

Highlights of Research Activities under IDVC Project

Bangalore (Karnataka)

- Fish-based biocontrol of malaria vector *Anopheles culicifacies* — very effective, cheap and sustainable for malaria control in southern India, is being implemented.
- A change of mosquitogenic conditions was observed and an action plan has been prepared for mosquito control in Bangalore City.
- Establishment of therapeutic efficacy of chloroquine and its correlation with the molecular markers *Pfcr1* and *Pfmdr1* is underway.
- Situation analysis of malaria was carried out in three districts—Kolar, Raichur and Chitradurga. Inadequate surveillance and untimely spray operations were responsible for rise in malaria. However, fish release show less malaria in these districts.
- Situation analysis of malaria was carried out in Andhra Pradesh. Inadequate surveillance and untimely spray operations were the major factors responsible for high proportion of *P. falciparum* malaria in the IMCP areas especially in the tribal areas.
- Indoor residual spray with Lambda-cyhalothrin 10% CS formulation against *An. culicifacies* was found very effective up to 12 weeks.
- Training on entomological techniques was rendered to 21 entomologists in Karnataka.
- Larvivorous fish against *Aedes* larvae in cement tanks for control of dengue and chikungunya was found very effective.
- Completed randomised multicentric clinical trial of Artekin against *P. falciparum* malaria in Mangalore.
- Initiated evaluation of Alphacypermethin coated long-lasting insecticidal nets in Mangalore City against *An. stephensi*.

Chennai (Tamil Nadu)

- Studies on environmental, social and behavioural risk factors related to malaria transmission in Chennai were carried out and GR completed in experimental and control areas.
- Phase III trial of Lambda-cyhalothrin 10% CS as IRS was undertaken in Hogenekkal and Nagasamudra PHCs of Dharmapuri district, Tamil Nadu. Trials in Rameswaram and Thangachimadam PHC, Ramanathapuram district were initiated and evaluation is in progress.
- Malaria clinic continued to offer early/prompt diagnosis and treatment.
- Other activities included technical support to various centres/institutes and collaborative research/scientific work. Health education and training programmes were undertaken.

Hardwar (Uttarakhand)

- Study on insecticidal properties of a plant code MRCHAR/04/04 was continued.
- Evaluation of bioefficacy and wash-resistance of K-O Tab 123, a formulation for long-lasting treatment of nets, against vector mosquitoes was done.
- Simultaneous determination of curcumin and piperine in plasma using high performance liquid chromatography was done.
- Study on accumulation of persistent organochlorine compounds in sub-Himalayan region of north India was continued.
- Field evaluation of neem oil-based Azadirachtin (0.15% EC) against the immatures of *Culex quinquefasciatus* and anopheline larvae was undertaken.
- Field evaluation of Pirmiphosmethyl (50% EC), an organophosphorous insecticide against the immatures of *Culex quinquefasciatus* and anophelines was done.

- Entomological and epidemiological investigations at Narora Atomic Power Station (NAPS), District Bullandshahar (Uttar Pradesh) were completed.
- Two patents were filed on: (i) A new composition for insect and pest control by V.K. Dua, M.F. Alam and A.P. Dash [Application No. 3234/DEL/2006 submitted final application]; and (ii) A new botanical formulation for mosquito control by V.K. Dua, A.C. Pandey and A.P. Dash [Application submitted for provisional registration].

Jabalpur (Madhya Pradesh)

- A study on cerebral malaria associated with neurological disorders in central India was continued.
- A project on rapid assessment of burden of malaria in pregnancy in Madhya Pradesh, India has been launched.
- Change has been done in drug policy in Bajaj PHC of Dindori district, which contributes highest number of malaria cases in the state based on NIMR research findings.
- DDT was replaced by synthetic pyrethroids as *An. culicifacies* a major malaria vector was resistant to DDT.
- Panna and Satna districts were brought under Enhanced Malaria Control Programme and intensive intervention started as a result of our evaluation and monitoring.
- Workshops at national and state level were organised for medical officers and health staff.

Nadiad (Gujarat)

- Health impact assessment of Sardar Sarovar Project during pre-irrigation baseline period was completed in Phase I districts.
- For making evidence-based decision on the use of larvivorous fish in malaria control in semi-arid areas in north Gujarat, a randomised controlled trial of a native fish species, *Aphanius dispar* was conducted in District Kutch. Initial results are very encouraging.
- Technical support was given to Ahmedabad Municipal Corporation in surveillance, investigation and containment of chikungunya

outbreak in Ahmedabad City.

- Completed field trial of a new insecticide formulation in collaboration with WHO Pesticide Evaluation Scheme; also evaluated two new larvicide formulations for urban malaria and dengue vector control in Ahmedabad.
- Provided technical support to the National Vector Borne Disease Control Programme in Gujarat state in terms of policies, annual programme planning, reviews of performance, training of health personnel and evaluation of malaria laboratory services.

Panaji (Goa)

- Study on estimation of malaria burden in Jharkhand, the 'Jharmal' Project was continued.
- Phase III, randomised, non-inferiority trial, to assess the efficacy and safety of Dihydro-artemisinin + Piperaquine (DHA + PPQ, Artekin) in comparison with Artesunate+ Mefloquine (AS +MQ) was continued at Goa Medical College.
- The project on community randomised evaluation of effectiveness of insecticide-treated nets for malaria control on construction workers in the urban slums of Goa was launched in October 2006.
- In the wake of chikungunya and dengue outbreaks in Goa, a survey on *Aedes* population dynamics and breeding habitat preferences in Goa was initiated.
- Evaluation of latex agglutination method for rapid diagnosis of malaria is underway.
- Monitoring of preparedness of Navi Mumbai Municipal Corporation (NMMC) for implementation of the World Bank supported project was done.
- Operational research on current practices of diagnosis and treatment of *P. falciparum* malaria in area with and without resistance to chloroquine in Govt. sector at primary, secondary and tertiary level and in private sectors, clinics, hospitals and general practitioners was undertaken in Goa.

Raipur (Chhattisgarh)

- Studies on the bionomics of mosquitoes,

particularly the vectors of malaria, dengue and filariasis in Raipur City were undertaken.

- Epidemiological investigation on malaria and therapeutic efficacy evaluation of chloroquine in Surguja district was carried out.
- Field evaluation of long-lasting insecticidal nets (LLINs) impregnated with Alphacypermethrin (Interceptor®) against anopheline vector mosquitoes was undertaken.
- Field evaluation of Pirimiphosmethyl (50% EC), an organophosphorous insecticide against the immatures of *Cx. quinquefasciatus* and anopheline was done.
- Investigation on outbreak of malaria in Basti PHC under Gaurella block of Bilaspur district was undertaken during 9–14 and 23–28 November 2006.
- Malaria clinic is serving as an early diagnosis and prompt treatment facility.
- Support is being provided to the State govt. by cross-checking of blood slides for malaria and filariasis.

Ranchi (Jharkhand)

- Cytogenetic study of *An. fluviatilis* revealed the presence of species T in Ranchi district.
- Insecticide susceptibility of malaria vector revealed that *An. culicifacies* and *An. annularis* are resistance to DDT (4%) in District Ranchi and *An. fluviatilis* developed partial resistance to DDT. Larvivorous fish hatcheries of *Gambusia affinis* and *Poecilia reticulata* were established for the first time in District Ranchi, Jharkhand state.
- Filariasis survey was carried out in the primitive Santhal tribes of Dumka district and Oram tribes of Ranchi district.
- *In vivo* 28 days studies to detect chloroquine resistance against *P. falciparum* malaria were carried out in PHC Jaldega of District Simdega and PHC Angara of Ranchi district. In PHC Jaldega, early treatment failure was seen in 4 cases (7.8%) and late treatment failure in 14 (27.2%) cases.
- Technical support was provided to the National Vector Borne Disease Control Programme in Jharkhand state for various activities such as malaria epidemic investigation and contain-

ment, malaria situation analysis, planning of antimalaria activities, dengue surveillance, establishment of larvivorous fish hatcheries, filariasis survey, cross-checking of slide, IEC, etc. Monitoring of programme implementation at PHC level with high malaria burden was undertaken in Jharkhand. Diagnostic and treatment facilities were provided to the patients reporting to malaria and filariasis clinic at the field unit.

Rourkela (Orissa)

- Studies on development of a site for malaria vaccine trials were continued in Sundargarh district.
- Evaluation of biolarvicide (Bti AS, VCRC B17 strain) against immatures of *Anopheles* and *Culex* species in Rourkela was undertaken.
- Phase III trial on the efficacy of long-lasting insecticidal nets (Olyset nets) was completed.
- Field evaluation of LLIN impregnated with Alphacypermethrin (Interceptor) was undertaken in Rourkela.
- Evaluation of ZeroFly—an insecticide incorporated plastic sheeting against mosquitoes was undertaken in Lathikata block of Sundargarh district.
- Phase III evaluation of high density polyethylene (HDPE) mosquito nets was undertaken.
- A phase II, double-blind, parallel-group, randomised, dose-ranging study assessing the antimalarial activity and safety of RBx 11160 administered for 7 days in patients with acute uncomplicated *P. falciparum* malaria was successfully completed.
- Study on multicentre, open-label randomised clinical trial of efficacy and tolerability of the fixed dose Artesunate/Amodiaquine (AS/AQ) combination therapy versus Amodiaquine (AQ) monotherapy for treatment of uncomplicated falciparum malaria in India was initiated.
- Monitoring of the Programme Implementation at PHC level in Sundargarh, Mayurbhanj, Bhadrak, Nayagarh and Bolangir districts of Orissa was done.
- In-depth review of National Vector Borne Disease Control Programme (Malaria) in

Sundargarh, Sambalpur and Nuapada districts of Orissa was undertaken.

Sonapur (Assam)

- Phase III evaluation of long-lasting insecticidal nets (Olyset nets) against *An. minimus* transmitted malaria in Assam was completed.
- Characterisation of *Plasmodium falciparum* strains prevalent in northeastern states was done.
- Field evaluation of long-lasting insecticidal nets (LLINs) impregnated with Alphacypermethrin (Interceptor) against anopheline vector mosquitoes in Assam was done.
- Phase III, randomised, non-inferiority trial, to assess the efficacy and safety of Dihydro-artemisinin + Piperaquine (DHA+PPQ, Artekin) in comparison with Artesunate + Mefloquine (AS+MQ) in patients affected by acute, uncomplicated *P. falciparum* malaria – multi-centric study in Asia was undertaken.
- In-depth review of NVBDCP for malaria in Darrang, Goalpara and Karbi Anglong districts of Assam was undertaken.
- Other activities included technical inputs to strengthen the malaria control activities specific to northeastern region—health education and capacity building measures, observance of antimalaria month, and mass propagation and distribution of larvivorous fishes (Guppy) in town areas, and malaria outbreak containment in affected districts of Assam.

