

Arboviral Surveillance and Response Capacity Survey 2021

Section I: Respondent details

1. Country

Bhutan

2. Respondent/person to be contacted for clarification, if needed (last name, first name, e-mail address)

3. Professional title and affiliation

4. Date (dd/mm/yyyy)

13/5/2021

Section II: Arboviral disease surveillance system

5. Which arboviruses have circulated in your country at any time since the year 2000? This refers only to arboviruses with autochthonous i.e., local mosquito-borne transmission.

Chikungunya	Yes
Dengue	Yes
Yellow fever	Not selected
Zika	Not selected

6. Do you have any written arbovirus surveillance and control plan(s) and/or guideline(s) for your country?

Yes. We do not have arbovirus-specific guidelines, but arboviruses are included within general surveillance guidelines.

6b. For which of the following arboviruses do you have written surveillance and control plans for your country? Please choose all that apply.

Chikungunya	Not selected
Dengue	Yes
Yellow fever	Not selected
Zika	Not selected

6c. Please upload surveillance and control plan(s) or protocol(s), or guideline(s)

4 file(s) submitted

7. Is there a specific national programme for arboviral diseases surveillance or is it integrated in another programme? Please select the appropriate answer:

Integrated in another programme

7b. Please specify the programme into which arboviral diseases is integrated

Vector surveillance guide for Malaria Elimination

8. For which level of the health structure are individual and aggregated data available? (Select all relevant levels)

	Individual level	Aggregated
Primary health care level	Yes	Not selected
District level	Yes	Yes
Regional level	Yes	Yes
National level	Yes	Yes

9. What are the tools used for recording case data for surveillance purposes? Select all that apply

National	Mixed methods
State/provincial	Mixed methods
District	Mixed methods

10. Which training has been provided to the staff working on arboviral disease surveillance data?

One-time basic training on data capture and analysis (MS Excel, MS Access, EpiInfo) and/or geographic information systems (GIS)	Yes
Repeated/continuing basic training on data capture, analysis, and/or GIS	Not selected
One-time advanced training on statistical software for data analysis (e.g. STATA, R, SAS, Tableau, etc)) and GIS	Not selected
Repeated/continuing training on advance statistical software for data analysis (eg STATA, R, SAS, etc) and GIS	Not selected
No training	Not selected

11. Is reporting mandatory for any arboviral disease cases in your country?

Yes

11b. For which of the following arboviral disease cases is reporting mandatory in your country?

Chikungunya	Mandatory reporting of all suspect cases
Dengue	Mandatory reporting of all suspect cases
Yellow fever	Mandatory reporting of all suspect cases

11c. For which other arboviral diseases is reporting mandatory?

11d. Please upload document(s) containing surveillance case definitions used for reporting of arboviral diseases

0 file(s) submitted

12. In the last 2 years, did your country conduct national epidemiological surveillance for human cases of arboviral disease?

No

12b. How frequently are surveillance data reported to the national level?

12c. What type of national epidemiological surveillance was conducted?

For reference, here are the relevant definitions:

Active surveillance is defined as having dedicated systems and staff that routinely and with effort survey for cases of disease or detection of vectors and associated pathogens by the public health department.

Passive surveillance is defined as having a reporting system where physicians, laboratories, mosquito control districts, academic institutions or others routinely report cases of disease or detection of vectors and associated pathogens to the public health department.

12d. If available, please upload the most recent report(s) on arboviral surveillance in humans

13. Does your country provide regular training sessions for healthcare workers on notification of *Aedes*-borne arboviral diseases?

Yes : All Neglected tropical diseases are included in the training and for vector surveillance, they do all mosquito identification and risk mapping

14. What do the arboviral disease surveillance staff perceive as factors contributing to the a) success and b) barriers/challenges to arboviral disease surveillance in humans?

- a) Success: Integrated Primary Health Care management system where all health workers were trained on public health and health promotion; the arboviral diseases are notifiable disease list; periodic vector surveillance and risk mapping
- b) Barrier/challenges: limited public knowledge on the disease; Rare/very seasonal disease and health workers forget for ruling out the disease; limited stakeholders participation and community ownership especially on mosquito breeding source reduction and community behavior on preventive and control measures

Section III: Arbovirus laboratory capacity

15. Is arbovirus diagnostic laboratory testing performed for confirmation of suspected cases in your country? (Please select the applicable option during outbreak periods and during non-outbreak periods, respectively)

Outbreak periods	Subset of suspect cases tested
Non-outbreak periods	All suspect cases tested

15b. On average, for what percentage of suspected arboviral disease cases your country is laboratory confirmatory testing performed? Please indicate for outbreak and non-outbreak periods, respectively

Non-outbreak (routine) percentage in a year	50
During outbreaks percentage per identified cluster	30

16. In the last two years, were the positive cases of arboviruses confirmed by a national reference laboratory?

Yes, but only for some arboviral infections. Please specify them:

Dengue /chikungunya

16b. If your country does not have capacity to type and serotype arboviruses, do you send samples for typing to other countries?

Yes. Please specify where:

AFRIMS, Bangkok, Thailand

17. Overall, what arboviral testing capacity(ies) is(are) available in your country? Please check all applicable boxes

	Antigen testing	IgM antibody testing	IgG antibody testing	Neutralizing Virus antibody testing	Virus isolation	RT-PCR or other nucleic acid amplification test	Viral gene/genome Sequencing
Chikungunya	Yes	Yes	Yes			Yes	
Dengue	Yes	Yes	Yes			Yes	
Yellow fever							
Zika							
Other							

18. Which additional resources are most needed for your country to perform adequate testing for arboviral diseases? Please describe what would be needed for each checked resource in the adjacent comment field

Additional personnel: Yes

Estimate of number of full-time staff: Surveillance staff full time in every districts

Additional training of personnel: Training of lab. technologist on PCR and gens sequencing

Additional laboratory equipment, reagents, etc.: PCR primers and assay

19. Do you perform virological surveillance on humans, ie, tracking of prevailing genotypes/serotypes? Please select all that apply

No: no capacity and facility (May be yes in long run as we have negative pressure laboratory in the country)

19b. Which samples do you use for virological surveillance?

19c. For which viruses do you perform virological surveillance? (check all that apply)

19d. Does your country provide regular training sessions for healthcare workers on arboviruses virological surveillance?

20. What do the arboviral diagnostic laboratory staff perceive as factors contributing to the a) success and b) barriers/challenges with respect to laboratory testing for arboviral infections?

Success: Rapid test available and easy to diagnose the suspected case; Supporting laboratory test available to support the arboviral disease Barrier/Challenges: limited capacity of the laboratory staff; Multi-tasking work in the field; No PCR facility for confirmatory

Section IV: Management of arboviral disease cases

21. Does your country have clinical guidelines for healthcare workers on diagnosis and clinical management of cases and severe cases of *Aedes*-borne arboviral diseases?

Yes

21b. Please upload the clinical guideline(s) for arboviral disease management

0 file(s) submitted

22. Are severe cases of arboviral diseases managed in a special area (part of the hospital, isolation beds)?

Yes

23. How many hospital beds are available per 100,000 population?

60

24. Does your country provide regular training sessions for healthcare workers on clinical diagnosis and management of *Aedes*-borne arboviral diseases?

Yes, specific training is provided. If so, please specify:

Refresher course every year

25. What do the arboviral disease surveillance/clinical staff perceive as factors contributing to the a) success and b) barriers/challenges with respect to case management?

- a) Success: Health workers aware of arboviral prevailing in their areas; Diagnostic tool (RDT) available at all hospitals
- b) limited capacity of our health workers in clinical management and diagnosis; Rare disease with no funding support

Section V: Routine vector surveillance and control

26. Is there a disease programme, agency, or service in charge of arbovirus vector surveillance in your country?

Yes. If so, please specify in the comment field.

Vector-borne Disease Control Programme

27. Which institution/department is in charge of reporting entomologic surveillance data to the national ministry of health/health department? (Check all that apply)

State/provincial health agencies	Yes
Other national agency	Yes
City/country health departments	Not selected
Local mosquito control districts or similar organisations	Yes
Universities or academic institutions	Not selected
Private companies	Not selected

28. For the last 2 years, did your country conduct entomologic surveillance for arboviral infections in mosquito vectors?

Yes

28b. Please upload the most recent national vector surveillance report

0 file(s) submitted

28c. Did the entomologic surveillance entail country wide programmes or was it restricted to specific locations?

Country wide

28d. How many sentinel surveillance sites do you have?

4

28e. How often was the surveillance conducted? Please choose one of the following:

depending on season (weekly cluster surveillance in peak season & once at initial before start of peak)

29. Do you conduct adult mosquito surveillance?

Yes

30. Do you conduct larval/pupal mosquito surveillance?

Yes

31. Are trapped mosquitoes identified to species?

Yes

32. Does your country either calculate minimum infection rates (MIR) for any *Aedes*-borne arboviruses with your mosquito data or receive such data from other agencies? Please choose only one of the following:

No

33. Which laboratories performed testing for arboviruses on mosquito pools collected in your country in the last two years? (check all that apply)

National public health laboratory	Not selected
State/provincial/regional public health laboratory	Not selected
Local health department laboratory	Not selected
University or academic institution	Not selected
Local MCD (if different from county health dep't)	Not selected
Mosquito surveillance done, but no testing done on mosquito pools	Yes
Not applicable (no mosquito surveillance done)	Not selected

34. Is there a record of *Aedes aegypti* or *Aedes albopictus* being found in your country in the past 5 years? Please choose only one of the following

Yes, only *Aedes aegypti*

34b. Please describe the potential public health threat from *Aedes aegypti* in your country

Aedes aegypti populations are spreading and pose a significant public health threat

34c. Please describe the potential public health threat from *Aedes albopictus* in your country

35. Over the past two years, did your country use any of the following vector control methods in local jurisdictions (either using government staff and resources, or subcontracting to a different entity to do so)? Please select all that apply

Adulticiding (insecticide application against adult mosquitoes)	Yes
Larviciding	Yes
Insect growth regulators (eg , pyriproxyfen)	Yes
Wolbachia method	Not selected
Sterile insect release	Not selected
None	Not selected

35b. Would your country have conducted or financially supported adulticiding/larviciding or source reduction activities in the last two years if sufficient funding were available?

35c. Which adulticides and/or larvicides (brand and product name) were used?

Fogging for adult: Pyrethrum Larvicides: Temephos & Pyreproxifen

36. Does your country provide regular training sessions for staff in charge of vector control and vector surveillance?

Yes, for both

37. For the last two years, did your country have a plan for mosquito-borne disease control that includes a threshold (eg, level of vector mosquito abundance or minimum infection rate) that would result in a recommendation for mosquito adulticiding/other mosquito reduction measures?)

Yes, have a threshold that does not require concurrent human cases

37b. Which indicator(s) is(are) used as threshold(s)?

Concurrent human cases	Not selected
Minimum infection rate	Not selected
Vector density	Yes
Breteau Index	Yes
House Index	Yes
Container Index	Yes

38. Overall, are data on any of the following arboviral outbreak risk factors routinely collected and analysed? (Select all that apply)

House Index	Yes
Breteau Index	Yes
Container Index	Yes
Temperatures	Not selected
Rainfall	Not selected
Migration of a non-immune population	Not selected
None	Not selected

39. Is there a surveillance system in place for monitoring *Aedes* resistance to the insecticide(s) used?

No

40. What do the vector surveillance staff perceive as factors contributing to the a) success and b) barriers/challenges with respect to vector surveillance and control in the country?

a) Success: Early surveillance and risk mapping; wider coverage in high-risk areas & community involvement

b) Barriers/challenges: No dedicated funding support; limited capacity & shortage of manpower

Section VI: Animal surveillance

41. During the last 2 years, did your country conduct national epidemiological surveillance for arboviral disease in animals (eg, epizootic surveillance for yellow fever in endemic areas)?

No

41b. How often was the animal surveillance conducted?

41c. What type of surveillance was conducted in animals?

41d. Please upload a report on the animal surveillance

42. Does your country (or local jurisdictions within the country) perform sentinel animal surveillance or epizootic surveillance, eg, for yellow fever in nonhuman primates in endemic regions?

No

42b. For which viruses is sentinel surveillance conducted and in which animal species?

42c. Please upload the most recent report(s) on sentinel animal surveillance

Section VII: Community sensitization and participation

43. Does your country have a community outreach program that also covers arboviral diseases?

Yes

43b. What entity(ies) is(are) in charge of the outreach program in your country?

Primary Health Centres on suspected arboviral and to the Village Health workers for referral of fever cases to the health centres

43c. What is the geographical coverage of the outreach program in your country?

Only selected areas. Please specify where:

Mobile clinics and fever surveillance

43d. Is the community outreach/social mobilization program sufficiently funded to cover staff time, prevention and outreach activities as needed?

No

43e. Which resources would help ensure adequate capacity?

Educational materials for the public	Yes
Educational and reference materials for providers	Yes
Educational and reference materials for local health departments	Yes
Additional staff	Yes
Staff training	Yes

44. Did your national arboviral disease program issue notifications to the public about local transmission risk and/or possible vector-control activities (eg larviciding, adulticiding, community mobilization and participation, etc) as a prevention message for arboviral diseases within last 2 years? (Check all that apply)

	During outbreaks	During non-outbreak periods
Issued by national public health agency	Yes	Yes
Issued by state/local health agencies	Yes	Yes
No risk in the past two years	Not selected	Not selected
No notifications even though risk was present	Not selected	Not selected

44b. Which means does your program use for community sensitization, mobilisation and acceptance of interventions in your country? (Check all that apply)

Press releases to electronic and printed media	Yes
Public service announcements on television or radio	Yes
Passive distribution of informational brochures	Yes
Active distribution of informational brochures	Yes
Town, community, or neighborhood meetings	Yes
Posting information on the home page of your agency's website	Not selected
Social media outlets (Facebook, Twitter, etc)	Yes
Door-to-door outreach in selected locations	Yes
Participation in community clean-ups	Yes
Modification of messages for all local languages	Yes

45. Does your country provide regular training sessions for staff in charge of community sensitization, mobilisation and acceptance of interventions dedicated to control arboviral diseases?

Yes. If yes, please describe in comments field:

Case management for community health workers, Community Action Group, Village health workers on fever case referral and breeding source reduction

46. What do the community outreach staff perceive as factors contributing to the a) success and b) barriers/challenges with respect to community participation

a) Success: Early referral,

b) Barries/challenges: limited ownership for sustenance

Section VIII: Preparedness for arboviral outbreaks/epidemics

47. Is there either a surveillance and outbreak response committee in your country, or a steering committee for that purpose?

Yes

48. Does your country have a contingency plan to organize healthcare services during an outbreak (including outbreaks of arboviral diseases)?

Yes

48b. Please upload the contingency plan

0 file(s) submitted

49. Are there defined or established criteria for declaring an outbreak of arboviral disease outbreak in your country?

Yes. If so, in the comments field, please briefly describe the criteria or reference the document in which those are sta

Plan uploaded earlier

50. Do you have established collaborations with national/regional research institutions / international agencies that are planned to be activated in case of arboviral outbreak?

Yes. If so, please specify institutions/agencies in the comments field:

AFRIMS, Bangkok Thailand

51. What vector control interventions are deployed in case of an emergency?

Fogging Community mobilization for source reduction

52. For the last 2 years, which of the following government levels had an emergency fund or a specified emergency funding mechanism for arbovirus outbreak response?

National level	Yes
State/local level	Not selected
None	Not selected

53. Does your country provide regular training sessions for staff/committee in charge of preparedness for arboviral outbreaks/epidemics?

Yes

54. What do the arboviral disease surveillance staff perceive as factors contributing to the a) success and b) barriers/challenges with respect to preparedness of arboviral diseases epidemics in your country?

Success: Focused on preventive measures (education on prevention and source reduction); Taskforce established to support the health team

Barriers /challenges: limited knowledge/ no committed fund

Section IX: Arboviral disease surveillance data

55. Please provide total number of cases and deaths for the following arboviral diseases from 2015 to 2020 (if available).

	Dengue	Chikungunya	Yellow fever	Zika
2015 Cases	0	0	0	0
2015 Deaths	0	0	0	0
2016 Cases	550	0	0	0
2016 Deaths	0	0	0	0
2017 Cases	870	0	0	0
2017 Deaths	0	0	0	0
2018 Cases	28	0	0	0
2018 Deaths	0	0	0	0
2019 Cases	3309	0	0	0
2019 Deaths	6	0	0	0
2020 Cases	823	0	0	0
2020 Deaths	0	0	0	0

(NA = Not Available)

55b. Were cases of other mosquito-borne arboviruses, not listed in the previous question, reported in your country from 2015-2020?

No

55c. Please select any of the following other mosquito-borne viruses that have been reported in your country from 2015-2020

55d. Please provide total number of cases and deaths due to each of the following other arboviruses that you selected from 2015-2020

56. Please provide the number of cases of locally acquired, mosquito-borne *Aedes*-borne arbovirus infections by case classification for 2020 and, if not available, for 2019

	Suspect cases	Probable cases	Confirmed cases	Deaths
Chikungunya	0	0	0	0
Dengue	823	823	16	0
Yellow Fever	0	0	0	0
Zika	0	0	0	0

57. Do arbovirus surveillance staff have any perceived reasons for increasing trends in arboviral disease incidence? Check all answers that apply.

Climate change (as evidenced by changes in meteorological data)	Yes
Construction activities	Yes
Population migration (within the country or between countries)	Yes
Increased availability of peri-domestic water-bearing containers suitable for mosquito egg deposition	Yes

Section X: Surveillance staffing

58. During 2019 (prior to the Covid-19 pandemic), indicate below the number of arbovirus surveillance staff at the national level.

	Number of personnel
Clinicians	1
Epidemiologists	1
Laboratorians	4
Entomologists/ vector control specialists	2
Support staff (administration; logistics; other)	4

59. Indicate below how many total staff persons are needed at the national level in your country to achieve full epidemiology and laboratory capacity* to conduct arbovirus surveillance.

	Number of personnel
Clinicians	1
Epidemiologists	2
Laboratorians	2
Entomologists/vector control specialists	6
Support staff (administration; logistics; other)	12

60. Optional comments to explain responses to questions 58 and 59 above

Vector-borne Disease Control programme oversees the vector surveillance and public health measures at the national level, such as training of health workers/surveillance workers and entomological surveillance. The staff reflected on above is just a requirement for the vector-borne disease control program. There is a plan to establish a Center for Vector-borne and Zoonotic Disease in the country, where we require more specialized staff and require more staff.

Royal Center for Disease Control does all quality control of the laboratory test; disease notification and declaration of the outbreak and its response plan. RCDC might require more lab. technologist with advanced skills in the future.

61. The national health authority/ministry of health has access to expertise in clinical management of arboviruses (Check all that apply)

Within the ministry of health (eg, public health medical officers, clinicians in state hospitals)	Yes
Through other national agency with regulatory authority	Not selected
Through academic institution(s)	Not selected
Private hospitals	Not selected
Does not have access	Not selected
Other	Request WHO, technical support

62. The national health authority/ministry of health has access to expertise in arbovirus epidemiology (Check all that apply)

Within the ministry of health	Yes
Through other national agency with regulatory authority	Not selected
Through academic institution(s)	Not selected
Does not have access	Not selected
Other	WHO, Experts from the region

63. The national health authority/ministry of health has access to expertise in arbovirus laboratory diagnosis (Check all that apply)

Within the ministry of health (e.g., public health laboratory scientists)	Yes
Through other national agency with regulatory authority	Not selected
Through academic institution(s)	Not selected
Does not have access	Not selected
Other	Partners Institutions

64. The national health authority/ministry of health has access to expertise in entomology (Check all that apply)

Within the ministry of health	Yes
Through other national agency with regulatory authority	Not selected
Through academic institution(s)	Not selected
Does not have access	Not selected
Other	Regional partners

65. Optional comments to explain responses to any of Questions 61-64

Very limited expertise at every level, seek support from the regional reference laboratories and WHO regional experts pool

Section XI: Survey conclusion

66. If you have any further comments to add regarding arbovirus surveillance and control in your country, including whether arboviruses other than *Aedes*-borne arboviruses are of higher priority, please do so in the text field below

