Operational plan for the prevention and control of Dengue in the Republic of Mauritius

Communicable Diseases Control Unit

Ministry of Health and Wellness

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List of Abbreviations

CDC	Centre for Disease Control and Prevention
CDCU	Communicable Disease Control Unit
CP	Community Physician
CSF	Cerebro-Spinal Fluid
DC	Dengue Case
DF	Dengue Fever
DHF	Dengue Hemorrhagic Fever
DGHS	Director General Health Services
DHS	Director Health Services
DPS	Deputy Permanent Secretary
ELISA	Enzyme-Linked Immunoassay
EWARS	Early Warning Alert and Response System
FETP	Field Epidemiology Training Programme
HSO	Health Surveillance Officer
AHRIM	Association of Hoteliers and Restaurants in Mauritius
PCR	Polymerase Chain Reaction
PHEOC	Public Health Emergency Operation Centre
PHFSI	Public Health Food and Safety Inspectors
RPHS	Regional Public Health Superintendent
RRT	Rapid Response Team
SCE	Senior Chief Executive
VBCD	Vector Biology Control Division
WHO	World Health Organization
WHO COMBI	World Health Organization Communication for Behavioral Impact

Summary

The goal of this operational plan is to reduce the incidence of dengue fever in Mauritius by implementing a cohesive strategy that integrates prevention, surveillance, and control measures. This will be achieved through four key objectives. First, strengthening surveillance systems to enable the early detection of dengue cases and swift response to potential outbreaks. Second, minimizing mosquito breeding sites by promoting environmental management and engaging communities in source reduction efforts. Third, increasing public awareness and fostering active community participation in dengue prevention initiatives to build a culture of shared responsibility. Finally, enhancing the country's capacity for rapid outbreak response by equipping health systems and emergency teams with the tools and training needed to effectively manage dengue outbreaks. Together, these objectives aim to create a resilient and sustainable framework for dengue control.

1. Introduction

Dengue fever is an important viral disease that is transmitted by day-biting mosquitoes. The principal vectors during outbreaks are the mosquitoes of the genus *Aedes*. In Mauritius, it is *Aedes albopictus* which is the local vector.

Dengue Fever and Dengue Haemorrhagic Fever (DF/DHF) were first recognized in the1950s, during the dengue epidemics in Philippines and Thailand.

Dengue usually causes two main types of clinical disease, namely dengue fever and dengue haemorrhagic fever. Dengue fever is usually associated with symptoms such as sudden onset of fever, headache, retro orbital pain, severe myalgia, arthralgia and in many cases body rashes may also appear.

Dengue haemorrhagic fever is associated, in addition to above, with bleeding manifestations. This condition may, in some cases, progress to a dangerous condition known as dengue shock syndrome. The latter is associated with a high mortality rate.

Causative agents

DF/DHF is caused by the dengue virus which belongs to genus Flavivirus family Flaviviridae and includes serotypes 1, 2, 3 and 4 (Den-1, Den-2, Den-3 and Den-4). When a person has had classic dengue (i.e. infection by one serotype), a second infection later by another serotype increases the likelihood of suffering from DHF.

1.1 Vulnerability of Mauritius to Dengue Fever

A preparedness plan for the prevention of control of dengue is critical for Mauritius because the island is vulnerable to outbreaks for the following reasons:

1. *Aedes albopictus*, the sole mosquito species responsible for chikungunya and dengue transmission in Mauritius, is abundant and widespread across the island.
2. The population of *Ae. Albopictus* is sustained throughout the year due to the mild tropical climate, the ecoplasticity of the vector and the ability of its eggs to remain viable for several months without water.
3. Mauritius suffered seven outbreaks of dengue (2009, 2014, 2015, 2019, 2020, 2023 and 2024).
4. Once introduced in a country, dengue is very difficult to eradicate and tend to recur periodically.
5. Mauritius has extensive travel and trade links to Dengue endemic zones.
6. Shipment of tyres containing infected larva has been established as a source of disease introduction in many countries

1.2 Goal and Objectives of the Operational Plan

The main goal of the operational plan is to reduce morbidity and mortality from Dengue. Consequently, the focus during epidemic phase is containment and mitigation while during the quiescent interepidemic phase is early warning by surveillance and control. Hence the surveillance objectives will accordingly be different in each phase. The main goals are to:

1. Provide a step-step approach to the management of the epidemics by all stakeholders
2. Provide a step-by-step approach to forecasting an epidemic
3. Provide a step-by-step approach to the quelling of an epidemic at the onset.

1.3 The target users of the preparedness plan

This document is intended to all those involved in planning and in responding to the threat that represents dengue and includes: 1) policy and decision makers, 2) Hospital Administrators, 3) Regional Health Directors, 4) Regional Public Health Superintendents, 5) Community Physicians at CDCU Headquarters, 6) Public Health Inspectors, 7) Health Surveillance Officers, and 8) Other Stakeholders.

2. Epidemiology of Dengue

With climatic changes, globalization and several other factors, the incidence of dengue cases has sky-rocketed worldwide making it the most rapidly spreading mosquito-borne viral disease in the world. The WHO reported a surge from 505,430 dengue cases in 2000 to 5.2 million in 2019, that is a tenfold increase in a little less than 2 decades. To date, the disease has established endemicity in more than 100 countries where 3.2 billion people run the risk of being infected (WHO, 2023). An increase in the number of dengue related deaths is also reported from around 16957 in 1990 to 40467 in 2017 (Zeng et al., 2021). In September 2023, the Centers for Disease Control and Prevention (CDC) reported dengue cases in over 195 countries with most cases found in tropical and subtropical regions of Asia, America and Africa (CDC, 2023). Once introduced in a country, dengue fever tends to cause regular epidemics. A period with no epidemic is known as the interepidemic period. Before 1970 only nine countries had experienced the DHF epidemic, a number that had increased more than four- fold by 1995. Recently dengue epidemics have been reported from Australia, New Caledonia, Malaysia, Puerto Rico, Reunion and Seychelles. Some 3900 million people are now at risk from dengue. WHO currently estimates that there may be 390 million cases of dengue infection worldwide every year with 90 million cases presenting with clinical symptoms.

The epidemiology of Dengue may be divided into two marked phases as shown in Figure 1 below. The viruses cause overt outbreaks during the *epidemic phase*. Following the epidemic phase, the viruses go into a quiescent phase also referred to the *interepidemic phase* from where it erupts back into the epidemic phase depending on various environmental factors. The environmental factors triggering viruses from one phase to another are poorly understood but includes temperature, rainfall, vector population and the number of immune subjects in the population commonly referred to as herd immunity.

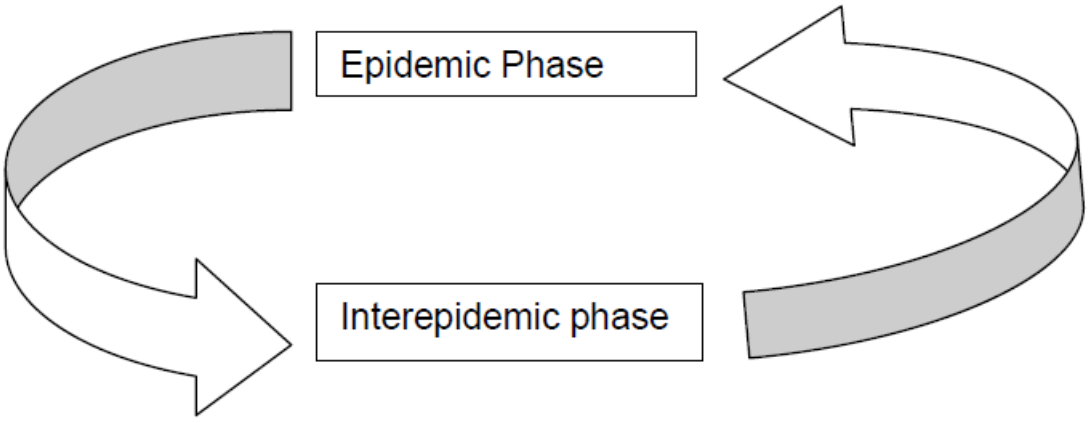


Figure 1: Cyclic nature of DENGUE epidemics: The control Strategy is different for the epidemic and the interepidemic phase

3. Control Strategy of Dengue

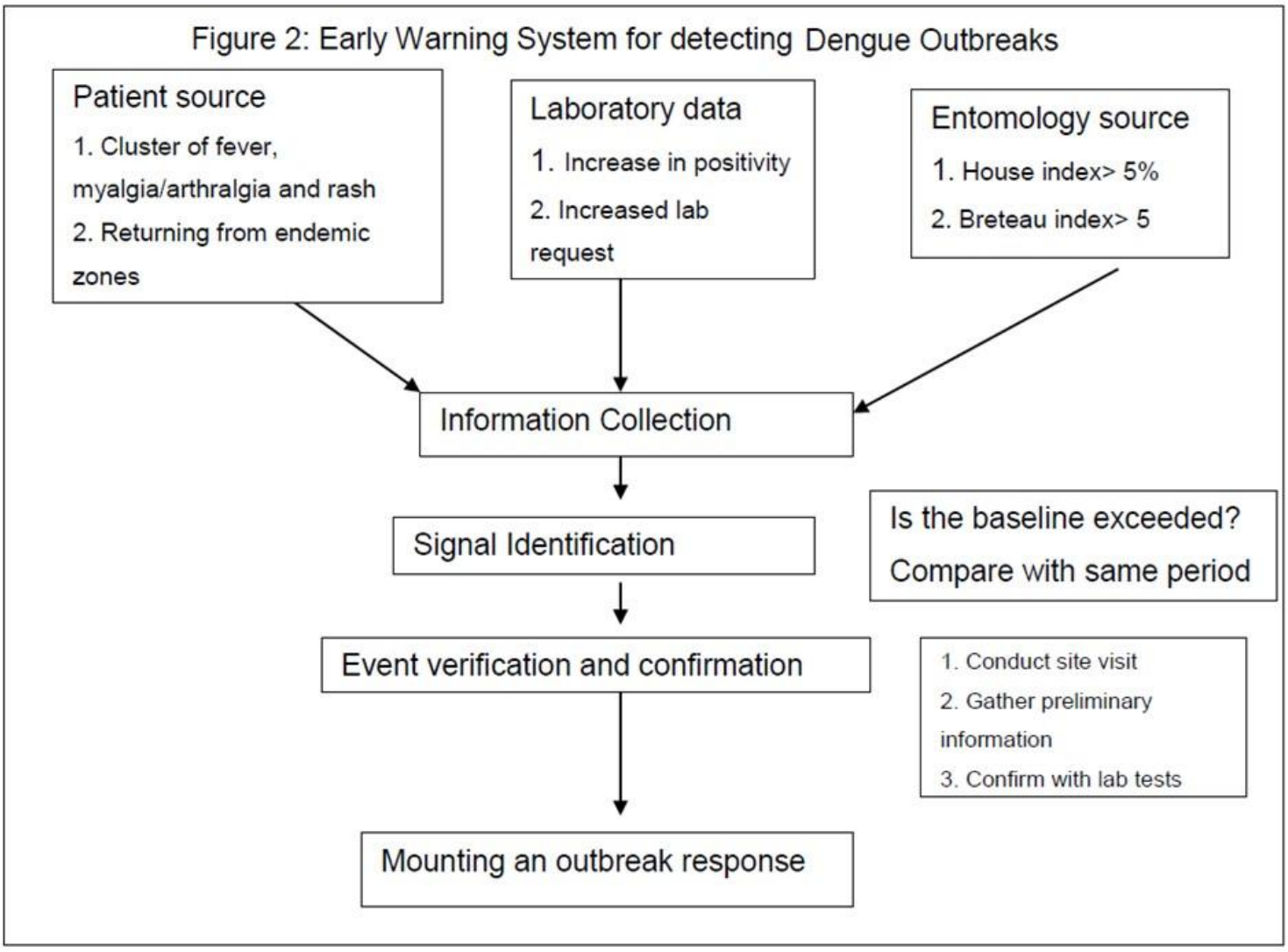
The control strategy for dengue depends on whether one is in the epidemic or the interepidemic phase. The activities for interepidemic period primarily focus on the control of the larval population of the vector since there are no infected adult mosquitoes. During the epidemic phase the focus is on the control of both larval and adult mosquito populations since the adult mosquitoes are infective. It is to be noted that, in the case of dengue, the virus can be transmitted to the eggs of the mosquito transovarially.

3.1 Triggers of outbreak investigation and control

Forecasting and recognizing an outbreak at the outset is important for reducing the full impact of the outbreak. As shown in Figure 2, an early warning system (EWARS) must be used to detect triggers of an outbreak. The CDCU shall use the following trigger criteria for outbreak investigation and control:

1. Patient source data of the occurrence of more than one suspected case of Dengue in a locality
2. Mosquito incidence data from the Vector Biology Control Division which includes - the House Index (HI), the Breteau Index (BI), the Container Index (CI), the Pupal Index (PI), the number of adult mosquitoes collected by human collectors or by BG Sentinel traps and predictive density maps of *Ae. albopictus* generated by the predictive model ALBOMAURICE (https://doi.org/10.1016/j.softx.2020.100638). The various indices are calculated as per Annex 18. BI threshold during inter-epidemic and epidemic seasons are respectively 5 and 0.
3. Laboratory data showing increased laboratory requests or positivity rate

Figure 2 depicts the decision point for switching from interepidemic to epidemic periods. The set of activities are described below.



4. Procedure for Managing Outbreaks

The main goals during an outbreak are to manage the patients to reduce morbidity and mortality by prompt and efficient management of the cases. In addition, one must also promptly quell the outbreak and protect the community at large. A set of tasks outlined in the ensuing sections are aimed at achieving these goals.

4.1 Objectives during outbreaks

The objectives during outbreaks are:

1. Planning and coordination
2. Outbreak investigation
3. Management of cases
4. Situation monitoring
5. Mosquito control
6. Risk Communication and Community Engagement

4.2 Algorithm for mounting a response to an outbreak

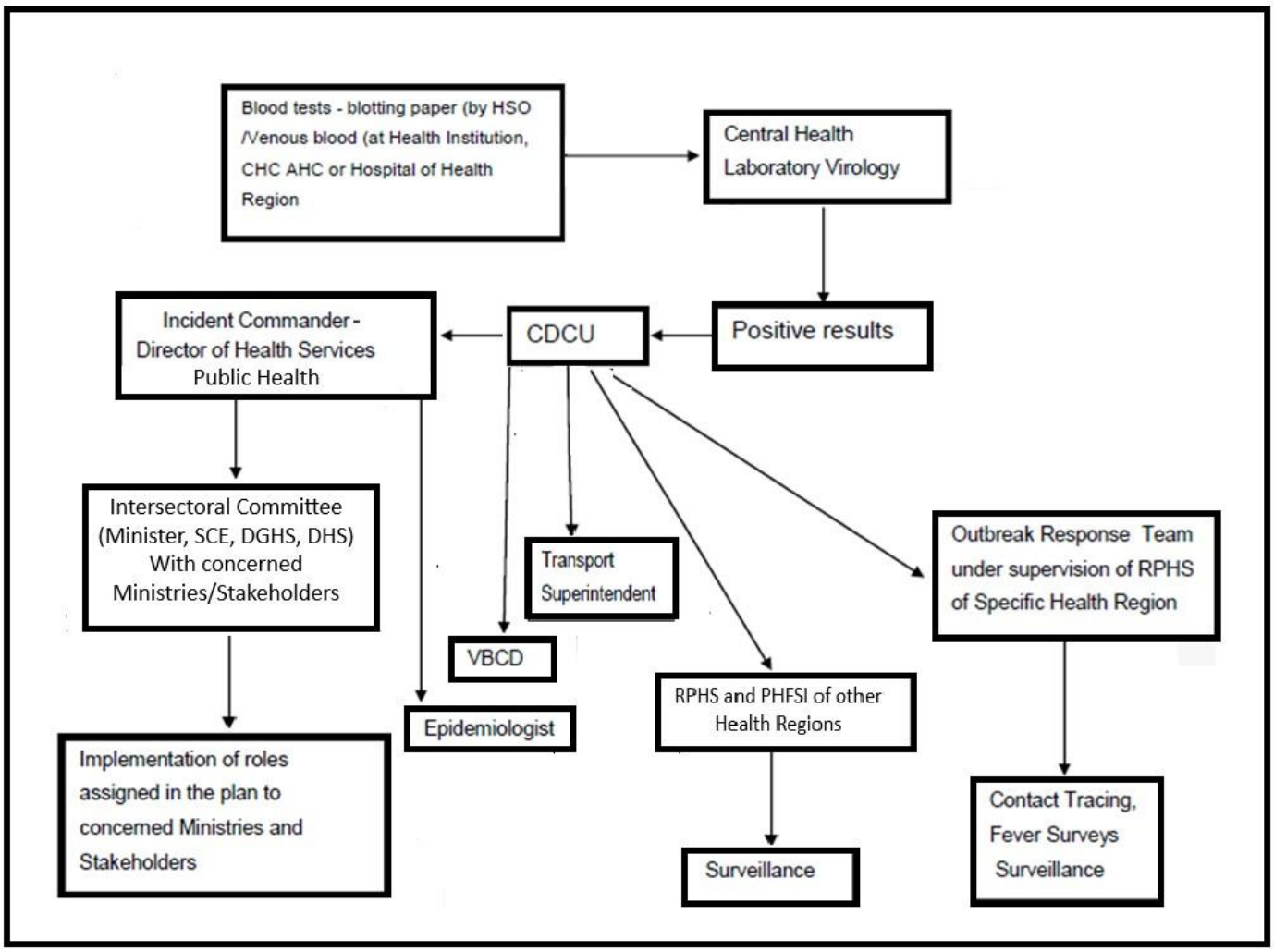


Figure 3. Algorithm for mounting an Outbreak Response

4.3 Overall Planning and coordination for logistic of an outbreak

Since several stakeholders are involved in the outbreak phase, it is important to define the roles and functions of each stakeholder, through planning and coordination, to ensure smooth supervision and minimize duplication, redundancy or contradictory activities. From the health sector the following main persons have clearly defined roles and responsibilities: (1) the RPHS of CDCU, (2) the Rapid Response Team led by the medical superintendent of the respective region Hospitals, (3) the Head of the Vector Biology and Control Division, and (4) the. From the non-health sector, the following departments and Ministries are involved: (1) the Ministry of Environment, Ministry of Local Government, (2.) Ministry of Agro Industry, food production, and security, (3) Ministry of Education, (4) Ministry of Tourism, (5) Ministry of Women Rights and (6) representative of Private Sector such as Mauritius Chamber of Commerce and Industry, The Chamber of Agriculture, L'AHRIM and other stakeholders. The participation of the non-health sectors will be ensured through the setting up of a task force. The general roles of these people are described.

4.3.1 Role of the CDCU

The role of the Communicable Disease Control Unit (CDCU) is as follows: -

1. Coordinate and oversee all activities pertaining to outbreaks
    a. Collect, compile data and submit reports
    b. Coordinate implementation of activities at regional levels through the Regional Public Health Superintendents
    c. Arrange for submission of daily technical reports, for each region, to the DGHS, DHS of Public Health.
    d. Set up an evaluation committee to examine all reports.

2. Direct all operations for:
    a. Outbreak investigations to be undertaken by the regional rapid response team
    b. Outbreak controls
3. Monitor the following activities
    a. Larviciding and Fogging operations effected in the regions
    b. The implementation of strategies for vector control and vector surveillance
    c. Analyze the trend of the disease in person, place and time
    d. Conduct additional epidemiological studies if necessary
4. Produce and disseminate information for action
    a. Guide the fogging and larviciding operation by directing them where the "hot zones" of the disease are.
    b. Produce and disseminate updated case definitions and case management protocols to all RPHS
    c. Supervise the training of clinicians in case definition and management
    d. Publish weekly bulletin of the disease trend and operation conducted
    e. Maintain a list of dengue-endemic countries and supply it to the senior PHFSI

4.3.2 The role of the Epidemiologist

The Epidemiologist is responsible to the Director of Health Services of Public Health through the Regional Public Health Superintendent and his role is as follows:

- To plan, design and implement epidemiological studies with a view to investigating human disease and risk factors
- To participate in research activities and special investigations (including disease outbreak investigations)

- To determine and utilize appropriate statistical methods/analysis to evaluate and interpret data
- To perform duties assigned in the event of a Public Health emergency and other response programmes
- To produce periodical reports on the epidemiological trends of communicable diseases and their risk factors.

4.3.3 The role of the head of the regional Rapid Response Team (RRT)

The role of the head of the regional rapid response team is as follows:

- To carry out field investigation of the outbreaks according to set procedures
- To report daily to the central command unit at the CDCU
- To analyze the prevalence of the disease in different risk groups and geographic areas

4.3.4 The role of the Vector Biology and Control Division

The role of the Vector Biology and Control Division is as follows:

- To map the density of the larvae, pupae and adult mosquitoes by the various indices (House Index, Container Index, Breteau Index and Pupal Index)
- To provide predictive maps of *Ae. albopictus* larval and adult density using the ALBOMAURICE modelling software
- To send daily report of the vector densities to the Operations centre at the CDCU and to the relevant regional Health Office by fax and email
- To participate in multi-sectoral and technical meetings
- To assess the efficacy of vector control interventions during outbreaks
- To investigate novel vector surveillance and control methods
- To assess resistance to insecticides in *Ae. albopictus* as per the Insecticide

Resistance Management Action Plan

- To assess the efficacy of insecticides used by the Public Health and Food Safety Inspectorate during outbreaks
- To provide vector-related information for drafting sensitization messages and for the prioritization of sensitization interventions
- To participate in sensitization campaigns
- To provide predictive maps of *Ae. albopictus* using the ALBOMAURICE modelling software on a monthly basis:

i. To investigate novel vector surveillance and control methods which could enhance the efficacy of response to outbreaks – drones, SIT, autodissemination traps, etc.

ii. To assess mosquito resistance to insecticides on a yearly basis as per the National Insecticide Resistance Management Plan

iii. To assess the efficacy of insecticides used by the Public Health and Food Safety Inspectorate upon procurement and as and when required

iv. To participate in sensitization campaigns, the roles of the Vector Biology and Control Division during inter-epidemic period are:

v. To carry out mosquito survey in at least two localities on a daily basis – including surveys in previous dengue hotspots

vi. To carry out one mosquito survey at eight pre-determined sentinel localities on a monthly basis

vii. To screen *Ae. albopictus* mosquitoes collected from the field for DEN, by PCR

viii. To send daily reports of to the vector densities to the CDCU and the relevant Health Offices by fax and email

ix. To carry out at least 20 special surveys per year (known as Night catch surveys) or as and when required, to assess the biting behavior, peak biting activity and incidence of vector mosquitoes.

x. To carry out special mosquito surveys at least once per month, in the seaport and airport for the potential detection of highly invasive mosquito species that may be introduced into Mauritius through ships, cargo vessels and aeroplanes. This includes accrued surveillance for *Aedes aegypti* - a highly competent dengue vector.

xi. To send daily reports of the vector densities to the CDCU and the relevant Health Office by fax and/or email

4.3.5 The role of the Health Inspectorate Cadre

1. Carry out environmental surveys of breeding places of vectors from hot zones
2. Take actions on the results of the survey of adult and larval vectors
3. Inspect port areas and warehouses or supply depots of imported tyres
4. Set up of ovitraps around airports and seaport terminals
5. Regularly undertake larviciding with temephos at the airport and seaports.
6. Undertaking or assisting in fever survey on a regular basis
7. Assist in active and passive case detection and contact tracing
8. Send weekly reports to the central unit at CDCU and vector biology unit
9. Liaise with vector biology unit for undertaking larval and pupal survey
10. Direct the fogging and larviciding operation
11. Liaise with local government for environmental cleaning of "hot zones"
12. To give technical advice for sensitizing the community and distribute information pamphlets
13. Issue warning and fine for persistent offenders.

4.3.6 Setting up of a Task Force for coordination of health and non-health sectors

A task force has been set up under the chairmanship of the Minister of Health & Wellness comprising of Senior Officials of other Ministries namely: the Ministry of Environment and NDU; Ministry of Local Government, Rodrigues and outer Islands; Ministry of Agro-Industry, Food production and Security; Ministry of Education, Culture and Human Resources; Ministry of Tourism, Leisure and External Communications; Ministry of Women Rights and representatives of Private Sector such as Mauritius Chamber of Commerce and Industry, the Chamber of Agriculture, L'AHRIM and other stakeholders.

The role of the task force is as follows:

- Identify and monitor control measures to be implemented by each sector
- Meet regularly during an outbreak to review progress and advise the government on the control measures to be taken.

4.3.7 Role of RCCE

- Coordination and internal communication by organizing coordination meetings, conducting advocacy campaigns, initiating the development and review of strategies and action plans, conducting training of stakeholders at all levels and mobilizing resources to facilitate implementation of activities.

- Public communication by identifying and training trusted spokespeople and capacity-building of various stakeholders by using social media, messengers, ambassadors, influencers and champions.

- Community engagement with communities in health zones and local government to achieve advocacy or briefings for specific groups such as educational talks, outreach

communication, use of private radio stations, use of community platforms and networks and engagement of community influencers.

- Infodemic management to monitor and manage rumors and misinformation circulating in the media, social networks and in the community by training officers in each health region.

4.3.8 Public relations/Advocacy/Administrative Mobilization

This component should target healthy behavior on the business sector's and administrative programme management's agenda via mass media such as news coverage, talk shows, soap operas, celebrity spoke persons etc. Active participation of the following Ministries should be included in the campaign against dengue:- 1) Ministry of Local Government, Rodrigues and Outer Islands, 2) all the Local Authorities, 3) Ministry of Education, Culture and Human Resources, 4)Ministry of Environment and NDU, 5) Ministry of Youth and Sports, 6), Ministry of Tourism, Leisure and External Communications, 6) Ministry of Agro Industry, Food Production & Security , 7) L'AHRIM, 8) The Mauritius Chamber of Commerce and Industry, and 9) the Chamber of Agriculture and other stakeholders

4.3.9 Sustained Appropriate Advertising and Promotion

The approach here should be massive, repetitive, intense and persistent advertising via radio, television, newspapers and other available media to engage the people in recommended behavior change and the health cost of not changing the behavior. An effective media program should be developed and implemented to create awareness of dengue, proper disposal of refuse and waste and source reduction measures.

4.3.10 The role of the Ministry of Environment and NDU

The role of the Ministry of Environment is as follows:

- Step up clean up campaigns by providing waste litter bins in high-risk areas
- Help in the cleaning up of bare lands and riverbanks where waste accumulates.
- Provide additional workforce whenever necessary

4.3.11 The role of the Ministry of Local Government, Rodrigues and Outer Islands

The role of the Ministry of local government is as follows:

- Opening of temporary dump sites for receiving green waste and old tyres
- Issuing of exemption from waste carrier ‘s license for carrying waste
- Regular inspection and monitoring of bare lands/wasteland
- Wasteland management by legal actions against offenders.
- General cleaning campaigns in collaboration with “forces vives”
- Carrying larviciding and fogging in collaboration with the Ministry of Health & Wellness.

4.3.12 The role of the Ministry of Agro Industry, Food Production and Security.

- Ensure elimination of breeding sites from irrigation areas.
- Sensitize planters on proper water storage for irrigation
- Supplement workforce for vector control activities.

4.3.13 The role of Ministry of Tourism, Leisure and External Communications

- Support the national awareness campaign
- Support the vector control activities

- Sensitize hotels for the need to identify cases within their premises and ensure that positive dengue patients remain isolated in their rooms.

4.3.14 Role of Ministry of Education, Culture and Human Resources

- Support the awareness campaign
- Ensure a clean environment within their premises.

4.3.15 The role of the Business Sectors

- Support the cleaning campaign
- Support the awareness campaign
- Empower workers for a clean working environment

4.3.16 Activation of emergency control teams

Emergency control teams have been set up in each Health Region.

During an outbreak, the RPHS of CDCU will activate the rapid response team as follows:

- Instruct by phone all RPHS to activate the regional team
- Assist in logistic arrangement for full outbreak operation
- Ensure availability of medical counter measures and diagnostic tools by procurement, pharmacy and laboratory section
- Arrange for additional staff or redeployment of staff
- Consult and advise relevant RPHS on the extent of the operation

4.3.17 Activation of the operation centre

During an outbreak, operation centres should be set up at the central and regional levels. At the central level, the unit will be headed by the Regional Public Health Superintendent of CDCU (**until the operationalization of PHEOC**) and will be assisted by:

i. 3 Community Physicians (preferably with FETP)
ii. 1 Epidemiologist
iii. 1 Principal Health Inspector,
iv. 1 Senior PHFSI
v. 2 PHFSI
vi. 1 entomologist of the Vector Biology and Control Division
vii. 3 staff of medical records department
viii. 3 staff of medical statistics
ix. 3 administrative staff.

The functions of the Central Operations Centre will be as follows:

i. Maintain a database of outbreak investigation on a daily basis
    a. Task to be performed by medical record and administrative staff
ii. Analyze the trend of the epidemic by locality
    a. Tasks to be performed by the medical statistics unit, with the support of the Epidemiologist
iii. Disseminate the result daily to all interested parties

4.4 Outbreak investigation

4.4.1 Establishing the outbreaks

An outbreak is confirmed by showing that the number of positive cases is above the expected baseline number. This will be done with the following steps:

1. Clinically confirming the suspected diagnosis by the application of the standard case definition
2. Laboratory confirmation of the index and linked cases
3. Outbreak Investigation Team from the CDCU consisting of:
    - RPHS
    - CPs with FETP
    - Epidemiologist
    - Public Health Food & Safety Inspectors
    - Senior Health Surveillance Officer/Health Surveillance Officer.

It is incumbent of the CDCU in collaboration with the DHS Public Health to inform about a potential outbreak by informing:

- The SCE
- The DGHS
- The DPS of Public Health
- The press attaché
- Members of the regional outbreak Rapid Response Team

4.4.2 Orienting the data in person, place and time

To understand the outbreak, it is essential to orient the data with respect to person, place and time. The tasks of the emergency control team shall be:

1. Collect minimum data set on clinical and epidemiological features
2. Analyze the distribution of cases in persons of different age groups, gender, exposure category and geographical distribution.
3. Draw a hand map of the distribution of the cases

4.5 Management of cases

Proper patient management is critical for reduction of case fatality and limiting the spread of the infected mosquito in the community at large. The strategy for management shall be:

- Isolation of cases
- Administering clinical management

4.5.1 Isolation of cases

1. Patients suffering from dengue fever and receiving treatment to be confined in a health institution or in their homes as per the latest protocol determined by higher authority of the MOHW.
2. Additional beds are to be provided for in hospitals.
3. Mosquito nets are to be made available in all hospitals and the monthly status of the mosquito nets is to be sent to the RPHS office.
4. Community to be sensitized in the need to restrain themselves from traveling to high-risk zones and to visits dengue fever affected patients.

4.5.2 Clinical Management of Suspected cases

1. Case definition of Dengue Fever should be circulated to all Medical Practitioners *(see Annex 1)*.
2. Guidelines on Clinical Management as prepared by Consultants

Physicians of suspected or confirmed cases of Dengue must be distributed to all Medical Practitioners.

A strategy of triage must be followed to reduce the surge capacity on the hospitals and reduce morbidity and mortality of the patient.

4.6 Situation Monitoring

The CDCU will be responsible for situation monitoring by both active case detection and passive surveillance from sentinel sites.

4.6.1 Active case detection

Whenever an index case is detected, an active case search will be undertaken for all contacts of the case. The following procedure will be used:

1. Interview the index case to enumerate a list of immediate contact
2. Draw a map of the location of all contacts
3. Trace the contacts using the above list
4. Interview with the contacts to get epidemiological data
5. Collect acute blood sample
6. Observe the contacts for 7 days

4.6.2 Passive Case detection

Passive surveillance for case detection must be conducted by using sentinel sites comprised of:

1. Government Hospital and clinics
2. Private clinics (to send official notification and status of patient to RPHS Office on a daily basis)

3. Private Medical practitioners (to send official notification and status of patient to RPHS Office on a daily basis)

The procedure for passive surveillance shall be as follows:

1. The sentinel sites should be chosen to represent all the health regions
2. Focal points for all sentinel sites should be identified for each health region
3. The focal point should be supplied with documentation and complete instruction on case definition and case investigation form including laboratory collection
4. Weekly communication should be maintained with the focal points

4.6.3 Laboratory Surveillance

The Virology Unit of the Central Health Laboratory will be responsible for virological surveillance. The main roles of the virology unit will be as follows:

1. To confirm the first and initial suspected cases by the most rapid test of PCR and ELISA
2. Perform PCR for DEN on mosquito population
3. Submit daily report to CDCU in a standard format by fax and email
4. To provide magnitude of the disease and the viral serotypes as the epidemic progresses
5. Participating in planning meeting for control of outbreak control

4.6.4 Vector Surveillance

The responsibilities of vector studies, surveillance and provision of guidelines for strategical control of mosquito vectors are vested to the Vector Biology and Control Division.

The roles of this unit in outbreak control are:

1. To conduct mosquito surveys within 24 hours of notification of the dengue case (DC) within a 300 m radius of the DC's residence, workplace, school and/or other places the

latter may have recently visited to determine larval, pupal and adult density of *Ae. albopictus* in the region.

2. To repeat mosquito surveys (monitoring surveys) after vector control interventions in the vicinity of dengue cases to evaluate their impact on the *Ae. albopictus* population.

3. Calculate the following density indices for *Ae. albopictus*

a. House index (HI)
b. Container index (CI)
c. Breteau index (BI)
d. Pupal index (PI)
e. Adult density

3. To map the vector density in dengue hotspots
4. Perform PCR for DEN on adult *Ae. albopictus* mosquitoes
5. To submit a daily report on vector population density to the operation center CDCU and the relevant regional Health Office
6. To provide predictive maps of *Ae. albopictus* in the dengue hotspots using the ALBOMAURICE modelling software
7. To evaluate the efficacy of insecticide products used by the the Public Health and Food Safety Inspectorate during outbreaks as per WHO guidelines

4.7 Mosquito control

4.7.1 Adult control by space spray

For the control of adult vector population, the following procedures are used:

- Space spray operations (thermal fogging or ULV aerosols) must be carried out immediately following the notification of the index case by the CDCU operation team
- Spraying must be done within a radius of 300 meters of the case house

4.7.2 Larval source reduction

The following procedures will be used for larviciding:

- All houses within 300m radius of the case house must be totally surveyed for *Aedes* breeding grounds by the PHFSI

4.7.3 Reporting of mosquito control activities

During the epidemic period, the following daily reports must be submitted to the MOHW:

1. Advance programme of work for larviciding for the week
2. Advance programme of work for fogging for one day
3. Daily report on larviciding
4. Daily report on fogging
5. Daily Entomological report
6. Daily application report

4.7.4 Social mobilization and Communication

Social mobilization or community participation is a key component for sustainable prevention and control of mosquito-borne diseases. Community participation includes mobilization of civil society groups and inter-sectoral groups in health education, personal protection and law enforcement. The target is to deliver the messages of environmental management for:

a) Container management to reduce the sources of mosquito breeding habitats
b) Elimination or alteration of breeding sites including rubbish disposal, tyres, etc.
c) Proper management of water storage devices
d) Environmental protection through larviciding and use of repellents etc.

The WHO COMBI model for social mobilization and communication must be used to deliver the above messages.

5. Surveillance Tasks for Interepidemic Period

5.1 Objectives during interepidemic period

The objectives during the quiescent interepidemic period are:

1. Capacity building and preparedness
2. Planning and coordination
3. Situation monitoring
4. Mosquito surveillance and studies
5. Mosquito control
6. Social mobilization and communication

5.2 Capacity building and Preparedness

The interepidemic phase provides an opportunity to build the capacity in preparedness of the CDCU for responding to outbreaks of day-biting mosquito-borne diseases.

5.3 Planning and coordination for logistic for interepidemic period

The interepidemic period is an excellent opportunity to foster and consolidate coordination. Since several stakeholders are involved in the control of day-biting vector diseases, it is important to define the role and function of each stakeholder through planning and coordination to ensure smooth surveillance and minimize duplication, redundancy or contradictory activities. The following four main persons have clearly defined roles and responsibilities: (1) the RPHS of CDCU, (2) the head of the RRT, (3) the head of the Vector Biology and Control Division, and (4) the CHL.

5.3.1 Constitution of Rapid Response Teams at regional level

Rapid response teams should be set up in each regional health centres. The rapid response team will consist of:

i. One Public Health Doctor
ii. One epidemiologist
iii. One public health nurse
iv. One Principal Health Food & Safety Inspector,
v. One Senior Health Food & Safety Inspector,
vi. One Senior Health Surveillance Officer
vii. One laboratory representative (if needed)
viii. One data manager/administrative support staff if needed)

During the interepidemic period, the rapid response team:

1. Review all protocols and SOPs for outbreak control and prevention and ensure availability of necessary logistics.
2. Undertake outbreak training modules and conduct regular simulation exercises
3. Enlist and stockpile the necessary supplies and equipment for outbreaks investigation and control

5.3.2 The role of the operation centers

Operation centers are set up at the central and regional levels. The operation centers shall be equipped with communication devices including fax, email, computers, printers and telephones.

5.4 Situation Monitoring

The CDCU is responsible for situation monitoring that consists of both active case detection and passive surveillance from sentinel sites.

5.4.1 Active case detection at point of entry

Health Inspectorate Division at points of entry (Port and Airport) to put under surveillance all passengers arriving from dengue endemic countries

1. A list of such passengers to be submitted to all health offices and CDCU
2. Home visit of incoming passengers will be done by HSO according to existing protocol.
3. Suspected cases will be requested to attend the nearest health institution and RPHS of region are informed accordingly
4. Regionalized training for HSO
5. Control to be tightened at both the airport and the harbor
6. A list of such passengers is to be submitted to the Ministry of Health and Wellness and to the CDCU Vector Division (Petite Riviere) for monitoring surveillance
7. Contact tracing will be done by PHFSIs and in case of appearance of any dengue – like symptoms, prompt actions to be taken.

5.4.2 Active case detection in the community

Whenever an index case is detected, an active case search will be undertaken for all contacts of the case. The following procedure will be used:

1. Interview the index case to enumerate a list of immediate contact
2. Tract the contacts using the list
3. Observe the contacts for 7 days

5.4.3 Passive Case detection in the community

The sentinel sites for case detection will be comprised of:

1. Government Hospital and clinics
2. Private clinics
3. Private practitioners

5.4.4 Laboratory Surveillance

The Virology Unit of the Central Health Laboratory will be responsible for virological surveillance. The main roles of the virology unit will be as follows:

1. To confirm the first and initial suspected cases by the most rapid test of PCR and ELISA
2. Submit daily report on results to CDCU and all RPHS of the 5 regions in a standard format by fax and email
3. To provide magnitude of the disease and the viral serotypes as the epidemic progresses
4. Participating in planning meeting for control of outbreak control

Annex 1: Case Definition of Dengue Fever (DF)

An acute febrile illness (temperature 39-40 C) of 2 – 7 days duration with 2 or more of the following manifestations:

1. Headache
2. Retro-orbital pain
3. Myalgia
4. Arthralgia
5. Rash
6. Haemorhagic manifestations
7. Leucopenia / thrombocytopenia (platelets less than 100,000).

Case classification

Suspected case: A case compatible with the clinical description

Confirmed case: A case compatible with the clinical description that is laboratory-confirmed

Laboratory criteria for diagnosis

1. Demonstration of IgG and IgM antibody titres by the Rapid Test
2. Demonstration of Dengue Antibodies in Serum Samples by ELISA
3. Detection of viral genomic sequences in serum or CSF samples

Annex 2: Dengue Fever Protocol

Ministry of Health and Wellness
Mauritius

My Ref : **MHO/DIS/DENG V6T** **Date : 14 October 2024**

From : ***Senior Chief Executive, Ministry of Health and Wellness***

To : ***All Regional Health Directors***
All Regional Public Health Superintendents
All Medical Superintendents

Amended Dengue Fever Protocol

Please refer to correspondence dated 01 August 2024 regarding the Dengue Fever Protocol.

2. Given the current low incidence of Dengue Fever cases in Mauritius, the Protocol is hereby being amended as follow:-

i. **Confirmation of Positive Rapid Diagnostics Test.** Any patient deemed to be suspected of being infected with Dengue Fever will undergo a Rapid Diagnostic Test. A positive Rapid Test for Dengue Fever must be confirmed by a PCR Test (4ml of blood properly labelled in an EDTA tube) at the Central Health Laboratory.

ii. **Medical Examination and Baseline Investigation:** A dedicated MHO/SMHO will conduct a medical examination and send baseline investigations for the patient. If the medical examination and baseline investigation is within normal parameters and without any associated medical condition, the patient will be allowed to go home pending confirmation of PCR test.

iii. **Admission of PCR-Positive Dengue Cases**: Patients confirmed as Dengue Fever positive by PCR shall be called to attend the Accident and Emergency Department (or a private health institution as per patient's choice) by the RPHS Office. All patients with a confirmed positive PCR test for Dengue Fever shall be admitted under the care of Physician/Paediatrician under strict sanitary precautions.

iv. **Treatment Protocol**: Dengue management shall strictly adhere to the established clinical guidelines.

v. **Follow-up Procedures**: Admitted patients will receive continuous medical follow-up from Physician or Paediatrician. This will be done in close collaboration with the Regional Public Health Superintendent, who will ensure for public health measures taken.

vi. **Discharge Criteria**: Discharge from the healthcare facility is contingent upon a confirmed negative PCR result for Dengue Fever.

vii. **Management of Absconding Patients**: In the event of a patient absconding from the healthcare facility, immediate notification must be sent to the police, the Regional Public Health Superintendent, and the treating Physician or Paediatrician.

viii. **Genomic Surveillance**: Genomic Surveillance is still being maintained.

ix. **Domiciliary Monitoring Unit**: Arrangement made for Domiciliary Monitoring Unit is to be maintained in the eventuality there is an upsurge of cases.

Dr B. Ori
Director General Health Services
for Senior Chief Executive

Copy : ***Senior Chief Executive***

5th Floor, Emmanuel Anquetil Building, Port Louis, Mauritius – Tel.: 2145353 Email: bori@ovmu.org

Annex 3: Case Report of Dengue Template

RPHS OFFICE
TEL: -4276770 FAX: - 4276770 Email: -vhpublichealth2@gmail.com

Date:

From: Ag. Regional Public Superintendent, Dr B.N Beedassy

To: Dr I.Nawoor

Director Health Services (Preventive)

REPORT:CASE OF DENGUE

NAME	
AGE	
GENDER	
NATIONALITY	
CONTACT NUMBER	
ADDRESS (AT TIME OF NOTIFICATION)	
DATE OF NOTIFICATION	
RESIDENTIAL ADDRESS	
OCCUPATION AND PLACE OF WORK	
TRAVEL HISTORY	
DATE OF ARRIVAL	

SIGNS AND SYMPTOMS	
VITALS	
PAST MEDICAL HISTORY	
ADMISSION	
TREATING PHYSICIAN	
INVESTIGATION	
TREATMENT	

Public Health Measures taken by RPHS

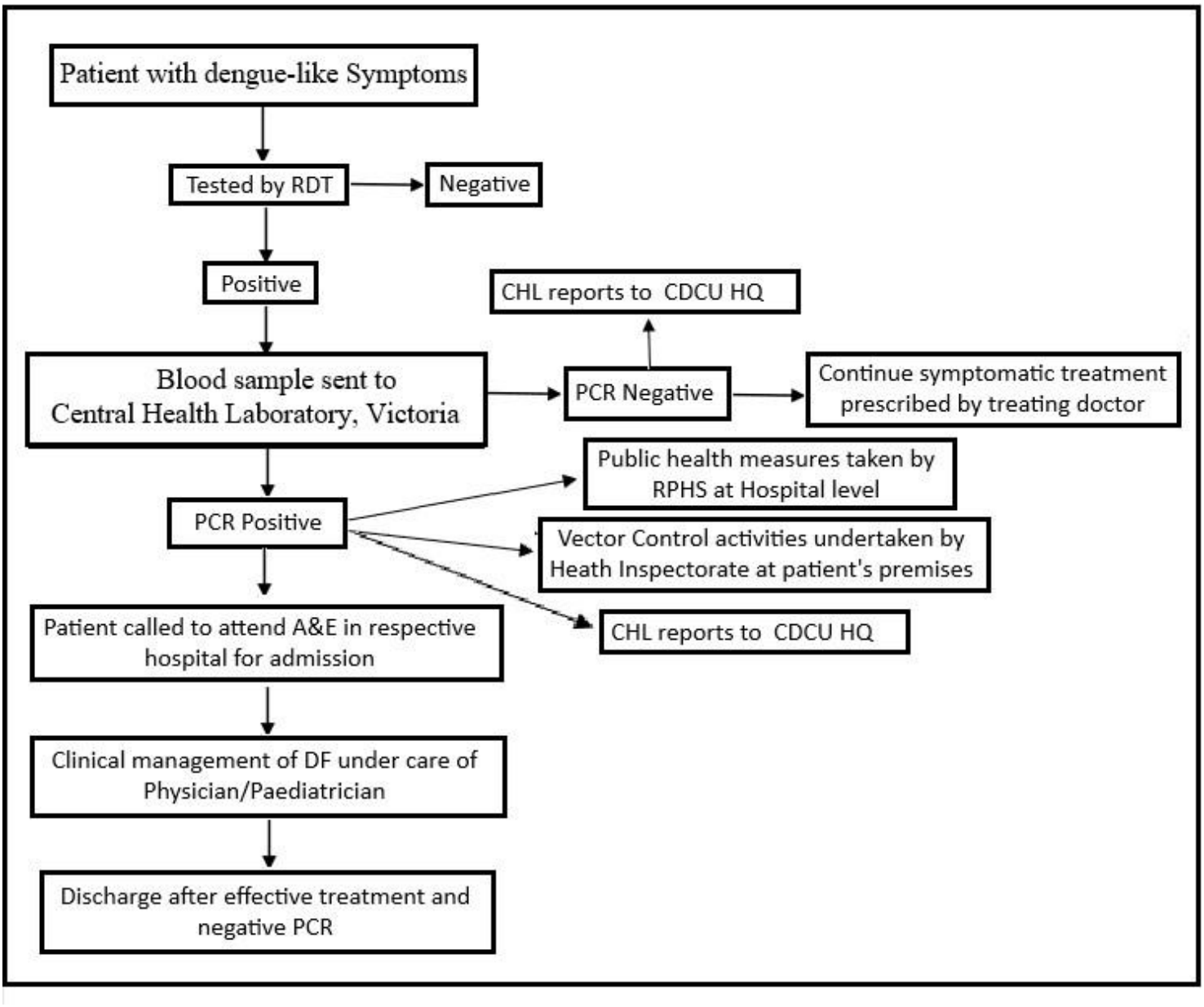
The patient has been isolated

- Electric mosquito apparatus and mosquito repellent cream have been counselled for protection.
- Health office will be notified for fogging at the residential address of the patient, place of work and the hospital.
- Monitoring will be done on alternate days: blood will be sent for dengue serology to laboratory
- All other Public Health measures will be carried out as per protocol.

Copy to: RPHS, CDCU Petite Riviere

RPHS. Headquarters

Annex 4: Flow chart for management of Dengue



Annex 5: Members of the writing/revision committee

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Dr. H. Bhadain	**Community Physician, CDCU**
Dr. D. Nuckchady	**Specialist Infectious Diseases**
Dr D. Iyaloo	**Head, VBCD**