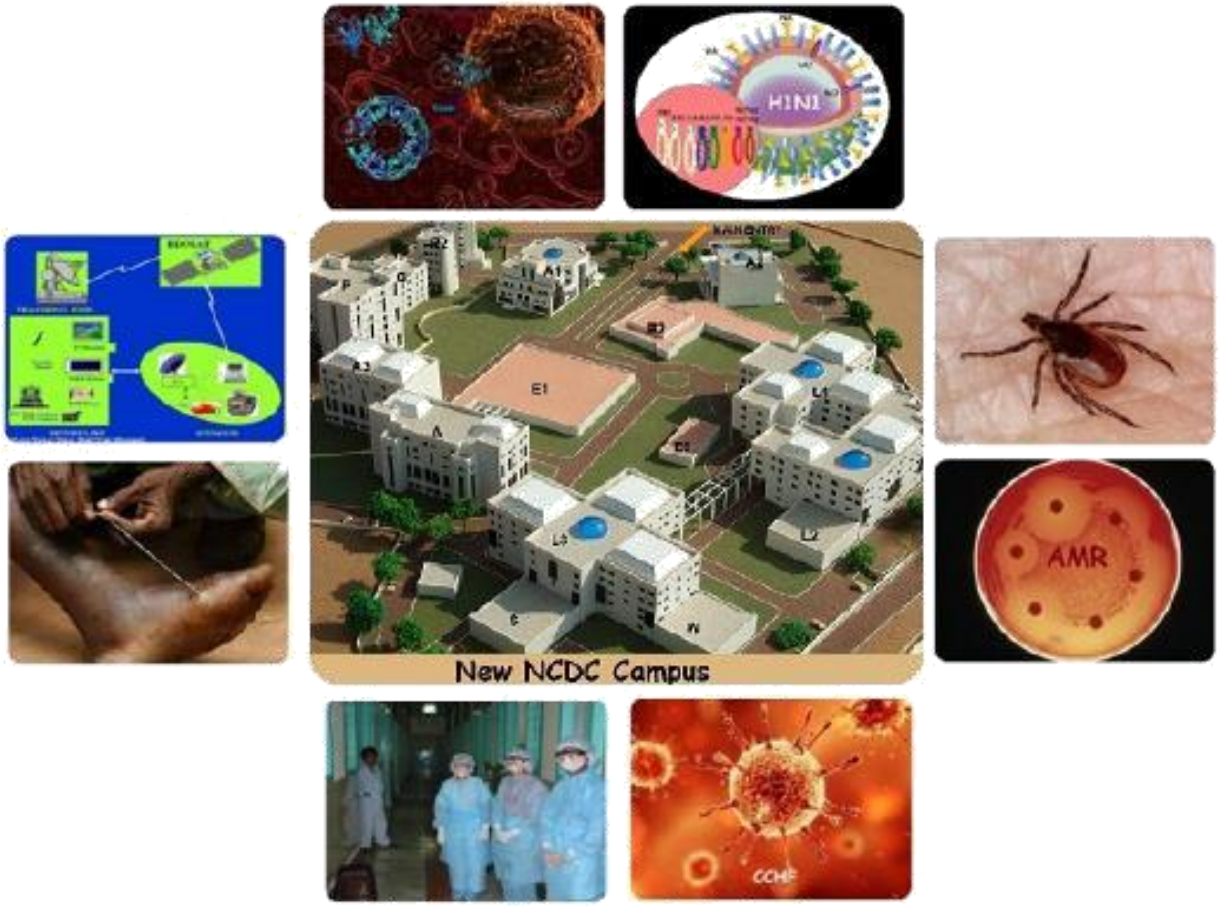
National Centre for Disease Control (NCDC)

Annual Report 2015 -16



National Centre for Disease Control

Directorate General of Health Services

(Ministry of Health & Family Welfare , Government of India)

22 - Shamnath Marg, Delhi - 110054

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Directorate General of Health Services
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Government of India

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The contents of this document are originally contributed by the Faculty Members of this institute through their respective Divisional Heads, based on the Scientific and Technical activities conducted by them during the year. The document is meant for referral use by scientific community, health advisors and policy makers dealing with prevention and control of communicable diseases.

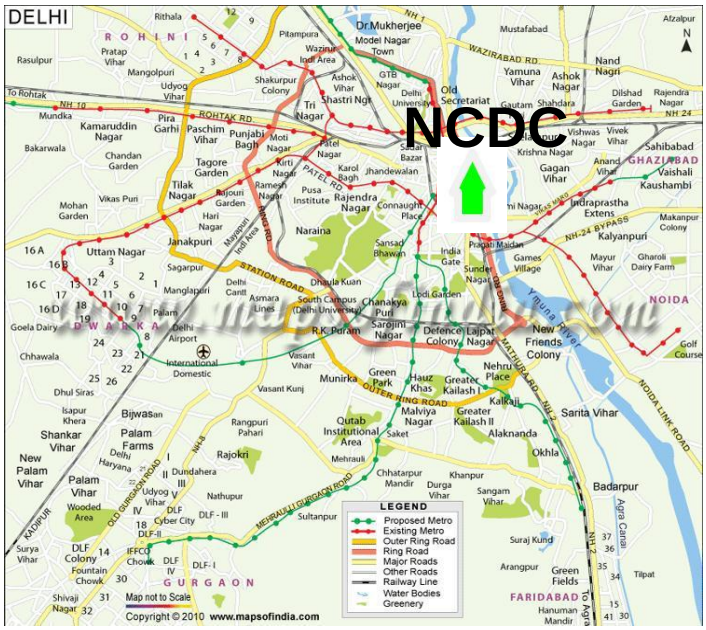
Contents

1. Introduction

The National Centre for Disease Control had its origin as Central Malaria Bureau, established at Kasauli (Himachal Pradesh) in 1909 and following expansion was renamed in 1927 as the Malaria Survey of India. The organization was shifted to Delhi in 1938 and called as the Malaria Institute of India (MII). In view of the drastic reduction achieved in the incidence of malaria, Government of India decided to reorganize and expand the activities of the institute to cover other communicable diseases. On July 30, 1963, the erstwhile MII was named as NICD to shoulder these additional responsibilities. With the ever-expanding horizon of infectious/ communicable diseases, Govt of India decided to modernize and upgrade the institute on the lines of CDC, Atlanta. Accordingly, the institute was re-named as the National Centre for Disease Control (**NCDC**) in 2009-10 to meet current-day public health challenges.

The institute was established to function as a national centre of excellence for control of communicable diseases. The function of the institute also included countrywide disease surveillance, training and applied research using multi-disciplinary integrated approach. The institute is expected to provide expertise to the States/ UTs on rapid health assessment and laboratory-based diagnostic services.

- Established in 1909 as Central Malaria Bureau at Kasauli
- Shifted to Delhi in 1938, renamed Malaria Institute of India
- **Assumed status of NICD on 30th July 1963**
- **Renamed as NCDC on 30th July, 2009 during Centenary Celebration**
- It is Centrally located at at 22-Sham Nath Marg, Delhi and housed in ~14 acres of Land



NCDC campus at Delhi is spread across ~15 acres which was originally the official residence of Commander in Chief of Indian Army. It now houses the administrative block, library, divisions of epidemiology and parasitic diseases. The Institute is one of its unique kind in the city of Delhi having about 80% as open area. The facilities available in the campus include research laboratories, auditorium, lecture hall, conference and seminar rooms, computer lab, BSL-3 facility and other supportive services. The Institute is under administrative control of the Director General of Health Services, Ministry of Health and Family Welfare, Govt. of India. The Director, an officer of the Public Health sub-cadre of Central Health Service, is the administrative and technical head of the Institute.

However, the institute is currently undergoing major upgradation of total infrastructure within the campus with a central funding of nearly Rs 326 crores approved during the 12th five year plan. Once completed, the all New campus will have world class facilities at-par with global standards to manage better disease surveillance, prevention and control strategies commensurate with the needs of 21st century.

There are several scientific departments at the headquarters of the institute: Centre for Epidemiology and Division of Parasitic Diseases, Division of Microbiology, Division of Zoonosis, Centre for HIV/AIDS & related diseases, Division of Biotechnology/molecular Diagnostics, Centre for Medical Entomology & Vector Management, Division of Malariology & Coordination, Centre for Environment & Occupational Health, Centre for Non-Communicable Diseases and Division of Health & Climate Change. The Institute also has its headquarters in Delhi and has 8 branches located at Alwar (Rajasthan), Bengaluru (Karnataka), Kozikode (Kerala), Coonoor (Tamil Nadu), Jagdalpur (Chattisgarh), Patna (Bihar), Rajahmundry (Andhra Pradesh) and Varanasi (Uttar Pradesh). Ministry of health has approved proposal for decentralized presence of NCDC by establishing NCDC branch in each state/UT.

In each division there are several sections and laboratories dealing with different communicable/non-communicable diseases. The divisions have well equipped laboratories with modern equipments capable of undertaking tests using latest technology. The activities of each division are supervised by an officer in-charge, supported by medical and non-medical scientists, research and other technical staff. The institute has a 24 x 7 Disease Monitoring Cell operating round the clock to respond to disease outbreak, and also a modern video-conferencing facility to interact with the network of disease surveillance centres in the states and districts.

2. Mandate of NCDC

NCDC is envisaged as a *Centre-par-excellence* to give further impetus to the advancement of knowledge in prevention and control of communicable/ infectious diseases with specific focus on:

- **Countrywide surveillance of epidemic-prone communicable diseases**
- **Epidemic/ outbreak investigations and their containment**
- **Referral diagnostic support services**
- **Training & manpower development**
- **Technical advisory**
- **Applied & operational research**

The Institute takes leading role in undertaking investigations of disease outbreaks all over the country employing epidemiological and diagnostic tools. It also provides referral diagnostic services to individuals, community, medical colleges, research institutions and state health directorates. The service component provided by the Institute also includes making available scientific research material, teaching aids, storage and supply of vaccines and quality control of biologicals. A brief of different services provided are mentioned below:

Surveillance/ Outbreak investigations

The institute investigates and recommends control measures for the outbreak of various communicable diseases in the States/UTs all over the country as well as to some neighbouring countries in the South East Asia Region. The institute also undertakes monitoring of outbreaks through-out the country, especially during its early rising phase by collecting information from the states and districts. The institute conducts emergency preparedness training for officials in the state as well as investigates rumours in cases of diseases that have been considered as eradicated e.g. Smallpox case rumours.

Referral diagnostic support services

The institute provides referral diagnostic services for various communicable diseases of microbial origin especially for those for which diagnostic facilities are ordinarily not available in hospitals and medical colleges. These include:

- Viral diseases- Pandemic H1N1, CCHF, Ebola, Dngue, MERS, HCV, Poliomyelitis, Measles, Coxsackie virus, EVs, AIDS, Rabies, Arboviral and AES-causing infections.
- Bacterial diseases- Meningitis, Diphtheria, Acute Respiratory Infections, Cholera and newer Entero-pathogens, Plague, Anthrax, Brucellosis, Rickettsioses etc.
- Mycotic diseases- Common fungal infections.
- Parasitic Diseases- Malaria, Kala-azar, Leptospirosis.

Other Services

- ***Quality Control of Biologicals***
- ***Storage and supply of vaccines and other biological materials***
- ***Entomological investigations***
- ***Evaluation of chemical compounds***

Trained Health Manpower Development Training:

Special emphasis is given to trained health man-power development that is essential for the successful implementation of different health programmes in the country. Besides the regular training programmes, numerous short-term training activities are conducted every year. The course curricula of these training programmes are designed to develop the necessary need-based skills. The participants to these courses come from different States/Union Territories of India. In addition, trainees from some of the neighbouring countries like Bangladesh, Bhutan, Sri Lanka, Myanmar and Nepal also participate in some of the training programmes. The institute also conducts separate training programmes specifically designed for international participants. Some of these courses are sponsored by international agencies like WHO, UNICEF, World Bank and USAID. The institute has developed training modules on different communicable diseases based on its field experiences, which are extensively used during training programmes at NCDC. Trainees in various courses are exposed to the application of computers and related softwares in Epidemiology and disease surveillance.

Applied Research

Applied integrated research in various aspects of communicable as well as some aspects of non-communicable
diseases has been one of the prime functions of the Institute. To achieve this, the institute is actively engaged in research in the following broad areas.

- Applied research in the field of virology, bacteriology, parasitology, entomology, mycology, biotechnology, epidemiology, and quality testing of vaccines and other biologicals with an aim of improving diagnostic capabilities of diseases of public health importance and providing laboratory support to the investigation and control of disease out breaks.
- Field based research through longitudinal studies of various epidemic prone diseases.
- Laboratory and field oriented research in the transmission dynamics of arthropod borne diseases with the ultimate objective of vector control.
- Evaluation of new formulations of insecticides and biocides and screening of indigenous herbs to evaluate their insecticidal properties. Studies on biological hazards of pesticides.
- *In-vitro* culture of pathogens, development of reagents, rapid diagnostic tests including molecular techniques using modern equipment and latest technology.

Expert group meetings: The Institute organizes meetings for formulation of guidelines for surveillance, management, prevention and control of various communicable and non-communicable diseases. The meetings are attended by experts of the respective field, senior administrators of health services of the states, programme managers from medical, veterinary, agriculture and animal husbandry departments.

***Supply of teaching and research material*:** The institute provides teaching material on various communicable diseases in the form of slides, charts, maps, procedure manuals, pamphlets, books etc. to Medical Colleges and Teaching Institutions. Various bacterial and fungal isolates, cell lines, slides of malaria, filaria, kala-azar, rabies, diphtheria, meningococcus, live cultures and preserved materials of arthropods are also provided to medical colleges and research institutions on request.

3. Upgradation of NCDC

Cabinet Committee of Economic Affairs (CCEA) approved the proposal for "Upgradation of NCDC" in December, 2010 at a total cost estimates of Rs.382.41 crores. The components are (a) construction of civil and services work (Rs. 326.19 crore), (b) procurement of equipments/machinery with latest technology (Rs. 47.00 crore) and (c) creation of additional posts (Rs. 9.22 crore). The HSCC has been engaged as DPR consultant and National Buildings Construction Corporation (NBCC) as Executing Agency for construction of civil works and services. 103 new Scientific & Technical posts and 11 administrative posts have been created under upgradation of NCDC. Government of India has approved the upgradation of NCDC at par excellence of CDC, Atlanta, USA. Under upgradation of NCDC NBCC handed over three newly constructed buildings to NCDC; namely Administrative Block, Type II Residential Complex and Epidemiology & Disease Control Complex. Hon'ble HFM inaugurated and dedicated these buildings to the nation on 30th September 2016. Addl. Secretary & MD, NHM, Sh. Arun K Panda, CMD HSCC Sh. Gyanesh Pandey and Addl. GM, NBCC- Sh. J. S. Singwal and Director NCDC – Dr. S. Venkatesh briefed the Hon'ble HFM about the facilities provided in these buildings. The inauguration function was attended by the Senior Officer for MOH&FW NVBDCP and faculties of NCDC. Hon'ble HFM praised the commendable work done by NCDC in Eradicating small pox, Guinea worm and Yaws diseases from the country.

Establishment of 30 Branches (including 8 existing branches of NCDC in all States and one UT of India

Under 12th five year plan, the Planning Commission approved a new activity "Strengthening of existing branches and establishment of 27 branches of NCDC" with a total outlay of Rs.400.00 Crore. A SFC for "Establishment of 30 branches (including 8 existing branches) of NCDC in all States and one UT" for a total cost of Rs.367.60 crore has been approved by the Secretary (HFW) in a meeting held on 24.04.2015. All DHS of 29 States and 1 UT have been requested to provide free of cost land for Establishment of NCDC branch which will be States's share. The State Governments of the following States have agreed to provide land/building to NCDC: Himachal Pradesh, Gujarat, Uttrakhand, West Bengal, Arunachal Pradesh, Maharashtr, Mizoram, Chhattisgarh, and Nagaland. The State Government of Jharkhand have allotted 2 acres of land at Itki Sanatorium, Ranchi and a MOU for transfer of land has been signed. 601 Posts were proposed under SFC which has now been submitted for creation by Ministry of Finance. A Project Management Unit (NCDC Cell) has been created at NCDC head quarters to look after the issues related to the branches as well as upgradation of NCDC

4.1 Integrated Disease Surveillance Program (IDSP)

Dr Pradeep Khasnobis
Sr CMO (NSFG) & Acting NPO
Dr Lata Kapoor
Joint Director
Dr Saurabh Goel
Deputy Director
Dr Ruchi Jain
Deputy Director
Dr Jyoti
Deputy Director
Dr Nishant Kumar
Deputy Director
Dr Pranay Verma
Deputy Director
Dr Sanket Kulkarni
Deputy Director
Dr Suhas Dhondore
Assistant Director

Integrated Disease Surveillance Programme (IDSP) was launched in project mode with World Bank assistance in November 2004 for 5 years. The project was extended for 2 years up to March 2012. The project continues in the 12th Plan with domestic budget as Integrated Disease Surveillance Programme under NHM for all States at an outlay of Rs 640.40 crores. Currently the programme conducts surveillance of 18 outbreak prone diseases.

Programme Components

- Integration and decentralization of surveillance activities through establishment of surveillance units at Centre, State and District level.
- Human Resource Development – Training of State Surveillance Officers, District Surveillance Officers, Rapid Response Team and other Medical and Paramedical staff on principles of disease surveillance.
- Use of Information Communication Technology for collection, collation, compilation, analysis and dissemination of data.
- Strengthening of public health laboratories.
- Inter-sectoral co-ordination for zoonotic diseases

Surveillance under IDSP

Surveillance units have been established at all State and District Headquarters (SSUs, DSUs). Central Surveillance Unit (CSU) is integrated in the National Centre for Disease Control (NCDC), Delhi.

- **Routine (Indicator based) Data Collection**

  Under IDSP data is collected on epidemic prone diseases on weekly basis (Monday– Sunday). The information is collected on three specified reporting formats, namely "S" (suspected cases), "P" (presumptive cases) and "L" (laboratory confirmed cases) filled by Health Workers, Clinicians and Laboratory staff respectively. The weekly data gives information on the trends and seasonality of diseases. Whenever there is a rising trend of illnesses in any area, it is investigated by the Rapid Response Team (RRT) to diagnose and control the outbreak. Data analysis and actions are being undertaken by respective State/District Surveillance Units. Emphasis is now being laid on reporting of surveillance data from major hospitals. As per March 2016, about 92% districts in the country report weekly surveillance data on epidemic prone diseases through e-mail or portal.
  Feedbacks are shared with each state regarding completeness, timeliness, outbreak reporting, disease trends on monthly basis

- **Outbreaks (Event Based)**

In addition to routine surveillance, States and districts notify the outbreaks immediately to the system through an Early Warning Signal (EWS) Format. On an average of 30-35 outbreaks are reported every week to Central Surveillance Unit (CSU).

There is a rising trend in number of reported and responded outbreaks of epidemic prone diseases under IDSP by state and district surveillance Units as seen in Figure 1. The number has increased from 1562 in year 2014 to 1935 in year 2015. Till March 2016, 706 outbreaks have been reported and responded to by IDSP Units at States.

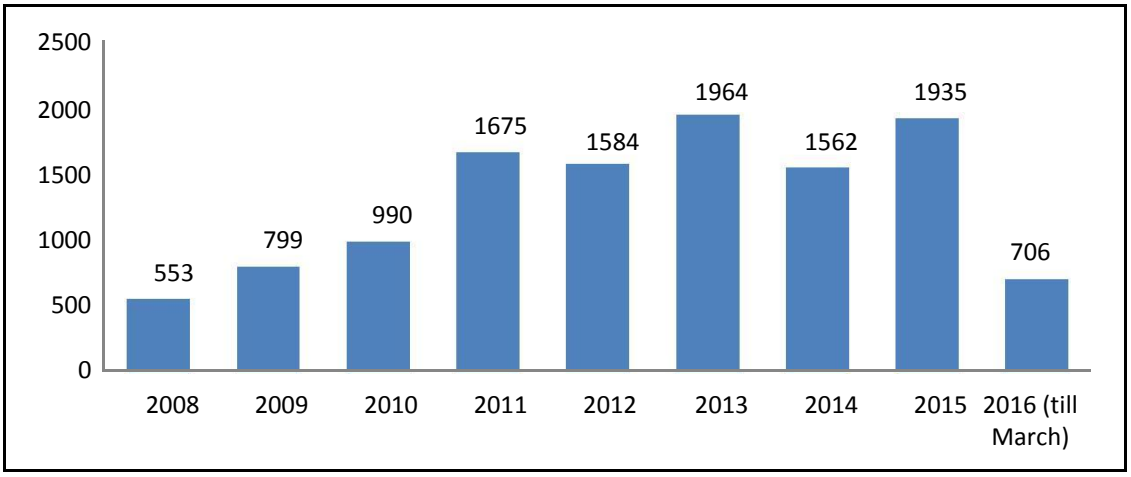
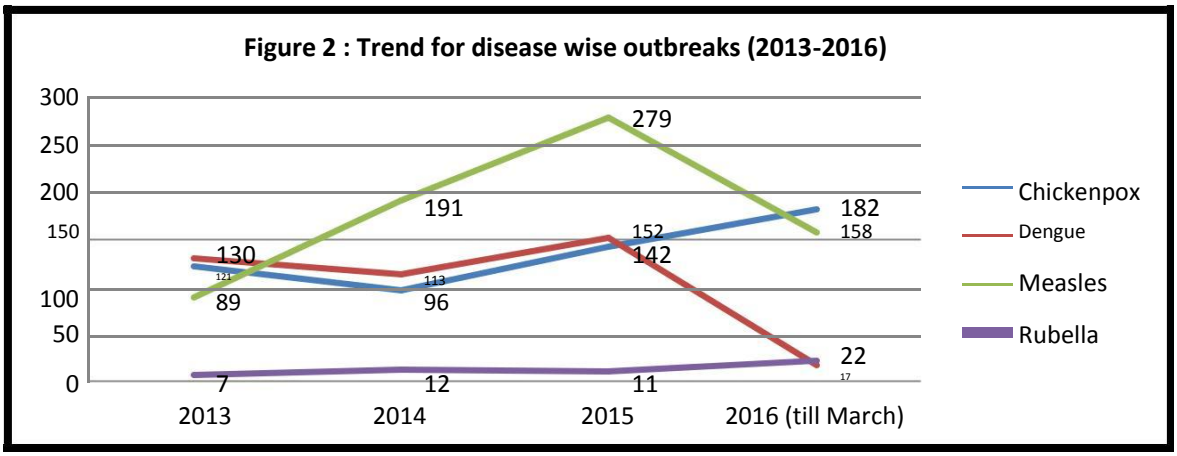


Figure 1: Trend of number of outbreaks reported and responded year wise

Since 2008, Acute Diarrhoeal disease outbreaks and Food poisoning constitute approximately 46 % of total number of outbreaks reported by the states till March 2016. Approximately 41% of total outbreaks were reported from 5 states, namely, Maharashtra (195), Karnataka (175), Madhya Pradesh (150), West Bengal (146) and Tamil Nadu (123) in 2015. Maximum surge in number of outbreaks was observed from state of Uttar Pradesh with 37 outbreaks reported in year 2013 to 120 in year 2015.



As seen in Figure 2, a marked increase in number of reported outbreaks of Chickenpox, Dengue, Measles, and Rubella is noted. Details regarding State wise and disease wise outbreaks reported are placed at Annexure 1 and 2

- **Outbreaks Investigation by CSU-IDSP**

Officers from IDSP were deputed to assist the districts/states in detailed outbreak investigation and response in 2015-16.

Outbreak Investigation	State	Officers deputed
Hepatitis B & C outbreak investigation in June'15	Odisha	Dr Ganesh Lokhande & Dr. Chhavi Pant Joshi
Dengue outbreak investigation, August'15	Uttar Pradesh	Dr Ganesh Lokhande & Dr Chhavi Pant Joshi
KFD Outbreak Investigation , April'15	Goa	Dr. Nishant Kumar
Investigation of Bird-Flu outbreak in Ranga Reddy District, Telangana, April'15	Andhra Pradesh	Dr. PranayVerma
Assist & monitoring the epidemic prone flood situation in Chennai, December'15	Tamil Nadu	Dr.Suhas S. Dhandore
Investigate H1N1 surge in Faridkot, Ferozepur & Bathinda, Feb '16	Punjab	Dr Suneet Kaur
Sindhudurg - KFD Outbreak in Feb-March 2016	Maharashtra	Dr. Sanket Kulkarni
NCDC Team for investigating jaundice outbreak in Shimla, Jan'16	Himachal Pradesh	Mr. Praveen G

Table 1: State wise Detailed Outbreak investigation where Officers from CSU were deputed

- **SHOC (Strategic Health Operations Centre)**

The Strategic Health Operations Centre (SHOC) was established under IDSP to strengthen the outbreak detection and response capacities of the states and districts by utilizing state-of-the-art information technology. An infectious disease outbreak plan has been prepared along with 47 standard operating procedures (SOPs) encompassing all the divisions and technical activities of NCDC that pertain to utilization of SHOC during a response to an infectious disease outbreak. Further strengthening of SHOC is being undertaken.

- SHOC was activated to Level 3 in 26th February to 13th April 2015 for Influenza H1N1 Outbreak
- SHOC at NCDC, Delhi was activated to Level1 on 25th May 2015 to 3 July 2015, in response to the AES at Muzaffarpur in Bihar and Malda in West Bengal
- SHOC at NCDC, Delhi was activated on 12th August 2015 to 30 October 2015 at level 1, in response to rise in H1N1 cases in the country.
- SHOC was activated at Level 1 from 11th August 2015 for monitoring the situation of flood in 5 states of the country Viz Gujarat, Rajasthan, Odisha, West Bengal and Manipur.

Figure 3: SHOC Activation for H1N1 in 2015

Data collection for Heat Wave cases and Deaths under mandate of SHOC

Each year, data on Heat wave causalities in form of cases and deaths is collected from April to July each month and a cumulative report is prepared. In 2015, 4331 cases of heat wave and 1124 deaths related to heat wave were reported from the states

Data collection on H1N1 under mandate of SHOC

For Year 2015, an increase in cases was observed from 1stJanuary to 31stMarch, wherein a total 34240 cases (highest no. of cases in the month of February) of Influenza A H1N1 and 2084 deaths were reported. The cases and deaths were primarily reported primarily from the States of Rajasthan, Gujarat, Maharashtra, Delhi, Karnataka, Madhya Pradesh, Telangana and Uttar Pradesh. In 2015, till 31st December, 2015, 42592 cases were reported from all States/U.Ts , out of which 2990 have died. Trends for cases and deaths for H1N1 in 2015 is given below.

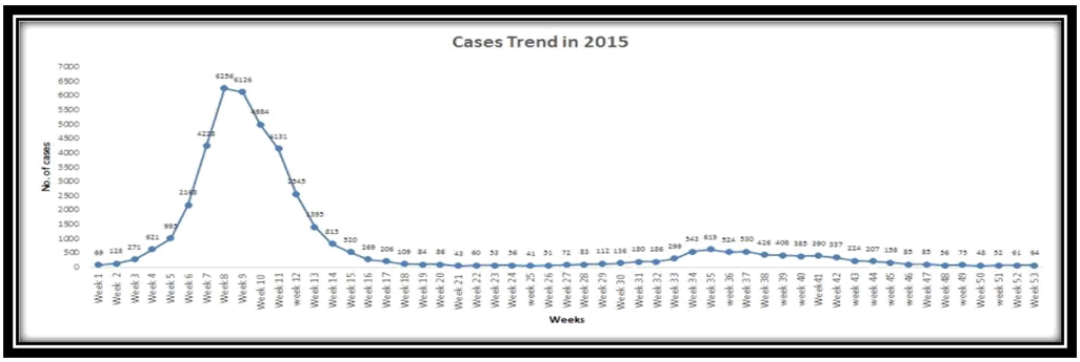


Figure 4: Trend of cases of H1N1 in 2015

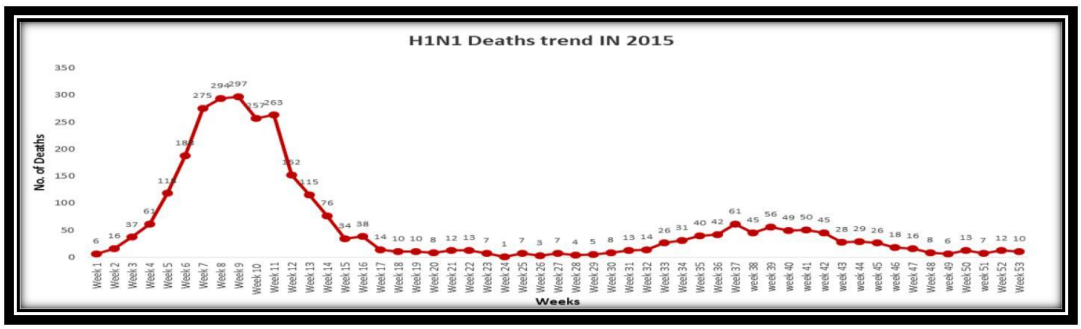


Figure 5: Trend of deaths of H1N1 in 2015

Data collection through Media scanning and verification cell

Media scanning and verification cell was established under IDSP in July 2008 to detect and share media alerts with the concerned States/Districts for verification and response. A total of 3607 health alerts have been detected till March 2016 since its establishment in July 2008. There were 422 media alerts generated in 2015-16.Majority of alerts were related to Acute diarrheal Disease, Measles and Dengue.

Strengthening of Laboratories

District laboratories are being strengthened for diagnosis of epidemic prone diseases in a phased manner. Till March 2016, 111 labs in 29 states have been made functional. These labs are being supported by trained manpower, funds for essential equipment and an annual grant of Rs 4 lakh per annum per lab for reagents and consumables.

A state based referral laboratory network has been established by utilizing the existing functional labs in the identified medical colleges and other major centers in the states and linking them with adjoining districts for providing diagnostic services for epidemic prone diseases during outbreaks. Presently this network is functional in 22 states involving 99 labs.

In addition, a network of 12 laboratories has been developed for Influenza surveillance in the country. These Laboratories are testing clinical samples of Influenza A H1N1 in different regions of the country.

Human Resources and Training

Considering the non-availability of health professionals in the field of Epidemiology, Microbiology, Entomology and Veterinary Sciences at district and state level, Health Ministry approved the recruitment of trained professionals under National Health Mission (NHM) in order to strengthen the disease surveillance and response system by placing one epidemiologist each at state/district headquarters, one microbiologist and entomologist each at the State headquarters. The recruitment of 413 epidemiologists, 114 microbiologists 27 entomologists and 8 Veterinary Consultants has been completed under IDSP till March 2016. Training of State/District Surveillance Teams (Training of Trainers) and Rapid Response Teams (RRTs) has been completed in all 36 States/UTs.

Broad mandates of IDSP Regarding Human Resource Training are

- Training of Master Trainers of State and District RRT members at 11 identified National level institutes.
- 2-Week FETP for district surveillance officers at 9 identified National level institutes.
- Induction training of newly recruited epidemiologists, microbiologists & entomologists at identified National level institutes.

The main focus of training for State level participants is on basics of disease surveillance, concepts of epidemiology and data management, whereas the district training focuses on correct procedures of data collection, compilation and reporting and outbreak response. A need based special two-week disease surveillance and Field Epidemiology Training Programme (FETP) have been initiated for the District Surveillance Officers. 729 District Surveillance Officers have already been trained in this special 2- week FETP.

Information and Communication Technology (ICT)

The IT network has been established at 776 sites (connecting all the State/UTs and district headquarters, medical colleges, Infectious Disease Hospitals (IDHs), and premier health institutions) for data entry, data transference, analysis and video conferencing with the help of National Informatics Centre (NIC) and Indian Space Research Organization (ISRO) to provide the terrestrial and satellite connectivity. However, satellite connectivity is not available since September 2010.

IDSP Portal

IDSP has started one stop portal (http://www.idsp.nic.in) for data access and transmission, trend analysis and free resources like training material, guidelines, advisories for health personnel related to disease surveillance. Revamping of IDSP portal (co-ordination with various stake holders), home page designed, Data migrated from the old site to the new site, Content creation was done and MDDS coding for blocks in master data was initiated

Video Conferencing

A total 393 VC sessions were done from April 2015-March 2016 of which some sessions were conducted by NVBDCP for elimination of Malaria, Zika virus preparedness in all the states, Establishment of Media Scanning and Verification Cell in all States, demonstration of VC from various States to Joint Monitoring Mission and IDSP portal training on Master data given to various Data Managers of different states

Figure 6: VC screenshot at CSU

Visits to states to review IDSP

In 2015-16, , state review of Odisha , Gujarat, Goa, Assam, Andhra Pradesh, Jharkhand , West Bengal, Bihar, Uttar Pradesh ,Punjab ,Haryana Madhya Pradesh, Puducherry, Nagaland, Karnataka, Maharashtra, Rajasthan and Uttarakhand were completed till 29th March 2016

Workshops and Trainings

- A National Review Workshop of IDSP was held from 14-16th May 2015, at Hyderabad, Telangana under Chairmanship of Director NCDC, representatives from CSU, SSOs and representatives from ISRO, NIC, etc.
- Integrated training on Anthrax for Medical Officers, Veterinary Officers and Laboratory Technicians to be held on 25-27th August at Ranchi, Jharkhand.
- Sensitization meeting of stakeholders from State Referral Labs (Referral Lab Network under IDSP) of Assam and Punjab for Lab QMS held on 26th – 27th August 2015
- Capacity Building Workshop on IHR (2005) was held at Egmore,Chennai from 2-4 September 2015 at Chennai.
- Training workshop for identified Quality Managers from 8 State Referral labs was held at Delhi from 12th -14th October 2015 and this was followed by on site assessment and training at these 8 labs by officers from NCDC/State Surveillance Units/CDC from 15th - 31st October 2015.
- Meeting of Finance Consultants of States and UTs was organized at CSU, idsp on 15th February 2016. The objective of the meeting was to discuss financial management under IDSP ,PIP process and Demonstration of PIP , and NHM Finance with special focus on FY 2016-17
- Sensitization meeting for establishment of 6 State Referral Labs in Uttar Pradesh was held in Lucknow on 30.03.2016

Joint Monitoring Mission (JMM) for Mid-term appraisal of IDSP by WHO

The Ministry of Health & Family Welfare, Government of India and the World Health Organization (WHO) organized a Joint Monitoring Mission (JMM) to review the Integrated Disease Surveillance Programme (IDSP), both at the national and sub-national levels from 26 November to 8 December 2015 in the core areas of surveillance, laboratory network, information systems, infrastructure, governance, finance and human resources.

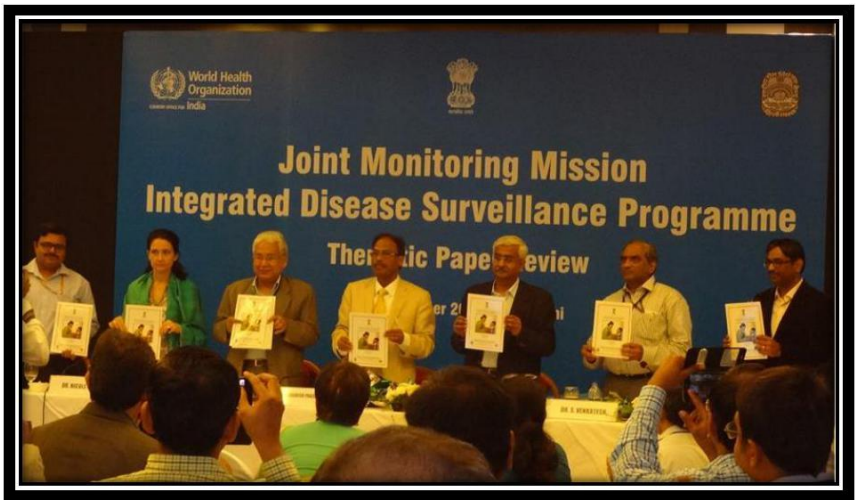


Figure 7: Joint Monitoring Mission of IDSP in 2015

Thematic workshop for the assessment was held on 4th and 5th of November 2015. CSU-IDSP and 9 states across the country are being visited by Experts from various institutes across the countries. This was followed by debriefing of Secretary Health and DGHS, MOHFW by the JMM Team Leads on the appraisal conducted and major findings

Key Recommendations of JMM review:

- The overall recommendation was to review and redesign the IDSP surveillance system including the re-prioritization of the list of diseases under the IDSP;
- Assessing the need for collecting ,more epidemiological data for action especially on priority diseases
- Redefining the required surveillance deliverables
- Exploration for possibility with integration of other disease surveillance platforms to contribute towards more efficient Early Warning and Response.
- Also, in terms of resource allocation, immediate measures including replacement of the old IT equipment supplied more than 10 years ago, redesigning and upgrading the portal system and dashboard for real-time visualization of data and display of key indicators in public domain was also recommended.
- Ensuring adequate numbers of trained human resources, surveillance mechanisms indicator and event based, strengthening laboratory,Zoonosis, influenza and VPD surveillance systems.

Annexure I

State-wise total no. of outbreaks reported by all States/UTs in 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015 and 2016 (till March 2016)

Sl. No.	State / UTs	Year									Total
		2008	2009	2010	2011	2012	2013	2014	2015	2016 (till March 2016)	
1	Andaman & Nicobar	0	0	0	0	0	1		0	0	1
2	Andhra Pradesh	72	64	75	91	97	123	64	51	10	647
3	Arunachal Pradesh	6	6	6	10	9	7	8	21	3	76
4	Assam	16	30	53	97	75	70	84	73	26	524
5	Bihar	1	6	21	144	181	134	86	121	114	808
6	Chandigarh	3	3	2	1	5	0		7	0	21
7	Chhattisgarh	1	7	2	55	45	58	50	50	21	289
8	Dadra and Nagar Haveli	0	0	1	0	0	2	3	17	7	30
9	Daman & Diu	0	1	1	0	2	0		3	2	9
10	Delhi	3	1	0	3	1	4	4	13	11	40
11	Goa	2	3	0	2	1	8		6	0	22
12	Gujarat	24	49	83	150	102	117	109	121	40	795
13	Haryana	10	9	18	21	19	15	27	28	10	157
14	Himachal Pradesh	3	13	7	4	13	5	11	27	2	85
15	Jammu & Kashmir	*	*	2	23	43	54	33	43	4	202
16	Jharkhand	*	5	4	29	24	50	53	66	33	264
17	Karnataka	54	97	89	196	156	251	163	175	64	1245
18	Kerala	17	47	54	56	80	76	74	98	24	526
19	Lakshadweep	*	*	*	*	*	*	2	2	0	4
20	Madhya Pradesh	16	65	70	89	65	98	83	150	30	666
21	Maharashtra	99	27	65	141	215	256	205	195	38	1241
22	Manipur	1	2	2	4	1	4	4	5	1	24
23	Meghalaya	5	3	2	1	1	1	3	14	3	33
24	Mizoram	5	0	0	0	1	1	2	6	2	17
25	Nagaland	0	1	2	1	0	1	1	2	1	9
26	Odisha	17	38	19	55	36	113	87	81	48	494
27	Puducherry	3	2	4	1	2	0	5	1	0	18
28	Punjab	17	22	18	44	34	24	21	45	17	242
29	Rajasthan	8	43	84	68	41	33	33	63	15	388
30	Sikkim	3	0	2	4	1	3	3	4	1	21
31	Tamil Nadu	50	113	90	127	173	149	122	123	31	978
32	Telangana							7	30	11	48
33	Tripura	1	2	2	7	3	4	13	8	0	40
34	Uttar Pradesh	40	67	98	34	40	37	35	120	85	556
35	Uttarakhand	27	30	25	36	23	33	19	20	2	215
36	West Bengal	49	43	89	181	95	232	148	146	50	1033
	Grand Total	**553**	**799**	**990**	**1675**	**1584**	**1964**	**1562**	**1935**	**706**	**11768**

Annexure - 2

Disease-wise total no. of outbreaks reported by all States/UTs in 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015 and 2016 (up to week ending 8.11.2015)

S no	Diseases/Illness	2008	2009	2010	2011	2012	2013	2014	2015	2016(till march)	Total
1	Acute Diarrhoeal Disease										
2	Acute Encephalitis Syndrome										
3	Acute Respiratory Illness	4	3	3	2	2		1	0	1	16
4	Anthrax	2	6	3	9	1	10	6	11	6	54
5	Chickenpox	12	45	47	70	100	121	96	142	182	815
6	Chikungunya	25	61	25	77	55	72	63	46	4	428
7	Cholera	20	34	34	58	94	96	38	45	12	431
8	Crimean-Congo Hemorrhagic Fever (CCHF)				2	1	8	6	15	5	37
9	Dengue	42	20	40	57	169	130	113	152	17	740
10	Diphtheria	1	1	1	5	4	4	7	8	5	36
11	Dysentery		1	3	9			1	5	3	22
12	Enteric Fever	6	10	10	12	8	1	19	16	1	83
13	Fever with Rash								29	44	73
14	Food Poisoning	50	120	184	305	255	370	306	328	109	2027
15	Influenza A H1N1					5	1			0	16
16	Influenza A H3N2					1			9	0	
17	Influenza B					2	1		2	0	5
18	Jaundice								22	7	29
19	Kala-azar	1		3	6	1	1		3		15
20	Leptospirosis	6	3	6	14	11	12	6	6	4	68
21	Malaria	44	34	37	86	12	43	53	88	5	402
22	Measles	40	44	94	177	110	89	191	279	158	1182
23	Meningitis	2	3	1	2					0	8
24	Mumps		2	3	10	19	25	17	35	14	125
25	Pertussis			1			1	1			3
26	Rubella		1	2	1	5	7	12	11	22	61
27	Scrub Typhus	3	1	1	4	9	4	4	8	0	34
28	Viral Fever/PUO	32	39	41	88	138	272	150	92	6	858
29	Viral Hepatitis	28	31	24	99	93	99	81	88	20	563
30	Others	1	3	5	19	16	8	9	20	6	87
	Total	553	799	990	1675	1584	1964	1562	1935	706	11768

Others:- AFP, KFD, Alcohol Poisoning, Chandipura Viral Encephalitis, Trichinellosis, Viral Exanthemas, Epidemic Dropsy, Hand Mouth & Foot Disease, Brucellosis, Castor Seed Poisoning, Fever with altered sensorium, Hand Foot and Mouth Disease, Mushroom Poisoning, Viral Encephalitis, HSV Encephalitis, Paederus Dermatitis From Rove Beetle, Primary Amoebic Meningo Encephalitis (PAM)

4.2 Division of Epidemiology

Dr Anil Kumar
Addl Director & Head
Dr Prabha Arora
Joint Director
Dr Aakash Shrivastava
Joint Director
Dr Arti Bahl
Joint Director
Dr Tanzin Dikid
Deputy Director
Dr Ananya Ray Laskar
Assistant Director
Dr Meera Dhuria
Assistant Director
Dr Rupali Roy
Assistant Director
Dr Girish Makhija
Assistant Director

Activities

- Organize training courses in epidemiology. Development of teaching materials on disease surveillance and outbreak investigation of epidemic prone communicable diseases.
- Investigation of outbreak of diseases of known/ unknown etiology and recommend measures for its prevention and control to the States/ UTs of the country. Provision of technical support to State government for investigation and control of disease outbreaks.
- Supervision to three branches of the Institute *viz.*, Alwar, Jagdalpur and Conoor.
- Support as National Focal Point for International Health Regulation
- Technical support to various National Health Programmes, evaluation of different indicators.
- Assisting the Director for publication of monthly Bulletin "CD Alert".
- Carry-out field research on different aspects of communicable diseases.

Outbreaks Investigated/ Rapid Health Assessment

Carried-out outbreaks investigation of in the country and suggested containment measures. A total of 21 outbreak investigations for diseases such as Chickenpox, Shellfish Poisoning, Kyasanur Forest Disease, Anthrax , ADD/Cholera, Hepatitis E, Hepatitis C, AES, Leishmaniasis, Foodborne Illness, Dengue, and H1N1 in different parts of the country were undertaken by EIS officers of the second and third cohort.

Acute Encephalopathy investigations at Muzaffarpur and Malda

Outbreaks of Acute Neurological Illness among young children have been reported from Muzaffarpur, Bihar since 1995 and from Malda, West Bengal in 2012-2014. NCDC in collaboration with other partners such as NVBDCP, ICMR and US CDC established a prospective surveillance in 2013 and 2014 at Muzaffarpur district, Bihar to systematically investigate the patients being admitted to key paediatric hospitals of this district with acute neurological symptoms.

The clinical and laboratory findings suggested that outbreak was of acute encephalopathy (non-infectious origin) rather than acute encephalitis (infectious origin). NCDC and other national laboratories of India as well as pathogen discovery laboratories of US CDC confirmed negative for viral etiology. The toxicology laboratories of US CDC detected presence of metabolites of natural phytotoxins (MCPG, Hypoglycin A) specific to Litchi fruits in ill patients of Muzaffarpur. It also detected specific markers of metabolic derangements in these patients typical to aforesaid toxins. The stated toxins were also detected in Litchi fruits collected from Muzaffarpur. NCDC field studies confirmed a positive relation between litchi consumption and being ill, which was stronger for children who skipped an evening meal.

In view of above, the findings and related recommendations of the Acute Encephalopathy studies 2013-2014 were deliberated in an expert group meeting under the chairmanship of DGHS in February 2015. The findings and recommendations were communicated to the Government of Bihar, and also Government of West Bengal as Malda district of West Bengal was reported to have experienced similar outbreaks in recent past.

In 2015, as support to Government of Bihar and West Bengal, NCDC facilitated visit of pediatricians from Delhi hospitals to provide on ground training to clinicians of Muzaffarpur, Bihar and Malda, West Bengal on case management and critical care. NCDC in support with other central agencies also developed key health messages which were shared with state health authorities for further dissemination. NCDC collaborated with NHSRC to develop a training module for ASHA workers, so as to sensitize them on this illness. NCDC also initiated advocacy to improve nutrition status of children through Child Health Division, MoHFW and also ICDS network, Ministry of Woman and Child Development.

Between May–July 2015, NCDC stationed its officials and Epidemic Intelligence Service officers at Muzaffarpur and Malda to support surveillance of new cases. The Strategic Health Operations Centre at NCDC remained operational throughout the outbreak season. Till end of surveillance in first week of July 2015, Muzaffarpur had reported less than 50 cases, which was much low as compared to the case load in the previous year 2014 (< 15%). Similarly Malda too in year 2015 reported fewer cases, less than 20 cases.

Manpower Development

National Centre for Disease Control (NCDC), Delhi is a WHO Collaborating Center for Epidemiology and training. The division of Epidemiology conducts regular training programmes and numerous other short-term training activities every year. The course curricula of these training programmes are designed and tailor-made to develop the necessary need-based skills for the health professionals. The participants to these courses come from different States/Union Territories of India. In addition, trainees from some of the neighboring countries like Nepal, Bhutan, Sri Lanka, Thailand, Timor Leste, Maldives and Indonesia also participate in some of the training programmes.

Training courses organized during the period

- One month Regional Training Programme on Prevention and Control of Communicable Diseases for paramedical personnel of South East Asia Region from 17th November to 14th December 2015. A total of 5 participants from Timor Leste attended the training.
- World Health Day on theme 'Farm to Plate, Make Food Safe" was organised on 1st April 2015 by WHO in collaboration with NCDC and FSSAI
- A two day workshop on Scientific Writing was held in May 2015 at NCDC for EIS officers of Cohort 3 (2014-16)
- 11th batch of MPH (FE) was inaugurated on 1st Aug 2015 in which 3 students joined. Currently one student is continuing with the training course.
- A two day workshop on Entomology and Zoonosis was held in August 2015 at NCDC for EIS officers of Cohort 3 (2014-16)
- Fourth cohort of India EIS training has been started on 5th October 2015. A total 11 officers from Medical discipline are currently undergoing the training.
- A three day training workshop on National Health Programmes was conducted from 20– 22 January 2016 for Public Health Specialists in the Central Health Services working in different health programmes, organisations and institutions around the country.
- A three day workshop on Surveillance Evaluation was held from 16-17 February 2016 for the 4th cohort of EIS officers in which their mentors and supervisors from Delhi evaluated them.

Providing Secretarial support to National Focal Point for International Health Regulations (IHR)

A National Consultation on Risk Communication was organised by WHO in collaboration with National Focal Point at NCDC on 15th and 16th April 2015.

Global Disease Detection-India Centre

CDC Atlanta floated a global funding opportunity announcement under Global Health Security Agenda instrument for prevention against emerging and re-emerging infections in July 2015. NCDC applied for funding of nine projects under this funding opportunity and was selected for funding for a period of five years through a cooperative agreement. A cooperative agreement is a type of grant with substantial technical involvement of US CDC staff. A total grant USD 6,259,517/ over a period of five years. Strengthen workforce development- India EIS training is an activity being carried out under this funding instrument

Epidemic Intelligence Services (EIS)

The fourth cohort of the India EIS training was launched on 5th October 2015 with the initiation of one month inception course for EIS trainees was held at NCDC. It is a Govt of India initiative in collaboration with US Centres for Disease Control, Atlanta. A total of 22 officers (eleven in the third cohort and eleven in the fourth cohort) are attending the training programme.

CD Alert

A bulletin on communicable diseases and an important tool for Rapid Dissemination of Information towards Control of Diseases is published by the National Centre for Disease Control, Delhi. It is widely circulated to different parts of the country including Directorates of Health Services of different States, Districts, Primary Health Centres, Medical Colleges and individuals. Many a times, the important topics covered in CD Alert have been reproduced, in part or whole, by IMA for dissemination of knowledge. The CD Alerts give an inside view of the disease including the global scenario, Indian scenario and also the diagnostic facilities of the particular disease within our country. The first issue was published in August 1997 on emerging and reemerging diseases and a total of seventy five issues have been published so far. A CD Alert on Zika Virus Disease was published in March 2016 and updated on the NCDC website.

NCDC Newsletter (In coordination with other scientific departments of NCDC)

It is a quarterly publication of the National Centre for Disease Control (NCDC) and the first issue was released on 4th October 2012 by Hon'ble Secretary, Ministry of Health and Family Welfare, Government of India. The purpose of this newsletter is to provide a forum for sharing information on outbreaks, programme updates from various departments at NCDC, technical and programmatic news and updates including capacity building and information on selected documents and guidelines, forthcoming conferences, world days and monitoring of disease trends. So far, thirteen issues have been successfully published and widely circulated.

List of Publications

- Shrivastava A, Srikantiah P, Kumar A, Bhushan G, et al. Outbreaks of unexplained neurologic illness - Muzaffarpur, India, 2013-2014. MMWR Morb Mortal Wkly Rep. 2015;64 (3):49-53.
- Kiran SK, Pasi A, Kumar S, Kasabi GS, Gujjarappa P, Shrivastava A, et al. Kyasanur Forest disease outbreak and vaccination strategy,Shimoga District, India, 2013-2014. Emerg Infect Dis. 2015;21(1):146-9.
- Kumar, T., Shrivastava, A., Kumar, A., Laserson, KF., et al. Viral Hepatitis Surveillance--India, 2011-2013. MMWR Morb Mortal Wkly Rep. 2015;64(28):758-62.

4.3 Division of Microbiology

Dr. Sunil Gupta
Addl Director & Head
Dr. Charu Prakash
Addl Director
Dr. Somnath Karmakar
Addl Director
Dr. Simrita Singh
Deputy Director
Dr Partha Rakshit
Deputy Director
Dr Sarika Jain
Assistant Director
Dr Purva Sarkate
Assistant Director
Dr Sanjim Chadha
Assistant Director
Dr Mahesh Waghmare
Assistant Director

Broad activities of the Division

- Routine and Referral diagnostic services for viral, bacterial and mycotic diseases
- National laboratory for Polio surveillance(AFP) and supplementary surveillance(sewage)
- Laboratory support to outbreak investigations
- Laboratory support to IDSP
- Microbiological analysis of environmental samples
- Training on laboratory aspects
- Preparation and supply of reagents, culture media, diagnostic kits and other materials as support to outbreak investigations in the country as well as to the network of collaborating laboratories in various organizations and institutes in the country.
- Lab support for investigations of Outbreak for unknown pathogens

New initiatives

National Programme on Containment of Anti-Microbial Resistance & National Programme on surveillance of Viral Hepatitis in India under the 12th Five Year Plan (2012-2017) were initiated.

Annual Compiled Data on Details of the Work Carried out at The Various Labs:

Enterovirus Laboratory

The Enterovirus Laboratory is a WHO accredited laboratory for Polio Virus isolation, typing and intra-typic differentiation as well as Measles and Rubella IgM antibody detection.
The Mandate of the laboratory is

a. Surveillance of acute flaccid paralysis (AFP) cases by processing stool samples from these cases for polio virus isolation, typing and intra-typic differentiation under National Polio Surveillance Project (NPSP)
b. Environmental Polio virus surveillance of sewage samples from seven sites in Delhi and four sites in Punjab under NPSP
c. The laboratory is a part of WHO network of laboratories for diagnosis of Measles and Rubella under which case confirmation for Measles and Rubella is done by IgM antibody detection
d. Diagnostic tests for routine samples received at NCDC for Measles, Mumps, Varicella Zoster virus (VZV), Ebstein Barr Virus (EBV)
e. Investigation of suspected outbreaks for Measles, Mumps, VZV, EBV
f. Maintain the laboratory as per WHO accreditation criteria for National Polio and National Measles laboratory

Annual Data

1. National Polio Laboratory Activities

Acute Flaccid Paralysis Surveillance

Stool specimens from Acute flaccid paralysis (AFP) cases are received from Delhi and surrounding states. The laboratory tests around 50 specimens per day. Viral isolation and Real time PCR for identification wild polio viruses, vaccine derived polio viruses and other enteroviruses is done on all the specimens. For genomic sequencing of polio viruses, samples are sent to Enterovirus Research Centre, Mumbai.

Table 1: AFP Surveillance Results

Month	Total AFP cases	Total stool specimens received in lab	Negative	NPEV By Isolation	Total L20B Pos	Total Sabin Like				NPEV by PCR	Total VDPV
						P1	P2	P3	Mixture		
Apr-15	547	1080	919	147	14	3	1	9	0	1	0
May-15	557	1098	867	174	48	10	0	27	7	4	0
Jun-15	594	1164	967	161	36	5	2	12	7	10	0
Jul-15	612	1194	909	244	41	16	1	15	4	5	0
Aug-15	712	1380	1101	277	2	0	1	0	1	0	0
Sep-15	830	1615	1436	171	8	4	2	1	1	0	0
Oct-15	788	1531	1401	125	5	0	0	0	3	0	*2
Nov-15	670	1304	1164	100	40	7	5	9	16	0	0
Dec-15	680	1331	1149	90	90	27	12	30	20	1	0
Jan-16	642	1254	1085	73	96	17	26	26	27	0	0
Feb-16	665	1289	1158	55	75	8	20	32	15	0	0
Mar-16	511	990	869	59	71	16	36	23	18	0	0
Total	**7808**	**15230**	**13025**	**1676**	**526**	**113**	**106**	**184**	**119**	**21**	**2**

*Type 2 VDPV was isolated from both stool specimens from single case from Shahdra, Delhi

Environmental Poliovirus Surveillance

The National Polio laboratory at NCDC also supports Environmental Polio virus surveillance (EPS) in Delhi and Punjab. Viral isolation and Real time PCR for identification wild polio viruses, vaccine derived polio viruses and other Enteroviruses is done on all EPS specimens. The details of the results from EPS specimens are listed below

Table 2: EPS Surveillance Results

Site Name	Total Samples Tested	Sabin Like	VDPV	Wild	NPEV	Negative
Red Cross Hospital	21	17	0	0	3	1
Wazirpur JJ Colony	53	38	0	0	14	1
Bhalaswa Lake	49	24	1	0	26	1
Swarn Cinema	51	45	1	0	4	1
Batla House	52	52	0	0	1	1
Sonia Vihaar	51	49	0	0	2	0
Nangloi	53	49	1	0	3	0
Civil Hospital Rajpura Patiala, Punjab	36	13	2	0	13	8
Fatehpur Disposal, Amritsar, Punjab	26	20	1	0	3	2
Zirakpur, Mohali, Punjab	26	25	0	0	1	0
Malerkotla, Punjab	25	24	0	0	1	0
Total	**443**	**356**	**6**	**0**	**71**	**14**

2. National Measles and Rubella Laboratory Activities

The Virology-1 Laboratory is a WHO accredited for Measles and Rubella testing and is a part of Measles Elimination Project in collaboration with WHO.

Table 3: WHO Surveillance Anti-Measles IgM Antibody (ELISA) samples

	Measles Tested	Measles Pos	Measles Neg	Measles Equivocal	Rubella Tested	Rubella Pos	Rubella Negative	Rubella Equivocal
Apr-15	57	43	12	2	14	2	12	0
May-15	20	10	10	0	10	4	6	0
Jun-15	18	13	3	2	5	1	4	0
Jul-15	33	23	10	0	10	2	8	0
Aug-15	16	12	3	1	4	0	4	0
Sep-15	0	0	0	0	0	0	0	0
Oct-15	0	0	0	0	0	0	0	0
Nov-15	8	8	0	0	0	0	0	0
Dec-15	10	9	1	0	1	0	1	0
Jan-16	62	30	29	3	32	6	26	0
Feb-16	57	46	11	0	11	3	7	1
Mar-16	205	88	113	4	117	67	48	2
Total	**486**	**282**	**192**	**12**	**204**	**85**	**116**	**3**

3. Other viruses under Enterovirus Laboratory

The Enterovirus laboratory has been providing diagnostic support for diseases like measles, mumps, Ebstein Barr virus, Parvo virus, varicella zoster virus and enteroviruses. In near future the laboratory plans to strengthen facilities for diagnosis of enteroviral diseases. It also plans to establish diagnostic tests for cases of myocarditis.

Table 4: Results of Anti-Mumps IgM and Anti-EBV IgM Antibody Test

	Mumps				**EBV**		
	Tested	**Positive**	**Negative**	**Equivocal**	**Tested**	**Positive**	**Negative**
Apr-15	1	1	0	0	10	0	10
May-15	1	0	1	0	8	1	7
Jun-15	6	0	6	0	14	3	11
Jul-15	2	0	2	0	18	1	17
Aug-15	0	0	0	0	25	4	21
Sep-15	1	0	0	1	22	0	22
Oct-15	4	0	4	0	10	2	8
Nov-15	3	0	3	0	0	0	0
Dec-15	2	0	2	0	11	1	10
Jan-16	5	1	4	0	20	1	19
Feb-16	7	0	7	0	22	2	20
Mar-16	7	0	7	0	0	0	0
Total	**39**	**2**	**36**	**1**	**160**	**15**	**145**

Table 5: Results of Anti- Parvo B IgM and Anti-VZV IgM Antibody Test

	Parvo				**VZV**			
	Tested	Pos	**Neg**	**Equivocal**	**Tested**	**Pos**	**Neg**	**Equivocal**
Apr-15	6	0	6	0	6	1	5	0
May-15	5	0	5	0	5	2	3	0
Jun-15	7	0	7	0	5	1	4	0
Jul-15	12	0	12	0	2	2	0	0
Aug-15	14	1	11	2	2	1	1	0
Sep-15	11	0	11	0	3	1	1	1
Oct-15	7	0	7	0	5	1	4	0
Nov-15	16	1	15	0	8	1	7	0
Dec-15	12	2	9	1	3	2	1	0
Jan-16	11	0	11	0	3	0	3	0
Feb-16	19	1	17	1	12	3	9	0
Mar-16	26	5	21	0	10	0	10	0
Total	146	10	132	4	64	15	48	1

Table 6: Results of Anti-Measles IgM Antibody Testing (Other than WHO Surveillance)

	Measles Tested	Measles Positive	Measles Negative	Measles Equivocal
Apr-15	4	4	0	0
May-15	6	3	3	0
Jun-15	8	0	8	0
Jul-15	2	0	2	0
Aug-15	3	0	3	0
Sep-15	0	0	0	0
Oct-15	3	0	3	0
Nov-15	3	0	3	0
Dec-15	8	1	7	0
Jan-16	10	3	7	0
Feb-16	8	2	6	0
Mar-16	16	5	11	0
Total	**71**	**18**	**53**	**0**

Respiratory Virology Laboratory

- The Laboratory provides molecular diagnostic services for Influenza A and its subtype i.e. Seasonal H3N2, Pandemic H1N1, H5N1 , H7N9, Influenza B, MERS- CoV and other respiratory viruses i.e. Respiratory Syncitial Virus.
- Beside this, the laboratory also provides the serological diagnosis for Rubella (IgG & IgM), CytomegaloVirus, Herpes simplex Virus I & II by using ELISA technique

Routine investigations

Diagnosis of Influenza

During the period total 1980 Throat/Nasal swab samples were received for Influenza diagnosis. Samples were processed in high containment facility BSL-III laboratory. RNA was extracted from these processed samples followed by amplification by using Real-Time RT- PCR technique. Following were the findings:

Total no. of samples received	**1980**
Influenza A Positive only (untypabe)	66
Pandemic H1N1 Positive	307
Influenza A H3N2 (Seasonal) Positive	75
Influenza B Positive	12

Influenza Lab-wise samples tested during the year 2016

Sr. No	Name of Net Work lab	Sample Tested	Sample Positive (H1N1)
1.	IPM, Hyderabad	4640	173
2.	KMC, Manipal	3885	124
3.	C.R.I Kasauli	76	0
4.	NCDC, Delhi	1110	144
5.	SGPGIMS, Lucknow	633	149
6.	JIPMER, Puducherry	240	1
7.	BJMC Ahmedabad	2032	249
8.	PGIMER,Chandigarh	990	214
9.	NEIGRIHMS Shillong	240	0
10.	NIMHANS Banglore	142	0
11.	HAFFKINES Mumbai	169	2
12.	IGMC Shimla	207	14
	Total	**14364**	**1068**

Influenza Like Illness (ILI) surveillance

During the period surveillance was done at different sentinel sites in Delhi for Influenza. Following were the results:

Sentinel site	Total no. of samples tested	Influenza A Positive Only (Untypable)	Pandemic H1N1 Positive	Influenza A H3N2 (Seasonal) Positive	Influenza B Positive
Kasturba Hospital	231	9	2	1	2
Aruna Asif Ali Hospital	21	1	-	-	2
PHC, Gokal Puri	4	-	-	-	-
SJ Hospital, New Delhi	30	1	1	-	-

Diagnosis of Rubella, Cytomagalo Virus (CMV), Herpes Simplex Virus (HSV)-I & HSV-I. The RCH test was performed for the diagnosis of immunity status in child bearing female for Rubella virus and recent infection by three viruses i.e. Rubella, CMV, HSV-II was performed for the patients with bad obstetric history i.e. abortion/miscarriage & for malformed babies i.e. microcephely, hepatosplenomegaly, jaundice etc. and HSV-I was performed for altered sensorium patients, encephalitis etc.

Test Performed for	Total no. of Serum samples were tested by ELISA	Found Positive
Rubella IgG	403	237
Rubella IgM	394	16
CMV IgM	578	53
HSV-I IgM	520	5
HSV-II IgM	411	9

Viral Hepatitis Laboratory

Total No. of samples tested from 1st April 2015 to 31st March 2016 = 737
Hepatitis Markers (test performed by ELISA)

Anti HAV IgM		Anti HEV IgM		Anti HBs		Anti HCV	
No tested	**No of positives**	**No tested**	**No of positives**	**No tested**	**No of positives**	**No tested**	**No of positives**
597	140	620	124	45	28	3	1

Tuberculosis Laboratory

Total samples (sputum/CSF/Biopsy/Urine/P.fluid/Pus/Tissue) received – 47 Nos.
Positive for Smear – 01 No.

Bacteriology

1. 391 urine samples were subjected to culture examination of pathogenic Bacteria out of which 130 were positive. (*E. coli 75, Klebsiella Sp.16, Pseudomonas Sp. – 4, Staphylococcus aureus14, Streptococcus Sp. 2,Entrococcous Sp. 11, Citrobacter Sp. 2, CONs 4 & Candida albicans 1*)
2. 161 Blood samples culture were carried for examination of pathogenic Bacteria out in of which 25 were positive.(*Klebsiella Sp.3, Pseudomonas Sp. – 4,Acenetobacter Sp 1, Staphylococcusaureus 13, Entrococcous Sp.3&CONs 1*)
3. 32 Pus, throat swabs, Pleural Fluid were processed for examination of pathogenic Bacteriaout of which 13 were positive.(*Klebsiella Sp.1, Pseudomonas Sp. – 1, Staphylococcusaureus 11)*
4. 41 samples (CSF, blood) obtained from suspected cases of pyogenic meningitis were processed out of which 5 were positive. *(Haemophilousinfluanzae 3 & S. pneumonia 1)*
5. 15 clinical samples from suspected diphtheria cases in Delhi were processed for diphtheria cases in Delhi. Out of which 01 samples are found to be positive for C. diphtheria
6. 66 blood samples were processed for widal test out of which 3 were positive.

Antimicrobial Resistance (AMR) surveillance: The laboratory is involved in technical coordination of national AMR surveillance under which a network of ten labs is being supported by procuring and supplying quality antibiotic discs to the network labs, Supplying quality control strains and performing External quality assurance for these labs.

127 Sample/ isolate were tested for Quality control of Antibiotic Susceptibility Test from various AMR network laboratories.

Diarrheal Disease Laboratory

Diarrhoeal Diseases Laboratory carries out "Laboratory based surveillance of Cholera in and around Delhi."

- Diagnostic Laboratory services
  i. Stool culture
  ii. Microscopy
  iii. Isolation and identification of diarrhoeal pathogens like Salmonella, Shigella, Vibrio, Enter pathogenic E . coli etc .
  iv. Serotyping and Laboratory confirmation for Vibrio cholerae, Salmonella and Shigella.
  v. Antimicrobial susceptibility testing of various entropathognes like Vibrio, Salmonella, Shigella, and Enteropathogenic E coli
  vi. Detection of rotavirus and Norovirus antigen in stool by ELISA method .

vii. Detection of antibiotic associated Diarrhea i.e. Clostridium difficile toxin A&B.

- Teaching and Training
- Processing of samples received from States from suspected Cholera / Acute Gastroenteritis outbreaks specimens
- Daily notification of Cholera positive cases for Authorities to undertake control measures.

Activities undertaken during the period:

- Laboratory based surveillance of Cholera in and around Delhi: The Laboratory received 108 rectal swab specimens from ID Hospital during the said period from suspected acute gastroenteritis or cholera cases. A total of 21 Vibrio cholera O1 ogawa , Vibrio cholera O1 inaba,1 Non O1 – Vibrio were isolated.
- Study of acute gastroenteritis cases in pediatric population of Aruna Asaf Ali Hospital: 93 stool samples were received from this pediatric population suspected of acute gastroenteritis. 18 E. coli pure culture, 02 Vibrio cholera O1, 8 Shigella,.4 salmonella,,2 Adenovirus,1Giardia were isolated. Detailed clinical epidemiological information in a structured proforma is available and data is being analyzed. Microscopy was carried out for the majority of samples.
- Referal sample received from various hospital and other sources of Delhi: 17 samples received out of which, 1 EPC, 1 Salmonella, 1 Giardia, 1Clostridium.
- New project initiated: Surveillance study on rotavirus in 0-5 year admitted children of Aruna Asaf Ali Hospital, Delhi. Total 93 samples were received, out of which 10 samples were positive for rotavirus.

Other activities carried out by the Laboratory

The Diarrhoeal Disease Laboratory also performed various other microbiological activities that are stated below.

Type of activity	**Number of samples tested**
Antimicrobial susceptibility testing	60
Stool Microscopy	50
Strains of Vibrio, Shigella etc stocked for future work	250

Environmental Laboratory

1. Bacteriological analysis of drinking water samples was provided to the following beneficiaries:
   a) Airport health organization, Delhi air port in connection with VVIP flight going abroad.
   b) Airport authority of India.
   c) Govt. Offices and Hospitals.
   d) General public by reference.
   e) TAJ AIR CATERERS Gurgaon road (in connections with VVIP flights)
2. Laboratory support to investigation of water borne diseases.
3. Processing of water samples received from the States as part of outbreak investigations of acute gastroenteritis.
4. Preparation and supply of rapid test kit (H2s-test) for assessment of bacteriological quality of drinking water in states & union Territories affected by natural disasters (earth-quakes, cyclones, floods etc.)
5. Teaching, training.
6. Disaster management / outbreak investigations.
7. Polio surveillance in Sewage water samples.
8. Preparation of guidelines / manuals etc.

Routine activities

Bacteriological analyses of 279 water samples were carried out by Most Probable Number (MPN) technique (Multiple tube method). The sources and results of these samples are given below:

S. No.	Type of water sample or source	Number of sample tested
1	Flight kitchens in connection with VVIP flight movement (with coordination of APHO)	196
2	Outbreak investigations	13
3	Water quality in hospitals/ Institutions	15
4	Others (Referred samples)	55
	Total	**279**

Environmental Polio surveillance

Total No. of 480 sewage water samples were collected from different locations of Delhi and Punjab e.g. (Batla House, Red cross hospitals , Swarn cinema , Sonia Vihar , Bhalaswa lake , Wazir pur , Nangloi) and Punjab (Maler kotla, Zirakpur kotla Mohali, Civil hospiatal Rajpura Patiala and Fatehpur Disposal Amritsar). Samples were processed and further samples sent to virology lab. for Polio Virus isolation.

Sl.No.	Name of the site	Number of sample received/collected
1	Batla house , Delhi	53
2	Red cross Hospital, Delhi	21
3	Swarn cinema , Delhi	72
4	Sonia Vihar, Delhi	50
5	Bhalaswa lake, Delhi	53
6	Wazirpur j. j. colony , Delhi	54
7	Nangloi, Delhi	52
	Total	355

Outside Delhi - Punjab

Sl.No.	Name of the site	Number of sample received/ collected
1	MPS Adamwal Road ,Losara Drain Maler Kotla , Punjab(ADW)	25
2	Zirakpur kotla , Punjab (ZKP)	37
3	Railway crossing Patiala, Punjab (RWC)	37
4	Fatehpur Disposal, Amritsar, Punjab (FPS)	26
	Total	125

Mycology Laboratory

- Mycological diagnostic services for the diagnosis of various fungal syndromes like candidiasis, aspergillosis, mycetoma, dermatpphytosisetc – especially those associated with immunodeficiency or tuberculosis, diabetes etc.
- Teaching and Training

Routine activities

Mycological diagnostic services were provided. The details of which are given below:

S. No	Type of sample	No. tested	No. positive	Diagnosis
1	CSF	18	1	*Cryptococcus neoformans*
2	Skin / Nail	01	-	
3	Tissue	18	1	*Actinomyces species*
4	Blood culture	02	-	
5	Sputum	02	1	*Candida albicans*
6	Urine	01	-	

Central Media Room

The laboratory is involved in preparing and supplying Culture media and biochemical tests material for various labs of the institute as mentioned below

S.N	Name of the media	Quantity of media prepared and supplied to various labs of the division												
		Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total
1	MHA	125P	125P	220P	265P	285P	115P	175P	125P	50P	260P	215P	420P	2380P
2	MA	120P	105P	128P	172P	125P	125P	110P	108P	80P	145P	160P	205P	1583P
3	TCBS	30P	43P	58P	50P	50P	50P	50P		25P	67P	15P	25P	463P
4	BSA	25P	55P	50P	75P	75P	50P	25P	25P	25P		25P	25P	455P
5	XLD	30P	15P	13P	40P		15P	15P	18P		25P		25P	196P
6	SSA	15P	18P	25P	25P	25P		20P	25P		25P	15P	25P	218P
7	BA	35P	40P	60P	99P	60P	60P	60P	75P	35P	90P	80P	50P	744P
8	CHA		06P			15P		05P	10P			20P		56P
9	Sugars (glucose , sucrose, lactose, mannitol)	320T	260T	195T	335T	160T	190T	320T			320T	200T	380T	2580T
10	TSI			100T		100T	100T		100T		100T	100T	100T	700T
11	PPA					100T	100T				50T	100T	100T	450T
12	LIA	100T			100T	100T	100T				100T	100T		600T
13	Simmons Citrate	100T	100T			100T	100T				200T	100T		700T
14	OP Water	300T	400T	400T	400T	400T	300T	300T	100T	200T	400T	300T	300T	3800T
15	AP Water		100T	200T	100T		100T	100T	100T				200T	900T
16	Motility Media/MIO	100T		100T	125T	100T	100T				100T	100T	100T	825T
17	Tryptic Soya Broth (50ml)								10B		17B			27V
	Tryptic Soya Broth (20ml)	44V	28V	35V		40V			25V		27V		25V	224V
18	Macconkey Broth D/S(Flask)	12F	40F	21F		20F	20F	43F	40F	21F	20F	20F	11F	268F
19	Macconkey Broth D/S	100T	300T	100T			200T	200T	350T	100T	200T	100T		1650T
20	Macconkey Broth S/S		300T	100T		100T	180T	360T	180T		200T	200T	160T	1780T
21	Selenite Broth	100T					100T							200T

22	3% Beef Extract (ml)	500		500	500	500	500	500	500	500	500	1000	500	6000
23	Brillient Green Bile Broth		100T					50T			100T			250T
24	1% Nutrient Agar Stab			53T	100T						50T	125T		328T,
25	Carry blairs t. Media							260V						260V
26	Urease												50T	50T
27	BHA Agar							09P						9P
28	BHA Broth													
29	Lofflars Media													
30	DA	15P	13P	10P	9P	20P	21P							88P
31	Nutrient Broth/Agar				100T			25P		50P				100T, 75P
32	BES Agar													
33	ysine Decorboxylase Broth	100T												100T
34	Arabinose	50T												50T
35	Arginine	50T												50T
36	L B Broth				100T									100T
37	Enterococcus Agar				50T	50T								100T
38	MR-VP Medium				50T									50T
39	Amies Transport Medium							55V						55V
40	Bile Esculine Agar Slant												50T	50T

Major Achievements

a. A team from WHO HQ audited the Virology-1 laboratory as per their accreditation checklist for Polio and Measles and Rubella. The laboratory has been granted Accreditation for Measles and Rubella IgM antibody testing with a score of 88.7% The laboratory has performed consistently well in Proficiency testing on panels received from WHO as well as re-validation.

Projects Completed recently

Serum Anti- Measles antibody levels at 4-6 years of age in children previously immunized with Measles vaccine

Ongoing Research Projects

a. The Enterovirus Laboratory is one of the participant in multi-centric global study on vaccine derived polio viruses in immune-deficient children by the task force for the global health in collaboration with Jeffery Modell Foundation, Centers for Disease Control and Prevention, Atlanta and WHO. The objective of the study is to determine the prevalence of poliovirus excretion in patients with B cell immunity defects known to be associated with prolonged excretion after oral polio vaccine administration.
b. Serum Anti- Measles antibody levels at 4-6 years of age in children previously immunized with Measles vaccine

Outbreaks Investigations

a) The details of outbreaks investigated by Enterovirus Laboratory in 2015-16 is as follows:

S.No.	Place	Test Name	No. of samples	Result
1.	STNM Hospital Gangtok Sikkim (Suspected Measles Outbreak)	Measles- IgM	20	Positive- 18 Negative- 01 Equivocal- 01
2.	Malda & Muzaffarpur (Suspected Encephalitis outbreak)	Measles- IgM	42	Positive- 00 Negative- 42 Equivocal- 00
		EBV- IgM		Positive- 03 Negative- 38 Equivocal- 01
		Mumps- IgM		Positive- 00 Negative- 42 Equivocal- 00
		VZV- IgM		Positive- 02 Negative- 36 Equivocal- 04

b. H1N1 outbreak in Punjab: Officer Incharge of Influenza Laboratory/Biotechnology Division investigated the rising trend of H1N1 related cases & deaths in the state of Punjab during 14^{th} - 18^{th} February 2016. She visited hospitals: PGI Chandigarh, Fortis Chandigarh, CMC Ludhiana, DMC Ludhiana, Civil Hospital, Moga. This was followed by a death audit meeting held in Directorate of Health and Family welfare, Punjab.

c. Outbreak of Mysterious Fever in Kanpur, U.P.: An outbreak of mysterious fever was investigated Dr. Simrita Singh, Deputy Director (Virology Lab.) as part of the outbreak investigating team in August 2015 in Kanpur, UP, which was later prove to be Dengue outbreak.

d. 3 Diphtheria outbreak samples were received from CMO, Bijnoor, U.P. in October, 2015. All were found negative for *C. diphtheria*

e. Lab. Support provided for investigation of Diseases outbreak in Ghaziabad (U.P.) in the month of Jan. 2016. Total number of samples received was 04, out of which 02 samples were satisfactory and 02 were unsatisfactory. Organisms grown in culture were *Klebsiella sp*. and *Proteus sp*.

f. Lab. Support provided for investigation of Diseases outbreak in Shimla (H.P.) in the month of Jan. 2016. Total number of samples received was 09, all samples were unsatisfactory. Organisms grown in culture were *E.coli, Klebsiella sp*. and *Pseudomonas sp.*

g. Details of samples tested by Viral Hepatitis laboratory is as follows:

Place	Anti HAV IgM		Anti HEV IgM		Cause
	No tested	No positive	No tested	No positive	
Dist. Shimla (Himachal Pradesh) Jan 2016	53	-	53	43	Hepatitis E virus

h. Various outbreak specimens were received at Diarrhoeal Diseases Laboratory from different states referred as field samples. Out of 5 samples received, 4 samples were positive for Shigella Details of suspected outbreak specimens that were received from various states is given below:

Type of Sample and source	**Date of receipt**	**Culture report**
2 isolates received from Trivandrum	13.05.15	1 *Shigella flexineri*, 1 *Shigella sonnei*
3 isolates received from PGIMS Rohtak	27.08.15	1 *Shigella flexineri*, 1 *Shigella sonnei*

Visits made/Trainings/Workshops attended by various officers

- Dr. Charu Prakash attended Biological Weapon Convention (BWC) meeting of experts on 10^{th}-14^{th} August 2015 at Geneva, Switzerland.
- Dr Somnath Karmakar along with Joint Director NCDC visited Hyderabad from 15 to 24 April 2015 to assist State Health Authorities in Avain Infkuenza containment means and to supervise surveillance means.
- Dr. Simrita Singh, Deputy Director (Virology Lab.) and Mrs. Suman Gupta (RA) visited Taiwan and participated in "International Training on Molecular Diagnosis of Middle East Respiratory syndrome Coronavirus (MERS-CoV)" from August 12-14, 2015 in Taiwan.
- Dr. Simrita Singh, Deputy Director & Dr. Sanjim Chadha, Assistant Director participated in the Centre for Disease Control's Hands-on training on Rickettsial Infections with special reference to Scrub Typhus, 27-29^{th} May 2015 held in National Centre for Disease Control, New Delhi
- Dr Sanjim Chadha, Assistant Director attended a workshop and hands on training on "Biosafety in Public Health Laboratories" during 29^{th} February to 4^{th} March 2016 held at National Institute of Health (NIH), Bangkok, Thailand.

Workshop/Training organized

- A hands on training of Microbiologists (Teaching and Non-teaching Specialists) on outbreak prone emerging and re-emerging diseases was organized at NCDC during 16-19 March 2016 jointly by the Division of Microbiology, Zoonosis and Biotechnology. During this training:
  a. Lecture was delivered by the Dr Sanjim Chadha, Assistant Director on lab diagnosis of influenza
  b. Practical hands on training of influenza diagnosis and visit to BSL-3 lab was conducted
  c. Demonstration of Donning and Doffing of Personal Protective Equipments (PPE).
  d. Demonstration of how to use Powered Air Purified Respirator (PAPR).

Publications

- Sanjim Chadha, Uma Sharma, Artee Chaudhary, Charu Prakash, Sunil Gupta and S. Venkatesh. Molecular Epidemiologic analysis of three Hepatitis C virus outbreaks in the Jammu and Kashmir State, India. *Journal of Medical Microbiology (under review)*

National Programmes

National Viral Hepatitis Surveillance Programme

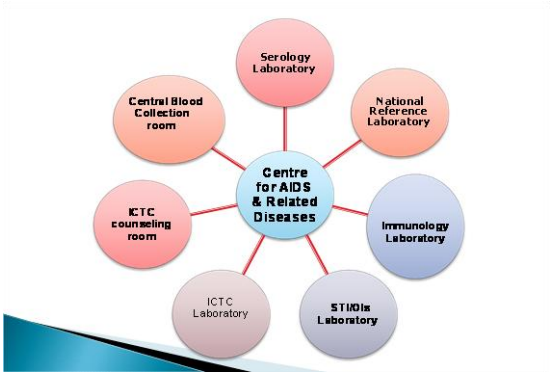
Work has been initiated. Funds have been released in financial year 2016-17. All activities are in the process of initiation

Treatment guideline on "Viral hepatitis – The Silent Disease: Prevention Control and Treatment Guidelines" have been prepared and approved. The same is now under the process of publication

4.4 Centre for AIDS & Related Diseases

Dr Sunil Gupta
Additional Director & Head
Dr Aarti Tewari
Assistant Director

This laboratory was initially started as AIDS Reference Laboratory in Division of Microbiology (since 1985). Subsequently this laboratory was upgraded as a "Division" in the year 1995 and later as a "Centre" known as Centre for AIDS & Related Diseases (CA&RD) in the year 2004. The Centre achieved NABL accreditation as per ISO 15189:2007 in the year 2011 and renewal of the same as per ISO 15189:2012 in the year 2015 and the certificate is valid upto February 2018.



Broad mandates of the Division:

1) HIV/ AIDS related activities:

- Confirmation of HIV sero-status of all samples received from 13 State Reference Laboratories(SRLs) and their linked Integrated Counselling and Testing Centres (ICTCs), which are showing indeterminate or discordant results.
- National AIDS Control Organization (NACO) designated referral laboratory for HIV-2 confirmation of patients referred through ART Centres of seven states of Delhi, Punjab, Chandigarh, Haryana, Rajasthan, Jammu & Kashmir and Himachal Pradesh.
- Preparation and distribution of proficiency testing (PT) panel to linked SRLs and their associated ICTCs
    - Eight member panel for SRLs
    - Bulk four-member panel for distribution by SRLs to their associated ICTCs
- Compilation and analysis of the PT panel results received from the SRLs and feedback to the participating SRLs.
- Participation in National EQAS for HIV serology, Syphilis serology and Absolute CD4-T Lymphocyte count.
- Activities related to Consortium of NRLs on Kit Quality testing of HIV, HCV and HBV diagnostic kits
- Absolute CD4/CD3 count in HIV positive samples referred from DDU ART centre and other linked ART centres and PPTCT centres by FACS Count.
- To provide HIV counseling and testing services to clients on his or her own free will or as advised by a treating physician.
- Rechecking of samples as part of quality control under HIV sentinel surveillance.
- Dried Blood Spot (DBS) testing under Integrated Biological & Behavioural Surveillance (IBBS) Surveillance.
- Dried Blood Spot (DBS) testing under National Family Health Survey (NFHS-4).
- Diagnosis of common opportunistic infections in HIV-positive patients in stool and sputum respectively.
- Serological diagnosis of syphilis by RPR and TPHA
- Conducting EQAS Workshops for SRL and technical officers, Lab technician and Quality Managers of State AIDS Control Society (SACS).
- Support to National Health Programs e g NACO

2) Other Activities

- Support to courses run at NCDC i.e. MPH

Details of the work carried out at the various laboratories of this Centre

National Reference Laboratory

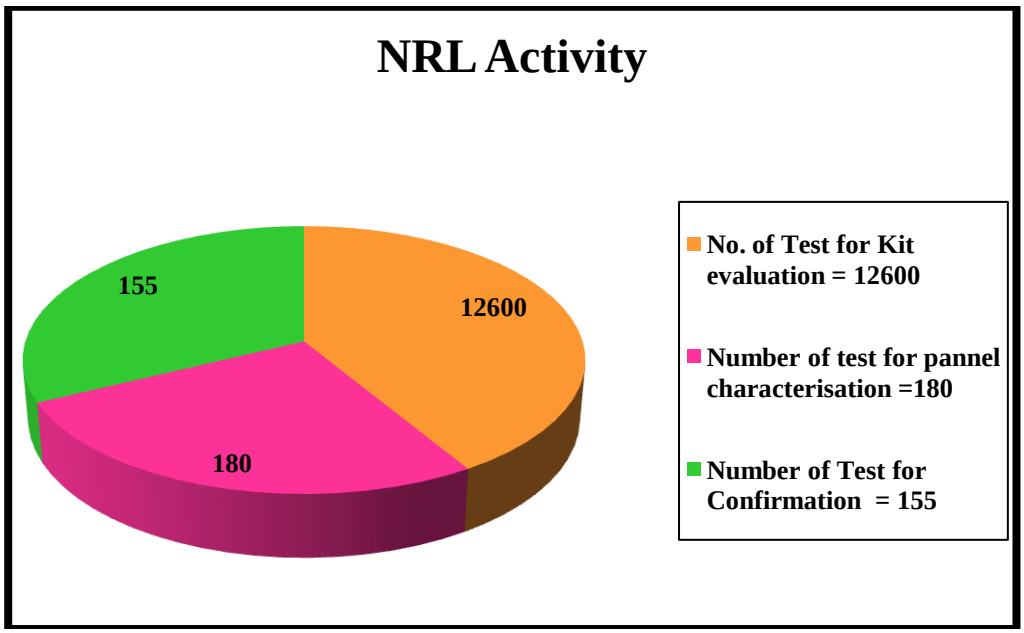
- HIV/HBV/HCV diagnostic kits evaluated:
  A total of 36 batches of diagnostic kits (31 batches of HIV rapid test kits and 3 batches of HIV ELISA and 2 HCV ELISA kits were evaluated). A total of approximately 12,600 test carried out in this evaluation.
- 6000 aliquotes of HIV, HBV HCV and negative panels were prepared for kit evaluation.
- Blood bags collected for characterization of panels- **57** characterization of HIV, HBV and HCV panels.
  Confirmation of HIV sero-status of all samples received from SRLs and their ICTCs which are showing indeterminate or discordant result- **83** for which a total of 155 tests were performed.
- External Quality Assessment Scheme (EQAS) for HIV Serology

1. Conducted two rounds of EQAS for HIV serology for 13 linked SRLs and their ICTCs in the states of Delhi, Haryana, Rajasthan and Jammu & Kashmir.

   a. Eight member panel for SRLs
   b. Bulk four-member panel for distribution by SRLs to their associated ICTCs

2. Reports of EQAS activity was compiled and sent to Apex Laboratory (NARI, Pune)

- Participated in EQAS for HIV serology conduct by NARI Pune. The result had **100% concordance**.
- In-house calibration of laboratory equipments such as pipettes, Refrigerators, Deep freezers and centrifuges were carried out.
- Documents were reviewed and updated and some new SOPs and QSPs were prepared as per ISO 15189:2012.



Serology Laboratory

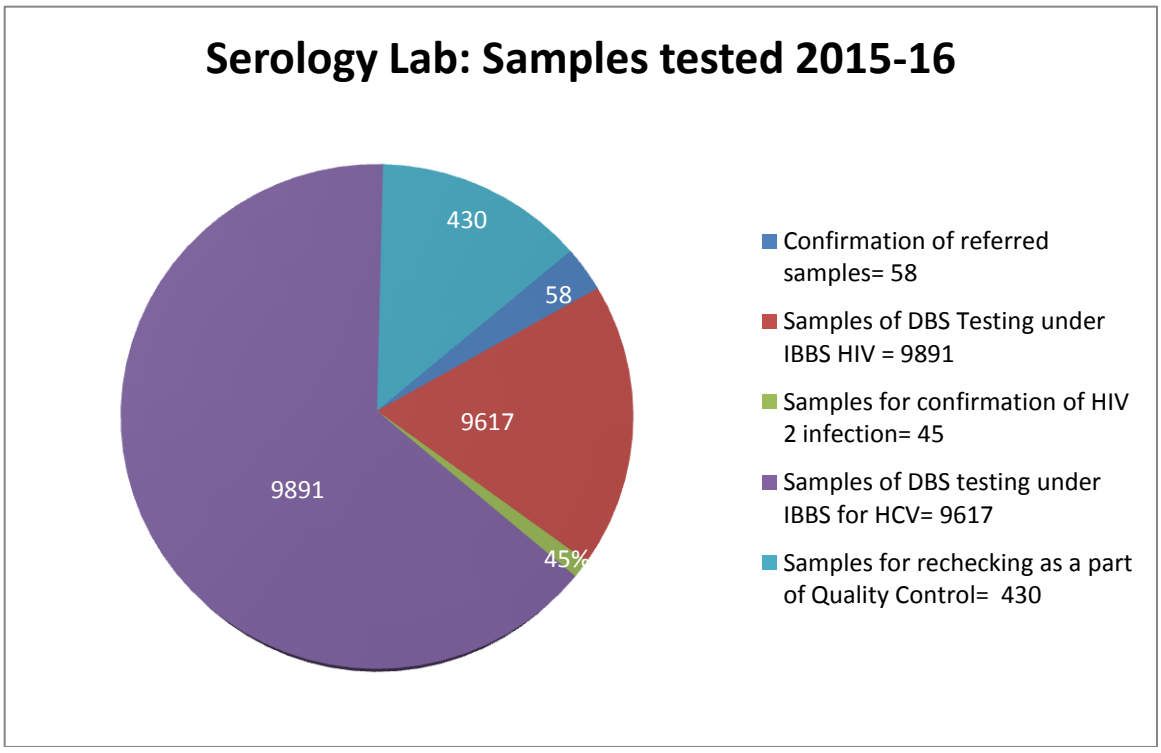
- Confirmation of HIV infection on samples referred by hospitals/ blood banks other than SRLs: 58
- HIV-2 confirmatory diagnosis of all the patients referred through ART centres of seven states of Delhi, Punjab, Chandigarh, Haryana, Rajasthan, Jammu & Kashmir and Himachal Pradesh-under NACO: 45
- Quality control testing of samples referred by hospitals/ blood banks other than SRLs: 430
- Quality control testing of samples tested under HIV Sentinal surveillance ANC round-1483

Dried Blood Spot (DBS) testing of samples under IBBS surveillance

Integrated Biological & Behavioural Surveillance (IBBS) is being implemented by NACO to strengthen surveillance among High Risk Groups (HRG) and Bridge population and will generate evidence on prevalence and risk behaviours among HRG and migrants to support planning and prioritization of programme efforts at district, state and national levels.

This centre has been designated as one of the 16 laboratories for testing of DBS samples under NACO.

- Approximately **9891 DBS samples** received from 09 domains of Delhi and 04 domains of Uttar Pradesh were tested **for HIV and** the results were submitted on line on NACO IIBS site.
- Approximately **9617 stored DBS samples** received from 09 domains of Delhi and 04 domains of Uttar Pradesh were tested **for HCV and** the results were submitted to NACO.



National Family Health Survey (NFHS-4)

- National family Health Survey-4 (NFHS-4) is a project funded by International Institute for Population Sciences (IIPS), Mumbai which has been appointed by the Ministry of Health & Family Welfare as the nodal agency to conduct this project.
- NFHS-4 aims to provide updates and evidence of most of the health & nutrition indicators in general population.
- Estimation of prevalence of HIV infection in key population of India is also one of the major components of the project.

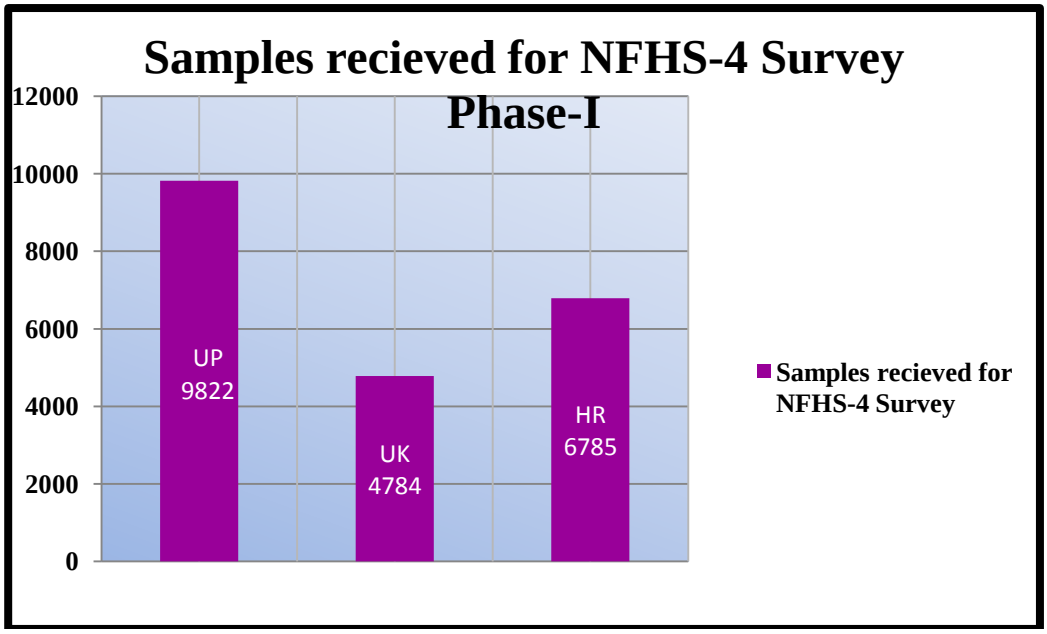
- The IIPS, under the direction from the Ministry of Health & Family Welfare has identified six labs across the country, where the Dried Blood Spot (DBS) samples on filter paper cards would be sent for HIV testing.

- NRL-NCDC is one the laboratories selected for HIV testing in NFHS-4.

- NRL-NCDC is assigned to test HIV DBS samples from Uttarakhand, Haryana, Uttar Pradesh, NCT Delhi & Himachal Pradesh.

- DBS samples from Uttar Pradesh, Uttarakhand and Haryana for the 1st Phase of NFHS – 4 has been received and logged into the system database. Details of the sample are given as below:

Uttar Pradesh (UP)	9822
Uttarakhand (UK)	4784
Haryana (HR)	6785
Total samples	21,391



Immunology Laboratory

CD4/CD3 cell estimation was performed on 5071 samples referred from Anti Retroviral Treatment (ART) Centre, Deen Dayal Upadhyay Hospital and other linked PPTCTCs of Delhi.

Opportunistic Infections/STI Laboratory

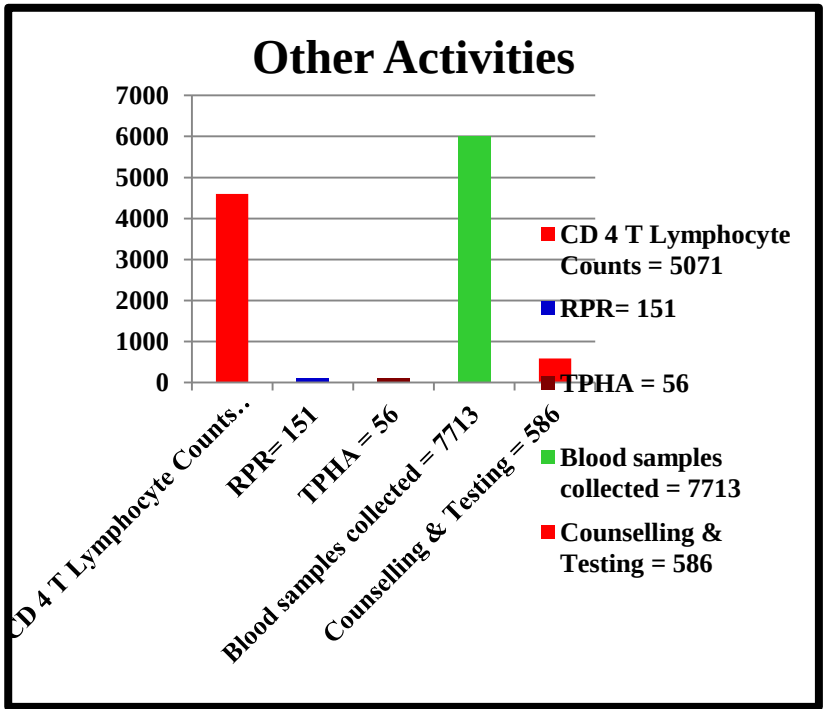
- Qualitative RPR: 151
- TPHA: 56

Integrated Counseling & Testing Centre (ICTC)

- Counseling of walk in clients visiting ICTC- 586
- HIV testing of clients visiting ICTC-586
- ICTC Participated in EQAS for HIV serology conduct by SRL, MAMC Delhi. The result had **100% concordance**.

Blood Collection Unit

This unit acts as a central sample collection facility for the centre. During the period a total of 586 blood samples were drawn from walk in clients and and 7127 samples were received and distributed to the respective laboratories for testing.



MAJOR ACHIEVEMENT OF THE DIVISION

- Centre received certificate of renewal of **NABL accreditation** in the field of Medical testing according to ISO 15189:20i2 from 14.2.2016 to 14.2.2018

WORKSHOP/TRAININGS ORGANIZED

- Training and capacity building of linked State Reference Laboratories (SRLs) of Delhi, Haryana, Rajasthan and J&K by conducting workshop for laboratory technicians on "**EQAS for HIV testing**" on 20/1/2016.
- The 6 day training of the technical team working under NFHS-4 project was conducted from 25.02.16-02.03.16. The trainer was Ms. Eleanor Brindle of University of Washington, Seattle.
- Organized a public lecture on "Awareness of HIV/AIDS" for NCDC Officers & Staff members on 19/11/15
- Organized a guest lecture on "improving laboratory methods to maximise the use of Dried Blood Spots (DBS), samples" on 2/3/16 for NCDC officers.

Training For NFHS-4 Testing

Guest Lecture on Dried Blood Spot Testing

4.5 Division of Zoonosis

Dr. Mala Chhabra
Addl Director & Head
Dr. Simmi
Deputy Director
Dr Monil Singhai
Assistant Director

The objectives of the division is to provide technical support for outbreak investigations, conduct operational research and trained manpower development in the field of Zoonotic disease and their control in the country. Diagnostic support is provided to State Governments for laboratory diagnosis of Zoonotic infections of public health importance.

The Division has Reference Laboratory for Plague. It has also been recognized by the World Health organization as WHO Collaborative Centre for Rabies. Currently the work is being carried out on following Zoonotic diseases:

A. Referral Diagnostic Services

S. No.	**Referral diagnostic services provided to the states**		**Samples tested April-March 2016)**
1.	Rabies	(a) Post-mortem diagnosis in animal brain	02
		(b) Diagnosis in hydrophobia cases by	19
		(c) Assessment of antibodies by ELISA test	
		(i) Human	114
		(ii) Animal	07
2.	Kala-azar	(a) Parasitological Diagnosis by smear examination and culture	241
3.	Toxoplasma	Serological and Diagnosis by ELISA test	182
4.	Brucellosis	Serological diag by tube agglutination test	273
5.	Rickettsiosis	Serological diagnosis by Weil Felix test, Elisa	954
6.	Hydatidosis	Serological by ELISA	15
7.	Arboviral Diseases	(a) Serological diagnosis by IgM ELISA JE	770
		(a)IgM ELISA test for Dengue (b) NS1 test for Dengue	263 113
		(c) IgM ELISA test for Chikungunya	162
8.	Plague- rodent sera and organs	(a) Serological diagnosis by PHA and PHI	881
		(b) Culture for Isolation of Y. Pestis	4558
9.	Leptospirosis	Serological diagnosis by ELISA	447
10.	Anthrax		22
11.	Virus isolation	Dengue	113
		Rabies	21
		AES/JE	7
12.	Lyme's Diseases by ELISA		10
13.	Hanta virus by ELISA		5
14.	Cysticercosis diagnosis by ELISA		120
15.	Molecular diagnosis carried out for JE (4), Dengue (207), Rabies (23) AES(22), CCHF(2)		258

B. THREE NEW INITIATIVES UNDER THE 12TH FIVE YEAR PLAN (2012-2017)

- **National Rabies Control Programme**

Has two components viz Human Component which is being implemented in all staes and Uts. NCDC is the nodal centre. The Animal Health Component is being pilot tested in Haryana and Chennai. Animal Welfare Board of India, Min of Environment & Forest is the nodal agency.

- **Programme for prevention and Control of Leptospirosis**

It is being implemented in the endemic states viz- Tamilnadu, Gujarat, Karnataka, Maharashtra, Kerala and Andaman & Nicobar islands

- **Strengthening of Intersectoral Coordination for Prevention and Control of Zoonotic Diseases is based on strengthening the existing system of IDSP for disease surveillance and response and creating awareness in general community**

TEACHING AND TRAINING

- Biorisk management capacity building Workshop 5-9 May 2015
- Hands on training on Rickettsial diseases with special reference to Scrub typhus 27th - 29th May 2015
- Meeting to review the status and preparedness of leptospirosis 25th May 2015
- Sensitization and training of state nodal officer and SSO'S on NRCP and Animal bite management 11th June 2015
- NRCP expert group meeting to finalize draft guidelines on "National guidelines on Rabies prophylaxis" on 8th July 2015
- Expert group meeting to finalise the draft guideline" Diagnosis ,case management ,Prevention & Control of leptospirosis " on 9th July 2015
- Participated as facility in training on Anthrax state medical & veterinary health professional at Ranchi Jharkhand

OPERATIONAL RESEARCH

Two PhD theses ongoing on different aspects of molecular characterization of Rabies viruses.

PUBLICATIONS

- National guidelines on Rabies prophylaxis
- National guidelines on Diagnosis, Case management, Prevention & Control of Leptospirosis

4.6 Division of Biotechnology/ Molecular Diagnostics

Dr . Sunil Gupta
Additional Director & Head
Dr. Sanjim Chadha
Assistant Director

Broad activities of the Division

The division provides molecular diagnostic services, molecular epidemiology, specialized training and applied research on various important epidemic-prone diseases of public health importance to achieve the following important objectives:

- Molecular Diagnostic support for confirmation of microbial pathogen.
- Identifying new, emerging and re-emerging pathogens.
- Genotyping and Sub-typing of strains.
- Characterizing drug-resistant strains.
- Maintenance of "Gene Bank" of important disease pathogens.

Ongoing research work

- DNA was extracted from samples of 30 HIV-1 positive infants born to HIV-1 positive mothers followed by amplification of HIV-1 specific *p-24* gene region (717bp) by PCR. The amplified PCR products were sequenced on 3130XL genetic analyzer. The sequences were resolved and analyzed for genetic variability using various bio-informatics tools. Genetic analysis revealed that all these samples belonged to subtype C clade.
- A total of 10, HIV-1 positive samples from infants born to HIV-1 positive mothers were amplified for DC-SIGN gene region (amplicon size 634bp), a host defense factor.

Outbreak investigations

- **Hepatitis C outbreak in Haridwar**
  A total of 10 serum samples, received from Haridwar, UP, were tested for HCV infection. RNA was extracted from the samples and amplified by RT-PCR for HCV specific 5` UTR gene (249 base pair). Out of the 10 samples 8 were found to be positive for HCV RNA.
- **Hepatitis C outbreak in Jammu and Kashmir**
  An outbreak of Hepatitis C in Srinagar district of J & K state was investigated during May 2015. A total of 30 serum samples were received at NCDC. RNA was extracted from these samples followed by amplification of HCV specific 5` UTR gene (249 base pair) by RT-PCR. Out of the 30 samples, 22 were found to be positive for HCV RNA. These samples were sequenced using 3130xL genetic analyzer. All the sequences were resolved using various bio-informatics tools. The genetic analysis revealed that all the sequences belonged to genotype 3b.
- **Dengue outbreak in Delhi**
  The dengue outbreak in the National capital region in 2015 was investigated by NCDC and molecular characterization of outbreak strains was done by Biotechnology Division, NCDC. Nineteen dengue virus positive samples (RT-PCR of cPrM gene) were sequenced on 3130XL genetic analyzer. After analyzing the sequencing data, it was found that all of these samples belonged to dengue virus, serotype 2 (genotype IV). This particular strain of dengue virus has been associated with severe disease manifestations and hemorrhagic complications.
- **Dengue outbreak in Kanpur**
  An outbreak of a mysterious fever in Kanpur, UP was investigated by a team of officials from NCDC and blood samples were collected during the acute phase of the febrile illness. Eight dengue virus positive samples (RT-PCR of cPrM gene) were sequenced on 3130XL genetic analyzer. After analyzing the sequencing data, it was found that all of these samples belonged to dengue virus, serotype 3 (genotype III).

- **H1N1 outbreak in Punjab**
  Officer Incharge of Biotechnology Division investigated the rising trend of H1N1 related cases & deaths in the state of Punjab during 14th - 18th February 2016. She visited the following hospitals:
    - PGI Chandigarh
    - Fortis Chandigarh
    - CMC Ludhiana
    - DMC Ludhiana
    - Civil Hospital, Moga

  This was followed by a death audit meeting held in Directorate of Health and Family welfare, Punjab.

Workshops/Trainings organised

- Dr. Sanjim Chadha, Assistant Director and Dr. Priyanka Singh, Technician, participated in the Centre for Disease Control's Hands-on training on Rickettsial Infections with special reference to Scrub Typhus, 27-29th May 2015 held in National Centre for Disease Control, New Delhi
- The division of Biotechnology organized an orientation Lecture cum training on Biomedical Waste management for NCDC officers and staff on 1.10.2015
- A workshop and hands on training on "Biosafety in Public Health Laboratories" was attended by Dr Sanjim Chadha, Assistant Director during 29th February to 4th March 2016 held at National Institute of Health (NIH), Bangkok, Thailand.
- A hands on training of Microbiologists (Teaching and Non-teaching Specialists) on outbreak prone emerging and re-emerging diseases was organized at NCDC during 16-19 March 2016 jointly by the Division of Microbiology, Zoonosis and Biotechnology.
    - Lecture was delivered by the Dr Sanjim Chadha, Assistant Director of Biotechnology Division on lab diagnosis of influenza during the hands on training of Microbiologists (Teaching and Non-teaching Specialists) on outbreak prone emerging and re-emerging diseases was organized at NCDC during 16-19 March 2016
    - Practical hands on training of influenza diagnosis and visit to BSL-3 lab was conducted during the training.

Publications

- Sanjim Chadha, Uma Sharma, Artee Chaudhary, Charu Prakash, Sunil Gupta and S. Venkatesh. Molecular Epidemiologic analysis of three Hepatitis C virus outbreaks in the Jammu and Kashmir State, India. *Journal of Medical Microbiology* (under review)
- P. Sharma, V. Mittal, M. Chhabra, R Kumari, P. Singh, D. Bhattacharya, S. Venkatesh, A. Rai. Molecular characterization of DENV-3 circulating during the post-monsoon period of 2013–14 in Delhi, India. *Virologica Sinica, 30(6): 464-469; December 2015.*
- P. Sharma, V. Mittal, M. Chhabra, P. Singh, D. Bhattacharya, S. Venkatesh, A. Rai. Continued circulation of DENV-2 (genotype IV) in Delhi, India. *British Microbiology Research Journal, 11(3): 1-8; 2016.*

4.7 Department of Parasitic Diseases

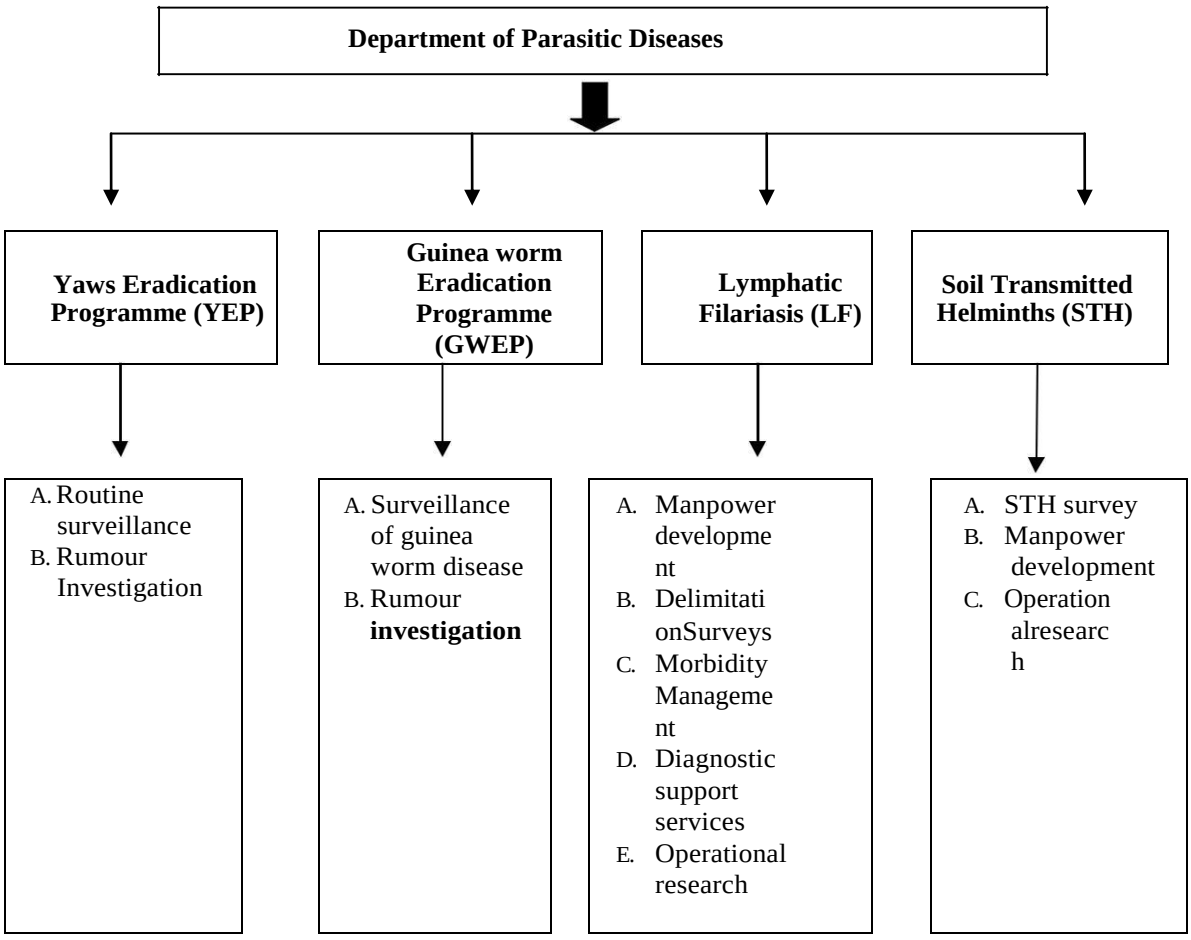
Dr. S K Jain
Addl. Director & Head
Dr. Vinay Garg,
Deputy Director
Dr Sandip S Jogdand
Assistant Director

The Branches under technical supervision of the Department:

1. KozhikodeBranch,NationalCentreforDiseaseControl,Kerala
2. Rajahmundry Branch, National Centre for Disease Control,AndhraPradesh
3. Varanasi Branch, National Centre for Disease Control,UttarPradesh

Broad activities of the Department

The department of Parasitic Diseases is nodal agency for planning, implementation, monitoring and evaluation of Yaws Eradication Programme (YEP) and Guinea Worm Eradication Programme (GWEP) in the country. The department is nodal agency for estimation of STH prevalence at national level. It also undertakes surveys, manpower development and research to support National Vector Born Disease Control Programme (NVBDCP) for lymphatic filariasis elimination. This department also provides teaching materials, standard operating procedures and technical guidance in the relevant public health domains.



Activities related to Yaws

Yaws Eradication Programme (YEP) covers 51 yaws endemic districts in ten states (Andhra Pradesh, Assam, Chhattisgarh, Jharkhand, Gujarat, Maharashtra, Madhya Pradesh, Orissa, Tamil Nadu and Uttar Pradesh).

Strategy for YEP includes:

- Case finding: Active case search, passive surveillance, rumour reporting
- Treatment of cases and contacts
- Manpower development
- IEC activities

As a result of YEP, the number of reported cases has come down from 3571 in 1996 to 46 in 2003. No Yaws case reported from 2004 to till date.

Brief description of activities

Country Report: A report on countrywide status of Yaws Eradication Programme was prepared and submitted to the DGHS as well as WHO to further the efforts at declaration of Yaws as Eradicated from India. The country report included the summary of all YEP activities including sero-suvey, independent appraisals and other important activities in the erstwhile Yaws districts.

As per the recommendations, existing reporting all the erstwhile endemic districts of Yaws has been initiated on IDSP Early Warning Signal (EWS) format to strengthen surveillance mechanism.

Declaration of Yaws Free India

An International Verification Team (IVT) of WHO consisting of International and National experts visited India during 4-17 October, 2015. The IVT divided itself into 5 teams and visited 5 Yaws endemic states. The teams together covered 5 districts, more than 50 health facilities and villages and interviewed the concerned officials and staff responsible for YEP at the state, district, Block, PHC, Sub-Centre and Village levels. It also visited Medical colleges, NGO's and other stakeholder's. At the end of their visit the teams were satisfied and in their interim report stated that there is compelling evidence that India is free of clinical cases of yaws and that yaws transmission has ceased in the country. The IVT strongly recommended to World Health Organization to consider issuing a Certificate of Eradication of Yaws for India.

Activities related to Guinea worm

The department is keeping a watch on reported suspect cases of Guinaeworm disease throughout the country. Monthly reports about surveillance of the disease are continuously reported by 89 endemic districts from states namely Andhra Pradesh (6 districts), Gujarat (13 districts), Karnataka (8 districts), Madhya Pradesh (21 districts), Maharashtra (15 districts), Rajasthan (23 districts) and Tamil Nadu (3 districts) to keep watch over emergence of any new suspected case, if any.

Activities related to Lymphatic Filariasis

Details for morbidity management & night blood smears examined

Sr. No.	Activities undertaken	No. of samples (NBS/Ag/Ab) examined
	Morbidity management	
1	NCDC branch Kozhikode for morbidity management	1173
2	NCDC branch Rajahmundry for morbidity management	292
3	NCDC branch Varanasi for morbidity management	2098
	Diagnostic services (Night Blood smear examination for filaria infection)	
1	Blood samples received from Delhi Hospitals for filarial antigen/Ab test and Night Blood Smears (NBS) were received from Delhi Hospitals & examined	12 NBS samples were examined, none found positive for mf infection. 141 samples were examined for Ag/Ab test, 27 found positive for mf infection.
2	Night blood smears were examined by NCDC branch Kozhikode for filaria infection.	103 NBS tested and none were found positive for mf infection
3	Night blood smears were examined by NCDC branch Rajahmundry for filaria infection.	1095 NBS tested and none smear was found positive for *W.bancroft* infection.
4	Night blood smears were examined by NCDC branch Varanasi filaria infection.	2557 NBS tested and 18 smears were found Positive for *W.bancrofti* infection.
	Cross checking of Night Blood smear for mf infection	
1	Night Blood Smears (NBS) received from various NFCP Units were cross-checked by Rajahmundry branch	404 NBS tested and none slide was found positive for mf infection
2	Night Blood Smears (NBS) received from various NFCP Units were cross-checked by Kozhikode branch	3553 NBS tested and none slide was found positive for mf infection
3	Night Blood Smears (NBS) received from various NFCP Units were cross-checked by Varanasi branch	Nil

Activities related to soil-transmitted helminthiasis (STH) infection:

Soil-transmitted helminthes (STH), namely roundworms, whipworms and hookworms, affect more than 2 billion people worldwide. STH infections have a high public health importance especially in developing countries like India. STHs are considered as one of the health markers for understanding the health and hygiene status of a particular region. The global diseases burden caused by the common STHs is estimated to be about 39 million disability-adjusted life years (DALY). Non-availability of accurate information on the prevalence or burden of disease in the community is a major obstacle to the timely implementation of preventive strategies like World Health Assembly Resolution, 2001 (WHA 54.19) advocating regular treatment of at least 75% of all school-aged children at risk of morbidity for STH infection by 2010. We need to understand prevalence and intensity of STH infections to guide deworming strategies (annual / bi-annual / none) as well as to assess impact of interventional strategies. NCDC has been conducting STH estimation surveys since 1963 using various techniques like Formol ether concentration (FEC), direct smear and Kato-Katz. Recent surveys have been conducted using WHO approved Kato-Katz technique. Previous surveys by NCDC had indicated that the overall STH prevalence varied widely from 0% to 83.2% in general (0.9% - 41.9% in urban areas; 0% to 41.9% in rural areas; 3.5% to 36.5% in hilly areas, 24.4% to 83.2% in coastal areas; 0.5 to 24.7% in tribal areas and 5.6% to 32.2% in plains).

With an objective to estimate STH prevalence rates in different regions of the country, NCDC has once again embarked upon a journey to map the disease load in the community. The current surveys have been conducted among school going children in different states in the country. NCDC has been identified by the Ministry of Health & Family Welfare as Nodal agency for control of Soil transmitted Helminthiasis in the country. NCDC now shall, along with partners, complete the epidemiological analysis to assess state wise prevalence and to monitor changes in prevalence over time.

The summary of the prevalence of STH infection in school going children (age-group 9-11 years) of different states that has been surveyed during the time period from April, 2015 to March, 2016 has been mentioned below:

S.No	State	Number of sentinel sites surveyed	Prevalence of STH (%)
1	Gujarat	8	32
2	Jharkhand	7	43
3	Kerala	12	44
4	Karnataka	16	49
5	Maharashtra	15	27
6	Goa	3	42
7	Lakshadweep (1site)**(63 %TT)	2	75
8	Odisha	13	36
9	Daman & Diu	1	56
10	Dadar&Nagar Haveli	1	64

Visits undertaken by officers related to YEP, GWEP and other activities:

Name of the Officer	Place & Purpose of visit	Duration
Dr. S.K. Jain	Ranga Reddy District, Telangana: to assess the bird flu situation, assist and advise the state in instituting public health measure.	15.04.15 to 18.04.15
	The Dangs, Assam: Visit of International Verification Team for Yaws Eradication Programme.	06.10.15 to 13.10.15
	Vadodara & Gandhinagar, Gujarat: to inspect and discuss about the establishment of new Gujarat branches of NCDC.	13.03.16 to 14.03.16
Dr. VinayGarg	Vellore, Tamil Nadu: Short course on Health Research.	14.03.16 to 17.03.16
Dr.Sandeep Jogdand	Gadchiroli, Maharashtra: Visit of International Verification Team for Yaws Eradication Programme.	06.10.15 to 13.10.15

4.8 Centre for Medical Entomology & Vector Management

Dr L J Kanhekar
Joint Director & Head
Dr Roop Kumar
Joint Director
Dr T.G. Thomas
Joint Director

Centre for Medical Entomology and Vector Management is reorganized to develop it as a National Centre par excellence for undertaking research, providing technical support and to develop trained manpower in the field of vector-borne diseases and their control. The centre provides technical guidance, support and advice to various states and organizations on outbreak investigations and entomological surveillance of vector-borne diseases and their control.

Major achievements

- Approval of MPH, Medical Entomology & P.G Diploma has been approved from Ministry of Health & Family Welfare and submitted to Guru Govind Singh Indraprastha University for affiliation.
- Outbreak investigation of mysterious fever was carried out at Bouhara village Bheetar Gaon PHC, Kanpur, Dehat District, U.P. and outbreak of Malaria in Punhanna CHC Mewat District, Haryana
- Aedes surveillance in international Airports/ seaports was also carried out in Goa, Amritsar, Kandla and Vishakapatnam and communicated to International Health, MOHF&WF.

Other Important Activities

- Division is source of knowledge for Medical and paramedical students from different parts of the country during their visit to NCDC.
- Division also provides entomological samples i.e. of mosquitoes, ticks, mites etc. to various institutions.

Capacity Building:

- Organized seminar on Dengue and Chikungunya on 1.06.2015 to create awareness for prevention and control of dengue. It was attended by all faculties and staffs of NCDC & NVBDCP.
- **Entomology training for EIS Officers** was also organized on Entomological aspects related to vector borne diseases from 12th to 14th August 2015.

EIS Officers-Field visit in Jharoda Dairy, Delhi

JE vector breeding habitats

- Demonstration of method of collection of immatures from rice field

Tick collection

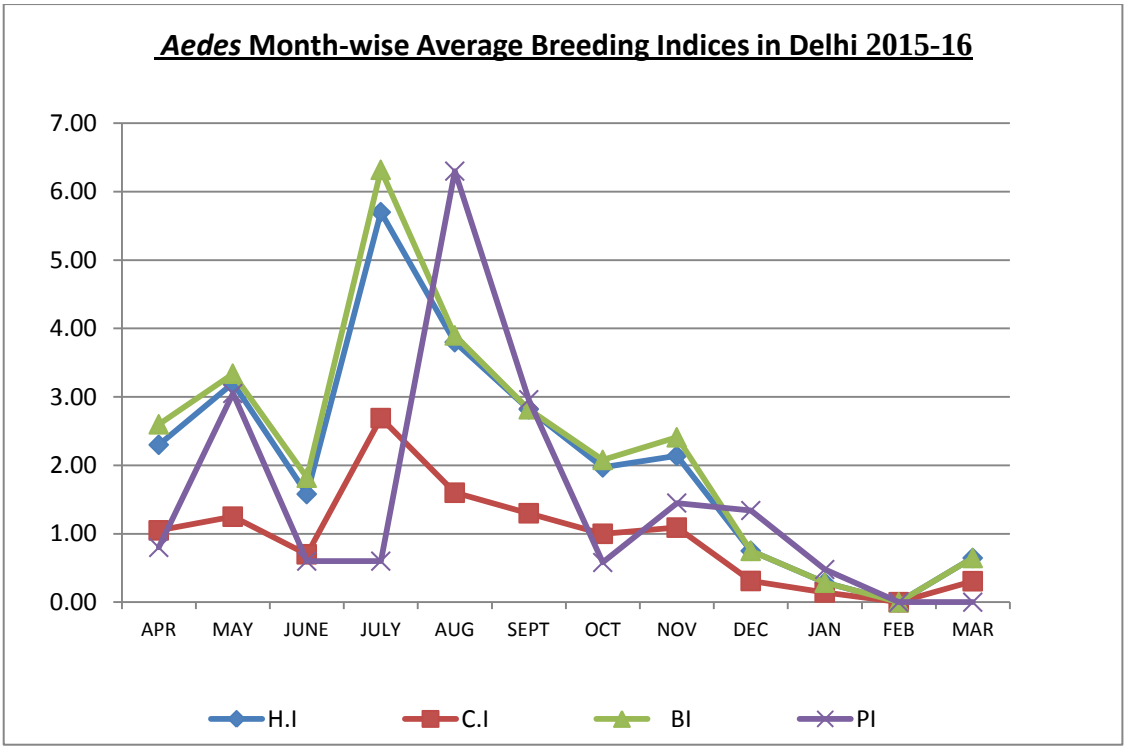
- Demonstration of Tick collection from animal in the field

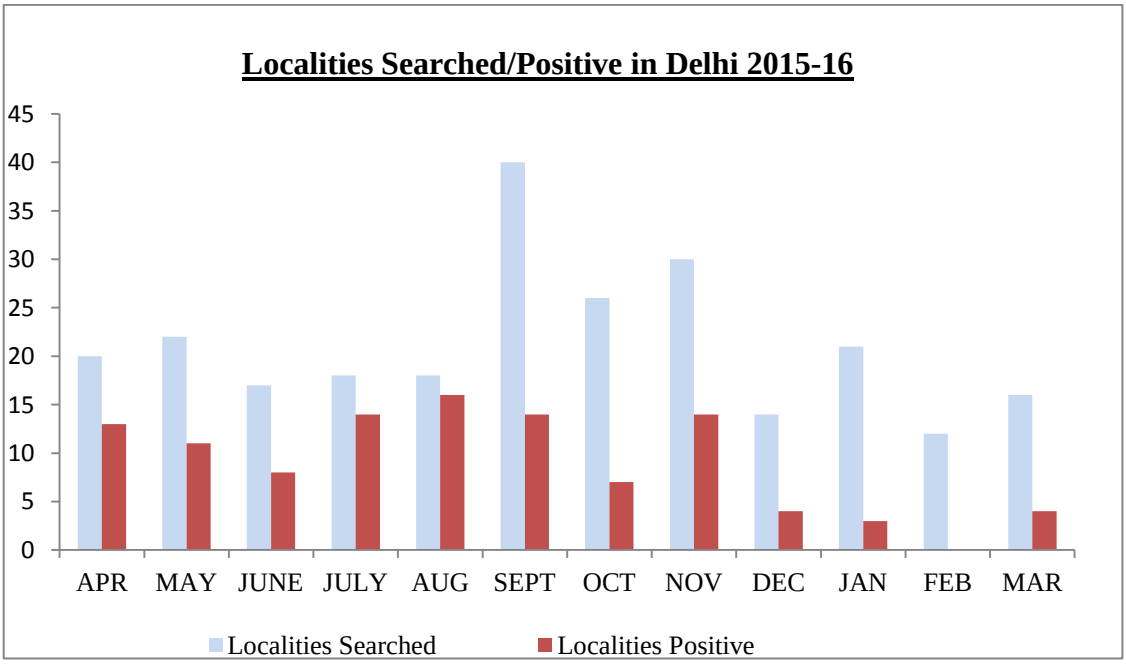
- Participants and Faculties of CME &VM

- Training has been conducted on Dengue Surveillance for sanitation officer, sanitary inspectors, Health Inspector of Central Govt. Hospital, Delhi on 24/08/2015.
- Training for Entomologists and VBD consultants on "Public Health Entomology" was conducted from 23.02.2016 to 22.03.2016 and was participated by 19 Entomologists/VBD consultants

Ongoing Research Projects

- "**Development of a protocol for entomological surveillance and for detection of early warning signals for Dengue outbreak in Delhi"**. Total of **254** localities searched for *Aedes* breeding total 108 localities were found positive during April-2015 to March-2016. Maximum breeding indices was noted during the month of July and August. Weekly reports for positive breeding sites are communicated regularly to MCD and NVBDCP for necessary control measures. Plastic storage containers contributed maximum breeding of immature as well as for pupae.





- *Aedes* survey was also conducted in some NCR regions and reports were communicated regularly to concerned CMO's and NVBDCP for necessary action.

- **Dengue Virus Detection in vector mosquitoes by ELISA method:** All the larvae samples collected during field visits were reared in the laboratory for adult emergence and then identified species-wise and sex-wise for each locality. The pools thus formed were tested for dengue virus using ELISA method. During the period approximately 173 pools of *Aedes* mosquitoes from Delhi have been tested and for virus detection and results have been communicated to concerned authorities.

Abstract Published and presented in the conferences:

- Dr. Roop Kumari, Priya singh, Sunita Patel, RS Sharma, S. Venkatesh. "Seasonal preference of Larvae and pupae of *Aedes aegypti* in different containers in Delhi, India and its significance. Abstract published in a conference of Entomology, Patiala University from Oct 29-30, 2015.

Visit of Hon'ble Health Minister to NCDC exhibition at International Trade Fair, New Delhi

Demonstration of use of Larvivorous fishes

Health exhibition of NCDC was inaugurated by Hon'ble Union Health Minister Shri J. P. Nadda. Larvae feeding by Gambusia fish were shown and vectors of dengue, CCHF and J.E were also displayed. It has been appreciated by him.

National Reference Entomological Museum

Demonstration of arthropods of medical importance to the trainees of various short term and long term training courses undertaken at NCDC, Delhi. Total specimens-108757, Mosquito specimens-89464 (Ano.- 52,295, Aedes 7718,Culex-15137 others, 14314). Oldest collection- Simulium indicum, 1902, Wales, UK, Aedes cantator – 1903.

List of Museum Visitors

- Dr. Tom Freiden, Director, CDC Atlanta
- Mr. Richard Verma, US Ambassador
- Dr. (Prof) Jagdish Prasad, DG, MOH &FW
- Dr. N.S Dharamshaktu, Addl. DG, MOH &FW
- Dr. B.D. Athani, Special DGHS, MOH &FW
- Dr. Rajpal Singh Yadav, WHO, HQ, Geneva
- Dr. Churian Verghese, WHO Geneva
- Dr. Fikru Tullu, WHO, India
- Dr. Graham Mathews, Imperial College, London
- Prof. Steve Lindsay , Durham University

Visit of Mr. Richard Varma, US Ambassador and Dr. Tom Freiden, Director, CDC

4.9 Division of Malariology & Coordination

Dr A. K. Bansal
Additional Director & Head
Mr Harish Chander Gahlot
Asstt Research Officer

Broad objectives/ activities

- To provide technical support for outbreak investigations, conduct operational research and trained manpower development in the field of malarial diseases and their control in the country.
- Diagnostic support is provided to state Governments for laboratory diagnosis of malaria infection.
- Coordination of visits of dignitaries /delegations to NCDC.
- Coordination of the short term orientation/training visits of under and post graduate medical, nursing and homeopathic students.

Activities undertaken

- A total of 1750 (From 1st April, 2015 to 31st March, 2016) blood slides were examined and 92 were found positive (Pv -86, Pf -05 and Pm -01). 1072 slides were received from Government hospitals and 655 from private hospitals. 33 slides were received from NCR (Ghaziabad, Sonipat, Bagpat, Uttarpradesh, Haryana and Faridabad)

Table1. Blood Smear Examined in Malaria Clinic from Delhi NCR in Delhi 2015-16

Month	B/S Examined	Positive Cases	Pv	Pf	Pm	Delhi	NCR
April, 2015	49	01	01	0	0	Go30P18	UP1
May, 2015	47	01	01	0	0	Go28P16	UP3
June, 2015	68	06	06	0	0	Go45P21	UP1Oth1
July, 2015	156	07	07	0	0	Go114P40	UP2
Aug, 2015	289	12	12	0	0	Go140P139	HR4UP5Oth1
Sept, 2015	524	38	36	01	01	Go230P283	UP 11
Oct, 2015	262	23	19	04	0	Go193P66	HR3
Nov, 2015	118	02	02	0	0	Go93P25	-
Dec, 2015	74	01	01	0	0	Go63P11	-
Jan, 2016	41	0	0	0	0	Go35P6	-
Feb, 2016	45	0	0	0	0	Go34P20	HR1
March, 2016	77	01	01	0	0	Go67P10	-
Total	**1750**	**92**	**86**	**05**	**01**	**Go1072P655**	**UP23HR8Oth2**

Go-Government, P-Private, S-Sonepat, G-Ghaziabad, HR-Haryana, UP-Uttar Pradesh

- The division extends regular short term orientation/ training to the visiting under and post graduate medical, nursing and homeopathic students. A total of 1052 students from different institutes viz: Hospitals, Veterinary Army officers, MBBS Students of Army, Medical officers of AFMC, Senior Medical officers of BSF , MD (CHA) & DHA Final Year students, M.Phil, MPH and Ph.D students, Nursing students from various Nursing Institutions, Post Graduate students of Community medicine of Medical Colleges, , Trainees of 'diploma in health promotion Education" & PG- DCHC, CGHS & CHS Officers, BHMS students and DNB were given short term training as follows :

Table2. Short term orientation training during 2015-2016

Date	No. of Students	Category of participants	Name of Institute
23.04.15	18	CMOs	BSF, RK puram, New Delhi – 110066
07.09.15	7	PG Trainee Medical Officers	AFMC, Pune
10.09.15	19	B.Sc. Nursing Students	Amity College of Nursing, Amity University, Gurgaon, Haryana
16.09.15	8	MD (CHA) / DHA students	NIHFW, Munirka, New Delhi
18.09.15	67	B.Sc. Nursing Students	Raj Kumari Amrit Kaur College of Nursing, Lajpat Nagar, Delhi
21.09.15	24	M.Sc. Nursing Students	-do-
22-24 Sept, 15	29	3rd yr. MD (Community Medicine)	LHMC, Maulana Azad Medical College, UCMS and Vardhman Mahavir Medical College, Delhi
04.11.15	33	B.Sc. Nursing Students	Fortis Institute of Nursing, Bhandup (W), Mumbai
02.12.15	36	BHMS Students	Dr. Padiar Memorial Homeopathic Medical College, Ernakulum (Dist.), Kerala
08 & 09 Dec, 15	113	P.C.B.Sc. and B.Sc. Nursing Students	Laxmi Memorial College of Nursing, Mangalore
14 & 15 Dec, 15	54	BHMS Students	Nehru Homeopathic Medical College & Hospital, Defense Colony, Delhi
17.12.15	46	B.Sc. Nursing Students	Nitte Usha Institute of Nursing Sciences, Deralakatte, Karnataka
22.01.16	41	B.Sc. Students	Bombay Hospital College of Nursing Bombay Hospital
27 & 28 Jan,16	6	Senior veterinary officers	RVC Centre and College, Meerut Cantt
29.01.16	33	B.Sc. Nursing Students	St. Ignitus Institue of Health Sciences, Prabhat Nagar HONAVAR, Karnataka
04.0216	85	B.Sc. Nursing Students	Father Muller College of Nursing, Kanakanady, Mangalore - 575002
11.02.16	54	B.Sc. and P.B.B.Sc. Nursing Students	Yenepoya Nursing College, University Road, Deralakatte, Mangalore - 575018
12.02.16	76	P.B.B.Sc. and B.Sc. Nursing Students	Athena College of Nursing, Falnier Road, Mangaluru - 575001
17.02.16	24	B.Sc. Nursing Students	Vidyarathna College of Nursing, City Hospiatl Campus, Vidyaranya Marg, Udupi - 576101
18.02.16	28	Dip in Health Promotion Education & PG Dip. in Community Health Care	Family Welfare Training and Research Centre, Mumbai
19.02.16	41	Basic B.Sc. and P.B. B.Sc. Nursing Students	MGM Mother Teresa College of Nursing, Aurangabad
22.02.16	25	B.Sc. Nursing Students	Dr. M. V. Shetty College of Nursing, Vidyanagar, Mangalore - 575013
24.02.16	14	B.Sc. Nursing Students	Tejasvini Nursing Institute, Mangalore
25.02.16	49	B.Sc. Nursing Students	Shri J.G. Co-operative Hospital Society's College of Nursing
01.03.16	9	M.Sc. Nursing Students	Vivekananda College of Nursing, Ramakrishna Mission Sevashram, Vivekananda Puram, Lucknow – 226 007
02.03.16	29	B.Sc. Nursing Students	Late Ratibhai Prabhudas Patel Nursing College, Ode – 388 210, Ta. & Dist. Anand (Gujarat)
03.03.16	26	B.Sc. Nursing Students	Shree Devi College of Nursing, Maina Towers, Ballalbagh, Mangalore - 575003
04.03.16	22	B.Sc. Nursing Students	CMC College of Nursing, Mantripukhri P.O., Koirengei, Imphal East, Manipur - 795002
10.03.16	36	B.V.Sc. and A.H. Students	College of Veterinary and Animal Sciences, Kerala Veterinary and animal Sciences University, Pookode, Lakkidi P.O. – 673576, Wayanad, Kerala

4.10 Centre for Non-Communicable Diseases

Dr Sonia Gupta
Addl Director & Head
Dr Malti Gautam
Joint Director
Dr Sanjay Kumar
Joint Director
Dr Rinku sharma
Deputy Director
Dr Hema Gogia
Dy Assistant Director
Mr. R. S. Rautela
Asstt Research Officer

The Centre was established in Feb 2015 with the following objectives

- Monitoring & Evaluation of the NPCDCS programme
- Development of training plan & curriculum for all category of staff under NPCDCS by partnering with professional bodies
- Development of surveillance mechanism & tools in coordination with national institutes, i.e., ICMR
- Advocacy with policy makers and NPCDCS programme managers

Activities

Internal review of NPCDCS in the initial 100 districts of programme implementation (2010-11), Nov 2015 -Feb 2016)

- To review hypertension and diabetes service delivery in facilities at district and below-district levels.
- To explore the strengths and weaknesses of the programme implementation, to identify areas for improvement.
- To develop standardized monitoring and evaluation tool for review of hypertension and diabetes services provided under NPCDCS in the districts.
- Districts visited for review- **Ambala, Darjeeling, Rajkot, Hoshiarpur, Tuticorin, Bokaro, Dibrugarh, Imphal East, Shimoga, and Jaisalmer**

Screening for NCDs and their risk factors among faculty and staff of NCDC and their counselling on adopting healthy lifestyle.

To assess the NCD risk factors among the officers and officials of NCDC a screening programme was organized by Centre for NCD, NCDC in September 2015. Analysis of data from 214 screened individuals showed 78% were male and 61% do not have optimal systolic blood pressure (SBP<120 mm Hg) ; 36% do not have optimal diastolic blood pressure (DBP<80 mm Hg); and 74 % of screened individuals were overweight (BMI>22.9 as recommended by WHO for Indians). More of male (69%) do not have optimal Systolic blood pressure and more of female (82%) were overweight. Optimal blood pressure was assessed because as per WHO report on Hypertension: a silent killer, a global public health crisis, raised BP >115 mm Hg accounts for 45% of all heart diseases and 51% of all stroke related death.

Celebration of International Days of Public Health Importance

World No Tobacco Day

International Day of Yoga

Guest speakers ***Dr. Ramesh Bijlani***, Retd. Prof & Head, Dept. of Physiology, AIIMS spoke on "Role of yoga in promotion of Health & prevention and management of chronic diseases ***Shri Yogi Udai***, senior faculty, Morarji Desai National Institute of Yoga.spoke on "Practicing yoga in daily life with demonstration of Asanas". .

World heart day

. A technical session on theme **Heart Healthy Environment for everyone and everywhere.**. A scientific talk on "*Heart Healthy Environment & choices at Workplace & Home for prevention & Control of Cardiovascular diseases*" ; " *Healthy Eating for Healthy Heart*"; and " *Dietary Guidelines For Healthy Heart*" were delivered by Professor Sandeep bansal, Head Dept. of Cardiology, VMMC & Safdarjung Hospital; Dr Kalyani Singh Associate professor, Lady Irwin College; and Mrs. Swapna Chaturvedi, senior Dietician AIIMS, Delhi respectively.

Participated in important meetings

- Technical meeting on "Strengthening Prevention and Management of Cardiovascular Disease" By SEARO
- Revision of NPCDCS reporting Formats at Dte.GHS
- Expert Group Meeting of RF/RHD Intervention at Dte.GHS

4.11 Centre for Environment & Occupational Health

Dr. C. S. Aggarwal
Addl Director & Head
Dr. Jai Karan
Deputy Director
Dr. Shikha Vardhan
Assistant Director
Dr. Pranil M Kamble
Assistant Director

The Centre for Environmental & Occupational Health (CEOH) is a new department at NCDC, which has been established in the month of February 2015 with the following objectives:

- Enhance health-sector leadership for creating a healthier environment through intensifying primary prevention aimed at tackling the root causes of environmental & occupational threats to health, and influencing public policies in all sectors to respond to emerging & re-emerging consequences of development
- Provide technical assistance and support to Central and State governments for strengthening environmental & occupational health policy-making, planning of preventive interventions, service delivery and surveillance
- Identify, assess & promote actions that reduce the burden of diseases associated with environmental pollution and occupational hazards
- Make evidence-based assessments, and formulate & update norms & guidance on major environmental & occupational hazards to health
- Support development of technical & operational guidelines & manuals, building capacity, for preparedness & timely response to minimize health consequences following disasters
- Plan & conduct operational research on critical areas to support programme activities

Activities *undertaken*

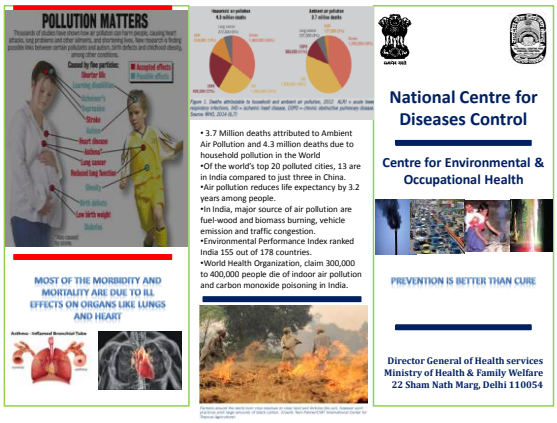
- CEOH division coordinated the Meetings at Dte.GHS, Nirman Bhawan, Delhi, of the working group constituted by Central Pollution Control Board (CPCB) to develop the methodology for reporting/ creation of data base and information system for health impact of Critically Polluted areas

- CEOH division of NCDC conducted meetings of National Expert Group on Climate Change and Health (NEGCCH) which was constituted by DteGHS on 2nd July 2015 under chairmanship of Dr V.M.Katoch. The Expert group had members from ICMR, NVBDCP, MoHFW, PHFI, NDMA, IARI, TERI, WHO etc to draft the 'Health Mission' under National Action Plan on Climate Change.

- For Comprehensive Environmental Pollution Index (CEPI) a core group was constituted under the chairmanship of Director NCDC to develop the methodology for development of guidelines related to health impact studies in critically polluted industrial clusters. Three meetings have been conducted in this regard on 8th Sep 2015, 24th Sep 2015 and 7th Jan 2016.

Other Activities:

- At India International Trade Fair (IITF2015), for public awareness against Air pollution and its impact on human health, informative leaflets were prepared. These leaflets depict type of pollution, source of pollution, impact on health and measures to reduce pollution were summarized and distributed.



- CEOH division conducted a three days Training Workshop for Public Health Specialists in CHS cadre on theme "Emerging Public Health Challenges in India: Perspectives & Issues" from 20th to 22nd January, 2016 at National Centre for Diseases Control.

Outbreak investigations carried out by the Division

- Head of the Department of this Centre has lead Central Team for investigation of an outbreak of avian influenza in Alappuzha district of Kerala state for the, outbreak of H1N1 Influenza in Karnataka state during February 2015, and outbreak of avian influenza in Amethi district, Uttar Pradesh during March 2015.

- Both Assistant Directors of the CEOH were involved in development of technical, laboratory, clinical and toxicological guidelines for investigating Acute Encephalopathy Syndrome (AES) ìn Muzaffarpur (Bihar) and Malda (West Bengal). They conducted orientation training of medical officers at these places followed by monitoring and management of outbreak of AES cases.

4.12 Statistical Monitoring and Evaluation Cell

Mrs. Shobha Marwah
Addl. Director & Head
Dr. Subhra Sarker
Jt. Director
Mr. Ajey Pandey
Sr. Statistical Officer

Main activities

The Statistical Monitoring and Evaluation Cellprovideprofessional statistical support to the various Divisions of NCDC. The activities carried out by the Division are broadly categorized as under:

- Participation in teaching and training of Statistics to the participants of various courses organized by NCDC.
- Provide statistical support to all Divisions in planning research studies and interpretation of data.
- Preparation of weekly reports on Cholera and H1N1 Cases tested by Microbiology Division.
- Conducting Training programmeson Biostatistics including computer training for NCDC officers/staff including those of officers/staff of NCDC branches.
- Providing Administrative support for conduct of 2 year MPH (FE) programme.

Other activities

As per the recommendation of National Health Policy, 2002 for reducing the shortage of expertise in the areas of Public Health and stressing the need of adequate availability of personnel with specialization in the 'public health' and 'family medicine' disciplines, since 2005NCDC is offering a 2 yearMaster in Public Health (MPH (FE)) course inaffiliation with GGSIPU, Delhi to the candidates possessing MBBS degree. Total annual intake for the course is of 20 seats.The number of students passed out in different years is as under:

Table: Year –wise total number of Student passed out in MPH (FE)

S. No.	Batch session	No. students passed
1.	2005-07	20
2.	2006-08	19
3.	2007-09 *	8
4.	2008-10 #	9
5.	2009-11	13
6.	2010-12	14
7.	2011-13	6
8.	2012-14	6
9.	2013-15	4
* Total seat intake was revised to 10 from 20 # Total seat intake was revised to 15 from 10		

SM & E cell with Academic Cell was involved in the following activities related to MPH (FE):

- Coordination with GGSIPU over Admission and counselling for **MPH(FE) Batch 2015.**
- Actions for advertisement of admission notice including processing for admission of WHO candidates for **MPH (FE) Batch 2015.**
- Preparation of academic schedule and Draft date sheet for I, II, III and IV semesters examinations keeping in view the University rules/regulations and accordingly conducting internal and NUES examination.
- Collection of information from all Centers/ Divisions & compilation of the same in the university's prescribed formats and making arrangements for the visit of the NCDC by the University Experts Team for Affiliation/Academic Audit by the University.
- Processing of the applications of MPH (FE) pass outs from NCDC and with two years of experience of Epidemiology work at district health facilities/health facilities/ hospitals for appearing for final examination of DNB (Epidemiology).
- Conduct of final end term Practical examinations of each semester and Coordination with University for evaluation of theory papers for each Semester.
- Collection of mark sheets/provisional degree/ final degree etc., issuing the same to students and keeping records of them.
- Providing support for Adhar Linked Biometrics Attendance System (BAS) in the capacity of Nodal Officer designated for (BAS)

4.13 Central Library

Dr Charu Prakash
Addl. Director & Officer In-charge
Smt. Shashi Talwar
Assistant Library & Information Officer

- NCDC is the prestigious library in the country, which has got archival literature in the field of Malaria and other vector borne diseases prevalent in the country. One Archival book on Entomology published as early as 1745 is available in the library.
- The library has literature on all the vector-borne diseases, Bacteriology, Parasitology, Microbiology, Infectious Diseases, Mycology, Biochemistry and Immunology.
- The NCDC library has a total of 36969 books and bound journals, 121 Thesis/ Dissertation.
- Library provides internet facility to students, and the researchers in the institute.
- Books and Journals are issued to members on demand following rules and regulations.
- Readers from other institutions/organizations are allowed to only for consultation.
- The library subscribes newspapers and Magazines, both in English and Hindi. Daily Health news clippings are scanned from the selected English and Hindi Newspapers and Magazines. The news items on subjects related to health and diseases are retrieved and provided for information to Director.
- Books on Administration, Court case and RTI were also procured on demand.
- Regularly provides literature (CD-Alert, Laboratory Manuals) on various subjects of interest to the research workers and participants attending various courses at the Institute.
- Library provides manuals and other materials published by NCDC/NVBDCP.
- Photocopying Services to the readers and the researchers on request.
- Works of Accessioning, Classification, Cataloguing and filing of Cataloguing cards are done.
- Reference articles are retrieved from JCCC-ERMED, Consortium from NML on request from Members.
- Daily shelving work for arranging of books, journals, Newspapers /Magazines/bound volumes/Non serial publications/WHO publication(about 40-50 books).
- Daily counter work which includes issue/return of books.
- Prepare Bay guides for readers help & prepare Daily Weather Record.
- Annual Reports are received from other organizations / Institutes and kept in record.
- Shifting & rearrangement of library books/journals from time to time.

5.1 NCDC, Patna Branch

Dr. Ram Singh
Joint Director
Dr. Ravi Shankar Singh
Senior Medical Officer

Broad objectives

- To carry out detailed entomological studies on the presence, distribution, population dynamics of the Kala-azar vector, dynamics of transmission and vector control measures thereof.
- To undertake detailed parasitological surveys to assess the magnitude of problem in the various affected districts.
- To recommend suitable drug therapy and vector control strategy.
- To develop trained man-power for the effective surveillance and control Kala-azar.

Research Activities

1. (a) Study on Susceptibility status of sandflies P. argentipes to insecticides organochlorine and synthetic pyrethroid with WHO test kit.

The insecticidal susceptibility test was carried out in 5 districts of Bihar viz-Patna, Samastipur, Muzaffarpur, Siwan and Gopalganj. From these districts, 6 villages each from Samastipur, Muzaffarpur and Gopalganj and 9 villages from Siwan and 5 villages from Patna studied for insecticide DDT and deltamethrin. The insecticide alpha-cypermethrin, the test were carried out in 11 villages of Patna and Samastipur districts of Bihar.

Collection of sandflies- The adults sandflies were collected from human dwellings and adjacent cattleshed, during early morning hours with the help of torch light and mouth aspirator tube. The collected sandflies were brought to laboratory or the nearby station for the testing with proper care. Then all collected sandflies were released in a cage for one hour to exclude the natural death in transportation.

Test procedure- The test was carried out as per WHO standard procedures for testing the insecticide susceptibility. A piece of white paper was inserted in each holding tube and a clip wire put for keeping the paper in position with the wall. A batch of 15 - 25 blood fed and active half gravid female sand flies were put in each holding tube with the help of aspirator tube through filling hole in sliding unit. All the holding tubes were kept in upright/vertical position for 1hour and damaged sand flies if any was removed. The exposure tube (red dot) were put with insecticide impregnated papers and one control exposure impregnated with oil. The insecticide impregnated papers were kept in position with copper clip. All sand flies in holding tube were transferred in exposure tube with the help of sliding unit and kept for one hour exposure, after that all the sand flies were transferred to the holding tube. Glucose soaked cotton pad was put on top of holding tube. The mortality was counted after 24 hours if mortality was from 5 - 20% it was corrected by applying Abbott's formula. :

$$\frac{\text{\% test mortality - \% Control mortality}}{\text{100- \% control mortality}} \text{X100}$$

The temperature and relative humidity were maintained at 25 ± 2˚C and 75 - 80%, respectively, in the laboratory. The 3 - 4 replicates were tested. All the sandflies dead or alive were identified by Lewis identification keys. A village in Patna district, where no DDT spraying was carried out for 15 years, was included as a control village for the study.

The results were interpreted as per WHO recommendations on susceptibility status, mortality between 98 - 100% indicated susceptible, 80-97% tolerance and <80% mortality suggest resistance in given population.

Insecticides- DDT 4%, deltamethrin 0.05%, alpha-cypermethrin 0.05%. The insecticides impregnated papers were procured from WHO collaborator centre Malaysia.

RESULTS

In total 2,599 sandflies *P. argentipes* were exposed to DDT and 1269 to control paper (no insecticide) while 1963 were exposed to deltamethrin paper with 986 tested in the control. The result revealed that in 31 (96.9%) villages tested *P. argentipes* had developed resistance. One village (3.1%) had developed tolerance to 4% DDT at one hour exposure. Mortality ranged from 25-71.3% in resistant villages and 82% in the tolerant population **Table-1.** High variability of mortality was found as 44.1±13.5, 25-82%, CV =30.7 in DDT tested villages. The synthetic pyrethroid deltamethrin (0.05%) test showed that 96.9% of villages were susceptible and 1 village had developed tolerance to this insecticide **Table-2.** The mortality recorded was between 97-100%. The variability in mortality was very low (99.7±0.73, 96.8-100%, CV=0.7) in synthetic pyrethroid deltamethrin. It is of great concern that in India the continuous usage of DDT in the sandfly vector control programme has resulted in the development of resistance. The health authorities must take note of this issue and formulating control measures for VL accordingly.

The synthetic pyrethroid alpha-cypermethrin 0.05% tested in 11 villages of Patna and Samastipur. The vector sandflies *P. argentipes* has developed tolerance to alpha-cypremethrin **Table 3.**

The laboratory breed F1 progeny sandflies *P. argentipes* of Patna district was also tested and found resistance to DDT 4% .The mortality ranges from 32-35% only **Table-4.**

For the comparison, the area in Patna district (villages- Hulashchak and Akopur) which were not having any history of DDT spray last 15 years except one round in 1996 only. These two villages were showing 100% mortality upto 2007, now *P. argentipes* developed resistance to DDT 4% in these villages.

Conclusion:

The vector sandflies *P. argentipes* has developed resistant against diagnostic dose of DDT 4% in all tested villages except in one village in Patna showed tolerant. The synthetic pyrethroid deltamethrin 0.05% found susceptible but also shown tolerance in only one village. The other synthetic pyrethroid alpha-cypermethrin also showed tolerance in tested villages. Hence in programme these synthetic pyrethroids may be used very cautiously.

The development of resistance in a population depends on largely resistance conferring genes in the population relatively high frequency without exposure to insecticides. The such type of genes may be responsible for development of resistance in sandflies population. Other factor mobility of insect in the field, the sandflies do not disperse effectively in other area and found in same area for years together. In these non IRS villages, the nearby villages of these area are being sprayed every year, hardly having 1 km distance. These area develop resistance very late as compare to other area of Samastipur & Muzaffarpur, Gopalganj and Siwan. The resistance in sandflies population reported in maximum area during 2004 - 2007 but these non IRS areas were 100% susceptible to DDT up to 2007.

Table-1 : Susceptibility status of *P. argentipes* against insecticide DDT 4%

District	PHC	Village	Insecticide Control Status							
			NE	ND	%M	NE	ND	%M	CM	
Patna	Phulwarisarif	Saraiya	54	18	33	20	1	5	30	R
		HulashChak*	60	25	41.7	20	0	0	42	R
		Saraiya	50	23	46	18	0	0	46	R
		HulashChak*	45	17	37.8	20	0	0	38	R
		HulashChak*	60	23	38.3	20	0	0	38	R
		HulashChak*	60	21	35	40	0	0	35	R
		Akopur	80	27	33.7	40	0	0	34	R
	Naubatpur	Dariyapur	80	57	71.3	40	0	0	71	R
		Azama	80	66	82	40	0	0	82	T

Muzaffarpur	Kurhni	Jagdishpurkamtaul	80	37	46.3	30	0	0	46	R
		Malkani	80	36	45	40	1	2.5	45	R
	Paroo	Parookasba	80	23	28.8	31	0	0	29	R
		Phularkasab	80	28	35	30	2	6.7	30	R
	Sahebganj	Rampur	80	48	60	40	0	0	48	R
		Newa Nagar	70	32	45.7	30	1	3.3	46	R
Samastipur	Sarairanjan	Rasalpur	80	23	28.8	40	2	5	29	R
		Raypur	80	19	23.8	40	0	0	24	R
	Morwa	Bandhey	80	22	27.5	40	0	0	28	R
	Pattory	Shahpur Undi	80	21	26.3	30	0	0	26	R
	Sarairanjan	Bathuabuzurg	80	24	30	30	1	3.3	30	R
	Patory	Jodpura	80	20	25	30	0	0	25	R
Gopalganj	Baikunthpur	Shankorpur	80	36	45	40	1	2.5	45	R
		Rewatith	60	32	53.3	40	0	0	53	R
	Barauli	Rampur	70	29	41.4	40	0	0	41	R
		Baturdew	80	50	62.5	40	2	5	63	R
	Shdhwalia	Kundsupanle	70	34	48.6	40	0	0	49	R
	Kuchaikot	Vijayapur	80	38	47.5	40	0	0	48	R
Siwan	Mairwa	Dharhana	60	35	58.3	40	1	2.5	58	R
		Dhusa	80	45	56.3	40	0	0	56	R
	Badharia	Lauwanpur	80	43	53.8	40	1	2.5	54	R
		Sundarpur	60	29	48.3	40	0	0	48	R
		Titra	80	27	46.3	40	1	2.5	46	R
		kakkarghatta	70	35	50	40	0	0	50	R
		Sishani	70	31	44.3	40	1	2.5	44	R
	Sadar	Sarsar	70	25	35.7	40	0	0	36	R
		Mardapur	70	32	45.7	40	0	0	46	R

Table-2 Susceptibility status of *P. argentipes* against deltamethrin 0.05%

District	**PHC**	**Village**	**Insecticide**			**Control**			**CM**	**Status**
			NE	ND	% M	NE	ND	%M		
Patna	Phulwarisarif	Akopur	80	79	98.8	40	0	0	98.8	S
		Akopur	100	97	97	50	1	2	97	T
		Hulashchak	80	80	100	50	2	4	100	S
		Bhusoladanapur	80	80	100	50	0		100	S
	Naubatpur	Dariyapur	60	60	100	30	0	0	100	S
		Azama	60	60	100	30	0	0	100	S
Muzaffarpur	Kurhni	Jagdishpurkamtaul	60	60	100	30	0	0	100	S
		Malkani	60	59	98.3	30	0	0	98.3	S
	Paroo	Parookasba	60	60	100	30	0	0	100	S
		Phularkasab	60	60	100	30	1	3.3	100	S
	Sahebganj	Rampur	83	83	100	40	0	0	100	S
		Newa nagar	60	60	100	30	0	0	100	S

Samastipur	Sarairanjan	Rasalpur	80	79	98.8	40	0	0	98.8	S
		Raypur	60	60	100	30	2	6.6	100	S
	Morwa	Bandhey	60	60	100	30	0	0	100	S
	Pattory	Shahpur Undi	60	60	100	30	0	0	100	S
	Sarairanjan	Bathuabuzurg	60	59	98.3	30	0	0	98.3	S
	Patory	Jodpura	60	60	100	30	0	0	100	S
Gopalganj	Baikunthpur	Shankorpur	60	60	100	30	0	0	100	S
		Rewatith	60	60	100	30	0	0	100	S
	Barauli	Rampur	60	60	100	30	0	0	100	S
		Baturdew	60	60	100	30	1	3.3	100	S
	Shdhwalia	Kundsupanle	60	60	100	30	0	0	100	S
	Kuchaikot	Vijayapur	60	60	100	30	0	0	100	S
Siwan	Mairwa	Dharhana	60	60	100	30	0	0	100	S
		Dhusa	60	60	100	30	0	0	100	S
	Badharia	Lauwanpur	60	60	100	30	1	3.3	100	S
		Sundarpur	60	60	100	30	0	0	100	S
		Titra	60	60	100	30	0	0	100	S
		kakkarghatta	60	60	100	30	0	0	100	S
		Sishani	60	60	100	30	0	0	100	S
	Sadar	Sarsar	60	60	100	30	0	0	100	S
		Mardapur	60	60	100	30	0	0	100	S

(1.b) Study on baseline susceptibility status of sandflies *P. argentipes* to organochlorine and synthetic pyrethroids

The sandflies were collected from the field and brought to the laboratory and gravid females were kept for egg laying and colony were maintained in the laboratory to obtained fresh sandflies for testing. F1 generation was tested with different insecticides at different exposure time interval as per WHO standard protocol. Based on the mortality observed after 24 hours of test, LT_{50} and LT_{90} values calculated and probit analysis done using Finney 1971 window programme.

The female sandflies 3-5 days old glucose fed, test carried out with DDT 4%, tested sandflies were 779, deltamethrin 0.05% (412), alpha-cypermethrin 0.05% (513), and with lambda-cyhalothrin 0.05% (826).

Result-

The test value of LT_{50} and LT_{90} with their fiducial limit as well as slope of regression line are presented in the **Table- 5 and Graph 1, 2, 3 and 4**. The LT_{50} value for DDT 4% were as 85minutes, deltamethrin 0.05% 11minutes, alpha-cypermethrin 0.05% (31 minutes) and for lambda-cyhalothrin 0.05% (15minutes) were calculated. The lethal time (LT_{90}) value were noted as for DDT 4% (218 minutes), deltamethrin 0.05% (26 minutes), alpha-cypermethrin 0.05% (61 minutes) and lambda-cyhalothrin 0.05% (64 minutes).

Considering the LT_{50} and LT_{90} values recorded, the results revealed that the sandflies population of *P. argentipes* were more susceptible to synthetic pyrethroid deltamethrin followed by alpha-cypermethrin and lambda-cyhalothrin. The LT_{50} and LT_{90} value for sandflies *P. argentipes* population showed highly resistant to DDT as the LT_{90} values was as high as 218 minute to get 90 % population killed.

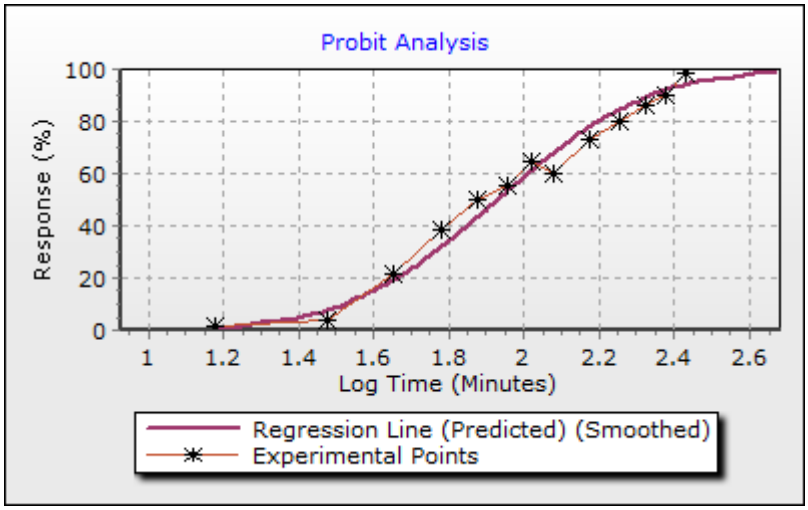
Conclusion- The results of this study could help to provide a clue for implementation of currently used insecticides. Furthermore, a specific guideline is needed for monitoring and evaluation of insecticide susceptibility test against sandflies. Before planning the vector control strategies in Bihar for control of vector population health authorities may consider these results.

Table-5 Susceptibility level of sandflies *P. argentipes* to insecticides

	DDT 4%	Deltamethrin 0.05%	Alpha - cypermethrin 0.05%	Lambda - cyhalothrin 0.05%
No. sandflies	779	472	513	826
LT50	85M(SE=0.64M)	11M(SE=0.64M)	31M(SE=0.86M)	15M(SE=1.7M)
FL	73-97 M	10-13M	29-32M	11-19M
LT90	218M	26M	61M	64M
FL	180-287M	23-29M	56-66M	48-102M
Slope ± SE	3.1311±0.3472	3.6006±0.2918	4.3694±0.2609	2.1626±0.2734

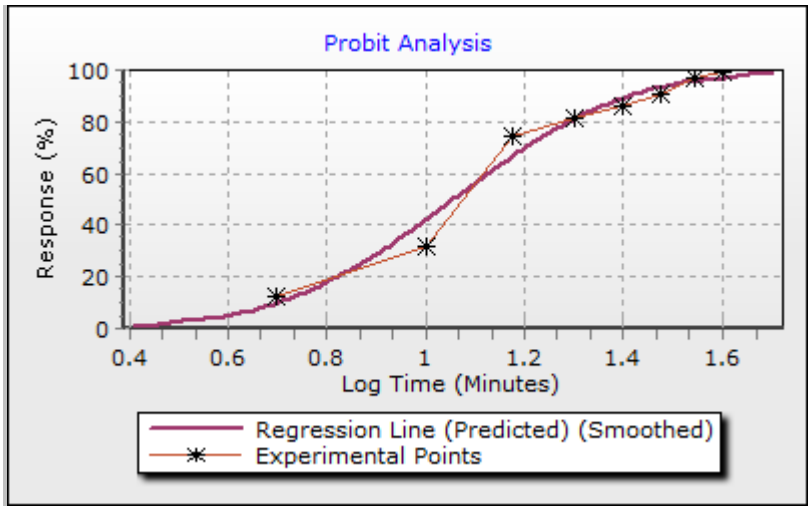
LT= Lethal Time; FL=Fiducial Limit; M=Minute; SE=standard Error

Graph- 1 Time-mortality regression line for DDT 4%



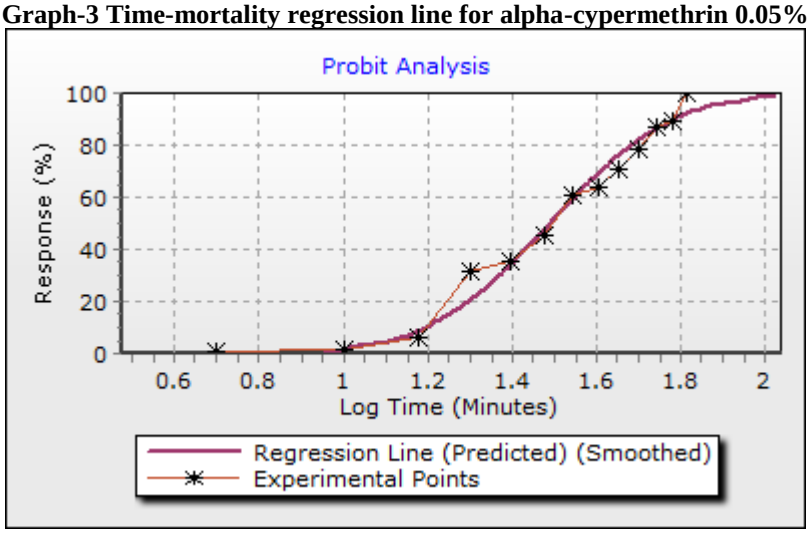
Y= a+ log X (where Y = Probit; a = Intercept; b= Slope; X = Time (min)
a= -1.0402, b= 3.1311, SE of b = 0.3472

Graph-2 Time-mortality regression line for deltamethrin 0.05%



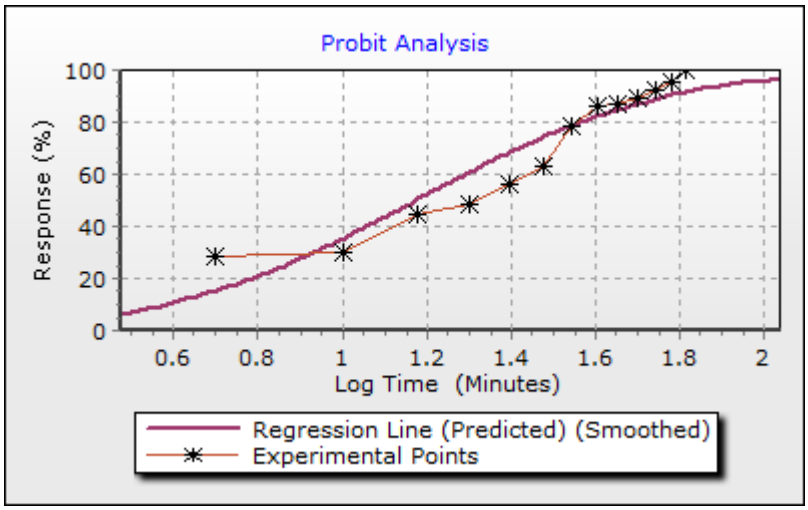
Y= a+ log X (where Y = Probit; a = Intercept; b= Slope; X = Time (min)
a= 1.1979, b= 3.6006, SE of b = 0.2918

Graph-3 Time-mortality regression line for alpha-cypermethrin 0.05%



Y= a+ log X (where Y = Probit; a = Intercept; b= Slope; X = Time (min)
a= 1.5035, b= 4.3694, SE of b = 0.2609

Graph-4 Time-mortality regression line for lambda- cyhalothrin 0.05%



Y= a+ log X (where Y = Probit; a = Intercept; b= Slope; X = Time (min)
a= 2.4583, b= 2.1626, SE of b = 0.2734

2. Studies on seasonal abundance of sandflies *P. argentipes* in Patna and Samastipur districts

The seasonal abundance of sandflies *P. argentipes* vector of visceral leishmaniasis was recorded in 3 villages in district of Patna and 3 villages from Samastipur. The sandflies were collected with the help of torch light and mouth aspirator from human dwellings and cattleshed. The 5 cattleshed and 5 human dwellings were selected for measuring the vector density for a period of one year. The collected sandflies were brought to the laboratory and species were identified by identification of key by Lewis. The Per Man Hour Density of sandflies *P. argentipes* was calculated.

Result-

The monthly PMHD (Per Man Hour Density) of vector sandflies *P. argentipes*, from July 2015 to June 2016 are presented in **Table- 6 & 7 , Graph 5, 6, 7, 8**. It was recorded that the sandflies *P. argentipes* density start build up during rainy season from July and reaches peak in the month of September, October. It was noted that the PMHD was higher in the month of August, September and October in both the districts. The PMHD ranged 38.3 to 94.3, during August to October in villages of Patna and began decline from November to February. The lowest density of *P. argentipe*, 17.8 to 1.5 PMHD in

Hulashchak village, 21.4 to 5.8 PMHD in Akopur and 20 to 0 PMHD in village Bhusoladanpur was recorded from December to February month. Again sandflies density start to buildup in these areas.

The same trend was also recorded in villages of Samastipur district, in village Bhathuabuzurg in month of August it was 31 PMHD, September 50 PMHD, October 29.5 PMHD and in November it was 27.5 PMHD recorded. During winter December to February it was lowest as in December it was 8 PMHD while in January 0.5 and February 1.5 PMHD. In other 2 villages same trend was observed.

Conclusion:

The temperature and humidity play an important role in buildup of vector density of sandflies *P. argentipes* in both the area. During the peak sandflies density period, the Relative Humidity was ranges from 83.6 to 72.3% and minimum temperature 26.2 to 23.2^0 C and a maximum temperature 33.9 to 35.2^0 C was noted. The temperature start decline, the vector density also goes down and reached even nil during January and February, during these period the average minimum temperature was recorded as low as 9.8^0 C though the Relative Humidity was 73 to 85%. The vector control activities may be plan as per highest density period to get good results.

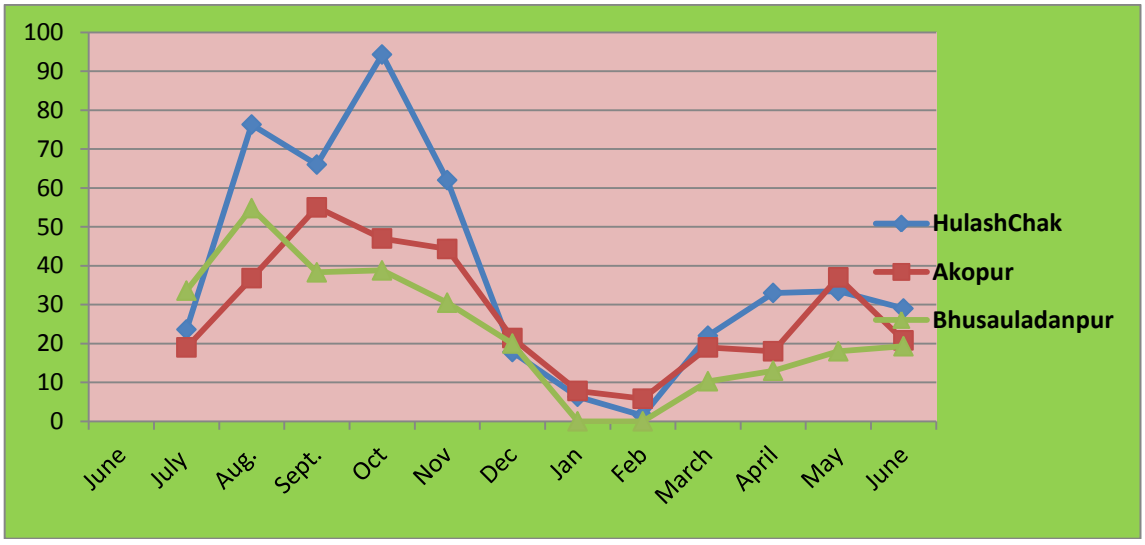
Table-6 Monthly PMHD of vector *P. argentipes* in Patna village

	Per Man Hour Density											
Village	July	Aug.	Sept.	Oct	Nov	Dec	Jan	Feb	March	April	May	June
Hulashchak	23.6	76.3	66	94.3	62	17.8	6.3	1.5	22	33	33.5	29
Akopur	19	36.8	55	47	44.3	21.4	7.8	5.8	19	18	37	20.8
Bhusauladanpur	33.6	54.8	38.3	38.8	30.5	20	0	0	10.3	13	18	19.3

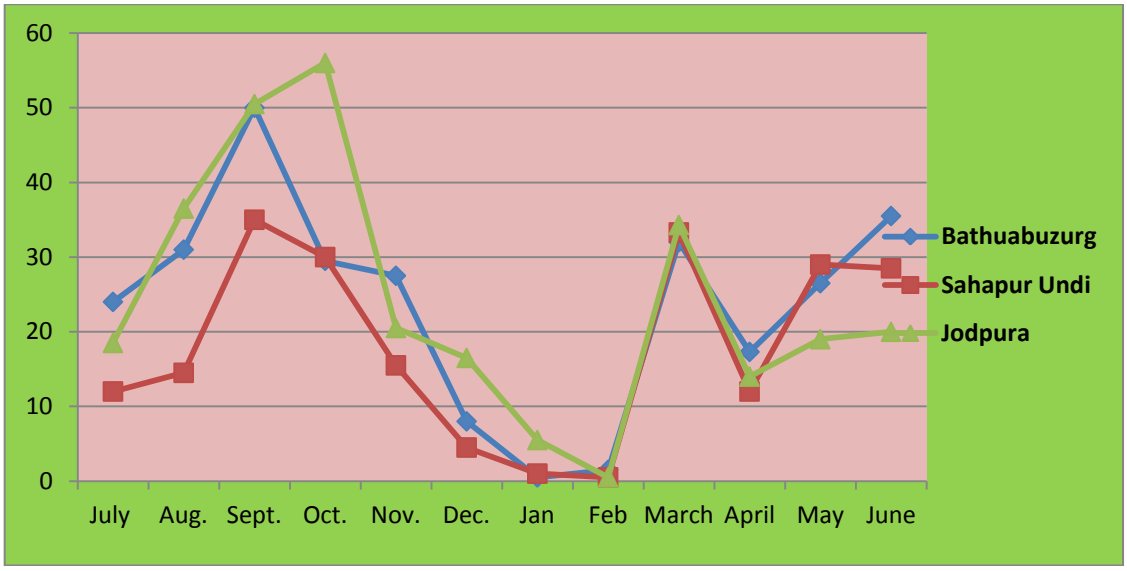
Table- 7 Monthly PMHD of vector *P. argentipes* in Samastipur village

	Per Man Hour Density											
Village	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan	Feb	March	April	May	June
Bathuabuzurg	24	31	50	29.5	27.5	8	0.5	1.5	32	17.3	26.5	35.5
Shahpurundi	12	14.5	35	30	15.5	4.5	1	0.5	33.3	12	29	28.5
Jodpura	18.5	36.5	50.5	56	20.5	16.5	5.5	0.5	34.3	14	19	20

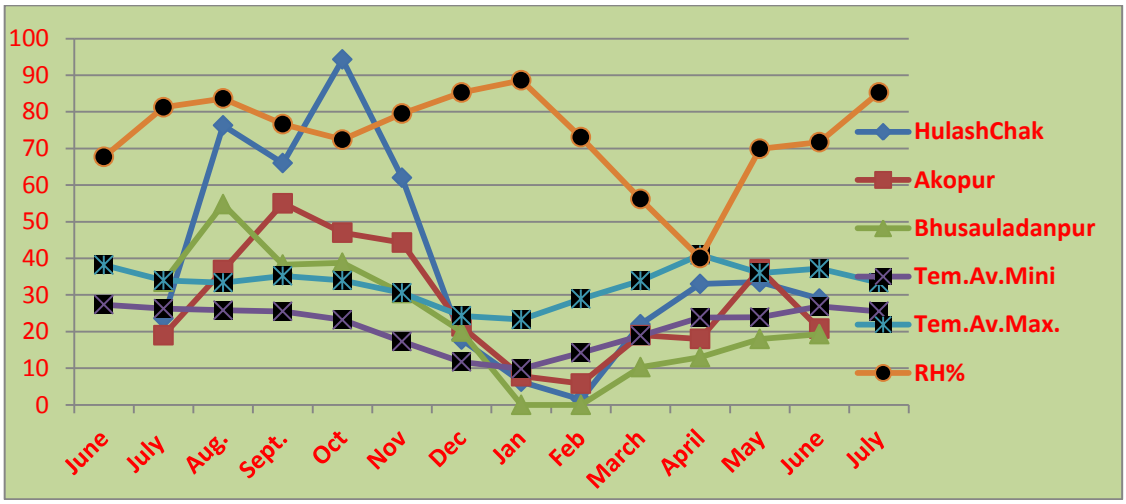
Graph- 5 Monthly PMHD of vector *P. argentipes in Patna villages*



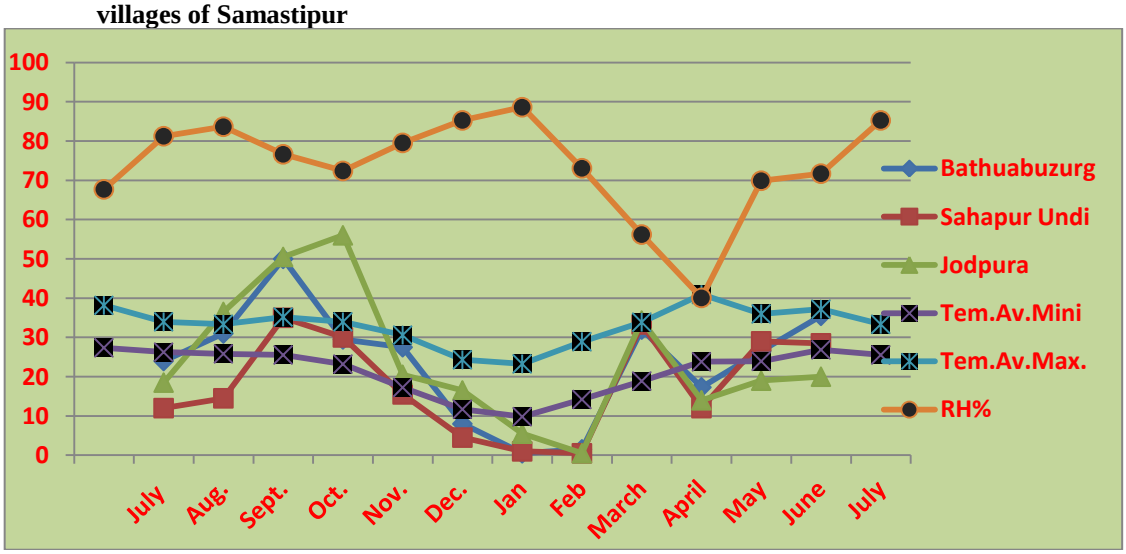
Graph- 6 Monthly PMHD of vector *P. argentipes* *in* Samstipur villages



Graph- 7 Monthly PMHD of *P. argentipes* and Av.min & Max Tem, Relative Humidity in villages of Patna



Graph- 8 Monthly PMHD of *P. argentipes* and Av.Min & Max Tem, Relative Humidity in villages of Samastipur



3. Studies on the vertical distribution of sandflies *P. argentipes* in cattleshed and human dwelling in Patna and Samastipur district of Bihar.

To know the distribution of vector sandflies in the dwelling, is very important in relation to apply effectively vector control measures in their resting sites. For the vertical distribution of vector sandflies *P. argentipes*, 3 villages from Patna district viz. HulashChak, Akopur, Bhusoladanapur and 3 villages viz. Shahpurundi, Jodpura and Bathubuzurg from Samastipur district were selected. From each village, 5 animal shelters and 5 human shelters were selected for the study for a period of one year starting from July 2015 to June 2016. The monthly sandflies were collected with the help of mouth aspirator tube and torch light in the early morning hour, from 0- 2 feet, 2- 4 feet, 4- 6 feet and above 6 feet of height of the walls from the ground level of their resting sites. The collected sandflies were brought to the laboratory, numbers were counted, abdominal conditions were noted and species were identified by the identification key.

RESULTS-

DISTRICT PATNA

i. Village- Hulashchak

Total of 1729 sandflies *P. argentipes* were collected from different height of dwelling, 1092 (63.2%) from 0 - 2 feet, 461(26.7%) 2 - 4 feet, 173 (10%) 4- 6 feet and 3 (0.2%) from >6 feet of height were collected from their resting sites. **Table- 8 Graph-9**

ii. Village- Akopur-

Total of 1659 sandflies *P. argentipes* from different level of height of dwelling,769(46.4%) from 0- 2 , 546 (32.9%) 2- 4 feet 341(20.6%) 4- 6 feet and 3 (0.2%) >6 feet of height were collected. **Table-9 Graph-10**

iii. Village- Bhusoladanpur-

Total of 1486 sandflies ***P. argentipes***, 747 (50.3%) 0-2 feet, 512 (34.5%) 2- 4 feet, 227(15.%) 4- 6 feet of height were collected. **Table-10 Graph-11**
A overall from these 3 villages 4874 sandflies of *P. argentipes*, 2608 (53.5%) 0-2 feet, 1519 (31.2%) 2-4 feet 741(15.2%) 4- 6 feet and 6 (0.1%) >6 feet of height of dwellings were collected during entire year of the study.

DISTRICT SAMASTIPUR

i. Village- Shahpurundi

A total of 682 vector sandflies *P. argentipes* 417 (61.1%) 0- 2 feet, 218 (32%) 2- 4 feet and 47 (6.9%) 4-6 feet of height of dwelling were collected**. Table-11 Graph-12**

ii. Village- Jodpura

From this villages 878 number of vector sandflies were collected. 577 (65.7%) from 0- 2 feet, 247(28.1%) 2- 4 feet 47 (5.4 %) 4- 6 feet and 7 (0.8%) from >6 feet of height were recorded from different level**. Table-12 Graph-13**

iii. **Village- Bathuabuzurg-**

From this village during the entire year a total of 985 sandflies *P. argentipes* were collected form 0-2 feet 611(62%), 2- 6 277(28.1%) 4- 6 93 (9.4%) and only 4 (0.4%) from >6 feet of their resting sites of dwelling. **Table-13 Graph-14**

From these 3 villages of Samstipur district a total of 2545 vector sand flies *P. argentipes*, 1605 (63.1%), 742 (29.2%), 187 (7.4%) and 11 (0.4) were collected for 0- 2 feet, 2- 4 feet,4- 6 feet and >6 feet of height, respectively.

From both the district, 7419 vector sandflies *P. argentipes* were collected, out of these sandflies 4213 (56.8%) from 0- 2 feet of height, 2261 (30.5%) 2- 4 feet of height, 928 (12.5%) 4- 6 feet and only 17 (0.2%) from > 6feet of height of walls, was recorded during the whole year.

Conclusion-

It may be concluded from the data generated from these 6 villages of 2 districts that maximum number of vector sandflies *P. argentipes* in the human and animal shelters rest during day time 0- 2 feet height walls of dwellings, therefore the spray personnel may give more attention during IRS programme to these resting sites of vector sandflies as more that 56% of vector sandflies rest in these areas of dwellings.

Table-8 Vertical distribution of sandflies *P. argentipes* in the dwellings in Hulashchak

Month	0-2 Feet	2-4 Feet	4-6 Feet	>6 Feet	Total
July	44(61.1)	22(30.6)	6(8.3)	0	74
Aug.	233(62.0)	110(29.3)	33(8.8)	0	376
Sept.	99(62.3)	36(22.6)	24(15.1)	0	159
Oct.	303(64.5)	125(26.6)	42(8.9)	0	470
Nov.	148(87.1)	22(12.9)	27(31.8)	0	197
Dec.	30(35.3)	28(32.9)	0	0	58
Jan	13(65)	7(35)	0	0	20
Feb.	7(87.5)	1(12.5)	0	0	8
March	48(60)	23(28.8)	9(11.3)	0	80
April	52(49.1)	34(32.1)	18(16.9)	2(1.9)	106
May	64(64.5)	28(28.3)	7(7.1)	0	99
June	51(60.7)	25(29.8)	7(8.3)	1(1.2)	84
Total	1092(63.2)	461(26.7)	173(10.)	3(0.2)	1731

Table-9 Vertical distribution of sandflies *P. argentipes* in the dwellings in Akopur

Month	0-2 Feet	2-4 Feet	4-6 Feet	>6 Feet	Total
July	62(52.5)	45(38.1)	11(9.3)	0	118
Aug.	76(45.2)	50(29.8)	42(25)	0	168
Sept.	105(39.7)	74(30.6)	63(26)	0	242
Oct.	63(47.7)	45(34.1)	24(18.2)	0	132
Nov.	107(47.1)	67(33.8)	53(24.2)	0	227
Dec.	83(42)	67(33.8)	48(24.2)	0	198
Jan	20(54.1)	10(27)	7(18.9)	0	37
Feb.	17(68)	6(24)	2(8)	0	25
March	50(45.5)	33(30)	27(24.6)	0	110
April	30(50.8)	20(33.9)	6(10.2)	3(5.1)	59
May	108(52.4)	88(41.5)	16(13.2)	0	212
June	48(36.)	41(31.3)	42(32.1)	0	131
Total	**769(46.4)**	**546(32.9)**	**341(20.6)**	**3(0.2)**	**1659**

Table-10 Vertical distribution of sandflies *P. argentipes* in the dwellings in Bhusoladanapur

Month	**0-2 Feet**	**2-4 Feet**	**4-6 Feet**	**>6Feet**	**Total**
July	86(49.2)	53(30.3)	36(20.6)	0	175
Aug.	146(57.5)	84(33.1)	24(9.5)	0	254
Sept.	95(54.9)	63(36.4)	15(8.7)	0	173
Oct.	68(36.4)	60(32.1)	59(31.6)	0	187
Nov.	153(51.5)	110(37)	34(11.5)	0	297
Dec.	36(61)	17(28.8)	6(10.2)	0	59
Jan	0	0	0	0	0
Feb.	0	0	0	0	0
March	31(52.5)	18(30.5)	10(16.9	0	59
April	34(47.2)	24(33.3)	14(19.4)	0	72
May	49(51.6)	36(37.9)	10(10.5)	0	95
June	49(42.6)	47(40.9)	19(16.5)	0	115
Total	747(50.3)	512(34.5)	227(15.3)	0	1486

Table-11 Vertical distribution of sandflies *P. argentipes* in the dwellings in Shahpurundi

Month	**0-2Feet**	**2-4Feet**	**4-6Feet**	**>6Feet**	**Total**
July	16(55.2)	10(34.4)	3(10.3)	0	29
Aug.	24(57.1)	14(33.3)	4(9.5)	0	42
Sept.	49(52.6)	41(44.2)	3(3.2)	0	93
Oct.	60(73.1)	20(24.4)	2(2.4)	0	82
Nov.	23(62.2)	11(29.7)	3(8.1)	0	37
Dec.	13(86.7)	2(13.3)	0	0	15
Jan	2(100)	0	0	0	2
Feb.	1(100)	0	0	0	1
March	110(61.1)	56(30.6)	17(9.3)	0	183
April	25(89.3)	3(10.7)	0	0	28
May	42(68.9)	17(27.9)	2(3.3)	0	61
June	52(53.3)	34(34.3)	13(13.1)	0	99
Total	**417(61.1)**	**208(32)**	**47(6.9)**	**0**	**672**

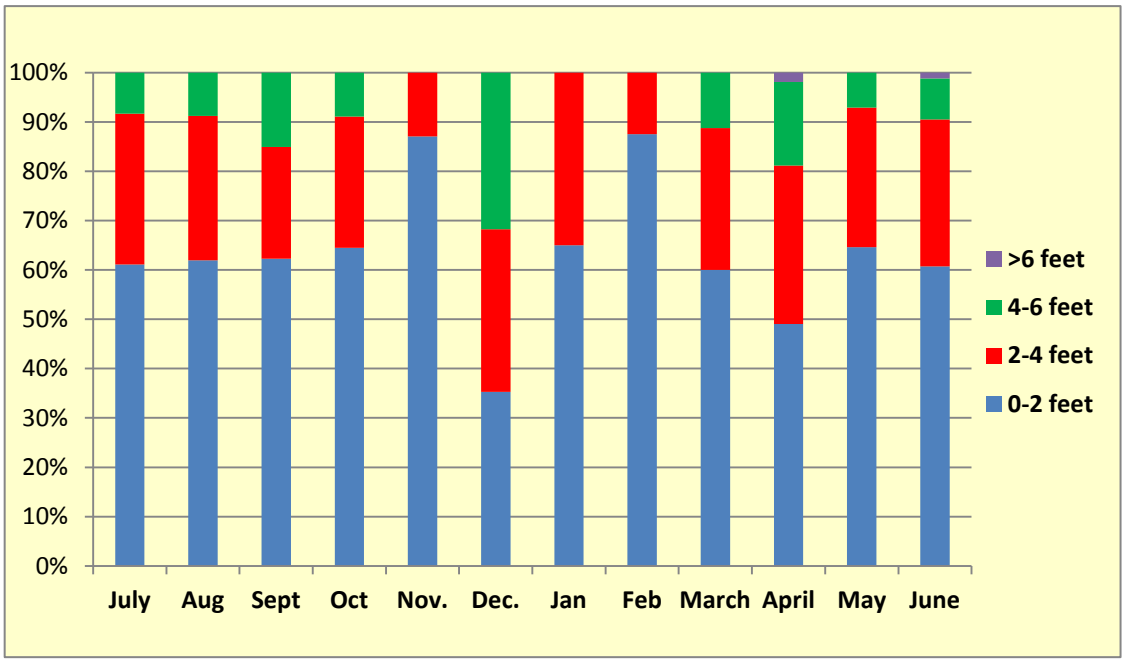
Table-12 Vertical distribution of sandflies *P. argentipes* in the dwellings in Jodpura

Month	**0-2Feet**	**2-4Feet**	**4-6Feet**	**>6Feet**	**Total**
July	28(59.6)	16(34)	3(6.4)	0	47
Aug.	43(48.9)	38(43.2)	0	0	81
Sept.	100(75.8)	28(21.2)	4(3)	0	132
Oct.	122(85.3)	21(14.6)	0	0	143
Nov.	44(71)	18(29)	0	0	62
Dec.	29(61.7)	17(36.1)	1(2.1)	0	47
Jan	6(50)	6(50)	0	0	12
Feb.	4(100)	0	0	0	4
March	104(51.5)	61(30.2)	32(15.8)	5(2.5)	202
April	31(79.9)	7(30.2)	1(2.6)	0	39
May	38(65.5)	17(29.3)	2(3.5)	1(1.7)	58
June	28(54.9)	18(35.3)	4(7.8)	1(1.9)	51
Total	**577(65.7)**	**247(28.1)**	**47(5.4)**	**7(0.8)**	**878**

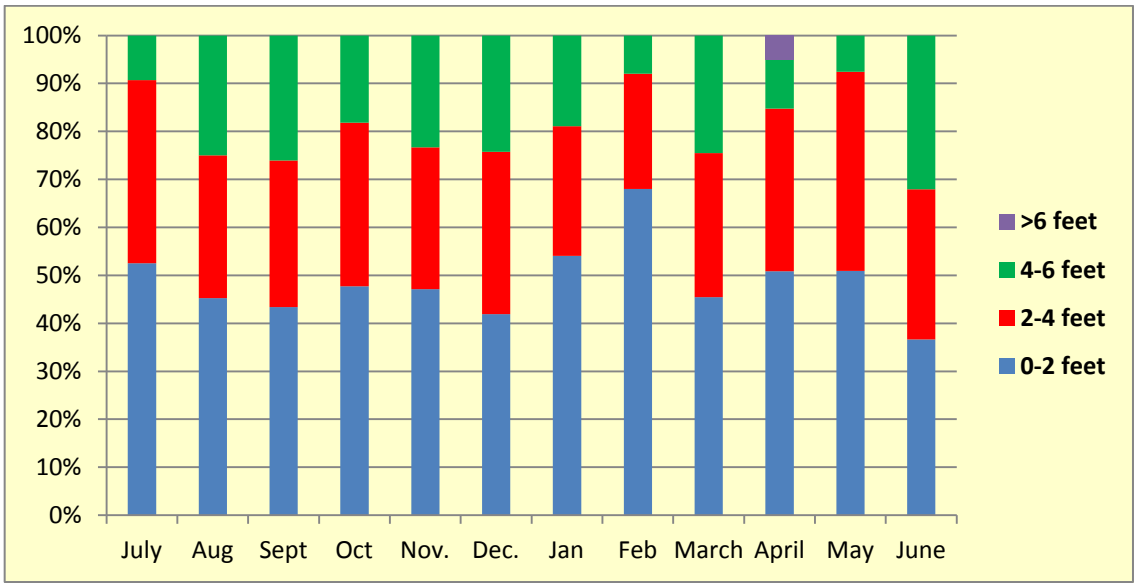
Table- 13 Vertical distribution of sandflies *P. argentipes* in the dwellings in Bathuabuzurg

Month	0-2Feet	2-4Feet	4-6Feet	>6Feet	Total
July	36(59)	20(33.8)	5(8.2)	0	61
Aug.	56(53.3)	40(38.1)	8(7.6)	1(0.9)	105
Sept.	86(62.8)	45(32.9)	5(3.6)	1(0.7)	137
Oct.	75(80.7)	16(17.2)	2(2.2)	0	93
Nov.	40(62.5)	21(32.9)	3(4.7)	0	64
Dec.	16(69.6)	7(30.4)	0	0	23
Jan	0	0	0	0	0
Feb.	0	0	0	0	0
March	31(52.5)	18(30.5)	10(16.9	0	59
April	34(47.2)	24(33.3)	14(19.4)	0	72
May	49(51.6)	36(37.9)	10(10.5)		95
June	49(42.6)	47(40.9)	19(16.5)	0	115
Total	**472(57.3)**	**274(33.3)**	**76(9.2)**	**2(0.2)**	**824**

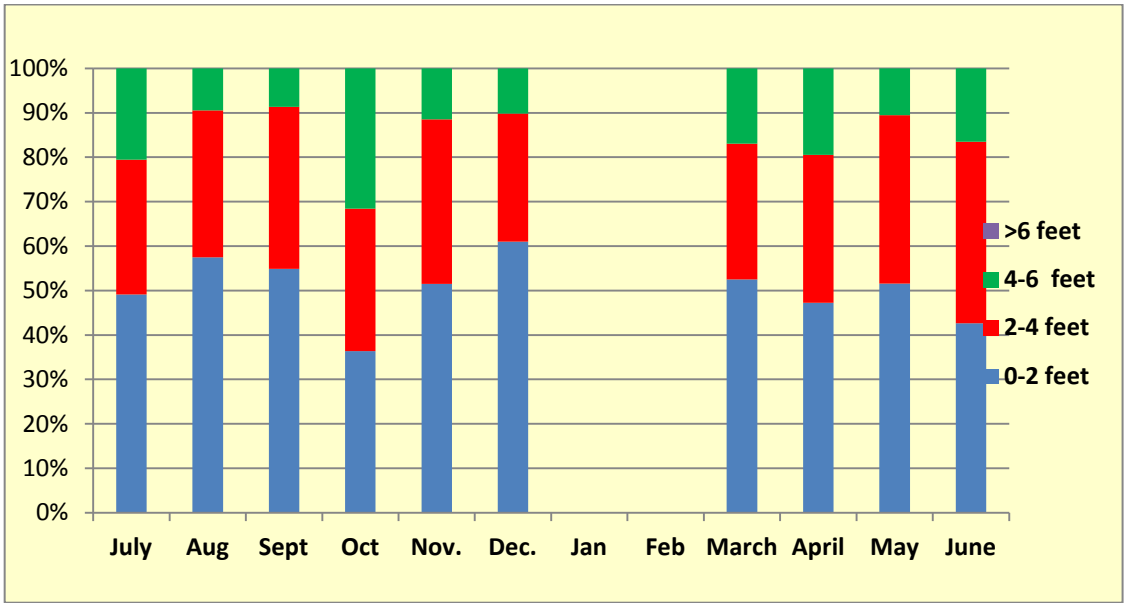
Graph-9 Vertical distribution of sandflies *P. argentipes* in dwellings of Hulashchak



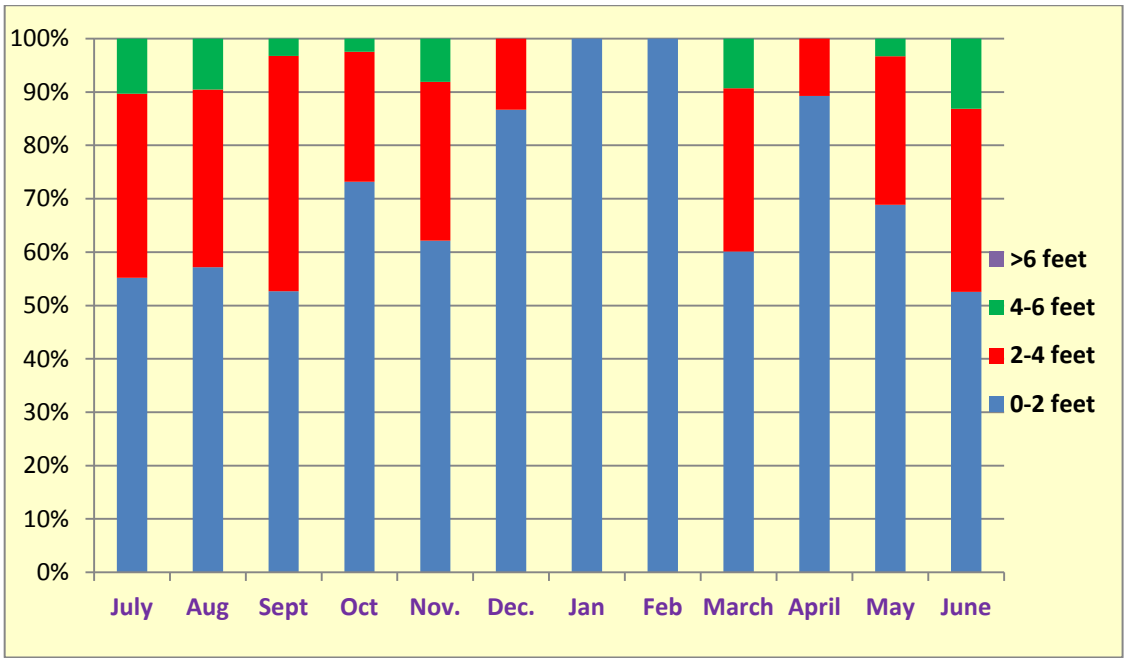
Graph-10 Vertical distribution of sandflies *P. argentipes* in dwellings of village Akopur



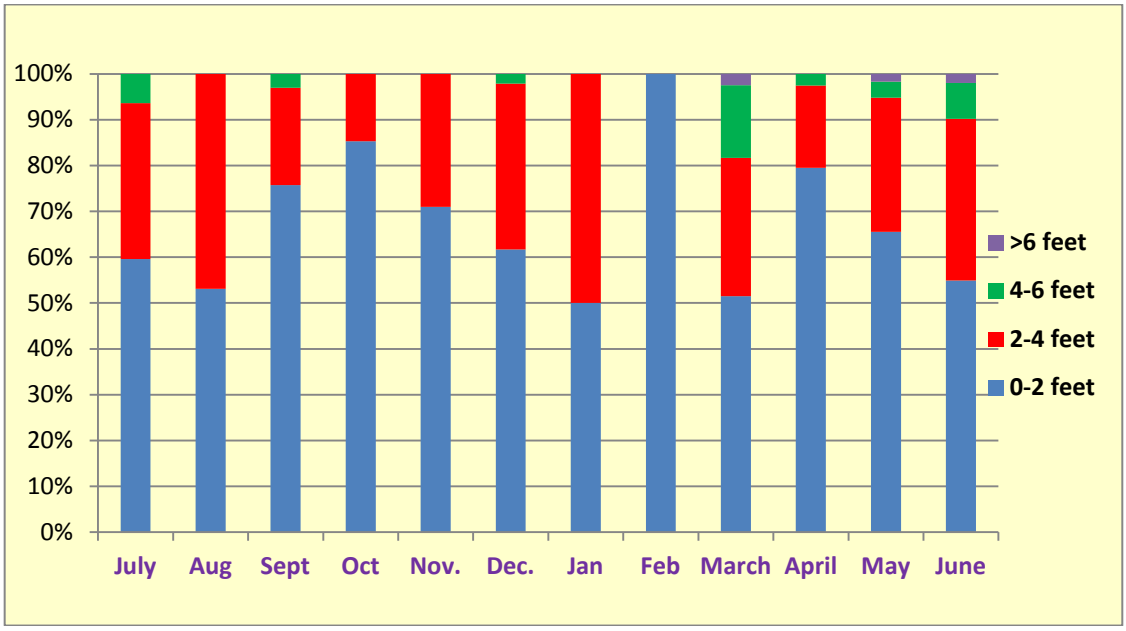
Graph-11 Vertical distribution of sandflies *P. argentipes* in dwellings of village Bhusoladanapur



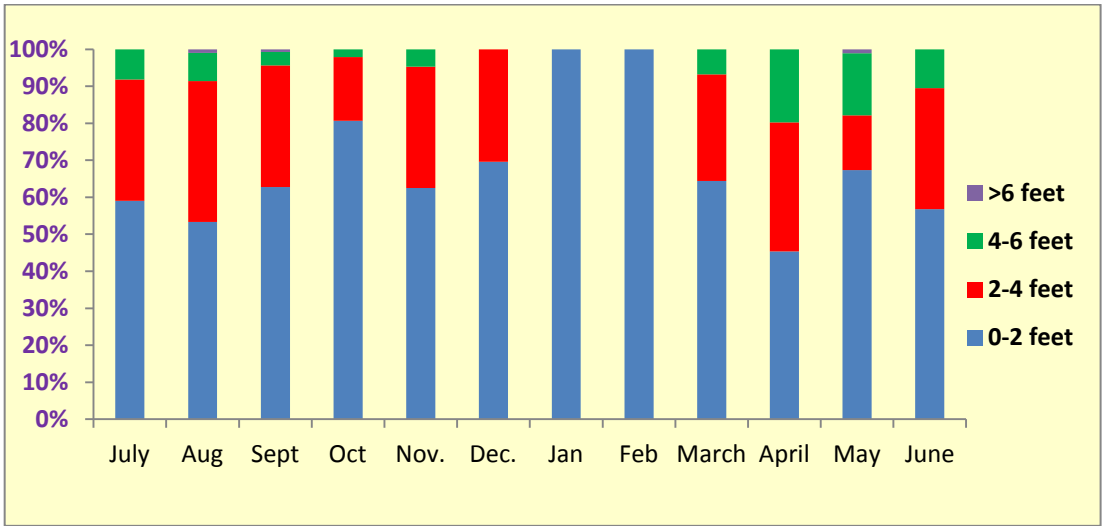
Graph-12 Vertical distribution of sandflies *P. argentipes* in dwellings of village Shapur Undi



Graph-13 Vertical distribution of sandflies *P. argentipes* in dwellings of village Jodpura



Graph-14 Vertical distribution of sandflies P. argentipes in dwellings of village Bathuabuzurg



4- Studies on age grading of sandflies *P. argentipes* in Patna and Samastipur districts

Age determination of sandflies becomes an important factor to know the transmission mode of visceral leishmaniasis and also to evaluate the efficacy of insecticides on proper time. However a very few information on follicular development of sandflies has been available to date when compared to mosquitoes. The present study was designed to know the parous/ nulliparous rate and longevity of *P. argentipes* a proven vector of leishmaniasis in Bihar, India.

Sandflies were collected from village Hulashchak, Akopur and Bhusoladanapur of Phulwarisarif PHC area of Patna district and village Shapurundi, Jodpura and Bathuabuzurg of Samastipur district of Bihar. The monthly resting site collection of adults sandflies were made from cattleshed and human dwellings in the early morning hours with the help of mouth aspirator tube and torch light. The collected sandflies were brought to laboratory and were kept at low temperature and high humidity (25 ± 2^0 C and 75% relative humidity) until dissected under microscope. Fresh sandflies were dissected and then their spermathecae were thoroughly examined for identification (Lewis 1965). By observing dilation of follicles, counting the notch formation, parous rate of each sandfly was estimated as described by (Guilvard, Wilkes, Killick & Rioux,1980).

Results

Results are presented in **Table 14 & 15 and Graph-15, 16**. A total of 2003, *P. argentipes* sand flies were dissected for parity assessment in Patna district, 1288(64.3) Nulliparous, 482(24.1%) Parous1, 165(8.2%) Parous 2, and 68(3.3%) were as Parous3.

In Samastipur a total of 1527 *P. argentipes* sand flies were dissected and out of these 988 (64.7%) were Nulliparous, 372(24.4%) Parous1, 134 (8.8%) Parous2 and only 33(2.2%) Parous3, were recorded from the field.

Therefore it was observed that very few vector sandflies *P. argentipes* complete 3 gonotrophical cycle in the field condition, the age may be ranged in this area vary from 2-3 week.

Table- 14 Parity of sandflies *P. argentipes* by counting folliculars relics in Patna district of Bihar

Month	Total Female Dissected	Nulliparous	Parous 1	Parous 2	Parous 3
July	158	100(63.3)	40(25.3)	18(11.4)	0
Aug	182	128(70.3)	40(21.9)	14(7.7)	0
Sept	185	110(59.5)	59(31.9)	16(8.6)	0
Oct	315	203(64.4)	70(22.2)	28(8.9)	14(4.4)
Nov	329	211(64.1)	73(22.2)	27(8.2)	18(5.5)
Dec	191	109((57.1)	48(25.1)	11(5.8)	23(12.0)
Jan	67	58(86.6)	8(11.9)	1(1.5)	0
Feb.	20	18(90)	2(10)	0	0
March	163	128(78.5)	34(20.9)	1(0.6)	0
April	136	76(55.9)	36(26.5)	22(16.2)	2(1.5)
May	163	106(65)	44(27)	11(6.7)	2(1.2)
June	94	41(43.3)	28(29.8)	16(17)	9(9.6)

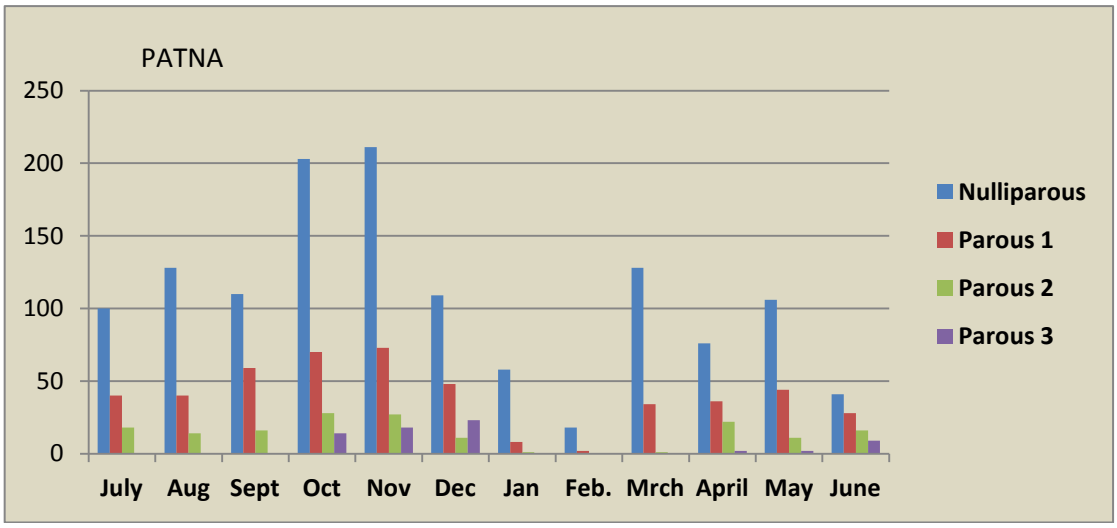
Figures in bracket are percentage values

Table-15 Parity of sandflies *P. argentipes* by counting folliculars relics in Samastipur district of Bihar

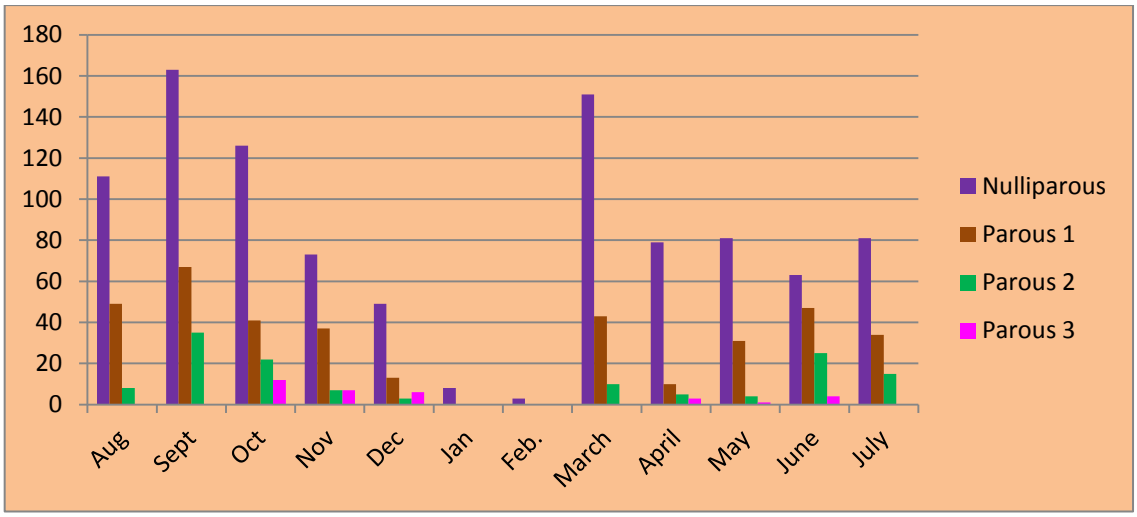
Month	Total Female Dissected	Nulliparous	Parous 1	Parous 2	Parous 3
Aug	168	111(66.1)	49(29.2)	8(4.8)	0
Sept	265	163(51.3)	67(25.3)	35(13.2)	0
Oct	201	126(62.7)	41(20.4)	22(10.9)	12(5.9)
Nov	124	73(58.9)	37(29.3)	7(5.7)	7(5.7)
Dec	71	49(69.0)	13(18.3)	3(4.2)	6(8.5)
Jan	8	8(100)	0	0	0
Feb.	3	3(100)	0	0	0
March	204	151(51.5)	43(21.1)	10(4.9)	0
April	97	79(81.4)	10(10.3)	5(3.1)	3(3.1)
May	117	81(69.2)	31(26.5)	4(3.4)	1(0.9)
June	139	63(45.3)	47(38.8)	25(18)	4(2.9)
July	130	61(62)	34(26.2)	15(11.5)	0

Figures in brackets are Percentage values

Graph- 15 Parity of wild sandfly *P. argentipes* by counting follicular relics in Patna district of Bihar



Graph- 16 Parity of wild sand fly P. argentipes by counting follicular relics in Patna district of Bihar



Publication:

Ram Singh and Pramod Kumar (2016). Evaluation of different mesh sizes of long lasting insecticidal nets against Phlebotomus argentipes Annandale and Brunetti (Diptera:Psychodidae), in Bihar state of India. Acta Tropica .159; 149-152.

5.2 NCDC, Bengaluru Branch

Dr. N. Balakrishnan
Joint Director & Officer In-charge

Broad objectives

- Coordination of Plague Surveillance activities in endemic States/ International Seaports of the country.
- Leptospirosis- Laboratory testing.
- Rickettsia- Laboratory testing.
- Dengue/Chikungunya-Laboratory testing.
- Investigation of disease out-breaks occurring in the region.
- Co-ordination with functioning of IDSP of Karnataka state.
- Training of health Professionals.

Routine activities undertaken during the period

a) **Plague** (Bacteriology, Serology and Entomological studies)
Plague Surveillance activities in endemic States and International Seaports.

- **Serology**- Collection of rodent, dog and human sera samples and laboratory testing for plague antibodies.
- **Bacteriology**- Isolation and characterization of bi-polar organisms with reference to *Y.pestis* and examination of rodent organ smears.
- **Entomology**-Collection, processing, mounting, identification and calculation of indices of rodent fleas. Maintenance of flea colony and insecticide susceptibility tests.

b) **Leptospirosis**: Laboratory testing of human blood samples.
c) **Rickettsia:** Laboratory testing of human and rodent blood samples.
d) **Dengue/Chikungunya:** Sentinel Laboratory for testing of human blood samples received from Karnataka state.
e) **Investigation of disease out-breaks:** Investigation of Kyasanur Forest Disease (KFD) outbreak

Plague Surveillance work

Plague was a major public health problem in the many states of India in the earlier part of the past country. Its enzootic foci exist in seven (7) states of the country and resulting periodic outbreaks. The National Centre for Disease Control (NCDC) Bengaluru Branch is coordinating plague surveillance activities of the following endemic areas of the country viz. Chittoor district, Andhra Pradesh; Niligiris and Krishnagiri districts, Tamil Nadu; Kolar and Bengaluru rural districts, Karnataka; Beed district, Maharashtra; Surat, Urban and Rural district, Gujarat; Barkot, Uttarkashi district Uttarkhand and Rohru, Shimla district, Himachal Pradesh.

The National Centre for Disease Control (NCDC) Bengaluru Branch has received rodent sera, organ samples, flea specimens, Dog /Human sera samples from the above states on weekly / monthly basis. The samples are being processed in the laboratory and test results are furnished to the state health authorities on a fortnightly basis. The NCDC Bengaluru Branch team also has periodically visited the above endemic areas/states for monitoring Plague Surveillance activities and also to collect rodent, Dog and Human blood samples, rodent organ samples and flea specimens. The above samples are being processed in the laboratory and reports are furnished to the concerned state Health Authorities for further measures.

Plague Serology:

During the reporting period of **2015-2016**, the particulars of Plague Surveillance activities carried out by the NCDC Bengaluru branch team in various states and Seaports are given in the Table -01.A total of **524** rodents and 162 dog and 205 human sera samples (Table -03) were collected during the visit of NCDC, Bengaluru team to various endemic areas, the various rodent species collected and their number in parenthesis viz.. *Tatera indica cauvierii* (1) *Rattus rattus* (412), *Bandicota indica* (25), and *Bandicota bengalensis* (74) *Rattus rattus turkmeniansis (12).*

During the reporting period the particulars of rodent and dog sera samples collected by the various state Plague control Units are given in Table-02.A total of **3114** rodents viz. *Tatera indica cauvierii* (682), *Rattus rattus* (2103), *Bandicota indica* (306), *Rattus norvegicus (19),and Bandicota bengalensis* (4) and Dog 162 sera samples were collected. The samples were also received by weekly / monthly basis from the respective states plague units. Also 205 human blood samples were collected during our survey.

Table-1: Particulars of states and seaports visited by the NCDC team during 2015-16

State	**Place**	**Sera sample received**							**Total**	
		Ti	***Rr***	***Bi***	***Rn***	***Mm***	***Bb***	***Rrt***	***Rodent***	***Dog***
Karnataka	Bangalore (R)	0	132	1	0	0	31	0	**164**	**0**
	Kolar (KA)	0	26	5	0	0	11	0	**42**	**0**
	Chamarajnagar	0	59	1	0	0	0	0	**60**	**0**
Andhra Pradesh	Palamaner	0	39	0	0	0	0	0	**39**	**0**
Maharashtra	Pune	0	49	0	0	0	0	0	**49**	**17**
	Mumbai Seaport	0	21	17	0	0	0	0	**38**	**0**
Uttarakhand	Barkot	0	16	0	0	0	0	5	**21**	**12**
Tamil Nadu	Theni	1	45	1	0	0	0	0	**47**	**2**
	Tuticorin	0	13	0	0	0	32	0	**45**	**0**
Himachal Pradesh	Rohru	0	12	0	0	0	0	7	**19**	**0**
GRAND TOTAL		**1**	**412**	**25**	**0**	**0**	**74**	**12**	**524**	**31**

Table- 2: Particulars rodent and dog sera samples collected state plague control units and received by the NCDC Bengaluru during 2015-16

State	**Place**	**Sera sample received**							**Total**	
		Ti	***Rr***	***Bi***	***Rn***	***Mm***	***Bb***	***Rrt***	**Rodent**	**Dog**
Karnataka	Kolar	382	647	0	0	0	4	0	**1033**	
Andhra Pradesh	Palamaner	88	80	0	0	0	0	0	**168**	
Gujarat	Surat (R)	0	63	0	0	0	0	0	**63**	**21**
	Surat SMC	0	675	199	0	0	0	0	**874**	**110**
Maharashtra	Pune	0	47	0	0	0	0	0	**47**	
Tamil Nadu	Hosur	212	151	0	19	0	0	0	**382**	
	Coonoor	0	440	107	0	0	0	0	**547**	
GRAND TOTAL		**682**	**2103**	**306**	**19**	**0**	**4**	**0**	**3114**	**131**

Rr- Rattus rattus Ti- Tatera indica cauvierii, Bi- Bandicota indica, Bb-B.bengalensis, Rn-Rattus norvegicus-Mm-Mus musculus. Mh-*Meriones hurrianae, Rrt.Rattus rattus turkmeniansis*

** All the rodent and dog sera samples collected from Surat SMC were sent directly to NCDC Delhi.

Table-03: Particulars of human sera samples collected by NCDC, Bengaluru during 2015-16

Place	Period of collection	Number of human sera received
Palamaner (AP)	Jun-15	19
Rohru, (HP)	Sep-15	19
Pune (MH)	Jul-15	35
Barkot (UK)	May-15	50
Theni (TN)	Dec-15	50
Chamarajnagar (KA)	Aug-15	32
Total		**205**

Table-04:-Particulars of rodent organs samples collected by NCDC Bengaluru team during 2015 -16

State	Place	Organ sample received Tested							Total
		Ti	***Rr***	***Bi***	***Rn***	***Mm***	***Bb***	***Rrt***	**Rodent**
Karnataka	Kolar	0	45	5	0	0	14	0	**64**
	Bangalore (R)	0	237	1	0	0	48	0	**286**
	Chamarajnagar	0	99	1	0	0	0	0	**100**
Andhra pradesh	Palamaner	0	69	0	0	0	0	0	**69**
Maharashtra	Pune	0	53	0	0	0	0	0	**53**
	Mumbai seaport	0	29	24	0	0	0	0	**53**
Uttarakhand	Barkot	0	18	0	0	0	0	15	**33**
Tamil Nadu	Theni	1	121	1	0	2	0	0	**125**
	Tuticorin seaport	0	41	0	0	0	53	0	**94**
Himachal Pradesh	Rohru	0	12	0	0	0	0	17	**29**
GRAND TOTAL		**1**	**724**	**32**	**0**	**2**	**115**	**32**	**906**

TABLE-05:-Particulars of rodent organs samples collected by state plague units during 2015-16

State	Place	Organ sample received /tested							Total
		Ti	***Rr***	***Bi***	***Rn***	***Mh***	***Bb***	***Rrt***	**Rodent**
Karnataka	Kolar	382	833	0	0	0	4	0	**1219**
Andhra Pradesh	Palamaner	88	80	0	0	0	0	0	**168**
Gujarat	Surat (R)	0	186	0	0	0	0	0	**186**
	Surat SMC	0	694	199	0	0	0	0	**893**
Maharashtra	Pune	0	49	0	0	0	0	0	**49**
Tamil Nadu	Hosur	212	151	0	19	0	0	0	**382**
	Coonoor	0	445	107	0	0	0	0	**552**
GRAND TOTAL		**682**	**2438**	**306**	**19**	**0**	**4**	**0**	**3449**

Rr- Rattus rattus Ti- Tatera indica cauvierii, Bi- Bandicota indica, Bb-B.bengalensis, Rn-Rattus norvegicus-Mm-Mus musculus. Mh-*Meriones hurrianae, Rrt.Rattus rattus turkmeniansis*

Plague Bacteriology and Microscopy:

The rodent organ and smears processed by the NCDC, Bengaluru team are given in the Table 4 & 5 The collected rodents were dissected for harvesting viz. Liver and Spleen and were stored in Cary Blair Transport Media and transported to laboratory. The Preliminary screening test has been carried out and samples were sent to Zoonosis division NCDC Delhi for further confirmation of the results samples. The rodent organ smears made were stained with Wayson's stain and examined under microscope and none of them were found positive for bipolar coccobacilli organisms. (Table-6).

Table-06.: Particulars of rodent organ smears received and examined by NCDC Bengaluru during – 2015-16

State	Place	Organ smear sample received /tested							Total
		Ti	***Rr***	***Bi***	***Rn***	***Mm***	***Bb***	***Rrt***	**Rodent**
Karnataka	Kolar	382	878	5	0	0	18	0	**1283**
	Bangalore Rural	0	237	1	0	0	48	0	**286**
	Chamarajanagar	0	99	1	0	0	0	0	**100**
Tamil Nadu	Hosur	0	0	0	0	0	0	0	**0**
	Coonoor	0	0	0	0	0	0	0	**0**
	Tuticorine	0	41	0	0	0	53	0	**94**
	Theni	1	121	1	0	2	0	0	**125**
Maharastra	Pune	0	102	0	0	0	0	0	**102**
	Munbai Seaport	0	29	24	0	0	0	0	**53**
Andhra Pradesh	Palamaner	88	149	0	0	0	0	0	**237**
Gujarat	Surat RDD	0	186	0	0	0	0	0	**186**
	Surat SMC	0	573	111	0	0	209	0	**893**
Uttarakhand	Barkot	0	18	0	0	0	0	15	**33**
Himachal Pradesh	Rohru	0	12	0	0	0	0	17	**29**
Grand Total		**471**	**2445**	**143**	**0**	**2**	**328**	**32**	**3421**

Rr*- Rattus rattus* ***Ti-*** *Tatera indica cauvierii,* ***Bi-*** *Bandicota indica,* ***Bb****-Bandicoot bengalensis,* ***Rn****-Rattus norvegicus-****Mm****-Mus musculus. Rrt.Rattus rattus turkmeniansis*

Entomological Study:

The rodent ecto-parasitic fleas are collected from the trapped domestic, peridomestic and wild rodents in Plague Surveillance work. The above flea specimens are preserved in 70% alcohol and transported to laboratory for mounting and identification. During the reporting period various State Plague Control Units i.e. Plague Control Unit, Kolar, Karnataka State and Anti Plague Unit, Palamaner, Andhra Pradesh, Plague control unit, Pune and Maharashtra state, Surat RDD team from Gujarat, Plague control unit, Barkot, Uttarkhand state conducted routine surveys, and also REP survey carried out at Theni, Tuticorin, Mumbai, Kandla seaports by NCDC, Bangalore team. The flea specimens collected during the Survey were identified by NCDC, Bengaluru and the particulars of unit /place wise collection and fleas species and indices are given in Table-08.

During 2015-16 a total of **488** rodent fleas were retrieved from **1717** rodents trapped from the domestic and peri- domestic situations during REP survey the absolute and specific flea indices *Xenopsylla cheopis, Xenopsylla astia and Nosopsylla fasciatus* have been calculated and given in Table-08.The results evident that in Kandla seaport areas showing flea indices *X cheopis* more than critical level. The results were communicated PHO Kandla to take antiflea measures for to control the fleas however in remaining places the specific flea index of *X cheopis* is below the critical level at all places surveyed.

TABLE-08.: Details of fleas collected and identified during the year 2015-16

State	Place of collection	Total Rodents collected	Total Fleas collected	Absolute Flea index	Specific Flea Index		
					X a	*X c*	*N f*
Karnataka	Kolar	633	129	0.20	0.13	0.07	0.00
	Bengaluru Rural	286	75	0.20	Fleas are used for colonisation		
	Chamarajnagar	123	41	0.33	0.11	0.22	0.00
Andhra Pradesh	Palamaner	191	29	0.15	0.09	0.06	0.00
Tamil Nadu	Theni	125	32	0.25	0.17	0.08	0.00
	Tuticorin Seaport	94	2	0.02	0.02	0.00	0.00
Maharastra	Pune	53	3	0.05	0.04	0.01	0.00
	Mumbai seaport	53	22	0.41	0.34	0.07	0.00
Gujarat	Kandla Seaport	97	150	1.54	0.15	**1.39***	0.00
Himachal Pradesh	Rohru	29	4	0.13	0.00	0.13	0.00
Uttarakhand	Barkot	33	1	0.03	0.00	0.00	0.03
Total		**1717**	**488**	**0.28**	**-**	**-**	**-**

***X c**-Xenopsylla cheopis*, ***X.a**-Xenopsylla astia*, ***Nf**- Nosopsylla fasciatus*,* High flea index

Leptospirosis

Leptospirosis is a Zoonotic bacterial disease caused by *Leptospira interogans* which has 25 Serogroups and more than 250 Serovars The disease symptoms resembles with other diseases like Dengue, Malaria, Flu, Viral encephalitis etc. Being a Zoonotic disease it affects the livestock resulting in great loss to the country. Man gets infection accidentally from infected animals or contaminated water or eatables.

Laboratory facilities for the diagnosis of Leptospirosis at NCDC, Bengaluru:

NCDC, Bengaluru has established a diagnostic laboratory for Leptospirosis in the recent past. Following tests are being carried out at NCDC laboratory.

- ELISA test: Using IVD Leptospira IgM serum antibody detection assay ELISA kit.

Laboratory Results

During the reporting period 2015-16 a total of 01 human blood sera samples were received from different districts of Karnataka, for the diagnosis of Leptospirosis was tested at Microbilogy Laboratory, Bangalore Medical Collage Bangalore for IgM antibody detection by ELISA method, and found to be Negative the details of the findings are presented in Table 09.

Table-9: Human sera samples received for the diagnosis of Leptospirosis for IgM test during 2014-15

State	Districts	Total Samples Received	Total Tested for IgM	IgM Positive (%)
Karnataka	**Bangalore**	1	1	1(0.0)
	GRAND TOTAL	**1**	**1**	1(0.0)

The test results have been communicated to the state Health Authorities for treatment and further follow up measures.

Studies on Dengue / Chikungunya:

NCDC, Bangalore branch is a sentinel lab for testing Dengue and Chikungunya in Karnataka state in this regard during 2015-16 received **281** human sera samples for Dengue IgM ELISA test and **13** human sera sample for Chikungunya IgM ELISA test from Private Hospitals in and around Bangalore for Quality assurance test. The tests were carried out and the results were communicated to the concerned for further necessary action.

Soil Transmitted Helminthiasis (STH) Survey in Karnataka state:

A STH survey has been initiated in a few districts of Karnataka state and in this regard a team from DPD, NCDC, Delhi has visited this branch during the month. The particulars of districts covered and number of samples collected are given below.

Name of the districts of Karnataka state	Number of stool samples examined	Number of stool samples positive		
		Al	*Tt*	*As*
Anekal (Bangalore Urban district)	**23**	**14**	**0**	**0**
Thindlu , Bangalore Corporation area (BBMP)	**64**	**22**	**0**	**0**
Chikkaballapur disitrct (Rural)	**20**	**5**	**0**	**0**
Chikkaballapur disitrct (Urban)	**50**	**16**	**1**	**0**
Mandya district	**51**	**31**	**0**	**0**
Hassan district	**54**	**37**	**0**	**0**
Dharwad district	**52**	**29**	**0**	**0**
Total	**314**	**154**	**1**	**0**

Soil Transmitted Helminthiasis (STH) Survey in Odisha state:

A STH survey has been initiated in a Three districts of Odisha state and in this regard a team from DPD, NCDC, Delhi and NCDC Bangalore. The particulars of districts covered and number of samples collected are given below.

Name of the districts of Odisha state	Number of stool samples examined	Number of stool samples positive		
		Al	*Tt*	*As*
Rayagada	**32**	**61**	**0**	**0**
Kalahandi	**63**	**22**	**0**	**0**
Sambalpur	**54**	**26**	**0**	**0**
Total	**149**	**109**	**0**	**0**

Note : ***Al****-Ascaris lumbricoides,* ***Tt****- Trichurus trichiura,* ***As*** *–Ankylostomiasis*

Entomological surveillance of vector of yellow fever, Dengue, Chikun gunya and Zika virus in and around Kempegowda International Airport, Bengaluru

As per the International Health Regulation, 2005, all airport and Seaports needs to be free of *Aedes* breeding in and around 400 meters area, for this regard as per the Instruction of the Directorate of National Centre for Disease Control (NCDC) Delhi an entomological surveillance of vector of yellow fever, Dengue and Chikungunya was carried out at KIAL during the period 16.011.2015 to 20.11.2015 (post monsoon) and 16.02.2016 to 18.02.2016 Pre monsoon). The findings of the survey were conveyed to the concerned officers of KIAL and APHO for further corrective measures

Training/Seminar/Symposia/Workshop organized

- Training programme on rodent borne diseases for 10 M.Sc PHE students of VCRC, ICMR, Pondicherry from 20.07.2015 to 23.07.2015.
- One day training programme on rodent borne diseases for MD community medicine students of M.S.Ramaiah,medical college Bangalore(3) and Govt. Medical college, Kozhikode (KL) (20) on 19.09.2015.
- A preliminary meeting for organizing XI Joint Conference of ISMOCD & IAE at Bangalore on 27.10.2015.& 13.11.2015.

Field visits made during 2015-16

- Investigation of KFD outbreak at Goa from 16.04.2015 to 22.04.2015.
- Plague Surveillance work and REP survey at Barkot, Uttarkashi (UK) from 11- 15May, 2015
- Plague Surveillance work and REP survey at Kolar 08.10.2016 to 10.06.2015.
- Plague Surveillance work and REP survey at Palamaner 10.06.2015 to 13.06.2015.
- Plague Surveillance work and REP survey at Beed (MH) from 05.07.2015 to 11.07.2015.
- Visit to NCDC Coonoor Branch from 15.07.2015 to 17.07.2015.
- Plague Surveillance work and REP survey at Attibele & Mayasandra 06-08.07.2015.
- Plague Surveillance work and REP survey at Chandapur 27.07.2015 to 29.07.2015.
- Plague Surveillance work and REP survey at Chamarajnagar from 09.08.2015 to 14.08.2015.
- For monitoring activities of YAWS eradication Programme at Kallakurichi (TN) from 18.08.2015 to 21.08.2015.
- Plague Surveillance work and REP survey at Rohru (HP) from 07.09.2015 to 12.09.2015.
- For monitoring activities of YAWS eradication Programme at Bhubaneswar Odisha state from 21-25.09.2015.
- Participated in the WHO mission verification of YAWS eradication Programme for Odisha state at NCDC Delhi and Bhubaneswar (Odisha) from 04.10.2015 to16.10.2015.
- Plague Surveillance work and REP survey at Mumbai International Sea Port (AP) from 02.11.2015 to 06.11.2015.
- Yellow fever vector survey at Bangalore International Airport from 16.11.2015 to 20.11.2015.
- For Soil Transmitted Helminthes Survey at Chamarajnagar, Mandya, Hassan and Dharwad Districts of Karanataka state from 22.11.2015 to 27.11.2015.
- Plague Surveillance work and REP survey at Cumbum Valley Theni Dist (TN) from 13.12.2015 to19.12.2015.
- Plague Surveillance work and REP survey at Anekal from 04.01.2016 to 06.01.2016.
- Plague Surveillance work and REP survey at Attibele from 11.01.2016 to 13.01.2016.
- Visit to NCDC Coonoor Branch from 19.01.2016 to 22.01.2016.
- For Soil Transmitted Helminthes Survey at Rayagada, Bhawnipattana, Sambalpur, of Odisha state from 30.01.2016 to 05.02.2016.
- Plague Surveillance work and REP survey at Chandapur from 10.02.2016 to 12.02.2016.
- For Aedes mosquito survey at Bangalore International Airport from 16.02.2016 to18.02.2016.

Meetings / symposia attended Dr. N.Balakrishnan, Jt.Director &Officer-in-Charge

- To attend Death audit committee meeting for vector borne disease at DHS, Karanataka on 30.05.2015.
- To attend State level technical advisory committee for control of vector borne diseases at DHS, Bangalore on 17.06.2015.
- To attend Death audit committee meeting for vector borne disease at DHS, Karanataka on 22.07.2015.
- For Branch Officers Meeting and NCDC Anniversary celebration, NCDC Delhi from 05.08.2015 to 08.08.2015.
- To attend Youth day celebration at Indian Academy Institute, Bangalore on 18.08.2015.
- To attend Dengue control discussion at BBMP Bangalore on 27.08.2015
- To participate in scientific advisory committee meeting at ICMR, Belgaum (KA) from 15.09.2015 to 19.05.2015.

- Participated as a member of Technical Advisory Committee (TAC) on Vector borne diseases, and Dengue Death Audit Committee of Karnataka state attended meetings at DHS, Bangalore on of on 07.09.2015, 19.09.2015 and 28.09.2015
- To deliver guest lecture on Climatic change-Epidemic outbreaks in Karnataka their monitoring and Management at Environmental Management & Policy Research Institute (Govt. Of Karnataka) Bangalore on 04.12.2015.
- To participated in brain storming season of all India rodent control net work group meeting at IIHR, Bangalore on 25.01.2016.
- Participated in a review meeting chaired by Honorable Health Minister of Karnataka at Vikas Soudha, Bangalore on 03.02.2016.
- An inter-state meeting on KFD outbreak 40 Officers from Karnataka, Maharashtra, Goa, Kerala state &NCDC, Bangalore & Delhi at DHO, Office, Sindhudurg, district,(MH) on 03.03.2016.
- As faculty of training programme on Entomology at NCDC Delhi from 07.03.2016 to 09.03.2016.
- Combating Antimicrobial Resistance, A Public Health Challenges & Priority Sensitization conducted under IDSP Karnataka for State programme officers & Govt. & private Health institute at Hotel Capital, Bangalore on 18.03.2016.

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- Shyamal Biswas, R Ravi Kuma, K G Vaishnav, Shiv Kumar, K T Patel and Veena Mittal(2015) Study on the Impact of Insufflation and Residual Insecticide Spray against Rat Fleas and Present Susceptibility Status of Rodent Fleas to various Insecticides in Surat, Gujarat Journal of Communicable Diseases 47(3) 26 -32
- Shyamal Biswas, R Ravi Kumar, Shiv Kumar, Veena Mittal and A S Bhosle (2015) Susceptibility Status of Rat Flea, *Xenopsylla Cheopis* (Siphonaptera: Pulicidae) Vector of Human Plague against Organochlorine, Organophosphate and Synthetic Pyrethroids in Beed District, Maharashtra, India Journal of Communicable Diseases 47(3) 42-45
- Balakrishnan, N. , Katyal, Rakesh, Mittal , Veena and Chauhan, L.S.(2015) Prevalence of *Aedes aegypti* the vector of Dengue / Chikungunya fevers in Bangalore City, Urban and Kolar districts of Karnataka state. . Journal of Communicable Diseases 47(4)19-23.
- N. Balakrishnan, T.G.Thomas, Mala Chhabra and S.Venktesh (2016)
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5.3 NCDC, Jagdalpur Branch

Mr. Ram Dayal
Senior Statistical Officer

The National Centre for Disease Control Branch at Jagdalpur was established as Malaria Research Field Station in February 1979, under Field Operational Research Scheme (FORS) of Indian Council of Medical Research (ICMR), New Delhi. The area was chosen as it forms a contiguous tribal belt of Madhya Pradesh, Orissa and Andhra Pradesh and was hard-core for persistent malaria transmission. The scheme was established with the following objectives: i) To undertake in-depth study on ecology and biology of frank and potential vectors of malaria; ii) To devise and demonstrate strategies of integrated control of malaria in problem areas, and iii) To collect data for assessing the epidemiological response of malaria to control measures. The branch carried out:

- Identification of 23 Anopheline mosquito species, and establishment of two potent vectors of malaria, i.e. *An. culicifacies*, &*An. fluviatilis*,
- Synthetic Pyrethroid Insecticide trial,
- Anti malaria drug trial,
- Entomological studies pertaining to malaria and Susceptibility to insecticides and Outbreak investigations.
- The most important work carried out was training Medical officers & Health workers of Jagdalpur, Kanker and Dantewada districts of Bastar for prevention and control of malaria & other communicable diseases, under trained health manpower development.

From 1st. March 1988 this field station situated at a tribal area was taken-over by Government of India as a branch of NCDC, under Ministry of Health and Family Welfare, upon the recommendation of the High Power Board on Malaria. Thereafter, the scope of the branch has been widened to include studies on other communicable diseases like, acute diarrheal diseases, Viral hepatitis, Gastroenteritis, Anthrax, Dengue, Chikunguniya, Avian influenza and Viral fever along with Morbidity survey of tribal population. Epidemiological Investigation of Outbreaks & Deaths due to communicable diseases, are carried out not only in Madhya Pradesh, & Chhattisgarh, but also neighboring states of Orissa and Andhra Pradesh. The unit is involved in Yaws Eradication Programme, since its inception during 1996 and providing training materials and training to Medical Officers & Health Workers of Yaws affected districts of Chhattisgarh, Orissa, Andhra Pradesh, and Madhya Pradesh. Service activities and laboratory services like, Malaria Clinic and Water Bacteriology during epidemics are also provided.

a) The branch is of multipurpose in function and carry out various activities including investigation of out-breaks of communicable diseases, rendering expert advice to the states throughout the nation on matters pertaining to prevention and control of communicable diseases.
b) To assist the state health authorities in field investigations as may be undertaken by them and providing them with technical assistance wherever necessary.
c) To train personnel in Epidemiology and control of communicable diseases.

Routine activities undertaken during the period

i. IEC activities for prevention & control of Malaria, Acute Diarrheal Diseases, and other communicable diseases are under taken at Chhattisgarh.
ii. Collection and compilation of Epidemiological data of malaria & other communicable diseases.
iii. Health Education: live demonstration of mosquitoes during exhibition.

Research project

Studies on anopheline fauna and malaria prevalence in Bastar District of Chhattisgarh

Chhattisgarh state was created in 2000 out of the erstwhile Madhya Pradesh state. The state is divided in to 27 district and has a population of about 25 million of that about one-thirds are tribal. About 44% of the land is occupied by forest. Malaria is a major public health problem and the state contributes about 13% of the total malaria cases reported in the country. *An. culicifacies* is the dominant malaria vector species supported by *An. fluviatilis* in the hilly forested area of the state. Perennial and persistent transmission of malaria is well known in this state due to *Plasmodium falciparum*, efficient anthropophagic vectors, congenial climatic conditions for mosquito breeding, high man-vector contact, lack of awareness and low socio-economic condition.

It is reported that 17 anopheline mosquito species *i. e. An. aconitus, An. annularis, An. barbirostris, An.hyrcanus , An. jamesi, An. jeyporiensis, An. karwari , An. maculatus, An. pallidus*, *An. spendidus, An. tessellatus , An. theobaldi, An. vagus*, *An. varuna, An. culicifacies, An.fluviatilis* and *An. Subpictus* were encountered during 1980-1981 from the undivided Bastar district (Kulkarni 1990).

Deforestation and opening of new land in forest areas either for crop cultivation or settlement due to increase population have brought some changes in eco-environment, which influenced the transmission of disease resulting in some changes in some behavioral aspects of the malaria vector species. Thus it is essential to review the distribution and species composition of vector mosquitoes in the given areas for adopting any vector control strategy. The information on the incidence of malaria and prevalence of malaria vectors species in the Bastar district is decades old hence a study on epidemiological and entomological aspects of malaria should have to be undertaken.

Though the state /district health authorities are taking adequate control measures however, these measures may not be area specific hence not commensuration with the actual ecological niches created by the vector. No vector management tool is effective without undertaking comprehensive vector ecological studies

During the study upto April-May 2015, 06 Anopheline species mosquitoes were recorded i.e *An. Annularis -19, An. Pallidus-02, An. Vagus-45, An. Culicifacies-97, An .fluviatilis- 04* and *An. subpictus-352* were encountered, vector mosquitoes were dissected and no infection found.

A study on *Aedes aegypti* (L) in Jagdalpur & suburbs area dengue cases

Brief Report

Study Area : 06 wards of Jagdalpur town and adjoining rural localities, v*iz. Jawahar Nagar ward*, Sanjay Nagar ward, Provirchand ward, Shivmandir ward, Ramaiya ward & Palli village which are under Jagdalpur Municipal Corporation.

Survey for Aedes aegypti (L) has been carried out. Identification and preservation of emerged and collected mosquitoes carried out. During larval collections a total 217 *Aedes albopictus,* 05 *Aedes vittatus* and 101 *Aedes aegypti* mosquitoes were emerged out.

5.4 NCDC, Coonoor Branch

Dr.N.Balakrishnan
Joint Director & Officer in Charge

Broad Mandate

- To study the epidemiology of major communicable diseases prevalent in this area.
- To assist in investigations on the outbreak of communicable diseases in this region.
- To undertake studies on the taxonomy, biology, ecology, etc. of heaematophagus arthropods of public health importance.
- To maintain cyclic colonies of vector mosquito species and to supply on demand to academic and Public Health institutions for experimental purpose.
- To impart training to the public health/academic personnel on various aspects.

Units within the Branch/Division: NCDC, Field Station, Mettupalayam

Routine activities undertaken during the period

a) Maintenance of cyclic colonies of vector mosquitoes.
b) Maintenance of cyclic colonies of rat flea.
c) Entomological study of vector density in the Nilgiris, Tamil Nadu.

Brief description

The cyclic colonies of the following mosquito vectors are being maintained at Mettupalayam field station viz., *Culex quinquefasciatus* (Mettupalayam strain), *Aedes aegypti* (Kallar strain) and Anopheles stephensi (Mettupalayam strain). The specimens are being utilized for various laboratory experiments, training/demonstrations to visitors and also supplied to teaching/research institutions on demand.

The cyclic colonies of rat flea *Xenopsylla cheopis* (Delhi Strain is being maintained at NCDC, Coonoor. The specimens are being utilized for training and laboratory susceptibility tests against the various insecticides.

Research Projects

Title: Plague surveillance activities in the erstwhile Plague endemic areas of Nilgiris district, Tamil Nadu

The Nilgiris district of Tamil Nadu state has long been recognised as a potential plague endemic area due to the existence of favourable climatic conditions and a wide spectrum of rodents and flea fauna. In this district there are seven plague control units functioning under the control of DPH & PM, Government of Tamil Nadu to carry out anti plague measures. A Research Project has been initiated during 1992 by the NCDC, Coonoor branch in collaboration with five Plague Control Units, viz, Naduvattam, Ootacamund, Kotagiri, Coonoor and Manjoor situated in the Nilgiris district.

Duration of the project: since 1992

Collaborating institutions: Directorate of Public Health & Preventive Medicine (Govt. of Tamil Nadu), Chennai

Background/ Materials & methods/Key findings/Conclusion

The wild, peri domestic and commensal rodents trapped by these units from the erstwhile plague endemic areas were received by the NCDC, Coonoor branch. In the laboratory the rodents are being identified species wise and dissected out for the collection of blood sera, organ samples / organ smears. The ectoparasitic fleas were also collected from the rodent, identified and flea indices are being computed. The rodent blood sera and other biological materials are being processed, stored and further study aspects viz, haemagglutination test with rodent sera using Fraction I antigen of *Y. pestis*, microscopic examination / laboratory culture studies of organ smears/ samples were carried out. The test results obtained at regular intervals are being communicated to the State Health Authorities for undertaking appropriate control measures.

During the reporting period, a total of **579** rodents were trapped which includes viz. *Rattus rattus* **(459)** and *Bandicoota indica* **120.** (Table – 1). A total of **574** sera pools were prepared from the rodents.The test results show that none of the samples sent from this branch during the study period showed positivity against *Y.pestis.* The ectoparasitic fleas were collected from the rodents and identified and also flea indices were computed. During the study a total of **143** fleas comprising of *Xenopsylla cheopis* (**140)** and S*tyvalius Spp.* **(03)** were recorded. The total flea index and specific flea index of *Xe. Cheopis* were **0.24** and S*tyvalius Spp.* **0.01** respectively. **(Figure – 1).**

(a) The rodents sero & organ samples were tested for the evidence of plague antibodies and none of them found positive.
(b) Total and specific flea indices of *X.cheopis* were computed for the study area and found below the critical level.

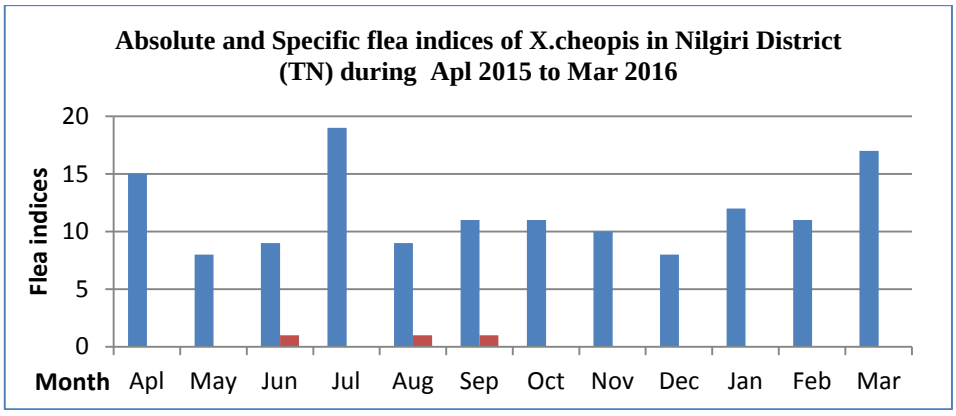
Relevance of the findings to national programme

The study results are being routinely conveyed to the State Health Authorities for undertaking further follow up measures. The plague surveillance results evident that the erstwhile endemic study area is free from rodent plague.

Table– 2: Particulars of rodents and flea collected from various Plague Units of Nilgiris from April 2015 to March 2016

Month	Plague Control Units				Total
	Coonoor		Ooty		
	Rr	Bi	Rr	Bi	
April	26	2	25	02	55
May	05	-	24	02	31
June	05	03	18	10	36
July	20	16	34	20	90
August	09	-	31	-	40
September	20	-	21	04	45
October	12	05	21	12	50
November	04	02	29	-	35
December	09	-	22	04	35
January	13	-	24	05	42
February	11	-	31	19	61
March	10	03	35	11	59
Total	**144**	**31**	**315**	**89**	**579**

Figure – 1



Manpower Development

Training on epidemiology, outbreak investigation of communicable disease & prevention and control of major public health problems to 83 students and 2 faculty members from PSG Nursing college, Coimbatore on 3rd Nov, 2015.

5.5 NCDC, Rajahmundry Branch

Dr K Regu
Joint Director & Incharge

Broad mandate

- Research, mainly operational research on different aspects of filariasis and other communicable diseases like Malaria, Dengue, Chikungunya, Yaws & STH etc.
- Training to various public health personnel on Lymphatic Filarisis.
- Provide services to public through Filarial & Malaria clinics.
- Supervision of ongoing National Disease Control Programmes and advise to State and NGOs.
- Apart from that other duties like outbreak investigations etc. being carried out as assigned.

Routine activities undertaken during the period:

- Training to various Public Health Personnel on Filariasis
- Running filaria day & night clinics
- To carry out research work on Filaria, Malaria & STH
- Outbreak investigation
- To help University students in project work
- Scientific publications in Journals.
- Supply of scientific materials to different Agencies.

Other Activities

This Centre is conducting two Filaria day clinics on all Thursdays and Fridays for the benefit of Filaria patients and One Night clinic on all Wednesdays for detection cum treatment of microfilariae carriers.

Night clinic for Micro filaria:	Total blood slides examined – 1095 Total blood slides found positive – Nil
Filaria Clinic :	Total no. of filaria cases treated - 4904 Total no. of old cases 2 times treated - 3809 Total no. of new cases treated - 1095
Malaria Clinic:	Total blood slides examined- 9 Total blood slides found positive-Nil S.P.R. -- Nil No. of PF cases -Nil
Cross checking of Filaria Slides from 18 NFCP units of Andhra Pradesh:	No. of Negative Slides cross-checked- 404 No. of Slides found positive for mf - nil Discrepancy per cent - nil
Lymphedema Morbidity Management Clinic:	Demonstration of Lymphoedema Morbidity Management procedure (maintenance of intensive local hygiene) taught to 292 patients.

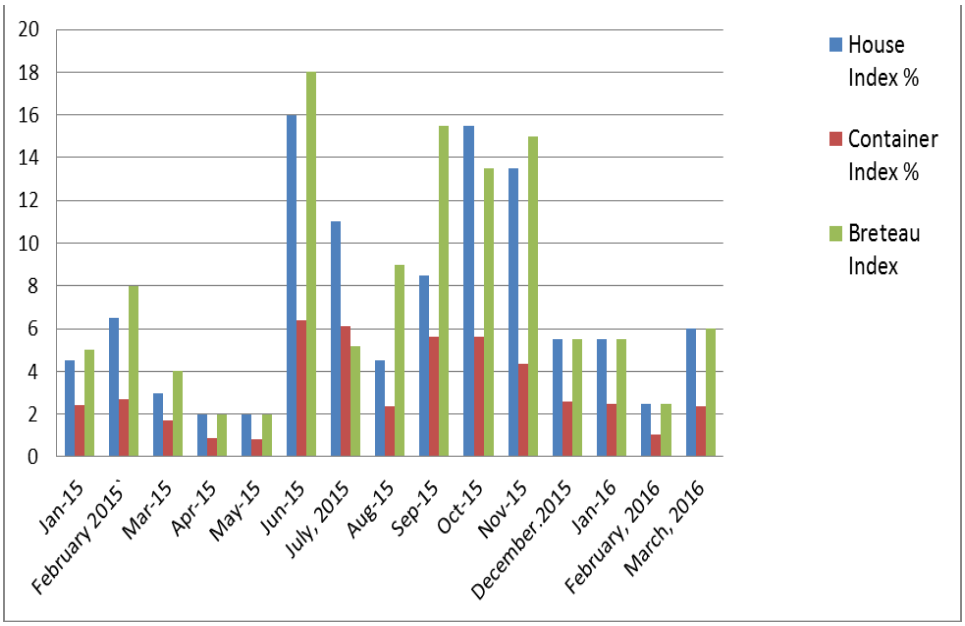
Research Project

I. Surveillance of Aedes species of mosquitoes, the vectors of Dengue/DHF and Chikungunya in different areas of Rajamahendravaram – 2015

Objectives: To monitor the Aedes larval indices in order to forecast the impending outbreak of Dengue/DHF/and Chikungunya in Rajamahendravaram town.

Month/ Year	No. of Houses surveyed	No. of Houses Positive	No. of Containers searched	No. of Containers positive	House Index %	Container Index %	Breteau Index
Jan, 2015	200	9	407	10	4.5	2.45	5
Feb, 2015	200	13	597	16	6.5	2.68	8
March, 2015	200	6	465	8	3	1.72	4
April, 2015	200	4	406	4	2	.9	2
May, 2015	200	4	471	4	2	0.8	2
June, 2015	200	32	560	36	16	6.42	18
July, 2015	200	22	423	26	11	6.14	5.2
Aug, 2015	200	9	381	9	4.5	2.36	9
Sept, 2015	200	17	551	31	8.5	5.62	15.5
Oct, 2015	200	31	482	27	15.5	5.60	13.5
Nov, 2015	200	27	690	30	13.5	4.34	15
Dec, 2015	200	11	425	11	5.5	2.58	5.5
Jan, 2016	200	11	447	11	5.5	2.46	5.5
Feb, 2016	200	5	477	5	2.5	1.04	2.5
March, 2016	200	12	507	12	6	2.36	6

Graph: *Aedes* larval indices in Rajahmahendravaram (Rajahmundry) town



II. A study to assess micro filarial Prevalence, intensity of infection and transmission among hostel students and the community around the hostels of East Godavari district, A.P.

Objectives

- To identify mf carriers, mf rate and mf density among students in hostels run by the Social Welfare Department and the community around the hostels in East Godavari district, Andhra Pradesh.
- To study the vector infection and infectivity rates in the hostel and the community around.
- To study the relation between the sleeping behavior and mf positivity among the hostel students.

Key findings: Out of 3 areas studied 1 area, Peddapuram (community around hostel) reported mf rate of 1.81%. 30 mosquitoes (*Culex quinquefasciatus*) were collected. All mosquitoes dissected for filarial infection. All negative for microfilaria.

Conclusion: Conducted survey in 2 areas hostels. Found 0.24 mf rate in one hostel. Survey conducted at 3 areas surrounding hostels and found 1.81% mf rate at one area.

Hostels and surrounding area data for 2015-16

S. No	Hostel/ Village Name	No. of smears collected	No. of smears Positive	MF Rate	Hostel surrounding area	No. of smears collected	No. of positive	MF Rate
1	**--**	**--**	**--**	**--**	**Peddapuram**	**220**	**04**	1.81
2	**Kakinada**	**421**	**Nil**	**Nil**	**Kakinada**	**132**	**Nil**	Nil
3	**Pitapuram**	**409**	**1**	**0.24**	**Pitapuram**	**257**	**Nil**	Nil
Total		**830**	**1**	**0.12**	**Total**	**809**	**4**	0.49

III. Study on the present status of microfilariae, intensity of infection and filarial transmission in East Godavari District.

Objectives

- To assess the present status of microfilaria prevalence and its intensity.
- To find out the infection and infectivity rates in the vector and intensity of transmission.

Name of the Village	Blood Smears Collected	Blood Smears Positive for MF	MF Rate	Disease Rate
Pasalapudi	519	2	0.38	0.32
Peddapuram	305	--	--	--
Total	**824**	**2**	**0.24**	**0.12**

Key findings: 824 Blood smears collected from 2 areas out of which Pasalapudi reported 2 mf carriers. Pasalapudi reported the mf rate is 0.38%. 25 Culex quinquefasciatus mosquitoes were dissected for filarial infection. All negative for microfilaria.

IV. Surveillance of Aedes species of mosquitoes, the vectors of Dengue/DHF and Chikungunya in different areas of East Godavari and West Godavari District.

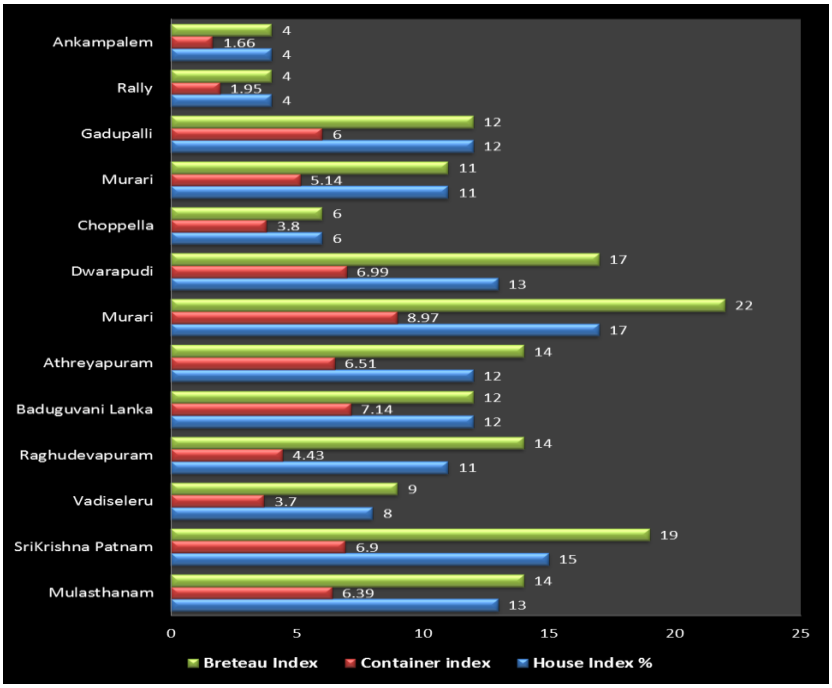
Objectives: To monitor the *Aedes* larval indices in order to forecast the impending outbreak of Dengue/DHF/and Chikungunya in East Godavari and West Godavari districts. The studies were conducted in month of October 2015 to March 2016.

East Godavari District :

S. No.	Name of the area visited	No.of Houses searched	No. of Houses Positive	No. of Containers searched	No. of Containers positive	House Index %	Container index	Breteau Index
1	Mulasthanam	100	13	219	14	13	6.39	14
2	SriKrishna Patnam	100	15	273	19	15	6.9	19
3	Vadiseleru	100	8	243	9	8	3.7	9
4	Raghudeva-puram	100	11	316	14	11	4.43	14
5	Baduguvani Lanka	100	12	168	12	12	7.14	12
6	Athreyapuram	100	12	215	14	12	6.51	14
7	Murari	100	17	245	22	17	8.97	22
8	Dwarapudi	100	13	243	17	13	6.99	17
9	Choppella	100	6	157	6	6	3.8	6
10	Murari	100	11	214	11	11	5.14	11
11	Gadupalli	100	12	200	12	12	6	12
12	Rally	100	4	205	4	4	1.95	4
13	Ankampalem	100	4	209	4	4	1.66	4

Aedes larval survey conducted in 13 villages of East Godavari district and found House Index above 10% in 9 villages and Breteau Index above 20% in 1 village. The results were intimated to local health authorities to take necessary action.

***Aedes* larval indices of East Godavari District**

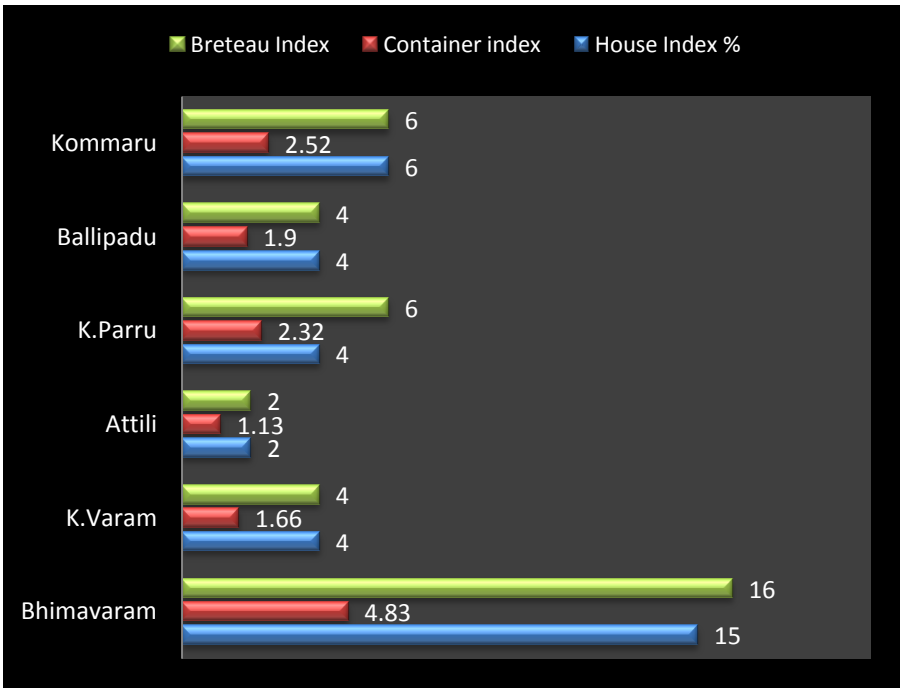


West Godavari District:

S. No	Name of the area visited	No.of Houses searched	No. of Houses Positive	No. of Containers searched	No. of Containers positive	House Index %	Container index	Breteau Index
1	Bhimavaram	100	15	331	16	15	4.83	16
2	K.Varam	50	2	120	2	4	1.66	4
3	Attili	50	1	88	1	2	1.13	2
4	K.Parru	50	2	129	3	4	2.32	6
5	Peravali	50	0	136	0	0	0	0
6	Chivatam	50	0	117	0	0	0	0
7	Ballipadu	50	2	105	2	4	1.9	4
8	Kommaru	50	3	119	3	6	2.52	6
9	Satyavada	50	0	114	0	0	0	0

Aedes larval survey conducted in 9 villages of West Godavari district and found House Index above 10% in 1 village. The results were intimated to local health authority to take necessary action.

***Aedes* larval indices of West Godavari District**

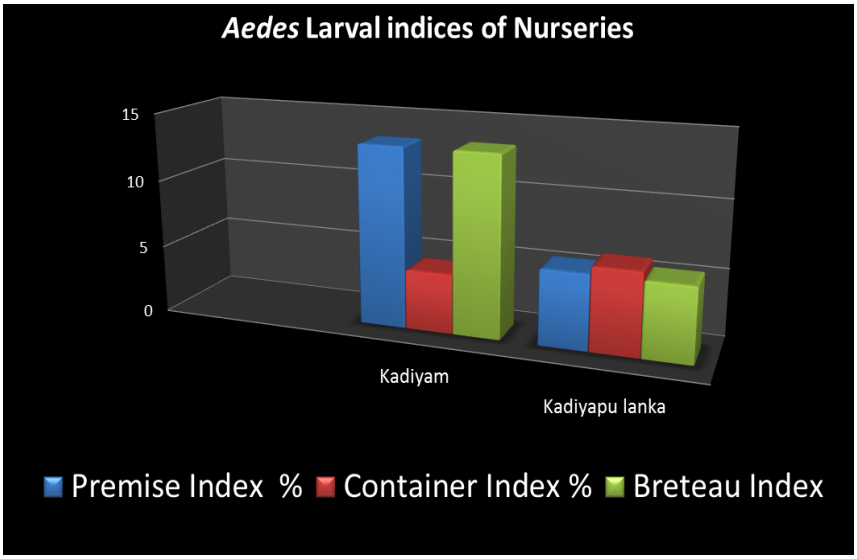


V. Surveillance of Aedes species of mosquitoes, the vectors of Dengue/DHF and chikungunya in plant nurseries of East Godavari District of Andhra Pradesh.

Objectives: To assess the breeding potential and breeding habits of Aedes mosquitoes in nurseries, during pre& post monsoon seasons.

***Aedes* Larval survey in Plant Nurseries in East Godavari District**

S. No	Name of the area visited	No.of Nurseries searched	No. of Nurseries Positive	No. of Containers searched	No. of Containers positive	House Index %	Container index	Breteau Index
1	Kadiyam	15	2	45	2	13.33	4.44	13.33
2	K .Lanka	18	1	15	1	5.55	6.66	5.55



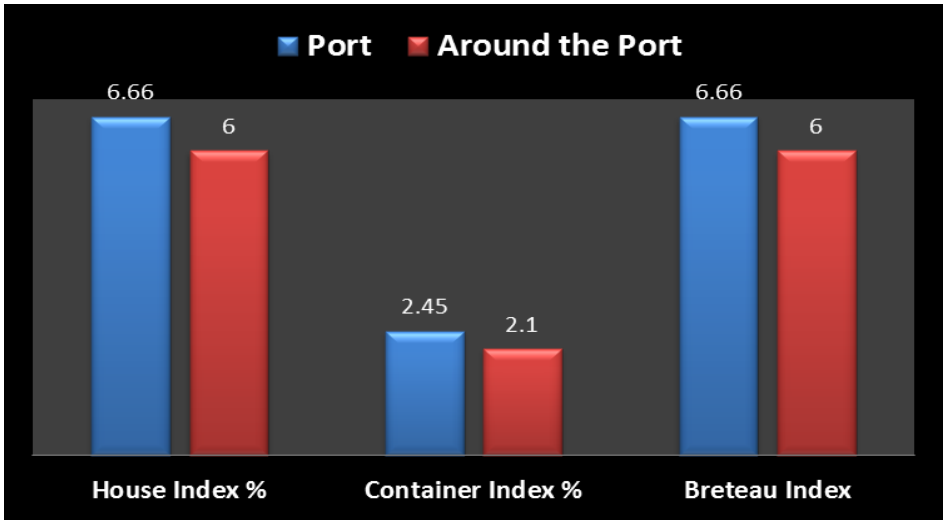
The major breeding sources were plastic containers and *Aedes aegypti* is predominant species.

Major Contributions of the organization

A. Surveillance of Aedes species of mosquitoes , the vectors of Yellow fever,Dengue/DHF, chikungunya and Zika virus in Vishakhapatnam Sea Port headed by Dr. L.J. Kanhekar, Joint Director, NCDC, Delhi.

S. No	Name of the Area	No. of premises searched	No. of premises positive	No. of containers searched	No. of containers positive	House Index %	Container Index %	Breteau Index
1	Port	45	3	122	3	6.66	2.45	6.66
2	Around the Port	100	6	285	6	6	2.10	6

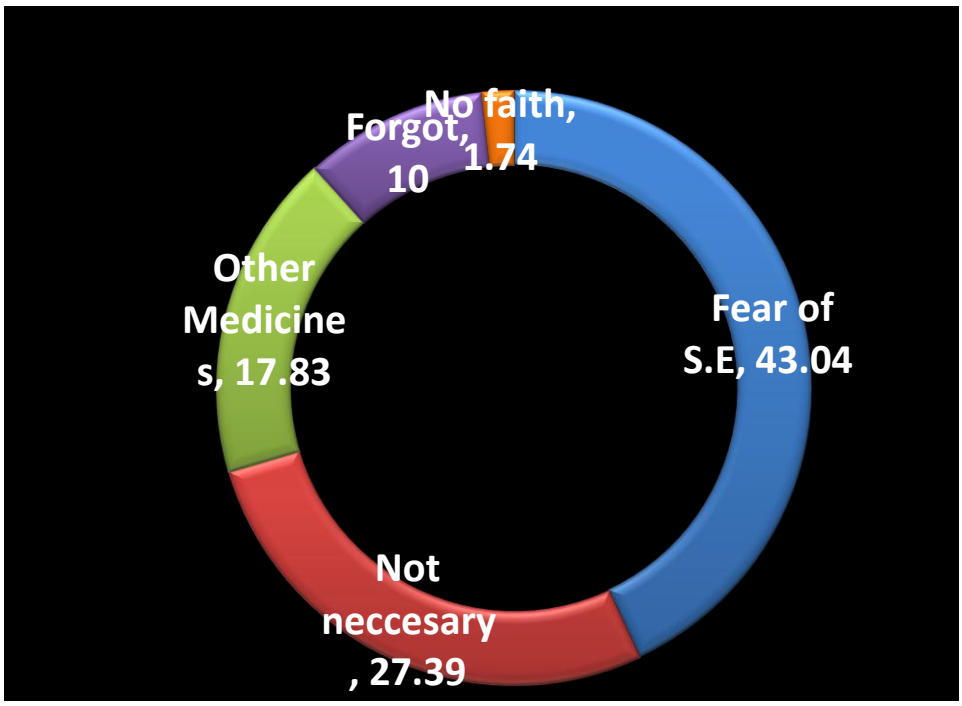
Aedes **larval indices in Vishakhapatnam Sea Port and around the port**



2. MDA Compliance study in West Godavari district.

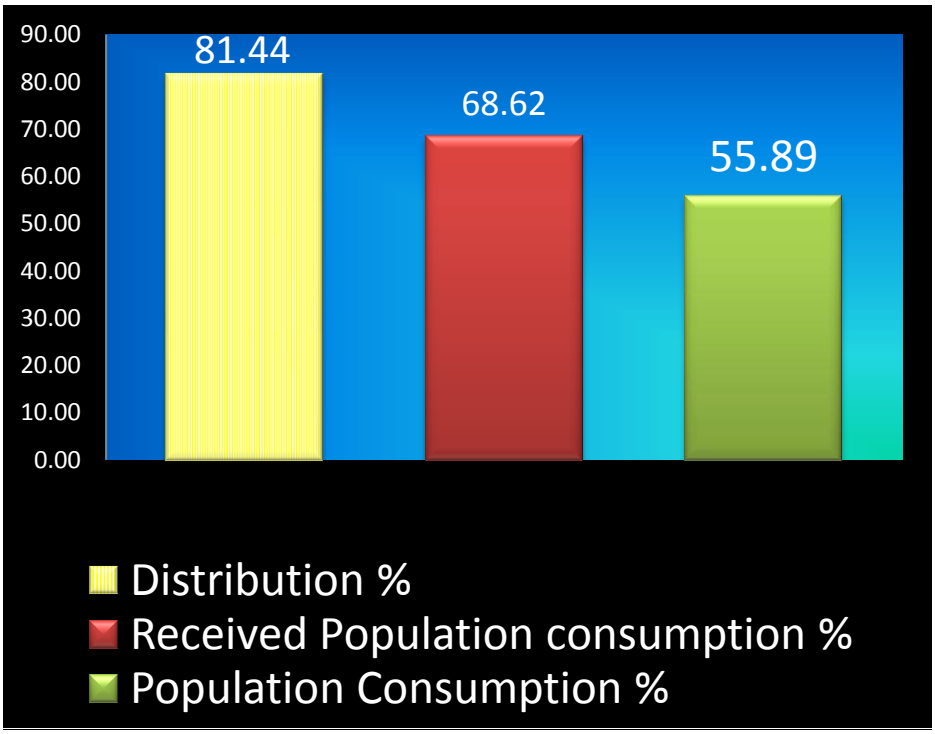
S.No	Name of the Area	No.of Persons Interviewed		Total	Received Drug		Total	Not Received	Consumption		Total	Not Swallowed		Distribution %	Received Population consumption %	Population Consumption %
		M	F		M	F			M	F		M	F			
1	URBAN	54	126	180	37	89	126	54	22	57	79	15	32	70	62.70	43.89
2	RURAL	254	466	720	217	390	607	113	147	277	424	71	112	84.31	69.85	58.89
GRAND TOTAL		308	592	900	254	479	733	167	169	334	503	86	144	81.44	68.62	55.89

Reasons of non-consumption by the respondents



Results: MDA Compliance study conducted in 6 urban areas of West Godavari. Distribution rate 70%. Received population consumption rate 62.7% and 24 villages in rural areas of West Godavari. Distribution rate 84.31%. Received population consumption rate 69.85%. The overall Distribution and Received population consumption rate is 81.44% and 68.62% respectively.

Overall Distribution, Received Population and consumption % in West Godavari District



Manpower Development

- Ten days training course on L.F elimination of the personnel involved in NFCP & UMS to 7 Filaria Inspectors & technicians on Elimination of Lymphatic Filariasis programme from 01-12 June, 2015. The trainings help to update knowledge on the ongoing malaria/filarial control and general awareness

- Five days training on L.F for M.O/Biologist/Entomologist / District Programme Officers to 13 Medical Officers from 17 – 21 Aug, 2015. The trainings helps to update knowledge on the ongoing malaria/filarial control and general awareness

5.6 NCDC, Kozhikode Branch

Dr K Regu
Joint Director & Officer Incharge
Dr. R.Rajendran
Deputy Director

Broad mandate

- Training and Capacity building
- Research
- Specialized services and
- Outbreak investigation and control

Units within the Branch

- B. Malayi Research Unit, Cherthala (BMRU), Alappuzha district, Kerala

Routine activities undertaken during the period

- Non scheduled One Day Lecture cum Demonstration Classes on Lymphatic Filariasis: Brief description: One day Lecture cum Demonstration Classes for Nursing students/Health Inspectors/Junior Health Inspectors/Junior Public Health Nurses/ Sanitary Inspector course students, Science students etc are imparted.
- Research on lymphatic filariasis relevant to B.malayi infection/ other vector born diseases.
- Investigation on the outbreaks of dengue, Japanese encephalitis, chikungunya etc.

Main activities

- Research in Lymphatic Filariasis and other Communicable diseases
- Training to Medical Officers/Biologists and Para Medical staffs about Lymphatic Filariasis and its elimination and other vector born diseases.
- Diagnosis and treatment of microfilaria carriers and management of filarial patients through filaria clinics
- Entomological surveillance of vectors of Filariasis, Dengue, Chikungunya, Yellow fever, Zika virus, Japanese encephalitis etc.
- Outbreak investigation of communicable diseases
- One day lecture cum demonstration classes on lymphatic filariasis and other vector borne diseases to Medical students, Homeo Medical students, Nursing students, Health Inspectors, Junior Health Inspectors, Public Health Nurses, Arts and Science students, Sanitory Inspector students, etc

Other activities

- Day clinic: Twice in a week, Mondays and Tuesdays for treatment of new and old filaria cases- 1173 patients attended the clinic.
- Night Clinic: Once in a week i.e. Thursday for collection /examination of night blood smear from individuals attending the night clinic. 103 Blood smears were tested and all are negative.
- Clinico-parasitological and entomological surveys
- Evaluation of Yaws Eradication Programme in Andhra Pradesh, Tamil Nadu and Telangana
- Regular collection of mosquitoes and larva of vectors of filariasis
- As a referral Centre of Lymphatic filariasis, cases are referred from Medical Colleges and other Health Institutions of the locality for Diagnosis and treatment
- Supply of study materials like mosquitoes, mosquito larvae to Academic and Research Institutions
- Identification services on insects of public health importance

The month wise attendance of patients in the Filaria clinics

Month/Year	Day clinic Patients attended	Night clinic Examined
April	109	5
May	92	5
June	116	6
July	93	23
August	106	12
September	103	0
October	94	2
November	86	9
December	96	3
January	94	19
February	104	0
March	80	19
Total	**1173**	**103**

- Supply of preserved material

1. Govt.Medical College Calicut & Thrissur: mf. Slides, vector mosquitoes
2. Homeo Medical College, Calicut: mf. slides & vector mosquitoes
3. Health & Family Welfare Trg. Centre, Calicut: mf. slides and vector mosquitoes
4. MES Medical College, Perithalmanna: Mf slides and vector mosquitoes

- Supply of other material-like preserved mosquitoes and larvae, stains, teaching materials etc. to Medical colleges, Nursing colleges, Universities, Arts & Science Colleges, Schools, and other research institutions as per request
- Filariasis Diagnostic services: 53 Blood samples mostly from acute stage of lymphedema patients were sent to the Department of Biochemistry, Mahatma Gandhi Institute of Medical Sciences, Sevagram, Wardha, Maharashtra for detection of filarial antibodies and antigen. Out of this 25 were positive for filarial antibodies of *Wuchereria bancrofti*. Necessary advice and treatment were provided to the patients.

Major achivements

- The Officers of this branch are involved in the review and updating of the reports and records of Yaws Eradication Programme in Andhra Pradesh, Telangana and Tamil Nadu . They acted as Expert Members in the International Commission of WHO for certification and visited the states of Tamil Nadu and Andhra Pradesh.
- Two Scheduled training courses in Filariasis conducted – One each for Medical Officers/Biologists (5 Working days) and Filaria Inspectors/Technicians (10 working days)- Total Participants- 39
- One day lecture cum demonstration classes on lymphatic filariasis and other vector borne diseases to Medical students, Homeo Medical students, Nursing students, Health Inspectors, Junior Health Inspectors, Public Health Nurses, Arts and Science students, Sanitory Inspector students, etc – 17 days - 384 participated
- Guidance to M.Sc students: Three M.Sc Medical Microbiology students from Kannur University have carried out dissertation works from December 2015 to March 2016 for their partial fulfillment of M.Sc degree.
- Follow up of land for establishment of NCDC branches: At Thiruvananthapuram, the capital city of Kerala, 1.5 acres of land was already identified by the Govt. of Kerala at Iranimuttam of Thiruvananthapuram Corporation and is in final stages of allotment. Similarly land for

establishment of branches at Chennai of Tamil Nadu, Amaravathi (Guntur) of Andhra Pradesh, and Hyderabad of Telangana is followed up by the officers of this branch and are in different stages of approval.

- Filaria Clinics : Day clinic - Twice in a week, Mondays and Tuesdays for treatment of new and old filaria cases- 1173 patients attended the clinic. Night Clinic: Once in a week i.e. Thursday for collection /examination of night blood smear from individuals attending the night clinic. 103 Blood smears were tested and all are negative.
- MDA against filariasis in Kerala: As part of the implementation of Mass Drug Administration against Lymphatic Filariasis with DEC + Albendazole combination in Kerala, classes on Lymphatic filariasis and its elimination imparted to 250 Medical Officers, 240 Health Inspectors/Health Supervisors/Junior Health Inspectors/Junior Public Health Nurses and 300 drug distributors of Palakkad, Malappuram and Kasaragod districts, where the MDA programme was implemented during December 2015 and January 2016. Evaluation of the drug distribution coverage and consumption coverage and reasons for non consumption etc were done and the results given to the State Health Authorities for improvement of the programme.
- Zika virus disease vector Surveillance: Following outbreaks of Zika virus disease in Brazil and other South American and Caribbean countries, the WHO has declared global public health emergency and Govt. of India has declared National public health emergency. Eight Foot Ball teams including a team from Brazil visited Kozhikode during February 2016 for the Nagji International Foot ball Tournament. As team of players from Brazil, the most affected country with Zika virus disease, vector surveillance activities were undertaken by this branch in collaboration with the District health authorities in and around the places of their stay, places of practice and tournament, places of their visit, etc and the finding intimated to the district and state health authorities for remedial measures.
- Yellow fever vector surveillance in and around International Airports (Kozhikode , Kochi and Thiruvananthapuram and Cochin Seaport of Kerala and Tiruchirapalli Airport and Tuticorin Seaport of Tamilnadu during Pre monsoon and Post monsoon periods. The findings were intimated to the concerned Airport/Seaport and other local health authorities for remedial measures.
- Surveillance of Aedes species of mosquitoes, the vectors of dengue and chikungunya in different parts of Alappuzha and Kozhikode districts. The findings of the studies were intimated to the local health authorities from time to time, which helped to prevent outbreak of dengue in these districts
- Cross checking of filaria blood slides received from District Vector Control Units of Kerala. A total of 3555 slides were received, cross checked and the results with necessary recommendations & suggestions were intimated to the concerned DVC Units for improvement
- Extension activities: Resource support to other institutions, public health intervention activities ec.
- Holding additional charge of NCDC Rajahmundry branch: The officer in charge of NCDC, Kozhikode is holding additional charge of NCDC, Rajahmundry branch and looked after the various training, administrative and technical activities of the branch.

Research

- **Study to monitor the *Aedes* larval indices in Alappuzha and Kozhikode districts**

Monthly *Aedes* larval indices were monitored in Alappuzha and Cherthala towns of Alappuzha district and Kozhikode Corporation of Kozhikode district. *Aedes albopictus* is the predominant species encountered from all the three towns. Alappuzha and Cherthala towns are free from *Ae. Aegypti* and Kozhikode town reported both. The breeding indices were high and above the critical levels from June to November of the year.

***Aedes* larval indices in Urban and Rural areas of Alappuzha district**

Locality	Houses	+ve	Containers	+ve	HI %	CI %	BI
Urban	840	108	2222	167	**12.85**	7.51	19.88
Rural	400	40	1090	54	**10.0**	4.95	13.5
TOTAL	**1240**	**148**	**3312**	**221**	**11.93**	**6.67**	**17.82**

***Aedes* larval indices in urban and rural areas of Alappuzha district**

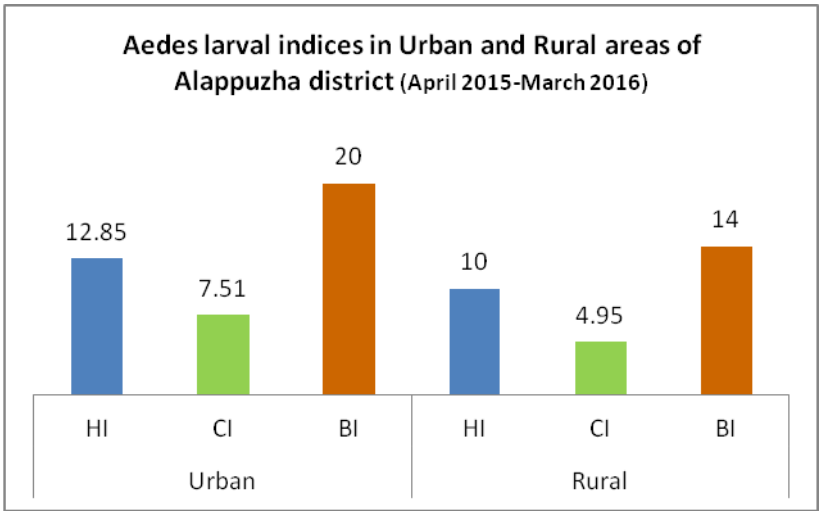
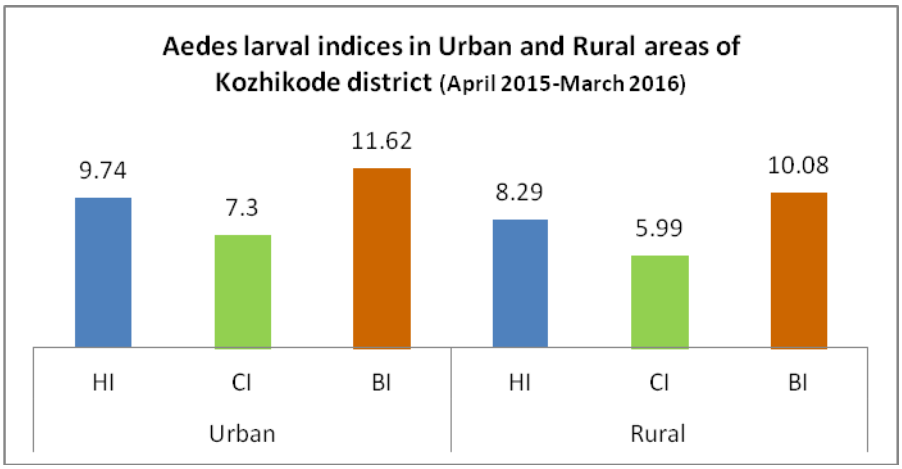


Table : *Aedes* larval indices in Urban and Rural areas of Kozhikode district.

Locality	Houses	+ve	Containers	+ve	HI %	CI %	BI
Urban	2021	197	3216	235	9.74	7.30	11.62
Rural	892	74	1501	90	8.29	5.99	10.08
TOTAL	**2913**	**271**	**4717**	**325**	**9.30**	**6.88**	**11.15**



- **Surveillance of *Aedes aegypti*, the vector of yellow fever, dengue, Chikungunya and Zika virus In and around International Airports and Seaports of Kerala & Tamil Nadu (Pre & Post monsoon)**

As per International Health Regulations, the areas in and around the airports and seaports should be free from *Aedes* mosquitoes and its breeding. To ascertain the larval indices in and around international airports and seaports of Kerala and Tamil Nadu surveys were carried out during pre-monsoon and post monsoon periods and the results of the surveys during the year 2015-16 are as follows:

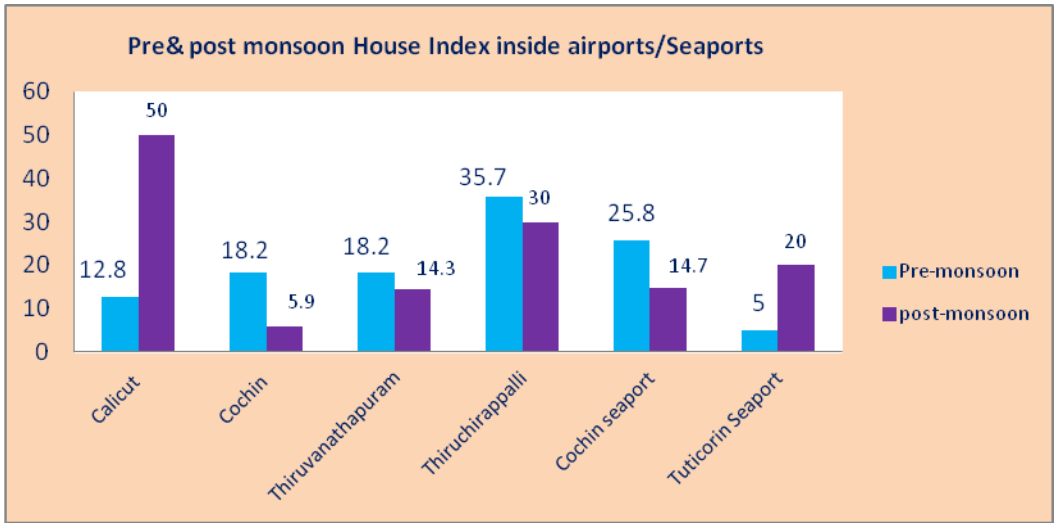
Pre -monsoon-*Aedes* larval indices inside & around International Airports/Seaports of Kerala & Tamil Nadu (May 2015)

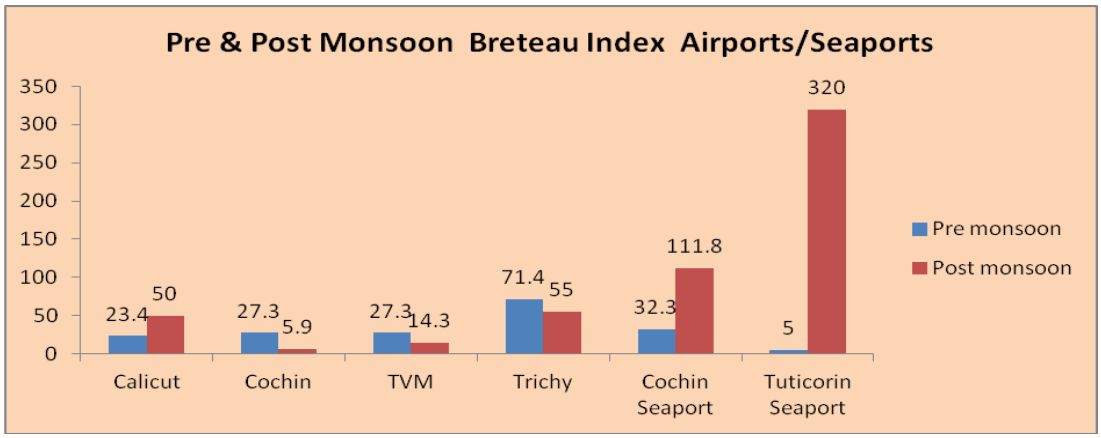
	Inside			**Around**			
Airport/Seaport	HI %	CI %	BI	HI %	CI %	BI	Species
Kozhikode Airport	**12.8**	8.7	**23.4**	**11.9**	20.3	11.9	*Ae.albopictus*
Cochin Airport	**18.2**	3.9	**27.3**	**14.56**	10.06	**32.03**	*Aedes aegypti & Ae.albopictus*
Thiruvanthapuram Airport	**18.2**	5.5	**27.3**	8.0	3.50	5.40	*Aedes aegypti & Ae.albopictus*
Thiruchirapally Airport	**35.7**	**19.2**	**71.4**	**19.0**	8.4	**22.0**	*Aedes aegypti* **&** *Ae.albopictus*
Cochin Seaport	**25.8**	2.5	**32.3**	9.0	6.9	12.0	*Ae.albopictus*
Tuticorin Seaport	5.0	2.9	5.0	**33.00**	12.4	**39.0**	*Aedes egypti, Ae.albopictus & Ae.vittatus*

Table: Post Monsoon *Aedes* larval indices inside & around International Airports/Seaports (November-December 2015)

	Inside			**Around**			
Airport/Seaport	HI%	CI %	BI	HI %	CI %	BI	Species
Calicut Airport	**50.0**	15.8	**50.0**	8.7	12.8	9.3	*Ae.albopictus*
Thiruvanthapuram Airport	**14.3**	10.0	14.3	**11.2**	4.8	11.2	*Ae.albopictus*
Cochin Airport	5.9	1.2	5.9	8.0	4.1	8.0	*Ae.albopictus*
Thiruchirapally Airport	**30.0**	20.8	**55**.0	**19.1**	12.6	**25.2**	*Ae. ageypti & Ae.albopictus*
Cochin Seaport	**14.7**	10.4	**111.8**	1.9	0.9	1.9	*Ae.albopictus*
Tuticorin Seaport	**20.0**	54.2	**320**	**16.4**	19.5	**34.6**	*Aedes aegypti & Ae.albopictus*

Pre and post monsoon *Aedes* larval indices inside Airports/Seaports of Kerala and Tamilnadu





The post monsoon surveillance in and around the airports and seaports showed that the Breteau index is above critical level in Tuticorin Seaport only.

Following the declaration of global and National Public Health Emergency against Zika virus, another survey was conducted during February 2016 also and the results are as below:

Table: Surveillance of *Aedes aegypti*, the vector of yellow fever, dengue, Chikungunya and Zika virus at International Airports and Seaport of Kerala & Tamil Nadu (Feb 2016)

Airport/Seaport	Inside			Around			Species
	HI %	CI %	BI	HI %	CI %	BI	
Kozhikode Airport	0	0	0	1.3	4.0	1.3	*Ae.albopictus*
Cochin Airport	0	0	0	4.0	3.8	4.0	*Ae.albopictus*
Thiruvanthapuram Airport	4.3	9.4	12.8	4.8	3.1	4.8	*Ae.albopictus*
Thiruchirapally Airport	**0**	**0**	**0**	13.9	4.4	15.8	*Aedes aegypti* & *Ae.albopictus*
Cochin Seaport	5.0	**43.70**	**116.7**	0.9	0.6	0.9	*Ae.albopictus*
Tuticorin Seaport	0	0	0	9.0	3.9	11.0	*Aedes aegypti* & *Ae.albopictus*

***Aedes* larval indices around Airports and Seaports during May 2015, Nov 2015 & February 2016 :**

Inside of all airports and seaports except Cochin Airport was free from *Aedes* larval breeding during February 2016. However breeding was detected from outside (within 200 to 400 meters) of all the airports and seaports and the indices were high in Cochin and Thiruchirapalli airports and Tuticorin seaport. The findings were intimated to the concerned authorities then and there for necessary action.

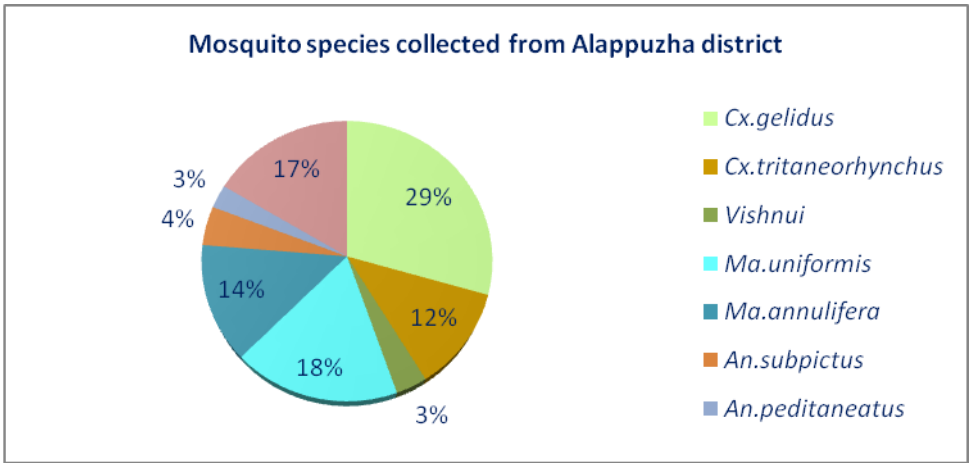
- **Entomological surveillance of vectors of JE in Alappuzha district (Vayalar) Rural**

As part of JE vector surveillance in Alappuzha district we are doing the monthly mosquito collection in Alappuzha district and the mosquitoes species collected during April 2015 to March 2016 are as follows.

Table: Monthly Vector species collection from Alappuzha district

Species	May	Jun	Jul	Aug	Nov	Jan	Feb	Mar	**Total**
Cx.gelidus	25	28	32	28	26	19	21	19	**198**
Cx.tritaneorhynchus	8	10	8	12	9	12	9	12	**80**
Vishnui	3	2	3	4	3	3	2	3	**23**
M.uniformis	16	15	12	15	16	16	16	15	**121**
M.annulifera	9	12	9	10	12	12	12	14	**90**
An.subpictus	4	4	5	4	0	4	4	5	**30**
An.peditaneatus	2	3	3	2	2	2	3	2	**19**
Ar.sabalbatus	14	15	12	14	15	15	12	15	**112**
TOTAL	**81**	**89**	**84**	**89**	**83**	**83**	**79**	**85**	**673**

Entomological surveillance of vectors of JE from Alappuzha district



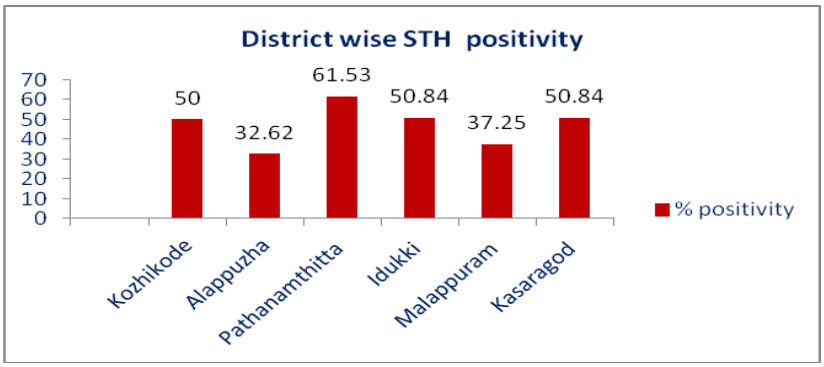
- **Soil Transmitted Helminthes study in different parts of Kerala**

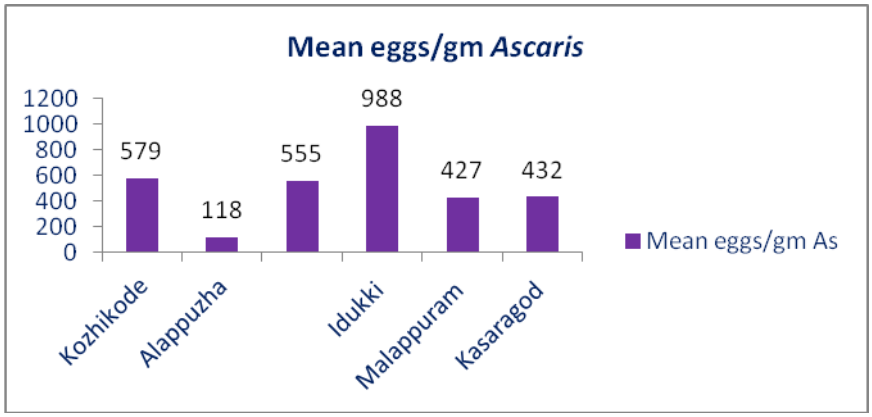
Study on Prevalence and Intensity of STH in school children of 9 to10 years in Alappuzha, Malappuram, Idukki, Pathanamthitta, Kozhikode and Kasaragod districts of Kerala were conducted. Stool samples were collected from students of 4th & 5th standards (8-10 age groups) and examined using Kato-Katz test kit. The results of the study are as follows:

Fig: Districts covered in Soil Transmitted Helminthes study in Kerala

Table: Soil Transmited Helminth prevalence and intensity of infection in districts of Kerala

Name of the district	Samples collected	Samples positive			% positivity	Mean eggs/gm		
		As	TT	HW		As	TT	HW
Kozhikode	60	30	0	0	50.0	579	0	0
Alappuzha	236	77	1	0	32.62	118	120	0
Pathanamthitta	52	32	0	0	61.53	555	0	0
Idukki	59	30	1	0	50.84	988	312	0
Malappuram	51	19	0	0	37.25	427	0	0
Kasaragod	59	30	0	0	50.84	432	0	0
TOTAL	**517**	**218**	**2**	**0**	**42.17**	**435**	**216**	**0**





The results were intimated to the local Health authorities for treatment of the students with infection.

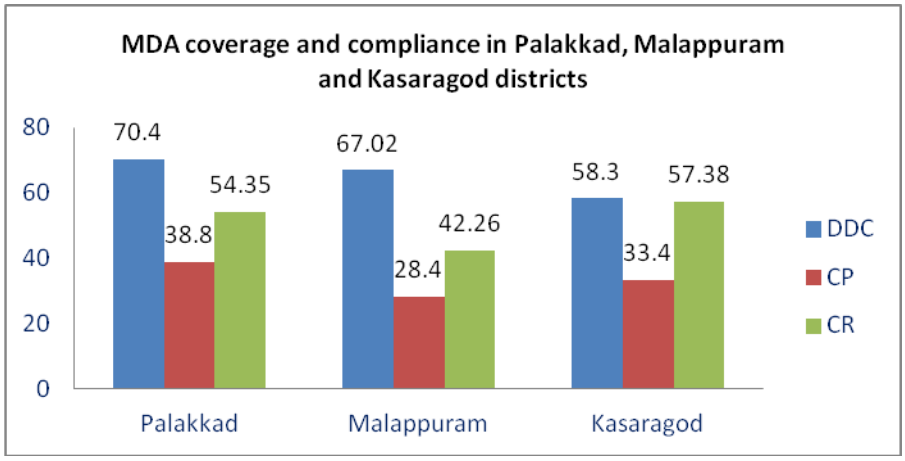
- **Study on coverage and compliance of MDA in Palakkad, Malappuram and Kasaragod districts.**

The MDA programme to eliminate lymphatic filariasis was implemented in 3 districts- Palakkad, Malappuram and Kasaragod of Kerala during December 2015 & January 2016. The post MDA drug coverage and compliance study were conducted in 30 wards each of Palakkad, Malappuram and Kasaragod districts.

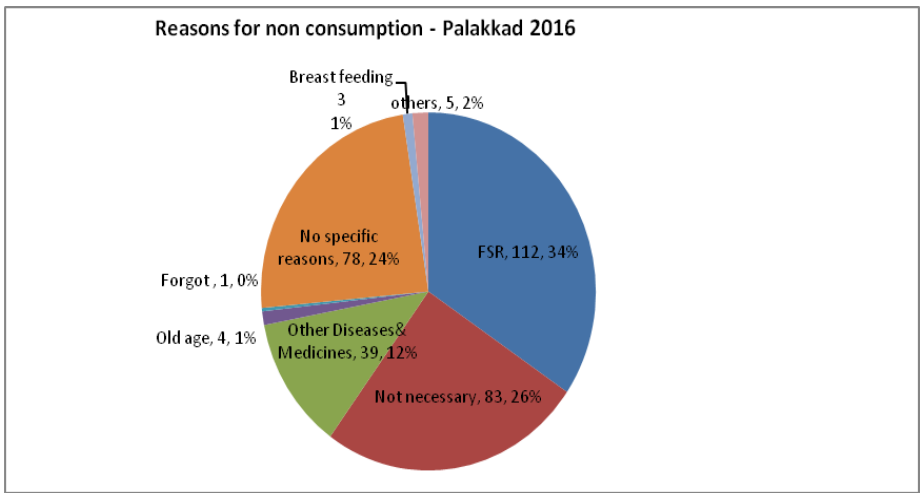
Table: Coverage and compliance study in Palakkad, Malappuram and Kasaragod

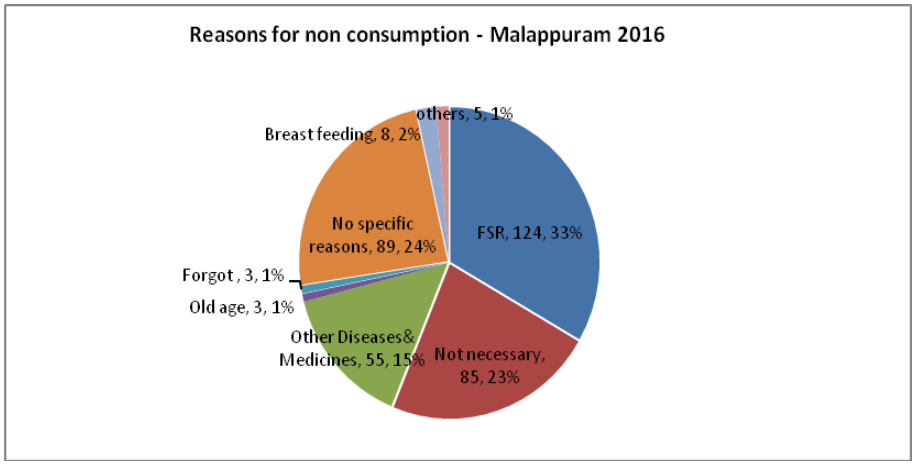
Sl No	District	Population Interviewed	Population Received Drugs	Population Consumed Drugs	Drug distribution %	Drug consumption %(Population)	Drug consumption % (in terms of receipt)
1	Palakkad	915	644	355	70.4	38.8	55.1
2	Malappuram	961	646	273	67.02	28.4	42.3
3	Kasargode	930	542	311	58.3	33.4	57.4
		2806	1832	939	65.29	33.5	51.1

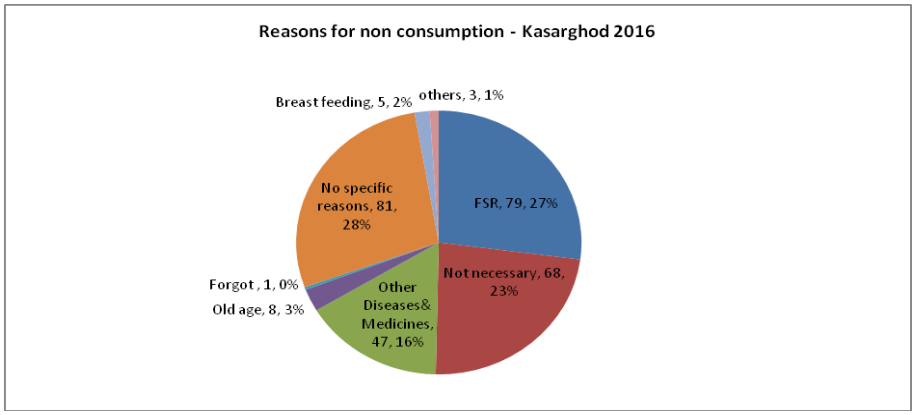
Fig: MDA Drug coverage and compliance in Kerala-2016



*DDC-Drug Distribution Coverage, CP- Consumption in terms of Population, CR-Consumption in terms of receipt







- **Study on present status of microfilaria prevalence and transmission in Kerala**

A total of 4370 blood smears were collected from 5 endemic districts, of which 31 microfilaria positive cases (0.71%) were detected. The microfilaria rate ranged from 0 to 1.85%. The details are given below :

Table: Parasiltological survey in different parts of Kerala

District	No.of blood smears collected	Microfilaria positive	Mf %
Thiruvanathapuram	1441	4	0.28
Palakkad	1021	16	1.57
Malappuram	540	10	1.85
Kannur	872	1	0.11
Alappuzha	490	0	0
Total	**4364**	**31**	**0.7**

Filarial infection in Mosquito vectors:

Entomological studies were conducted in different parts of Palakkad districts to assess filarial infection status of mosquitoes. A total of 773 *Culex quinquefasciatus* mosquitoes were dissected and 11 of them were found positive for filarial infection. The vector infection rate and infectivity rates were 1.40% and 0.12% respectively.

Outbreak investigated

1. Investigation of Dengue in Pallipuram Panchayat of Alappuzha district

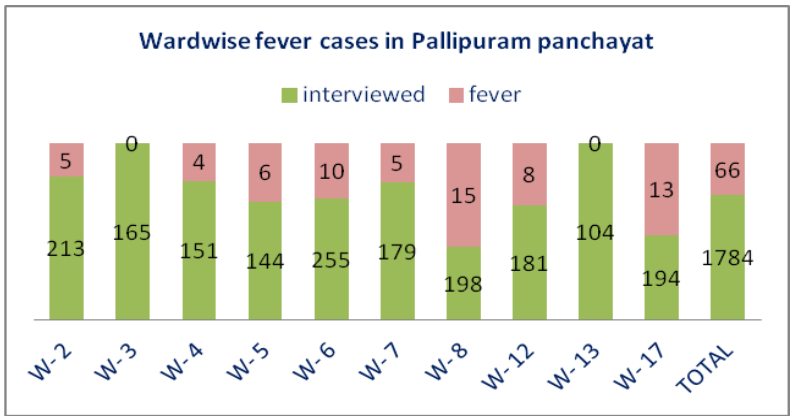
A focal outbreak of dengue fever was reported in Pallipuram grama panchayat area of Alappuzha district in Jan-Feb 2016. A total of 4 confirmed dengue cases were reported. The district health authorities have implemented various control activities in this Panchayat. Therefore, to assess the gravity of the problem, an epidemiological and entomological investigation was carried out from 9.3.2016 to 11.3.2016. The results of the study are as follows:

Table: Fever incidence in Pallipuram panchayat within last one month

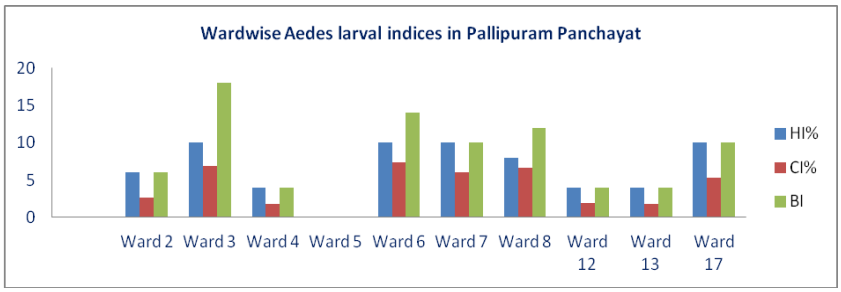
Area	Male		Female		Total	
WARD 5	interviewed	positive	interviewed	positive	interviewed	positive
Ward 6	129	5	126	5	255	10
Ward 7	76	0	103	5	179	5
Ward 8	87	6	111	9	198	15
Ward 2	100	0	113	5	213	5
Ward 17	93	5	101	8	194	13
Ward 12	93	2	88	6	181	8
Ward 13	49	0	55	0	104	0
Ward 3	86	0	79	0	165	0
Ward 4	81	3	70	1	151	4
WARD 5	69	0	75	6	144	6
TOTAL	**863**	**21**	**921**	**45**	**1784**	**66 (3.7%)**

The major symptoms reported were fever, headache, body pain, abdominal pain, etc.

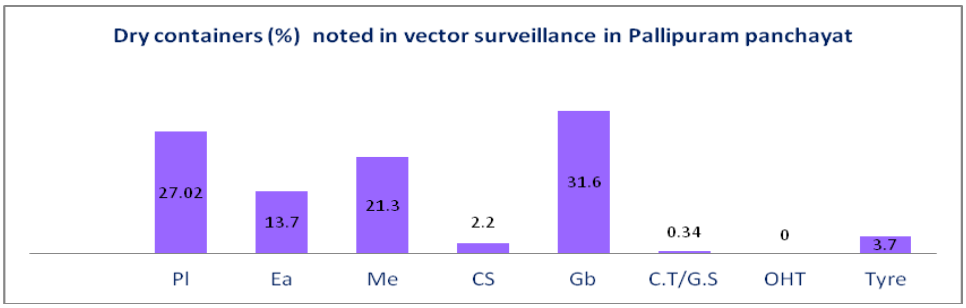
Fig: Ward wise fever cases in Pallipuram panchayat



Entomological investigation: *Aedes* larval surveys were conducted in 10 wards at random. From each ward 50 houses in and around were checked. The results are as below:



Note: HI- House Index, CI-Container Index, BI- Breteau Index



**Pl-Plastic, Ea-Earthen, Me-metal,CS-Coconut Shell,Gb-Glass bottle C.T/GS-Grinding Stone, OHT-Others*

Table: Type of containers searched in Pallipuram panchayat

S.No	Type of containers	Searched	Positive	% positive
1	Plastic	613	16	2.6
2	Metal	310	14	4.5
3	Earthen	61	5	8.2
4	Tyre	20	5	25.0
5	Glass bottles	16	0	0.0
6	Coconut shell	5	0	0.0
7	Over head tank	1	0	0.0
		1026	40	3.9

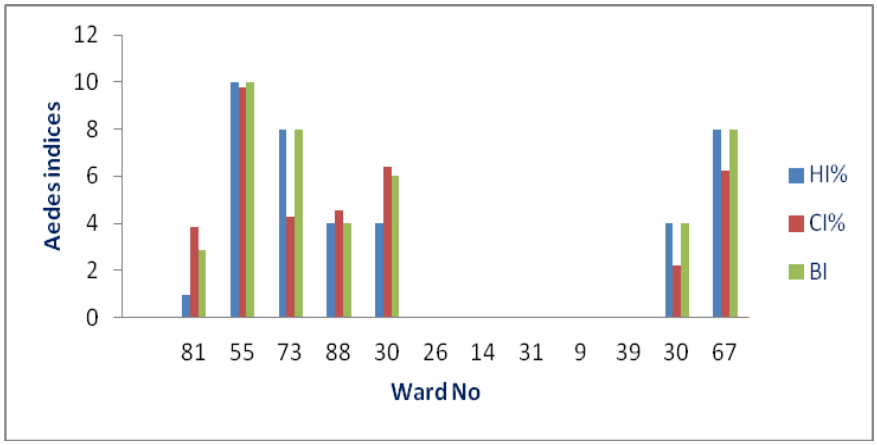
All the larvae were identified as *Aedes albopictus* and *Aedes aegypti* was not found from this area.

Alappuzha district is endemic for dengue. Year wise - number of confirmed dengue cases reported in Alappuazha district from 2011 to 2015 are 36, 81, 184, 46 & 157 respectively.

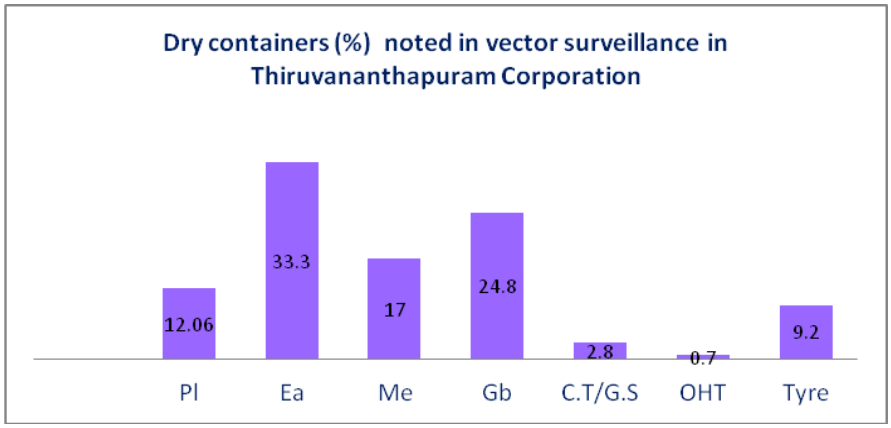
As per our study after the implementation of containment measures, the *Aedes* larval indices- House Index, Container Index & Breteau Index were 6.6% (0.0 to 10.0), 3.9% (0.0 to 7.4) and 8.0(0.0 to 18.0) respectively. The finding of the study was intimated to District health authorities for further necessary action to prevent further outbreaks.

1. Investigation of dengue in Thiruvananthapuram Corporation

Thiruvananthapuram district is the most endemic district for dengue in Kerala. Year wise - number of confirmed dengue cases reported in Thiruvananthapuram district from 2011 to 2015 are 865, 2447, 4192, 1280 & 991 respectively. The year- wise contribution of confirmed dengue cases of Thiruvananthapuram Corporation to the district from 2011 to 2015 are 447 (51.7%), 1287 (52.6%), 1605 (38.3%), 480 (37.7%) and 301(30.4%) respectively.
In order to assess the persistence of dengue cases in Thiruvananthapuram Corporation, an entomological investigation (*Aedes* larval studies) was done at random in 12 wards of Thiruvananthapuram Corporation from 29.2.2016 to 3.3.2016. The results are as follows:



Note: HI – House Index, CI- Container Index, BI- Breteau Index



**Pl-Plastic, Ea-Earthen, Me-metal,CS-Coconut Shell,Gb-Glass bottle C.T/GS-Grinding Stone, OHT-Others*

Table: Type of containers searched in Thiruvananthapuram Corporation

S.No	Type of containers	Searched	Positive	% positive
1	Plastic	412	9	2.2
2	Metal	208	4	1.9
3	Earthen	135	8	5.9
4	Tyre	25	1	4.0
5	Glass bottles	13	0	0.0
6	Over head tank	7	1	14.3
		800	23	2.9

Note: Both *Aedes aegypti* and *Ae. albopictus* were found during the present study

As per our present studies, the *Aedes* larval indices- House Index, Container Index & Breteau Index were 3.7% (0.0 to 10.0), 2.9 % (0.0 to 9.8) and 3.8 (0.0 to 10.0) respectively. This is due to extreme summer season. Numerous unwanted dry containers were also observed during the study. These will act as potential breeding sources on the arrival of monsoon. *Aedes aegypti* and *Ae.albopictus*, the 2 major vectors are prevalent in Thiruvananthapuram Corporation. The finding of the study was intimated to District health authorities for further necessary action.

5.7 NCDC, Varanasi Branch

Dr A K Yadav
Medical Officer & Incharge

Mandate

- Coordinate Training Programme on Elimination of Lymphatic Filariasis (LF) of Medical /Para-Medical officials i.e Medical Officers/Biologists, Filaria Inspectors/ Technicians Working in NFCP units & Urban Malaria Scheme (UMS).
- Carrying out operational research & training to support National Programme of elimination of Lymphatic Filariasis.
- Supervision of Yaws Eradication Programme (YEP) activities in Mirzapur & Sonebhadra District of Uttar Pradesh.
- Support to Integrated Disease Surveillance Project (IDSP) in the State of Uttar, Pradesh.
- Outbreak investigation of various Communicable disease in the State of Uttar Pradesh & other States as per the direction of NCDC HQ
- Services to Public through weekly Night & Day Filaria Clinic and Lympoedema Management clinic of filarial patient.
- Night Blood Survey for detection of asymptomatic microfilaria (mf) carriers in rural/ urban areas of Varanasi.

Filaria Clinic:

One of the most important activity undertaken at this centre is that of running of Night Filaria Clinic. This centre acts as local Filaria Hospital since over last 48 years. It also acts as referral centre for diagnosis and treatment of suspected cases of lymphatic filariasis.

Two Days Filaria Clinic conducted on every Monday & Wednesday and one Night Filaria Clinic on Thursday, are being conducted at this centre. Patient are examined and treatment/advice given during Day Clinic. Blood Smears were collected from patient attending the Night Filaria Clinic on Thursday between 1900 hrs. - 2100 hrs. and examined for evidence of microfilariameae. During the year 2016-2017 month wise cases attending Filaria Clinic are presented in Table - 1

Table 1: Night Filaria Clinic at NCDC, Varanasi during 2015-16

Month	New cases	Acute	Chronic	+ve for mf.	mf. rate (%)
April, 2015	157	75	82	6	3.82
May, 2015	209	109	100	6	2.87
June, 2015	279	149	130	10	3.58
July , 2015	345	171	174	2	1.57
Aug. 2015	305	148	157	9	2.95
Sept. 2015	296	153	143	6	0.02
Oct. 2015	295	103	92	2	1.04
Nov. 2015	159	61	98	1	1.62
Dec. 2015	128	60	68	1	1.78
Jan. 2016	91	41	50	1	1.09
Feb., 2016	168	93	75	-	--
March 2016	228	119	109	6	2.62
Total	**2660**	**1282**	**1278**	**50**	**1.87**

All the new cases are provided anti filarial drug from this centre after initial registration and 18 days follow up regularly. The figure does not include cases of follow up visits made by the patient after every 18 days.

Day Filaria Clinic

A total of 17744 repeat visits were made by the patient attending day filarian clinic. All the patient are provided with anti filarial therapy and they are also advised washing and care of affected body part for prevention of ADL attacks. During 2015-2016 month wise cases attending Day Filaria Clinic are given in Table- 2.

Table 2: Total Patient treated in day filaria Clinic in 2015-16

Month & Year	**No. of Patient treated**
April, 2015	1329
May, 2015	1236
June, 2015	1525
July , 2015	1807
Aug. 2015	1518
Sept. 2015	1982
Oct. 2015	1426
Nov. 2015	1164
Dec. 2015	1573
Jan. 2016	968
Feb., 2016	968
March 2016	2248
Total	**17744**

Lymphoedema Management Clinic

Lymphoedema Morbidity Management Clinic is functioning at this centre since October, 2001 as a part of programme for elimination of Lymphatic Filariasis. Patient suffering from different grades of Lympoedema/other chronic manifestation of the diseases attend this centre for washing & other methods of Lymphoedema management of the affected parts. During the year, a total of 2024 Lymphoedema patients were registered for the Lymphoedema Management**. (Table -3)** They were demonstrated proper foot care, hygiene and maintenance to prevent further ADL attacks.

Table 3 : Patient attendance in lymphoedema management clinic during 2015-16

Month & Year	**No. of patient with Lymphoedema Grade(s)**			**Total No. of Patient**
	I	**II**	**III**	
April, 2015	23	50	61	**134**
May, 2015	57	55	64	**176**
June, 2015	71	96	106	**273**
July , 2015	44	59	92	**195**
Aug. 2015	62	73	93	**228**
Sept. 2015	50	56	97	**203**
Oct. 2015	44	49	59	**152**
Nov. 2015	33	39	49	**121**
Dec. 2015	26	36	68	**130**
Jan. 2016	26	32	60	**118**
Feb., 2016	26	32	60	**118**
March 2016	40	54	82	**176**
Total	**502**	**631**	**891**	**2024**

Manpower Development

Since its inception, this centre have conducted several training courses for Medical Officers/Biologists/District Programme Officer & Technicians/Filaria Inspectors working under National Filaria Control Programme (NFCP) & Urban Malaria Scheme (UMS) of different Filaria endemic States/Union Territories of the country. The duration of the training courses ranges from five working days & ten working days depending upon the requirement of the programme. These training courses include in-depth training on Filariology (Entomology, Parasitology), morbidity management and the concept of Mass Drug Administration (MDA) for elimination of Lymphatic Filariasis. The details of training courses conducted by the branch during the year 2015-16 is given in Table No. 4

Table 4 : Details of training courses conducted by the branch during the year 2015-16

Sl. No.	Name of the project	Date with duration		Place	No. of Participants
		From	To		
1	Training Course in Filariology for Filaria Inspectors/Technicians	11.05.15	22.05.15	NCDC, Varanasi	10
2	Training Course in Filariology for Health Medical Officers/ Biologist/ District Programme Officers	03.08.15	07.08.15	NCDC, Varanasi	12
	TOTAL				**22**

i. **Broad objectives:** To give sufficient exposure to the participants in the field of Parasitology, Entomology, method of survey, vector identification, morbidity management, epidemiology of filariasis, control and evaluation of the programme.

ii. Duration and dates : Given in separately for each Training in Table

iii. **Target participants:** Medical Officers/Biologist/District Programme Officers & various categories of Para-Medical Personnel (Filaria Inspectors & Technicians) involved in Filaria Control Programme & Urban Malaria Scheme from Filaria endemic States/Union Territories of Country

iv. **Expected outcome :** Participants are expected to gain sufficient knowledge and skills to effectively contribute towards the control of Lymphatic Filariasis

v. **How the expected outcome of the Activity will beneficial for the national Programme :** The trained man power development in the filed of Lymphatic Filariasis will contribute in LF Elimination/Control programme in the country as per target set up under National Health Policy for Elimination of LF by the year 2017.

vi. **Source of funding :** Most of training courses conducted at this branch are funded by NCDC Budget only.

Tour/Field visits made by the Officer of the branch

(i) **Duration of clearance of circulating Filarial Antigenimia**- To undertake study after DEC + Alb therapy in which Filarial Antigen Card test should be carried out to detect the clearance of filarial Antigen. The study is hampering due to non availability of Filaria Antigen Kit at the branch.

(ii) **Orthopaedic manifestations in the patients of Lymphatic Filariasis** - To undertake study titled in which we will differentiate between the patients of actual Lymphatic Filariasis from bone & joints disease in the help of questionnaire.

Sl. No.	Name & Designation of the Officer	Date	Place	Type of Activity
1	Dr. A.K. Yadav Medical Officer & OIC	06.05.2015	Allahabad	To attend OA No. 193/2012 filed by Sri R.N. Prajapati Vs. UOI & others before CAT, Allahabad.
2	Dr. A.K. Yadav Medical Officer & OIC	07.05.2015	Allahabad	To attend OA No. 1341/2013 filed by Sri K.S. Pandey Vs. UOI & others before CAT, Allahabad
3	Dr. A.K. Yadav Medical Officer & OIC	30 - 31 July, 2015	NCDC, Delhi	To attend Annual Day of NCDC & Branch Officers meeting

Newly shifted office building at Dhelwaria, Chowkaghat, Varanasi and official of the NCDC, Varanasi Branch

5.8 NCDC, Alwar Branch

Dr Naveen Chharang
Deputy Director & Incharge
Dr Hari Om Gupta
Assistant Director

This unit renders services during training in public health i.e. FETP, Para Medical FETP, MPH, Malaria & NVBDCP, EIS like courses & during health emergency situation like flood, earthquake, cyclone, tsunami/epidemic etc. In addition to it, support to state and District in various National health programmes as trainer and facilitator in the field of Public Health as and when required.

Routine activities undertaken during the period: This unit renders services during training in public health i.e. FETP, Para Medical FETP, MPH, Malaria & NVBDCP, EIS like courses & during health emergency situation like flood, earthquake, cyclone, tsunami/epidemic etc. Support to intensive Pulse Polio Programme (IPPI) in five rounds of NID/SNID a total of 208 doses were given to the children under 5 years of age at this center.

Laboratory services

S. No.	Test conducted	Total specimen	Found positive	Remarks
1.	Widal Test	446	71	
2.	Malaria (MP slides) Test	531	02 (*P. vivax*) 0 (PF)	
3.	Water examination	10	All satisfactory	
4.	Cholera test	NIL	NIL	

Pulse Polio Programme (IPPI) in five rounds of NID/SNID a total of 208 doses were given to the children under 5 years of age at this center.

Manpower Development

Provide Training facilities in the field of Public Health FETP, Para Medical FETP, NVBDCP Malaria Epidemiology, EIS like trainees, MPH, workshops and also to the State and District as and when required.

Name and Title	Study of Diseases Surveillance system	Date	No. of Trainees
RFETP	1. Study of Surveillance System 2.Epidemic Investigation 3.Institutional Data Analysis 4.KABP Study of Dengue fever	06 - 12 Dec, 2015 7 Days	6
Para-Medical Course on Prevention and control of Communicable Disease	To find out the prevalence of ARI among under 5 years children and treatment seeking behavior of Slum areas of Alwar town.	12/02/2016	25
Malaria logy, NVBDCP	Field exercise on Vectors & Vector Borne diseases Control in Alwar District	16 - 18 Mar, 2016 3 Days	30

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