



**AMREF DIRECTORATE OF LEARNING SYSTEMS
DISTANCE EDUCATION COURSES**

**MALARIA PREVENTION, CONTROL
AND MANAGEMENT**

**UNIT 12
Malaria Surveillance**

Unit 12: Malaria Surveillance

A distance learning course of the Directorate of Learning Systems (AMREF)

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Unit 12: Malaria Surveillance

Introduction

Welcome to Unit 12 on malaria surveillance. In the last Unit we discussed counselling and health promotion in malaria. In this unit we shall look at malaria surveillance. This is the last unit in this course. You are therefore a stone-throw away from completing your course. Congratulations!

So far, much of this course has focused on malaria the disease; its causes and case management. In this unit we shall look at malaria from a different angle – that is surveillance. Surveillance covers aspects of health care related to data collection, reporting of minimum statistics, analysis and presentation of statistical information on malaria.

Because the subject of surveillance is broad, in this unit we shall only consider the following areas of interest:

- Disease surveillance;
- community diagnosis;
- investigation of epidemics;
- carrying out epidemiological study;
- writing and reading reports; and
- The role of laboratory services in malaria surveillance.

Before you proceed let us look at our objectives for this unit.

Learning Objectives



By the end of this unit you should be able to:

- Describe the surveillance of malaria;
- State the role of Community diagnosis in malaria;
- Discuss the steps in carrying out an epidemiological study;
- Outline the guidelines in writing an epidemiological report;
- State the roles of laboratory in disease surveillance;
- Describe the components to evaluate in a malaria control programme.

12.1 Disease Surveillance in Malaria

Surveillance is about keeping a careful and CONTINUOUS watch over something or somebody. For example, it can mean keeping watch over a suspect or person who has a potential for committing a violent act.

Before you read on, do Activity 1, it should take you 5 minutes to complete.

**ACTIVITY 1**

What is surveillance?

Confirm your answer as you read the following:

Surveillance is the continuous watchfulness over the distribution and trends of diseases, which is done through systemic collection, analysis and interpretation and dissemination of health data for use in public health action It includes:

- Identifying , investigate and control outbreaks or epidemics;
- Identifying specific population groups at high risk of sickness and death from priority diseases;
- Confirming current priorities among disease control activities;
- Evaluating the impact of preventive and curative activities on the incidence and prevalence of priority diseases in the community;
- Monitoring disease trends so as to adjust plans to meet current needs.

Surveillance can be divided into three categories:

- Active surveillance;
- Passive surveillance;
- Sentinel surveillance.

Let us now discuss each one of them in turn.

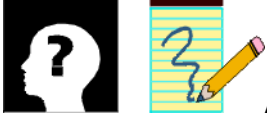
- **Active Surveillance:**

This is the regular or periodic collection of case reports from health care providers or facilities. In other words it is done all the time by collecting data in your health unit or laboratory. Data collected by active surveillance is more accurate than other types of surveillance.

The objectives of active surveillance include:

- Monitoring the community for cases on diseases of epidemiological importance (e.g. malaria, Meningitis, Ebola);
- Acting appropriately when cases are detected.

Having seen the definition and objectives of active surveillance, do Activity 2, it should take you 5 minutes to complete.



ACTIVITY 2

What do you think are the essential steps in carrying out Active surveillance?

Confirm your answer as you read the following:

You should take the following steps when establishing active surveillance:

- Establish accurate record keeping;
- Identify someone to designate as the person in charge of surveillance and give him/her the authority to act;
- Watch all links in the chain of infection. In this step consider the following
 - The aetiological organism
 - Its reservoir (host)
 - Its mode of transmission
 - The at risk and vulnerable population

- **Passive Surveillance**

This is the reporting of cases by health workers at their discretion. It uses already existing systems in your districts. It relies on the periodic reports which you prepare and submit to your district team. That is why these reports should be as accurate and detailed as possible. Although this type of surveillance is inexpensive, the data is likely to underestimate the presence of disease in a population.

- **Sentinel Surveillance**

This type of surveillance relies on reports of cases of disease whose occurrence suggest failure or indicate that special problem are emerging and therefore there is need for improvement.



Surveillance does not end here! It must lead to action.



We had earlier mentioned that surveillance should lead to action. Some of the Actions include the following:

- Identifying areas which have a higher prevalence of malaria disease than others;
- Identifying the need for further health services;
- Evidence-based health care planning;
- Identifying areas that need immediate decisive intervention;
- Dissemination of data to other districts and persons/organizations;
- Health education.

Having looked at what surveillance is and the actions that should be taken, let us turn to the uses of disease surveillances in reference to malaria.

Uses of Disease Surveillance

Before you read on, do Activity 3, it should take you 5 minutes to complete.

**ACTIVITY 3**

Why should you carry out malaria disease surveillance in your community?

We hope your answers included the following reasons for carrying out malaria disease surveillance in the community:



- To make a community diagnosis of malaria at a particular point in time;
- To monitor continuously over a period of time the change in the trend of malaria in the community following interventions;
- To detect sudden rise in disease occurrence as well as outbreaks;
- To be able to act quickly and so cut short any epidemic or outbreak of malaria;

- To investigate malaria epidemic, analyze the reasons for it, plan a feasible intervention/s, carry out and monitor the effects of the intervention/s on the out break;
- To increase knowledge on the malaria disease dynamics including vector and human reservoir;
- To plan effective health services.

One of the importance of Disease Surveillance is to carry out community diagnosis. What is community diagnosis? Let us find out next.

12.2 Community Diagnosis

Before you proceed do Activity 4, it should take you 5 minutes to complete.

**ACTIVITY 4**

1. What do you understand by the term community diagnosis?

2. Outline the steps you would follow when carrying out a community diagnosis in your community.

Confirm your answer as you read the following discussion:

Community diagnosis is a process of establishing which of the local diseases or health problems in a community are important and which ones should be given high priority by the health worker. It is a participatory process that involves the community. In carrying out community diagnosis, you should establish a good relationship with community leaders and involve them in your activities. Your work should always be done with the knowledge and co-operation of community leaders. If this is not done, you may not succeed in achieving your objective.

Community diagnosis answers the following questions:

- What are the commonest diseases seen in out patients?
- What is the distribution of the common diseases in the area?
- What is the local distribution of uncommon but important diseases in the area?
- What diseases have presented in an epidemic form in the area in the past?
- Which diseases are the community most concerned about?

- Which are the most important local health problems?

The following steps form the backbone of a community diagnosis exercise:

- Identify the sources of data about the community and it's health;
- Assess the reliability of the data available and their limitations;
- Collect data about the characteristics of the population;
- Relate individual's health and malaria infection in your community to their places of residence and season of the year;
- Establish birth rates and death rates in your community.



Figure 12.1: A health worker collecting information from the community

We shall now turn to investigating malaria epidemic.

12.3 Investigating a Malaria Epidemic

Epidemics occur in areas or situations where most of the conditions for intense malaria transmission exist, but normally one or more essential factor is lacking or is insufficient. Thus in normal years, malaria incidence is low and the transmission season short and consequently the population is mostly non-immune. However, in years when the essential factors become exceptionally prominent and/or prolonged (such as heavy rains), the resulting intense transmission produces an epidemic.

Malaria epidemics are usually the result of:

- Major changes in the climatic system like excess rainfall;
- Premature termination or unplanned interruption of anti malarial measures, which had previously controlled areas with all epidemiological characteristics of high endemicity;
- Less effective implementation of control measures.

For timely detection and remedial measures to prevent and control the malaria epidemic outbreak, you should analyze the data on unusual change in malaria incidence in the community and compare it with the number of fever cases from the same area reporting to outpatient facility. Other sources of information are:

- rise in malaria positivity rate in the laboratory examination;
- rising fever incidence reported by community health workers.

Such reports should be carefully assessed along with laboratory positivity rate of the area. If the positivity rate is high, it is likely to be the beginning of malaria epidemic in the area and requires immediate careful investigation.



How are epidemic prone areas classified?

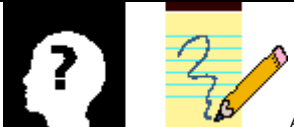
According to WHO, epidemic-prone areas can be classified, according to the main factors responsible for triggering an epidemic as follows:

- Endemic areas subject to a sudden increase in the number of exposed non-immune individuals, caused by:
 - the arrival *en bloc* of non-immune populations (e.g. refugees or displaced populations) into a malarious area;
 - the mixture of large numbers of immune and non-immune people living in primitive conditions (e.g. in temporary labour camps and development project sites).
- Hypo- or meso-endemic areas subject to a sudden increase in vectorial capacity, caused by:
 - an abrupt rise in *Anopheles* density due to abnormally heavy rains, and/or increased survival of the mosquitos due to prolonged warm and humid weather;
 - acceleration of the parasite sporogonic cycle due to exceptionally long and warm summers;
 - invasion of a more efficient vector into areas where local vectors were not able to maintain intense transmission, or areas where no vector previously existed.
- Hypo- or meso-endemic areas subject to environmental modifications which may lead to both increased vector density and human population movement, such as:
 - agricultural development;
 - rapid, uncontrolled growth of cities in tropical areas.

- Previously endemic areas, which fail to maintain previously effective controls because of:
 - resurgence of malaria transmission (leading to post-eradication epidemics);
 - progressive spread of parasite resistance, particularly in Africa, south of the Sahara, during the past two decades. While in some situations, parasite drug resistance has assumed epidemic proportions, epidemics often act as a major vehicle for the spread of drug-resistant strains.

Signals For Prediction of Malaria Epidemics

There are certain signals that can help you to detect a malaria epidemic. Can you think of any of them? Put your thoughts down in the following activity.



ACTIVITY

List down the signals that can help you detect a malaria epidemic

Now confirm your answers as you read the following discussion.

The prediction of malaria epidemics is of vital importance, since this enables you to mobilize the resources in a timely manner and to also initiate suitable preventive and containment measures in the area so that the situation is brought under control early. For this, there are certain factors or signals that you should watch for, usually in combination. These are:

- Climatic factors:
- Vulnerability
- Parasite factors
- Operational factors

Let us look at each of these factors in turn.

1) Climatic factors:

The climatic conditions have a profound effect on the life cycle and longevity of vector mosquito and also on the development of the malaria parasite. The important climatic factors are:

- **Temperature and Relative Humidity (RH)** – the optimum temperature for development of malaria parasite is between 25 ° C To 30 ° C, and average relative humidity of at least 60%. These temperature and RH conditions increase the longevity of mosquitoes & thus aid malaria transmission.
- **Rainfall-** Increased rainfall specially rainy days result in mosquitogenic conditions. Pre-monsoon rains, which maintain temperatures between 25-30 C and relative humidity around 80% for longer duration, lead to increase vector density and longevity to initiate malaria transmission, if parasite load exists in the community.
- **Natural calamities-** The natural calamities/ disasters like flood, drought and earthquake, usually cause increase in mosquitogenic conditions resulting in outbreak of malaria epidemic.

2) Vulnerability:

Some of the important points of vulnerability of an area are as follows:

- In urban slums, an increase in conditions that facilitate mosquito breeding, such as increased houses, water storage, and poor drainage;

- Change in vectors resting and feeding habits, and response to insecticides;
- Deforestation;
- Increase in breeding and density of vector; and
- Increase in the degree of man-mosquito contact.

3) Parasite factors:

- Increasing trend of fever cases and SPR (*P. falciparum* Slide positivity rate),
- Increase in proportion of gametocytes in the community
- Resistance in parasite to drug/s ;
- Increase in malaria mortality; and
- Increase in consumption of anti- malarials.

4) Operational factors:

Inadequate basic health services may contribute heavily to outbreak of malaria epidemic in the area, particularly the following points:

- Shortage of staff;
- Poor surveillance machinery;
- Communication difficulties, such as lack of transport and poor road network in less accessible districts/areas can hinder weekly reporting;
- Inadequacy in material and equipment; and
- Inadequate training of national, provincial and district teams to carry out support supervision;
- Lack of motivation of work.

Effective surveillance systems are essential for the control and prevention of malaria disease. The following steps are vital in investigating malaria epidemics:

- Counting the disease events and describing them in appropriate terms;


- Estimating the degree of risk related to a factor affecting the health of the community or a group of individuals affected;
- Identifying why the malaria cases have gone out of expected proportion;
- Identifying ways of controlling the epidemic outbreak
- Mounting a programme of surveillance, either as an emergency or as a routine.

Having learnt how to detect and investigate a malaria epidemic, let us now look at an epidemiological study.

12.4 Epidemiological Study

This is a very broad subject. For purposes of this unit, we shall only consider how to plan an epidemiological study.

Before you read on do activity 5, it should take you 5 minutes to complete.



ACTIVITY 5

What is epidemiology? Write your definition in the space provided

Epidemiology is the branch of medicine that studies the patterns of disease occurrence in human population and the factors that influence these patterns. It

studies the disease distribution and determinants in the populations.



What are the main steps in the planning of an epidemiological study

Steps in Planning an Epidemiological Study

There are three main steps in the planning of an epidemiological study. These are:

- Deciding whether an investigation is needed;
- Deciding what methods are to be used;
- Deciding what resources are needed.

After you have got satisfactory answers to all the above questions, you then do the following:

- Set the objectives appropriate to the purpose of the investigations;
- Select a study design appropriate to the investigation;
- Choose a study population and appropriate method of sampling it;
- Determine what background information, resources and administrative procedures are needed in order to carrying out the investigation.

At this stage, you are now ready to carry out data collection. Let us look at how this is done.

Collection and Reporting of Minimal Statistical Information on Malaria

You can collect various types of information at various levels of health services from:


- Records in health facilities
- Special reports.

When information (Data) is collected, it has a lot of uses in our day-to-day life, especially for planning purposes and to give early warning signs of increasing disease trends and epidemics.

In the case of malaria, the following is the priority information we should collect:

- (i) Number of malaria cases managed at the Out Patient and In-Patient.
- (ii) Type and amount of treatment given;
- (iii) Rate of laboratory confirmed positive cases;
- (iv) Number of referrals and reasons.

Before you read on, do Activity 6, it should take you 5 minutes to complete.



ACTIVITY 6

How can you use the data you collect on malaria?

I hope in your answer you indicated the following uses to which you can put the data you collect on malaria:


- Setting objectives and priorities;

- Monitoring and delivering health service including drug utilization;
- Evaluation of health programme;
- Teaching purpose;
- Operational control of health services;
- Planning health policies and strategies;
- Recognizing abnormal situations and taking remedial action.

Each activity is a potential source of information that can be reported through the following means:

- Use of forms;
- Use of special studies;
- Community *baraza*.

Before you read on do Activity 7, it should take you 5 minutes to complete.



ACTIVITY 7

What are sources of the data you would collect on malaria?

You can collect data on malaria from the following sources:

- Records at health facilities;

- Laboratories attached to health facilities;
- Village and community health workers;
- Private health care clinics;
- Surveys conducted in the community especially among school children;
- Death certificates.

You can collect and analyze data to portray important differences, which the health services providers should be aware about. Changes observed over time may reflect unusual events that may call for changes in current policies.

All malaria cases diagnosed should be recorded daily according to age, sex, and type of malaria. The data should be summarized on a monthly record form. This data should be regularly analyzed and used as already outlined above.

Analysis and Interpretation of Statistical Information on Malaria

Data on malaria collected from various sources should always be analyzed and interpreted so that appropriate action can be taken. It is therefore important for health workers at the periphery who collect the data to learn basic methods of data analysis and interpretation and to be able to act accordingly.

Definition and Calculation of Various Vital Statistical Indicators

a) Range

It is defined as the difference between the largest and smallest figure of a set of values. To determine the range, we re-arrange figures in ascending order and deduct the lowest from the highest figure. The range is useful in showing the dispersion or variation of the values in question. E.g. variation age, weight etc.

b) Arithmetic mean

It is the sum of all values of a set of observations divided by the number of observations.

To determine the arithmetic mean we calculate the sum of all the observations and divide it by the total number of observations. Arithmetic mean gives us the average value of the observations.

c) Percentage

It is a number of observations in a group with a particular characteristic divided by the total number in the group multiplied by 100.

Percentages are used to compare two or more groups with each other (see Example 1)

Example 1: Calculating percentage of people with malaria

Two neighbouring villages A and B had the following information.

Village A		Village B.	
- Total population	= 450	- Total population	= 600.
- People with malaria	= 50	- People with malaria	= 50.
- % with malaria	= $\frac{50 \times 100}{450} = 11\%$	- % with malaria	= $\frac{50 \times 100}{600} = 8\%$
	450		600

Whereas each village had 50 people with malaria, calculation of percentage of people with malaria has enabled us to compare two villages. Thus village A has a bigger problem with malaria than village B.

Such a simple calculation of percentage enables the health worker to establish:

- Which health unit is seeing more malaria cases;
- What is the percentage of malaria in out-patients, in-patients,
- Percentage of malaria deaths compared to other diseases;
- Which age groups form the biggest percentage of malaria cases?

This information would assist the health worker to identify priority areas, age groups and diseases for action and also to evaluate the impact of any control activities.

d) Incidence:

Incidence of malaria is the number of new cases of malaria occurring during a given period of time in a given population. An episode of malaria may last for a number of days say 4-7 days. So in calculating incidence, re-attendances must be distinguished from new cases (new episodes). The information can be compiled on daily, weekly and monthly basis. The computation of the incidence of malaria at a health unit or in the community is an important indicator for detecting, monitoring and evaluating malaria epidemics. Malaria incidence computation can help the health worker to identify which time of the year have the biggest problem and plan accordingly.

Incidence is expressed as a rate per 1000 population.

$$\text{Incidence Rate} = \frac{\text{No. of new cases of malaria} \times 1000}{\text{Population of community}}$$

Example 2: Calculating Incidence.

A village of 1000 people has the following data collected on malaria over a period of 3 months.

<u>Month</u>	<u>No. of New Cases</u>
January	28
February	67
March	49

The incidence each month therefore

$$\text{January} \quad \frac{28}{1000} \times 1000 = 28 \text{ per } 1000.$$

1000

$$\text{February} \quad \frac{67}{1000} \times 1000 = 67 \text{ per } 1000.$$

1000

$$\text{March} \quad \frac{49}{1000} \times 1000 = 49 \text{ per } 1000.$$

1000

Conclusion: From this example, it can be concluded that February had the highest risk of infection from malaria.

e) Prevalence:

Prevalence of malaria is the number of both new and old cases of malaria found at a particular point in time in a given population.

$$\text{Prevalent Rate} = \frac{\text{No. of new and old cases at particular time} \times 1000}{\text{Population of community}}$$

The prevalence rate can be used to compare the level of malaria burden at a particular time in two or more communities or areas.

Presentation of Data

For data to be more easily appreciated and to draw quick comparisons, it is often useful to arrange the data in the form that can be easily interpreted.



Tallying is one of the methods used to help us organize data before we analyse it. I know you have already come across a tally sheet in your workplace. They are commonly used in the outpatient or MCH/FP clinic. Basically, tallying is the setting up of classes or clusters which are tied by a slanting stroke. Usually four vertical strokes are made then a fifth stroke is drawn through them to represent the fifth item. Each cluster represents specific identifiable characteristics of the specified data. This data is then presented using a frequency distribution table. See example in Figure 12.2 below.

A frequency distribution table helps to put meaning and pattern in tallied data. To prepare a frequency distribution table the data must be grouped in classes which can be easily understood and analyzed.

Age in years	Tally	Number of patients	Percentage
0-4	IIII IIII	10	33
5-9	IIII II	7	23
10-14	IIII	4	14
15-19	III	3	10
20-24	III	3	10
25-29	III	3	10
TOTAL		30	100

Figure 12.2 Frequency distribution table of the ages of 30 patients seen at Health Centre

Before you read on do Activity 8, it should take you 5 minutes to complete.

ACTIVITY 8

List down the methods of presenting data.

Now read through the text below and see if your ideas are included.

Once you have grouped your data, as we mentioned earlier, there are many ways of presenting it. We have already discussed the frequency distribution table. The other ways of presenting data are:

- Tabular presentation
- Graphical presentation

Let us briefly describe them.

i. Tabular presentation

This covers the various tables that are used to present data, for example, frequency distribution table and a contingency table. The presentation of data in a frequency table shows the classes and the frequency of each class. See table 12.1 below.

Table 12.1: Weekly dispensary attendance

Age	Male	Female	Total	%
0-4	25	25	50	27
5-9	20	25	45	24.5
10-14	15	15	30	16
15-50	15	30	45	24.5
51+	5	10	15	8
All ages	80	105	185	100%

Another type of tabular presentation is the contingency table. This table shows how two variables of the individuals in a survey relate to each other.

ii. Graphical presentation

This type of presentation makes the data you have collected more easily understood at a glance. It emphasises any fluctuations which may be present and tries to make the material as attractive to look at as possible. Graphical presentations are also useful for purposes of forecasting the future magnitude of a series of figures given according to time.



List down three types of graphical presentations

I hope your list included the following types of graphical presentations:

- Line graph
- Histogram;
- Frequency polygon;
- Bar graph;
- Pie chart;
- Maps.

Graphs are a very familiar method of presenting information. They are more attractive to the eyes because even without looking at figures, you can easily see and appreciate the rise and fall in the figures presented and can tell when they are high or low. For example, the temperature chart that we maintain for inpatients is an example of a line graph. Making graphs of monthly/weekly clinic attendees, epidemic diseases, hospital referrals or admissions is a useful practice that can help you to assess what you are doing and what needs to be done.



ACTIVITY 9

What conclusions do you draw if the line of the graph goes up?
.....

What conclusions do you draw if the line of the graph goes down?
.....

What conclusions do you draw if the line of the graph remains the same?
.....

I hope you said that a straight horizontal line on a graph indicates that there has been no change in the aspect being measured. When the line goes up, it indicates that there has been an increase (e.g. more people attending your outpatient); when the line goes down, it means that the quantity is decreasing, e.g. fewer people attending your outpatient services.

According to Plews and Onyango (1987), the construction of a good graph requires the following:

- Clear, concise and unambiguous titles
- Clear and concise statement of units in which the figures are measured;
- Correct vertical and horizontal scaling;
- Statement of units used on vertical and horizontal axis;
- A key/legend to explain the various features of a graph, if need be,
- Correct graphing according to the scales specified on the horizontal and vertical axes.

Let us now describe some common types of graphs.

i. Histogram

This type of graph uses vertical blocks to represent class frequencies in a frequency distribution. You show the classes on the horizontal axis and the frequencies of the classes on the vertical axis. While the horizontal axis need not start from zero, the vertical axis must always start with zero. It is used to illustrate any data where the variable concerned changes with time. The histogram for Table 5 plots the weekly outpatient dispensary attendance.

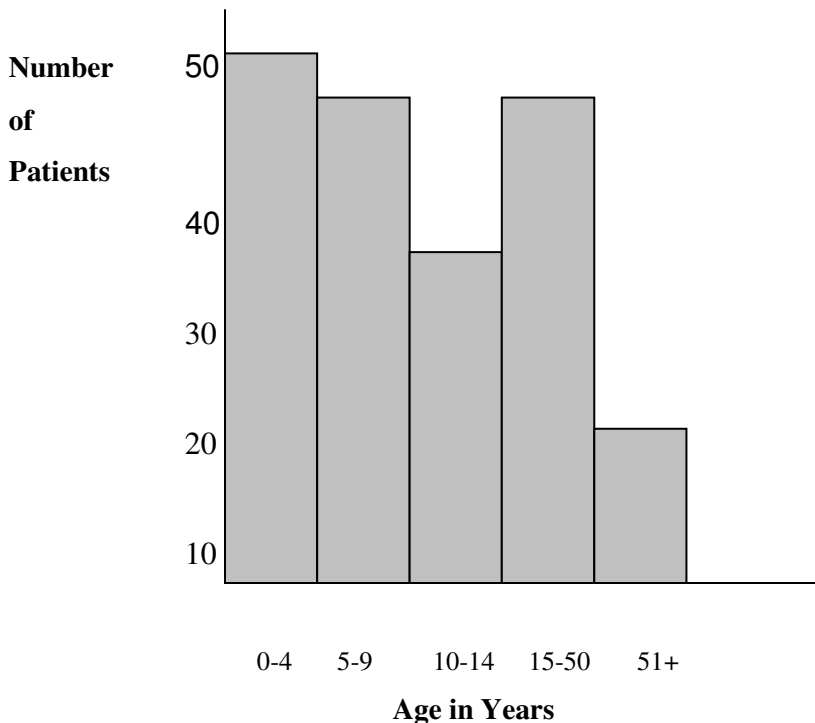


Figure 12. 3: Histogram of weekly dispensary attendance

ii. Frequency polygon

A polygon is a many sided figure. A frequency polygon is derived from a histogram by joining the midpoints of the tops of the rectangles of the histogram in straight lines. The resultant figure does not have vertical bars but is made up of straight lines joining the different points on the graph. For comparison purposes, you can even draw two frequency polygons on the same graph paper.

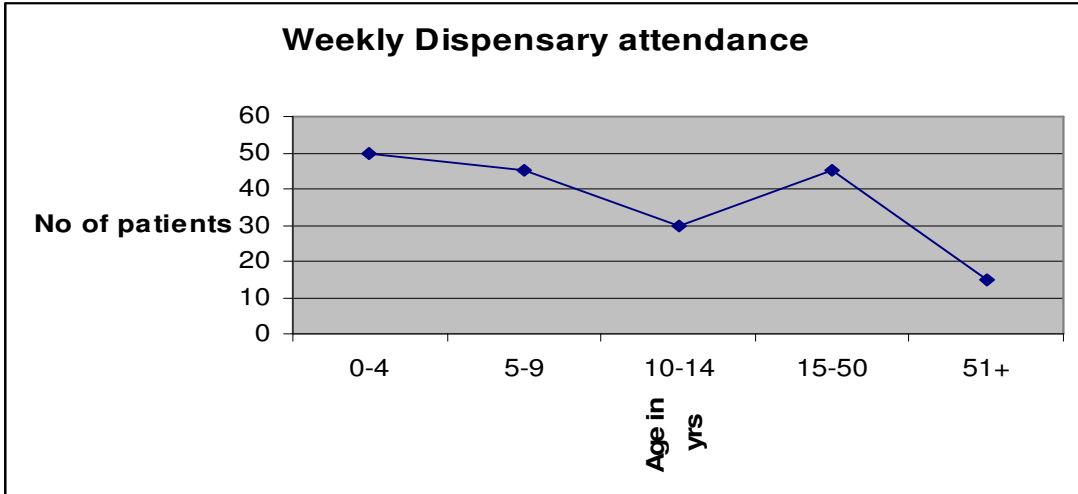


Figure 12. 4: Frequency Polygon of weekly dispensary attendance

iii. Bar Chart

This is a graph which comprises a number of spaced rectangles whose length varies with the magnitude represented. The rectangles have the same width and may be vertical or horizontal. They are used to represent a large variety of statistical data, including data that can be represented in other ways. Bar charts can also be multiple, that is, representing two or more sets of comparable data.

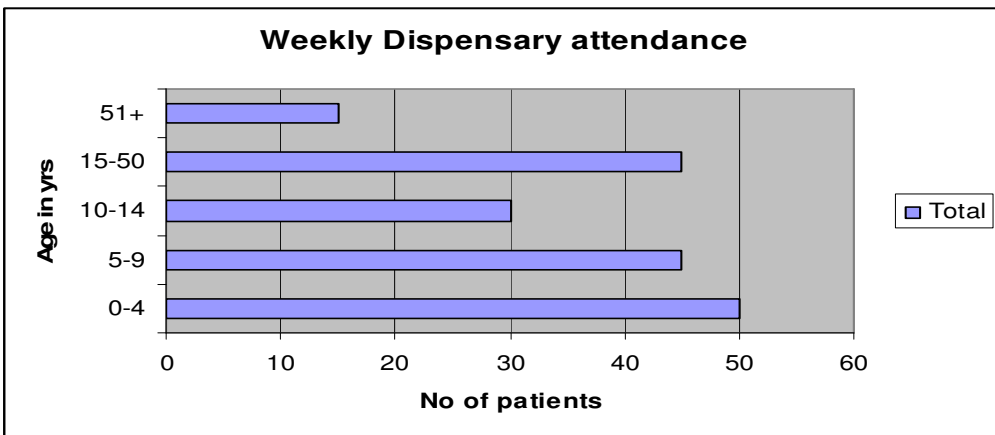


Figure 12.5: Bar chart of weekly dispensary attendance.

iv. Pie chart

We are sure you have already come across pie charts in textbooks. It is basically a circle divided into sectors or pieces. Each piece of a pie chart represents a total percentage of a specific group or cluster. A pie chart is especially useful for dealing with data where actual numerical quantities are not so important. For example, when you want to find out what percentage of your population has access to water rather than the actual number. It is therefore used for comparisons based on percentages. For a pie chart to give a good visual impression, you should make sure that the total data is not sub-divided into too many separate components. Ideally, the sectors should not exceed seven.

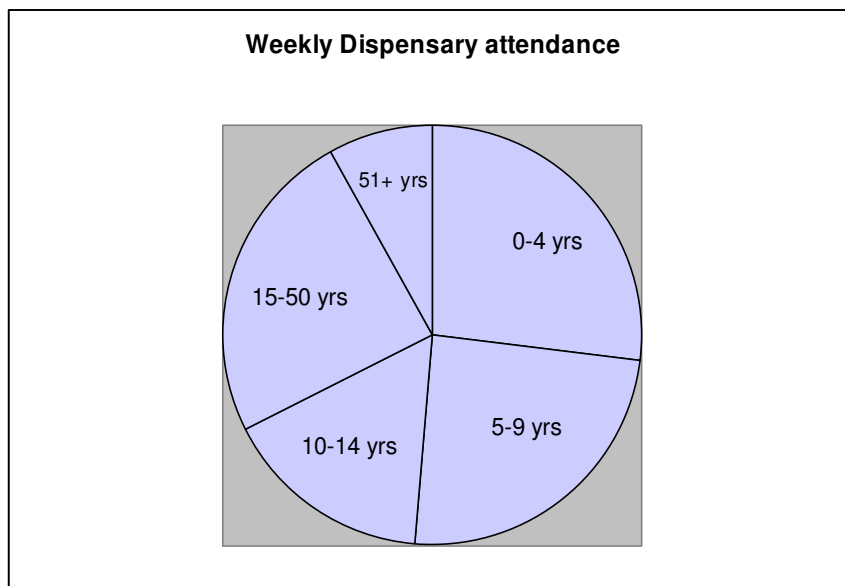


Figure 12.6: Example of a pie chart.

v. Maps

Maps are another effective way of presenting information. They are used to describe, for example, differences in the frequency of a disease in different areas

Now that you have learnt how to collect data and present it in a form that is easy to understand, let us now consider how to write an epidemiological study report.

12.5 Guidelines in Writing an Epidemiological Study Report.

After carrying out your survey or community diagnosis, you need to communicate your findings so that people are aware of what you have done and what action needs to be taken. One way of doing this is by writing a report.

The most difficult part of writing a study report is actually how to start it. Once you have made a start you will find that the task becomes easier.

The main parts for an epidemiological report will be, but not limited to:-

- i) Title of the report;
- ii) Summary of the main objectives , methods of investigation, results and conclusion;
- iii) Introduction and Background information (Based on the problem and published information on the subject);
- iv) Method of investigation, tools and sampling methods;
- v) Results and discussion of results;
- vi) Conclusions and recommendations;
- vii) References and appendices

Your first aim is to produce a rough draft of your report. This will help clarify your thought about how to express your results and conclusions. Subsequent revisions of your report will be much easier to make.

When you have completed your first draft, discuss your report with your colleagues and your supervisor. Listen to what others have to say.

To be useful, your report should not only give the results of the study and the inferences drawn, but also information about how the study was conducted to enable a critical reader carryout a similar study.



Your Epidemiological study is not complete until you have produced a report.

The following are guidelines in writing an epidemiological study report:

- Write in clear, concise and logical manner;
- List the major components of the report;
- Describe the main features of tables and diagrams in relation to the presentation of findings in an epidemiological report;
- Draw accurate diagrams to demonstrate given data;
- List ways in which maps may be used in epidemiological study;
- Describe the major elements to be explained;
- Demonstrate how to deal with each of these elements with reference to a given published paper;
- Critically evaluate the credibility and usefulness of an epidemiological report.

Let us now learn about the role of laboratory services in malaria disease surveillance.

12.6 Role of Laboratory Services In Malaria Disease Surveillance

In respect to malaria disease, laboratory services play a very important role. Where laboratory services are available and accessible, accurate information can be obtained for effective control and prevention of the disease.

The laboratory service has a role in the following areas:

- Supporting health workers to make a correct diagnosis;
- Identifying the malaria causing agents;
- Helping clinicians to determine the right treatment and thus rational drugs use;
- Validating malaria treatment;
- Effective resource utilisation.

Laboratory diagnosis of malaria aims at identifying the various stages in the life cycle of malaria parasite (*Plasmodium* species). It is important to note that there are certain stages of the parasite which are critical in deciding the type of interventions for prevention and control of malaria. These parasitic stages include the asexual form (ring form or trophozoites) and the sexual form (gametocytes).




The laboratory staff should be a member of the health team that investigates an epidemic.

12.7 Evaluation of Malaria Control Programmes

Let us start by looking at the definition of programme evaluation.

Before you read on, do Activity 9, it should take you 5 minutes to complete.



ACTIVITY 10

Define Programme Evaluation

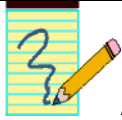
Confirm your answer as you read the following discussion.

Programme evaluation is the systematic collection of programme data, for use to improve health programmes and guide in the allocation of resources

Evaluation provides information that is:

- **timely:** i.e. available at all times for programme improvement during implementation
- **relevant:** i.e. directly related to programme management
- **decentralized:** i.e. transmitted rapidly to all levels of the health system

Before you read on, do Activity 10, it should take you 5 minutes to complete.



ACTIVITY 11

Name four interrelated components of evaluation of malaria control programme

(i)

.....

(ii)

.....

(iii)

.....

(i)

.....

The four interrelated components of evaluation of national malaria control programmes include:

- (i) **Process monitoring:** to verify whether activities are carried out as planned, to ensure accountability and detect problems;
- (ii) **Evaluation of programme outcomes and impact:** to document that programmes lead to expected results in terms of improved quality of services, rate of coverage, establishing practices etc (outcome targets), and of the desired changes in morbidity and mortality (impact objectives);

- (iii) **Applied research:** can include cost studies and evaluations of effectiveness requiring research designs more rigorous than the tracking of indicators;
- (iv) **Periodic programme evaluation:** to bring together all the information necessary for possible re-planning.

Conclusion

We have now come to the end of unit 12. In this unit we discussed surveillance, community diagnosis and investigation of epidemics in relation to malaria. We also learnt that surveillance can be active or routine and that when it is carried out it should always lead to action. Lastly we looked at how to evaluate a malaria control programme.

You should now review the learning objectives given at the beginning of this unit to check if you have achieved all of them. If there is any that you are not sure about go to the relevant section and read it again. If you feel confident that you have learnt the work of this unit, complete the attached Tutor Marked Assignment. Remember to also do the practical assignment given below.

PRACTICAL ASSIGNMENT

Instructions

Go through the records in your health facility and find out the following:

- How many children and adults have been treated for malaria in the last year?
- How many cases were confirmed to be positive in the laboratory?
- How many deaths were related to malaria within that period?

Feedback

Record your findings and indicate: how you can use them to develop a surveillance system for your community? How can you use them in community diagnosis? What steps should be taken by the community?

Send your findings to your tutor together with the assignment.

GLOSSARY

APPLIED RESEARCH

Research whose results will be of direct practical importance. Includes all research undertaken within the framework of a malaria control programme

HEALTH SURVEILLANCE (HIS)

A combination of health statistics from various sources, used to derive information about health status, health care, provision and use of services, and their impact on health.

CASE FATALITY RATE

The proportion of cases of a specified condition which are fatal within a specified time. This is usually expressed as a percentage.

EVALUATION

The systematic collection and use of data with a view to improve health programmes and guide the allocation of programme resources

FEEDBACK

The flow of information from a later phase of a process to an earlier phase

GOAL

The general, long-term aim of a health programme including its social and economic benefits

IMPACT

The main, observed changes in health status in consequence of programme activities

INCIDENCE

The number of instances of illness commencing, or of persons falling ill, during given period in a specified population.

INCIDENCE RATE

The rate at which new events occur in a population.

INDICATOR

An easily measurable phenomenon which is a valid, reliable measurement of another phenomenon which is of greater interest but cannot be measured directly.

MORBIDITY

The incidence or prevalence of a given disease or condition, or the burden of the disease in a population

MORBIDITY RATE

A term, preferably avoided, used indiscriminately to refer to incidence rates or prevalence rates of a disease

MORTALITY RATE

The incidence rate of death

NOTIFICATION

The reporting of number of cases of a certain disease or condition from a health service facility to a central unit

OUTCOMES

Changes observed in coverage, adequacy and quality of interventions, services and practices. The intermediate results of programme activities

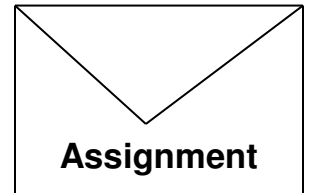


**AMREF DIRECTORATE OF LEARNING SYSTEMS
DISTANCE EDUCATION PROGRAMME**

Student Name _____

Student Number: _____

Student Postal Address: _____



**MALARIA PREVENTION, CONTROL AND MANAGEMENT
Tutor Marked Assignment
Unit 12: Malaria Surveillance**

1. (a) Define surveillance.

.....
.....
.....
.....
.....
.....

(b) Name the two types of surveillance

(i)
.....
(ii)
.....

5) What sources of data are available in your community for malaria surveillance?

6) List down six methods of presenting data.

- (i)
- (ii)
- (iii)
- (iv)
- (v)
- (vi)

7) Write down the definition of programme evaluation

8) List the importance of the information that an evaluation provides.

- (i)
- (ii)
- (iii)

9) What are the four interrelated components of the evaluation of a national malaria control programme?

- (i)
- (ii)
- (iii)
- (iv)

Congratulations! You have now come to the end of this course on malaria. We hope you have learnt a lot and that you are now well equipped to manage, prevent and control malaria in your catchment area. If you have encountered any problems in this unit please write to us. We shall be happy to give you relevant responses to enable you cope with your work. Ensure that you have written your name, student number and address on the assignment and then send it by post or bring it in person to AMREF.

We wish you success in your fight against malaria!