STANDARD OPERATING PROCEDURE FOR INTRODUCTION OF PUBLIC HEALTH PESTICIDES INCLUDING BIOLARVICIDES IN THE NATIONAL VECTOR BORNE DISEASE CONTROL PROGRAMME

2020

STANDARD OPERATING PROCEDURE (SOP) FOR INTRODUCTION OF PUBLIC HEALTH PESTICIDES (PHP) INCLUDING BIOLARVICIDES AND LONG LASTING INSECTICIDAL NETS (LLINS) IN THE NATIONAL VECTOR BORNE DISEASE CONTROL PROGRAMME (NVBDCP)

In India, insecticides are introduced into public health programmes based on entomological parameters and their impact on disease incidence/ prevalence. Insecticides are used in the programme for indoor residual and space spraying, treatment of mosquito nets/ Long Lasting Insecticidal Nets (LLINs) and larval control for containment of vector borne diseases. The revised procedure to be adopted for the introduction of newer insecticides or insecticide formulations for public health use (under National Vector Borne Disease Control Programme (NVBDCP) is depicted in the Flow chart.

The NVBDCP considers introduction of new PHP/LLINs and/or deletion of PHP/LLINs for use under the proramme on the basis of registration/de-registration of product by CIB&RC. Technical Advisory Committee (TAC) of GoI deliberates on the data generated on bio-efficacy, vector susceptibility and epidemiological impact etc by the institute(s) that conduct field trials as per approved revised common protocol based on the technical specification of the PHP/LLINs by Technical Specification Committee (TSC). The inclusion/deletion of a PHP is made with the approval of Ministry of Health and Family Welfare, Government of India

The manufacturers/importers of new pesticides/ formulations of pesticides listed under the schedule of Insecticides Act (1968) need to submit requisite data to get it registered with Central Insecticides Board (CIB) before submitting the proposal to NVBDCP for its inclusion under NVBDCP for use in programme. The steps involved in the process (Flow chart) of getting the pesticides evaluated for efficacy against disease vectors, registration and approval for their use in the national programme are described below:

1. The manufacturer(s) or importer of pesticides who intends to get their product included for use in the public health programme will submit

an application to ICMR/NCDC/Universities with requisite capacity/ facilities as mentioned at **Annexure** requesting them to initiate necessary steps to generate data through laboratory and field trials strictly as per the latest Revised Common Protocol for Uniform Evaluation of Public Health Pesticides including Bio-larvicides for use in Vector Control displayed on website of NVBDCP/ICMR/NCDC/ CIB. For research trial and testing (RTT) samples, permission from Registration Committee of CIB is required prior to import (if sample is to be brought from outside country). Data requirement for registration by CIB & RC in respect of chemistry, bio-efficacy, toxicology and packaging is available at www.cibrc.nic.in which may be obtained directly from CIB.

2. The ICMR/NCDC/Universities will examine such applications for their scientific merit through a review process. Only after meeting the eligibility criteria, proposal will be prepared (with appropriate budget component) in accordance with the latest Revised Common Protocol and after approval in their respective system, convey to the requesting manufacturer or importer for their consent (within 3 months). In case of the proposals requiring clearance from Human Ethics Committee and /or Animal Ethics Committee, the institutes will obtain it within this period. The entire process should be completed at the earliest but not exceeding 3 months.

3. On receipt of the concurrence of the manufacturer/importer for conduct of trial, the ICMR/NCDC/Universities will initiate the process of evaluation. The manufacturer/importer will enter into a Memorandum of Understanding (MoU) as per the need of the trial agency and transfer the funds as well as the product to be tested to the institute. In the MoU, it should be clearly mentioned that the disposal of wastes and insecticide containers will be done following standard guidelines and also to be specified that who will be responsible for this. It should also be mentioned especially that the plastic covers and used LLINs will be disposed of by manufacturer/importer following standard Guidelines. All the activities under this step of SOP need to be completed **within 2 months**, excluding the trial period specified in latest Revised Common Protocol for evaluation of product.

4. The identified Institute will conduct the trial as per the latest Revised Common Protocol and ethical guidelines as required for respective institutes and approval and review norms in their respective system.

5. The final report will be sent by trial agency to the firm following respective review and approval norms.

6. The manufacturer/importer, with the final trial report received from the trial agency, can file an application with the Central Insecticide Board (CIB) & RC for registration of the product.

7. The manufacturer/ importer can approach NVBDCP with a complete dossier including registration certificate issued by CIB & RC including label claim and the Phase-I, Phase-II and Phase-III trial reports- for consideration for inclusion of the product in the programme.

8. The NVBDCP will place the application with all documents of the manufacturer/importer to the Sub Group of NVBDCP to examine for the scientific merit of the product(within 2 months).

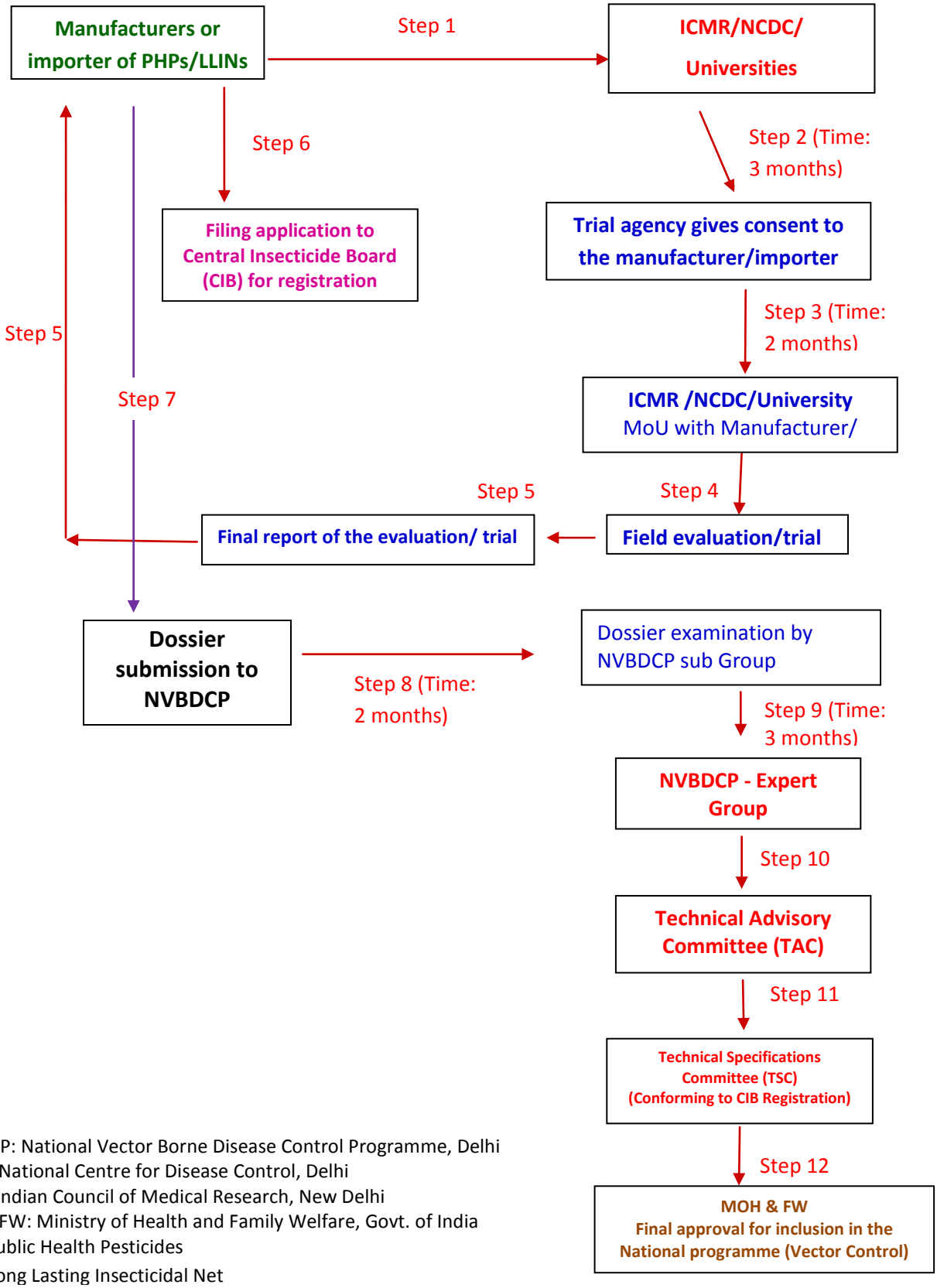
9. Based on recommendations of Sub-Group, NVBDCP will process the application for deliberation of NVBDCP Expert Group (within 3 months). The recommendations of Expert Group will be processed by the NVBDCP for deliberations in the Technical Advisory Committee (TAC).

10. The TAC will deliberate on recommendations of the Expert Group of NVBDCP and will grant its approval for inclusion of the PHP/LLINs under the programme. In case the product is not recommended by TAC, the manufacturer/ importer will be informed accordingly.

11. Once TAC recommends for inclusion of the PHP/LLINs in the programme, NVBDCP Technical Specification Committee (TSC) finalizes the PHP/LLINs technical specifications, based on Registration Certificate issued by CIB & RC and BIS specifications, wherever needed.

12. TAC recommendations and technical specifications approved by TSC will be submitted to Ministry of Health & Family Welfare, Govt. of India for consideration for approval towards inclusion of the PHP/LLINs under the programme.

FLOW CHART OF THE STANDARD OPERATING PROCEDURE FOR INTRODUCTION OF PUBLIC HEALTH PESTICIDES INCLUDING BIOLARVICIDES AND LONG LASTING INSECTICIDAL NETS IN THE NATIONAL VECTOR BORNE DISEASE CONTROL PROGRAMME



NVBDCP: National Vector Borne Disease Control Programme, Delhi
NCDC: National Centre for Disease Control, Delhi
ICMR: Indian Council of Medical Research, New Delhi
MOH&FW: Ministry of Health and Family Welfare, Govt. of India
PHP: Public Health Pesticides
LLIN: Long Lasting Insecticidal Net

Composition and Terms of Reference of Sub Group/Expert Group/ Committees

I. NVBDCP Sub Group

Composition

1. Head Entomology, NVBDCP, New Delhi
2. Subject expert from NCDC, New Delhi
3. Subject expert from ICMR New Delhi and/or nominated expert from ICMR Institutes
4. Representative from CIB, Faridabad, Haryana
5. Expert of Chemistry or Toxicology from Delhi University
6. Independent Subject Experts (2-3)

Terms of reference

Screening of the dossier with requisite documents submitted by the manufacturer/ importer to NVBDCP requesting for consideration to include under the Programme before submission to the NVBDCP Expert Group.

II. NVBDCP Expert Group

Composition

1. Chairperson (external)
2. Director, NCDC, Delhi
3. Director, NVBDCP, Delhi
4. Head, Epidemiology and Communicable Diseases, ICMR
5. Director of ICMR-NIMR
6. Representative of CIB & RC
7. External subject experts- Entomology (Three)
8. Subject Expert in Chemistry and Toxicology (one each)
9. Municipal Health Officers, three Delhi Municipal Corporations
10. Member of Civil Society (one)
11. HOD, Entomology, Dte. of NVBDCP (Member Secretary)

Terms of reference

Deliberations on the recommendations of the NVBDCP Sub Group and on PHP/LLINs issue/s. Advice the programme on PHP/LLINs issue/s. Convey the specific recommendation/s to TAC.

III. Expert Committee of respective institutions (ICMR/ NCDC/ Universities)

Composition

1. Chairperson (An external eminent subject expert)
2. Three additional subject experts (External, one each in Entomology, Chemistry and Toxicology).
3. Expert from public health for Phase III trials wherever needed
4. Scientist from institutes
5. Director, NCDC or nominee
6. Head, ECD Division, ICMR or nominee
7. Secretary, CIB & RC or nominee
8. Head, Concerned Division of ICMR/NCDC/Universities- Member Secretary.

Terms of reference

a. To examine the scientific merit of the applications submitted by the manufacturer/importer and identify the research institute for evaluation following the latest Revised Common Protocol.
b. To review the progress of the evaluation/trial on the projects.
c. Approval of the final evaluation report for communicating to the manufacturer/ importer.

IV. Technical Advisory Committee (TAC), NVBDCP

1. The Director General of Health Services, Directorate of General of Health Services, Government of India, Chairperson
2. Director, NVBDCP as the Member Secretary.
3. Compositions of the Committee as approved by DGHS and Ministry of Health & Family Welfare
4. Representative from WHO could be invited to attend the meetings, whenever necessary.
5. The Chairman is empowered to co-opt any expert, so required, to assist the committee from time to time.

Terms of reference

1. To review the recommendations of the NVBDCP Expert Group and approve the PHP/LLINs for introduction under the programme
2. To review drug policy and suggest alternative drugs for treatment of malaria and other VBD cases.
3. To review and suggest diagnostics and case management practices under NVBDCP for all vector borne diseases.
4. To identify and review whether the preventive measures undertaken have been consistent with the agreed plan of action and or leading to measurable target of achievements.
5. To suggest mid-course changes in strategy including use of insecticides, diagnostics and drugs, if resistant patterns are evident.
6. Any other technical issue/s related to programme strategies and implementation.

V. Technical Specification Committee (TSC), NVBDCP

- The Special/Additional Director General of Health Services, Dte. of GHS, GoI, Chairperson
- Director, NVBDCP - Member Secretary.

Composition of the Committee as approved by DGHS and Ministry of Health & Family Welfare.

Terms of reference

1. To finalize the technical specifications/parameters of the PHP/LLINs recommended by TAC for inclusion under the programme.

Annexure

FACILITIES REQUIRED FOR DIFFERENT PHASES FOR UNIFORM EVALUATION OF PUBLIC HEALTH PESTICIDES INCLUDING BIO-LARVICIDES FOR USE IN VECTOR CONTROL

- To be referred by Institutes of ICMR/NCDC centres/Universities for equipping before taking up a project or entering into MoU for Uniform evaluation of Public health pesticides including bio-larvicides for use in vector control under NVBDCP.
- The manufacturers/firms may refer the document to ensure the capacity of evaluating institute before entering into MoU for Uniform evaluation of Public health pesticides including bio-larvicides for use in vector control under NVBDCP.
- This is essentially based on the latest Revised Common protocols for uniform evaluation of Public health pesticides including bio-larvicides and LLINs for use in vector control under NVBDCP (https://nvbdcp.gov.in/Doc/Revised-Common-Protocol. pdf

Salient points on evaluation of larvicides, LLINs and adulticides for IRS are given for quick reference to the requirements for evaluations to achieve the objectives

A. LARVICIDES/INSECT GROWTH REGULATORS/BACTERIAL LARVICIDES		
Testing Phases	**Objectives**	**Facilities required**
Phase I (Laboratory evaluation)	1. Determination of biological activity • Chemical Larvicides • Insect Growth regulators (IGRs) • Bacterial larvicides 2. Determination of the diagnostic concentration 3. Assessment of cross resistance	1. Test system: Characterized target insect species to be tested 2. Test item: Candidate product/formulation 3. Test facility: Laboratory for preparation of stock solutions/suspensions/test concentrations 4. Technical expertise to run standard protocols 5. Insectary-rearing facilities to F1 of test system (insect species to be tested)

		6. Test item: i.e. other commonly used larvicides for assessment of cross resistance 7. Data management & computing facilities
Phase II (Small scale evaluation)	1. Determine the efficacy and residual activity of the larvicides/formulation against target vector species breeding in clean and polluted water habitats. 2. Determination of optimal field application dosage for phase III trial 3. Making record of qualitative observations on non-target organisms, especially predators, cohabiting with mosquito larvae	1. Field sites with adequate number of breeding habitats of the target vector species or facilities with simulated field conditions. 2. Test item: candidate larvicide/formulation 3. Equipment/instruments for application (delivery) of test item 4. Sampling devices viz., dippers, buckets, enamel trays etc. 5. Logistic support (travel etc.) 6. Technical expertise to run standard protocols 7. Emergence inhibition studies using floating cages. 8. Data management & computing facilities
Phase III (Large scale evaluation)	1. Confirm the efficacy of larvicide at selected optimal field application dosage(s) against target mosquito species in natural breeding sites 2. Confirm residual activity/application intervals in clear and polluted habitats. 3. Record observations on ease of application 4. Community acceptance 5. Perceived side effects on handlers 6. Effect on NTOs	1. Field sites with adequate number of breeding habitats of the Target-vector species. 2. Test item: candidate larvicide/formulation 3. Equipment/instruments for application (delivery) of test item 4. Sampling devices viz., dippers, buckets, enamel trays etc. 5. Sampling devices for measuring adult density 6. Assessing effect of test item on Non-Target Organisms (NTO) and sampling devices

		7. Logistic support (travel etc.) 8. Technical expertise 9. Data management & computing facilities
B. LONG LASTING INSECTICIDAL NETS (LLINS)		
PHASE I (Laboratory Studies)	Determine the efficacy of LLINs in relation to 20 WHO standard washes (accelerated washing) • Assessment of regeneration time of insecticide and wash resistance • Knock down time	1. Test system: Characterized target insect species to be tested 2. Test item: Candidate LLIN 3. Test facility: Laboratory facility for net washing and drying as per the WHO washing protocol 4. Net storage facility at ambient temperature during regeneration time before next wash 5. Net washing machine (Shaker water bath with controlled temp. and RPM) 6. Testing facility for conducting cone bioassays and tunnel test 7. Technical expertise to run standard protocols 8. Insectary-rearing facilities to F1 of test system (insect species to be tested) 9. Data management & computing facilities.
PHASE II (Small scale field trials)	Determine the efficacy of LLINs washed 20 times relative to unwashed LLIN, WHO recommended reference LLIN (with same insecticide at WHO recommended dosage) washed 20 times (positive control) before exhaustion and untreated net (negative control) against susceptible/resistant mosquitoes in experimental huts that simulate local village huts. [against resistant	1. Specially designed experimental huts for recording exit-entry behaviour of target mosquitoes for measuring response to LLINs 2. Test system: Target insect species to be tested 3. Test item: Candidate LLIN, reference LLIN & untreated net 4. Test facility: Net washing and drying facility

	population for combination nets] • Deterrence (reduction in hut entry relative to the huts provided with untreated control nets) • Induced exophily (proportion of mosquitoes that will be found in the verandah trap) • Blood feeding inhibition (reduction in blood feeding compared to control nets) • Immediate and delayed mortality (proportion of mosquitoes killed of total numbers entered the hut after 24 hrs holding of alive mosquitoes)	5. Storage facilities for washed nets 6. Logistics (travel etc.) 7. Testing facility for cone bioassays 8. Chemical content analysis facility/Govt. recognized laboratory 9. Technical expertise 10. Insectary-rearing facilities to F1 of test system (insect species to be tested) 11. Data management & computing facilities
PHASE III (Large scale field trials)	Multi-centric in at least three eco-epidemiological settings • Evaluate insecticidal acitivity and fabric integrity of LLIN over 36 months in comparison to the reference LLIN with the same insecticide and under the same field conditions • Assess net washing mode and washing habits of the householders • Assess community acceptability of LLIN and reference net • Assess collateral benefits to the users.	1. 10-12 comparable study villages with adequate density of target vector species (villages to be selected based on population size, disease, incidence, accessibility, community use of ITNs/nets). 2. Logistics support (travel etc.) 3. Facility for chemical content analysis of nets. 4. Testing facility for cone bioassays and tunnel test 5. Diagnostic facility (kits/microscopy for disease incidence/prevalence) 6. Data management & computing facilities 7. Technical expertise to follow the structured protocols (entomology, sociology and parasitology) 8. Mosquito collection tools/devices (aspirators/traps)
C. INDOOR RESIDUAL SPRAY (IRS)		
PHASE I (Laboratory Studies)	1. Intrinsic toxicity of the candidate insecticide, determining LD_{50} and LD_{90}	1. Test system: Target insect species to be tested 2. Test item: Candidate insecticide

	2. Diagnostic dosage for monitoring resistance to the insecticide & cross resistance 3. Assess irritant and excito-repellent properties of the insecticide by determining (time to first take off) FT_{50} and FT_{90} after exposure to treated substrates 4. Assess the efficacy and residual activity of the insecticide	(Technical grade) 3. Test facility: Testing intrinsic toxicity-tropical application using applicator for applying insecticide on thorax 4. Facilities for preparation of insecticide impregnated papers 5. Adult susceptibility test kits (WHO tubes and bottles) 6. Cone bioassay kits for assessing residual effect on pre-fabricated substrates 7. Technical expertise to run standard protocols Insectary-rearing facilities to F1 of test system (insect species to be tested) 8. Data management & computing facilities
PHASE II (Small scale field trials)	Assess the efficacy and residual activity of insecticides against wild population of the target vector species • Determine optimum application dosage of the insecticide to be used for Phase III evaluation • Measure the efficacy of insecticides in terms of mortality (immediate and delayed) and residual effect • Study the impact on the behaviour of mosquitoes (deterrence, blood feeding inhibition and induced exophily) • Record ease of application and perceived side effects by spray men and inhabitants during application and use.	1. Specially designed experimental huts for recording exit-entry behaviour of target mosquitoes 2. Test system: Target insect species to be tested 3. Test item: Candidate insecticide/formulation 4. Sprayers (compression sprayer) 5. Spray solution preparation kit 6. Personal protection equipment (PPE) 7. Logistics (transport etc) 8. Testing facility for cone bioassays 9. Mosquito collection tools/devices 10. White cloths to cover the floor/verandah of the huts 11. Cylindrical cages for assessment of fumigant property of insecticide 12. Technical expertise 13. Insectary-rearing facilities to F1 of

		test system (insect species to be tested) 14. Dissection stereo and compound microscopes 15. Data management & computing facilities
PHASE III (Large scale field trials)	Multi-centric in at least three eco-epidemiological settings 1. Confirm the efficacy of insecticide formulation at selected dosage against target vector 2. Confirm residual activity and frequency of application 3. Impact on disease incidence/prevalence 4. Community acceptability and collateral benefits 5. Ease of application, perceived side effects by operators and inhabitants	1. Comparable study villages with adequate population size and vector density (Villages with API>2 (in last 3-5 years), population of 3000) 2. Location of control villages at about 5-10 kms from the treated villages 3. Logistics support (transport etc.) 4. Sprayers (compression) 5. A physician to monitor signs and symptoms for insecticide poisoning, if any 6. Chemical analysis facility/outsourcing for assessment of spray quality 7. Bioassay kits (cones) for assessing residual activity on different surfaces 8. Technical expertise-entomology and parasitology (mosquito landing collection on humans and animals, light trap catches, mosquito dissection (infection/infectivity), parity, entomological inoculation rate (EIR) and sample blood surveys) 9. Personal protection equipment 10. Data management & computing facilities.