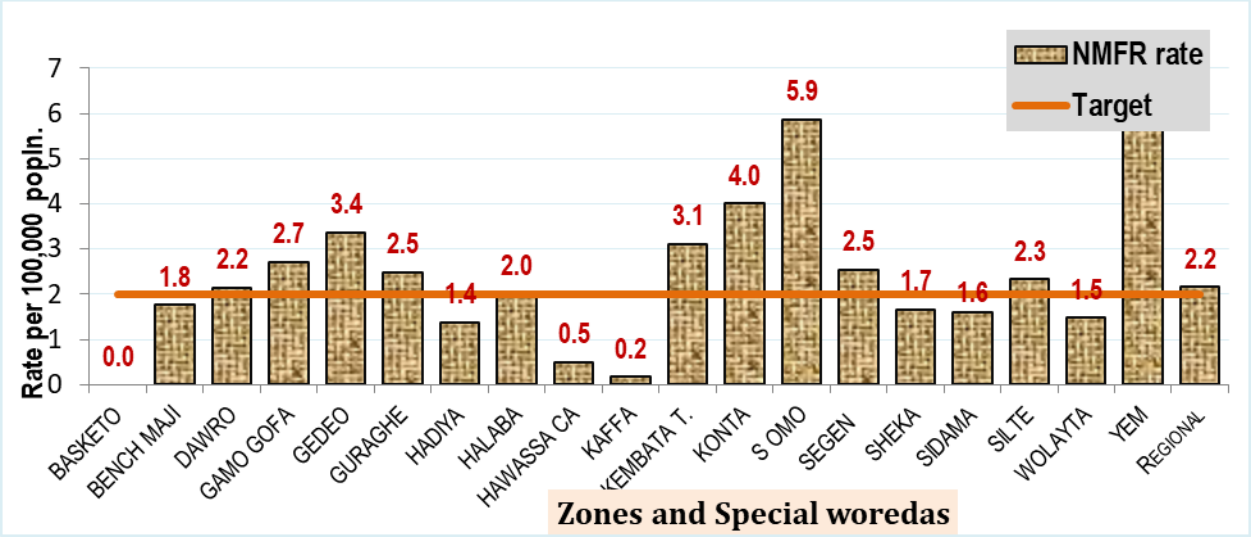

Figure 11: Non measles febrile rash rate by zones and special wordas, SNNPR, 2017

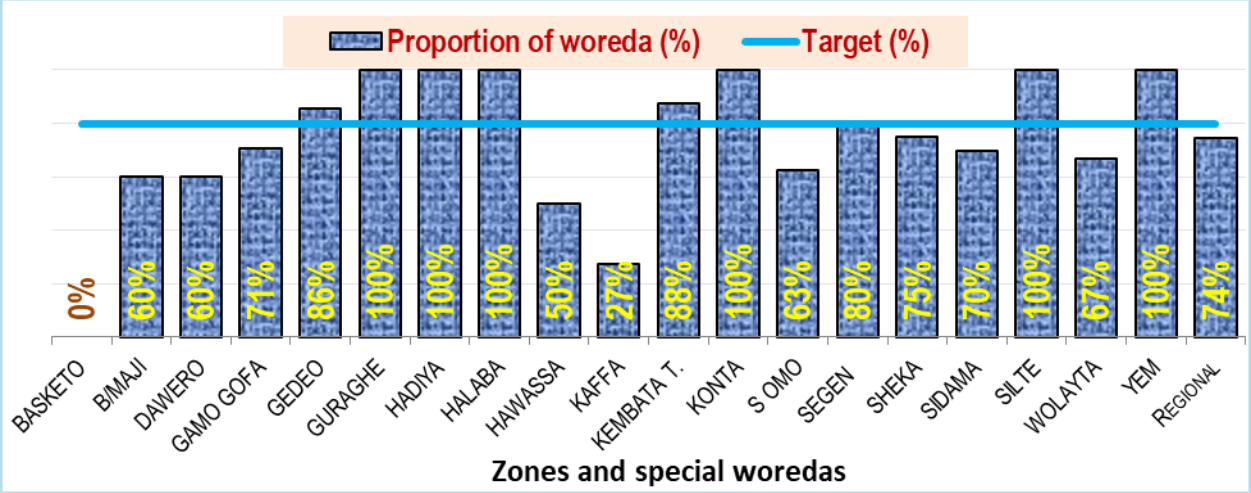

Figure 12: Proportions of woredas that sent at least one serum specimen by zones and special woreda, SNNPR, 2017

2.1.6. Discussion

Between 2013 and 2017, 17out of 19 zones and special woredas reported confirmed measles. The disease burden varied from place to place. Konta special woreda was the most affected part of the region with increasing disease burden from one confirmed case reported in 2013 to a remarkably high number i.e.946 cases with an incidence of 797.2/100,000 reported in 2016. By the same token, Keffa was part of the region with increasing disease burden from the year 2013 in which 6 confirmed cases were reported to 351 cases reported in 2016 (incidence of 30.8/100,000). Sidama zone reported persistently high number of measles during the study period. The possible reasons for high measles burden in these areas could be related to problem in the cold chain management system and the accumulation of susceptible group which requires further assessment in the future. In addition, the reliability of high measles vaccination coverage report is under question. However, Case load in Wolayita zone and Hawassa city was substantially reduced from 2013 to 2017. Case load in Bench Maji was consistently reduced from year 2013 to 2017; but still in 2017 significantly high measles burden with 49 cases (incidence of 5.6/100,000) reported. However measles outbreak was not reported from Basketo, Segen and Sheka zones despite the vaccination coverage was relatively lower in these areas these areas.

During the study period Konta special woreda was the only part of the region that reported measles related death. This doesn't lead into conclusion that death was not occurred in any other parts of the region as the practice of reporting death in general is very low in the region. Konta special woreda reported 116 measles deaths. All the deaths were exclusively reported in 2016 after a massive outbreak that affected 946 people. The case fatality rate was 12.3% in the year. This case fatality rate was above the national expected cases fatality rate (3% to 6%) and expected case fatality of WHO African region (3% to 5%) (2, 7). The possible reason for high case fatality was the delay in outbreak response that case management was initiated after the majority of cases were already complicated and severe. Konta special woreda is found in remote part of the region with difficult topography.

The result of this study identified that children age < 1 year were most affected with a magnitude of 212 per 100,000 populations. This finding was similar with study in South Africa. But it was different from national surveillance data analysis from 2005-2009, Ethiopia; in which children between 1 to 4 years of age were most affected (8). The possible reason for this difference was the use of population denominator in this study.

This study showed that the annual incidence of measles was highest during 2014. This was due to the occurrence of measles outbreak in many part of the region which includes Wolayita, Gamo Gofa, Dawero, Sidama and Bench Maji zones. The study also revealed that high measles incidence was observed during the dry season (Octobers to February). This finding was consistent with previous study in the region and another study conducted in Amhara region, Ethiopia. Similar finding was also reported from national retrospective study, Ethiopia and from Kumbotso Kano, Northern Nigeria (9-12) . However, high transmission of measles during the dry season could not be justified in this study.

With regard to vaccination status, 39.8% of Measles cases were not vaccinated; which was inconsistent with the regional vaccination coverage i.e. greater than 95% each year from 2013 to 2017. 27.9% of the cases were vaccinated with one dose of measles that clearly indicates certain segments of a vaccinated population with only one dose measles were not fully immunized against measles.

Limitation

The limitation of this study was line list data had no sufficient information on outcome status (measles related complications, death or recovery) of measles affected population.

2.1.7. Conclusion

Despite there was high immunization coverage reported from the region (>95%), Measles outbreak continue to occur in most parts of the region and caused a remarkably high number of morbidity and mortality. Some prevailing factors may be associated with this, poor cold chain system, accumulation of susceptible groups, poor nutritional status, dry weather condition and low vaccination coverage in some parts of the region. Therefore, observation from this study demonstrates that there are still major challenges to meet the country's Measles elimination goal in 2020.

2.1.8. Recommendations

On the basis of these findings, we recommend that the Regional Health Bureau and Health departments of respective zones and special woredas should follow of the routine immunization program regularly. It is important to strengthen the routine and supplementary immunization activities (SIA) in the region. Further assessment of the cold chain system especially for areas with high measles burden is recommended. The regional health bureau also should provide continuous support for areas which had low performance on the surveillance system. Furthermore, the ministry of health, regional health bureau and all stakeholders should work closely to achieve measles elimination target in the country.

2.1.9. Reference

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Chapter III-Surveillance System Evaluation

3.1. Malaria Surveillance System Evaluation of Boricha district, Sidama Zone, SNNPR, Ethiopia, 2018

3.1.1. Abstract

Background: Public health surveillance has been defined as "the continuous, systematic collection, analysis and interpretation of health-related data. This study is important to identify shortcomings of malaria surveillance system of Boricha district and provides guidance to improve the system.

Methods: The study was conducted in Boricha district, which is found in Sidama zone. A descriptive cross-sectional study with secondary data review was conducted from January 21, to February 20, 2019. Standard semi-structured questionnaire adapted from CDC Surveillance System Evaluation Guideline was used to collect information about core and support functions of surveillance system, and surveillance system attributes.

Results: Malaria of Boricha district from 2013 to 2018 showed that the highest number of cases was reported in 2018. The flowchart of malaria surveillance system begins from the Health post, then final to EPHI. Malaria case definition was found at all levels. The system was flexible but uses multiple routes of reporting.

Conclusion and recommendations: Overall, the surveillance system was useful because it detected malaria cases, estimated morbidity and monitored trends of the disease. However, the system also had weakness; timeliness information was not recorded, the district office didn't conduct regular supportive supervision to the peripheral health facilities. Therefore, the district health office should initiate regular supportive supervision using standard checklist for peripheral health facilities. And, the zonal health department should follow that every surveillance activities are well functioning at both the district and at facilities level.

3.1.2. Introduction

Public health surveillance has been defined as "the continuous, systematic collection, analysis and interpretation of health-related data with the a priori purpose of preventing or controlling disease or injury and identifying unusual events of public health importance, followed by the dissemination and use of such information for public health action"(1, 2). Surveillance processes include data collection, data quality monitoring, data management, and data analysis, interpretation of analytical results, information dissemination, and application of the information to public health programs. The initial focus of public health surveillance principles and practices was on infectious diseases, but today public health surveillance systems are used to monitor and forecast a broad range of health determinants (e.g., risk behaviors, health care services, and socioeconomic factors) and outcomes relevant to infectious diseases, injuries, chronic diseases, mental health, and occupational and environmental health (3).

The initiative to strengthen the disease surveillance system that promotes the integration of surveillance activities in Ethiopia was started in 1996. Later in 1998 the WHO/AFRO, following the resolution of the 48^{th} assembly, started promoting Integrated Disease Surveillance and Response (IDSR) for all member state to adopt as the main strategy to strengthen national disease surveillance system. Ethiopia as a member state adopted this strategy, which is district centered and outcome oriented (4).

Evaluation of public health surveillance systems is a critical component that ensures a specific system is useful for a particular public health initiative and is achieving the overarching goals of the public health program and the data collection objectives (5, 6). Public health surveillance systems should be evaluated periodically, and the evaluation should include recommendations for improving quality, efficiency, and usefulness (7).

In 2015, an estimated 212 million cases of malaria with 429,000 deaths occurred worldwide. Caseload and number of deaths was decreased by 14% and 22% respectively compared with 2010. Most of the cases were reported from WHO African Region (90%) followed by the WHO South-East Asia Region (7%) and the WHO Eastern Mediterranean Region (2%). The global burden of mortality is dominated by countries in Sub-Saharan Africa, Democratic Republic of Congo and Nigeria together accounted for more than 36% of the total malaria deaths (8). Data for the period 2015-2017 highlight that no significant progress in reducing global malaria cases was made in this timeframe. In 2017, there were an estimated 435 000 deaths from malaria

globally, Children aged under 5 years are the most vulnerable group affected by malaria. In 2017, they accounted for 61% (266 000) of all malaria deaths worldwide (9).

Ethiopia, with a population of nearly 100 million, is the second most populous country in Africa with diverse population mix and unique cultural heritage. Nearly 60% of the Ethiopian population lives in malarious areas and 68% of the country's landmass is favorable to malaria transmission (10).

Rational of the study

Strong surveillance system is important for effective and sustainable malaria control program especially in malaria endemic areas. Therefore, the purpose of this study was to identify shortcomings with related to malaria surveillance system of Boricha district and provides guidance to improve the system.

3.1.3. Objective

General Objective

The overall objective of the study was to evaluate malaria surveillance system of Boricha district, Sidama Zone, SNNPR, Ethiopia, 2018.

Specific Objectives

- ✓ To describe the existing malaria surveillance system of Boricha district
- ✓ To evaluate core and support functions of the surveillance system
- ✓ To evaluate surveillance system attributes including simplicity, flexibility, data quality, acceptability, sensitivity, predictive value positive, representativeness, timeliness, and stability.

3.1.4. Methods and Materials

Study Area

The surveillance system evaluation was conducted in Boricha district, which is one of the districts in Sidama zone. Boricha is bordered on the south by Oromia regional state and Wolayita zone, on the west by Hawassa zuriya Woreda, on the north by Shebedino Woreda, and on the east by Dale Woreda and Loka Abaya Woreda. Based on 2011 EFY (2018/2019) projection, the total population of the district was estimated to be 334,690. Children under five years age constitutes 50,773 (15.1% of the total). There was one primary Hospital, 10 Health centers, 39 Health posts and One NGO clinic that were expected to report through the routine surveillance system.

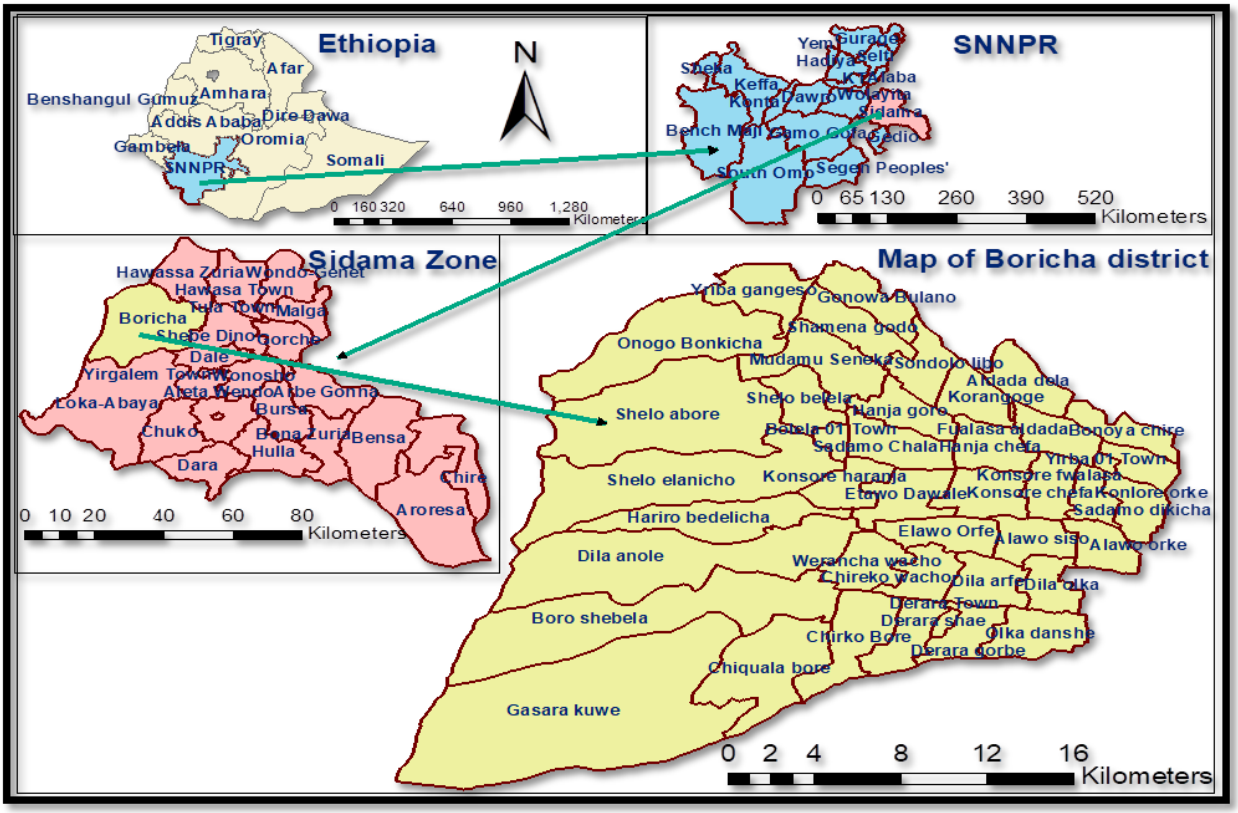

Figure 13: Map of Boricha district, Sidama zone, SNNPR, Ethiopia, 2018

Study design and period

A descriptive cross-sectional study with secondary data review was conducted from January 21, to February 10, 2019.

Data collection method

Using standard semi-structured questionnaire adapted from CDC surveillance system evaluation guideline, information about core and support functions of surveillance system, and surveillance system attributes (usefulness, simplicity, and flexibility, data quality, acceptability, representativeness, timeliness, and stability of the surveillance system) were collected. Moreover, Secondary data sources such as malaria surveillance report, HMIS report, supervision report, written feedbacks, epidemic preparedness and response plans (EPRP) were also reviewed.

Sample size and sampling technique

Purposive sampling was used to select Sidama zone among the 14 zones, 4 special woredas that and one city administration that were found in Southern Nation Nationalities Region (SNNPR). Whereas, Boricha district was selected based on hotspot woredas classification released in July 2108, in which it was the only hotspot one woreda in the zone. In addition to that, the district was among the areas with high malaria burden in the zone. Furthermore, Yirba primary hospital which was the only hospital in the district and Derara health center which had the low annual performance in 2016/17 were included in the surveillance system evaluation. Moreover, two health posts under the catchment of Yirba primary hospital and another two Health posts under Derara Health center were included in the study.

Data analysis

The collected quantitative data was entered and analyzed using the Microsoft office Excel 2010 and qualitative data was also summarized to supplement the quantitative findings.

Result dissemination plan

The result of the study will be submitted to Addis Ababa University, School of public health, department of preventive Medicine; and to Southern Region Health Bureau, Sidama Zone Health department and Boricha district Health office through hard and soft copies. In addition, result will be disseminated through oral presentation as required.

Ethical clearance

Official permission to conduct the study was obtained from Southern Region Health bureau, Sidama zone Health Department and Boricha district Health office.

Operational definitions

Usefulness: A public health surveillance system is useful if it contributes to the prevention and control of adverse health-related events

Simplicity: The simplicity of a public health surveillance system refers to the structure of data flow and lines of response, and its ease of operation.

Acceptability: Reflects the willingness of individuals and organizations to participate in the surveillance system.

Data quality: is the completeness and validity of the data recorded in the public health surveillance system.

Representativeness: Is the ability of the system to describe health events accurately in terms of time, place and person.

Sensitivity: The sensitivity of surveillance system refers to the proportion of cases health-related event detected by the surveillance system, or sensitivity can refer to the ability to detect outbreaks.

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: Is the ability of the system to trigger appropriate action in time.

Positive predictive value: Is the proportion of reported cases that actually have the health-related event under surveillance.

Flexibility: Is the ability of the system to adapt to changing needs such as the addition of a new disease, the collection of additional data, and change in case definition.

Completeness: Proportion of all expected government health facilities participated in the surveillance system.

3.1.5. Results

Malaria situations

Malaria situation in Sidama zone

From 2013 to 2018, Sidama zone reported 93,706 total malaria cases; with average annual incidence of 406 per 100,000 populations. Boricha district reported the highest number with 15,149 total malaria cases (4,765 cases per 100,000), followed by Aleta Chuko district with 11,398 total malaria cases (5,369 cases per 100,000) and Loka Abaya with 9,788 total malaria cases (7,773 cases per 100,000). However, as indicated in figure 2, the caseload in the zone was decreasing each year from 2013 to 2018. In 2013, 29,326 total cases reported (incidence of 821 per 100,000); whereas, in 2018, a significantly reduced number with 5,604 total malaria cases (incidence of 130 per 100,000) reported. When we observe the malaria species distribution of the zone within the past six years, p.vivax was the dominant species than P.falciparum. The overall seasonal pattern of malaria as presented in figure 4, showed that there was a sharp increase of malaria caseload in August; and it was declined in September. Still, from September to December there was relatively high number of malaria cases was reported.

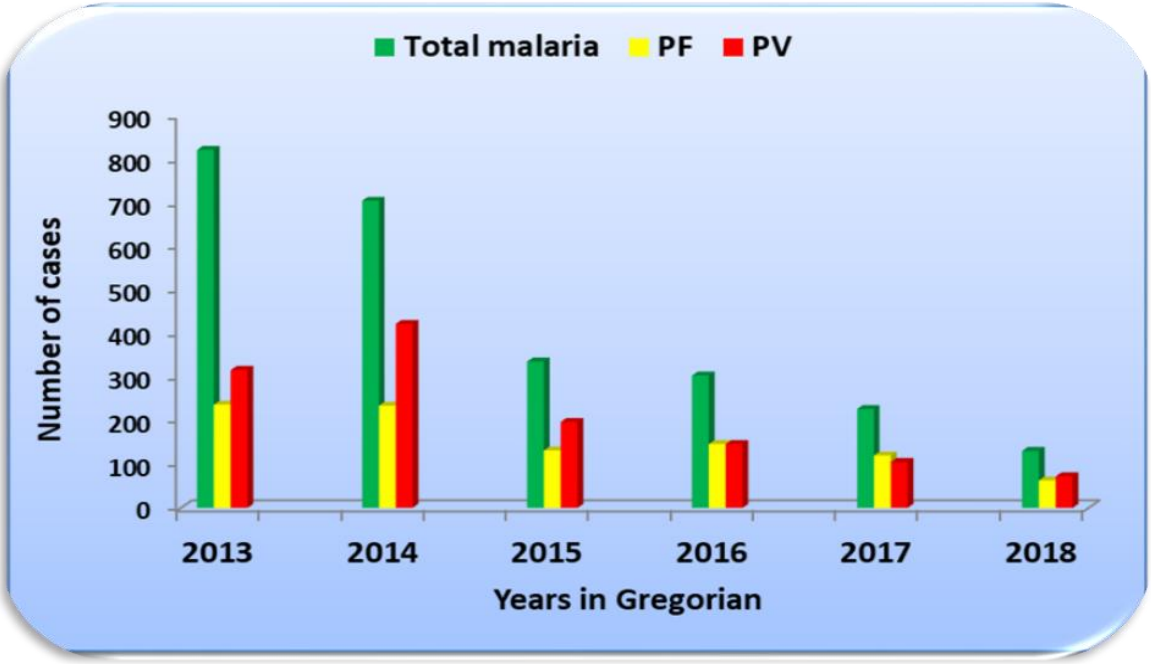

Figure 14: Trend of malaria per 100,000 populations, Sidama zone, SNNPR, Ethiopia, 2013-2018

Malaria situations of Boricha district

Trend of malaria in Boricha from 2013 to 2018 as indicated in figure 3, showed that there was higher number of total malaria cases reported in 2014 as compared to 2013. In 2013, a total of 3,389 cases with incidence of 1,110 per 100,000 reported. In 2014, 5,220 cases with an incidence of 1,661 per 100,000 reported. Even so, from 2014 to 2018 malaria burden was reduced consistently. Unlike to Sidama zone, the dominant in Boricha district was Plasmodium falciparum; except in 2014 in which p.vivax was the dominant species. The same with Sidama zone, highest number of malaria cases was reported in August; and as shown in figure 4, relatively high number of cases was reported from September to December.

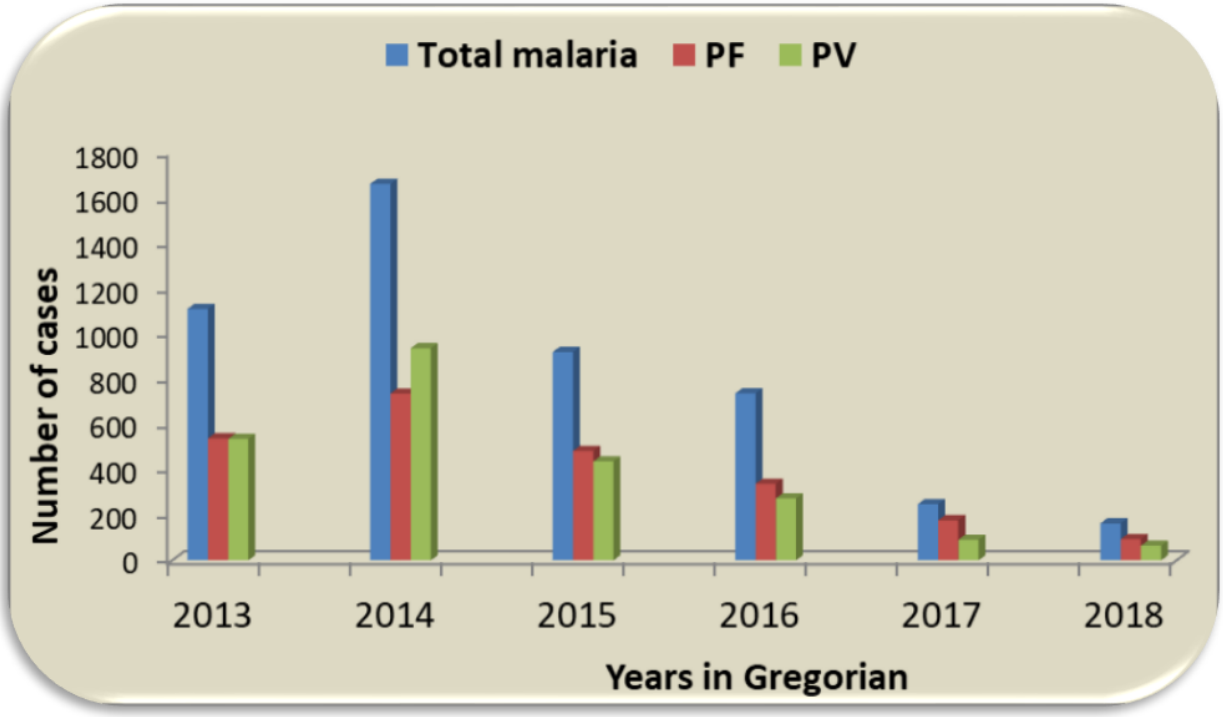

Figure 15 Trend of malaria per 100,000 populations, Boricha district, Sidama zone, SNNPR, Ethiopia, 2013-2018

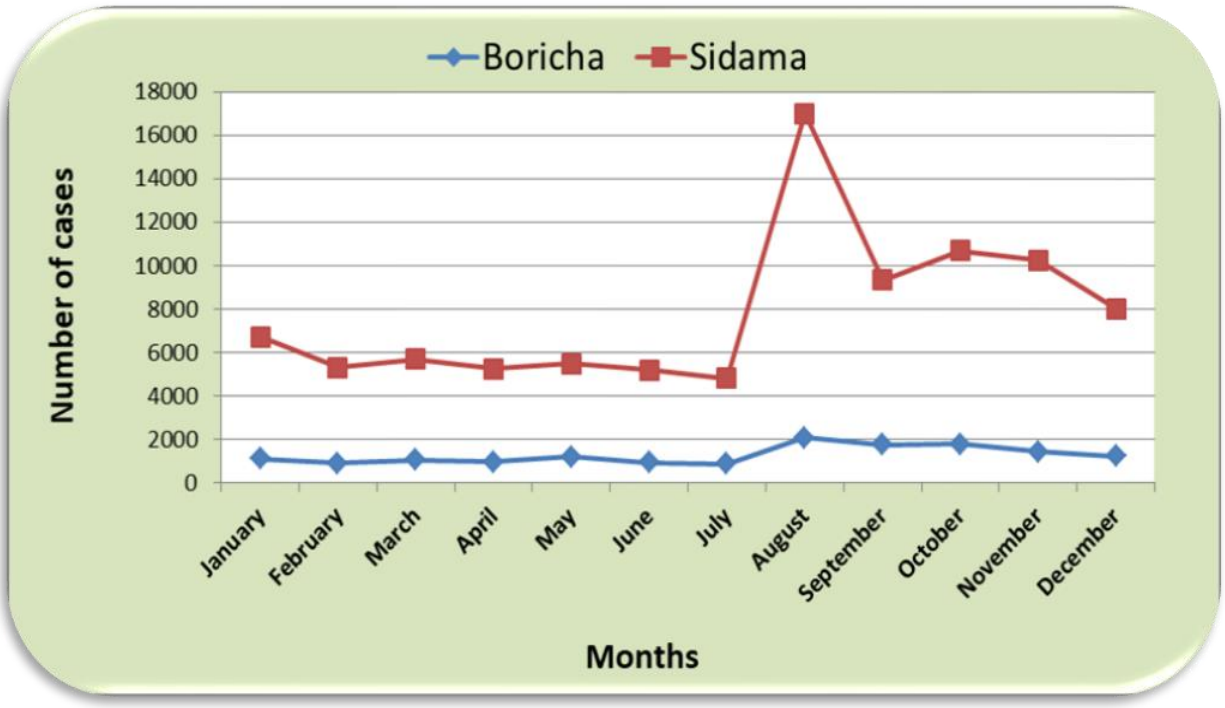

Figure 16 : Seasonal pattern of malaria for Sidama zone and Boricha district, SNNPR, Ethiopia, 2013-2018

Communication and reporting system

Malaria is one of the seven weekly reportable diseases in Ethiopia. The working malaria surveillance system capture data as malaria suspected fever cases, total malaria cases (confirmed and clinical) and confirmed cases differentiated by species i.e. P.falciparum (PF) and P.vivax (PV) from outpatient and inpatient departments. The reporting system also includes deaths due to Malaria. The flowchart of malaria surveillance system begins from the Health post in which Health extension workers (HEWs) compile and sends weekly malaria report to the catchment Health centers and Primary Hospital via paper based reporting. The report in the health post includes suspected malaria cases and confirmed cases using RDT by HEWs. At the Hospital and Health centers, the delegated surveillance focal persons collect weekly malaria data from outpatient and inpatient departments of the health centers and Hospital, and compile the collected data along with the health posts report; then report to the district PHEM core process via telephone or mobile texting. Boricha district health office collect weekly malaria report from one Primary Hospital and 10 health centers. The collected and aggregated data reported to the Sidama zone Health department, PHEM core process via telephone. Sidama Zone health

department PHEM core process receives weekly malaria report from 19 districts, 3 town administrations, 9 hospitals and 21 NGO health facilities. The received data then, entered into electronic IDSR data base. The zonal PHEM analyze the weekly malaria data to observe trends of malaria in the zone; and subsequently the aggregated data would be reported to SNNPR Health bureau, PHEM core process via email.

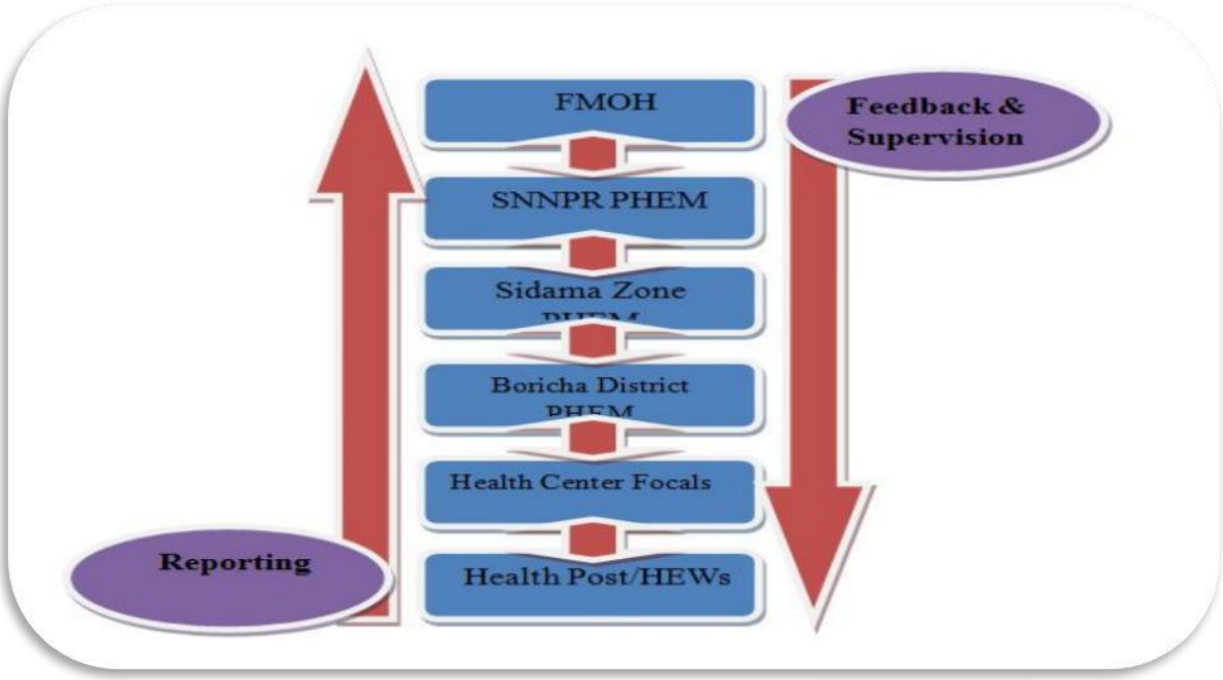

Figure 17 Flow chart of the surveillance system of Boricha District, Sidama Zone, SNNPR, Ethiopia, 2018

Assessment of availability of Surveillance Documentation, Registers and Forms

Malaria case definition

Standard case definitions of malaria were available in all visited health facilities and posted on the wall. The case definitions of malaria include suspected case definition and confirmed case definition.

Suspected case:- Illness suspected by a health worker to be due to malaria, generally on the basis of the presence of fever with or without other symptoms

Confirmed case:- Malaria case (or infection) in which the parasite has been detected in a diagnostic test, i.e. microscopy or a rapid diagnostic test (RDT)

Reporting formats and registration book

The assessed Hospital and the Health center had OPD registration book which allowed them to record information about clinical malaria cases; whereas, separate malaria registration books were found in the Hospital and Health center laboratories, and at the Health posts. There was no shortage of Case based and Line list reporting formats at all levels of health facilities, district and zonal health offices in the year 2018. However, there was a shortage of weekly reporting format at the health posts. Therefore, the HEWs workers were forced to use self-modified paper for weekly report. Despite there was rumor logbook at the district and zonal level, the practice of recording and documenting rumors was very poor. Besides, there was no rumor logbook at the health facilities.

Case detection and Outbreak investigation

Malaria case detection was based on the case definitions of malaria and confirmations using RDT at the community level and Microscopic examinations of blood film in the hospital and health centers. Weekly data analysis was performed by the zonal PHEM throughout the year in 2018 which was important to compare weekly trends of malaria with the same weeks of the previous year trends; yet, malaria outbreak was not reported from the district in the year. However scabies outbreak was reported from some areas in zone, including Boricha district.

Laboratory

A successful Malaria Prevention and Control Program depend on availability of high quality laboratory diagnostic services. The gold standard malaria microscopy was used to confirm malaria cases at the Hospital and Health centers. The use of rapid diagnostic tests (RDTs) at the Health post offers a potential alternative to provide malaria diagnosis and treatment service at the community level. In order to support and facilitate, quality assurance of blood film microscopy and RDT for malaria, comprehensive Malaria Laboratory Diagnosis and external quality assessment (EQA) guideline has been developed by EPHI. Southern Nation Nationalities regional public health laboratory has adopted and implemented EQA program in the region. Malaria external quality assurance methods are blind rechecking and On-site evaluation. Blind rechecking is based on random collection of slides from peripheral laboratories and re-checking at a higher level laboratories, or EQA centers. On-site evaluation is regular supervision and mentorship of peripheral laboratories by regional public health laboratory staffs. However, EQA program of the region was not strong enough and lack regularity. Rate of participation of laboratories in the EQA program in Boricha district was very low. Only two facilities among the total 11 facilities participated in malaria blind re-checking in 2018 and only one quarter feedback was found. EQA of malaria RDT was based on regular supportive supervision of HEWs while performing malaria RDT. In the assessed Health posts, there was no evaluation feedback that indicates performance of HEWs on RDT. However, malaria RDT kit performance evaluation done at national reference laboratories (EPHI) before distribution to different facilities across the country.

Computer skill and data analysis

Zonal and district PHEM work process had functional computers dedicated for the surveillance activities. Personnel working there had basic computer skills to operate e-IDSR software and to perform additional analysis. There was computer at the hospital and health centers but health personnel at the facilities had no the skill to use computer for data management. With regard to data analysis, only the zonal PHEM performed weekly analysis and weekly epidemiological bulletin regularly. The bulletins well describe the weekly situations of malaria and other reportable diseases with adequate interpretations. The practice of analyzing weekly report at the district level was irregular and narrative interpretation and weekly epidemiological bulletin was absent.

Epidemic monitoring chart was posted at the OPD in Yirba Hospital and Derara Health center and clearly describe weekly trend of malaria per 52 annual weeks. However, except Konsore Arke Health post, the practice of using malaria monitoring chart in the other Health posts was poor.

Epidemic preparedness and response plan (EPRP)

Although emergencies by definition are sudden events, their occurrence can be predicted with some degree of certainty. The first step is to find which hazards pose a threat to any specific areas by examining records of past incidents. Therefore, with regards to this, both Sidama zone and Boricha district developed emergency preparedness response plan (EPRP) by differentiating the possible emergencies that could occur in the areas for the coming six months (January to June). Sever Acute Malnutrition (SAM), measles; malaria and acute watery diarrhea (AWD) were the anticipated emergencies in the areas. Hence, the EPRP included estimated number of population that will be affected by each of those emergencies, stock of vital and essential drugs /supplies and other necessary materials; and budget was allocated at both levels. But, Health facilities had no budget line for possible emergencies. Rapid response team (RRT) at the zonal and district levels conduct meeting regularly that we confirmed while observing the minute book. However, RRT and epidemic management committee at health facilities only be activated if disease outbreak occur.

Guidelines

National Malaria Guideline, which includes management protocols of malaria, and strategic plan for controls and preventions, was available at all units. However, PHEM guideline was available only at the zonal and the district level PHEM.

Training

Health extension workers in all visited Health posts and Health professionals working in the surveillance unit at Yirba primary hospital and Derara health center have taken short term training (4-5 days training) on integrated diseases surveillance system (IDSR). In the district level, there was one officer who took the “basic front line field epidemiology” training and one field epidemiologist officer graduated recently.

Supervision and feedback

The zonal health department conducted regular supportive supervision to the district health office and all assessed Health facilities. Supervision feedbacks were found during the assessment at the district health office and all health facilities. However, as informed by representative of the district health office, the district office had conducted supportive supervision to the peripheral health facilities but supervision feedback was not found during the assessment.

Description of System Attributes

Usefulness

The surveillance system is useful to timely detect and respond outbreaks of diseases and allows estimating the magnitude and mortality related to public health important diseases for public health decision. In that, all those interviewed health care respondents at zonal and district levels said that the surveillance system was useful to detect and manage outbreaks of different diseases timely. In fact, regularly collected data through surveillance system was useful to estimate the disease burden of malaria and other public health important diseases; and therefore, the surveillance system helped public health programmers to implement efficient and effective control and prevention strategies of malaria.

Simplicity

Health workers at the visited health facilities responded that the case definition was easy to capture malaria suspected cases and case confirmation of malaria doesn't require special laboratory. Even though the gold standard malaria microscopy diagnostic method was only available at Hospital and at the Health centers, HEWs at the Health posts used RDT (rapid diagnostic test) to confirm malaria. However, with regards to the structure of reporting system, the surveillance system requires multiple routes of reporting, starting from the health posts, then finally to Ethiopian Public Health Institutes (EPHI). Besides, the system requires availability of internet access, computers, printers, standard reporting format which was unavailable at the Health posts during our evaluation. In addition, special training which includes data compilation and reporting, analysis, bulletin preparation is required for all surveillance officers working at each level. Having all those points mentioned above, we can possibly say that malaria surveillance system was complex than being simple.

Flexibility

Malaria surveillance system was well integrated with surveillance of other reportable diseases. And also, it was flexible enough to add new health events in the reporting system; for example, perinatal death recently has been included in the reporting system and some health facilities in the district also started to report RTA (road traffic accident) in weekly bases without additional resource requirement.

Acceptability

The working case definitions of malaria and the reporting formats used were easily understood by all parties working in the surveillance. The information generated through the surveillance was utilized by different stakeholders working in the health system such as disease prevention department, Maternal and Child Health (MCH) department and others at zonal and district level. Hence, we can say that the surveillance system was well accepted by health workers at each level.

Representativeness

Under Boricha district, one primary Hospital, 10 health centers, 39 health posts and two private health facilities were included in the routine surveillance report. The national standard of health service coverage suggests that one health post should serve for 5,000 populations; in this regard the district didn't meet the national requirements in which 27 additional health posts were required. Moreover, the surveillance system only describes malaria distribution by time and place. Person characteristics like age and sex were not represented in the surveillance.

However, malaria diagnosis and treatment service was easily accessible at community through HEWs and malaria is very common or endemic disease in the community; as a result, people are very familiar with the symptoms of the disease. Therefore, when people feel the symptom of malaria they used to visit nearby health facilities seeking for further investigation and treatment. Thus, Large number of malaria suspected cases came to the health posts and HEWs confirm cases using RDT free of charge and provide Quartem if positive. The district hospital and health centers provide laboratory diagnosis for suspected cases using microscopic examination of blood films with a cost of five birr. For this reasons, it is possible to say that the surveillance system of the district clearly depict the actual situation of malaria in district.

Stability

There was no internet access or fax in Boricha district health office. The reporting system was limited to phone communication. The surveillance officers use personal mobile to notify weekly report to the higher level; yet, the expenses used for mobile was not covered. Therefore, the surveillance system was less stable.

Data quality

Quality of data was a key factor in generating reliable health information that enables monitoring progress and making decisions for continuous improvement. Routinely used data quality measures in the surveillance system were report completeness and timeliness. Completeness of a report was measured in weekly bases by dividing total number of government sites reported to the total number of government sites expected to report. The report completeness of Boricha district was above the target 90% each week in 2018 and timeliness information was not recorded.

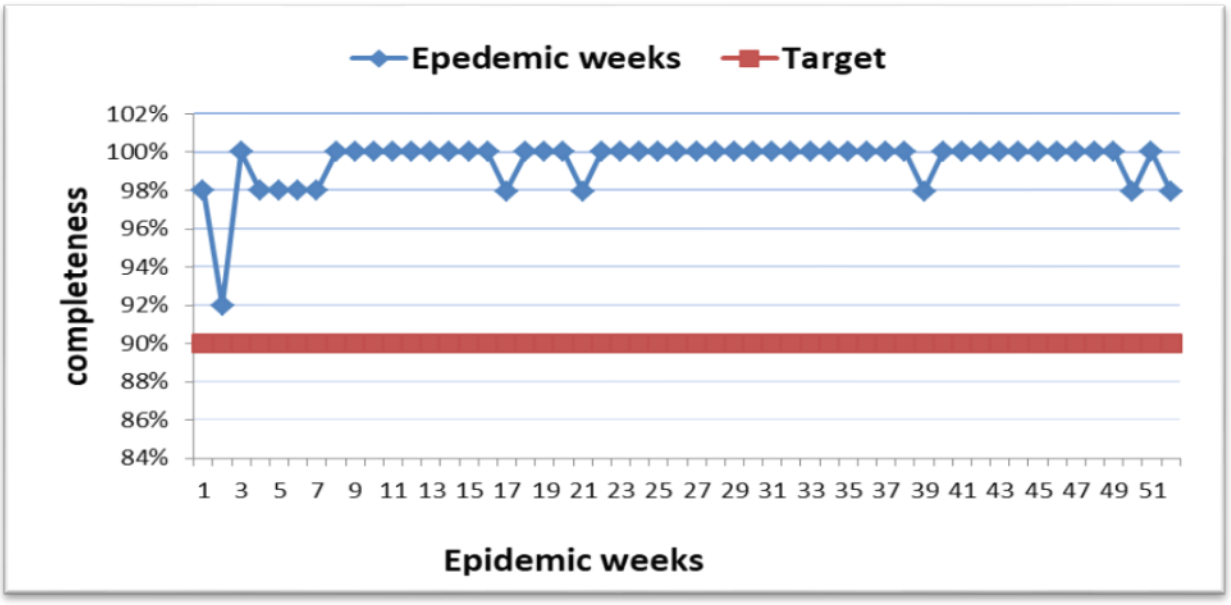

Figure 18 Trend of report completeness of Boricha district, Sidama zone, SNNPR, Ethiopia, 2018

Sensitivity

It was difficult to determine the sensitivity of the surveillance system as the number of malaria cases that were detected outside the routine surveillance system; or malaria cases that didn't came to the health facilities was not known. However, malaria diagnosis and treatment was nearly accessible to the district community through Health Extension Program (HEP) free of any cost. As a result most people with the symptom of malaria were expected to come to the nearby Health post seeking for further diagnosis and treatment. Therefore, based on this reasons we assume that malaria surveillance system had high sensitivity.

Predictive Value Positive

To measure the PPV of the surveillance, we collected a total of 51 giemsa stained slides that were reported positive by Laboratory professionals at Yirba primary hospital and Derara health center. 38 slides were collected from Derara health center while the rest 13 slides were from Yirba hospital. Systematic random sampling technique was used to select slides. The slides were initially stored for EQA (external quality assessment) program. Then, all the collected slides were re-checked by senior laboratory technologists at Hawasa regional public health laboratory. All the 13 slides reported from Yirba Hospital were confirmed positives; whereas, out of 38 slides collected from Derara health center, two slides were found false positive. Overall, 49 slides out of the total 51 slides were correctly reported positives. Thus, PPV of the surveillance was obtained by dividing true positives by the total reported positives; the PPV therefore was 96.1%. However, majority of malaria cases were reported from the health posts confirmed by RDT. Therefore, PPV calculated did not represent RDT confirmed malaria cases.

3.1.6. Discussions

Ethiopia has shown remarkable progress in reversing the burden and epidemics of malaria in the last two decades. Mortality and incidence rates of malaria declined by 96 and 89%, respectively, between 1990 and 2015. The performance of the country in reducing the burden of malaria and reversing malaria epidemics is better than many sub-Saharan African countries (10)**.** Similarly, the incidence of malaria in Boricha district was reduced by 84% in 2018 as compared to 2013. However, there was only one death reported from the district between 2013 and 2018. The most observed fact for this was under reporting of deaths of any disease including malaria. The other possible reason is that there was no Hospital in the district until Yirba Health center was transformed into primary Hospital in June, 2018; and therefore more complicated and sever malaria cases were referred and managed at Hospitals outside the district. The observed remarkable reduction of malaria burden in the district was due to several factors. The use of potent and effective IRS chemicals called; Bendiocarb and Propoxer; and high ITNs coverage contributed for the significant reduction of malaria burden. The accessibility of malaria diagnosis and treatment at community level through Health extension program (HEP), improvement of surveillance system and increased utilization of information generated through the surveillance were the major factors for the reduction of malaria burden.

There have been significant advances in malaria diagnosis and prevention in Ethiopia since the beginning of scale up in 2004. Before 2008, over 80% of the reported cases were presumptive cases lacking parasitological confirmation. Presumed treatment has declined greatly in the last few years (11)**.** In Boricha district, only 18 out of 545 (3.3%) total malaria cases were treated based on clinical symptoms alone. However, malaria still remains a major public health problem in Ethiopia. P.vivax was more dominant species in Sidama zone which accounted 54% of the total confirmed cases in 2018; while the situation in Boricha was quite different, P.falciparum was the dominant species that accounted 59% of the total confirmed cases; this finding is consistent with the study in Gambella region and Woreta, there P.falciparum was the dominant species (12)**.**

Computer is very important tool for public health surveillance system. It is used for data entry, analysis and reporting. During the assessment we observed that the zonal health department had functional computer dedicated for the surveillance system and internet was also available. At the district there was functional computer used for the surveillance system; however internet was not

available. Therefore, data reporting was limited to phone communication; as a result data quality could be affected. At the assessed health facilities excluding the health posts, there were functional computers, however, surveillance officers had no the skills to use computer for data management. Use of standard case definitions is very important as it allows standardization and consistency of reporting across the country. In this regard, all the assessed Health facilities used standard case definitions for priority health problems in the district; particularly malaria case definition was available.

Effective surveillance and timely reporting of diseases is essential in identifying an outbreak in action. It is crucial to collect high quality data in order to be able to understand the health status of a specific geographical area. Public health actions such as formation of an outbreak team, press work, explorative case interviews and epidemiological studies need to happen as fast as possible after the beginning of an outbreak in order to prevent harm (13, 14)**.** However, in Boricha district there was no record that provides information on timeliness of report and regular data analysis was not conducted. Despite this limitation in the district, the surveillance system at the zonal level was strong enough to provide information for action as early as possible.

3.1.7. Limitations

Because of time and resource constraints only two out of the total 11 Health facilities (one Hospital and 10 Health centers), and four out of 39 Health posts were included in this study. This may compromise the representativeness of the findings. In order to overcome this issue, qualitative information regarding to the operating system of other Health facilities was obtained from different focal persons of the district health office and incorporated in the report.

3.1.8. Conclusion

Overall, the surveillance system was useful because it detected malaria cases, estimated morbidity and monitored trends of the disease. Cost-free malaria diagnosis and treatment service at the community level and integrated disease reporting system enhanced its flexibility and sensitivity. However, the system also had weakness; it didn't track person characteristics like age and sex of malaria cases, which is important for public health programming and policy development. The system requires multiple routes of reporting therefore it was complex. Timeliness is important measure of data quality but there was no record that indicates timeliness of the report. There was no standard reporting formats at the Health post level. There was no feedback from the district to the peripheral health facilities. Most of the time health personnel at both the district and facility levels use personal mobile for immediately and weekly reporting of diseases.

3.1.9. Recommendations

Based on the gaps observed from this study, we recommend that the district health office should initiate regular supportive supervision using standard checklist for peripheral health facilities. The district should also conduct weekly data analysis and prepare epidemiological bulletin regularly. Train health personnel at Hospital and Health centers on data management. For efficient and effective surveillance system internet is very important, therefore the zonal health department should work with stakeholders to avail internet service at the district, Hospitals and Health centers levels. Standard reporting formats should be available at the health posts. Refund of money spent to buy airtime to notify immediate and weekly reports through personal cellphones is important to keep stability of the system. Overall, the zonal health department should make sure that every surveillance activities including weekly data analysis, bulletin preparation, developing EPRP, proper functioning of RRT and data quality are properly addressed at the district and at facilities.

3.1.10. References

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Chapter IV-Health Profile Assessment

4.1. Health Profile Description of Dale district, Sidama Zone, SNNPR, Ethiopia; 2016/17

4.1.1. Abstract

Background: - A community health profile is a comprehensive compilation of information about a community. The purpose of this study is to identify priority health and health related problems of the district and communicate the findings for public health action.

Methods: - Descriptive cross sectional study was conducted from January to February, 2018. Health and health related information was collected from different sectors in Dale district using standard checklist. Hard copy and softcopy of available data from district, and different literature and review publications have been incorporated.

Result: - The district total population was estimated to be 235,847; of which 49% were females. Water supply coverage was 48%, ODF coverage was 19.4% and Helminthiasis was the leading cause of morbidity. There was malaria outbreak in 2017. Pentavalent (Penta 3) coverage was 92.2%, Measles coverage was 92.33%, and full immunization coverage was 92.33%. **ANC** coverage at least one visit was 107.8%, at least 4 visit was 96.5%, proportion of delivery attended by skilled personnel was 73.2% and the post natal coverage was 77.4%.

Conclusion and recommendation:- Low water supply coverage, low ODF coverage helimenthiasis and malaria were the priority problems in the district which require immediate intervention from the district heath department and other stakeholders to solve these problems.

4.1.2. Introduction

A community health profile is a comprehensive compilation of information about a community. It is a process of gathering and interpreting information from multiple and diverse sources in order to develop a deep understanding of the health of a community. It is also a process that uses these results to develop strategies to improve the health status of the community. Community health assessment also includes products, such as a community heath profile and a community health improvement plan (1, 2)**.**

The data in a profile reflects the health of a given community from many different angles. A community can refer to a county, a locality within a county, a tribe, or a multi-county region. The information may include data already collected and published about a community or information collected by the organizations or individuals creating the profile. It provides a long list of public health needs, issues, and problems. This list can then be used to set priorities. The purpose of prioritization is to develop consensus on a short list of goals that a community can realistically tackle; and is an entry point for operational research. Stakeholders of health and health related issues should have access to evidence-based information from well compiled health profile (2)**.**

The community health profile report includes indicators and narrative about the demographic and socioeconomic characteristics, health status, risk factors, health resource availability, quality of life, and perceptions of health that are relevant to the community. The profile should contain a combination of narrative, data tables, comparison graphs, and trend lines. Finally, the priority issues identified by community partners should be listed and described (3)**.** However, in low income countries like Ethiopia such information especially at district level is usually not complete and not comprehensive.

Rationale of the study

Health profile assessment is a way to gain a snapshot of a community‘s current assets and needs by examining and recording community strengths, challenges, and resources. Therefore, an assessment of current health profile of a community is important to provide a way for a coalition to get a better understanding of the community‘s health and what the current needs may be (2)**.** The primary objective of this health profile is to provide a broad over view of the social, economic, demographic characteristics, geographic and health status of the population of Dale district. So, having this document, governmental and non-governmental health stakeholders working for the District communities have evidence based information for prioritizing and instituting appropriate public health interventions.

4.1.3. Objectives

General Objective

The overall objective of the study was to describe health profile of Dale district, Sidama Zone, SNNPR, Ethiopia, 2016/17

Specific objectives

- To describe health status of the district by using health and health related indicators
- To describe the existing health infrastructure of the district
- To identify priority health problems of the district for public health programing

4.1.4. Methods and Materials

Study design

Descriptive cross sectional study was conducted from January 29 to February 28, 2018. Hard copy and softcopy of available data from district Health office, Education office, Agriculture office, Water & Energy office, Administrative office, Culture and Tourism office; and, different literature and review publications have been incorporated about the study area. The responsible bodies from each sector have been interviewed and discussed along with structured questionnaire. Data was processed and analyzed using Microsoft Office Excel.

Ethical Issues

Permission to conduct this health profile Assessment was obtained from Regional health Bureau, Sidama Zone Health department, and Dale district sector offices.

Dissemination of the Result

The study result will be submitted to Addis Ababa University, school of public health, department of preventive medicine, and to other stakeholders using a report and oral presentation.

4.1.5. Results

History and culture

The district is also known by an extra ordinary Queen called Furra. In spite of lack of written accounts, which make the date and place of birth uncertain, Furra is believed to have lived between fourteenth and fifteenth centuries. The reign of Queen Furra is said to have been fraught with problems and excessive demands imposed upon Men; to cite as an example, she ordered people to build her a house between the Sky and the land; that is in the Air. To solve such problems, the wise people came up with solutions. Then she used to order executions, particularly, of all the short and old bold men. During one of these executions, an old Man asked the young Men; hide me in a place where the Queen and her followers could not find me and I will be of help at a time when wisdom and advice are unavailable. His request was accepted and he was hidden in the cave near a river bank and stones covered the entrance to the cave. There he would not be suspected by Furra's followers .Afterwards Men continued to visit him, feed him, in return, receive advice from him (5, 6)**.**

Towards the last day of her rule, she ordered to fetch her very fast animal (faster than a horse) that could carry her to all the Lands she was ruling, including foreign battle fronts. By receiving advice from the wise Man hiding in the cave, they brought her a Giraffe and tied her on the animal back. As the Giraffe run speedy, her body parts started falling apart in different areas in the forests. The place where her body part **"Dale"** buttock was fallen given the name Dale; the name of the current Dale district (5)**.**

Geography and Climate

Dale district is located at $6^0$44″latitude North and $38^0$28″ East. Elevation of this district is 2123 meters above sea level on average. The lowest and highest average temperature are 11^0c and 22^0c respectively. The annual rainfall distribution ranges from 1041-1448 mm. The district is bordered on the south by Aleta Wendo and Chuko districts, on the west by Loko Abaya district, on the northwest by Boricha district, on the north by Shebedino district, and on the east by Wensho district. It covers areas of 30,212 hectares; from this 2900 hectares is covered by crops, 111 hectares grazing, 970 hectares forest and 61 hectares is considered swampy, degraded or otherwise unusable. The average land size per a house hold is 0.6 hectares.

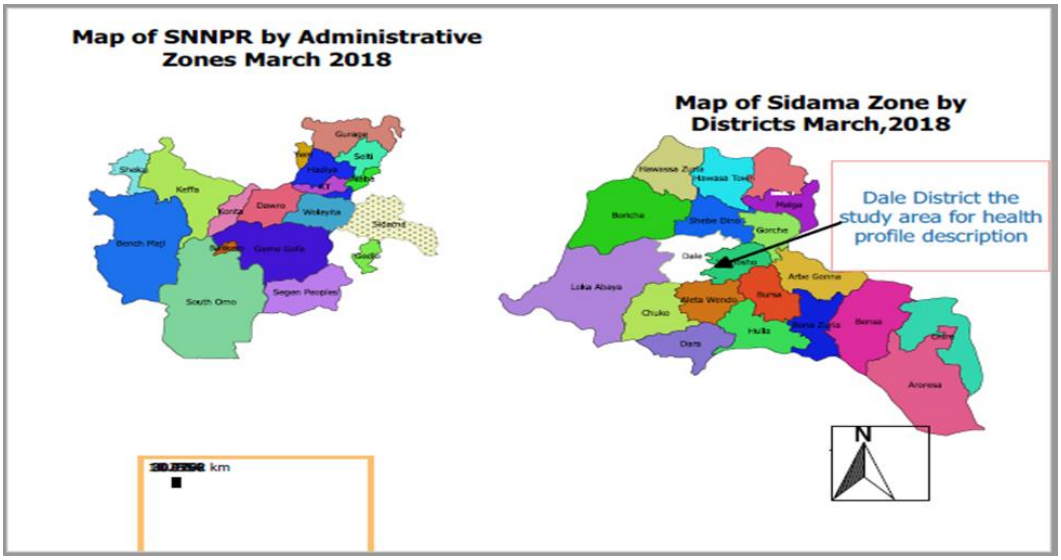

Figure 19: Map of Dale district, Sidama zone, SNNPR, Ethiopia, 2018

Demographics

Based on the 2007 Census conducted by the Central Statistical Agency (CSA), this district had a total population of 212,310, of whom 107,356 were males and 104,954 were females. The majority (80%) of the inhabitants was Protestants, 8% practiced Ethiopian Orthodox Christianity, 4.69% were Muslims, 3.46% were Catholic, and 1.3% of the population was traditional religion followers (7)**.** In 2016/17, the district population was estimated to be 235,847, from which 49% of the population were females. Women with reproductive age constitutes 54,952 (23.2%) of the population segment. Out of the total population 36,816, (15.6%) were children less than five years. The annual population growth rate was 2.8.

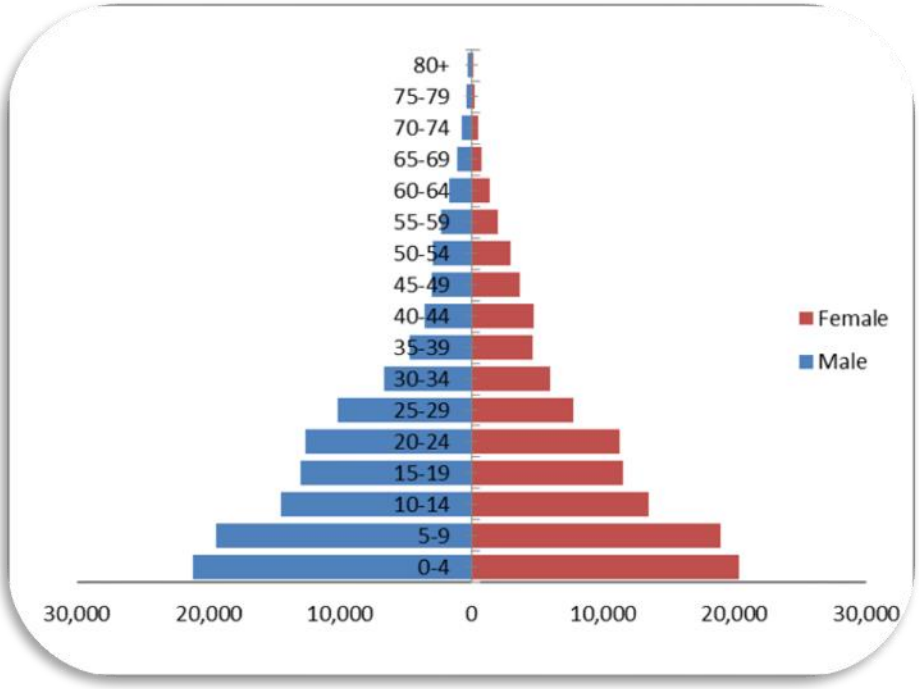

Figure 20: population pyramid for Dale district, Sidama zone, SNNPR, 2018

Table 6: Distribution of population group and vital statistics for Dale district, Sidama, SNNPR, Ethiopia, 2016/17

S/N	Parameter	Number	Percent (%)	Remark
1	Total population	235,847	100%	
2	Male	120,282	51%	
3	Female	115,565	49%	
4	Between 0-4 years old	36,816	15.6%	
5	Between 5-14 years old	112,900	47.9%	
6	≥ 15 years old	122,947	52.1%	
7	Females 15-49 years old	54,952	23.2%	
8	Live birth	444		
9	Average house hold size			
10	IMR/1000	No Data	No Data	
11	Under 5 Mortality rate/1000	No Data	No Data	
12	CBR/1000	1.88		

Economy

Industry in this district includes 51 coffee pulpers. Two micro-finance institutions operate in Dale: the Sidama Microfinance Institution (SMFI), established in 1998; and the Omo Microfinance Institution (OMFI), established in 1997. While OMFI is a regional organization, SMFI operates only in the Sidama Zone. Most residents are subsistence farmers, cattle especially, are a measure of wealth. Important cash crops in the district include coffee, corn, barley, haricot beans, local varieties of cabbage, and sweet potatoes. Dale is the major coffee growing area in Sidama Zone. 15,805.86 hectares of the land in the district is covered by this crop. In 2009 E.C, the district brought 4,675.7 tons of washed coffee for the central market.

Administrative and Political Organization

Based on the 1994 constitution of Ethiopia, Woreda/District is the basic decentralized administrative unit and has an administrative council composed of elected members. Dale district is administered by 36 kebeles; which is the lowest administrative structure. Yirgalem town has been serving as the capital of the district; in which all sector offices are located. Yirgalem has its own town administrative structure 'Yirgalem town administration'. Politically the district is directly responsible to Sidama zone Administration.

Facilities and infrastructures

With regard to public service, telecommunication and electric power service coverage of the district was 75% and 35% respectively. The district had 25 km Asphalt road, 104 km all weather roads, 106 km dry weather road. To increase productivity and skills of farmers, the district agricultural office constructed 15 offices and leaving homes for Developmental Agents (DA), 36 Farmer Training Centers (FTC), one animal health clinic and one animal health post.

Education and school health

In 2016/17, the district had a total of 50 schools; 35, 2nd level primary (1-8) schools, 11, 1st level primary schools (1-4) and 4 secondary schools (9-10). It had no preparatory school and college. The school dropout rate of the district was 6.1; the district education office investigated the reasons for school dropout; food shortage and other economic issues were the main reasons for school dropout. Out of the total 50 schools, only 11 had access for drinking water. All schools had male and female latrine in separate. None had school feeding program.

Table 7: Plan and achievements of school enrollment of school age children in Dale district, Sidama zone, SNNPR, Ethiopia, 2016/17

Sex	Targeted	Achievements	Percent (%)
Male	**35,371**	**28,928**	**81.8**
Female	**33,049**	**27,984**	**84.7**
Total	**68420**	**56,912**	**83.2**

Water supply

Water is the basic need in our daily life. Everyone has contact with water whatever the quality is. Safe water coverage of the district was only 48%.

S/N	Type of water source	Total	Functional
1	Protected spring water	111	No Data
2	hand Pump	155	No Data
3	Public tap	139	No Data
Total		405	No Data

Health

Health infrastructures

There are 11 health centers, 33 health posts and 2 private clinics but there was no Hospital. Regarding to telecommunication, all Health centers and health posts did not have telecommunication service. Three out of the total 11 health centers had no electric service. 4 health centers had no safe water supply. All health posts and health centers had all weather transport accessibility. In the district there were 234 health professionals and 249 supporting staffs.

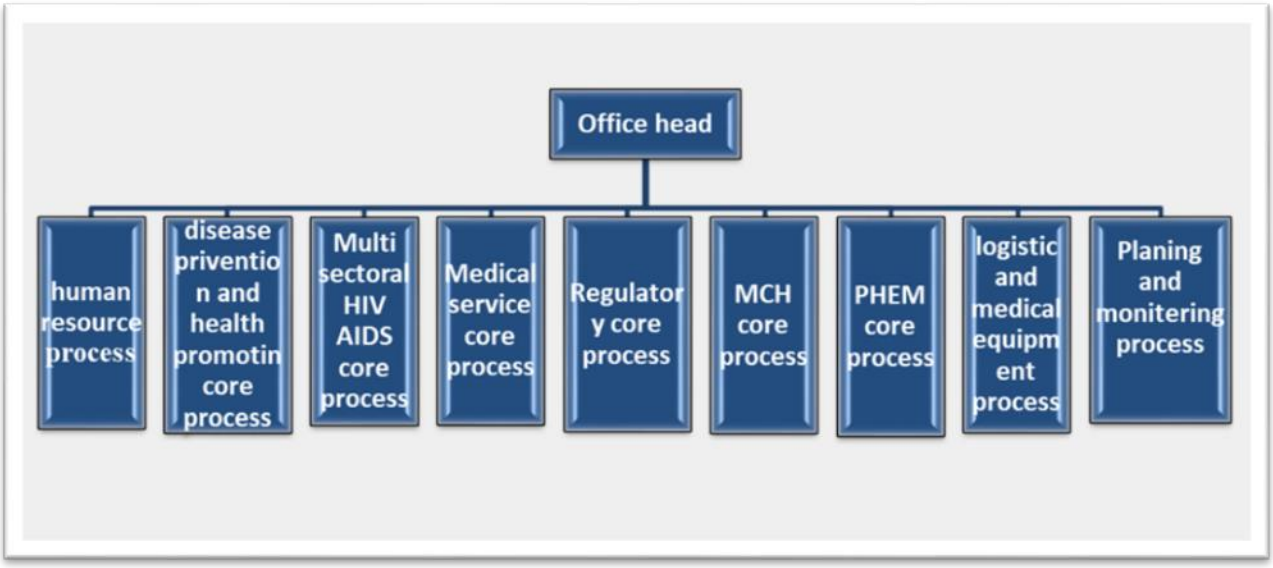

Figure 21: organizational structure of Dale District Health office, Sidama zone, SNNPR, Ethiopia

Table 8: Accessibility of Electric power, safe water and telecommunication service for Health facilities in Dale district, Sidama zone, 2016/17

S/N	Health facility		Number
1	Health centers	With Electric power service	8
		Without electric service	3
		With water supply	7
		Without water supply	4
		With telecommunication service	0
2	Total number of health facilities		11

Table 9: Distribution of Health Professionals for Dale district, Sidama Zone, SNNPR, Ethiopia, 2016/17

S/N	Profession	Male	Female	Total
1	Health officer	38	14	52
2	BSc Nurse	3	2	5
3	Laboratory	8	7	15
4	Pharmacy	12	2	14
5	Clinical nurse	34	83	117
6	Midwife Nurse	-	13	13
7	Environmental health officer	2	0	2
8	HIT	2	2	4
9	Urban health extension worker	-	5	5
10	Rural Health extension worker	-	89	89
11	Supportive worker	100	149	249
Total		**199**	**366**	**565**

Health budget

For 2016/17 year, the district administration had allocated a total budget of 4,220,318 birr for the district health office excluding monthly salary; from which 1,291,545 birr was allocated for capital budget, 354,7478 birr was for operations and 150,000 birr for public emergency. Budget for public emergency was increasing; in 2014/15 it was only 11,500 birr, in 2015/16 it was increased to 100,000 birr. Besides the regular governmental budget, NGOs provided 1,369,472 birr support to cascade different public health programs in the district.

Immunization coverage

In 2016/2017, 8,536 population were targeted for immunization, Pentavalent (Penta 3) coverage was 7,874 (92.2%), Measles 7881 (92.33%), PAB against neonatal tetanus 88.2% and full immunization coverage was 7881 (92.33%). Dropout rate for penta from measles was 3%.

Maternal Health and child health

In 2016/17, 47,781 populations was targeted for contraceptive, the contraceptive acceptance rate (**CAR**) was 99.03%. **ANC** achievement at least one visit was 107.8%, at least 4 visit was 96.5%, proportion of delivery attended by skilled personnel was 73.2% and the post natal coverage was 77.4%.

Table 10: Plan and Achievements of Maternal health activities in Dale district, Sidama zone, SNNPR, Ethiopia, 2016/17

Activity	Planned	Achieved	Coverage (%)
ANC at least 1 visit	9,259	9,984	107.8%
ANC at least 4 visits	8,888	8,582	96.5%
Skilled Delivery	8,333	6,099	73.2%
Family Planning	21,236	7,828	36.86%

Tuberculosis

Tuberculosis is among the common endemic diseases in Ethiopia. Case detection rate for all forms of TB patients was 60%, TB treatment Success rate for bacteriological confirmed cases was 99.6% and TB treatment Cure Rate 96.2%; with no defaulter. From the total 264 TB patients, one person was died from the disease (0.38%).

HIV/AIDS

In 2016/17, the district health office performed different activities on HIV/AIDS control and prevention. Plan to provide HIV/AIDS awareness to youths outside schools was 1520; the achievement was 422 (27.8%). Health education and awareness creation plan for commercial sex workers was 80 and achieved 13 (16.2%). Discussion was conducted with health development army (HDA) in 32 Kebeles out of the total 36 kebeles. The health office had a plan to distribute 800,000 condoms; the achievement was 740,211 (92.5%). In this district there were 169 peoples living with HIV (PLHIV); females were 89 (52.7%). With regard to HIV/AIDS mainstreaming activities, 301,000 birr from the government workers (0.5 % support from salary) for HIV care and support program was collected. Support was given to 124 peoples from the total 169 people living with HIV (PLHIV). The district health office planned to provide VCT service for 139,494, achieved 5,162 (3.70%). Plan to provide PIHCT service was 107,036; the achievement

was 14,898 (13.92%). PMTCT service provision plan for mothers was 8160 and achieved 8038 (98.5%).

Table 11: HIV testing service plan and achievement of the Dale District, 2016/17

HIV testing	Plan	Achievement	Percent (%)	Positivity rate
VCT	139,494	5,162	3.7	0.02%
PIHCT	107,036	14,898	13.92	0.02%
PMTCT	8160	8038	98.5	0%

Malaria

From 2013-2017, a total of 8196 malaria cases was reported, with average annual incidence of 766.45 cases per 100,000 populations. The highest number was reported in 2013 with 2779 cases (incidence of 1109.1/100,000) and the lowest was reported in 2015 with 508 cases (incidence of 197.8/100,000). There was a sharp decline of malaria from 2013 up to 2015; but after 2015 the caseload spikes again and in 2017 malaria outbreak was reported from the district.

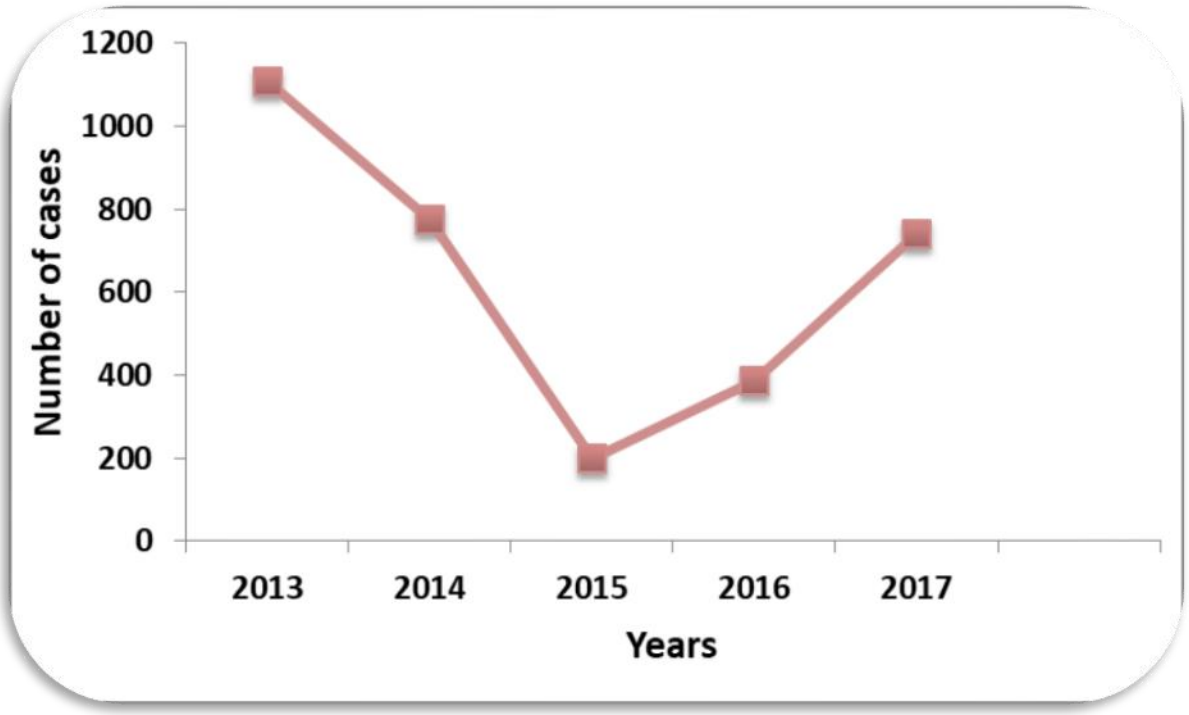

Figure 22: Total malaria cases per 100,000 populations, from 2013-2017

Seasonal pattern of malaria

The seasonal pattern of malaria in the district showed that high number of cases was reported during August to November. The highest number was reported during November with 1580 cases, followed by 1296 in October and 1217 cases in September. The lowest number of cases was reported during April with 286 cases.

Figure 23: Seasonal pattern of malaria in Dale district, Sidama zone, SNNPR, 2013-2018

Nutrition

Between 2012 and 2017, a total of 3289 Sevier acute malnutrition (SAM) cases was reported. Of which 2987 cases were OTP while 302 cases were SC. The average annual incidence of SAM was 139.8 cases per 10,000 populations (children less than 5 years of age). The annual burden of OTP cases showed variability from year to year while SC was relatively stable. The highest number of SAM was reported in 2014 with 1012 cases (incidence of 261.9/10,000); whereas the lowest number was reported in 2016 with 233 total SAM cases (58 per 10,000).

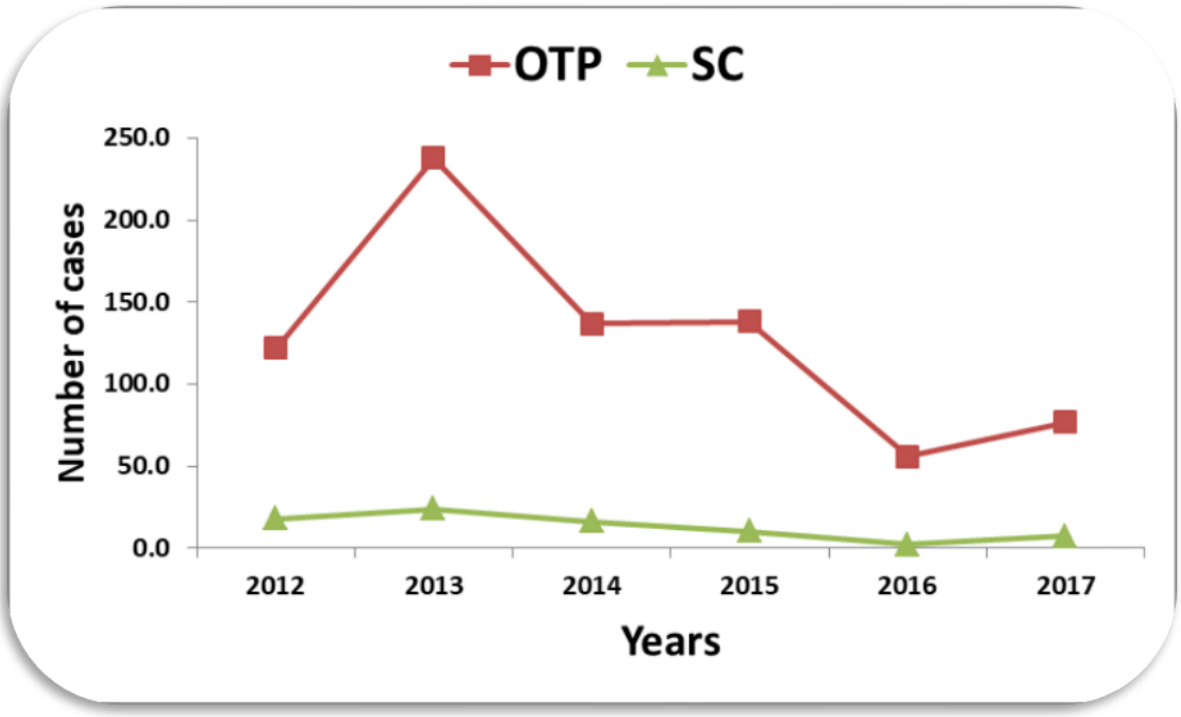

Figure 24: OTP and SC cases per 100,000 populations (under five years), 2012-2017

Environmental Health

In the district, there were 49,210 households. Latrine coverage was 88.3%. 5,776 households had no latrine. From the total 36 kebeles, only 7 (19.4%) were defecation free areas. Health care provider at health facilities conducted health education on regular basis. Health education program at health posts and house to house was addressed by health extension workers (HEW). The health education program was mainly about prevalent health problems in the district; personal & environmental hygiene, expanded program on immunization (EPI), HIV/AIDS, TB, Malaria and maternal health were some of the areas addressed during health education program.

Disaster and outbreak

There was malaria outbreak in 2017, in which 1929 total malaria cases (incidence of 738.3 per 100,000) reported. This number was almost two fold increased as compared with 2016, in which 990 cases (385.4/100,000) reported.

Leading causes of outpatient visit

Helminthiasis was the leading cause of morbidity in the district; which accounts 8,972 (11.05%) followed by Pneumonia 8,519 (10.49%) and Typhoid fever 8,350 (10.28%). Pneumonia caused the highest morbidity in children less than five years of age; which accounts a significant number 6506 (39.7%) () followed by non-bloody Diarrhea 18.86% (3090) and helminthiasis 6.4% (1049).

Table 12: Top ten leading causes of Morbidity, OPD, all age group; Dale district, Sidama, SNNPR, Ethiopia, 2016/17

S/N	Diseases	Male	Female	Total	Percent (%)
1	Helminthiasis	4377	4595	8972	11.05%
2	Pneumonia	5033	3486	8519	10.49%
3	Typhoid fever	3798	4552	8350	10.28%
4	Urinary tract infection	2755	3336	6091	7.5%
5	Diarrhea (non-bloody)	2966	2629	5595	6.89%
6	All respiratory diseases	2946	2521	5467	6.73%
7	Unspecified infection and parasitic diseases	2473	1950	4423	5.45%
8	Acute febrile illness	1963	2045	4008	4.94%
9	Malaria all types	1831	1531	3362	4.14%
10	Trauma (injury, fractures etc.)	2081	1262	3343	4.12%
	Total of the above causes	30223	27907	58130	71.6%
	Total of the other causes	11,258	11,800	23,058	28.4%
	Total of the all causes	41,481	39,707	81,188	100%

Table 13: Top ten leading causes of Morbidity, Age Group 0-4, Dale district, Sidama, 2016/17

S/N	Diseases	Male	Female	Total	Percent (%)
1	Pneumonia	3677	2829	6506	51.4%
2	Diarrhea (non-bloody)	1661	1429	3090	24.4%
3	Helminthiasis	546	503	1049	8.3%
4	All Respiratory Diseases	530	496	1026	8.1%
5	Infection of the skin and subcutaneous tissue	498	499	997	7.9%
Total		6,912	5,756	12,668	

4.1.6. Discussion

Open defecation free (ODF) coverage in the district was 19.4%, which was lower than the regional (39%) and the National coverage (26%) (8). Helminthiasis was the leading cause of outpatient visit in the district, for 4 consecutive years (from 2013/14-2016/17). Some literatures revealed that high prevalence of these infections is closely correlated with poverty, poor environmental hygiene, and impoverished health services; and parasitic helminthes are known causes of morbidities such as nutritional deficiency, impaired physical development and learning ability (9). Low ODF and low water supply coverage might be the contributing factors for high prevalence of Helminthiasis in the district. Case detection rate for all forms of TB for the district was 60% which was below the regional detection 75.3% and the National 67.3%, and cure rate for bacteriological confirmed TB cases was 96.2%; which was above the regional 73.7% and the national 77.9% (8).

Pneumonia caused highest number of morbidity on children less than 5 years of age followed by bloody diarrhea; that seeks serious public health action. (VCT) and (PIHCT) service coverage was very low; 3.7% and 13.92%, respectively. Population to health center ratio for Dale was 1 to 21,440 people which is above the National standard; but there was no hospital in the District.

4.1.7. Limitation

Sectors missing some important health and health related indicators; for example in the heath sector mortality data was documented.

4.1.8. Conclusion

Hygiene and sanitation practice of the District community was very low which was indicated by low ODF coverage and Helimenthiasis was the leading cause of health problem for four consecutive years. Water overage of the district was very low and malaria remains among the leading causes of morbidity and caused outbreak in 2017.

4.1.9. Recommendation

More than half segment of the district population had no safe drinking water supply; therefore, governmental and non-governmental organizations (NGOs) should act to solve this problem. Health education and community awareness on hygiene and sanitation, latrine utilization, and overall prevention and control program requires strict monitoring and follow-up. District health sector and other stakeholders should work on awareness creation and encourage the public for HIV testing and know their status. Regular supportive supervision to health extension workers (HEWs) and health professionals should be conducted.

4.1.10. References

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Chapter V-Scientific Manuscript

5.1. Rubella outbreak investigation in South Aari district, South Omo zone, Southern Nation Nationalities and Peoples Region (SNNPR), Ethiopia, December, 2018

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Key words: Rubella, Outbreak, Case control

5.1.1. Abstract

Background: The most serious consequence of rubella virus infection can develop when a woman becomes infected during pregnancy that can severely affect the fetus, resulting in miscarriage, fetal death, or the combination of disabling conditions collectively called Congenital Rubella Syndrome (CRS), which includes heart disease, blindness and deafness. The purpose of this outbreak investigation was to identify the source of the outbreak and control further spread of the disease.

Methods: Unmatched Case-control study in the ratio of 1 to 3 was conducted from December 24, 2018 to January-22, 2019. Standard semi-structured questionnaire was used to collect data. Logistic regression was performed to observe statistical association of the dependent variable with the independent variable. Line-list data was also used for descriptive study.

Result: A total of 53 cases of rubella were identified. Of these, 31 cases (58.5%) were females. Children between 5 to 15 years were the most affected. Statistically significant risk factors were household contact with an AOR of 5.09 (95% CI, 1.34-19.4) and exposure to school children with fever and rash with an AOR of 2.77 (95% CI, 1.09-7.05).

Conclusion and recommendations: The occurrence of this outbreak provides an insight regarding the existence of circulating rubella infection in the district. Rubella can cause a life-long damage to infants when it occurs during pregnancy. Therefore, the ministry of health (MOH) should take the leading role to introduce rubella vaccination into the routine immunization program and establish CRS surveillance system across the country.

5.1.2. Introduction

Rubella is an acute, usually mild viral disease traditionally affecting susceptible children and young adults worldwide (1). Rubella virus is classified as a toga virus, genus rubivirus. It is an enveloped RNA virus; with a single antigenic type that does not cross-react with other members of the toga virus group (2). Persons with rubella are most infectious when the rash is erupting, but they can shed virus from seven days before to seven days after rash onset. Rubella may be transmitted by persons with mild or no symptoms (up to 50% of all rubella virus infections). Infants with Congenital Rubella Syndrome (CRS) shed large quantities of virus from body secretions for up to one year and can therefore transmit rubella to persons caring for them who are susceptible to the disease (3). The average incubation period is 18 days with a range of 12 to 23 days. There may be a mild prodromal illness involving a low-grade fever, malaise, coryza and mild conjunctivitis. Lymphadenopathy involving post-auricular and sub-occipital glands may precede the rash (4).

The most serious consequence of rubella virus infection can develop when a woman becomes infected during pregnancy that can severely affect the fetus, resulting in miscarriage, fetal death, or the combination of disabling conditions collectively called Congenital Rubella Syndrome (CRS), which includes heart disease, blindness and deafness (5, 6). This is most likely to develop with maternal infection during the first 12 weeks of pregnancy, although isolated birth defects, particularly sensory-neural hearing impairment, can be found in infants with maternal infection at up to 20 weeks of pregnancy. As is the case with measles, the burden of the disease is unevenly distributed across WHO regions (7).

Globally, an estimated 110,000 babies are born with CRS every year, mostly in South East Asia and Africa. Sadly, these children will suffer a lifetime because of birth defects such as blindness, deafness, and heart disease, even though a cost-effective vaccine is widely available to prevent both rubella and CRS. This is why rubella and CRS elimination is a race worth winning (8, 9). However, most countries that introduced RCV under the national immunization program have achieved a remarkable reduction of rubella and CRS burden. After achieving more than 94% of MMR coverage, Australia recently has declared the elimination of rubella and CRS. Likewise, the last time endemic rubella and CRS cases were reported from America was 2009, and the region was verified free of endemic rubella virus transmission in 2015. In the World Health Organization (WHO) European Region, 33 countries had eliminated rubella by 2016. Due to the

steady implementation of rubella immunization over the 21 years, the annual rubella incidence rate remained low in all age groups, and the natural epidemic cycle of rubella has probably been broken in Shandong province of China (9-11).

The measles case-based and lab-supported surveillance system in WHO African Region was established after the Region started accelerated measles control program in 2001, and is being implemented by nearly all countries across the Region since then. The elements of such a case based surveillance system still remain highly relevant and allow for the monitoring of the impact of the strategies on measles epidemiology, as well as for rubella testing of measles lab-negative specimens. In so doing, the system has allowed countries to better understand the epidemiology of rubella as well. However, as the African Region moves towards the elimination target, and with certain countries having achieved a longer period of sustained low incidence for measles, there is a need to make the surveillance system more sensitive, and more tuned to address the emerging issue of rubella control(12).

5.1.3. Objectives

General Objectives

The overall purpose of the outbreak investigation was to identify the source of the outbreak and prevent further spread of the disease.

Specific objectives

- To identify the source of an ongoing outbreak
- To describe the extent and magnitude of the outbreak by place, person and time
- To provide technical support to control and prevent the outbreak from further spreading
- To identify risk factors associated with the outbreak

5.1.4. Methods and Materials

Study Area

The study was conducted in South Aari district, located in South Omo zone. South Omo zone is one of the fourteen zones found in Southern Regional state of Ethiopia. South Aari district, around the zonal capital Jinka, is located in the intensively cultivated middle altitudes, and could be said to mark the south-western limits of the traditional Ethiopian highland ox-plough agriculture. The highest point in the district is Mount Mago (2528 meters). Rivers include the Maki. The Mago National Park covers part of the southwestern corner between the Mago and Neri Rivers. The total population of the district in 2018/19 was estimated to be 254,894. Female population constitutes 128,211 (50.3% of the total). Less than five years population constitute 38,668 (15.61%) and population less than 15 years constitutes 118,579 (47.87%).

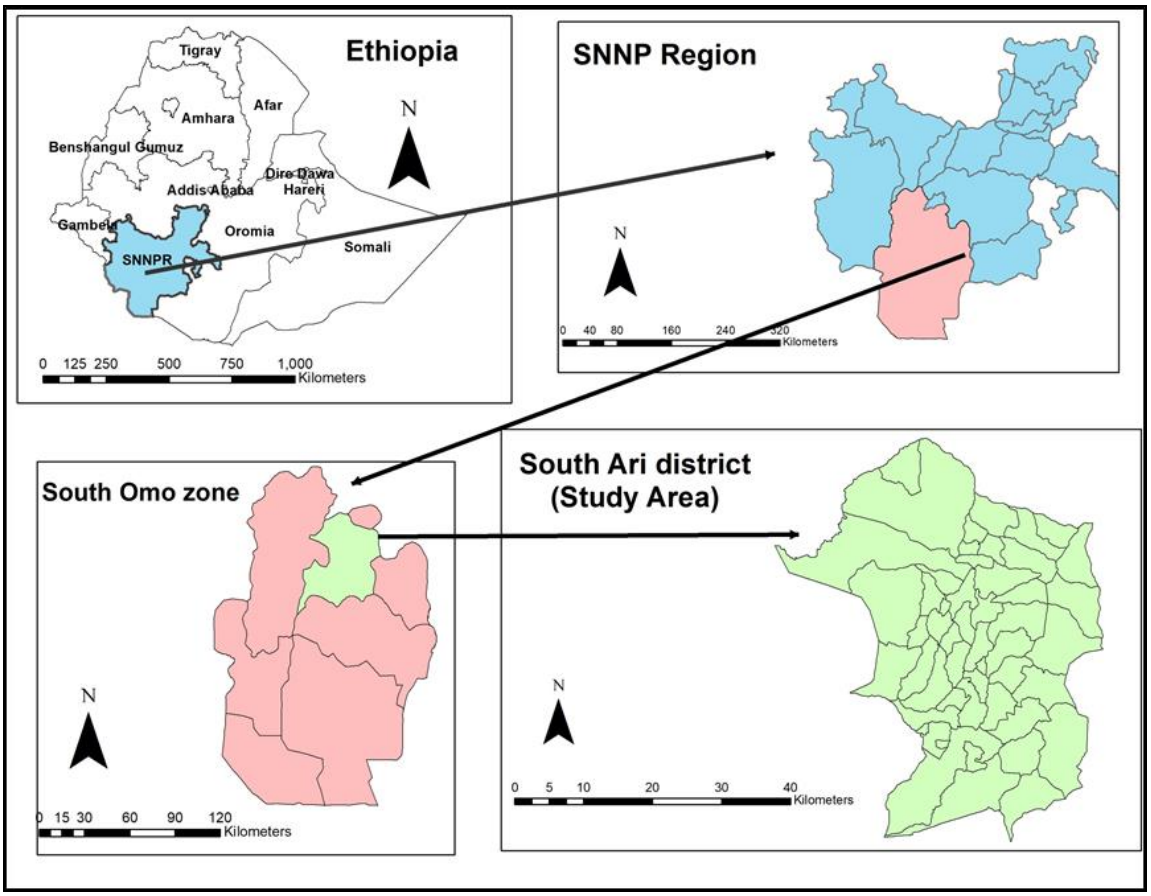

Figure 25: Map of South Ari district, South Omo zone, SNNP Region, Ethiopia

Study design and period

Unmatched Case-control study in the ratio of 1 to 3 (27 cases and 81 controls) was conducted from December 12, 2018 to January 3, 2019. A case was a child aged less than 15 years lived in South Aari district who was tested positive for rubella specific IgM antibodies or that met the clinical case definition and was epidemiologically linked to a laboratory-confirmed case of rubella during the outbreak. A control was a child less than 15 years who lived in the same community without signs and symptoms of rubella. All twenty-seven confirmed cases that were identified during the investigation period were included as cases, whereas three controls against each case were selected. Cases and controls were recruited from the community through active case search. Updated Line list data obtained from the district health office was used for descriptive study purpose.

Data collection

Using standard semi-structured questionnaire information about demographic characteristics, clinical presentations and associated risk factors collected. House to house active case search with the guidance of HDA leader (Health development Army) and HEW (Health Extension Worker) was conducted.

Data entry and Analysis

Both the dependent and the independent variables are dichotomous; therefore logistic regression was performed to observe statistical association of the dependent variable with the independent variable. Statistically significant associations at $P<0.25$ in bivariate analysis were subsequently analyzed using multivariate analysis. Odds ratio (OR) adjusted for confounders was calculated, associations at $P<0.05$ was considered significant. Epi-Info7 and Microsoft Excel 2010 were used for data entry and analysis.

Laboratory Method

The Laboratory analysis was conducted at Hawassa Regional Public Health laboratory. The analysis was based on ELISA (Enzyme-linked immuno-sorbent assay) principle. IgM antibodies in the human serum forms an immune complex with antigen coated on the micro-titer-plate. Unbound immunoglobulins are removed by washing process; and enzyme conjugate attaches to this complex. Unbound conjugate is again removed by washing processes. After adding the substrate solution (TMB), a blue color is produced by the bound enzyme (peroxidase). The color changes to yellow when stopping solution is added. The Intensity of color formed is directly proportional to the concentration of antibodies in the serum. The optical density of the color formed was then measured using ELISA reader.

Operational definitions

Suspected rubella: Any generalized rash illness of acute onset that does not meet the criteria for probable or confirmed rubella or any other illness

Probable rubella: A case that meets the clinical case definition, has no or noncontributory serologic or virologic testing, and is not epidemiologically linked to a laboratory-confirmed case of rubella

Confirmed rubella: A case that is laboratory confirmed (with or without symptoms) or that meets the clinical case definition and is epidemiologically linked to a laboratory-confirmed case of rubella

Ethical clearance

Official permission to conduct the study was obtained from Southern Regional Health bureau, South Omo zone and South Aari district Health departments.

5.1.5. Results

Descriptive study

On December 9, 2018, a suspected measles/rubella outbreak was reported from South Aari district. The index case, 13 years old girl was found during Human Papilloma Virus (HPV) vaccination campaign at Aykamer primary school. Upon further investigation by the district health department, additionally seven suspected cases were identified. The index case had no clear contact history. Blood specimens were collected from all the eight suspected cases and sent to Hawasa regional public health laboratory. Five of the eight suspected cases were found positive for rubella specific IgM. Confirmed rubella outbreak was then declared on December 11, 2018. On December 12, 2018, Field epidemiology Residents from Regional Public Health Emergency Management (PHEM) deployed to the area to investigate the outbreak.

Distribution by Age group and Sex

From December 9, 2018 to January 3, 2019, we identified a total of 53 rubella cases. Of these, 31 cases (58.5%) were females, with female to male ratio of 1.4 to 1. The age distribution of cases showed, the median age was 6 years, ranging from 2 to 16 years. Children between 5 to 14 years were the most affected with attack rate of 51.3 per 100,000 populations, followed by children less than 5 years of age with attack rate of 28.45 per 100,000 populations.

Table 14: Attack rate of rubella by Age Group, South Aari district, South Omo zone, SNNPR, Ethiopia

S. No	Age group	Number of cases	Attack rate (per 100,000 populations)
1	< 5 years	11	28.45
2	5-14 years	41	51.31
3	≥ 15 years	1	0.73
Total		53	

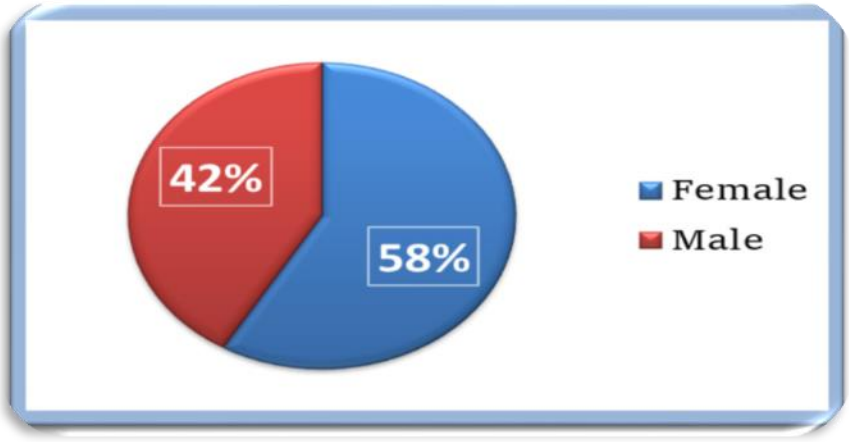

Figure 26: Distribution of rubella by sex, South Aari district, South Omo zone, SNNPR, Ethiopia

Distribution by Time and Place

The highest number was reported from Aykamer kebele with 28 cases (attack rate of 18.3 per 1000), followed by 22 cases (attack rate 13.2 per 1000) from Gedir kebele. With regard to clinical presentations of cases, all cases had rash and fever while 25 cases (92.6%) had conjunctivitis, 21 cases (77.8%) had cough, 24 cases had coryza (runny nose), and 8 cases (29.6%) had vomiting. As illustrated in the epidemic curve, the outbreak was a propagated type. The caseload sharply increased from one case on 9th December to 13 cases on 11th December, at which the peak was observed. The caseload then turned to zero on 16th December and increased again to 6 cases on 23th December. Rubella case was not reported after January 3, 2019 from the district.

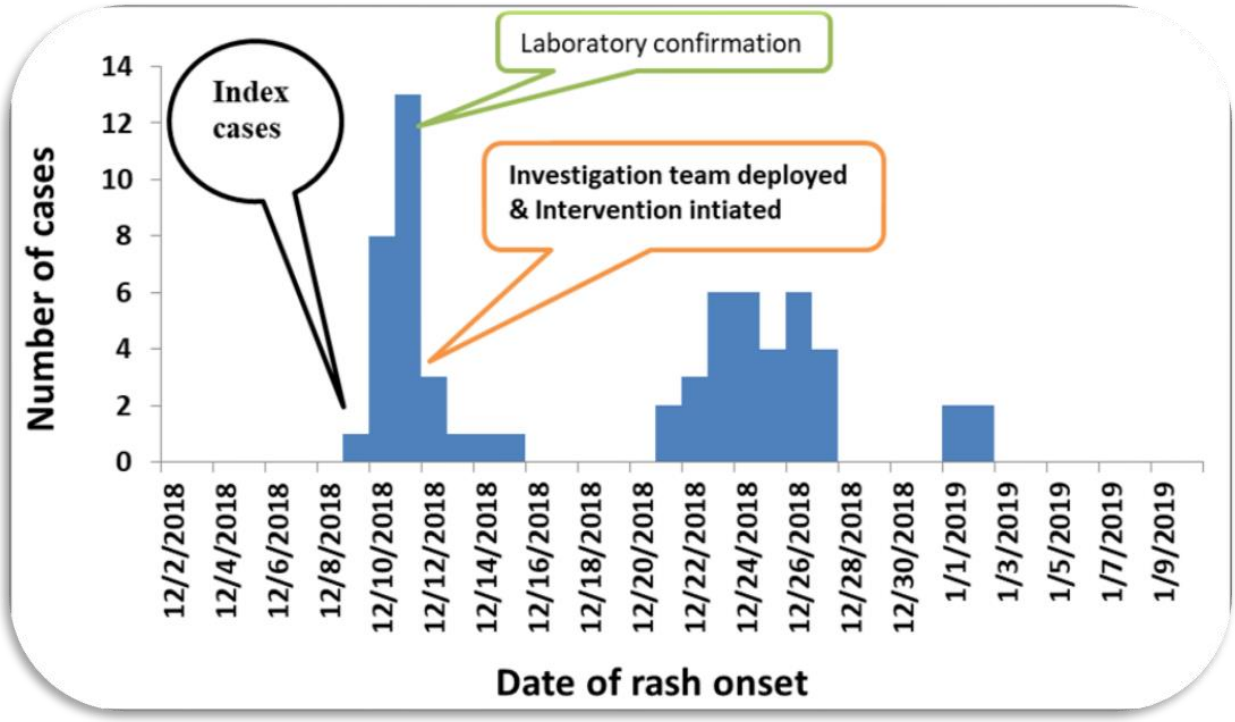

Figure 27: Epidemic-curve of the rubella outbreak by Date of Onset of rash in South Aari district, South Omo zone, SNNPR, 2019

Analytic study

A total of 108 study subjects with 27 cases and 81 controls in the ratio of 1to 3 were recruited. From the 27 cases, 13 (48.2%) were females. The median age of the cases was 4 years, ranging from 1 to 13 years. From 81 controls, 41 (50.6%) were females; the median age of the controls was 6 years ranging from 2 to 13 years. 49 respondents (45.4%) thought that the disease was caused by Bad weather condition, while 33 respondents (30.6%) thought the disease was caused by contact with ill person from the same disease, the rest 26 (24%) said they don't know the cause of the disease. 55 respondents (50.9%) thought that the disease affects children less than 5 years of age, 25 cases (23.1%) thought it affects children less than 18 years while the rest 28 (25.9%) respondents said that it can affect all age group of both male and female. Statistically significant risk factors for contracting rubella were household contact with active febrile rash cases with an AOR of 5.09 (95% CI, 1.34-19.4) and exposure to school children with fever and rash with an AOR of 2.77 (95% CI, 1.09-7.05).

Table 15: Bivariate and Multivariate Analysis of risk factors for rubella (Case=27 and Control=81), South Aari district, South Omo zone, SNNPR, Ethiopia

Variables		Cases n=27 (%)	Controls n=81 (%)	Odds Ratio and 95% CI	
				COR*	AOR*
contact at the school	Yes	16 (59.3%)	30 (37%)	2.45 (1.003-6.14)	2.77 (1.09-7.05) **
	No	11 (40.7%)	51 (63%)		
Neighborhood contact	Yes	5 (18.5%)	12 (14.8%)	1.30 (0.38-4.07)	
	No	22 (81.5%)	69 (85.2%)		
Household contact	Yes	6 (22.2%)	5 (6.2%)	4.27 (1.14-16.61)	5.09 (1.34-19.4) **
	No	21 (77.8%)	76 (93.8%)		
Suffered from rubella like illness before	Yes	4 (14.8%)	8 (9.9%)	1.58 (0.38-5.74)	
	No	23 (85.2%)	73 (90.1%)		
Know transmission of rubella	Yes	10 (37%)	40 (49.4%)	0.61 (0.24-1.48)	
	No	17 (63%)	41 (50.6%)		
The house was well ventilated	Yes	6 (22.2%)	18 (22.2%)	1 (0.32-2.81)	
	No	21 (77.8%)	63 (77.8%)		

****Significant association at P value <0.05, *COR: Crude odds ratio; AOR: Adjusted odds ratio**

5.1.6. Discussions and conclusion

Rubella surveillance in Ethiopia is integrated with measles case-based surveillance system. However, rubella generally is a milder disease than measles, and infection is subclinical in 30% to 50% of cases; the primary focus of measles integrated rubella surveillance system is detection of measles cases as well, therefore the surveillance system is much less likely to detect rubella than measles. Besides, CRS surveillance system is not yet established in the country; as a result the true burden of rubella and CRS is under estimated or unknown. Not ignoring this fact, surveillance data of SNNP Region from 2013-2017 showed that 383 laboratory confirmed cases of rubella were reported. Gamo Gofa and South Omo zones reported the highest number with 62 & 51 cases respectively. However, the extent of transmission was not known as line-list information was unavailable.

In this case-control study we identified risk factors associated with rubella outbreak in South Ari district. Household contact with febrile rash cases and exposure to children with febrile rash cases at the school were significantly associated risk factors for contracting rubella. Similar studies in Zimbabwe and China showed exposure to febrile rash cases at school was associated with rubella infection (13, 14). 98% of rubella affected cases were children less than 15 years of age. This finding is consistent with surveillance data analysis in WHO Africa region between 2002 and 2009 that showed 95% of rubella IgM positive cases occurred in children ≤ 15 years of age (15). Similar finding was also reported from Zimbabwe and Kenya in outbreak investigation studies (14, 16). However, the absence of vaccination is the major risk factor for the occurrence of rubella outbreak in various parts of the country; as yet rubella vaccination is not included in the routine immunization program in Ethiopia.

WHO recommends that countries should take the opportunity offered by accelerated measles control and elimination activities to introduce RCVs. Measles vaccine delivery strategies provide an opportunity for synergy and a platform for advancing rubella and CRS elimination. However, it is also important to review the epidemiology of rubella, including the susceptibility profile of the population; assess the burden of CRS; and establish rubella and CRS prevention as a public health priority before introducing RCV into the national immunization program (17). The Measles and Rubella Initiative (M&RI) is a global partnership committed to ensuring that no child dies from measles or is born with CRS. The Global Vaccine Action Plan (GVAP) was

endorsed by the 194 Member States of the World Health Assembly in May 2012. One of the indicators included in the GVAP is that measles and rubella would be eliminated in at least five WHO regions by 2020. This integrated vision of "a world without measles, rubella or congenital rubella syndrome (CRS)" is supported by WHO, UNICEF and other partners in the Global Measles and Rubella Strategic Plan 2012–2020 (4, 17). The number of countries using rubella vaccines in their national program continues to steadily increase. As of December 2016, 152 out of 194 countries had introduced rubella vaccines; however national coverage varies from 13% to 99%. Reported rubella cases declined 97%, from 670,894 cases in 102 countries in 2000 to 22,361 cases in 165 countries in 2016. CRS rates are highest in the WHO African and South-East Asian regions where vaccine coverage is lowest (18). The occurrence of this outbreak provides an insight regarding the existence of circulating rubella infection in the district. Rubella can cause a life-long damage to infants when it occurs during pregnancy. Therefore, the ministry of health (MOH) should take the leading role to introduce rubella vaccination into the routine immunization program and establish CRS surveillance system across the country.

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Chapter VI-Scientific Abstract

6.1. Rubella outbreak investigation in South Aari district, South Omo zone, Southern Nation Nationalities and Peoples Region (SNNPR), Ethiopia, December, 2018

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Abstract

Background: The most serious consequence of rubella virus infection can develop when a woman becomes infected during pregnancy that can severely affect the fetus, resulting in miscarriage, fetal death, or the combination of disabling conditions collectively called Congenital Rubella Syndrome (CRS), which includes heart disease, blindness and deafness. The purpose of this outbreak investigation was to identify the source of the outbreak and control from further spreading.

Methods: Unmatched Case-control study in the ratio of 1 to 3 was conducted from December 24, 2018 to January-22, 2019. Standard semi-structured questionnaire was used to collect data. Logistic regression was performed to observe statistical association of the dependent variable with the independent variable.

Result: A total of 53 rubella cases were identified. Of these, 31 (58.5%) were females. Children between 5 to 15 years were the most affected. Statistically significant risk factors were household contact with an AOR of 5.09 (95% CI, 1.34-19.4) and exposure to school children with fever and rash with an AOR of 2.77 (95% CI, 1.09-7.05).

Conclusion and recommendations: The occurrence of this outbreak provides an insight regarding the existence of circulating rubella infection in the district. Therefore, the ministry of health (MOH) should take the leading role to introduce rubella vaccination into the routine immunization program and establish CRS surveillance system across the country.

Key words: Rubella, Congenital Rubella syndrome (CRS), Vaccination

6.2. Anthrax outbreak investigation in Menit Goldia district, Bench Maji zone, Southern Nation Nationalities and Peoples Region (SNNPR), Ethiopia, April, 2019

Authors- Zerihun Demoze[1], Fikere Enqusselassie[2], Abigiya Wonedimagegnehu[2], Abdulnasir Abagero[2]

Address: [1] Addis Ababa University School of Public Health Ethiopian Field Epidemiology Training Program Resident. [2]Addis Ababa University, School of Public health, Ethiopian Field Epidemiology training Programme, Addis Ababa, Ethiopia.

Background:

Anthrax is a zoonotic disease of public health importance caused by gram-positive spore-forming and toxin-producing bacterium. We investigated an outbreak of anthrax to verify cases and describe the outbreak.

Methods:

A descriptive across sectional study was conducted from March 17- April 5, 2019 to verify case and describe the outbreak. Information on symptoms and demography was collected by using case definitions and structured questionnaire.

Results:

The index human case was cutaneous anthrax detected on 24th March, 2019 following contact with dead ox suspected for anthrax. It a total of 57 (3.8% AR) cases with 2 (3.5% CFR) deaths (community deaths) reported between 14th _18th of March, 2019. Male were more affected than women. The median age of cases was 25 years, ranging from 1- 40 years.

Conclusion and recommendations:

Index case was cutaneous form which had contact with dead animal suspected for anthrax, there were community death due to suspected anthrax and adults were more affected. We recommend district health administration to improve the awareness of community members in regard to contact with dead animals and to avoid community death enhance earlier cases detection and management at health facility level.

Key words: Anthrax, outbreak, Addis Ababa, Ethiopia, 2019.

Chapter VII-Narrative Summary of Disaster Situation

7.1. Rapid Meher Season Health and Nutrition Need Assessment in SNNP Region, Hadiya zone, Kembata Tembaro zones and Halaba special woreda, 2018

7.1.1. Executive summary

Multi-Sector Rapid need Assessment is designed and adopted by the Government of Ethiopia, United Nations and other relevant humanitarian organizations to collect required information following the two main rainy seasons of the country. Federal Disaster Response Management and Food Security Coordination office (DRMFSCO) leads the process while technical staffs from different sectors plays critical roles in the execution of multi-sectorial information. Therefore, this assessment was conducted to identify public health emergency needs of Hadiya and Kembata zones, and Halaba special woreda following Meher season weather condition. Health and Nutrition related information was collected by using standard checklist and through interviewing sectors representatives. There was an ongoing Scabies outbreak in Hadiya and Kembata Tembaro zones; but there were no sufficient drugs and supplies to treat the cases, especially in Hadiya zone. There was multi-sectorial PHEM coordination forum in all assessed areas but conduct meeting when emergency happened and RRT members were not trained on emergency management. Due to the presence of associated risk factors, Malaria, Measles, AWD and Meningitis were anticipated to cause disease outbreak. In Hadiya and Kembata Tembaro zones MAM cases were not admitted to TSFP for the last four months. Monthly trend of SAM in Hadiya showed higher variability whereas in Halaba special woreda the trend was stable throughout year. There was no sufficient amount of emergency drugs and supplies that is needed to control possible future outbreaks in the assessed areas.

7.1.2. Introduction

Multi-Sector Rapid need Assessment is designed and adopted by the Government of Ethiopia, United Nations and other relevant humanitarian organizations to collect required information following the two main rainy seasons of the country. The Belg rainy season runs from February to May. This is then followed by the long rainy season, known as the Kiremt or Meher, which is between June and mid-September.

The assessment is based on the coordinated approach, under the overall coordination and supervision of the Government of Ethiopia and technical support of the United Nations Agencies, non-governmental organizations (NGOs) and all other relevant humanitarian partners. Federal Disaster Response Management and Food Security Coordination office (DRMFSCO) leads the process while technical staffs from different concerned government sectors plays critical roles in the execution of multi-sectorial information.

Following successful kiremt rains between June and September 2018, above-average harvest is expected in most parts of Southern Nations Nationalities and Peoples Region (SNNPR). This is expected to improve the food security situation of the region. However, erratic distribution and below normal kiremt rains in lowland areas, hailstorms, landslides and frost in some highland areas and the occurrence of fall army worm in some parts of the region significantly reduced crop yields which may cause food insecurity in some parts of the region. At the same time, reports of water shortage are emerged from different areas primarily pastoral areas. In addition, disease outbreaks, Malnutrition persist in some pocket areas of the region.

Therefore, this assessment was conducted to gather information about Health and Nutrition status of Hadiya zone, Kembata Tembaro zone and Halaba special woreda in relation to Meher season weather condition; and the information obtained from this assessment will help to identify the existing and anticipated gaps in the areas and to determine if external intervention is needed.

7.1.3. Objectives

General objective

The assessment was aimed to determine Health and Nutrition needs of Hadiya zone, Kembata Tembaro zone and Halaba special woreda following Meher season weather condition of 2018

Specific objectives

- To identify health and nutrition emergencies of the assessed areas for the coming six months i.e. from January to June 2018
- To determine the existing capacity of the health system to address an ongoing Health and Nutrition emergencies if any, and anticipated risks
- To identify priority needs to assist in the planning and deployment of resources

7.1.4. Methods and Materials

Study areas

The assessment was conducted in Hadiya zone, Kembata Tembaro zone and Halaba special woreda. Moreover, three selected woredas from Hadiya zone (Shashego, West Badwacho and Analmo) and two woredas from Kembata Tembaro Zone namely Damboya and Hadero Tunto woredas were included.

Hadiya zone is divided into ten woredas and two town administrations with an estimated total population of 1,650,104, from which 50.6% population are Females. Children below five years of age constitute 263,625 (16%); women with reproductive age (age between 15-49 years) accounts 393,495 (23.8% of the total populations). The zone is characterized by three agro-ecological zones: highland, midland and lowland. It has a bimodal type of rainfall pattern: Belg (mid-February to May) and Meher (June to September) seasons. Meher season constitutes nearly 70% of the total annual crop production.

Kembata Tembaro is one of the zones in Southern Nation Nationalities and Peoples regional state. Administratively the zone is divided into seven woredas, two town administrations, 119 rural and 3 urban kebeles. The total population of the zone was estimated to be 920,012. Female's population constitute 469,206 (51% of the total). Children under five years of age account 23.3% of the total populations (243,363). It has three agro-ecological zones; Dega that covers 23% of the total areas of the zone, Woina-dega (covers 70%) and Kola (covers 7%). The annual average temperature ranges 12 to 25 ºc and the annual average rainfall ranges 1100 to 1400 mm. The zone has bimodal rainy seasons; with the Belg and Meher rainy seasons. Meher season production constitutes 60-65% of the total annual production.

Halaba special woreda is found in the Southern Nations, Nationalities and peoples Region of Ethiopia. It is located in the Great Rift Valley. The woreda is bordered on the south by exclave of Hadiya zone, on the south west by the Kembata Tembaro zone, on the west and north by Hadiya zone, on the north east by lake Shala, and on the east by Oromia; the Bilate river. The administrative center is Halaba Kulito. The total population of the special woreda was 333,384 and females constitute 51% of the total populations.

Assessment Team

Government-led multi-agency Meher need assessment was composed of different sectors, Federal and Regional DRMFSCO, Ministry of Education, Regional Health bureau, Regional water bureau, Regional Metrology, Regional livestock and fishery, World Vision and Goal Ethiopia. The team was sub grouped as a food need assessment group that assessed the food gap of the community and the non-food assessment group focused on identifying gaps with related to Health and Nutrition, Water and Sanitation, and Education.

Study design

Cross sectional study design with secondary data review was conducted from November 20 to December 10/2018

Data collection

At each zones and woredas, representatives from relevant sector offices provide briefings about the existing situations of their zones and woredas from multi-sectorial point of view. Then, team members were distributed to different sectors to collect sector based information. Using standard checklist and through interviewing sectors representatives, Health and Nutrition information were collected. Selected Health centers and Health posts were visited, as well as Elementary and pre-elementary schools were visited to observe scabies cases. After each assessment day the assessment findings and field observations were discussed with sectors representatives. Moreover, information obtained from surveillance system Data-base was included.

7.1.5. Findings and discussions

Health Emergency and Coordination

The Health and Nutrition Technical Working Group (TWG) meets on monthly basis during non-emergency period and every two weeks during emergencies. There was a multi-sectoral PHEM coordination forum at each zones and assessed woredas including Halaba special woreda. However, the coordination forum conduct meeting when emergency happened. Both assessed zones and woredas had Rapid Response Team (RRT) but only Kembata Tembaro zone and Halaba special woreda allocated budget for public health emergency. In all assessed areas RRT members were not trained on emergency management.

Epidemics reported in the previous three months

There was an ongoing Scabies outbreak in all assessed areas. From August to October 2018, Hadiya zone reported 20,000 cases, whereas Kembata Tembaro zone and Halaba special woreda reported 8249 and 213 cases respectively. The monthly distribution of the disease in Halaba special woreda showed a little variability. But, in Hadiya and Kembata Tembaro zones case-load of the disease showed significant variation from month to month. High case load was observed from January to March, and then it started to decline up to April. After April, it restarted to increase up to June where the peak was observed and again it started to decline up to October and starting from October the case load has been increasing sharply. Elementary and pre-elementary schools children were the most affected. Other than scabies there was no any outbreak reported from the assessed areas within the last three months.

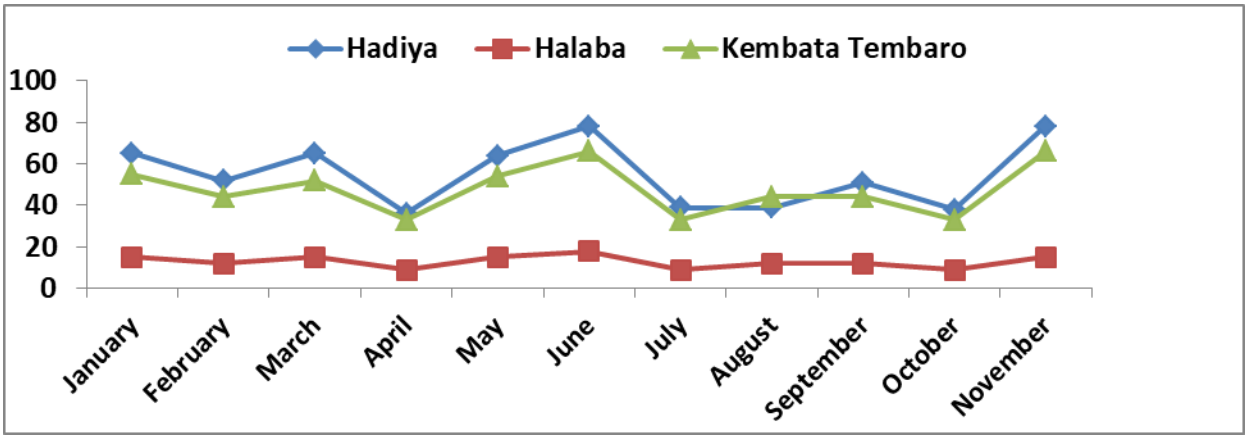

Figure 28: Monthly trend of Scabies in Hadiya zone, Kembata Tembaro zone and Halaba special woreda, 2018

Risk Analysis

Malaria

Even though Malaria burden has been consistently decreasing each year, still in 2018 some areas in the assessed two zones and special woreda have been significantly affected by Malaria. Malaria associated risk factors such as water harvested for dry season, stagnant water and interrupting rivers was found during field observation which may create favourable condition for Mosquito breeding and hence Malaria outbreak may occur especially in malaria endemic areas.

From January up to November 2018, Hadiya zone reported 3744 confirmed Malaria; of which Shashego woreda was the most affected area with 836 cases (incidence of 617 per 100,000 populations). Hosanna town was the 2nd most affected part of the zone with 477cases (incidence of 453 per 100,000). Shone town with 119 cases (incidence of 419 per 100,000) and Anne Lemo woreda with 296 cases (incidence of 331 per 100,000) were the other areas with high Malaria burden. Long Lasting Insecticidal Nets (LLINs) coverage of the zone was 100%, whereas IRS (Indore residual spray) coverage was 88%.

In the same time period, Kembata Tembaro zone reported 3153 confirmed malaria cases. From which Sheshicho Town was the most affected with 448 cases (incidence of 1895 per 100,000), followed by Kedida Gamela woreda with 1231 cases (incidence of 1034 per 100,000). LLINs coverage of the zone was 100%. The zonal Health department has identified 70 kebeles with a total population of 296,998 as Malaria endemic.

Halaba special woreda reported 749 confirmed malaria cases (incidence of 225 per 100,000). IRS coverage of the special woreda was 97% but LLINs coverage was low (53%) that may increase risk of Malaria outbreak in the woreda. In the woreda all the 79 kebeles are Malaria endemic.

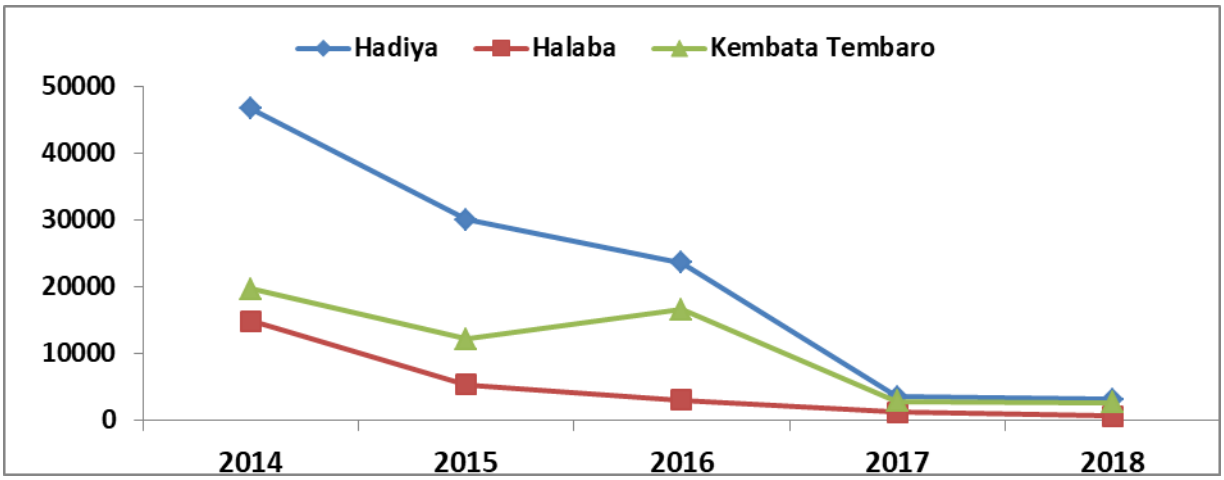

Figure 29: Trend of Confirmed Malaria in Hadiya, Kembata Tembaro and Halaba special woreda, from 2014-2018

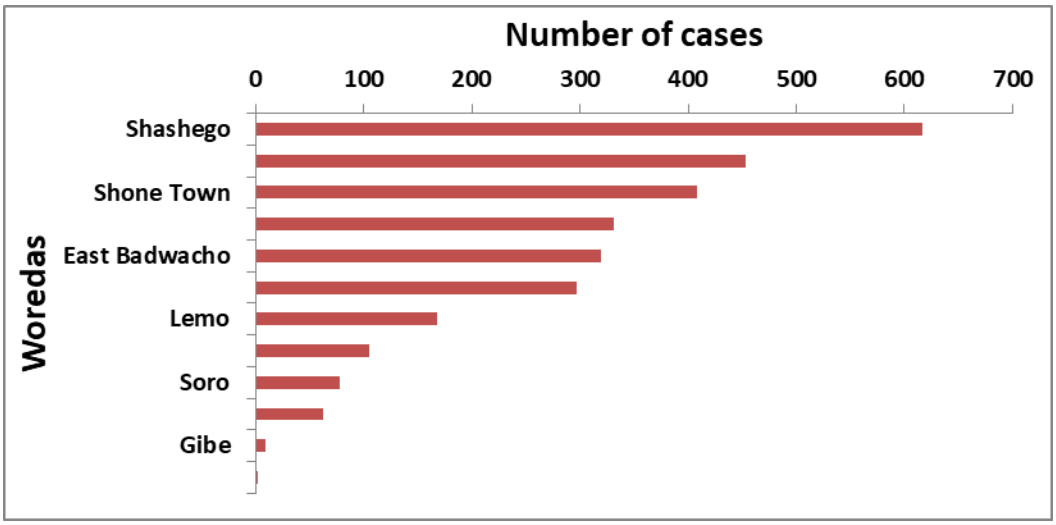

Figure 30: Confirmed Malaria per 100,000 populations by woredas, Hadiya zone, 2018

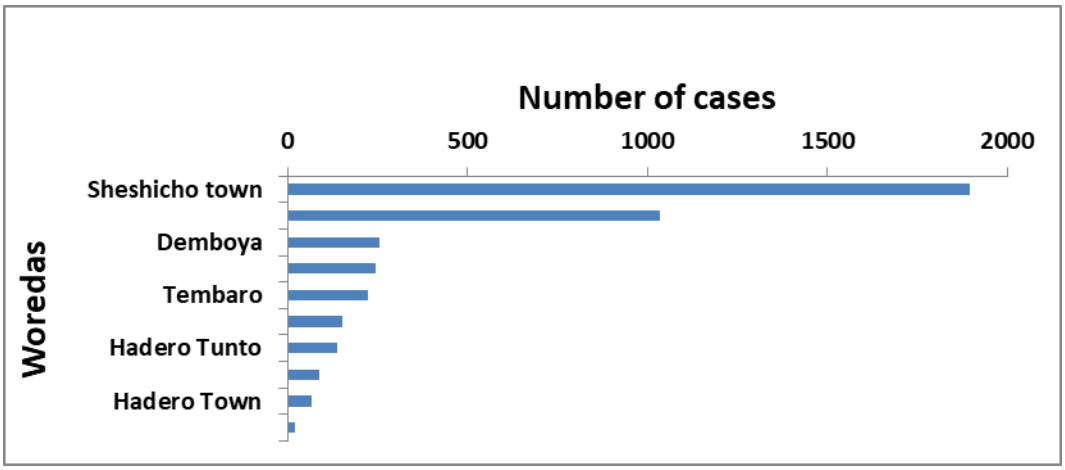

Figure 31: Confirmed Malaria per 100,000 populations by woredas, Kembata Tembaro zone, 2018

Acute watery Diarrheal diseases (AWD)

Hadiya zone had reported AWD outbreak in 2017, but still in 2018 AWD associated risk factors have been identified. Latrine coverage of the zone was 93% and Safe water coverage was 48.8% .i.e. more than half of the populations of the zone had no access for safe drinking water. However, AWD outbreak was not reported from Kembata Tembaro zone in the last three years. Latrine coverage of the zone was 98% and utilization rate was 99%, but safe water coverage was low (53%) which may be a risk factor for AWD outbreak to occur. With the same token, AWD outbreak was not reported from Halaba special woreda. The identified risk factors for AWD outbreak in the woreda was low safe water coverage (29%) and relatively low Latrine coverage and utilization rate each with 80%.

Meningitis

Confirmed outbreak of Meningitis was not reported from all assessed areas in the past three years. However, ninety nine suspected cases of Meningitis from Halaba special woreda and fifteen suspected cases from Kembata Tembaro zone were reported; Hadiya zone reported only one suspected case. Meningitis vaccination was not conducted in all assessed areas in the last three years.

Measles

Confirmed Measles outbreak was not reported from all assessed areas in 2018. However, the absence of supplementary immunization activity (SIA) in the assessed areas may lead to accumulation of susceptible groups that may increase the risk of Measles outbreak to occur.

Nutrition

Hadiya zone

The Health system of Hadiya zone was composed of three Hospitals, 62 Health Centers and 310 health posts. From these, 25 Health centers had functional OTP/SC program and all Health posts had OTP program. The overall trend of SAM from 2014 to 2018 showed that there was substantially high number of cases reported between 2015 and 2016 which was due to El Nino-induced drought that affected many parts of the country. As we turn to 2017, the number of SAM cases significantly decreased from that of 2016. From May to October 2018, Hadiya zone reported 31,006 MAM cases and 1,934 SAM cases of under-five children; and 296,944 Pregnant and Lactating Women (PLW) were screened for malnutrition; of which 16,140 were MUAC<23 cm. Children with MAM cases were not admitted to TSFP program for the last four months (August to November). When we observe the seasonal pattern of SAM in 2018, the highest number was between January to March where the peak was in March; and the 2nd highest number was between May to June. However, from July to October the situation looked stable; but after September 2018 the number of SAM cases showed a slight increment as compared to the same season of 2017. West Badewacho woreda was the most affected with a magnitude of 2581 cases per 100,000 children (age between 6-59 months) and the least affected was Gombora Woreda with 167 cases per 100,000 children.

Kembata Tembaro zone

The health system was composed of four Hospitals, 31 Health centers and 138 Health posts. Among these 17 health centers had functional OTP/SC program and all Health posts had OTP program. Trend of SAM cases from 2014 to 2018 indicated that there was relatively high number of cases between 2015 and 2016 which was due to El Nino induced drought. From May to October 2018, the zone reported 722 SAM and 7302 MAM cases of under-five children; in addition to that 20,606 Pregnant and lactating women with MUAC<23 cm were identified. However, MAM cases were not admitted to TSFP program for last four months. So far in 2018, 1077 total number of SAM cases was reported from the zone which was higher than that of 2017 with 535 cases. Tembaro woreda reported the highest number with 403 cases with incidence of 2099 cases per 100,000 children (age between 6-59 months), followed by Hadero Tunto with 221 cases (1207 per 100,000 children) and Durame town with 54 cases reported (1052 per 100,000 children). The monthly trend of SAM in 2018 showed that the highest number of cases was reported in March with 147 cases reported and the 2nd highest number was in January with 130 cases. High case load was also reported in May and June with 113 and 119 cases reported respectively.

Halaba special woreda

The Health system of Halaba special woreda was composed of two Hospitals, nine Health centers and seventy-nine Health posts; from these, all Health centers had OTP/SC program and all Health posts had OTP program. In the same way with Hadiya and Kembata Tembaro zones, there was high number of SAM cases between 2015 and 2016 due to El Nino induced drought. From May to October 2018, 247 SAM and 1792 MAM cases of under-five Children were reported from the special woreda; in addition 3675 pregnant and lactating women with MUAC<23 cm were reported. The monthly trend of SAM in the special woreda showed a little variability; however, from May to June there was relatively high number of cases reported.

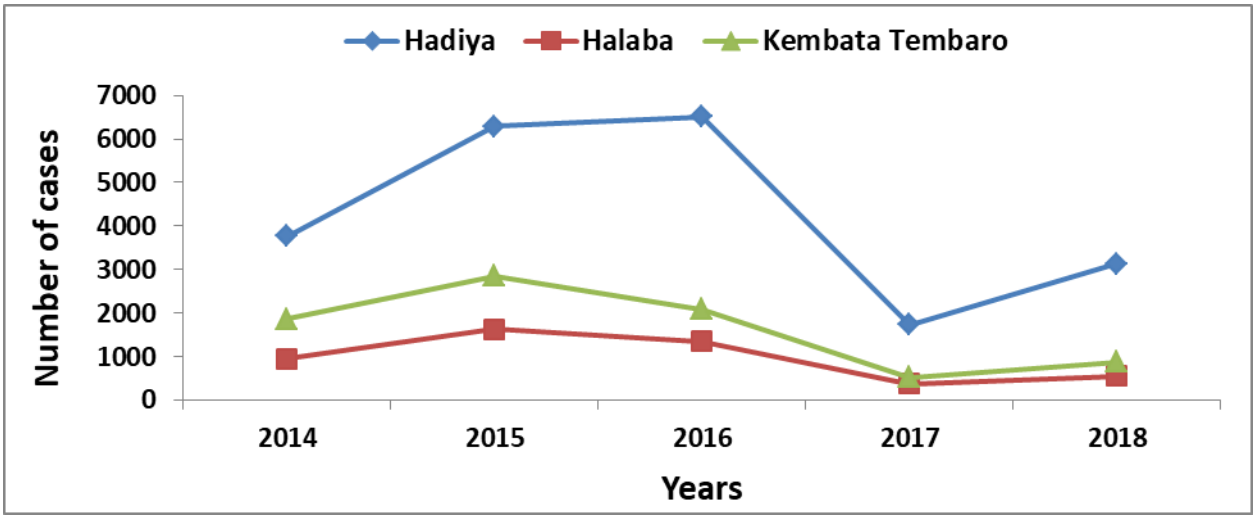

Figure 32: Trend of SAM in Hadiya, Kembata Tembaro and Halaba special woredas, 2014-2018

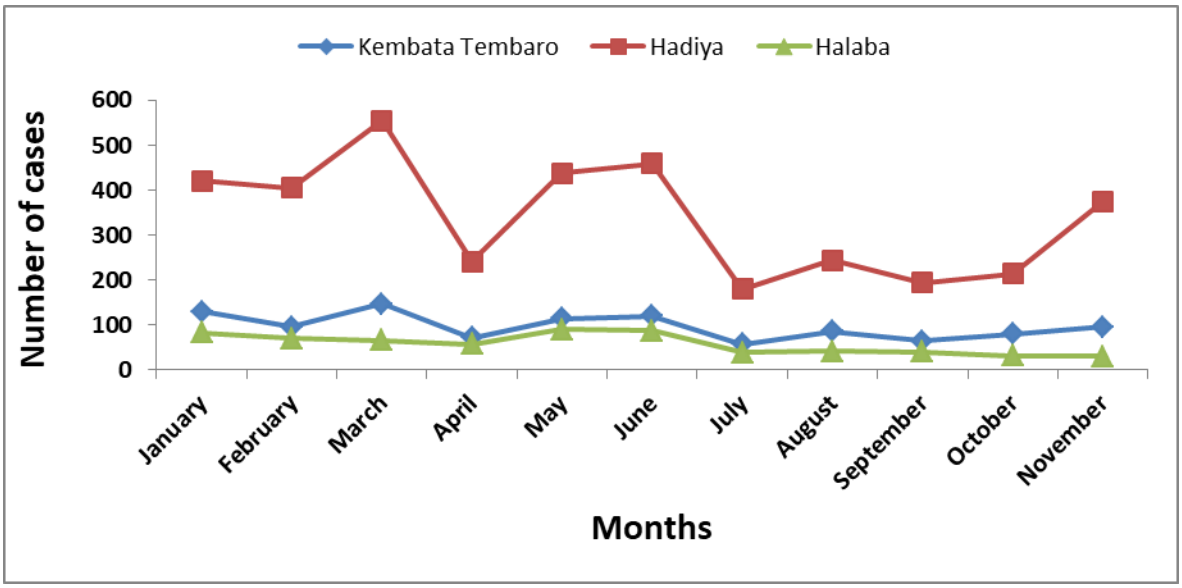

Figure 33: Monthly trend of SAM in Hadiya, Kembata Tembaro and Halaba special woreda, 2018

Figure 34: Total SAM cases of Hadiya zone per 100,000 populations, 2018

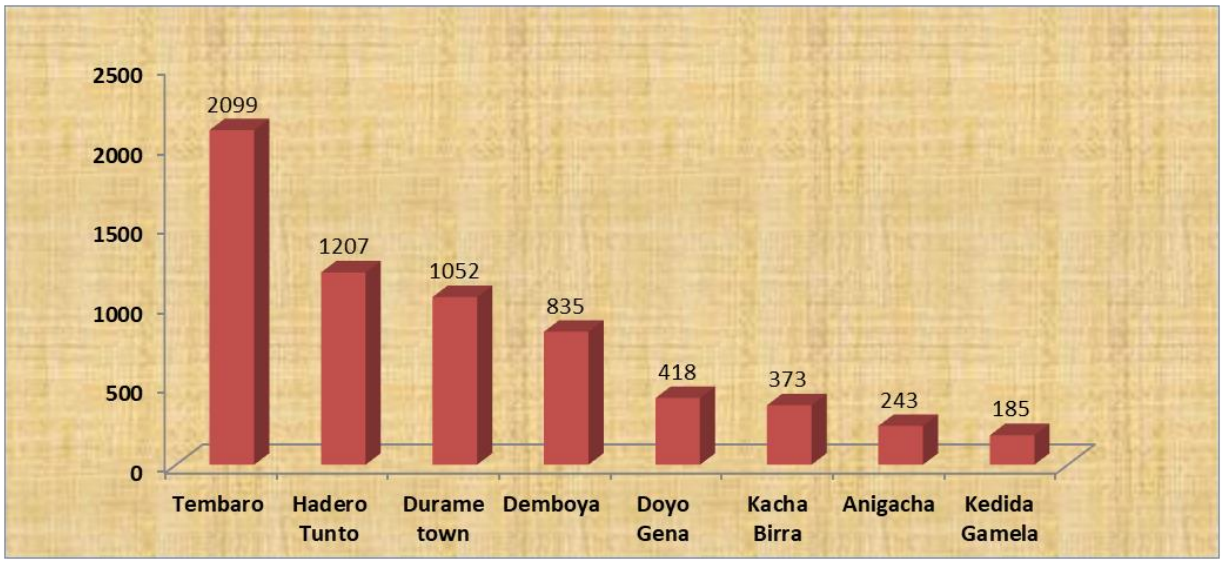

Figure 35: Total SAM cases of Kembata Tembaro zone per 100,000 populations, 2018

Gaps and Challenges

In both Hadiya and Kembata Tembaro zones emergency drugs such as perimetrin (for scabies) anti-malarial drugs, antibiotics, deliver kits, laboratory supplies, Vitamin A and CTC kits were stocked out for the last three months. However, Nutrition supplies were available for at least one month. Besides, 21,000 internally displaced people (IDPs) from Keffa zone are distributed to different host communities in Kembata Tembaro zone. In Halaba special woreda Nutrition supplies and few other supplies such as Ringer lactate, Doxycycline, consumables (syringes, Gloves), Vitamin A and Tetracycline were available. However, anti-Malarial drugs, delivery kits, CTC kits, laboratory supplies and routine antibiotic were stocked out.

7.1.6. Conclusion

There was an ongoing Scabies outbreak in Hadiya and Kembata Tembaro zones; but there was no sufficient drugs and supply to treat the cases, especially in Hadiya zone. There was multi-sectorial PHEM coordination forum in all assessed areas but conduct meeting when emergency happened and RRT members were not trained on emergency management. Due to the presence of associated risk factors, Malaria, Measles, AWD and Meningitis were anticipated to cause disease outbreak. In Hadiya and Kembata Tembaro zones MAM cases were not admitted to TSFP for the last four months. Monthly trend of SAM in Hadiya showed higher variability whereas in Halaba special woreda the trend was stable throughout year. There was no sufficient amount of emergency drugs and supplies that is needed to control possible future outbreaks in the assessed areas.

7.1.7. Recommendations

Therefore, from those findings mentioned above we recommend that SNNPR regional health bureau and partners should avail necessary emergency drug and supplies based on the indicated gap, provide training to all zonal and woreda level RRT members, and restart TSF Program in the areas to prevent further complication of MAM cases. Moreover, Regional health bureau should work with stakeholders to capacitate PHEM department through training and continuous supportive supervision and it is also very important to strengthen the surveillance system in order to implement efficient and effective public Health diseases control and prevention.

Chapter VIII-Proposal for Epidemiological Research Project

8.1. The prevalence of Virologic Failure and Associated factors among patients routinely treated with ART in Southern Region of Ethiopia with Regard to the UNAIDS 90-90-90 Treatment Targets

8.1.1. Proposal Summary

Background: In 2015, 36.7 million people were living with HIV and 2.1million new HIV infections were reported globally. Out of which 19.0 million (51.8%) people were living with HIV and 960,000 (45.7%) new infections were from Eastern and southern Africa. In sub-Saharan Africa, poor retention in care, inadequate adherence to treatment and lack of stock of antiretroviral drugs among others have been identified as factors contributing to adverse outcomes of ART and the development of drug resistance. As ART roll-out continues in resource-limited settings, the risk of potential emergence of HIV drug resistance (HIVDR) is growing; therefore assessing the magnitude of viral suppression and associated factors is important for combating AIDS related death.

Objective: The main objective of this study is to determine prevalence of unsuppressed viral load and associated factors among patients routinely treated in Southern Ethiopia

Methods: cross-sectional study with secondary data review will be applied to determine prevalence of unsuppressed viral load & associated factors among patients routinely treated in Southern Ethiopia of 15 governmental ART providing health facilities from December, 2018 to December, 2019. A standardized ART intake and follow up forms will be used to extract the data from patients' individual folders. These forms are employed by the ART clinics and extracted data will be reviewed to assess demographic variables that include age, sex, educational status & marital status as well as clinical conditions and related variables like ART adherence & regimen, baseline CD4 count, WHO staging during treatment initiation.

Result Analysis: A univariate descriptive analysis will be performed after the data is entered and coded in excel spread sheet and exported to SPSS version 23 statistical packages. Categorical variables will be analyzed through frequencies. Subsequently, a bivariate analysis will be performed to establish association between demographic and clinical characteristics of the patients.

Work Plan: The research will be conducted from December, 2018 to December, 2019.

Budget: This research needs a total of **70,495 Ethiopian Birr** having already the available laboratory reagents and supplies with estimation of 881,012 from the development of proposal until final result.

Key Words: HIV, AIDS, Virologic Failure, Viral Load, Southern Ethiopia.

8.1.2. Introduction

Background

The Human Immunodeficiency Virus (HIV) induced acquired immunodeficiency syndrome (AIDS) pandemic, has been a major medical and public health problem globally. In 2015, 36.7 million people were living with HIV and 2.1million new HIV infections globally. Eastern and southern Africa shared 19.0 million (51.8%) people living with HIV and around 960,000 (45.7%) newly infected people with the virus per year. With regard to number of people living with HIV on antiretroviral therapy, coverage of antiretroviral therapy reached 46% globally, the gains were greatest in the world's most affected region, eastern and southern Africa. The gains in treatment are largely responsible for a 26% decline in AIDS-related deaths globally since 2010, from an estimated 1.5 million in 2010 to 1.1million in 2015 (1, 2).

The Acquired Immune Deficiency Syndrome (AIDS) disease has been one of the most destructive epidemics to hit Ethiopia. According to EPHI HIV related estimates and projections of Ethiopia for 2017, there were a total of 722,248 people living with HIV, of which 60.5% were female. Besides, there were an estimated 22,827 people newly infected during 2017, of whom 60.5% were females. Annual AIDS deaths during the same period are 14,872 (3). In Ethiopia, 2005 is the year to start highly active antiretroviral therapy (HAART). Based on the spectrum estimate the 2017 ART need was 665,116 for adults and 57,132 for children under 15 years of age (4).

HIV-1 viral load refers to the number of copies of HIV-1 RNA in one milliliter of plasma. Unlike the virus in the cell, plasma viral load indicates the magnitude of virus replication and often disease progression. It is therefore a very useful guide for initiation of therapy and monitoring of response to antiretroviral drugs. Plasma viral load also plays a major role in the transmission of HIV as well as response to treatment (5).

HIV RNA testing is effective tool to identify virological failures during monitoring of patients on ART that prevent premature change or to continuous use of failed regimens compared to monitoring through immunologic parameters. The primary goal of HAART is to suppress HIV-1 RNA lower than the detection level (LDL) of the assay within 3 to 6 months on treatment and restore immunologic function, to reduce morbidity and mortality, to reduce vertical transmission, and improve quality of life (6).

Rapid scale-up of ART in resource-limited settings is accompanied with an increasing risk of emergency and transmission of HIVDR. Due to HIV's error-prone replication, high mutation rate and viral recombination, development of some HIVDR is inevitable, even with appropriate ART prescribing and adherence. HIVDR has significant human and financial implications. As the number of people on treatment increases, the emergence of meaningful population-level HIVDR becomes a greater risk which has the potential to undermine the dramatic gains that ART programs have had in reducing the morbidity and mortality of HIV-infected people in resource limited settings (1).

Statement of the problem

Achieving the 90–90–90 treatment target—where 90% of people living with HIV know their status; 90% of people who know their HIV status are accessing treatment; and 90% of people on treatment have suppressed viral loads—provides an entry point to progress towards all goals and targets for 2020. Doing so will require urgently closing the gaps in the treatment cascade (7). In sub-Saharan Africa, poor retention in care, inadequate adherence to treatment and lack of stock of antiretroviral drugs among others have been identified as factors contributing to adverse outcomes of ART and the development of drug resistance (8-11). The aims of this study is to assess virologic failure and associated factors among HIV patients and on anti-retroviral therapy in southern Ethiopia with regard to the UNAIDS 90-90-90 treatment targets.

Significance of the study

The accurate and reliable quantification of HIV-1 RNA levels, or plasma viral load (pVL), has become a crucial tool in the management of HIV disease. Providers use pVL to determine a patient's viral set point prior to the initiation of antiretroviral therapy (ART), to help decide when to initiate therapy, to monitor response to treatment and to detect treatment failure (1, 2). For patients on therapy, and for their providers, viral load testing answers the vital question of whether ART has successfully suppressed their viremia. Assays used to quantify viral load should be able to help differentiate patients with adequate viral suppression (i.e. those who are undetectable) from patients with low level viremia, who may be failing therapy (12). Therefore, assessing the magnitude of viral suppression and associated risk factors is important for combating AIDS related death. This study fills information gaps with regard to the magnitude of un-suppressed viral load and associated factors in the region.

8.1.3. Literature review

Globally, antiretroviral therapy coverage reached 46% [43–50%] at the end of 2015. Gains were greatest in the world's most affected region, eastern and southern Africa, where coverage increased from 24% [22–25%] in 2010 to 54% [50–58%] in 2015, reaching a total of 10.3 million people. According to UNAIDS Fast-Track approach to 90–90–90 treatment target by 2020, whereby the third 90 focuses on 90% of people on treatment have suppressed viral loads (13).

A study in Cameroon showed that out of 407 patients 96 (23.6%) had unsuppressed viral load and 74 (18.2%) had antiretroviral drug resistance and the prevalence of unsuppressed viral load and drug resistance increased with time on ART and all 74 patients with antiretroviral drug resistance were resistant to non-nucleoside reverse-transcriptase inhibitors and 57 of them were also resistance to nucleoside reverse-transcriptase inhibitors (14).

Another study in Kenya stated that of the 232 samples that underwent HIV-1 RNA viral load quantification, 57 (24.6%) had virologic failure and fifty-five of the 57 samples with virological failure were amplified and sequenced, 29 (52.7%) had at least one detectable HIV-1 resistance associated mutation, giving an overall ADR prevalence of 12.5% among all participants included in the study (15).

In Southern Mozambique, that of the 332 subjects assessed for HIV-1 RNA levels, 118 (36%) had detectable viremia, 37 (11%) had LLV and 81 (24%) had virological failure and genotyping resistance data were obtained from 61/81 (75%) and 11/37 (30%) of subjects with VF and LLV, respectively. HIV DRMs were only detected in subjects with HIV-1 RNA = 1000 copies/ml. Of these, 89% had at least one HIV DRM. Out of 61 subjects, 54 (89%) presented mutations conferring resistance to NNRTIs and 49 (80%) presented mutations conferring resistance to NRTIs, always alongside NNRTI resistance mutations. The most common mutations were 184V, which was present in 45/72 individuals (63%), followed by 103N, 190A and 181C, found in 20/72 (28%), 19/72 (26%) and 16/72 (22%) subjects, respectively. In this study longer time on ART and illiteracy were factors associated with HIVDRMs (16).

Study done in Addis Ababa, Ethiopia showed that at 6 month of HAART, 13(19%) of patients had virologic failure (HIV RNA >5000copies/ml) (6). Another study in Jimma, Ethiopia reported that virological failure was observed in 14 (5.3%) of the participants. It was found that 158/275 (57.5%) and 233/265 (87.9%) of the participants achieved VL <40 copies/mL at 3 and 6 months respectively. Patients experiencing virological failure had significantly lower CD4 count at 6 months mean (±SD) =169 (±85) compared to those with successful viral suppression 313 (±131); P = 0.002). However, only four of the 14 participants with virological failure (28.6%) experienced immunological failure at 6 month and, 22 of 251 (8.7%) participants with virological suppression experienced immunological failure (10).

8.1.4. Objectives

General Objective

To determine prevalence of unsuppressed viral load and associated factors for virologic failure in Southern Nations Nationality and peoples Region (SNNPR)

Specific objectives

- To determine prevalence of unsuppressed viral load
- To describe factors associated with unsuppressed viral load

8.1.5. Methods and Materials

Study area

The study will be conducted in 15 ART providing health facilities (Hawassa University Comprehensive Specialized Hospital, Adare Hospital, Yirgalem Hospital, Dilla University Referral Hospital, Durame Hospital, Wolayita Sodo University Hospital, Arbaminch Hospital, Jinka Hospital, Butajira Hospital, Nigist Eleni Mohammed Memorial Hospital, Kulito Hospital, Leku Hospital, Bushulo Health Center, Soddo Health Center and Worabe Health Center) in nine zones (Sidama, Gedeo, Kembata Tembaro, Wolayita, Gamo Gofa, South Omo, Hadiya, Silte & Gurage), Halaba special woreda and Hawassa City Administration of South Nations, Nationalities and Peoples Region (SNNPR). These health facilities are selected as majority of ART patients in the region (more than 50% around 15,564 are served in these facilities, they are easily accessible by roads, and can be reached within the time & resources available to the investigation (17).

Study population

The study populations will be all adults age above 14 years, who have attended in the above listed ART providing health facilities.

Study design

A cross-sectional study will be done by reviewing patients' individual folders of the study facilities from January, 2014 to December, 2018 to assess socio-demographic characteristics, baseline and follow up clinical and laboratory data, and treatment outcome and also to assess the magnitude of virologic failure.

Study period

Cross-sectional study with secondary data review will be conducted from December, 2018 to December, 2019.

Sample size

Sample size (n) is calculated by assuming 19% as anticipated proportion of virologic failure reported from Addis Ababa by Kassa and his colleagues (7). The expected margin of error (d) is 0.03 and the confidence interval (Z□/2) is 95%. The sample size with 10% contingency is 724.

This number of individual study subjects will be drawn by allocating proportionally to each health facility (Figure 38).

Data collection

A standardized ART intake and follow up forms will be used to extract the data from patients' individual folders. These forms are employed by the ART clinics. ART nurses who are trained on comprehensive HIV care and treatment services will be involved in patient follow ups at the time of the study.

Patients' individual folders and ART Registers (five years data) of study facilities will be reviewed to assess demographic variables that include age, sex, educational status & marital status as well as clinical conditions and related variables like ART adherence & regimen, baseline CD4 count, WHO staging during treatment initiation.

According to the 2014 ART guideline of Ethiopia, the eligibility criteria for initiation of ART are dependent on the availability of CD4 count instruments in the treating health facilities. When CD4 count is not available, ART can be initiated to patients in WHO clinical stages III and IV irrespective of total lymphocyte count (TLC), and WHO clinical stage II patients and if TLC is less than 1,200/ml. Whereas in the presence of CD4 count measurement instruments in the health facilities, treatment is given to WHO clinical stage IV patients, irrespective of the CD4 count – to WHO clinical stage III, if the CD4 cell count is less than 500/mL; and all WHO clinical stages if the CD4 cell count is below 200/mL (18).

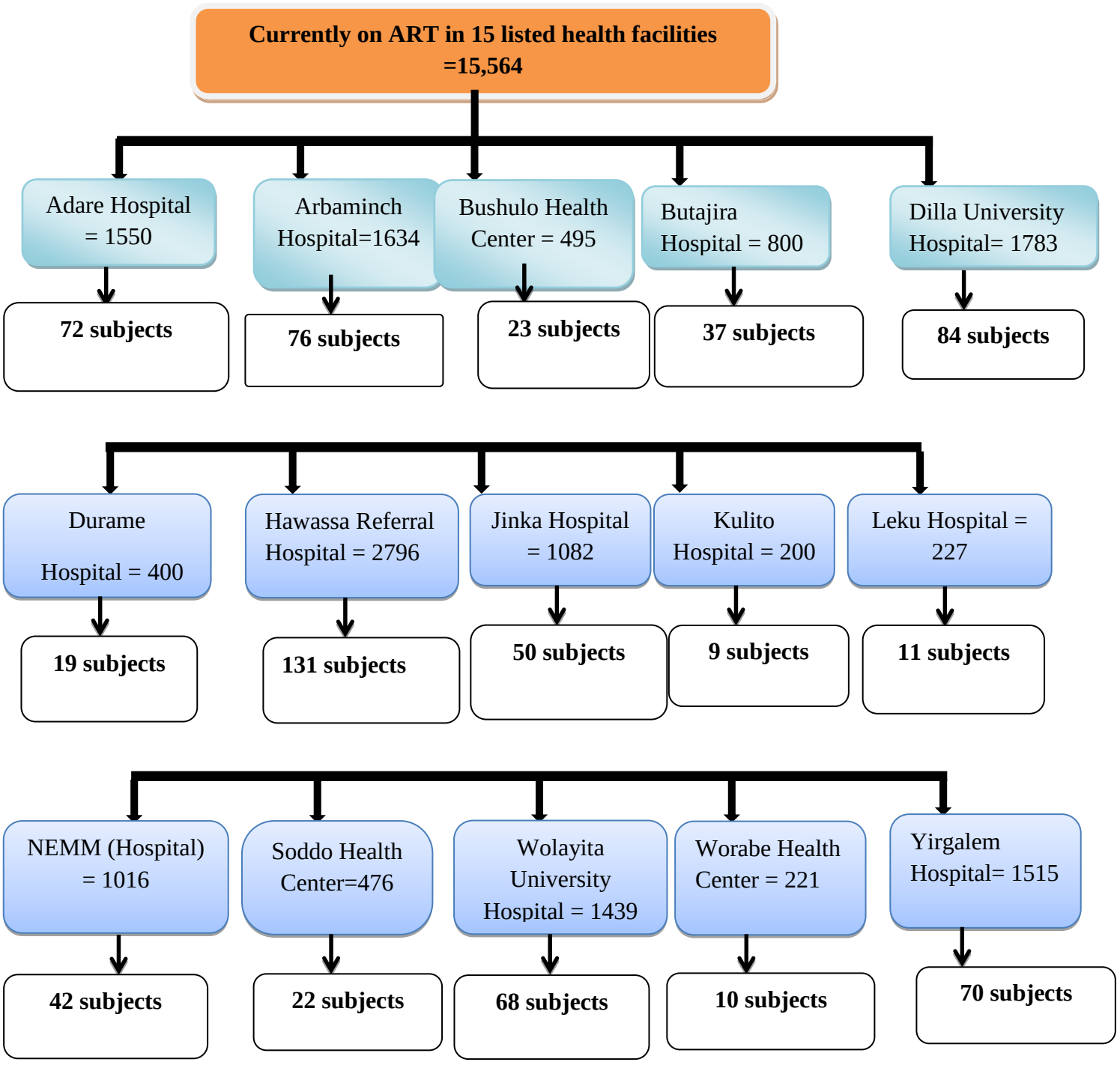

Figure 36: Flow chart showing proportional allocation of sample size to study virologic failure in 15 selected health facilities in SNNP Region from December/2018 to December/2019.

Baseline CD4 counts and HIV plasma viral load will be those measured before initiation and after six months of initiation respectively. Virologic failure will be defined as a HIV plasma viral load >1000 copies/mL (closest to 6 months) after treatment initiation. HIV-1 viral load testing will be performed using the Abbott molecular assay (Abbott Laboratories, USA).

Switching to second line treatment will be considered if there is evidence of virologic failure after any adherence problems are addressed. The WHO recommended VL threshold for switch to second line therapy (VL>1000 copies/ml) will be used as a trigger and all potential clients failing first line therapy with three months enhanced adherence counseling are discussed in a multi-disciplinary meeting attended by clinicians, nurses and counselors.

Sample collection and analysis

Sample collection

Blood collection at ART providing health facilities and sending separated plasma to SNNPR public Health Laboratory for viral load testing is a routine procedure for ART monitoring. Five milliliter of blood sample will be collected from each patient into EDTA (Becton Dickinson, Franklin Lakes, NJ, USA) tubes and each blood sample will be spun immediately after collection at 3500 rpm for 25minutes and plasma will be separated into two cryo-tube (nunc tube) at collection sites and transported at 2-8ºC with triple package to SNNPR public Health Laboratory and stored at -20 to -70ºC till viral load analysis.

Sample analysis

HIV-1 RNA load from each patient using a second generation RT-PCR assay (Abbott Molecular Inc. Des Plaines, USA) with a lower detection limit of 150 copies/ml will be quantified. A virologic failure will be considered for all patients with HIV-1 RNA >1000 copies/ml.

Inclusion criteria

For this study, ART patients who are enrolled on ART register during five year review period.

Exclusion criteria

Incomplete information on patient individual folders & ART register and who are enrolled outside eligibility period as well as who are shorter periods on ART (less than 6 months) and being on a second line regimen will be excluded.

Study Variables

Dependent Variables

- ❖ Virologic failure

Independent Variables

- ❖ Socio-demographic status
- ❖ Base line CD4
- ❖ WHO Staging
- ❖ Illness of TB
- ❖ Opportunistic infections/cancers
- ❖ Adherence

Data management

The collected data from both ART Registers & patients' cards and laboratory records will be entered and coded in excel spread sheet and exported to SPSS version 23 statistical package in which data analysis will be done.

Data analysis

A univariate descriptive analysis will be performed. Categorical variables will be analyzed through frequencies. Subsequently, a bivariate analysis will be performed to establish association between demographic and clinical characteristics of the patients. Parametric values will be analyzed by chi-square test. A value of $p< 0.05$ is considered as significant.

Dissemination of results

The result of the study will be published and disseminated to concerned bodies: Addis Ababa University, SNNPR Health Bureau, Ministry of Health and to those who work on HIV/AIDS control and prevention program in the country. Efforts will be made to present the findings of the study will be presented in different seminars, workshops, and conferences.

Ethical issues

The research will be ethically cleared by SNNPR Health Bureau. Permission will be guaranteed from each health facility. Letter of support will also be obtained from each zone health department and district health offices. Confidentiality of individual's patient information will be kept.

8.1.6. Budget

Training cost

Table 16: Logistics and other costs budget breakdown for conducting a research on virologic Failure in Southern Ethiopia with Regard to the UNAIDS 90-90-90 Treatment Targets

Serial no.	**Participants**	**No. of participants**	**Training days**	**Daily per diem**	**Total Days**	**Total payable**
1	Trainee/data collectors	30	2	300	4	36000
2	Trainer	8	2	300	2	4800
3	Facilitator	2	2	300	2	1200
4	Hall rent	1	2	2000	2	4000
Total					46000	

Refreshment

Serial no.	**Item**	**Total Required**	**Unit Cost**	**Total**
1	Tea and coffee	160	15	2400
2	Soft drink and water	240	15	3600
3	Others(cookies, chip, etc)	160	25	4000
Total				10000

Stationary material

Serial no.	**Item**	**Total Required**	**Unit Cost**	**Total Cost**
1	Pen	05 pk	8	40
2	Pencil	05 pk	2	10
3	Flipchart	05 each	135	675
4	Note Book	40 pk	20	800
5	Paper	20 pk	225	550
6	Photocopy	3000 pages	1	3000
7	Permanent marker	05 pk	30	150
8	Adhesive tap	05 each	15	75
Total				5300

Cost Summary

1.	Training cost	46,000
2.	Refreshments cost	10,000
3.	Stationary cost	5,300
4.	Reagent and Supplies (Available on hand)	881,012

Total expected budge	**61,300**
Contingency (15%)	9,195
Grand Total	**70,495**

8.1.7. Work Plan

Table 17: Work plan for conducting a research on virologic Failure in Southern Ethiopia with Regard to the UNAIDS 90-90-90 Treatment Targets

Activities	Period							
	2018	2019						
	December	Jan. to Mar	Apr	June.	July	Aug. to Sep.		Oct. to Dec
Selection of research title								
preparation of draft of the proposal								
Proposal approval and obtain ethical clearance								
Training of data collectors								
Data collection								
Data entry and analysis								
Result writing and reporting								
Sending for publication								
Monitoring of research								

8.1.8. References

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Chapter IX-Additional outputs

9.1 Measles Outbreak investigation in Arba Minch University, Chamo Campus, Gamo Goffa zone, SNNPR, Ethiopia, 2018 (Co-investigator)

9.1.1. Introduction

Measles is an acute viral illness caused by a virus in the family paramyxovirus, genus *Morbillivirus*. Measles is characterized by a prodrome of fever (as high as 105°F) and malaise, cough, coryza, and conjunctivitis, followed by a maculopapular rash. The rash spreads from head to trunk to lower extremities. Measles is usually a mild or moderately severe illness. However, measles can result in complications such as pneumonia, encephalitis, and death. Approximately one case of encephalitis and two to three deaths may occur for every 1,000 reported measles cases (1).

Accelerated measles control activities started in 2001 in countries in the World Health Organization (WHO) African Region, aiming to reduce measles deaths by half by 2005. The strategies implemented included improving routine vaccination coverage, providing a second opportunity for measles vaccination through supplementary immunization activities (SIAs), improving measles-case management, and establishing case-based measles surveillance (2).

Ethiopia reports confirmed measles cases every year with numbers peaking between January and May. Outbreaks tend to be geographic in scope, but occur in different parts of the country over the years. This is a reflection of the gaps in population immunity across the country. The second factor is that measles now is increasingly occurring in older children and adults. In 2014 it was estimated that Ethiopia along with DR Congo and Nigeria comprise the three countries in Africa with the largest number of infants unvaccinated with MCV1 (DR Congo has 0.6 million, Ethiopia has 0.9 million and Nigeria 3.32 million) (3).

9.1.2. Objectives

General objective

The overall objective of this investigation was to identify the source of the outbreak in order to prevent further spread of the disease.

Specific objectives

- ✓ To describe the extent of the outbreak by person, place and time
- ✓ To provide technical assistance to control the outbreak
- ✓ To get a lesson in outbreak investigation and control activities

9.1.3. Methods and Materials

Background of Gamo Gofa zone

Gamo Gofa zone is located at 500km from Addis Ababa and 280 Km distance from SNNPR capital –Hawassa to the south, bordered by Wolayita zone to the North, by Basketo special woreda to the West, by South Omo zone to the south and by Segen people zone on south east. It covers area of 12,581.4 km3 and has a total population of 2,089,527. The zone consists of made up of 34 urban and 452 rural kebele administrations. The zone health profile shows that there are four general hospitals and four primary hospitals, 3 health centers and 41 community health posts. Chamo campus is one of the five campuses of the Arbaminch University and has it 43 departments. The number of population found in the campus is 6,953 (5,553 Regular students, 1,000 tutors & 400 other supportive stuffs).

Study design

Descriptive cross sectional study design was conducted from January, 27 to February, 17, 2018. The investigation team was composed of field epidemiology residents from regional health bureau, Gamo Gofa zone health department, Arbaminch town heath unit and representative from regional WHO.

Laboratory methods

Serum specimens were collected from seven suspected cases and sent to Hawasa regional public health laboratory for IgM test, of which four specimens were tested positive for measles specific IgM antibody. Laboratory analysis was based on ELISA principles.

9.1.4. Findings and discussion

Suspected Measles was reported from Chamo campus on 25/01/2018 by Gamo Gofa zone health department. The index case was a 22 years old patient who is a first year student of Arba Minch University, Chamo campus. He had been in Arba Minch university Chamo campus since October 1, 2017. Given that, he had no travel history until the day he felt sick. On January 07, 2018, he celebrated Ethiopian Christmas and the next day (Jan 8, 2018). He then went to the chamo campus clinic reported as he was sick, where he was given antipyretics as it was thought to be simple upper respiratory infection. However, He was unwell and he had gone to the clinic back again and checked for malaria & found to be negative. On the seventh day he went back to the clinic as there was no improvement along with developed rashes on his face. Then after, the campus clinic referred him to Arba Minch hospital where he was suspected for measles infection. From January 22-25, a total of 8 secondary cases were seen at Arba Minch hospital. Samples were collected from seven measles suspected cases & sent to Hawassa Regional Public Health laboratory for confirmation. From the seven samples sent, four of them tested positive for measles IgM. Finally, Adult Measles Outbreak was declared on 09/02/2018 in the Chamo campus.

A total of 65(4 laboratory confirmed and 61 epi-linked) measles cases with median age of 20 years ranging from 19 to 22 years identified. The most affected age group was 20 years (42%). The overall attack rate (AR) was 93.5/10,000 with zero death. Males were more affected than females; 55 cases (84.6%) from the total 65 cases males. From the total 65 cases 48 (74%) didn't known their vaccination status, 10 (15.5%) them were not vaccinated and the rest 7 (10.7%) of the cases were vaccinated. Majority of the cases were from Amhara region (South & North Wolo, Awi zone and West Gojam zone).

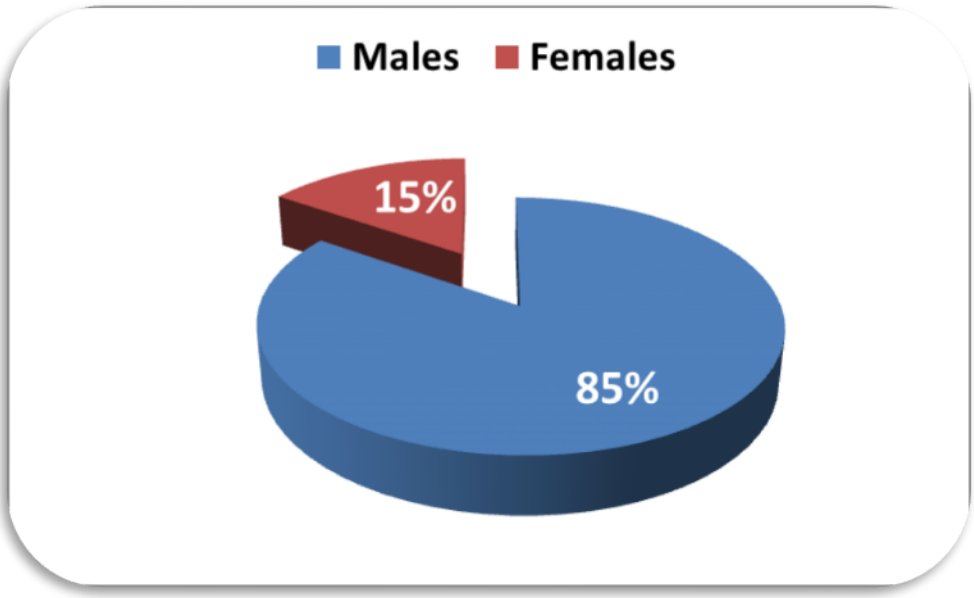

Figure 37: Distribution of measles cases by sex, Arbaminch University, Chamo Campus, Gamo Gofa zone, SNNPR, Ethiopia, 2018

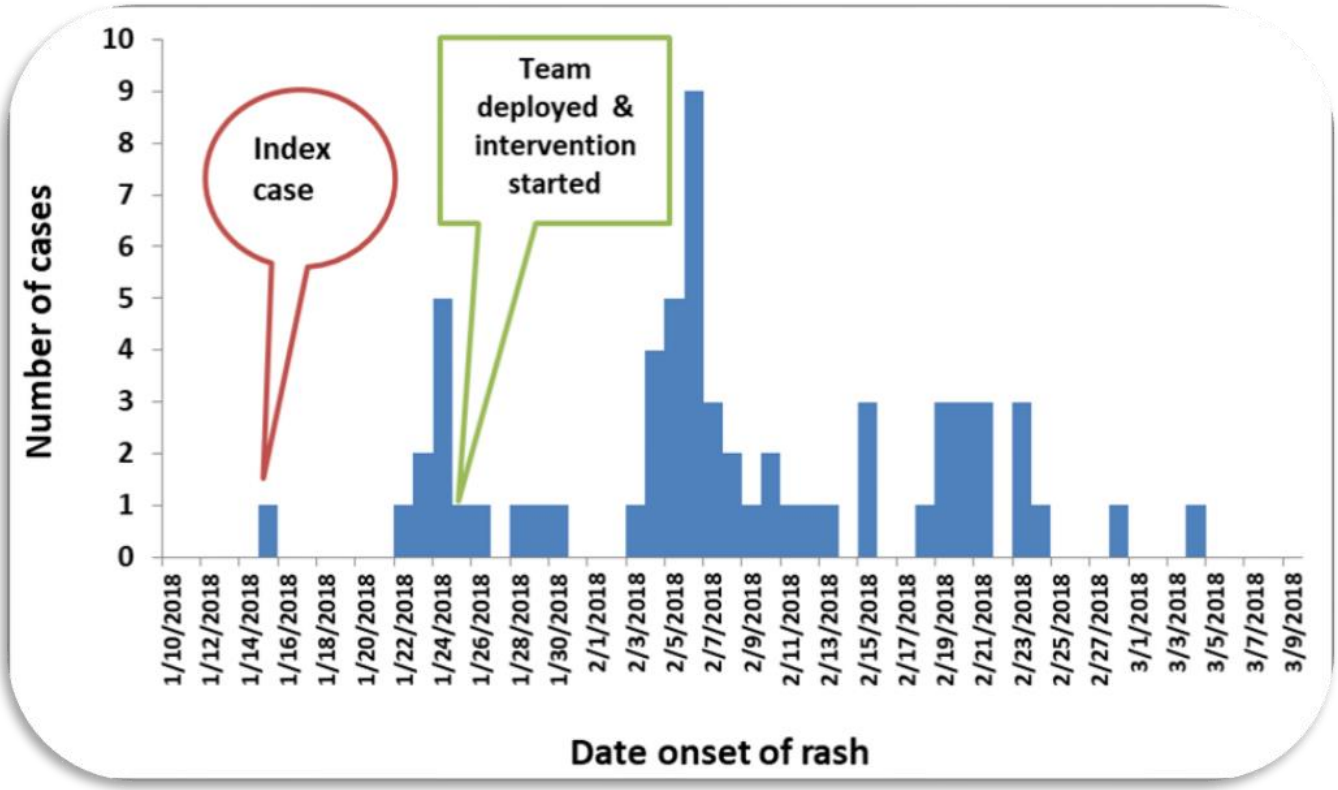

Figure 38: Epi-curve showing measles cases by date of onset of rash, Arbaminch University, Chamo campus, Gamo Gofa zone, SNNPR, Ethiopia, 2018

Public health actions

- The outbreak was confirmed by Regional public health laboratory
- Investigation team were deployed
- Logistics were mobilized from the region to the site where the outbreak occurred
- Multi-Sectoral coordination team & RRT were mobilized at each level
- Awareness creation on disease prevention & control for campus community
- Active case search were done through surveillance team
- Cases management was done
- Early warning letters were written & distributed to all districts
- Case detection & isolation were done to reduce the transmission
- Mass vaccination for 4,834 (81% of the target group) was conducted for the campus community

9.1.5. Conclusion and Recommendations

Majority of the cases were from Amhara region and from male dormitory; it was probably due to that the primary case was from male dormitory and students that came from the same areas could have a possibility to have more contact to each other. Therefore, FMOH should consider targeting supplementary immunization program for high risk areas like Universities, Prisons and Refuges.

9.1.6. References

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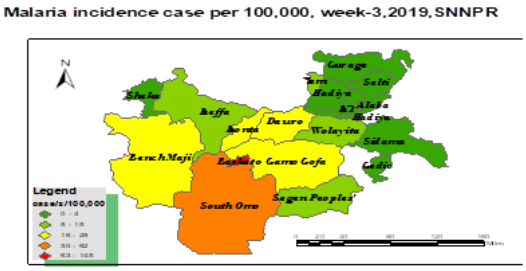
South Nations Natonalities and People's Regional State Health Bureau
Public Health Emergency Management (PHEM) Core Process,2019

WEEKLY PHEM BULLETIN

Epidemiologic Week 03, 2019 (13 - 19/05/2011 E.C); Hawassa; Tele:0462120281; phemsnnpr@gmail.com

9.2. Weekly Epidemiological Bulletin, week-03, 2019



Backgrounds of the region

SNNPR comprises of 14 zones,1 City admin, 4 special Woredas, 136 Woredas, 22 town Admins,3,602 rural Kebeles, 324 urban Kebeles, its with area of 118,000 km^2(20% of nation)

It has 56 endogenous nationalities with 20,151,221 total Population.

Report completeness

In 3 rd epidemiologic week 2019, of 4,642 expected governmental health facilities in the region 4,292 health facilities submitted their PHEM weekly report with its completeness and timelines attained at regional level was 92 % &68% respectively, while the regional target for completeness set at 90%.

Malaria

In Week 03/2019, a total of 22,545 suspected malaria cases were examinedby using either RDT or microscopy, whereas 2,243 cases reported as confirmed malaria with its positivity rate was 10%.Of these 1,353(60%) cases were P. falciparum, while 890(30%) were P.vivax cases.

Among 2,255 malaria cases 2,240(99%) were reported from outpatients and 15 (1%) were from inpatients cases with no deaths due to malaria reported during epidemiological Week 03/2019.

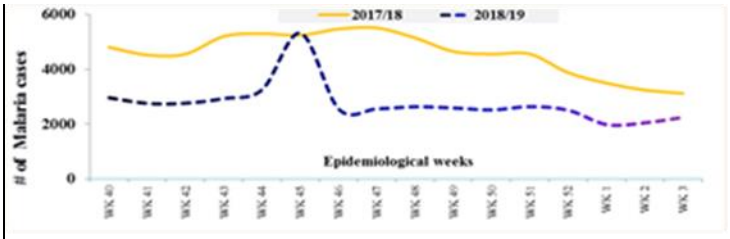


Fig.2: Trend of Malaria cases over the last 03, weeks in SNNPR, 2019

The number of malaria cases reported during in the current week was decreased by 869(28%) cases as compared with the previous last week 02(3,124) cases reported). Regarding the incidence of malaria Basketo sp.woreda reported the high number of malaria cases, which was 145 cases per 1000 population, Hawassa town and South omo zone followed reporting the second & third largest cases per 1000 population.

Fig.3: Malaria cases per 100,000 populations by zones/Sp.woredas in SNNPR, Week 03, 2019

Of top 10 leading woredas in Zones during week-03, malaria cases loads was concentrated more of in selamago, Basketo special woreda & Uba debretshay ranked from 1-3 reporting 247,110 & 103 cases respectively. Gena Bossa,Menit Goldia and Humbo woredas reported the least malaria case as compared with the others mentioned above.

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WEEKLY PHEM BULLETIN
Epidemiologic Week 03, 2019 (13 - 19/05/2011 E.C); Hawassa; Tele:0462120281; phemsnnpr@gmail.com

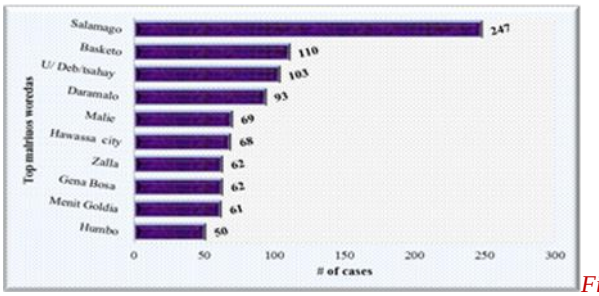

Figure 4 Top 10 woredas with highest malaria case in last one week, SNNPR, Week 03/2019

The trend analysis of malaria in the top 6 woredas of the region for the last epi(wk,40/18- wk 03/19) illustrated in *Figure.4* that,selamago,Basketo and Hawassa city Admns were ranked 1-3 reporting high number of malaria cases for 15 consecutive weeks.

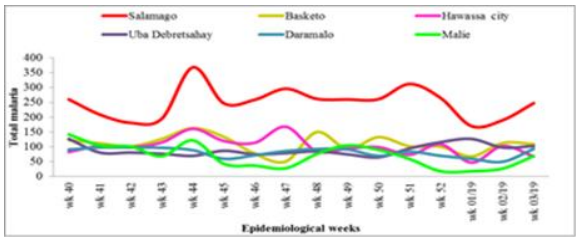

Fig.5: Trend of malaria cases in five highest reporting woreda in SNNPR, during Week 01 - 30 in 2018.

Meningitis

In this week, 12 suspected meningitis cases with zero death were reported in the region. The number of cases reported increased by 7 as compared with the previous week 02/19.The cases reported from Sodo zuria hospital(4),North Ari(3),Aman hospital (2),Hawassa referral hospital(1) and Bona & Halaba hospitals reported (1) case each.

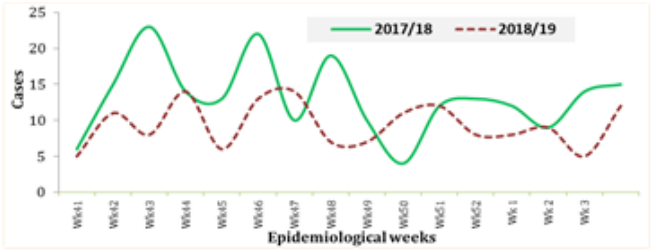

Fig.6: Trend of suspected meningitis cases over the last 03/19 weeks in SNNPR, Week 03, 2019.

Dysentery

There were total of 446 cases of dysentery reported with no admissions & death in a week 03/19. The number of dysentery cases decreased by 44 cases as compared to the previous week (490 cases were reported in week 02/19).

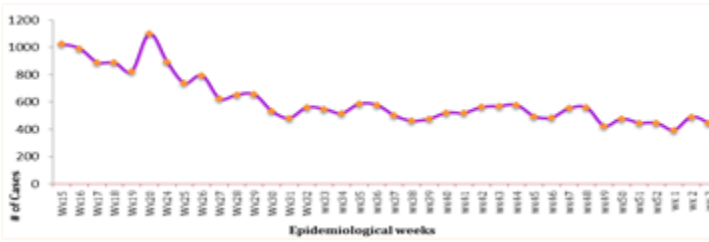

Fig. 7: Trend of dysentery cases for the last 03 weeks, SNNPR, 2019

Distribution of dysentery cases by Zones, Sidama, Gurage,Bench Maji, South Omo, and Gamo gofa ranked 1-5, reporting 94, 82, 50, 49and 38 cases respectively.

South Nations Natonalities and People's Regional State Health Bureau
Public Health Emergency Management (PHEM) Core Process,2019
WEEKLY PHEM BULLETIN
Epidemiologic Week 03, 2019 (13 - 19/05/2011 E.C); Hawassa; Tele:0462120281; phemsnnpr@gmail.com

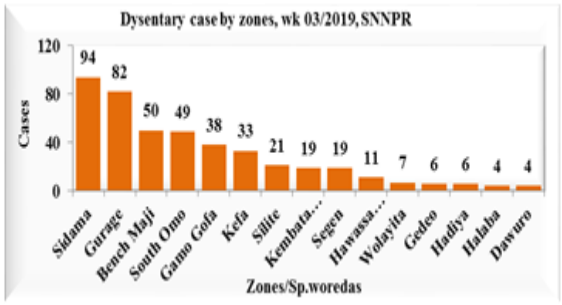

Figure.8: Dysentery cases by Zone over the last 03, weeks in SNNPR, 2019

Severe Acute Malnutrition (SAM)

A total of 446 SAM cases, from w/c 381(85%) from OPD &66(15%) from IP and 6 deaths, from Leku HSP,Alich woriro,Dilla HSP and Sodo zuria woreda each reported 2,2,1,1, deaths due to SAM respectively during week 03/19.
In general, the number of severe acute malnutrition cases increased by **36** at the regional level as compared with week 03 (n=411).

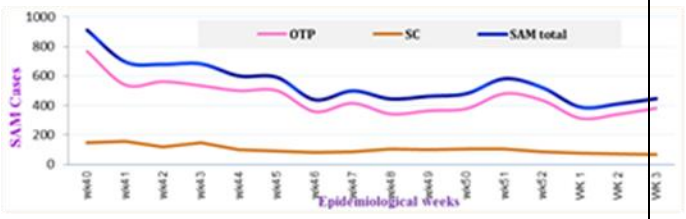

Figure.9: Trend of Severe Acute Malnutrition (SAM) cases over the last 03, weeks in SNNPR Week 03, 2019.

Prevalence of SAM across the region remained at 15 cases/100,000 < 5 children. Segen Zone reported about 73 SAM cases/100,000 children/c was equivalent with 5 fold of the region, while Hawassa Town and Gedeo zone followed ranking as 2nd &3rd highly prevalent regardless cases was not captured in this data during week 03/19.

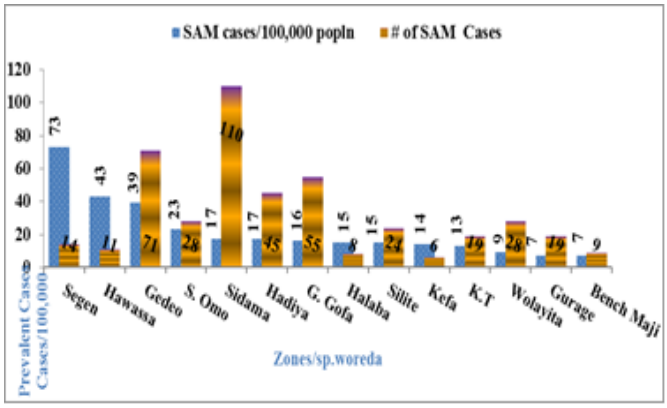

Figure. 10: Comparison of Cases Vs.Prevalence of SAM by zones/ Sp.woredas, SNNPR, SWeek 03, 2019.

Of top 20 woreda for SAM case (OTP+SC) for last one month, (wk 52/18- 03/19) Yergachefe, Gedeb, Arbegona,Bensa & Uba debretsehay woredas ranked 1-5 reporting 64,51,48,45 & 40 SAM cases In addition to mentioned above, 3 hospitals (Hawassa Refeferal, Werabe & Arba Minch) 23, 15&14 SC cases respectively during Week 03/2019.As Weekly trends of SAM illustrated in figure 11, among top 6 woreda's reported high number of SAM cases 5 in 6 reported from Gedeo Zone. Internally displacement, food insecurity and social crises due to conflicts remained aggravating factors for critical malnutrition. Hence it needs comprehensive attention.

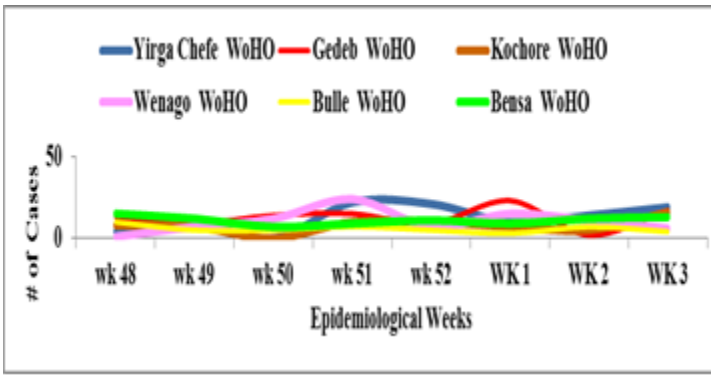

Figure. 11: Trend of SAM cases in six highest reporting woreda in SNNPR, Week 48/18 - 03/19, 2019.

South Nations Natonalities and People's Regional State Health Bureau
Public Health Emergency Management (PHEM) Core Process,2019

WEEKLY PHEM BULLETIN

Epidemiologic Week 03, 2019 (13 - 19/05/2011 E.C); Hawassa; Tele:0462120281; phemsnnpr@gmail.com

Measles

During Week 03, 2019, *one* suspected measles specimen was received from Ezha WoHO in Gurage zone.

AFP

In the region 03 AFP/Polio suspected cases from Decha WoHO (1),Gesha WoHO and Aleta chuko WoHO (1) reported during the week 03/19.

MDSR

There was no maternal death reported in the region during the week.

Annexes

1.1 Rubella investigation checklists

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 5. Daily laborer 6. Merchant 7. Gov't 8. NA (for under 5 child) 9. Other (specify)_____
1.4	Family Occupation(HH head)	1. Farmer 2. House wife 3. Student 4. Unemployed 5. Daily laborer 6. Merchant 7. Gov't 8. Other (specify)_____
1.5	Religion	1. Orthodox 2. Protestant 3. Muslim 4. Catholic 5. Other (specify)_____
1.6	Ethnic group	1. Aari 2. Male 3. Daasanach 4. Hamer 5. Bana 6. Other (specify)
1.7	Educational level of the patient /respondent	1. Kindergarten 2. Elementary 3. Secondary 4. Above secondary 6.N/A
1.8	Educational level of the family	1. Illiterate 2. Read and write 3. Elementary 4. Secondary 5. Above secondary
1.9	Marital status of 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)	_____

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. pneumonia10. Vomiting 11. Others_____
2.2	**Ask ONLY if complication**	Pneumonia: 1.yes 2. no Cornea: 1. yes 2. no Blindness : 1. yes 2. no Convolution 1.Yes 2.No Otitis media (ear discharge): 1.Yes 2.No diarrhea :1. yes 2. no Feeding problem 1.Yes2.No 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_____ 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 4. Supplementary food 5. TTC ointment 6.Anti pyretics7.Others given_____
2.12	Did you (she/he) recovered after the treatment?	1.recovered / cure 2. partially improved 3. referred to next level HF 3. disabled after illness 4.death

Questions related to Risk factors for measles illness

3.1	Did you have any travel history 12-23 days to areas with active febrile rash cases before onset of symptoms?	1.Yes 2.No If Yes where _____
3.2	Did you contact with a person with rubella symptoms within the last 2-3 weeks?	1. Yes 2. No if yes, where_____
3.3	Do you have any travel history seven days before and after rash onset	1.Yes 2. No If yes where _____
3.4	Do you have any contact history with someone else seven days before and after rash onset	1.yes 2.No If yes with whom_____
3.5	If Yes to question 3.4 place of travel	1.School 2.Neighbor 3.Market 4.Other_____
3.6	Do you know modes of transmission for rubella?	1.Yes 2.No If yes specify_____
3.7	Have you ever had rubella infection?	1.Yes 2. No 3. Don't know
3.8	Nutritional status of the cases (use MUAC and weight for <5 children)	1.Normal 2.Moderate 3.Severely malnourished
3.9	Is the house well ventilated?	1. Yes 2. No
3.10	Distance from house to Health facility?	1. <1km 2. Between 1 – 5km 3. >5km

3.11	Where did you go first when you get ill?	1. Health Facility 2. Traditional Healers 3. Holy Water 4. Stayed at home 5. Other :(Specify)_____
3.12	How do you think people get rubella?	1. Contact with a virus from ill person 2. From God 3. Bad attitude of other people 4. Bad weather condition 5. Other(Specify)
3.13	How could you (she/he) suffer from rubella?	1. Contact with a virus from ill person 2. From God 3. Bad attitude of other people 4. Bad weather condition 5. Don't know
3.14	Do you know how could spread/infection of rubella be stopped?	1.by vaccination 2. By modern treatment 3. By isolation of infected ones /minimizing contact with infected person 4. By doing traditional practice 5. By pray /spraying holy water/ 6. by keeping infected one in dark place in the house 7. Others specify_____.
3.15	Who do you think can be affected by rubella?	4. Children of aged less than 5 years 5. Children of aged less than 18 years 6. Women of any ages 7. Any age groups of both male and women 8. Other (specify):_____
3.16	How do you think rubella can be cured?	1. Using modern medicine 2. Using traditional Medicine 3. Holly water 4. By feeding nutritious foods 5. Keeping the sick person indoor 6. Other(Specify)_____

1.2 Anthrax Investigation form

Region_____Zone_____Woreda_____Kebele_____

Respondent Status A. Case B. Control

Respondent: A. Patient B. Patients' family (Mother, father, sister, etc.)

Socio Demographic Information

1. **Name of the Respondent_____**
2. Age _____
3. Sex A. Male B. Female
4. Occupation: A. Farmer B. Pastoralist/Semi pastoralist C. Daily laborer D. Employee E. tannery worker F Butchery worker G. Abattoir Worker(Including Meat inspectors) H. other_____
5. Marital status: A. Married B. Single C. Divorced D. widowed E. Not applicable
6. Educational Status A. None Educated B. Primary school student C. Secondary School Student D. University student E, Already Graduated F. Other

Clinical Presentations (case only)

1. Date of onset of symptoms: _____/_____/_____
2. Date seen at health facility: _____/_____/_____
3. Is there other sick person in your family A. Yes B. No
4. If Yes, how many_____ Age _____ Sex_____ educational status _____
Clinical classification of the case:
Gastrointestinal B. Cutaneous Anthrax C. Inhalational anthrax
Laboratory classification. A. Suspected B. probable C. confirmed

5. General Symptoms: A. Anoxia B. fever C. Malaise/fatigue D. cyanosis
6. Gastro/Intestinal: A. Vomiting B. Diarrhea (if yes was it bloody) C. Nausea D. fever E. abdominal bloating
7. Cutaneous: A. Skin lesion B. Pruritus C. Edema D. Vesicles E. Eshcar
8. Location of ulcer A. Leg B. Hand C. Face D. Chest E. other body part
9. Inhalational: A. Cough B. Dyspnea (shortness of Breath)C. Difficulty in swallowing D. Fever E. Sweating F. others(specify)_____

Exposure/risk factors

1. Whre do you live /residence? A. Kola B. Woinadega C, Dega
2. Have you exposed to animal body fluids for the last two weeks? A. Yes B. No
3. Have you exposed to any sick animal which has bleeding from natural orifices (mouth, nose, anus, ear, etc.)? A. yes B. No
4. If yes, what was the status of the animal you have exposed to?
A. Sick live animal B. Dead animal body C. both D. body fluid
5. Have you consumed raw/undercooked meat before 14/7 days prior to onset of symptoms? A. Yes B. No
6. Have you exposed to the following animal products (if yes encircle the letter/s) A. Skin/Hide B. Hair/wool C. Milk/yoghurt, D, Others specify_____
7. Do you have a garden/work with soil? A. Yes B. No
8. Do you work in clinical microbiology/Laboratory? A. Yes B. No
9. Did you have any contact with people with similar Illness and symptoms? A. Yes B. No
10. If yes, when was it? A. before a week B. before two weeks C. I don't remember

Knowledge related information

1. Do you know that anthrax is a zoonosis disease in your area A.yes B. No
2. Do you know the transmission modes of Anthrax? A. Yes B. No
3. If yes, what are they? A. unsafe Handling of Sick animals B. **. unsafe** Handling of contaminated animal products B. Inhaling the spores from animal products/Soil C. Eating contaminated under cooked Meat D. Drinking of Raw/unboiled Milk E. improper disposal of dead animal body/carcass . F. Others_____
I. Treatment taken
A. Do you know that anthrax is treatable? A. Yes B. No
B. Is there Traditional healers for anthrax in your area? A. Yes B. No
C. Have you been treated for your illness? A. Yes B. No
D. If yes what was the medication ?Antibiotics B. local traditional healing Medicines C. Tsebel/Dua D. actually I don't remember
E. If you were treated with taraditional medicines, why you have chosen it?_____
II. Prevention methods
11. What do you think is the ways to prevent anthrax infection ?
A. Avoiding unsafe contact with animals which are sick or dead
B. Eating properly cooked meat or avoid eating/drinking under cooked meat and other animal products
C. Avoiding unsafe contact of humans with animals which are showing anthraxillness and symptoms
D. Vaccination(both humans and animals
E. Proper disposal of carcasses
F. Avoid unsafe contact/hunting of wild animals which have potential to transmit anthrax

1.3 Surveillance system evaluation checklists

Zone Health department ---------- District Health office ----------

General Hospital ---------- Health post----------

Catchment population ---------- Respondent Name (s) ----------

Cell phone no----------

A. Communication and reporting system assessment

Which communication material did you have?

A. E-mail B. wired phone C. mobile

D. radio E. fax F. other----------

2. Did you have address of District health office PHEM officer/Health Center surveillance focal person?

A. Yes B No

3. How frequently you communicate with the District health office PHEM officer / Health center surveillance focal person on emergencies and other daily activities?

A. Daily B. weekly C. every 2 week

D. monthly E. quarterly F. every 6 month

G.yearly H. others----------

4. When do you expect the health post is report weekly surveillance data to HC?

A. Every Monday B. Every Tuesday C. Every Wednesday

D. Every Thursday E. Every Friday F. Every Saturday

G. Every Sunday

5. When do you expect the health center is report weekly surveillance data to District office?

A. Every Monday B. Every Tuesday C. Every Wednesday D. Every Thursday

E. Every Friday F. Every Saturday G. Every Sunday

6. When do you expect the District health office is report weekly surveillance data to Zone health department?

A. Every Monday B. Every Tuesday C. Every Wednesday

D. Every Thursday E. Every Friday F. Every Saturday

G. Every Sunday

7. When do you expect the Zonal health department is report weekly surveillance data to Regional health Bureau?

A. Every Monday B. Every Tuesday C. Every Wednesday

D. Every Thursday E. Every Friday F. Every Saturday

G. Every Sunday

8. When do you expect the Regional health Bureau is report weekly surveillance data to Federal?

A. Every Monday B. Every Tuesday C. Every Wednesday

D. Every Thursday E. Every Friday F. Every Saturday

G. Every Sunday

9. How is the Health office communicating the HCs and HPs focal person in case of immediately reportable diseases?

A. by e-mail B. by phone C. by fax

D. regular weekly report E .others

10. Did you send summary or short report to the administrative /program leaders or other responsible organs on planning, prevention and control activities addressing Important issues at community level that have arisen through the surveillance system? Observe acute malnutrition.

A. Yes B. No

11. If answer for Q10 is yes to whom did you send? ----------

B. Assessment of availability of Surveillance Documentation, Registers, and Forms

Is there a national manual or protocol for Malnutrition surveillance?

A. Yes B. No C. Not applicable

2. Did you have a copy of National Guide line / management protocol for PHEM?

A. Yes B. No C. Not applicable

3. Did you have rumors logbook for PHEM?

A .Yes B. No

4. Was the rumor logbook have been used to document that all reportable events?

A. Yes B. No

5. Did you have standard case definition for all country priority diseases? (Measles, Malaria and Malnutrition etc.) Observe

A. Yes B. No C. Not applicable

6. Was the case definition posted?

A . Yes B. No

7. If answer for Q5 is No, for which disease(s) did you lack the case definition?

---

8. Did you have case based reporting formats for out breaks?

A. Yes B. No C. Not applicable

9. Was there guide line for specimen collection, handling and transportation to the next level?

A. Yes B. No C. Not applicable

10. Did you have line list for reporting outbreaks?

A. Yes B. No C. Not Applicable

11. Do you have EPRP, Is the plan funded (is there contingency/emergency response fund?

A. Yes B. No

C. Data analysis, Computer skill and training assessment

Had you trained on surveillance system?

A. Yes B. No

2. If answer for Q1 is yes

A. when---------- - B Topic---------- C. For how long? ----------

3. Did you give any onsite orientation about surveillance system for District health office coordinator /officers, HC focal/ health workers and HEW ?

A. Yes B. No

4. Was data compiled?

A. Yes B. No

5. Did you have computer?

A. Yes B. No

6. It is functional)?

A. Yes B. No

7. How the data entry and compilation is accomplished?

A. Manual B. Computer C. other----------

8. Did you have computer skill on

A. Ms. Word / Ms. excel B. Ms. Power point C. Epi-info

9. Did you analyze data of the surveillance system?

A. Yes B. No

10. If answer for Q9 is yes, did you describe data by (observe) malnutrition

A. time B. Place C. person

11. Did you have denominators for data analysis?

A. total pop ----- B. Male ----- C. Female -------- D. <5 ----------

12. Please indicate the frequency of your data analysis.

A. weekly B. every two week C. Monthly

D. quarterly E. every 6 month F. annually

G. No regular time

13. Did you notify the results of your analysis to the higher level PHEM? Observe weekly

bulletin

A. Yes B. No

14. Did you notify the results of your analysis to the lower level PHEM?

A. Yes B. No

15. Do you have surveillance database /EPHEM/ Functional

A. Yes B. No

16. Did you start to use e-IDSR software reporting system?

A. Yes B. No

17. If answer for Q16 is No, what is the reason?

D. Epidemic response and preparedness assessment

1. Did you have plan for epidemic response and preparedness?

A. Yes B. No

2. Did you have emergency stocks of drugs and supplies?

A. Yes B. No

3. If answer for Q2 is No, how did you control epidemics? ----------

4. Had you experienced shortage of drugs, vaccines and supplies in 2017/18?

A. Yes B. No

5. Was an epidemic management committee built in your office? Observe minute

A. Yes B. No C. Not Applicable

6. Did the epidemic management committee have regularly scheduled meeting time?

A. Yes B. No

7. Was Rapid response team (RRT) built in your office? Observe minute

A. Yes B. No C. Not Applicable

8. Did the RRT have regularly scheduled meeting time during epidemics? Observe minute

A. Yes B. No

9. Did you have case management protocol for epidemic prone diseases?

A. Yes B. No C. Not Applicable

10. Did your PHEM have multi sectorial emergency preparedness and response task force?

A. Yes B. No C. Not Applicable

11. Were partners working together with your office on emergencies?

A. Yes B. No

12. If answer for Q11 is yes, what type of supports did they give to your office? ----------

---

13. Was there a budget for epidemic response?

A. Yes B. No

14. Who had the authority to mobilize the emergency finance?

A. Health office head B. PHEM case team leader C. PHEM officer D. other---------

15. Had you a car assigned for emergencies (PHEM)?

A. Yes B. No C. Not applicable

16. If answer for Q15 is NO, how did you address emergencies? ----------

---

E. Outbreak investigation and case confirmation assessment

1. Had you investigated any outbreak in 2010 EFY?

A. Yes B. No, list if any

2. Did you have outbreak investigation check list? Observe

A. Yes B. No

3. If answer for Q2 is No, how did you know possible factors for the outbreak?

---

4. Where was laboratory confirmation of cases?

A. regional lab B. Hospital C. EHNRI

D. HC E. Other----------

5. Who was responsible to investigate an outbreak?

A. RRT B. HEWs C. Health Bureau staffs

D. experts organized randomly E. Health facility staffs

F. other----------

6. Had you faced any challenge in outbreak investigation in 2017/18?

A. Yes B. No

7. If answer for Q6 is yes,

a) List the challenges

---

b) List the alternatives that you take to tackle the challenges

---

F. Supervision and feedback assessment

1. Did you have supervision plan in 2017/18?

A .Yes B .No

2. If answer for Q1 is No, how did you supervise?

---

3. If for Q1 is yes, did you supervise the HCs and HPs according to your plan in 2017/18?

A. Yes B. No

4. If answer for Q3 is No, what is the reason? ----------

5. If answer for Q3 is yes, how many times did you supervise each HC and HP in 2017/18?

---

6. Had you reviewed about surveillance practice by higher level supervision?

A. Yes B. No

7. Did you have regular supervision checklist?

A. Yes B. No

8. If answer for Q7 is No, how did you supervise the health facilities & Health posts?

---

9. Were you supervised by higher level officers in 2017/18?

A. Yes B. No

10. If answer for Q9 is yes how many times in 2017/18? ----------

11. Did you send feedback of your supervision to the health centers (HCs) and health posts (HPs) commenting/indicating their strong and weak sides?

A. Yes B. No

12. If answer for Q11 is No, why?

---

13. If answer for Q11 is yes, for how many HCs and HPs did you send a feedback in 2017/18?

---

14. Had you received feedback from higher level supervisors in 2017/18?

A .Yes B. No

15. If answer for Q14 is yes how many feedbacks did you received in 2017/18?

---

16. Had you faced any challenge on supervision and feedback in 2017/18?

A. Yes B. No

G .System Structure and function

1. is there PHEM structure has adequate staff in your office?

A. Yes B. No

2. If yes is there assigned /employed permanently or delegated temporarily?

A. permanently B. delegated temporarily

3. How many experts are working on PHEM? Expected Vs. assigned

---

4. If no why staffs are not assigned?

IS THE SURVEILLANCE SYSTEM HELP?

1. To detect outbreaks early on time to permit accurate diagnosis?

A. Yes B. No

2. To estimate the magnitude of morbidity and mortality?

A. Yes B. No

3. Permit assessment of the effect of prevention and control programs?

A. Yes B. No

4. To estimate research intended to lead to prevention and control?

A. Yes B. No

Describe Each System Attributes:

I. Simplicity:

1. Is the case definition easy for case detection by all level health professionals?

A. Yes B. No

2. Does the surveillance system allow all levels of professionals to fill data?

A. Yes B. No

3. Does the surveillance system help to record and report data on time?

A. Yes B. No

4. Does the surveillance system have necessary information for investigation?

A. Yes B. No

5. Does the surveillance system allow updating data on the cases?

A. Yes B. No

6. How long does it take to fill the format?

A. <5 min B.5 to 10 min C .10 to15min D.>15 min

7. How long does it take to have laboratory confirmation? ----------

II. Flexibility

1. Can the current reporting formats be used for other newly occurring health event (disease) without much difficulty?

A. Yes B. No

2. Did you think that any change in the existing procedure of case detection and reporting formats will be difficult to implement?

A. Yes B. No, add your explanation ----------

3. Is the system easy to add new variables?

A. Yes B. No

4. Is the surveillance system easy to integrate with other systems?

A. Yes B. No

5. Is the surveillance system easy to add new disease on report?

A .Yes B. No

6. Is the system easy to add new information technology?

A. Yes B. No

III. Data quality

1. Are all reported forms Complete?

A. Yes B. No

2. If answer for Q1 is No, how many unfilled spaces are in your 2017/18? ----------

---

3. Percentage of unknown or blank responses to variables from the total reports of 2017/18? report ----------

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

5. Is the recorded data clear to read and understand?

A. Yes B. No

6. If answer for Q5 is No, how many records are not clear/are difficult to understand 2017/18 report? ----------

7. Percent of records which are difficult to read/ understand. ----------

IV. Acceptability

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

A. Yes B. No

2. If yes, how many are active participants (of the expected)? ----------

3. If No, what is the reason for their poor participation in the surveillance activity?

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

B) No feedback / or recognition given by the higher bodies for their contribution

C) Reporting formats are difficult to understand

D) Report formats are time consuming

E) Other: ----------

4. Were all participants using the standard case definition to identify cases?

A. Yes B. No

5. Were all the reporting agents send their report using the current and appropriate surveillance reporting format?

A. Yes B. No

6. Were all the health professionals aware about the surveillance system?

A. Yes B. No

7. Was all PHEM officers send report on time?

A. Yes B. No

V. Representativeness

1. Was the surveillance system enabled to follow the health and health related events in the whole community?

A. Yes B. No

2. If answer for Q1 is no, who do you think is well benefited by the surveillance system?

A. The urban B. The rural C. both

3. Are all the Socio demographic variables included in the surveillance reporting format?

A. Yes B. No

4. If the answer for Q3 is No, which is less represented

A) Sex B) age group C) ethnic group D) religion

VI. Timeliness

1. Are all reporting sites reporting on time?
A. Yes B. No
2. Percent of reporting sites that report on time. ----------

VII. Completeness

1. Are all reporting sites reporting?
A. Yes B. No
2. Percent of Health centers& Health posts that send report of each week in 2017/18.
/----------

VIII. Stability

1. Was any new restructuring affected the procedures and activities of the surveillance?

   A. Yes B. No

2. Was there lack of resources that interrupt the surveillance system?

   A. Yes B. No

3. Was there any time /condition in which the surveillance is not fully operating?

   A. Yes B. No

4. If the answer for Q3 is yes, explain why? ----------

1.4 Health profile checklists

1. **Historical Aspects of the area (Culture & Truism office).**
   1.1. Woreda at a glance: where it is_____
   1.2. The name (how& why) _____
   1.3. How the woreda was Formed_____
   1.4. Any other historical aspect_____

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

2.1. Woreda map_____

2.2. Location (distance and direction) from the capital city Hawassa_____ _____

2.3. Altitude _____

2.4. Annual rain fall (average)_____ Max_____Min_____

2.5. Annual temp(average)_____High _____Low_____

2.6. Climatic zones Highland_____% Midland _____% Lowland _____%

2.7. Accessibility to main roads_____

2.8. Accessibility Health facility to woreda office----------

3. **Administrative setup**

3.1. Total no. of kebeles: _____ Rural_____Urban_____

3.2. Woreda boundaries North_____South_____
East_____ West_____

4. **Demographic information**

4.1. Population: Total_____ urban_____.rural_____

4.2. Male Popn _____Female Popn _____ sex ratio_____

4.3. < 1yrs_____, < 5 yrs_____, < 15 years_____, >64 years_____,

4.4. Women 15-49 yrs of age_____.

4.5. Total population by kebele (each kebele pop)_____Ethnic composition/language _____ _____ _____

4.6. Total house hold……..

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

5.1. Main source of the economy_____

5.1.1. Land density _____

5.1.2. Cultivated _____

5.1.3. Farming _____

5.1.4. Grazing _____

5.1.5. Main crops _____, _____, _____, _____

5.1.6. Fertilizer utilization _____

5.2. House hold income source(average)

5.2.1. Agriculture_____ (No.)

5.2.2. Different business_____(No.)

5.2.3. Employee_____(No.)

5.2.4. Jobless _____(No.)

5.2.5. Average income per HH/year_____

6. **Education and school Health**

6.1. Distribution of Schools:

6.1.1. Primary (1-8) ____1st Cycle(1-4)_____ 2ndCycle (5-8)____

6.1.2. Secondary (9-10)_____

6.1.3. Preparatory schools (11-12)_____,

6.1.4. TVET/colleges_____

6.1.5. K.G _____

6.2. **Educational status of the community**

6.2.1. Total School Age Children (target)_____

6.2.2. Total Enrolment _____(_____%)

6.2.3. School dropout in 6 months or year 2004 _____

6.2.4. If there is school dropout ,why _____

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

6.3. School health activities:

6.3.1. Water supply: schools with water supply_____

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

6.3.3. School latrine hygiene…….

6.3.4. School with wash committee members and their contribution to water and sanitation hygiene…….

6.3.5. Schools with HIV/other Health clubs_____

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

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

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

8. **Health delivery system (**District Health Structure/organogram)

8.1. Health Facility

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

8.2. Health institution to pop ratio:

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

8.4. Health service coverage _____

8.5. Human resource for health (all type)

Type	No.	Remark
Physicians		
Health officers		
Nurses		
Lab.		
Pharmacy		
Env. Health		
HEWS		
Others		

Doctor: pop ratio_____, Nurse: pop ratio_____ HEW: pop ratio_____

8.6. **Top causes of morbidity and mortality**

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

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

8.6.2. **Top ten causes of admissions**

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

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

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

8.7. **Vital Statistics and Health Indicators**

8.7.1. Infant Mortality Rate (IMR) _____(total <1 yr deaths in 2008yr_____)

8.7.2. PMR_____ (The last year 2008yr)

8.7.3. Total live births_____

8.7.4. Total still births_____

8.7.5. Total neonatal deaths_____

8.7.6. Child Mortality Rate_____(total <15 yr deaths in 2008yr_____)

8.7.7. Crude Birth Rate_____

8.7.8. Crude Death Rate_____ (total deaths 2008yr____)

8.7.9. Maternal Mortality Rate_____(total maternal deaths in 2008_____)

8.7.10. Contraceptive Prevalence rate_____

8.7.11. Contraceptive acceptance rate _____

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

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

8.7.14. Percentage of deliveries attended by skilled birth attendants_____

8.7.15. Percentage of deliveries attended by HEWs_____

8.7.16. Percentage of deliveries attended by TBA _____

9. **Immunization Coverage (for children); Under one year**

9.1. BCG _____

9.2. OPV-0 _____OPV -1 _____ OPV-3 _____

9.3. Penta-1_____ Penta-3 _____

9.4. PCV_{10} -1 _____PCV_{10} -3 _____

9.5. Measles _____

9.6. Fully immunized_____

9.7. PW TT2+ _____, NPW TT2+ _____

9.8. Woreda's Immunization activities, cold chain system, challenges, shortage of vaccines

……

……

……..

10. **Health budget allocation:**

10.1. **Government**

10.1.1. Total budget allocated for the district _____

10.1.2. Total budget allocated for health _____(____%)

10.2. **Funds from NGO**

10.2.1. Total _____ (purpose/programs)_____

11. **Disaster situation in the woreda**

11.1. Was there any disaster in the woreda in the last one year?_____

11.2. Any recent disease outbreak/other public health emergency_____

11.3. If yes, cases_____ and deaths_____

11.4. Which kebele affected……

11.5. When was it happen……

11.6. Attack rate of the outbreak……..

11.7. Case fatality rate…….

12. **Community Health Services:**

12.1. **Status of services provided by community health workers namely**

12.1.1. No. of TBAs/TTBA_____ and their responsibility _____

12.1.2. No. of CHWs/CHPs_____ and their responsibility _____

12.1.3. Responsibility of HEWs_____

12.1.4. Others_____

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

12.2.1. MCH(Delivery, ANC, PNC))_____

12.2.2. FP(Methods) _____

12.2.3. EPI(outreach service, cold chain, vaccine)_____

12.3. **Environmental Health, Sanitation Hygiene. (WASH)**

12.3.1. Latrine coverage_____(____%) & utilization rate_____(_____%)

12.3.2. Total safe water supply coverage_____ (_____%)

12.3.3. Safe water supply coverage by kebele with its popn _____

12.3.4. Main source of water supply _____

12.3.5. Others_____

12.4. **Health education**_____

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

13.1. **Malaria:**

13.1.1. Total malarious kebeles_____

13.1.2. Pop at risk_____

13.1.3. ITNs coverage (including current distribution) _____

13.1.4. Is there IRS this year (No of kebeles) _____

13.1.5. If yes, No of kebeles undertaking IRS_____

13.1.6. Population covered _____

13.1.7. HHs covered_____

13.1.8. Total malaria cases/yr_____ Deaths/yr_____,

13.1.9. <5yr cases_____ deaths_____

13.1.10. Malaria supplies (Coartem, RDT, etc) shortage _____(month)

13.1.11. If, Other issues_____

13.2. **TB/Leprosy**

13.2.1. Total TB cases_____

13.2.2. PTB negative_____

13.2.3. PTB positive____

13.2.4. Extra PTB _____

13.2.5. TB detection rate _____

13.2.6. TB Rx completion rate _____

13.2.7. TB cure rate _____

13.2.8. TB Rx success rate _____

13.2.9. TB defaulter_____

13.2.10. Death on TB Rx_____

13.2.11. Total TB patients screened for HIV_____

13.2.12. Total Leprosy cases_____ on Rx_____

13.3. **HIV/AIDS;**

13.3.1. Total people screened for HIV (last one year)_____

13.3.2. VCT_____

13.3.3. PITC_____

13.3.4. PMTCT_____

13.3.5. HIV prevalence_____

13.3.6. HIV Incidence (new cases/yr)_____

13.3.7. Total PLWHA_____

13.3.8. On ART_____

13.3.9. On Pre-ART_____

13.3.10. Other HIV prevention activities_____

13.4. **Nutrition (malnutrition related OTPs, SC,TSF, CBN and PSNP activities)/HO & Early warning**

13.5. Total OTP sites_____,

13.6. Total admissions to OTP/yr_____

13.7. Total SC sites,_____

13.8. Newly opened/yr_____

13.9. Total admissions to SC/yr_____

13.10. Is there TSF (Targeted Supplementary Feeding) program in the woreda? ____

13.11. If yes children in the program, _____ (No& %)

13.12. CBN program_____

13.13. If yes children in the program, _____ (No& %)

13.14. PSNP_____ other_____

13.15. If yes children in the program, _____ (No& %)

13.16. General food security condition_____
_____
_____
_____
_____
_____
_____.

13.17. Shortage of Essential drugs
_____
_____
_____
_____
_____
_____.

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

14. Discussion of the highlights and the main findings of the health profile assessment and description_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

_____
_____.

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

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____.

1.5 Annexes of proposal summary for epidemiologic research

Annex 1. Data extraction form from ART register (part 1)

ART Register (1)

Month _____ YEAR 200 ___

Registration							Status at start ART					TB / HIV Coinfection								Fill when applicable		1st Line Regimen		2nd Line Regimen	
ART Start Date (DD/YY/MM)	Unique ART Number	Why Eligible (Transfer in)	MRN	Name in full (individual father, grandfather)	Sex (M/F)	Age (no / yr)	Functional Status	Weight	Child: Height / Length	WHO Clinical stage	CD4 (if child %)	Screened for TB (-/+)	Active TB Dx (-/+)	TB Treatment Start date Stop date (DD/MM/YY)	INH prophylaxis (DD/MM/YY)						CTX Start date Stop date (DD/MM/YY)	ANC Reg Num EDD (DD/MM/YY)	Original Regimen	Substitutions 1st code / Reason / (DD/MM/YY) 2nd code / Reason / (DD/MM/YY)	Regimen	Switches 1st code / Reason / (DD/MM/YY) 2nd code / Reason / (DD/MM/YY)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)

Why Eligible (type code)

1. *Clinical only*
2. *CD4*
3. *TLC*
4. *Transfer In (TI) Where ART Started*

Functional Status

1. *Ambulatory*
2. *Bedridden*
3. *Working*

Reasons for regimen change:

1. *Toxicity/side effects*
2. *Pregnancy*
3. *Risk of pregnancy*
4. *Due to new TB*
5. *New drug available*
6. *Drug out of stock*

Reasons for switch to 2nd line Regimen:

8. *Clinical treatment failure*
9. *Immunologic failure*
10. *Virologic failure*

Follow-up Status at end of each month:

1. *On treatment (current regimen abbreviation)*
2. *DEAD*
3. *STOPPED ART (continued on other care)*
4. *LOST (not seen X months) or DROP/Lost to follow up RESTART*
5. *Transferred Out (TO). If TO transferred out to where*

If follow-up Status is "STOP" then add reasons (and weeks of interruption if later restarted):

1. *Toxicity/side effects*
2. *Pregnancy*
3. *Treatment failure*
4. *Poor adherence*
6. *Drugs out of stock*
7. *Patient lack finances*
8. *Other patient decision*
9. *Planned treatment interruption*

Data extraction form from ART register (part 2)

ART Register (2)

Month _____ YEAR 200 ___

Months 0 - 6											Months 7 - 12										Months 13 - 24																Months 25 - 36															
0	1	2	3	4	5	6					7	8	9	10	11	12					13	14	15	16	17	18	19	20	21	22	23	24					25	26	27	28	29	30	31	32	33	34	35	36				
						Regimen	Function status	Wt Ht	CD 4							Regimen	Function status	Wt Ht	CD 4												Regimen	Function status	Wt Ht	CD 4												Regimen	Function status	Wt Ht	CD 4
(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)	(43)	(44)	(45)	(46)	(47)	(48)	(49)	(50)	(51)	(52)	(53)	(54)	(55)	(56)	(57)	(58)	(59)	(60)	(61)	(62)	(63)	(64)	(65)	(66)	(67)	(68)	(69)	(70)	(71)	(72)	(73)	(74)	(75)	(76)

Adult 1st Line Regimens:

1a(30) = d4(30)-3TC-NVP
1a(40) = d4(40)-3TC-NVP
1b(30) = d4(30)-3TC-EFV
1b(40) = d4(40)-3TC-EFV
1c = AZT-3TC-NVP
1d = AZT-3TC-EFV

Adult 2nd Line Regimens:

2a = ABC-ddI-LPV/R
2b = ABC + ddI-NFV
2c = TDF-d4-LPV/R
2d = TDF-ddI-NFV

Child 1st line Regimens

4a = d4T-3TC-NVP
4b = d4T-3TC-EFV
4c = AZT-3TC-NVP
4d = AZT-3TC-EFV

Child 2nd Line Regimens

5a = ABC-d4-LPV/R
5b = ABC + ddI - NFV
5c = TDF - ddI - LPV/R
5d = TDF - d4 - NFV

Reason Left Treatment (put in month removed):

TO = Transferred Out. If TO transferred out to where
STOP = If the patient and the clinician discussed and decided to stop treatment for different reasons.
LOST = If the patient has missed an appointment (not picked up drugs) for at least one month.
DEAD = If the facility has been notified that the patient has died

ART_R

Socio demographics & family care

Note: <u>All</u> but family HIV status fields must be completed at enrollment & all date fields must use Ethiopian calendar in DD/MM/YY format

Health Facility Name – Health Facility name as registered at the Ministry of Health

Medical Record Number (MRN): Unique individual identifier on medical information provided by facility on folder

Enrollment date: Enter the date client was registered in HIV care using Ethiopian calendar in DD/MM/YY format

Unique ART number: Unique identifier assigned to a client when stating ART. It is composed of region number/ facility type code/ specific facility code /client assigned 5 digit serial numbers starting as 00001

Region Code: **1.** Tigray (TG)) **2.** Afar (AF) **3.** Amhara (AM) **4.** Oromia (OR) **5.** Somali (SO) **6.** Benshangul Gumuz (BG) **7.** SNNPR (SN) **12.** Gambella (GA) **13**. Harar (HA) **14**. Addis Ababa (AA) **15.** Dire Dawa (DD)

Facility Type code: **Use 08** for Hospital and **09** for Health center

Client Name: Enter client's given name, **Father's Name**:- Enter client's father's name. If not known enter NA **Grandfather's Name**: - Enter client's grandfather's name. If not known enter NA

For a Child ask and fill Mother name, place and mode of delivery as:

Child's; mother Name: Enter client's mother if the client is a child <15 years. If clients mother name is not known enter NA

Place and mode of delivery: Mark in appropriate circle that indicate the place and mode of child's delivery

Date of Birth: - Use Ethiopian calendar in DD/MM/YYYY format. If only month & year are known, enter 00 for day, if only year is known, enter 00 for day & 00 for month

Age: - Enter Client's current age in years. If Client is less than 5 years old, enter age in months.

Sex: -Mark in the appropriate circle that indicate sex of the client

Marital Status: - Mark in appropriate circle that indicate clients (child's care giver) current marital status

Annex 2: Intake form-A

Religion: - Mark in appropriate circle that indicate religion of the client

Level of Education: - Mark in appropriate circle that indicate client's completed year of schooling

Occupation: Enter what the client's current works for living

Client Address: - Enter the current permanent address of the client including; Region, Zone/Sub-city, Wereda , Kebele , House number as well as telephone number

For clients out of the catchment area of this facility: confirm absence of barriers for regular follow up at this facility including, time, transport access, transport money

Date confirmed HIV+: Enter test date using Ethiopian calendar in DD/MM/YYYY format; if tested more than once, enter the most recent one

Type of HIV Test Mark in appropriate circle that indicate the type of test the client took

Client referral information; Mark in appropriate testing point if client linked from with the facility or indicate facility type if from outside facility

Care giver information: Enter the name, the address & relationship of care giver; to avoid unintended disclosure it is advisable if care giver is confided client sero-status

Disclosure at enrollment:

Does anyone know client HIV Status? Mark appropriate response that indicate clients disclosure status

To who knows clients HIV status: Mark appropriate response that indicate for whom the clients has disclosed

Family members (spouse/parent /child/ren/sibling's) **HIV status: at enrolment** & follow up

At Enrollment: Mark the relationship, enter the age, sex & health status of client's each family members and for those who's HIV Status is determined indicate the date

At follow up visits: if the status of the clients family member changed enter the date in DD/MM/YY format in the cell corresponding to the updated status

Annex 2.1. HIV Care/ ART clinic Intake form- A

Socio demographics & family care

FEDERAL MINISTRY OF ALTH OF ETHIOPIA

Facility Name_____ MRN _____ Enrollment date: ___/___/____(DD/MM/YY)

Unique ART No. _____ Unit TB No. _____

Client Name_____Fathers'Name_____Garand Fathers' _____

For child only:- Mother's Name: _____

Place of delivery: ○ Health facility ○ Home ○ Other specify _____

Mode of delivery: ○ Spontaneous vaginal ○ Cesarean section ○ Other specify _____

Date of birth _____/_____/_____ **age:** _____**years** (enter months for a child<5 years of age)

Sex: ○ **M** ○ **F**

Client/ child's care giver) **Marital Status:** ○ Never Married ○ Married ○ Divorced ○ Widowed

Religion: ○ Orthodox ○ Muslim ○ Protestant ○ Catholic ○ Other_____

Level of education: ○ No education ○ Primary ○ Secondary ○ Tertiary ○ Other/specify_____

Occupation:_____

Address: Region_____ Zone/Sub city_____ Woreda_____ Kebele _____ House No._____ Telephone _____

Client reside within the catchments area ○ Yes ○ No , if no; Is challenge anticipated to regularly

Date confirmed HIV+: _____/_____/_____(DD/MM/YY) **Type of HIV Test:** ○ **Rapid HIV tests** ○ **DBS/PCR (for children)**

Annex 2.2. Client Referral Information
From with-in the Facility

O Medical OPD O Pediatric OPD O TB Clinic O MCH (PMTCT) O VCT

O Adult IPD O Pediatric IPD O Other Outpatient specify_____

Outside the Facility

O Health Centers O Public Hospital O Private Hospital O NGO/FBO Hospital O Private Clinic O Self-referred O Others _____

CARE GIVER/EMERGENCY CONTACT INFORMATION

Full Name: _____ Age: _____Gender: O Male O Female Relation: _____

Address: Region_____ Zone/Sub city_____ Woreda_____ Kebele _____ House No._____ Telephone _____

DISCLOSURE AT ENROLLMENT:

Does anyone else know about your/your child's HIV Status? O Yes O No

If yes who knows your/your child's HIV positive status? O Spouse (Wife/Husband) O Own Child (ren) O Parent(s) O Sibling(s) (Brother(s)/Sister(s) O Relatives O Friends O Others _____

FAMILY MEMBERS (Spouse/Parent and Child/ren/Sibling) HIV STATUS AT ENROLLMENT AND FOLLOW UP Visit

(Enter date for appropriate HIV status in DD/MM/YY format*)

At enrollment				**At enrollment or follow up visit**: update all black fields as status changed					
Family member	age	Sex	Health status (healthy, chronically ill, dead	Counseled for HIV*	Tested for HIV*	HIV test Result; NR, R *	Enrolled in Care*	Started ART *	Unique ART #
Spouse/Parent									
Child1/Sibling									
Child2/Sibling									
Child3/Sibling									
Child4/Sibling									

Annex 3: Intake form- B

Annex 3.1. Past and presenting illness & PHDP

Note: All fields must be completely filled in at enrollment & all date fields must use Ethiopian calendar in DD/MM/YY format

Health Facility Name – Health Facility name as registered at the Ministry of Health

Medical Record Number (MRN): Unique individual identifier on medical information provided by facility on folder

Past Opportunistic Illness (OIs):– Mark all IOs that the patient has experienced before enrollment. Note: that this information can be obtained from the client, medical/lab records or referral form

Past Prophylaxis / Treatment:-

Co-trimoxazole (CTX): If client is on CTX at enrollment enter the start date; using Ethiopian calendar in DD/MM/YYYY

Isoniazid (INH): If client on INH at enrollment enter the start date and if client has completed the INH enter stop date using Ethiopian calendar in DD/MM/YYYY format

ARV for PMTCT: Mark appropriate circle to indicate client exposure to ARV for PMTCTE, if yes enter facility name and the regimen given to the mother and the baby

Lifelong ART/TI: For all transfer in, mark ART status at enrolment, enter the regimen, how long the client was on ART, start date in DD/MM/YY format, & if the client is still on ART

VITAL SIGNS:- Check and enter the measurement: temperature in ^{O}C, Pulse(PR) in rate per minute Blood pressure (BP) in mmHg Respiratory rate (RR) in rate per minute

Anthropometric Measurement:- measure and enter: Height in cm, Weight in kg, body mass index (BMI) in KG/ M^2

Functional Status:- Assess & mark appropriate circle: Working if able to perform usual work in & out of house, Ambulatory if Able to perform activities of daily living but not able to work Bedridden (B)=not able to perform activities of daily living

Developmental status for children <5 years:- A= Appropriate if a child has attained milestones for age: Delay: if the child failure to attain milestones for age Regression: loss of what has been attained for age

Presenting Symptom: Ask and mark all the symptoms that the e client complain to have at enrolment

Client's pregnancy status at enrolment: If pregnant enter Date of last Menstrual Period (LMP) & Expected Date of Delivery (EDD) otherwise mark appropriate circle

Client general appearance at enrollment: Assess and describe the general prance of the clients in the space provided

Physical Examination: Assess and mark appropriate physical finding category for each system; and describe all abnormal findings

WHO HIV Clinical Stage: Assess and stage the clients; enter the criteria (from past /presenting finding) used to put the client on a particular WHO clinical stage; listed below

- **WHO HIV Clinical Stage 1:**

- Clinically Asymptomatic Client - Persistent Generalized Lymphadenopathy (PGL)

- **WHO HIV Clinical Stage 2:**

- Minor Mucocutaneous Manifestations - Herpes Zoster - 5-10% body weight loss
- Recurrent upper respiratory tract infection

- **WHO HIV Clinical Stage 3:**

- Oral Candidiasis - Unexplained Chronic Diarrhea (>1 month) - >10% of Body Weight loss
- Oral Hairy Leukoplakia - Unexplained Prolonged Fever (>1 month) - Pulmonary Tuberculosis
- Bacterial Pneumoni - Unexplained anemia (<8g/dl), - Neutropaenia ($<0.5x10^9$/l) and/or chronic thrombocytopaenia ($<50 \times 10^9$/L) -Other Severe Bacterial Infections (eg. pyomyositis)

- **WHO HIV Clinical Stage4:**

- Extrapulmonary Tuberculosis -HIV Wasting Syndrome - Atypical Mycobacteriosis
- Candidiasis (Esophagus, Trachea, Bronchi or Lungs) - Crytococcosis Extrapulmonary
- Cryptosporidiosis with Diarrhea (>1 month duration) -Herpes Simplex (mucocutaneous >1 month, or visceral - CMV Disease (other than liver, spleen, lymph nodes)
- HIV Encephalopathy - Karposi's Sarcoma - Lymphoma - PML - Mycosis, Disseminated (i.e. Histoplasma, Coccidioides) - Pneumocystis Carinii Pneumonia (PCP) -Salmonella Septicemia, Non-typhoid - Toxoplasmosis of the CNS - Symptomatic HIV-associated
- Invasive cervical carcinoma - nephropathy or cardiomyopathy - Atypical disseminated leishmaniasis

POSITIVE HEALTH DIGNITY AND PREVENTION PHDP) ISSUE ADDRESSED

Enter the date of adherence counseling in DD/MM/YY format and mark all issues raised and dressed during PHDP counseling

ARV Eligibility Criteria:-

Mark in the appropriate circle to indicate clinical criteria client fulfilled to be eligibility for ART and specify if other criteria

Annex 3.2. HIV Care/ ART clinic Intake form-B

Past, presenting illness & PHDP

FEDERAL MINISTRY OF ALTH OF ETHIOPIA

Facility Name_____ MRN _____

PAST OPPORTUNISTIC ILLNESS (OI), PRPHYLAIS AND TREATMENT (MARK ALL THAT APPLY)

Past OI

O Pulmonary TB O TB-Extrapulmonary O Fever (>1 month; unexplained) O Diarrhea (>1 month) O Oral Candidiasis O pharyngeal candidiasis O Wasting Syndrome O Pneumocystis Carinii Pneumonia O Pneumonia (recurrent) O Cryptococal Meningitis O Minor Mucocutaneous manifestations O Herpes-simplex(>1 month) O Toxoplasmosis (brain) O Kaposi sarcoma O Other specify_____

Past Prophylaxis/Treatment

Cotrimoxazole: Date started__/____/__ __ If stopped; date stopped ____/_____/_____

INH: Date started_____/_____/_____ If completed; date completed ____/_____/____

ARV For PMTCT:- O Yes O No If Yes Health facility:-_____Regimen for mother:_____ Regimen for baby: _____

Lifelong ART/TI:- O Yes O No if yes Regimen: _____ Start date : ____/___ /____

Months on ART _____

Still on Treatment: O Yes O No

Client STATUS AT ENROLLMENT

VITAL SIGNS:- :- Temp (^{o}C)_____ PULSE/HR (/m)_____ BP (mmHg)_____ RR (R/m)_____

ANRTOPOMETRY:- Height (cm) _____Weight (kg)_____ BMI (kg/m^2)_____ for child only; Head circumference (cm): _____

For child; anthropometry interpretation: O Normal weight for age O underweight

FUNCTIONAL Status:- O Working O Ambulatory O Bed ridden O Developmental status (for a child<5) O Appropriate for age O Delay O Regression

PRESENTING SYMPTOM

O Cough O weight Loss __% body wt O Dyspnea O Fever > 1 month

O Nightsweat O Diarrhea O Mental Confusion O STI Symptoms

O Dysphagia/ Odynophagia O Nausea and/or vomiting O Persistent Headaches

O Others specify:_____

CLIENT'S PREGNANCY STATUS at Enrollment:

O Pregnant LMP ___/_____/_____ EDD_____/_____/_____

O Not Pregnant O Not Applicable

CLIENT GENERAL APPEARANCE OF AT Enrollment:_____

Physical Examination by system

System	Normal	Abnormal	Specify Abnormal Finding
HEENT			
Lymph nodes			
Chest			
Heart			
Abdomen			
Genitourinary System			
Musculo-skeletal system			
Skin			
Nervous System			

WHO HIV Clinical Stage at enrollment: _____

why: _____

POSITIVE HEALTH DIGNITY AND PREVENTION (PHDP) ISSUE ADDRESSED

Date	Basic HIV & TB transmission education,	Prevention: abstinence, safer sex, condoms	Positive living	Progression of disease	Available treatment/ prophylaxis CPT, IPT	Education on essentials of ART	Why complete adherence needed	Explain dose, when to take	What side effects & how to manage	What to do if one forgets dose	Conclusion

Art Eligibility Assessment and Plan

O eligible for ART O Yes O No,

if yes why O CD4 less than or equal to 500 O WHO HIV Clinical Stage 3 &4 O Pregnancy O age <15 years O Other specify_____

HIV CARE/ART FOLLOW-UP FORM

FEDERAL MINISTRY OF HEALTH

Facility Name_____

Name: _____ **Age:** _____**years (Months for Children<5 years)** **Sex** ☐ **M** ☐ **F**

Address: Region_____ **Woreda/Sub city**_____ **Kebele** _____ **House No.**_____ **Telephone**_____

Patient Card No. _____ **Unique ART No.** _____

Date confirmed HIV+: _____/_____/_____**(DD/MM/YY) Type of HIV Test:** ☐**Rapid HIV tests** ☐ **DNA/PCR (for children)**

Eligible (date)_____/_____**Why Eligible (code)**_____**Eligible & Ready (date)**_____/_____**(dd/mm/yy)**

Height (Adult) in cm _____

S/US	Follow up date (dd/mm/yy)	Months on ART	Weight (Kg) Edema+/-	BMI (MUAC for pregnant woman or bedridden)	Pregnancy status / FP method	Functional Status (W,A,.B)	WHO Stage 1-4 / T1-T4	TB Screen - P/N / TB	TB Proph /TB Rx	OIs/Opportunistic cancers	Assessed & Managed for pain	CD4/mm^3 or % if < 5 yrs	Hgb. ALT/ AST/Cr	Co-trimoxazole Preventive therapy		Other medications / or nutritional supplements dispensed	Assess & counsel for ARV Adherence		ARV drugs			Client set HIV prevention plan	Next Visit Date (dd/mm/yy)
					If child Length/ Height/ Head circumference for < 3years	Developmental Milestone (A.D.R)								Adh (G,F, P)	Dispense dose		Adh (G,F, P)	Why F or P	Dispense (dose /code)	Side effect	Reason for change		

S/US

S=Scheduled US=Unscheduled

TB SCREEN

SCREEN FOR TB AT EVERY VISIT

Adult & Adolescent

1. Current Cough?
2. Fever?
3. Night sweats?
4. Weight loss?

P= (Positive screen)-Yes to any of the above---Evaluate for TB.
N=(Negative screen)-No to all questions above---assess for IPT eligibility
TB=Currently on AntiTB

Children 0-14 years old

1. Current Cough
2. Fever
3. Weight loss or poor weight gain
4. Contact history with TB patient

P=(Positive screen)-Yes to any one of the four---evaluate for TB
N=(Negative screen)-No to all four---assess for eligibility to IPT
TB= Currently on AntitTB

Months on ART

Duration in months since initiation of ART:

0 = ART Initiation date
1 week = 1 week
2 weeks = 2 weeks
3 weeks = 3 weeks
1 = 1 month
2= 2 months

If Pre-ART, leave this column blank

Pain Assessment & Management

Assess for Pain & Manage as
NP=no pain
S1=WHO Step 1
S2=WHO step 2
S3=WHO step 3

Nutritional Status(adults)

BMI
(for non pregnant / non post partum)
1= Not malnourished (>18.5)

2=Moderate malnutrition (16 -18.5)
3=Severe malnutrition (< 16)

***BMI=wt/(ht)^2**

MUAC
(for pregnant/ postpartum /bedridden)
1=Not malnourished (**>22cm)**
2=Moderate malnutrition **(19-22cm)**
3=Severe malnutrition **(<19 cm** for pregnant and postpartum /< **18cm** for bedridden)

Pregnancy Status /Family Planning Method

P = Pregnant (If pregnant, give estimated due date (EDD))
PMTCT = Referred to PMTCT & indicate linkage (enter code in the space provided on the header)
WP = want to become pregnant
No FP = not pregnant & is not using any FP methods
FP= On Family Planning (enter code):
1= Condoms
2= Oral contraceptive pills
3= Injectables/implantable hormones
4=Diaphragm/cervical cap
5=Intrauterine device
6=Vasectomy/tubal legation
7= Abstinence (no sex)

Length /height/ HC

Measure length / height in cm for children younger than 14 years at EVERY visit
Measure head circumference in cm for children younger than 3 years of age at EVERY visit

Nutritional Status (Children)

W/H
1=Normal/appropriate (> -1 Z score)
2=Mild (< -1 and > -2 Z score)
3=MAM (< -2 and > -3 Z score)
4=SAM (< -3 Z score)

Functional status

W=Working (able to perform usual work in or out of the house, harvest, go to school or, for children, normal activities or playing)
A=Ambulatory (able to perform activities of daily living)
B=Bedridden (not able to perform activities of daily living)

DEVELOPMENTAL MILESTONES FOR CHILD

Code as: A= Appropriate :D= Delay: R= Regression
Sitting without support …….3 to 9 months
Standing with assistance……5 to 11 months
Hands and knees crawling ….6 to13 months
Walking with assistance ….7 to 14 months
Standing alone…….8 to 17 months
Walking alone……. 9 to 18 months
Delay: failure to attain milestones for age
Regression: loss of what has been attained for age

Nutritional Status (Older children & adolescents)

BMI for age(5-18yrs)
1=Normal/appropriate (> -2 Z score)
2=Mild (< -1 and > -2 Z score)
3=Moderate malnutrition (< -2 and > -3 Z score)
4=Severe malnutrition (< -3 Z score)
***BMI for age for older children and adolescents.**

Eligibility

ELIGIBLE date(dd/mm/yy) when patient is medically eligible for ART

WHY ELIGIBLE (Note reasons why patient eligible for ART)

1. Clinically only
2. CD4 count
3. Transfer in (TI)
4. Other(like TB, HBV, Pregnancy)

ELIGIBLE AND READY
Enter the date (dd/mm/yy) when patient is medically eligible and ready (counseled for adherence) for ART

Client Set HIV Prevention Plan

D= Agreed to Disclose to partner/ family / friend,
PT=planned to bring partner for testing,
ChT= agreed to bring children for testing,
SSex= discussed & agreed to practice safer sex
SubU=Decides to avoid or decrease Substance use
ASS= Assessed for STI
SRX=client managed for STI

TB PROPHYLAXIS/TREATMENT

INH1-6=Currently on INH prophylaxis (Number refers to months on INH)
INHC=Completed treatment
INH dc=discontinued for any reason
TB R_X 1-8 =Currently on AntiTB (numbers refer to months on Rx)
TB R_X dc=discontinued TB Rx for any reason
TB Rx C=Completed anti TB Rx

ADHERENCE

Estimate adherence using the table below:
Adherence % missed doses:

	%	(of 30 doses)	(of 60 doses)
G(good)	> 95%	2 doses	≤ 3 doses
F(fair)	85-94%	3-5 doses	3-9 doses
P(poor)	< 85%	≥ 6 doses	> 9 doses

SIDE EFFECTS

1. No side effects
2. Nausea
3. Diarrhea
4. Fatigue
5. Headache
6. numbness/ tingling/pain
7. Rash
8. Anemia
9. Abdominal pain
10. Jaundice
11. Fat changes
12. dizzy, anxiety, nightmare, depression
13. other

REASONS FOR STOPPING REGIMEN

STOP = Stopped ART
If STOP, In **why** column, note reason:
1 Toxicity/side effects
2 Pregnancy
3 Treatment failure
4 Poor adherence
5 Illness, hospitalization
6 Drugs out of stock
7 Patient lack finances
8 Other patient decision
9 Planned treatment interruption
10.Other

DISPENSE DOSE/REGIMEN CODE

Note the Number of doses of treatment dispensed / Regimen code

OI/Opportunistic cancers

NOI= No OI or Opportunistic cancer
Z=Zoster
BP=Bacterial **P**neumonia
PTB= Pulmonary Tuberculosis
EPTB= Extra pulmonary tuberculosis
T= oral,esophageal candidiasis
Ulcers-mouth, genital,
DC or DA=Diarrhea Chronic/Acute
PCP=Pneumocystis pneumonia
CT= CNS Toxoplasmosis
CM=Cryptococcal Meningitis
NHL=NonHodgkins Lymphoma
KS=Kaposi's Sarcoma
CCa=Cervical cancer
O=Other

If Fair or Poor adherence, in why column note reason:

1. Toxicity/Side effects
2. Share with others
3. Forgot
4. Felt better
5. Too ill
6. Stigma, discloser
7. Drug stock out
8. Lost/ran out of pills
9. Delivery/travel problems
10. Inability to pay
11. Alcohol
12. Depression
13. Other

REASONS FOR REGIMEN CHANGE

1. Toxicity/Side effects
2. Pregnancy
3. Risk of pregnancy
4. Due to new TB
5. New drug available
6. Drug stock out
7. Other
8. Clinical failure
9. Immunologic failure
10. Virologic failure

Adult 1st Line Regimens
1a =d4T+3TC+NVP
1b =d4T+3TC+EFV
1c=AZT+3TC+NVP
1d=AZT+3TC+EFV
1e=TDF+3TC+EFV
1f=TDF+3TC+NVP
1g =Others, specify (TDF+FTC+EFV, ABC+3TC+EFV, ABC+3TC+NVP & ABC+3TC+AZT)

Adult 2nd Line Regimens:
2a =ABC +ddI +LPV/r
2b= TDF+ddI+ LPV/r
2c= TDF+3TC+LPV/r
2d=AZT+3TC+LPV/r
2e= Other

Child 1st Line Regimens
4a =d4T+3TC+NVP
4b = d4T+3TC+EFV
4c = AZT+3TC+NVP
4d = AZT+3TC+EFV
4e=AZT+3TC+LPV/r*
4f= d4T+3TC+LPV/r*
4g = Others, specify (ABC+3TC+EFV, ABC+3TC+NVP, ABC+3TC+AZT)

Child 2nd Line Regimens
5a = ABC+ddI+LPV/r
5b= ABC+3TC+LPV/r
5c=other

* Regimen of choice for HIV infected infants who are exposed to NVP for PMTCT

In the follow-up date, in 2nd column if one of the options below applies, use the row next to the last visit to enter the appropriate information
TO = transferred out **LOST**= not seen since>/=1 months **DROP**= last to follow- up for >3 month **DEAD**

Federal Ministry of Health, Ethiopia

Laboratory Requisition and Report form for HIV Viral Load Testing

1. Health Facility Information

Facility Name: _____ Facility Code: _____ Tel.No._____

Region: _____ District:_____

Requested by: Name _____Signature:_____ Date (ET)__/__/____ (dd/mm/yyyy)

2. Client Information

Unique ART ID: __/__/__/__/__/__/__/__/__/__ MRN __/__/___/___/__/__

Sex: ❑ M ❑ F

Age (years) _____ <1 year (in months) __/__/

3. Current ART regimen

❑Adult First Line Regimen:_____

Date (ET) Initiated __/__/____ (dd/mm/yyyy)

❑ *If Pediatric*, First Line Regimen: _____

Date (ET) Initiated __/__/____ (dd/mm/yyyy)

❑ Current Second Line Regimen:_____

Date (ET) Initiated __/__/____ (dd/mm/yyyy)

4. ART Adherence

❑ Good >95%

❑ Fair (85-94%)

❑ Poor <85%

5. Is the client pregnant ❑Yes or ❑No **Breastfeeding** ❑Yes or ❑No

6. CD4 count history (CD4% for <5 years)

Most recent result_____cells/ul Date (ET) __/__/____ (dd/mm/yyyy)

Baseline result (pre ART) _____ cells/ul Date (ET) __/__/____ (dd/mm/yyyy)

7. Current Clinical observations/symptoms:

WHO (Treatment) Staging : ❑ I ❑ II ❑ III ❑ IV

8. Reason for Test

Routine viral load: ❑ First viral load test (6 months or more post ART) ❑ Annual Viral Load (VL) Test

Suspected ART Failure: ❑ Initial Viral load >1000 copies/ml (repeat) ❑Immunological ❑Clinical

9. To be filled by referring laboratory

Date (ET) Specimen Collected: __/__/____ (dd/mm/yyyy) Time (ET):_____

Specimen type

❑ Whole Blood ❑ DBS ❑ Plasma

Date specimen sent to Reference laboratory __/__/____ (dd/mm/yyyy Time (ET):_____

10. For Testing Laboratory use only

LAB ID: _____

Date Received (ET) __/__/__ __(dd/mm/yyyy)

Specimen quality

❑ Acceptable ❑ Unacceptable

Reason_____

Test results:

Test Date (ET): __/__/____(dd/mm/yyyy)

Test result: _____copies/ml

Tested by _____Signature_____

Dispatch date (ET)____/___/_____ (dd/mm/yyyy)

Reviewed by_____Signature_____