

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

**School of Public Health**

**Ethiopian Field Epidemiology Training**

**Program (EFETP)**



**Compiled Body of Works in Field Epidemiology**

**By:**

**Fasil Tesfa (BSc)**

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

**May, 2018**

**Addis Ababa, Ethiopia**

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## List of acronyms and abbreviation

AA	Addis Ababa
AAU	Addis Ababa University
AFP	Acute Flaccid Paralysis
AIDS	Acquired Immunodeficiency Syndrome
AR	Attack Rate
ART	Anti-retroviral Treatment
ARTI	Acute Respiratory Tract Infection
AWD	Acute Watery Diarrhea
BCG	Bacillus Chalmette Guerin
BSc	Bachelor of Science
CAR	Contraceptive Acceptance Rate
CBN	Community Based Nutrition
CBR	Crude Birth Rate
CDC	Center for Disease Control and prevention, US
CDR	Crude Death Rate
CFR	Case Fatality Rate
CLRF	Case Bases Laboratory Reporting Form
CMR	Child Mortality Rate
CRF	Case Based Reporting Form

CRS	Congenital Rubella Syndrome
CU5	Children Under Five Years of Age
DHS	Demographic and Health Survey
E.C	Ethiopian Calendar
EDHS	Ethiopian Demographic and Health Survey
EFETP	Ethiopian Field Epidemiology Training Program
EFY	Ethiopian Fiscal Year
EHNRI	Ethiopian Health and Nutrition Research Institution
EOS	Enhanced Outreach Strategy
EOPD	Emergency Out Patient Department
EPHA	Ethiopian Public Health Association
EPHI	Ethiopian Public Health Institute
EPI	Extended Program on Immunization
FMOH	Federal Ministry of Health
GOV	Governmental
HC	Health Center
HEW	Health Extension Worker
HF	Health Facilities
HIV	Human Immunodeficiency Virus
HMIS	Health Management Information System

HP	Health Post
HSDP	Health Sector Development Program
ICT	Information and Communication Technology
IgG	Immunoglobulin G
IgM	Immunoglobulin M
IHR	International Health Regulation
IPD	Inpatient Department
IRS	Indoor Residual Spray
ITN	Insecticide Treating Net
KM	Kilo Meter
LLITN	Long lasting Insecticide treated Net
MAM	Moderate Acute Malnutrition
MMR	Maternal Mortality Rate
MMRV	Measles Mumps and Rubella Vaccine
MUAC	Middle Upper Arm Circumstance
NGO	Non-Governmental Organization
NHA	National Health Accounts
NMCP	National Malaria Control Program
NNT--	Neonatal Tetanus
OPD	Out Patient Department

OPV	Oral Polio Vaccine
OTP	Outpatient Therapeutic Program
PCV	Pneumococcal Conjugate Vaccine
PENTA	Five diseases preventable vaccine
PF	<i>Plasmodium falciparum</i>
PHEM	Public Health Emergency Management
PMTCT	Prevention of Mother to Child Transmission
PNC	Postnatal Care
PTB	Pulmonary Tuberculosis
PV	<i>Plasmodium vivax</i>
PVP	Positive Predictive Value
RDT	Rapid Diagnostic Test
RRT	Rapid Response Team
Rx	Treatment
SAM	Sever Acute Malnutrition
SARS	Sever Acute Respiratory Syndrome
SPH	School of Public Health
TB	Tuberculosis
Temp	Temperature
TFU	Therapeutic Feeding Unit

TSF	Therapeutic Supplementary Feeding
TT <sub>2</sub> <sup>+</sup> NPw	Tetanus Toxoid Vaccine Non pregnant women
TT <sub>2</sub> <sup>+</sup> Pw	Tetanus Toxoid Vaccine pregnant women
VCT	Voluntary Counseling and Testing
UNICEF	United Nations Children's Fund
WHO	World Health Organization

## **Executive Summary**

National health Policy of Ethiopia gives due attention to prevention and control of diseases which are epidemic prone, of international concern and diseases on eradication and elimination programs through surveillance activities. The role of public health practitioners include ensuring effective health promotion, disease prevention and control activities, conducting surveillance on emerging public health threats and providing pertinent information to policy makers and public health officials.

From October, 2016, I have been staying in Field Epidemiology Training Program, School of Public Health-AAU and at Addis Ababa City Administration Health Bureau, Akaki Kality sub city field base. I carried out, Pertussis outbreak and Rubella outbreak investigation, surveillance data analysis, evaluation of surveillance system, health profile description of woreda 1, abstract and scientific manuscript for scientific conference, research proposal (Epi-Project) and weekly bulletin.

### **Chapter 1: Outbreak investigation**

During my field residency, I carried out, Pertussis and Rubella outbreak investigation

- Descriptive study was employed to investigate the pertussis outbreak in Abergelle district of Wag Himra zone of Amhara region. A total of 339 cases and one deaths were identified with an overall attack rate of 5.8 per 1000 population. The mean age of the cases was 4.84 years which was ranged from 3 months to 30 years. The more affected groups were male and age <5 years with specific Attack Rate 6.9/1000 and 24.3/1000 population respectively.
- Descriptive study was conducted to investigate the rubella outbreak in Akaki Kality sub city of woreda 9. A total of 17 cases and zero death (CFR=0) cases were line listed. The overall AR was 26 per 10,000 population. The attack rate less than 5 year of age was 126 per 10,000. The median age was 6 years. 10 (58.8%) of cases were males. Sex specific AR was 31 per 10,000 populations and 20 per 10,000 for male and female respectively. The cases were reported from 2 Kebeles. 16 of the cases reported from Tulu Dimtu Kebele and the rest one from Fenta Kebele. Five samples were positive for Rubella IgM antibodies.

## **Chapter 2: Surveillance data analysis**

A retrospective descriptive secondary five year (2012 – 2016) malaria data analysis was conducted in Akaki Kality sub city; a total of 4939 clinical and confirmed malaria cases were identified during the five year period in the sub city. Among these, 4861 (98.42 %) were outpatient and 78 (1.58 %) were inpatient. Out of the total 4717 (95.51 %) confirmed malaria cases 3522(74.33%) and 1195(25.67%) were Plasmodium vivax and Plasmodium falciparum respectively. There was a significance increase in the incidence rate of confirmed malaria cases from 2012 – 2016 and the average incidence rate was 4.7/1000. The peak malaria report year was 2016 with 1139 (23.06%) of the total cases in the five year period. Over all case there were no death identified during the study year.

## **Chapter 3: Surveillance system evaluation**

A descriptive cross-sectional study design was used to evaluate the surveillance system with selected diseases (measles and Malnutrition) of the Akaki Kality sub city of Addis Ababa City. In the year 2016/17, a total of 23 suspected measles cases were reported and Malnutrition cases a total of 61(46%) SAM and 71(54%) MAM cases were reported from sub city. Surveillance data of selected diseases were not analyzed and used for action at all level of the surveillance unit. We identified a lack of a written emergency preparedness and response plan that helps to strengthen capacity in recognizing and responding to public health emergencies. In addition, including sub city, all of the assessed woredas failed to have emergency drugs stock and specific budget line in the system. Absence of timely analysis and utilization of data made the existing surveillance system weak. Therefore, it is necessary to strengthen the surveillance system by capacitating health workers at all levels to analyze and utilize available data.

## **Chapter 4: Health profile description**

Health Profile assessment is a systematic collection, organization and documentation of health and socio-demographic data from a specific area or district. We collected health and health related data from Akaki 01 woreda and Akaki Kality sub city, from February 21, 2017 to March 11, 2017. The population of the woreda in 2008 EFY was estimated to be 31,526; of whom 15,133 (48%) were males. In 2008 E.C the woredas full immunization coverage, contraceptive acceptance rate and all

form of TB case detection rate was 100%, 33.7% and 100 % respectively. The leading cause of adult outpatient (OPD) visit was ARTI, Acute febrile illness and trauma, whereas the leading causes of under-five OPD visit was ARTI, Diarrhea (Non-bloody) and pneumonia. HIV prevalence was 3.4%. One of the leading cause of adult OPD visit was trauma; hence health official's in collaboration with the woreda police should have to work hard on prevention and control of trauma.

### **Chapter 5:- Scientific Manuscript for Peer Reviewed Journals**

Scientific Manuscript for Peer Reviewed Journals was conducted on 5 year malaria surveillance data analysis at Akaki Kality sub city, Addis Ababa.

### **Chapter 6:- Scientific abstracts**

Two abstracts for scientific conference submission were prepared during residency time. These were:

- Analysis of Malaria data – At Akaki Kality sub city, Addis Ababa: five years (2012-2016)
- Evaluation of surveillance system- At Akaki Kality sub city, Addis Ababa:

### **Chapter 7:- Protocol/proposal for Epidemiologic Research Project**

Protocol/proposal for Epidemiologic Research Project was prepared. The main objectives of this study to determine the burden, patterns and factors associated with injuries among patient visiting adult Emergency Departments of Yekatit 12 Hospital Medical College, Addis Ababa. Hospital based cross sectional study is designed.

### **Chapter 8:- Other additional output report**

Other additional Output Report was conduct on weekly bulletin of PHEM Report for WHO Epidemiologic Week 10/2017, Akaki Kality sub city Health Office

# **1. Chapter I: Outbreak Investigation**

## **1.1 Pertussis outbreak investigation of Abergelle district, Wag Himra zone, Amhara region, North - East Ethiopia**

### **Abstract**

**Background:** Pertussis is a highly contagious respiratory illness caused by *Bordetella pertussis*. It is one of the most common vaccine-preventable bacterial infections that affects all susceptible individuals, regardless of age. Investigation was done to verify the existence of an outbreak and to identify associated risk factors contributed for the occurrence of an outbreak in Debi, Belka and Tsina villages/Kebele of Abergelle district.

**Methods:** Community based descriptive cross sectional investigation were conducted. We used structured questionnaire to collect data from cases.

**Results:** A total of 339 cases and one deaths were identified with an overall attack rate of 5.8 per 1000 population. The mean age of the cases was 4.84 years which was ranged from 3 months to 30 years. The more affected groups were male and age <5 years with specific Attack Rate 6.9/1000 and 24.3/1000 population respectively.

**Conclusions:** The suspected pertussis outbreak was occurred in remote villages/kebeles of Abergelle district. Routine immunization was not given regularly and functional refrigerators were not available in the health posts due to lack of infrastructure electric power and road accessibility. Routine immunization services and treatment of infected patients with appropriate antibiotics should be intensified.

**Keywords:** Pertussis, Outbreak, Abergelle, Wag Himra zone, North Ethiopia

## **Introduction**

Pertussis, commonly referred to as 'whooping cough', is the one of the few remaining vaccine preventable diseases, which is a highly infectious respiratory illness caused by *Bordetella pertussis* or *Bordetella Parapertussis* and which was first identified in the 16th century [1]. Pertussis has a wide distribution in many countries throughout the world. It is essentially a disease of infancy and early childhood, but at least half of the deaths resulting from pertussis infection occur in the first year of life. Although other agents like *B. parapertussis* and Adenovirus are associated with the etiology of whooping cough, at present the most important cause is *B. pertussis* [2]. Infants and young children have remained most susceptible to pertussis-related morbidity and mortality. In recent years infants younger than 6 months and unvaccinated preschool children have been at higher risk for pertussis-associated complications [3].

Globally, the disease is notifiable in many countries. Worldwide, the World Health Organization estimates that 20 to 40 million annual cases of pertussis and 300,000 deaths occur due to the disease, of which 90% occur in low- and middle-income countries (LMICs) [1, 2]. In the 2012 whooping cough outbreak in the United Kingdom, the highest incidence was in infants and in babies under the age of 3 months [8]. Historically the introduction of pertussis vaccine resulted in a 92% decrease in morbidity and 93% decrease in mortality from whooping cough [9].

In Utah, western U.S. outbreaks of pertussis typically occur every 3-4 years. The highest annual incidence of pertussis occurs among unvaccinated children aged <5 years. Secondary attack rates are approximately 80% to 90% among susceptible household contacts [11].

Clinical manifestation of pertussis, in the first stage, the catarrhal stage, is characterized by the insidious onset of coryza (runny nose), sneezing, low-grade fever, and a mild, occasional cough, similar to the common cold. The cough gradually becomes more severe, and after 1–2 weeks, the second, or paroxysmal stage, begins. Fever is generally minimal throughout the course of the illness. During paroxysmal stage, diagnosis of pertussis is usually suspected. Characteristically, the patient has bursts, or paroxysms, of numerous, rapid coughs, apparently due to difficulty expelling thick mucus from the tracheobronchial tree. At the end of the paroxysm, a long inspiratory effort is usually accompanied by a characteristic high-pitched whoop. Vomiting and exhaustion commonly follow the episode. Paroxysmal attacks occur more frequently at night, with

an average of 15 attacks per 24 h. During the first 1 or 2 weeks of this stage, the attacks increase in frequency, remain at the same level for 2–3 weeks, and then gradually decrease. The paroxysmal stage usually lasts 1–6 weeks but may persist for up to 10 weeks [5]. Symptoms of pertussis is more severe in infants and young children. The clinical manifestations in adolescents and adults may be classical but are more often atypical [5].

The most common complication, and the cause of most pertussis-related deaths, is secondary bacterial pneumonia. Young infants are at highest risk for acquiring pertussis-associated complications. Since pertussis is a human disease; no animal or insect source or vector is known to exist. Adolescents and adults are an important reservoir for *B. pertussis* and are often the source of infection for children [6].

Pertussis is highly contagious. Patients are most infectious during the catarrhal period and the first 2 weeks after cough onset. It is contagious from symptom of onset to 21 or more days after the start of the paroxysmal cough or until completion of 5 days of appropriate antibiotic therapy [7].

In the 2015 whooping cough outbreak in Ethiopia Amhara region of, Mekdela district, South Wollo zone investigated a total of 215 cases and eight deaths were identified with an overall attack rate of 1.3 per 1000 population. The more affected groups were females. On multivariate logistic regression analysis, the risk factor that remained independently statically significant associated with developing pertussis was presence of infected person in the family AOR (adjusted odds ratio): 5.859, (95% CI 2.526–13.589). But previously sick with pertussis AOR: 0.053, (95% CI 0.006–0.460) and receiving full dose of vaccine AOR: 0.256, (95% CI 0.080–0.818) were remained as protective factors from pertussis infection [10].

Debi, Belka and Tsina are three of out of 16 villages/kebeles that are found in Abergelle district which were affected by pertussis outbreak since 2016\2017. Recently in September 2017 in Debi and Tsina villages/kebeles outbreaks of pertussis were occurred. The aim of this investigation was to verify the existence of an outbreak and to identify associated risk factors contributed for the occurrence of the outbreak.

An enhanced surveillance system should develop and implement to ensure timely surveillance and to capture additional data on pertussis cases that would be important to formulate hypotheses, monitor/describe the outbreak, identify risk groups, and inform targeted interventions [12].

## **Objectives**

### **General Objective**

To investigate, verify the existence of the outbreak and identify risk factors associated with the occurrence of pertussis outbreak in Abergella District Wag Himra Zone of Amhara Region; Ethiopia.

### **Specific objectives**

- To confirm/verify the existence of the outbreak
- To describe the magnitude of outbreak by person, place and time
- To take possible intervention

## **Methods and materials**

### **Study area and population**

Investigation was conducted in Debi, Belka and Tsina villages/ kebeles of Abergelle district. Abergelle is one of the 7 districts of Wag Himra zone of Amhara region. It's far about within 787 to 857 Km from Addis Ababa and within 67 to 157 Km from Wag Himra zone Administration of Amhara region. Administratively the District is divided into 1 Urban and 16 Rural Kebele (the lowest governmental structure). Abergelle is bordered by Sekota in the South, by Zikuala in the West and in the East and North boarder by Tigray region.

Total population of Abergelle district estimated to be 58, 679 (projection based on 2007 census). Of these population; male 29281 (49.9%) and female 29398 (50.1%); children under 5 years of age 7945 (13.5%); Under 1 years old 1828 (3.1%).

Regarding the Health service coverage, the District has 5 Health Center and 16 Health post which gives the potential health coverage reached above 100%. In the District, 14 HEWs are deployed in health sector.

Debi, Belka and Tsina are three of villages/kebeles that are found in Abergelle district which were affected by pertussis outbreak. These villages/kebele have a total population of 4079, 4519 and 2525 respectively. All affected villages/ Kebele were hard to reach remote villages/kebeles of the district because there was no road accessibility, which is well constructed.

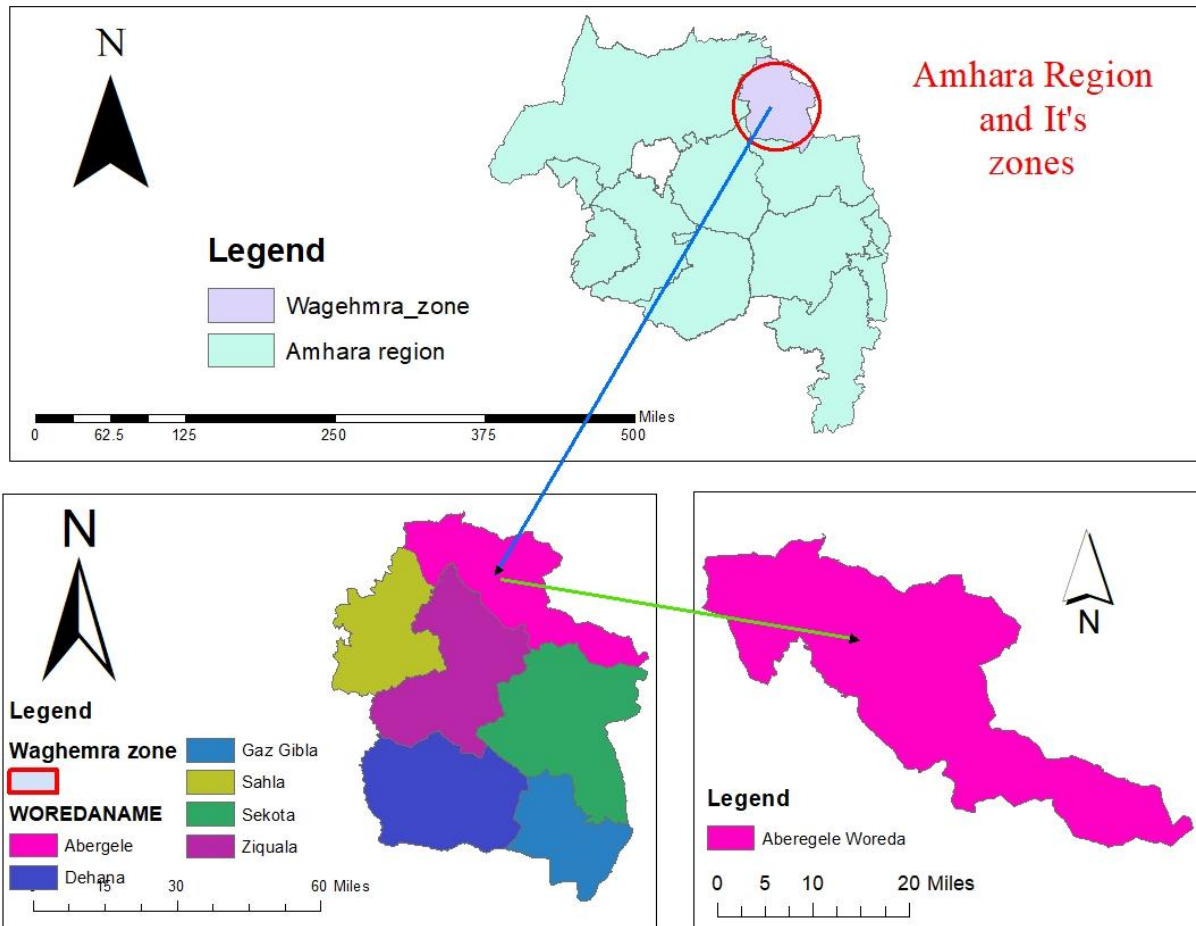


Figure 1 Map of Abergelle district of wag Himra zone, Amhara region 2018

### Study Design

Descriptive cross-sectional study was employed to investigate the outbreak.

### Study Period

From May 1<sup>th</sup> 2018 to May 17<sup>th</sup> 2018.

### Source of Population

Total population of Abergella District was the source of the population, It estimated to be 58, 679 (projection based on 2007 census).

### Study Population:

The study population was selected from source population, 3 Pertussis affected Kebeles.

## **Sample Size**

339 cases of pertussis was reported and line listed.

## **Case definitions**

- ✓ Suspect case of pertussis Non-improving cough of 14 days or more or cough of any duration with paroxysms or cough of any duration with whoop.
- ✓ Confirmed A case of acute cough illness of any duration with a positive culture for B. pertussis, or a case that meets the clinical case definition and is confirmed by PCR, or a case that meets the clinical case definition and is epidemiologically linked directly to a lab-confirmed case.
- ✓ Epidemic of pertussis is a situation when two or more cases clustered in time.

## **Data Collection Method**

Surveillance data of the District Health Office was reviewed retrospectively to observe similar outbreak from the district and to set background status of the disease. Structured questionnaire was used to interview cases. Active search was conducted using line listing of cases. In addition to this we conducted formal discussions with different stakeholders about the overall outbreak situation and the control and prevention efforts undertaken in the Woreda.

## **Data Entry and Analysis**

Collected quantitative data was checked and entered on a computer and analyzed using Microsoft office Excel 2013 and Epi Info 7.1

## **Laboratory Investigation**

Laboratory test does not perform

## **Environmental Investigation**

General housing condition sleeping room, housing ventilation were visual inspected.

## **Ethical issue**

Informed verbal consent was taken formally from all respondents before interviews and all agreed to take part.

## **Result**

### **Descriptive Epidemiology**

In the descriptive study, during the outbreak period (April 30<sup>th</sup> to May 17<sup>th</sup> 2018) a total of 339 suspected pertussis cases with 1 deaths were identified from 3 kebeles/villages, Belka, Debi, and Tsina kebele with Attack Rate 50.2/1000, 14.7/1000 and 21.4/1000 population respectively. The death was reported from Belka Village/Kebele. On 23 April; 2018 the first case (index) was identify and reported from Belka Kebele of Abergelle District. It's far 95 Km from the Woreda center. The index case was male and 5 years old. Among the total cases 205 (60.5%) of them were males. The age of the cases were ranged from 3 months to 30 years with mean age of 4.84 and median age of 4 years. Of the total cases, 193 (56.9%) of them were aged 0–4 years.

### **Sign and symptom**

All cases were shows a symptoms of cough, Paroxysms of coughing, inspiratory cough and post-tussive vomiting.

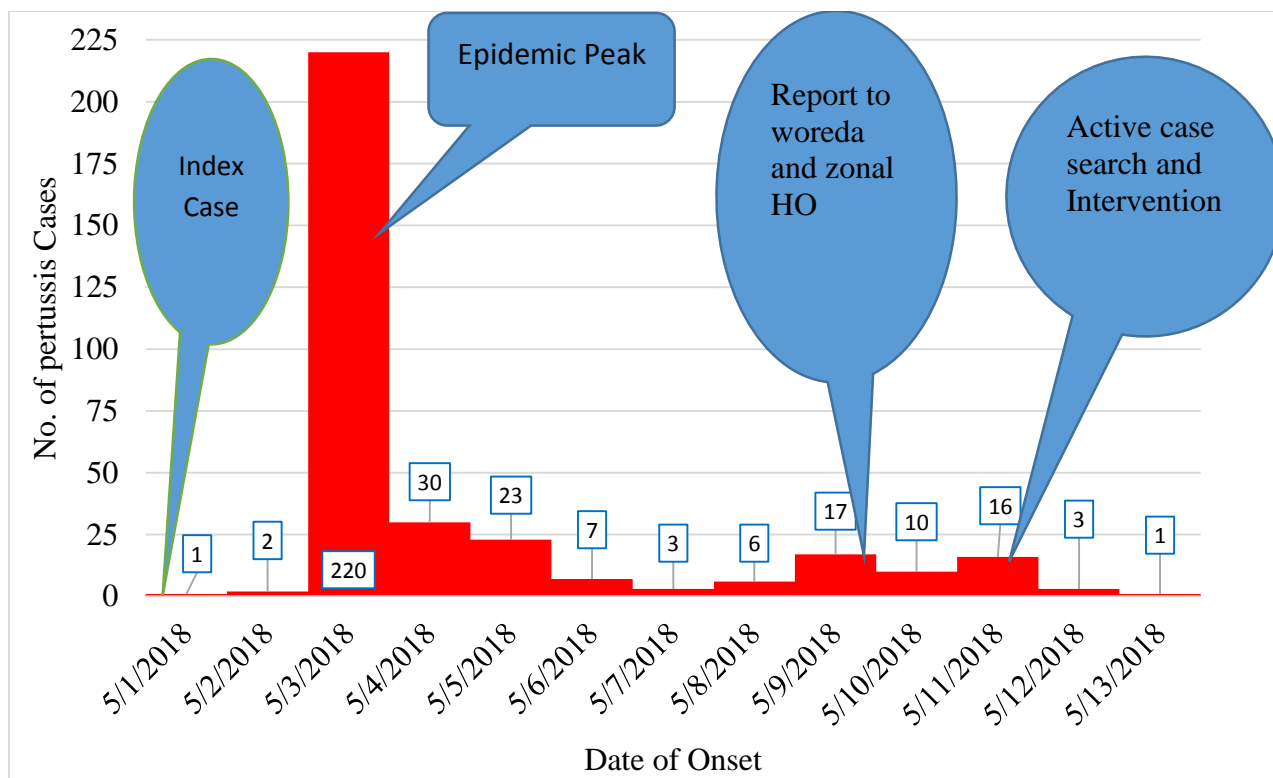


Figure 2 Epi curve of pertussis cases by date of onset of cough in Belka, Debi and Tsina villages/kebeles of Abergelle district, wag Himra zone, Amhara, 2018

Table 1 Distribution of pertussis cases by age group and sex in Belka, Debi and Tsina villages/kebeles of Abergelle district, wag Himra zone, Amhara, 2018

Age Group In years	Male	Female	Total No. of Cases
< 6/12 –	3 (0.9%)	0	3 (0.9%)
6/12 – 11/12	13 (3.8%)	8 (2.4%)	21 (6.2%)
1 – 4	98 (28.9%)	71 (20.9%)	169 (49.8%)
5 – 9	55 (16.2%)	40 (11.8%)	95 (28%)
10 – 14	32 (9.4%)	15 (4.5%)	47 (13.9)
≥ 15	4 (1.2%)	0 (0.00%)	4 (1.2%)
Total	205 (60.5%)	134 (39.5)	339 (100%)

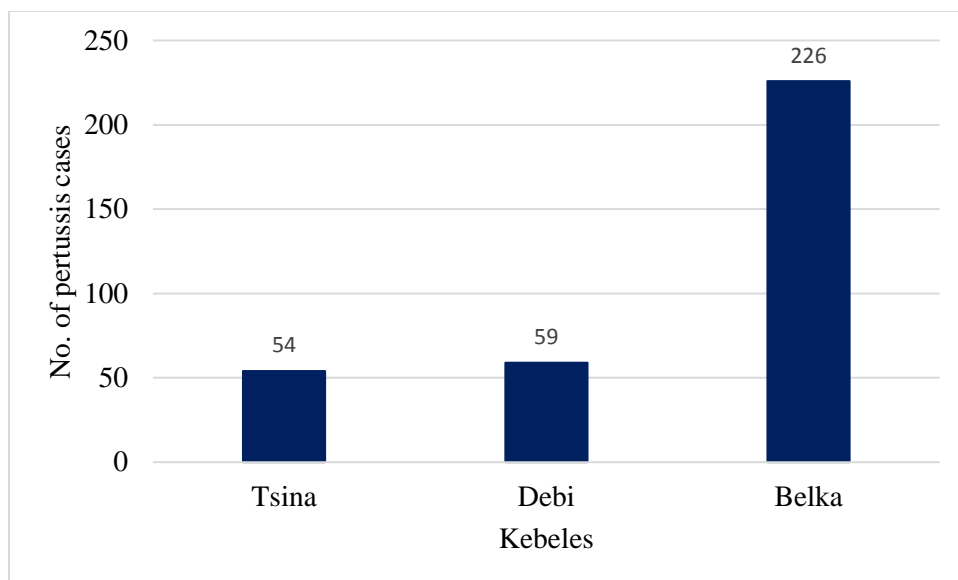


Figure 3 Distribution of pertussis cases by Villages/kebeles of Abergelle district, wag Himra zone, Amhara, 2018

In the health post EPI (Expanded Programme on Immunization) registration, the vaccination status of cases were 285 (84.1%) and 43 (12.7%) were unvaccinated and Unknown respectively, while the remaining 7 (2.1%), 3 (0.9%) and 1 (0.3%) were fully vaccinated, one dose and two dose vaccinated respectively (Table 2).

Table 2 Distribution of pertussis cases by age group and vaccination status in Belka, Debi and Tsina villages/kebeles of Abergelle district, wag Himra zone, Amhara, 2018

Age group	Vaccination status of cases					Total
	Full dose	2 dose	1 dose	Unvaccinated	Unknown	
<6/12	0	0	1	2	0	3 (0.9%)
6/12 - 11/12	2	0	0	16	3	21 (6.9%)
1 to 4	4	1	2	142	20	169 (49.8%)
5 to 9	1	0	0	76	18	95 (28%)
10 to 14	0	0	0	45	2	47 (13.9%)
≥ 15	0	0	0	4	0	4 (1.2%)
<b>Total</b>	7 (2.1%)	1 (0.3%)	3 (0.9%)	285 (84.1%)	43 (12.7%)	339 (100%)

The overall attack rate of the disease was 5.8 per 1000 inhabitant of the three kebele and the case fatality rate (CFR) was 0.3%. Majority of the cases were aged below 5 years old. The highest attack rate (24.3 per 1000) was among children of aged below 5 years. Individuals in the age group  $\geq 15$  years were the least affected with an attack rate of 0.13 per 1000 inhabitant of this age group. Highest case fatality rate, 0.52% was seen in children of age group 0–4 years. The deaths, 1(100%) was occurred among males, with a specific case fatality rate of 0.5% (Table 3).

Table 3 Number of pertussis cases and deaths by age group and sex in Abergelle district, Amhara region, 2018

Variables	Total number of population	Number of cases	Number of death	AR/1000	CFR (%)
Age Group In years					
0-4	7,945	193 (56.9%)	1	24.3	0.52
5-9	10,327	95 (28%)	0	9.2	0
10-14	8,743	47 (13.9%)	0	5.4	0
$\geq 15$	31,664	4 (1.2%)	0	0.13	0
Total	58,679	339 (100%)	1	5.8	0.3
Sex					
Male	29,281	205	1	6.9	0.5
Female	29,398	134	0	4.6	0

### Vaccination coverage

Belka and Debi villages/kebeles health posts didn't have functional refrigerators for the storage of vaccines due to absence of electric power and inaccessibility of transport infrastructures, as result in these villages/kebeles there was no regular routine immunization service. The immunization service in this kebele was provided on an irregular period by transporting the vaccine from the District town health centers. Immunization card was not given for vaccinated children. The health post report on pertussis showed that the vaccination coverage of Belka and Debi villages/kebeles were 100% each in the last year 2016/17. And also the district health office's vaccination coverage was 100%.

## **Public Health Intervention**

On May 5 /2018 health worker team and HEWs arrived at affected kebele and community based active pertussis case search and management were conducted in all affected kebeles of the district. There were delaying of notification and lack of timely management of cases in the community. The health worker team identified and characterized the pertussis outbreak by sign and symptom using community case definition of pertussis. Technical assistance was given for health workers on case management, recording and reporting situation. Cases were treated to prevent further spread; and reduce morbidity and mortality attributable to pertussis infection. Contact tracing in each affected kebeles were done by health workers and HEWs. Those, who had contact history with suspected pertussis case were administer antimicrobial prophylaxis, Erythromycin.

We discussed with all PHEM staffs of zonal and district health office, staffs of affected kebele health center (Debi Health Center) and health extension workers (HEWs) of respective affected kebeles. Health education was given for the community members on the transmission and prevention of the disease, to motivate health seeking behavior and treatment if there is sign and symptoms of pertussis. The Zone health department has started closely working with the affected district (Abergelle) and the entire neighboring districts to prevent or control the outbreak from spreading to these areas. Alarming the community, health extension workers and community leaders were conduct. Routine surveillance was enhanced and the situation was closely followed at each level on a daily basis until the epidemics was controlled.

## **Discussion**

Over the period of outbreak (May 1 2018 to 17 May 2018) a total of 339 cases and one deaths were line listed from the three villages/kebeles. The overall attack rate of the outbreak was 5.8 per 1000 inhabitants, which is higher than pertussis outbreak in Mekdela district South Wollo zone of Amhara region (1.3%) and Papua New Guinea (4%) [10, 9].

This might be due to under reporting of cases or weak surveillance activities. More than half of pertussis cases 226 (84.1%) had not received of pertussis vaccine at all, this could be due to the area of the villages/Kebeles very remote and due to absence of electric power and road facilities. The case fatality rate of district was 0.3% which is lower than as compared to the study done in Mekdela district South Wollo zone of Amhara region (3.7%) and Papua (3%), this could be due to rapid response of the health extension worker in the study area [10, 9].

Males were more affected than females. The outbreak affected age ranges from 3 months to 30 years. The most affected age groups were those who were aged under 5 years. In this outbreak one deaths were occurred among males.

The most affected age group was under 5 years 193 (56.9%) with the attack rate of 24.3 per 1000 population, which is due to unvaccinated status of cases (84.1%) and one (100%) deaths with CFR of 0.52% occurred in children aged under 5 years which was lower than the CFR in Mekdela district South Wollo zone of Amhara region (3.3%) and West Africa (2.8%). This might be due to good seeking behavior of the population and immediate treatment of cases [10, 7].

Even though vaccination coverage of the affected villages/kebeles was greater than 99%, this outbreak was occurred, this might be due to false reporting of vaccination coverage and poor potency of the vaccine due to absence of functional refrigerator.

### **Limitation of the study**

Absence of vaccination card was difficult to determine the vaccination status, exact date of vaccination and other relevant information which could cause information bias. Recall bias on the date of onset by the cases and their mothers since the investigation was conducted lately after 339 cases and one deaths were occurred.

## **Conclusions and Recommendation**

This outbreak was occurred in remote villages/ kebeles of Abergelle district with a weak surveillance system and delayed reporting. The outbreak was reporting after a week of the occurrence of diseases. In this outbreak the overall attack rate was 5.8 per 1000 population.

More than half of the cases of this outbreak were children below 5 years of age. The factor that contributes for the occurrence of pertussis outbreak was low vaccination status of affected village/Kebele. The majority of cases of the outbreak were occurred before the zonal health office, district health office and cluster health center being notified and initiated the response activities.

To prevent subsequent pertussis outbreaks the following action points put as recommendations:

- District health office should installed generator for affected villages/kebele health centers and health posts to access electric power for cold chain in routine immunization services for the community.
- Well functional refrigerators should be avail for the health posts to maintain the potency of vaccines.
- Rapid response team should be established at all levels to increase early notification of the outbreak.
- Inhabitants of the community needs to be mobilized to increase their awareness on importance of immunization and health service seeking behavior.
- The cluster health center should have to establish and implement routine EPI service in Belka and Debi villages/kebeles.
- The health extension workers in Belka health post and the health workers of Debi health center should enhance the awareness of the community on mode of transmission of pertussis, its prevention and importance of taking appropriate treatments if being infected to prevent pertussis related complications and death.

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## **1.2 Rubella Outbreak Investigation in Woreda 9 of Akaki Kality sub city; Addis Ababa -Ethiopia May 2018**

**Introduction:** Rubella is a contagious disease, caused by rubella virus and transmitted via the respiratory route. Ethiopia does neither currently have a rubella immunization program nor a congenital rubella syndrome (CRS) surveillance system. To investigate rubella outbreak and identify risk factors associated with rubella outbreak in Woreda 9 of Akaki Kality sub city; Addis Ababa.

**Method:** Descriptive study was employed to investigate the outbreak. Case defined as any person with fever and maculopapular (nonvascular) generalized Rash and Cough, Coryza or conjunctivitis (red eyes) OR any person in whom a clinician suspects rubella. The measles case-based surveillance reporting form was used to identify rubella cases from 3<sup>rd</sup> January 2018 to 17<sup>th</sup> April 2018. Epi Info<sup>TM</sup> version 7 and Excel 2013 used to enter and analyze data.

**Results:** A total of 17 cases and zero death (CFR=0) cases were line listed. The overall AR was 26 per 10, 000 population. The attack rate less than 5 year of age was 126 per 10,000. The median age was 6 years. 10 (58.8%) of cases were males. Sex specific AR was 31 per 10,000 populations and 20 per 10,000 for male and female respectively. The cases were reported from 2 (100%) Kebeles. 16 of the cases reported from Tulu Dimtu Kebele. Five samples were positive for Rubella IgM antibodies.

**Conclusion:** We investigated an outbreak of rubella in which all cases (100%) of the cases were in children aged less than 15 years, with a median age of six years. A rubella specific case definition should be needed for early case detection because currently the case definition used to detect rubella is the measles suspected case definition.

**Key Words:** Rubella outbreak; Congenital Rubella Syndrome; Rubella Cognitive Vaccine

## **Introduction**

The name "rubella" is comes from Latin word and means little red. It was first described as a separate disease by German physicians in 1814 resulting in the name "German measles"[1]. Rubella also known as three-day measles, which is usually mild febrile rash, self-limiting illness and highly contagious outbreak-prone acute viral diseases characterized by maculopapular rash in children and adults, and has many similarities with the epidemiology of measles. However, up to 50% of infected persons are asymptomatic [2, 3]. The causative agent of rubella is the rubella virus, a single stranded RNA virus of the genus Rubivirus in the Togaviridae family. Rubella virus maintains only one serotype exclusively able to affect humans [4].

The virus is transmitted via the respiratory route and can occur through respiratory droplets or direct contact, replicates in the nasopharyngeal mucosa and local lymph nodes and spreads by viremia to different organs with incubation period ranges from 12–23 days [Rubella vaccines]. People are infectious during the week before and after the appearance of the rash and babies with Congenital Rubella Syndrome (CRS) may spread the virus for more than a year [1], also vertical transmission of rubella virus is also possible [2].

Rubella can cause congenital rubella syndrome in the newborn, when a woman contracts rubella infection before conception or in early months of pregnancy, depending upon the timing of fetal infection, infection may result in loss of pregnancy and birth defects or serious consequences may occur, known as Congenital Rubella Syndrome (CRS). The risk of major defects or organogenesis is highest for infection in the first trimester. The defects associated with CRS are ophthalmic (e.g., cataracts, microphthalmia, glaucoma, and chorioretinitis), auditory (eg, sensorineural deafness), cardiac (eg, patent ductus arteriosus), and craniofacial. Infants with CRS who survive the neonatal period may face serious developmental disabilities (eg, visual and hearing impairment) and have an increased risk for developmental delay, including autism [2, 5, 6].

World Health Organization (WHO) established the Measles and Rubella Laboratory Network (Lab Net) in 2003 to promote case identification and confirmation. Rubella is a vaccine-preventable infection, and considered to be potentially eradicable [8]. As per the World Health Organization (WHO) estimate worldwide more than 100,000 children per year are born with CRS [7]. Before the introduction of rubella vaccine, rubella infection was prevalent worldwide, outbreaks occurred in cycles every 5–9 years [2] and the incidence of CRS varied from 0.1–0.2 per 1,000 live births

during endemic periods, and from 0.8–4 per 1,000 live births during rubella epidemics. As a result of the vaccination programme in many high-income and in some low-income and middle-income countries, the estimated number of CRS cases globally decreased from about 119, 000 cases in 1996 to about 105, 000 cases in 2010 [10]. The large-scale vaccination programme in Americas and Europe has achieved a drastic reduction or elimination of both the virus and CRS [9].

In countries where rubella vaccination has not been introduced to the national immunization programme or the vaccine coverage is low, rubella outbreaks continue to expose susceptible women to an increased risk for miscarriages, still births or CRS in their newborns [9]. Although little is known about rubella epidemiology and the incidence of CRS in Africa, special surveillance investigations in developing countries in Africa, the Americas Asia, Eastern Europe and the Eastern Mediterranean have documented incidence rates of CRS ranging from 0.4 to 4.3 per 1,000 live births [11, 12]. Africa and South East Asia regions, with the respective estimated incidence of 116 and 211 per 100, 000 live births in 2010, have the highest rates of CRS [10].

In Ethiopia, estimates of the rate of CRS range from 24 to 112 per 100, 000 live births in urban Addis Ababa and rural Ethiopia, respectively [10]. Study conducted at four cities and one district towns in Ethiopia among young adult females aged 14-25 years old, showed that overall prevalence of the natural IgG antibody against Rubella was found to be 94%. The highest prevalence of rubella antibody (97%) was found among young females in Addis Ababa in the central region of the country. It follows that the incidence of congenital rubella infection is probably low in Addis Ababa because the vast majority of the female population is immune [13].

Rubella and Measles transmission with subsequent outbreaks can occur in communities and congregate settings such as households, workplaces, the military, schools and universities. The setting, extent of spread and size of the outbreak will determine the magnitude of the response [14]. Population susceptibility to infection is predicted by herd immunity, population density, place of residence, socio-economic factors, as well as other epidemiologic indicators [15, 16]. There is no specific treatment for rubella; however, management is a matter of responding to symptoms to diminish discomfort. Treatment of newborn babies is focused on management of the complications. Congenital heart defect and cataracts can be corrected by direct surgery [17].

Surveillance system for rubella or CRS does not exist in Ethiopia; however, most epidemiologic data on rubella infection are derived from ongoing Measles case-based surveillance system, which established in 2004, including laboratory testing for the detection of measles specific and rubella-specific antibodies. Given that rubella is a mild disease and asymptomatic in up to 50% of cases of rubella infection and associated CRS is oftentimes missed and/or under-reported. Although, little is known of the magnitude and distribution of rubella cases; In African countries, including Ethiopia, CRS is widely under-recognized as a public health problem, and information on rubella and CRS epidemiology is very limited [14].

## **Objectives**

### **General Objective**

To investigate and identify risk factors associated with the occurrence of rubella outbreak in Woreda 9 of Akaki Kaliti sub city; Addis Ababa; Ethiopia.

### **Specific objectives**

- To confirm/verify the existence of the outbreak
- To describe the magnitude of outbreak by person, place and time
- To identify potential risk factors of disease transmission

## **Methods and materials**

### **Background of Woreda 9**

Woreda 9 is one of the 11 woredas of Akaki Kality sub city. It's far about within 25 - 35 KM from Addis Ababa and within 7-15 KM from Akaki Kality sub city administration office. Administratively the Woreda is divided into 9 Ketena (the lowest governmental structure). The Woreda is surrounded by 5 woreda of Akaki Kality sub city in the North, West and East and on the South, Oromia special zone surrounding Finifinne is shares boarder. Geographically the altitude varies from 2050 up to 2331 meter above sea level.

Total population of Woreda 9 estimated to be 6,660 (projection based on 2007 census). Of these population; male 3197 (48%) and female 3,463 (52%); children under 5 years of age 477 (7.2%); numbers of women of reproductive age (15-49) 2,307 (34.6%); numbers of pregnant women 155 (2.33%).

Regarding the Health service coverage, the Woreda has 2 Health Center which gives the potential health coverage reached above 90%. . In this woreda, 5 HEWs are deployed in health sector.

### **Study Design**

Descriptive cross sectional descriptive study was employed to investigate the outbreak.

### **Study Period**

From 3<sup>rd</sup> January 2018 to 17<sup>th</sup> April 2018.

### **Source of Population**

Total population of Woreda 9 was the source of the population, It estimated to be 6, 660 (projection based on 2007 census).

### **Study Population:**

The study population was selected from source population. 2 rubella affected Ketenas.

### **Sample Size**

Investigation was conducted On 17 cases of rubella.

**Definition**

**Case:** defined as any person with fever and maculopapular (nonvascular) generalized Rash and Cough, Coryza or conjunctivitis (red eyes) OR any person in whom a clinician suspects rubella.

**Data Collection Method**

Surveillance data of the Woreda Health Office was reviewed retrospectively to observe similar outbreak from the district and to set background status of the disease. Structured questionnaire was used to interview cases. Active search was conducted using line listing of cases. In addition to this we conducted formal discussions with different stakeholders about the overall outbreak situation and the control and prevention efforts undertaken in the Woreda.

**Data Entry and Analysis**

Collected quantitative data was checked and entered on a computer and analyzed using Microsoft office Excel 2013 and Epi Info 7.1

**Laboratory Investigation**

Blood specimens were collected from (10) suspected measles patient and sent to EPHI

**Ethical issue**

Informed verbal consent was taken informally from all respondents before interviews and all agreed to take part.

## **Result**

### **Descriptive Epidemiology**

On 3<sup>rd</sup> January; 2018 the first case (index) was registered and reported from Tulu Dimtu ketena of Woreda 9. It's far 2 Km from the Woreda center. The index case was male and 4 years old. A total of 17 rubella cases (5 confirmed and 12 Epi-linked) without death were reported from two ketena of Woreda 9, Fanta Ketena project 12 condominium site and Tulu Dimtu ketena condominium site. Tulu Dimtu ketena condominium site were most affected area. From the total cases (17); 16 cases were reported from Tulu Dimtu condominium site Tulu Dimtu kebele and the rest one case from Fenta kebele project 12 condominium site.

The overall attack rate was 26 case per 10,000 population. Case fatality rate was zero. The median age of the case was 6 years old with range of 2 years – 12 years. The attack rate among less than five years age group was 126 cases per 10,000 populations while 18 cases per 10,000 populations in the age of greater than five years. In addition, the attack rate between five and 15 years age was 98 cases per 10,000 populations. There was zero case fatality rate registered throughout the outbreak. 5 of the sample was positive for rubella IgM. Subsequently, a total of 17 rubella cases were line listed. The index case for this outbreak was believed to be a 4 year old child male.

Although the index case laboratory result unknown, during case detection we identify 16 cases, who developed rashes after index case. Out of which 9 cases were reported from freedom elementary school on 26 February to 2 March. The peak of the outbreak occurred on in 15<sup>th</sup> January 2018 to 21<sup>th</sup> January 2018 (WHO Epi week – 3 of 2018) and 26 February to 2 March (WHO Epi week – 9 of 2018). The shape of epidemic cover was propagated type of outbreak 9 cases were students of freedom schools. The last case occurred on 8<sup>th</sup> April to 14<sup>th</sup> April 2018 (WHO Epi week – 15 of 2018).

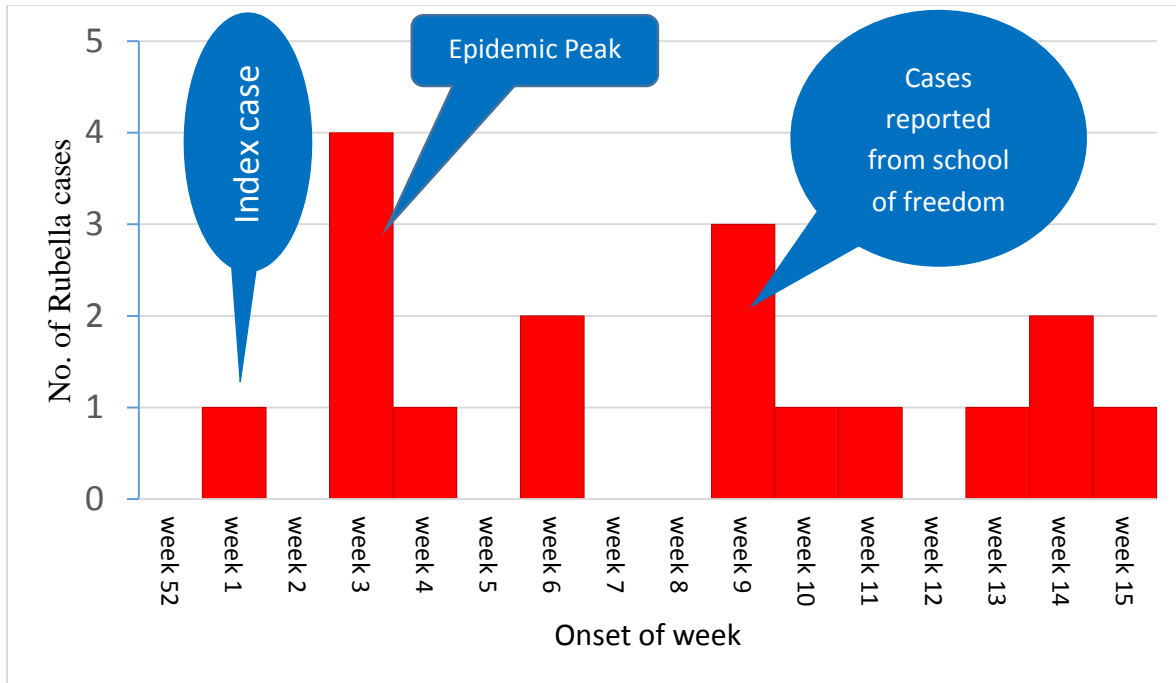


Figure 4 Epi Curve WHO Epi week of onset of sign and symptom rubella from 3rd January to 17th April 2018 in Woreda 9; Akaki Kality sub city of Addis Ababa; April 2018

Out of 9 kebeles in the Woreda; 2 Kebeles were affected by Rubella outbreak. Attack rate was highest in Tulu Dimtu Kebele (216 per 10,000 population), followed by Fenta Kebele only 1 cases (14 per 10,000 population), and it's the least one. The first cases identify in Tulu Dimtu Kebele condominium site and after 2 weeks 5 cases reported in the same ketena and again after a couple of week 9 cases reported from freedom elementary school in the consecutive 3 weeks. 60 percent of children less than 5 years reported having been vaccinated against measles while none had been vaccinated against rubella. All cases were treated as outpatients and there was no death.

Rubella has similar symptoms with measles. The common sign and symptoms manifested in rubella cases were listed below; rash (100%); fever (70.6%), cough (42.1%), and Conjunctivitis (35.3%) and Coryza (17.6).

Table 4 Distribution of rubella cases by sign and symptoms from 3rd January to 17th April 2018 in Woreda 9; Akaki Kality sub city of Addis Ababa; April 2018

<b>Sign and symptoms Category</b>	<b>Yes</b>	<b>Percentage</b>
Rash	17	100
Fever mild	12	70.6
Cough	7	42.1
Conjunctivitis	6	35.3
Coryza	3	17.6

58.8 percent of all cases were males. 35.3 percent of the cases were aged less than 5 years while 52.9 % were aged 5 - 9 years Age group. None of cases was reported above 15 years of age.

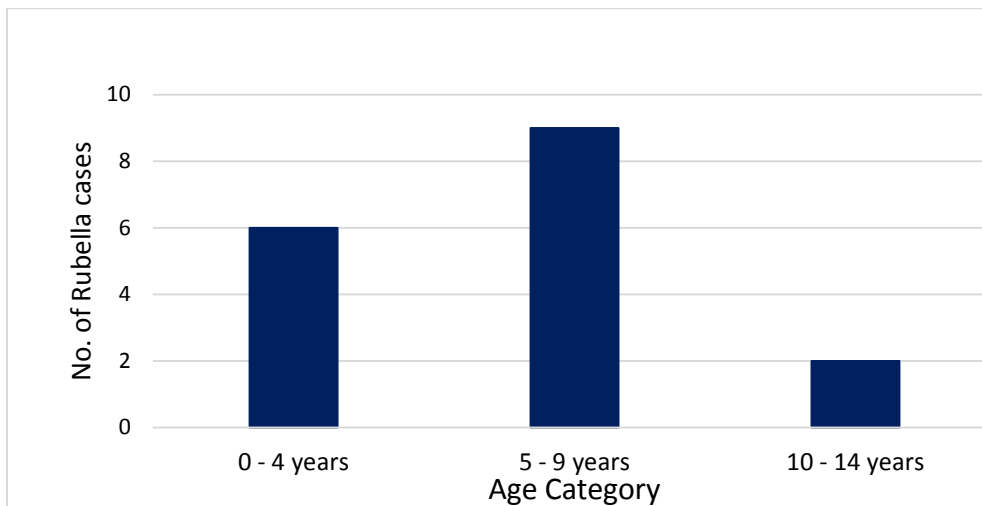


Figure 5 Rubella cases distribution by Age Category from 3rd January to 17th April 2018 in Woreda 9; Akaki Kality sub city of Addis Ababa; April 2018.

Of the total affected cases; 10(58.8%) were males. Sex specific AR was 31/10,000 population and 20/10,000 populations for male and female respectively see below table 5.

Table 5 Rubella cases distribution by sex from 3rd January to 17th April 2018 in Woreda 9; Akaki Kaliti sub city of Addis Ababa; April 2018

Category	Population	No. of cases	Percentage	AR/10,000
Male	3,197	10	58.8	31
Female	3,463	7	41.2	20

### **Laboratory Investigation**

To identify the etiologic agent of the cases 10 specimens were collected from suspected measles case and sent to EPHI. Five out of 10 the specimens were IgM positive for Rubella. Therefore the Positivity rate was 50% for Rubella IgM.

### **Public Health Intervention**

After report received from freedom elementary school Woreda PHEM officers and HEWs arrived in the school. Health workers identify cases and trace contacts and cases were treated to prevent complication and further spread. Discussing with schools leader the health worker request cases to stay at home until recovers and Routine surveillance was enhanced. Health education was given for the community member's school staff member on prevention and transmission of the disease, to motivate health seeking behavior and treatment if there is sign and symptoms of rubella. Alarming the community, health extension workers and community and school leaders were implemented to strength the local surveillance system.

## **Discussion**

Rubella cases captured by measles case-based surveillance system and the Epidemic have been in Tulu Dimtu ketena/kebele condominium site of woreda 9. The epidemic curve has several peaks typical of a propagated outbreak, suggestive of person to person transmission due to many of the cases were attends the same school.

We attributed this outbreak to the fact that our country does not currently provide RCV in the National Immunization Program; therefore; most of the children were susceptible to this disease. The results of the investigation revealed that of the total number of rubella (16 cases), 100% had never been vaccinated against rubella infection. Studies in other countries not providing RCVs have also demonstrated widespread transmission and rubella outbreak [18, 19, 20].

Contact with rubella case during illness, thereby spreading the rubella infection to others in contact through sneezing and coughing. This finding is therefore biologically plausible considering that rubella is spread through respiratory secretions.

Many study shows household and school classmate contact was a significant risk factor for rubella outbreak. Children who contracted rubella from their school and village were spreading the disease to their siblings at home [21].

Woreda 9 Health Office didn't respond timely to the outbreak due to lab result delaying. However; the health center daily line listed of cases were done; information, education and communication materials on rubella for community for sensitization was not available. This implies that community education wasn't adequate.

### **Limitation of the Study**

- The sensitivity of this case definition is likely not high enough to identify all rubella cases. Case definition used to detect the rubella cases was designed for the measles case-based surveillance system.
- Case Control study did not performed due to the number of reported case was very few.

## **Conclusion and Recommendation**

### **Conclusions**

- We investigated an outbreak of rubella in which 100% of the cases were in children aged less than 15 years, with a median age of six years.
- Tulu Dimtu Kebeles was more affected Kebeles.

### **Recommendations**

- A rubella specific case definition is needed for early case detection because currently the case definition used to detect rubella is the measles suspected case definition and this may lead to unnoticed rubella outbreaks because the signs and symptoms of rubella are milder than measles.
- The Woreda Health Office should strengthen active surveillance system in order to detect case early as much as possible.
- Strengthen sensitization of health workers and health extension workers
- Continues Health Education of the community on Ways of transmissions and prevention activities.

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# **2. Chapter II- Surveillance data analysis**

## **2.1 Analysis of 5 year malaria surveillance data report of Akaki Kality sub city Addis Ababa, 2012-2016**

### **Abstract**

#### **Back ground**

Malaria is a major health problem life threatening parasitic disease caused by the protozoan parasite plasmodium and one of the leading causes of illness and death in the world mostly in sub-Saharan Africa including Ethiopia. Highland malaria has become very common in many African countries. Similarly, the rise of malaria cases at high altitude areas of Ethiopia has been indicated, including the outskirts of Addis Ababa, Akaki-Kality sub city and its environs of highland areas. This paper shows the trend of malaria in Akaki-Kality sub city from 2012 – 2016.

#### **Methodology**

A retrospective descriptive study was conducted on secondary five year (2012 – 2016) malaria data in Akaki Kality sub city. After the data was officially requested and received from PHEM center of the sub city, data cleaning and analysis was conducted using Microsoft Excel 2013.

#### **Result**

A total of 4939 clinical and confirmed malaria cases were identified during the five year period in the sub city. Out of the total 4717 (95.51 %) confirmed malaria cases 3522(74.33%) and 1195(25.67%) were *P. vivax* and *P. falciparum* respectively. There was a significance increase in the incidence rate of confirmed malaria cases from 2012–2016 GC and the average incidence rate was 4.7/1000. Overall there were no death identified during the study year.

#### **Conclusion**

Having malaria deaths and devastating malaria epidemics in the sub city seems now history; Plasmodium vivax and plasmodium falciparum were the responsible species of malaria in the sub city. To strengthening of surveillance requires taking constructive corrective measures to all types of error or gaps that have identified in this paper.

**Key words:** Malaria, Highland, Incidence rate, Akaki Kality sub city

## **Introduction**

Malaria is a major health problem life threatening parasitic disease caused by the protozoan parasite plasmodium and transmitted by female anopheles mosquitoes [6]. There is five plasmodium species that are known to infect humans but each species differ in many aspects of their biological and geographic distribution which is *P. falciparum*, *P. vivax*, *P. ovale*, *P. malariae* and *P. knowlesi*. Of these, *P. falciparum* and *P. vivax* are the most important (The dominant species of malaria in Ethiopia are both *P. falciparum* and *P. vivax*) [6, 7].

Malaria is one of the leading causes of illness and death in the world and also the leading cause of death in children under the age of 5 years and pregnant women in developing countries [1, 2, 3]. Globally, an estimated 3.4 billion people are at risk of malaria. In 2012 WHO estimates that 270 million cases of malaria and 627, 000 deaths occurred globally. Most cases (80%) and deaths (90%) occurred in sub- Saharan Africa, and most deaths (77%) were in children under 5 years of age including Ethiopia [6]. Malaria is presently endemic in a broad band around the equator, in areas of the Americas, many parts of Asia, and much of Africa; however, it is in sub-Saharan Africa where 85– 90% of malaria fatalities occur including Ethiopia. [9, 10].

Malaria is the most widely distributed infectious disease and it is the major public health problem in Sub-Saharan Africa including Ethiopia [14]. African health facility studies show that malaria constitutes 20-60% of the outpatient consultation and 10% of hospital admission [15].

Ethiopia is also one of the most malaria epidemic-prone countries in Africa. Approximately 75% of Ethiopia's landmass is malaria-endemic; areas of disease are primarily associated with altitude and rainfall [20]. According to Federal Ministry of health data 52 million people (68%) live in malaria risk areas in Ethiopia [20]. *P. falciparum* and *P. vivax* are the two dominant parasite species causing malaria in Ethiopia, with relative frequencies of on average, 60%-70% of malaria cases have been due to *P. falciparum*, with the remainder caused by *P. vivax* [21]. In 2010, the Federal Ministry of Health (FMOH) reported 4,068,764 clinical and confirmed malaria cases to the World Health Organization (WHO) as recorded in the 2011 World Malaria Report [20]. And also, in 2011/2012, malaria was the leading cause of outpatient visits, accounting for 17% of all outpatient visits, and 8% of health facility admissions among all age groups [22]. In Ethiopia, malaria is highly seasonal in many low laying and some highland urban city communities; the main seasons

for malaria transmission in Ethiopia occurs between September and December in most of country, after the main rainy season from June to August including highland areas of the country [20].

Highland malaria has become very common in many African countries [24] and similarly, the rise of malaria cases at high altitude areas of Ethiopia has been indicated due to as a result of human-induced climatic changes and global warming [25]. About 31 urban centers of Ethiopia are known to be malaria endemic including Addis Ababa [26]. For example, an outbreak of malaria was reported in Akaki Kality Town and other suburbs of Addis Ababa in 1998/9 [27 and Zone 6 Health Department, unpublished report, 1999]. More than three times increment of primary clinical cases of malaria was recorded during the peak of this epidemic [28]. In addition, the occurrence numerous malaria cases in Akaki, and the village around the artificial lakes (locally known as Aba Samuel) and the vicinity, in the warm spring of the Filwuha area of Addis Ababa from Akaki valley, around in the bed of Kebena Lake and during the cessation of the rainy season, from mid-September to early November was confirmed [28]. In general, recently, multitudes of development and construction projects are underway in Addis Ababa especially in Akaki-Kality town, progressing to rural malaria endemic adjacent areas. Consequently, these human activities could create suitable breeding sites for, *An. arabiensis*, the principal vector of malaria in the country [28].

Strengthening control and prevention intervention of malaria is scaling up in Africa, including Ethiopia. Due to this continues intervention morbidity and mortality of due to malaria is declining in East Africa including Ethiopia [23]. It is important to analyze the magnitude of the disease to strengthening the control mechanisms and to fill the gaps in the intervention mechanism.

### **Significance of the study**

The analysis of any data is the back bone in the interpretation of any public health raw data; and as being in the public health importance malaria is one of the diseases under surveillance in Ethiopia, so data is also in need to be analyzed and interpreted as of other data as well since it is one of the public health concerns. For this reason data analysis in terms of place, person and time will be proposed in line with the aim of residency program in Field Epidemiology.

## **Objective**

### **General Objectives:-**

To describe the trend and magnitude of five year malaria PHEM data of Akaki Kality Sub city, Addis Ababa from 2012 to 2016 GC.

### **Specific objectives**

- Describe the magnitude of malaria by person, place and time.
- To characterize the incidence of malaria over time.
- To describe the type of malaria in terms of, laboratory result, morbidity and mortality in Akaki Kality sub city, Addis Ababa.

## **Methods and Materials**

### **Study area, population**

In Akaki-Kality sub city .Akaki-Kality sub city is one 11<sup>th</sup> sub city of A.A which is one of malaria endemic area. The Sub city found in south & south east direction of the city. The sub city on the distance of 12-35 Km from Addis Ababa. It is located at a relatively low-lying altitude, 2110 meter above sea level in the out skirt of the city [30]. The sub city has 11 district out of this 3 are rural type the rest 8 is Urban type. The total Population is 224,370 from this 48% male & 52% female. In the sub city 1 government, 1 private Hospital, 09 government and 1 NGO health center. Eight are function and 2 are under construction, there are many private health institutions in urban woreda of the sub city.

### **Study period**

The period from January 17/2017 to February 27/2017

### **Study design**

A retrospective descriptive study was conducted by reviewing five year PHEM malaria data reports of Akaki-Kality Sub city from 2012-2016 GC.

### **Data Source**

Five year secondary data was obtained from Akaki Kality (PHEM) surveillance data of 2012 - 2016. Variables such as woreda, as well as, clinically and confirmed, confirmed, inpatient, outpatient, P. Falciparum and P. Vivax, malaria suspected cases and malaria deaths would include in the data base.

### **Sample size**

All malaria cases, including suspected, confirmed and deaths reported during 2012 – 2016 to PHEM center were included in this study.

## **Data Collection**

We systematically identify all malaria cases and deaths recorded in the PHEM center. The data include reports of private health facilities and health centers are included in the PHEM network in the respective Sub city hierarchy. All reported malaria cases (confirmed and clinically treated), confirmed malaria cases, malaria outpatients, inpatients and deaths due to malaria was included in this study.

## **Data Management**

Data cleaning was done from the initial secondary data stored in Microsoft Excel in the PHEM Center using the same version. Descriptive analysis was computed using Microsoft office Excel 2013.

## **Ethical Consideration**

Permission approval of the study was obtained from Akaki Kality PHEM center.

## **Operational Definition & indicators**

**Confirmed malaria case:** - A suspected case confirmed by microscope or RDT for Plasmodium parasite [29].

**Malaria suspected case:** - A person with a fever or fever with headache, chills, rigor, back pain, sweats, myalgia, nausea and vomiting diagnosed clinically as malaria [29].

**Malaria outbreaks:** - Crossing the norm line OR doubling the number of malaria cases compared to the prior year of reported WHO epidemic week [29].

**Clinically and confirmed case:** - malaria suspected cases plus confirmed malaria cases [29].

## Result

### Malaria Morbidity and Distribution

Within the last five years (2012 – 2016) a total of 4939 clinically and confirmed malaria cases were treated and reported at the Sub City. Among the total clinically and confirmed cases, 4861 (98.42 %) were outpatients, 78 (1.58 %) were inpatients and 4717 (95.51 %) cases were confirmed. From the total malaria confirmed case the highest distribution was Woreda 7 followed by Woreda 1 and Woreda 6.

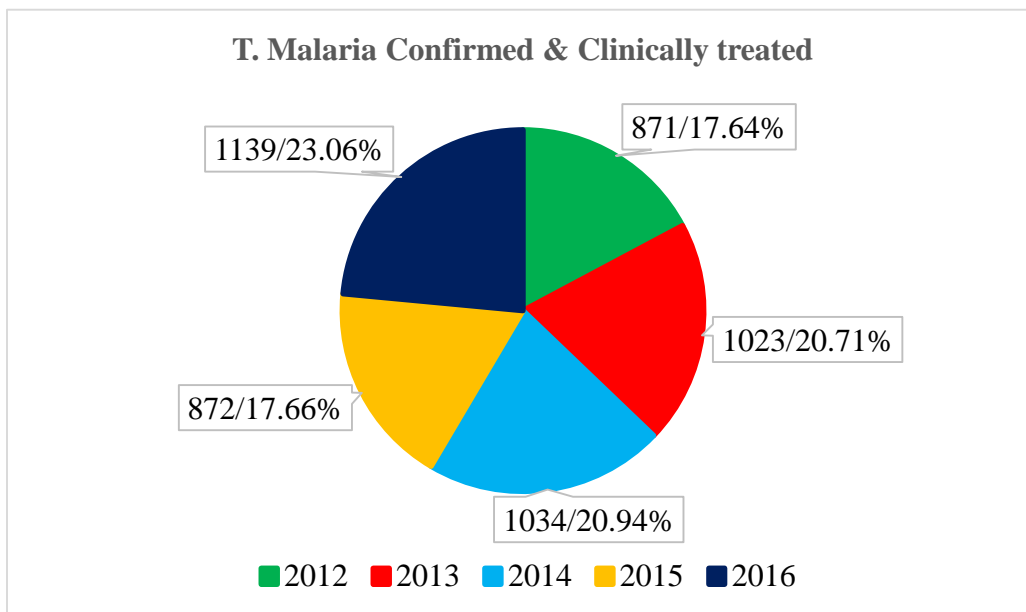


Figure 6. Pie chart. Number of malaria cases by year and percent from the total 5 year cases in Akaki-Kality Sub City, 2012-2016.

## Malaria Incidence

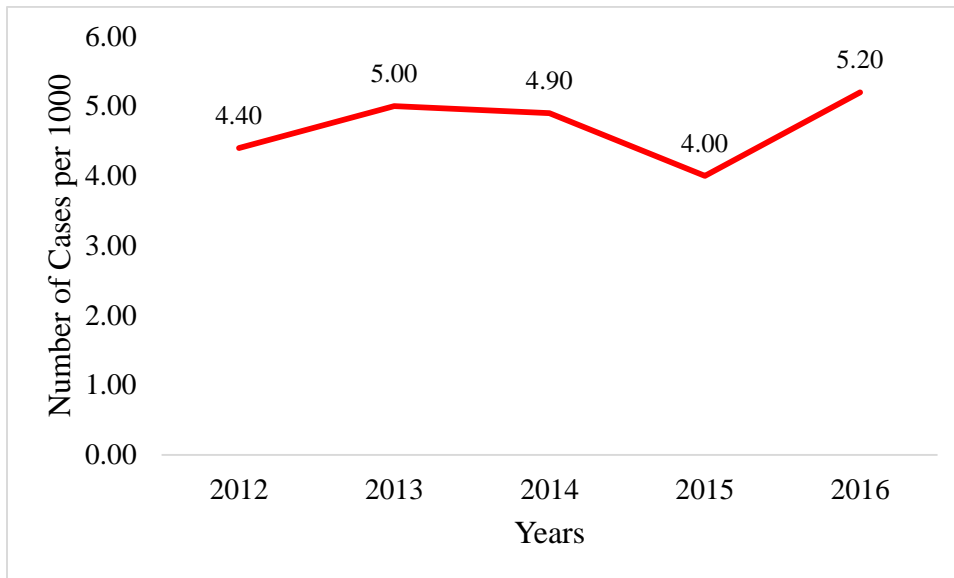


Figure 7. Incidence of malaria cases by year in Akaki-Kality Sub City, 2012-2016.

In Akaki Kality Sub City, there was a significant increase in the incidence of malaria cases in the first three years (from 2012 to 2014 years) and substantial decrease in 2015 relative to the last three years and again raise in the last one year (2016). The highest incidence of malaria was reported in the year 2016 which accounts 5.2/1000 population; and the total five year malaria data indicates that the average malaria incidence of the sub city accounts 4.7/1000 population; for detail information see the above figure 7. Also figure 5 shows that reported number of malaria cases were the same trends with malaria incidence and the year with the most reported malaria cases was 2016 which accounts 1139 cases or 23.06% from the total five year cases. The report shows a raise in the number of clinically and confirmed malaria cases by 5.4 % in 2016 relatively to 2015 see Figure 6 above.

Table 6 below show that from the allover five year woreda malaria data average malaria incidence is calculated; from that Woreda 7 was highest in malaria incidence followed by Woreda 1 and Woreda 6 with a respective incidence of 6.7/1000, 6.14/1000 and 5.7/1000 population.

Table 6. The allover five year Incidence of malaria cases Per 1000 Population by Woreda, in Akaki Kality Sub City, 2012–2016 GC.

Total five year Incidence of malaria cases Per 1000 Population by Woreda, in Akaki Kality Sub City, 2012–2016 GC.						
Woreda	YEAR					Average
	2012	2013	2014	2015	2016	Incidence/1000 Pop.
Woreda 01 Malaria Incidence/1000	7.2	6.9	4.8	4.2	7.6	<b>6.14</b>
Woreda 03 Malaria Incidence/1000	1.6	3.5	1.2	4.2	4.2	<b>2.94</b>
Woreda 04 Malaria Incidence/1000	0.5	1.7	2.1	3.3	4.6	<b>2.44</b>
Woreda 05 Malaria Incidence/1000	5.9	6.2	3.4	4.4	6.1	<b>5.2</b>
Woreda 06 Malaria Incidence/1000	4.1	6.2	5	7.8	5.4	<b>5.7</b>
Woreda 07 Malaria Incidence/1000	8	9.3	5.4	3.7	7.1	<b>6.7</b>
Woreda 08 Malaria Incidence/1000	4.1	4	2.8	4	4	<b>3.8</b>

*NB. There was no surveillance malaria data with the rest three rural woreda b/c during the last five year the woreda had not surveillance system and also any health service infrastructure.*

### Confirmed Malaria Cases Distribution by Species

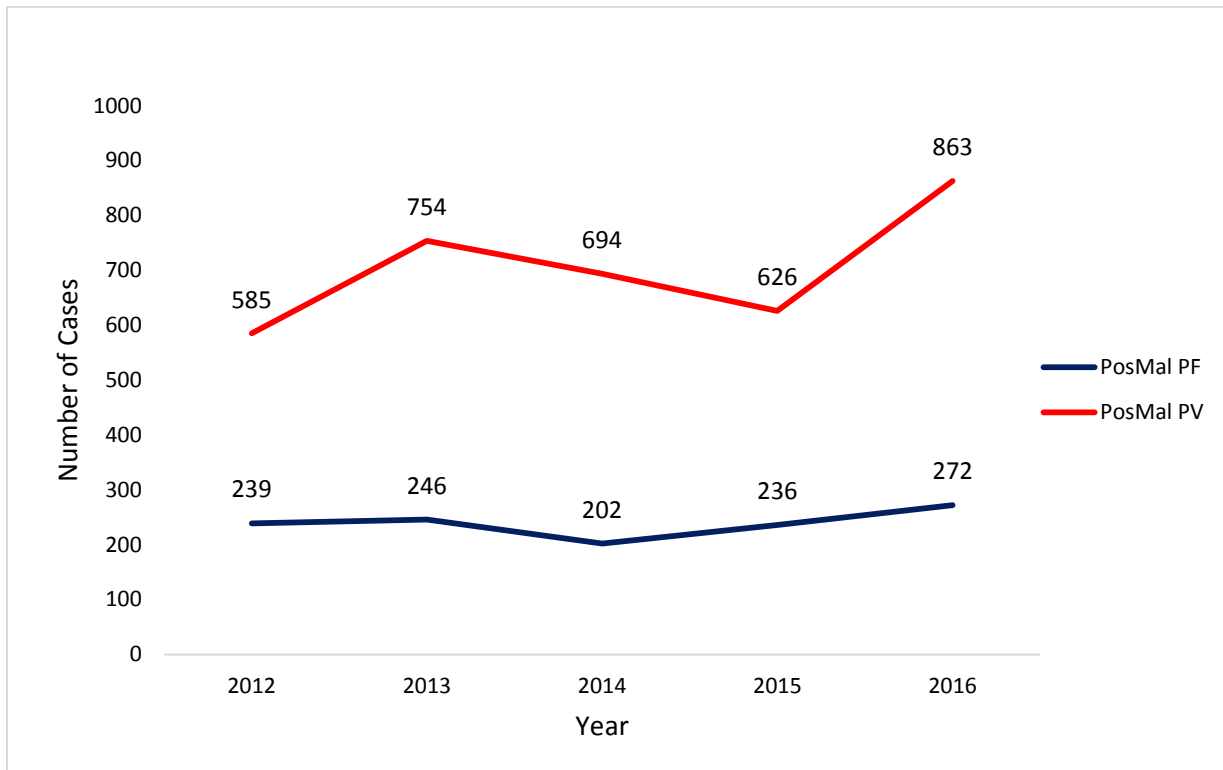


Figure 8. Trends of confirmed malaria cases in species by year, in Akaki-Kality Sub City, 2012 - 2016.

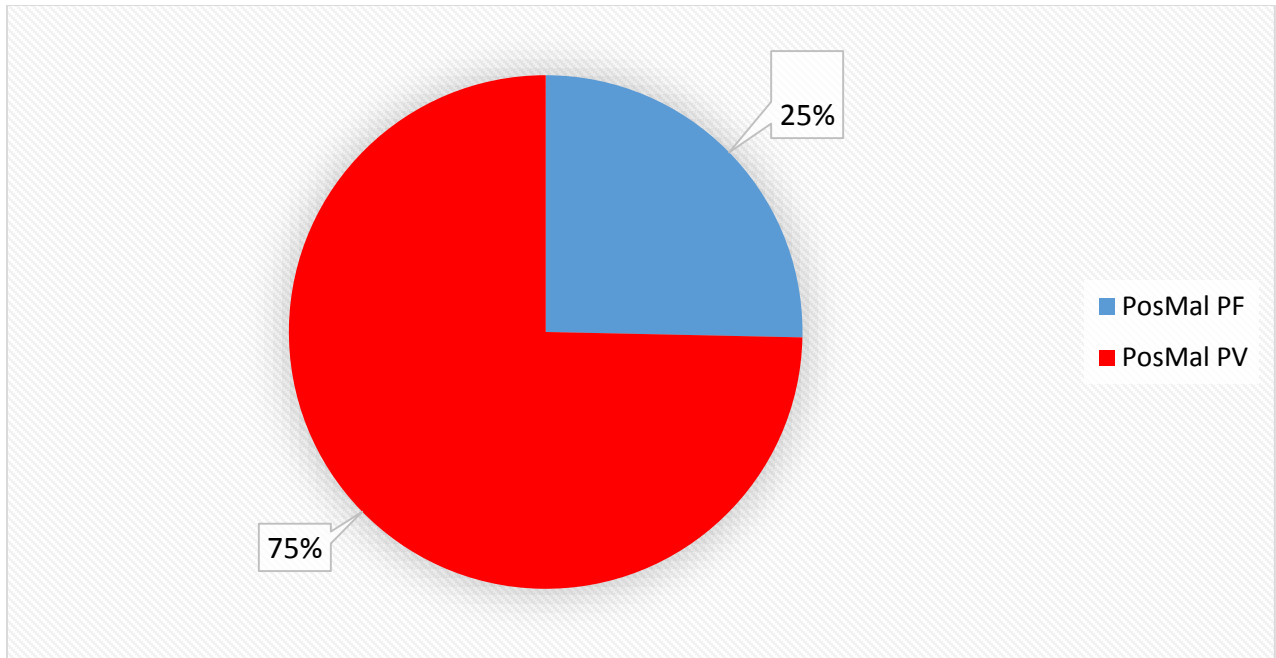


Figure 9. Number of Malaria Case by Species, in Akaki-Kality Sub City, 2012- 2016.

Figure 9 shows that from the total of confirmed malaria cases (4717), P. Vivax is the dominant species which accounts 3522 (74.67%) and P. Falciparum accounts 1195(25.33%). And the trend shows that the species P. Vivax significantly increased from the first year (2012) to the following year (2013) and declined to the next two consecutive year (2014, 2015) and again substantially raised in 2016. (For detail information see figure 8 above)

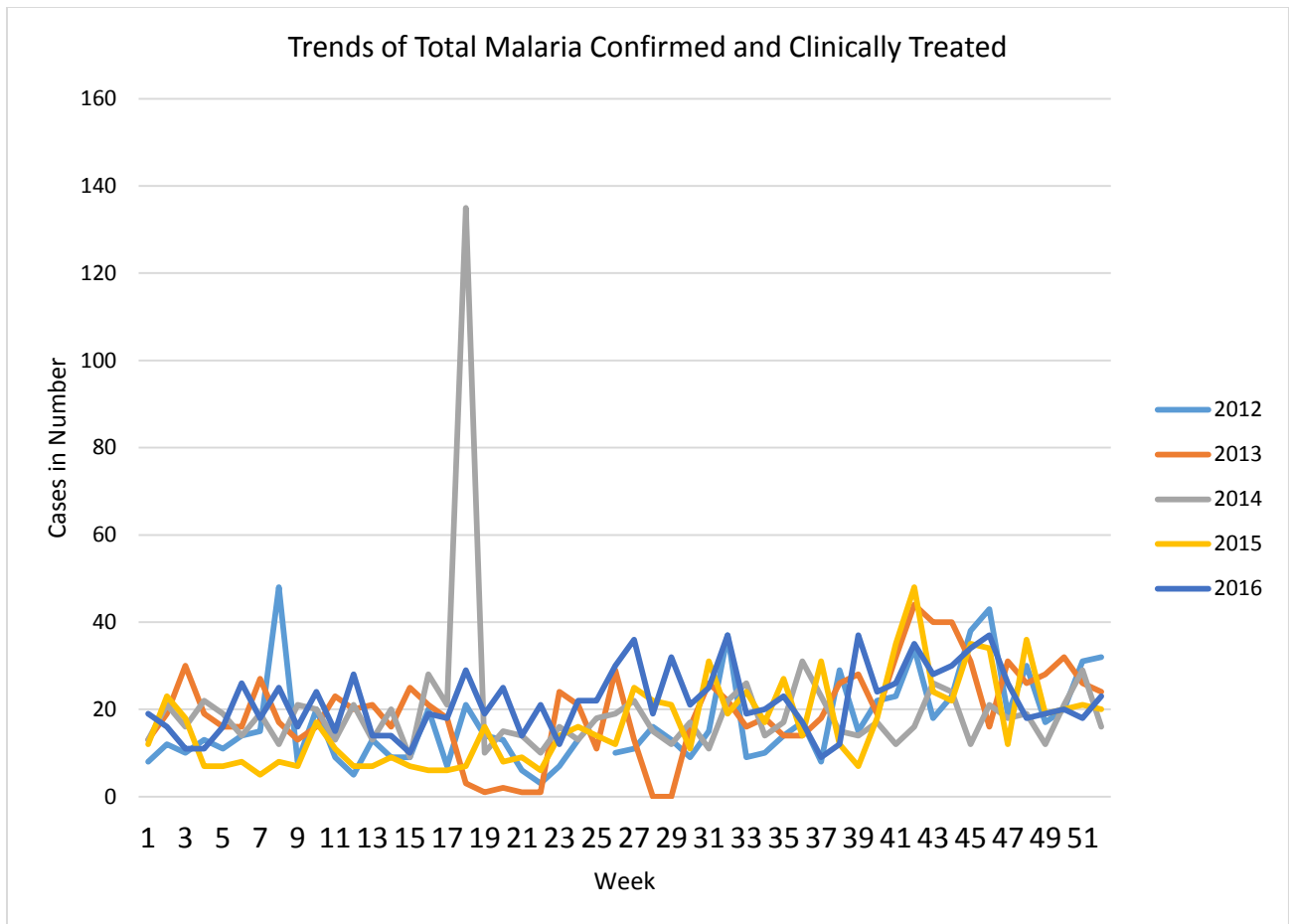


Figure 10. Five year trend of malaria by Week and year in Akaki-Kality Sub City, 2012-2016.

Figure 10 shows that from week 32 to week 47 have the most transmission of malaria in Akaki-Kality Sub City, Addis Ababa followed by week 8 to week 20. Generally, week 18 was the peak of the weeks with the highest malaria report in 2014 and secondary in week 42 with the highest malaria report in 2013 and 2015 and week 19, 20, 21, 22, 28 and 29 was the least peak of the weeks with the least malaria report in 2013 from the total five year clinical and confirmed malaria case reports.

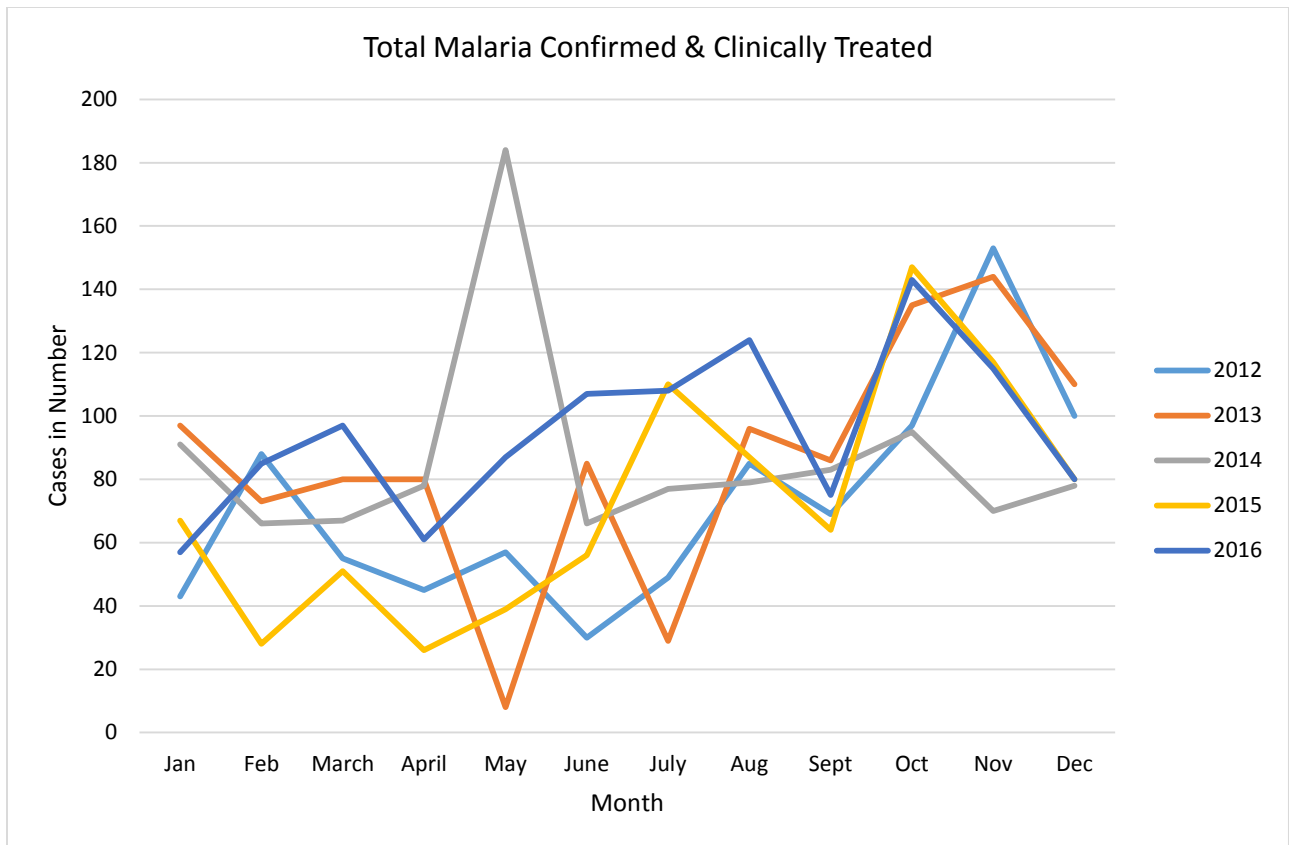


Figure 11. Five year trend of malaria by month and year, in Akaki-Kality Sub City, 2012-2016.

Figure 11 shows that the Meher season (September – November) have the most transmission of malaria in Akaki-Kality Sub City, Addis Ababa followed by the Belg season (March- May). Generally, May was the peak of the months with the highest malaria report in 2014 and the least malaria report in 2013. The second was October and November with the highest malaria report in 2012, 2013, 2015, and 2016 of the total five year clinical and confirmed malaria case reports.

## Malaria Prevalence

Table 7 below shows that the overall five year average of Sub City confirmed and clinically reported malaria prevalence was 4.53 per 1000, which was almost parallel to the out-patients reported cases. The trends of confirmed and clinically malaria cases prevalence increase in the first three years, then declining from 4.843 per 1000 population in 2014 to 4/1000 population in 2015 and again raise from 4 per 1000 in 2015 to 5.078 in 2016. The total malaria inpatients and total malaria deaths accounts 0.7 per 10000 and 0 (Zero) respectively. Total malaria positive report shows an average of 4.33 per 1000; with P. Falciparum 1.09/1000 and P. Vivax 3.24 per 1000.

Table 7. The total five year malaria cases prevalence by indicators of Akaki-Kality Sub City, Addis Ababa, 2012 - 2016.

Total five year malaria cases and Prevalence by indicators, Akaki K.S.C. 2012–2016						
Indicator	YEAR					Average Prevalence
	2012	2013	2014	2015	2016	
The total confirmed and clinical malaria cases/1000	4.286	4.911	4.843	3.984	5.078	<b>4.6204</b>
Total outpatient malaria case/1000	4.183	4.858	4.740	3.984	4.939	<b>4.5408</b>
Total in-patient malaria cases/1000	0.103	0.0528	0.07	0	0.138	<b>0.07276</b>
Total malaria deaths/100,000	0	0	0	0	0	<b>0</b>
Total malaria suspected febrile examined cases/1000	9.94	36.82	40.6	30.9	30.21	<b>29.694</b>
Total malaria positive cases/1000	4.055	4.801	4.197	3.939	5.06	<b>4.4104</b>
Total P. Falciparum cases/1000	1.176	1.18	0.946	1.078	1.213	<b>1.1186</b>
Total P. Vivax cases/1000	2.8789	3.620	3.251	2.86	3.847	<b>3.29138</b>

## Discussion

Malaria is one of the main public health problems in Ethiopia according to the health and health related indicators bulletin report, malaria is becoming increasing substantially from year to year outpatient diseases and the report indicates that number of cases significantly increase in 2013, 2014 and 2016 from the five year study. Now a day Highland area become malaria endemic area the reason for global warming, climatic change and traveler from endemic area to Highland area [28]. Evidence have also shown the rises of malaria cases in highland areas of country from the early 1990s [28]. The five year retrospective study shows that the malaria endemicity of the Sub City except some seasonal variations of cases are usually present in a community at a certain predictable level which is may be due to seasonal rainfall in addition to Aba Samuel River[28], Akaki River[28], Akaki Valley[28] and construction & industrial area of the sub city.

Malaria transmission in the sub city indicates from the study is peaks during after rainy season October to December and April to May in all years of the study from 2012 – 2016. In general in our country malaria transmission highly during the harvesting seasons bi-annually from September to December and April to May with serious consequences [5].

This 5 year malaria surveillance data report showed *P. vivax* to be the dominant species in the study area accounting for 75% of the cases and followed by *P. falciparum* accounting for 25% of the total 5 year cases of the study. In the report indicated that the higher occurrence of *P. vivax* in Akaki Kality Sub City is consistent with earlier report of conducted in Akaki Beseka [Ethiop. J. Health Dev. 2004; 18(1):2-7] [27], which documented the predominance of *P. vivax* at high altitudes a relatively low-lying altitude, 2110 meter above sea level in the out skirt of the city. This is also in agreement with another report that showed *P. vivax* as the predominant species in towns and highland areas [34] as well as a recent study which reported the dominance of *P. vivax* using parasitological and entomological data from the Butajira area [33]. The contributed factor for the dominance of *P. vivax* may be the dormant nature of the species in the liver [33].

Prevalence of malaria in lowland parts of Ethiopia (< 2000m) is estimated to 1.3% [20]; the report indicates that the prevalence of total confirmed malaria in the sub city an average 0.4% it represents relatively lower than other endemic parts of the country which is lowland, but higher than highland areas of the country (> 2000m) which estimated 0.1% [20]. And also the report shows that average malaria incidence of the sub city was below the country incidence which accounts 6.3/1000

population [35]. Generally considered that areas altitude higher than 1500m above sea level have little or no malaria cases and deaths [24] due to the low temperatures, which may slows the development of the vector and the parasites [5].

According to the information obtained from Akaki Kality Sub City Health office no systematic malaria control program has been in place in Akaki Kality Sub City. Distribution of free insecticide treated bed nets (ITNs), indoor residual spraying (IRS) and other malaria control activities were not performed in the districts.

### **Limitation of the study**

- Woredas did not incorporate in the PHEM network. This may hide the distribution of the malaria cases in the woreda level.
- Total malaria suspected febrile illness may not necessarily reflect the actual behavior of the health indicator. Some health facilities overlaps and also exchange with the total malaria clinically and confirmed cases.
- The data had been lost important variables, including age and sex.
- Data surveillance coverage and quality were poor in private clinic.

## **Conclusion and Recommendation**

Having malaria deaths and devastating malaria epidemics in the Akaki sub city seems now historic. Due to the tremendous efforts in controlling and preventing malaria in the country. Even though an assessment of malaria burden and trends must rely on the combination of surveillance and survey data, accurate surveillance is the ultimate goal of for malaria control programs. To strengthening of surveillance requires taking constructive corrective measures of all types of error that have identified in this paper. The confidential assessment of malaria burden and trend is only certain by the strengthening of the surveillance system.

The malaria report system shows significant improvement from year to year. Initially the governmental and private health facilities were included in the PHEM network, but there is no strict supervision of health facilities especially private clinics and NGOs. Currently all health facilities is incorporated into the PHEM network except woreda health office.

Generally malaria in the highland areas become common and endemic including in Akaki Sub City. The study shows total malaria confirmed and clinically treated case increase from year to year so more study should be conducted in urban and highland areas of the country including Akaki Kality sub city. Malaria transmission is characterized by the bi- peak of the season, where the first occurs March up to May and the second season is from the September to November, indicating by inclining in malaria morbidity.

Malaria species account are different in different years. According to the result this may help for policy makers to look for the severity of the disease related to the malaria species and for planning of distribution of funds, drugs and prevention and management materials. The study shows *P. vivax* rate is higher than *P. falciparum*; this may be due to migratory patients who may be relapsing of the disease or it may be due to the nature of malaria species.

### **Recommendation**

- MOH, EPHI and RHB should able further Strengthen of routine surveillance by incorporating Woredas in the surveillance system and improving quality, capacity and coverage of a surveillance system for estimation of case prevalence and incidence.

- RHB should be able to give great attention regarding to have continuous surveillance and strengthening of building knowledge and strengthening of surveillance expansion to the health centers as well as to the communities.
- RHB and Sub city PHEM should strictly supervise, monitor and control surveillance system in the health facility, NGOs and private clinics and incorporate other non-including facilities should better give attention by PHEM and the facilities by themselves.

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# **3. Chapter – III: Evaluation of Surveillance System**

### **3.1 Surveillance System Evaluation in Akaki Kality Sub city Health Sectors, Addis Ababa, 2016/2017**

#### **Abstract**

**Background:** Public health surveillance is the ongoing systematic collection, analysis, interpretation and timely dissemination of health-related data for action and program evaluation. Conducting a surveillance system evaluation is crucial for monitoring efficacy and effectiveness of intervention programs in health care systems. This study is intended to evaluate surveillance system in Akaki Kality sub city mainly focusing on malaria and severe acute malnutrition prevention and control activities.

**Method:** A descriptive cross-sectional study design was used to evaluate the surveillance system of the Akaki Kality sub city of Addis Ababa City. We used 4 Health centers, 4 woreda office and the sub city health office in the study. We collected data by interviewing PHEM focal persons at all levels of the system using structured questionnaire for evaluation of surveillance system adapted from WHO and CDC. Additionally, we also used observation of secondary documents and tools used for surveillance at all level to collect data.

**Result:** By 2016/17, a total of 23 suspected measles cases were reported and Malnutrition cases a total of 61 (46%) SAM and 71(54%) MAM cases were reported from sub city. Surveillance data of selected diseases were not analyzed and used for action at all level of the surveillance unit. We identified a lack of a written emergency preparedness and response plan that helps to strengthen capacity in recognizing and responding to public health emergencies. In addition, including sub city, all of the assessed woredas failed to have emergency drugs stock and specific budget line in the system.

**Conclusion:** The overall surveillance system was not operating well to meet its objectives. Even if the surveillance system of the sub city was simple, flexible, timeliness, acceptability and useful, there were attributes and core function that require attention for improvement of the surveillance processes such as data quality, completeness, data analysis and feedback.

In order to increase case detection of diseases; Improving the system performance, reporting and data analysis on regular basis; capacity of health care providers need to be improved through training and supervision.

**Key word:** Surveillance system, Evaluation, Measles, Malnutrition

## **Introduction**

Public health surveillance is an ongoing systematic collection analysis, interpretation and dissemination of data regarding a health related event for the purpose of public health action to reduce morbidity and mortality and to improve community health. In short it also defined as “information for action” [1]. Design, objectives, purpose, mode of operation of each surveillance systems is different. Hence, to ensure quality of data provided by surveillance system, effectiveness, efficiency and usefulness of the surveillance system, should be evaluated periodically [1]. Proper understanding and use of public health surveillance data helps health workers at the health units and health official at different level of the health system to set priorities, plan interventions, mobilize and allocate resources, detect epidemics early, initiate prompt response to epidemics, and evaluate and monitor health interventions [1].

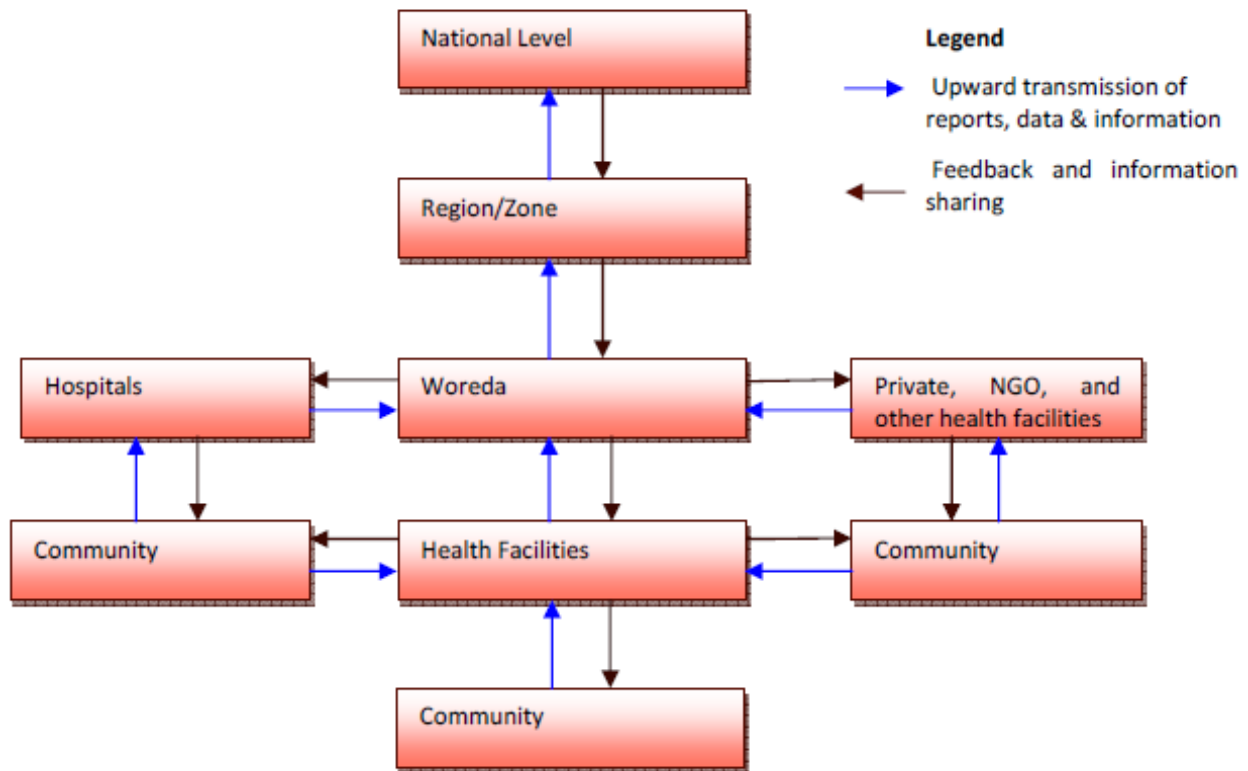
In most developing countries, communicable diseases and malnutrition condition are the most common causes of death, illness and disability. These diseases are Malaria, Measles, Cerebrospinal meningitis, Cholera, Yellow fever, Lassa fever, Tuberculosis, HIV/AIDS, Diarrhea and Pneumonia, etc.[3, 4]. The Federal Ministry of Health has enunciated programs for the elimination, eradication, prevention and control of these diseases, with technical support from development partners [3, 5]. This study is intended to evaluate surveillance system in Akaki Kality sub city mainly focusing on describe key attributes of the surveillance system of Malnutrition and Measles and prevention and control activities.

Measles is an acute, highly contagious viral disease caused by measles virus and it's a member of the genus Morbillivirus of the Paramyxoviridae family. This highly contagious virus is transmitted primarily by respiratory droplets or airborne spray to mucous membranes in the upper respiratory tract or the conjunctiva. Measles is one of the communicable diseases causing preventable mortality and morbidity in the country. Epidemiological surveillance of measles is a major public health strategy in prevention and control of the disease and the surveillance system was established in 2004 [2]. For the period from May 2014 to May 2015 in Ethiopia, 192 outbreaks of measles have occurs, 1,050 outbreak cases were lab-confirmed and 5,682 cases are Epi-linked. There are 14,877 suspected cases of measles reported through May 2015; 19% are lab-confirmed, 80% are Epi-linked, and 1% are clinically compatible. Although the <5 year age group is most affected, cases occurred in all age groups [8].

Malnutrition is a pathological state resulting from a relative or absolute deficiency or excess of one or more essential nutrients. This state being clinically manifested or detected only by biochemical, anthropometric or physiological tests. Severe acute malnutrition is among one of 21 notifiable and weekly reportable diseases in Ethiopia Public Health Emergency Management system including Moderate Acute Malnutrition. Although the Ethiopian government has adopted a crosscutting approach to nutrition over the last decade, there is no specific nutrition policy (2). While the problem of malnutrition in Ethiopia is relatively well documented, its specific determinants are not well understood. Nationally, 44 percent of children under age five are stunted, and 21 percent of children are severely stunted (DHS, 2011). Regional variation in the prevalence of stunting in children is substantial. Stunting levels are somewhat above the national average in the Amhara (52 percent), Tigray (51 percent), Afar (50 percent), and Benishangul-Gumuz (49 percent) regions and are lowest in Addis Ababa and the Gambela region (22 and 27 percent ), respectively (DHS, 2011).

In Addis Ababa city there was no surveillance system at woreda level till end of 2016 GC; it was started at the beginning 2017 including the study area, Akaki Kality sub city, which will to be evaluate. In Akaki Kality sub city, there were no measles and malnutrition surveillance system evaluation conducted before. The goal of the surveillance system evaluation is to assess the effectiveness of the surveillance and response system in terms of timeliness, quality of data, preparedness, case management, overall performance and using the indicators to identify gaps or areas that could be strengthened.

The formal flow of surveillance data is usually from reporting site to the next level up to the national level and to WHO. The community and health facilities at the lowest level particularly health posts are the main source of information about the occurrence of health related events (Fig. 12). The information collected from this site is compiled in standardized forms, analyzed and then forwarded to the district health office by health centers. The district level compiles, analyzes and sends the data to the zonal level by using a standard form. Similarly the zonal level compiles and analyzes the report and sends the compiled data to the region by using a standard form and internet, from which the national level receives the compiled data. The zonal and regional levels usually send the report to the next level by email Telephone. Feedback and information sharing follow the same route, but in the reverse direction (Fig. 12).



Source: Ethiopian National PHEM Guideline

Figure 12. Routine data and information flow chart for public health surveillance activity indicating varying cycles at various levels, Ministry of Health, Ethiopia.

### Rational of the study

Surveillance system evaluation is an important tool to assess the capacity of the system to meet its purpose and objectives; to improve its operation and to optimize the available resources. Hence evaluation of Akaki Kality sub city surveillance system provides information on the surveillance system usefulness, describes the specific attributes, identifies areas that needs improvement and make recommendations to improve the quality, efficiency and usefulness of the system. In addition it can be used as a base line for future evaluation of the system. Measles and Malnutrition are public health important diseases and health conditions selected for evaluation of the system in Akaki Kality sub city. Therefore the findings of this evaluation can be used as an input to strengthen the overall surveillance system activities of the sub city to achieve its intended objectives and purpose.

## **Objectives**

### **General objectives**

To evaluate the performance of core activities and key attributes of surveillance system of Measles and Malnutrition and recommend better solutions to improve performance in the future in Akaki Kality sub city, Addis Ababa 2016/17.

### **Specific Objectives**

- To assess the performance of core activities such as case detection and predicting epidemics, registration, reporting analysis and response of the surveillance system in the study area
- To evaluate and describe key attributes of the surveillance system of Measles and Malnutrition
- To assess support functions: like training, guidelines, supervisions and the resources available for surveillance system
- Assess major gaps, challenges and the strength of the surveillance system in the sub city, woreda health office and Health centers

## **Methods and materials**

### **Involvement of stakeholders**

Before the start of the evaluation activities, discussions were done with head of Akaki Kality sub city health office PHEM core process on selection of a woreda to be included in the study and to ensure that the evaluation of the system addresses appropriate questions and attributes to produce useful and acceptable findings. Moreover we discussed the diseases were selected to be evaluated and the sub city health office PHEM officers suggest two diseases one from immediately reportable diseases (Measles) and one additional disease from weekly reportable disease (Malnutrition).

### **Study Area**

Akaki Kality sub city is one 10<sup>th</sup> sub city of A.A. The Sub city found in south & south east direction of the city. The sub city on the distance of 12-35 Km from Addis Ababa city administration. It is located at a relatively low-lying altitude, 2110 meter above sea level in the out skirt of the city. The sub city has 11 Woreda out of this 3 are rural the rest 8 is Urban woreda. The total Population is 229,755 from this 48% male & 52% female in 2016/17 GC. In the sub city 1 government, 1 private Hospital, 08 government and 3 NGO health center. Eight are function and 2 are under construction, there are 92 private health institutions in urban woreda of the sub city.

### **Study period**

The period from June /2017 to September /2017 was consumed to evaluate one year (from July 2016 to June 2017) performance of sub city surveillance system.

### **Study subject and population**

The study subjects were sub city health office, woreda health offices (4 woredas) and health facilities (4 health centers) which lays in the sub city. The population under surveillance for measles and malnutrition was the total population the sub city.

### **Study design**

Descriptive cross sectional study design was used to evaluate Akaki Kality Sub city surveillance system.

### **Sample size and Sampling technique**

Sub city health office, 4 woreda health offices and 4 health centers, totally 9 sites have been included in the study. Selection of these sites and facilities were done as follow:

#### **Selection of woredas**

Akaki Kaliti sub city is divided in to 11 woredas. We have selected 4 woredas by lottery method discussing with sub city PHEM office head and resident team.

#### **Selection of health facilities**

Regarding health facilities there were a total of 4 health centers under selected woredas and we have selected all 4 woreda health centers.

#### **Data collection procedure**

We were collected data by interviewing PHEM focal persons at all level of the system by using structured questionnaire for evaluation of surveillance system adapted from WHO and CDC. Additionally we have also used observation of secondary documents and tools used for surveillance at all level to collect data.

#### **Data processing and analysis**

We were used Microsoft Office Excel 2013 to enter, organize and describe the data appropriately.

#### **Data quality control**

Data collected by interview at every level was cross-checked with documents availability of the surveillance unit and also completeness of the information after every interview were checked and rechecked.

#### **Ethical consideration**

Before the start of this study official permission letter was obtained from the sub city administration to access sub city, woredas and health centers health office data (PHEM office data). And also verbal consent prior to each interview was obtained from every interviewee.

## **Dissemination of the Study**

The finding of the study was submitted in both hard and soft copy to the AAU- SPH and Akaki Kality sub city. In addition the report will also be submitted to EFETP resident coordinators, Mentors and advisors in soft copy.

## **Operational definitions**

Terms used in the evaluation were operationally mentioned as follows:-

**Case detection:** is the process of identifying cases and outbreaks.

**Case registration:** is the process of recording the identified cases

**Case/outbreak:** Confirmation: refers to the epidemiological and laboratory capacity for confirmation.

**Reporting:** Refers to the process by which surveillance data moves through the surveillance system from the point of generation.

**Epidemic preparedness:** Refers to the existing level of preparedness for potential epidemics

**Stakeholders:** The organizations or individuals that generate or use surveillance data for promotion of health, prevention and control of diseases.

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

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

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

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

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

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

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

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

**Sensitivity:** - The sensitivity of a surveillance system can be considered on two levels. First, at the level of case reporting, sensitivity refers to the proportion of cases of a disease (or other health related event) detected by the surveillance system. Second, sensitivity can refer to the ability to detect outbreaks, including the ability to monitor changes in the number of cases over time.

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

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

**Usefulness:**- How helpful the system is to public health staff in taking actions as a result of interpreting and analyzing its data.

## **Result**

The surveillance system of Akaki Kality sub city was assessed. In this assessment a total of 9 health sector were included. The evaluation was assess the core activities (case detection and registration of data reporting, data analysis, outbreak investigation, epidemic preparedness and response; existence and functionality of RRT and the surveillance feedbacks), supportive functions and quality components (system attributes) of the surveillance system were evaluated. The evaluation assessed the surveillance system of one immediately reportable (Measles) and one weekly reportable disease (SAM and MAM). In all visited health centers and woreda health office, the surveillance of these diseases exists and functioning with limitations. For measles detection, standard case definitions were available in all of the health facilities, but in all visited health centers there were no a cases definition regarding Malnutrition (SAM & MAM). However, from the total 4 visited health centers 1 (25%) health centers were not posted case definitions for measles on the wall of Emergency OPD and OPD.

### **Description and Importance of the surveillance system to be evaluated**

#### **Description of surveillance system**

The FMOH of Ethiopia identified 21 top priority diseases and health conditions to be reported by the surveillance system which are important public health events that fulfill one or more of the following conditions; have high epidemic potential (measles, cholera, meningitis, smallpox, SARS, yellow fever, avian human influenza, malaria), required internationally under IHR 2005 (Smallpox, SARS, Wild type poliomyelitis, Human influenza), disease targeted for eradication or elimination (Wild type poliomyelitis, dracunculiasis, neonatal tetanus), diseases that have a significant public health importance ( Rabies, Dysentery, Relapsing fever, Malnutrition, Typhoid fever) and diseases that have effective control and prevention measures (2).

In Akaki Kality sub city these identified 21 top priority diseases and health conditions are monitored by Addis Ababa city Administration Health Bureau, Akaki Kality sub city health office PHEM core process, Woreda health office PHEM officer and health facilities focal person through available means of communication like telephone, paper based reporting etc. These diseases are set to be reported as mandatory notification (which are immediately reportable) diseases and routine surveillance (which are to be reported weekly).

Table 8. List of reportable top priority diseases and health conditions in Akaki Kality, Addis Ababa, Ethiopia

Immediately Reportable Diseases	Weekly Reportable Diseases & conditions
1. Acute Flaccid Paralysis (AFP)	15. Dysentery
2. Anthrax	16. Malaria
3. Avian Human Influenza	17. Meningococcal Meningitis
4. Cholera	18. Relapsing Fever
5. Dracunculiasis/Guinea worm	19. Malnutrition (SAM and MAM)
6. Measles	20. Typhoid Fever
7. NNT	21. Typhus
8. Pandemic Influenza A	
9. Rabies	
10. Smallpox	
11. SARS	
12. Viral Hemorrhagic Fever (VHF)	
13. Yellow Fever	
14. Maternal Death (MDSR)	

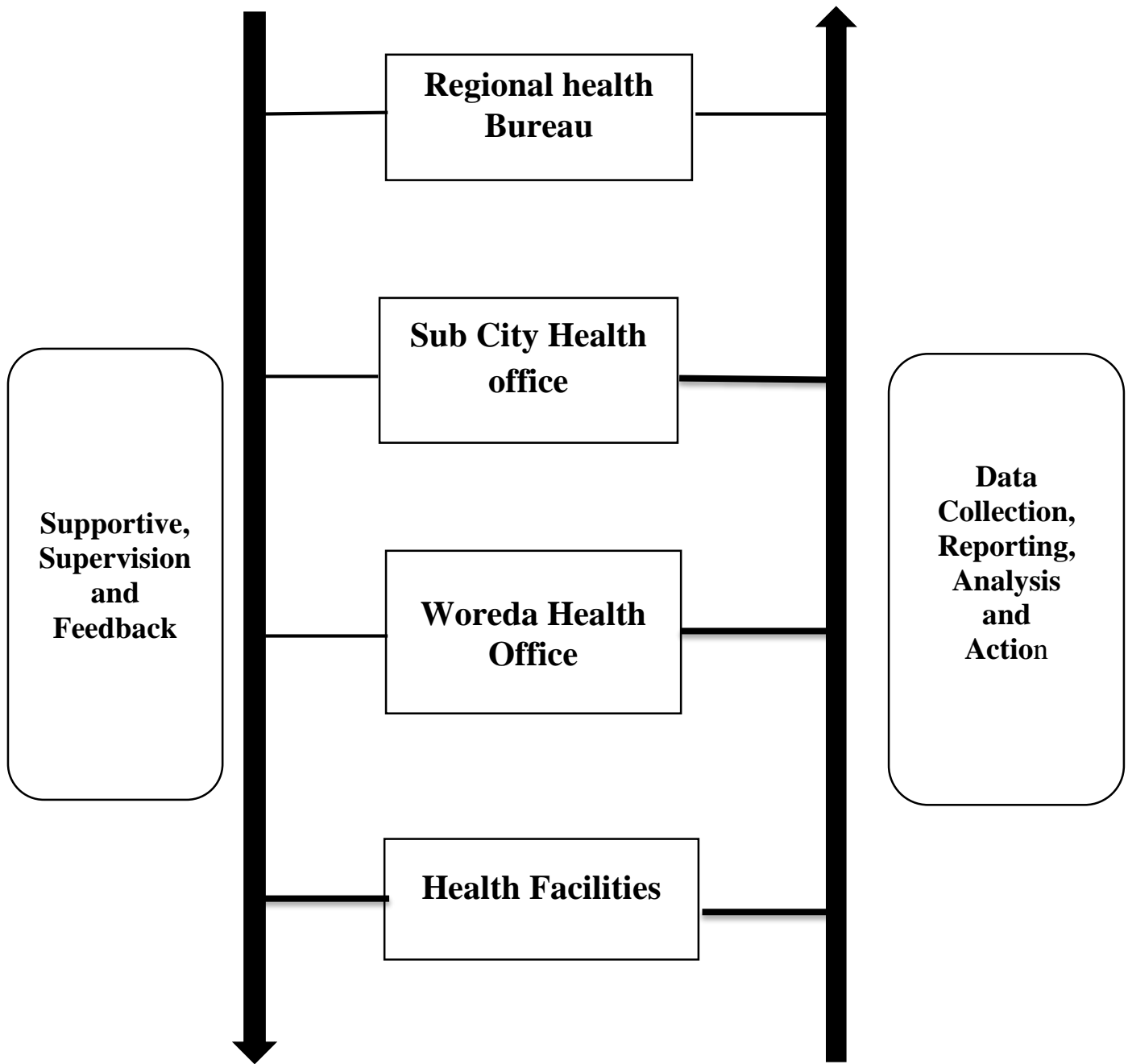


Figure 13 Diagram illustrating the formal flow of surveillance data in Akaki Kality Sub city, Addis Ababa, 2017

These 21 reportable diseases and any public health related threats and risks will be reported. The report start from the health facilities and move to the next level while feedback and supervision begins from upper level to lower level as shown on the above diagram.

**Public health importance of the surveillance system to be evaluated**

This surveillance system evaluation assessed one immediately reportable disease (Measles) and one weekly reportable disease (Malnutrition). They are important public health problems of the sub city that causes potential to outbreaks/epidemics and significant amount of morbidity and mortality in the sub city if the surveillance system not operates properly. To detect and report these important public health problems the surveillance system uses two types of case definitions (standard and community case definitions) for each events.

**Malnutrition**

In Akaki Kality sub city from July 2016 to June 2017, a total of 132 cases and 0 deaths due to Malnutrition were reported. Of these, 61 (46%) were sever acute malnutrition (SAM) and 71 (54%) were moderate acute malnutrition (MAM). All SAM cases were referred to the catchment hospital and the rest moderate malnutrition cases treated in health centers OPD.

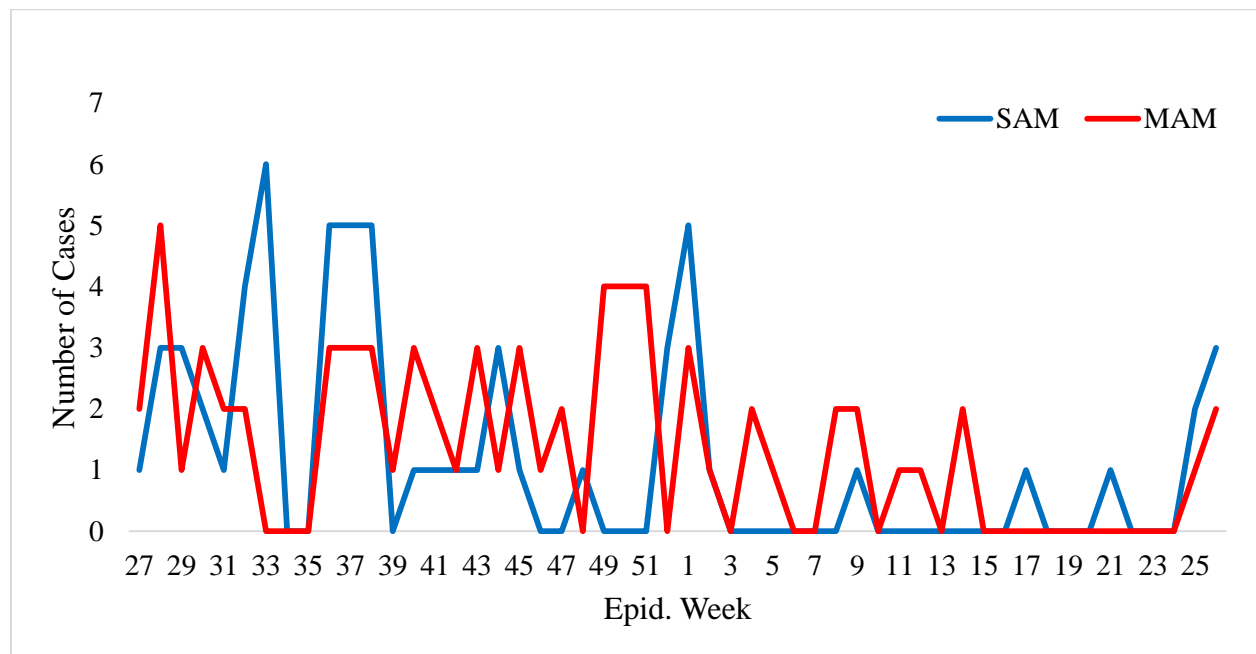


Figure 14 Trends of SAM and MAM malnutrition cases by week, Akaki Kality sub city, Addis Ababa from July 2016 – June 2017.

## Measles

During 2016/2017 GC, a total of 23 cases and 0 deaths were reported due to measles in Akaki Kality sub city. Of these cases, 19 (82.6%) were reported from January 02/01/2017 - July 02/07/2017 and there was no outbreak occurred during the year 2016/2017 (fig 5).

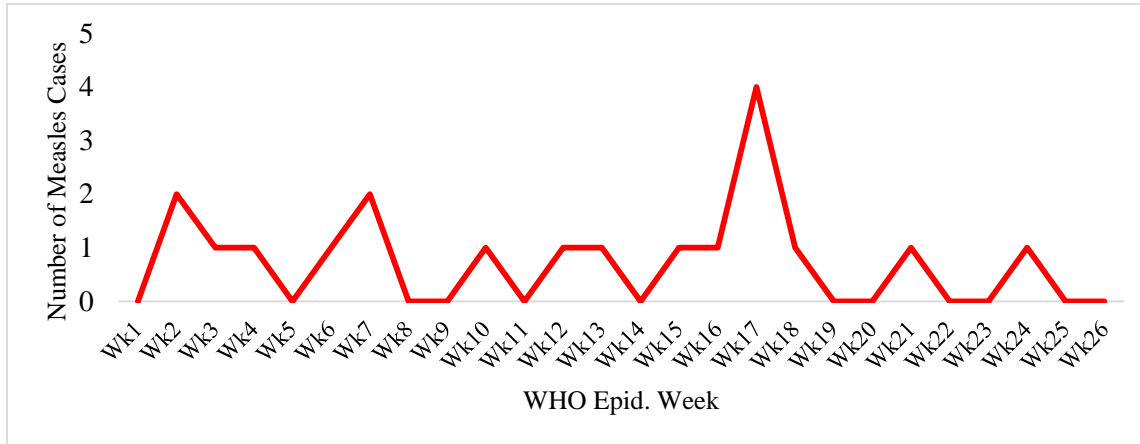


Figure 15 Trends of measles cases by week in Akaki Kality Sub city, Addis Ababa from January 02/01/2017 - July 02/07/2017

## Core activities and supportive function of surveillance system

### Availability of National PHEM Guideline

It is expected that a Public Health Emergency Management guideline is distributed for all sub city of Addis Ababa city administration. In the same manner, Akaki Kality sub city had distributed this guideline for its Woredas. We found in all visited woredas of Akaki Kality sub city. In addition, health centers were supplied with National PHEM guidelines except, one health centers (25%) among 4 visited health centers.

### Case Detection, Registration and Case definitions

Standard case definitions for all prioritized diseases are available at Akaki Kality sub city and visited woredas. In addition in all visited health center standard case definition for some diseases are available such as for Measles, AWD, NNT and AFP, but in all visited health centers there were no a cases definition regarding Malnutrition (SAM & MAM) in the sub city. Although, from the total 4 visited health centers 1(25%) health centers were not posted case definitions for measles on the wall of Emergency OPD and OPD. At visited woredas and health centers no recent outbreak

was occurred and detected on a selected diseases (measles & malnutrition) within last 1 year. At all visited health centers, there is clinical registration and it was identified that diseases are correctly filled in clinical registration. Except in 2 health center for which respondent did not correctly told diagnosis of one selected disease (malnutrition) using standard case definition, the rests visited health centers respondents were observed to diagnosis the disease very well.

### **Standard Case Definitions**

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

**Sever Acute Malnutrition:** - Children age from 6 months to 5 years with MUAC less than 11cm and/or children with bilateral edema regardless of their MUAC.

**Moderate Acute Malnutrition:** - Children age from 6 months to 5 years with MUAC greater than 11cm and less than or equal to 12cm and/or children with bilateral edema regardless of their MUAC.

### **Community Case Definitions**

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

**Sever Acute Malnutrition:** - Children age 6 months to 5 years with bilateral leg edema.

### **Data Reporting**

Federal Ministry of Health and its stakeholders are responsible for designing and preparation of PHEM reporting formats. Akaki Kality sub city health office has provided these format through Regional Health Bureau and NGOs. During the last six months, shortage of weekly PHEM reporting formats was observed in 2 (50%) woredas and 1 (25%) health centers. However, these woredas and health centers solved their problem by copying the formats. Akaki Kality sub city is use telephone and paper based mail to report weekly surveillance activities to next level. All visited woredas and health centers are using both paper based mail and telephone to report for sub city health office.

## **Data Analysis**

At Akaki Kality sub city, for some diseases like malaria, typhoid and epidemic typhus are analyzed quarterly by time and place during quarter performance report of the sub city. But, for measles and malnutrition (SAM & MAM) at sub city level (Akaki Kality), analysis didn't performed at all during the last 1 year. Except 1 woreda (woreda 2), at all visited woredas, analysis didn't performed at all during the last 6 month for any priority diseases including measles and malnutrition (SAM & MAM). This may be due to recently establishment of surveillance system at woreda level with in less than 8 or 7 month (lack experience) and lack of awareness, training, commitment and resources such as computer and printers. During this assessment, any of priority diseases are not analyzed in all visited health centers. At all levels, PHEM and focal persons are responsible for data analysis of top priority diseases.

## **Existence of Action Threshold Levels**

Action threshold level is available at sub city, all visited woreda and health centers level on National PHEM Guideline. In addition, in 3 of health centers out of 4 visited health centers there are action threshold levels for two selected diseases. Even though there are thresholds levels for 21 prioritized diseases on National PHEM guideline, some health centers focal persons did not know/understand it properly. For example, among 9 PHEM focal person of woreda and health centers who were asked for threshold levels for measles, 7 (77.8%) of them were respond correctly, but for malnutrition, 6 (66.7%) of them were not respond correctly. This exhibited that utilization of surveillance manuals and guidelines is not good at woredas and health centers levels.

## **Outbreak Investigation**

During 2016/17, measles and malnutrition (SAM & MAM) outbreaks were not reported from any woreda of Akaki Kality sub city and also outbreak investigation did not performed on the selected diseases during the year.

## **Epidemic Preparedness and Management**

There is written epidemic preparedness and response plan at Akaki Kality health office. But, there were no emergency drugs and supplies at all were encountered in the past one year at Akaki Kality sub city. There was no written epidemic preparedness and response plan at all visited woredas except one woreda (woreda 2). In addition, there was also no medical drugs and supplies for emergency management in all visited woredas during the past one year.

Regarding existence and activities of epidemic management committee, there are established committee at sub city health office and at 1 (25%) woreda out of 4 visited woredas. During this assessment, it was identified that established committee at both levels is not working regularly. There is no budget line for epidemic response at Akaki Kality sub city health office and at all visited woredas. Nevertheless, they use from others budget sources and supported by regional health bureau during epidemic. In addition there is epidemic rapid response team at all visited sites (sub city, woredas and health centers).

## **Availability of Budget and Resources for Surveillance Activities**

There is budget allocated from government source for PHEM activities at regional level. Unlikely, there is no allocated budget from government source for public health emergency activities at sub city level in Addis Ababa city administration. This problem is extended to the woredas and they are depending on sub city or regional support. Due to this reason, woreda PHEM focal persons were become demotivated for surveillance activities. Even though all visited woredas had computers and its accessories, but they did not have for PHEM activities separately rather they use it for all activities. Stationery is not enough at all health centers. In addition shortage of hygiene and sanitation materials was observed at all woredas and 2 health centers, but all visited health centers has disinfectant and 2 woreda has disinfectant & spray pump.

Table 9. Availability of resources for surveillance activities at Sub city PHEM office, woredas and health centers level, Akaki Kality sub city, Addis Ababa, 2017

S. No	Resources	Akaki Kality Sub City			Woredas			Health Centers		
		N	N	%	N	n	%	N	N	%
1	Electricity	1	1	100	4	4	100	4	4	100
2	Computer	1	1	100	4	0	0	4	0	0
3	Printer	1	1	100	4	0	0	4	0	0
4	Stationary	1	1	100	4	4	80	4	4	100
5	Vehicle	1	0	0	4	0	0	4	0	0
6	Motor Cycle	1	1	100	4	0	0	4	0	0
7	Fax	1	0	0	4	0	0	4	0	0
8	Telephone	1	1	100	4	4	100	4	0	0

*N.B. N- Number of health facility visited*

*n- Number of health facility avails of resources*

## Feedback

Akaki Kality sub city health office PHEM department was received 20 written feedback bulletin (almost 2 feedback per month) from regional level during the year 2016/17. Also the sub city health office department had given written feedback at least 1 times for most woredas during last 6 month prior to assessment in 2016/17. However this activity was not regularly done for all woredas at this level. Many woredas, 4 out of 3 visited woredas had given written feedback for health facilities with integration of other activities that consists few indicators of surveillance activities 1 times with in the last 6 month. Nonetheless, Woreda 6 has prepared and disseminate written feedback for their health facilities on surveillance activities 2 times within the last 6 month. In majority of observed woredas, producing and dissemination of written feedback for health

facilities is unsatisfactory. Additionally, PHEM focal persons at woreda level have been giving feedback for health facilities orally and signing on their registration book during their field visit.

### **Supervision**

During the past six months, Akaki Kality sub city health office conducted supportive supervision only once time on surveillance activities for woredas and health centers. . Reporting system, active case searches and other surveillance activities were reviewed in supervised woredas and health centers. Shortage of vehicle, budget and logistics were attributed for incapability of conducting regular supportive supervision at sub city level. All, visited health centers and woredas PHEM office had been supervised during the past 6 months by higher levels (Sub city level). All woredas have not conducted integrated supportive supervision for health facilities with standard surveillance indicators, but most woredas PHEM officers' conduct field visits at health facilities every 2 weeks – 4 weeks with core surveillance activities. Reporting system, active case searches and other surveillance activities were reviewed in supervised woredas and health centers.

### **Training of Surveillance Activities**

During the assessment year, Akaki Kality sub city PHEM unit being with Addis Ababa city administration health bureau PHEM unit have conducted refreshment training course on surveillance system for woreda health office and Health centers PHEM focal persons. In all visited health centers and one woreda health office, PHEM focal persons were trained on basic surveillance system and National PHEM Guideline. Generally, the sub city PHEM officers, all health center focal person and only two woreda PHEM officers were trained on basic surveillance system during the last 2 years.

### **Description of the Laboratory Capacity and Case Confirmation**

#### **Case Confirmation and Laboratory Capacity of Woredas and Health Facilities**

All visited woredas have not the capacity to transport specimens to higher levels for confirmatory test. This can be due to that, in addition to recent establishment of surveillance system at woreda level, lack of trained personnel on this and lack of enough cold chain equipment at this level. Also any of these woredas have not guidelines of specimen collection, handling and transportation. Laboratory of all visited health centers has ability to collect and diagnose sputum, urine, stools and

blood specimen. In addition there are trained staffs and good cold chain system in 4 (100%) of health centers to transport specimen of suspected measles and acute flaccid paralysis cases.

## **Description of the key attributes of the Surveillance System**

### **Usefulness**

At sub city level, visited all woredas and health centers, it was identified that the current surveillance system is helpful for early detection of outbreaks. This was confirmed during recent outbreak of relapsing fever (RF) in this sub city that the system was well enough in disease detection and control activities. Government and non-government organizations have used surveillance data to make decisions and take actions.

Measles and malnutrition surveillance system found useful to measure burden of the disease or the problem in some level. Respondents at sub city, all visited woredas and health centers believe that the system is good enough to estimate magnitude of morbidity and mortality of selected diseases. However, late or no feedback from central laboratory on sent specimen for confirmatory test has being a challenge in early detection and management of outbreaks.

### **Simplicity**

All respondents at sub city, woreda and health centers agreed that case definitions of selected diseases (measles and malnutrition) are easy and applicable for case detection by all level professionals. All respondents at each level were familiar with when and for whom report will send. Respondents at all level told that it takes 10 - 15 minutes to fill weekly reporting format on morbidity and mortality of priority disease. Similarly, respondents at sub city and woreda levels agreed that it takes about 10 minutes to disseminate weekly reports through phone.

### **Flexibility**

As the current reporting format contains additional spaces at the end for both weekly and immediately reportable diseases with namely; others, it can accommodate newly occurring health events/disease (new disease emerged) to fill on without any difficulty. But there is limitation of the format in lacking some variables which most required for analysis like age, sex, address and clinical symptoms.

## **Data Quality**

Reporting formats of weekly and immediately reportable diseases are well understood at sub city, woreda and health center levels. But at health center there were some missed variables in the PHEM reporting formats, like epidemiological week, blanks zero report instead of writing 0 number in blank space and date of the report sent to next level and some of the missed variables in the case based report formats of measles were, date of report for higher level, vaccination history, full address. Unlike 2 woredas (woreda 2 and woreda 6) other woreda health offices didn't recorded number of sites expected to report and number of sites reported on time on the form that are important variables to determine completeness and timeliness of the reporting. The main reasons for poor data quality were lack of training for woreda PHEM focal person and health center focal persons, work overload, lack of attention, lack of commitment, lack of supervision and feedbacks specific to surveillance.

## ***Acceptability***

Acceptability of surveillance reflects the willingness of persons and organizations to participate in the surveillance system. Acceptability is a largely subjective attribute that encompasses the willingness of persons on whom the public health surveillance system depends to provide accurate, consistent, complete, and timely data (6).

Among the health sectors available in Akaki Kality sub city all woreda health offices, health centers and NGO health facilities were 100% active participant whereas private Hospitals and clinic participation on average were 83% in the past 12 weeks prior to the evaluation. Of all facilities, privates are less likely to send weekly PHEM report. This can be due to lack of understanding the relevance of data by these facilities and weak monitoring system of governmental organizations.

Overall participation rate of all health sectors found in the sub city were 91.5%. So, the reporting system at place is acceptable by participant agents and health professionals at large. Different stakeholders like WHO, UNICEF, CDC and others are participating in strengthening surveillance system in collaboration with Regional and sub city health offices.

## **Representativeness**

Following implementation of health extension program, majority of the population are accessed to basic health services as a result of many health centers have been constructed in each woreda in Addis Ababa city administration since implementation of this program. During the assessment in Akaki Kaliti sub city there were 8 health centers, 3 NGO health facilities and 85 private clinics and also 3 health centers under construction for 3 rural woredas of sub city respectively. The primary health service coverage of the sub city was 75%. The health seeking behavior of the communities dramatically changed as a result of awareness creation done by Health extension workers.

## **Timeliness and Completeness**

Timely report of surveillance data is important for early public health interventions. Timeliness of the public health surveillance is usually considered that time interval between the onset of health-related event and the reporting of the event within the time period specified in national PHEM guideline to the public health agency responsible for immediate control effort, prevention of continued exposure or program planning. The 2016/17 weekly report timeliness of the sub city was 92%. However, we couldn't able to determine the timeliness of visited health centers due to incompleteness and absence of copy of reported data, but the PHEM data that compiled in the sub city health office shows that timeliness of all health facilities including NGO health centers and private clinics was an average 91.6% in the past three month prior to the assessment. The average weekly reporting rate/completeness of the sub city and woreda health office were 100% in the past three month prior to the assessment.

## **Stability**

Availability of PHEM focal persons at sub city, woreda and at all Health facility level is a good opportunity for running surveillance system even with limited resources. However shortage of budget and logistics specific to the system is hindering supervision and capacity building activity at woreda and health facility level. Moreover being engaged on additional duties or activities than of PHEM focal persons at all levels were also affected the stability and proper functioning of the system to achieve its intended objectives and purpose.

## Discussion

In short public health surveillance systems defined as “information for action”. Design, objectives, purpose, mode of operation of each surveillance systems is different. Hence, to ensure quality of data provided by surveillance system effectiveness, efficiency and usefulness of the surveillance system, should be evaluated periodically. The evaluation should assess how well the public health surveillance system is integrated with other surveillance and health information systems (e.g., data exchange and sharing in multiple formats, and transformation of data) to promote and encourages best use of scarce resources and activities which can be combined taking advantages of similar public health resources, functions, skills and target population. No perfect system exists; however, and trade-offs must always be made. Each system is unique and must balance benefit versus personnel, resources, and cost allocated to each of its components if the system is to achieve its intended purpose and objectives [1].

In Akaki Kaliti sub city the structure of surveillance data reporting flow from the periphery to the higher level was well organized in simple and defined role and responsibility of each reporting entities, there were problems with reporting means due to lack of transport, telephone, fax and computer for data management and analysis, this affected the overall generation of reports. Our findings showed that most of the assessed woreda health office and health centers had PHEM guideline including the sub city health office. Many of the assessed woreda health office has shortage of standard reporting formats; however, they were performing their task by coping or printing the format in the last 6 month prior to assessment period. The data reported from peripheral health facility to the woreda was also not well organized and documented. The average reporting rate of the sub city was 91.5% in the last 6 months prior to assessment which was lower than the expected 100%.

The core functions of the surveillance system recording, reporting, analysis and feedback have a direct implication on the quality of surveillance data. Surveillance data should have good quality because without quality public health data, interventions may mislead decision makers [9]. At the health facility level data was collected and recorded in registry books. The understanding of measles and malnutrition case definition by PHEM focal person was found to be satisfactory and also collection and registration of data was complete and clinical registers and reporting formats were uniform during 3 month prior to assessment. Except sub city health office all visited woreda

health office and health centers were not entered surveillance data to electronic data base and also surveillance data was not analyzed and interpreted for action or decision makers. This makes difficult to pick disease of highly public health sensitive or the true outbreak may be hidden at woreda level at the time. Such weak performance could be due to lack of necessary resource (computer and statistical package to perform data analysis), poor monitoring and supportive supervision and feedback system in the surveillance activities.

Supportive supervision helps to strengthen the capacity of staff and ensure that the right skills are used appropriately, the necessary logistics are in place, and that planned activities are implemented according to schedule. Supervision is an important support function that ensures success in the implementation of a surveillance system. A well-functioning system is frequently backed up by regular and purposeful supervisory support. In Akaki Kality sub city, there were no done regular feedback and supportive supervision given to the lower levels. Supportive supervisions were done only 1 times during the year 2016/17 which was less than the expected plan.

Epidemic preparedness refers to the existing level of preparedness for potential epidemics and includes availability of preparedness plans, stockpiling, designation of isolation facilities, setting aside of resources for outbreak response [2]. At all levels, there were no well-organized epidemic preparedness and response planning, and no financial and/ or logistic support. There is no written epidemic preparedness and response plan epidemic management committees at all visited health sectors except sub city health office and woreda 2 health office. This may cause weak case detection and response during epidemics.

The aim of preparedness is to strengthen capacity in recognizing and responding to public health emergencies through conducting regular risk identification and analysis, establishing partnership and collaboration, enhancing community participation and implementing community-based interventions and strategic communication during the pre-emergency phase and ensuring their monitoring and evaluation [11]. It was identified that rapid response team is formed at all level, but functional only during outbreak. Feedback is a key function of public health surveillance system. Many of visited woreda had given at least one written feedback for some health facility during the last 6 month prior the assessment. Regional health bureau is essential role player in preparing and disseminating feedback of surveillance activities for sub cities and sub cities for woredas in different method, our result shows that Akaki Kality sub city health office PHEM

department was received 20 written feedback bulletin (at most 2 feedback per month) from regional level during the year 2016/17 and many woredas were received at least 1 written feedback during the last 6 month prior to assessment. Current practice of the region on preparation and dissemination weekly bulletin is a good starting point to strength feedback system.

Report completeness rate is one of the indicators to determine whether the surveillance system is our result shows that Akaki Kality sub city health office PHEM department was received 20 written feedback bulletin (at most 2 feedback per month) from regional level during the year 2016/17strong or not. According to the finding, Akaki Kality sub city PHEM weekly surveillance report completeness is higher than the national target, 80% [10] which accounts 100%. Timeliness is one of quality measure of any surveillance system and should be monitored regularly. It is a key element of the surveillance system that indicates the system's ability to take appropriate action on public health problems, based on the urgency and the type of responses needed. When reports are sent and received on time, the possibility of detecting a problem and conducting a prompt and effective response is greater. So that, ministry of health prepared an indicator to measure the timeliness of the report and aimed to reach a target of 80% [10]. We investigated that, the sub city reporting timeliness was satisfactory, it was higher than the national target, which accounts 92%.

This good result will increases the quality of work towards disease surveillance as the reporting weekly itself tells the sensitivity of surveillance system. This clearly illustrates that timely reports will give timely information which helps to predict future outbreaks, trends of diseases occurrence, cases for further studies, future impact of diseases surveillance and action for problems identified on time.

Operational budget is one of the supportive functions of the surveillance system. There was no budget line at sub city, woreda and health facilities level at all for surveillance. Study suggest that failure of surveillance systems in developing countries is often due to limited available resources, lack of knowledgeable staff, disorganization, and poor infrastructure for finding and reporting cases.

## **Limitation of the study**

- Private health facilities were not included in the assessment.
- Data were not available to trace trends at health facilities.
- Incomplete data was a big problem to calculate most of the indicators which help to measure basic indicators for measles surveillance system.
- Unable to determine report timeliness of woredas and health centers due to poor handling and management of data (absence of variables needed timeliness).
- Unable to determine report completeness of woredas by health center due to absence of data on the number of reported and expected sites under their catchment area on weekly report.
- Unable to determine sensitivity of the system quantitatively without knowing false negatives and true positives that identified by the system, which requires collection or access to data external to the system (E.g. population survey).

## **Conclusion and Recommendations**

### **Conclusion**

Based on the assessment made, we can hardly say that there is alive surveillance system going on in all assessed health sector in the sub city. However, the overall surveillance system was not operating well to meet its objectives. Even if the surveillance system of the sub city was simple, flexible and useful there were attributes that require attention for improvement of the surveillance processes such as data quality, completeness, timeliness and sensitivity. Additionally supportive surveillance activities of the sub city were not satisfactory, which have impact on surveillance system attributes and this was due to lack of budget for surveillance and related logistics. Hence, efforts should be exerted to improve the system mainly on supportive supervision, feedback, emergency preparedness, proper and timely feedback, outbreak investigation, data management and analysis of top prioritized diseases.

The analysis of the PHEM data was done at sub city level, but nonexistent both at woreda and health facility level. The reporting rate of the Akaki Kality sub city was more than expected (>80%) in the last one prior to the assessment and surveillance data analysis was limited at sub city level.

We also identified lack of written emergency preparedness and response plan and epidemic management committee that helps to strengthen capacity in recognizing and responding to public health emergencies. In addition we identified that all of assessed woredas including sub city health office failed to have emergency drugs stock and most of facilities in the system have experienced emergency drugs shortage in the past one year.

In general increase government commitment for sustainability and stability by providing adequate resources and provide training for health professional and regular supervision on 21 priority disease in order to improve the system performance to detect, report and contain timely. Overall improve the quality of data needs structural set up of the surveillance system. Also assign good and responsible person in the unit/ focal person at each woreda and health facility level and involvement of the community in the structure is admirable.

## Recommendations

The goal of strengthening surveillance system (Measles diseases and Malnutrition condition) reporting at each level of the health facilities and offices is to produce a system that values information for the role in guiding decision making. We recommend the following actions for surveillance system to be improved:

- Top 21 priority diseases (Measles and Malnutrition) surveillance data should be analyzed, interpreted and used for decision making. All the peripheral (Woredas and Health facilities) staff should be able to manually organize, summarize and display data in table and graphs as appropriate.
- Completeness and timeliness of the peripheral health sector (Woredas and Health facilities) surveillance data should be improved by regular monitoring, program specific supportive supervision and feedback system.
- In order to increase cases detection of diseases, improve the system performance, reporting and data analysis on regular basis; the capacity of health care providers of both governmental and non-governmental health facilities should be builds through conducting training on disease surveillance and response at woredas and health facilities level.
- Training on basic standard procedures for outbreak investigation and use of the result for action should be given to all woredas RRT members (Sub city Health office).
- Registration book should be checked at regular basis at all health facilities by woredas PHEM office to strengthen appropriate documentation.
- For the system to be stable and acceptable by all levels the national PHEM and regional health bureau should have to assign a budget specific to the system at sub city and woreda level.
- Updated Surveillance guidelines of all priority diseases including measles and malnutrition should be available in all health facilities and health offices.
- Plan for specific ISS (Integrated Supportive Supervision) for PHEM department should be prepared at sub city and woreda health office level and the supervision should be conducted every quarter based on the schedule. Similarly regular and supportive Feedback should be given to lower level based on the supervision findings.

- Reporting formats should be redistributed to woredas health office and health facilities especially for health centers. Additional PHEM manual, standard case definition and case management protocol should be distributed for all peripheral health sectors.
- Written emergency preparedness and response plans should have to be prepared at all levels of the surveillance system. In addition all levels should have to establish Emergency response management team with identified role and responsibilities. Also activities of the team need to be documented properly including the meeting minutes.
- Laboratory results of measles specimens referred to the national laboratory should have to be communicated as early as possible to confirm suspected outbreaks and take action timely.

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# **4. Chapter IV- Health Profile Description Report**

## **4.1 Health Profile Assessment Report of Akaki 01 Woreda, Akaki Kality Sub city, Addis Ababa 2008 EFY**

### **Abstract**

Health Profile assessment is a systematic collection, organization and documentation of health and socio-demographic data from a specific area. This summarized and comprehensive health profile data of the woreda is important for public health officials and stakeholders to use it for policy development, planning and evaluation of public health programs.

We collected retrospective health and demographic data from Akaki 01 woreda and Akaki Kality sub city, from February 21, 2017 to March 11, 2017 by using standard checklist and interview. The data was analyzed using Microsoft Excel 2013.

The total area of the woreda is about 604 hector. Administratively, the woreda is divided in to 11 ketena. The population of the woreda in 2008 EFY was estimated to be 31,526; of whom 15,133 (48%) were males. In 2008 E.C the woredas full immunization coverage, contraceptive acceptance rate and all form of TB case detection rate was 100%, 33.7% and 100 % respectively. The leading cause of adult outpatient (OPD) visit was ARTI, Acute febrile illness and trauma, whereas the leading causes of under-five OPD visit was ARTI, Diarrhea (Non-bloody) and pneumonia. HIV prevalence was 3.4%.

One of the leading cause of adult OPD visit was trauma; hence health official's in collaboration with the woreda police should have to work hard on prevention and control of trauma.

**Key word:** -Health profile, Health indicators, District Health system

## **Introduction**

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

Our Country had set five years Growth and Transformation Plan since 2003 E.C. This strategic plan will lead the country to the achievement of Millennium Developmental Goals. Different cross cutting approaches are in place to enhance this plan. Of these activities, Demographic Health Survey that is carried out nationally and health profile description at each administrative level is a tool for updating status and input for planning [1].

Communicable diseases constitute the main burden of disease in terms of morbidity and mortality like Tuberculosis, malaria and HIV/AIDS. Nutritional status, Maternal and child health is another major challenge in Ethiopia. Variations in key health service indicators have been observed between urban and rural regions in Ethiopia. Despite improvements in vaccination coverage, coverage rates remain low (32 percent for DPT3 and 35 percent for measles), particularly when compared to the average for low-income countries (67 percent for DPT3 and 63 percent for measles) and Sub-Saharan Africa. Ethiopia suffers from a severe shortage of both health personnel and accessible facilities. Approximately 30 percent of households were estimated to live more than 10 kilometers from the nearest hospital, health center, or health station [2].

The study is conducted in Akaki Kaliti sub city Akaki 01 Woreda which is one the eleven Woreda of the sub city. The study is also helpful in reminding the woreda officers, their past accomplishment and what to be done in the coming future, including plan updates based on the feedback of this assessment in the area [3].

The purpose of a community health assessment is to collect, analyze and present information so that the health of the population can be understood and improved, and to provide evidence to inform health service planning. It provides baseline information about the health status of community residents, tracks health outcomes over time, and helps to identify opportunities for disease prevention, health promotion and health protection [4].

### **Significance of the study**

Health profile description is very important to understand the demographic, socio-economic status, morbidity, mortality and other health and health related indicators in the given woreda and, the data needs to be summarize and compile well. The information generate from health profile description will help sub city health department, woreda health office, health center and other health stake holder in public health planning, resource allocation, intervention and system evaluations as well.

## **Objective**

### **General objective**

To assess and describe the health and health related profile of Akaki 01 Woreda by the year 2008 E.C. and so as to identify and recommend on areas that needs improvement.

### **Specific objective**

- To describe the demographic characteristics of the population in Akaki Kality sub city Akaki 01woreda 2008 E.C.
- To describe health delivery infrastructures and health delivery status in Akaki Kality sub city Akaki 01woreda in 2008 E.C.
- To describe the health status of the population in Akaki Kality sub city Akaki 01woreda in 2008 E.C, using health and health related indicators.
- To make recommendations based on the findings.

## **Methods and Materials**

### **Study area and period**

The study area was Akaki 01 Woreda which is one of 11 Woreda in Akaki Kality sub city of Addis Ababa. This woreda found in south & south east direction of Akaki Kality sub city. To develop this profile on a one year data (from July 01, 2007 E.C up to June 30, 2008 E.C) is used.

The woreda on the distance of 5-15 Km from the Akaki Kality sub city office. The total Population was 31,526 from this 48 % male & 52 % female .The woreda had 1 government Health center, 11 private and 1 NGO clinics. And all of them are functional.

### **Study design**

A retrospective descriptive cross sectional study design was applied to develop this profile description of Akaki woreda 01 by review of primary & secondary data on the Annual basis.

### **Data Source and collection**

To develop this profile, data was collected and reviewed from the following sources.

- Akaki 01 Woreda health office, plan and program core process and Education office.
- Akaki 01 health center HMIS report, PHEM & health extension weekly, monthly, quarterly and annually report. Additionally graph, chart & post wall chart.
- Review of related Literatures conducted in Addis Ababa and Akaki Kality Sub City.

### **Data Management and quality**

Health and Health related data collected from the above organizations were entered and analyzed using Excel 2013 and the result would presented using tables and different figures and charts. Keep the data quality by recording keeping and Cross revisit.

### **Ethical considerations**

A formal letter was submitted to the for all level of the administration to receive the appropriate information

## **Result**

### **Geography and Climate**

Akaki 01 woreda is one of 11 woreda in Akaki Kality sub city of Addis Ababa. Akaki 01 woreda is surrounded by four woreda of Akaki Kality sub city and it shares boarder on the north with woreda eight and woreda nine, on the south with woreda two, on the west with woreda three and woreda two and on the east with woreda nine. The woreda lies between  $9^{\circ}05'95''$ N latitude and  $47^{\circ}76'93''$ E longitude. It is found in the elevation of ranging from 2050 to 2331 meters above sea level. The total land area of the woreda is 604 (4.89%) hectare covered, it is the third highest dense from 11 woreda of the sub city and population density is 52 people per hectare. The distance of the woreda from Akaki Kality sub city office ranges between 05 to 15 Km.

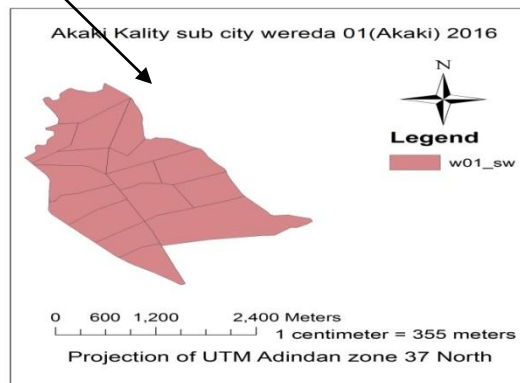
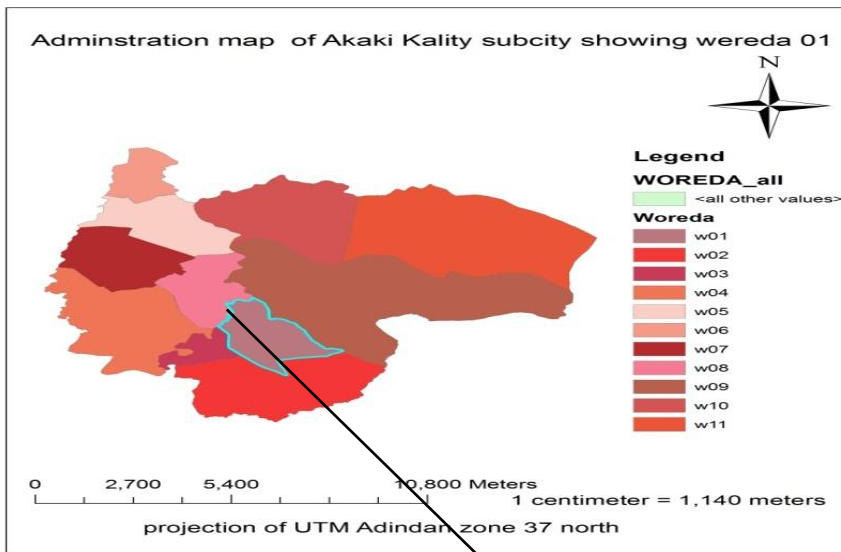


Figure 16. Map of Akaki 01 Woreda, Akaki Kality sub city, Addis Ababa, 2008 E.C

### **Administrative and political structure**

Akaki 01 woreda had 11 ketena and all sector offices concentrated in one place of building. All the sector offices of the district are under the administrative structure of Akaki Kality sub city office including Akaki health center. See fig 2 below for detail organizational structure of Akaki health center.

Organizational structure of Akaki health center

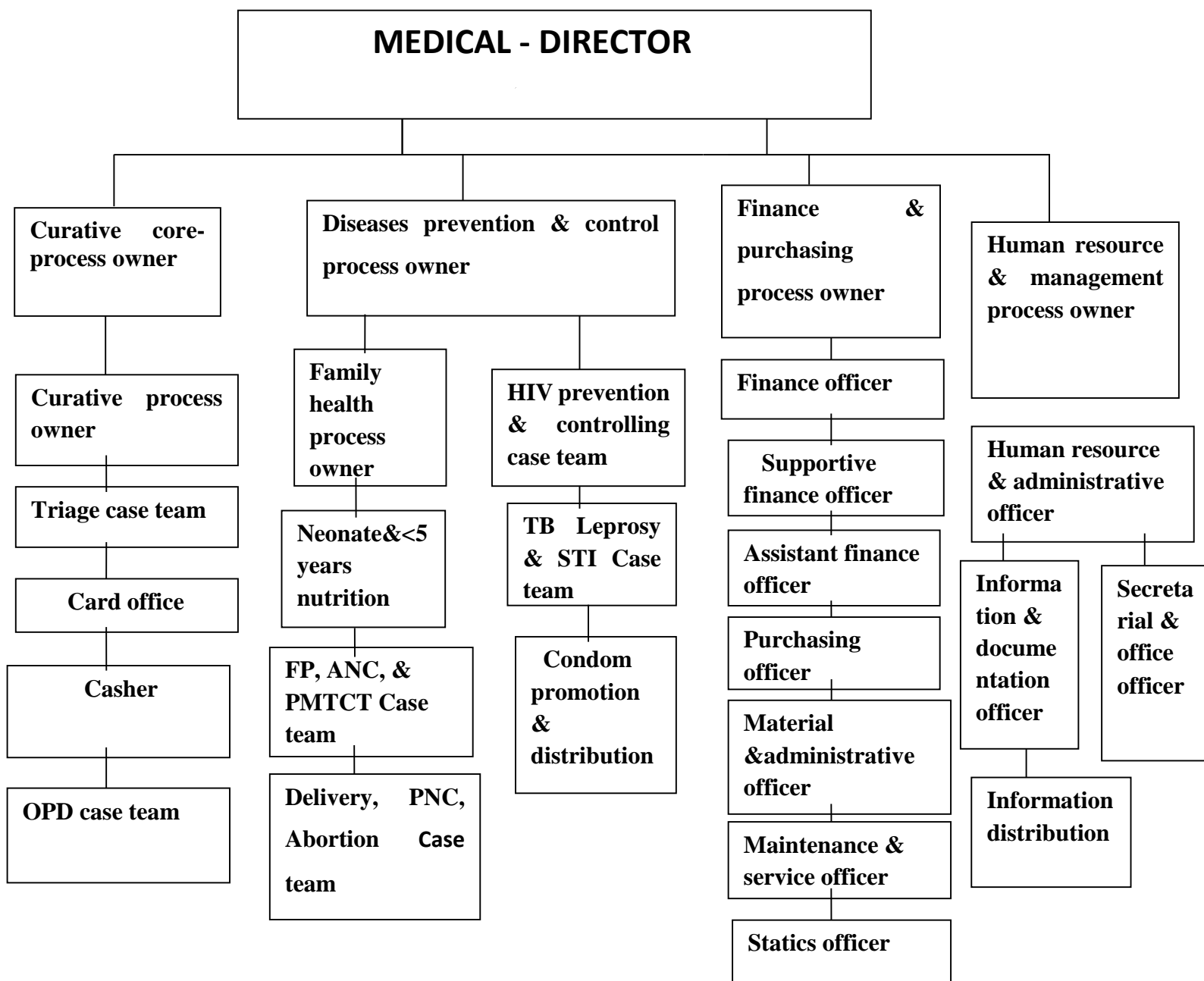


Figure 17: Organizational structure of Akaki health center Woreda 1, 2008 EC

## Demographic Information

Akaki 01 woreda has a total estimated population of 31,526 with 15,132 (48%) male and 16,393 (52%) female. Male to female sex ratio was estimated approximately 1:1. From the total population under one years old children constitutes 705 (2.2%), under five 2256(7.2%), less than 15 years old 7549(23.9%), women of child bearing age 10921 (34.64%) and pregnant women were 735 (2.33%). Additionally the total household of woreda by the year was 5,197; the annual growth rate is considered to be 2.5% per annum, average household size was 6.1 per household. Total population for age group above 65 years old were 994(3.15%) according to this data we calculated dependency ratio of Akaki 01 Woreda which account 37%.

Table 10. Estimated Population by age group and sex in Akaki 01 woreda, Akaki Kality sub city, 2008 E.C.

Age group	Male Population	Female Population	Total Population
Under 5 years	1089	1167	2256
5 to 9 years	1256	1161	2417
10 to 14 years	1286	1590	2876
15 to 19 years	2512	2639	5151
20 to 24 years	1861	2098	3959
25 to 29 years	1892	2295	4187
30 to 34 years	1438	1459	2897
35 to 39 years	999	1213	2212
40 to 44 years	802	705	1507
45 to 49 years	575	525	1100
50 to 54 years	363	426	789
55 to 59 years	288	279	567
60 to 64 years	303	311	614
65 and over years	469	525	994
Total	15133	16393	31526

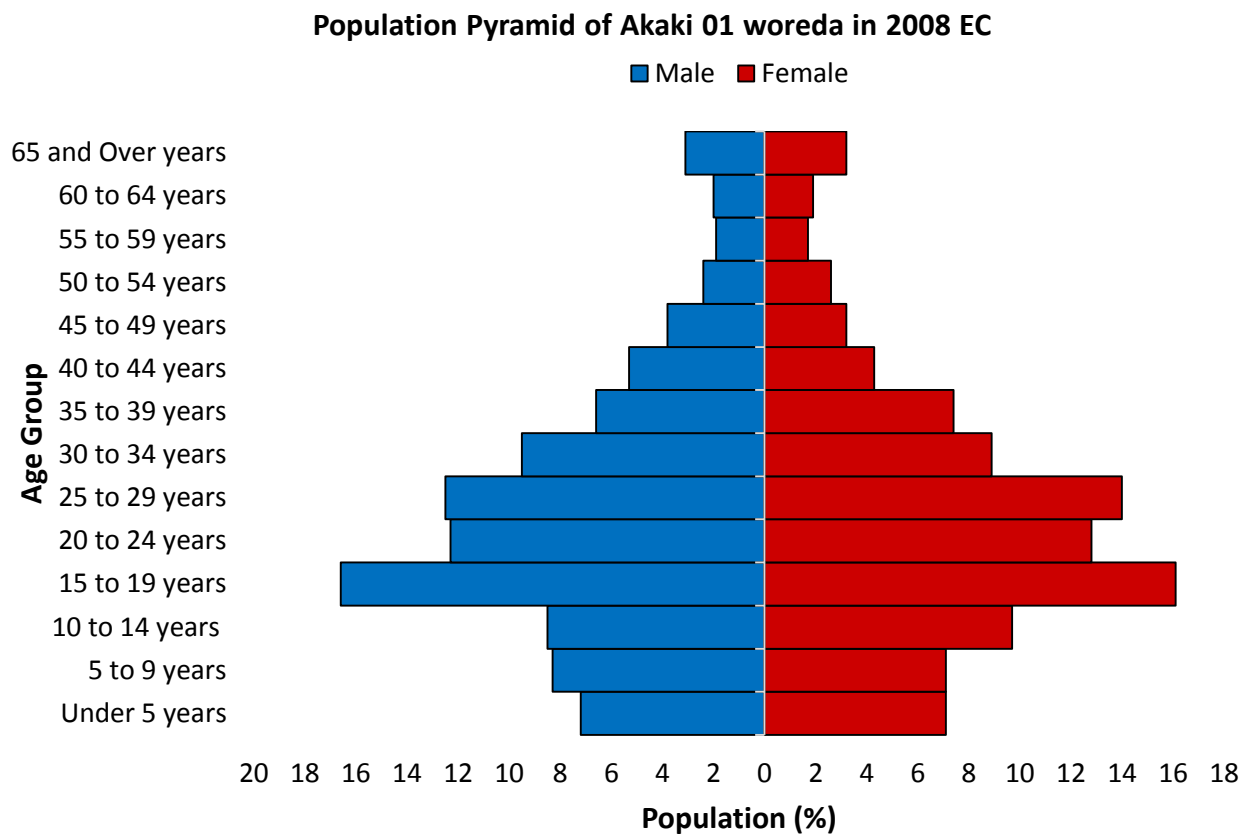


Figure 18. Population Pyramid of Akaki 01 woreda in 2008 E.C.

The above population pyramid of Akaki 01 woreda shows that from the total population 40.3% of the population were fall below 25 years age group.

Akaki woreda 1 had a total of 11 ketena of which Ketena 06/02 Arsama-Gebi had the largest population size (3670) in the woreda followed by Ketena 06/03 Fero-Sefer (3039) and 04/3 Abo-Bora, 05/1 Gra-Duba and Ketena 05/3 with the same population size (3033). The least population had live in Ketena 06/4 Alem-bank (2063).

Table 11. Estimated Population size by “ketena” in Akaki 01 woreda, Addis Ababa by 2008 EC

Serial	Name of “ketene”	Population		Total
		Male	Female	
1	04/1	1336	1448	2784
2	04/2	1389	1505	2894
3	04/3 Abo-Bora	1456	1577	3033
4	05/1 Gra-Duba	1456	1577	3033
5	05/2 Gara-Medhanialem	1220	1322	2542
6	05/3	1456	1577	3033
7	06/1 Ajep	1281	1388	2669
8	06/2 Asama-Gebi	1762	1908	3670
9	06/3	1459	1580	3039
10	06/4 Alembank	990	1073	2063
11	Arsema	1328	1438	2766
	TOTAL	15,133	16,393	31,526

### **Economy and income**

There were no full & enough data in the woreda about productivity and income but a little of information was found of which 249 people served with agriculture productivity, 814 were on private business owners in different type. The rest were unknown because they have no enough data.

### **Education**

The current system of formal education in Ethiopia is based on a three – tier system; eight years of primary education (1 – 8<sup>th</sup> grade), followed by four years of secondary education (9 – 12<sup>th</sup> grade), and four to seven years of tertiary education, depending on the field of study (5).

Akaki 01 woreda had a total of 26 schools, of which 14 were KG; 3 governmental, 10 private and 1 NGO own schools and from the total 8 were primary schools (1 – 8<sup>th</sup> Grade) which is 4 governmental, 3 private and 1 NGO owned school. The remaining schools from the total were

secondary schools (9 – 12<sup>th</sup> grade) which accounts 4; 1 from governmental, 2 private and 1 NGO owned schools.

In 2008 EFY a total of 10,424 students were enrolled to school, of which 5513 (52.9 %) were females and by the same year a total 521 teachers teaches in the schools of which 318 (61%) were males. For details for students and teachers profile see table.12 below.

All schools had access to protected and safe water supply. The latrine coverage 100% but only 8 schools which has standard latrine; the rest were not a standard with poor quality, poor sanitation & management; it serves for temporary only. All the schools (8 primary and 4 secondary) have Anti HIV/AIDS clubs.

Table 12. List of all Formal Schools in Akaki 01Woreda, Akaki Kality Sub City; Addis Ababa in 2008 E.C

Types of School	OWNER			Number of Students 10,424		Number of Teachers 521	
	Gov.	Private	NGO	Male	Female	Male	Female
KG	3	10	1	859	893	-----	95
Primary	4	3	1	2584	2905	216	97
Secondary	1	2	1	1468	1715	102	11
TVET/COLLG/UNIV.	-----	-----	-----	-----	-----	-----	-----
Total	8	15	3	4911 (47.1%)	5513 (52.9%)	318 (61%)	203 (39%)

### Health service institutions and infrastructures

One of Ethiopia's major roads, leading to SNNRP and South part of Oromia goes through Akaki-Kality sub city including Akaki 01 Woreda from Addis Ababa. The Woreda can be accessed through this road from Akaki-Kality sub city, Addis Ababa; administrative seat of Akaki-Kality sub city Akaki 01 Woreda South east part of the sub city. In the Woreda there were 15 Health facilities of which 1governmental health centers, 11 private clinics, 1 NGO clinic, 1 factory clinic and 1 private drug store. All health facilities were functional and accessible year round for detail information see table 13 below.

Provision of requisite infrastructure was in Akaki 01 woreda medium. Even though the powers of electricity and water supply were on & off, all ketena had electric power and pipe line safe water supply. Regarding transportation only 14 % - 20% have transport facility which is asphalted road the rest was none asphalted, most of the ketena had accessed to wireless telephone communication but sometimes it becomes nonfunctional. Also recently mobile service is introduced but its network access was not regular, users had to travel some distance apart from their residential area in searching of network. Computers, postal, internet, fax, bank service is almost exist but the bank is not enough for Akaki 01woreda because of most of the time overcrowded especially Ethiopia commercial bank.

Regarding infrastructures for facilities like communication for health center had fixed line call service for the rest health facilities there is no data regarding fixed line call service and all health facilities had mobile phone network coverage. Regarding water supply and electric power supply all health facilities of the woreda had accessed and additionally Akaki health center had its own generator.

Table 13. Number of health facilities in Akaki 01 Woreda, Akaki Kality sub city 2008 E.C

S/no	Type of Health facilities	Number	Ratio Health facility: population
2	Health center Gov. *	1	1 : 42,546
3	Private clinic	11	1 : 2,627
4	Private pharmacy	-----	-----
5	Gov. pharmacy	-----	-----
6	Private Drug store	1	1 : 31,526
7	Diagnostic laboratories	-----	-----
8	Private hospital	-----	-----
9	NGO Clinic	1	1 : 31,526
10	Factory clinic.	1	Unknown
	TOTAL	15	

**N.B. \*** The denominator is estimated population of the catchment whose get health service at Akaki health center, woreda 1 including woreda 9, 10, 11 which is 42,546.

## Human resource

Based on human resource man power data of Akaki 01 woreda health office and Akaki 01 health center from the total health worker and supportive staff health officer, nurse, midwife, lab.Tech and pharmacist to population ratio is 1:3,546, 1:1,934, 1:1,474, 1:7,091 and 1:4,727 respectively see table 14 for detail information. From the total health worker and supportive staff female account 81 which is 58.3% and from the overall health worker to population ratio was 1: 311 in the woreda including supportive staffs.

Table 14. Man power of woreda health office and health facility in Akaki o1 woreda 2008 E.C

S/no	Type	Male	Female	Total	Ratio
1	Physicians*	0	0	0	-----
2	Health officer*	6	6	12	1:3,546
3	Laboratory technician/technologist*	4	2	6	1:7,091
4	Pharmacy technician/pharmacist*	7	2	9	1:4,727
5	Nurse*	13	9	22	1:1,934
6	Midwife*	3	7	10	1:1,474
7	X-ray*	0	0	0	-----
8	Environmental Health worker (woreda)	2	0	2	1:15,763
9	HEWs (woreda)	0	13	13	1:2,425
10	Other health workers (HEWs coordinator)	1	1	2	1:15,763
11	Supportive staffs.*	22	41	63	-----
	TOTAL	58	81	139	-----

*N.B. \*. The denominator is estimated population of the catchment whose get health service at Akaki health center, woreda 1 including woreda 9, 10, 11 which is 42,546.*

## Ten top causes of morbidity

In 2008 EFY the leading causes of adult OPD in Akaki 01 health center among the leading ten top diseases were Acute respiratory disease 4,548 (19.3%); followed by Trauma injury 3080 (13.07%); and Acute febrile illness (AFI) 2576 (10.93%). While the leading causes of under -five children OPD visit in Akaki 01 health center was Acute respiratory disease (3137 cases, 44.24%) followed

by Diarrhea 1798 (25.36%) and Pneumonia 780 (11). Detail of leading causes of OPD visit is shown in the table 15 below.

Table 15. Top ten leading causes of OPD visit (morbidity) in Akaki 01 health center, by 2008 EC.

S.no	Adult	Number	%	Under 5 years old	Number	%
1	Acute Respiratory infection	4548	19.3	Acute Respiratory infection	3137	44.24
2	Trauma Injury	3080	13.07	Diarrhea( Non-bloody)	1798	25.36
3	Acute Febrile Illness (AFI)	2576	10.93	Pneumonia	780	11
4	Dyspepsia	2506	10.63	Other or Unspecified Disease of the Eye & Adnexa	289	4.08
5	Diarrhea( Non-bloody)	2473	10.49	Infection of the Skin & subcutaneous Tissue	262	3.69
6	Urinary Tract Infection	2233	9.47	Other or Unspecified Diseases	216	3.05
7	Diseases of musculoskeletal system & connective Tissues	2181	9.25	Diarrhea with dehydration	212	2.99
8	Infection of the Skin & subcutaneous Tissue	1771	7.51	Moderate Acute malnutrition	153	2.16
9	Typhoid fever	1210	5.13	Other or unspecified infectious and parasitic diseases	131	1.85
10	Other or Unspecified Disease of the Eye& Adnexa	990	4.20	Acute Febrile Illness (AFI)	113	1.59
	TOTAL	23,568	100%	TOTAL	7,091	100%

### Ten Top causes of deaths (mortality)

By the year 2008 EC there was no registered death in HMIS book at Akaki 01 health center in both age groups.

## Health indicators and vital statistics

Vital statistics and health indicators are playing a main role in estimating population size and in guiding countries policy making and program development. It's the majority influential tool for monitoring and communicating critical information about population health. In Akaki Woreda 1 the crude birth rate was 31.7 per 1000 population. The other health indicators in the woreda was dependency ratio which accounts 37% in the year 2008 E.C. Data on other measures like total fertility rate, crude death rate, under-five child mortality rate are not available in Akaki woreda 1. For detail information see table 16 below

Table 16. Vital statistics data of Akaki woreda 1 health office Akaki health centers, 2008 EFY

Sr.no	Indicators	Numbers (%)	Remarks
1	Infant Mortality Rate (Per 1000)	-----	No data
2	Crude Birth Rate (Per 1000)	31.7/1000	
3	Maternal Mortality Rate	0	
4	Contraceptive prevalence rate	42.34 %	
5	Contraceptive acceptance rate	33.7 %	
6	Percentage of deliveries attended by skilled birth attendants	100 %	
7	Percentage of deliveries attended by HEWs	-----	
8	Dependency Ratio	37%	
9	Crude Birth Rate (per 1000)	31.7 %	
10	Total fertility rate	-----	No data
11	Crude death rate	-----	No data
12	Average household size	6.1	

## Maternal and child health

Bases on 2008 E.C HMIS performance report of Akaki health center 01 Woreda major indicators for maternal and child health are presented as follow. Since there is no a community based vital statistic system; we had only used the data generated from the health center in the woreda.

### Child health and Immunization

Immunizations coverage is one of the indicators used to monitor progress towards the achievement of MDG4 and the reduction of child morbidity and mortality, as it is one of the most cost-effective public health interventions for reaching these goals.

In 2008 E.C Akaki woreda 1 health center had conducted fully vaccinated immunization services for 1426 children out of 991 planned under one year age children, which makes the health center full immunization coverage above 100% which is 143%. Detail of immunization coverage of the woreda is shown in the table 17 below.

Table 17. Child Health and EPI coverage of Akaki health center based on catchment population in 2008 E.C

S/no	Description.	Plan	Coverage	Percentage	Remark
1	No_ live Birth	991	985	99.1%	
2	No_ still Birth	-----	3	NA	
3	Option B+	50	22	44%	
4	BCG	991	1637	165	
5	MEASELES	951	1426	150	
6	OPV O	991	1568	158	
7	OPV 3	951	1533	161	
8	PENTA 1	991	1637	165	
9	PENTA 3	951	1580	166	
10	ROTA	991	1606	162	
11	PCV1	991	1644	166	
12	PCV 3	951	1418	149	
13	FULLY VACCINATED	951	1426	150	

### Maternal health and FP

Proper care during pregnancy, delivery and after is important for the health of both the mother and the baby, and is the fifth Millennium Development Goal (MDG). Prenatal care of pregnant women

in the first three months of pregnancy is highly correlated with better outcomes and is a reflection of access to care as well as awareness.

In Akaki 1 woreda by 2008 EC from the total 991 planned to provide service for pregnant women 2097 (211%) were got ANC service. Among the total 988 deliveries all (100%) of them were attended at health center by skilled health Professionals. For detail information see below table 18.

Table 18. Maternal Health and EPI coverage of Akaki 01 woreda health center based on catchment population by 2008 E.C

S/no	Description.	Plan	Coverage	Percentage	Remark
1	ANC First	991	2097	211%	
2	ANC 4 <sup>TH</sup>	961	820	85	
3	PMTCT	991	1868	188	
4	No_ live Birth	991	985	99	
5	No_ still Birth	-----	3	0.3	
6	Birth Attends SHP (Deliver)	991	988	99.7	
7	PNC	941	809	82%	
8	TT2+	991	1563	157.7	

### Family Planning

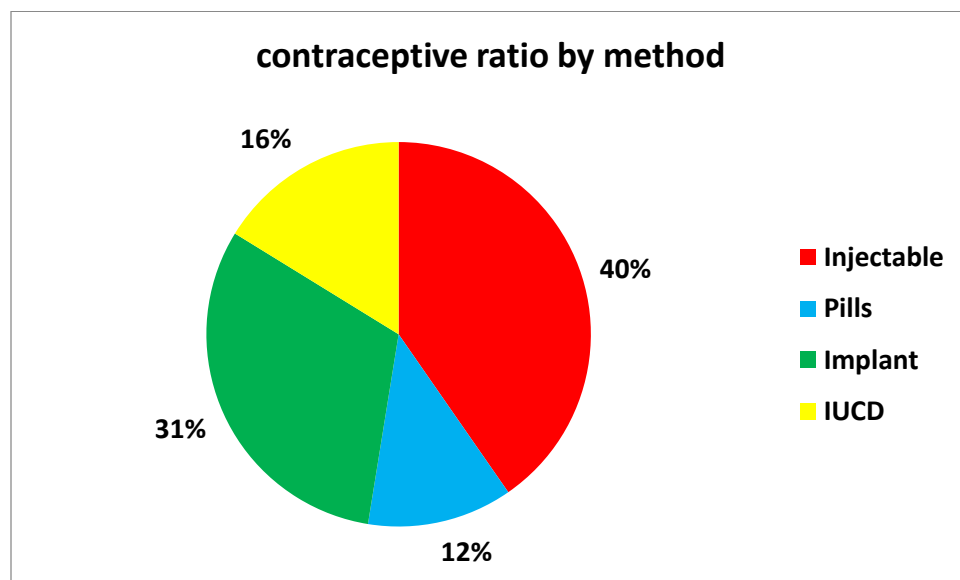


Figure 19. Modern contraceptive user's ratio by method in Akaki health centers, 2008E.C

Based on the data by the year 2008 E.C HMIS performance report of Akaki 01 health center contraceptive prevalence rate and contraceptive acceptance rate was 42.3 and 33.7 respectively. By the year the health center was planned to provide family planning to give contraceptive service for a total estimated 9644 non pregnant women and achieved 4625 (48%). From the total achieved family planning the contraceptive ratio by method is calculated and injectable accounts the highest which is 1863(40.3%) followed by implant 1441 (31.2%) for detail information see the above fig.19.

## **Endemic Diseases**

### **Malaria**

Malaria is endemic throughout the year with peak cases during after rainy seasons according to the sub city date as well as woreda data. In Akaki 01 woreda a total of 134 confirmed and clinical malaria cases were treated and the incidence was 4.3/1000 population. About 98 (73.1%) cases from the total confirmed and clinical malaria cases were male and 36 (26.9%) cases were female. The most affected age group was 15 years and over which accounts 121 cases (90.3%) followed age group 5-14 year 9 (6.7%) cases and Under 5 year 4 cases (3%). Out of a total 134 confirmed and clinical cases 113 (84.3%) were confirmed based on laboratory finding. From the total 113 confirmed malaria cases 87 (77%) was *P. vivax* and the rest case which accounts 26 (23%) was *P. falciparum* by 2008 E.C. No ITNs were distributed and did not spray chemical insecticide.

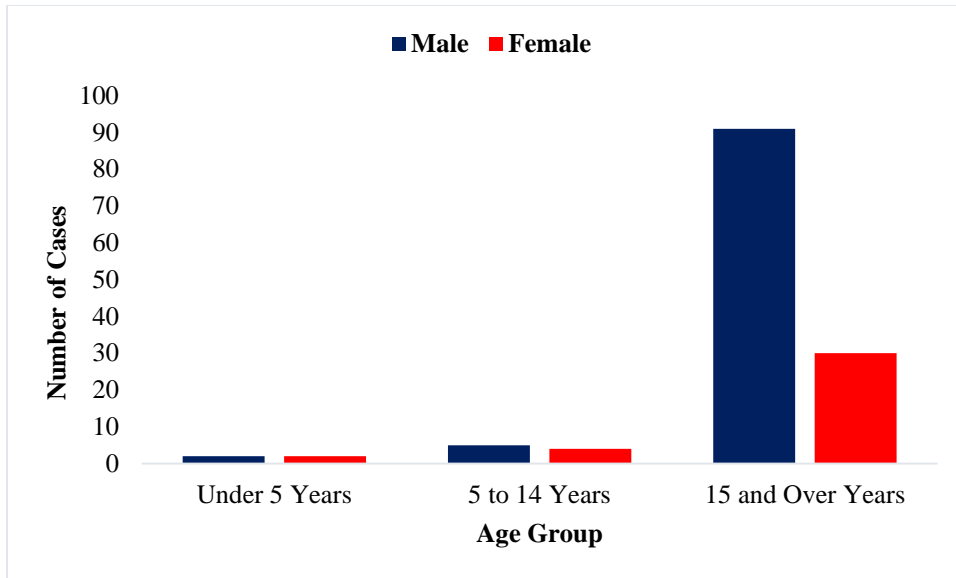


Figure 20. Total confirmed and clinical malaria case by age group and sex in the woreda 2008 EC.

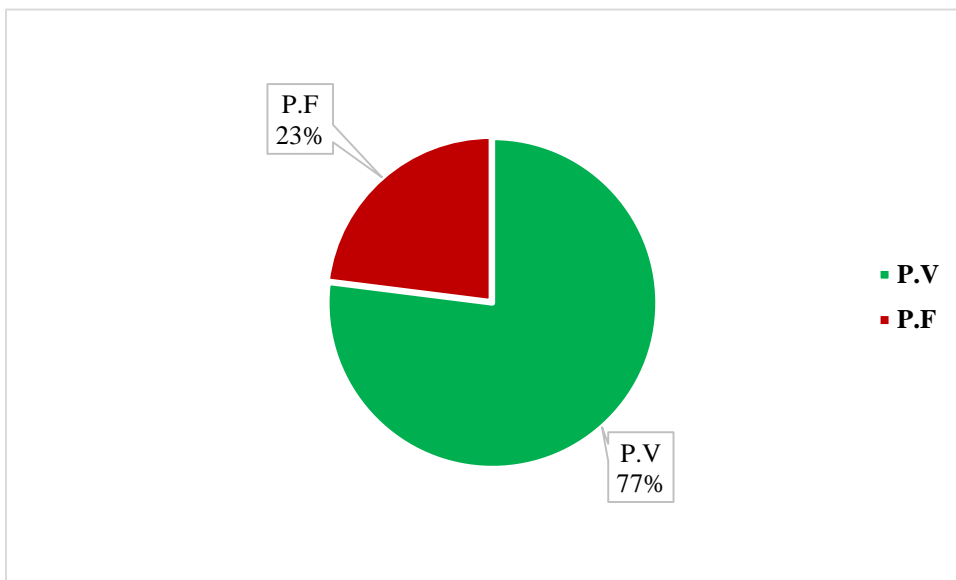


Figure 21. Total malaria cases by species in the woreda by the year 2008 EC.

## HIV/AIDS

In 2008 a total of 2,391 clients were screened for HIV among those females' accounts 2,022 (84.6) the rest for male. From a total screened 41(1.7%) diagnosed positive for HIV; females' and males' accounts 31 and 10 respectively. In 2008 there was 100 pre ART cases and 1205 on ART enrolled

cases from which 121 cases newly started on ART at Akaki health center. From the total 1,205 on ART enrolled cases females accounts 819(68%) and males composed 386(32%) and the HMIS data shows 1,187(68%) cases on ART were  $\geq 15$  age group and the rest 386(32%) were under 15 age group. Condoms had been distributed to 11,089 users at the health center of the woreda.

The health center HMIS data shows a total of 133 new HIV cases including VCT, PICT and PMTCT data and 1305 old HIV cases including pre ART cases and on ART enrolled cases in the year 2008 EFY. Based on this data we calculate incidence and prevalence of the health center catchment population which is 3.2 /1000 and 3.4% respectively.

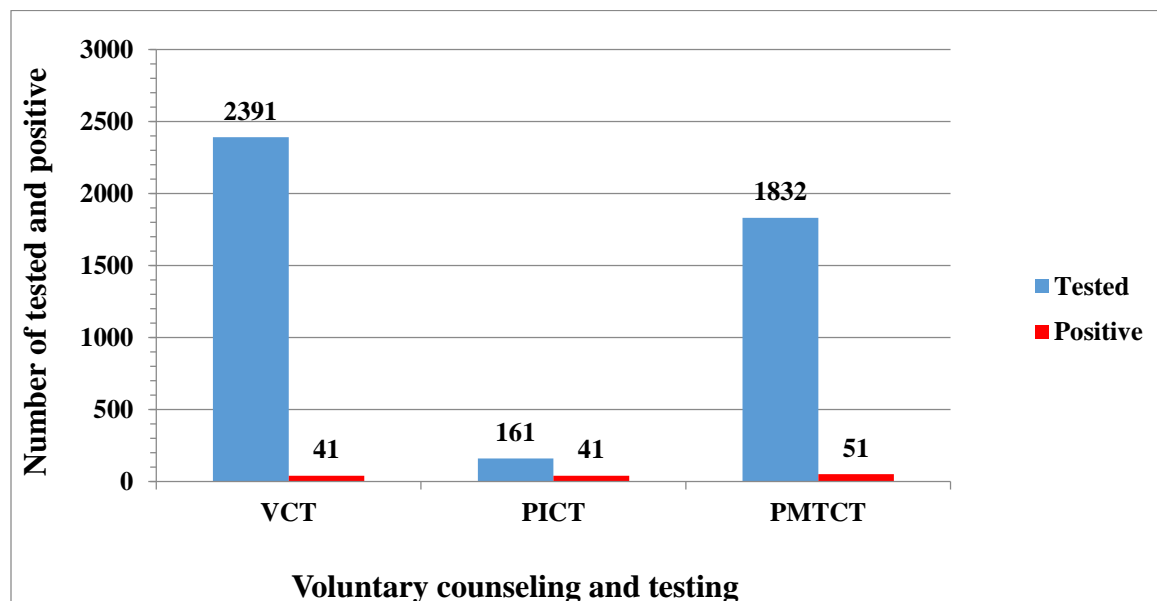


Figure 22. HIV voluntary counseling and testing distribution and result in Akaki 01 health center by the year 2008 EFY.

### Tuberculosis (TB) /leprosy

Totally 164 TB case registered in 2008 EFY, among those 112 were new all forms of TB of which 43 were smear positive PTB at about 38.7% case ratio. All form of TB detection rate is 100%. Cure rate 87.5% & treatment success rate was 83.5%. Defaulters were 0 and death rate was 6%. A total of 158 TB cases were screened for HIV out of these 41(26%) were positive and 117(76%) were negative for HIV test. HIV prevalence (TB/HIV co-infection) among TB cases registered in Akaki health center by the year 2008 EC were 25%.

In the respective year 2 leprosy cases were found among the diagnosed customers and only 1 case among leprosy cases were successfully treated.

## **Environmental health and Sanitation**

### **Latrine coverage and sanitation**

Latrine coverage of the woreda was below 50% and all public latrines were clean routinely before overflowing. By 2008 EC in all ketena of the woreda 400 meter cubic solid waste was disposed by municipal service and above 800 peoples were participate on sanitation campaign in the woreda.

### **Health Education**

In Akaki Woreda 1 in 2008 EFY health education were given at the health facilities by different health professionals for 11,533 client in different topics. The topics covered by the health education were on Family planning, personal hygiene and environmental health, disease prevention and intervention, accident prevention and first aid, TB, HIV/AIDS, immunizations and others health related topics.

### **Nutrition intervention**

By the year 2008 EC Akaki 01 woreda is considered food secured area no supplementary feeding programs were established. The health centers have outreach therapeutic program; from a total 4,687 children under 5 screen for malnutrition 141 (3%) were moderate malnutrition and 35 (0.75%) were severe malnutrition. Sever malnourish children were referring to the catchment hospital.

### **Disasters and outbreaks occurred**

By the year 2008 EC in Akaki 1 woreda there was an outbreak of AWD which accounts a total of 16 case of which 10 (62.5%) case were female and the rest were male.

### **Essential Drugs**

In Akaki health center woreda 1 essential drugs used for most frequently occurring diseases like Amoxicillin, ORS, Artemisin/lumefatrine (COARTAM), Mebendazole, Paracetamol, Ferrous

salt plus Folic acid and ART drugs were on hand throughout the year and no drug shortage encountered during the year 2008 E.C.

### **Health service expenditure and Budget allocations**

In 2008 EFY, 14,620,749 ETB was allocated for the woreda. Of this total budget, the woreda had allocated 11,149,995 ETB (76.3%) for salary including health professional salary and 80,000 ETB (0.55%) to woreda health office for running different routine activities of health office. During the same year, 7,774,217 ETB was allocated Akaki health center. Of this total budget, the health center had allocated 5,254,928 ETB (67.6%) for salary the rest 2,519,284 (32.4%) for running different routine activities of health facility like pharmaceutical supplies, lab reagent, for training, for maintenance, for power and water supply and for communication etc... The head of the woreda health office had complaints about shortage of budget in that year. No any fund to support the Health center as well as the woreda health office in 2008 EC.

## Discussion

Health profile description will assist policymakers, planners, and other collaborators in the health sector to formulate appropriate strategies and interventions to provide quality community health services and a series of well-timed interventions to improve reproductive health service, maternal health and child health, to control endemic diseases, to establish health service and infrastructures and to strengthen inter-sectorial collaboration of the health sector with other sectors.

Acute upper respiratory tract infection was the leading causes of morbidity both in under five and general population. Diarrheal disease and Pneumonia were also found to be an important cause of morbidity in under five children. This finding is similar to the national top causes of morbidity. Unlike the national data, in Akaki Kality sub city Akaki 01 woreda Injury/Trauma is one of the top ten causes of morbidity it takes the second places in the woreda which can be explained by the urban nature of the city which makes it vulnerable with road traffic accidents and construction related traumas [10].

Contraceptive acceptance rate (CAR) a basic maternal health indicators to show the access and users of modern family planning method which is proportion of women of reproductive age (15-49 years) who are not pregnant and who are accepting a modern contraceptive method (new and repeat acceptors). The contraceptive acceptance rate in Akaki 01 woreda (33.7) is similar with Addis Ababa city contraceptive acceptance rate which is 33.1 [11]; but based on Akaki Kality sub city HIMS data Akaki 01 woreda CAR is higher than the sub city which accounts 26.1%. The national target for contraceptive acceptance rate by the end of 2007 E.C was 85% and based on 2007 E.C health and health related indicators report of FMOH the current national performance on contraceptive acceptance rate is 69.9%. Peoples in urban setup are believed to have a higher level of CAR as they can access information related to family planning. In contrary based on the above data both Addis Ababa city and Akaki 01 woreda including Akaki Kality sub city CAR was far below the national performance which can be due to poor data collection method and absence of health information management system at private facilities which may serves much of the clients in the city [11].

Based on the report shown in the study women receive ANC service from a skilled provider higher than in the study conducted by 2011 EDHS women residing in urban areas received ANC service

from a skilled provider which accounts 76% [5]. Urban women are almost three times more likely than rural women to receive ANC from a skilled provider [5]. Past study showed that the improvement of PNC coverage at national level increase from time to time and Akaki woreda1 data shows PNC coverage is almost similar with the national level coverage in 2007 EFY which accounts 84%, but with respect to regional distribution less than from Addis Ababa PNC service which achieved 100% in the same year [9].

Improving child health is one of the government's priorities to meet the Millennium Development Goal (MDG) of reducing under-five mortality by two-thirds by 2015 (from the base year of 1990). By 2008 EFY, the infant mortality rate in Akaki 01 woreda was 40 per 1,000 live birth which is a little bit higher than the national infant mortality which was 37 per 1,000 live births (EDHS 2011) [8]. According to guidelines developed by the World Health Organization, children are considered fully vaccinated when they have received a vaccination against tuberculosis (BCG), three doses each of the DPT and polio vaccines, and a measles vaccination by the age of 12 months. The pentavalent vaccine DPT-HepB-Hib, introduced in 2007, has replaced the previous DPT vaccine. This new vaccine protects against diphtheria, pertussis (whooping cough), tetanus, hepatitis B, and Haemophilus influenza type b [6]. According to Akaki health center HMIS data results show full immunization coverage was similar with Addis Ababa full immunization coverage which accounts 100% and higher than national level coverage 90% [11]. Also this study shows immunization status of the children each specific antibody was similar with Addis Ababa and higher than the national level immunization coverage [9].

TB is one of communicable disease cause of morbidity and mortality in the country. Ethiopia ranked seventh in the world and third in Africa for TB burden [8]. The most recent WHO estimates for Ethiopia are: an annual TB incidence (including HIV-positive) of 224 per 100,000 populations: an annual TB prevalence (including HIV-positive) of 211 per 100,000 populations and mortality (excluding HIV) of 32 per 100,000 populations (WHO 2015). According to the Akaki 01 health center TB report all form of TB detection rate was the same with Addis Ababa city detection rate and above national detection rate which accounts 100% and 67.3% respectively [11]. In the study both the TB treatment success rate and cure rate had also a better performance than A.A city and national performance, but less TB treatment success rate than national performance [11, 8]. Also malaria was one of endemic communicable disease in the woreda with incidence 0.34%, but it was

insignificant as compare with national incidence 1.9% [11]. HIV/AIDS also one of communicable endemic disease causes of morbidity and mortality in the country and as we calculated the prevalence of HIV by 2008 EC based on the data from Akaki health center by its catchment population was 3.4% which is less than Urban areas (4.2%) and also Addis Ababa prevalence rate 5.2%, but higher than the national point prevalence based on the study EDHS 2011[5].

### **Limitation**

- There was no data available on important vital health indicators like maternal mortality rate, under-five mortality and child mortality rate.
- There was no important and tangible information about the background, culture and history of the woreda at culture and tourism office.
- There was no health profile description at neighboring woreda and recent data on important health indicators to be used for comparison.

## **Conclusion and recommendation**

### **Conclusion**

In woreda1 Akaki health center communicable diseases like ARTI is the most frequently occurring disease in Adult and pediatric. There was better health improvement in ANC follow up. Moreover there was good achievement in family planning coverage and contraceptive prevalence rate. The woreda should continue on this progress. The good performance gained on immunization coverage and maternal health should be strengthened more and kept sustainable.

The presence of road and electric power as well as availability of latrine and safe water in most of the community is an advantage for health service for preventing disease and promoting health. The woreda main problem was drainage, liquid sewerage, and latrine problem, shortage of human power. More needs to be done to achieve the Ethiopian HSDP-IV target and to improve TB case detection rate through community mobilization and health education by health workers, HEW and women health development army as WHOs recommended.

### **Recommendations**

- Vital statistics in the Woreda needs to be documented regularly and properly and the surveillance system and its documentation should have to be strengthened and improved.
- Strong inter-sectorial collaborative effort is needed towards construction of roads, adequate safe water supply and construction of standard latrine and installation of electricity to introduce ICT.
- PHEM officer's woreda and sub city should assess and identify cause and occurrence of malaria cases in Akaki 01.
- Adequate coartem supply and ITNs distribution should be conducted on regular basis, public should be sensitized with respect to promote their health, prevent disease, and to visit health facilities regularly by woreda and sub city health office.
- Since the three common diseases in the woreda are Acute Respiratory Tract Infection, Diarrheal Diseases and Pneumonia , though Health education on prevention and control of respiratory disease, hygiene and sanitation practices training should be provided to the community in Akaki 01 woreda through health facilities and health extension professionals.

- Among the leading causes of morbidity of the woreda trauma injury takes the second place in adult Outpatient visit. Hence the health official's in collaboration with the woreda police and security offices should have to work hard on prevention and control of trauma, leading cause of OPD visit.
- The health office also should have to improve the woreda safe water coverage and latrine coverage, by collaborating with respective stake holders.

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# **5. Chapter–V: Scientific manuscript for peer reviewed Journals**

## **5.1 Five Year (2012-2016) Surveillance Data Analysis of Malaria- Akaki Kality sub city, Addis Ababa**

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### **Abstract**

**Back ground:** Malaria is a sever disease in Ethiopia. Approximately 75% of Ethiopia's landmass is malaria-endemic; which is primarily associated with altitude and rainfall. In Ethiopia, malaria is highly seasonal in most area including the outskirts of Addis Ababa, Akaki-Kality sub city and its environs of highland areas. It is important to analyze the magnitude of the disease to strengthening the control mechanisms and/or to fill the gaps in the intervention mechanism. This paper shows the trend of malaria in Akaki-Kality sub city from 2012 – 2016.

**Methodology:** A retrospective descriptive study was conducted on five year (2012 – 2016) malaria data in Akaki Kality sub city. After the data was officially requested and received from PHEM center of the sub city, data cleaning and analysis was conducted using Microsoft Excel 2013.

**Result:** A total of 4939 clinical and confirmed malaria cases were identified during the five year period in the sub city. Among these, 4861 (98.42%) were outpatient and 78 (1.58%) were inpatient. Out of the total 4717 (95.51%) confirmed malaria cases 3522(74.33%) and 1195(25.67%) were Plasmodium vivax and Plasmodium falciparum respectively. There was a significance increase in the incidence rate of confirmed malaria cases from 2012 – 2016 and the average incidence rate was 4.7/1000. Over all case there were no death identified during the study year.

**Conclusion:** Having malaria deaths and devastating malaria epidemics in the Akaki sub city seems now history; due to the strengthening of surveillance system with tremendous efforts in controlling and preventing malaria in the country. Plasmodium vivax and plasmodium falciparum were the responsible species of malaria in the sub city. To strengthening of surveillance requires taking constructive corrective measures to all types of error or gaps that have identified in this paper.

**Key words:** Malaria, Confirmed and clinical, Highland malaria, Malaria Incidence

## **Introduction**

Malaria is a major health problem life threatening parasitic disease caused by the protozoan parasite plasmodium and transmitted by female anopheles mosquitoes [1]. Malaria is one of the leading causes of illness and death in the world [2]. In 2013, there are 97 countries and territories with ongoing malaria transmission, and 7 countries in the prevention of reintroduction phase, making a total of 104 countries and territories in which malaria is presently considered endemic.

Globally, an estimated 3.4 billion people are at risk of malaria. WHO estimates that 270 million cases of malaria occurred globally in 2012 and 627 000 deaths. Most cases (80%) and deaths (90%) occurred in Africa, and most deaths (77%) is in children under 5 years of age [1]. However, it is in sub-Saharan Africa where 85– 90% of malaria fatalities occur [1]. African health facility studies show that malaria constitutes 20 to 60% of the outpatient consultation and 10% of hospital admission including Ethiopia [3].

Approximately 75% of Ethiopia's landmass is malaria-endemic; areas of disease which is primarily associated with altitude and rainfall [4]. Ethiopia is also one of the most malaria epidemic-prone countries in Africa. According to Federal Ministry of health data 52 million people (68%) live in malaria risk areas in Ethiopia [4]. *P. falciparum* and *P. vivax* are the two dominant parasite species causing malaria in Ethiopia, with relative frequencies of on average, 60%-70% of malaria cases have been due to *P. falciparum*, with the remainder causes by *Plasmodium vivax* [5].

In 2010, the Federal Ministry of Health reported 4,068,764 clinical and confirmed malaria cases are reported to the World Health Organization in the 2011 World Malaria Report [4]. And also, in 2011/2012, malaria was the leading cause of outpatient visits, accounting for 17% of all outpatient visits, and 8% of health facility admissions among all age groups [6]. In Ethiopia, malaria is highly seasonal in many communities; the main seasons for malaria transmission in Ethiopia occurs between September and December in most of country, after the main rainy season from June to August [4].

Highland malaria has become very common in many African countries [7] and similarly, the rise of malaria cases at highland areas of Ethiopia, like Addis Ababa >2000m ASL has been indicated due to as a result of human-induced climatic changes and global warming [8]. For example, an outbreak of malaria is reported in Akaki Kality Town and other suburbs of Addis Ababa in 1998/9

[9] and More than three times increment of primary clinical cases of malaria are recorded during the peak of this epidemic [10]. In addition, the occurrence numerous malaria cases in Akaki and the village around the artificial lakes (Aba Samuel) and the vicinity, in the warm spring of the Filwuha area of Addis Ababa from Akaki valley, around in the bed of Kebena River and during the cessation of the rainy season are confirmed [10]. In general, recently, multitudes of development and construction projects are underway in Addis Ababa especially in Akaki-Kality town, progressing to rural malaria endemic adjacent areas; like Dukem and Bishoftu.

It is important to analyze the magnitude of the disease to strengthening the control mechanisms and/or to fill the gaps in the intervention mechanism. This paper tries to present and assesses the trends of the five year malaria data reports of Akaki- Kality sub city with related to the magnitude of the malaria transmission and incidence.

## **Methods and Materials**

**Study area:** Akaki-Kality sub city is one 10<sup>th</sup> sub city and malaria endemic area of Addis Ababa city. The Sub city found in south & south east direction of the city and on the distance of 12-35 Km from Addis Ababa city administration. It is located at altitude of 2110 meter above sea level in the out skirt of the city [30]. The sub city has 11 woreda and the total Population is 224,370.

**Study period:** The period from 2012 to 2016 G.C.

**Study design:** A descriptive retrospective cross sectional study was conducted by reviewing five year (2012-2016) PHEM data reports of Akaki-Kality Sub city.

**Sample size:** All malaria cases, including suspected, confirmed and deaths during 2012 – 2016 reported to PHEM center were included in this study.

**Data Analysis:** Descriptive analysis was computed using Microsoft office Excel 2013.

**Ethical Consideration** Permission approval of the study was obtained from Akaki Kality PHEM center.

## Result

A total of 4939 clinical and confirmed malaria cases were identified during the five year period in the sub city. Among these, 4861 (98.42 %) were outpatient and 78 (1.58 %) were inpatient. Out of the total 4717 (95.51 %) confirmed malaria cases 3522(74.33%) and 1195(25.67%) were Plasmodium vivax and Plasmodium falciparum respectively. The peak malaria report year was 2016 with 1139 (23.06%) of the total cases in the five year period. Over all cases there were no death identified during the study year.

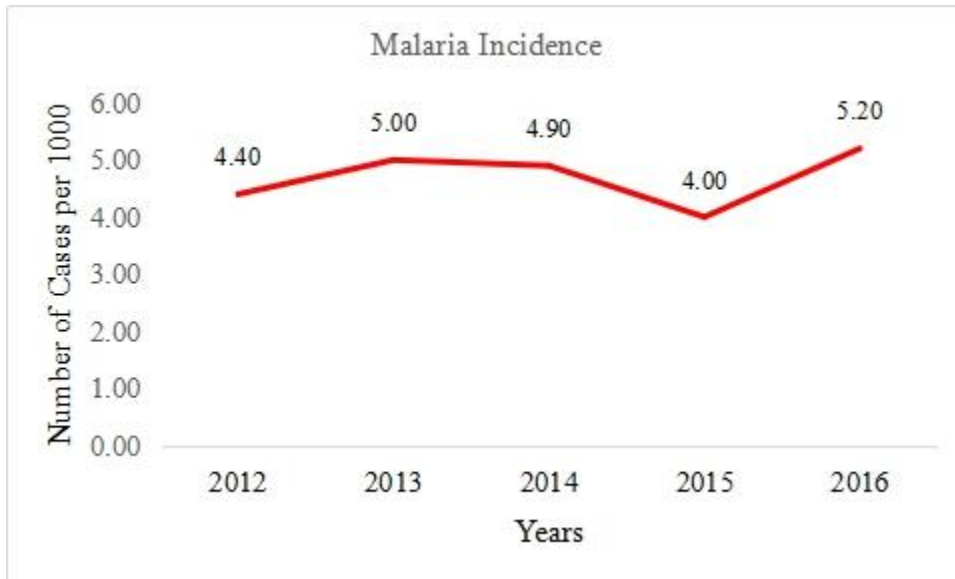


Figure 23. Trends of malaria incidence rate by year in Akaki-Kality Sub City, 2012-2016.

There was a significance increase in the incidence rate of confirmed malaria cases from 2012 – 2016 by 18.2% and the average incidence rate was 4.7/1000.

Table 19 below show that from the allover five year woreda malaria data average malaria incidence was calculated; from that Woreda 7 was highest in malaria incidence followed by Woreda 1 and Woreda 6 with a respective incidence of 6.7/1000, 6.14/1000 and 5.7/1000 population.

Table 19 The allover five year Incidence of malaria cases Per 1000 Population by Woreda, in Akaki Kality Sub City, 2012–2016 GC.

Total five year Incidence of malaria cases Per 1000 Population by Woreda, in Akaki Kality Sub City, 2012–2016 GC.						
Woreda	YEAR					Average Incidence/1000 Pop.
	2012	2013	2014	2015	2016	
Woreda 01 Malaria Incidence/1000	7.2	6.9	4.8	4.2	7.6	<b>6.14</b>
Woreda 03 Malaria Incidence/1000	1.6	3.5	1.2	4.2	4.2	<b>2.94</b>
Woreda 04 Malaria Incidence/1000	0.5	1.7	2.1	3.3	4.6	<b>2.44</b>
Woreda 05 Malaria Incidence/1000	5.9	6.2	3.4	4.4	6.1	<b>5.2</b>
Woreda 06 Malaria Incidence/1000	4.1	6.2	5	7.8	5.4	<b>5.7</b>
Woreda 07 Malaria Incidence/1000	8	9.3	5.4	3.7	7.1	<b>6.7</b>
Woreda 08 Malaria Incidence/1000	4.1	4	2.8	4	4	<b>3.8</b>

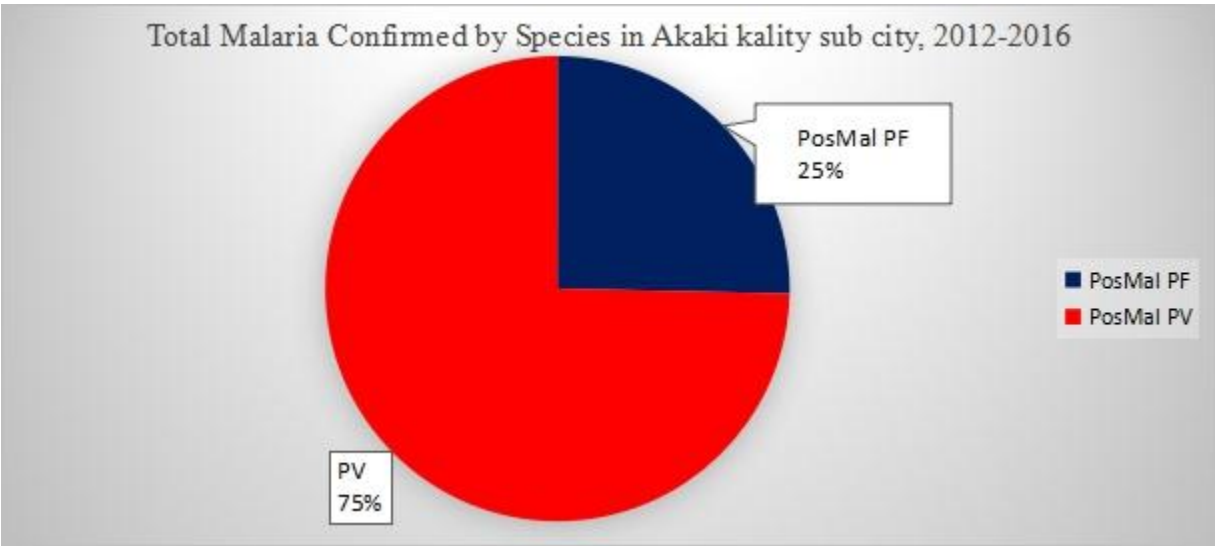


Figure 24. Number of Malaria Case by Species, in Akaki-Kality Sub City, 2012- 2016.

Figure 24 Shows that from the total of confirmed malaria cases (4717) P. Vivax was the dominant species which accounts 3522 (75%).

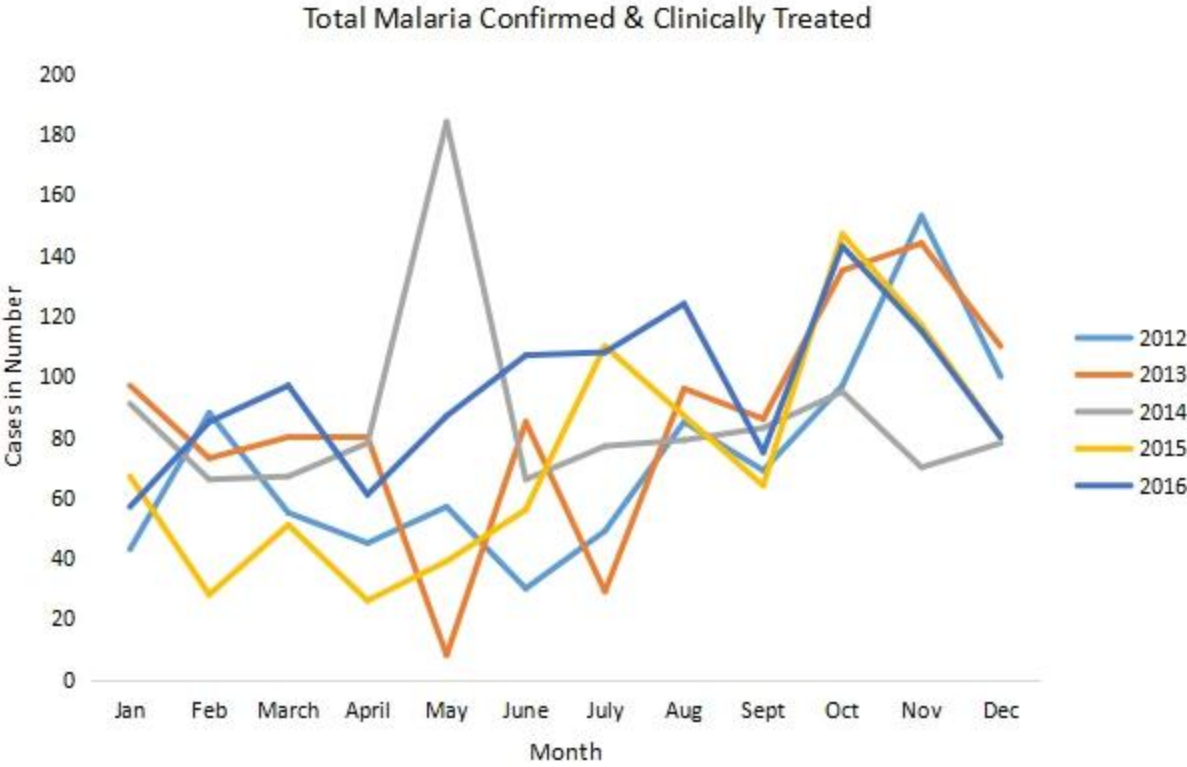


Figure 25. Five year trend of malaria by month, in Akaki-Kality Sub City, 2012-2016.

Figure 25 above shows that the Meher season (September – November) have the most transmission of malaria in Akaki-Kality Sub City, Addis Ababa followed by the Belg season (March- May).

Table 20 below shows that the overall five year average of Sub City confirmed and clinically reported malaria prevalence was 4.6 per 1000.

Table 20. The total five year malaria cases prevalence by indicators of Akaki-Kality Sub City, Addis Ababa, 2012 - 2016.

Total five year malaria cases and Prevalence by indicators, Akaki K.S.C. 2012–2016						
Indicator	YEAR					Average Prevalence
	2012	2013	2014	2015	2016	
The total confirmed and clinical malaria cases/1000	4.286	4.911	4.843	3.984	5.078	<b>4.6204</b>
Total outpatient malaria case/1000	4.183	4.858	4.740	3.984	4.939	<b>4.5408</b>
Total in-patient malaria cases/1000	0.103	0.0528	0.07	0	0.138	<b>0.07276</b>
Total malaria deaths/100,000	0	0	0	0	0	<b>0</b>
Total malaria suspected febrile examined cases/1000	9.94	36.82	40.6	30.9	30.21	<b>29.694</b>
Total malaria positive cases/1000	4.055	4.801	4.197	3.939	5.06	<b>4.4104</b>
Total P. Falciparum cases/1000	1.176	1.18	0.946	1.078	1.213	<b>1.1186</b>
Total P. Vivax cases/1000	2.8789	3.620	3.251	2.86	3.847	<b>3.29138</b>

## Discussion

Malaria is one of the main public health problems and becoming increasing substantially from year to year in Akaki Kality sub city according to the health and health related indicators bulletin report. The 5 year report indicates that number of cases significantly increase in between 2012 to 2016 from the five year study. Now a day a study conducted in highland area shows that malaria become endemic for the reason of global warming, climatic change and traveler from malaria endemic to highland area. Evidence have also shows the rises of malaria cases in highland areas of country since from the early 1990s [10].

The five year retrospective study showed that the transmission of malaria in the sub city present in a community at a certain predictable level, except some seasonal variations of cases which is due to seasonal rainfall in addition to Aba Samuel River, Akaki River, and construction & industrial area of the sub city[10]. And also seasonal rainfall patterns are the major determinants of malaria transmission in the Papua New Guinean highlands [11]. Malaria transmission in the sub city indicates from the study was peaks during after rainy season October to December and April to May in all years of the study from 2012 – 2016. In general in our country malaria transmission highly during the harvesting seasons bi-annually from September to December and April to May with serious consequences [12].

The 5 year malaria surveillance data report showed *Plasmodium vivax* to be the dominant species in the study area and the higher occurrence of *Plasmodium vivax* in Akaki Kality Sub City was consistent with earlier report that conducted in Akaki Beseka [Ethiop. J. Health Dev. 2004; 18(1):2-7] [9], which documented the predominance of *Plasmodium vivax* at altitude 2331 meter above sea level in the out skirt of Addis Ababa city. This was also in agreement with another report that showed *Plasmodium vivax* as the predominant species in towns and highland areas [14] as well as a recent study which reported the dominance of *Plasmodium vivax* using parasitological and entomological data from the Butajira highland area [13]. The contributed factor for the dominance of *P. vivax* may be the dormant nature of the species in the liver [13].

Prevalence of malaria in lowland parts of Ethiopia (< 2000m) is estimated to 1.3% [4]; the report indicates that the prevalence of total confirmed malaria in the sub city an average 0.4% it represents relatively lower than other endemic parts of the country which is lowland, but higher than highland

areas of the country (> 2000m) which estimated 0.1% [20]. And also the report shows that the average malaria incidence of the sub city was below the country incidence rate which accounts 6.3/1000 population [15].

Generally in the sub city death become a history do you to the accessibility of health facilities with extended surveillance system. In contrary malaria incidence rate increases from time to time because no systematic malaria control program had been in place in the sub city and distribution of free insecticide treated bed nets (ITNs), indoor residual spraying (IRS) and other malaria control activities were no to be proceed.

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# **6. Chapter – VI: Abstracts for Scientific Presentation**

## **6.1 Scientific Abstract on Five Year (2012-2016) Surveillance Data Analysis of Malaria - Akaki-Kality sub city, Addis Ababa**

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### **Abstract**

#### **Back ground**

Malaria is a major health problem life threatening parasitic disease caused by the protozoan parasite plasmodium and one of the leading causes of illness and death in the world mostly in sub-Saharan Africa including Ethiopia. Approximately 75% of Ethiopia's landmass is malaria-endemic; which is primarily associated with altitude and rainfall. In Ethiopia, malaria is highly seasonal in many communities and area including the outskirts of Addis Ababa, Akaki-kality sub city and its environs of highland areas. It is important to analyze the magnitude of the disease to strengthening the control mechanisms and/or to fill the gaps in the intervention mechanism. This paper shows the trend of malaria in Akaki-Kality sub city from 2012 – 2016.

#### **Methodology**

A retrospective descriptive study was conducted on secondary five year (2012 – 2016) malaria data in Akaki Kality sub city. After the data was officially requested and received from PHEM center of the sub city, data cleaning and analysis was conducted using Microsoft Excel 2013.

#### **Result**

A total of 4939 clinical and confirmed malaria cases were identified during the five year period in the sub city. Among these, 4861 (98.42 %) were outpatient and 78 (1.58 %) were inpatient. Out of the total 4717 (95.51 %) confirmed malaria cases 3522(74.33%) and 1195(25.67%) were Plasmodium vivax and Plasmodium falciparum respectively. There was a significance increase in the incidence rate of confirmed malaria cases from 2012 – 2016 and the average incidence rate

was 4.7/1000. The peak malaria report year was 2016 with 1139 (23.06%) of the total cases in the five year period. Over all case there were no death identified during the study year.

### **Conclusion**

Having malaria deaths and devastating malaria epidemics in the Akaki sub city seems now history; due to the strengthening of surveillance system with tremendous efforts in controlling and preventing malaria in the country. Plasmodium vivax and plasmodium falciparum were the responsible species of malaria in the sub city. To strengthening of surveillance requires taking constructive corrective measures to all types of error or gaps that have identified in this paper.

**Key words:** Malaria, Confirmed and clinical, Highland malaria, Incidence rate

## **6.2 Scientific Abstract on Surveillance System evaluation report of - Akaki-Kality sub city, Addis Ababa**

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### **ABSTRACT**

#### **Background**

Public health surveillance is the ongoing systematic collection, analysis, interpretation and timely dissemination of health-related data for action and program evaluation. Conducting a surveillance system evaluation is crucial for monitoring efficacy and effectiveness of intervention programs in health care systems. This study is intended to evaluate surveillance system in Akaki Kality sub city mainly focusing on malaria and severe acute malnutrition prevention and control activities.

#### **Method**

A descriptive cross-sectional study design was used to evaluate the surveillance system of the Akaki Kality sub city of Addis Ababa City. We used 4 Health centers, 5 woreda office and the sub city health office in the study. We collected data by interviewing PHEM focal persons at all levels of the system using structured questionnaire for evaluation of surveillance system adapted from WHO and CDC. Additionally, we also used observation of secondary documents and tools used for surveillance at all level to collect data.

#### **Result**

In the year 2016/17, a total of 23 suspected measles cases were reported and Malnutrition cases a total of 61(46%) SAM and 71(54%) MAM cases were reported from sub city. Surveillance data of selected diseases were not analyzed and used for action at all level of the surveillance unit. We identified a lack of a written emergency preparedness and response plan that helps to strengthen capacity in recognizing and responding to public health emergencies. In addition,

including sub city, all of the assessed woredas failed to have emergency drugs stock and specific budget line in the system.

### **Conclusion**

The overall surveillance system was not operating well to meet its objectives. Even if the surveillance system of the sub city was simple, flexible, timeliness, acceptability and useful, there were attributes and core function that require attention for improvement of the surveillance processes such as data quality, completeness, data analysis and feedback. In order to increase case detection of diseases; Improving the system performance, reporting and data analysis on regular basis; capacity of health care providers need to be improved through training and supervision.

**7. Chapter – VII:  
Protocol/Proposal for  
Epidemiologic Research  
Project**

## **7.1 Prevalence of injury and associated factors among patients visiting the Emergency Departments of Yekatit 12 Hospital Medical College, Addis Ababa, Ethiopia**

### **Abstract**

**Background:** Injuries are extremely important public health problem, in both developed and developing countries. Injuries due to accidents & violence are major public health problem, killing more than 250 000 people in the EU-27 each year and disabling many more. Although injuries are known to be preventable, still it continues to be a widespread health problem. In Ethiopia, despite government efforts to reduce RTAs, injury is increasing at an alarming rate and constitute around half of all surgical emergencies.

**Objective:** The general objective of this study is to determine the burden, patterns and factors associated with injuries among patient visiting adult Emergency Departments of Yekatit 12 Hospital Medical College Addis Ababa, 2018

**Methods:** Prospective cross sectional institution based study design will used to conduct the study at emergency department of Yekatit 12 Hospital Medical College, Addis Ababa, Ethiopia, from February to May 2018. Data will collected using interviewer-administered technique. Data will entered in EPI info version 7.

**Work plan:** Data collection will be started on first week of March 2018 and the overall work of the study is planned to finalize until end of May 2018.

**Budget:** Estimated cost to undertake the study is 85,698 ETH Birr.

# Introduction

## Background

Injury is physical damage that results when a body, intentionally or unintentionally, is subjected to intolerable levels of energy. It can be caused by many related diverse causes and social activities, such as transport, work, violence, recreation, sports and the home situation. Such example events like, traffic collisions, drowning, poisoning, falls, burns, or violence (e.g. assault, self-inflicted violence, or acts of war) [1, 3].

According to WHO, injuries are becoming among the leading causes of global burden of disease represents 12% and the third most important cause of overall mortality. Globally, estimated that more than 5 million people die as a result of injuries each year. This accounts for 9% of the world's deaths, nearly 1.7 times the number of fatalities that result from HIV/AIDS, tuberculosis and malaria combined. Approximately a quarter of the deaths from injuries are the result of suicide and homicide, while road traffic injuries account for nearly another quarter. Other main causes of death from injuries are falls, drowning, burns, poisoning and war [3].

Injury is a serious public health problem threatening future generation particularly in the low and middle income countries (LMICs), where they are growing in significance, largely as a consequence of the epidemiologic, geographic, and socioeconomic transition, that experience 90% of global report from injury [4]; of which 21% contributes from African region, especially in sub-Saharan countries and 16% of all disabilities with heavies' impact in developing countries [3]. Findings from East Africa countries such as Kenya, Sudan, and Tanzania demonstrate that there is a significant growing burden of traumatic injuries [24, 25]. Among African nations the rate of injury mortality in 2004 was the highest in Nigeria and the lowest in Egypt. South Africa and Ethiopia were second and third, respectively [18].

In Ethiopia, like other developing countries, injuries are common but little attention is being given to this problem [14]. Especially more common among men and among persons aged group 15–44 years [13]. Data compiled by the ministry of health in 2000/2001 showed that injuries ranked fourth and fifth as a leading cause of admission and death respectively accounting for 6.2% and 1.6% [15].

## **Statement of the problem**

Injuries constitute a major public health problem, many things that produce injuries are absolutely necessary to the conduct of daily life, such as the interpersonal relationships that sustain self and other, the energy sources used for heating and lighting, the vehicles and roads used for transport, buildings and construction material, the medications used to cure illnesses, and the machinery and tools by which formal and informal industry and agriculture are practiced. This all mechanisms and activities with its many different associated factors like (behavioral, socio-economic and demographic factors) makes the task of injury prevention and control considerably more complex than the control of infectious and communicable diseases, which, in principle at least, can be eliminated by eradication of the pathogens or vaccination of the host [26].

Around the world, almost 16,000 people die from injuries every day. For every person who dies of injuries, several thousand injured persons survive, but many of them are left with permanent disabling. In 2002, about 5.2 million people died worldwide and harming many millions more due to injury. Their occurrence is creating mounting concern, with injury-related fatalities projected to rise to 8.4 million by 2020. Over 68% of them resulting from unintentional causes, nearly a quarter of all unintentional injury deaths worldwide are the result of road traffic crashes. In 2002, approximately 1.18 million people were killed as a result of a motor vehicle crash [4]. Whether they are unintentional resulting from incidents such as road traffic collisions, drowning, and falls or intentional following an assault, self-inflicted violence or war-related violence, injuries affect people of all ages and economic groups [3].

Injury related economic and social costs are enormous, which cause considerable economic losses arise from the cost of treatment to victims, their families, and nations as a whole with the burden falling most heavily on developing countries, where nearly 90% of these deaths and injuries occur [4]. There are few global estimates of the costs of injury, but the following examples illustrate the financial impact of injuries on national economies and individual families: Road traffic deaths and injuries cost approximately 2% of gross domestic product in high-income countries and as much as 5% of gross domestic product in some low- and middle-income countries. These costs include medical bills, vehicle damage, and lost productivity and total around US\$ 1.9 trillion a year globally [3].

This public health crisis threatens to grow rapidly unless swift and effective action is taken. Injury is one of the commonest causes of death and disability in the African region. Every day in Africa, about 2,400 people die from injuries which constitute 15% the global burden of death. Injury related deaths in Africa among people aged 15-44 rank second behind HIV/AIDS, especially in sub Saharan countries [27], where the proportion of such deaths from injury is higher than in any other region of the world and where the risk of death from injury is greatest, particularly for men in the age group 15-29 years. The contribution of injuries to rise of mortality and disability in sub-Saharan Africa is due to the rapid growth of motorized transportation and industrialization without any related increase in safety measures and education. In South Africa, injury has been described as a 'malignant epidemic' [28].

Injuries are an important and largely neglected health problem in our countries, which constitute around a half of all surgical emergencies, and were the major reason for an emergency room visit in Addis Ababa during 1999, more than a quarter of all surgical admissions, and 62% of orthopedic admissions in Black Lion hospital. With regard to prevalence of injuries, Injuries from road traffic take the lion share and have become one of the major health burdens in Ethiopia. Especially urban city of the country particularly in Addis Ababa. EDHS 2016 report showed that accidental fall and road traffic accidents accounted for the highest percentages of accidental injuries or deaths in Addis Ababa [15, 29, 31].

Considering the increasing contribution of violence, injury and medical emergencies to the burden of disease, recently the Ethiopian Health Sector Development Program recognizes that injuries have multiple causes that necessitate a multi-sectorial approach towards effective prevention and rapid responses when they occur, including efforts to strengthen the quality and availability of emergency medical services. To materialize this, the Ministry of Health has prepared a National Multi Sectorial Strategic Plan in coordination with various sectors. Road traffic injury, fire burn, falls and other work related injuries are priorities in the plan. The plan emphasizes the importance of well-organized emergency medical system in reducing the severity and consequences of injuries and violence [28].

However, in Ethiopia, despite government efforts to reduce road traffic injuries, the occurrence and health impact of injuries have not receives expected attention, due to this injury is increasing at an alarming rate and constitute around half of all surgical emergencies. Similarly, lack of

sufficient data about its magnitude and pattern/mechanisms of injuries leads to underestimation of injury burden. Without reliable information, health care planners at all levels are unable to allocate resources so as to achieve the greatest impact in preventing injuries, treating and rehabilitating injured persons [31].

On the other hand previous studies that examined prevalence of injuries and its associated factors had largely focused on specific injuries, such as falls and fractures or specific age groups, like the elderly. However, little is known about the wider spectrum of adult injury mechanisms. As well those studies on injury, most were depend on secondary sources of chart review which may end up with incomplete and biased information due to data collected were not thinking in future research.

Thus to design effective prevention strategies, there is need of findings about the magnitude and pattern/mechanisms of injury and its associated factors. Therefore, the aim of this study was to determine the magnitude of injury and its associated factors among patients who visiting the Emergency Departments of Yekatit 12 Hospital Medical College of Addis Ababa City Administration Health Bureau.

### **Significance of the study**

The purpose of this study is to design effective injury prevention strategies and enhance effective patient care and services rendered in the emergency unit of the hospital by reducing the overcrowding of the department. This will help to develop an effective response towards the problem.

The results of this study will lead to enhance an organized injury data in this teaching hospital that provides good information about its pattern and information on the external causes/mechanisms of injuries and associated factors requiring ED visit and/or hospitalization. On top of that, it will describe the burden due to injuries in the hospital of the emergency department for prioritization of care services. Moreover, the information of the result will also contribute inputs for health care planners at all levels to allocate resources for effective injury prevention strategies and during planning to reorganization of the emergency department in a manner that allow the hospital to deliver quality emergency health service to the emergency medical care users in general and for injury victims in particular.

Finally, the result of this research will serve as a base for further research on the topic and therefore, when this research completed it will provided a data on prevalence of injury and associated factors in patients visiting the emergency department (EOPD) of Yekatit 12 hospital medical college.

## **Study objectives**

### **General objective**

To determine the magnitude, patterns and factors associated with injuries among patient visiting adult Emergency Departments of Yekatit 12 Hospital Medical College Addis Ababa

### **Specific objectives**

- To determine the magnitude of injuries among patient visiting adult Emergency Departments of Yekatit 12 Hospital Medical collage Addis Ababa.
- To characterize pattern of injury among patient visiting adult Emergency Departments of Yekatit 12 Hospital Medical college Addis Ababa.
- To identify factors associated with injuries among patient visiting adult Emergency Departments of Yekatit 12 Hospital Medical College Addis Ababa.

## **Literature review**

Injuries are traditionally grouped according to two broad categories: intentional and unintentional. Conventionally, intentional injuries include interpersonal violence (spousal abuse, child abuse, and other assaults), self-inflicted injuries (attempted and completed suicides) as well as collective violence and war-related injuries. Motor vehicle injuries, poisonings, burns, falls, drowning, and other injury classifications in which intentionality is understood to be absent constitute the broad unintentional injuries category [1].

Every two minutes someone dies of an injury. This means that each year a staggering 7 million people are admitted to hospital, 35 million people are treated as hospital outpatients and 19 million people receive medical treatment outside the hospital as a result of an accident or violence related injury. Injuries due to accidents and violence are a major public health problem, killing more than 250 000 people in the European Union 27 member states (EU-27) each year and disabling many more. Injuries are the fourth most common cause of death, after cardiovascular diseases, cancer, and respiratory diseases. While the dimension of the problem is well known, better information about circumstances and causes is needed for the main unintentional and intentional injury domains in order to set up efficient prevention programs. Injuries, whether intentional or unintentional, are the third leading cause of death in Europe and pose a threat to economic and social development [2, 10].

Injuries represent a significant and growing disease burden in the developing world, and now represent one of the leading causes of death in economically active adults in many low- and middle-income countries. According to East Africa at Tanzania, Kenya, 11.5%, 41% of cases were injury cases respectively with a high burden of road traffic & assault injuries in a predominantly working age group population and head & extremity injuries were the mainly affected organs [28, 48]. Injury is more common among men and among persons aged 15–44 years [13]. Injury deaths attributable to road traffic crashes was the highest in Egypt (41%) followed by Ethiopia (30%) [21].

## **Prevalence of injury and common mechanisms**

A prospective observational study at level I East Europe trauma center on trauma pattern showed that the trauma etiology was RTI 71.6% cases, falls in 19.9% and crushing injuries in 5.0% patients and only one case of a gunshot wound was encountered in the study. Out of traffic-related injuries, the automobiles were involved in 55.4% and motorcycles in 8.9% patients. Motor cycle drivers accounted 2.0% of patients and pedestrians hit by vehicles were in 32.7% cases [11].

Review on mortality and morbidity data of unintentional injury in Ireland 1980–1996/1993–1997 revealed that road traffic crashes followed by falls are the main causes for injury deaths the reverse is true for the hospital admissions (e.g. RTC 42.1% and falls 17.2% (deaths) respective falls 42.9% and RTC 14.5% (hospitalization), [17]. Descriptive study on St John's hospital Accident & Emergency data at Livingston, England, fractures/dislocations (25–30%) and sprains/soft tissue injuries (20–25%) were the leading causes for Admission & Emergency attendances [18], whereas a study at East London, England, Limb fractures (27%), poisonings (14%) and intracranial injuries (11%) were most coded admissions [19].

Hospital based retrospective study at Northern Jordan showed that, violence was the most common reason of injury (70.66%), followed by road traffic crashes (23.21%), falling down accident (8.85%) and poison and Contact with venomous animals and plants (Bites/stings) (4.62%). The most common anatomical location of reported injuries were the head (38.74%), followed by abdomen/pelvis and lower back [22].

Retrospective analysis of Hospital-based injury data from level III institution in Cameroon, the result showed that the allover injury burden was 28% and Road Traffic Accident (RTI) were the leading mechanisms of injury (36.44%), followed by assault (22.88%), work related injury (15.13%), and fall accident (9.78%). In the selective analysis of cases of road traffic injuries the type of vehicle involved was specified, cars were involved in (25%) cases and motorcycles in (60%) cases; the remaining cases concerned buses, trucks, hand-pushed vehicles, bicycles and domestic animals on the road [32].

Retrospective record review in Nigeria from August / 2004 to August / 2005 showed that road traffic injuries (RTIs) were the most common causes of injury for all age groups which account (65%), within traffic injuries, more injured groups were passengers (43%), pedestrians (30%) and

drivers (27%). Other causes of injury included blunt/penetrating injuries (25%) and falls (10%). Less than 5% of all patients arriving to the emergency department for injuries arrived by ambulance. [39].

On-site review of records at Kenya depicted top three leading causes of injuries assault (41.6%), RTA (27.7%) & unspecified soft tissue injuries (11.3%). Others included cut-wounds (7.2%), dog bites and falls each accounted 3%, while burns & poisoning contained 1.2 % and 0.8% respectively. A study done at Nigeria showed traumatic injuries consists 98% and common cause was motor vehicle crashes (54%) [28, 38].

In Ethiopia: A prospective cross sectional study at Amhara Regional State Referral Hospital were conducted, the prevalence of injury in emergency departments of the referral hospitals was found to be 55.6 %, and with causes of injury were assault (37.4 %) and RTI for (33.9%) of patients. The highest proportion of sites of injury occurred on the street (46.1 %) and the least proportion 15 (6.5 %) occurred at school and sports area. The mode of transport used by the casualties was varied among the patients; forty five (19.6 %) were coming by walking or carried by people, 132 (57.4 %) used a taxi or other private car, while 9 (3.9 %) came by police transport 168 and only 44 (19 %) got an ambulance service to reach the referral hospitals [35]. A study Findings from Gondar university hospital showed that injury burden were 25% and the common mechanism of injury was blunt assault, (51.3%), followed by road traffic accidents, (30.3%) [31].

Retrospective cross sectional at Study at Hawassa university referral hospital, common mechanisms of injuries were RTA (53.9%), fighting (22%), fall down accident (15.1%) & stub injury (3.2%). In this study males were more injured by road traffic accident than females, with a percentage difference accounts 81.1% and 18.9% respectively. The most affected age group was 21-30 years of age by RTA and fighting. Retrospective review of records at Jimma University specialized hospital (JUSH) showed that, the prevalence of injury was 8.2% and the common mechanism was blunt assault (30.9%), followed by RTA (30.3%), cut by sharp tool (13%), stab (9.5%) and falling (9.3%) [45, 47].

An assessment report by Addis Ababa City Administration Health Bureau in 2007 has shown that, the pattern of injuries in Addis Ababa found that injuries accounted for 27% of all emergency visits and 2.8% all regular visits OPD (31% of emergency and 10% of regular visits in hospitals

and 22% of emergency and 1% of regular visits in Health centers), 5% of all hospitalizations, and 3% of deaths. This report also showed that the patients were predominantly young males, among patients who had reported injuries, (62.6%) were male and (37.4%) were female giving a male to female ratio of 1.7:1. The majority of injured patients, (65.9%), were within the age groups of 15-44 years [29].

An institution based a prospective cross-sectional study at AABET hospital resulted traumatic injuries were represents 42.6% of the total visited patient emergency. Mainly occurred due to RTA (50.6%), Assault (19.4%), fall down accident (15.3%) and burn (5.7%). And Gunshot (2.5%), Stab/Cut injury (2.2%), machinery (1.6%) and self-injured (0.6%) were the least frequently encountered mechanisms. Likewise the rest other mechanisms of injury specified by respondents were hit by a tree, house, object, stone & hanging which had a frequency of less than 1%. In this study most of the time males were affected by RTA, Assault, fall down & Burn in 72.3%, 91.8%, 77%, & 66.7% than females that was 27.7%, 8.2%, 23%, & 33.3% respectively. The more affected age groups were 21-30 and 12-20 by RTA, assault and fall down [44].

Investigations in TASH showed injury prevalence were 32.5%, unintentional injuries were the primary cause (73.2%). Of them RTAs (38.3%), then stuck/hit by a person/object (31.5%), & fall accident (21.2%). Other less common injuries were gunshot (3.4 %), industrial machinery injury (2.2%), stab (1.2%) and sexual assault (1%). The rest (1.2%) were due to burn, choking, hanging or undetermined causes [46].

### **Associated variables/ factors**

According to Europe, Two main causes account 70% of all fatal injuries among adolescents: road injuries (48%) and suicides (20%; for both causes approximately 3 to 4 times higher for males (road: 28, suicide: 12) than females (road: 8, suicide: 3). Poisoning (drugs), ranks third. Higher number of males between 15 and 24 years treated for an injury [10].

Hospital based retrospective study at Northern Jordan violence had a high significant effect on the site of injuries. Patients who had suffered injury to the head because of a stab wound or fighting are substantially over-involved in head injuries, with the injury risk being 3.88 and 7.51 times higher than those patients who had been injured to head due to a gunshot, respectively. Even patients who had suffered injury to head because of assault showed significantly higher injury risk

than non-assault patients (OR = 8.46). Contrary to injuries to head, patients who had been injured to the hips and thigh because of a stab wound or fighting had substantially low involvement in hip and thigh injuries, with an injury risk of 0.091 and 0.089 times lower than those patients who had suffered injury to the hips and thigh because of a gunshot, respectively. However, patients who had suffered injury to the hips and thigh because of assault also showed lower involvement of injury risk than non-assault patients (OR = 0.36). Similarly, patients who had been injured in the knee and lower legs because of a stab wound or fighting or assault were substantially less involved in knee and lower legs injuries, with an injury risk of 0.265, 0.27, and 0.21 times lower than those patients who had been injured to the hips and thigh because of a gunshot, respectively [22].

Institution based cross-sectional study Survey at Western Turkey, the prevalence of unintentional injuries among university students was 14.9% during the past 12 months. The most commonly reported injuries were road injuries (43.8%), and injuries occurring at home (33.2%) and outside home (26.9%) at places such as schools, workplaces, or sports venues. The prevalence of unintentional injuries was significantly higher in males than females (18.1% vs. 12.0%  $p < 0.05$ ). Results of the logistic regression analysis indicated that male gender (OR 1.51), studying in college and vocational school (OR 1.34), perception of very bad (OR 0.49) or good economic status (OR 0.49), drinking alcohol (OR 1.52), using illicit substances (OR 1.70), having a diagnosed illness (OR 1.36), or having risk of developing depression (OR 1.54) had significant effects on the risk of unintentional injuries ( $p < 0.05$ ) [43].

Emergency Department review of records at Kenya; assault was leading cause accounting over 50% in those aged 15-29 years, and together with RTC were first or second leading cause. Cuts occurred more significantly among males than females, 8.1% versus 5.3% (OR=1.56; 95%CI: 1.25 to 1.96;  $p < 0.001$ ) otherwise no gender difference [28].

Based on Ethiopia, Retrospective cross sectional study at Hawassa; males (81.1%) injured by RTA were greater than females (18.9%) with a ratio of 4:1. Mainly affected age group was 21-30 years (40.6%) by RTA & fighting. From RTA, majority were pedestrian (46.1%) and passenger (33%) the rest were at home (15.7%) and farm (1.9%). Majority of injuries were accidental (62.6%) followed by quarrel (23.5%) & drug related like alcohol 113% [45].

Findings at TASH revealed unintentional injury highly affects civil servant (81.25%), students (75%), & farmers (53.7%). Intentional injuries accounted (26.8%) of whom farmers 36%, civil servant 12.8%, & students 9.3%. Among those injured by Stuck/hit (a person/object), (22.4%) were due to interpersonal violence (assault) predominantly in farmers (43%), civil servants (15.3%) and students (11.1%). Fall has occurred in farmers (23.5%), students (19.1%), & unemployed (16.2%). In multivariate analysis, found that odds of injury of assault increased for male {(P= 0.037, AOR, 2.528, 95%CI (1.058-6.037)}. Those with a monthly income less than 650 birr were highly associated with assault {(P= 0.002, AOR 2.919, 95% CI (1.493-5.705)}. Similarly, those with age under 40 years were significantly associated with assault {(P= 0.004, AOR 3.271, 95%CI (1.451-7.375)}. In addition, being a passenger had 89% less likely of having RTAs than being a pedestrian {(P=0.033, AOR 0.109 95% CI (0.014-.833)}. Those illiterate had one more times to have RTAs than educated. Age > 40 associated with RTAs (P=0.031, COR 1.766, 95%CI, 1.054-2959) & age <40 associated with fall accident {(P=0.008, COR, 2.194, 95% CI (1.230-3.913)} [46].

Retrospective descriptive study at Addis Ababa resulted with falls (number one mechanism) were common in females aged over 65 years (52.2%). RTCs were top cause in age 15-44. Burns ranked 4<sup>th</sup> (9.8%). Males were responsible for (67.6%) of all causes of intentional injuries 46.1 % occurred on street and least proportion 6.5% occurred at school & sports area. From Amhara referral hospitals, 19.6 % were coming by walking/ carried by people, (57.4 %) used taxi/ private car, 3.9 % by police transport & 19 % by ambulance service to reach referral hospitals. Age 20-44 (AOR: 2.25, C.I: 1.06-4.81), Sex, male ( AOR: 2.83, C.I: 1.79-4.47), income less than 34.2 USD ( AOR: 1.89, C.I: 1.03-3.45), occupation; daily laborers ( AOR: 6.27, C.I: 2.38-16.47) & farmers (AOR: 2.90, C.I: 1.31-6.41) and substance use (AOR:2. 16, CI: 1.18-3.96) were highly associated with injury with multiple logistic regression analysis [29, 35].

An institution based a prospective cross-sectional study at AABET hospital resulted, in multivariate analysis factors that were associated with injury were sex, educational background, and activities at the time of injury. It was found that males were 4 times more likely to have assault than females {P= 0.10, AOR: 3.582, 95% CI: (1.366-9.393)}. Being male also found that they were 50% less likely to be injured with injury of fall down than females {P= 0.023, AOR: 0.518, 95% C.I: (0.294-0.914)}. In addition, illiteracy contributed 2 times more likely to have injury of

RTA than literates {P = 0.029, AOR: 2.106, 95% CI: (1.076-3.778)}. In similar manner pedestrians were 93% less likely to have injury than passenger {P= 0.000, AOR: 0.067, 95% CI: (0.031-0.143)} [44].

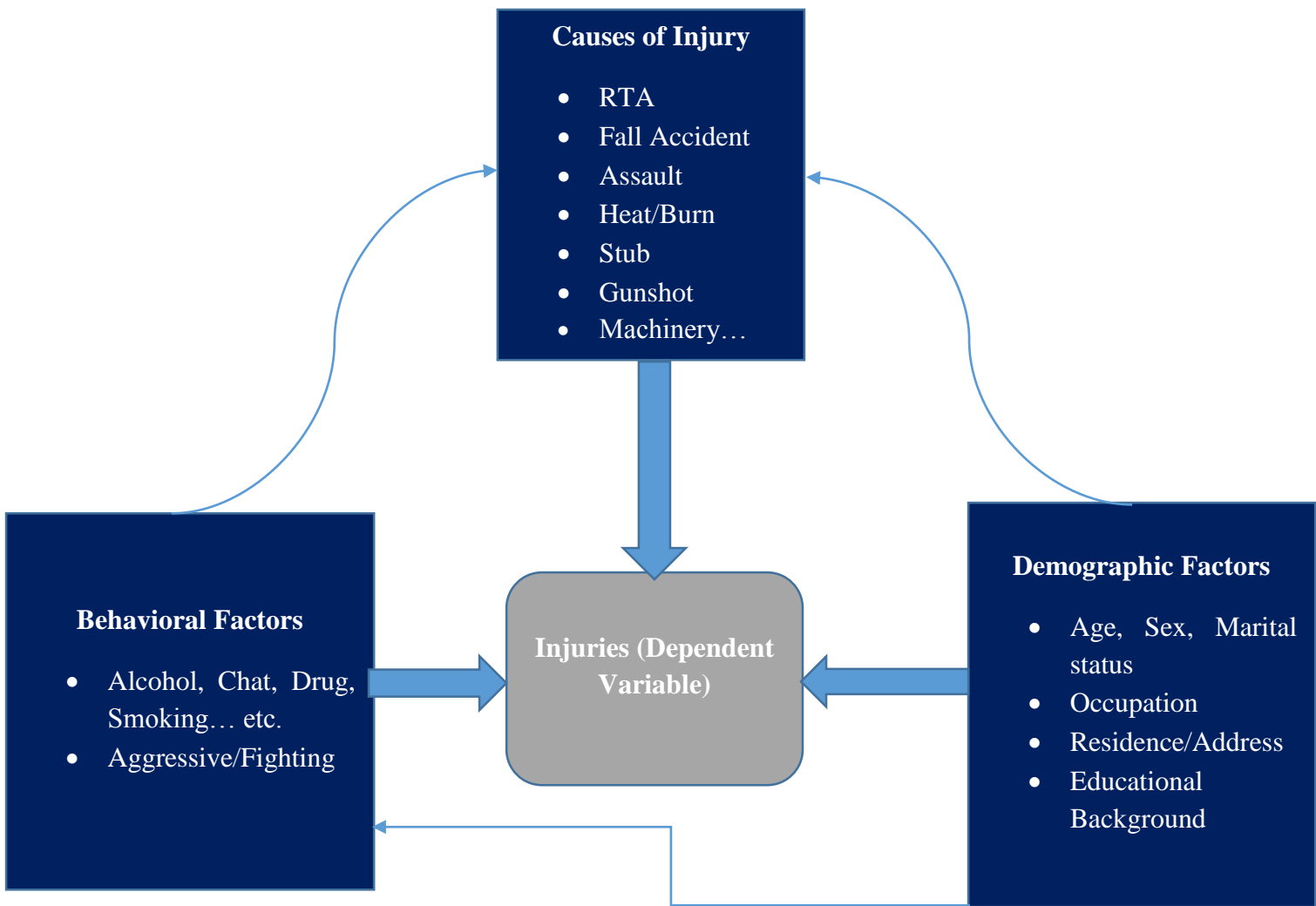


Figure 26. Conceptual frame work showing relationship between dependent and independents variables.

## **Methods and material**

### **Study area and period**

This study will be carried out at Yekatit 12 Hospital Medical College, Addis Ababa, Ethiopia, from February to May 2018 G.C.

Yekatit 12 Hospital was established in the home of Emperor Haile Selassie I in 1915 with the former name Bethsaida and Emperor Haile Selassie I Hospital until 1967. After the revolution of 1974 the name changed to Yekatit 12 hospital. From 1987 EC the hospital administered under Addis Ababa city administration health Bureau. A medical College was opened in 2003 EC. It has 1400 clinical and non-clinical staff with 350 beds and for catchment population of more than 5 million. The services provided by the hospital are Pediatric and Adult emergency, burn unit, ICU, Orthopedics, surgical unit, maternity, general observation and OPD follow up. The hospital offers diagnosis and treatment for approximately 161,774 patients per year. 2009 EC annual performance report showed that patient flow of emergency department, inpatient services and OPD were 25,336, 12,643 and 123,795 patients visited the hospital respectively. Using the above data as a reference we can calculate average daily patient flow of emergency department which accounts for 70 patients in emergency department per day.

### **Study design**

An institution based prospective cross-sectional study design will be utilized in Yekatit 12 Hospital Medical College, Addis Ababa, Ethiopia, from February to May 2018 G.C.

### **Source population**

All patients who visit the Emergency Department of Yekatit 12 Hospital Medical College in 2018 will be considered as source population.

### **Study population**

All patients who visit the adult Emergency Department of Yekatit 12 Hospital Medical College during the study period will be included in the study.

### **Sample size determination and sampling method**

The sample size will be determined using a single population proportion formula considering the following assumptions: value of standard normal distribution with confidence interval (CI) of

95% ( $Z=1.96$ ), absolute precision or tolerable margin of error ( $d=0.05$ ), and anticipated proportion of patients who experience injury is ( $p= 31\%$ ) [29].

A systematic random sampling technique will use to select the respondents for interview by using the entry point to the triage sit of patients as a sampling frame.

$$n_i = \frac{(Z_{\alpha/2})^2 p q}{d^2}$$

$$\frac{(1.96)^2 \times 0.31(1-0.31)}{(0.05)^2} = 329$$

By adding 5% (16.5) non-respondent, the total sample size is:

$$329+16.5 = 345.5 \sim \underline{\underline{346}}$$

## **Inclusion and exclusion criteria**

### **Inclusion criteria**

All patients who visits the adult Emergency Department of Yekatit 12 Hospital Medical College during the study period will included in the study.

### **Exclusion criteria**

Children less than 12 yrs. as well; those injured patients who were not volunteers to give information, and those who transferred immediately to other hospitals were excluded groups in the study.

### **Method of data collection**

Data will collect using the interviewer-administered technique. Five data collectors (BSC Nurses) & two supervisors will assigns and data will be gather from March 10 to May 08, 2018. Data collection tool adapted from Injury surveillance guidelines checklist developed by experts from WHO and the US in 2001 with certain modification will use to gather information from injured patients prospectively [48].

### **Data quality control**

A through training of data collectors and supervisors will be undertaken and to have common understanding. In addition, pretest will conduct on 5% of the sample before the actual data collection to check consistency of the questioners (to identify potential problematic areas, unanticipated interpretations and cultural objections to any of the questions) so that an ambiguous questions and repetitive ideas will correct. Also additional response categories will add based on pretest findings.

Supervision will carries out on daily bases to check completeness, consistency both by the supervisor and by principal investigator to keep the quality of data. During the data collection from the site and at end of each day questioners will review and check by the principal investigator & supervisor for completeness and corrective measures are taken to minimize errors. As well the principal investigator shall complete entering and clean before analysis carries out.

### **Data processing and analysis**

After all the necessary data collected, we will coded, and entered data into EPI INFO version 7 statistical package.

### **Ethical considerations**

The study will carries out after obtaining ethical clearance from the research and ethics committee of Addis Ababa University (AAU), college of health Science, public health faculty through Department of Field Epidemiology. Then data will collected after getting permission from the management (Provost/Medical director) of Yekatit 12 Hospital Medical College.

To keep confidentiality of respondents, each participant will informed about the objective of the study and that participation is on volunteer base, as well their names will not indicated in the questioner (anonymous). As well questioners can be keep locked.

### **Finding dissemination**

The finding of the study will distributed to AAU, Public health faculty, Department of Field Epidemiology and to Yekatit 12 Hospital Medical College, where the study is conducts. Also it will presents to the staff and students of AAU, Public health faculty, Department of Field Epidemiology.

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# **8. Chapter – VIII: Other Additional Output Reports**

## 8.1 Weekly Bulletin of PHEM Report for WHO Epidemiologic Week 10/2017, Akaki Kality sub city Health Office



### AKAKI KALITY SUB CITY ADMINISTRATION HEALTH OFFICE PUBLIC HEALTH EMERGENCY AND MANAGEMENT OFFICE W.H.O WEEKLY EPIDEMIOLOGICAL BULLETIN: WEEK 10

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#### Introduction

This Epidemiological Weekly Bulletin serves to provide key information on public health emergency management activities, and summarizes surveillance data and performance on epidemic prone diseases and other public health emergencies. The bulletin mainly includes surveillance data of week 10 of 2017 received through SMS, phone call and line list reports. It highlights the surveillance completeness and timeliness across all woreda, trends of diseases under surveillance, cluster of cases and events, ongoing outbreaks and responses undertaken at all levels in the sub city.

Highlights of the Week 10 (March 6–12/2017)

Akaki Kality Surveillance report completeness and timeliness rates in week 10 for health facilities under the sub city were 100%.

There were no new SAM and one MAM cases reported from March 6–14/ 2017.

Number of total malaria cases were 26.

Number of typhoid cases were 469

Number of epidemic typhus were 449.

Number of dysentery in the week were 14.

Number of relapsing fever in the week were 03

The number of Measles case 01

There were no AWD cases detected in this week.

No maternal death were reported in this week

Completeness and Timeliness

In this week the surveillance completeness rate in each facilities under sub city were 100%.

#### IV .selected Diseases and conditions

##### 1. Malaria

Total Malaria confirmed cases in week 10 were 26. Malaria cases have increased significantly as compared to the previous weeks (which was 9 in week 9). Among the confirmed cases 2(7.7%) were P. Falciparum and 24(92.3%) were P. Vivax. There is a significant increases in the trend of malaria incidence in the last 10 week and indicate a potential risk of outbreak.

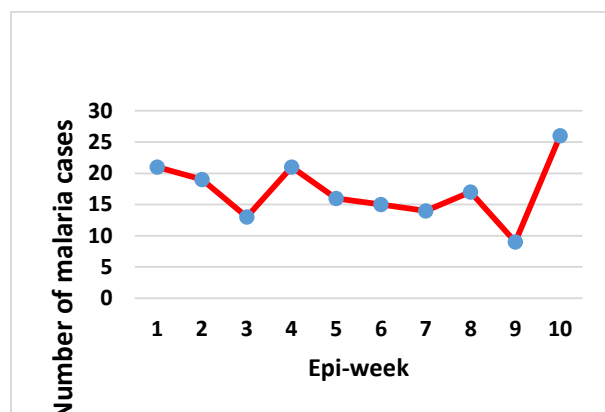


Figure 27. Trend of malaria case in Akaki Kality Sub City, from January 02//2017 to march 12/2017.

##### Typhoid

A total of 469 typhoid cases with no death were reported in this week. The number of Cases were increased as compared to the previous week (which was 370).

##### 3. Dysentery

A total of 14 dysentery cases were reported during week 10. The number of Cases were decreases as compared to the previous week report (which was 25).

##### 4. Measles

There was one measles suspected case reported from woreda five The pt. come from bolle bulbula of bolle sub city

##### 5. Relapsing fever

There are 3 RF cases reported in this weak. The number of relapsing fever was relatively decrease from previous week (which was 6). All of the reported case were deloused and managed based on RF treatment protocol.

##### 6. Immediately reportable disease

All immediately reportable disease (AWD, AFP, NNT, SARS, Rabies, Cholera, Anthrax, Guinea worm, VHF, Yellow fever, MD and other were reported zero In week 10.

##### V. Recommendations

There is a potential risk for relapsing fever due to hot weather in this winter season so it is recommended to give continues community awareness and risk assessment.

Contacts:

**Fasil Tesfa +251-911-055-138**

**E-mail: fslbirhan@yahoo.com**

## 9. Annex

### 9.1 Questionnaire for Pertussis Outbreak Investigation

Date of Data collection\_\_\_\_\_

Full Name\_\_\_\_\_

Respondent:  Patient  Family member (Mother, Father: Brother or sister or other relatives close to patient.)

Respondent's status.  Case  Control

A. socio demography:

1. Age \_\_\_\_\_sex\_\_\_\_\_

2. Residence: Woreda \_\_\_\_\_, Kebele\_\_\_\_\_, Got\_\_\_\_\_

3. Occupation: \_\_\_\_\_, Profession\_\_\_\_\_

4. Religion A. Orthodox B. Muslim C. Protestant D. Others

5. Level of education of case/control Under School Age KG Primary Secondary  
Tertiary  Unable to read and write

6. Educational level of the mother/ father/ care giver. Not able to read and write  Primary   
Secondary  Tertiary

7. Total number of family members who live in the house \_\_\_\_\_

8. Is there any person affected by the diseases in the family? 1. Yes 2. No

B. Clinical manifestations

9. Do you have any of the following clinical features?

A. Paroxysmal cough B. Whoop C. Post-tussive vomiting D. Apnea E. Cyanosis

Others Symptoms\_\_\_\_\_

10. Date of onset: \_\_\_\_\_date/month/year

11. Date seen at health facility-----/-----/-----

C. complications:

12. Were any of the following present?

Edema of face  Sub Conjunctival hemorrhage  Weight loss  Pneumonia  Seizure  
 Hernia

13. Was participant hospitalized? 1. Yes 2. No If yes, duration (in days) of hospitalization: \_\_\_\_\_

D. Possible source of exposure:

14. Has the participant been exposed to a person(s) with a suspected/ confirmed case of pertussis?

1. Yes 2.No

15. If above is yes: Date of suspected contact: \_\_\_\_ / \_\_\_\_ / \_\_\_\_ What is the age of the contact case? \_\_\_\_ (yrs.)

16. What was the date of onset in the contact case? \_\_\_\_ / \_\_\_\_ / \_\_\_\_ Relationship of contact case: \_\_\_\_\_

17. Had the contact case been adequately immunized (3 or more doses of pertussis vaccine)? 1. Yes 2. No 3. Unknown

C. Risk factors/ associated factors

Immunization History

18. Did he/she/you vaccinated against pertussis? No  Yes

19. If yes; could you tell me the date of vaccination (see immunization card \_\_\_\_\_)

20. Number of dose received: \_\_\_\_\_

21. If your answer is no for question 18 what is the main reason that you/your child not vaccinated

A. The health facility is far B. I do not know the time of vaccination C. The vaccine will hurt me /my child

D. The vaccine does not prevent pertussis other specify -----

22. Distance from health facilities\_\_\_\_\_

23. Do you know pertussis is vaccine preventable diseases?

24. Was / were he/she/you ever been sick with such diseases? Yes  No

25. If yes when? -----

26. Do you know about mode of transmission for pertussis? 1. YES 2. NO

27. Do you know about mode of prevention and control methods for pertussis? 1. YES 2. NO

28. What is the estimated area of the house?

29. House Condition A. ventilated B. none ventilated

30. Number of room's in the house\_\_\_\_\_

31. Does the house have windows? 1. Yes 2. No

If Yes, specify direction of windows \_\_\_\_\_

## 9.2 Questionnaires for Case - control study on Rubella outbreak

### Questionnaires for Case - control study on Rubella outbreak in Woreda 9 of Akaki Kality Sub city; Addis Ababa city.

Hello. My name is \_\_\_\_\_ we are investigating rubella outbreak and identify risk factors associated with rubella outbreak in Woreda 9 of Akaki Kality sub city; Addis Ababa. The information we collect will help the government to plan the health services. Your household is selected for the survey. The survey usually takes about 15 to 25 minutes. We do not write your name, all of the answers you give will be confidential and will not be shared with anyone. You have to right to disagree on the survey, but we hope you will agree to answer the questions since your views are important. If I ask you any question you don't want to answer, just let me know and I will go on to the next question or you can stop the interview at any time. Do you have any questions?

Are you willing to participate in the interview?

Yes      No (Thank and stop)

Name and Signature of interviewer \_\_\_\_\_

Date \_\_\_\_\_

Name and Signature of the supervisor \_\_\_\_\_

Date \_\_\_\_\_

**Interviewed**  **Case**       **Control**

Patient/ Case Name \_\_\_\_\_ Date of Data collection \_\_\_\_\_

Region \_\_\_\_\_ Zone \_\_\_\_\_ Woreda \_\_\_\_\_ Kebele \_\_\_\_\_

**I. Socio-demographic Characteristics**

1.1. Sex \_\_\_\_\_

1.2. Age \_\_\_\_\_

1.3. Occupation of the interviewed

A. Farmer    B. House wife    C. Student    D. Unemployed    E. Daily laborer    F. Merchant  
G. Gov't      other (specify) \_\_\_\_\_

1.4. Family Occupation (HH head)

A. Farmer    B. House wife    C. Student    D. Unemployed    E. Daily laborer    F. Merchant  
G. Gov't      other (specify) \_\_\_\_\_

1.5. Religion

A. Muslim    B. Orthodox    C. Protestant    D. Catholic    Other (specify) \_\_\_\_\_

1.6. Educational level of the patient

A. Illiterate    B. Read and write    C. Elementary    D. Secondary    E. Above secondary  
F. Under School Age

1.7. Educational level of the family

A. Illiterate    B. Read and write    C. Elementary    D. Secondary    E. Above secondary

1.8. Marital status    A. Single    B. Married    C. Divorced    D. Widowed

1.9. Family size \_\_\_\_\_

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

2.1. What was the symptom?

- A. Fever      B. Rash      C. Cough,      D. Coryza (runny nose),  
E. Conjunctivitis (red eyes)      F. Ear discharge      G. pneumonia  
H. Vomiting      Others \_\_\_\_\_

2.2. Ask ONLY if complication

- Pneumonia:                       yes    no   
Cornea:                             yes    no   
Blindness:                         yes    no   
Convolution:                       yes    no   
Otitis media (ear discharge):     yes    no   
Diarrhea:                          yes    no   
Feeding problem:                 yes    no   
Cataracts:                         yes    no   
Glaucoma:                         yes    no   
Hearing loss:                     yes    no   
Other (Specify): \_\_\_\_\_

2.3. Date of rash on set: \_\_\_\_\_

2.4. Duration of rash: \_\_\_\_\_

2.5. Date seen at health facility: \_\_\_\_\_

2.6. Did you (he/she) take treatment?     Yes     No

2.7. If yes, treatment taken

- ORS       Antibiotics       Vitamin A       Supplementary food  
 TTC ointment       Anti-pyretic       others (specify): \_\_\_\_\_

2.8. Location when rash started? \_\_\_\_\_

2.9. Have you recovered after the treatment?

Cure    partially   deteriorated/disabled    death

2.10. Visited health facilities?  Yes    No   If yes date \_\_\_\_/\_\_\_\_2010 E.C.

2.11. Illness duration before visiting the health facility \_\_\_\_\_ in days

### **III. Risk factor**

3.1. Have you been vaccinated for Measles?

Yes    No    Unknown    Not applicable

3.2. If yes last vaccination

Patient recall    Vaccination card

3.3. If yes; number of vaccine doses received

One dose    Two dose    Three and above

3.4. Age of vaccination at first vaccinated. \_\_\_\_\_

3.5. If not vaccinated why?

Service not available    lack of knowledge about vaccination campaign,  
 Absence during vaccination campaign; other (specify): \_\_\_\_\_

3.6. Did you have any travel history 7-18 days to areas with active rubella cases before onset of symptoms?    Yes    No

3.7. If Yes to question 3.6. Place of travel

School    Neighbor    Market    Other Kebele  
 Other (Specify): \_\_\_\_\_

3.8. Had you contact with a person with rubella symptoms within the last 2 to 3 weeks?

Yes    No

3.9. Do you have any travel history four days before and after rash onset?

Yes     No    If yes where \_\_\_\_\_

3.10. Do you have any contact history with someone else four days before and after rash onset?

Yes     No     If yes, with whom \_\_\_\_\_

3.11. Do you know modes of transmission for measles?

Yes     No    If yes specify \_\_\_\_\_

3.12. Have you ever had rubella infection?     Yes     No     Don't know

3.13. Nutritional status of the cases

Normal     Moderate     Severely malnourished

3.14. What is the estimated area of the house? \_\_\_\_\_

3.15. House condition?     ventilated     not-ventilated

3.16. Distance from house to Health facilities (HC or HP)?

Greater than 5 km.     Equal or less than 5 km.

3.17. Where did you go first when you get ill?

Health Facility     Traditional Healers     Holy Water

stayed at home    other :( Specify) \_\_\_\_\_

3.18. How do you think people get Rubella?

Contact with a virus from ill person     From God

Bad attitude of other people     Other (Specify): \_\_\_\_\_

3.19. Do you Know rubella is vaccine preventable?

Yes     No     Don't Know

3.20. Who do you think can be affected by rubella?

- Children of aged less than 5 years     Children of aged less than 18 years
- Women of any ages     any age groups of both male and women

Other (specify): \_\_\_\_\_

3.21. How do you think rubella can be cured?

- Using modern medicine     using traditional Medicine
- Holly water     by feeding nutritious foods
- Keeping the sick person indoor    Other (Specify) \_\_\_\_\_

### 9.3 Data collection Questionnaire for Surveillance System Evaluation

#### Sub City Level Questionnaire for Surveillance System Evaluation

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**Identifiers**

Date \_\_\_/\_\_\_/\_\_\_\_\_

Sub City \_\_\_\_\_

Respondent Name \_\_\_\_\_

Zone \_\_\_\_\_

Interviewer \_\_\_\_\_

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

1. Is there a national manual for surveillance?

a. Yes      b. No      c. Unknown

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

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**II. Case Detection and Registration;**

2. Do you have standard case definitions for Measles?

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

If yes, observe the standard case definition for those diseases \_\_\_\_\_

---

**III. Data reporting:**

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

A. Federal Ministry of Health PHEM unit.

B. NGOs

C. Others RHB \_\_\_\_\_

4. Have you encountered shortage of appropriate surveillance forms at any time during the Last 6 months?

- a. Yes                      b. No                      c. Unknown

5. What are the reporting entities for the surveillance system?

- A. Public health facilities
- B. NGO health facilities
- C. Military health facilities
- D. Private health facilities
- E. Others \_\_\_\_\_

6. Number of districts has reported weekly and immediately report in the last 3 months compared to expected number? \_\_\_\_\_

7. Number of Health post, Health centers, Hospitals, NGO health facility, others (private) sent weekly report in the last three months? \_\_\_\_\_

**Weekly:** \_\_\_\_\_

**Immediately:** \_\_\_\_\_

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

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

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

- a. Yes                      b. No

If yes, with in what time is the report received after detection of the case/ diseases?

- A. Less than 1 hour
- B. 2-24 hour
- C. 1- 2 days
- D. 3- 7 days
- E. after 1 week
- F. Other \_\_\_\_\_

10. How do you report to the next level?

- A. Mail
- B. Fax
- C. Telephone
- D. Radio
- E. Electronic

F. Other

**IV. Data analysis**

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

a. yes      b. no      c. don't know

If yes, observe analyzed data by person: \_\_\_\_\_

12. Do you describe data by place?

a. yes      b. no      c. don't know

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

13. Do you describe data by time?

a. yes      b. no      c. don't know

If yes, observe description of data by time: \_\_\_\_\_

14. Do you perform trend analysis?

a. yes      b. no      c. don't know

If yes, observe line graph of cases by time \_\_\_\_\_

List disease(s) for which line graph is observed \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

**V. Availability of defined threshold;**

15. Do you have defined threshold level for Measles?

a. yes      b. no      c. don't know

If yes, observe for some diseases \_\_\_\_\_

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

17. How often do you analyze the collected data?

A. Daily

B. Weekly

C. Every 2 weeks

D. Monthly

E. Quarterly

F. As needed.....

18. Have you an appropriate denominator?

- a. Yes    b. No    c. don't know

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

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**VI. Outbreak Investigation**

19. Number of outbreaks suspected in the past year: \_\_\_\_\_

20. List the diseases: \_\_\_\_\_

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

(Observe reports and take copies if possible) \_\_\_\_\_

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

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

[Observe report]

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

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

**VII. Epidemic preparedness (relevant for epidemic prone diseases)**

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

- a. Yes    b. No    c. Unknown

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

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

- a. Yes            b. No            c. Unknown

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

- a. Yes            b. No            c. Unknown

29. Are there standard case management protocols for Measles?

- a. Yes            b. No            c. Unknown

If yes, list the exists protocols, \_\_\_\_\_

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

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

30. Is there a budget line for epidemic response?

- a. Yes            b. No            c. Unknown

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

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

31. Is there established zonal epidemic management committee?

- a. Yes            b. No            c. Unknown

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

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

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

If yes, observe written report to confirm \_\_\_\_\_

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

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

- a. Yes            b. No            c. Unknown

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

- a. Yes            b. No            c. Unknown

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

**XI. Feedback:**

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

\_\_\_\_\_

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

**XII. Supervision:**

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

\_\_\_\_\_ (%)

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

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**XIII. Training on surveillance activities;**

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

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

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

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41. Major challenges during and after training activities \_\_\_\_\_

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42. Strengths during and after training \_\_\_\_\_

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**XIV. Resources**

**Do you have? :**

**43. Data management equipment**

Computer \_\_\_\_\_

Printer \_\_\_\_\_

Photocopier \_\_\_\_\_

Data manager \_\_\_\_\_

Statistical package \_\_\_\_\_

Stationary \_\_\_\_\_

**44. Communications:**

Telephone service \_\_\_\_\_

Fax \_\_\_\_\_

Radio call \_\_\_\_\_

Mobile phone \_\_\_\_\_

Computers that have modems \_\_\_\_\_

45. **Budget line (from donors)** \_\_\_\_\_

**XV. Surveillance Networking**

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

- a. Yes      b. No      c. Unknown

**XVI. Budget for surveillance**

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

- a. Yes      b. No      c. Unknown

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

\_\_\_\_\_ ( %)

48. How could surveillance be improved? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**XVII. Surveillance Co-ordination**

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

- a. Yes      b. No      c. Unknown

If yes, observe organogram of the zone to confirm: \_\_\_\_\_

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

\_\_\_\_\_

**Questionnaire for Attributes and level of Usefulness:**

A. Total population under surveillance \_\_\_\_\_

B. In 2016/17, what is the incidence / Prevalence of:

Measles incidence \_\_\_\_\_ prevalence \_\_\_\_\_ Deaths \_\_\_\_\_

Malnutrition (SAM & MAM)

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

Does the surveillance system help?

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

B. To estimate the magnitude of morbidity and mortality of these diseases, including

identification of factors associated with these diseases? Yes/ No

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

**Observe (confirmation):**

D. Interventions and diseases trends analyzed \_\_\_\_\_

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**II. Description of Each System Attributes:**

**i. Simplicity:**

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

a. Yes    b. No        c. Unknown

2. What are the organizations which need to receive reports of the surveillance data?

---

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

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

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

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

Overall comments of on the above point's \_\_\_\_\_

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**ii. Flexibility:**

1. Can the current reporting formats be used for other newly occurring health event (disease) without much difficulty? a. Yes    b. No    c. don't know

2. Do you think that any change in the existing procedure of case detection, case definition, allocating funds, report forms, and formats will make difficult to implement?

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

Overall comments on the above points: \_\_\_\_\_

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

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

2. Have you ever given training for data collectors on data quality management?
  - a. yes    b. no.    c. don't know
3. Are the reporting site and data collectors supervised regularly? a. Yes    b. No
4. **Observe:** Review the last month report of selected diseases
  - A. Average number of *unknown or blank responses* to variables in each of the reported forms \_\_\_\_\_  
\_\_\_\_\_
  - B. Percent of reports which are complete (that is with no blank or unknown responses) from the total reports \_\_\_\_\_  
\_\_\_\_\_

**iv. Acceptability:**

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

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

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

- A. Lack of understanding of the relevance of the data to be collected
- B. No feedback or recognition given by the higher bodies for their contribution; i.e. no dissemination of the analysis data back to reporting facilities
- C. Reporting formats are difficult to understand
- D. Report formats are time consuming
- E. Cost of data reporting
- F. Other: \_\_\_\_\_  
\_\_\_\_\_

2. Are all stakeholders are fully participate in surveillance system strengthening?
  - a. yes            b. no            c. don't know

If no, what are the reasons make them discomfort? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**V. Representativeness:**

1. What is the health service coverage of the zone? \_\_\_\_\_%

2. Do you think that the populations under surveillance have good health seeking behavior for these diseases? Yes / No
3. Whom do you think is well represented by the surveillance data?
  - a. the urban
  - b. the rural
  - c. equal

**VI. Timeliness:**

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

Comment \_\_\_\_\_

---

2. During the most recent outbreak of measles within how many days these outbreaks were reported to the region after the first case/index case/ \_\_\_\_\_
3. Is enough information is available for control of selected diseases during outbreak?
  - a. yes
  - b. no
  - c. don't know

Comment \_\_\_\_\_

---

4. How long does it take to have laboratory confirmation of Measles \_\_\_\_\_

**Vii. Stability:**

1. Was there lack of resources that interrupt the surveillance system? Yes/No
2. Was the new BPR restructuring affected the procedure and activities of the surveillance of these diseases? A. Yes/ B. No

## District (Woreda) Level Questionnaire for Surveillance System Evaluation

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### Identifiers

Date \_\_\_/\_\_\_/\_\_\_

Region \_\_\_\_\_

Interviewer \_\_\_\_\_

Zone \_\_\_\_\_

Respondent \_\_\_\_\_

District \_\_\_\_\_

---

### Availability of national surveillance manual

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

- a. Yes      b. No      c. Unknown

If yes, observe national surveillance manual \_\_\_\_\_

### **I. Case confirmation**

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

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

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

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

### **II. Data reporting**

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

- a. Yes      b. No      c. Unknown

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

Weekly: \_\_\_\_\_ /12 times the number of health facilities

Immediately: \_\_\_\_\_ /----- times the number of health facilities

### **On time (use national deadlines)**

6. Number of weekly reports submitted on time: \_\_\_\_/12 times the number of health facilities

7. Number of immediately reports submitted on time: \_\_\_\_\_/3 times the number of health facilities

8. How do you report to the next level?

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

**Strengthening reporting**

9. How can reporting be improved?

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

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

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

If yes, Observe for each denominators \_\_\_\_\_

---

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

- a. Yes
- b. No
- c. Unknown

Observe description of data by age and sex \_\_\_\_\_

---

---

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

- a. Yes
- b. No
- c. Unknown

Observe description of data by place \_\_\_\_\_

---

---

13. Do you describe of data by time?

- a. Yes      b. No      c. Unknown

If yes, observe the description \_\_\_\_\_

---

---

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

- a. Yes      b. No      c. Unknown

If yes, Observe and list diseases \_\_\_\_\_

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**IV. Availability of threshold level for selected diseases**

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

- a. Yes      b. No      c. Unknown

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

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16. Who is responsible for data analysis? \_\_\_\_\_

17. How often do you analyze the collected data?

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

**V. Outbreak investigation**

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

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

---

19. Has your district ever investigated an outbreak?

- a. yes      b. No      c. Unknown

**VI. Epidemic preparedness**

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

- a. yes                    b. no            c. Unknown

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

---

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

- a. yes    b. no    c. unknown

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

---

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

- a. Yes                    b. No            c. Unknown

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

---

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

- a. Yes                    b. No            c. Unknown

**VII. Epidemic management committee**

24. Is established epidemic management committee at district level?

- a. yes    b. no    c. unknown

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

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---

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

- a. Yes                    b. No            c. Unknown

**VIII. Responses**

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

- a. Yes                    b. No            c. Unknown

27. Is your district responded with 48 hours of notification of most recently reported outbreak?  
a. yes            b. no            c. don't know

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

28. What were the case fatality rates during most recent outbreak mainly for measles?  
\_\_\_\_\_

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

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

a. Yes            b. No            c. Unknown

If yes, observe written report to confirm \_\_\_\_\_  
\_\_\_\_\_

***IX. Feedback***

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

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

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

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

***X. Supervision***

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

Observe supervision report or any evidence of supervision in last 6 months \_\_\_\_\_  
\_\_\_\_\_

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

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

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

---

---

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

Reason 1 \_\_\_\_\_

Reason 2 \_\_\_\_\_

Reason 3 \_\_\_\_\_

***XI. Training***

35. Number of health personnel trained in disease surveillance

---

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

***XII. Resources***

37. Is your district has enough logistics for surveillance activities?

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

38. Data management

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

39. Communication

- a. Telephone service  
b. Fax  
c. Computers that have modems

**40. Information education and communication materials**

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

**41. Hygiene and sanitation materials**

- a. Spray pump
- b. Disinfectant

***XIII. Surveillance co-ordination:***

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

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

If yes, observe some documents \_\_\_\_\_

***XIV. Satisfaction with surveillance system***

43. Are you satisfied with the surveillance system?

- Yes    No    Unknown    Not applicable

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

***XV. Opportunities for integration***

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## Health Center Level Questionnaire for Surveillance System Evaluation

### Identifiers

Date \_\_\_/\_\_\_/\_\_\_\_\_

Region \_\_\_\_\_

Interviewer \_\_\_\_\_

Zone \_\_\_\_\_

Respondent \_\_\_\_\_

District \_\_\_\_\_

Name of health facility \_\_\_\_\_

### ***I. Availability of national surveillance manual***

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

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

If yes, observe national surveillance manual \_\_\_\_\_

### ***II. Case detection and registration***

2. within what time interval (between date of onset and reach health facility) have you detected the most recent outbreak (e.g. measles and so on)? \_\_\_\_\_

3. Is there clinical register at this facility?

a. yes            b. no            c. Unknown

If yes, observed the existence of a clinical register \_\_\_\_\_

4. Is clinical register is filling correctly?

a. yes            b. no            c. unknown

Observe the last month filled clinical register if correctly done \_\_\_\_\_

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

a. Yes            b. No            c. Unknown

Observe the standard case definition for each priority diseases \_\_\_\_\_

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

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

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

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



Number of immediately reports submitted on time: \_\_\_\_/\_\_\_\_ times the number of sites

14. How do you report?

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

**15. Strengthening reporting**

How can reporting be improved?

---

***V. Data analysis***

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

- a. yes    b. no    c. Don't know

If yes, Observe description of data by age and sex \_\_\_\_\_

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

- a. yes    b. no    c. don't know

If yes, Observe description of data by place \_\_\_\_\_

18. Do you describe data by time?

- a. yes    b. no    c. don't know

If yes, Observe description of data by time \_\_\_\_\_

19. Do you perform trend analysis?

- a. yes    b. no    c. don't know

If yes, Observe line graph of cases by time \_\_\_\_\_

20. Who is responsible for data analysis? \_\_\_\_\_

21. How often do you analyze the collected data?

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

22. Have you appropriate denominators?

- a. yes    b. no    c. don't know

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

---

***VI. Availability of threshold levels for each priority disease***

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

- a. Yes    b. No    c. Unknown

If yes, what is the threshold level for Measles? \_\_\_\_\_

---

---

***VII. Epidemic preparedness***

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

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

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

---

***VIII. Epidemic response***

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

- a. Yes      b. No      c. Unknown

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

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

Observe case fatality rate for most recent outbreaks \_\_\_\_\_

---

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

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

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

---

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

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

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

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

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

***X. Supervision:***

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

Observe supervision report or any evidence of supervision in last 6 months \_\_\_\_\_

---

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

a. yes    b. no    c. don't know

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

---

---

**XI. Training**

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

---

33. On what topics of surveillance they trained? \_\_\_\_\_

---

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

---

**XII. Resources**

**Have you:**

**35. Logistics**

a. Electricity \_\_\_\_\_

b. Bicycles \_\_\_\_\_

c. Motor cycles \_\_\_\_\_

d. Vehicles \_\_\_\_\_

**36. Data management**

a. Stationery \_\_\_\_\_

b. Calculator \_\_\_\_\_

c. Computer \_\_\_\_\_

d. Software \_\_\_\_\_

e. Printer \_\_\_\_\_

f. Statistical package \_\_\_\_\_

**37. Communications**

a. Telephone service \_\_\_\_\_

- b. Fax \_\_\_\_\_
- c. Radio call \_\_\_\_\_
- d. Computers that have modems \_\_\_\_\_

**38. Information education and communication materials**

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

**39. Hygiene and sanitation materials**

- a. Spray pump
- b. Disinfectant

**40. Protection materials (list)** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

***XIII. Satisfaction with surveillance system***

41. Are you satisfied with the surveillance system?  
a. Yes      b. No      c. Unknown      d. Not applicable

42. If no, how can the surveillance systems is improved? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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

\_\_\_\_\_  
\_\_\_\_\_

**9.4 Data collection questionnaire for health profile description of Akaki woreda 1, Akaki Kality sub city, 2008 E.C**

Health profile of \_\_\_\_\_ District .Name of the data collector-----

Date: -----Respondent (s):-----

**1. Historical Aspects of the area (only if relevant)**

---

---

---

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

Map of the Woreda-----

Location \_\_\_\_\_

Altitude \_\_\_\_\_

Annual rain fall\_\_\_\_\_

Mean annual temperature in C° -----

Climatic zones\_\_\_\_\_

The major crops in the area -----

Main food crops of the area-----

**3. Political and Administrative Organization/ Administrative setup**

No of Kebeles/Ketena-----Urban-----Rural-----

Nearest Kebele----- (-----Km from the Woreda center)

Remote Kebele----- (-----km from the Woreda center)

List their names \_\_\_\_\_

---

Woreda boundary including degree

North -----South-----East-----West

**4. Population and population structures**

Total population \_\_\_\_\_ . Total HH -----

Population by Kebele -----

Male \_\_\_\_\_ Female \_\_\_\_\_

Under 1yrs \_\_\_\_\_ Under 3 yrs. -----Under 5yrs-----Under 15yrs-----

Women of childbearing age (15-49years) -----Pregnant women -----Above 64yrs. -----  
Sex ratios \_\_\_\_\_urban \_\_\_\_\_rural\_\_\_\_\_

**Ethnic/language**

Ethnic composition

Oromo\_\_\_\_(\_\_\_\_%), Amhara\_\_\_\_(\_\_\_\_%), Tigre\_\_\_\_(\_\_\_\_%), Gurage\_\_\_\_(\_\_\_\_%)

Others\_\_\_\_(\_\_\_\_%)

Languages of the district-----

Official language (Work language) -----

**Religion**

Orthodox \_\_\_\_ (\_\_\_\_%), Muslim \_\_\_\_ (\_\_\_\_%), Protestant \_\_\_\_ (\_\_\_\_%), Catholic \_\_\_\_ (\_\_\_\_%) and

Others \_\_\_\_ (\_\_\_\_%)

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

Average income/year \_\_\_\_\_Source

Employee GOV. \_\_\_\_\_

Agriculture and farming \_\_\_\_\_

Self-own and private \_\_\_\_\_

*Economic status*

High-----Low-----Medium----- other

Productivity-----

**6. Education**

Total schools-----Gov. ----- NGOs. -----Private Schools-----

KG -----

Primary -----

Secondary -----

Preparatory -----

KG M----- F-----total----- Primary M----- F-----total-----

Secondary M----- F----- total----- Preparatory M----- F----- Total-----

School distribution by Kebele -----

Schools access with water in number-----

Reasons for absence of water for certain parts of schools-----

-----

**6.1. Additional info**

KG-----No of students-----

1-4----- No of students-----

5-8----- No of students-----

1-8----- No of students-----

School clubs (activities) other than education and their major and current functionalities

A,

B,

C, D,

Schools access to road-----access to tell-----access to electricity-----

Literacy status (%) -----Illiterate (%) -----

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

Accessibility (main roads) \_\_\_\_\_

Type of road \_\_\_\_\_

How many kebeles have access to transportation \_\_\_\_\_

Flow of transportation per day \_\_\_\_\_

How many people have access to fixed telephone? \_\_\_\_\_

How many people have access to mobile phone? (Coverage) \_\_\_\_\_

How many people get power supply \_\_\_\_\_?

Post office \_\_\_\_\_

Bank \_\_\_\_\_

Telecommunication \_\_\_\_\_

**Woreda district health structure**

Number of health facility in the district

	Gov.	NGOs	Private Standard	Pop ratio-----	-----
HOSP	-----	-----	-----	Pop ratio-----	-----
HCS	-----	-----	-----	Pop ratio-----	-----
HPS	-----	-----	-----	Pop ratio-----	-----
Clinics		-----	-----		
Diagnostic lab		-----	-----		

**How many of the health centers have access to**

transportation \_\_\_\_\_ (%), telecommunication----- (%), Elec. /power supply \_\_\_\_\_ (%)  
Water facility----- (%)

How many HPs have access to transport-----, telephone----- power? ----- Water?

### 8. Vital Statistics and Health Indicators

Infant Mortality Rate-----Child Mortality Rate-----

Crude Birth Rate-----Crude Death Rate-----

Maternal Mortality Rate-----Contraceptive Prevalence rate \_\_\_\_\_

ANC coverage-----Delivery coverage-----

PNC coverage -----

#### Immunization Coverage;

Polio3-----Pentavalent3 \_\_\_\_\_ Measles -----

#### Health staff to population ratio for each profession

Health officers -----Nurses -----Midwifery -----Medical lab \_\_\_\_\_

Pharmacy \_\_\_\_\_ Env'tal \_\_\_ HEWs,

Others-----

### 9. Health Services

Rural ----- Urban-----

Health institution to population ratio \_\_\_\_\_ Health service coverage-----

Top and leading causes of OPD visit in adults and children

1. \_\_\_\_\_ 1, -----
2. \_\_\_\_\_ 2, -----
3. \_\_\_\_\_ 3, -----
4. \_\_\_\_\_ 4, -----,
5. \_\_\_\_\_ 5, -----,
6. \_\_\_\_\_ 6, others-----
7. \_\_\_\_\_ 7, Admission causes in Children-----
8. \_\_\_\_\_ -----
9. \_\_\_\_\_ 8, Death cause-----
10. \_\_\_\_\_ -----
- 11, others-----
- 12 Admission causes-----

13 Death cause, -----

*Health budget allocation from last year-----*

*Health budget for emergency condition-----*

**10. Community Health Services;**

Status of services provided by community health workers namely:

TBAs -----

CHWs/ Dep't army-----

HEWs -----

Other -----

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

**MCH/FP trend 3 or 5years (recent to last)**

**EPI**

BCG -----

OPV1 -----

OPV3-----

PCV1 -----

PCV3 -----

PENTA1 -----

PENTA2 -----

Measles -----

Full immunization -----

**12. Environmental Health & sanitation.**

**Latrine coverage** \_\_\_\_\_ & utilization rate \_\_\_\_\_

others \_\_\_\_\_

**Safe water coverage**

Total safe water coverage \_\_\_\_\_ ( \_\_\_\_ %)

Safe water supply coverage by kebele \_\_\_\_\_

Main source of water supply \_\_\_\_\_

Kebeles getting safe water \_\_\_\_\_ ( \_\_\_\_ %)

Population getting safe water\_\_\_\_\_ (\_\_\_\_ %)

**Health Education**, (what, when, where, how and who conducted health education) -----

-----

**13. Endemic diseases;**

**Malaria**

Identified malarious Kebele in the district -----

Recent trends of 3(5) yrs. malaria data. -----

-----

**Malaria prevention and control**

IRS coverage trends (3/5) yrs. -----

List of chemicals used since the start of IRS and their use of duration in the district, -----

-----

ITNs Distribution recent 3/5 year coverage -----

Environmental management, -----

-----

**TB/Leprosy**

Total TB cases \_\_\_\_\_

PTB negative \_\_\_\_\_

PTB positive \_\_\_\_\_

Extra PTB \_\_\_\_\_

TB detection rate trend-----

TB treatment success rate trend -----

TB cure rate-----

TB defaulter rate \_\_\_\_\_

Death on Treatment \_\_\_\_\_

TB cases screened For HIV \_\_\_\_\_

TB cases positive for HIV-----

Leprosy cases-----

**HIV/AIDS;**

HIV tested/screened trend and population type (student, rural pop, urban pop, HF visitors)

-----

HIV screened age group-----

HIV positives trend and age group-----

-----

PW screened trend-----Pw +Ve. Trend-----

HIV Incidence trend -----

Pw ever enrolled in PMTCT-----

PLWHA ever enrolled in ART\_\_\_\_\_ PLWHA currently enrolled in Art-----

PIHCT screened \_\_\_\_\_PIHCT + Ve. -----

VCT screened-----VCT + Ve. -----

**14. Nutritional status in the district**

**Nutrition (malnutrition related OTPs, SC, TSF, CBN and PSNP activities)/HO**

**& early warning**

Total OTP sites\_\_\_\_\_, total admissions to OTP/yr.\_\_\_\_\_

Total SC sites, \_\_\_\_\_, newly opened/yr.\_\_\_\_\_, total admissions to SC/yr.\_\_\_\_\_

Is there TSF (targeted supplementary feeding) program in the woreda\_\_\_\_\_?

CBN program\_\_\_\_\_ PSNP \_\_\_\_\_ other\_\_\_\_\_

General food security condition\_\_\_\_\_

Essential drugs (shortage):-

-----  
-----  
-----  
-----  
-----

Malnutrition cases admitted to OTP trend-----

SC admission trend-----

**15. Disaster Status in the area**

Was there any disaster in the district in the last years? \_\_\_\_\_

Any recent disease outbreak/other public health emergency\_\_\_\_\_

If yes cases\_\_\_\_\_ and deaths\_\_\_\_\_

**16. Epidemic prone diseases** -----  
-----  
-----

**17. What do you think the main problems of the district?**

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

-----  
-----  
-----

Discussion of the highlights and the main findings of the health profile assessment and description

-----  
-----

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

-----  
-----

## **9.5 Data collection questioners for Assessment of prevalence of injury and associated factor among patient who visited ED of Yekatit 12 hospital medical college**

### **CONSENT PROCEDURE**

I am graduating student of Addis Ababa University, College of Health Science from Public Health faculty department of Field Epidemiology at Tikur Anbessa Specialized Hospital. I am interviewing clients seeking injury treatment here with the objective of assessing to the prevalence of injuries (i.e. mechanisms, affected organs) & associated variables of injury in order to collect information necessary for developing appropriate strategies to control and prevent injuries and related injuries. So that I choose you for the study, you are injured patient who is seeking treatment or not. This information collected through this interview will not affect your injury diagnosis & treatment as well not included in your clinical record. Therefore your honest and genuine participation helps me to get more information. Most importantly your participation is based on your willingness and response is completely confidential and unwillingness might not prohibit you from getting services.

The interview takes only 15-20 minutes

Do you agree? A. Yes B. No

If “Yes” let’s proceed below

**Thank you!!!**

## **PART I. SOCIO DEMOGRAPHIC CHARACTERISTICS**

1. Sex.
  1. Male
  2. Female
2. Age
  1. 12-20
  2. 21-30
  3. 31-40
  4. 41-50
  5. >50
3. Religion
  1. Orthodox
  2. Protestant.
  3. Catholic
  4. Muslim
  5. Other
  - 6.unkown
4. Educational background
  1. No education
  2. Primary education
  3. Secondary education
  4. Higher education
5. Marital status.
  1. Single
  2. Married
  3. Divorced/Separated
  4. Widowed
6. Occupation.
  1. Student
  2. Civil servants/NGO
  3. Construction worker
  4. Driver/assistant
  5. Daily laborer
  6. Farmer
  7. House wife
  8. Merchants
  9. Unemployed
  10. Factory Employee
7. Residence
  1. < 20km
  2. 20-50KM
  3. >50KM
8. Monthly Income/Salary: \_\_\_\_\_

## **PART II. MECHANISM OF INJURY**

9. How does the injury occur?
  1. Road traffic accident
  2. Assault
  3. Burn
  4. Fall down accident
  5. Domestic Injury/Stab/Cut injury
  6. Gunshot
  7. Machinery
  8. Self- injured
  9. Animal attack/Injury
  10. Other (specify)
10. What is the intent of injury
  1. Unintentional
  2. Self-Harm
  3. Intentional/Assault
  4. Other (specify)
11. The place of injury occur

1. Home      2. Pedestrian      3. Transport      4. Office      5. School  
6. In industry      7. Street      8. Farm      9. Construction site

12. Mode of transportation to the hospital

1. On foot      2. By taxi      3. By ambulance  
4. Carried by people      5. By police.      6. Other (Specify)

13. During the last 12 hours before injury occurs have you had took stimulant/suppressant drug or drinks containing alcohol

- 1 Yes      2 No

14. If Yes, Which of the following, if any, have you took

- 1 Alcoholic drinks      2 Khat      3 Marijuana      4 Any other

15. What was the context of the injury?

1. Quarrel, fight      2. Drugged ---related like alcohol, chat and drugs      3. Sexual assault  
4. Animal injuries.      5. Accidental.      88. Other (Specify)

### **PART III. EFFECTS OF INJURY ON THE BODY**

16. Which part of the body was injured?

1. Head and neck      2.chest      3. Abdomen  
4. Pelvic area      5. Extremities      6. Spinal and spinal cord

17. Nature of injury in the body.

1. Fracture      2. Dislocation.      3. Soft tissue injury  
4. Burn.      5. Organ injury      6. Open wound injury      4. Other (Specify)

18. What was the patient doing at the time of injury?

1. Working      2. Pedestrian  
3. Passenger      4. Driver      4. Other (Specify)

19. Time of injury occurrences

1. In the morning      2. After noon      3. In the evening  
4. At night      5. After mid night

20. From where does the patient come to the emergency department?

1. From the scene      2. From hospital.      3. from health center  
4. from private health institution

21. Before arriving to ED any treatment was given? 1. Yes      2. No

22. If yes Q21 which type of treatment was given

1. No care
2. Care given by non-trained person
- 3 Care given by trained person
4. Care give health institution

23. Condition of the patient at emergency department

1. Stable with patient is conscious & comfortable
2. Unstable with comatose, intubated with low GCS & c spine collar

24. Any care given in emergency department

1. first aid
2. Resuscitation
3. Only medication
4. Immobilization
5. Other (Specify)

25. Position of patient in emergency room.

1. Treated and discharged
2. Admitted
3. Referred
4. Other (specify)