National Action Plan

Prevention and Control of Dengue in Sri Lanka

2019 - 2023

National Dengue Control Unit
Ministry of Health, Nutrition & Indigenous Medicine

National Action Plan on Prevention and Control of Dengue in Sri Lanka 2019 - 2023

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NATIONAL ACTION PLAN AT A GLANCE	
Country	Sri Lanka
Title	National Action Plan on Prevention and Control of Dengue
Organization	Ministry of Health, Nutrition & Indigenous Medicine
Duration	2019 - 2023
Budget	Rs:1,858,943,750.00
Implementing Institute	National Dengue Control Unit of the Ministry of Health
Geographical Target areas	National & subnational
Project Objectives	**Outcome Objectives:** To achieve case incidence below 100/100,000 population by the year 2023 To reduce and maintain case fatality rate below 0.1 % by the year 2023
	Specific Objectives: 1. To intensify epidemiological surveillance to detect and notify dengue cases real-time 2. To intensify entomological surveillance to forecast vector density and to take appropriate control measures 3. To apply appropriate integrated vector management (IVM) strategies to interrupt dengue transmission 4. To improve early diagnosis and case management 5. To detect epidemics early and to respond to potential epidemics effectively 6. To strengthen monitoring and evaluation to ensure optimal programme implementation, management and performance 7. To facilitate, link and conduct operational research in the prevention and management of dengue infections

FOREWORD

It gives me great pleasure to present the National Action Plan on Prevention and Control of Dengue: 2019 – 2023 developed by the National Dengue Control Unit with the support of the expert committee appointed by me. The Government of Sri Lanka is conscious of the possible adverse consequences of Dengue on affected communities. Therefore, all necessary measures have been taken to reduce the health impact due to dengue to such an extent that it would no longer be a major public health issue by 2023.

To achieve this goal, Sri Lanka must put forward an integrated and evidence based action plan in order to implement an effective and sustainable preventive programme. This national action plan prepared after several consultations presents sustainable strategies and activities for prevention and control of this disease in Sri Lanka. A series of multi-disciplinary, broad-based, multi-pronged strategies are proposed, with long-term sustainability achieved through direct integration with the national programme.

The National Dengue Control Unit under the direct guidance of the Ministry of Health will be the primary implementer of this action plan with the support of its partner organizations. The Ministry of Health solicits cooperation of all stakeholders for the effective implementation of this plan. I am confident that all stakeholders within the Government as well as the development partners will provide their unconditional support towards this national endeavour.

Dr. Rajitha Senaratne
Minister of Health, Nutrition and Indigenous Medicine
Sri Lanka

PREAMBLE 1

The National Action Plan on Prevention and Control of Dengue in Sri Lanka 2019 - 2023 has been developed by the National Dengue Control Unit in response to the increasing endemicity level with intermittent outbreaks which warrants re-organized and strengthened framework for prevention, control and clinical management of Dengue through an integrated approach.

National Dengue Control Unit of the Ministry of Health was established in 2005 for coordinating dengue control and prevention following the major Dengue outbreak in the year 2004. When dengue illness increasingly expanded in high magnitude in 2011 it was upgraded to a directorate as the National Dengue Control Unit with a dedicated annual budget allocation.

With coherent and coordinated efforts undertaken to reverse the alarming trends, this National Action Plan on Dengue Prevention and Control, 2019–2023, incorporates wider perspectives of Dengue control to support the restructuring of the programme at national and subnational levels. It aims to move from a reactive response to an emergency situation, to proactive risk assessment, early warning systems, and preventive measures through advocacy, resource mobilization, strategic partnerships, capacity-building, monitoring and evaluation.

The partnership and resources of members of the Presidential Task Force for Dengue Prevention will be solicited under a single plan of action aligned to the Ministry of Health. Close collaboration has been maintained with all representatives at both national and sub-national levels.

The plan emphasizes coordinated actions among multisectoral partners for preparedness and epidemic response ensuring sustainable and cost-effective efforts that can build capacities and increase resilience to future outbreaks, in line with global and regional strategic framework.

Through the effective implementation of its many components, this plan is expected to reduce dengue morbidity, making Dengue transmission not a major public health problem in Sri Lanka.

Mrs. Wasantha Perera
Secretary
Ministry of Health, Nutrition and Indigenous Medicine

PREAMBLE 11

Dengue has become a major health issue in recent years in Sri Lanka, with high morbidity, and considerable mortality.

The aim of this national action plan is to achieve case incidence below 100/100,000 population and to reduce and maintain case fatality rate below 0.1 % by the year 2023 by adhering to the comprehensive set of activities included under specific objectives given in the document.

The overall purpose of this national action plan is to adopt an integrated approach to minimize the impact of Dengue as a public health problem, with collaborative/ synergistic support and commitment from relevant stakeholders.

This publication will be a useful reference document for programme managers in the NDCU/ provinces/ districts for planning and implementing the prevention and control activities of Dengue nationally and sub-nationally.

I believe this document will serve as a reference for coordinated and integrated actions with partners within the health sector and other stakeholders in strengthening and streamlining Dengue preventive and control activities and improving clinical management to reduce the impact of this vector-borne disease. Further, the results framework included could be used to monitor and evaluate the activities stated.

Dr. Anil Jasinghe
Director General of Health Services

PREFACE

Since its establishment in 2005, the National Dengue Control Unit has done a significant amount of work to plan and implement Dengue control and prevention in Sri Lanka. However, over the past decade there were several major cyclical epidemics together with the number of dengue cases reported growing annually at an exponential rate. Therefore, a sustainable programme through a comprehensive integrated approach aiming to reduce both morbidity and mortality to such an extent that it will no longer be a major public health issue needed to be developed. The intention of this National Action Plan on Prevention and Control of Dengue, 2019 – 2023 is to outline the road map in sustaining key interventions through meticulous planning and a holistic approach in implementation.

Today, Sri Lanka has reached the lowest-ever case fatality rate of <0.2% (51,659 cases with 58 deaths) in 2018 from a high 5% and 1% in 1996 and 2009 respectively, despite an increase in the proportion of more severe Dengue Haemorrhagic Fever (DHF) to 10 - 15%. Lowering mortality from the current case fatality rate and maintaining it is the country's top priority. During the next 5 years further strengthening of healthcare and laboratory facilities for early diagnosis through enhanced fever screening and emergency care at the level of first contact is emphasized.

The country will pay more attention to reducing morbidity in the coming years, which is an equally challenging task that requires adaptation of specific collaborative actions. Multiple opportunities have opened up in terms of advocacy, social mobilization and legislation, with the presidential task-force providing a platform for both intra- and inter-sectoral collaboration. Together with the new strategies of risk mapping, innovation and risk modification, more positive results should be expected.

In order to achieve the sustainable implementation of strategies and activities highlighted here, availability of adequate funds and resources together with trained and skilled workforce is paramount. It is hoped that this action plan will be a catalyst for Sri Lanka in order to move forward to achieve the ultimate aim of diminishing impact of Dengue as a public health problem.

Dr. Hasitha A. Tissera
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ACKNOWLEDGEMENT

This National Action Plan on Prevention and Control of Dengue: 2019 – 2023 was developed by the National Dengue Control Unit of the Ministry of Health through a series of consultative/stakeholder meetings and consolidating the opinion of experts in relevant fields.

Independent experts facilitated by the World Health Organization (WHO) and experts of the Ministry of Health provided necessary technical support for the development of this action plan. Further, Ministry of Health provided the financial support for printing of this document.

ABBREVIATIONS

BH	Base Hospital
BI	Breteau Index
CBO	Community Based Organization
CCP	Consultant Community Physician
CIDA	Construction Industry Development Authority
CSR	Corporate Social Responsibility
DENV	Dengue Virus
DF	Dengue Fever
DHF	Dengue Haemorrhagic Fever
DS	District Secretariat
DSS	Dengue Shock Syndrome
e-IMMR	Electronic Indoor Morbidity and Mortality Record
FBC	Full Blood Count
GH	General Hospital
GIS	Geographic Information Systems
GN	Grama Niladhari
GP	General Practitioner
HDU	High Dependency Unit
HEB	Health Educational Bureau
HEO	Health Entomological Officer
HO	House Officer
ICNO	Infection Control Nursing Officer
IMMR	Indoor Morbidity and Mortality Record
IVM	Integrated Vector Management
LG	Local Government
M&E	Monitoring and Evaluation
MO	Medical Officer
MOH	Medical Officer of Health
MOOH	Medical Officers Of Health
NDCP	National Dengue Control Programme
NDCU	National Dengue Control Unit
NGO	Non Governmental Organization
NIE	National Institute of Education
NO	Nursing Officer
NS1 RDT	Non Structural Protein 1 based Rapid Diagnostic Test
OPD	Out Patient Department
PCU	Primary Care Unit
PHI	Public Health Inspector
PHM	Public Health Midwife
PI	Premises Index
PTF	Presidential Task Force
RDHS	Regional Director of Health Services
RE	Regional Epidemiologist
SHEO	Supervising Health Entomological Officer
SHO	Senior House Officer
SKS	Saukya Karya Sahayaka
SOP	Standard Operational Procedure
SPHI	Supervising Public Health Inspector
SPHID	Supervising Public Health Inspector District
TH	Teaching Hospital
TOT	Training of Trainers
UDA	Urban Development Authority
WHO	World Health Organization

CONTENTS

Executive Summary

EXECUTIVE SUMMARY

Dengue has become a major public health issue in recent years, with high morbidity, and considerable mortality.

The National Dengue Control Unit (NDCU) of the Ministry of Health is the focal point for coordinating dengue prevention and control activities with stakeholders mandated by the Presidential Task Force on Dengue Prevention and Control. This unit was established in the year 2005 through a policy decision that was taken by the Ministry of Health following the major Dengue outbreak in the year 2004. NDCU is responsible for coordinating entomological surveillance, integrated vector management, inter-sectoral collaboration, social mobilization and capacity building in clinical management along with regular monitoring and evaluation of both national and sub-national activities for prevention and control of Dengue. A comprehensive strategic plan for prevention and control of Dengue in Sri Lanka was developed for 2011 – 2015. The National Action Plan on Prevention and Control of Dengue in Sri Lanka 2019 - 2023 has been developed by the National Dengue Control Unit in response to the increasing endemicity level with intermittent outbreaks which warrant re-organized and strengthened framework for prevention, control and clinical management of Dengue through an integrated approach.

The National Action Plan for 2019 - 2023 incorporates wider perspectives of Dengue control to support the restructuring of the programme at national and subnational levels.

Based on the vast experience gained from the 2017 major outbreak and changing serotypes of virus sociocultural changes and urbanization etc., the following outcome objectives are laid down to reduce morbidity and mortality due to Dengue:

- To achieve case incidence below 100/100,000 population by the year 2023
- To reduce and maintain case fatality rate below 0.1 % by the year 2023

The following comprehensive set of specific objectives are laid down to achieve the above outcome objectives;

1. To intensify epidemiological surveillance to detect and notify dengue cases real-time
2. To intensify entomological surveillance to forecast vector density and to take appropriate control measures

3. To apply appropriate integrated vector management (IVM) strategies to interrupt dengue transmission
4. To improve early diagnosis and case management
5. To detect epidemics early and to respond to potential epidemics effectively
6. To strengthen monitoring and evaluation to ensure optimal programme implementation, management and performance
7. To facilitate, link and conduct operational research in the prevention and management of dengue infections

In order to track the progress of implementation and evaluate programme achievements and sustain the activities, a "Performance Framework" is incorporated for the current action plan with easily quantifiable and verifiable process, output, outcome and impact indicators.

In the next five years, the planned activities will be implemented in a phased manner with an estimated budget ranging from Rs. 350-400 million as a collective effort to reduce the health and socioeconomic impact due to dengue in the country.

Introduction

PURPOSE

Dengue has become a major public health issue worldwide in the current century, with high morbidity and mortality. *Aedes aegypti* and *Aedes albopictus* are the vectors responsible for the transmission of dengue viruses (DENV). The four DENV serotypes (1, 2, 3, and 4) have been co-circulating in Sri Lanka for more than 30 years. Despite the presence of Dengue since the early 1960s, over the past two decades, there has been a dramatic increase in the transmission of Dengue Fever (DF), Dengue Haemorragic Fever (DHF) and Dengue Shock Syndrome (DSS) tending to occur in outbreaks in Sri Lanka. The frequency and magnitude of dengue epidemics have increased over the recent decades which have become a major health challenge to the country calling for comprehensive efforts to combat the disease.

As the central level organization responsible for coordination of control and preventive activities related to dengue, the National Dengue Control Unit has compiled the "National Action Plan on Prevention and Control of Dengue in Sri Lanka 2019 – 2023". This includes more comprehensive efforts entailed in the "Strategic plan for prevention and control of Dengue Fever/Dengue Heamorrhagic Fever in Sri Lanka 2011 – 2015". The updated action plan for 2019 - 2023 is developed aiming to restructure the current health response to the disease situation, optimally utilizing the innovative techniques to improve effectiveness and efficiency while invigorating multi-sectoral collaboration for cohesive action.

This action plan has been developed under the following major strategies;

- Monitoring Disease Surveillance
- Vector Surveillance and Integrated Vector Management (IVM)
- Providing Facilities for Evidence-based Clinical Care
- Inter-sectoral Coordination and Social Mobilization
- Risk Communication and Outbreak Preparedness and Response
- Innovative Research

Aforementioned strategies are elaborated in this action plan developed by national level experts and partners. In the implementation of this action plan, it would be

necessary to harness the technical and logistical expertise available at the national and regional levels through various collaborations and networking. In order to track the progress of implementation and evaluate programme achievements and sustain the activities, a “Performance Framework” is incorporated for the current action plan with easily quantifiable and verifiable process, output, outcome and impact indicators.

In the next five years, the planned activities will be implemented in a phased manner in an effort to reduce the health and socioeconomic impact due to dengue within the country.

This document is recommended as a guide for the health sector as well as other relevant partners and stakeholders in developing their operational plans at national and regional settings to harmonize and intensify dengue prevention and control activities.

CONTEXT

Dengue viruses (DENV) are mosquito-borne flaviviruses that have plagued humans for centuries. Unplanned urbanization and rapid human population growth in tropical and subtropical regions of the world have produced favourable conditions for DENV transmission. Moreover, changes due to urbanization and human population growth have led to the current global dengue pandemic, characterized by emergence of new serotypes of DENV and an expanding geographic distribution of both DENV and the mosquito vectors, *Aedes aegypti* and *Aedes albopictus*, which transmit DENV among humans. The extent of dengue transmission and therefore the risk of outbreaks are determined by a combination of various modifiable and non-modifiable factors; distribution and virulence of the virus, population density, movement of humans, level of herd immunity in the porpulation, vector competence of *Aedes* mosquitoes, and weather and climate variables are amongst other environmental factors accentuated by human behaviour.

GLOBAL SITUATION

The more severe form of the illness [also known as Dengue Haemorrhagic Fever (DHF)] was first recognized in the 1950s during dengue epidemics in the Philippines and Thailand. Before 1970, only 9 countries had experienced severe dengue epidemics. The disease is now endemic in more than 100 countries mainly in the regions of the South-East Asia, the Western Pacific, the Americas and the Eastern Mediterranean. There are 4 billion people at risk and 390 million dengue infections occurring each year which includes nearly 5 million Dengue Heamorrhagic Fever cases and 22,000 deaths. The America, South-East Asia and Western Pacific regions are the most seriously affected, exceeding 1.2 million cases in 2008 and over 3.2 million in 2015.

In the South East Asian region, Dengue Fever/Dengue Haemorrhagic Fever is endemic in 10 countries and detection of all four serotypes has now rendered these countries hyperendemic. Sri Lanka is grouped under the hyperendemic category by the World Health Organization, together with Bangladesh, India, Indonesia, Maldives, Myanmar, Thailand and Timor – Leste (other categories being ‘endemicity uncertain’ and ‘non-endemic’).

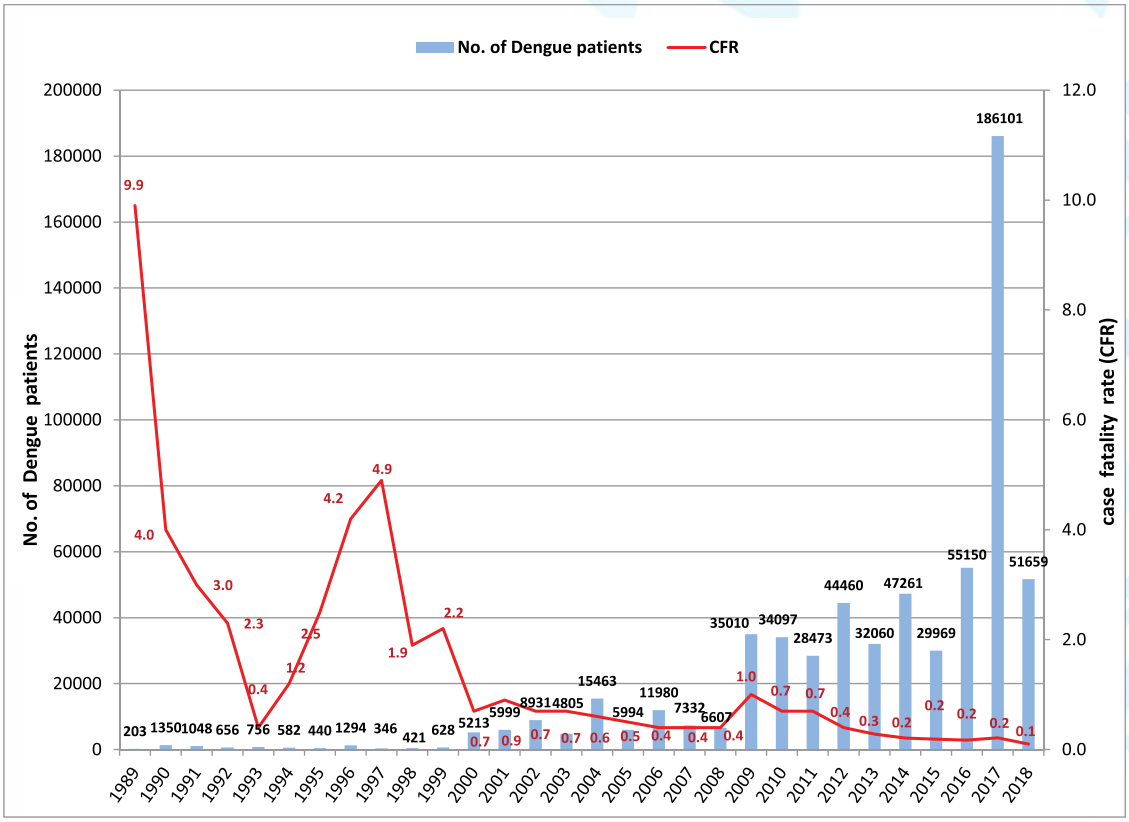
SRI LANKAN SITUATION

General Profile

Sri Lanka is an island in the Indian Ocean with 65,610 km² in extent. According to the population and housing census conducted in 2012, the total population is 20,359,439. The most urbanized Western Province has a population of 5,851,130 which is 28.7% of the total. The least populated area is the Northern Province (1,061,315; 5.4%). The country reports a population density of 325/km^2 with the highest of 3,438/Km^2 in the Colombo district followed by 1719/km^2 in the Gampaha district in Western Province. Sri Lanka represents an ethnic mix with a majority of 74.9% Sinhalese followed by Sri Lankan Tamils, Moors and other ethnic minorities. The working adult population (15 – 60 years) contributed 62.4% of the total population in the country.

Being a tropical country lying between Latitude 6° 55' 37.4844" N and Longitude 79° 51' 40.4784" E, it has year-round warm weather, moderated by ocean winds and considerable moisture. The average temperature ranges from 16 °C (60.8 °F) to 32 °C (89.6 °F). The rainfall pattern is influenced mainly by two monsoon periods; Southwest monsoon from May to September, Northeast monsoon from December to February. Humidity is typically higher and remains above 70% throughout the year.

In Sri Lanka, 48 Aedes species belonging to 11 subgenera have been reported to date. The established Dengue vectors *Aedes aegypti* and *Aedes albopictus* belong to the subgenus Stegomyia while knowledge on the role of the remaining 46 Aedes species in DENV carriage and transmission, remains yet to be discovered. Sri Lanka has been affected by Dengue Fever (DF)/Dengue Hemorrhagic Fever (DHF) epidemics for over two decades. DENV infections have been endemic in Sri Lanka since the mid 1960s. DF was serologically confirmed for the first time in the island in 1962. The presence of DF in all of the major towns situated below 1200 m elevation was confirmed in 1966 and in 1976–1978.

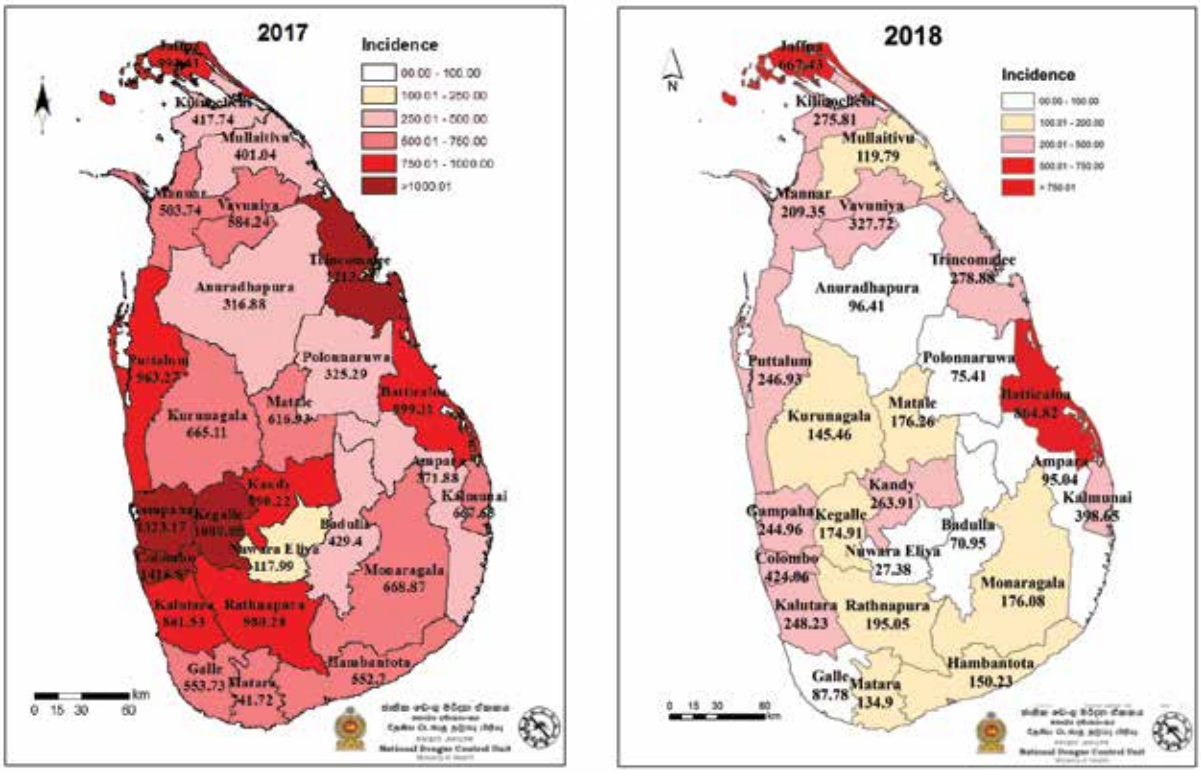


Source: Epidemiology Unit, Ministry of Health

Figure 1: The trend of notified DF/DHF patients and Case fatality rate: 1989 - 2018

Since 2000, dengue is increasingly posing a significant socio-economic and public health burden to the country (Figure 1). The geographic spread, incidence and severity of disease is of major concern ever since the first dengue hemorrhagic fever epidemic occurred in 1989. Periodic epidemics have become progressively larger during 2009-2014 with 28,000 to more than 40,000 cases reported each year (47,258 cases in 2014). In 2017, a total of 186,101 Dengue cases were reported, which corresponds to an incidence rate of 865.9 per 100,000 population (in - 2016: 271.9 per 100,000) and 440 deaths (Case Fatality Rate: 0.24) (Figure 2).

As a result of intersectoral activities coordinated by the Ministry of Health and the stakeholders of Presidential Task Force on Dengue prevention and control (Annexure I), there were only 51,659 suspected Dengue patients (at an incidence rate of 245.6 per 100,000 population) and 58 fatalities (Case Fatality Rate: 0.11%) in 2018 (Figure 2).



* Incidence – Number of dengue patients per 100,000 population

Figure 2: Dengue incidence in Sri Lanka in 2017 and 2018

Dengue Epidemic in 2017

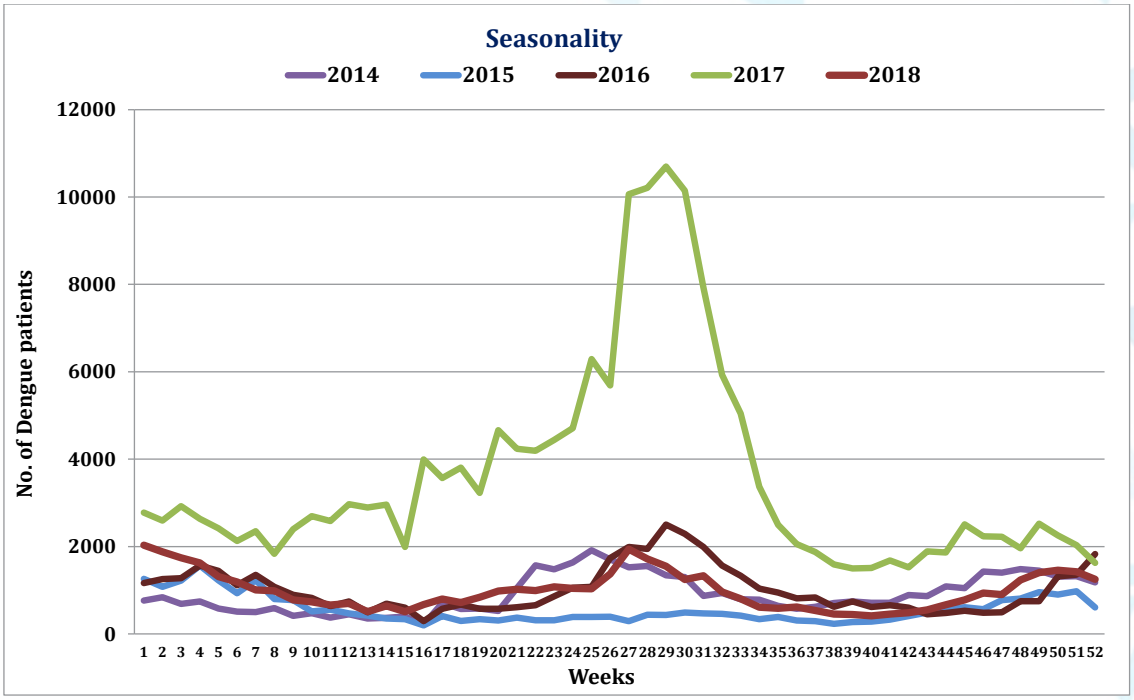
Since January 2017, an unusual increase in reported cases of dengue throughout the country was observed, a trend which steadily continued till the end of the year. However, the massive outbreak was curtailed successfully with more intensive integrated actions. Furthermore, the preceding lower case fatality rate below 0.2% was maintained around 0.24% during the outbreak, despite the increase in the proportion of the more severe Dengue Haemorrhagic Fever (DHF) to 10-15%.

Possible reasons for the epidemic were;

- change of the causative virus type from type I to type II,

- shift of breeding places from households to other common premises (schools, construction sites etc),

- migration of susceptible population from low endemic areas to high endemic areas

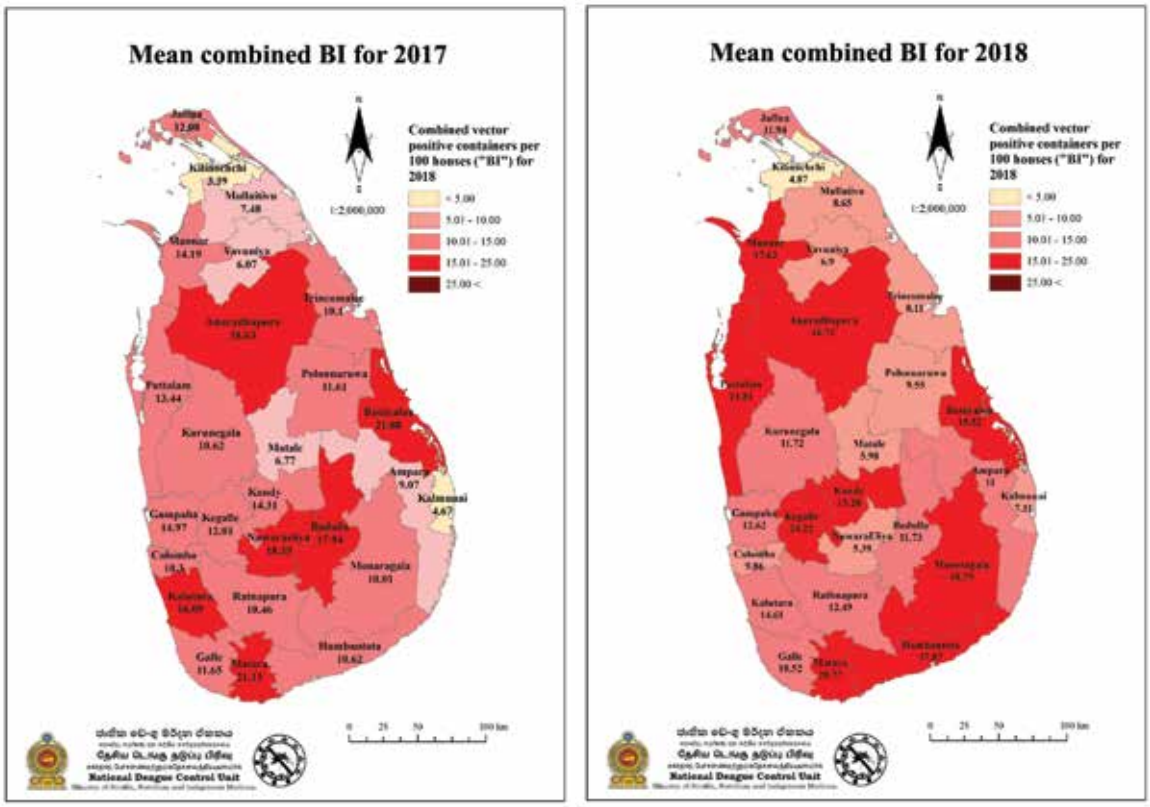


Source: Epidemiology Unit, Ministry of Health

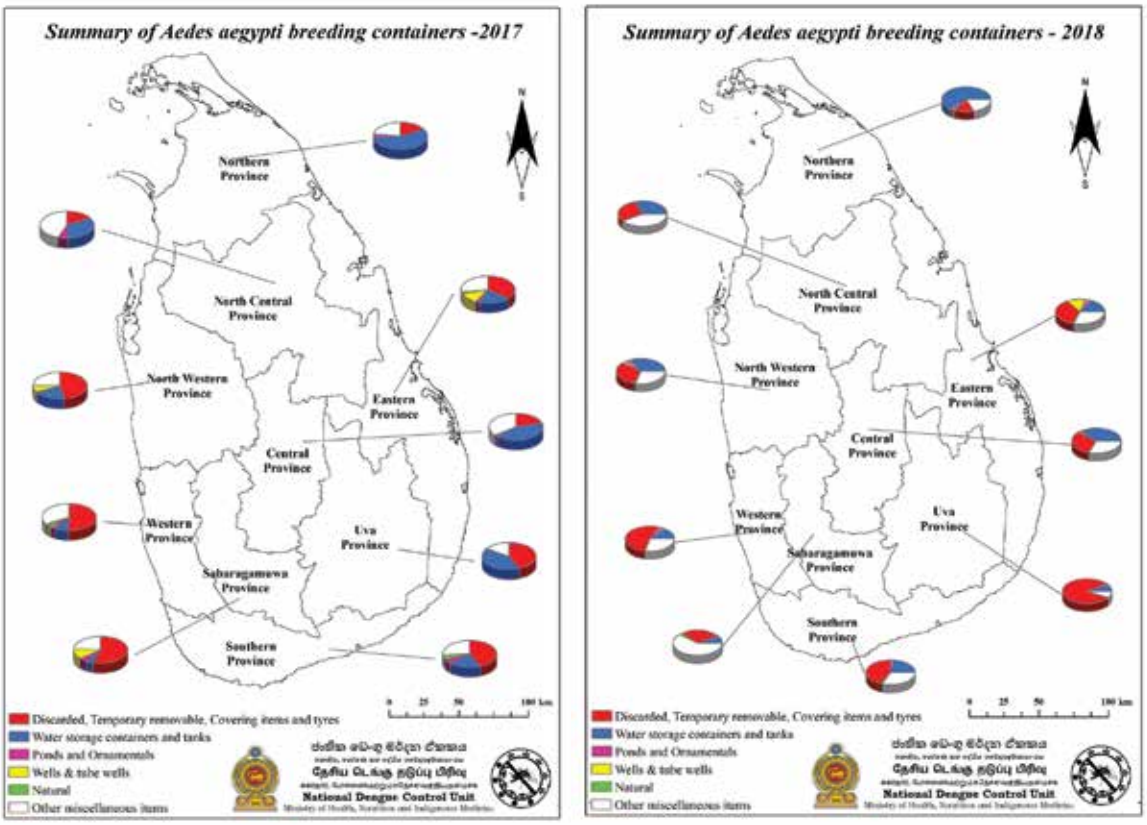
Figure 3: Distribution of suspected DF/DHF in Sri Lanka by week, 2013 – 2018

Dengue fever exhibits a seasonal pattern in many parts of the island. Rainy season is a major determinant of Dengue driven by a combination of climatic or environmental factors for transmission in both urban and rural areas (Figure 3).

4A



4B



* Breteau Index (BI) = Number of positive containers for *Ae.aegypti/Ae.albopictus* larvae and/or pupae per 100 houses inspected

Figure 4: Mean combined Breteau Index* and Summary of *Aedes aegypti* breeding places in 2017 & 2018

BI of districts Puttalam, Mannar, Kurunegala, Monaragala, Kandy, Kalmunai, Kegalle, Rathnapura, Hambantota, Kilinochchi, Mullativ and Ampara in 2018 were higher than that in 2017 (Figure 4A).

When compared to breeding container summary of *Aedes aegypti* in year 2017, in year 2018 Western, Uva, North Central and Central Provinces have shown an increased percentage in discarded containers. North Central, Northern and North Western Provinces have been observed as having an increased percentage in water storage containers. However, Uva province has shown a drastic reduction in the precentage of positive water storage containers in year 2018 when compared to year 2017 (Figure 4B).

Implementation of Dengue related control activities in Sri Lanka

Dengue prevention and control activities are carried out to the grass root level through responsible central and provincial bodies. At the central level, the National Dengue Control Unit, provides technical guidance including policy development, planning, capacity building, resource allocation and monitoring and evaluation. At the provincial level, execution of field level dengue prevention and control activities are carried out through a network of district and divisional (Medical Officer of Health Unit) preventive health services (Annexure II). At the central level, integrated disease surveillance is carried out by the Epidemiology Unit. Provision of patient care services are rendered by both central and provincial health care institutions based on National Guidelines on Clinical Management of DF/DHF.

NATIONAL DENGUE CONTROL UNIT

National Dengue Control Unit is the focal point for Dengue control programme in the Ministry of Health in Sri Lanka. It was established in the year 2005 on a decision taken by the Ministry of Health following a major DF/DHF outbreak in 2004. Although it functioned initially as a coordinatiion unit, with annually increasing case load, and high socio-economic and public health burden, it was upgraded to a directorate as National Dengue Control Unit (NDCU) with annual budget allocation.

NDCU is responsible for the following major strategies which are jointly carried out with the provincial level curative and preventive health facilities.

i. Monitoring Disease Surveillance

ii. Vector Surveillance & Integrated Vector Management (IVM)

iii. Providing Facilities for Evidence-based Clinical Care

iv. Inter-sectoral Coordination and Social Mobilization

v. Risk Communication and Outbreak Preparedness and Response

vi. Innovative Research

NDCU is closely collaborating with the Epidemiology Unit and analyses disease surveillance data to identify clustering of patients for timely action and to mitigate outbreaks. The disease surveillance system combines both passive paper-based system and real-time online sentinel site system. Both these systems work parallel with weekly reporting and online updates.

National Dengue Control Unit is mandated for Dengue vector surveillance and vector control island-wide. NDCU is responsible for collection and interpreting data that is gathered by district teams. Data on vector densities (immature stages - larval, pupae and adult vector) overtime enables predicting early outbreaks/epidemics. The NDCU organizes and facilitates environmental management through premise inspection and source reduction campaigns as a mainstay of IVM (Figure 5). Further, capacity building for public health staff in relation to dengue control along with regular monitoring and evaluation of provincial, district and MOH level activities are carried out. A significant proportion of district-level Dengue prevention activities are funded and guided by NDCU.

National Dengue Control Unit is also responsible for procurement of necessary insecticides (adulticides, larvicides), equipment for vector control and entomological activities, and capacity building/ training for the field work force.

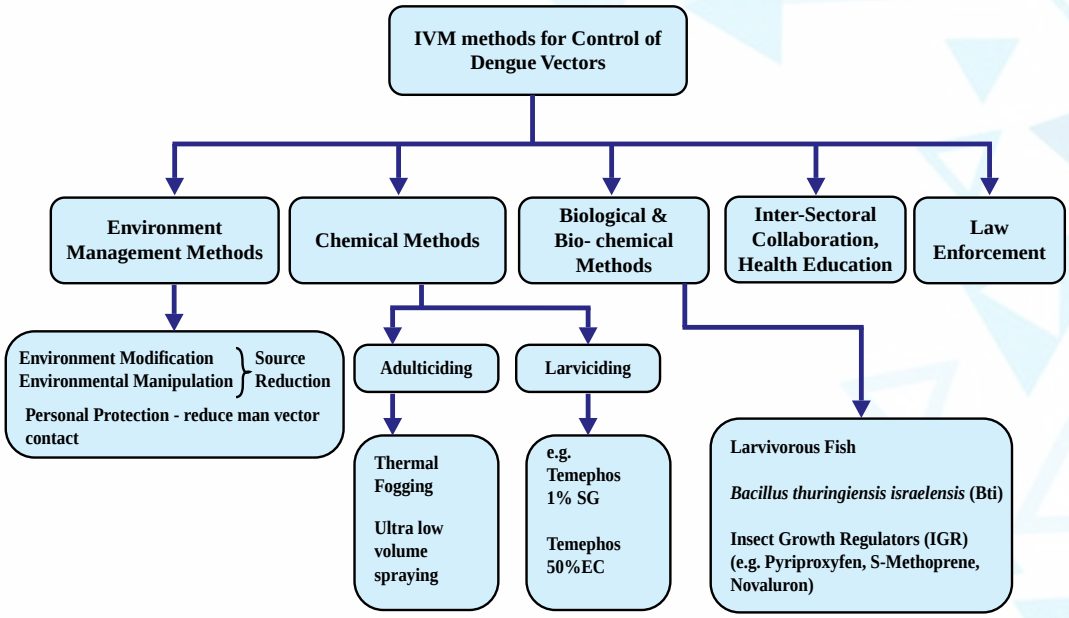


Figure 5: IVM Methods for Control of Dengue Vectors in Sri Lanka

Capacity development through establishment of high dependency unit (HDU) of primary, secondary and tertiary care hospitals in relation to clinical management of Dengue is coordinated by the National Dengue Control Unit. Further, training of clinicians to improve capacity is jointly coordinated by the Epidemiology Unit and NDCU.

For bringing together multi-disciplinary partnership to raise public awareness and behavioural change, the Presidential Task Force (PTF) on Dengue Control and Prevention was established in 2010 by liaising closely with relevant ministries and stakeholders. Main stakeholders involved in PTF are ministries of Provincial Councils and Local Government, Home Affairs, Education, Environment, Law and Order, Defence, Hosing & Construction and Media. This multi-disciplinary partnership created at national level flows through Provincial, district, divisional and community levels (Annexure I).

Risk communication, outbreak preparedness and response, and social mobilization are other strategies mandated by NDCU. Identifying disease clusters with potential outbreaks are communicated with Medical Officer of Health Units based on real-time epidemiological and entomological surveillance data. Source reduction campaigns are organized with the support of armed forces and Police together with field level health staff. Such programmes are monitored and evaluated by the NDCU.

Advocacy and effective communication targeting behaviour change and community empowerment for a sustainable preventive action are one of the main functions of NDCU.

Further, capacity building of all levels of public health staff in relation to Dengue control along with regular monitoring and evaluation of provincial, district and MOH level activities are carried out at national level. NDCU is involved in operational research with both international and local collaborators on innovative Dengue prevention activities. One of the novel research projects is Wolbachia initiative which transmits *Wolbachia* bacteria into wild mosquito populations to reduce the ability of these mosquitoes to transmit disease.

RATIONALE

Increasing endemicity level for Dengue Fever and Dengue Haemorrhagic Fever (DF/DHF) with intermittent outbreaks in Sri Lanka has created a challenging situation which needs re-organised and strengthened framework for prevention, control and clinical management of Dengue.

The demand for central level leadership and technical contribution to the district and divisional level in relation to Dengue control is growing rapidly. Further, a strong link between the central organization and peripheral institutions for technical inputs, service provision, monitoring and evaluation has been identified as a priority. Since, there are success stories for prevention and control of communicable diseases with vertical disease control programmes in Sri Lanka (e.g. Malaria, Filariasis and Leprosy programmes), the scope of the present capacity of NDCU has been revisited by an expert panel and a more comprehensive vertical programme has been suggested at national and sub-national levels. Hence, the physical and functional structure of the National Dengue Control Unit as a coordinating body needs to be restructured as a more responsible central organization while developing the capacity of subnational structure in a similar manner (Annexure III & IV).

Due to rapid urbanization and climate change, with limited adherence to conditions and requirments building construction, in and out-migration of people, challenges in solid waste management and other sanitary measures and the presence of wide range of breeding places inherent to different regions of the country, *Aedes* mosquito control should be streamlined in a planned manner through zonal mosquito vector surveillance. Therefore, it is envisaged to strengthen the capacity of NDCU at the vertical level and monitor Dengue control in Sri Lanka more cohesively. Infrastructure, logistics and necessary funds for planning, implementation, monitoring and evaluation should be made available to initiate and carry out a comprehensive and a sustainable programme.

The context of the National Action Plan 2019 - 2023 is structured in such a way by incorporating wider perspectives of Dengue control to support the restructuring of the programme. The main mandate of Dengue Control should focus towards the reduction of the ultimate impact due to Dengue, which is mortality. By considering the highest ever disease burden and mortality in 2017, the overall objective of the current programme was laid down to reduce mortality due to Dengue by reducing morbidity and disease transmission.

Moreover, restructuring should include more innovative and novel strategies emphasizing various aspects of prevention and control of Dengue and its consequences. Generation of early warning is the mainstay of the entire control programme, and therefore, development of advanced surveillance tools using geographic information system (GIS) applications and upgrading of existing mechanisms are essential. Further, provision of effective clinical care by improving infrastructure facilities and providing trained human resources has been highlighted.

With the expansion of the Dengue control programme, utilization of entomological data in a scientific manner and promotion of more targeted novel vector control measures need to be emphasized. Similarly, implementation of policy decisions beyond health sector as well as joint activities involving stakeholder ministries, non governmental organizations (NGOs)/ community based organizations (CBOs) and

private sector are proposed for sustainable Dengue prevention. Further, starting from advocacy for politicians and policymakers to effective communication for community empowerment, the action points should be addressed comprehensively under social mobilization.

A functioning system for monitoring and evaluation (M & E) is vital for the success of a public health programme. Combination of monitoring and evaluation allows understanding of the cause-and-effect relations between implementation and impact. Hence, the establishment of M&E unit with a comprehensive database for regular monitoring and development of valid and measurable indicators is paramount.

Finally, when all strategic components of the Dengue Control Programme are lined up and operationalized, a collection of evidence through timely and innovative research is essential to facilitate evidence-informed decision making.

Outcome Objective:

To achieve case incidence below 100/100,000 population by the year 2023

To reduce and maintain case fatality rate below 0.1 % by the year 2023

These outcome objectives were set to reduce the transmission of Dengue so that it will be no longer a major public health problem.

Specific Objectives:

1. To intensify epidemiological surveillance to detect and notify dengue cases real-time
2. To intensify entomological surveillance to forecast vector density and to take appropriate control measures
3. To apply appropriate integrated vector management strategies to interrupt dengue transmission
4. To improve early diagnosis and case management
5. To detect epidemics early and to respond to potential epidemics effectively
6. To strengthen monitoring and evaluation to ensure optimal programme implementation, management and performance
7. To facilitate, link and conduct operational research in the prevention and management of dengue infections

Strategies

Specific Objective 1: To intensify epidemiological surveillance to detect and notify dengue cases real-time

1.1. Improve routine reporting system

1.2. Strengthen sentinel surveillance system

1.3. Develop the capacity to capture cases on confirmation (Special Surveillance System) at final diagnosis or on discharge

1.4. Improve/ strengthen the utilization of surveillance data/ statistics of the hospitals for hospital preparedness

Specific Objective 2: To intensify entomological surveillance to forecast vector density and to take appropriate control measures

2.1. Restructure/ establish the National and Sub-national Dengue control programmes

2.2. Establishment of a systematic entomological surveillance programme

Specific Objective 3: To apply appropriate integrated vector management (IVM) strategies to reduce dengue transmission

3.1. Adopt and implement appropriate environmental management measures to reduce vector density and dengue transmission

3.2. Advocacy programmes to gain political commitment and to influence policy makers

3.3. Strengthen inter-sectoral collaboration among relevant stakeholders and promote joint action

3.4. Proper management of solid waste based on the National solid waste management policy

3.5. Elimination of mosquito breeding in construction sites

3.6. Active engagement of schools in strengthening environmental management

3.7. Active engagement of Tourist Hotels in strengthening environmental management

3.8. Establishment of sustainable corporate social responsibility (CSR) projects to educate the general public on prevention and control of Dengue

3.9. Strengthen communication and empowerment of communities by developing and implementing a communication package on prevention & control, early health care seeking and treatment by the focal point (i.e. NDCU)

3.10. Enforcement of legislation

Specific Objective 4: To improve early diagnosis and case management

4.1. Standardize clinical management practices

4.2. Strengthen early diagnosis capacity

4.3. Develop capacity of medical doctors and supportive staff

Specific Objective 5: To detect epidemics early and to respond to potential epidemics effectively

5.1. Further strengthen surveillance system to detect and respond to outbreaks early

5.2. Stratify the areas according to risk level (National & Sub-national level)

5.3. Establishment of laboratory surveillance mechanisms to strengthen timely and effective early warning & confirmation of outbreaks

5.4. Prepare and communicate alerts to stakeholders at correct time

Specific Objective 6: To strengthen monitoring and evaluation to ensure optimal programme implementation, management and performance

6.1. Establishment of effective monitoring and evaluation mechanism at National level

6.2. Establishment of effective monitoring and evaluation mechanism at the Sub-National level

6.3. Monitoring of other non-health institutions

Specific Objective 7: To facilitate, link and conduct operational research in the prevention and management of dengue infections

7.1. Conduct operational research in the prevention and management of dengue infections

Objectives

Outcome Objectives

To achieve case incidence below 100/100,000 population and

To reduce and maintain case fatality rate below 0.1 % by the year 2023

Specific Objective: 1 **To intensify epidemiological surveillance to detect and notify dengue cases real-time**					
No	**Strategies**	**Activities**	**Monitoring**		**Responsibility/ collaboration**
			Process/ Output Indicators	**Means of verification**	
1.	1.1. Improve routine reporting system	Capacity building of both curative & public health officials (HO, SHO, MO Public health, ICNO, RE, MOOH, etc.) on routine surveillance (i.e. case definition of Dengue fever and formats used and flow of notification system) Develop a web-based system for routine notification in hospitals Develop infrastructure in hospitals to facilitate a web-based routine notification	Percentage of institutions notifying through the routine surveillance system monthly Number of functioning web-based systems in place	Routine Notification System	National Dengue Control Unit Epidemiology Unit Hosp. Administrators
	1.2. Strengthen sentinel surveillance system	Expand sentinel surveillance system (i.e. All the base hospitals and above) Report suspected Dengue cases to MOOH within 24 hours from admission	Percentage of dengue cases notified using real-time web-based notification system within 24 hours of suspicion Number of suspected cases reported to MOH within 24 hours from admission	DenSys Notification System	National Dengue Control Unit Epidemiology Unit Hosp. Administrators

No	Strategies	Activities	Monitoring		Responsibility
			Process/ Output Indicators	Means of verification	
		Supervise reporting of Dengue cases from hospitals bi-weekly/ monthly Train Public Health staff on the early investigation of notified cases Investigate all reported cases within 24 hours and essentially within 3 days Inspect premises within the 200m radius of index cases Map the cases up to GN level and identify the clusters to take necessary action	Percentage of dengue cases investigated within 3 days		
	1.3.Develop the capacity to capture cases on confirmation (Special Surveillance System) at final diagnosis or on discharge	Further enhance special disease surveillance system in Teaching, Provincial General and District General Hospitals Distribute special surveillance forms to all the relevant institutes	Percentage of DHF cases among Dengue fever patients	Special disease surveillance system	National Dengue Control Unit Epidemiology Unit Hospital Administrators

No	Strategies	Activities	Monitoring		Responsibility
			Process/ Output Indicators	Means of verification	
		Train House Officers, Medical Officers/ ICNOs on special surveillance Monitor case notification, through trends and geographical spread Analyse the data and identify the nature of disease and take necessary action			
	1.4.Improve/ strengthen the utilization of surveillance data/ statistics of the hospitals for hospital preparedness	Develop a preparedness plan for hospitals, based on surveillance data	Percentage of hospitals using surveillance data (trends charts, threshold definitions linking to outbreak response planning) Percentage of hospitals with the annual preparedness plan	Notification Register of hospital	Hosp. Administrators MO Public Health National Dengue Control Unit Epidemiology Unit

Specific Objective: 2 **To intensify entomological surveillance to forecast vector density and to take appropriate control measures**					
No	**Strategies**	**Activities**	**Monitoring**		**Responsibility/ collaboration**
			Process/ Output Indicators	**Means of verification**	
2.	2.1.Restructure/ establish the National and Sub-national Dengue control programmes	Restructure National Dengue Control Unit as National Dengue Control Programme (NDCP) to coordinate all the Dengue control activities (i.e. increase the cadre at National level – Deputy Director, CCPs, MOs Entomologist & SPHI etc.) by establishing specific cells with terms of reference (Annex 1) Create a dengue control cell/ unit at RDHS level to coordinate overall dengue prevention and control activities at district level (i.e. Medical Officer - Dengue Control, Entomologists, SPHI/ PHI etc. at RDHS level) [Vacancies of high-risk areas to be filled first]	Number of Medical Officers – Dengue Control, SPHII etc. appointed at the District/RDHS level	Data on available cadre positions at RDHS level	Ministry of Health Ministry of Public Administration

No	Strategies	Activities	Monitoring		Responsibility
			Process/ Output Indicators	Means of verification	
	2.2.Establishment of a systematic entomological surveillance programme	Develop infrastructure and improve human resource to facilitate entomological surveillance • Recruit entomologists for all districts • Establish entomological laboratories in high-risk districts Develop Standard Operational Procedures' (SOP's) for entomology surveys and standardize the application of entomological procedures based on SOP Develop & distribute standardized survey formats Develop a comprehensive surveillance plan yearly at district and divisional levels • Identify sentinel sites from high-risk MOH/GN areas of the district (from urban and semi-urban or rural areas) to conduct sentinel surveys (as defined in the guideline for Integrated Vector Management)	Number of districts with sentinel sites for entomological survey Number of districts conducting routing entomological survey Number of entomological surveys (Routine/ and Sentinel) done per district per month	Vector Surveillance database Denys Database Insecticide Susceptibility Test reports	National Dengue Control Unit Provincial / Regional Directors of Health services Provincial/ Regional Epidemiologists MOOH Entomologists

No	Strategies	Activities	Monitoring		Responsibility
			Process/ Output Indicators	Means of verification	
		• Identify high risk localities to conduct routine entomological surveys (as defined in the guideline for Integrated Vector Management) • Conduct spot checks based on case notification, previous notification trends or as a post survey etc. Map the vector (i.e. *Aedes aegypti* & *Aedes albopictus)* distribution to identify high risk localities at divisional/ district/ provincial/ national level – for both adult and larva Conduct insecticide susceptibility test, cage bio essay etc.	Percentage reduction of larval vector indices (Breteau index, Premises index, Container index) Percentage of premises inspected in high-risk areas Number of MOH areas with vector mapping Number of insecticide susceptibility test conducted per year per high risk district/ Nationally Number of cage bio essay conducted per district per year		

No	Strategies	Activities	Monitoring		Responsibility
			Process/ Output Indicators	Means of verification	
		Improve existing reporting system of entomology surveys for timely actions by providing preliminary report to relevant authorities on the same day and the detailed report within 5 days to relevant MOH office or the relevant institute	Number of detailed reports provided within 5 days to relevant authority (i.e. MOOH, other relevant institutes etc.)		
		Develop a web-based entomological surveillance mechanism (for routine/ sentinel/ spot surveillance)	Number of MOH areas adopted a web-based entomological surveillance mechanism		
		Use web-based timely entomological surveillance data for action			
		Supervise entomological survey activities for accuracy & timeliness	Number of surveys conducted according to the SOPs Number of supervisions done per month at district level		

Specific Objective: 3 **To apply appropriate integrated vector management (IVM) strategies to interrupt dengue transmission**					
No	**Strategies**	**Activities**	**Monitoring**		**Responsibility**
			Process/ Output Indicators	**Means of verification**	
Environmental Management, biological & chemical control					
3	3.1.Adopt and implement appropriate environmental management measures to reduce vector density and dengue transmission	Map and analyze epidemiological and entomological data for epidemic forecasting and for following actions • Source reduction through environmental management • Changes to human habitation or behaviour by applying mosquito repellents, screening doors etc.	Number of vector control programmes conducted Number of alerts generated prior to an outbreak being reported in localities according to risk level Percentage of alerts acted upon within 7 days by the field staff	Vector Surveillance database	National Dengue Control Unit Provincial / Regional Directors of Health services
		Develop training guidelines on • Source reduction through environmental management • Changes to human habitation or behaviour (i.e. Personal protection, screening doors etc.) • Chemical & biological methods for dengue vector control		Data on routine and special cleaning up campaigns	Provincial/ Regional Epidemiologists MOOH Regional Entomologists

No	Strategies	Activities	Monitoring		Responsibility
			Process/ Output Indicators	Means of verification	
Environmental Management, biological & chemical control					
		Develop capacity of national, provincial, district and divisional public health staff who are engaged in dengue vector control measures Conduct regular in-service training for field staff Map and update vector breeding sites monthly Train field health staff (e.g. PHII, PHM, SKS) on health education Ensure availability of home inspection cards in high-risk GN divisions and do regular monitoring by the divisional and district level staff Conduct routine premise (houses, schools, construction sites etc) inspection based on risk category of the MOH area (priority high risk/ high risk, and low risk) according to entomological and epidemiological evidence	Percentage of MOH areas updating vector breeding sites monthly		

No	Strategies	Activities	Monitoring		Responsibility
			Process/ Output Indicators	Means of verification	
Environmental Management, biological & chemical control					
		Conduct special mosquito control campaigns and other necessary vector control activities in identified priority high risk and high risk localities Apply appropriate IVM methods (source reduction/ chemical/ biological methods etc.) considering identified breeding places in different localities (e.g. construction sites, abandoned boats, pineapple plantations/wells, water storage tanks etc) Conduct field supervision visits by Central, Provincial, District and MOH staff (i.e. by **Central team** – Director/ NDCU, CCPs, Medical Officers, Entomologists, PHII: By **Regional team** - CCPs/ RE, MO-Dengue Control, MOOH, Entomologists and SPHID/SPHII/ District PHII) in all high-risk GN divisions according to norms Develop a policy on rational use of insecticide based on International guidelines			

No	Strategies	Activities	Monitoring		Responsibility
			Process/ Output Indicators	Means of verification	
Advocacy, Inter-sectoral Collaboration, Communication and Empowerment of Communities					
	3.2. Advocacy programmes to gain political commitment and to influence policy makers	Advocacy for higher level politicians [i.e. Presidential Task Force (PTF) meetings]	Number of advocacy programmes conducted at the national level per quarter		Stakeholders of PTF
		Conduct stakeholder meetings with provincial/ district/ local political leadership	Number of advocacy programmes conducted at district level per quarter		Stakeholders at provincial/ district level
	3.3. Strengthen inter-sectoral collaboration among relevant stakeholders and promote joint action	Identify stakeholders and define their roles and responsibilities (National & sub-national)	Percentage of districts having inter-sectoral dengue control committees	Progress review meetings and minutes (e.g. PTF) Reports	Ministry of Provincial Council and Local Government Ministry of Public Administration and Ministry of Home Affairs
		Conduct regular meetings with stakeholders (National & sub-national) according to the norms	Percentage of MOH areas having inter-sectoral dengue control committees		MOOH Ministry of Housing and construction Ministry of Environment

No	Strategies	Activities	Monitoring		Responsibility
			Process/ Output Indicators	Means of verification	
Advocacy, Inter-sectoral Collaboration, Communication and Empowerment of Communities					
		Establish district and divisional level Dengue control committees Convene inter-sectoral meetings weekly (in priority high-risk areas), bi-weekly (in high-risk areas), monthly (in low-risk areas) to discuss and coordinate dengue control activities at MOH level Declare and conduct National mosquito control weeks and special cleaning up campaigns with relevant stakeholders Engage relevant stakeholders for rapid response activities Enlist and empower government and private institutions in each MOH areas Establish "Dengue Control Committees" in each institutions of MOH areas Advocate monthly reporting of source reduction activities of each institution to respective MOH office	Number of inter-sectoral meetings held (central, district and MOH level) Number of GN divisions taken actions to prevent an outbreak Number of National mosquito control weeks conducted No of special cleaning up campaigns conducted		Police Defence forces NGOs Ministry of Agriculture and Lands Media including Radio, TV and Newspapers

No	Strategies	Activities	Monitoring		Responsibility
			Process/ Output Indicators	Means of verification	
Advocacy, Inter-sectoral Collaboration, Communication and Empowerment of Communities					
	3.4. Proper management of solid waste based on the National solid waste management policy	Conduct advocacy programmes for local level politicians Develop a capacity to collect waste in each district (e.g. Tractors, compactors etc.) Instruct to adhere to waste segregation procedures at district level	Number of Divisional Secretariat areas segregating garbage Number of Divisional Secretariat areas collecting containers regularly Number of districts with compost sites		Ministry of Provincial Council and Local Government MOOH PHII
	3.5. Elimination of mosquito breeding in construction sites	Develop a system to register new major construction sites at MOH and Local Government before the commencement Train contractors, building corporations, architects, health, local government personnel on Dengue prevention and control	Number of major construction sites free of mosquito breeding places		Ministry of Housing and construction Ministry of Health NDCU CIDA UDA

No	Strategies	Activities	Monitoring		Responsibility
			Process/ Output Indicators	Means of verification	
Advocacy, Inter-sectoral Collaboration, Communication and Empowerment of Communities					
		Appoint a health and safety officer for major construction sites Carry out regular inspection of dengue breeding places in construction sites Educate & encourage the people working at construction sites to segregate waste before disposal Identify and reserve suitable sites for correct garbage disposal Carry out regular entomological surveillance at construction sites and disseminate timely reports to MOH for feedback and follow up action			
	3.6. Active engagement of schools in strengthening environmental management	Engage all children and teachers in Dengue prevention and control activities every Friday for one hour in every week Establish waste segregation system at primary schools for behavioural change	Number of cleaning up campaigns conducted in schools in a district per month	Reports sent by the schools	Ministry of Education Ministry of Health

No	Strategies	Activities	Monitoring		Responsibility
			Process/ Output Indicators	Means of verification	
Advocacy, Inter-sectoral Collaboration, Communication and Empowerment of Communities					
		Send a consolidated report by all schools of particular MOH area every month to relevant Medical Officer of Health Organize clean-up campaigns by schools with the help of parents before starting the school after school vacations or before examinations			
	3.7. Active engagement of Tourist Hotels in strengthening environmental management	Engage the tourism industry in clean-up and other vector control methods			Ministry of Tourism Development and Christian Religious Affairs Ministry of Health
	3.8. Establishment of sustainable CSR projects to educate the general public on prevention and control of Dengue	Prepare electronic and print media to educate the general public on prevention and control of Dengue Obtain sponsorships to maintain schools, public places, religious places etc. free of mosquito breeding places			Ministry of Health NDCU Public-Private Partnership

No	Strategies	Activities	Monitoring		Responsibility
			Process/ Output Indicators	Means of verification	
Advocacy, Inter-sectoral Collaboration, Communication and Empowerment of Communities					
		Obtain sponsorships to maintain hoardings on prevention and control of Dengue in public places Work in harmony with Medical Officer of Health			
	3.9. Strengthen communication and empowerment of communities by developing and implementing a communication package on prevention & control, early health care seeking and treatment by the focal point (i.e. NDCU)	Develop a website for NDCU and update it regularly Communicate through social media Identify behaviours relevant to prevention & control, early health care seeking and treatment	Proportion of householders engaged in weekly inspections for mosquito breeding	Summary data of Home inspection cards Entomological survey reports	Ministry of Health/ NDCU/ HEB RDHS MOOH Local Government/Ministry of Provincial Council and Local Government

No	Strategies	Activities	Monitoring		Responsibility
			Process/ Output Indicators	Means of verification	
Advocacy, Inter-sectoral Collaboration, Communication and Empowerment of Communities					
		Develop and implement a communication plan for prevention and control – Specific target groups to be defined (e.g. schools, construction sites, factories, religious places etc.)			
		Develop and implement a communication plan for early health care seeking and treatment	Number of health promotion programmes conducted (including the media)	Other reports Minutes and reports of the meetings held	District and Divisional Secretariat/Ministry of Home Affairs Ministry of Media and Information
		Train National and sub-national level responsible staff officers on advocacy and communication	Percentage of institutions/ schools implementing weekly regular inspections for mosquito breeding		
		Develop and disseminate task-oriented, clear communication material (i.e. for schools, community etc.)	Proportion of targeted locations free of breeding places		
		Conduct regular media workshops/ seminars	Proportion of meetings conducted to raise awareness on prevention and control of Dengue		

No	Strategies	Activities	Monitoring		Responsibility
			Process/ Output Indicators	Means of verification	
Advocacy, Inter-sectoral Collaboration, Communication and Empowerment of Communities					
		Conduct educational activities among schools (children and teachers) to raise awareness Empower school children to clean their own home environment Promote dengue free school by reporting school absenteeism through school App Develop messages for media on early detection, ambulatory care etc. Enforce regular inspection by street committees Empower mother's groups, civil societies for behavioural change Distribute school card and empower school children to clean their own home environment			Ministry of Health Ministry of Education National Institute of Education (NIE) Stakeholders of PTF

No	Strategies	Activities	Monitoring		Responsibility
			Process/ Output Indicators	Means of verification	
Enforcement of Law					
	3.10.Enforcement of legislation	Review existing legal enactments Conduct stakeholder meetings to review and update existing laws and strengthen enforcement of laws by relevant authorities as and when necessary Draft a joint circular for construction sites with relevant stakeholders based on emerging entomological evidence (roof gutters, ponds) and disseminate it to them (e.g. Ministry of Housing and Construction, Local Government etc.) – Apply the rules and regulations in the said circular for the building plans of new building developments Apply the rules and regulations in the said circular for the building plans of new building developments Monitoring and evaluation of implemented laws	Number of stakeholder meetings conducted to review and update existing laws		Ministry of Health NDCU Legal Draftsman Department Provincial / Regional Directors of Health services Provincial/ Regional Epidemiologists MOOH PHII Ministry of Health Ministry of Housing and Construction Ministry of Provincial Council and Local Government


05

Specific Objective: 4

To improve early diagnosis and case management

No	Strategies	Activities	Monitoring		Responsibility
			Process/ Output Indicators	Means of verification	
4.	4.1. Standardize clinical management practices	Review and revise clinical management guidelines on dengue	Percentage of consultants/ MOs/ nursing officers trained within the past 24 months on the management of dengue patients.	Records/ minutes Review reports/ minutes	Hosp. Administrators Epidemiology Unit NDCU
		Disseminate the updated guidelines to all public and private hospitals and General Practitioners	Number of deaths due to dengue	Death audits Hospital sources	Relevant Consultants
		Establish model dengue management centres with patient management equipment	Case fatality rate due to DF/DHF		
		Establish help-line for difficult cases for clinicians	Proportion of patients admitted to hospital in shock state		
		Collect information on all deaths due to Dengue in public/private hospitals	Percentage of patients diagnosed with DHF prior to going into shock reported through special surveillance		
		Review each suspected Dengue death immediately	Percentage of hospitals (Base Hospital and above) with OPD fever corner/room or PCU Percentage of BH/GH/TH with HDUs Number of deaths reviewed within a month		

No	Strategies	Activities	Monitoring		Responsibility
			Process/ Output Indicators	Means of verification	
	4.2. Strengthen early diagnosis capacity	Establish fever screening centre at OPDs of secondary and tertiary care hospitals Make FBC test available 24/7 in the secondary and tertiary care hospitals Develop diagnostic and ambulatory care facilities at primary care hospitals in high-risk areas Develop a management protocol to improve the treatment-seeking behaviour of vulnerable groups (e.g. pregnant mothers, infants etc.)	Percentage of secondary and tertiary care institution OPDs with the capacity to perform FBC 24/7 Percentage of hospitals/institutions issue the FBC report to the patients within one hour Percentage of provincial hospitals and above with diagnostic facilities (NS1 RDT)		
	4.3.Develop capacity of medical doctors and supportive staff	Implement continuous medical education for doctors and supportive staff as capacity building plan Develop training modules for doctors and supportive staff Organize training of trainers (TOT) programme for master trainers	Number of training programmes conducted on Dengue case management at secondary and tertiary care hospitals Number of training of trainers (TOT) programmes conducted for master trainers per year		Ministry of Health NDCU Epidemiology Unit WHO World Bank Other Donor Agencies

No	Strategies	Activities	Monitoring		Responsibility
			Process/ Output Indicators	Means of verification	
		Train consultants/ medical officers/ nursing officers in the management of dengue patients (Curative, both public and private sectors) Carry out regular in-service training	Number of consultants/ medical officers/ nursing officers trained for the management of dengue patients Number of in-service training programmes conducted per year		

Specific Objective: 5 **To detect epidemics early and to respond to potential epidemics effectively**					
No	**Strategies**	**Activities**	**Monitoring**		**Responsibility**
			Process/ Output Indicators	**Means of verification**	
5	5.1. Strengthen surveillance system further to detect and respond to outbreaks early	Develop an early warning capability using the entomological surveillance to categorize risk areas	Percentage of MOOH conducting at least one entomology survey per month	Routine e-surveillance DenSys surveillance Entomology surveillance	National Dengue Control Unit Epidemiology Unit Provincial / Regional
		Prepare an emergency response plan with assigned task to stakeholders (both preventive and curative sectors) and health and non-health sectors	Percentage of outbreaks detected early (clustering of five or more cases)	reports e-IMMR	Directors of Health services Regional Epidemiologists MOOH
		Further strengthen clinical wards of primary healthcare units, secondary and tertiary care institutions or establish a system in GP and OPD by increasing capacity to perform FBC 24/7	Percentage of secondary and tertiary care institution OPDs with the capacity to perform FBC 24/7 Percentage of provincial hospitals and above with diagnostic facilities (NS1 RDT)		
		Introduce “Dengue Free Child” school app to the general public and to schools and identify clustering of patients for necessary action	Percentage of schools using “Dengue Free Child” APP in each high risk districts		

No	Strategies	Activities	Monitoring		Responsibility
			Process/ Output Indicators	Means of verification	
	5.2. Stratify the areas according to risk level (National & Sub-national level)	Develop a risk stratification system to categorize the areas up to GN areas (priority high risk, high risk and low risk) Develop operational guidelines for rapid response activities Predict outbreaks when the indices exceed the set baseline values and communicate with relevant stakeholders Prepare a risk based communication plan to relevant stakeholders to mitigate outbreaks	Percentage of outbreaks responded within 3 days of identification Percentage of districts having functional rapid response teams Number of patients reported within the year at the national level		
	5.3. Establishment of laboratory surveillance mechanisms to strengthen timely and effective early warning & confirmation of outbreaks	Establish sentinel surveillance stations for routine fever monitoring Develop a reference laboratory with a feedback mechanism to National level (serology and virology)	Percentage of hospitals (Base Hospital and above) with OPD fever corner/room or PCU Number of reference laboratories formed		

No	Strategies	Activities	Monitoring		Responsibility
			Process/ Output Indicators	Means of verification	
	5.4 Prepare and communicate alerts to stakeholders at correct time	Establish district/ national rapid deployment teams according to need and risk level	Number of high risk districts with rapid deployment teams		
		Establish an operational room for rapid response			
		Conduct inter-sectoral meetings during the outbreak period			
		Conduct periodical reviews at national/ sub-national level	Number of reviews conducted at National level per year Number of reviews conducted at sub-national level per year		
		Communicate the risk and strengthen the vector control activities with other sectors (LG and DS office)			
		Establishment of mechanism for post outbreak needs assessment			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தமிழ்
English
DENGUE
FREE CHILD
THE FIGHT AGAINST
ABOUT DENGUE
REPORT NOW
Sri Lanka
Telecom
Mobitel

Specific Objective: 6 **To strengthen monitoring and evaluation to ensure optimal programme implementation, management and performance**					
No	**Strategies**	**Activities**	**Monitoring**		**Responsibility**
			Process/ Output Indicators	**Means of verification**	
6.	**6.1. Establishment of effective monitoring and evaluation mechanism at National level**	Establish a monitoring and evaluation unit			
		Develop a monitoring and evaluation plan	Number of IVM programmes carried out using environmental, chemical or biological methods per month	MOH summary reports Meeting minutes	NDCU RDHS RE MOH
		Development of a central database to monitor district level preventive activities	Percentage of carrying out monthly MOH presentations at DS office meeting		
		Develop and update monitoring formats			
		Develop a web-based data system which could be accessible to other stakeholders (e.g. District secretary, Local Government Commissioner)			

No	Strategies	Activities	Monitoring		Responsibility
			Process/ Output Indicators	Means of verification	
		Prepare annual plan for supervision (both at national & sub-national level) Conduct regular supervision visits to high risk districts Conduct reviews quarterly at national level	 Number of supervisory visits conducted by the NDCU team in high risk districts per quarter Number of reviews conducted at national level per year		
	6.2.Establishment of effective monitoring and evaluation mechanism at Sub-National level	Map the cases to identify the geographical boundaries to identify local spread at district/ divisional levels Analyze the epidemiological data (identify the age categories affected, sex, GN areasetc.) and entomological data to minimize risk Implement vector control plan at MOH level and monitor the situation daily	Number of districts/ MOH areas with spot map		

No	Strategies	Activities	Monitoring		Responsibility
			Process/ Output Indicators	Means of verification	
		Deploy inspection teams to outbreak/ outbreak-prone areas Collect summary returns of preventive and control activities weekly at divisional level Prepare monthly report on-field activities Conduct reviews monthly at district level	Number of inspection teams deployed to outbreak/ outbreak prone areas per quarter Number of reviews conducted at district level per year		
	6.3. Monitoring of other non-health institutions	Conduct review meetings with other stakeholders on Dengue prevention & control activities Send the minutes of the stakeholder meetings to relevant Medical Officer of Health every month	Number of review meetings conducted with other stakeholders on Dengue prevention & control activities per quarter Number of inter-sectoral meetings conducted per quarter		


NDCA/02

Specific Objective: 7 **To facilitate, link and conduct operational research in the prevention and management of dengue infections**					
No	**Strategies**	**Activities**	**Monitoring**		**Responsibility**
			Process/ Output Indicators	**Means of verification**	
7.	7.1. Conduct operational research in the prevention and management of Dengue infection	Conduct consultative meeting to update evolving research needs and prioritize topics for research	Availability of prioritized research needs	Final research reports Publications Policies related to health IMMR Routine e-surveillance DenSys surveillance	NDCU Epidemiology Unit RDHS Hospital Directors Universities
		Identify and translate valid on-going research in other parts of the world to match local context.	Number of operational research/ projects conducted		
		Develop research proposals for funding	Number of reports/ publications specifically addressing programmatic gaps		
		Generate information on the burden of disease for evidence-based decision making	Number of collaborating centres participating in research		
		Conduct operational research on laboratory diagnosis, clinical management and vector control	Number of grants received/ utilized		

No	Strategies	Activities	Monitoring		Responsibility
			Process/ Output Indicators	Means of verification	
		Conduct research on epidemic prediction models			
		Establish a collaborative network with both international and local research institutions	Percentage of successful operational research that has been adopted by the programme for prevention and management of dengue infections (programme implementation) and policy formulation		
		Facilitate conduct of field trials on vaccine among susceptible communities	Number of field trials conducted on vaccine among susceptible communities		
		Advocate higher officials and translate vital findings to relevant National policies	Number of research findings translated to National policies		

Monitoring & Evaluation Framework

Key Indicators for Monitoring and Evaluation

Monitoring and Evaluation Plan

Performance/ Results Framework of National Dengue Control Programme

Key Indicators	Baseline			Target
	Value	Year	Source	
Impact Indicators				
Reduce the incidence of dengue below 100/100,000 by the year 2023	198.22	2013 – 2016	Routine Surveillance	below 100/100,000 by 2023
Reduce case fatality of Dengue < 0.1% in by the year 2023	0.21	2013 - 2016	Death Reviews	case fatality of Dengue < 0.1% by 2023
Outcome Indicators				
Percentage reduction of larval vector indices • Breteau index (BI) • Premises index (PI)	8.8/2016 12.3/2017 5.0/2016 9.6/2017	2016 – 2017	Entomological surveys	<1 BI <1 PI
Reduction of *Aedes* positive discarded items to <10% in urban settings by the year 2023	40%	2017-2018	Entomological surveys	<10%
Output Indicators				
Incidence of dengue	198.22	2013 – 2016	Routine Surveillance	below 100/100,000 by 2023
Case fatality rate due to Dengue	0.21	2013 - 2016	Death Reviews	case fatality of Dengue < 0.1% by 2023
Reduction of larval vector indices compared to baseline value • Breteau index (BI) • Premises index (PI)	8.8/2016 12.3/2017 5.0/2016 9.6/2017	2016 – 2017	Entomological surveys	<1 BI <1 PI
Percentage reduction of discarded items in urban settings	40%	2017-2018	Entomological surveys	<10%

Key Indicators	Baseline			Target
	Value	Year	Source	
Process Indicators				
No. of Special Mosquito Control Campaigns conducted	19/20	2016/ 2017	NDCU data	14 programmes per year
No. of routine inspection programmes conducted by each district		2016 - 2017	District data	
No. of GN divisions inspected completely in each district	N/A	2016 - 2017	District data	
No of entomological surveys conducted by the central entomological team per year (with quarterly break down) and by premise (i.e. residential houses, schools, construction sits etc)	100/2016 110/2017	2016 - 2017	Entomological surveys conducted by NDCU team	200
No of entomological surveys conducted by each district per year (with quarterly break down) by premise (i.e. residential houses, schools, construction sits etc)	250/2016 300/2017	2016 - 2017	Entomological surveys conducted by District teams	400
Percentage of dengue cases investigated within 3 days **after receiving notification to MOH**	33% (Unpublished NDCU Survey Data)	2018	District data	More than 95 percent of the notifications
Percentage of Dengue cases investigated within 7 days from the **onset of fever**	Not Available	2017 - 2018	Epidemiology Unit data	
No. of HDU's established in base hospitals and above	87	2016	NDCU data	
No. of hospitals (Base hospitals and above) with FBC facilities 24/7	Not Available	2016 - 2017	Hospital data & NDCU data	

Time Frame
(Gantt Chart)

Time Frame (Gantt Chart)

		2019				2020				2021				2022				2023			
Outcome Objectives: To achieve case incidence below 100/100,000 population by the year 2023 To reduce and maintain case fatality rate below 0.1 % by the year 2023																					
Specific Objective: 1. To intensify epidemiological surveillance to detect and notify dengue cases real-time																					
Strategies	**Activities**	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1.1. Improve routine reporting system	Capacity building of both curative & public health officials (HO, SHO, MO Public health, ICNO, RE, MOOH, etc.) on routine surveillance (i.e. case definition of Dengue fever and formats used and flow of notification system)	√		√		√		√		√		√		√		√		√		√	
	Develop a web-based system for routine notification in hospitals						√	√	√	√				√				√			
	Develop infrastructure in hospitals to facilitate a web-based routine notification							√	√	√				√				√	√		
1.2. Strengthen sentinel surveillance system	Expand sentinel surveillance system (i.e. All the base hospitals and above)			√	√	√	√	√		√				√				√			
	Report suspected Dengue cases to MOOH within 24 hours from admission	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Supervise reporting of Dengue cases from hospitals bi-weekly/ monthly	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Train Public Health staff on the early investigation of notified cases	√		√		√		√		√		√		√		√		√		√	
	Investigate all reported cases within 24 hours and essentially within 3 days	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Inspect premises within the 200m radius of index cases	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Map the cases up to GN level and identify the clusters to take necessary action	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

		2019				2020				2021				2022				2023			
Strategies	**Activities**	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1.3. Develop the capacity to capture cases on confirmation (Special Surveillance System)	Further enhance special disease surveillance system in Teaching, Provincial General and District General Hospitals	√	√	√	√	√	√	√	√												
	Distribute special surveillance forms to all the relevant institutes	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Train House Officers, Medical Officers/ ICNOs on special surveillance	√		√		√		√		√		√		√		√		√		√	
	Monitor case notification, the trends and geographical spread	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Analyze the data and identify the nature of the disease and take necessary actions	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
1.4.Improve/ strengthen the utilization of surveillance data/ statistics of the hospitals for hospital preparedness	Develop a preparedness plan for hospitals, based on surveillance data	√				√				√				√				√			

		2019				2020				2021				2022				2023			
Specific Objective: 2. To intensify entomological surveillance to forecast vector density and to take appropriate control measures																					
Strategies	**Activities**	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
2.1.Restructure/ establish the National and Sub-national Dengue control programmes	Restructure Dengue Control Unit as National Dengue Control Programme (NDCP) to coordinate all the Dengue control activities (i.e. increase the cadre at National level – Deputy Director, CCPs, Entomologist & SPHI etc.) by establishing specific cells with terms of reference (Annex 1)						√	√	√	√	√	√	√								
	Create a dengue control cell/ unit at RDHS level to coordinate overall dengue prevention and control activities at district level (i.e. Medical Officer - Dengue Control, Entomologists, SPHI/ PHI etc. at RDHS level) [Vacancies of high-risk areas to be filled first]						√	√	√	√	√	√	√	√	√						
2.2.Establishment of a systematic entomological surveillance programme	Develop infrastructure and improve human resource to facilitate entomological surveillance • Recruit entomologists for all districts	√	√	√	√	√	√														
	• Establish entomological laboratories in high-risk districts	√	√	√	√	√	√	√	√	√	√	√	√	√							
	Develop Standard Operational Procedures' (SOP's) for entomology surveys and standardize the application of entomological procedures based on SOP	√	√	√	√				√ *				√ *				√ *				√ *
	Develop & distribute standardized survey formats			√	√				√				√				√				√
	Develop a comprehensive surveillance plan yearly at district and divisional levels • Identify sentinel sites from high-risk MOH/GN areas of the district (from urban and semi-urban or rural areas) to conduct sentinel surveys (as defined in the guideline for Integrated Vector Management)	√	√	√	√				√				√				√				√
	• Identify high risk localities to conduct routine entomological surveys (as defined in the guideline for Integrated Vector Management)	√	√	√	√				√				√				√				√
	• Conduct routine, sentinel & spot checks based on case notification, previous notification trends or as a post survey etc.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

		2019				2020				2021				2022				2023			
Strategies	**Activities**	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Map the vector (i.e. *Aedes aegypti* & *Aedes albopictus)* distribution to identify high risk localities at divisional/ district/ provincial/ national level						√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Conduct insecticide susceptibility test, cage bio essay etc.					√				√				√				√			
	Improve existing reporting system of entomology surveys for timely actions by providing preliminary report to relevant authorities on the same day and the detailed report within 5 days to relevant MOH office or the relevant institute					√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Develop a web-based entomological surveillance mechanism (for routine/ sentinel surveillance)							√	√	√				√				√			
	Use web-based timely entomological surveillance data for action										√	√	√	√	√	√	√	√	√	√	√
	Supervise entomological survey activities for accuracy & timeliness	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

		2019				2020				2021				2022				2023			
Specific Objective 3. To apply appropriate integrated vector management (IVM) strategies to interrupt dengue transmission																					
Strategies	**Activities**	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Environmental Management, biological & chemical control																					
3.1.Adopt and implement appropriate environmental management measures to reduce vector density and dengue transmission	Map and analyze epidemiological and entomological data for epidemic forecasting and for following actions • Source reduction through environmental management • Changes to human habitation or behaviour by applying mosquito repellents, screening doors etc.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Develop training guidelines on • Source reduction through environmental management • Changes to human habitation or behaviour (i.e. Personal protection, screening doors etc.) • Chemical & biological methods for dengue vector control	√	√	√	√	√				√				√				√			
	Develop capacity of national, provincial, district and divisional public health staff who are engaged in dengue vector control measures	√		√		√		√		√		√		√		√		√		√	
	Conduct regular in-service training for field staff	√		√		√		√		√		√		√		√		√		√	
	Map and update vector breeding sites monthly					√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Train field health staff (e.g. PHII, PHM, SKS) on health education	√		√		√		√		√		√		√		√		√		√	
	Ensure availability of home inspection cards in high-risk GN divisions and do regular monitoring by the divisional and district level staff					√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Conduct routine premise (houses, schools, construction sites etc) inspection based on risk category of the MOH area (priority high risk/ high risk, and low risk) according to entomological and epidemiological evidence	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Conduct special mosquito control campaigns and other necessary vector control activities in identified priority high risk and high risk localities	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

		2019				2020				2021				2022				2023			
Strategies	**Activities**	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Apply appropriate IVM methods (source reduction/ chemical/ biological methods etc.) considering identified breeding places in different localities (e.g. construction sites, abandoned boats, pineapple plantations/wells, water storage tanks etc)	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Conduct field supervision visits by Central, Provincial, District and MOH staff (i.e. by **Central team** – Director/ NDCU, CCPs, Medical Officers, Entomologists, PHII: By **Regional team** - CCPs/ RE, MO-Dengue Control, MOOH, Entomologists and SPHID/SPHII/ District PHII) in all high-risk GN divisions according to norms	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Develop a policy on rational use of insecticide based on International guidelines					√	√	√	√	√				√				√			
Advocacy, Inter-sectoral Collaboration, Communication and Empowerment of Communities																					
3.2. Advocacy programmes to gain political commitment and to influence policy makers	Advocacy for higher level politicians [i.e. Presidential Task Force (PTF) meetings]	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Conduct stakeholder meetings with provincial/ district/ local political leadership	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
3.3. Strengthen inter-sectoral collaboration among relevant stakeholders and promote joint action	Identify stakeholders and define their roles and responsibilities (National & sub-national)	√	√	√	√	√	√	√	√	√								√			
	Conduct regular meetings with stakeholders (National & sub-national) according to the norms	√		√		√		√		√		√		√		√		√		√	
	Establish district and divisional level Dengue control committees	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Convene inter-sectoral meetings weekly (in priority high-risk areas), bi-weekly (in high-risk areas), monthly (in low-risk areas) to discuss and coordinate dengue control activities at MOH level	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

		2019				2020				2021				2022				2023			
Strategies	**Activities**	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Declare and conduct National mosquito control weeks and special cleaning up campaigns with relevant stakeholders	√		√		√		√		√		√		√		√		√		√	
	Engage relevant stakeholders for rapid response activities	√		√		√		√		√		√		√		√		√		√	
	Enlist and empower government and private institutions in each MOH area	√		√		√		√		√		√		√		√		√		√	
	Establish “Dengue Control Committees” in each institution of MOH areas	√		√		√		√		√		√		√		√		√		√	
	Advocate monthly reporting of source reduction activities of each institution to respective MOH office	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
3.4. Proper management of solid waste based on the National solid waste management policy	Conduct advocacy programmes for local level politicians	√			√			√			√			√			√			√	
	Develop a capacity to collect waste in each district (e.g. Tractors, compactors etc.)	√	√	√	√	√	√	√	√	√				√				√	√	√	√
	Instruct to adhere to waste segregation procedures at district level	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
3.5. Elimination of mosquito breeding in construction sites	Develop a system to register new major construction sites at MOH and Local Government before the commencement	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Train contractors, building corporations, architects, health, local government personnel on Dengue prevention and control	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Appoint a health and safety officer for major construction sites	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Carry out regular inspection of dengue breeding places in construction sites	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Educate & encourage the people working at construction sites to segregate waste before disposal	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Identify and reserve suitable sites for correct garbage disposal	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Carry out regular entomological surveillance at construction sites and disseminate timely reports to MOH for feedback and follow up action	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

Strategies	Activities	2019				2020				2021				2022				2023			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
3.6. Active engagement of schools in strengthening environmental management	Engage all children and teachers in Dengue prevention and control activities every Friday for one hour in every week	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Establish waste segregation system at primary schools for behavioural change	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Send a consolidated report by all schools of particular MOH area every month to relevant Medical Officer of Health	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Organize clean-up campaigns by schools with the help of parents before starting the school after school vacations or before examinations																				
3.7. Active engagement of Tourist Hotels in strengthening environmental management	Engage the tourism industry in clean-up and other vector control methods	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
3.8. Establishment of sustainable CSR projects to educate the general public on prevention and control of Dengue	Prepare an electronic and print media to educate the general public on prevention and control of Dengue	√		√		√		√		√		√		√		√		√		√	
	Obtain sponsorships to maintain schools, public places, religious places etc., free of mosquito breeding places	√		√		√		√		√		√		√		√		√		√	
	Obtain sponsorships to maintain hoardings on prevention and control of Dengue in public places				√				√				√				√				√
	Work in harmony with Medical Officer of Health	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
3.9. Strengthen communication and empowerment of communities by developing and implementing a communication package on prevention & control, early health care seeking and treatment by the focal point (i.e. NDCU)	Develop a website for NDCU and update it regularly	√	√	√																	
	Communicate through social media	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Identify behaviours relevant to prevention & control, early health care seeking and treatment	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Develop and implement a communication plan for prevention and control – Specific target groups to be defined (e.g. schools, construction sites, factories, religious places etc.)	√		√		√		√		√		√		√		√		√		√	
	Develop and implement a communication plan for early health care seeking and treatment	√		√		√		√		√		√		√		√		√		√	
	Train National and sub-national level responsible staff officers on advocacy and communication	√		√		√		√		√		√		√		√		√		√	
	Develop and disseminate task-oriented, clear communication material (i.e. for schools, community etc.)	√		√		√		√		√		√		√		√		√		√	
	Conduct regular media workshops/ seminars	√		√		√		√		√		√		√		√		√		√	

		2019				2020				2021				2022				2023			
Strategies	**Activities**	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Conduct educational activities among schools (children and teachers) to raise awareness	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Empower school children to clean their own home environment	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Promote dengue free school by reporting school absenteeism through school App	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Develop messages for media on early detection, ambulatory care etc.	√	√			√				√				√				√			
	Enforce regular inspection by street committees	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Empower mother's groups, civil societies for behavioural change	√		√		√		√		√		√		√		√		√		√	
	Distribute school card and empower school children to clean their own home environment	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Enforcement of Law																					
3.10.Enforcement of legislation	Review existing legal enactments	√				√				√				√				√			
	Conduct stakeholder meetings to review and update existing laws and strengthen enforcement of laws by relevant authorities as and when necessary	√		√		√		√		√		√		√		√		√		√	
	Draft a joint circular with relevant stakeholders based on emerging entomological evidence (roof gutters, ponds) and disseminate it to them (e.g. Ministry of Housing and Construction, Local Government etc.) – Apply the rules and regulations in the said circular for the building plans of new building developments			√	√	√				√				√				√			
	Apply the rules and regulations in the said circular for the building plans of new building developments				√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Monitoring and evaluation of implemented laws	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

		2019				2020				2021				2022				2023			
Specific Objective: 4. To improve early diagnosis and case management																					
Strategies	**Activities**	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
4.1. Standardize clinical management practices	Review and revise clinical management guidelines on dengue		√	√	√	√								√	√	√	√				
	Disseminate the updated guidelines to all public and private hospitals and General Practitioners						√	√										√	√		
	Establish model dengue management centres with patient management equipment					√	√	√	√									√	√		
	Establish help-line for difficult cases for clinicians						√	√													
	Collect information on all deaths due to Dengue in public/Private hospitals	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Review each suspected Dengue death immediately	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
4.2. Strengthen early diagnosis capacity	Establish fever screening centre at OPDs of secondary and tertiary care hospitals					√	√	√	√				√				√				√
	Make FBC test available 24/7 in the secondary and tertiary care hospitals						√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Develop diagnostic and ambulatory care facilities at primary care hospitals in high-risk areas						√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Develop a management protocol to improve the treatment-seeking behaviour of vulnerable groups (e.g. pregnant mothers, infants etc.)					√	√														
4.3.Develop capacity of medical doctors and supportive staff	Implement continuous medical education for doctors and supportive staff as capacity building plan	√		√		√		√		√		√		√		√		√		√	
	Develop training modules for doctors and supportive staff					√	√	√	√										√	√	
	Organize training of trainers (TOT) programme for master trainers		√		√		√		√		√		√		√		√		√		√
	Train consultants/ medical officers/ nursing officers in the management of dengue patients (Curative, both public and private sectors)		√		√		√		√		√		√		√		√		√		√
	Carry out regular in-service training	√		√		√		√		√		√		√		√		√		√	

		2019				2020				2021				2022				2023			
Specific Objective: 5. To detect epidemics early and to respond to potential epidemics effectively																					
Strategies	**Activities**	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
5.1. Strengthen surveillance system further to detect and respond to outbreaks early	Develop an early warning capability using the entomological surveillance to categorize risk areas	√	√	√	√									√	√						
	Prepare an emergency response plan with assigned task to stakeholders (both preventive and curative sectors) and health and non-health sectors	√	√	√										√	√						
	Further strengthen clinical wards of primary healthcare units, secondary and tertiary care institutions or establish a system in GP and OPD by increasing capacity to perform FBC 24/7	√	√	√	√																
	Introduce “Dengue Free Child” school app to the general public and to schools and identify clustering of patients for necessary action	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
5.2. Stratify the areas according to risk level (National & Sub-national level)	Develop a risk stratification system to categorize the areas up to GN areas (priority high risk, high risk and low risk)	√	√	√	√	√	√			√				√				√			
	Develop operational guidelines for rapid response activities	√	√	√	√					√				√				√			
	Predict outbreaks when the indices exceed the set baseline values and communicate with relevant stakeholders	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Prepare a risk communication plan to mitigate outbreaks	√	√	√	√																
5.3. Establishment of laboratory surveillance mechanisms to strengthen timely and effective early warning & confirmation of outbreaks	Establish sentinel surveillance stations for routine fever monitoring	√	√	√	√																
	Develop a reference laboratory with a feedback mechanism to National level (serology and virology)	√	√	√		√		√		√		√		√		√		√		√	

		2019				2020				2021				2022				2023			
Strategies	**Activities**	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
5.4 Prepare and communicate alerts to stakeholders at correct time	Establish district rapid deployment teams according to need and risk level	√	√	√	√																
	Establish an operational room for rapid response	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Conduct inter-sectoral meetings during the outbreak period				√	√	√	√													
	Conduct periodical reviews at national/ sub-national level	√		√		√		√		√		√		√		√		√		√	
	Communicate the risk and strengthen the vector control activities with other sectors (LG and DS office)	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

		2019				2020				2021				2022				2023			
Specific Objective: 6. To strengthen monitoring and evaluation to ensure optimal programme implementation, management and performance																					
Strategies	**Activities**	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
6.1. Establishment of effective monitoring and evaluation mechanism at National level	Establish a monitoring and evaluation unit	√	√	√	√																
	Develop a monitoring and evaluation plan	√	√																		
	Development of a central database to monitor district level preventive activities	√	√	√	√					√					√					√	
	Develop and update monitoring formats	√	√			√				√				√				√			
	Develop a web-based data system which could be accessible to other stakeholders (e.g. District secretary, Local Government Commissioner)	√	√	√	√				√				√				√				√
	Prepare annual plan for supervision (both at national & sub-national level)	√	√	√	√				√				√				√				√
	Conduct regular supervision visits to high risk districts	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
6.2.Establishment of effective monitoring and evaluation mechanism at the Sub-National level	Map the cases to identify the geographical boundaries to identify local spread at district/ divisional levels	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Analyze the epidemiological data (identify the age categories affected, sex, GN areas etc.) and entomological data to minimize risk	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Implement vector control plan at MOH level and monitor the situation daily	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Deploy inspection teams to outbreak/ outbreak-prone areas	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Collect summary returns of preventive and control activities weekly at the divisional level	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Prepare monthly report on-field activities	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Conduct reviews monthly at the district level	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
6.3. Monitoring of other non-health institutions	Conduct review meetings with other stakeholders regarding Dengue prevention & control activities																				
	Send the minutes of the stakeholder meetings to relevant Medical Officer of Health every month	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

		2019				2020				2021				2022				2023			
Specific Objective: 7. To facilitate, link and conduct operational research in the prevention and management of dengue infections																					
Strategies	**Activities**	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
7.1. Conduct operational research in the prevention and management of dengue infection	Conduct consultative meeting to update evolving research needs and prioritize topics for research					√				√				√				√			
	Identify and translate valid on-going research in other parts of the world to match local context.	√		√		√		√		√		√		√		√		√		√	
	Develop research proposals for funding	√			√			√			√			√			√			√	
	Generate information on the burden of disease for evidence-based decision making	√		√		√		√		√		√		√		√		√		√	
	Conduct operational research on laboratory diagnosis, clinical management and vector control	√		√		√		√		√		√		√		√		√		√	
	Conduct research on epidemic prediction models					√	√	√	√	√	√	√	√								
	Establish a collaborative network with both international and local research institutions	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	Facilitate conduct of field trials on vaccine among susceptible communities	√		√		√		√		√		√		√		√		√		√	
	Advocate higher officials and translate vital findings to relevant National policies				√				√				√				√				√

Budget Summary

Budget Summary

Specific Objectives	2019	2020	2021	2022	2023	Total for 5 years
	Amount Rs:	Amount Rs:	Amount Rs:	Amount Rs:	Amount Rs:	Amount Rs:
Specific Objective: 1. To intensify epidemiological surveillance to detect and notify dengue cases real-time	4,150,000	3,250,000	3,265,000	265,000	280,000	11,210,000
Specific Objective: 2. To intensify entomological surveillance to forecast vector density and to take appropriate control measures	4,000,000	3,100,000	3,100,000	3,100,000	100,000	13,400,000
Specific Objective 3. To apply appropriate integrated vector management (IVM) strategies to interrupt dengue transmission	218,137,500	216,337,500	244,411,250	243,461,250	271,585,000	1,193,932,500
Specific Objective: 4. To improve early diagnosis and case management	118,350,000	117,350,000	120,865,000	119,915,000	123,480,000	599,960,000
Specific Objective: 5. To detect epidemics early and to respond to potential epidemics effectively	875,000	425,000	462,500	462,500	515,000	2,740,000
Specific Objective: 6. To strengthen monitoring and evaluation to ensure optimal programme implementation, management and performance	5,037,500	4,137,500	4,441,250	4,441,250	4,441,250	22,498,750
Specific Objective: 7. To facilitate, link and conduct operational research in the prevention and management of dengue infections	3,037,500	3,037,500	3,041,250	3,041,250	3,045,000	15,202,500
Grand total	**353,587,500**	**347,637,500**	**379,586,250**	**374,686,250**	**403,446,250**	**1,858,943,750**

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Annexures

Annex I

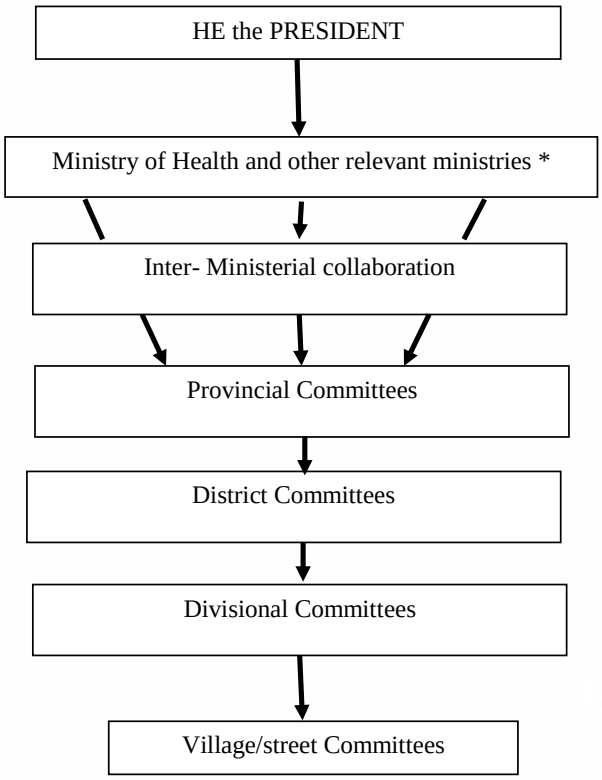
Presidential Task Force on Dengue Prevention & Control and Intersectoral Coordination

The Presidential Task Force was appointed by H.E. the President to strengthen multisectoral collaboration and implementation of strategies at the National/Provincial/District levels. The first meeting was convened on 25. 05.2010 chaired by H.E. the President.

Predicting the Dengue outbreak experienced in 2017 the Presidential Task Force was reinstated in May 2017.

An action plan was prepared by the National Dengue Control Unit in collaboration with the Presidential Task Force, with the objective of prevention and control of dengue in identified different localities and to minimize dengue fatality.

Structure of the Presidential Task Force on Dengue Prevention & Control



***Stakeholders of the Presidential Task Force**

-Ministry of Health
-Ministry of Provincial Councils & Local Government
-Ministry of Home Affairs
-Ministry of Education
-Ministry of Defence
-Ministry of Law and Order
-Ministry of Media
-Ministry of Environment
-Ministry of Disaster Management
-Ministry of Finance
-Ministry of Public Administration etc.

Key Tasks of the Presidential Task Force on Prevention and Control of Dengue

- To prepare strategic/action plans and programmes to implement effective Integrated Vector Management in collaboration with the National Dengue Control Unit.
- To promote collaboration among other national health agencies and major stakeholders to implement dengue programmes.
- To address programmatic issues and gaps.
- To adopt an enabling policy environment in implementing regulatory legislation for effective dengue prevention and control.
- To develop coordinated actions for sustainable dengue vector management within and outside of the health sector.
- To increase visibility and sustainability by providing greater opportunities to decision-making on vector control with the participation of local communities.
- Setting up a core task force at Provincial, District and Divisional levels with multidisciplinary expertise.

ROLES & RESPONSIBILITIES OF STAKEHOLDERS

Ministry of Health

- Optimum clinical management of Dengue patients
- Prevent spread of epidemics
- Coordinate with other relevant government & non-government sectors to carry out dengue control /prevention activities

Ministry of Education

- Maintain all government, private schools, “Pirivenas”, training colleges, “Vidya Peeta”, free of mosquito breeding
- Inculcate a behavioural change in school children to keep the environment free of mosquito breeding
- Collaborate with respective Medical Officer of Health and staff to maintain schools, surrounding premises free of mosquito breeding
- Provide necessary guidance through school children to keep their home environment free of mosquito breeding

Ministry of Provincial Councils & Local Government

- Proper solid waste management including disposal of non-biodegradable items.
- Cleaning of drainage systems and maintaining them properly to prevent water collections
- Maintain area of public places without mosquito breeding
- Active involvement in dengue control/ prevention activities
- Strengthen legal activities

Ministry of Home Affairs

- Maintain all government & private institutions free of mosquito breeding
- Active involvement and mobilizing of the district, divisional and village level officers coming under the ministry in dengue control and preventive activities.

Ministry of Defense & Ministry of Law & Order

- Maintain all institutions coming under the ministry, free of mosquito breeding
- Active involvement of tri-forces and police personnel in dengue control and prevention activities

Ministry of Mass Media & Information

- Free of charge telecast/ broadcast of advertisements in relation to dengue including clinical features, treatments and prevention & control (Under the technical guidance of the National Dengue Control Unit of Ministry of Health)

Ministry of Disaster Management

- Provide support to control and prevent dengue outbreak situations.

Ministry of Environment

- Formulation and implementation of policies for proper disposal of solid waste
- Active involvement in dengue control/ prevention activities

Inter-ministerial collaboration for effective and synchronized activities from multiple disciplines, towards prevention and control of Dengue in Sri Lanka.

Annex II

Development of the capacity of field workforce to augment elimination of mosquito breeding places

Introduction

Integrated Vector Management (IVM) which is defined as "a rational decision-making process for the optimal use of resources for vector control" is the mainstay of prevention and mitigation of Dengue outbreaks. Environment management which includes premise inspection and elimination of mosquito breeding places has been identified as a major component of Integrated Vector Management. However, the lack of a dedicated workforce to facilitate such grass-root level activities was regarded as a huge drawback for sustained Dengue control activities in Sri Lanka.

Justification

The need for a trained workforce to augment field activities is a timely policy initiative taken to develop the capacity of field teams at the district/ divisional levels since Dengue is a priority public health problem. Recruitment of committed field staff to implement prevention and control activities at the community level is a necessity.

Objective

To establish a trained field workforce to augment Dengue prevention and control activities

Methodology

A dedicated field team "Sakya Karya Sahayaka" (SKS) / "Field Assistants Mosquito Control" was recruited on contract basis to implement prevention and control activities at the community level.

A total of 1500 SKSs were approved and recruited in a phased manner during 2017 and 2018 island wide based on the risk level. Those recruited as SKSs to the Ministry of Health were assigned to the National Dengue Control Unit (NDCU) for initial training and followed up by further extensive training of 12 weeks conducted at selected regional level health offices.

A training curriculum was developed which included theoretical components targeting development of knowledge on the mosquito and breeding sites, environmental management including modification and manipulation of potential breeding sites, handling chemicals and insecticides including fogging, cultivation and distribution of larvivorous fish, handling and maintenance of vector surveillance and control equipment, provision of health education, Personal Protective Equipment, feedback returns and formats and administrative procedures within the Ministry of Health. Practical sessions in the field for hands-on skills development were also conducted.

Implementation

SKSs were allocated to all 25 districts prioritized according to the risk level for dengue. Accordingly, nearly half of the workforce was deployed

to the Western Province. Within the district, SKSs were stationed in all high-risk Medical Officer of Health (MOH) units or District Health offices.

The assigned responsible officers and supervising officers at different levels are as below;

Level	Responsible officers	Supervising officers
National	Director/NDCU	Consultant Community Physicians, Medical Officers, Entomologists, Public Health Inspectors (PHII)
Provincial	Provincial Director of Health Services	Consultant Community Physicians
Regional	Regional Director of Health Services	Consultant Community Physicians, Regional Epidemiologists, Medical Officer Vector Control, Regional Malaria Medical Officer (RMO), Entomologists, Supervising Public Health Inspector-District, Supervising Public Health Inspector (SPHI)
Divisional	Medical Officer of Health/ Additional Medical Officer of Health	SPHI, PHII

The main duties of SKSs are;

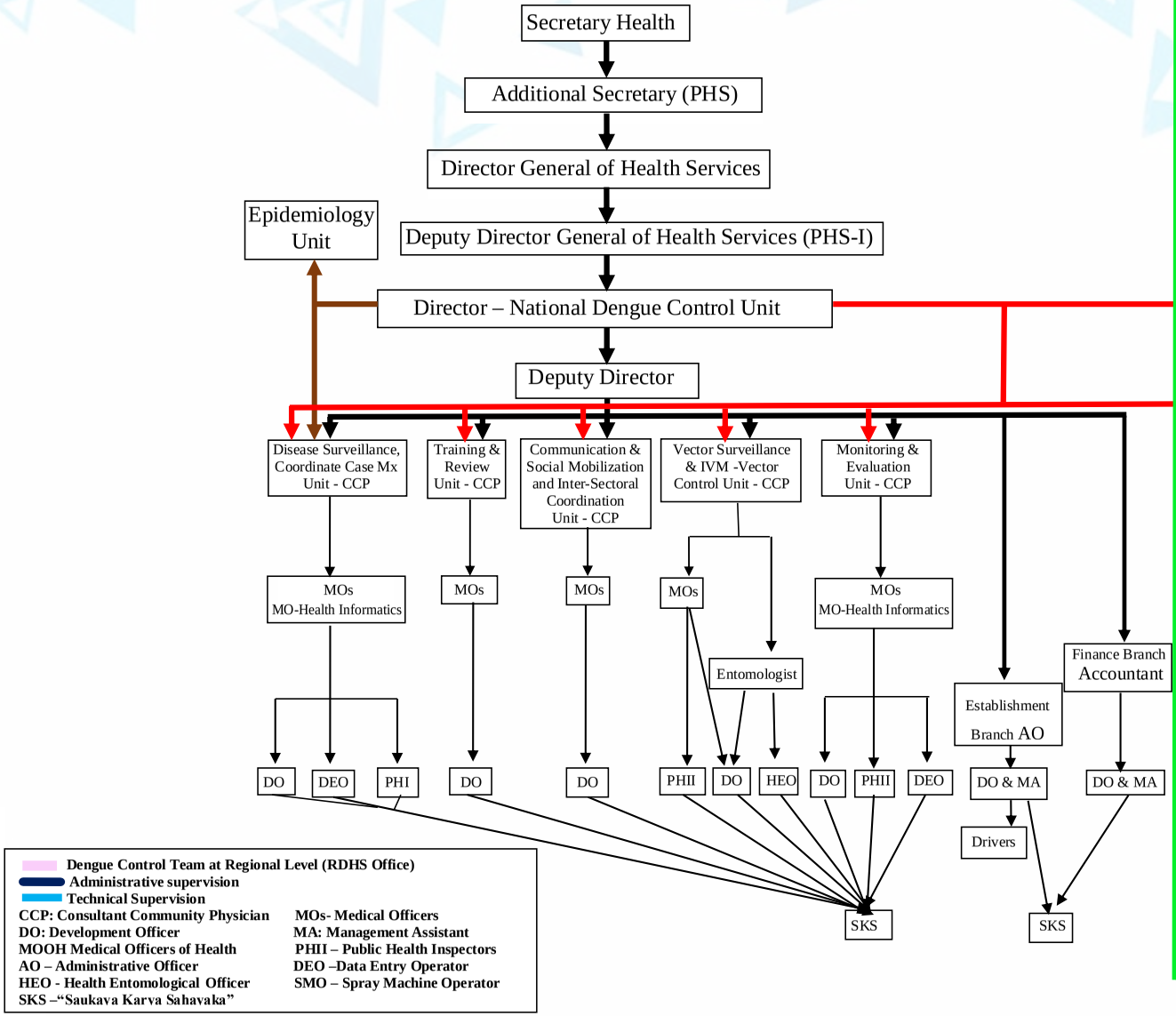
- Inspection of premises around each reported dengue patient to identify mosquito breeding places and assisting the community to eliminate them
- Regular house to house inspection and removal of breeding places in high-risk areas
- Educating the public on mosquito breeding and prevention activities including distribution of health education materials under the direct supervision of area PHII
- Promoting the public on waste segregation and disposal
- Assisting technical officers for vector control
- Assisting in entomological surveys
- Fogging under the guidance and supervision of technical officers and
- Maintaining relevant documents (i.e. daily records and summary reports).

Way forward

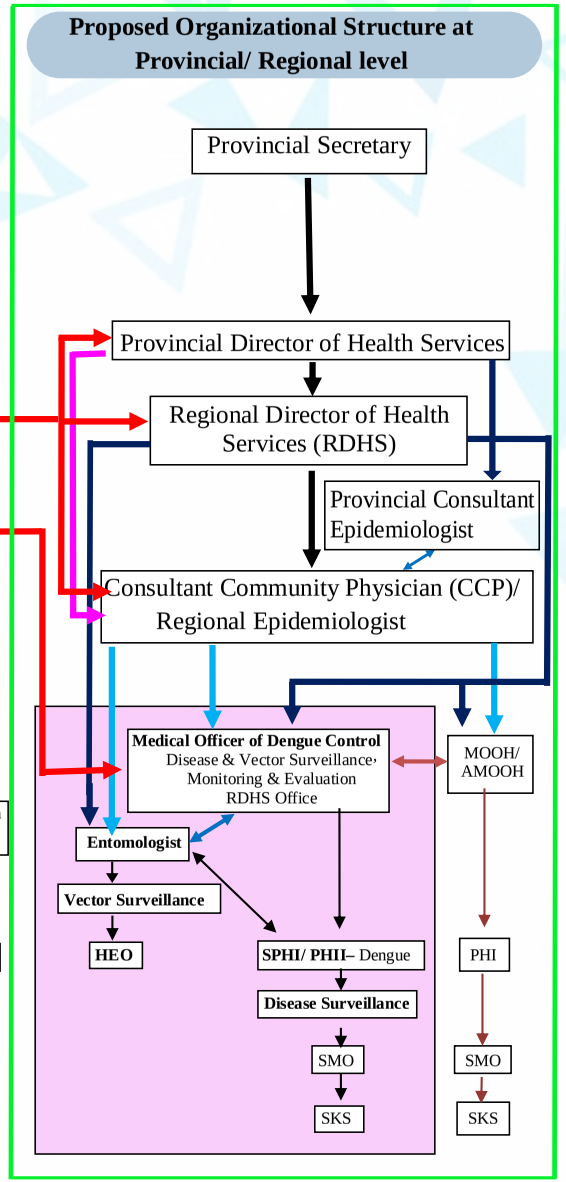
It is proposed to absorb SKSs into the government service after successful completion of required standards of the National Vocational Qualification Level 3, as stipulated by the Ministry of Skills Development and training after the contract period.

Annex III

Organizational Structure of the National Dengue Control Unit



Proposed Organizational Structure at Provincial/ Regional level



Annex IV

Summary of Proposed Cadre Revisions at Central Level

Designation	Approved Cadre	Available Cadre	Cadre to be filled
Director	1	1	
Deputy Director	0	0	1
Consultant Community Physicians	4 (one post – pending approval)	2	2
Medical Officers	9+2*	4+1*	5+1*
Entomologists	2	2	
Supervising Public Health Inspectors/ Public Health Inspector	3 (2PHII + 1 SPHI)	3	1 SPHI
SHEO/HEO	7 (1 SHEO + 6 HEO)	7	--
SKS	15	15	

* Medical Officer-Health Informatics

Summary of Proposed Cadre Revision for Dengue Control Cell at District/ Regional Level

Designation	Approved Cadre	Available Cadre	Cadre to be filled
Medical Officer Dengue Control	0	0	1
Entomologists	1	0/ 1	1 (If entomologist is not available)
Supervising Public Health Inspectors/ Public Health Inspector	0	0	1 SPHI (Class 1) 1 PHII
Health Entomological Officers (HEOO)	0	0	2 HEOO
Development Officers	0	0	1
Spray Machine Operator	0	0	3
Saukya Karya Sahayaka	0	0	5

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