



REPORT NO.

175

PARLIAMENT OF INDIA
RAJYA SABHA

DEPARTMENT-RELATED PARLIAMENTARY STANDING
COMMITTEE ON HEALTH AND FAMILY WELFARE

ONE HUNDRED SEVENTY FIFTH REPORT

ON

“A STUDY OF VECTOR-BORNE DISEASES IN NORTH-EAST INDIA”

PERTAINING TO

**DEPARTMENT OF HEALTH AND FAMILY WELFARE
(MINISTRY OF HEALTH AND FAMILY WELFARE)**

(Presented to the Rajya Sabha on 7th August 2026)
(Laid on the Table of Lok Sabha on 7th August 2026)

भारतीय संसद, राज्य सभा



PARLIAMENT OF INDIA,
RAJYA SABHA

**Rajya Sabha Secretariat, New Delhi
August, 2026/ Shravan, 1948 (SAKA)**

Website : <http://sansad.in/rs>
E-mail : rs-chfw@rss.sansad.in



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COMPOSITION OF THE COMMITTEE
(2024-25)

1. Prof. Ram Gopal Yadav - Chairman

RAJYA SABHA

2. Shri Rajib Bhattacharjee
3. Dr. Ajeet Madhavrao Gopchade
4. Dr. Sikander Kumar
5. Shri Shambhu Sharan Patel
6. Shri B. Parthasaradhi Reddy
7. Shri Ashok Singh
8. Shri Rameswar Teli
9. Shri Babubhai Jesangbhai Desai
10. Shri C. Sadanandan Master

LOK SABHA

11. Shri Ramvir Singh Bidhuri
12. Dr. Vinod Kumar Bind
13. Ms Iqra Choudhary
14. Shri Mukeshkumar Chandrakaant Dalal
15. Shri Sanjay Uttamrao Deshmukh
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17. Dr. Dharamvira Gandhi
18. Dr. Kadiyam Kavya
19. Dr. Prabha Mallikarjun
20. Dr. C. N. Manjunath
21. Shri Balya Mama Suresh Gopinath Mhatre
22. Dr. Rajesh Mishra
23. Shrimati Aparajita Sarangi
24. Dr. Sharmila Sarkar
25. Dr. Hemant Vishnu Savara
26. Dr. Byreddy Shabari
27. Dr. Mahesh Sharma
28. Dr. Rani Srikumar
29. Shri Parimal Suklabaidya
30. Dr. Alok Kumar Suman
31. Mrs. Ruchi Vira

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SECRETARIAT

- | | |
|---------------------------|------------------|
| 1. Shri K.S. Somashekhar | Secretary |
| 2. Shri Rakesh Naithani | Joint Secretary |
| 3. Shri Bhupendra Bhaskar | Director |
| 4. Shri Vivek Chandra | Deputy Secretary |
| 5. Smt. Renu Sreekanth | Under Secretary |

PREFACE

I, the Chairman of the Department-related Parliamentary Standing Committee on Health and Family Welfare, have been authorized by the Committee to present the Report on its behalf, present this One-Hundred Seventy Fifth Report on the 'A STUDY OF VECTOR-BORNE DISEASES IN NORTH-EAST INDIA'.

2. In exercise of its constitutional mandate, the Committee, in its meeting held on 18th November, 2024 identified the subject "A study of vector-borne diseases in North-East India" for a detailed examination. The Committee selected the subject to have a comprehensive insight on the Vector-Borne Diseases (VBDs) in India, with special focus on the North Eastern States. The primary objective behind identifying the subject is to examine the control and management mechanism, specific to NER States, on prevalence, spread, vaccination, treatment methods, etc. in respect of Vector-Borne Diseases. Varied aspects of VBDs like effectiveness of Intensified Malaria Elimination Project-3 (IMEP-3), implementation of WHO guidelines for Vector-Borne Diseases in India, outcome of various researches done by ICMR-NIMR on VBDs, socio-economic challenges faced in the fight against VBDs, measures adopted for community sensitization and training for management of Vector-Borne Diseases, role and participation of local bodies / stakeholders at State level like municipality, corporation, steps taken so far to eliminate Vector-Borne Diseases, State/Regional Scheme/Programme along with impact assessment thereof on reduction of incidence of Vector-Borne Diseases, scientific measures/administrative management required for total elimination of Vector-Borne Diseases along with timeline, etc also formed part of the examination. Through the study, the Committee intends to identify ways to combat VBDs through widespread environmental control and modification of extant measures through proper management and adequate community mobilization.

3. The Committee held a meeting on the subject on 24th September, 2025 for hearing the views of the Ministry of Health and Family Welfare and representatives of National Centre for Vector-Borne Diseases Control (NCVBDC). In the meeting, aspects like the basic working related to the management and control of six main vector-borne diseases viz., Malaria, Kala-azar, Dengue, Chikungunya, Japanese Encephalitis and Lymphatic Filariasis, Malaria Elimination Progress in India and National Strategies for Malaria Elimination, Kala-azar Block endemicity trends & progress, achievements, initiatives and sensitization efforts related to containment of Dengue & Chikungunya, status & trends of Japanese Encephalitis cases and deaths along with latest vector control tools were discussed.

4. During the finalization of its Report, the Committee relied upon the following documents/ papers:-

- (i) Background Note on "Vector-Borne Diseases in North-East India" received from Department of Health and Family Welfare;
- (ii) Background Note on "Vector-Borne Diseases in North-East India" received from all the States from NER;
- (iii) Oral Evidences tendered by representatives Department of Health and Family Welfare and NCVBDC;
- (iv) Written submissions of various domain experts;
- (v) Replies to the questionnaires received from the Department of Health and Family Welfare; and
- (vi) Other relevant documents pertaining to the subject.

5. The Committee, in its meeting held on 6th August, 2026, considered the draft Report and adopted the same.

6. For facility of reference and convenience, the observations and recommendations of the Committee have been printed in bold letters in the body of the Report and also reproduced at the end of the Report at ‘Observations/Recommendations -at a Glance’ .

7. On behalf of the Committee and on my own behalf, I extend special thanks to Secretaries and officers of the (i) Department of Health and Family Welfare (ii) NCVBDC for their useful inputs on the subject. I also acknowledge the contribution of the domain experts for their deep insight and useful suggestions during the course of interactions. I further extend special appreciation to the officers of the Committee Section for their useful efforts in assimilating all relevant information and enabling the Committee in producing this quality Report.

**New Delhi
6th August, 2026
Shravan, 1948 (Saka)**

**PROF. RAM GOPAL YADAV
Chairman
Department-related Parliamentary Standing
Committee on Health and Family Welfare**

ACRONYM

ACT	Artemisinin-based Combination Therapies
AMR	Antimicrobial Resistance
API	Annual Parasite Index
ARLs	Apex Referral Laboratories
ASHA	Accredited Social Health Activist
BCC	Behaviour Change Communication
BHI	Block Health Inspectors
BHW	Block Health Workers
CHCs	Community Health Centres
CRC	Clinical & Public Health Research Centre
DBT	Department of Biotechnology
DDT	Dichlorodiphenyltrichloroethane
DHR	Department of Health Research
DVDMS	Drugs and Vaccine Distribution Management System
EDCT	Early Diagnosis and Complete Treatment
EDPT	Early Detection and Prompt Treatment
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
GVCR	Global Vector Control Response
ICAR	Indian Council of Agricultural Research
ICMR	Indian Council of Medical Research
IDSP	Integrated Disease Surveillance Programme
IHIP	Health Information Portal
IHIP	Integrated Health Information Portal
IMEP	Intensified Malaria Elimination Project
IIPH	Indian Institute of Public Health
IPC	Interpersonal Communication
IRS	Indoor Residual Spraying
ITBN	Insecticide-Treated Bed Nets
IVM	Integrated Vector Management
JE	Japanese Encephalitis
KA	Kala-azar
LF	Lymphatic Filariasis
LLINs	Long Lasting Insecticidal Nets
MDA	Mass Drug Administration
MDoNER	Ministry of Development of North Eastern Region
MoHUA	Ministry of Housing and Urban Affairs
MPW	Multipurpose Health Workers
MPWs	Multi-Purpose Health Worker
NCVBDC	National Centre for Vector-Borne Diseases Control
NER	Northeast Region
NESIDS	North East Special Infrastructure Development Scheme

NHM	National Health Mission
NIMR	Institute of Malaria Research
NSAIDs	Nonsteroidal Anti-Inflammatory Drugs
NVBDC	National Vector Borne Disease Control
NVBDCP	National Vector Borne Disease Control Programme
PHCs	Primary Health Centres
PKDL	Post-Kala-azar Dermal Leishmaniasis
PPP	Public-Private Partnership
PRIs	Panchayati Raj Institutions
RDKs	Rapid Diagnostic Kits
RDTs	Rapid Diagnostic Test kits
RMRC	Regional Medical Research Centre
RRM	Regional Review Meetings
SHGs	Self-Help Groups
SI	Sanitary Inspectors
SSHs	Sentinel Surveillance Hospitals
SVBDCP	State Vector Borne Disease Control Programme
SW	Sanitary Workers
TAS	Transmission Assessment Survey
TBE	Tick-Borne Encephalitis
VBDs	Vector-borne diseases
VC	Vector Control
VCRC	Vector Control Research Center
VRDL	Viral Research and Diagnostic Laboratories
WHO	World Health Organization
ZVBDC	Zoonotic Vector Borne Diseases Research & Training Centre

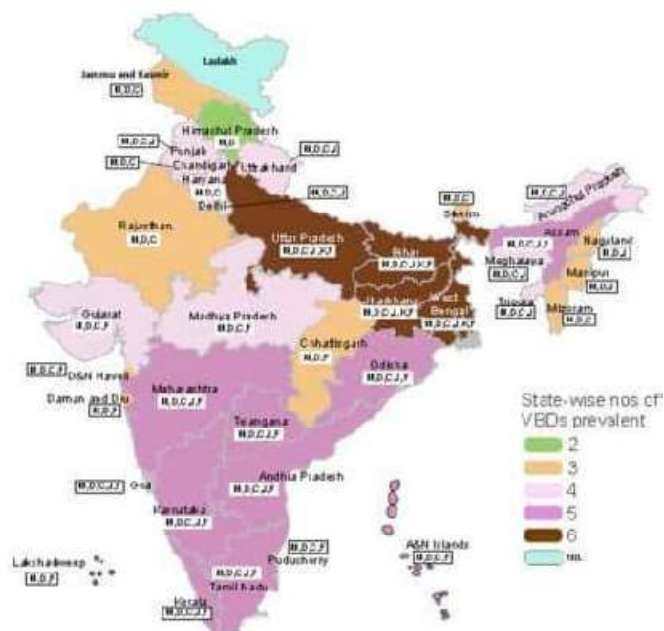
Introduction

1.1 Vector-borne diseases (VBDs) are a significant public health concern worldwide, including India. In India, especially, the North Eastern States, have been endemic for many vector borne diseases. Various arthropod vectors play pivotal roles in the transmission of diverse VBDs, notably mosquitoes, sandflies, blackflies, lice, ticks tsetse flies, etc. Commendable efforts have been made by the Government of India and State Government concerned across India, especially in North–East India, towards understanding the nature, prevalence, and breeding patterns of vectors, subsequently implementing measures to curb their proliferation. The crux of the issue is to comprehend the presence of different vector species and their subspecies in these endemic states of India, the distribution of vectors to mitigate infections and eliminate them within the designated time limit. While the age-old methods like indoor residual sprays, space sprays, fogging, treated bednets etc. are proving less effective in controlling the surge of VBDs, the study would like to emphasize the critical need for unified and collaborative efforts to contain/mitigate these diseases, both at the regional and national levels, by integrating various disciplines and strategies, international practices adopted towards its management and the possibilities of its implementation in India, challenges and solutions in containing/eliminating VBDs.

2.0 Vector-borne diseases in India: Definition, Distribution & Management

a) Definition & Distribution of VBDs in India

2.1 Vector-borne diseases can be defined as a group of communicable diseases transmitted by arthropods (mosquitoes, flies, lice, tick, mites, etc.) to humans. Malaria, Dengue, Chikungunya, Japanese Encephalitis, Lymphatic Filariasis and Kala-azar are the six main vector-borne diseases covered under the National Health Mission (NHM). National Centre for Vector-Borne Diseases Control (NCVBDC) formulates policies/guidelines, to provide technical, financial assistance as per NHM norms for prevention and control of these six VBDs. According to the Ministry, the Government has plans to eliminate Kala-Azar, Lymphatic Filariasis & Malaria by 2023, 2027 and 2030, respectively. Ladakh is one area which does not have any of these six vector-borne diseases. The map below reflects the distribution of the main vector-borne diseases in India.



2.2 The geographical & spatial distribution of various types of vectors and related diseases in the country, in general and North- East India, in particular, is as below:

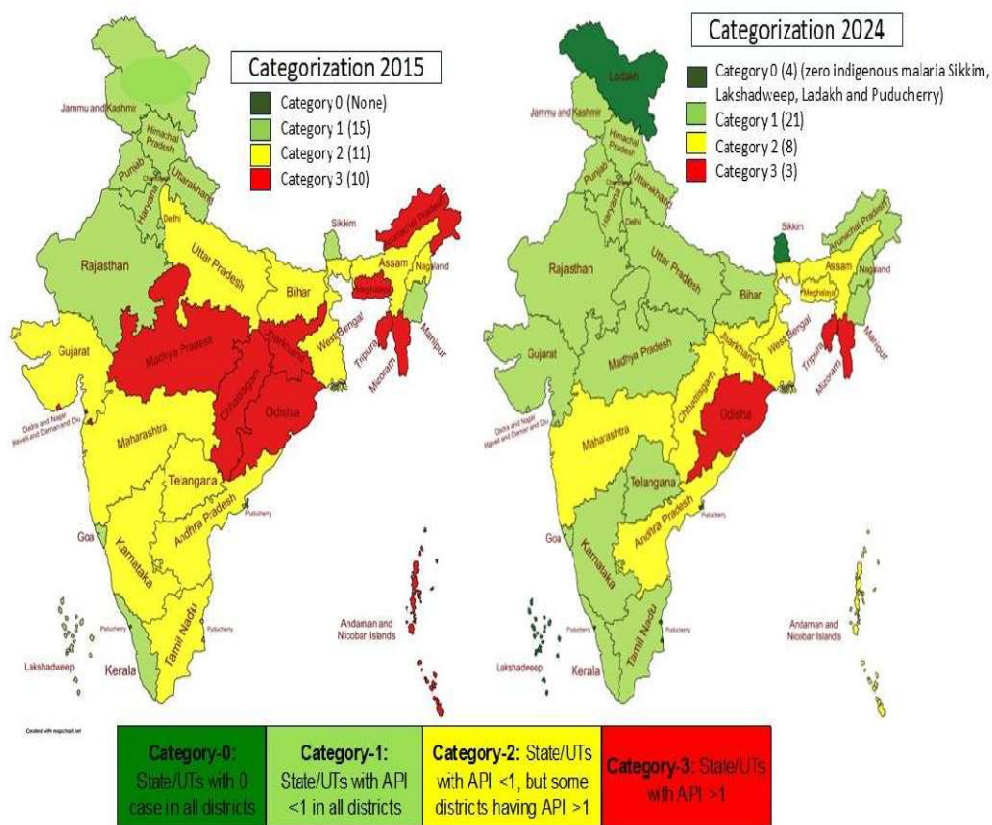
Disease	Vectors	India	North East	Vector in NE
Malaria	Anopheles	Present across 35 states/UTs	Assam, Mizoram, Meghalaya, Arunachal Pradesh, Manipur, Tripura, Nagaland	An. minimus An. fluviatilis An. baimai (dirus) An. culicifacies
Dengue / Chikungunya	Aedes	Present across 35 states/UTs (except Ladakh)	Emerging in Assam and other NE states; urban clusters expanding	Ae. aegypti Ae. albopictus
Lymphatic Filariasis	Culex	Present in 20 states/UTs	Assam; not endemic in other NER States	Cx. Quinquefasciatus
Kalaazar (Leishmaniasis)	Phelebotomus (Sand-fly)	Jharkhand, Bihar, UP, WB	Not endemic in NER States	Not endemic in NE
Japanese Encephalitis (JE)	Culex	Present in 24 states/UTs	Assam, Meghalaya, Arunachal Pradesh, Tripura, Manipur, Nagaland, Mizoram	Culex (Cx.) tritaeniorhynchus Cx. vishnui Cx. Pseudovishnui

b) Control & Management of VBDs

2.3 The Government depending on prevalence rate, the incidence and based on the local requirement alters their strategy, while working on vector control and management. The Government as part of their presentation before the Committee gave an overall picture regarding the methods/programmes adopted by them, over the period, across the country, to manage and control the spread of the six main vector-borne diseases covered under the National Health Mission.

I. Malaria

2.4 Malaria, is caused by the parasite Plasmodium, the PV and PF, i.e., Vivax and Falciparum, two major species which are found in India. It is transmitted by the bite of the female Anopheles mosquito. The system put in place by the Government is that the health workers, the ASHA & the ANMs workers, have been trained to find such cases of malaria, especially focusing in the endemic areas, where there is fever with chill and rigor. Further, identification of the disease is also done through Microscopy or Rapid Diagnostic Test kits available at the Ayushman Arogya Mandir, and thereafter, the treatment for the same is initiated. Over the decade, there has been a tremendous progress in reduction in the number of cases. The Annual Parasite Index (API) which is basically the number of positive Malaria cases per thousand population every year has also reflected the reduction.



2.5 The map shows the geographical incidence of Malaria indicating that in 2015, nearly ten States were in Category -3 which have API more than one. Whereas in 2024 only three States, namely, Orissa, Mizoram and Tripura, are left in the Category -3. The States in yellow have the API less than one overall, but there are a few districts left which have API more than one. Those in green are all those States which have API less than one in all the districts. The States in dark green, that is, Sikkim, Lakshadweep, Ladakh and Puducherry, do not have any indigenous cases. In the entire country, there are 37 high burdened districts, which have API more than one in 2024, while the number was 155 in 2015. There has been a drastic reduction in cases as well as deaths from 2015. Further, 160 districts have reported zero indigenous malaria cases since the last three years. In the Northeast, 16 districts in Arunachal and 6 districts in Nagaland have reported zero indigenous malaria cases since last three years. In all the districts which have reported zero malaria, the authorities are working on sub-national malaria elimination verification to declare them malaria free. All these States and UTs report are on the Integrated Health Information Portal (IHIP), on real time, for all the six vector-borne diseases.

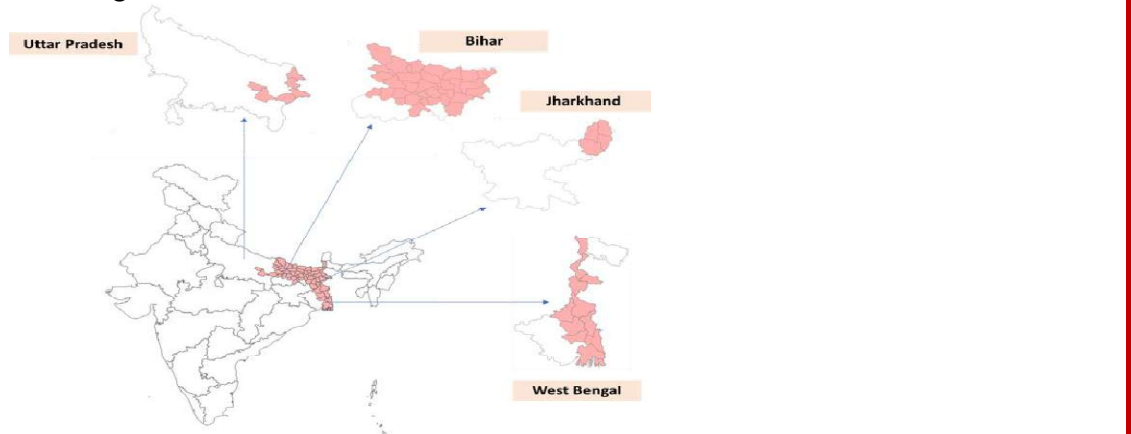
2.6 Various strategies have been adopted by the Government to ensure that all the districts have API less than one and for malaria elimination by 2030. The core intervention for malaria surveillance is the triple 'T' method, i.e., test, treat and track, for ensuring that all such cases are identified early, diagnosis is done and full treatment is done. Further, strategy for prevention for vector control is undertaken with collaboration of other Ministries like, the Ministry/o Rural Development, Department/o Urban Development, Ministry/o Panchayati Raj, etc.

2.7 Regarding capacity building in this area, regular training is provided to the ASHA and to the multi-purpose workers. To enhance the interest and commitment of these ground level workers, recently, the ASHA incentive for treatment completion has been increased from 75

rupees to 200 rupees. Other proactive measures from the side of the Government includes, tracking the stock of the drugs which are being provided to the patients, through strengthening the Drugs and Vaccine Distribution Management System (DVDMS) portal. For all these diseases, all the vaccines and drugs provided are monitored through the DVDMS portal. The Ministry in collaboration with ICMR is also promoting research activates for insecticide resistance and drug resistance. All these collective efforts have resulted in the exit of India from ‘high burden’ to ‘high impact’ countries as per the World Malaria Report 2024.

II Kala-azar

2.8 Kala-azar (KA) is caused by the bite of female Sand Fly. There are also a few Post-Kala-azar Dermal Leishmaniasis (PKDL) cases, that is, those Kala-azar cases where patient have skin manifestation after two years. PKDL is a non-lethal skin complication of visceral leishmaniasis (kala-azar). These patients are also put on treatment related to KA. Though not prevalent in the Northeast, there are four States, namely, UP, Bihar, Jharkhand, and West Bengal, where Kala-azar cases are still prevalent. Kala-azar is one of the vector-borne diseases which have achieved elimination since 2023, but the elimination has to sustain for three years. That is the second year of the sustenance of elimination. Accordingly, regular trainings are given on the sub-national elimination in order to sustain it for three years. After one more year of sustenance of elimination, the certificate from the WHO on the elimination of Kala-azar can be expected. Accordingly, these four States are preparing the dossiers and would be submitting it to the WHO.



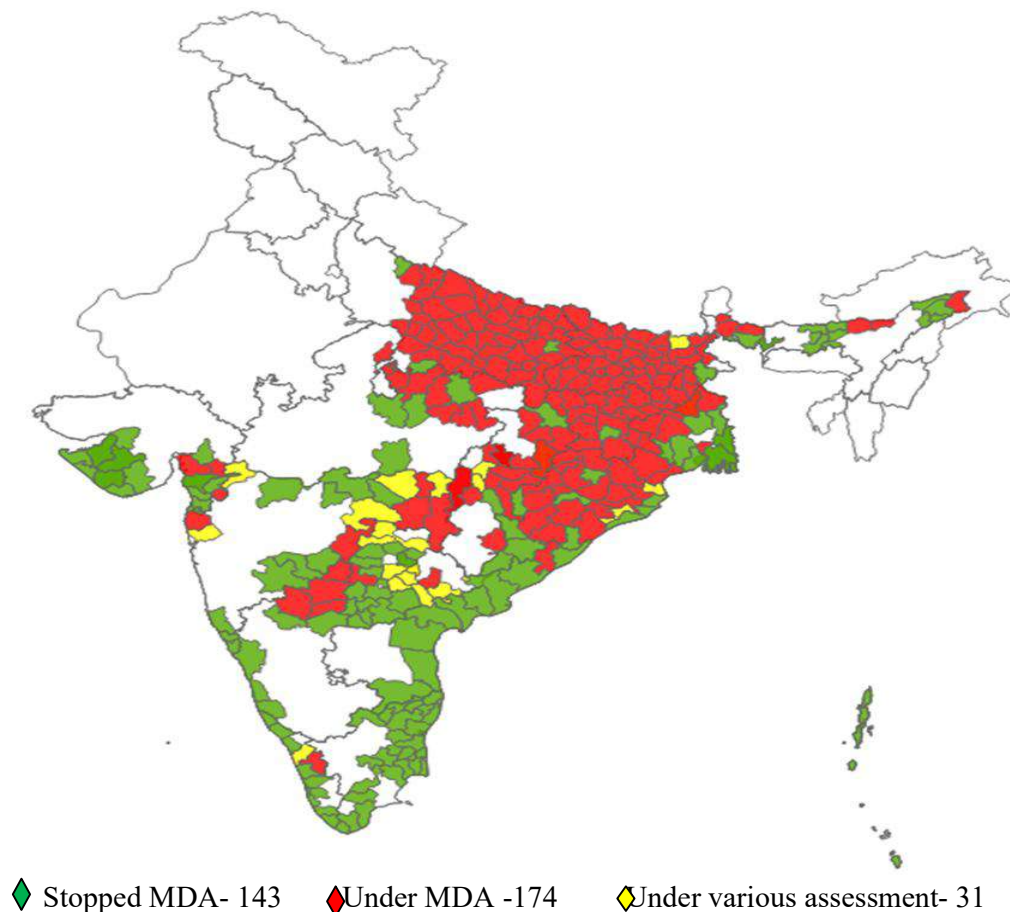
2.9 Since 2023, India contributes to around 4 per cent of Kala-azar cases, earlier, it was 35 per cent. In 2014, there were 9241 KA cases which came down to 485 in 2025 i.e. 95 % decline in the last 10 years. In July, 2025, only 320 cases of Kala-azar and 204 cases of PKDL were reported. The endemic blocks were 33 in 54 districts of the four States, namely, Bihar, Jharkhand, Uttar Pradesh, and West Bengal. Out of this, 90 per cent contribution was by Bihar and Jharkhand.

2.10 From 2015 onwards, as part of the Kala-azar Programme, the Government has introduced a single-day-single-dose injection of AmBisome in the place of 28-day Miltefosine regimen. Also, Kala-azar cases are being reported on the IHIP portal alongwith other vector borne diseases. Initiatives which have borne results in the decline of KA cases are use of Gerard plaster to reduce the density of Sand Fly; community engagement wherein self-help groups are mobilized at the village level to help in sensitization and also identifying the cases early and putting them on treatment; engagement of 22 medical colleges in 4 Kala-azar endemic states in 2022; introduction of wage loss incentives to KA/PKDL patients, etc. In

Bihar and Jharkhand, Kala-azar patients are given an additional incentive of Rs. 6,600 and for PKDL cases, the wage loss incentive is Rs. 4,000.

III Lymphatic Filariasis

2.11 Lymphatic Filariasis (LF) is caused by the bite of Culex mosquito, which breeds in dirty water and affects the lymphatic system. It is the chronic Lymphatic Filariasis, which leads to Lymphedema, known in common terms as the hathi paon, or Elephantiasis and Hydrocele.



2.12 The districts which are LF endemic do Mass Drug Administration (MDA). Once these districts clear the Transmission Assessment Survey (TAS), MDA is stopped. LF was endemic in 20 States and UTs across 348 districts. Out of this, 41 per cent, i.e., 143 districts have cleared the TAS. Out of these 20 endemic States, 6 States have stopped MDA are Goa, Tamil Nadu, Puducherry, Dadra and Nagar Haveli, Daman and Diu, Lakshadweep, Aandaman and Nicobar Islands. Around 174 districts have reported more than 01 per cent microfilaria rate, hence under MDA and 75 per cent of these districts are from five States, namely, Bihar, Chhattisgarh, Jharkhand, Odisha and Uttar Pradesh.

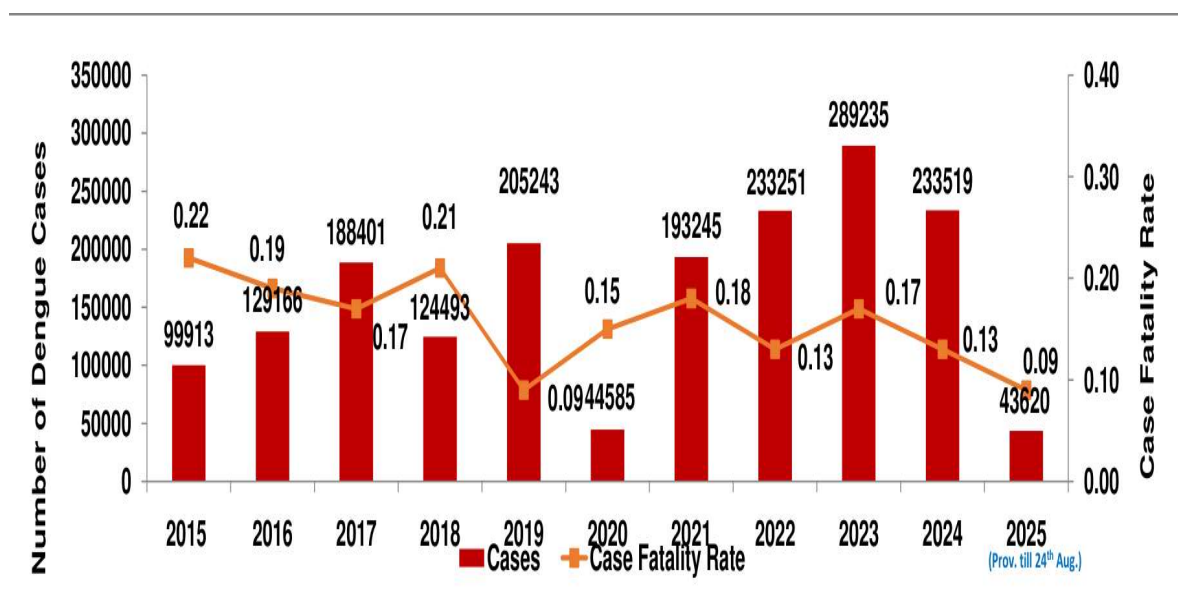
2.13 The Government of India has a five-pronged strategy to battle lymphatic filariasis. One is the Mass Drug Administration (MDA) campaign, which till date is done twice a year on 10th February and 10th August. However, the Committee has been apprised that since the number of districts affected by LF has reduced, respective States have requested only one round of campaign. Hence from 2026 onwards, only 10th February annual round for all the districts which have microfilaria rate more than one per cent. Once MDA round is done in

medical colleges, the teams are sent in rural areas where the team check whether consumption for the drugs has actually happened that are being provided under the LF. Second and third strategy is working on morbidity management and disability prevention, and vector control, surveillance and management. These strategies involves intersectoral convergence with all line departments, especially Rural Development, Urban Development, Panchayati Raj, Women and Child Development, Drinking Water and Sanitation, etc. Fourth strategy is high level advocacy with intersectoral convergence. Lastly, it is innovation in the field of drugs and diagnostics done with ICMR.

2.14 Recent achievements in containing the LF include MDA coverage round in February and August, 2024 & February 2025 being quite effective with 94% direct observed consumption; two-fold increase in Hydrocele surgeries, i.e., 38,382 in 2021 to 63,370 in 2024 and increase in medical college participation for Coverage Evaluation Survey from 1% (2 districts) in 2019 to 96% (152 districts) in 2024. In the category of newer initiatives under the LF programme, foremost is early diagnosis with focussed approach for epidemic districts. Early diagnosis and treatment are being reported on the IHIP portal. A real-time monitoring on a day-to-day basis is being done to know about the areas where new cases have come up and accordingly, strategy is changed. Further, guidelines for elimination of LF have been revised. The Committee, in this regard, notes that there is also a change in honorarium for the drug administrator, the ASHA workers, who actually go door to door to supply the drugs during the MDA, which has recently been increased from Rs. 600 to Rs. 3,000.

IV Dengue

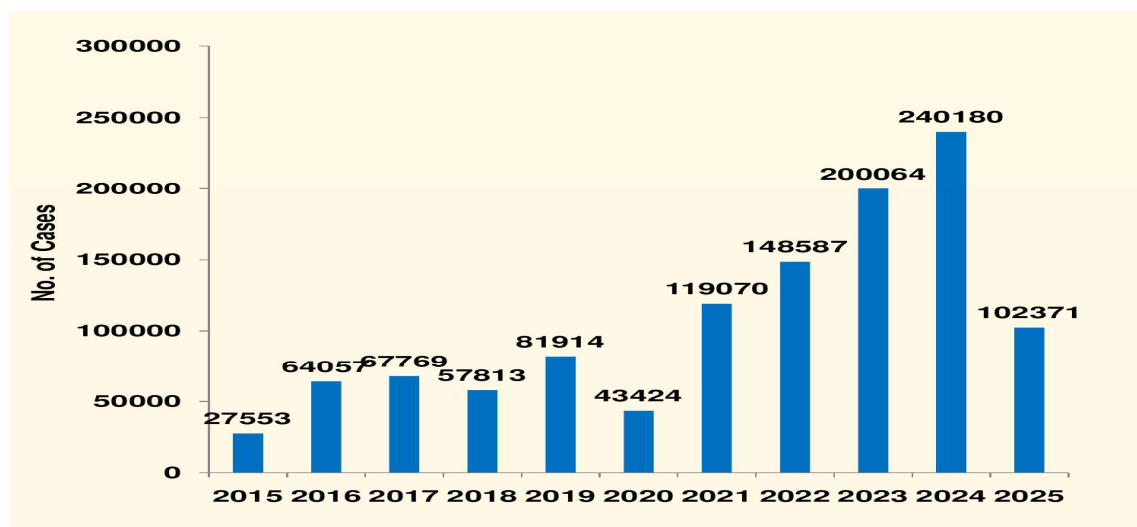
2.15 Dengue is a viral disease transmitted by Aedes mosquito. There are four virus serotypes viz. DENV-1, DENV-2, DENV-3, and DENV-4 related to dengue circulating in India. Climatic conditions, rapid urbanisation, and poor waste management have facilitated this Aedes proliferation.



Generally, 70 per cent to 80 per cent of the dengue cases are reported from July to November. All states in India are endemic of the disease except Ladakh. Dengue first appeared in Assam in 2010, with significant outbreaks since 2013. In 2025, only around 43,620 cases have been reported till August, it was quite a drop in the number of cases because of the early interventions which started from June itself.

V Chikungunya

2.16 Chikungunya is another viral disease spread by the bite of Aedes mosquito. All States and UTs are endemic of Chikungunya except Ladakh. This disease is not directly attributable to death. As far as Chikungunya case fatality ratio is concerned, the national target is of less than one per cent, which has been sustained at 0.2 per cent since 2015. Measures to curtail the spread include preparation of national guidelines before the season.



2.17 Since the endemic of Chikungunya is mostly limited to urban areas, ministries involved are Ministry of Health and Family Welfare and Ministry of Housing and Urban Affairs (MoHUA) who holds meetings with municipalities and joint action plan is developed. Strict monitoring is done and reported on the IHIP portal. Core focus is on sensitization and training, as there is no treatment, the focus is on vector control and management, and prevention. Currently, there are 869 Sentinel Surveillance Hospitals and 27 Apex Referral Laboratories which provide advanced diagnostic services for both dengue and chikungunya testing.

VI Japanese encephalitis

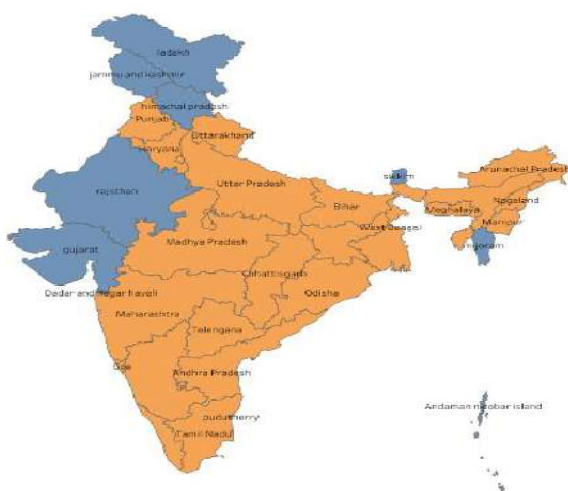
2.18 Japanese encephalitis (JE) is mosquito-borne viral disease transmitted by Culex mosquito. These mosquitoes generally breeds in rice fields, ponds, irrigation channels, etc, hence majority of the JE infection occurs in rural areas. The transmission happens generally between July and October. JE is primarily a childhood disease accordingly a two dose JE vaccine is given to children. The doses are given between 9 to 12 months and 16 to 24 months. Adults are also affected by the disease, in endemic areas where get adult cases, adult JE vaccination have been started which is a single dose.



- Endemic (24)



- Non Endemic (12)



2.19 According to last 2024 data, majority of cases were from Assam, Meghalaya, Jharkhand, Madhya Pradesh, Uttar Pradesh, Bihar, Manipur, Chhattisgarh, Tamil Nadu and West Bengal. Out of which, the leading states were Assam, Manipur and Meghalaya. IgM ELISA is the testing kits used for diagnostics of JE. The fatality rate related to the disease has reduced drastically from 17.6 per cent in 2014 to 7.1 per cent in 2024. Sentinel Surveillance hospitals (SSHs) have increased over the years from 101 to 174 and the Apex Referral Laboratories have increased from 12 to 15 between 2014 and 2024.

2.20 The Committee takes into account that India faces persistent Vector Borne Disease (VBD) burdens, with Dengue reporting hundreds of deaths in recent years, along with Malaria, Chikungunya and other VBDs outbreaks influenced by various factors. The Committee understands that VBDs have varied determinants which include environmental, socio-economic and infrastructural factors. Therefore, to control and manage the advances of VBDs, an integrated approach combining chemical, biological, and environmental controls are needed. The Committee believes that while Government has taken many major measures in containing the VBDs, there is always scope for innovation and improvement in the area. The measures taken by the Government to eliminate breeding sites, regular community clean-up drives, usage of chemical vector control like adulticides *via* fogging, etc., seems to have been exerting limited effect. But the biological control measures like the promotion of natural predators like larvivorous fish and sterile insect techniques are potent and promise long-term success. The Committee feels that all these efforts would gain more benefits if a common and coordinated task approach, involving various Ministries/Organizations concerned, is adopted and adhered to. Such coordinated policy/programme should also take into consideration the different levels of incidents across affected states/districts. Scattered policies and its implementation would only lead to resurgence of VBDs, therefore, leading to escalation of economic and health costs. Accordingly, the Committee recommends that the Government should strengthen the existing framework/ roadmap for controlling and managing VBDs with a clear-cut timeline for phasing out and for complete elimination of each the vector-borne diseases from the country.

2.21 While the Committee acknowledges the efforts of National Vector Borne Disease Control (NVBDC) through Integrated Vector Management (IVM) in India, the concept

developed by WHO, as early as in the 1980s, it feels that the Government should revamp the IVM in India. The Committee, in this connection, recommends that the Government must re-orient IVM in India more effective and productive manner by encompassing aspects like interdisciplinary research networks; regularly reviewing and updation of existing guidelines/policies; innovative capacity building programs; scaled up infrastructure; digital platforms for sharing best practices; usage of authentic social media as awareness campaign forum, promoting community participation, focusing more on high-risk groups, like children, pregnant women, outdoor workers and travelers to endemic areas, etc.

2.22 Regarding the vaccinations for counter and management of VBDs, the Committee understands that internationally, vaccination is available for Yellow Fever, Japanese Encephalitis, Tick-Borne Encephalitis (TBE), Chikungunya, Dengue, and Malaria. Whereas in India, vaccination is available only for Japanese Encephalitis which is free of cost under the Universal Immunization Programme. To address the gaps, the Committee strongly recommends that India should pursue international collaborations with WHO and other leading organizations and benefit from the global expertise for vaccine development. Further, the Government should also facilitate the efforts to speed up the indigenous vaccine development for Dengue and Chikungunya through the establishment of clinical trial networks and also expand immunization coverage of JE. The Committee also recommends that the Ministry should further explore the newer ideas like mRNA and viral vector technologies for rapid development of vaccines, micro needles, nasal sprays to enhance vaccine uptake and efficacy, cold-chain vaccine outreach for vulnerable and unreachable regions, etc., for strengthening immunization of VBDs.

2.23 The Committee has also been made aware of lack of defined protocols to treat complicated stages of VBDs like 3rd and 4th stage of Dengue, Dengue Hemorrhagic Fever and Dengue Shock Syndrome. The Committee also recognizes the need for effective research for future preparedness in anticipation of the emergence of new VBDs. In this regard, the Committee recommends that the Ministry should prioritize the development of disease-wise Standard Treatment Protocols, especially for complicated stages of VBDs. The Committee further recommends that research may be undertaken under the guidance of ICMR to identify new diseases transmitted by vectors and related complications as part of future preparedness.

3.0 Trends of VBDs in North–East India

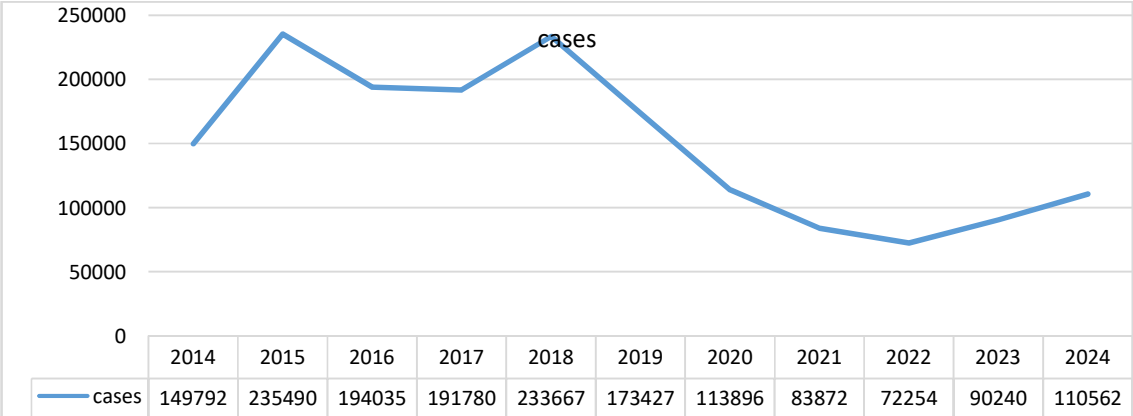
3.1 The Northeast Region (NER) of India, comprising eight states including Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, and Tripura, is particularly vulnerable to VBDs due to its unique ecological, climatic, and socio-economic conditions. Intense monsoon rains create ideal breeding habitats for mosquitoes, while abundant paddy fields, ponds, blocked drains, and poorly maintained water storage systems further contribute to mosquito proliferation. Additionally, the region's dense forest cover supports forest-dwelling vectors such as *Anopheles dirus* and *An. fluviatilis*, which are highly efficient malaria vectors.

3.2 The study of VBDs in NER of India mandated a sketch on the major causes for incidences along with region specific geographical expansion of the diseases. The details of the major causes for incidence of five VBDs in NER are narrated below:

3.3. Malaria: The NER is endemic for malaria, involving both *Plasmodium falciparum* (responsible for most of the severe and fatal cases) and *Plasmodium vivax*. Factors responsible for Malaria endemicity are hard to reach areas, difficult terrain, warm and humid

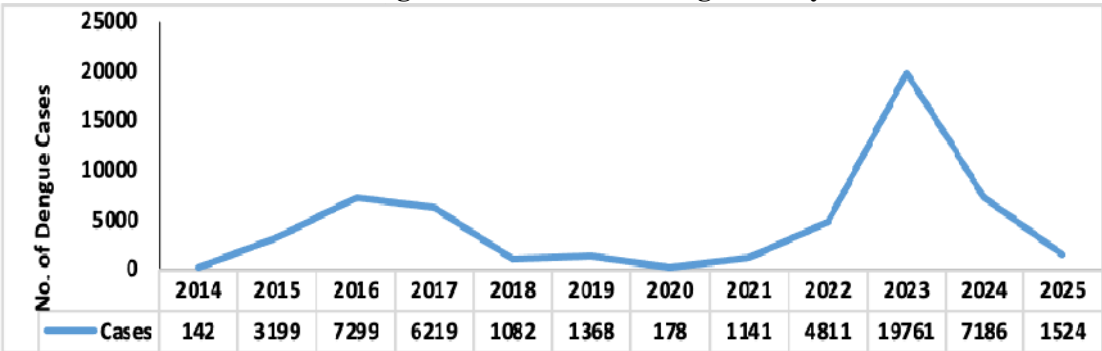
climate, exposure of forest dwelling and tribal population, rapid urbanization with unplanned construction activities. Assam, Arunachal Pradesh, Meghalaya, Mizoram, and Tripura report the highest burden from 2000-2014 and NER region as a whole contributed around 8.4% of total cases in India in 2000. Details of the same are at **Annexure-1, Table 1& 2**.

Trend of Malaria cases in NER during last 10 years



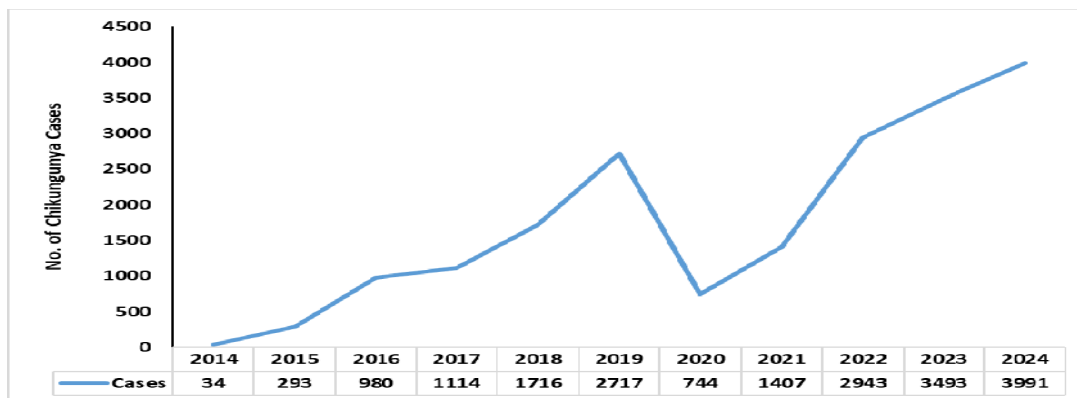
3.4 **Dengue:** Dengue cases in the NER States and their contribution in country’s total during 2000 to 2024. Details of the same are at **Annexure-2, Table 3 & 4**. Many climatic factors and human activities influence incidence and geographical expansion of Dengue, of which major factors are rapid urbanization with unplanned construction activities; demographic and societal changes; increased population movement; deficient solid waste management system; inadequate water supply and improper storage practice; limited vector control tools; lack of community ownership and global climate change.

Trend of Dengue cases in NER during last 10 years



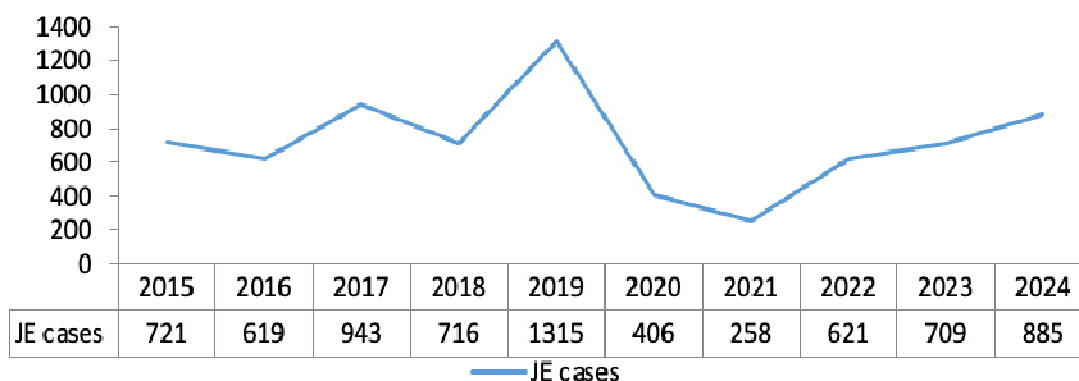
3.5 **Chikungunya:** Chikungunya is an outbreak-prone viral disease transmitted by bite of infected Aedes mosquito. It affects all age groups and both sexes. The disease can cause debilitating illness which may persist for more than a year. According to the Governments submission no deaths have directly attributable reported by any State/UT due to chikungunya. This disease is endemic in all States/UTs (except Ladakh). The statistics of chikungunya from 2000-2024 different states and NER is place at **Annexure-3, Table 5 & 6**.

Trend of Chikungunya cases in NER during last 10 years



3.6 Japanese Encephalitis (JE): JE is a mosquito borne arbo-viral disease, transmitted by Culexvishnui group. These mosquitoes breed in rice fields, ponds, irrigation channels, pools and puddles rich with aquatic vegetation. Majority of JE infection occur in rural areas and the transmission occurs mostly during July to October. Primarily a childhood disease, majority of JE cases are reported among child under 15years. Adults are also affected as reported by many States. Details of the incidence are at **Annexure-4, Table 7 & 8.**

Trend of JE cases in NER during last 10 years



3.7 The Committee wished to know the spread of vector-borne diseases in tribal and rural populations in the NER and sought the information from the Ministry. In this regard, the Ministry apprised the Committee that VBDs related data was not collected with tribal and rural bifurcation. The data maintained in the Ministry is state-wise information reflecting year wise the incidence/rate of vector-borne diseases.

3.8 The Committee feels that the NER States and also the entire country should maintain data specifically reflecting the incidence/rate of vector-borne diseases among tribal, rural and urban population, which would help framing effective and sustainable localized public health policy in the areas. India's VBD epidemiology is highly diverse due to differences in vectors, ecology, socio-economic conditions and healthcare access, etc. In India's diverse landscape, aggregate statistics may not present the ground realities and will lead to "one-size-fits-all" approaches. Specific data would help in drafting tailor-made control and management strategies, efficient resource allocation and prioritization. This should act as support material for prioritizing research subjects,

capacity building and policy refinement. The data would also support proper allocation of funds and helps integrate VBD control with broader programs like Ayushman Bharat Health and Primary Health Centres/Wellness Centres in rural areas, urban health missions, One Health approaches in tribal-forest regions. Accordingly, the Committee recommends for the maintenance and sharing of specific data at national and state levels on VBD spread in tribal, rural and urban areas.

4.0 Major determinants surging VBDs outbreaks in NER

4.1 Various studies points towards climatic conditions of hilly areas, deforestation, water logging, etc, vector proliferation leading to VBDs outbreaks in NER. The cooler and humid climate in hilly regions like the North eastern states and parts of the Himalayas may provide a conducive environment for the survival of certain vectors, especially Anopheles mosquitoes (malaria). Likewise, climate change may cause a shift in vector habitats to higher altitudes. Example, El Niño effect causing increased rainfall & higher temperatures results in expansion of mosquito breeding sites pre disposing to VBDs. Further, deforestation disrupts natural ecosystems, bringing humans into closer contact with forest-dwelling vectors and zoonotic disease reservoirs. Also, poor drainage systems, especially in urban slums and during the monsoon season, result in stagnant water that becomes ideal breeding grounds for mosquitoes. Increased temperature, drought, disrupted rainfall lead to water storage and increased breeding sites. Increased temperature may also lead to more mosquito bites as it shortens development of eggs to adults, reduces extrinsic incubation period, increases survival in areas that were formerly cold. The Committee desires that the Government should formulate Urban Mosquito Risk Index and develop a city and district-wise Mosquito Risk Index based on breeding sites, waste management, rainfall and disease incidence in order to use the index to prioritise interventions by Urban Local Bodies. The Government may encourage healthy competition among cities for effective vector control.

4.2 Further, it was presented before the Committee that one of the causative factors responsible for the endemicity of vector borne diseases in NER is rapid urbanization with unplanned construction activities. In this regard, the Committee sought to know how this factor specifically contributes to the vector borne diseases in NER and the remedial measures to address this specific factor. In reply, the Ministry submitted that the rapid urbanization with unplanned construction activities leads to increased number of breeding sites for vector mosquitoes leading to increased risk of VBDs. To mitigate this risk, strong inter-sectoral coordination with line departments like Urban Development and Town Planning are important for effective and stricter implementation of civic regulation. In this context, it was informed that the M/o H&FW had organized high-level advocacy meetings to sensitize the line departments on their role and support in preventing mosquitogenic conditions in the country including NER. Further, the Ministry had also advised the states on the implementation of bye-laws for preventing mosquito breeding in the community and construction sites for preventing VBDs. Community awareness campaigns are implemented to promote mosquito prevention practices and improve environmental cleanliness, supporting long-term efforts for control of VBDs in NER.

4.3 While discussing the determinants behind the surge of VBDs, the Ministry informed that climate change may cause a shift in vector habitats to higher altitudes. The Committee wanted to know about the empirical data, which supports this factor. In reply, the Ministry stated that in the recent years, there were reports about change in temperature, humidity, and rainfall pattern across the country including the NER. Increased temperature shortens development time of mosquito eggs to adults and reduces extrinsic incubation period of the pathogen inside the mosquito, due to which the mosquito biting on human increases in intensity. According to the Ministry, this may lead to increased transmission of vector borne diseases like Dengue.

4.4 Another factor that impacts the prevalence of vector borne diseases in NER as submitted by the Ministry, is the proximity to international borders. Accordingly, the proximity of NER states to international borders contributes to the prevalence of VBDs especially in border areas with Bhutan, Myanmar and Bangladesh. Seasonal migration and cross-border movement with Myanmar, Bangladesh, and Bhutan further facilitate the spread of infections. Piggery is yet another determinant in the NER, which primarily contributes to vector-borne diseases. The major challenge being the presence of unorganized pig farms near paddy fields and human habitations, creating favourable conditions of VBDs especially Japanese Encephalitis (JE).

4.5 The Committee understands that NER's unique geo-climatic, ecological, and socio-cultural setting create exceptionally high receptivity and perennial transmission in many areas, explaining the disproportionate historical burden of VBDs. The Committee finds that the key determinants for the spread of VBDs in the region include environmental and climatic conditions like hot-humid conditions, abundant water bodies, deforestation, shifting cultivation and unplanned urbanization. Vector Bionomics and ecological shifts like multiple efficient *Anopheles* species, multi-insecticide resistant, high biting rates, pigs/birds as amplifiers also accounts for as determinants. Further, there are Socio-economic, demographic, and access determinants like diverse indigenous/tribal populations, cross-border and internal migration facilitating parasite/vector movement, limited healthcare access, asymptomatic reservoirs, etc. Behavioural and occupational factors include outdoor livelihoods, proximity to breeding sites and poor waste management. Health system and programmatic factors include funding and human resource gaps, vaccination coverage gaps or diagnostic challenges, fragmented surveillance. Taking these factors into consideration, the Committee feels that the Government should implement a region-specific, integrated, multi-sectoral VBDs strategy for assured control and management of VBDs in the NER. Such approach should be adhered to and implemented while keeping into consideration the eco-epidemiological understanding of local determinants, prioritize universal coverage of proven tools like long-lasting insecticidal nets/LLINs and artemisinin-based combination therapies (ACTs), strengthened surveillance by including detection of asymptomatic and GIS hotspot mapping.

4.6 The Committee, accordingly, recommends for regular community engagement customized to tribal sensitivities, enhanced cross-border and inter-state coordination, dedicated funding along with inter disciplinary research collaborations and stronger coordination between the National Vector Borne Disease Control, State Governments, Medical institutions, ICMR, and Department of Health Research (DHR) for effective implementation of adopted strategy. Improved public awareness programmes about VBDs, their transmission, and preventive measures as well as education campaigns should target high-risk populations, focusing on behavioural changes to reduce vector exposure are vital. The Committee believes that a general national template is insufficient due to NER heterogeneity, hence, recommends for a region-specific, integrated, multi-sectoral VBDs strategy for effective and result oriented control and management of VBDs in the NER of India.

5.0. Measures adopted by Central/State Governments in NER to control vector-borne diseases

5.1 The Ministry of Health and Family Welfare as part of presentation before the Committee submitted the steps/initiatives taken by the Government through the National Vector Borne Disease Control Programme (NVBDCP) for the control and management of VBDs. According to the Ministry, the Disease Management involves early case detection with active, passive and sentinel surveillance followed by complete and effective treatment,

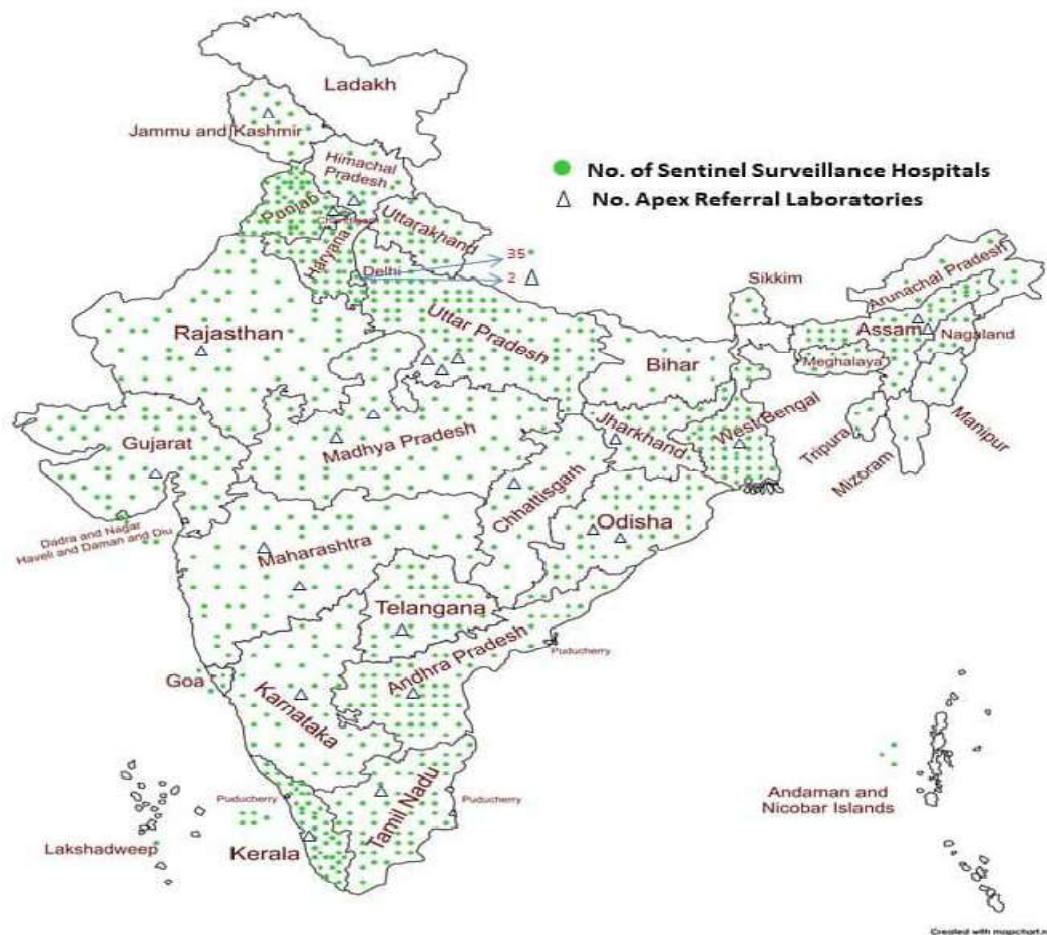
strengthening of referral services, epidemic preparedness and rapid response. Integrated Vector Management measures include Indoor Residual Spraying (IRS) in selected high risk areas, long lasting Insecticidal Nets (LLINs) in high malaria endemic areas, use of larvivorous fish, anti-larval measures in urban areas including bio-larvicides and minor environmental engineering and source reduction for prevention of breeding. There are also supportive interventions aiming at bringing in Behaviour Change Communication (BCC), Inter-Sectoral Convergence and Human Resource Development through capacity building. The Committee was also curious to know about the common awareness campaigns related to vector-borne diseases, like sanitation measures, insecticide-treated nets and repellents and the role of Local Self Government Institutions in such campaigns. In reply, the Ministry informed that under the overarching umbrella of National Health Mission (NHM), funds are provided for community awareness activities such as dissemination of messages through various media, distribution of pamphlets, leaflets, posters, banners, miking, rallies, campaigns, Local schools' awareness programmes, advocacy workshops with Panchayati Raj Institutions (PRIs), Villages council members, sunboards and LLIN.

5.2 The Committee specifically sought the details of steps taken to monitor insecticide resistance in different NER States and the protocol which exists for change of the insecticide used in vector management. In response, the Ministry informed that insecticide resistance against vector mosquito species is regularly monitored by NVBDC through the State Entomological Zones, including NER. Indian Council of Medical Research (ICMR) institutes, Regional Medical Research Centre, North-East Region, Dibrugarh and ICMR-Vector Control Research Centre, Puducherry also carry out studies on insecticide resistance on vectors in NER and other States. Insecticide resistance monitoring is carried out using standard guidelines. The programme has provided technical guidelines to the States for change of insecticide. The Ministry also submitted an instance of change of the insecticide used in vector management, i.e, in 2015, Kala-azar endemic States have changed DDT with Synthetic Pyrethroids for vector control. DDT has been phased out from the programme and States were advised to stop use of DDT. In its place, States have shifted to Malathion and Synthetic Pyrethroid insecticides for indoor residual spraying to eliminate Malaria.

5.3 The Committee understands that insecticide resistance is one of the major challenges related to vector management. Insecticide resistance against vector mosquito species is regularly monitored by National Vector Borne Disease Control and accordingly technical guidelines are issued to the States for change in the usage of insecticide. Following various studies undertaken by ICMR that reported resistance of DDT in Malaria vectors, DDT has been phased out, and Synthetic Pyrethroids & Malathion are used. The Committee believes that rotation of Indoor Residual Spraying (IRS) insecticides, introduction of next-generation Long Lasting Insecticidal Nets (LLINs) (PBO/dual-active), routine insecticide susceptibility testing, and adoption of Integrated Vector Management (IVM) combining multiple interventions, including environmental management and larval control could be more effective measures that can be adopted to deal with insecticide resistance. Hence, the Committee strongly recommends that the said measures/strategies be made part of the IVM guidelines and promoted vigorously among the NER population through varied platforms.

5.4 Subsequently, considering the high rate of incidence of vector borne diseases in NER, the Committee wanted to know the measures adopted by the Government to revamp and

refurbish the diagnostic /testing infrastructure in the NER States. Regarding which the Ministry submitted that free diagnosis and treatment services for VBDs are provided under National Health Mission through existing health facilities like Ayushman Arogya Mandir/Sub-Centres, Primary Health Centres (PHCs), Community Health Centres (CHCs), and District Hospitals. However, to augment free diagnosis of Dengue, Chikungunya and Japanese encephalitis in NER, M/o H&FW has designated District hospitals, Medical colleges as Sentinel Surveillance Hospitals (SSHs). Currently, there are 869 Sentinel Surveillance Hospitals and 27 Apex Referral Laboratories which provide advanced diagnostic services for both dengue and chikungunya testing. The Ministry also submitted that for Dengue and Chikungunya, the SSHs in NER has increased from 29 in 2014 to 70 in 2025 and for Japanese encephalitis, it was increased from 30 in 2014 to 52 in 2025. In addition, ICMR-Regional Medical Research Centre, North-East Region, Dibrugarh and All India Institute of Medical Sciences, Guwahati are the Apex Referral Laboratories (ARLs) with advanced diagnostic facilities. A map on the network of laboratories for early diagnosis of Dengue & Chikungunya is shown below.



Laboratory & SSH Network for Dengue & Chikungunya

5.5 Regarding the human resources, as part of their written submission to the Committee, ICMR- Vector Control Research Centre informed that there is a critical shortage of trained entomologists at state, district, and municipal levels which affects surveillance, insecticide resistance monitoring, and outbreak response. According to them, many sanctioned posts under NCVBDC and state health departments remain vacant or filled by non-specialists which limit evidence-based vector control and delays response actions. It was also submitted

that the strengthening the entomology workforce through targeted recruitment, continuous training, and collaboration with ICMR and academic institutions is vital to sustain elimination progress.

5.6 The Committee, while acknowledging the free diagnosis and treatment services for VBDs provided under National Health Mission, feels the necessity for in depth considering of the diversity and extent of the country's population, especially in NER. The Committee has come across the fact that there is still considerable gap in the distribution of laboratory and diagnostic infrastructure in the NER. In the opinion of the Committee, limited laboratory capacity and processing time delays confirmation of VBDs cases. Accordingly, the Committee recommends for the creation/expansion of adequate Viral Research and Diagnostic Laboratories (VRDL) network in NE states. Regarding diagnostic tests, the Committee wants the Ministry to explore the possibility of multiplex diagnostic platforms and point-of-care diagnostic tests, for use in low-resource regions, that can be rapid, affordable and detect multiple VBDs, simultaneously.

5.7 Shortage in manpower, supply management, and timely disease surveillance are the challenges faced in the remote areas of NER related to VBDs. The Committee desires that the disease surveillance system should be strengthened through real time, technology-driven monitoring to ensure early detection and timely response to infectious disease. It has also been brought to the notice of the Committee that many sanctioned posts under National Vector Borne Disease Control (NVBDC) and State health departments remain vacant or filled by non-specialists. The shortage of skilled and trained human resources in NVBDC and State health departments prove to be a major operational gap in implementing VBD control programmes as absence of skilled entomologists affects entomological surveillance, insecticide resistance monitoring, and data-driven decision-making, which in turn, limits evidence-based vector control and delays response actions. Accordingly, the Committee recommends for fast-track recruitment and deployment of qualified entomologists in all NCVBDC districts and regular certificate driven capacity building programmes to be held through premium institutes for stakeholders. The need for the establishment of a North Eastern Regional Entomology Training Hub for capacity building and technical certification has also been brought to the notice of the Committee, accordingly, the Committee recommends that the Ministry should actively look into the feasibility of the settling up of such a training hub in the NER.

5.8 According to the Ministry, the NER states, particularly, Assam, Manipur, Meghalaya and Tripura, contributed a major share of India's Japanese Encephalitis (JE) cases in 2024. The burden is due to eco-epidemiological factors such as vast paddy field areas, irrigation canals (vector breeding sites), unorganised pig farms often near paddy fields and human habitations, creating conducive conditions for Japanese Encephalitis Virus amplification. Addressing the submission of the Ministry that piggery management as one of the challenges faced in the VBDs control in NER, the Committee sought to be appraised on the measures taken by Government to regulate piggery management. Responding to which, the Ministry replied that the NCVBDC provides technical guidance and advisories regularly, especially during pre- and post-monsoon seasons, to all Japanese Encephalitis (JE) endemic States and Union Territories including NER States, to create public awareness through focussed campaigns, prioritizing clean up drives and source reduction activities. The Ministry also

shared with the Committee that the Government is providing indigenous JE vaccine (2 doses) under Universal Immunisation Programme for the children aged 9-12 months and 16-24 months in 83 JE endemic districts of NER.

5.9 The Committee acknowledges that agricultural practices such as paddy cultivation and pig rearing create conditions conducive to malaria and JE transmission. Most of the time people engaged in such agricultural practices/ animal rearing overlook the hygiene protocols related to water logging, disposal of pig manure, etc. This is due to lack of awareness which reflects in their behavioural pattern. The Ministry has submitted that the National Vector Borne Disease Control provides technical guidance and advisories regularly, especially during pre- and post-monsoon seasons, to be followed in such agricultural practices/ animal rearing. Nevertheless, the Committee recommends that the Ministry should enhance the promotion of animal and human surveillance, pig rearing regulation and zoning as per international One Health best practices. The Committee, moreover, recommends the Ministry to conduct regular community awareness campaigns under the guidance of Village Health Committees, thereby targeting school and workplaces to bring forth sustained behavioural changes.

5.10 Along with occupational hazards, socio economic challenges such as different tribes and their beliefs/interactions, their confidence in health facilities, water sourcing practices, etc. also form part of factors listed by the Ministry playing a role in its fight against vector borne diseases. To address such socio-economic challenges, beliefs and practices, efforts are made through multi-sectoral coordination with forestry, tribal departments, faith based organizations and non-governmental sector to control transmission in NER and build confidence of the tribal population in health care activities. Further, foot soldiers like ASHA workers sensitize the community about VBDs and provide diagnosis and treatment for Malaria. Community Health Officers are also involved in connecting with the community to create awareness about VBDs and health facilities. Awareness campaign is carried out through locally adapted and culturally accepted messages for sensitization of tribal community towards personal protection, vector management, health seeking behaviours etc.

5.11 On different factors impacting the prevalence of vector borne diseases in NER, the Committee wanted to understand how far the proximity to international borders is relevant. According to the Ministry, the proximity of NER states to international borders contributes very much to the prevalence of VBDs especially in border areas with Bhutan, Myanmar and Bangladesh. The challenges faced are related to surveillance and vector control. As per Ministry's submission, regular cross-border coordination, joint surveillance, early diagnosis, complete treatment and intensified vector control measures in border districts are carried out to address these problem.

5.12 Keeping in view multi-dimensional socio-economic challenges such as different tribes and their beliefs/interactions, water sourcing practices, etc., the Committee believes that concerted efforts should be made to have door to door surveillance and awareness campaigns to boost the confidence of tribes in the popular national health system and universal immunization programmes. Such efforts should be made with the help of Accredited Social Health Activist (ASHA) and Community Health Officers. According to the Committee, such approach and strategy for social causes will bear

fruit only through sustained efforts. The Committee, therefore, recommends that to encourage the commitment of the foot workers the Ministry should review and revise the incentives of ASHA workers and Community Health Officers periodically as a motivating measure to support the efforts undertaken by them. In this regard, the Committee notes that in the tribal, hilly and desert areas the national norm for deployment of ASHA workers (1 ASHA per 1,000 populations) is relaxed to one ASHA per habitation. The Committee desires that the Ministry should strictly follow this deployment norm in the NE Region. The Committee also strongly recommends the Government for targeted vector control measures, like fever detection camps, school-based awareness, citizen reporting systems in high-risk areas such as tribal and forest settlements, tea gardens, industrial zones.

5.13 On cross-border transmission of VBDs, the Committee is of the firm view that the NER's topography along with cross-border movement across international boundaries and dispersed settlements accentuates VBDs importation. The Committee recommends for cross border vector disease coordination mechanism to establish a regional coordination platform with neighbouring countries (Bangladesh, Bhutan and Myanmar) for surveillance and information sharing. Harmonise outbreak reporting and vector-control strategies in border districts. There is need to strengthen preparedness against cross-border transmission of vector-borne diseases. To address this issue, the Committee recommends the use of remote-sensing technology for mapping larval habitats and inaccessible zones along with mobile surveillance with the calibrated help of drones under Namo Drone Didi Scheme which provides Self-Help Groups (SHGs) of women with heavily subsidized agricultural drones. The Committee also recommends the Ministry to take adequate lessons from global malaria elimination frameworks such as the Greater Mekong Subregion initiative, enhance cross-border district-to-district data sharing and collaborative surveillance along the Myanmar and Bangladesh borders to address the prevalence of VBDs. Further, the Committee recommends the Ministry to undertake joint measures to engage with healthcare agencies of neighbouring countries to explore the possibility of joint action under a partnership group against VBDs prevalence in NER.

5.14 The Ministry, as part of their submission on the subject of VBDs management, provided details of the Integrated Vector Management (IVM) measures adopted in the NER States during the last 5 years along with the details of the expenditure involved in these programmes and the proportion of funding by the Centre/ State and International assistance. According to the Ministry, over the last five years, NER States have implemented Integrated Vector Management measures like distribution of Long-Lasting Insecticidal Nets, Indoor Residual Spraying and larval source management. Unique efforts were made through enhanced entomological capacity by providing human resource, entomological kits and mobility support for undertaking vector surveillance and monitoring vector control activities. Manual on IVM was developed and shared with the States including NER for implementation. For capacity building of Entomologists, trainings were imparted as part of the IVM strategies.

5.15 The Committee observes that though robust Integrated Vector Management (IVM) remains the cornerstone for VBDs, the IVM of VBDs should be all inclusive covering different zones/states and different levels of incidents, with special impetus to NER. According to the Committee, peri-urban expansion, unplanned construction, accumulation of waste, inaccessibility of health facilities in remote areas, lack of awareness, etc., are the causative factors for the surge of VBDs in NER. In regard, the

Committee recommends that the Integrated Vector Management (IVM) in NER should be specially curated and due impetus be given to aspects like climate-informed planning along with infrastructure modifications like improved drainage, strict enforcement of municipal bye-laws related to construction-site and waste management by local bodies, launch of year-round multi-media awareness programs through ASHA workers, schools and digital platforms, especially in local languages, etc.

5.16 The Committee, furthermore, recommends for adequate deployment of mobile health units and setting up of pre-monsoon seasonal camps for remote/tribal villages with periodic evaluation, usage of citizen science apps for reporting breeding sites and tracking vector density, regular refresher courses for health workers/ field and laboratory staff, strengthening of district laboratories, institutionalization of a cadre-based entomology system and rapid response teams be made part of the IVM in NER. The Committee wants the Ministry to develop an exclusive portal, covering day to day activities in NER with real time data related to VBDs management, reporting of incidence, etc, accessible to all concerned including citizens.

5.17 As regards to the special provisions for funding for vector-borne disease cases in the NER, the Ministry informed the Committee that under National Health Mission (NHM), adequate budgetary support for all VBDs, are provided to States in an integrated manner for case management, vector control activities, training support, epidemic preparedness, ASHA incentives, inter-sectoral coordination, drugs and diagnostics, awareness activities, etc. The Committee has been further informed that the funds are provided as per NHM norms following the Centre-State funding pattern. According to the Ministry, fund utilization is being reviewed during mid-term, annual review and during Common Review Missions. Other than that, regular reviews are also undertaken under the programme with each States including NER States. Further, the NCVBDC administers an umbrella programme, namely, National Vector Borne Diseases Control programme (NVBDCP) for prevention and control of vector borne diseases. The States/ UTs are responsible for implementation of the programme, whereas NCVBDC provides technical and financial assistance to the States/UTs in the form of cash and commodity, under the overarching umbrella scheme of the NHM.

5.18 Pertaining to the role of Ministry of Development of North Eastern Region (DoNER) in the implementation of the State VBD programme of NVBDCP, the Ministry of Health and Family Welfare submitted that there is no defined role of DoNER in this regard. It is the M/o Health and Family Welfare that provides financial support to the States under NHM for effective vector control including in the urban areas under municipal bodies in NER. Further, the Ministry also reviews the preparedness and actions taken by the urban local bodies in coordination with M/o Housing and Urban Affairs.

5.19 The Committee have come across that the North East Special Infrastructure Development Scheme (NESIDS) primarily support and accelerate infrastructure and socio-economic developments in the NER. The Committee feels that NESIDS should focus on developmental projects related to health as well as projects that would help to bridge infrastructure gaps in VBD hotspots. Extending NESIDS scope in control and management of VBDs in NER would address the infrastructure gaps like improvement

in diagnostics facilities and climate-resilient water management, etc. Accordingly, the Committee recommends the creation of a dedicated VBD window under NESIDS catering to allocate funds for integrated development and infrastructure like vector-proof housing and diagnostics facilities in high-burden areas of NER. It is of the considered opinion of the Committee that as long as the crippling grip of VBDs on the NER is not effectively and decisively addressed, the holistic economic and infrastructural development of the region is not possible.

5.20 The Ministry of Health and Family Welfare submitted to the Committee the measures adopted by different State Governments in NER in the last 5 years to control vector-borne diseases in the areas of diagnostic and treatment facilities; training for health workers, etc. The State specific VBDs Management efforts, their outcome and challenges submitted before the Committee are as under:-

(i) Arunachal Pradesh:

5.21 Over the last five years, targeted Vector-Borne Disease Awareness and Control Campaigns have been implemented in Arunachal Pradesh to strengthen prevention and response efforts. Several sanitation and preventive measures have been implemented to control vector-borne diseases in Arunachal Pradesh. Door-to-door inspections are conducted regularly to identify and eliminate stagnant water sources under the Swachh Bharat Abhiyan, complemented by mass cleaning drives and community-led vector source elimination campaigns, especially during the monsoon season. Drainage cleaning and prevention of water logging receive additional support from the Urban Development and Rural Works departments.

5.22 For personal protection, Long-Lasting Insecticidal Nets (LLINs) have been distributed across all districts except, Tawang and Dibang Valley. Awareness is further promoted through posters, local jingles, and folk songs emphasizing the use of mosquito repellents, full-sleeve clothing, and insecticide-treated nets. Local Self-Government Institutions, particularly Gram Panchayats and Village Councils, have played a pivotal role by mobilizing communities for cleanliness drives, disseminating awareness through community halls and religious platforms, and collaborating closely with ASHAs, Anganwadi workers, and NGOs in Information, Education, and Communication (IEC) / Behaviour Change Communication (BCC) activities.

5.23 The control programs implemented in Arunachal Pradesh have demonstrated tangible effectiveness in recent years. There has been a significant decline in Annual Parasite Incidence (API) for malaria in high-burden districts, largely due to widespread use of Long-Lasting Insecticidal Nets (LLINs) and strengthened active surveillance. Dengue outbreaks were quickly contained in Papumpare and East Kameng districts during 2022 and 2023 through timely community fogging and school-based awareness campaigns. Sustained IEC-BCC efforts have led to notable behavioural changes, with improved community participation in source reduction activities and consistent net usage. Additionally, early reporting and treatment-seeking behaviour have improved following the training of grassroots health workers. Innovative measures such as the introduction of larvivorous fish in permanent and

seasonal water bodies, online mapping of breeding sources, and the use of malaria awareness songs on garbage-carrying trucks have further strengthened vector control. These initiatives are supported by funding from the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM).

5.24 The State's National Vector Borne Disease Control Programme (NVBDCP) operates under the guidance of the central National Centre for Vector Borne Disease Control (NCVBDC), with regular Regional Review Meetings (RRM) conducted every three months to monitor progress. However, according to the Ministry's submission the challenges persist, particularly in aspects like surveillance, monitoring, and evaluation during the monsoon season and in areas with poor network connectivity.

(ii) Assam:

5.25 Assam has implemented comprehensive preventive and control measures for vector-borne diseases across all districts. These include constant monitoring and tracking of suspected VBD cases, regular intersectoral meetings at state and district levels, and virtual meetings with endemic districts. Frontline health workers such as ASHAs, Sanitary Inspectors (SI), Block Health Inspectors (BHI), Multipurpose Health Workers (MPW), Sanitary Workers (SW) and Block Health Workers (BHW) conduct regular fever screening along with community awareness activities. All health workers have been sensitized on malaria prevention and control. Diagnostic kits and anti-malarial drugs are made available at all healthcare facilities to ensure early detection and complete treatment. Vector control measures include Indoor Residual Spraying (IRS) in all districts, larvicidal spraying in catchment areas, case-based fogging operations, Malathion fogging, and Insecticide-Treated Bed Nets (ITBN) during malaria outbreaks.

5.26 Integrated Vector Management strategies are being followed, supported by intensified IEC/BCC activities for effective community mobilization. Regular review meetings are also organized by the Vector Control (VC) at the state headquarters to strengthen malaria control efforts.

5.27 As per the submission of the Ministry, there was a spike in Malaria cases in Assam in 2024. The increase was recorded mostly from Kokrajhar and Chirang districts. According to the Ministry, the increase in cases was found mostly in the population residing in forest fringes making it difficult to access the healthcare facilities. Central teams were deployed to assess the ground situation and provide technical support to the State for combating the situation.

5.28 The Ministry also informed that to prevent such outbreaks in future, steps like enhanced surveillance, strengthened vector control, capacity building, public awareness campaigns, inter-sectoral coordination with forest department and continuous monitoring are being undertaken.

(iii) Manipur:

5.29 In Manipur, out of the six major VBDs, only three are currently prevalent: Malaria, Dengue, and Japanese Encephalitis (JE). The first JE case was reported from Laii village in Senapati district in 1994, while the first Dengue case was recorded from Moreh in Tengnoupal district in November 2007. Climate change has significantly influenced disease patterns in the State, with hilly areas experiencing an increase in both maximum and minimum temperatures ($\geq 1.75^{\circ}\text{C}$ and $\leq 1.5^{\circ}\text{C}$ respectively) over the last 10 years. These districts are also vulnerable to landslides, earthquakes, flash floods, and extreme seasonal temperatures, which have contributed to unusual patterns in the occurrence of vector-borne diseases.

5.30 To strengthen diagnosis and treatment, all health facilities in the State are equipped with Rapid Diagnostic Test kits (RDTs) and antimalarials for malaria management, while all reporting units have Binocular Microscopes (Olympus CX23). Additionally, Sentinel Site Hospitals are equipped with ELISA testing facilities for Dengue and JE.

(iv) Meghalaya:

5.31 The State Vector Borne Disease Control Programme (SVBDPC) in Meghalaya implements the NVBDCP under the National Health Mission framework. The State focuses on Early Detection and Prompt Treatment (EDPT) through active and passive surveillance covering 10-15% of the population annually, deployment of ASHA workers with Rapid Diagnostic Kits (RDKs) and anti-malarial drugs, quality-controlled laboratory services, and six functional Sentinel Site Hospitals.

5.32 Vector control strategies include four entomological zones with regular Indoor Residual Spraying (IRS), fogging operations using Malathion, distribution of Long-Lasting Insecticidal Nets (LLINs), and the use of larvivorous fish in stagnant water bodies. Community engagement is strengthened through widespread IEC/BCC campaigns using local languages, school and market drives, social media influencers, rallies, folk media, and observance of health days such as World Malaria Day and National Dengue Day.

5.33 The State has also established the Zoonotic Vector Borne Diseases Research & Training Centre (ZVBDC) at IIPH Shillong and utilizes the Integrated Health Information Portal (IHIP) for real-time surveillance. However, according to the Ministry, several challenges persist in data collection and surveillance, including difficult terrain and poor road connectivity in remote hilly areas, shortage of surveillance staff, inconsistent reporting from private providers, low community awareness, geographic and climatic variability, and poor mobile network and internet connectivity in rural regions. Despite these constraints, the State continues to strengthen intersectoral coordination with departments such as Veterinary, Fisheries, and Municipal bodies to enhance vector-borne disease control.

(v) Mizoram:

5.34 Mizoram under the guidance of NVBDCP have implemented several vector control and public health measures over the past five years. Vector control activities include two rounds of Indoor Residual Spraying (IRS) annually, distribution of Long-Lasting Insecticidal Nets (LLINs) in 2020 and 2024, bed net impregnation in areas not covered by LLINs, source

reduction drives, and thermal fogging during dengue outbreaks. For diagnosis and treatment, anti-malarial drugs and logistics are made available at all health facilities, while ASHAs provide village-level diagnosis and early treatment to ensure prompt case management.

5.35 State and district-level Task Force Committees, chaired by the Health Secretary and District Collectors respectively, have been formed to oversee malaria elimination efforts. Extensive IEC/BCC activities, including house-to-house campaigns, school and community programmes, health screenings, slogan displays, and counselling sessions, have been conducted across all districts with active collaboration from NGOs and faith-based organizations. Special attention is given to jhum cultivators through visits to jhum huts for IRS, fever screening, and prompt treatment. To ensure treatment compliance, Daily Treatment Tracking Forms are used by MPWs and ASHAs, and a Public-Private Partnership (PPP) approach has been adopted by supplying anti-malarial drugs to private hospitals and laboratories while tracking all diagnosed malaria patients for complete treatment.

(vi) Nagaland:

5.36 Nagaland observes important health days and months to intensify awareness and control efforts against vector-borne diseases. World Malaria Day is observed on April 25 every year to raise global awareness about malaria prevention and elimination. National Dengue Day is organized on May 16, and Anti-Dengue Month is observed in July, while Anti-Malaria Month is held throughout June with intensive activities such as posters, leaflets, house visits, mass screenings, LLIN checks, and miking campaigns. World Environment Day is also observed on June 5.

5.37 Under the leadership of the State NVBDCP, extensive IEC/BCC activities are carried out through TV, radio, newspapers, social media, and print media. Key messages focus on source reduction, personal protection measures including LLIN use, protective clothing and repellents, dry-day observance, and community participation. Village-level awareness programs are conducted through community halls, with engagement of local leaders, urging residents to eliminate stagnant water, avoid sleeping near pigsties to reduce Japanese Encephalitis risk, and use LLINs. Special initiatives include development of key messages for frontline workers, Interpersonal Communication (IPC) skills training modules and leaflets, JE-specific messages for churches and other platforms, and regular social media postings with creatives translated into Nagamese. State-level meetings continue to emphasize sustained IEC/BCC efforts as districts move towards malaria elimination.

5.38 On the entomology front, although a comprehensive vector resistance study could not be conducted between 2019 and 2024 due to insufficient mosquito specimens, susceptibility tests on *Anopheles philippinensis* in 2023 showed 100% mortality to both DDT and Malathion. However, surveillance activities in Nagaland continue to face challenges due to rugged and remote terrain, frequent disruptions, and shortage of adult mosquito-trapping kits.

(vii) Tripura:

5.39 Tripura faces heightened vulnerability due to extensive forest areas, high vector density, bamboo plantations, jhum cultivation, difficult terrain, poor road connectivity, and

language barriers from multiple dialects. Climatic conditions in hilly areas, deforestation, and water logging have significantly contributed to vector proliferation by accelerating mosquito development, extending transmission seasons, creating new breeding sites, and increasing human-vector contact.

5.40 To combat VBDs, the state has adopted various vector control measures including Indoor Residual Spraying (IRS) with Cyfluthrin 10% WP, distribution of Long-Lasting Insecticidal Nets (LLINs), fogging, larvicidal sprays, and the use of larvivorous fish. Key initiatives under the NVBDCP over the past five years include ensuring Early Diagnosis and Complete Treatment (EDCT), routine surveillance, mass screening in high-API pockets, complete saturation of drugs and diagnostics up to ASHA level, intensified IEC/BCC activities, regular training of health workers, observance of weekly dry days, confirmation of cases through Sentinel Site Hospitals, and intersectoral convergence. Awareness campaigns involve community meetings, banners, posters, leaflets, miking, school programs, social media publicity, and mobile IEC vans. Special focus is given to jhum cultivators and remote populations through line listing and regular screening. The programme receives support from the Global Fund (GFATM) and benefits from strong centre-state collaboration under NVBDCP, including technical guidance from NCVBDC and HR support at the district level.

5.41 Challenges persist in data collection and surveillance due to limited resources, inadequate infrastructure, vector resistance to insecticides, difficult terrain, and changing environmental conditions, particularly with rising dengue cases. Research in Tripura has focused on malaria vectors (*An. minimus* and *An. baimaii*), the role of jhum cultivation, climate change impacts, and knowledge-attitude-practice studies among communities. A hatchery for larvivorous fish has also been established to support biological control.

(viii) Sikkim

5.42 Sikkim has the highest incidence rate of Dengue and Chikungunya among the NER States. From the State, the total number of Dengue cases reported in 2024 was 374. Incidence rate was calculated as 134.1 per lakh based on the estimated population (2.79 lakhs). However, as per the revised estimated population (6.46 lakhs) provided by the State, the corrected incidence rate for Dengue in 2024 is 57.9 per lakh population. Total number of Chikungunya cases reported in 2022 was 1863. Incidence rate was calculated as 703 per lakh based on the estimated population (2.65 lakhs) provided by the State. However, as per the revised estimated population (6.39 lakhs) provided by the State, the corrected incidence rate for Chikungunya in 2024 is 291.2 per lakh population.

5.43 The reasons attributable to this scenario would include factors like geography, developmental activities and population movement. Though Sikkim is largely hilly, areas in low-altitude with growing settlements are more susceptible to *Aedes* breeding. To control the risk of Dengue and Chikungunya, programme activities are implemented in the State like source reduction activities for elimination of vector breeding, disease surveillance, and community awareness and monitoring. According to the Ministry, NVBDC reviews the situation regularly, provided technical guidance, issued advisories and imparted trainings for capacity building of programme officers, entomologists and doctors to strengthen the

programme implementation and the financial support to implement the programme strategies, is provided to the State under NHM.

5.44 Taking into account the submission of various States in the NER the Committee infers that the persistence VBDs in the region is rooted in a mix of general factors including environmental, socio-economic and infrastructural. Apart from this, certain studies indicate State wise causative factors like malaria hotspots linked to elevation and land-use in Assam and Arunachal Pradesh, climate change - like an increase in both maximum and minimum temperatures in hilly areas of Manipur, jhum cultivators in Mizoram, language barriers from multiple dialects in States like Nagaland and Tripura, population movement in Sikkim, etc, also adds to the problem. Accordingly, the Committee feels that considering the unique topography, climatic conditions, and socio-demographic characteristics of the NER and State specifications, region-specific action plans with micro level sub-plans need to be formulated to strengthen vector-borne disease control and elimination efforts.

5.45 Keeping in view the State specific requirements, the Committee recommends that the Ministry should ensure that the Regional Review Meetings (RRM) of the State's National Vector Borne Disease Control Programme are conducted every three months to monitor progress on aspects like surveillance, monitoring, and evaluation of VBDs as well as the smooth functioning of intersectoral coordination with departments such as Veterinary, Fisheries, and Municipal bodies to control the surge of VBDs in NER, especially, during the times when the spread of these diseases is at its peak. Further, the RRM should tangibly assess the progress made during the previous quarter in comparison to the benchmarks set and accordingly, review and reset the targets for the next quarter. Responsibilities to achieve the targets should also be clearly defined so as to measure achievements and lapses, objectively and to make course correction.

5.46 The Committee also urges the Ministry to confirm the usage of Daily Treatment Tracking Forms are used by Multi-Purpose Health Worker (MPWs) and ASHAs to ensure treatment compliance. Moreover, the Committee recommends that the data collected through Daily Treatment Tracking Forms needs to be digitised for ease of access and analysis for research purpose. For certifying complete treatment, the Committee wants the Ministry to strengthen the Public-Private Partnership (PPP) approach as well by supplying anti-malarial drugs to private hospitals and laboratories while tracking all diagnosed malaria patients.

5.47 The Committee understands that on the entomology front, the Ministry could not conduct a comprehensive vector resistance study between 2019 and 2024 due to insufficient mosquito specimens, as susceptibility tests on *Anopheles philippinensis* in 2023 showed 100% mortality to both DDT and Malathion. In this regard, the Committee opines that the Ministry should not postpone such studies due to reasons like insufficient mosquito specimens and should consider techniques like archived specimen genetic screening by utilizing samples already stored in laboratories or repositories from the past, pool-sequencing, etc., to undertake such studies. Further, the Committee would also want the Ministry to explore the feasibility of controlled rearing of the vectors for specimen purpose as per established WHO protocols. Accordingly, the Committee

recommends that the Ministry should adopt new techniques and measures to conduct vector resistance study which would help in future preparedness against VBDs.

5.48 Further, the Committee understands from domain experts that certain State specific steps/management that can be further adopted at micro and macro levels to contain/mitigate vector-borne diseases like universal LLIN coverage in Mizoram and Tripura, strengthened cross-border screening and surveillance along the Myanmar and Bangladesh borders, development of city-specific action plans for Guwahati, Agartala, Kohima and Aizawl involving weekly container surveillance, construction-site compliance enforcement and use of long-lasting larvicides in high-risk wards, wide JE vaccination coverage in Assam and spill-over districts, ensuring pig-sty distancing of at least 500 meters from human dwellings wherever feasible and managing night-roost bird habitats near habitation, to complete pending MDA/IDA rounds, correct coverage gaps, and conduct of pre-TAS/TAS for Lymphatic Filariasis as per eligibility in endemic districts of Assam, etc. Accordingly, the Committee strongly recommends that the Ministry must act upon these measures as suggested by domain experts for addressing the challenges of VBDs in NER.

6.0 Research done on Vector-borne diseases in India and in the International arena

6.1 Two premium institutes of the Indian Council of Medical Research (ICMR) which work in the field of research on VBDs are ICMR-Vector Control Research Center (ICMR-VCRC) and ICMR-National Institute of Malaria Research (NIMR), established in 1975 and in 1977, respectively. ICMR-VCRC has been engaged in basic and applied research with the primary objective of finding newer methods and developing strategies of vector control for the control of vector borne diseases. The World Health Organization (WHO) has designated the VCRC as a collaborating Centre for Research and Training in Lymphatic filariasis and Integrated Vector Management. ICMR- NIMR was originally established as the 'Malaria Research Centre' later renamed as the 'National Institute of Malaria Research' in 2005 has a mandate to support national malaria control program through basic applied and operational research aiming to eliminate malaria from the country. The primary task of the Institute is to find short term as well as long term solutions to the problems of malaria through basic, applied and operational field research.

6.2 As part of its examination of the subject, the Committee sought the comments of these two prominent institutions on the subject. The gists of their responses are given below:

(i) ICMR-VCRC

6.3 According to VCRC, Vector-borne diseases, transmitted by arthropods such as mosquitoes, ticks, sandflies, and mites, are highly prevalent in Northeast India due to its mountainous terrain, dense forests, heavy rainfall, and humid climate. Major VBDs in the region include Malaria (especially *P. falciparum*), Japanese Encephalitis (linked to rice fields and pig rearing), Dengue and Chikungunya (rising in urban areas like Guwahati, Imphal, and Aizawl due to urbanization), and Scrub Typhus (emerging in forested tribal areas of Nagaland, Mizoram, and Arunachal Pradesh). The high burden of VBDs stems from

ecological factors, historical patterns, jhum cultivation, rapid urbanization, cross-border transmission risks, and limited healthcare access in remote tribal areas. Climate change has also facilitated the proliferation of vector breeding sites and increased human-vector contact, notably, forest-dwelling vectors such as *Anopheles baimaii* and *An. minimus* which are now encroaching upon human settlements.

6.4 As per their submission, in Northeast India, there are a number of challenges to data collecting and surveillance of VBDs, among them difficult terrain, remote areas, and inadequate laboratory infrastructure are the prominent ones. Underreporting and delayed outbreak detection result from the lack of regular health reporting systems in many rural and tribal communities. Furthermore, parasite resistance to antimalarial medications, particularly *Plasmodium falciparum*, and vector resistance to insecticides, especially in *Anopheles* mosquitoes, are causes of growing concern. Treatment and diagnosis become even more difficult due to the rise of drug-resistant strains and shifts in pathogens, such as those found in scrub typhus and malaria.

(ii) ICMR-NIMR

6.5 The reply of NIMR also points to the region's humid climate, dense forest cover, river systems, and ecological similarity to the Indo-Malayan region as the reasons for highly prevalent VBDs such as Malaria, Japanese Encephalitis, Dengue, Chikungunya, and Scrub Typhus in North-East India. These conditions provide ideal breeding habitats for major vectors like *Anopheles minimus*, *An. baimaii*, *Aedes albopictus*, and *Culex* species. Key contributing factors include deforestation, jhum (shifting) cultivation, urbanization, changes in land-use patterns, paddy cultivation, irrigation canals, difficult terrain, cross-border movement, and climate change-induced rising temperatures and erratic rainfall.

6.6 NIMR agrees to the fact that socioeconomic challenges, diverse tribal populations, low confidence in health facilities and limited point-of-care diagnostics complicate control efforts of VBDs in NER. Diagnosis and treatment are one of the challenges seen in NE states due to the difficult terrain and paucity of point-of-care facilities. According to them, drug resistance has led to a modified malaria treatment policy in the region. While interventions like IRS and LLINs have significantly reduced malaria in some districts (e.g., Karbi Anglong and Dima Hasao in Assam), diseases like Dengue have increased in urban areas such as Guwahati and Imphal due to water storage practices and the spread of *Aedes* mosquitoes. Scrub Typhus is emerging in deforested areas, and Japanese Encephalitis continues to cause high case fatality in valley regions. Overall, ecological disruptions from infrastructure development, deforestation, and shifting cultivation have increased human-vector contact and enabled the invasion of new vector species, posing ongoing public health challenges across the North-Eastern states. Further, one of the most effective remedial measures adopted by the Government based on the outcomes of the studies ICMR-NIMR is on Insecticide Resistance Monitoring and Therapeutic Efficacy. Based on the observations of the study, the Government to undertake necessary steps to phase out DDT for Indoor Residual Spray and Synthetic Pyrethroids & Malathion were recommended in its place. The Government also revised the malaria treatment protocol in NER from ACT-SP (Artemisinin-based

Combination Therapy with Sulfadoxine-Pyrimethamine) to ACT-AL (Artemether-Lumefantrine).

6.7 As part of understanding the research scenario, the Committee enquired from the Ministry the logic behind the launch of the Zoonotic Vector Borne Diseases Research & Training Centre (ZVBDC) just for a period of 5 years. The institution was launched at IIPH-Shillong in December 2023, the first of its kind in Northeast India as multi-disciplinary hub which supports syndromic surveillance, genetic analysis, outbreak forecasting and "One Health" integrated research. The Ministry responded to this by informing that the ZVBDC was set up by IIPH Shillong with funding from the Department of Biotechnology (DBT)/Wellcome Trust India Alliance through a Clinical & Public Health Research Centre (CRC) grant. As the CRC grant is for a period of 5 years, the ZVBDC was initially conceived for that duration. They also stated that the Ministry anticipates that the work of the ZVBDC will continue through other grants beyond the period of the parent grant. The infrastructure and training built through this grant will be used for other grants and fellowships that will benefit the state and the region. For example, DBT has awarded a collaborative grant to IIPH Shillong in collaboration with NCBS to detect unknown pathogens.

6.8 The Committee assumes that the purpose of the Zoonotic Vector Borne Diseases Research & Training Centre (ZVBDC) is to bring together expertise in public health, clinical medicine, veterinary sciences, laboratory methods, and social sciences to improve understanding and support integrated research of key Zoonotic and Vector-Borne Diseases in NER. Considering the relevance of the purpose of such an institution, the Committee strongly recommends that the Government should continue its financial aid to the Institution either through collaborative grants or extension of its parent grant and even consider augmenting the functioning of the Centre through enhanced monetary support. The Committee views that the Ministry must conduct yearly review/audit on the effective utilization of the grants so made before further extension of grant provision. The Committee is of the firm opinion that budget constraints should not limit innovation and scientific research and development, and hence private sector involvement in funding of such projects needs to be explored. The Committee recommends that the Ministry should look into PPP investment on Research and Development, on high priority. Apart from the financial aspect, the Committee recommends that ZVBDC should concentrate in genomic surveillance of vectors and pathogens as emerging insecticide resistance and new strains requires real-time data on vector genetics and virus evolution. Further the Committee recommends the development of a National One Health platform for VBDs connected through various central institutions like ICMR, ICAR, etc., and State machinery like ZVBDC, Veterinary Departments, etc. This would enable the sharing of data and other real-time information relating to vector control measures being undertaken at different locations by multitude of agencies.

6.9 Subsequently, the Committee asked the Ministry about the challenges faced in data collection and surveillance of vector-borne diseases in NER, especially in areas like vector resistance or disease mutation. In reply, the Ministry informed that the primary challenges faced in data collection and surveillance are hard to reach area, occupational exposure i.e.

Jhum cultivation, forest related work, changing climate and urbanization influence vector habitats, complicating prediction and surveillance efforts. Further, the Committee sought to know the steps taken by the Government to surmount the issue of inconsistent reporting from private healthcare providers and informal sectors in data collection and surveillance of vector borne diseases. M/oH&FW responded to this by stating that the Ministry collects the VBD data digitally on Integrated Health Information Platform (IHIP)-VBD portal from public and private healthcare providers from the States including NER. To improve the reporting from private healthcare providers, Malaria and Dengue (except Arunachal Pradesh) are made notifiable diseases in NER States and informal sector is sensitized to link with the healthcare delivery system. For effective coordination, all states including NER States share data on VBDs digitally on IHIP-VBD portal including prevalence, spread and treatment details in respect of vector-borne diseases.

6.10 The Committee, during its examination on the subject observes that data collection and surveillance is a one of the major challenges in the control and management of VBDs in NER. The Committee appreciates the work done by the Government through the launch of Integrated Health Information Platform (IHIP) which enables real-time case-based surveillance, mapping of vector indices, and weekly analytics on “fever plus vector density” trends. The Committee, in this regard, recommends an exclusive portal, covering day to day activities in NER or to publish a North-East Vector Surveillance Bulletin, based on real time data related to VBDs management, before and after each monsoon season to facilitate evidence-based planning in NER. The Committee feels that Government should upgrade the diagnostic panels & electronic reporting through IHIP. Ineffective feedback mechanism is another factor that impedes regular reporting, leading to undetected hotspots. Accordingly, the Committee recommends user-friendly mobile apps and helplines to be communicated in vernacular languages with acknowledgment and follow-up protocols, ensuing two-way communication systems with SMS updates and documentation of each resolution, etc.

6.11 The Committee, strongly view that the data interpretation is equally important as its collection, therefore, health workers should get regular training in data interpretation for timely resource allocation and outbreak response. Along with human resources, artificial intelligence can also be used for big data analytics, climate & epidemiological trends and predict outbreak patterns. The Committee, hence, recommends the Ministry to resort to AI-powered early warning systems integrated with IHIP for hotspot prediction and similar activities. Use of Machine Learning for vector image recognition via citizen apps, etc can also be considered. The data so collected/analysed should be the backbone of the findings of research institution and these findings should in turn give shape to future health policies. Research-to-Policy Integration should be the aim of the Government in dealing with health hazards of the country. Further, the Government can also look into the possibility of creating a national VBD research mission, encourage CSR contributions and international collaborations for projects under the mission to set in place a sustainable ecosystem in this sphere.

7.0 Global perspective/response towards the management of vector-borne diseases

7.1 According to WHO's 'Global Vector Control Response 2017-2030' document, 80% of the World's population is at risk of one or more vector-borne diseases and VBDs account for around 17% of the estimated global burden of communicable diseases. The Committee sought from the Ministry a comparative study of India's incidence of Vector-borne disease with the global trend along with a comparative strategy of treatment and guidelines of WHO to combat the challenges posed by Vector-borne disease and the adherence of those guidelines by Government of India. The Ministry submitted as reply a disease wise comparative table of India's incidence of VBDs with the global trend as shown below:

Years	2019	2020	2021	2022	2023	2024	2025	2026 (till March)
Malaria								
WHO Global estimated cases	22,90,00,000	24,10,00,000	24,70,00,000	24,90,00,000	26,30,00,000	20,38,000	20,07,000	Not Available
India reported cases	3,38,494	1,86,532	1,61,753	1,76,522	2,27,564	2,55,500	2,33,555	18,771
Dengue								
Global	15,52,664	11,34,367	6,00,123	15,17,651	22,33,433	77,18,988	21,98,720	2,12,462
India	2,05,243	44,585	1,93,245	2,33,251	2,89,235	233516	121824	9824
Kala-azar								Up to April
Global	14587	11970	11937	12957	11793	12857	Not available	
India	3269	2052	1357	891	595	508	485	112
Japanese encephalitis								
Global	3709	1532	988	1886	2120	576	Not Available	Not Available
India	2545	729	787	1109	1107	1472	975	4

7.2 Further, the Ministry also appraised the Committee on the global trends and action plans for the prevention and control of VBDs, highlighting the role played by WHO in the field. They also submitted the steps taken by the Central and State Governments in concurrence with the action plans of WHO on the issue of VBDs in NER in India. The disease wise Action taken by Central and State Government to adopt measures suggested by WHO in North East Region are:

(i) Malaria

NER states implemented steps like universal coverage with LLINs (long-lasting insecticidal nets), improved diagnostic and surveillance (rapid kits), and IRS (indoor residual spraying). GFATM investment in high burden regions, deployment of community volunteers for universal coverage of test-treat and track services, TES guided use of antimalarials (artemisinin combinations), promotion of intersectoral action, entomological surveillance, use of larvivorous fish, Integrated Disease Surveillance Programme (IDSP) for outbreak detection, upgradation of health worker training under NVBDCP, etc are other actions taken in this regard. WHO has also deployed one zonal coordinator each to Mizoram and Tripura to provide on ground support.

(ii) Dengue & Chikungunya

For Dengue & Chikungunya measures like source reduction drives, larvicide distribution, community education, use of insecticide-treated nets, strengthened lab network and reporting under IDSP/NVBDCP, clinical management, capacity building, mass awareness campaigns, fogging, local self-government involvement for environment management along with Central- intersectoral convergence workshop I 2024 are undertaken.

(iii) Lymphatic Filariasis (LF)

Among all North Eastern states, only Assam is endemic for LF, 15 districts identified as endemic, 11 districts have successfully cleared TAS-3, 01 districts have successfully cleared TAS-2, 03 districts are currently implementing MDA and all WHO-recommended strategies are being implemented in the State.

7.3 The Committee observes that WHO strategies for VBDs include applying the continuum of transmission framework, distributing next-generation insecticide-treated nets, and ensuring universal Test-Treat-Track coverage and LLIN use. Further, WHO efforts also focus on strengthening case-based surveillance, promoting risk stratification, using new tools and implementing mass and targeted drug administration. The strategy promotes community engagement in mosquito control, sustainable vector management aligned with the Global Vector Control Response (2017–2030), and effective clinical care through resilient health services. It also supports innovation in vaccines and treatments, encourages cross-sectoral collaboration, and promotes behaviour change. According to the Ministry, all national guidelines on VBDs for strategies and treatment are aligned with WHO guidelines, while being adapted to suit India's unique epidemiological, socio-economic, and health system context.

7.4 The Ministry as part of their submission shared details of various internationally funded programmes, for fighting vector-borne diseases in NER. The Ministry submitted that the Global Fund to Fight against AIDS, Tuberculosis and Malaria (GFATM) has been supporting India since 2005 in Malaria Control and Elimination under different projects in NER. The chronological details of the programme and the GFATM investment for the last 5 years in NER States is mentioned below:

S.No	Years	Project Name
1	July 2005 to June 2010	Intensified Malaria Control Project
2	October 2010 to September 2015	Intensified Malaria Control Project-II
3	October 2015 to December 2017	Intensified Malaria Control Project-III
4	January 2018 to March 2021	Intensified Malaria Elimination Project
5	April 2021 to March 2024	Intensified Malaria Elimination Project-2
6	April 2024 to March 2027	Intensified Malaria Elimination Project-3

S.N.	Duration	Project Name	GFATM allocated budget for NER
1.	April 2021 - March 2024	Intensified Malaria Elimination Project-2	INR 63.82 Crores
2.	April 2024- March 2027	Intensified Malaria Elimination Project-3	INR 77.52 Crores

Note#- Details of investments in NER for last 5 years and future

7.5 According to the Ministry, the Intensified Malaria Elimination Project -3 (IMEP-3) targets 159 districts across 12 States. Out of these, the 7 North East states cover 119 districts. The details are given below:

S.No.	State	Number of districts
1	Arunachal Pradesh	25
2	Assam	35
3	Nagaland	12
4	Manipur	16
5	Meghalaya	12
6	Mizoram	11
7	Tripura	8
Total		119

7.6 The Ministry also submitted that WHO has deployed one zonal coordinator each to Mizoram and Tripura to provide ground support. The Committee enquired the reason for such an action taken to be restricted for just these two states in NER. In reply, the Ministry stated that Tripura and Mizoram are Category-3 (API>1: number of malaria-positive cases per 1,000 population in a year), States with four high burden districts in each state. These districts have difficult terrain including hard to reach and forested areas impacting healthcare delivery services to support programme activities, hence, WHO has deployed one zonal coordinator in these two states.

7.7 The Committee observes that World Health Organization's (WHO) Global Vector Control Response (GVCR 2017–2030) provides a new strategy to strengthen vector control worldwide through increased capacity, improved surveillance, better coordination and integrated action across sectors and diseases, surveillance and early detection, etc. The Committee understands that India's vector-borne disease control

strategies are largely aligned with the WHO Global Vector Control Response. Accordingly, much emphasis needs to be given by the Government on Integrated Vector Management (IVM), usage of next-generation Tools, Zoonotic Disease Management, Cross-Border Coordination, Community-Led Urban Sanitation Models, Antimicrobial Resistance (AMR) Surveillance, etc. till the achievement of objective conceived. The Government, therefore, needs to strive to adopt the good global practices into India's framework, so that that full-scale implementation of such measures in the North-Eastern States are commensurate to meet challenges due to terrain, international borders, tribal populations and climatic variability. The Committee, therefore, recommends the Ministry to take a cue from WHO strategy to review and evaluate India's current VBDs guidelines and policies and to implement the same to tackle VBDs in NER and in the country as a whole.

7.8 The Committee feel that 2030 elimination goals of Malaria require accountability and course correction. The target of the Government should be to achieve zero indigenous cases by 2027 and sustain malaria-free status by 2030 through phased, district-level elimination. Hence, the Committee recommends a sustained and community-involved approach with annual audited reports, adaptation to local vector behaviour and resistance patterns and tie up funding to performance matrices. The Committee strongly believes that in order to eradicate any VBDs, a multi-faceted approach is far more effective than any single method. Political commitment, adequate funding, addressing climate change/urbanization impacts and adaptive strategies based on local epidemiology are critical for success in both India and globally for the elimination of VBDs.

8.0 Experts' Opinions/suggestions on VBDs

8.1 As part of its examination of the subject, the Committee sought the opinions and suggestion of various experts in the field. Accordingly, many written submissions were received and the Committee found many common threads in the submissions of the domain experts. In the general opinion of the domain experts, the contributing factors for the surge of VBDs, especially in the NER, include geographical barriers, scattered tribal settlements, cross-border movement, insecticide resistance, inadequate infrastructure, and shortage of entomologists, etc and the major challenges involve difficult terrain, outdoor vectors, cross-border transmission, urbanisation, and weak laboratory networks. Key challenges in NER also include high asymptomatic cases, insecticide resistance, human resource shortages, geographical barriers, and climate change.

8.2 Coming to more specific suggestions of the experts, the Committee noted according to them, the core strategies for VBDs management should be emphasized on early parasite-based diagnosis before treatment, effective case management, integrated vector control, robust surveillance, vaccination where available, and public health prevention measures. Other strategies also include district-based planning, real-time surveillance, active case detection, targeted vector control, cross-border coordination with neighbouring countries, and enhanced community participation, all implemented continuously on a need-based approach. Certain proposed solutions involve strengthened diagnostics, training, cross-border

collaboration, micro-level planning, outbreak containment, digital data systems, enhanced Primaquine use, and ICMR-supported operational research. District/block-wise micro plans with community ownership and integrated efforts are critical for accelerating elimination in the region.

8.3 The experts further stated the disease wise extant control/management tactics in place. According to them, Malaria has declined significantly with several states nearing pre-elimination, though transmission persists in Mizoram. For malaria, the universal testing precedes therapy with artemisinin-based combination therapy (ACT) for *P. falciparum*, chloroquine for susceptible *P. vivax*, and primaquine to prevent relapses, alongside continuous monitoring of drug resistance is quite effective. Dengue and chikungunya are rising in urban areas due to *Aedes* mosquitoes, urbanisation, and poor waste management. Its management focuses on mosquito bite protection, environmental control, supportive care with hydration and paracetamol (avoiding NSAIDs), close monitoring for severe cases, and deployment of the QDenga vaccine in high-transmission settings. LF hotspots continue in Assam tea gardens and the disease requires annual mass drug administration (MDA) with high coverage to interrupt transmission, complemented by morbidity management through hygiene, exercise, triple-drug therapy and surgical interventions. For Japanese Encephalitis (JE) vaccination protocols, and antimicrobial resistance surveillance as best practices and it remains endemic especially in Assam.

8.4 The way forward, suggested by the experts for long-term VBD elimination in NER include sustained surveillance, robust IVM, institutional capacity building, and inter-sectoral coordination along with emphasises on region-specific plans for tribal, tea garden, forest-fringe, and urban areas, GIS mapping, mobile units, One Health approach, climate modelling, laboratory strengthening, entomologist training, and a Regional Entomology Training Hub. According to them, the Government initiatives under NCVBDC include the National Strategic Plan for Malaria Elimination (2023–27), JE Prevention Programme, Dengue Action Plan, and Accelerated LF Elimination, supported by ICMR-RMRC Dibrugarh for research and capacity building are positive steps.

8.5 Experts in their submission also shared the WHO approach for tackling the VBDs surge like promotes integrated vector management, disease surveillance, preventive chemotherapy, vaccination, public awareness, and ongoing resistance monitoring. In India, national guidelines are aligned closely with these recommendations while adapting to local epidemiology and health system capacities for effective implementation. Focus on integrated vector management (IVM), LLIN distribution, insecticide rotation, digital surveillance (IHIP), vaccination, MDA, hotspot interventions, active case detection, and community participation, are also in consonance with the WHO's Global Vector Control Response.

8.6 It was also submitted before the Committee that the Government aims for major milestones in VBDs control through malaria elimination by 2030 and zero indigenous cases by 2027 through the National Framework and Strategic Plan 2023-27, active promotion of JE vaccination, MDA for LF, an 8-point strategy for dengue/chikungunya, along with strengthened surveillance via IHIP digital reporting, GIS hotspot mapping, resistance monitoring, cross-border coordination, and IEC/BCC activities for community engagement.

8.7 The Committee's attention was also drawn towards many short-term actions and state-specific initiatives like focus on hotspot mapping, elimination campaigns, and filling technical vacancies, while long-term strategies emphasise logistics improvement, community empowerment, integrated vector management (IVM), and sustained monitoring, aligned with WHO's Global Vector Control Response (2017–2030). Best practices include mosquito nets, early diagnosis, and models like Odisha's DAMAN and Chhattisgarh's Malaria Mukh Bastar Abhiyaan.

8.9 State-specific initiatives which strengthened the efforts include Mizoram runs state-wide rickettsial disease surveillance, Assam maintains a sentinel surveillance network for JE, camp-based active case detection is used for kala-azar, and Nagaland implements the Intensified Malaria Elimination Project (IMEP-3). However, major challenges persist, including difficult terrain, poor connectivity, porous international borders, outdoor-biting vectors, emerging drug resistance, and limited healthcare access in remote tribal areas. To address these, interventions focus on enhanced surveillance, deployment of Long-Lasting Insecticidal Nets (LLINs), laboratory strengthening, health worker training, community awareness, and region-specific action plans tailored to tribal areas, tea gardens, forest-fringe zones, and urban settings using mobile health units and source reduction. Priority diseases include Japanese Encephalitis, scrub typhus, lymphatic filariasis, dengue, and chikungunya. The region is increasingly adopting a One Health approach, strengthening laboratory networks, integrated animal-human surveillance, operational research, climate-based risk modelling, and digital reporting systems to enable timely outbreak response and effective disease control.

8.10 The Committee observes that significant challenges persist, including inadequate surveillance in remote and hard-to-reach areas, poor treatment compliance, delayed vector control responses, highly localised disease patterns requiring tailored region-specific strategies, limited health-seeking behaviour among communities, and difficulties in effective implementation of Long-Lasting Insecticidal Nets (LLINs) and Indoor Residual Spraying (IRS). The Committee concludes that addressing these gaps through targeted interventions and better coordination remains crucial for sustained progress in VBDs elimination.

8.11 The Committee intends to identify ways to combat Vector-Borne Diseases (VBDs) through widespread environmental control, modified measures, proper management and adequate community mobilization in the NER. The Committee takes into account different aspects of VBDs that are specific to NER States, like the socio-economic challenges faced, coordination mechanism, measures adopted for community sensitization and training involved, data sharing on prevalence, spread, vaccination, treatment methods, etc. Effectiveness of Intensified Malaria Elimination Project-3 (IMEP-3), implementation of WHO guidelines for Vector-Borne Diseases in India, outcome of various research done by ICMR-NIMR on VBDs, role and participation of local bodies/ stakeholders at State level like municipality, corporations, etc. along with the best practices in effective implementation of vector control measures undertaken so far in the country were brought before the Committee as part of the examination. The Committee had examined all these aspects and have given its recommendations after

weighing the suggestions of the domain experts as well. Further, the Committee recommends the Ministry to look into the additional suggestions put forward by the domain experts before the Committee to tackle the VBDs in NER and implement them appropriately. Some of such suggestions are - universal testing preceding the therapy with artemisinin-based combination therapy (ACT) for *P. falciparum*, chloroquine for susceptible *P. vivax* and primaquine to prevent relapses, deployment of the recently approved QDenga vaccine in high-transmission settings, setting up a Regional Entomology Training Hub, institutional capacity building in vector management and treatment, effective platforms for inter-sectoral coordination, One Health approach to deal with VBDs, climate-based risk modelling and digital reporting systems to enable timely outbreak response and effective disease control, emulating facets from models like Odisha's DAMAN and Chhattisgarh's Malaria Mukh Bastar Abhiyaan and extensive use of drones for mapping, delivery of supplies/services to overcoming topographical challenges.

8.12 Deployment of the QDenga vaccine in high-transmission settings

The Committee has been given to understand that the first preventive vaccine for dengue has been given official approval by CDSCO and DCGI for 04 to 60 years age of persons to be administered two dosages in the interval of three months as QDenga is effective for all the four serotypes of dengue. Since the vaccine Qdenga will be available on commercial basis in the market in the mid of year 2027, the Committee, therefore, recommends for incorporation of Qdenga vaccine in universal immunization programme with accelerated impetus.

8.13 Climate-Based Vector Disease Early Warning System

The Committee recommends the Government to integrate IMD weather forecasts, satellite/GIS mapping and vector surveillance to predict disease hotspots and to issue district-level early warning alerts before outbreaks occur. The Committee further stresses strategic course of action to enable proactive vector control and better resource deployment.

RECOMMENDATIONS/OBSRVATIONS OF THE COMMITTEE–AT A GLANCE

Vector-borne diseases in India: Definition, Distribution & Management

1. The Committee takes into account that India faces persistent Vector Borne Disease (VBD) burdens, with Dengue reporting hundreds of deaths in recent years, along with Malaria, Chikungunya and other VBDs outbreaks influenced by various factors. The Committee understands that VBDs have varied determinants which include environmental, socio-economic and infrastructural factors. Therefore, to control and manage the advances of VBDs, an integrated approach combining chemical, biological, and environmental controls are needed. The Committee believes that while Government has taken many major measures in containing the VBDs, there is always scope for innovation and improvement in the area. The measures taken by the Government to eliminate breeding sites, regular community clean-up drives, usage of chemical vector control like adulticides *via* fogging, etc., seems to have been exerting limited effect. But the biological control measures like the promotion of natural predators like larvivorous fish and sterile insect techniques are potent and promise long-term success. The Committee feels that all these efforts would gain more benefits if a common and coordinated task approach, involving various Ministries/Organizations concerned, is adopted and adhered to. Such coordinated policy/programme should also take into consideration the different levels of incidents across affected states/districts. Scattered policies and its implementation would only lead to resurgence of VBDs, therefore, leading to escalation of economic and health costs. Accordingly, the Committee recommends that the Government should strengthen the existing framework/ roadmap for controlling and managing VBDs with a clear-cut timeline for phasing out and for complete elimination of each the vector-borne diseases from the country.

(Para 2.20)

2. While the Committee acknowledges the efforts of National Vector Borne Disease Control (NVBDC) through Integrated Vector Management (IVM) in India, the concept developed by WHO, as early as in the 1980s, it feels that the Government should revamp the IVM in India. The Committee, in this connection, recommends that the Government must re-orient IVM in India more effective and productive manner by encompassing aspects like interdisciplinary research networks; regularly reviewing and updation of existing guidelines/policies; innovative capacity building programs; scaled up infrastructure; digital platforms for sharing best practices; usage of authentic social media as awareness campaign forum, promoting community participation, focusing more on high-risk groups, like children, pregnant women, outdoor workers and travelers to endemic areas, etc.

(Para 2.21)

3. Regarding the vaccinations for counter and management of VBDs, the Committee understands that internationally, vaccination is available for Yellow Fever, Japanese Encephalitis, Tick-Borne Encephalitis (TBE), Chikungunya, Dengue, and Malaria. Whereas in India, vaccination is available only for Japanese Encephalitis which is free of cost under the Universal Immunization Programme. To address the

gaps, the Committee strongly recommends that India should pursue international collaborations with WHO and other leading organizations and benefit from the global expertise for vaccine development. Further, the Government should also facilitate the efforts to speed up the indigenous vaccine development for Dengue and Chikungunya through the establishment of clinical trial networks and also expand immunization coverage of JE. The Committee also recommends that the Ministry should further explore the newer ideas like mRNA and viral vector technologies for rapid development of vaccines, micro needles, nasal sprays to enhance vaccine uptake and efficacy, cold-chain vaccine outreach for vulnerable and unreachable regions, etc., for strengthening immunization of VBDs.

(Para 2.22)

4. The Committee has also been made aware of lack of defined protocols to treat complicated stages of VBDs like 3rd and 4th stage of Dengue, Dengue Hemorrhagic Fever and Dengue Shock Syndrome. The Committee also recognizes the need for effective research for future preparedness in anticipation of the emergence of new VBDs. In this regard, the Committee recommends that the Ministry should prioritize the development of disease-wise Standard Treatment Protocols, especially for complicated stages of VBDs. The Committee further recommends that research may be undertaken under the guidance of ICMR to identify new diseases transmitted by vectors and related complications as part of future preparedness.

(Para 2.23)

Trends of VBDs in North–East India

5. The Committee feels that the NER States and also the entire country should maintain data specifically reflecting the incidence/rate of vector-borne diseases among tribal, rural and urban population, which would help framing effective and sustainable localized public health policy in the areas. India’s VBD epidemiology is highly diverse due to differences in vectors, ecology, socio-economic conditions and healthcare access, etc. In India’s diverse landscape, aggregate statistics may not present the ground realities and will lead to “one-size-fits-all” approaches. Specific data would help in drafting tailor-made control and management strategies, efficient resource allocation and prioritization. This should act as support material for prioritizing research subjects, capacity building and policy refinement. The data would also support proper allocation of funds and helps integrate VBD control with broader programs like Ayushman Bharat Health and Primary Health Centres/Wellness Centres in rural areas, urban health missions, One Health approaches in tribal-forest regions. Accordingly, the Committee recommends for the maintenance and sharing of specific data at national and state levels on VBD spread in tribal, rural and urban areas.

(Para 3.8)

Major determinants surging VBDs outbreaks in NER

6. The Committee understands that NER’s unique geo-climatic, ecological, and socio-cultural setting create exceptionally high receptivity and perennial transmission in many areas, explaining the disproportionate historical burden of VBDs. The Committee finds that the key determinants for the spread of VBDs in the region include

environmental and climatic conditions like hot-humid conditions, abundant water bodies, deforestation, shifting cultivation and unplanned urbanization. Vector Bionomics and ecological shifts like multiple efficient *Anopheles* species, multi-insecticide resistant, high biting rates, pigs/birds as amplifiers also accounts for as determinants. Further, there are Socio-economic, demographic, and access determinants like diverse indigenous/tribal populations, cross-border and internal migration facilitating parasite/vector movement, limited healthcare access, asymptomatic reservoirs, etc. Behavioural and occupational factors include outdoor livelihoods, proximity to breeding sites and poor waste management. Health system and programmatic factors include funding and human resource gaps, vaccination coverage gaps or diagnostic challenges, fragmented surveillance. Taking these factors into consideration, the Committee feels that the Government should implement a region-specific, integrated, multi-sectoral VBDs strategy for assured control and management of VBDs in the NER. Such approach should be adhered to and implemented while keeping into consideration the eco-epidemiological understanding of local determinants, prioritize universal coverage of proven tools like long-lasting insecticidal nets/LLINs and artemisinin-based combination therapies (ACTs), strengthened surveillance by including detection of asymptomatic and GIS hotspot mapping.

(Para 4.5)

7. The Committee, accordingly, recommends for regular community engagement customized to tribal sensitivities, enhanced cross-border and inter-state coordination, dedicated funding along with inter disciplinary research collaborations and stronger coordination between the National Vector Borne Disease Control, State Governments, Medical institutions, ICMR, and Department of Health Research (DHR) for effective implementation of adopted strategy. Improved public awareness programmes about VBDs, their transmission, and preventive measures as well as education campaigns should target high-risk populations, focusing on behavioural changes to reduce vector exposure are vital. The Committee believes that a general national template is insufficient due to NER heterogeneity, hence, recommends for a region-specific, integrated, multi-sectoral VBDs strategy for effective and result oriented control and management of VBDs in the NER of India.

(Para 4.6)

Measures adopted by Central/State Governments in NER to control vector-borne diseases

8. The Committee understands that insecticide resistance is one of the major challenges related to vector management. Insecticide resistance against vector mosquito species is regularly monitored by National Vector Borne Disease Control and accordingly technical guidelines are issued to the States for change in the usage of insecticide. Following various studies undertaken by ICMR that reported resistance of DDT in Malaria vectors, DDT has been phased out, and Synthetic Pyrethroids & Malathion are used. The Committee believes that rotation of Indoor Residual Spraying (IRS) insecticides, introduction of next-generation Long Lasting Insecticidal Nets (LLINs) (PBO/dual-active), routine insecticide susceptibility testing, and adoption of

Integrated Vector Management (IVM) combining multiple interventions, including environmental management and larval control could be more effective measures that can be adopted to deal with insecticide resistance. Hence, the Committee strongly recommends that the said measures/strategies be made part of the IVM guidelines and promoted vigorously among the NER population through varied platforms.

(Para 5.3)

9. The Committee, while acknowledging the free diagnosis and treatment services for VBDs provided under National Health Mission, feels the necessity for in depth considering of the diversity and extent of the country's population, especially in NER. The Committee has come across the fact that there is still considerable gap in the distribution of laboratory and diagnostic infrastructure in the NER. In the opinion of the Committee, limited laboratory capacity and processing time delays confirmation of VBDs cases. Accordingly, the Committee recommends for the creation/expansion of adequate Viral Research and Diagnostic Laboratories (VRDL) network in NE states. Regarding diagnostic tests, the Committee wants the Ministry to explore the possibility of multiplex diagnostic platforms and point-of-care diagnostic tests, for use in low-resource regions, that can be rapid, affordable and detect multiple VBDs, simultaneously.

(Para 5.6)

10. Shortage in manpower, supply management, and timely disease surveillance are the challenges faced in the remote areas of NER related to VBDs. The Committee desires that the disease surveillance system should be strengthened through real time, technology-driven monitoring to ensure early detection and timely response to infectious disease. It has also been brought to the notice of the Committee that many sanctioned posts under National Vector Borne Disease Control (NVBDC) and State health departments remain vacant or filled by non-specialists. The shortage of skilled and trained human resources in NVBDC and State health departments prove to be a major operational gap in implementing VBD control programmes as absence of skilled entomologists affects entomological surveillance, insecticide resistance monitoring, and data-driven decision-making, which in turn, limits evidence-based vector control and delays response actions. Accordingly, the Committee recommends for fast-track recruitment and deployment of qualified entomologists in all NCVBDC districts and regular certificate driven capacity building programmes to be held through premium institutes for stakeholders. The need for the establishment of a North Eastern Regional Entomology Training Hub for capacity building and technical certification has also been brought to the notice of the Committee, accordingly, the Committee recommends that the Ministry should actively look into the feasibility of the settling up of such a training hub in the NER.

(Para 5.7)

11. The Committee acknowledges that agricultural practices such as paddy cultivation and pig rearing create conditions conducive to malaria and JE transmission. Most of the time people engaged in such agricultural practices/ animal rearing overlook the hygiene protocols related to water logging, disposal of pig manure, etc. This is due to lack of awareness which reflects in their behavioural pattern. The Ministry has

submitted that the National Vector Borne Disease Control provides technical guidance and advisories regularly, especially during pre- and post-monsoon seasons, to be followed in such agricultural practices/ animal rearing. Nevertheless, the Committee recommends that the Ministry should enhance the promotion of animal and human surveillance, pig rearing regulation and zoning as per international One Health best practices. The Committee, moreover, recommends the Ministry to conduct regular community awareness campaigns under the guidance of Village Health Committees, thereby targeting school and workplaces to bring forth sustained behavioural changes.

(Para 5.9)

12. Keeping in view multi-dimensional socio-economic challenges such as different tribes and their beliefs/interactions, water sourcing practices, etc., the Committee believes that concerted efforts should be made to have door to door surveillance and awareness campaigns to boost the confidence of tribes in the popular national health system and universal immunization programmes. Such efforts should be made with the help of Accredited Social Health Activist (ASHA) and Community Health Officers. According to the Committee, such approach and strategy for social causes will bear fruit only through sustained efforts. The Committee, therefore, recommends that to encourage the commitment of the foot workers the Ministry should review and revise the incentives of ASHA workers and Community Health Officers periodically as a motivating measure to support the efforts undertaken by them. In this regard, the Committee notes that in the tribal, hilly and desert areas the national norm for deployment of ASHA workers (1 ASHA per 1,000 populations) is relaxed to one ASHA per habitation. The Committee desires that the Ministry should strictly follow this deployment norm in the NE Region. The Committee also strongly recommends the Government for targeted vector control measures, like fever detection camps, school-based awareness, citizen reporting systems in high-risk areas such as tribal and forest settlements, tea gardens, industrial zones.

(Para 5.12)

13. On cross-border transmission of VBDs, the Committee is of the firm view that the NE Region's topography along with cross-border movement across international boundaries and dispersed settlements accentuates VBDs importation. The Committee recommends for cross border vector disease coordination mechanism to establish a regional coordination platform with neighbouring countries (Bangladesh, Bhutan and Myanmar) for surveillance and information sharing. Harmonise outbreak reporting and vector-control strategies in border districts. There is need to strengthen preparedness against cross-border transmission of vector-borne diseases. To address this issue, the Committee recommends the use of remote-sensing technology for mapping larval habitats and inaccessible zones along with mobile surveillance with the calibrated help of drones under Namo Drone Didi Scheme which provides Self-Help Groups (SHGs) of women with heavily subsidized agricultural drones. The Committee also recommends the Ministry to take adequate lessons from global malaria elimination frameworks such as the Greater Mekong Subregion initiative, enhance cross-border district-to-district data sharing and collaborative surveillance along the Myanmar and Bangladesh borders to address the prevalence of VBDs. Further, the Committee recommends the Ministry to undertake joint measures to engage with healthcare

agencies of neighbouring countries to explore the possibility of joint action under a partnership group against VBDs prevalence in NER.

(Para 5.13)

14. The Committee observes that though robust Integrated Vector Management (IVM) remains the cornerstone for VBDs, the IVM of VBDs should be all inclusive covering different zones/states and different levels of incidents, with special impetus to NER. According to the Committee, peri-urban expansion, unplanned construction, accumulation of waste, inaccessibility of health facilities in remote areas, lack of awareness, etc., are the causative factors for the surge of VBDs in NER. In regard, the Committee recommends that the Integrated Vector Management (IVM) in NER should be specially curated and due impetus be given to aspects like climate-informed planning along with infrastructure modifications like improved drainage, strict enforcement of municipal bye-laws related to construction-site and waste management by local bodies, launch of year-round multi-media awareness programs through ASHA workers, schools and digital platforms, especially in local languages, etc.

(Para 5.15)

15. The Committee, furthermore, recommends for adequate deployment of mobile health units and setting up of pre-monsoon seasonal camps for remote/tribal villages with periodic evaluation, usage of citizen science apps for reporting breeding sites and tracking vector density, regular refresher courses for health workers/ field and laboratory staff, strengthening of district laboratories, institutionalization of a cadre-based entomology system and rapid response teams be made part of the IVM in NER. The Committee wants the Ministry to develop an exclusive portal, covering day to day activities in NER with real time data related to VBDs management, reporting of incidence, etc, accessible to all concerned including citizens.

(Para 5.16)

16. The Committee have come across that the North East Special Infrastructure Development Scheme (NESIDS) primarily support and accelerate infrastructure and socio-economic developments in the NER. The Committee feels that NESIDS should focus on developmental projects related to health as well as projects that would help to bridge infrastructure gaps in VBD hotspots. Extending NESIDS scope in control and management of VBDs in NER would address the infrastructure gaps like improvement in diagnostics facilities and climate-resilient water management, etc. Accordingly, the Committee recommends the creation of a dedicated VBD window under NESIDS catering to allocate funds for integrated development and infrastructure like vector-proof housing and diagnostics facilities in high-burden areas of NER. It is of the considered opinion of the Committee that as long as the crippling grip of VBDs on the NER is not effectively and decisively addressed, the holistic economic and infrastructural development of the region is not possible.

(Para 5.19)

17. Taking into account the submission of various States in the NER the Committee infers that the persistence VBDs in the region is rooted in a mix of general factors including environmental, socio-economic and infrastructural. Apart from this, certain studies indicate State wise causative factors like malaria hotspots linked to elevation and

land-use in Assam and Arunachal Pradesh, climate change - like an increase in both maximum and minimum temperatures in hilly areas of Manipur, jhum cultivators in Mizoram, language barriers from multiple dialects in States like Nagaland and Tripura, population movement in Sikkim, etc, also adds to the problem. Accordingly, the Committee feels that considering the unique topography, climatic conditions, and socio-demographic characteristics of the NER and State specifications, region-specific action plans with micro level sub-plans need to be formulated to strengthen vector-borne disease control and elimination efforts.

(Para 5.44)

18. Keeping in view the State specific requirements, the Committee recommends that the Ministry should ensure that the Regional Review Meetings (RRM) of the State's National Vector Borne Disease Control Programme are conducted every three months to monitor progress on aspects like surveillance, monitoring, and evaluation of VBDs as well as the smooth functioning of intersectoral coordination with departments such as Veterinary, Fisheries, and Municipal bodies to control the surge of VBDs in NER, especially, during the times when the spread of these diseases is at its peak. Further, the RRM should tangibly assess the progress made during the previous quarter in comparison to the benchmarks set and accordingly, review and reset the targets for the next quarter. Responsibilities to achieve the targets should also be clearly defined so as to measure achievements and lapses, objectively and to make course correction.

(Para 5.45)

19. The Committee also urges the Ministry to confirm the usage of Daily Treatment Tracking Forms are used by Multi-Purpose Health Worker (MPWs) and ASHAs to ensure treatment compliance. Moreover, the Committee recommends that the data collected through Daily Treatment Tracking Forms needs to be digitised for ease of access and analysis for research purpose. For certifying complete treatment, the Committee wants the Ministry to strengthen the Public-Private Partnership (PPP) approach as well by supplying anti-malarial drugs to private hospitals and laboratories while tracking all diagnosed malaria patients.

(Para 5.46)

20. The Committee understands that on the entomology front, the Ministry could not conduct a comprehensive vector resistance study between 2019 and 2024 due to insufficient mosquito specimens, as susceptibility tests on *Anopheles philippinensis* in 2023 showed 100% mortality to both DDT and Malathion. In this regard, the Committee opines that the Ministry should not postpone such studies due to reasons like insufficient mosquito specimens and should consider techniques like archived specimen genetic screening by utilizing samples already stored in laboratories or repositories from the past, pool-sequencing, etc., to undertake such studies. Further, the Committee would also want the Ministry to explore the feasibility of controlled rearing of the vectors for specimen purpose as per established WHO protocols. Accordingly, the Committee recommends that the Ministry should adopt new techniques and measures to conduct vector resistance study which would help in future preparedness against VBDs.

(Para 5.47)

21. Further, the Committee understands from domain experts that certain State specific steps/management that can be further adopted at micro and macro levels to contain/mitigate vector-borne diseases like universal LLIN coverage in Mizoram and Tripura, strengthened cross-border screening and surveillance along the Myanmar and Bangladesh borders, development of city-specific action plans for Guwahati, Agartala, Kohima and Aizawl involving weekly container surveillance, construction-site compliance enforcement and use of long-lasting larvicides in high-risk wards, wide JE vaccination coverage in Assam and spill-over districts, ensuring pig-sty distancing of at least 500 meters from human dwellings wherever feasible and managing night-roost bird habitats near habitation, to complete pending MDA/IDA rounds, correct coverage gaps, and conduct of pre-TAS/TAS for Lymphatic Filariasis as per eligibility in endemic districts of Assam, etc. Accordingly, the Committee strongly recommends that the Ministry must act upon these measures as suggested by domain experts for addressing the challenges of VBDs in NER.

(Para 5.48)

Research done on Vector-borne diseases in India and in the International arena

22. The Committee assumes that the purpose of the Zoonotic Vector Borne Diseases Research & Training Centre (ZVBDC) is to bring together expertise in public health, clinical medicine, veterinary sciences, laboratory methods, and social sciences to improve understanding and support integrated research of key Zoonotic and Vector-Borne Diseases in NER. Considering the relevance of the purpose of such an institution, the Committee strongly recommends that the Government should continue its financial aid to the Institution either through collaborative grants or extension of its parent grant and even consider augmenting the functioning of the Centre through enhanced monetary support. The Committee views that the Ministry must conduct yearly review/audit on the effective utilization of the grants so made before further extension of grant provision. The Committee is of the firm opinion that budget constraints should not limit innovation and scientific research and development, and hence private sector involvement in funding of such projects needs to be explored. The Committee recommends that the Ministry should look into PPP investment on Research and Development, on high priority. Apart from the financial aspect, the Committee recommends that ZVBDC should concentrate in genomic surveillance of vectors and pathogens as emerging insecticide resistance and new strains requires real-time data on vector genetics and virus evolution. Further the Committee recommends the development of a National One Health platform for VBDs connected through various central institutions like ICMR, ICAR, etc., and State machinery like ZVBDC, Veterinary Departments, etc. This would enable the sharing of data and other real-time information relating to vector control measures being undertaken at different locations by multitude of agencies.

(Para 6.8)

23. The Committee, during its examination on the subject observes that data collection and surveillance is a one of the major challenges in the control and management of VBDs in NER. The Committee appreciates the work done by the

Government through the launch of Integrated Health Information Platform (IHIP) which enables real-time case-based surveillance, mapping of vector indices, and weekly analytics on “fever plus vector density” trends. The Committee, in this regard, recommends an exclusive portal, covering day to day activities in NER or to publish a North-East Vector Surveillance Bulletin, based on real time data related to VBDs management, before and after each monsoon season to facilitate evidence-based planning in NER. The Committee feels that Government should upgrade the diagnostic panels & electronic reporting through IHIP. Ineffective feedback mechanism is another factor that impedes regular reporting, leading to undetected hotspots. Accordingly, the Committee recommends user-friendly mobile apps and helplines to be communicated in vernacular languages with acknowledgment and follow-up protocols, ensuing two-way communication systems with SMS updates and documentation of each resolution, etc.

(Para 6.10)

24. The Committee, strongly view that the data interpretation is equally important as its collection, therefore, health workers should get regular training in data interpretation for timely resource allocation and outbreak response. Along with human resources, artificial intelligence can also be used for big data analytics, climate & epidemiological trends and predict outbreak patterns. The Committee, hence, recommends the Ministry to resort to AI-powered early warning systems integrated with IHIP for hotspot prediction and similar activities. Use of Machine Learning for vector image recognition via citizen apps, etc can also be considered. The data so collected/analysed should be the backbone of the findings of research institution and these findings should in turn give shape to future health policies. Research-to-Policy Integration should be the aim of the Government in dealing with health hazards of the country. Further, the Government can also look into the possibility of creating a national VBD research mission, encourage CSR contributions and international collaborations for projects under the mission to set in place a sustainable ecosystem in this sphere.

(Para 6.11)

Global perspective/response towards the management of vector-borne diseases

25. The Committee observes that World Health Organization’s (WHO) Global Vector Control Response (GVCR 2017–2030) provides a new strategy to strengthen vector control worldwide through increased capacity, improved surveillance, better coordination and integrated action across sectors and diseases, surveillance and early detection, etc. The Committee understands that India’s vector-borne disease control strategies are largely aligned with the WHO Global Vector Control Response. Accordingly, much emphasis needs to be given by the Government on Integrated Vector Management (IVM), usage of next-generation Tools, Zoonotic Disease Management, Cross-Border Coordination, Community-Led Urban Sanitation Models, Antimicrobial Resistance (AMR) Surveillance, etc. till the achievement of objective conceived. The Government, therefore, needs to strive to adopt the good global practices into India’s framework, so that that full-scale implementation of such measures in the North-Eastern States are commensurate to meet challenges due to terrain, international borders, tribal populations and climatic variability. The Committee, therefore,

recommends the Ministry to take a cue from WHO strategy to review and evaluate India's current VBDs guidelines and policies and to implement the same to tackle VBDs in NER and in the country as a whole.

(Para 7.7)

26. The Committee feel that 2030 elimination goals of Malaria require accountability and course correction. The target of the Government should be to achieve zero indigenous cases by 2027 and sustain malaria-free status by 2030 through phased, district-level elimination. Hence, the Committee recommends a sustained and community-involved approach with annual audited reports, adaptation to local vector behaviour and resistance patterns and tie up funding to performance matrices. The Committee strongly believes that in order to eradicate any VBDs, a multi-faceted approach is far more effective than any single method. Political commitment, adequate funding, addressing climate change/urbanization impacts and adaptive strategies based on local epidemiology are critical for success in both India and globally for the elimination of VBDs.

(Para 7.8)

Experts' Opinions/suggestions on VBDs

27. The Committee intends to identify ways to combat Vector-Borne Diseases (VBDs) through widespread environmental control, modified measures, proper management and adequate community mobilization in the NER. The Committee takes into account different aspects of VBDs that are specific to NER States, like the socio-economic challenges faced, coordination mechanism, measures adopted for community sensitization and training involved, data sharing on prevalence, spread, vaccination, treatment methods, etc. Effectiveness of Intensified Malaria Elimination Project-3 (IMEP-3), implementation of WHO guidelines for Vector-Borne Diseases in India, outcome of various research done by ICMR-NIMR on VBDs, role and participation of local bodies/ stakeholders at State level like municipality, corporations, etc. along with the best practices in effective implementation of vector control measures undertaken so far in the country were brought before the Committee as part of the examination. The Committee had examined all these aspects and have given its recommendations after weighing the suggestions of the domain experts as well. Further, the Committee recommends the Ministry to look into the additional suggestions put forward by the domain experts before the Committee to tackle the VBDs in NER and implement them appropriately. Some of such suggestions are - universal testing preceding the therapy with artemisinin-based combination therapy (ACT) for *P. falciparum*, chloroquine for susceptible *P. vivax* and primaquine to prevent relapses, deployment of the recently approved QDenga vaccine in high-transmission settings, setting up a Regional Entomology Training Hub, institutional capacity building in vector management and treatment, effective platforms for inter-sectoral coordination, One Health approach to deal with VBDs, climate-based risk modelling and digital reporting systems to enable timely outbreak response and effective disease control, emulating facets from models like Odisha's DAMAN and Chhattisgarh's Malaria Mukh Bastar Abhiyaan and extensive use of drones for mapping, delivery of supplies/services to overcoming topographical challenges.

(Para 8.11)

28. Deployment of the QDenga vaccine in high-transmission settings

The Committee has been given to understand that the first preventive vaccine for dengue has been given official approval by CDSCO and DCGI for 04 to 60 years age of persons to be administered two dosages in the interval of three months as QDenga is effective for all the four serotypes of dengue. Since the vaccine Qdenga will be available on commercial basis in the market in the mid of year 2027, the Committee, therefore, recommends for incorporation of Qdenga vaccine in universal immunization programme with accelerated impetus.

(Para 8.12)

29. Climate-Based Vector Disease Early Warning System

The Committee recommends the Government to integrate IMD weather forecasts, satellite/GIS mapping and vector surveillance to predict disease hotspots and to issue district-level early warning alerts before outbreaks occur. The Committee further stresses strategic course of action to enable proactive vector control and better resource deployment.

(Para 8.13)
