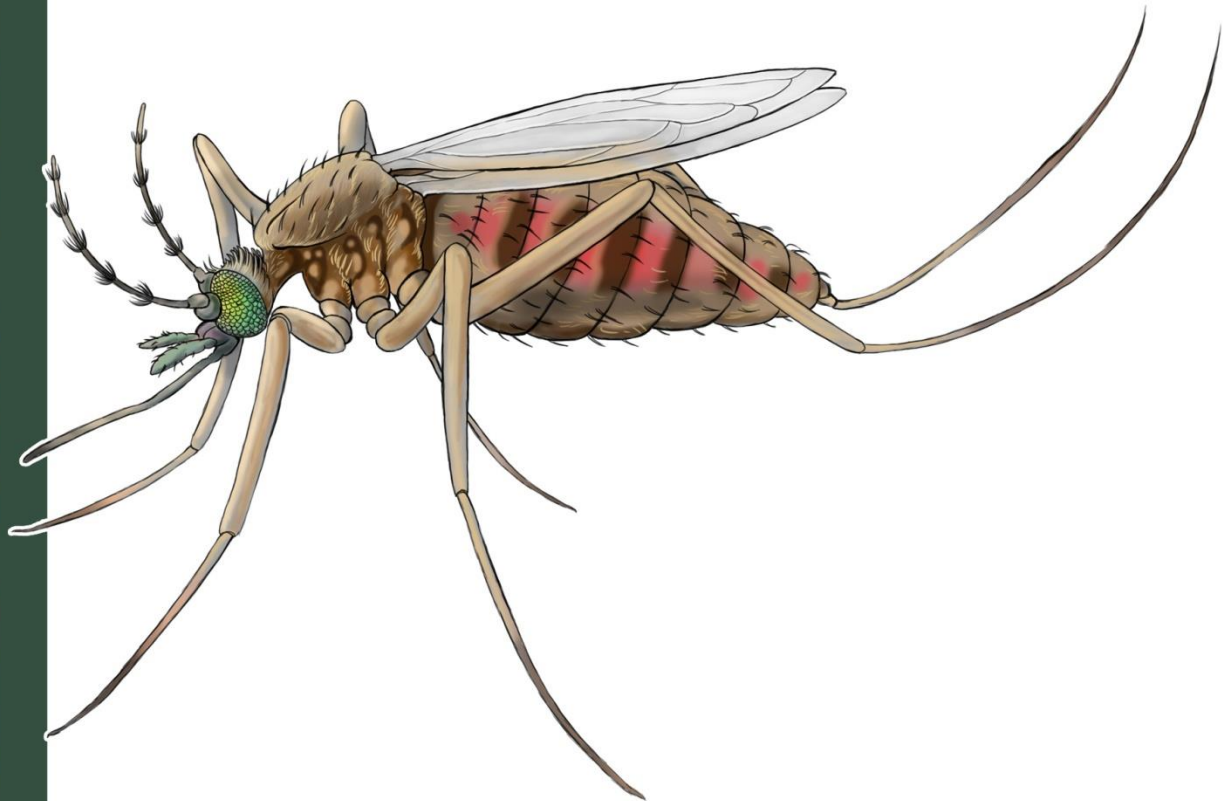
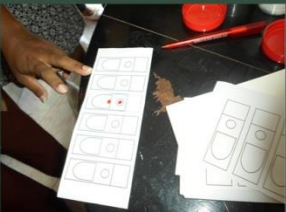


# MANUAL ON INTEGRATED VECTOR MANAGEMENT FOR COMMUNITY HEALTH WORKERS AND VOLUNTARY COLLABORATORS IN BELIZE



*Lets Act Together*  
**City Clean-Up Campaign**

Saturday & Sunday 18 & 19 Oct 2014  
7:00 am – 4:00 pm  
Areas within Central American Blvd, Mahogany St. & Tibruce St.

 **Bag and Bring Out Your GARBAGE**

**RENUF**  
No containers...  
No breeding sites...  
No mosquitoes...  
No Dengue!



Prepared by Mr. Matthew Nicasio (MPH)  
For the Pan American Health Organization (PAHO)  
In association with the Ministry of Health, Belize, Central America

## ACKNOWLEDGEMENTS

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# Introduction to Vector Control

## Overview

Vector control is any method to limit or eradicate the animals, birds and insects which transmit disease organisms (**germs or parasites**) to humans. This session describes the three most common vector-borne diseases in Belize.

## Time:

60 minutes

## Objectives

By the end of the presentation, the participants should be able to:

- Identify the vectors of Malaria, Dengue, Chikungunya and Chagas diseases
- State at least four (4) of the signs and symptoms for Malaria, Dengue, Chagas and Chikungunya diseases.
- Explain the transmission cycle for Malaria, Dengue, Chikungunya and Chagas diseases.

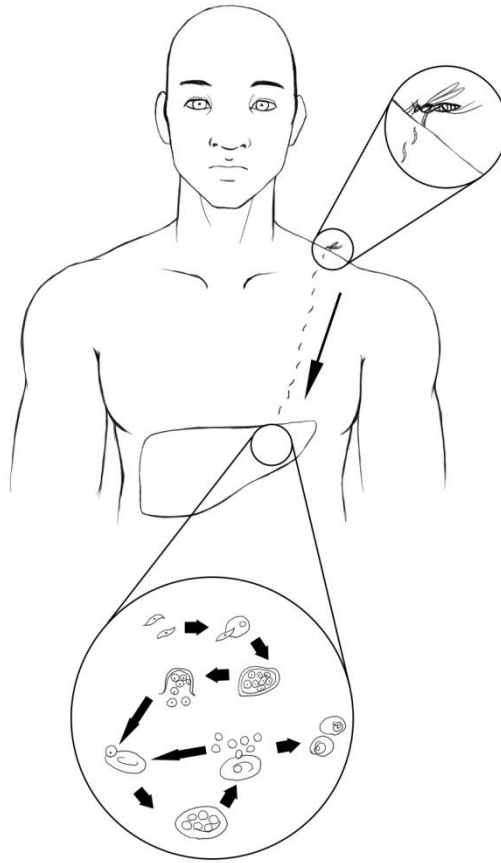
## Materials:

PowerPoint presentation or flipchart paper and colored markers



### The vector of Malaria Fever

The vector which transmits malaria is the *Anopheles* mosquito. The *Anopheles* mosquito becomes infected by biting and obtaining a blood meal from a person infected with malaria parasites.



## Signs and symptoms of Malaria

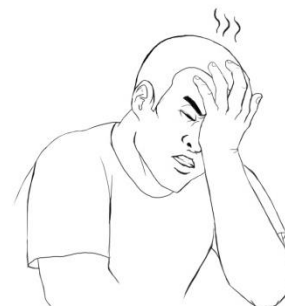
As the malaria parasite enters the blood stream they infect and destroy red blood cells. Destruction of these blood cells leads to fever and flu-like symptoms such as:

- Fever
- Sweats and chills
- Headache
- Muscle aches
- Nausea (bad feeling)
- Tiredness



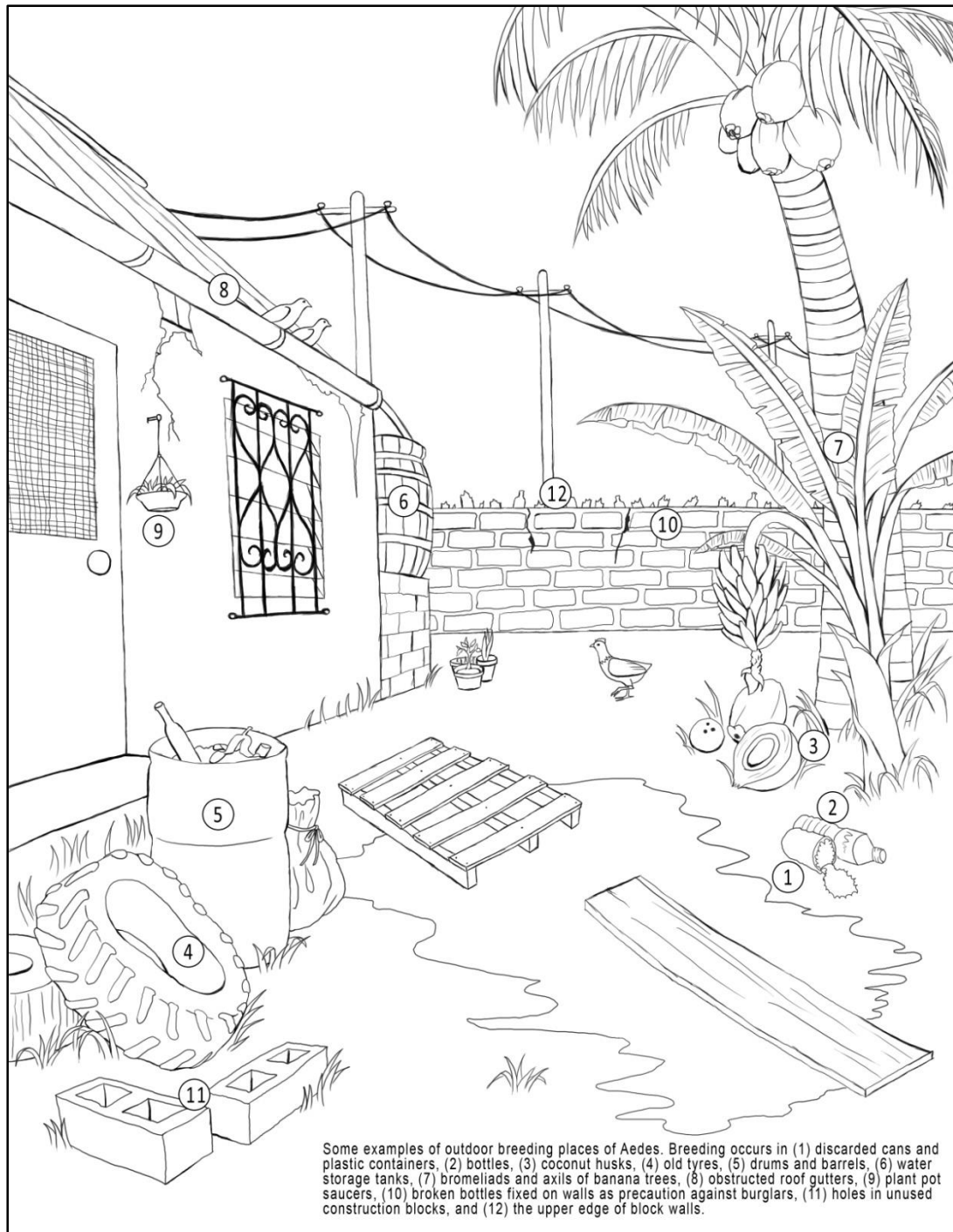
Severe malaria is caused by the parasite *Plasmodium falciparum*. Infection with *P. falciparum*, if not quickly treated, it can progress to severe malaria. The main symptoms of severe malaria along with those mentioned above include:

- Dark brown urine
- Difficult breathing (hard to breath)
- Bleeding from gums and nose



## The Vector of Dengue and Dengue Transmission

The most important vector of dengue virus is the mosquito *Aedes aegypti*. This mosquito breeds mainly in man-made and natural containers.

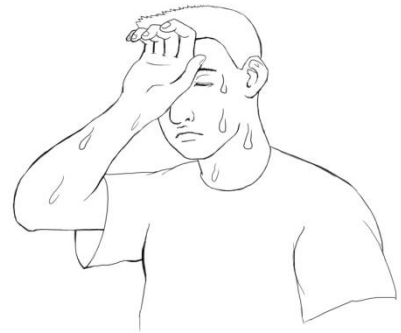


When this mosquito bites a person who has the dengue virus, the mosquito becomes infected with the dengue virus. The infected mosquito can later (8 to 12 days) spread the virus to healthy people by biting them.

## Signs and Symptoms of Dengue Fever

Dengue fever is a common viral infection that is carried by the female *Aedes aegypti* mosquito. Dengue fever symptoms are:

- Sudden fever with
- Headache
- Pain behind the eyes
- Backache
- Skin rash
- Loss of appetite (not feeling hungry)



**Note:**

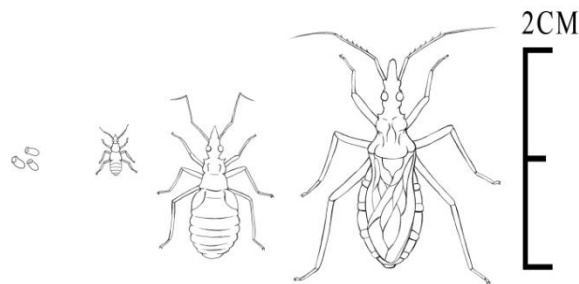
*Chikungunya is very similar to dengue.*

*Like with dengue, there is no treatment or vaccine.*

*Chikungunya is transmitted by the same type of mosquito.*

*The signs and symptoms are the same; but Chikungunya also causes severe swelling of the joints.*

## The vector of Chagas Disease



Chagas is a disease which is caused by a blood parasite (*Trypanosoma cruzi*) and is spread by the "*Triatoma dimidiata*" bug known as the "kissing bug", "chinche" or "kissele"

## Transmission of Chagas Disease

The first bug gets infected when they feed on wild animals which carry the blood parasite. The bugs can also get the blood parasite when they bite an infected person. Transmission takes place when the



infected bug bites a person and stools on the skin near the bite. The bite itches, and when the person scratches the area around the bite, or touches the eye or mouth, the parasite then enters the body.

(Note: Be careful when handling the bug because up to 30% of the bugs are infected.)

There are unusual ways that the disease is spread:

- From mother to unborn child
- Blood transfusion
- Eating uncooked game meat such as gibbon and armadillo.



## Signs and Symptoms of Chagas Disease

Chagas disease shows itself in two stages. The first stage lasts for about two months after infection. During this stage, a high number of parasites circulate in the blood. In most cases, symptoms are absent or mild, but can include:

- Fever,
- Headache,
- Paleness
- Muscle pain
- Swelling of the bite
- Swelling of the eye



In less than 50% of people bitten by a chagas bug, the first sign can be a red swelling on the skin at the bite area.

During the second stage, the signs and symptoms are:

- Breathing problems
- Feeling tired
- Abnormal heartbeat (due to damaged heart muscle)
- Constipation and pain (due to swollen colon)

# **The Role of the Environmental Health Unit in Addressing Public Health and Vector Control**

## **Overview**

The Environmental Health Unit is a section of the Ministry of Health. Its mission is to contribute to healthy living and working conditions for the Belizean population in order to reduce public health problems related to poor environmental conditions.

## **Time:**

30 minutes

## **Objectives**

By the end of the presentation, the participants will be able to:

- Explain the role and function of the Environmental Health Unit
- Explain the role and function of the Vector Control Department
- Recognize that there are laws governing public health

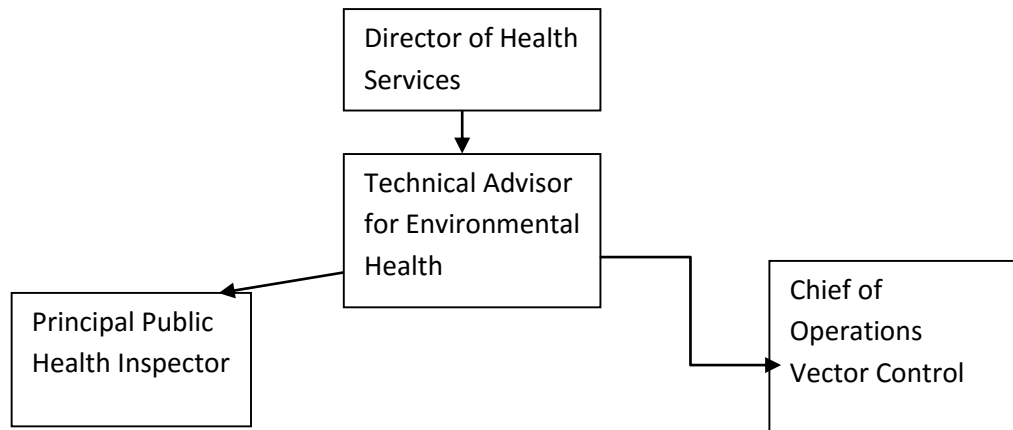
## **Materials**

Power Point presentation with laptop and accessories or overhead projector

Or flipchart with colored markers

## Lecture Presentation

### Composition of the Environmental Health Unit, Ministry of Health



### Role and Function of the Environmental Health Unit

**The Director of Health Services (DHS)** is the technical leader of the Ministry of Health. The DHS leads in accomplishing national health goals, including goals of the environmental program, in partnership with local and international agencies.

**The Technical Advisor** develops national program goals, monitors the work of the program and evaluates the results.

**The Principal Public Health Inspector** and **the Chief of Operations** are the managers responsible for the environmental activities at the community level.

#### Services provided include:

1. Ensuring food safety	2. Institutional health monitoring
3. Water quality monitoring	4. Investigation of public health complaints
5. Animal-to-man diseases surveillance, prevention and control	6. Communicable disease surveillance
7. Monitoring of recreational areas	8. Job-related health and safety surveillance
9. Port health and quarantine	10. General environmental health
11. Acute pesticide poisoning surveillance	12. Other duties in line with environmental health

## **Role and Function of the Vector Control Department**

The Vector Control Program works toward a healthy environment that prevents and controls malaria, dengue, chikungunya, chagas and other vector-borne diseases. Services provided include:

- Indoor spraying against the malaria mosquitos
- Outdoor spraying with Ultra Low Volume (ULV) insecticide against the dengue and chikungunya vector
- Diagnosis and treatment of malaria and dengue cases
- Monitoring the vectors
- Health education to the general public

## **Public Health Laws**

**Reference is “The Public Health Regulations, Chapter 40, of the substantive Laws of Belize**

The power to carry out public health responsibilities in the country of Belize is legally within the Office of the Director of Health Services. All public health employees – Public Health Inspectors, public Health Nurses, Health Educators, vector control personnel, etc. – are the day-to-day workers of the DHS.

### **The Role and Function of the Community Health Worker (CHW) and Voluntary Collaborator (VC) in Preventing and Controlling Vector Borne Diseases**

#### **Overview**

A major program change from hospital-based care to community-based prevention led to the formation of the CHW and VC programs within the health system. These are important community-based programs as they link communities to the formal health system.

#### **Time:**

45 minutes

#### **Objectives**

At the end of the presentation, the participants will be able to:

- Recall two (2) roles of the CHW and VC in preventing vector diseases
- Relate a reason why the CHW and VC programs are important

#### **Materials:**

Power Point presentation with laptop and accessories or overhead projector

Or flipchart with markers

## Lecture Presentation

### The Role of Community Health Workers and Voluntary Collaborators in Preventing and Controlling Vector Borne Diseases

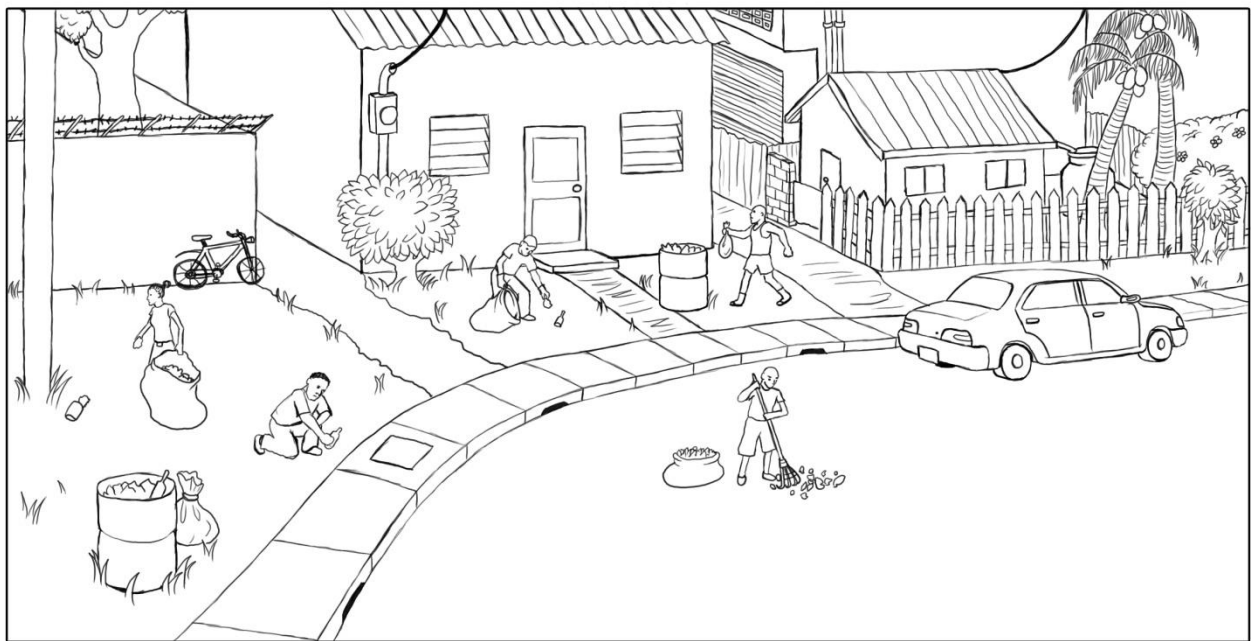
Their role can be defined in the following ways:

**Community Health Education**—The CHW and VC organize and conduct health education sessions to everybody on an integrated approach to manage the vector borne diseases of malaria, dengue, chikungunya and chagas.

**Health Promotion and Community Mobilization** – Health promotion is an important part of the CHW and VC's contribution to proper integrated vector management. There is the need to organize and motivate community members to take actions, such as:

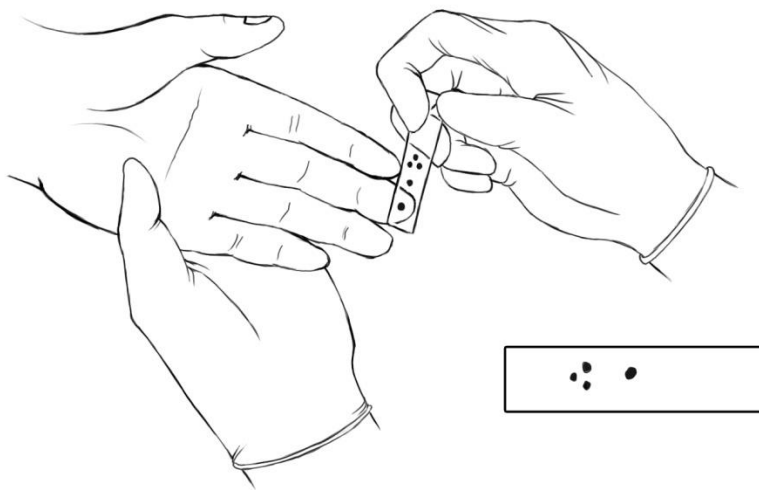
- Clearing stagnant water and swamps
- Keeping surroundings free of garbage and overgrown bush
- Crushing or boring of cans
- Changing water in flower vases every 3-5 days

An example is planning and organizing community clean-up campaigns to get rid of vector breeding areas.



- **Monitoring and Treatment** – The CHW and VC are involved in vector control work by looking out for and identifying symptoms. The taking of blood smears is also an important task for persons suspected of having malaria. Treatment of malaria cases can be a part of the responsibility of CHW and VC's by monitoring dosage, compliance and self-medication. CHWs and VCs also refer sick persons to health facilities for treatment and care.

### Taking a Blood Smear for Testing



# **Behavior Change for the Prevention and Management of Vector Borne Diseases**

## **Overview**

Communication for Behavioral change is an interactive process of individuals, communities and/or societies developing communication strategies to promote positive behaviors that fit their situations.

Time:

60 minutes

## **Objectives**

By the end of the presentation, the participants will be able to:

- Recognize community habits to bring about good behavior change.
- Identify support for community vector management activities
- Develop a basic plan for a community vector management activity

## **Materials**

Power Point presentation with laptop and accessories or overhead projector

Or flipchart with colored markers

## **Lecture Presentation**

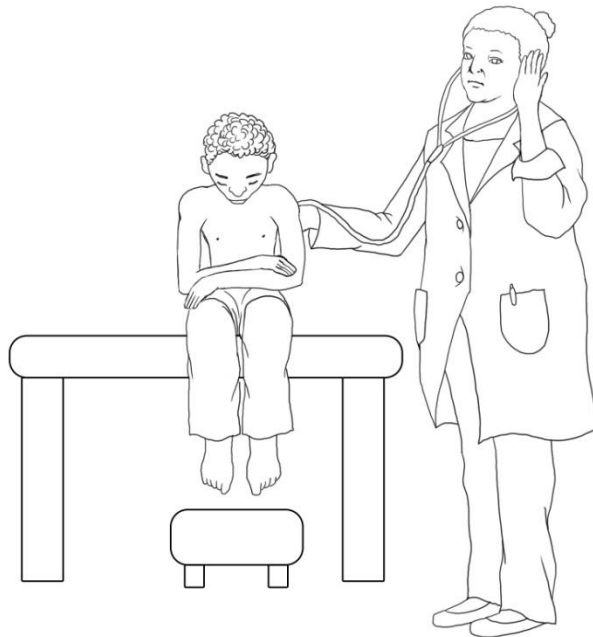
### **Definition of Communication for Behavioral Change**





**Communication for Behavioral Change** is a strategy used by planners and health educators to communicate, lead and support community action. This strategy is broken down into the following communication activities to guide behavior change. These include:

- Recognizing habits in homes and the community such as poor water storage and dirty yards that increase the risk for vector borne diseases
- Developing community plans to address poor habits
- Using different ways to help with behavior change, e.g. training sessions, reporting cases
- Getting support for vector management activities e.g. equipment, transport, financial help where necessary
- Developing a communication plan to motivate people to start using vector management activities.
- Encouraging early clinical care to reduce case death and prevent further spread of disease.
- Encouraging infection prevention and control measures within the community.



## Session 5:

### Introduction to Integrated Vector Management

#### Overview

Vector Control is not only the responsibility of the Ministry of Health. It must also include the community, private businesses, government and non-government organizations.

#### Time:

60 minutes

#### Objectives

By the end of the presentation, the participants will be able to:

- Explain the importance of bringing the community together for action.
- State three steps to take in mobilizing the community.

#### Materials:

Power Point presentation with laptop and accessories or overhead projector

Or flipchart with colored markers

#### Lecture Presentation

##### Definition of Integrated Vector Management

Integrated vector management (IVM) is *a process* involving agencies and community persons with different skills working together to prevent the spread of vector borne diseases. Examples of agencies and skills are: vector control officers, community leaders, parents, Ministry of Works, schools, women's groups, CHWs, and nurses.

## **Five important areas of IVM**

1. Advocacy, Social Mobilization and laws
2. Collaboration within the Health Sector and with other sectors
3. Working together
4. Problem-solving and decision-making
5. Capacity building

## **Advocacy, Social Mobilization and Legislation**

- Advocacy is the ability to “sell” the benefits of IVM to other agencies, organizations and non-governmental organizations (NGO)
- Social Mobilization is the ability to motivate persons and communities into action
- Legislation means using laws and making recommendations for new rules to improve IVM

## **Integrated Approach**

- Resources to address the problems are well used
- Different persons and agencies work together
- Different ways to control vectors are used such as safe chemical and non-chemical methods.

## **Problem-solving and decision-making**

- Decisions are made based on scientific evidence and local experience

## **Capacity building**

- Human and financial resources are improved for better IVM

## Session 6:

### Prevention and control strategies for malaria, dengue, chikungunya and chagas diseases

#### Overview

The cost of preventing vector-borne diseases is much less than treating the diseases. Getting rid (eradication) of mosquitoes is not an easy task. There are, however, effective ways to prevent and control malaria, dengue, chikungunya and chagas.

#### Time:

60 minutes

#### Objectives

After completing this module, the participants will be able to:

- State five ways to prevent and control malaria, dengue, chikungunya and chagas diseases

#### Materials

Power Point presentation with laptop and accessories or overhead projector

Or flipchart with colored markers

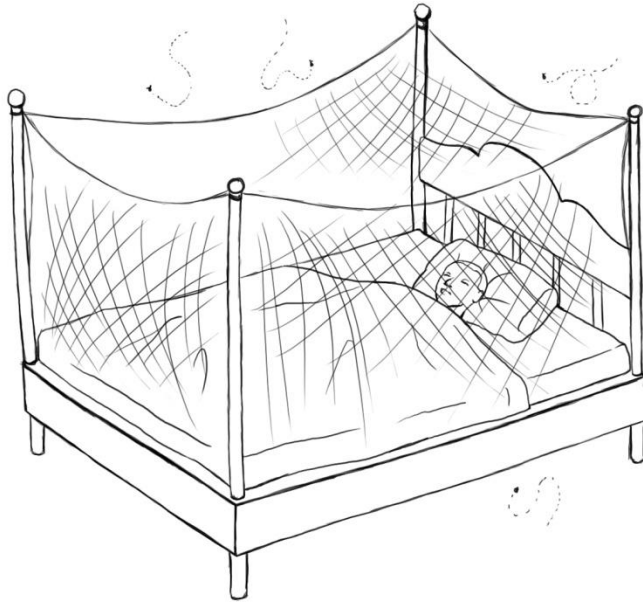
## Lecture Presentation

### Prevention and Control Strategies for Malaria, Dengue and Chagas Diseases

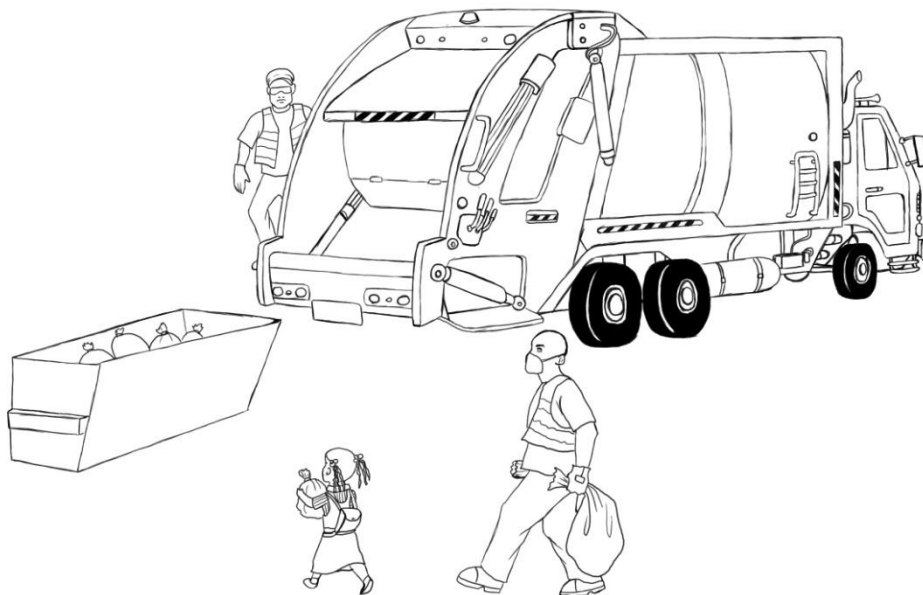
Vector-Borne Diseases	Prevention and Control Strategies
Malaria	<ol style="list-style-type: none"><li>1) Mosquitoes inside the house can be controlled by inside spraying.</li><li>2) Mosquitoes outside the house can be best controlled through their source - destruction of places where they breed.</li><li>3) Night-biting mosquitoes can be reduced through the use of insecticide-treated bed nets.</li><li>4) Better ways to build homes to prevent mosquitos from entering e.g. screened windows and doors.</li></ol>
Dengue and Chikungunya	<ol style="list-style-type: none"><li>5) Mosquitoes inside the house can be controlled by inside spraying.</li><li>6) Mosquitoes outside can be best controlled through their source - destruction of places where they breed.</li><li>7) Night-biting mosquitoes can be reduced through the use of insecticide-treated bed nets.</li><li>8) Improved housing construction to refuse mosquito entry.</li><li>9) Ultra Low Volume (ULV) insecticide spraying of communities with a high risk for dengue and chikungunya</li></ol>
Chagas	<ol style="list-style-type: none"><li>1) Spraying of houses and surrounding areas with insecticides</li><li>2) House improvements to prevent vector entry e.g. window and door screens</li><li>3) Personal ways such as bed nets</li><li>4) Good hygiene in preparing, transporting, storing, and eating food</li><li>5) Screening blood donors</li><li>6) Health facility screening of newborns and other children of infected mothers for early diagnosis and treatment</li><li>7) Testing of organs, tissues or cell donors and receivers by Ministry of Health</li></ol>

Note that some actions can be done by persons, families, communities and the health system.

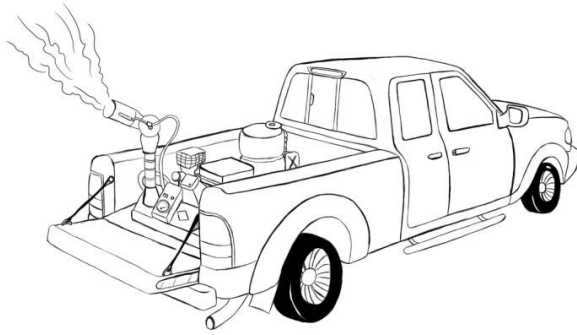
## Personal protection



## Environmental Sanitation



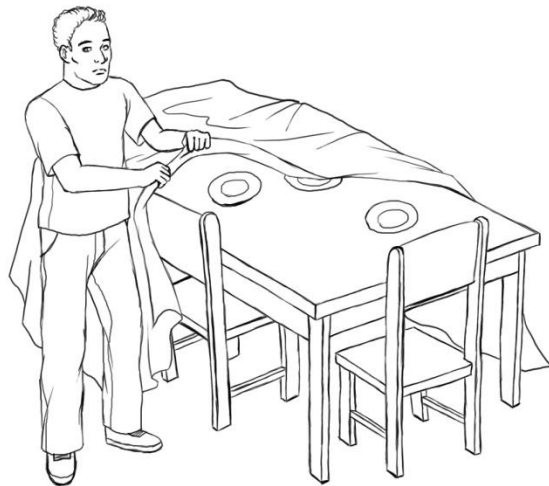
## UltraLow Volume (ULV) insecticide Spraying



The mosquito spray truck uses a machine to spray a small amount of the chemical Malathion to kill mosquitoes, which can cause Dengue and Malaria.

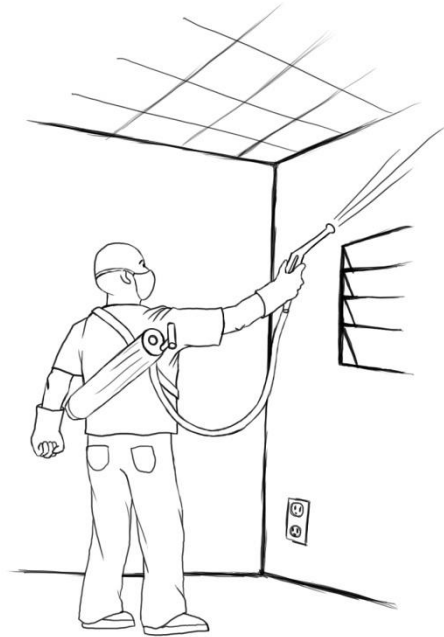
You should keep your windows and doors open so that the chemical can reach the mosquitoes inside the house.

## Preparation for Indoor Spraying



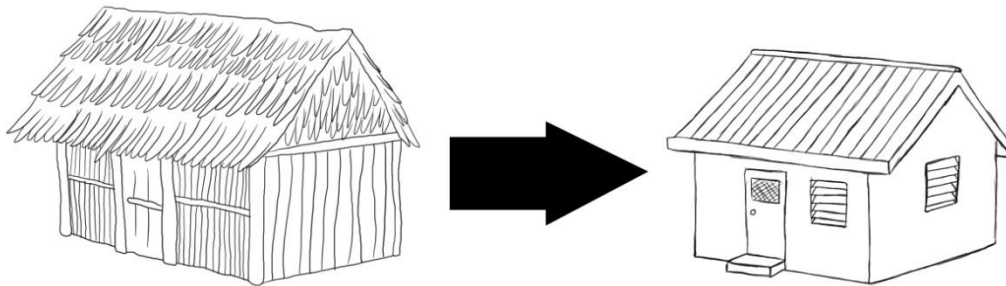
Furniture and food must be removed or covered with a plastic sheet before a house is sprayed.

## Indoor Spraying



Wall and roof surfaces can be sprayed with an insecticide that kills mosquitoes that rest on these places

## Improved housing construction

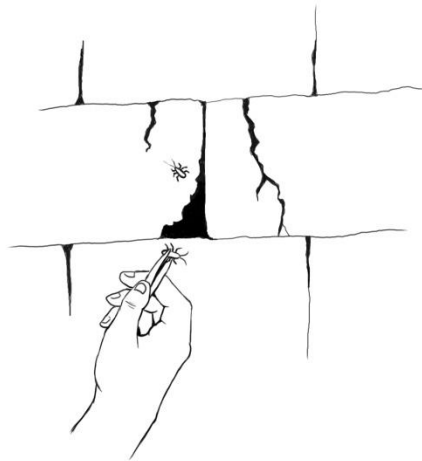


House improvement prevents the triatomine (Chagas) bugs from entering.

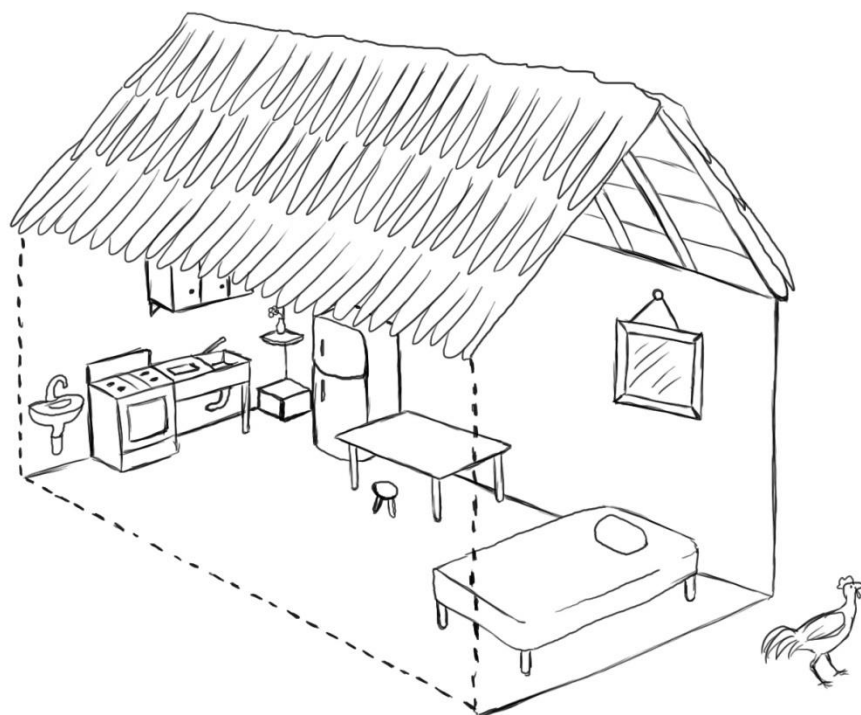




Mosquitoes do not find openings in the screen when the screen is treated.



Cracks in walls and other hiding places can be checked for the presence of bugs.



The bugs find suitable hiding places in the cracks in mud-brick walls and dark places among boxes, firewood and other objects, behind pictures, in beds and in thatched roofs.

## Session 7:

# Monitoring and reporting of Malaria, Dengue, Chikungunya and Chagas

## Overview

Better monitoring and reporting of malaria, dengue, chikungunya and chagas cases will help the Ministry of Health to know which areas and/or population groups are most affected.

## Time:

45 minutes

## Objectives

By the end of the session, participants will be able to:

- Relate the Information needed for vector borne disease monitoring.
- State the steps in reporting vector borne disease cases

## Materials

Power Point presentation with laptop and accessories or overhead projector

Or flipchart with colored markers

CHW and VC forms for reporting and referring persons

## Lecture Presentation

### What is Disease Monitoring?

Disease monitoring is the process of gathering information about a disease. It includes:

1. Checking the number of cases of the disease - past and present
2. Finding out how the cases are scattered in the community
3. Finding out where disease cases are. This helps to recognize:

- a) The area and population most affected
- b) Pattern of cases and deaths (if any)
- c) How effective the control measures are

### **Type of Information Required in Disease Monitoring**

- **Environmental** – Looking at situations within the environment that support the presence and breeding of the vector
- **Climate** – Knowing rainfall and temperature patterns needed for mosquitos to breed
- **Geography** – Knowing the location of cases so that direct action can be taken to prevent further spreading.
- **Financial and social conditions** – Better construction of houses to reduce the risk of insect bites resulting in vector-borne diseases. Reducing poverty of individuals, families and communities so that they can improve their living condition.

### **Reporting System**

- **Name of person**
- **Date of birth**
- **Address and other contact information**
- **Age**
- **Sex**
- **If female, is she pregnant?**
- **Places where person recently traveled**
- **Medications taken before for the complaint**
- **Signs and symptoms of the person**
- **Any action taken by the CHW or VC**
- **Date blood sample was taken**
- **Date and time of referral**

### Community Action for Disease Control

#### Overview

Community Action for Disease Control is concerned with causes and effects of health and disease conditions in communities.

#### Time

30 minutes

#### Objectives

By the end of the presentation, the participants will be able to:

- Explain why some community actions put community members at risk of vector-borne diseases
- State two (2) good community actions that reduce the risk of vector-borne diseases

#### Materials

Power Point presentation with laptop and accessories or overhead projector

Or flipchart with colored markers

#### Lecture Presentation

Community-based action for disease control stresses the importance of getting the community involved in recognizing risk factors and behaviors for getting vector-borne diseases.

**a) Person to person methods**



**b) Group methods**



**c) Community communication methods:**

- Radio and television
- Newspaper
- Flyers, posters and pamphlets
- Music messages
- Drama
- Community meetings
- Billboards
- Home visits
- Texting



## **Community risk factors for acquiring vector-borne diseases**

- Presence of vector breeding spots: stagnant water, dirty surroundings, overgrown bush, old water in flower vases, holes in trees, old tires, cans
- Presence of mosquitoes and chagas bug
- Poor housing conditions (broken walls, no window screens)
- Lack of protective clothes and covering that protect from the bite of vectors

## **Community preventive actions**

- Cleaning surroundings: garbage, solid waste, overgrown bush
- Clearing stagnant water
- Crushing and boring cans
- Changing water in flower vases every 3 – 5 days
- Draining holes in trees
- Killing mosquito larva (Larvaciding) in artificial water containers (with Abate, etc.)
- House spraying
- Supporting Ultra Low Volume (ULV) spraying operations in the community
- Taking treatment as prescribed to reduce risk of spreading the disease

## Session 9:

### Practical Session on Skills for Taking Blood Smear (TBF) to Ensure Good Diagnosis

#### Time:

90 minutes

#### Objective

By the end of the session, participants will be able to:

- Demonstrate preparing for taking a blood smear
- Demonstrate taking the blood smear
- Demonstrate packaging the blood smear

#### Materials

##### Preparation of the smear

- Wash hands
- Use clean technique while preparing the slides
- Use gloves
- Use only disposable needles/lancets
- Avoid injury
- Handle and carefully throw away sharp instruments and other materials contaminated with blood

##### Step 1: Prepare

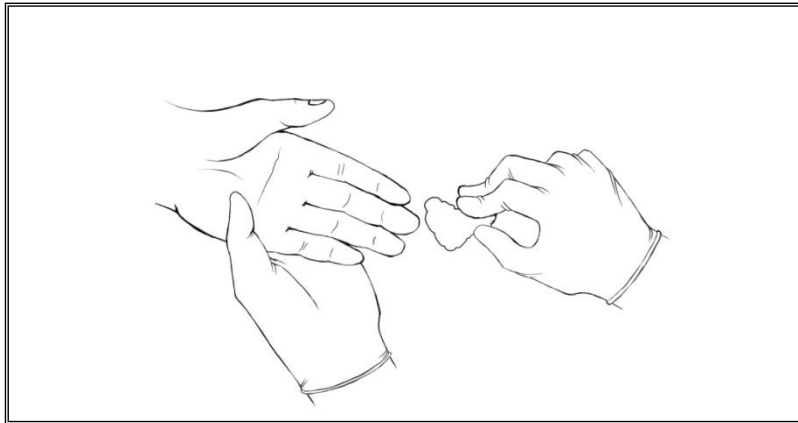
- Two clean slides
- Two pieces of cotton (one wet with alcohol and the other dry)
- A new sterile lancet
- Alcohol



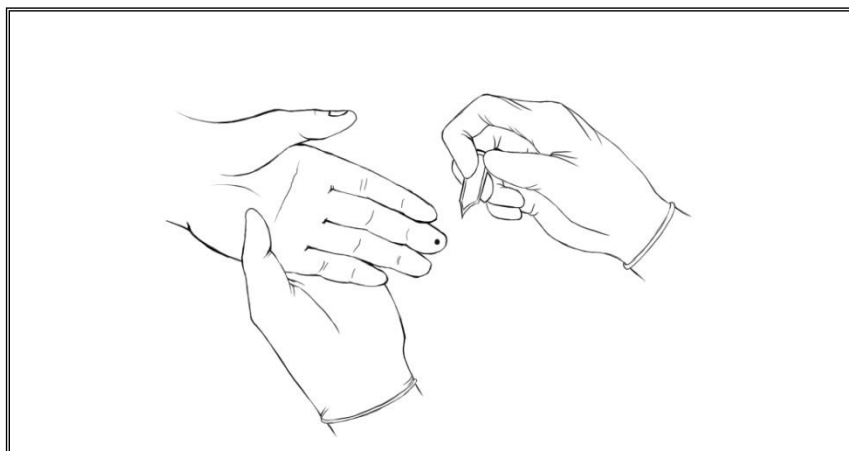
- The notification booklet

On the “frosted” side of the glass slide, write the person’s complete name, address, age and the date the sample was taken.

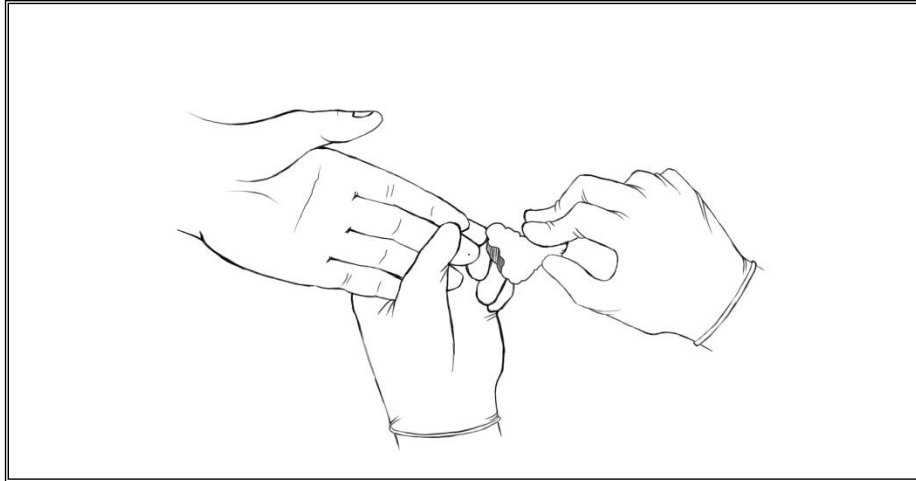
**Step 2: Wipe the finger to be pricked first with the piece of wet cotton, then with the piece of dry cotton**



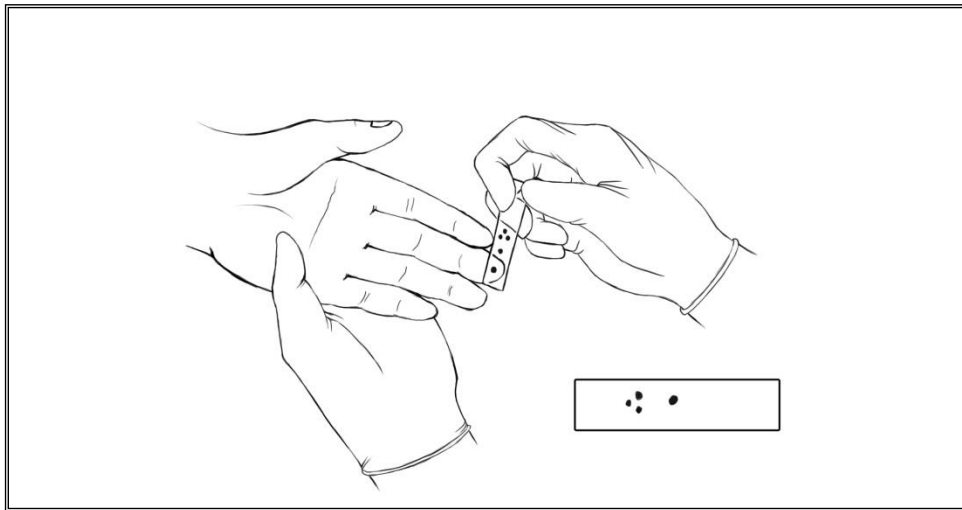
**Step 3: Hold the finger firmly, prick the side of the cleaned finger. Please note that the middle finger is the preferred one to be pricked.**



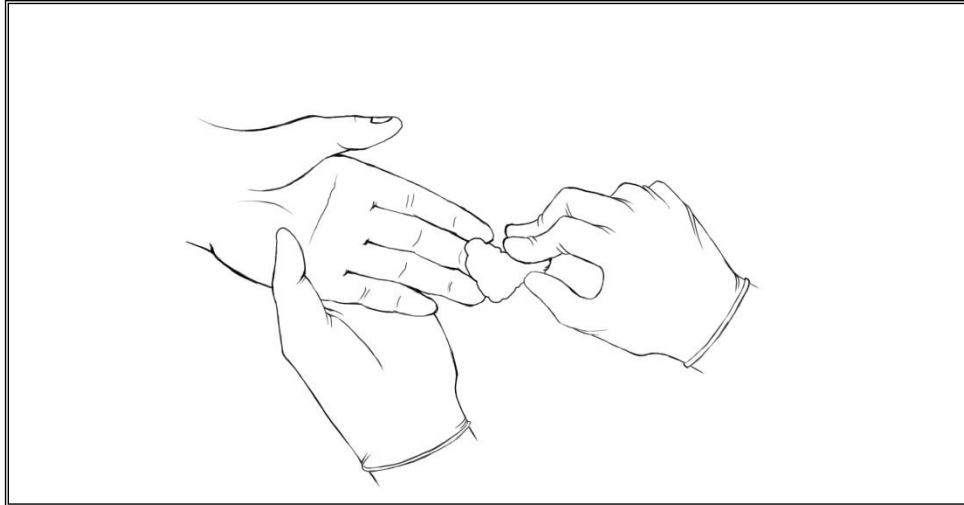
**Step 4: Squeeze the pricked finger and wipe off the first drop of blood that appears**



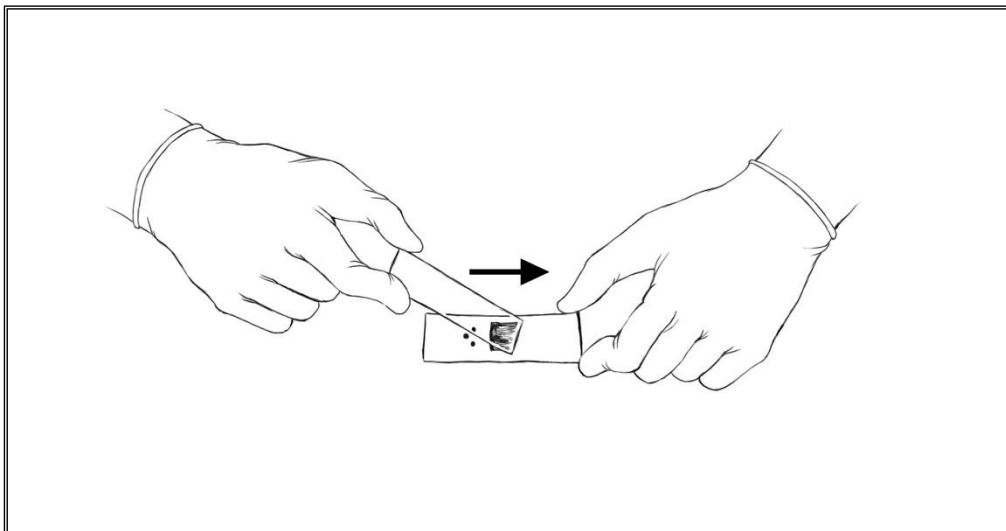
**Step 5: Squeeze the finger again to get blood that will become the sample. Remember that it is a thick and a thin blood film that is needed on the same slide; therefore, enough blood should be taken on the two (2) areas of the slide.**



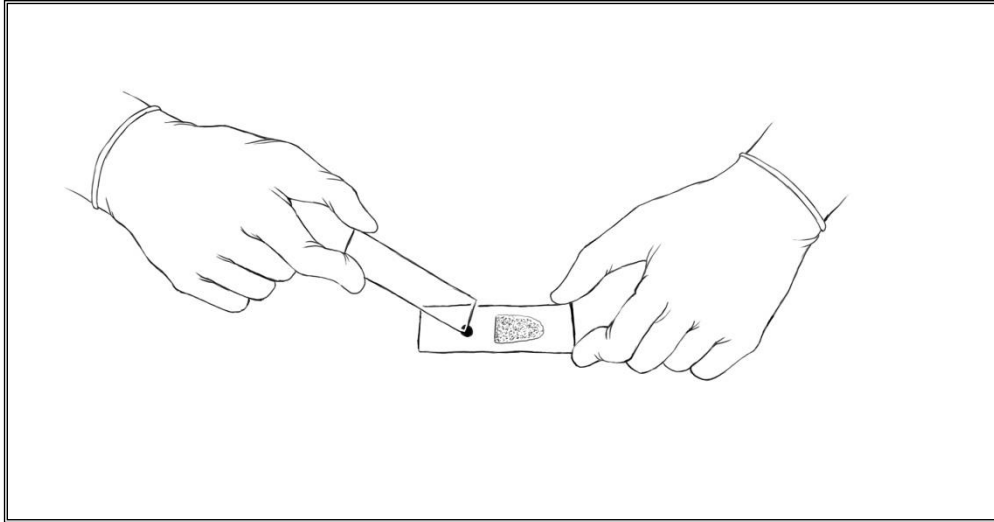
**Step 6: Cover the pricked area with the wet piece of cotton used**



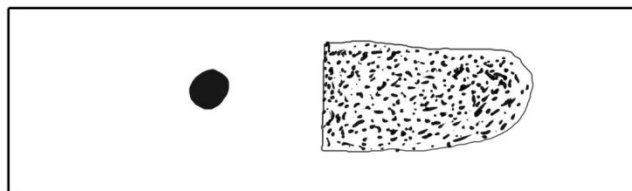
**Step 7: Holding the other clean slide at a proper angle for spreading, join the blood drops on one area of the slide. Use the edge of the spreading side to uniformly spread a thin smear. Wipe the edge of the slide used in spreading the blood.**



**Step 8: After joining the blood droplets on one area of the slide to create the thin blood film, use the tip of the other slide to join the drops together on the other side of the slide to create the thick blood film.**



**Step 9: After spreading, place the smear in a safe place where it can be air-dried, under some cover or in a slide box. Protect from insects.**



**Step 10: Fill out the notification slip, making sure the patient's address and age are correctly noted, including the date the smear is taken. If you believe the sample needs to be tested as soon as possible, you can state this on the notification slip.**

## References

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