

Evaluation of Measles Surveillance Systems in Afar Region, Ethiopia: A Descriptive Evaluative Study, 2017

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Abstract

The prevalence of measles was 55% in Afar region. Measles vaccination coverage was more than 85% in most of district of the region. But Recurrent here & there measles outbreak was reported. This might be hypothesized that low herd immunity in the community. Expanded programme on immunization is one of systems involved in measles surveillance in Afar region. Thus, the aim of the study was to evaluate performance of measles surveillance systems in the Afarregion..Descriptive evaluative study was conducted in Afar region from Feb 15-May 30/ 2017. A total of twenty three (n=23): one region, three districts, ten health centers and nine health posts were included by purposive sampling technique based on their involvement in and relevance to the measles surveillance system. Data was collected by trained nurses (n=12) using structured interviewer administered questionnaire adopted from "Centers of Disease Control (CDCs) Updated Guidelines for the Evaluation of Surveillance Systems.Data was analyzed by SPSS version 20 software. The study revealed that the Performance of surveillance systems core activities relatively were 100% at regional level. But, at district and health facility level were still far from the 80% target. Performance of surveillance systems supportive function at health facility levels were still far from the 80% target, but relatively 100% at regional and district level. Timelines & completeness both at regional and district level was low which was still far from the 80% target. So,the system found to be simple and flexible. It is inadequate completeness and timeliness. There were Poor mechanisms of feedback from central to peripheral health system. System has low stability, which led system to be not very useful and not representative. Predictive value positive found to be low. Surveillance system appears to be not meeting its objectives. Hence, the region should expand a web based reporting system.

Key words: Afar, measles, surveillance systems, Evaluation, Herd immunity

I. INTRODUCTION

Measles is an acute viral infectious disease and an important cause of childhood morbidity and mortality worldwide. Measles is an acute viral illness with the potential for severe and life-threatening complications [1, 2]. In 1988, CDC published Guidelines for Evaluating Surveillance Systems to promote the best use of public health resources through the development of efficient and effective public health surveillance systems. CDC's Guidelines for Evaluating Surveillance Systems are being updated to address the need for the integration of surveillance and health information systems, the establishment of data standards, the electronic exchange of health data, and changes in the objectives of public health surveillance to facilitate the response of public health to emerging health threats (e.g. new diseases)[3, 4].

Surveillance is defined as the systematic, continuous collection, analysis and interpretation of health-related data, which is needed for the planning, implementation and evaluation of public health practice. Disease surveillance is a critical component in the control and elimination of vaccine preventable diseases[3, 5, 6]. Surveillance can serve as an early warning system for impending public health emergencies; document the impact of an intervention, or track progress towards specified goals; and monitor and clarify the epidemiology of health problems[7].

Evaluation is an important tool for policy makers that help to improve the performance and productivity of health programs. The rationale of evaluating public health surveillance systems is to determine if the disease is being monitored efficiently &effectively. Every surveillance system should be evaluated periodically with recommendations to improve surveillance system usefulness, quality and efficiency[3, 8].

In developing countries, especially in Africa, the main assessment disease surveillance systems is the assessment of the core and supportive

functions of integrated systems. Most of the assessments were done shortly after the adoption of integrated diseases surveillance and response strategy[8, 9].

In Ethiopia, an assessment of the disease surveillance systems was done both in 1999 and in 2002. This allowed Ethiopia to judge the improvement as a result of the implementation of the strategy. Measles is one of vaccine preventable disease which has a plan to eliminate by 2015 or 2020[5].

Measles is one of a major public health problem among <5 children in Afar region. The prevalence of measles was 55% [5]. Measles vaccination coverage was more than 85% in most of district. But Recurrent here & there measles outbreak was reported. This might be hypothesized that low herd immunity. Expanded programme on immunization is one of systems involved in measles surveillance in Afar region.

A literature review suggested that no evaluation of the measles surveillance system has been conducted in Afar region. Thus, to fill the existing gaps of an evaluation measles surveillance system in Afar region was conducted with objective to identify strengths, weakness, understand shortcomings in systems and proposed recommendation.

A. Statement of the problems

In 2012, there were 33,602 measles cases reported by the countries of the WHO European region, with 10,271 cases reported by European union member states. Measles was targeted for elimination by 2015, but this goal will not be achieved. Progress towards measles elimination has been hindered, as some children are either not immunized on time or are never immunized (the recommended age for immunization varies from 6–15 months, with a second

dose required, as 2–5% of children over 12 months of age do not respond to the first dose)[10]

In Ethiopia figures on vital health indicators from UN, 2014 report shows that infant mortality rate of 44 /1000. Under-five mortality rate has been reduced to 64/1000. Measles accounts for 5% of child hood mortality. Ethiopia is implementing strategies aligned with global targets to advance the achievement of MDG 4 in reducing child mortality. The country is committed to achieve the elimination of measles by 2020 in line with African Region resolution. Through implementation of the recommended strategies including strengthening routine immunization activities and accelerated measles control since 2002, there was steady progress in reducing morbidity and mortality from measles. Continuing measles outbreaks, despite efforts to implement planned strategies are documented especially in south nation &nationality, Afar, Amhara, and Oromia regions. Beginning 2010, outbreaks became more frequent with visible age shift affecting infants and children and or youngsters above the age of 5 to 20 years[11].

Moreover, in Afar region, there was limited systematized collecting, analyzing & reporting of data on measles surveillance systems. Considering health implication constituted by measles in terms of morbidity, mortality &a paucity of information clarifying present situation on measles surveillance systems. On the contrary, this study reduces gap related to measles surveillance systems in Afar region, Ethiopia.

B. Conceptual Framework

The priority measles for surveillance systems was in terms of systems attributes, core activities and supportive category broadly which each have specific variables (Fig. 1)



Fig 1: Conceptual framework of surveillance and response systems for measles in Afar, Ethiopia, May, 2017[3]

II. OBJECTIVES

A. General objectives

To assess the level of performance of the measles surveillance core activities, supportive functions as well as systems attributes in filling in the World Health Organization criteria in Afar, Ethiopia from Feb 7-30 May, 2017.

B. Specific objectives

- To describe core surveillance systems activities in the study area
- To describe supportive activities of surveillance system
- To describe key attributes of surveillance system in the study area

III. METHOD & MATERIALS

A. Study setting and Period

The evaluation was carried out from Feb 7 -30 May, 2017 in Afar regional states. It has 5 districts. The size of Afar national regional State is 278,000 sq. k/ms. geographically, the region is located between 9°N - 12°N latitude and 40°E - 42°E longitude at the northern tip of the Great East African Rift Valley. The structure of the health care system in Afar as well as in the zones is based on the primary health care and the "health area" concept which is conceived as a decentralized health care system able to integrate at district level. Its health facilities include 1 hospitals, 6 health centers, 27 health post.

B. Study subject

The study subjects were the regional health bureau, district Health Office and Health Facilities (health centers and health posts) which was engaged in measles surveillance system.

C. Study design

Descriptive evaluative study was used. The study was conducted as per the Updated Guidelines for Evaluating Public Health Surveillance Systems, published by the Center for Disease Control and Prevention for the evaluation of the surveillance system.

D. Sampling method

Purposive sampling was used to select one Administrative Zone on the basis of its access to complete data source and measles outbreak reported.

E. Data collection technique & Analysis

Primary data collection tools: Data was collected using semi-structure questionnaire and observation using check-list. Data was collected by the principal investigators. We adapted our

questionnaires according to our objectives from the WHO Guideline and we conducted interview the woreda Health Office and health Facilities, surveillance focal person, health extension workers and personal observations of documents was also conducted in the woreda Health Office, and Health Facilities to the surveillance officers or focal persons in the selected health facilities and health offices for the study.

Secondary data: We were used different data sources such as; annual reports of the region, data from partners-like WHO and published articles in the areas of these diseases. The national integrated diseases surveillance and response, the Public Health Emergency Management Guidelines. The Investigators reviewed, abstracted, and recorded data of outpatient registers and laboratory registers especially, measles lab results. The abstracted register data was then compared to the facility's aggregate weekly reports and also reviewed supervision checklists. The purpose of the document review was to understand and assess the data reporting process and to compare data across different sources to identify any problems with data quality and completeness. SPSS version 20 software was used to analyze data.

F. Data Quality Management

To ensure quality, the standardized questionnaire adopted was in English and translated into Afar local language, by experts. We reviewed and revised the questionnaire to ensure internal validity. We pre-tested it on 5% of calculated sample size. Data collectors and supervisors were trained for three days on the data collection tools and process of data collection. To ensure completeness, 5% of the collected data were checked and the investigators monitored the overall quality of data collection. We used line list for describing measles cases in terms of time, place and person.

G. Measles case definitions for surveillance purposes

1. Suspected

A case with signs and symptoms consistent with clinical criteria of measles. All suspected cases have to be investigated and classified based on clinical, laboratory & epidemiological data as one of the following:

2. Laboratory confirmed

A suspected case which meets the laboratory criteria for measles case confirmation.

3. Epidemiologically linked

A suspected case which has not been adequately tested by laboratory and which was in contact with a laboratory-confirmed measles case 7-18 days before the onset of rash

4. Clinically compatible

A suspected case which has not been adequately tested by laboratory and has not been epidemiologically linked to a confirmed measles case.

5. Discarded

A suspected case which was investigated and discarded, either through negative results of adequate laboratory testing for measles or by an epidemiological link to a laboratory-confirmed case of another disease.

H. Operational Definitions

1. Acceptability

Willingness of persons and organizations to participate in the evaluation of the surveillance system. It will be measured quantitatively through reviewing completeness of report forms for the past three months and timeliness of data reporting

2. Simplicity

The simplicity of a public health surveillance system refers to both its structure and ease of operation.

3. Flexibility

A flexible public health surveillance system can adapt to changing information needs or operating conditions with little additional time, personnel, or allocated funds.

4. Data Quality

reflects the completeness and validity of the data recorded in the public health surveillance system.

5. Sensitivity

refers to the proportion of cases of a disease (or other health-related event) detected by the surveillance system.

6. Positive Predictive Value

is the proportion of reported cases that actually have the health-related event under surveillance.

7. Representativeness

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

8. 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 by that agency of trends or Outbreaks or (iii) the implementation of control measures. The number of measles routine reports submitted before a deadline, divided by the number of reports expected in the reporting

month or year 100% 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.

9. Usefulness

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

10. Completeness

the proportion of all expected data reported that were actually submitted to the public health surveillance system. The number of measles routine reports submitted divided by the number of reports expected in the reporting month or year x 100% [12].

11. Case detection

is the process of identifying cases and outbreaks.

12. Case registration

is the process of recording the identified cases.

13. Outbreak Confirmation

refers to the epidemiological & laboratory capacity for confirmation.

14. Reporting

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

15. Epidemic preparedness

Refers to the existing level of preparedness for potential epidemics.

16. A case definition

is a set of criteria used to decide if a person has a particular disease, or if the case can be considered for reporting and investigation

17. Standard case definition

is a case definition that is agreed upon to be used by everyone within the country. Standard case definition can be classified as confirmed, probable, and possible or suspected.

J. Ethical Clearance

Permission to collect data was obtained from the Afar Regional Health Bureau and were written to Talelik and Dalifage district Health Office, Health Centers and Health Posts.

K. Dissemination of finding

The production of evaluation of measles surveillance systems report is not an end in itself; efforts were put into communication to ensure that targeted actions are taken. The target audience for

evaluation of measles surveillance systems includes health managers, policy-makers, health professionals & general public in the community. The report could disseminate through presentation at staff meeting, seminar, exhibits popular professional venues and possibly brochures.

IV. RESULTS & DISCUSSION

A. Public Health importance of Measles

These studies reveal that, Measles cases were occurred in most of districts, reaching its peak in the hot-dry season. In 2016, a total of 189 measles cases were reported. No deaths recorded (Fig. 2)

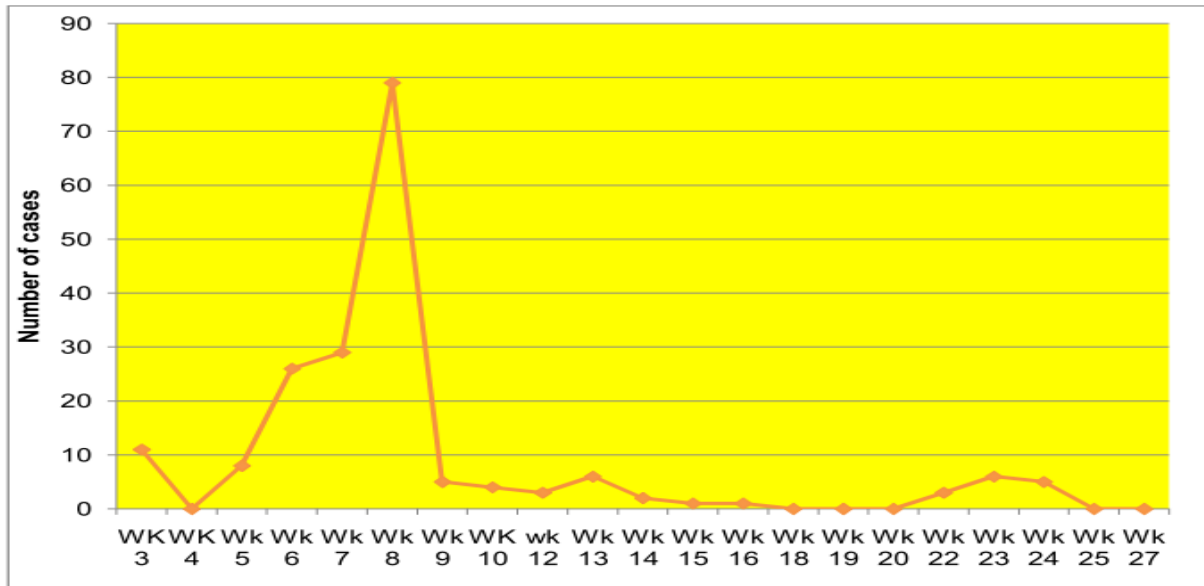


Fig 2: Distribution of Measles cases by WHO Epi-weeks in Afar, Ethiopia, May, 2017

B. System's Purpose & Operation

This study reveals that, Surveillance of measles exists traditionally but poorly functioning. Suspected cases was investigated and reported which is agreeing with study conducted in Nigeria[13]. A blood specimen

collected within the first 30 days of rash onset. In outbreaks, specimen collection limited to first 5 suspected cases (Fig. 3).

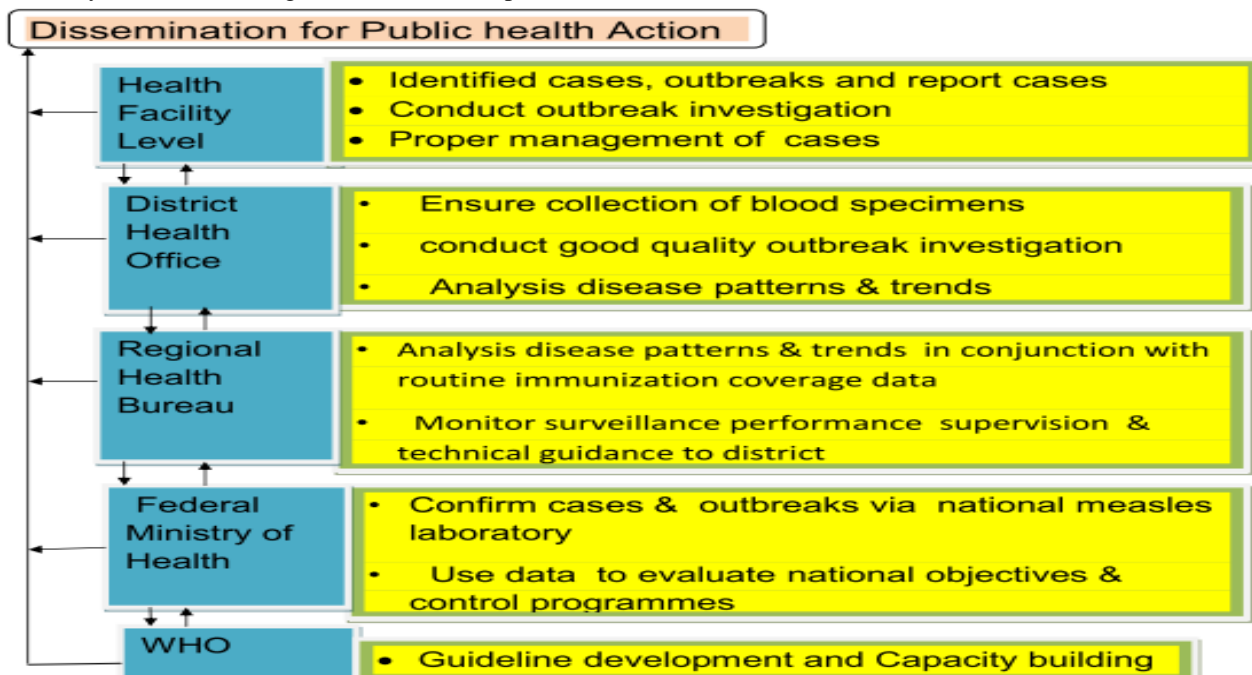


Fig 3: Flow Chart of Measles Surveillance systems in Afar, Ethiopia, May, 2017

C. Case definition

Suspected: Any person with generalized maculo-papular rash and fever plus one of the following: cough, or coryza, or conjunctivitis ; or any person in whom a clinician suspects measles [9]

Confirmed: A suspected case that is sero-positive for IgM by ELISA or epidemiologically linked to a lab-

confirmed case[9]. Performance of surveillance systems core activities relatively were 100% at regional level. Majority of performance of surveillance systems core activities at district and health facility level were still far from the 80% target (Fig. 4)

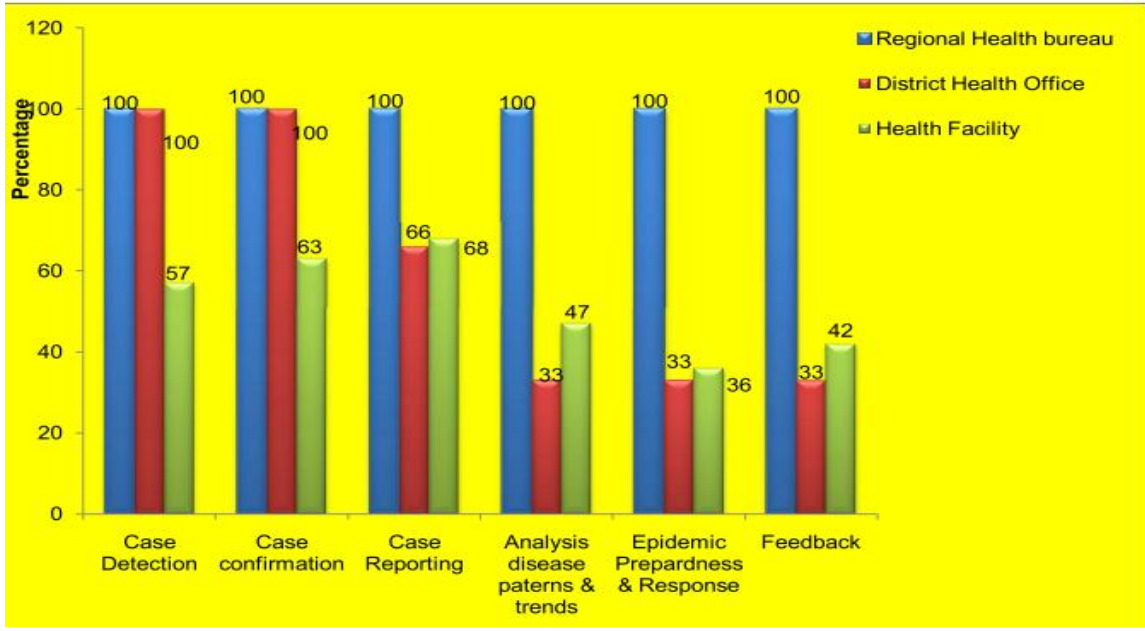


Fig 4: Performance of Measles surveillance systems core activities, Afar, Ethiopia, May 2017

D. Usefulness of Data

This study reveals that, the measles surveillance system didn't identify risk factors (put off fire only) which is agree with study conducted in Ghana[14]. Most of (59.3%) participants didn't know whether system was useful or not.

These findings show that, No action has been taken as a result of data analysis and interpretation. The measles surveillance systems were not allows district to identify seasonal patterns of the disease in the region (Fig .5).

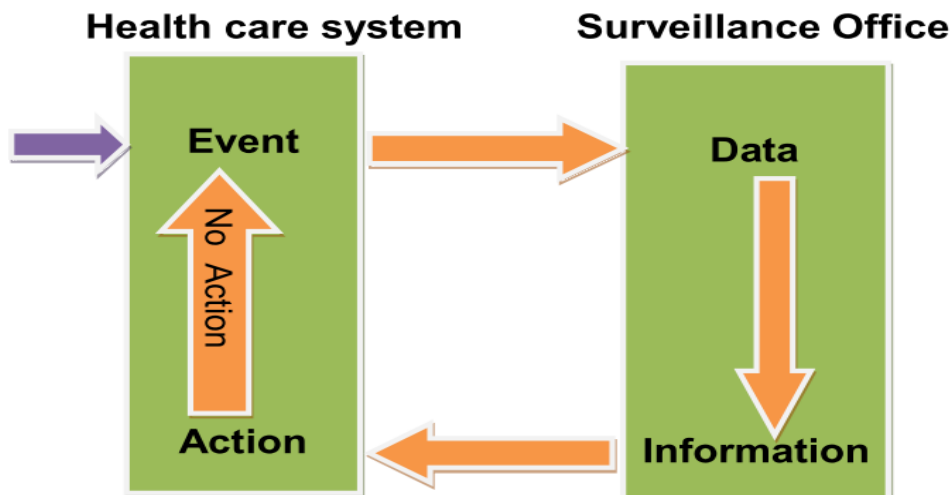


Fig 5: Status of Usefulness of Data and flow of information, Afar-Ethiopia, May, 2017

This study reveals that, performance of measles surveillance systems supportive function at health

facility levels were still far from the 80% target, but relatively 100% at regional and district level (Fig.6).

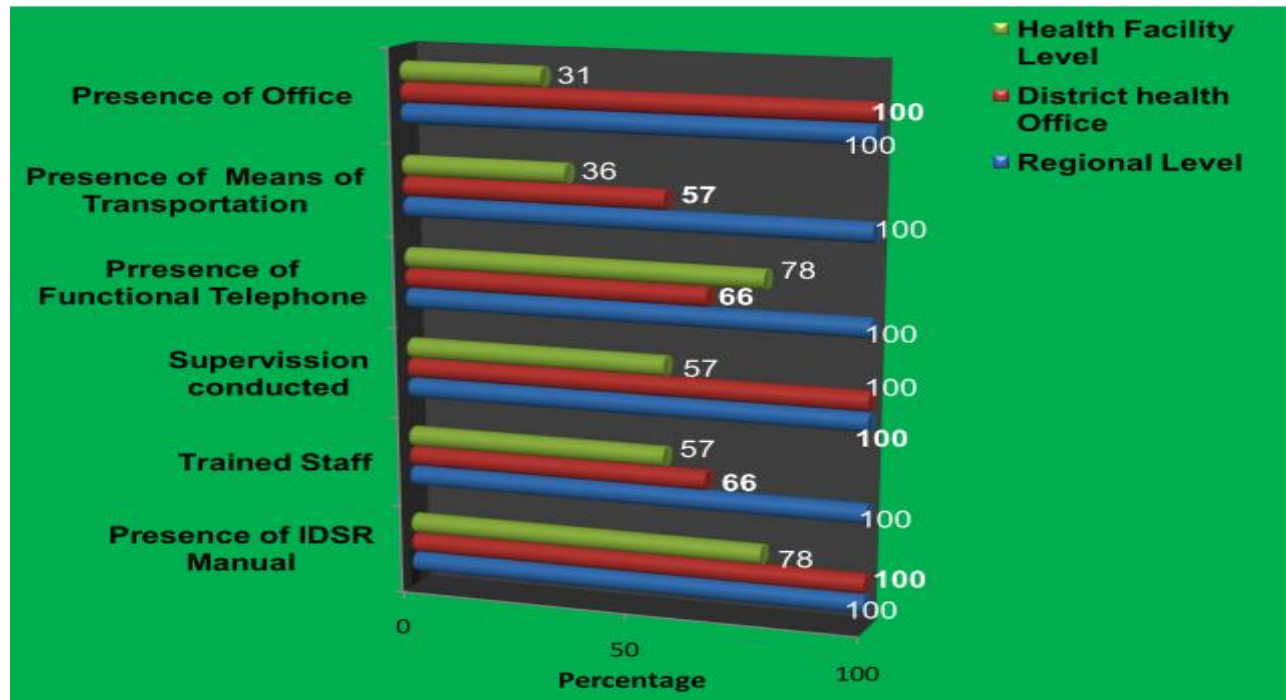


Fig 6: Performance of Measles Surveillance Systems Supportive Function, Afar- Ethiopia, May, 2017

E. Attributes of surveillance system

Simplicity

- Amount of time spent operating surveillance system less than 20 minute.
- Route of surveillance data flow was clear.
- Measles Case definition and its application were easy.

- Measles surveillance systems can be applied by all levels of health professionals.

Flexibility: Measles surveillance System adapt to a change in resources and Systems can accommodate change in case definition.

Representative: All reports not investigated. Representative suffers from lack of inclusion of private health sector data.

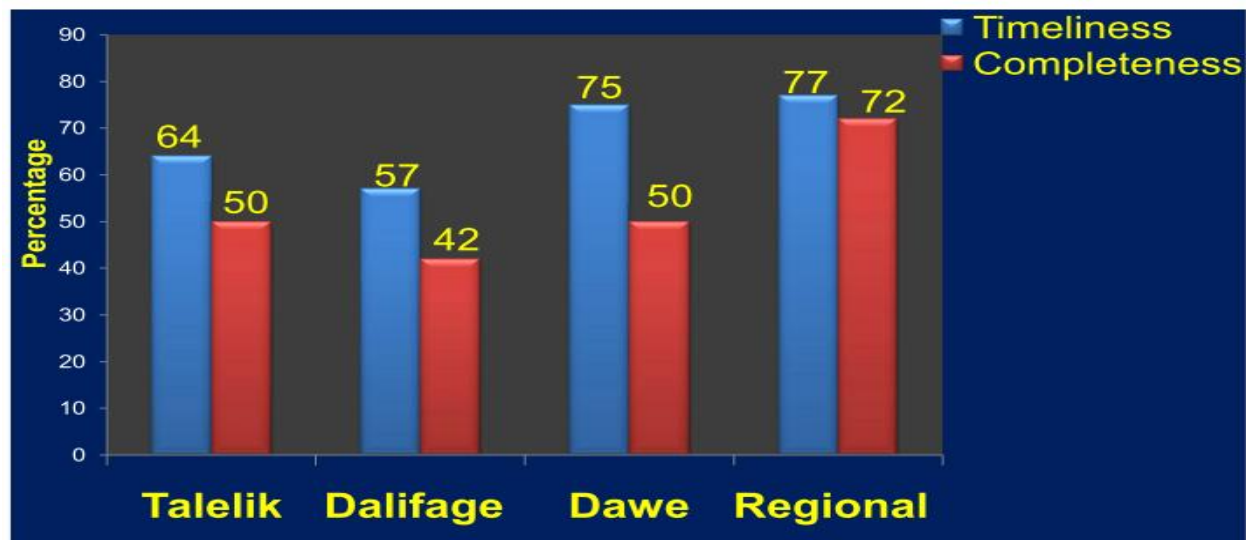


Fig 7: Weekly Reporting rate and Timeliness by District and Region; Afar-Ethiopia, May, 2017.

Timelines and completeness both at regional and district level was low which was still far from the 80% target & consistency with study conducted in Pakistan[15](Figure 7).

F. Stability;

- Personal cell phone was used for reporting systems
- Health post had none functional telephone.
- Thus, surveillance system in the district was donor driven

G. Sensitivity

- Poor laboratory data documentation.
- Staff needs training
- No other system collects similar diseases data in the region. Mothers in community were not bringing their children with measles to the health facility which is agree with study conducted in Austria[16].

H. Predictive value positive:

- Suspected cases confirmed to be measles =113 (True Positive) and
- Suspected cases that were IgM negative=76 (False Positive).
- Therefore, Proportion of true cases detected by the system was 59/113 (52.2%) and
- Predictive value positive in the region were 113/189 (59.8%).

I. A possible limitation of the study

- The other measles surveillance systems in the region like Health information management systems & other component of Expanded on immunization were not assessed.

V. CONCLUSIONS

The current evaluation showed that the system was overall ineffective in estimating morbidity and mortality, monitoring the trend of disease & had limited usefulness in early detection of outbreak. The surveillance core activities, supportive function and systems attribute components of the measles surveillance system seem to be not functioning well in the region.

The measles surveillance system found to be simple and flexible , Inadequate completeness and timeliness , Poor mechanisms of feedback from central to peripheral health system, System has low stability, which led system to be not very useful and not representative, Predictive value positive found to be

low, Surveillance system appears to be not meeting its objectives

VI. RECOMMENDATIONS

The following recommendations can lead to improvements with the Identified weaknesses. Theregional health bureau, district health office and district health facility should:

- Expands a web based reporting system
- Training of operators of the system to increase data quality, efficiency, and usefulness of system.
- Internal funding of the surveillance system should be improved.
- Regular monitoring of program specific supportive supervision and continuous feedback system should be strengthened for more improvement of the completeness and timeliness and/or surveillance system as whole.

Conflict of Interests

- We declare no conflict of interests on this paper.

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