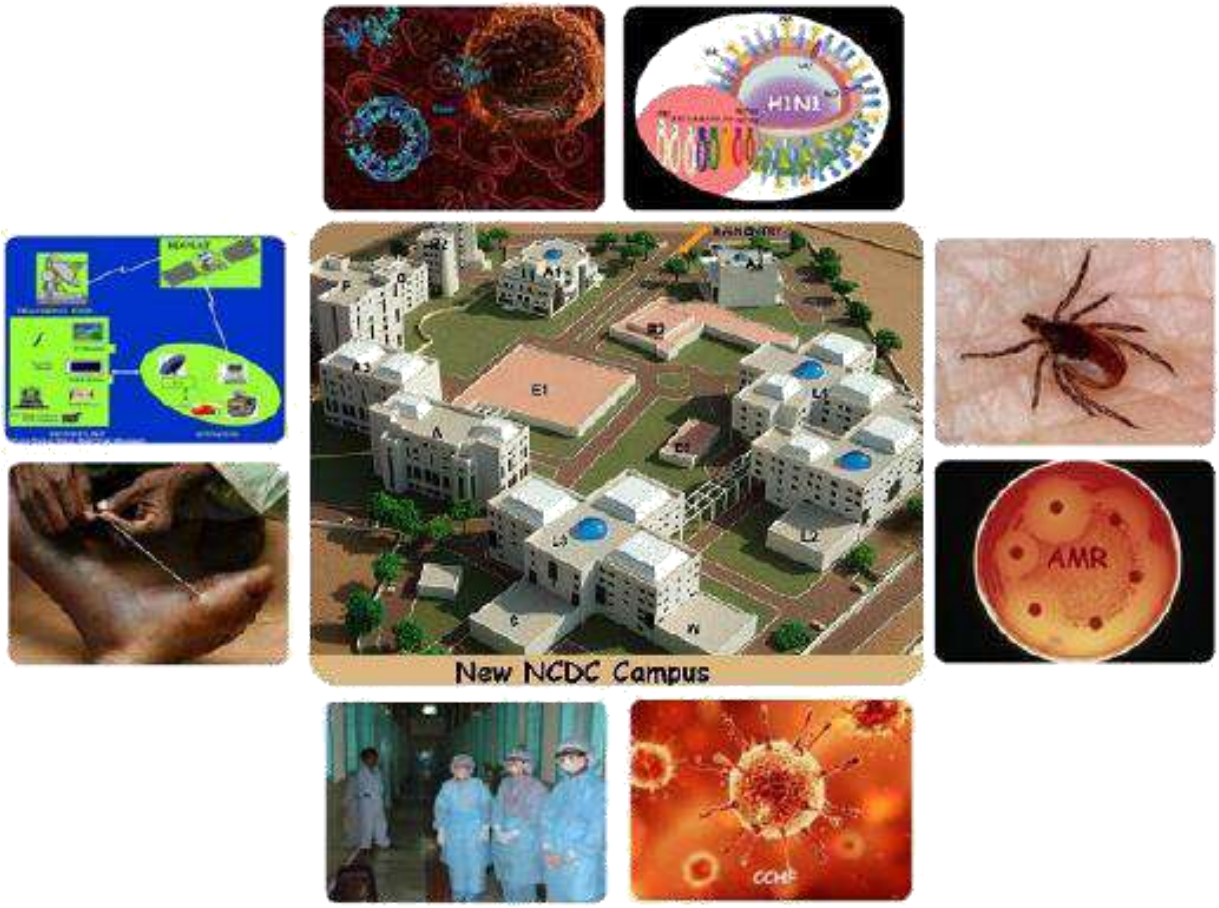
National Centre for Disease Control (NCDC)

Annual Report 2016 -17



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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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.

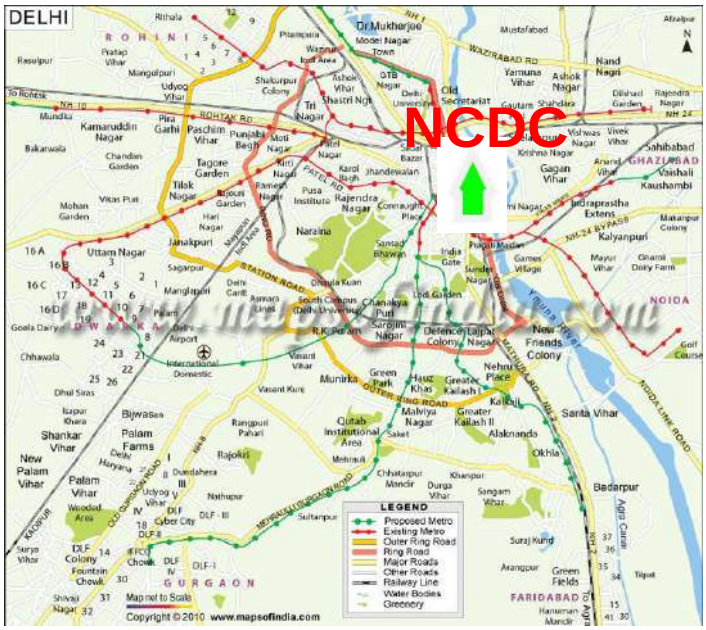
Contents

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: Training of State Surveillance Officers, District Surveillance Officers, Rapid Response Team and other Medical and Paramedical staff on principles of disease surveillance.
- Use of IT 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. Presently, about 96% districts in the country report weekly surveillance data on epidemic prone diseases through e-mail or portal.

- **Outbreaks (Event Based)**

In addition to routine surveillance, States and districts also notify the outbreaks immediately to the system through an Early Warning Signal (EWS) format. On an average of 30-35 outbreaks get reported every week to Central Surveillance Unit (CSU). As seen in Figure 1, a total of 553 outbreaks of epidemic prone diseases were reported and responded through IDSP in 2008, 799 outbreaks in 2009, 990 outbreaks in 2010, 1675 outbreaks in 2011, 1584 outbreaks in 2012 1964 outbreaks in 2013 , 1562 outbreaks in 2014, 1935 outbreaks in 2015 and 2679 in

2016. 448 outbreaks have been reported till 13th week in 2017 till March 2017. There is a rising trend in number of reported and responded outbreaks of epidemic prone diseases under IDSP by state and district surveillance Units especially from year 2014 to 2016.

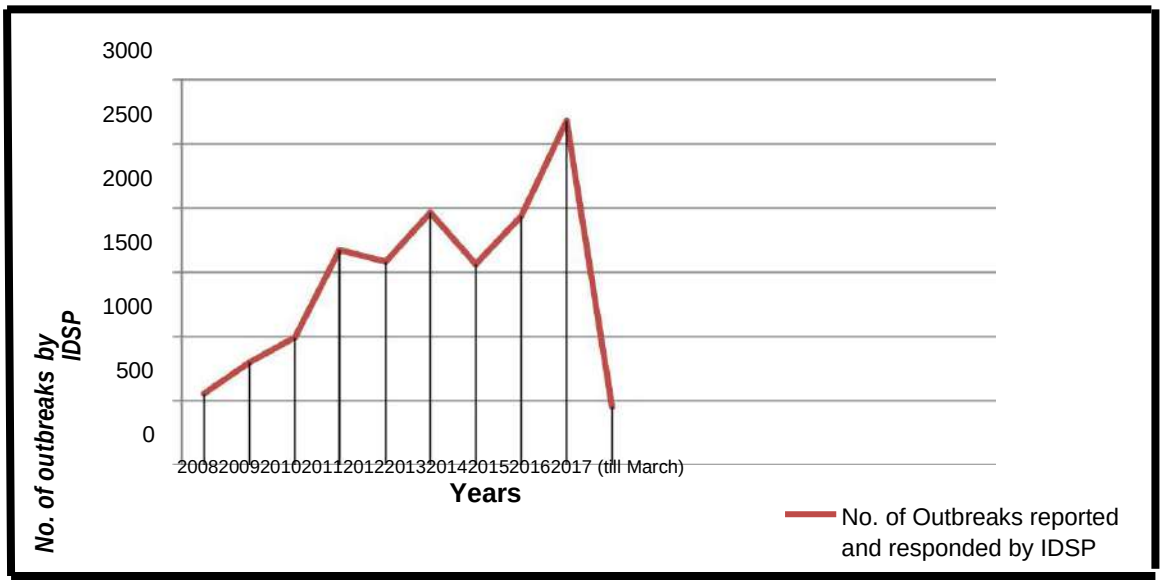


Figure 1: Trend of number of outbreaks year wise

Figure 2 depicts a marked surge in outbreak detection and response is seen in many states like Bihar, Odisha, Gujarat, Uttar Pradesh and West Bengal from year 2014 to 2016.

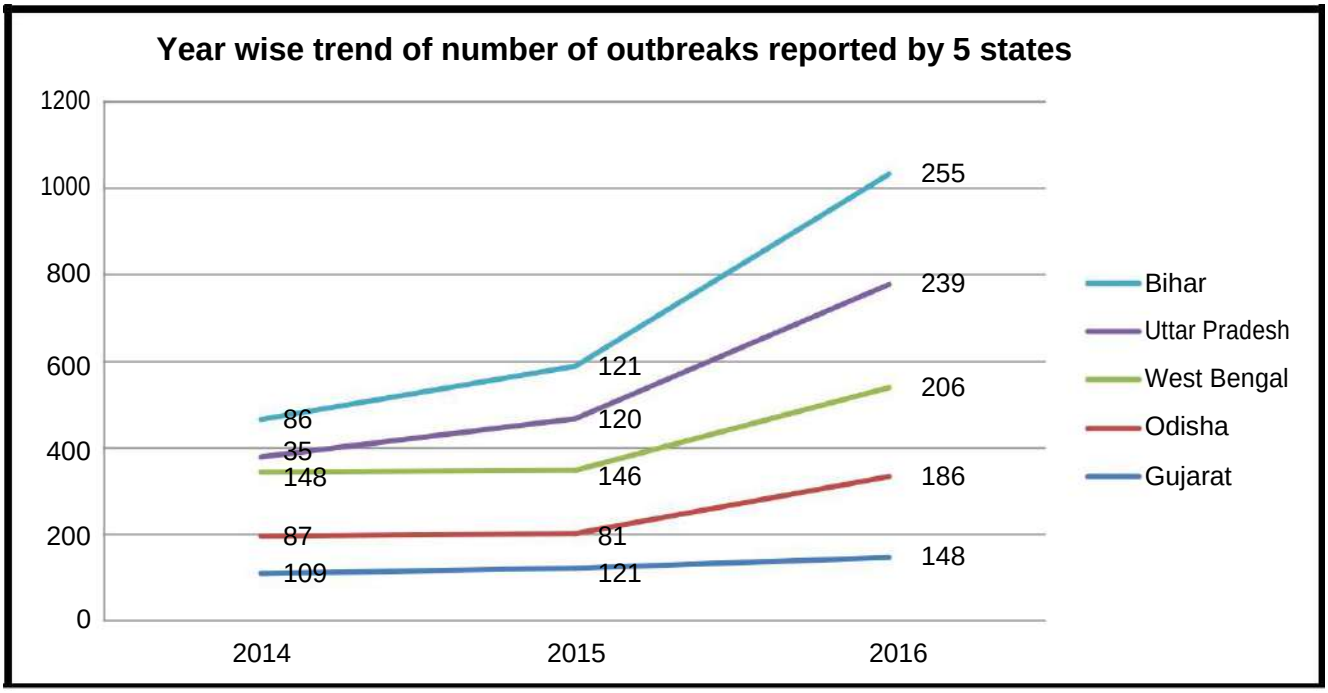


Figure 2: Year wise tend of number of outbreaks reported by 5 states

Disease wise analysis suggests that since 2008, Acute Diarrhoeal disease outbreaks and Food poisoning constitute approximately 46 % of total number of outbreaks reported by the states till March 2017. In 2016, approximately 43% of total outbreaks were reported from 5 states, namely, Bihar (255), Uttar Pradesh (239), Karnataka (238), Maharashtra (217) and West Bengal (206).

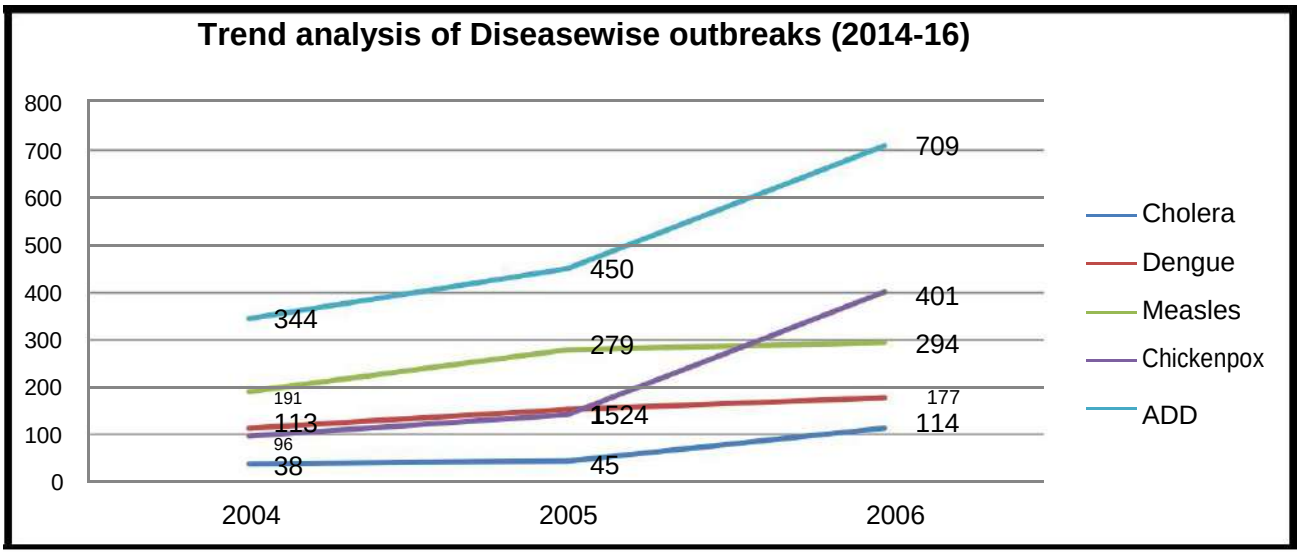


Figure 3: Trend Analysis of disease wise outbreaks over 2014-16

Figure 3 explains disease wise trends over years (from 2014-2016) for 5 diseases namely Chickenpox, Cholera, Dengue, Measles and Acute Diarrhoeal Diseases where a marked upsurge in number of outbreaks reported is observed. Details regarding State wise and disease wise outbreaks more information is placed at Annexure 1 and 2

- **Outbreaks Investigation by CSU-IDSP**

Officers from IDSP were deputed for following outbreak detailed investigations in 2016-17.

Outbreak Investigation	**State**	**Officers deputed**
Bidar, Karnataka, Bird flu Outbreak investigation in May 2016	Karnataka	Dr. Sanket Kulkarni
Mandla to investigate Cholera Outbreak as a part of Central RRT Aug'16	Madhya Pradesh	Dr. Nishant
Kozhikode, Malappurum and Trivendrum - Diphtheria Outbreak in August 2016	Kerala	Dr. Sanket Kulkarni
Avian Flu – Khorda in December 2016	Odisha	Dr. Sanket Kulkarni
Avian Influenza outbreak Hathijan, Gujarat, Jan'17	Gujarat	Praveen G

Table 1: Outbreak Investigation by CSU-IDSP

- **Data Collection though SHOC/EOC**

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 was 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 at watch phase for data collection and verification of media news related to heat waves and at Level 1 for the activities related to Simhastha Kumbh, Ujjain on 22.04.16 to 10.6.16.
- A meeting of the experts from NCDC & CDC was held under Chairmanship of Dr. S. Venkatesh, Director (NCDC) on 28th June 2016 in SHOC Room, NCDC to update and finalize the Infectious Disease Outbreak Plan (IDOP) SHOC
- Hon'ble Minister of Health and Family welfare Shri J P Nadda also visited SHOC on 30th September 2016 and did VC with 6 States (Karnataka, Punjab, Tamil Nadu, Assam, Jammu and Gujarat)
- SHOC was activated to Level 1 for collection, compilation and analyzing the H1N1 data on daily basis from 36 stares/UT in February 2017
- A daily situational awareness report (SAR) is also circulated from SHOC.

Figure 4: VC in SHOC by Hon'ble Health Minister

Heat Wave cases and Deaths data collection 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 2016, 35124 cases of heat wave and 725 deaths related to heat wave were reported from the states

H1N1 data collection under mandate of SHOC

In 2016, upsurge of Influenza A (H1N1) cases were not observed. In 2016, till 31st December, 2016, 1786 cases have been reported from all States/U.Ts, out of which 265 have died.

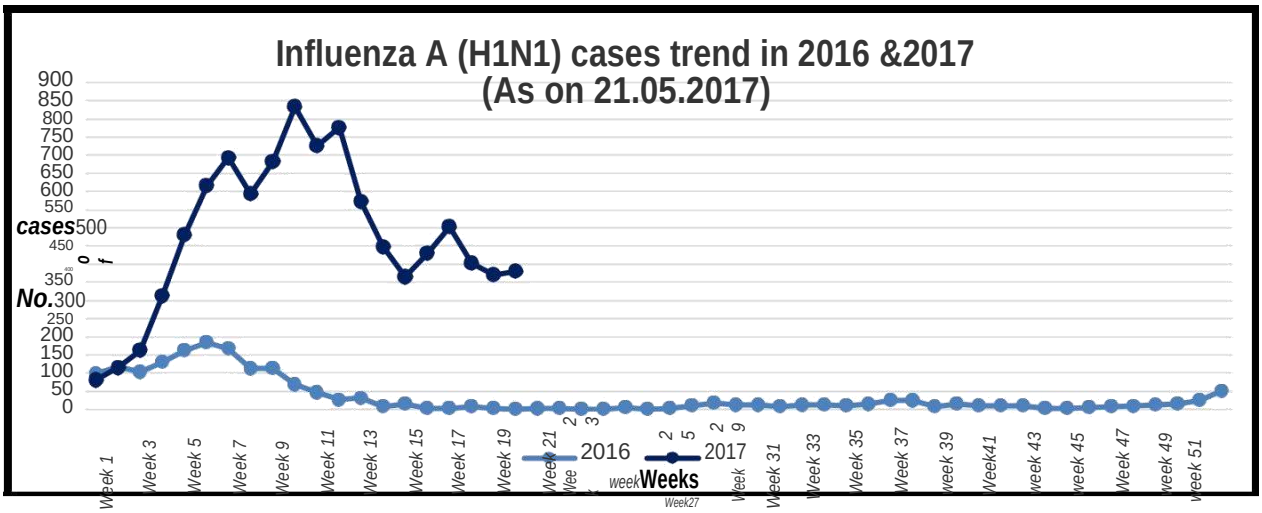


Figure 5: Trends of H1N1 Cases in 2016 -17

In 2017, the upsurge in H1N1 cases was observed from 2nd week, 2017 from the affected States (primarily from the States of Tamil Nadu, Puducherry, Telangana and Karnataka followed by Andhra Pradesh, Maharashtra and Kerala). Cases trend in all major affected State has come down from 11th week, 2017. However in West Bengal, Rajasthan, Delhi, Himachal an increasing trend is seen.

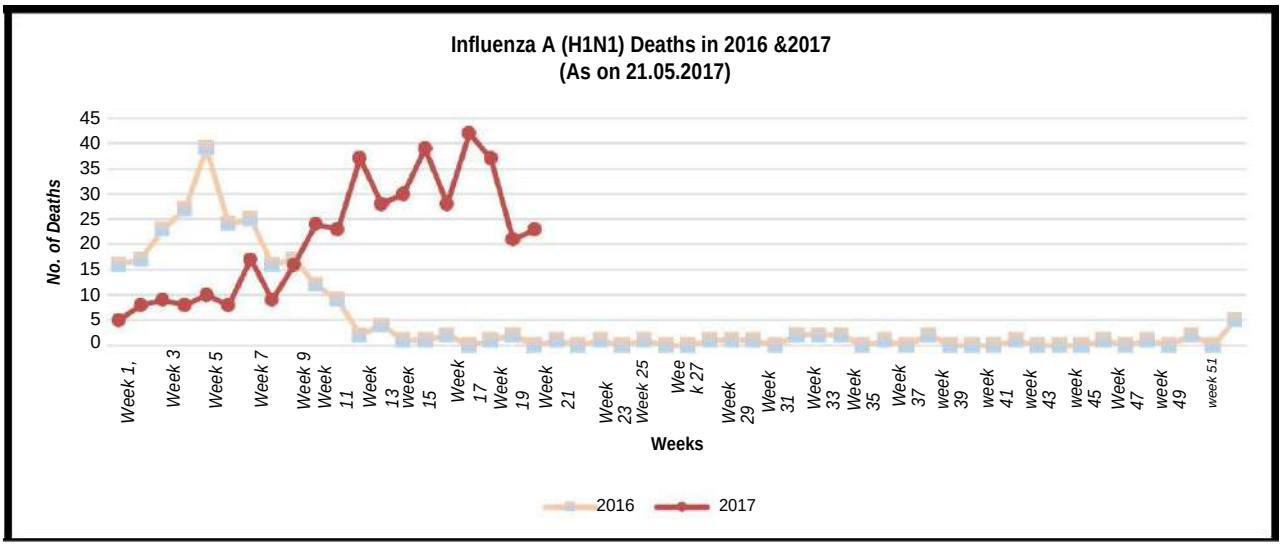


Figure 6: Trends of H1N1 deaths in 2016 -17

- **Data collection through Media Scanning**

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 4232 health alerts have been detected till March'17 since its establishment. In the year 2016-17, a total of 625media alerts were issued. Majority of alerts were related to diarrheal, food borne and vector borne diseases.

Table 2: State wise media scanning alerts

Sno.	States / UTs	Number of Media Alerts in 2016-17
1	Andaman and Nicobar Islands	0
2	Andhra Pradesh	17
3	Arunachal Pradesh	0
4	Assam	5
5	Bihar	18
6	Chandigarh	4
7	Chhattisgarh	11
8	Dadra and Nagar Haveli	0
9	Daman and Diu	1
10	Delhi	32
11	Goa	4
12	Gujarat	33
13	Haryana	18
14	Himachal Pradesh	9
15	Jammu & Kashmir	13
16	Jharkhand	14
17	Karnataka	48
18	Kerala	30
19	Lakshadweep	0
20	Madhya Pradesh	40
21	Maharashtra	55
22	Manipur	6
23	Meghalaya	1
24	Mizoram	11
25	Nagaland	3
26	Odisha	60
27	Puducherry	2
28	Punjab	18
29	Rajasthan	32
30	Sikkim	0
31	Tamil Nadu	35
32	Telangana	28
33	Tripura	5
34	Uttar Pradesh	53
35	Uttarakhand	12
36	West Bengal	7
	Total	**625**

Strengthening of Laboratories

District laboratories are being strengthened for diagnosis of epidemic prone diseases in a phased manner. Till date 117 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 24 states/UTs involving 107 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 418 epidemiologists, 143 microbiologists 24 entomologists and 11 Veterinary Consultants has been completed under IDSP as per 31st March 2017. 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.

IT Network and Video conferencing

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. New and improved home page, user friendly navigation linkages thru all government websites, daily updations of Media Alerts, monthly disease alerts and weekly outbreak reports, HRD module developed in October 2016

- **Video conferencing**

  A total of 383 VC sessions were done from April 2016 – March 2017 of which some sessions were done by NVBDCP for Filaria, establishment of MSVC at state HQs, CSU review teams visiting State HQs / District HQs, testing VC sessions for Hon'ble
  Ministers visit to SHOC

Role of CSU-IDSP at Mass gathering-KumbhMela Ujjain April-May 2016

Kumbh Mela is a Hindu religious mass gathering held every 12 years at four different places including Ujjain district. The objective with IDSP was to establish a daily surveillance for early detection and response to any outbreak at SimhasthaKumbh, a religious mass gathering of 50 million pilgrims in Ujjain, Madhya Pradesh during April-May 2016.24-hours emergency call centre was established and media scanning for enhanced outbreak detection and rapid response teams in each zone for outbreak response. This system detected ADD outbreaks and a large number of illnesses attributed to fever, acute respiratory infection, and diarrhoea with immediate response from Rapid Response Teams.

Visits to states to review IDSP

In year 2016-17, State level IDSP reviews were conducted inAssam, Andhra Pradesh, Arunachal Pradesh, Delhi , Himachal , Mizoram, , Madhya Pradesh, , Maharashtra, Chhattisgarh, Haryana, Karnataka, west Bengal, Kerala, Tripura, Orissa, Meghalaya , Tamil Nadu by IDSP Officials. During those reviews, it was felt that there is a pressing need to intensify the monitoring of the States by conducting a regular joint evaluation by IDSP.

Hence, in this regards, IDSP decided to conduct regular quarterly IDSP internal evaluation from year 2017 in which 2 States will be randomly chosen in a quarter for in-depth evaluation. For quarter January – March 2017, in depth review of Odisha (28.02.17 – 03.03.17) and Meghalaya (20.03.17 – 25.03.17) was conducted.

The exercise focused on strengthening IDSP activity at State and District as well as hand holding of the health staff rather than fault finding. Further, two districts and their health facilities and Lab (District Hospital, Sub-District Hospital, CHC, PHC and Sub-Centres) was visited in each State. On the last day of review, debriefing meeting was done with Senior State Officials by NPO, IDSP or any other senior official designated by NPO.

Team Composition:

- Two Assistant Directors/Epidemiologist from NCDC – One of them will be Team lead, preferably looking after the implementation of IDSP in the selected State.
- Two Consultant IT from IDSP
- One Finance Consultant, IDSP
- One Data Manager, IDSP
- One Consultant Microbiologist, IDSP

Figure 7: In depth review of Odisha: 28th Feb – 3rd march 2017

Figure 8: In depth review of Meghalaya: 20 – 25 March 2017

Workshops and Trainings

- IDSP National Review Workshop was conducted from 9th to 11th June 2016 in Jaipur, Rajasthan
- A meeting of BRICS nations was organized on 1st and 2nd August 2016 in Bengaluru called "Strengthening Health Surveillance Systems and Best Practices" in which delegates from China, India and South Africa participated.
- State data managers training was conducted in 2 batches at CSU, IDSP from 20th September to 23rd September 2016
- Workshop on strengthening Influenza Surveillance was held from 4th to 6th October 2016 in Delhi.
- Meeting for Initiation of Urban Surveillance under IDSP was organized on 24th October 2016 in Nirman Bhawan, New Delhi
- Training workshop on Influenza and Zika virus disease for DHS &DME was held on 24th November 2016 at RML hospital, Delhi
- Workshop on Reprioritization of Diseases/ Disease group under IDSP was organized in Delhi on 6th and 7th December 2016
- One day training Workshop on Emerging Infectious Diseases for SSOs of IDSP and RDs was held in Nirman Bhawan New Delhi on 30th January 2017
- One day orientation training for State Finance Consultants working under IDSP of all states/UTs held on 3rd February 2017 at CSU, IDSP.

Figure 9: A meeting of BRICS nationsBengaluru: 1 – 2August 2016

Figure 10 &11: IDSP National Review Workshop on 9th to 11th June 2016 in Jaipur, Rajasthan and release of Launch of Disease Alert

Annex-1

State-wise total no. of outbreaks reported by all States/UTs in 2008, 2009, 2010, 2011, 2012, 2013, 2014,2015, 2016 and 2017 (up to week 13)

Sl. No.	State / UTs	Year										
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	total
1	Andaman & Nicobar	0	0	0	0	0	1		0	0	0	1
2	Andhra Pradesh	72	64	75	91	97	123	64	51	53	9	699
3	Arunachal Pradesh	6	6	6	10	9	7	8	21	28	3	104
4	Assam	16	30	53	97	75	70	84	73	103	14	615
5	Bihar	1	6	21	144	181	134	86	121	255	47	996
6	Chandigarh	3	3	2	1	5	0		7	2	2	25
7	Chhattisgarh	1	7	2	55	45	58	50	50	120	10	398
8	Dadra and Nagar Haveli	0	0	1	0	0	2	3	17	17	1	41
9	Daman & Diu	0	1	1	0	2	0		3	2	1	10
10	Delhi	3	1	0	3	1	4	4	13	22	0	51
11	Goa	2	3	0	2	1	8		6	2	0	24
12	Gujarat	24	49	83	150	102	117	109	121	148	39	942
13	Haryana	10	9	18	21	19	15	27	28	17	3	167
14	Himachal Pradesh	3	13	7	4	13	5	11	27	11	1	95
15	Jammu & Kashmir	*	*	2	23	43	54	33	43	56	8	262
16	Jharkhand	*	5	4	29	24	50	53	66	84	19	334
17	Karnataka	54	97	89	196	156	251	163	175	238	56	1475
18	Kerala	17	47	54	56	80	76	74	98	112	22	636
19	Lakshadweep	*	*	*	*	*	*	2	2	1	0	5
20	Madhya Pradesh	16	65	70	89	65	98	83	150	165	24	825
21	Maharashtra	99	27	65	141	215	256	205	195	217	45	1465
22	Manipur	1	2	2	4	1	4	4	5	6	0	29
23	Meghalaya	5	3	2	1	1	1	3	14	9	2	41
24	Mizoram	5	0	0	0	1	1	2	6	9	0	24
25	Nagaland	0	1	2	1	0	1	1	2	4	0	12
26	Odisha	17	38	19	55	36	113	87	81	186	28	660
27	Puducherry	3	2	4	1	2	0	5	1	4	0	22
28	Punjab	17	22	18	44	34	24	21	45	77	9	311
29	Rajasthan	8	43	84	68	41	33	33	63	98	11	482
30	Sikkim	3	0	2	4	1	3	3	4	3	0	23
31	Tamil Nadu	50	113	90	127	173	149	122	123	110	34	1091
32	Telangana							7	30	57	5	99
33	Tripura	1	2	2	7	3	4	13	8	1	5	46
34	Uttar Pradesh	40	67	98	34	40	37	35	120	239	34	744
35	Uttarakhand	27	30	25	36	23	33	19	20	17	2	232
36	West Bengal	49	43	89	181	95	232	148	146	206	14	1203
	Grand Total	**553**	**799**	**990**	**1675**	**1584**	**1964**	**1562**	**1935**	**2679**	**448**	**14189**

Annex-2

Disease-wise total no. of outbreaks reported by all States/UTs in 2008, 2009, 2010, 2011, 2012, 2013, 2014 ,2015, 2016 and 2017 (up to week ending 13 week)

S.No	Diseases/Illness	Year										
		2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**Total**
1	Acute Diarrhoeal Disease	228	332	411	532	467	576	344	450	709	51	4100
2	Acute **Encephalitis** Syndrome	6	5	11	31	6	13	38	25	24	0	159
3	Acute Respiratory Illness	4	3	3	2	2		1	0	2	0	17
4	Anthrax	2	6	3	9	1	10	6	11	32	6	86
5	Chickenpox	12	45	47	70	100	121	96	142	401	109	1143
6	Chikungunya	25	61	25	77	55	72	63	46	50	11	485
7	Cholera	20	34	34	58	94	96	38	45	114	2	535
8	Crimean-Congo Hemorrhagic Fever (CCHF)				2	1	8	6	15	12	1	45
9	Dengue	42	20	40	57	169	130	113	152	177	14	914
10	Diphtheria	1	1	1	5	4	4	7	8	24	0	55
11	Dysentery		1	3	9			1	5	10	1	30
12	Enteric Fever	6	10	10	12	8	1	19	16	14	6	102
13	Fever with Rash								29	58	23	110
14	Food Poisoning	50	120	184	305	255	370	306	328	395	83	2396
15	Influenza A H1N1					5	1					
16	Influenza A H3N2					1			9	1	0	17
17	Influenza B					2	1		2	1	0	6
18	Jaundice								22	17	2	41
19	Kala-azar	1		3	6	1	1		3	1	1	17
20	Leptospirosis	6	3	6	14	11	12	6	6	11	2	77
21	Malaria	44	34	37	86	12	43	53	88	39	3	439
22	Measles	40	44	94	177	110	89	191	279	294	99	1417
23	Meningitis	2	3	1	2					0	0	8
24	Mumps		2	3	10	19	25	17	35	45	4	160
25	Pertussis			1			1	1		2	0	5
26	Rubella		1	2	1	5	7	12	11	41	5	85
27	Scrub Typhus	3	1	1	4	9	4	4	8	6	0	40
28	Viral Fever/PUO	32	39	41	88	138	272	150	92	80	5	937
29	Viral Hepatitis	28	31	24	99	93	99	81	88	98	18	659
30	Others	1	3	5	19	16	8	9	20	21	2	104
	Total	**553**	**799**	**990**	**1675**	**1584**	**1964**	**1562**	**1935**	**2679**	**448**	**14189**

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

4.2 Yaws Eradication Programme (YEP)

Coordinator: Division of Parasitic Diseases

Yaws Eradication Programme (YEP): This programme was launched as a centrally sponsored scheme in 1996-97 in Koraput district of Orissa, which was subsequently expanded to cover all the 51 Yaws endemic districts in ten states (Andhra Pradesh, Telengana, Orissa, Maharashtra, Madhya Pradesh, Chhattisgarh, Tamil Nadu, Uttar Pradesh, Jharkhand, Assam and Gujarat). The programme aimed to reach the un-reached tribal areas of the country. National Centre for Disease Control has been identified as the nodal agency for the planning, monitoring and evaluation of the Programme. The Programme is implemented by the State Health Directorates through the existing health care system. The number of reported cases has come down from 3751 to nil during the period from 1996 to 2003 and subsequently no case has been reported from any of the states after November 2013.

The programme envisaged achieving its objective through adopting following strategies:

- Case finding: active case search, passive surveillance, rumour reporting
- Treatment of cases and contacts
- Manpower development
- IEC activities
- Multi-sectoral approach
- Sero –survey in 1-5 year children

The disease has been declared eliminated on 19th September, 2006. Following elimination of the disease sero surveillance for Yaws in 1-5 yr old children has been completed during the year 2009 to 2011. All the samples tested negative by RPR method, indicating interruption of transmission of Yaws infection in the endemic area. However, monthly surveillance, active search operations, verification of rumour reports and health education are being undertaken continuously to achieve eradication of the disease.Funds in the form of "Grant-in-aid" are being provided to the states for operational cost to undertake activities under YEP.

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.

Recommendations of the International Verification Team were further endorsed by WHO's Strategic and Technical Advisory Group for Neglected Tropical Diseases, at Geneva during 13-14 April, 2016. Director General of WHO in her letter dated 5 May, 2016 conveyed that India has achieved interruption of transmission of yaws. India is the first Member State to achieve this important milestone.

4.3 Guniea Worm Eradication Programme

Coordinator: *Division of Parasitic Diseases*

In 1983-84, the Institute was made the nodal agency by the Ministry of Health & Family Welfare, Govt. of India, for planning, co-ordination, guidance and evaluation of Guinea Worm Eradication Programme. At the beginning of the Programme i.e. in 1984, about 40,000 GW cases were reported in 12,840 guinea worm endemic villages across 89 districts of seven endemic states, viz. Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra and Rajasthan. The State of Tamil Nadu remained free from GW disease since 1982. The last guinea worm case in India was reported in July 1996 in Jodhpur district of Rajasthan. World Health Organization certified India as guineaworm disease free country in February 2000. However, routine surveillance is being continued till the disease is eradicated globally.

4.4 Support to National Filaria Control Programme

Coordinator: *Division of Parasitic Diseases*

Filariasis is the common term for a group of diseases caused by parasitic nematodes belonging to family Filarioidea. Filariasis is caused by three species of parasitic worm: Wuchereria bancrofti, Brugia malayi and B. timori Transmitted to humans by mosquitoes. In India, Wuchereria bancrofti, transmitted by the, Culex quinquefasciatus, has been the predominant infection. The infection is prevalent in both urban and rural areas. The vector species breeds preferably in dirty and polluted water. Brugia malayi infection is now reportedly restricted to rural areas of Kerala and the infection disappeared in some pockets in other states. Mansonia (Mansonioides) annulifera is the principal vector while M. (M). Uniformis is the secondary vector for transmission of B. malayi infection. The breeding of these mosquitoes is associated with aquatic plants such as Pistia stratiotes, Salvinia auriculata, Salvinia molestes, Eichhornia speciosa, E. crassipes, etc. Department of Parasitic Diseases and three branches under its control plays important role in research and man-power development in filariasis. Training courses of 10 days and 5 days are conducted at Rajahmundry, Kozhikode and Varanasi branches for technical staff and officers involved in the control lymphatic filariasis. The following activities are carried out:

1. 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).
2. Research & training to support National Programme of elimination of Lymphatic Filariasis.
3. Morbidity management clinics for filariasis cases.
4. Night blood smear examination at clinics as well as HQ

Details for morbidity management & night blood smears examined

S. No.	Activities undertaken	No. of samples (NBS/Ag/Ab) examined
Morbidity management		
1.	NCDC branch Kozhikode for morbidity management	1020
2.	NCDC branch Rajahmundry for morbidity management	316
3.	NCDC branch Varanasi for morbidity management	1994
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	117 NBS and Ag/Ab testing were performed for mf infection and 23 found positive.
2.	Night blood smears were examined by NCDC branch Kozhikode for filaria infection.	1607 NBS tested and 38 were found positive for mf infection
3.	Night blood smears were examined by NCDC branch Rajahmundry for filaria infection.	1143 NBS tested and none slide was found positive for *W. bancrofti* infection.
4.	Night blood smears were examined by NCDC branch Varanasi filaria infection.	2305 NBS tested and 32 slides were found positive for infection. *W. bancrofti*
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	208 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	327 NBS tested and none was found positive for mf infection
3.	Night Blood Smears (NBS) received from various NFCP Units were cross-checked by Varanasi branch	Nil

4.5 National Programme on Containment of Anti-Microbial Resistance (AMR)

Coordinator: Division of Microbiology

The SFC has been approved for the 12th Five Year Plan (2012-2017) with an allocated budget of Rs. 30.00 crores vide Office Memorandum No. T-14018/02/2013-PH-II, dated 23rd October, 2013.

Activities carried out under the AMR programme:

- AMR surveillance: Ten (10) laboratories as mentioned below were involved in the first phase to initiate antimicrobial resistance surveillance on four bacterial pathogens of public health importance: Klebsiella, *Escherichia coli, Staphylococcus aureus, and Enterococcus species*.Three more bacterial pathogens added for AMR surveillance eg Pseudomonas sp, Acinetobacter sp, and Salmonella sp.
- Hospital Infection Control guidelines:
- An interim concise guideline on infection control has been uploaded on NCDC website as a ready reference for the hospitals to start implementing infection control practices in their settings. Detailed National Infection control guidelines have been drafted and are in the process of finalization
- IEC activities: An advertisement given in newspapers for creating awareness in community for promoting rational use of antimicrobials.
- IEC activities conducted for creating awareness for rational use of drugs for various stakeholders such as general practitioners, clinicians and nurses.
- Development of national action Plan on AMR containment

  National Action plan (NAP) will be rolled out before May 2017 as per WHA requirement. A draft Strategic framework for developing NAP has been discussed in a recent meeting between NCDC and WHO and a draft of the same has been prepared.

  - Three committees formulated for developing National action plan and taking the programme forward:

  A. Core Working Group with all relevant stakeholders as the members who will meet frequently (monthly) under the chairmanship of Director NCDC; (The first meeting of the core working group already organized at NCDC on 6th Oct 2016 and different subgroups constituted to work on different components and develop strategic National action plan. Meetings of the subgroups have already been done and recommendations have been compiled to develop a draft strategic action plan on AMR containment.

  B. Technical advisory Group under the joint chairmanship of DGHS and D.G, Indian Council of Medical research (ICMR)

  C. Inter-sectoral coordination Committee under the chairmanship of Secretary (Health) with members from different relevant ministries such as Animal Husbandry, Agriculture, Environment and Finance.

  - To begin with, a national workshop was organized in New Delhi from 8th to 9th Dec 2016 involving all the stakeholders including besides experts from Ministry of Health Officials from other ministries eg Ministry of agriculture, Ministry of Science and technology and Ministry of Environment, forests and climate change, as well as Non Governmental organizations and professional associations to discuss and develop the national action plan for containment of AMR. The meeting was chaired by DGHS and DG (ICMR).
  - The draft strategic national action Plan for AMR which was developed as an outcome of this workshop was shared with the members of the core working group in a meeting on 2nd Feb 2017 at NCDC and subsequently with members of the technical advisory group dated 28th Feb 2017. Comments obtained from the members were incorporated , the revised draft was discussed in the inter-sectoral meeting organized under the chairmanship of secretary (health) dated 10th April 2017 , the comments obtained were gain incorporated and final draft presented and got approved in the inter-ministerial meeting organised by MOHFW during April 2017 . Subsequently it is planned to make an operational plan by getting inputs from all the stakeholders concerned before it is implemented across the country.

4. 6 National Program on Prevention & Control of Viral Hepatitis in India

Coordinator: Division of Microbiology

The National Programme for surveillance of Viral Hepatitis has been launched under the 12th five year plan with a budget of 30 cr with the following objectives

a) Detection of outbreaks
b) Describe trends in type-specific acute hepatitis and identify risk factors
c) Estimate the proportion of chronically infected persons
d) Estimate the burden of chronic infections
e) Estimate the incidence of HCC and cirrhosis
f) Numerous actionable opportunities for intervention.

To achieve the above objectives the following initiatives have been taken:

1. A Technical Resource Group (TRG) comprising of Gastroenterologists, Epidemiologists, Microbiologists and representatives from NACO, ICMR, WHO, CDC has been constituted
2. Assessment of Laboratories to be designated as Network Laboratory under the National Viral Hepatitis Surveillance Programme was carried out by visiting some of these laboratories. The selection of these laboratories were done keeping in view they are well distributed across the country.
3. Laboratory network: A network of Laboratories have been established and generation of reliable and actionable data from surveillance is underway. The Microbiology Laboratory of the following Medical College/Institute has been selected to be designated as a Network Laboratory under the National Viral Hepatitis Surveillance Programme. Memorandum of Understanding (MOU) have been signed by NCDC and the following Medical College/Institute
   a) Coimbatore Medical College, Coimbatore, Tamil Nadu
   b) Gujarat Medical Education and Services, Sola, Ahmedabad, Gujarat
   c) Regional Institute of Medical Sciences, Ranchi, Jharkhand
   d) Regional Institute of Medical Sciences, Imphal, Manipur
   e) Sher-E-Kashmir Medical College, Srinagar, Jammu & Kashmir
   f) Burdwan Medical College, Burdwan, West Bengal
   g) Gandhi Medical College, Bhopal, Madhya Pradesh
   h) Sanjay Gandhi Post Graduate Institute, Lucknow, Uttar Prades
   i) Government Medical College, Thiruvananthapuram

   Signing of MOU with PGIMER, Chandigarhis also under progress.
4. The Preliminary Plan for carrying out the Viral Hepatitis Surveillance was developed with inputs from experts across the country and representatives from NACO, ICMR, WHO and CDC. The plan was subsequently approved by the DGHS. A detailed plan for Surveillance along with Operational Guidelines for the testing laboratories as well as the physicians have been developed and is in the process of approval by the Technical resource Group.
5. Recruitment of Manpower on contract basis at NCDC: The interview and skill test has been conducted by NCDC for the following posts.
   a) Microbiologist (1 post)
   b) Laboratory technicians (5 posts)
   c) Data entry operator (1 post)
   d) Procurement Assistant (1 post)
6. Procurement of kits and equipment: The process of procurement of kits and equipment are underway. The technical specifications for procurement of ELISA reader and ELISA washer for all the laboratories across the country have been approved. The specifications for procurement of kits are being drafted to ensure supply of quality kits for the programme.

   Treatment guideline on "Viral hepatitis – The Silent Disease: Prevention Control and Treatment Guidelines" have been published and released by the DGHS. The same has been uploaded on the NCDC website for reference.

4.7 National Rabies Control Programme

Coordinator: Division of Zoonosis

Rabies is endemic throughout the country with the exception of Andaman & Nicobar and Lakshadweep Islands. Dog rabies is major public health problem accounting for about 96% of the mortality and morbidity. Estimates suggest that annual human rabies death incidence to be around 20,000 and the annual incidence of animal bites to be 1.7% (17.5 million per year). Control of rabies involves two components viz Human health component and Animal health component. Human health component involves training of health professionals, implementing use of intradermal route of inoculation of cell culture vaccines and judicious and appropriate use of immunoglobulins. The strategy of human health component is being rolled out throughout the country. The strategy of animal health component i.e population survey of dogs, mass vaccination of dogs, dog population management and strengthening surveillance and response is initially being pilot tested in Haryana and Chennai and will subsequently be implemented in the country. In addition, IEC activities and Laboratory strengthening of five laboratories will be carried out together in coordinated manner. It is expected that all animal bite victims will receive appropriate management thereby reducing human mortality due to rabies and there will be decrease in transmission of dog rabies.

Activities conducted in Jan-Oct 2016:

Human Component

- MoU signed with 6 States , so far total 25 States and 5 UTs have signed the MOU
- Nodal Officers identified from 7 States. So far total 26 States and 5 UTs have identified SNOs
- Operational guidelines for National Rabies Control Programme circulated to State Nodal Officer.
- Training of Master Trainers on Animal Bite Management and ID route of Rabies Post Exposure Prophylaxes was organized at NCDC on 2 March, 2016.
- World Rabies Day Celebrated on 28th Sep 2016. A Scientific symposium on theme "Rabies. Educate. Vaccinate. Eliminate" was organized at NCDC
- Mass media campaign for rabies awareness launched through newspaper advertisement on World Rabies Day.
- Base line data regarding status of existing facilities on animal bite management and data about animal bite victims is being received from the states and UTs.
- Monitoring of status of implementation of human component and utilization of Grant in aid is being undertaken
- Visit to the Haryana to monitor the Status of implementation of human component

Animal Component

- Central Team visited Haryana (District Hissar & Fatehabad) to monitor the status of implementation of animal component . Meeting was also held with Principal Secretary, Govt. of Haryana at Chandigarh to discuss the issues pertain into the implementation of animal component in the State Haryana.
- Review meeting under Special DGHS on 24 May, 2016 to review the status of implementation of animal component in Haryana

4.8 Programme for Prevention and Control of Leptospirosis

Coordinator: Division of Zoonosis

Leptospirosis is public health problem in Gujarat, Kerala, Karnataka, Tamil Nadu, and Maharashtra & Andaman. Frequent outbreaks of leptospirosis are being reported, predominantly affecting young adult males. The disease is easily treatable and the mortality is preventable if detected and treated early. Under XII plan, Programme for Prevention and Control of Leptospirosis is being implemented in six endemic states. The strategy includes strengthening of diagnostics laboratories for early diagnosis, strengthening of patient management facilities, trained manpower development, strengthening of inter sectoral coordination and create awareness in general community.

Activities conducted in Jan-Oct 2016:

- MoU signed and grant in aid released to all program states except Andaman & Nicobar Island in 2015-16.
- Mass media campaign on Leptospirosis Awareness through New Paper advertisement is under process
- Base line data on cases and deaths due to Leptospirosis received from the programme States
- Draft operational guidelines for program for prevention & control of Leptospirosis ahs been prepared

4.9 Intersectoral Coordination for Prevention & Control of Zoonotic Diseases

Coordinator: Division of Zoonosis

Activities conducted in Jan-Oct 2016

- The Manual for Zoonotic Diseases of Public Health Importance publication has been reviewed and updated. The new publication has been circulated and uploaded on NCDC website
- Coordination of Joint orientation training course (IVRI & NCDC) on zoonotic diseases of public health importance for medical and veterinary professionals being organized at NCDC from 28 November- 2 December, 2016

For effective prevention and control of zoonotic diseases there is requirement of multi-sectoral integrated response among medical, veterinary and other related departments. This has been adopted on "need basis" for prevention of zoonoses in the country. Under XII plan, a programme for strengthening mechanism of Inter-sectoral Coordination for Prevention and Control of Zoonotic Diseases has been approved and is being implemented. The strategy includes strengthening of inter-sectoral co-ordination utilizing existing surveillance system of IDSP for collection and collation of animal disease data for setting up early warning signals, strengthening of SSU under IDSP, trained manpower development, sensitization of professionals in various sectors and IEC to create awareness among community and professionals.

4.10 Support to National Polio Surveillance

Coordinator: Division of Microbiology

AFP Surveillance: The Virology laboratory of NCDC has been accredited as WHO National Polio Lab to assist NPSP on lab based surveillance. In this regard, 13989 contact stool specimens & 7144 cases were received and tested. Isolates found positive for polio virus were processed for further typing and intratyping characterization. No wild poliovirus has been reported till date.

Supplementary Surveillance: As per Govt. of India, Ministry of Health & FW, NCDC has been selected to carry out supplementary surveillance by collecting sewage samples on weekly basis from 7 sites selected by NPSP to see the presence of any wild poliovirus in the sewage. In this regard, 340 sewage samples have been collected and tested at NCDC and include 4 sites of Punjab. Positive isolates were tested at NCDC, Delhi. No wild poliovirus since October, 2010 has been reported.

4.11 Global Health Security Agenda (GHSA)

Coordinator: Division of Epidemiology

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

5.1 Division of Epidemiology

Dr. C.S.Aggarwal
Addl Director & Head
Dr. Aakash Shrivastava
Joint Director
Dr. Arti Bahl
Joint Director
Dr. TanzinDikid
Joint Director
Dr. Ananya Ray Laskar
Assistant Director
Dr.Meera Dhuria
Assistant Director
Dr.Girish Makhija
Assistant Director
Mr. Ram Dayal
Senior Statistical Officer

Activities

1. Organize training courses in epidemiology. Development of teaching materials on disease surveillance and outbreak investigation of epidemic prone communicable diseases.
2. 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.
3. Supervision to three branches of the Institute *viz.*, Alwar, Jagdalpur and Conoor.
4. Support as National Focal Point for International Health Regulation
5. Technical support to various National Health Programmes, evaluation of different indicators.
6. Assisting the Director for publication of monthly Bulletin "CD Alert".
7. 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 19 outbreak investigations for diseases such as AES, Measles, Mumps, Acute Diarrhoeal Diseases, Hepatitis A & E, Avian Influenza H5N1, H1N1 and suspected cholera in different parts of the country were undertaken by EIS officers of the second and third cohort.

Acute Encephalopathy Surveillance, Muzaffarpur, Bihar, May – July, 2016

Outbreaks of acute neurological illness with high mortality have been reported from Muzaffarpur, Bihar since 1995. In most outbreaks, previously healthy under 5 years age children typically present with acute onset of seizures and altered mental status in early morning hours, quickly deteriorating to coma associated with high mortality. Outbreaks usually occur in May and June, and coincide with Muzaffarpur's litchi harvesting season.

NCDC and partner institutions along with US-CDC had conducted systematic investigations in 2013 and 2014 which demonstrated an association between this outbreak illness and hypoglycaemic agent MCPG found in litchi fruits. In 2015, guided by the findings, measures were taken to reduce morbidity and mortality, and the case incidence in 2015 was about a tenth of the case incidence in 2014.
Epidemic Intelligence Service - India officers, NCDC conducted hospital based surveillance for the period 25th May to 10th July, 2016 at two paediatric hospitals of the district: Shri Krishna Medical College Hospital (SKMCH) and KrishnadeviDeviprasadKejriwal Maternity Hospital (KDKMH), Muzaffarpur.

A total of 36 AES cases including 5 deaths were reported during the surveillance period. Case Fatality was 14%. The cases were from Muzaffarpur and four neighbouring districts: East Champaran, Sheohar, Sitamarhi, and Darbhanga. Muzaffarpur residents made up for 70% of the cases and mostly belonged to central blocks of the district.

During the surveillance period, the first case was reported on May 27, 2016. Most cases were reported in the last week of May - first week of June, and the peak was observed on 04-06 of June 2016. The last

case during the surveillance period was reported on the June 28, 2016. Almost 70% cases were ≤ 5 years of age. Male to female ratio was equal.
History of seizures was reported in 97% cases and altered mental status in 80% cases. At time of admission 85% had altered sensorium and 50% of these were unconscious. Over 60% patients were afebrile (measured temperature) at the time of admission, and over half of the cases had hypoglycaemia; almost 44% had blood glucose level ≤ 50mg/dl. CSF cytology and biochemistry was available for 20 cases and was mostly unremarkable.

A good litchi harvest was reported this year, which was largely over by mid June. Discharged children reported having eaten fruits from orchards and missed evening meals during the season.

A central team that visited during this period tested serum specimens of Muzaffarpur cases for JE IgM using ELISA at NCDC and also searched for larvae or adult vectors of Culexgp or environment for their breeding. The environment and laboratory findings were not supportive of JE transmission.

Acute Encephalopathy Investigations, Gorakhpur, Uttar Pradesh, July, 2016

A central team comprising of officers from NCDC, Delhi, AIIMS-Delhi, NVBDCP, Delhi, IDSP NCDC, Delhi, NIV Pune, and ROHFW, Lucknow visited Gorakhpur district in July 2016 to investigate AES situation in the district. The data suggested that in past few years highest incidence of AES and JE has been recorded from 7 districts of East UP: 4 districts of Gorakhpur Division and 3 districts of Basti Division. It was observed that JE constitutes a small proportion of the all-cause AES in this district and is declining. There is a seasonal pattern of increased incidence of AES cases in months July to December with a peak in September. The Central Team in order to understand the disease profile studied the line list and then examined in detail both the admitted AES paediatric case patients and the admitted non-AES acute febrile illness paediatric case patients. The case presentations and CSF findings were suggestive of encephalopathy rather than encephalitis. There were case presentation similarities in both AES and non AES cases. Based on the clinical profile, NCDC shortlisted the potential etiological agents and considered laboratory testing for these etiological agents. The sera and CSF specimens of admitted AES and non AES cases were tested at NCDC laboratories. While only about 10% serum JE IgM positivity was reported among AES paediatric cases, Scrub Typhus IgM positivity was as high as over 70% among AES paediatric cases. Even Scrub Typhus IgG positivity was high among AES paediatric cases and interestingly IgM and IgG positivity was equally high among non AES febrile paediatric cases. The team concluded that scrub typhus infection is quite prevalent in this region and many of these cases complicate to develop encephalopathy. These findings and proposed recommendations were deliberated in a meeting chaired by the Director General, DGHS Government of India and subsequently shared with the State authorities.

JE/AES situation assessment, Dibrugarh and Sivasagar, Assam, July, 2016

A central team comprising of officers from NCDC, Delhi, IDSP NCDC, Delhi, NIMHANS Bangaloreand RMRC Dibrugarhvisited Dibrugarh and Sivasagar districtsin July 2016 to investigate JE situation in the state. The data suggested that JE is invading into newer districts of Assam and 26 of a total of 27 districts in Assam reported JE in 2015.Adult cases more prominent in contrast to the paediatric cases around 2007-2008 i.e., post vaccination among the <1to15 years' age group.Potential risk factors are present viz. Pig sty/cattle shed located around/under the human dwelling and Proximity of rice field to human dwellings. There is extensive AES awareness in the Dibrugarh and Sivasagardistricts. All cases are referred to Assam Medical College and Hospital, Dibrugarh, from the adjoining areas.The JE ward is there but nor functional. Majority of physicians are aware of AES approach and diagnosis of JE.They follow the standard protocol for diagnosis and management of AES. Most of the patients utilise free ambulance services provided by the government. Massive awareness campaign against JE/AES undertaken in Sivasagar district since October 2015 with collective effort of all the departments along with Animal Husbandry and Forestry.
In 2010, JE vaccination was carried out in the Dibrugarhdistrict in 1-15 year population followed by adult population in 2014. Entomological survey of Dibrugarh District for May to July 2016 provided by RMRC, Dibrugarh, shows the maximum number of mosquitoes collected each month were Culexvishnuii followed by Mansoniauniformis
The facilities at Sivasagar Civil Hospital are inadequate with non- functional ventilator in the ICU and no brain imaging and other laboratory facility available to differentiate nervous system disorders. There

is no disability data of the survivors in the district.Availability of Neuro-imaging is limited and ruling out other causes of encephalitis/encephalopathy is done predominantly on clinical grounds.
These findings and proposed recommendations were deliberated in a meeting chaired by the Director General, DGHS Government of India and subsequently shared with the State authorities.

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.

The Training courses organized during the reported period

1. Three months Regional Field Epidemiology Training Programme for the health personnel of South East Asia Region was conducted from 1 August to 29 October, 2016. A total of six people from India (3) and Nepal (3) attended the training.
2. One month Regional Training Programme on Prevention and Control of Communicable Diseases for paramedical personnel of South East Asia Region from15 March to 11 April 2017. A total of nineparticipants from Timor Leste (4) and India (5) attended the training.
3. 12th Batch of MPH (FE) was inaugurated on 1st Aug 2016 in which 2 students joined. Currently one student is continuing with the training course.
4. A two day leadership & motivation workshop for EISOs & NCDC officers was held on 11-12 August 2016 at NCDC, Delhi
5. Fifth cohort of India EIS training has been started on 1 February 2017. A total 13 officers are currently undergoing the training.
6. A two day training of EISOs on Surveillance, TB, Leprosy, VBD, Zoonosis, and Entomology was held on 9-10 August 2016 at NCDC, Delhi
7. National Consultation on Integration of Epidemic Intelligence Services EIS training into MD (Community Medicine) was held on 2 June, 2016

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

As National Centre for Disease Control which is the National Focal Point for IHR in India, we are obliged to report on progress of IHR implementation annually to the World Health Organization by responding to the WHO - IHR monitoring framework (self assessment) in collaboration with stakeholders. It is an attempt to make sure that we are compliant with all the core capacities. National level stakeholder meeting for responding to IHR self-monitoring questionnaire (2015) was held in January 2016 and duly approved questionnaire was submitted to WHO in May 2016. Based on IHR self-monitoring questionnaire (2015), India has also communicated to WHO, regarding its compliant status to IHR (2005).
India's response to WHO IHR monitoring framework (2016) was submitted to WHO in October, 2016. Requests from WHO via Event Information Site in relation to contact tracing of MERS CoV, H1N1, Ebola and other outbreak response related issues were responded to. Evaluation of Ebola Virus Disease Surveillance at Indira Gandhi International Airport, Delhi 2016 was carried out by Epidemic Intelligence Service Officer posted at NFP-IHR secretariat. The "Risk Communication Plan" was drafted and is available on NCDC website at http://ncdc.gov.in/writereaddata/mainlinkfile/File593.pdf
A meeting to discuss “Food Safety Emergency Response Plan” being drafted by Food Safety and Standards Authority of India(nodal agency for food safety under IHR in India) on 26 August, 2016 under the chairmanship of Director, NCDC.
The Public Health (Prevention, Control and Management of Epidemics, Bioterrorism, and Disasters) Bill, 2017 (Draft) was in public domain in month of Feb-March 2017 to invite comments

Global Disease Detection-India Centre

Details are mentioned under the Chapter on Programs.

Epidemic Intelligence Services (EIS) programme

The Ministry of Health & Family Welfare, Government of India launched the Epidemic Intelligence Service (EIS) Programme at National Centre for Disease Control (NCDC), Delhi in October, 2012. This

programme is on the lines of the programme of the Centers for Disease Control and Prevention (CDC), Atlanta, USA.

The two years training programme is being conducted in close collaboration with CDC, Atlanta and is designed to train public health professionals with skills in epidemiology necessary for public health action including surveillance, effective and rapid response to any public health event or crisis.
Three batches (28 candidates) have completed the EIS programme since 2014.

Currently 23 candidates are pursuing EIS training in two Cohorts – 4 & 5. EIS programme cohort 4 began in October 2015 and has 10 EIS officers (including one self-sponsored) candidate. Three EISOs of cohort 4 are posted outside Delhi at IDSP Tamil Nadu, IDSP Uttar Pradesh, NIMHANS Bangalore; out of seven EISOs in Delhi- four are posted in NCDC Delhi; two in MOHFW and one at IDSP Delhi.

The fifth cohort of the India EIS programme commenced from 1 February 2017 with the initiation of one month inception course for EIS trainees was held at NCDC from 1 Febraury to 10 March 2017.
Cohort 5, EIS programme began in February 2017 and there are 13 candidates including 7 self sponsored and six Government sponsored. Four are posted outside Delhi at IDSP Punjab, IDSP Telangana, NARI Pune & Manipal Karnataka. Out of remaining nine candidates five are posted at NCDC, Delhi (Microbiology, Zoonosis, NCD, IDSP, CEOH); and one each at TB Division MoHFW, EDMC, NACO and RHFWTC Delhi.

Following their admission in the programme there is initial 1 month training in NCDC in Epidemiology & Biostatistics. The EIS officers are then posted in agencies like AIIMS, NIMHANS, NITLD, TMCH, NIRT Chennai and in different National Health Programmes at Central/State level like NVBDCP, RNTCP, NACO and NPCDCS. They work under guidance of Supervisors, Mentors, Resident Advisor & faculty of NCDC and develop expertise and skills in Core Areas of Learning for effectively responding to public health challenges. All EISOs are involved in field assignment at a central/state agency with guidance and direction from supervisor and mentor; have been involved in Outbreak investigations, Joint review of IDSP; have attended conferences etc. besides regularly presenting weekly seminars at NCDC Delhi. EIS officers are fully equipped to address the threats of outbreaks and also aid in strengthening public health system and surveillance.

During last one year the EISOs have attended- Five week induction training course; Surveillance workshop, training on surveilllanve & VBD and Leadership & motivation workshop.

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 Diabetes was published in April 2017 and one on Food-borne diseases and food safety in India was published in March 2017and updated on the NCDC website.

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

It is a quarterly publication of 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, seventeen issues have been successfully published and widely circulated.

List of Publications during 2016-17

- Shrivastava, A., Kumar, A., Thomas, JD., Laserson, KF., et al. Association of acute toxic encephalopathy with litchi consumption in an outbreak in Muzaffarpur, India, 2014: a case-control study. Lancet Glob Health. 2017; 5(4):e458-e466.

5.2 Division of Microbiology

Dr Sunil Gupta
Addl Director & Head
Dr Charu Prakash
Addl Director
Dr Somenath Karmakar
Addl Director
Dr Sandhya Kabra
Addl Director
Dr Simrita Singh
Joint Director
Dr Partha Rakshit
Deputy Director
Dr Sarika Jain
Assistant Director
Dr PurvaSarkate
Assistant Director
Dr Sanjim Chadha
Assistant Director
Dr Mahesh Waghmare
Assistant Director

Details of Routine Activities Undertaken by the Division of Microbiology

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.

Details are mentioned under the chapter on Programs.

Annual Compiled Data on Details of the Work Carried out at 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 rec'd in lab	Negative	NPEV By Isolation	Total L20B Pos	Total Sabin Like				NPEV by PCR	Total VDPV
						P1	P2	P3	Mixture		
Apr-16	484	947	770	130	38	9	6	12	8	2	0
May-16	616	1209	1032	162	15	3	4	6	2	0	0
Jun-16	596	1166	914	223	29	10	0	14	5	0	0
Jul-16	599	1173	923	247	3	0	0	3	0	0	0
Aug-16	883	1725	1477	248	0	0	0	0	0	0	0
Sep-16	679	1334	1171	143	20	7	0	6	7	0	0
Oct-16	602	1178	1069	72	37	12	0	25	0	0	0
Nov-16	562	1103	1025	63	15	5	0	8	1	1	0
Dec-16	568	1115	1042	61	12	4	0	6	2	0	0
Jan-17	566	1102	996	89	17	3	0	11	3	0	0
Feb-17	502	983	789	68	126	35	0	49	42	0	0
Mar-17	487	954	898	47	9	0	0	9	0	0	0
Total	**7144**	**13989**	**12106**	**1553**	**321**	**88**	**10**	**149**	**70**	**3**	**0**

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	Samples Tested	Sabin Like	VDPV	Wild	NPEV	Neg
Red Cross Hospital	52	51	0	0	1	0
Wazirpur JJ Colony	52	39	0	0	13	0
Bhalaswa Lake	52	30	1	0	21	0
Swarn Cinema	51	48	0	0	3	0
Batla House	52	47	0	0	5	0
Sonia Vihaar	52	50	0	0	2	0
Nangloi	52	47	0	0	5	0
Civil Hospital Rajpura	26	15	0	0	10	1
Fatehpur Disposal,	26	20	0	0	6	0
Zirakpur, Mohali, Punjab	26	23	0	0	3	0
Malerkotla, Punjab	25	22	0	0	3	0
Total	**466**	**392**	**1**	**0**	**72**	**1**

1. National Measles and Rubella Laboratory Activities

The Enterovirus 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

Month	Measles	Measles	Measles	Measles	Rubella	Rubella	Rubella	Rubella
Apr-16	89	46	38	5	43	21	20	2
May-16	71	32	35	4	38	22	13	3
Jun-16	21	8	13	0	13	5	8	0
Jul-16	0	0	0	0	0	0	0	0
Aug-16	0	0	0	0	0	0	0	0
Sep-16	0	0	0	0	0	0	0	0
Oct-16	0	0	0	0	0	0	0	0
Nov-16	5	0	5	0	5	0	4	0
Dec-16	9	5	3	1	4	2	1	1
Jan-17	6	6	0	0	0	0	0	0
Feb-17	48	38	7	3	10	1	9	0
Mar-17	31	14	15	2	17	5	11	1
Total	**280**	**149**	**116**	**15**	**130**	**56**	**66**	**7**

2. 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 andAnti-EBV IgMAntibody Test

	Mumps				EBV			
	Tested	Pos	Neg	Equivocal	Tested	Pos	Neg	Equivocal
Apr-16	3	0	2	1	0	0	0	0
May-16	0	0	0	0	0	0	0	0
Jun-16	3	3	0	0	0	0	0	0
Jul-16	4	1	3	0	0	0	0	0
Aug-16	4	1	3	0	0	0	0	0
Sep-16	4	1	3	0	0	0	0	0
Oct-16	1	0	0	1	0	0	0	0
Nov-16	0	0	0	0	15	0	14	1
Dec-16	0	0	0	0	12	1	11	0
Jan-17	0	0	0	0	19	0	19	0
Feb-17	0	0	0	0	8	0	8	0
Mar-17	0	0	0	0	10	0	10	0
Total	**19**	**6**	**11**	**2**	**64**	**1**	**62**	**1**

Table 5: Results ofAnti- Parvo B IgM andAnti-VZV IgM Antibody Test

	Parvo				VZV			
	Tested	**Pos**	**Neg**	**Equivocal**	**Tested**	**Pos**	**Neg**	**Equivocal**
Apr-16	15	0	15	0	2	1	1	0
May-16	16	2	13	1	0	0	0	0
Jun-16	13	2	11	0	6	1	5	0
Jul-16	12	0	12	0	9	2	5	2
Aug-16	14	3	11	0	7	1	6	0
Sep-16	10	0	10	0	0	0	0	0
Oct-16	7	2	5	0	0	0	0	0
Nov-16	3	0	3	0	0	0	0	0
Dec-16	0	0	0	0	0	0	0	0
Jan-17	1	1	0	0	0	0	0	0
Feb-17	3	0	3	0	0	0	0	0
Mar-17	8	4	3	1	0	0	0	0
Total	**102**	**14**	**86**	**2**	**24**	**5**	**17**	**2**

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

Month	**Tested**	**Positive**	**Negative**	**Equivocal**
Apr-16	9	5	4	0
May-16	7	1	5	1
Jun-16	4	2	2	0
Jul-16	9	0	7	2
Aug-16	4	1	3	0
Sep-16	4	2	2	0
Oct-16	2	0	2	0
Nov-16	0	0	0	0
Dec-16	2	0	2	0
Jan-17	0	0	0	0
Feb-17	0	0	0	0
Mar-17	0	0	0	0
Total	**41**	**11**	**27**	**3**

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 Diagnostic support

- **Diagnosis of Influenza**:During this period a total of 510 throat/nasal swab samples were received for Influenza diagnosis. Samples were processed in Bio Safety Cabinet-Class II. RNA was extracted from these samples followed by amplification of the RNA by using RT- PCR technique. Following were the findings:

Name of the test	**Total no. of samples received**	**Total no. of samples tested**	**Positive**		**Negative**
Influenza Real time PCR	510	510	**Inf A**	**47**	446
			Inf A H1N1	16	
			Inf A H3N2	31	
			Inf B	**17**	
			Total	**64 (Inf A & B)**	

Influenza Like Illness (ILI) surveillance

During this period, surveillance was done at three sentinel sites in Delhi for Influenza like illness & SARI cases. Following were the results:

S. No.	**Name of the Sentinel Site**	**Name of the test**	**Total no. of samples received**	**Total no. of samples tested**	**Positive**		**Negative**
1.	Kasturba Hospital	Influenza Real time PCR	144	144	Inf A	14	126
					Inf A H1N1	2	
					Inf A H3N2	11	
					Inf B	4	
					Total Positive	18	
2.	Guruteg Bahadur Hospital	Influenza Real time PCR	12	12	Inf A	0	
					Inf A H1N1	0	
					Inf A H3N2	0	
					Inf B	0	
					Total Positive	0	
3.	SJ Hospital, New Delhi	Influenza Real time PCR	82	82	Inf A	2	80
					Inf A H1N1	1	
					Inf A H3N2	0	
					Inf B	0	
					Total Positive	2	

- Diagnosis of Rubella, Cytomegalo -Virus (CMV), Herpes Simplex Virus (HSV-I) & Herpes Simplex Virus -II(HSV-I I) infection. ELISA was performed for the above infections.

Test Performed for	**Total no. of**	**Total no. of Serum**	**Samples found**
Rubella IgG	264	264	255
Rubella IgM	206	206	11
CMV IgM	455	455	36
HSV-I IgM	368	368	2
HSV-II IgM	370	370	5

- A total of 10 urine samples were received and tested for CMV infection PCR .DNA was extracted from these samples and amplified for gb gene of 310 bp. 4 samples were found to be positive in CMV PCR test

Viral Hepatitis Laboratory

Routine diagnosis

Total No. of samples tested from 1st April 2016 to 31st March 2017 = 689
Hepatitis Markers (test performed by ELISA)

IgMAnti HAV		IgMAnti HEV		IgM Anti HCV		Anti HCV	
No tested	**No of positives**	**No tested**	**No of positives**	**No tested**	**No of positives**	**No tested**	**No of positives**
591	176	609	162	34	10	134	76

Tuberculosis laboratory

- Total samples (sputum/CSF/Biopsy/Urine/P.fluid/Pus/Tissue) received – 63 Nos.
- Positive for Smear / culture – 03 Nos.

Bacteriology laboratory

Routine diagnosis

- 344 urine samples were subjected to culture examination of pathogenic Bacteria out of which 114 were positive. (*E. coli 68, Klebsiella Sp.7, Pseudomonas Sp. – 14,Proteus Sp. 10, AcenetobacterSp 3, ,Entrococcous Sp. 3, Citrobacter Sp. 2, CONs 5& Candida albicans 2*)
- 165Blood samples culture were carried for examination of pathogenic Bacteria out in of which 40 were positive.(*E. coli10, Klebsiella Sp.7, Pseudomonas Sp. – 6,Proteus Sp. 3, AcenetobacterSp 4, Citrobacter Sp. 1,Staphylococcusaureus 5, Streptococcus Sp. 1 & CONs 3*)
- 30 Pus, throat swabs, Pleural Fluid were processed for examination of pathogenic Bacteriaout of which 9 were positive.*(E. coli 1, Pseudomonas Sp. – 2&Staphylococcusaureus 6)*
- 84 samples CSF obtained from suspected cases of pyogenic meningitis were processed out of which 5 were positive.
- 99 blood samples were processed for widal test out of which 1 was 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

263 Sample/ bacterial isolates obtained from various AMR network laboratories were tested for Quality control of Antibiotic Susceptibility Test., there was More than 90% concordance in results.

Diarrheal Disease Laboratory

Broad activities

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

- Diagnostic Laboratory services
  i. Stool culture
  ii. Microscopy
  iii. Isolation andidentification 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 / AcuteGastroenteritis outbreaksspecimens
- Daily notification of Cholera positive cases for Authorities to undertake control measures.

Routine activities

Referral samples received from various hospital and other sources of Delhi: 59 stool samples which were received, out of which, 1 EPC, 24 Vibrio Cholera O1,4 Shigella, 1 Giardia were isolated, In addition, 1 Adenovirus,3 Clostridium difficile toxin A& B were detected by Rapid/Latex/ELISA method

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	115
Stool Microscopy	72
Strains of Vibrio, Shigellaetc stocked for future work	800
Gene Sequencing	20 isolate of Vibrio Cholera O1 processed for CTX gene sequencing
Serotyping and PCR test	30 isolate of E.Coli processed for serotyping and pathogenic gene testing like stx1 , stx 2, LT , ST gene)

Environmental Laboratory

- Bacteriological analysis of drinking water samples was provided to the following beneficiaries:
  i. Airport health organization, Delhi air port in connection with VVIP flight going abroad.
  ii. Airport authority of India.
  iii. Govt. Offices and Hospitals.
  iv. General public by reference.

v. TAJ AIR CATERERS Gurgaon road (in connections with VVIP flights)

- Laboratory support to investigation of water borne diseases.
- Processing of water samples received from the States as part of outbreak investigations of acute gastroenteritis.
- 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.)
- Teaching, training.
- Disaster management / outbreak investigations.
- Polio surveillance in Sewage water samples.
- 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
1	Flight kitchens in connection with VVIP flight	196
2	Outbreak investigations	10
3	Water quality in hospitals/ Institutions	96
4	Others (Referred samples)	72
	Total	**374**

Mycology Laboratory

Broad mandate

- Mycological diagnostic services for the diagnosis of various fungal syndromes like Candidiasis, Aspergillosis, Mycetoma, Dermatophytosis etc. - especially those associated with immunodeficiency, Tuberculosis, Diabetes etc.
- Teaching and Training

Routine activities

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

S. No	Type of Sample	Number of Samples tested	Number of Samples positive	Diagnosis/Pathogen
1	CSF	18	01	*Cryptococcus neoformans*
2	Skin / Nail	01		
3	Tissue	18	01	*Actinomyces spp*
4	Blood Culture	02		
5	Sputum	02	01	*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.No	Name of 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	345P	400P	300P	186P	125P	130P	50P	125P	100P	175P	175P	225P	2336P
2	MA	220P	215P	215	140P	135P	48P	75P	160P	40P	132P	55P	155P	1590P
3	TCBS	46P	50P	55P			25P	15P		10P	12P	25P	50P	288P
4	BSA	50P	50P	75P	25P	55P	25P	25P	25P		25P	37P	25P	417P
5	XLD	53P	25P	55P		45P		15P	43P	22P	25P			283P
6	SSA	25P	25P	60P		30P	10P	15P	40P			15P	25P	245P
7	BA		67P	15P		35P	23P	43P	25P	45P	60P	52P	75P	440P
8	CHA		12P	14P			7P	15P		10P	12P	10P	10P	90P
9	SUGARS	260T	440T	440T	160T	160T	160T		160T	160T	500T		160T	2500T
10	TSI	100T	200T	150T	100T		50T		100T	100T	50T		100T	850T
11	PPA	100T	200T	150T	100T		50T		100T	100T			100T	900T
12	LIA		100T	200T	100T		100T			100T	100T		100T	800T
13	Simmons Citrate	100T	200T	100T	100T	100T				100T	100T		100T	900T
14	OP Water	300T	500T	300T	200T	100T	100T	100T	200T	100T	300T	100T	300T	2600T
15	AP Water		100T	100T	200T	100T		100T			100T		300T	1000T
16	Motility Media	100T	100T		100T	100T				100T		100T		600T
17	Tryptic Soys Broth (50ml)	02V		30V								05V		37V
	Tryptic Soyabroth (20ml)	45V	25V	31V				22V	41V			25V	35V	204V
18	Macconkey Broth D/S	20F	74F	50F	20F	40F	40F	40F	20F		20F	20F	40F	384F
19	Macconkey Broth D/S	100T	400T	200T	110T	200T	200T	200T	100T		100T	100T	200T	1910T
20	Macconkey Broth S/S	100T	520T	320T		260T	320T		160T		160T	160T	320T	2320T
21	Selinite Broth	100T			100T			50T			100T			350T
22	3% Beef Extract (ml)	500	500	500		500								2000
23	Brillient Green Bile Broth		50T											50T
24	1% Nutrient Agar Stab		180V	100T		200T					200T		100T	600T,180V
25	Carry Blairs Media			160 V										160V
26	Urease			70T, 9V										70T, 9V
27	BHA Agar				9V									9V
28	BHA Broth				10T									10T
29	Lofflars Media						20V							20V
30	DA					45P								45P
31	Nutrient Broth						20V							20V
32	BES Agar										50T			50T

Major Achievements

a. A team from WHO HQ audited the Polio 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 been granted Accreditation for Polio testing with a score of 97% (virus isolation) and 93% (PCR- Intratypic differentiation)

b. The Polio laboratory has performed consistently well in Proficiency testing on panels received from WHO as well as re-validation.

Year	Proficiency Score of Polio virus isolation	Proficiency Score of Polio virus ITD & VDPV	Proficiency Score of Measles IgM	Proficiency Score of Rubella IgM	Revalidation Score of Measles IgM	Revalidation Score of Rubella IgM
2015	100%	100%	100%	97.7%	100%	100%
2016	100%	90%	96.2%	100%	96%	100%
2017	-	-	-	-	100%	100%

Projects Completed recently

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

Ongoing Research Projects

c. 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.
d. Viral aetiological profile of children admitted with acute myocarditis in collaboration with a tertiary level hospital in Delhi NCR
e. A total of 306 nasal/throat samples of pandemic H1N1 and seasonal influenza A were tested for Oseltamivir Resistance by MAMA-PCR (Mismatch Amplification Mutation Assay -PCR) to find out H275Y mutation in NA gene. Out of these, 70 samples gave the amplification results by MAMA-PCR (NA gene & CAC/CAT->TAC/TAT mutation). A total of 16 Pandemic/Seasonal Influenza positive samples were amplified, sequenced for NA gene (938 bp) were resolved using bioinformatics tools. All the sequences were aligned with each other using BioEdit software to look for the mutations related to Oseltamivir Resistance in NA gene.
f. Study of acute gastroenteritis cases in pediatric population of ArunaAsaf Ali Hospital: 134 stool samples which were received from pediatric population of AAA Hospital Delhi of acute gastroenteritis. 18 E. Coli pure culture, 10 Vibrio cholera O1, 1 NAG Vibrio, 7 Shigella, 2 Adenovirus, 1 Salmonellae, 1 Giardia were detected. Microscopy was carried out for the 110 samples.
g. Surveillance study on rotavirus in 0-5 year admitted children of ArunaAsaf Ali Hospital, Delhi: Total 134 samples were received, out of which 17 samples were positive for rotavirus.

Outbreaks Investigations Carried Out

a. Serum samples from suspected measles cases were received from STNM Hospital, Gangtok, Sikkim on 22.04.2016. A total of 11 serum samples were received. Out of 11 serum samples, 8 were positive, 2 were negative and 1 was equivocal for Anti-Measles IgM antibodies (ELISA).
b. Serum samples from suspected chickenpox cases were received from IDSP Dehradun on 27.04.2016. A total of 3 serum samples were received. Out of 3 serum samples, 2 were positive and 1 was negative for Anti-VZV IgM antibodies (ELISA).
c. Serum samples from suspected chickenpox cases were received from office of the Chief Medical Officer Dehradun on 27.06.2016. A total of 2 serum samples were received. Out of two serum samples, one was positive and the other was negative
d. Serum samples from suspected measles cases were received from STNM Hospital, Gangtok, Sikkim on 02.01.2017. A total of 16 serum samples were received. Out of 16 serum samples, 9 were positive, 5 were negative and 2 were equivocal for Anti-Measles IgM antibodies (ELISA).
e. Serum sample from a suspected chickenpox case was received from Maharajgunj, Ganeshpura village, UP on 20.04.2017 and the sample was positive for Anti-VZV IgM antibodies (ELISA).

f. A total of 5 samples suspected of HSV-1 and Rubella were received from Sir ThutobNamgyal Memorial Hospital, Gantok, Sikkim in April 2016. These samples were tested by ELISA for HSV-1 and Rubella IgM and none was found positive.

g. One suspected sample for H5N1 was received from District Hospital Daman in January 2017. The sample was tested by Real time PCR and was found to be negative for Inf H5 N1.

h. Lab. Support provided for investigation of diarrheal diseases outbreak in Jaipur (Rajsthan.) in the month of May. 2016.

i. Lab. Support provided for investigation of Hepatitis outbreak in Bahadur Garh, Jhajjar (Haryana) in the month of March 2017.

j. Three Diphtheria isolates were received from Sri Dev URS medical college, Tamaka, Kolar for toxigenicity test in October 2016. Two were found positive for diphtheria toxin.

k. Thirteen samples of Diphtheria outbreak were received from CMO, Bijnoor, U.P. in August-2016. All were found negative for *C. diphtheriae*

l. 49 outbreak samples were received from IDSP, Badayun, U.P in February, 2017 and were tested for Widal. All were found negative for *Salmonella* typhi and para typhi.

m. The details of outbreaks investigated by Viral Hepatitis Laboratory is as follows:

S. No	**Place**	**Anti HAV IgM**		**Anti HEV IgM**		
		No tested	**No positive**	**No tested**	**No positive**	**Cause**
1.	Dist Shamli (Uttar Pradesh) Aug 2016	Anti HCV		HCV RT PCR*		HCV Genotype*
		No tested	No positive	No tested	No positive	3a
		60	60	59	26	
2.	Dist Malkangiri (Odisha)	Anti HAV IgM		Anti HEV IgM		Cause
		No tested	No positive	No tested	No positive	
		12	0	12	2	-
3.	Dist Shamli (Uttar Pradesh) April 2017(Surveillance in General Population)	Anti HCV		HCV RT PCR		HCV Genotype
		No tested	No positive	No tested	No positive	
		269	99	Samples archived; to be tested by Biotechnology Division		

*The test was done in Biotechnology division; Out of 60 samples which was HCV serology positive, RNA extraction of one sample could not be performed.

n. Various outbreak specimens were received at Diarrhoeal Diseases Laboratory from different Statesreferred as field samples. Details of suspected outbreak specimens thatwere received from various states is given below:

Type of Sample and source	**Date of receipt**	**Culture report**
1 isolates received from Ganesh Shankara V Medical College Kanpur	27.04.16	Nil
6 Rectal Swab and 22 isolates received from SMS Hospital Jaipur	03.05.16	2 Vibro Cholera and 25 E.Coli
1 Rectal Swab received from Dy Civil Surgeon Faridabad Haryana	30.05.16	Nil
2 stool samples received DSO Hospital Vijayapur	04.07.16	NIL
I isolate received from State Public Health Laboratory Nagpur	10.08.16	1 Vibrio cholera O1
15 water samples (JABAL PUR)received from DrPurva as part of outbreak investigations	22.08.16	NIL
8 isolate received from ICMR Jabalpur	24.08.16	8 Vibrio Cholera O1

Visits made/Trainings/Workshops attended by various officers

Dr Sunil Gupta, Addl Director:

- Attended WHO supported Bi-regional consultation on AMR in Asia at Tokyo Japan from 14th to 15th April 2016
- Attended annual review Meeting of IDSP state surveillance officers at Jaipur(Rajasthan) from 8th to 10th June 2016
- Attended annual conference of Indian Society of Malaria and other Communicable Diseases held at Bangalore from 10th to 12th June 2016
- Participated in the WHO supported workshop on Use of WHONet software for AMR surveillance held during 27th to 29th July 2016 at Hotel Four Points Sheraton ,New Delhi
- Attended WHO intercountry meeting at WHO SEARO, New Delhi dated 9th Sept 2016 on Use of IT in AMR surveillance
- Attended the WHO supported national Workshop for integration of Influenza surveillance at Hotel Lalit, New Delhi from 4th to 5th Oct 2016
- visited Guru Ram Rai Institute, Dehradun and delivered a lecture dated 3rd Dec., 2016 on Influenza Surveillance
- Attended Expert meeting for developing National Action Plan on AMR in Vey sector at Indian council of agricultural research , Pusa Campus , Delhi dated 05.12.16
- Attended BRICS countries meeting on disease surveillance and AMR dated 15 & 16 Dec. 2016 at Hotel lalit ,New Delhi organized by MOHFW
- Attended Indo-Netherland Joint Meeting on AMR held at residence of Netherland ambassador, New Delhi dated 19th Dec 16
- Attended AMR meeting organized by Neeti Foundation at India Habitat centre dated 20th Dec 2016
- Attended the FAO-ICAR collaborative meeting on developing national action plan on AMR dated 27th Dec 2017 at Pusa campus ICAR, New Delhi
- Attended the meeting on AMR organized at Bangalore by ICAR/FAO/NIVEDI from 18th – 19th January 2017
- Attended an Indo-Dutch Teleconference on AMR on 1st February 2017 at Netherland Embassy.
- Attended the National Conference of Hospital Infection Society of India from 9th – 10th February 2017 and delivered a talk on : Country response , AMR containment
- Attended a two day meeting of researchers organized by FAO/ICAR at Central Institute for Fisheries Technology, CIFT, Kochi on 27-28 March 2017 to discuss the research needs, capabilities and priorities for AMR in India

Dr. Charu Prakash, Additional Director

- Attended workshop on Biorisk Management (BRM) as per GAP-III Implementation for Diagnostic facilities from 28th March to 1st April 2016 at Bangkok, Thailand.
- Attended workshop on Strengthening capacity and internal quality assurance for SEAR Measles and Rubella laboratory network from 15th -20th August 2016 at Thimpu, Bhutan.

Dr Simrita Singh, Joint Director:

- Attended "Foundation for Quality India (FQI) 150th NABET accredited certificate course" in ISO15189:2012 Internal Auditors and Quality Management System during 8th-11th August 2016 at NCDC,Delhi
- Attended "National Workshop on Influenza Surveillance" organized by WHO with the goal of integrating the 12 IDSP influenza Laboratories and the 6 ICMR laboratories to further strengthen the Influenza Surveillance system in the Country during 4th -6th October 2016 at Hotel Lalit, New Delhi
- Attended symposium on Antibiotic Resistance Organized by WHO on 17th November 2016 at LHMC, Delhi
- Headed the Central Health Team to investigate the outbreak of H5N1 at Memnagar Rescue Centre, Ahmedabad, Gujarat during January2017

Dr Partha Rakshit, Deputy Director:

- Visited Eastern & North Eastern India to assess various labs in for inclusion as network labs under National Viral Hepatitis Surveillance Programme
- Visited Jakarta April 2016 for Regional Action Plan for SEARO countries during
- Visited Mumbai on 28th July 2016 for the World Hepatitis Day
- Visited Tamil Nadu in November 2016 to assess district hospitals labs

Dr Sarika Jain, Asstt Director

- Attended the meeting entitled: AMR research innovation: addressing India's priorities at India Habitat Centre, New Delhi dated 7th Dec 2016 organized by ICMR
- Attended the Workshop on Capacity Building and strengthening of Hospital Infection Control on 14th -15th Dec. 2016 organized by AIIMS and ICMR at AIIMS, New Delhi
- Attended an Indo-Dutch Teleconference on AMR on 1st February 2017 at Netherland Embassy.

Dr. Purva Pankaj Sarkate. Assistant Director

- Attendend workshop on Biorisk Management (BRM) as per GAP-III Implementation for Diagnostic facilities from 28th March to 1st April 2016 at Bangkok, Thailand.
- visited Ghugari Block Jabalpur, Madhya Pradesh from 18th -22nd August 2016 for investigation of Cholera outbreak.
- visited Maharajgunj, Uttar Pradesh from 17-19th April 2017 for investigation of Chicken pox outbreak.

Dr Sanjim Chadha, Assistant Director:

- Visited Telangana, Hyderabad during 2[1st]- 2[3rd] February 2017 to review the rising trends of cases and deaths related to H1N1.
- Attended "Foundation for Quality India (FQI) 150th NABET accredited certificate course" in ISO15189:2012 Internal Auditors and Quality Management System during 8th-11th August 2016 at NCDC,Delhi
- Attended "National Workshop on Influenza Surveillance" organized by WHO during 4th -6th October 2016 at Hotel Lalit, New Delhi
- Attended symposium on Antibiotic Resistance Organized by WHO on 17th November 2016 at LHMC, Delhi
- Attended workshop on Influenza Surveillance Data Management organised by WHO-SEARO and US CDC during 16th -20th January 2017 at Pune
- Attended workshop on "16S rRNA Sequence Based Bacterial Identification" during 14th -16th February 2017 at Gurgaon, India.

Dr. Mahesh Waghmare, Assistant Director

- attended the Workshop on Capacity Building and strengthening of Hospital Infection Control on 14th -15th Dec. 2016 organized by AIIMS and ICMR at AIIMS, New Delhi

Trainings/workshops attended by the lab staff:

- Ms Suman Gupta, Research Assistant and Ms. Manisha Batra, Laboratory Assistant attended training program on molecular detection of Respiratory Viruses at NIV Pune from 22-26 Aug 2016.
- Mrs. Manisha Batra, Laboratory Assistant attended "National Workshop on Influenza Surveillance" organized by WHO from 4th – 6th October 2016 at Hotel Lalit,New Delhi.
- Mrs. Manisha Batra, Laboratory Assistant attended CDC- Thermo workshop on "16S rRNA Sequence Based Bacterial Identification" from 14 -16h February 2016 at Thermo Fisher,Gurgaon, India.

Workshop/Training organized

a. Dr Sunil Gupta, Addl. Director:
   - Organised in collaboration with CDC, India a hands On training course on lab aspects of Bio-risk management and emerging Infections for Microbiologists at NCDC, Delhi from 16th to 20th May 2016
   - Organised a CME at NCDC, Delhi for general Practitioners of Delhi on Rational use of antimicrobials dated 25th May 2016
   - The first core working group meeting organized dated 6thOct 2016 at NCDC, Delhi and subgroups formed with defined TOR,s for developing NAP for AMR containment
   - Organized the expert group meeting at NCDC, Delhi dated 7th Oct 2016 to develop surveillance Plan for Viral hepatitis in the country.
   - Organised/attended one day meeting on rational use of antibiotics at Lady Hardinge Medical College, New Delhi for clinicians and also a media workshop on generating awareness about AMR dated 17th Nov 2016
   - NCDC/WHO National workshop Organized (8th to 9th Dec) to develop National Action Plan on AMR containment at Hotel lalit, New Delhi
   - Organized Core Working Group meeting on Antimicrobial Resistance for reviewing NAP-AMR on 2nd February 2017 was organized at NCDC, Delhi
   - Organized Technical Advisory Group meeting onAMR for reviewing NAP-AMR under co-chairmanship of DGHS & Sec (DHR) & DG (ICMR) on 28th February 2017 was organized at Nirman Bhawan

b. Dr Sanjim Chadha, Assistant Director organized the following workshops at NCDC, Delhi:

   - Training on 'Biosafety practices in Public Health Laboratories on 28.06.2016 at NCDC, Delhi. In this training the She coordinated hands on exercise on "Personal Preventive Equipment and Biological Spill Management".
   - Hands on training on Nucleotide Sequencing during 28th – 29th November 2016
   - Lecture regarding the new Biomedical Waste Management rules (2016) for all the officers of laboratory division on 7th March 2017 at NCDC, Delhi.
   - Training on new Biomedical Waste Management rules (2016)for all the officers, staff and daily wagers of the laboratory divisions of NCDC on 30th March 2017

c. National training workshop on use of WHONet software for AMR surveillance organized by WHO in coordination with MoHFW& ICMR for AMR Surveillance network labs under NCDC and ICMR during 27th – 29th July, 2016.

d. An Antibiotic awareness programme organized in coordination with LHMC and WHO India on 17th November as part of World antibiotic awareness week (14-20th November, 2016). The programme had a session on "Technical briefing for Media professionals" and "AMR Symposium" for doctors and nurses.

Publications

1. Singh, Swati, Kaushal, A., **Gupta, Sunil.** and Kumar, A. (2016) Gene specific **i**mpedimetric bacterial DNA sensor for rheumatic heart disease, *Ind. J. Microbiol. (Springer)* DOI 10.1007/s12088-016-0620-6.
2. Singh S, Kaushal A, **Gupta Sunil** and Kumar A (2016) Amperometric detection of pathogen causing rheumatic heart disease. *Cell. Mol. Biol. (Omics International)*62 (3): 1-3. DOI:10.41 72 / 1165 -158X .1000137
3. Singh, S., Kaushal, A., Gautam, H., **Gupta, Sunil.** and Kumar, A. (2017) Ultrasensitive nanohybrid DNA sensor for detection of pathogen to prevent damage of heart valves, *Sensors and Actuators B Chemical (Elsevier Science)*,doi.org/10.1016/j.snb.2017.02.043
4. 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, 65(8): 804-13; 2016.*

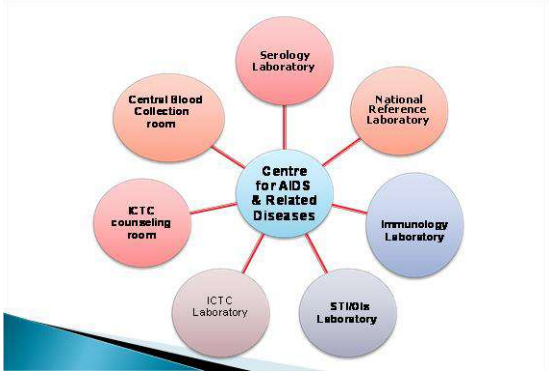
5. Uma Sharma, Megha Singhal, Supriya Singh, Artee Chaudhary, Sunil Gupta, S. Venkatesh, Arvind Rai and Mohammad Husain. Early Screening of HIV-1 from Dried Blood Spots in Infants Born to HIV-1 Positive Mothers from North Indian States. *Clin Res HIV/AIDS, 3(1): 1032; 2016*
6. Uma Sharma, Poonam Gupta, Megha Singhal, Supriya Singh, Sunil Gupta, S. Venkatesh, Arvind Rai and Mohammad Husain. Comparative Genetic Variability in HIV-1 Subtype C *nef* Gene in Early Age Groups of Infants. *Journal of Medical Virology, 2017.* DOI:10.1002/jmv.24820
7. Sanjim Chadha, Simrita Singh, Manisha Batra, Thakur Datt, Sweta T. Kothari, G. Arun Kumar, Sunil Gupta, S. Venkatesh. Evaluation of a new commercial master mix for diagnosis of Influenza A H1N1 by real- time reverse transcriptase PCR in view of outbreak preparedness *Journal of Virological Methods* (Under review)

5.3 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 division (mandates & activities) of the Centre:



There are seven laboratories/units under the CARD. These are described below:

1) National Reference Laboratory (NRL) for HIV testing

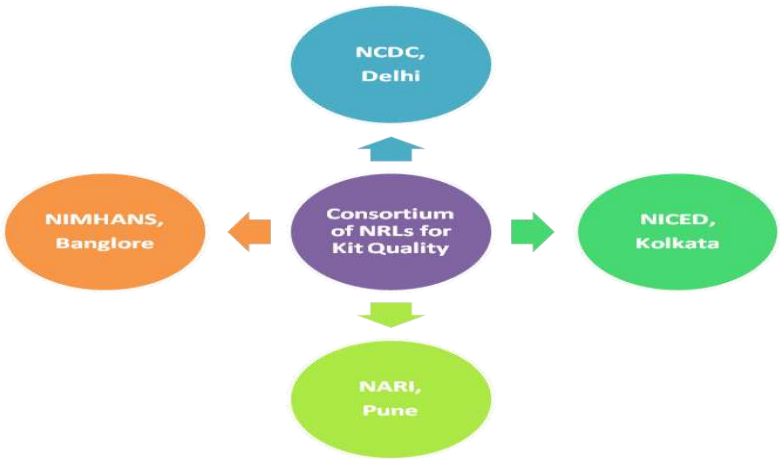
Centre for AIDS & Related Diseases (CA&RD), National Centre for Disease Control, (NCDC) Delhi is one of the **13 National Reference Laboratories** (NRL) for HIV testing under the aegis of National AIDS Control Organization (NACO). Others being AIIMS Delhi, CMC Vellore, IPM Hyderabad, MMC Chennai, NIB Noida, NICED Kolkata, NIIH Mumbai, NIMHANS Bengaluru, RIMS Imphal, STM Kolkata, TN Dr MGR University Tamil Nadu and NARI Pune.
Moreover the NRL NCDC is linked with 13 State Reference Laboratories (SRLs) under NACO in the states of Delhi, Haryana, Rajasthan and Jammu & Kashmir.

- **The list of the 13 State Reference Laboratories (SRLs) are**:

1. Government Medical College, Srinagar
2. Government Medical College, Jammu
3. S.M.S Medical College, Jaipur
4. Dr. S.N. Medical College, Jodhpur
5. J.L.N Medical College, Ajmer
6. Government Medical College, Kota
7. S.P. Medical College, Bikaner
8. R.N.T Medical College, Udaipur
9. Pt. B.D Sharma Post Graduate Institute of Medical Sciences, Rohtak
10. VMMC & Safdarjung Hospital, New Delhi
11. University College of Medical Sciences, Dilshad Garden, Delhi
12. Maulana Azad Medical College, BZD Marg, Delhi
13. Lady Hardinge Medical College, New Delhi

- One of the functions as an NRL is for External Quality Assessment Scheme "EQAS for HIV testing" activity.
- NRL prepares and distributes proficiency testing (PT) panels for HIV serology testing to linked SRLs and their associated ICTCs (twice in a year). It analyses the PT panel results received from the SRLs and provide feedback to the participating SRLs.
- NRL confirms HIV sero-status of all samples with indeterminate / discordant results received from 13 SRLs and their linked Integrated Counselling and Testing Centres (ICTCs).

- **"Consortium for kit Quality testing"**
  National AIDS Control Organization (NACO) has sponsored formation of consortium of National Reference Laboratories for kit quality. The mission of the consortium is to develop a national system for assuring Transfusion Transmitted infections (TTI) test quality by a consortium with uniform approaches and procedures. NCDC, Delhi; NARI, Pune; NIMHANS, Bangalore; and NICED, Kolkata are partner institutes in this consortium and a MOU has been signed with these institutes. The secretariat for the consoritium activity has been formed at National AIDS Research Institute (NARI), Pune. Under "**Consortium of NRLs for kit Quality**" diagnostic kits (Rapid and ELISA) HIV, HBV, HCV kits are evaluated for the sensitivity and specificity and the reports are sent to NACO which in turn decides regarding suitability of kits prior to release.



2) Central Blood Collection Unit:
This unit acts as a central sample collection facility for the centre. It collects samples for the walk in clients and also receives samples referred from other States and ART centres of Delhi.

3) Immunology laboratory:
This is one of the CD4 testing laboratories under NACO. It receives samples for CD4 count of HIV positive patients referred from ART centres (DDU Hospital, Delhi and other linked PPTCT centers of Delhi). Absolute CD4 count and CD4 percentage estimation is done by FACS count.

4) HIV-2 referral Laboratory:
Accurate diagnosis & differentiation of HIV-1 & HIV-2 is crucial for treatment. As HIV-2 is intrinsically resistant to NNRTI, (first line ART regimen), NACO has established a network of laboratories responsible for confirmation of HIV- 2 infection since 2013.
CA&RD functions as a National AIDS Control Organization (NACO) designated referral laboratory for HIV-2 confirmation.It caters to 7 North Indian states of Delhi, Punjab, Chandigarh, Haryana, Rajasthan, Jammu & Kashmir and Himachal Pradesh.

5) ICTC (Integrated counseling & testing centre):
This unit has a dedicated ICTC HIV testing laboratory. Pre test counseling and testing of HIV suspected patients are carried out in this laboratory. There is a dedicated female Counselor and a lab technician for this. After testing these samples in ICTC Laboratory the HIV report is given only to the patient after post test counseling.

6) Sexually Transmitted Infections (STI)/Opportunistic Infections (OI) Laboratory:
Diagnosis of syphilis (Rapid Plasma Reagin (RPR) test and Treponema Pallidum Haemagglutination Assay (TPHA)) is carried out for all the samples of ICTC clients with STI symptoms and referrals from various hospitals of Delhi.

7) Serology laboratory:

- Quality control testing of samples received under **HIV Sentinel surveillance** (HSS-ANC round) from various Sentinal sites in the states of Rajasthan, Delhi, Jammu & Kashmir, Haryana are carried out in this lab.
- HIV testing on Dried Blood Spot (DBS) samples under **Integrated Biological & Behavioural Surveillance (**IBBS).
  IBBS was implemented by NACO to strengthen surveillance among High Risk Groups (HRG) and Bridge population to generate evidence rate on prevalence and risk behaviours among HRG and migrants population.
  This Centre has been designated as one of the 16 laboratories for testing of DBS samples under NACO. DBS samples are received from Delhi, Jammu &Kashmir.
- HIV testing on Dried Blood Spot (DBS) samples under **National Family Health Survey-4 (NFHS-4)** project
  NFHS-4 is a project funded by International Institute for Population Sciences (IIPS), Mumbai. It has been appointed by the Ministry of Health & Family Welfare as the nodal agency to conduct this project.
  This survey estimates prevalence of HIV infection in key population of India.
  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.Results of this survey are likely to come out shortly.

8) Capacity building activities

- Support to training courses run at NCDC
  - Master of Public Health (MPH)
  - Field Epidemiology Training Programmes (FETP)
  - Post Graduates students of Community Medicine, Microbiology
  - Nursing students
- Conducting EQAS Workshops for SRL staffs; Technical officers, Lab technician and Quality Managers of State AIDS Control Society (SACS).
- Technical support to National Health Programs e.g NACO

Details of the work carried out at the various laboratories of CARD for the period 2016-17.

1) National Reference Laboratory (NRL):

- **HIV/HBV/HCV diagnostic kits evaluated:**
  - ✓ A total of **42** batches of diagnostic kits (HIV rapid test kits /HIV ELISA and HCV ELISA kits) were evaluated. A total of approximately **18,500 tests** carried out in this evaluation.**14,500 aliquotes** of HIV, HBV, HCV and negative panels were prepared for kit evaluation.
- **Confirmation of HIV sero-status of all indeterminate or discordant results:** A total of 24 indeterminate /discordant samples were received for serological confirmation at this centre..
- **External Quality Assessment Scheme (EQAS) for HIV Serology:**
  - Conducted two rounds of EQAS for HIV serology for 13 linked SRLs and their ICTCs.
  - Eight member panel for SRLs were prepared and distributed to respective SRLs.
  - ✓ Bulk four-member panel were prepared for distribution to ICTCs linked to SRLs. 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**

- **Routine Quality management system (QMS) activities:**
  - In-house calibration of laboratory equipments (Pipettes, Refrigerators, Deep freezers and centrifuges) were carried out.

- All laboratory SOPs, QSPs, Documents and records are periodically reviewed and updated (as per the requirement of ISO 15189:2012).

2) Central Blood Collection Unit:

- ✓ During the period a total of **818 blood samples** were drawn .
- ✓ **5690 samples** were received and distributed to the respective laboratories for testing

3) Immunology Laboratory

- ✓ CD4/CD% cell estimation was performed on **5166 samples** referred from Anti Retroviral Treatment (ART) Centre, **Deen Dayal Upadhyay Hospital and other linked PPTCTCs** of Delhi.

Name of ART centre	HIV positive samples tested for CD4 count	Results
1. DDU Hospital	5143	The results of samples tested have been communicated to respective ART centres.
2. PPTCT centres	23	
Total	**5166**	

4) HIV-2 referral Laboratory

- HIV-2 confirmatory diagnosis of 23 samples of patients referred through ART centres of seven states of Delhi, Punjab, Chandigarh, Haryana, Rajasthan, Jammu & Kashmir and Himachal Pradesh-under NACO

States	**Samples tested**
Delhi	15
Rajasthan	6
Punjab	1
Haryana	1
Total	**23**

5) ICTC (Integrated counseling & testing centre)

- Counseling of walk in clients visiting ICTC: **838**
- HIV testing of clients visiting ICTC: **838**

S.No	**NGO (Risk Group)**	**No.of clients tested**	**Result Positive for HIV-1**
1.	Janhit & Samarth(FSW)	326	3
2.	Space (Transgender)	79	5
3.	Space (MSM)	120	5
4	Aadhar (Migrant)	115	3
5.	Sharan (IDU)	02	0
6.	Self	196	12
	Total	**838**	**28**

- ICTC Participated in EQAS for HIV serology conduct by SRL, MAMC Delhi. The result had **100% concordance**.

6) Sexually Transmitted Infections (STI)/Opportunistic Infections (OI) Laboratory:

- Qualitative RPR: **671** tested
- Semi-quantitative RPR: 40 tested.

7) Serology Laboratory

- Quality Control testing of HCV -: **289** tested
- **HCV** testing of stored serum samples received under HIV Sentinal surveillance ANC round: **1483**

- **National Family Health Survey (NFHS-4)**

  DBS samples received for HIV testing : **47,581**

  Details of DBS samples from Uttar Pradesh, Uttarakhand, Haryana, Himachal Pradesh and Delhi for the 1st & 2nd Phase of NFHS-4 which had been received and logged into the system database are given as below:

State	No of samples logged into the system
Uttarakhand	4758
Haryana	6778
Uttar Pradesh (UP)	29660
Delhi (DL)	1178
Himachal Pradesh (HP)	5207
Total samples	**47,581**

11536 samples in phase 1 & 1178 samples in phase 2 were tested.

8) Capacity building activities

- ✓ **Dr Aarti Tewari, Assistant Director** participated as a resource faculty for training on "QMS at CD4 laboratories"at NIHFW, Delhi on 28th Feb & 1st March 2017.
- ✓ Training and capacity building of linked State Reference Laboratories (SRLs) of Delhi, Haryana, Rajasthan and J&K by conducting **two days workshop on "EQAS for HIV testing**" for Technical officers , laboratory technician of SRLs and Quality Managers of SACS on 7th-8th March, 2017 at NCDC.
- ✓ Folk media campaign/Nukkad Natak show for HIV /AIDS awareness was organized at NCDC for NCDC staff through Delhi SACS AIDS Control Society (DSACS) on **24/03/2017.**

9) Other activities:

- **National accreditation Board for Testing and Calibration of Laboratories (NABL) Accreditation Activities:**
  - ✓ Internal audit and Management review meeting (MRM) of the centre as per ISO15189:2012 was conducted.
  - ✓ NABL desktop surveillance conducted as per ISO15189:2012.
- **Field visits made by various officers during 2016-17**
  - ✓ Dr Aarti Tewari (Assistant Director) was a member of Central Health Team from NCDC, Delhi deputed to district Badaun (U.P) to investigate cases of febrile illness from 1st-4th October 2016. 49 blood samples were collected for investigation of dengue,chikungunya and typhoid.
- **Important Visitors**
  - ✓ Dr. Anita Desai, Professor, NIMHANS Bangalore conducted the internal audit of the activities under "Consortium of NRLs for kit quality" on 13th Jan 2017.

Major Achievements

- Centre has been awarded the NABL accreditation certificate in the field of Medical testing as per ISO 15189:2012 for HIV testing and CD4 testing from 14.2.2016 to 13.2.2018.

Meetings/Worshop/Trainings attended by Dr Aarti Tewari, Assistant Director in 2016-17

- Attended the meeting of Lab in charges of "Consortium of NRL's for kit Quality testing" held in NARI, Pune on 23rd May2016.

- Attended as a nominated committee member a meeting regarding examination of Bid Evaluation report submitted by M/s Rites Limited with respect to the Procurement of HIV Test Kits 2, 3 & Whole Blood Finger Prick Test Kits, held in NACO, Delhi on 26 May 2016.
- Attended the meeting of lab in charges and cofounders of the activity of "Consortium of NRL's for kit Quality testing" under the chairmanship of J.S (NACO) held in NACO Delhi on 18th October 2016.
- Attended a meeting on "Post delivery Random Quality Check of kits held in NACO, Delhi on 29th November 2016.
- Attended the Training of Trainers (TOT) for implementation of QMS in CD4 Laboratories held in Pune on 28th & 29th Dec2016.
- Attended a meeting of "Lab for Life Project" as subject expert to review the training modules on Quality control held in NACO, Delhi On 13th December 2016
- Attended a meeting on Technical issues related to specification of HIV test kits held in NACO, Delhi on 9th January 2016.
- Attended a Meeting on "Development of National Strategic plan and Stakeholders consultation on global fund concept note development held in Hotel Park on 8 Feb, 2017.
- Attended a meeting on Technical sub-committee members of first 90 EMTCT of HIV & HIV-TB of NSP at NACO, Delhi on 10th March, 2017.
- Attended a Meeting on "HIV self Testing in India" at NACO, Delhi on 16th March, 2017.

Trainings/workshops attended by the laboratoty staff:

- Mr. Ashok Kumar Research Officer and Mr.Sandeep Shahi, Technician attended the "Panel aliquoting workshop" at NARI Pune from 3-5 August 2017.
- Mrs Veera, Technician and Mr Rahul, Technician attended the "World AIDS Day" celebration at JLN stadium, Delhi on 01/12/2017.
- Mrs Ranjeeta ICTC counselor attended the training on HCTS guidelines and e module on HIV-TB in on 6/1/2017 at COE for HIV (MAMC) Delhi.
- Mrs Veera, Technician attended the "EQAS Workshop for HIV testing" at MAMC, Delhi on 28/02/2017.
- Mr. Ashok Kumar Research Officer and Mr. Rahul Kumar Technician attended training on "QMS at CD4 Laboratories at NIHFW, Delhi on 2nd and 3rd March 2017.
- Mr. Sandeep Shahi Technician attended the " EQAS Workshop" at MAMC, Delhi on 16/03/2017.
- Mr. Charan Singh, Research Assistant and Mr. Rahul Kumar Technician attended the Training on DBS testing on at NARI Pune on 22/03/2017.
- Mr. Ashok Kumar , Research Officer attended the meeting of NRLs at NARI Pune on 23/03/2017.

5.4 Division of Zoonosis

Dr. Mala Chhabra
Addl Director & Head
Dr. Naveen Kumar Gupta
Joint Director
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 diseases 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 Organisation as WHO Collaborative Centre for Rabies.

Currently the work is being carried out on following Zoonotic diseases: Plague, Rabies, Kala-azar, Arboviral infections (Dengue, JE, and Chikungunya & CCHF) Toxoplasmosis, Brucellosis, Leptospirosis, Rickettsiosis, Hydatidosis, Neurocysticercosis and Anthrax. Major Role and Activities of Division during 2016-17 are as follows:

A. Referral diagnostic services

Rabies	
(a)Post-mortem diagnosis in animal brain samples by Negri body, FAT, BT	55
(b) Diagnosis in hydrophobia cases	10
(c)Assessment of antibodies by ELISA test	
(i) Human	80
(ii) Animal	01
Kala-azar	
(a)Parasitological diagnosis by smear examination and culture	05
(b)Serological diagnosis by IFA test	51
Toxoplasma	
Serological and diagnosis by IFA test	29
Brucellosis	
Serological diagnosis by tube agglutination test	279
Rickettsiosis	
Serological diagnosis by Weil Felix test	1303
Hydatidosis	
Serology by ELISA	9
Hanta Virus	
Serological diagnosis by IgM &IgG ELISA	4
Lyme Disease	
Serological diagnosis by IgM & IgG ELISA	29
Arboviral diseases	
Serological diagnosis by IgM ELISA test for Japanese Encephalitis.	933
(i)Human sera samples	330
(ii)Human CSF	603
IgM ELISA test for Dengue	702
IgM ELISA test for Chikungunya	603
Plague	
Serological diagnosis by PHA and PHI in rodent Sera	896
Culture for isolation of Y.pestis from rodent organs	3955
Neurocysticercosis	
Serological diagnosis by ELISA	76
Leptospirosis	
Serological diagnosis by ELISA	464
Anthrax	39
Viral isolation	
Chikungunya	134
Dengue	134
JE	-
Rabies	141
Lymes Disease	Nil
Hanta virus	Nil
Molecular Diagnosis	
Rabies	66
Dengue	49

Chikungunya	68
Zika	07

B. Training courses/Expert group meetings

- Joint orientation training courses (IVRI & NCDC) on zoonotic diseases of public health importance for medical and veterinary professionals,
  - At NCDC, Delhi Nov- Dec 2016
  - At NCDC Bengaluru March 2017
- Standing Committee on Zoonoses – December 2016
- Seminar on "Rabies: Educate.Vaccinate.Eliminate" Sept 2016

C. Training courses/workshops: Resource persons

- Workshop on "Emerging and Re-emerging Infectious' AIIMS, Delhi - April, 2016 – 2 officers.
- Training for medical and paramedical staff on health hazard, Calcutta - June, 2016 - One officer
- Training for Laboratory aspect during Public Health Emergency of International Concern, Hyderabad - August 2016 - One officer
- Asia-Pacific workshop on surveillance, Prevention and Control of Zoonotic Influenza, Paro, Bhutan - August 2016 - - One officer.
- Training of State RRTs at Kolkata, West Bengal, Sept, 2016 - One officer
- APCRI meeting Bangaluru Dec 2016 - - One officer
- Training on emerging infections IDSP, Nirman Bhawan, Feb 2017 - - One officer
- Dengue vaccine at AIIMS, Delhi, April 2017 - One officer
- National Consultative Workshop on Revised Reporting Formats under IDSP, New Delhi, May 2017 - - One officer
- Regional Joint orientation training course, Raipur, January 2017 - One officer
- WHO Rabies Expert Consultation ,Bangkok, Thailand, April 2017 - - One officer

D. Teachings & Trainings

- 16th Field Epidemiology Training Programme NCDC, Delhi
- MPH
- EIS officers
- PG students- community medicine & microbiology
- PhD scholars – 2

E. Trainings received

- International Training Workshop on Laboratory Diagnosis forDengue/Zika/Chikungunya at Taiwan April 2017– 1 officer
- Training in laboratory diagnosis of Yellow fever – 3 officials

F. Outbreak investigations

- Gorakhpur, AES/JE – June-July 2016
- Rabies in animals, Delhi Zoo 2016
- AES, Malkangiri, Odisha Oct 2016
- H5N1, Odisha Dec 2016
- H5N1, Odisha Jan 2017

G. List of publications

- P. Sharma, V. Mittal, M. Chhabra, R Kumari, et al. Molecular epidemiology and evolutionary analysis of dengue virus type 2, circulating in Delhi, India. Virus Disease. 2016;1-5
- P. Singh, M. Chhabra, P. Sharma, et al. Molecular epidemiology of Crimean-Congo hemorrhagic fever virus in India. Epidemiology and Infection. 2016; 144, (16):3422-3425.
- P. Singh, P. Sharma, S. Kumar, M. Chhabra, et al. Continued persistence of ECSA genotype with replacement of K211E in E1 gene of Chikungunya virus in Delhi from 2010 to 2014. Asian Pacific Journal of Tropical Disease, 2016; 6(7), 564-566.
- Zoonotic Diseases of Public Health Importance.2016; (Link: http://www.ncdc.gov.in/)
- R. Thakur, Y. Kumar, V. Singh, N. Gupta, V.B. Vaish and S Gupta. Serogroup distribution, antibiogram patterns and prevalence of ESBL production in Escherichia coli. Indian Journal of Medical Research,2016;143:521-524
- Y. Kumar, N. Gupta, V.B. Vaish and S. Gupta. Distribution trends and antibiogram pattern of Salmonella enterica serovar Newport in India. Indian Journal of Medical research.2016;144:82-86

H. Other responsibilities

Important visitors to the organization:

- WR INDIA visited NCDC, coordinated by Zoonosis Division on 31st May, 2016

Other activities

- Officers from the Division were members of Stage Management and Decoration Committee of Annual Day held on 30.08.2016.
- Officers from the Division coordinated the inaugural ceremony and Ministers visit on 30th September, 2016 at NCDC, Delhi.
- Officers of the Division are Chairpersons/members of various Committees
- Purchase Committee 1
- Purchase Committee 2
- Biomedical Waste Management -depart
- Library
- Physical verification
- Equipment maintenance
- Vigilance
- Disciplinary committee
- Participation in NCDC upgradation meetings
- ACR office staff

5.5 Division of Biotechnology/ Molecular Diagnostics

Dr Sunil Gupta
Additional Director & Head
Dr Sandhya Kabra
Additional Director & In-charge
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 pathogens.
- Identifying new, emerging and re-emerging pathogens.
- Genotyping and Sub-typing of strains.
- Characterizing drug-resistant strains.

Ongoing research work

- **HIV-2**: Blood samples from 6 HIV-2 positive patients were collected. Plasma was separated and Peripheral Blood Mononuclear Cells (PBMCs) were isolated from these blood samples and DNA was extracted from these isolated PBMCs. These DNA samples were amplified by diagnostic nested PCR for HIV-2 specific 5`LTR region (140 base pairs) and all the six samples were found to be positive for HIV-2. These DNA samples were also amplified for gag gene (781 bp) and, reverse transcriptase gene (995 bp) of HIV-2. Nucleotide sequencing was carried out for all the six samples for these three genes.

- **Influenza**: A total of 316 nasal/throat samples of pandemic and seasonal influenza belonging to year 2015 and 2016 were studied for Oseltamivir Resistance of Influenza A virus (NA gene). These samples were earlier detected positive by Real Time PCR (CDC protocol version 2009). Mismatch Amplification Mutation Assay-PCR (MAMA-PCR) was standardized for detection of H275Y mutation in NA gene for Oseltamivir resistance in Influenza A H1N1 samples. Out of the 316 samples tested, 70 gave the amplification results by MAMA-PCR (NA gene & CAC/CAT->TAC/TAT mutation). To confirm the presence of drug mutation by sequencing, out of 70 samples, representative 17 were separately amplified for NA gene (938 bp), which were further processed for nucleotide sequencing. The sequencing results were resolved using various bioinformatics tools.

Outbreak investigations

- **Hepatitis C outbreak in Saharanpur, UP**
  A total of 20 serum samples, received from Saharanpur, 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 20 samples, 13 were found to be positive for HCV RNA. Nucleotide sequencing was carried out for all the 13 positive samples. After analyzing the sequencing data, it was found that samples belonged to different genotypes 3a, 1a and 4.
- **Hepatitis C outbreak in Shamli, UP**
  A total of 60 serum samples, received from Shamli village, 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 60 samples, 26 were found to be positive for HCV RNA. Nucleotide sequencing was carried out for all the 26 positive samples. After analyzing the sequencing data, it was found that all of these samples belonged to 3a genotype.
- **Dengue & Chikungunya viruses**
  A total of 24 serum samples were processed for RNA isolation followed by Duplex Reverse Transcriptase Polymerase Chain Reaction (D-RT-PCR) of dengue (511 bp of cPreM gene)

and chikungunya (205 bp of E1 gene) viruses. Out of which 8 samples were found to be positive for chikungunya virus. Eight chkungunya virus positive samples (RT-PCR of E1 gene) were sequenced on 3130XL genetic analyzer. After analyzing the sequencing data, it was found that all of these samples belonged to East Central South African (ECSA) genotype.

Visits made by officers

Dr Sandhya Kabra, Additional Director & In charge:

- Visited districts Kanchipurum and Cuddalore of Tamilnadu along with CDC consultants for field review and participated in a training workshop in Chennai during 20th - 23rd June 2016.
- Visited Gujarat to meet Health Secretary to discuss implementation of Quality Management of system in district laboratories on 12th August 2016.
- Visited Tamil Nadu during October 2016 for coordination for baseline laboratory assessment
- Visited Chennai from 7th – 11th November 2016 for assessment of Tamil Nadu District labs and Medical Colleges.
- Visited Ranchi from 17th-18th November 2016 regarding advocacy Meeting with Additional Chief Secretary for strengthening of laboratories and system assessment.
- Visited Bhopal, Madhya Pradesh from 15th – 16th December 2016 for advocacy meeting for lab assessment and systems lab assessment and training of experts (approx. 45) in F-LAT visited Ranchi, Jharkhand from 16th – 19th January 2017 for assessment of labs in district hospitals and medical colleges.
- Visited Chennai, Tamil Nadu from 13th – 14th and 16th – 17th February 2017 for wet lab Microbiologists training workshop. This training workshop was attended by 15 district Microbiologists, 10 Medical College faculty members, PGs and other staff.
- Visited Vadodara on 15th March 2017 to assess one lab of Vadodara to develop as Model central lab with focus on AMR, HAI & BMW.
- Visited Damoh, Katni, Jabalpur and Narsinghpur, Madhya Pradesh from 20th – 24th March 2017 for baseline assessment of laboratories at district labs as a part of the central assessment of 51 districts and 6 Medical Colleges.

Dr Sanjim Chadha, Assistant Director:

- Attended a three days workshop on "16S rRNA Sequence Based Bacterial Identification" during 14th -16th February 2017, organised by Thermo Fisher Scientific & Centers for Disease Control and Prevention at Gurgaon, India.
- Visited Hyderabad to review rising trends of cases and deaths related to H1N1 in the State of Telangana during 21- 23 February 2017.
- Attended a five days multi-country workshop on "Influenza Surveillance Data Management" from 16th -20th January 2017 in Pune. This workshop was organised by WHO-SEARO and US CDC in collaboration with NIV, Pune.
- A Symposium on Antibiotic Resistance was attended by Dr Sanjim Chadha, Assistant Director at LHMC on 17.11-16.
- Attended the Foundation for Quality India (FQI) 150th NABET accredited certificate course in ISO 15189:2012 Internal Auditors and Quality Management System 8-11 August 2016 at NCDC, Delhi,
- Attended the conference and delivered a lecture on "Laboratory surveillance of Influenza, ILI and SARI" during the conference "National Capacity Building Workshop in Bio-risk Management and Laboratory Aspects of Emerging and Re-emerging Infections" organized by CDC (India) in NCDC during 16-20 May 2016.
- Attended the National Workshop on Influenza Surveillance organized by WHO during 4th – 6th October 2016, New Delhi for ICMR as well as IDSP influenza network laboratories. This meeting will focus on integrating the 12 IDSP influenza laboratories and 6 ICMR laboratories to facilitate and organize a well coordinated national influenza surveillance plan to obtain quality data on Influenza virus types so as to enable us to institute effective interventions.
- Trainings/workshops attended by the lab staff:
- Dr Priyanka Singh, Technician participated in the workshop on "Preparedness and Diagnosis of Yellow Fever" at NIV, Pune from 11th to 13rd May 2016.

Workshop/Training organized

Dr Sandhya Kabra, Additional Director & In charge:

- Organized Foundation for Quality India (FQI) 150th NABET accredited certificate course in ISO 15189:2012 Internal Auditors and Quality Management System 8th – 11th August 2016 at NCDC, Delhi.
- Organized a National meeting of Task Force (Microbiology) from 29th – 31st August, 2016 for finalization of training modules for microbiology and its assessment tool at Delhi. Coordinated baseline laboratory assessments in September 2016 in Gujarat along with CDC and state and national experts at 33 locations and debriefed the state government on the same in October 2016 after studying the report. A similar meeting was held with Principle Secretary (H) Tamilnadu for Advocacy in September 2016 followed by training of state level experts (45-50) in October 2016 on assessment tool.

Dr Sanjim Chadha, Assistant Director:

- Organised a lecture regarding the new Biomedical Waste Management rules on 7th March 2017 during 12.15 pm – 1.30 pm for all the officers of the laboratory divisions of NCDC. The lecture was held in the Central Seminar Room of NCDC and was taken by Dr Lata Kapoor, Joint Director, NCDC.
- Organised a training on new Biomedical Waste Management rules, on 30th March 2017 from 2:30PM to 4:00 PM in the Central Seminar Room of NCDC for all the officers, staff and daily wagers of the laboratory divisions of NCDC. A total of 168 participants attended this training.
- Organised a training on 'Biosafety practices in Public Health Laboratories" on 28th June 2016 in the central seminar Hall of NCDC jointly by the Division of Microbiology, Zoonosis and Biotechnology. In this training Dr Sanjim Chadha the officer I/c coordinated a hands on exercise on "Personal Protective Equipment and Biological Spill Management".
- Organised a two days hand on training on Nucleotide Sequencing, conducted by the Thermo Fisher Scientific during 28th – 29th November 2016, in which the Lab personnel from the Biotechnology division, Zoonosis division and Influenza Laboratory were trained.

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, 65(8): 804-13; 2016.
- Priyanka Singh Pankaj Sharma, Sachin Kumar, Mala Chhabra, M. Rizvi, V. Mittal, D. Bhattacharya, S. Venkatesh, Arvind Rai. Continued persistent of ECSA genotype with replacement of K211E in E1 gene of chikungunya virus in Delhi from 2010 to 2014 Asian Pacific Journal of Tropical Disease, 6(7): 564-566; 2016.
- Priyanka Singh, M. Chhabra, P. Sharma, R. Jaiswal, G. Singh, V. Mittal, A. Rai, S. Venkatesh. Molecular epidemiology of Crimean-Congo haemorrhagic fever virus in India Epidemiology and Infection, 2016
- Uma Sharma, Megha Singhal, Supriya Singh, Artee Chaudhary, Sunil Gupta, S. Venkatesh, Arvind Rai and Mohammad Husain. Early Screening of HIV-1 from Dried Blood Spots in Infants Born to HIV-1 Positive Mothers from North Indian States. *Clin Res HIV/AIDS, 3(1): 1032; 2016*
- Uma Sharma, Poonam Gupta, Megha Singhal, Supriya Singh, Sunil Gupta, S. Venkatesh, Arvind Rai and Mohammad Husain. Comparative Genetic Variability in HIV-1 Subtype C nef Gene in Early Age Groups of Infants. Journal of Medical Virology, 2017. (In press)

5.6 Department of Parasitic Diseases

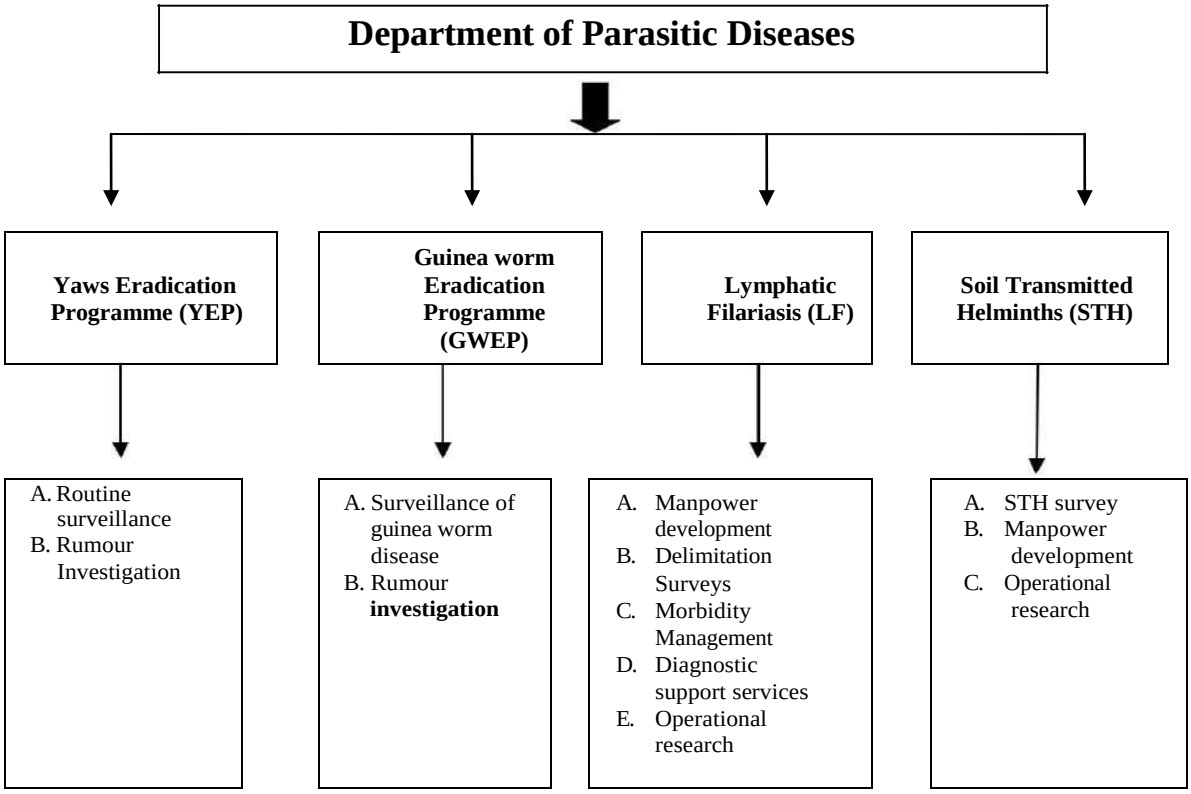
Dr. S K Jain
Addl. Director & Head
Dr. Vinay Garg,
Deputy Director
Dr Ankur Garg
Assistant Director

The Branches under technical supervision of the Department:

1. Kozhikode Branch, National Centre for Disease Control, Kerala
2. Rajahmundry Branch, National Centre for Disease Control, Andhra Pradesh
3. Varanasi Branch, National Centre for Disease Control, Uttar Pradesh

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 October, 2015. The IVT strongly recommended to World Health Organization to consider issuing a Certificate of Eradication of Yaws for India. Recommendations of the International Verification Team were further endorsed by WHO's Strategic and Technical Advisory Group for Neglected Tropical Diseases, at Geneva during 13-14 April, 2016.
Director General of WHO in her letter dated 5 May, 2016 conveyed that India has achieved interruption of transmission of yaws. Dr Chan has offered her heartfelt congratulations to the Govt. of India for being the first Member State to achieve this important milestone.

Activities related to Guinea worm

The department is keeping a watch on reported suspect cases of Guinea worm 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

S. No.	Activities undertaken	No. of samples (NBS/Ag/Ab) examined
	Morbidity management	
4.	NCDC branch Kozhikode for morbidity management	1020
5.	NCDC branch Rajahmundry for morbidity management	316
6.	NCDC branch Varanasi for morbidity management	1994
	Diagnostic services (Night Blood smear examination for filaria infection)	
5.	Blood samples received from Delhi Hospitals for filarial antigen/Ab test and Night Blood Smears (NBS) were received from Delhi Hospitals & examined	117 NBS and Ag/Ab testing were performed for mf infection and 23 found positive.
6.	Night blood smears were examined by NCDC branch Kozhikode for filaria infection.	1607 NBS tested and 38 were found positive for mf infection
7.	Night blood smears were examined by NCDC branch Rajahmundry for filaria infection.	1143 NBS tested and none slide was found positive for *W. bancrofti* infection.
8.	Night blood smears were examined by NCDC branch Varanasi filaria infection.	2305 NBS tested and 32 slides were found positive for infection. *W. bancrofti*
	Cross checking of Night Blood smear for mf infection	
4.	Night Blood Smears (NBS) received from various NFCP Units were cross-checked by Rajahmundry branch	208 NBS tested and none slide was found positive for mf infection
5.	Night Blood Smears (NBS) received from various NFCP Units were cross-checked by Kozhikode branch	327 NBS tested and none was Found positive for mf infection
6.	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.

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. 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. 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. In order to do so, the Department of Parasitic Diseases is now been designated as the national nodal agency for mapping the entire country on the basis of homogenous ecological zones.
The summary of the prevalence of STH infection in school going children (age-group 9-11 years) of different states has been mentioned below:

S.No.	State	Number of sentinel sites surveyed	Prevalence of STH (%)
1	Puducherry	2	26
2	Andhra Pradesh	10	36
3	Delhi	18	28
4	Andaman & Nicobar	2	24
5	Uttarakhand	10	67
6	Himachal	10	29
7	Punjab	10	39
8	Haryana	7	42
9	Uttar Pradesh	130	75
10	Jammu & Kashmir (1 site)	2	55
11	Chandigarh (1 site)	1	32

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

Name of the Officer	Place & Purpose of visit	Duration
Dr. S.K. Jain	Bangalore; to deliver a lecture on yaws eradication success stories in XIth Joint Annual Conference of the IAE & ISMOCD.	9th to 12th June, 2016
	Varanasi, Mirzapur, Allahabad &Ghazipur; visited flood effected districts of Uttar Pradesh.	5th to 9th September, 2016
	Vadodara, Gujarat; to inspect the opening of new NCDC branch.	23rd November, 2016
	Genewa, Switzerland; to participate in STH &Schistosomiasis Control and Elimination: An update on strategy to reach the	28th November to 1st December, 2016

	2020 targets and Post 2020 vision.	
	Indonesia; to participate in the Mid Term Evaluation of Yaws and Leprosy in Indonesia.	3rd to 16th December, 2016
	Bhubaneshwar; to discuss regarding establishment of new NCDC Branch.	13th February, 2017
Dr. VinayGarg	Ujjain Simhasth; Epidemiological surveillance.	12th to 17th May, 2016
	Jabalpur, to monitor National Deworming Day.	8t to 10th February, 2017
Dr. AnkurGarg	Rajahmundry; STH survey	13th to 17th September, 2016
	Jammu; to conduct STH survey with team.	3rd February, 2017

5.7 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 reorganised 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 are highlighted below:

- Approval of MPH, Medical entomology & P.G. Diploma has been approved from Ministry of Health & Family Welfare.
- Aedes surveillance from 10 International Airports/seaports was carried out and communicated to International Health, MOH&FW under IHR Act-2005
- Plant extract of Agava spp plant has been evaluated against mosquito larvae.
- Dr. L.J. Kanhekar, Joint. Director and HOD CME & VM, prepared project entitled "Phase 3rd field evaluation of Duranet LLIN against Malaria Mosquitoes" subsequently presented in the meeting of NCDC Scientific committee on 22.04.2016 and in the meeting of NCDC ethical committee on 26.04.2016.
- Dr. L.J. Kanhekar, Joint. Director and HOD CME &VM, visited Agartala & District Dhalai (Tripura) to investigate malaria outbreak for a period from 02.06.2016 to 07.06.2016. Mosquitoes were collected by aspirator, floor sheet in a room and larval & Pupal collections were made from slow moving stream, drain, pond, cesspit etc. from the village of Dhalai district.

Capacity Building

1. One month training course on Public Health Entomology for District Malaria Officers/ Entomologists/Municipal Corporation Department (19 participants & specially one from North Delhi Municipal Corporation & three from New Delhi Municipal Corporation attended training).
2. One day workshop cum hands on training on Dengue & Chikungunya vectors & their control was organised at NCDC and 19 Field workers & Sanitary Inspectors from Municipal Corporation also attended it.
3. Dr. LJ Kanhekar, Joint Director, delivered lecture during induction training of DMOs for MP at NIMR Delhi on 29.04.2016.

Other Important Activities:

- Aedes larval surveillance in NCDC campus were continued to keep the density of Dengue/Chikungunya vectors under control- The breeding detected were brought to the notice of NBCC for rectification.
- Insecticide Susceptibility test performed on cloth sample treated with Nanoparticle received from Department of Biochemistry, University of Delhi
- Insecticide Susceptibility test performed on Agave spp. plant extract on Culex Spp. larvae for Evaluation.
- Surveillance of vectors of Dengue, Chikungunya in Delhi and NCR areas.
- Surveys of 4 International Sea ports and 6 Airports which are the POEs for Yellow fever and Zika virus
- Dengue virus antigen detection from dried mosquitoes to predict the impending out breaks of Dengue from Delhi region
- Laboratory is being set up to detect the Zika virus antigen from dried mosquitoes

- No. of Entomological Material supplied during 2016 -2017 to various Medical Colleges and Institutes is 11.
- Dr. Roop Kumari, Joint Director, attended and presented on "Vector Surveillance activity for early warning" at the conference organised by ISMOCD & IAE at Bangalore from 9th to 12th June, 2016.
- Dr. Roop Kumari, Joint Director, one paper has been accepted in International Journal "Way forward for Seasonal Planning of Vector Control of Aedes aegypti and Aedes albopictus in a highly endemic are in India"

Ongoing Research Projects:

1. Development of a protocol for entomological surveillance & early warning signal for Dengue outbreak in Delhi
2. Japanese Encephalitis /Dengue virus detection in mosquitoes of some endemic areas

Dengue Virus Detection in vector mosquitoes by ELISA method:

All the larvae samples collected during field visit 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.

Maintenance of Entomological Museum:

It contains many species of insects (Diptera, Coleoptera, Lepidoptera, Hymenoptera, Odonata, Hemiptera & Orthoptera) and few arachnids. It has 1,08, 757 specimens (89,464 Mosquitoes belonging to 31 genera and 539 species). Besides these, there are 19,293 entomological Specimens, other than mosquitoes. The oldest specimen is from United Kingdom collected in 1902, and the oldest collection from India is of malaria vector *Anopheles culcifacies* collected, in 1905 from Karnal, Haryana State. Collections also include *An. sundaicus* (Car Nicobar, India in 2005), *An. stephensi*, *An. subpictus*, *Culex quinquefasciatus*, *Ae. aegypti* (Alwar & Jaipur, India in 2017), *Ae. aegypti* (Ahmedabad, India in 2017).

a) **Establishment of Mosquito Colony:**
Mosquito colony of *Anopheles stephensi*, vector of Malaria and *Culex quinquefasciatus*, vector of Filariasis were established in the Centre for Entomology & Vector Management

b) **Laboratory Culture of *Gambusia affinis***
Mosquito larvivorous fish, *Gambusia affinis* was established in the CME & VM for demonstration purpose for training students.

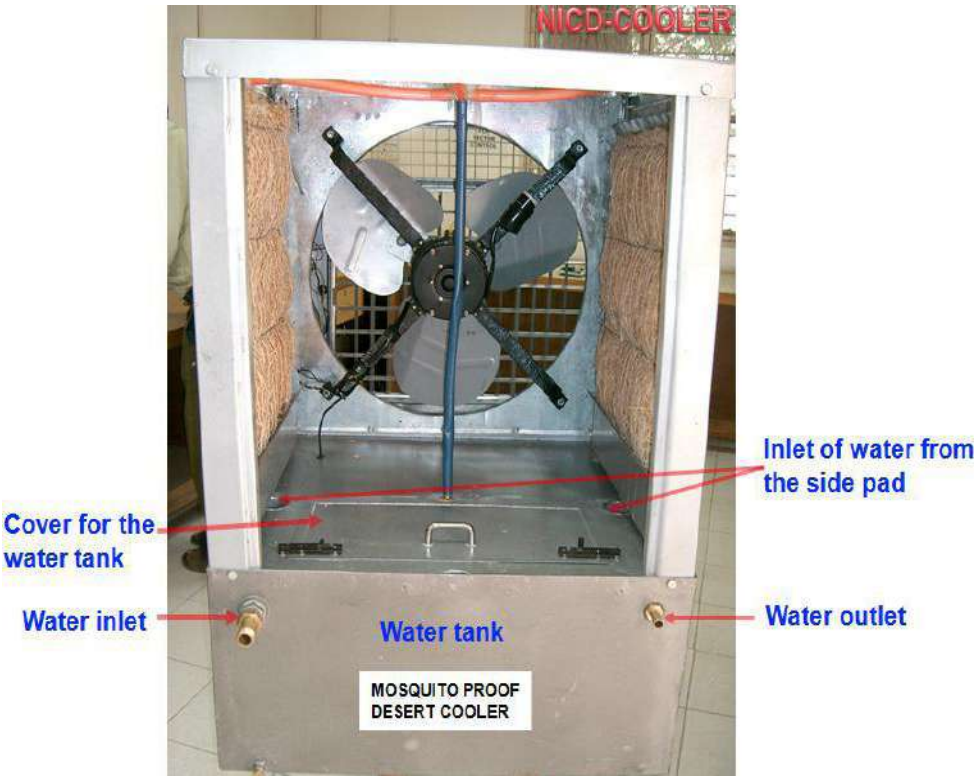
Following Workshops/Seminars/Meetings/Symposium participated/attended by officials of CME & VM division:

S. No	Name of the Programme	Period	Place	Participants
1.	World Health Day	07.04.2016	PGIMER/Dr. RML Hospital Auditorium	Dr. L.J. Kanhekar, Dr. T.G Thomas, Dr. Roop Kumari
2.	Workshop on prevention & control of Vector Borne Disease	18.04.2016	SDMC, India Habitat Center, Lodhi Road, Delhi.	Dr. L.J. Kanhekar, Joint Director
3.	National Dengue Day Celebration	16.05.2016	NVBDCP at NCDC Seminar Hall	Dr. Roop Kumari, Joint Director
4.	Accelerated roadmap for Kala-Azar Elimination	03.02.2017	Hotel Grand	Dr. L.J. Kanhekar, Joint. Director
5.	Finalization of standard operating Procedures for Vector in POE	06.02.2017	Nirman Bhawan, Delhi	Dr. L.J. Kanhekar, Joint. Director

6.	Finalization of Training module for Rapid Response team	11-12 April, 2017	NIHFW, New Delhi	Dr. L.J. Kanhekar, Joint. Director
7.	World Malaria Day Programme and Technical Session	25.04.2017	NVBDCP & WHO	Dr. L.J. Kanhekar, Joint. Director

Mosquito Proof Desert Cooler (NICD COOLER):

- It has been designed in 2009 by NICD.
- The following are the advantages over the conventional desert coolers:
- Water tank of the NICD cooler is completely covered to prevent the entry of mosquitoes in to the water tank for egg laying. There is thus no risk of disease transmission due to coolers.
- No weekly cleaning of the water tank is required.
- No chemical larvicide is required to kill mosquito larvae.
- It can be conveniently installed in high rise buildings.
- Even standing water in the cooler, when not in use, has no risk of mosquito breeding



The NICD cooler is a patented item and registered with National Research Development Corporation (A DSIR enterprise, Ministry of Science and Technology) and is being manufactured and marketed by the 11 agencies.

5.8 Division of Malariology & Coordination

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

Broad objectives/ activities

- 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 & conduct of the short term orientation/training visits & conference etc. of under and post graduate medical, nursing and homeopathic students & other professionals.
- Contribute academically/ technically in various meetings, seminars, symposium and review meetings/missions when invited as participant.

Activities undertaken

- A total of 1377 (From 1st April, 2016 to 31st March 2017) blood slides were examined and 65 were found positive (Pv -62, Pf -03). 1103 slides were received from Government hospitals and 257 from private hospitals. 17 slides were received from NCR (Ghaziabad, Bagpat, Uttar Pradesh, Haryana)

Table1. Blood Smear Examined in Malaria Clinic from Delhi NCR in Delhi April – Nov, 2016

Month (2016-17)	B/S Examined	Positive Cases	Pv	Pf	Delhi	NCR
April	56	1	1	0	Go47 P8	HR1
May	135	8	8	0	Go117 16	UP2
June	137	10	10	0	Go122 14	HR1
July	170	8	8	0	Go124 P41	G2 B2 HR1
August	245	17	17	0	Go168 77	--
September	233	13	13	0	Go161P65	HR5 UP2
October	175	5	3	2	Go152P22	UP1
November	75	2	1	1	Go71P4	--
December	46	1	1	0	Go45P1	----
January	29	0	0	0	Go28P1	----
February	37	0	0	0	Go33P4	----
March	39	0	0	0	Go35P4	----
Total	**1377**	**65**	**62**	**3**	**Go1103P257**	**B2G2U5HR8**

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

- The division extends regular short term orientation/ training to the visiting under and post graduate medical, nursing and homeopathic students. A total of 820 students from different institutes via: Hospitals, 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 2016—2017

S. No.	Date	No. of Students	Category of Students	Name of Institute
1	06.04.16	07	B.Sc. Nursing Students	Sheri H.N. Hospital and R.C. College of Nursing, Indira Nagar, Fossbery Road, Sewree, Mumbai
2	12.05.16	42	MBBS students	North DMC Medical college, Hindu Rao Hospital, Malka Gang, Delhi
3	02.09.16	9	PG Trainee Medical Officers	AFMC Pune
4.	30.09.2016	24	BSc Nursing Students	Fortis Mulund College, Mumbai
5.	03-05 Oct, 2016	24	PG Students of Medical College	MAMC, LHMC, UCMS and VMMC & SJH
6.	04.10.2016	62	Air Force Officers	Biological and Chemical Emergence Response of AFINBCP, AF stn Arjangarh, Mehrauli-Gurgaon Road
7.	20.10.2016	29	BSc Nursing students	Mahastr University of Health Science Nasik Bombay Hospital Trust 12, New Marine Line, Mumbai
8.	03.11.2016	22	MSc Nursing students	R.A.K. College, Lajpat Nargar
9.	04.11.2016	63	BSc Nursing students	R.A.K. College, Lajpat Nargar
10	11.11.2016.	10	MSc Nursing students	Akal College HP
11	23.11.2016.	26	Diploma in (DHPE)	Bombay
12	06.12.16	70	BSc Nursing Students	Mangalore
13	08.12.16	45	P.C.B.ScNursing Students	Mangalore

14	14.12.16	29	BHMS Students Kerala	Kerala
15	10.01.17	33	B.Sc. Nursing Students	Unity Academy of Mangalore
16	11.01.17	58	B.Sc. Nursing Students	Vidyarathna College of Nursing, Vidyaranya Marg Udapi
17	12.01.17	50	P.B.Bsc Students	Kotekar Beeri Road, Paneer, Deralakatte Karnataka
18	24.01.17	29	PBBScNursing Students	Father Muller College Kankanady, Mangalore
19	07.02.17	22	B.Sc. Nursing Students	Tejasvini Nursing Institute College Mangalore
20	08.02.17	29	Basic B.Sc. Nursing Students	St. Andrews College of Nursing , N.M Wadia Hospital Pune
21	09.02.17	91	B.Sc. Nursing Students	Father Muller College Kankanady, Mangalore Mangalore
22	09.02.17	13	B.Sc. Nursing Students	Vidyanagar P.O.Pedamale Neemargar,Mangalore
23	15.02.17	27	B.Sc. Nursing Students	Dr.M.V.Shetty Manga lure
24	16.02.17	23	B.Sc. Nursing Students	Shree Devi College Mangalore
25	27.02.17	06	MSc Students	Ramakrishna Mission Sevashram Vivekananda Puram, Luck now
26	10.03.17	45	B.Sc. Nursing Students	St.Philomenas Hospital. No. 1, Mother Theresa Road, Bangalore
27	23.03.17	02	B.Sc. Nursing Students	Himalayan Institute of Medical Sciences, Jolly Grant, Dehradun

5.9 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

There are an estimated 61 million cases of diabetes and 38 million cases of cardiovascular diseases in India. The prevalence of COPD is 3.5%, annual incidence of cancer is 1.1 million and estimated number of persons with cancer is 2.8 million. Annually 9.8 million deaths occur due to NCDs and they account for 60% of proportional mortality, the leading causes being CVDs, chronic respiratory diseases, cancers and diabetes. NCD are associated with economic loss and in India 20 million productive life years are lost annually to them. In response to the newly emerged problem of non-communicable diseases, Centre for Non Communicable Diseases (NCD) was set up in February 2015, in National Centre for Disease Control (NCDC). Erstwhile Biochemistry lab was inducted into Centre for NCDs for laboratory support.

The major achievements during the period are as under:

1. **Celebration of World Health Day (WHD) 2016 in collaboration with RML PGIMER (Diabetes)**
   Following activities were done
   - CD alert (Special edition on diabetes)
   - Intensified opportunistic screening in OPDs of medical institutes/ colleges from 1 to 7 April 2016
   - Poster making competition on the theme 'Healthy life despite diabetes' by UGs and PGs(109) of Medical & Nursing Colleges (29)
   - Technical seminar on the World Health Day, 7 April 2016

2. **Co-investigated** the likely cause of clustering of disability cases in four villages namely Hariharpur, Godiapalli, Chediapalli and Panchrida Manpur of Odagaon block in Nayagarh district of Odisha state **April 2016**

Clinical team doing the assessment of the patients referred by Rapid household survey

3. **EIS officer (4th cohort) posted at CNCD reviewed**

   - Surveillance system for Maternal Death review in one of the district of Odisha
   - "Causes of Non-Compliance to Continuum of Care in Patients Screened Under NPCDCS for Hypertension and/or Diabetes in Sundergarh District, Odisha (under study)

4. **Convened a meeting on 4th August 2016 under the Chairmanship of Dr Shaukat (Advisor NCD)**
   Recommended
   - To develop standardised training module for all health functionary under NPCDCS

- Act as repositories for all training and IEC material

5. **Convened an expert group meeting for standardization of the medical officer training module and training module for MO to roll out PBS for NCD under NPCDCS**

6. **Pretested and finalised the standardised training module for Medical officer to roll out population level screening for NCD under NPCDCS**

7. **Organized a National Seminar in Joint Collaboration of Dte GHS, MoHFW on RHD 2 Feb 2017**
   - Released a CD alert on RHD
   - Experts from AIIMS, Dte.GHS and PGIMER Chandigarh made their presentations during the plenary session.

8. **Co-investigated** the likely cause of clustering of disability cases in four villages namely Hariharpur, Godiapalli, Chediapalli and Panchrida Manpur of Odagaon block in Nayagarh district of Odisha state **April 2016**

9. **Conducted National Level TOTs for medical officer to roll out Population Level Screening for NCD**
   - 29 states and 4 UTs (148 Master Trainers trained)

5.10 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*

- Coordinated the observance of World Day for Safety and Health at Work, on 28th April, with theme "**Workplace Stress: a collective challenge**".
- Actively involved in drafting of Strategies of National action Plan for Climate Change & Human Health. After detailed deliberations, draft was prepared for strategy of NAPCCHH which was submitted to the MOHFW. The draft NAPCCHH has also been uploaded on the website of NCDC for inviting comments of stakeholders. The comments/ suggestion received have been discussed and incorporated in the Strategic framework of the NAPCCHH and resubmitted to MOHFW
- One of the faculty participated in Second Global health conference on Health and Climate held on 7 & 8th July 2016 at Paris
- Conducted a Workshop on 'Building the bridge between air quality, weather and health in India' at Juniper Hall, India Habitat centre in collaboration with National Institute of Health (NIH), USA & Centre for Diseases Control (CDC) Atlanta on 7th & 8th Nov 2016 to devise strategy for registry or surveillance by triangulation of data from hospitals and related stakeholder
- CEOH was nominated by MoHFW to host/anchor side event on 12th

November 2016 in Conference of Parties (COP)-22 at the India pavilion during COP22, in Marrakesh, Morocco from 7-18 November 2016". CEOH coordinated with ICMR, NIMR, DST, IH division MoHFW, etc. for this side event.

- Officers of CEOH participated in various meetings, workshops, symposiums and seminars on Climate Change & Environmental Health held by Ministry of Health & F.W.(MOH&FW), Ministry of Environment, Forest & Climate Change (MOEFCC), Indian Council of Medical Research (ICMR), Department of Science & Technology (DST), National Institute of Medical Research (NIMR), Indian Institute of Technology (IIT), Public Health foundation of India (PHFI), Maulana Azad Medical College (MAMC), Vardhman Mahavir Medical College (VMMC) and Guru Gobind Singh Indra Prastha University (GGSIPU) etc.
- One officer coordinated disability survey in Odisha. The officers of the CEOH coordinated expert group meeting on biomedical waste management.
- The officers of CEOH provide services to the institute as part of various Institute Committees covering administrative and financial matters.
- The officers of CEOH participate in teaching, training and research activities as part of various academic and other training programmes/workshops at NCDC, besides attending various conferences/ workshops/ trainings within and outside NCDC.
- Planning to conduct research studies through:
- Field visits to develop the methodology for development of guidelines related to health impact studies in critically polluted industrial clusters.
- Establish Working Group with Central Pollution Control Board (CPCB), to develop the methodology for reporting/creation of information system of health impact of Critically Polluted areas
- Coordinated to explore possibilities with Central Pollution Control Board (CPCB), National Disaster Management Authority (NDMA), Indian Meteorological Department (IMD) etc, to develop mechanisms for "Early Warning System / Alerts" to make vulnerable and general population more prepared.
- Attended various meetings, workshop, symposium and seminars on Environmental health and climate change at Nirman Bhawan, Vigyan Bhawan, Public Health foundation of India (PHFI), Guru Gobind Singh Indra Prastha University (GGSIPU)
- Faculty of CEOH division was actively involved in various administrative meetings like upgradation of NCDC building and other related tasks.
- Establishment of Coordination among various stakeholders for partnership network.
- Establishment of monitoring and surveillance mechanism for listing health impacts of change/ extremes of climate.

Activities planned

'Four regional' and 'One National consultation' had been planned to finalise the draft strategies.

- One Regional Consultation in South Zone has already been conducted at Chennai, Tamil Nadu on 2nd & 3rd March 2017
- Thirteen institutes/ organization/ department had been proposed as Centres of Excellence (COE) for preparing and submitting the draft of the specific Adaptation/ Mitigation plan for climate sensitive

Climate Sensitive Disease	**Identified Nodal Institute**
Vector Borne Diseases	National Institute of Malaria Research, New Delhi
Water Borne Diseases	National Institute of Cholera and Enteric Diseases, Kolkata
Food Borne Diseases	National Institute of Epidemiology, Chennai
Heat Stress	National Institute of Occupational Health, Ahmedabad
Air Pollution	School of Public Health, PGIMER, Chandigarh
Nutrition related problems	National Institute of Nutrition, Hyderabad
Zoonotic Diseases	National Centre for Disease Control, Delhi
Allergic Diseases	Patel Chest Institute, Delhi
Cardio-pulmonary Diseases	AIIMS, New Delhi
Mental Health support	National Institute of Mental Health and Neuroscience, Bangalore
Sea and coastal area health adaptation and mitigation plan	Jawaharlal Institute of Postgraduate Medical Education & Research (JIPMER), Puducherry
Hilly area Health Adaptation and Mitigation Plan	North Eastern Indira Gandhi Regional Institute of Health and Medical Sciences (NEIGRIMS), Shillong.
Disasters management	National Institute of Disaster Management (NIDM)

5.11 Statistical Monitoring and Evaluation Cell

Mrs. Rajnesh Jain
Addl. Director & Head
Mr. Ajey Pandey
Sr. Statistical Officer

Main activities

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

- Participation in teaching and training of Statistics to the participants of various courses
- Provide statistical support to all Divisions in planning research studies and interpretation of data
- Preparation of weekly reports on Cholera & H1N1 Cases Cases tested by Microbiology Division
- Conducting Training programmes on 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

Keeping in view of 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, NCDC started 2 year course MPH (FE) in affiliation with GGSIPU, Delhi since 2005 with a total annual intake of 20 seats. Candidates possessing MBBS degree are eligible for the course. Admission to the course is through Common Entrance Test (CET) conducted by GGSIPU. The Fee for course in Rs. 30,000/- per year. The MPH (FE) course was necessitated by the urgent and compelling need of a large number of Public Health experts in India with skills in Epidemiology to deal with the burden of emerging and re-emerging communicable diseases, non-communicable diseases, bioterrorism and disaster management, etc. The number of students passed out in different years is as under:

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	12
7.	2011-13	6
8.	2012-14	6
9.	2013-15	4
10.	2014-16	1
* 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 2016**
- Actions for advertisement of admission notice including processing for admission of WHO candidates and also writing to DHSs of all states: **MPH (FE) Batch 2016**
- Preparation of academic schedule and Draft date sheet for I, II, III and IV semesters 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 Adhaar Linked Biometrics Attendance System (BAS)in the capacity of Nodal Officer designated for (BAS)
- Provided Technical support to NFHS-4 and NFHS-5

5.12 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. Studies on distribution of sandflies species in different Eco-type in Patna and Samastipur districts of Bihar

The distribution of sandflies species in indoor resting habitats were recorded in 3 villages each from Patna and Samastipur district of Bihar for a period of one year. The sandflies were collected from animal shelters and human dwellings from each village with the help of torch light and mouth aspirator in the early morning hours.

To know the presence of sandflies outdoor on trees/plants, the 6 Palm trees and 6 Bamboo plantation were identified for the collection of sandflies in Patna and Samastipur district of Bihar. The sandflies collections were made with the help of CDC light traps. The CDC light traps were put in the canopy of Palm tree by the climber in the evening hours and were removed in the early morning hours. The height of these **Palm tree was > 40feet** from ground level to put the CDC light traps. On Bamboo trees, the CDC Light traps were put on 3 to 10 feet of height of trees from ground level in the evening hours and were also removed in the early morning hours. The CDC light traps were removed from plants and containers were separated from traps and transported to the laboratory. The sandflies were separated from the collection boxes and the sandflies's number counted and species were identified by the identification key in the laboratory.

The sandflies were also collected from outdoor/ peri-domestic areas of the villages with the help of sticky trap method and soil emerging traps. These sticky trap (plastic sheet with cater oil) were placed outside of the domestic area. 100 traps in each district were used. These traps were placed during evening hours and removed in the early hours and brought to the laboratory and sandflies were separated and identified. The soil emerging traps were placed near the bamboo plantation and outside of cattle dwelling where the cattle rest during day time. Total 60 traps were used in both districts.

RESULT-

INDOOR COLLECTION-

The Patna district, results are presented in the **Table-1**. A total of 6125 sandflies were collected from indoor resting sites from Cattle shed and human dwellings for a period of 12 months. Out of these sandflies 5363 (87.6%) were vector sandflies *P. argentipes,* 2% *P. papatasi* and remaining 10.4% were Sergentomyia spps. The prevalence of *P. argentipes* was higher in cattlesheds 4908(91.5%) in comparison to Human shelter (8.5%) in Patna district. The *P. papatasi* were more prevalent in human shelters (13.6%).

The Samastipur district, results are presented in **Table-2**. A total of 3289 sandflies were collected from resting sites of cattleshed and human dwellings. The 77.6% sandflies were identifies as *P. argentipes species, 9.8% P. papatasi, 4.9% S. babu, 3.8% S. barraudi, 1.5% S. indica, 1.2%S. baghdadis, 0.9% S. bailyi and 0.4% were S. panjabensis.* The cattleshed and Human dwelling prevalence ratio was 67.1/32.9%. In this district also the vector sandflies *P. argentipes* were more prevalent in cattle shelter. It showed that preference for sandflies is more in cattleshed for day time resting.

OUTDOOR CLLECTION-

BAMBOO PLANTATION- A total of 2216 sandflies were collected from Bamboo plantation in Patna and Samastipur district of Bihar, **Table- 3.** 1366 out of these sandflies were from Patna and 850 sandflies were from Samastipur district. In Patna district, from 1366 sandflies, 623 were *P. argentipes*. The male female ratio was 53.6% male and 46.4% female. The prevalence of *P. argentipes* in collected sandflies was 45.6% , and 54.4% were Sergentomyia species in Patna district.
From Samstipur 850 sandflies were collected, out of these 451 sandflies were ***P. argentipes*** (53.1%) and 46.9% were Sergentomyia species were recorded. The *P. argentipes* male female was as 55.4% male and 44.6% female species were recorded. The *S. salehi* 2%, *S. babu 24*.2%, S. *barraudi 9.5% , S. indica 2.6% ,S. baghadadis 3.8%, S. bailyi 3.2% and 1.6% S. panjabensis* were recorded

PALM TREE- From both the districts, a total of 516 sandflies were collected by using CDC light traps. Out of these sandflies only 10 Male *P. argentipes* sandflies (1.9%) were collected from Palm trees, the remaining sandflies were Sergentomyia (506) 98.1%. Not a single female of *P. argentipes* sandfly could be collected from the Palm trees**.** The *S. babu* was more prevalent (50.2%) were recorded. **Table 4.**
Sticky and soil emerging traps-
From Patna and Samastipur, 200 sticky traps were used and the sticky traps yielded 117 sandflies, out of these 106 were vector sandflies *P. argentipes* (65 male and 36 female) and remaining 11 were *S. babu* (5 male, 6 female). The total 60 soil emerging trap yielded 11 sandflies of *P. argentipes* (8 Female, and 3 male).

CONCLUSION

The sandflies population comprises of 9 species in the study areas of Bihar. Out of these sandflies species vector *P. argentipes* was highly prevalent. The *P. argentipes* was more abundant in cattleshed than human dwelling. The outdoor (exophilic) prevalence of this species was also high in bamboo plantation and other peri-domestic area. This showed that vector sandflies has changed its behavior from endophic to exophilic, found outside of human/cattle dwelling in high number.

Table- 1 Total and percentage prevalence of sandflies in Patna

	Cattleshed				Human dwelling				Total	Ratio	
Species	M	F	T	%	M	F	T	%	CD&HD	CD/HD	Total % P
P. argentipes	1013	3895	4908	90.9	80	377	457	62.9	5365	91.5/8.5	87.6
P. papatasi	5	20	25	0.5	34	65	99	13.6	124	20.2./79.8	2
S. babu	70	123	193	3.6	35	51	86	11.8	279	69.2/30.8	4.6
S. barraudi	46	83	129	2.4	12	27	39	5.4	168	76.8/23.2	2.7
S. indica	26	43	69	1.3	11	21	32	4.4	101	68.3/31.7	1.7
S. baghdadis	12	19	31	0.6	5	9	14	1.9	45	68.9/31.1	0.7
S. bailyi	8	11	19	0.4	0	0	0	0	19	100/0	0.3
S. punjabensis	6	18	24	0.5	0	0	0	0	24	100/0	0.4
M=Male, F=Female, T=Total, CD=Cattle dwelling, HD=Human dwelling, P= Prevalence											

Table-2 Total and percentage prevalence of sandflies in Samastipur

	Cattleshed				Human dwelling				Total	Ratio	
Species	M	F	T	%P	M	F	T	%P	CD & HD	CD/HD	Total % P
P. argentipes	475	1237	1712	85.1	268	569	839	56.5	2551	67.1/32.9	77.6

P. papatasi	25	71	96	4.8	90	136	226	17.7	322	29.8/70.2	9.8
S. babu	10	63	73	3.6	16	35	91	7.1	164	44.5/55.5	4.9
S. barraudi	4	49	51	2.5	26	49	75	5.9	126	40.5/59.5	3.8
S. indica	0	30	30	1.5	1	17	18	1.4	48	62.5/37.5	1.5
S. baghdadis	1	25	26	1.3	0	12	12	0.9	38	68.4/31.6	1.2
S. bailyi	2	11	13	0.7	1	14	15	1.2	28	46.4/53.6	0.9
S. punjabensis	2	10	12	0.6	0	0	0	0	12	100/0	0.4
M=Male ,F=Female, T=Total, CD=Cattle dwelling, HD=Human dwelling, P=Prevalence											

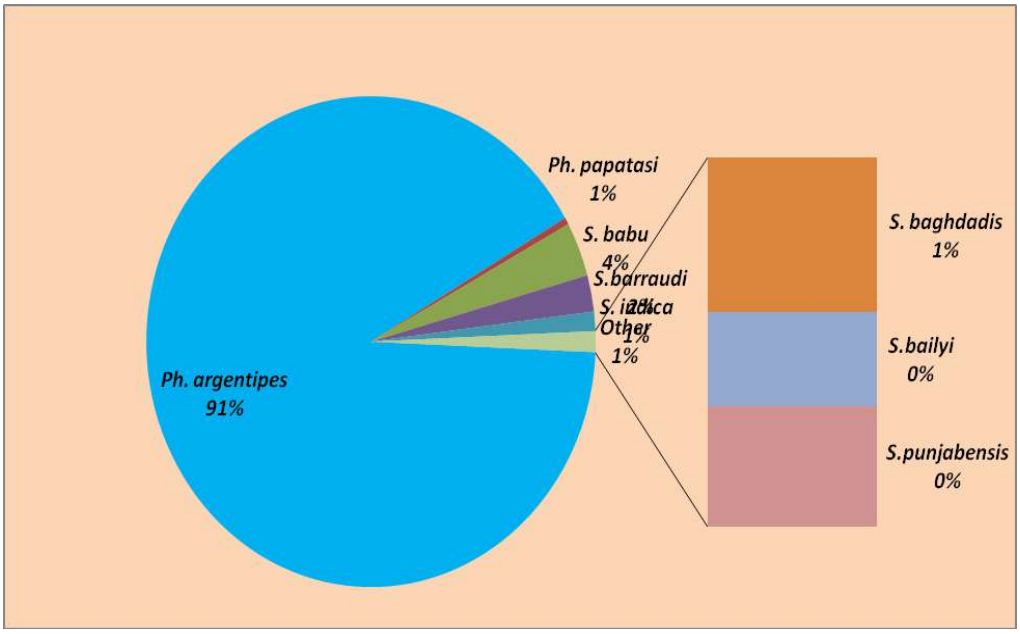
Table-3 Total and percentage prevalence sandflies in Patna and Samastipur on bamboo plantation

	Patna				**Samastipur**					
Species	**M**	**F**	**T**	**%**	**M**	**F**	**T**	**%**	**Total**	**% P**
P. argentipes	334	289	623	45.6	250	201	451	53.1	1074	48.5
P. papatasi	0	0	0	0	0	0	0	0	0	0
P. salehi	8	30	38	2.8	5	12	17	2	55	2.5
S. babu	185	201	386	26.8	80	126	206	24.2	592	26.7
S. barraudi	60	80	140	10.3	31	50	81	9.5	221	9.9
S. indica	26	40	66	4.8	6	26	22	2.6	88	3.9
S. baghdadis	18	20	38	2.8	13	19	32	3.8	70	3.2
S. bailyi	21	25	46	3.4	5	22	27	3.2	73	3.3
S. punjabensis	8	21	29	2.1	3	11	14	1.6	43	1.9
M=Male, F=Female, T=Total, P=Prevalence										

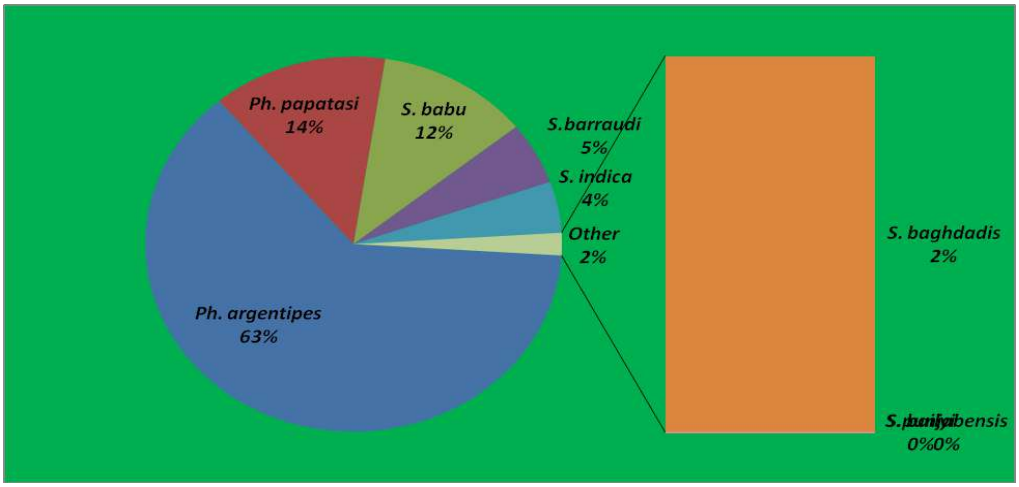
Table-4 Total and percentage prevalence of sandflies in Patna and Samastipur on Palm trees

	Patna			**Samastipur**						
Species	**M**	**F**	**T**	**%**	**M**	**F**	**T**	**%**	**Total**	% P
P. argentipes	10	0	10	2.8	0	0	0	0	10	1.9
P. papatasi	0	0	0	0	0	0	0	0	0	0
P. salehi	0	0	0	0	0	0	0	0	0	0
S. babu	68	124	189	53.1	30	40	70	43.8	259	50.2
S. barraudi	15	40	55	15.5	10	26	36	22.5	91	17.6
S. indica	5	13	18	5.1	2	8	10	6.3	28	5.4
S. baghdadis	10	25	35	9.8	6	13	19	11.9	54	10.5
S. bailyi	19	30	49	13.8	7	18	25	15.6	74	14.3
S. punjabensis	0	0	0	0	0	0	0	0	0	0
M=Male, F=Female, T=Total, P=Prevalence										

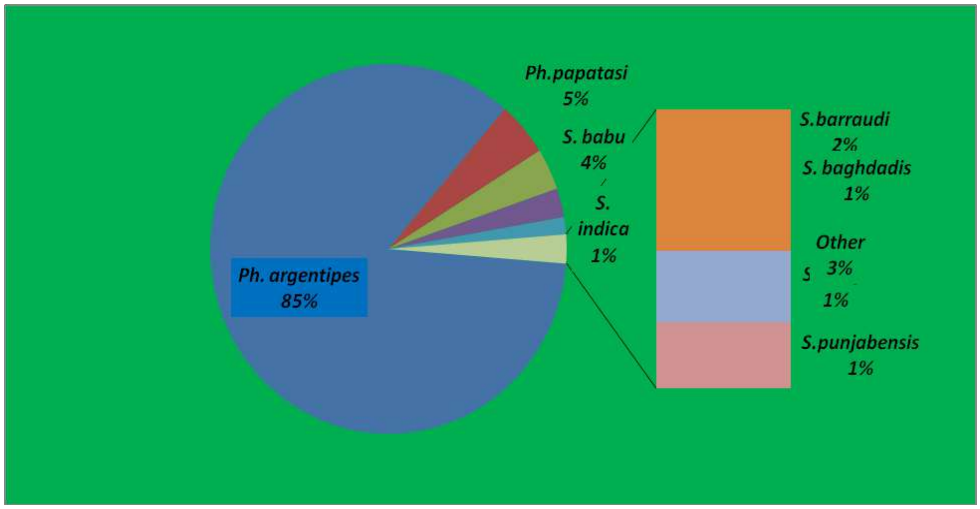
GRAPH 1: Total & percentage prevalence of sandflies species in cattlesheds in Patna



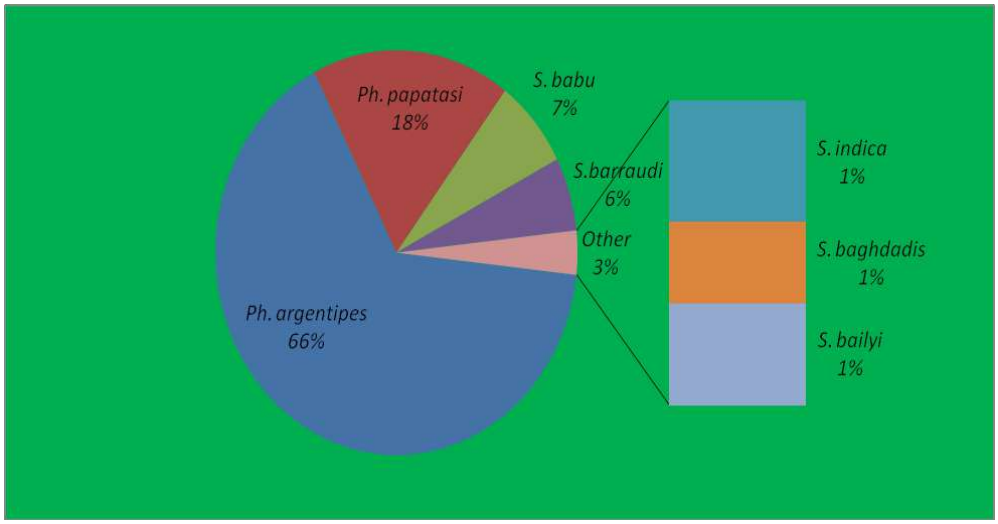
GRAPH- 2: Total & percentage prevalence of sandflies species in Human dwelling in Patna



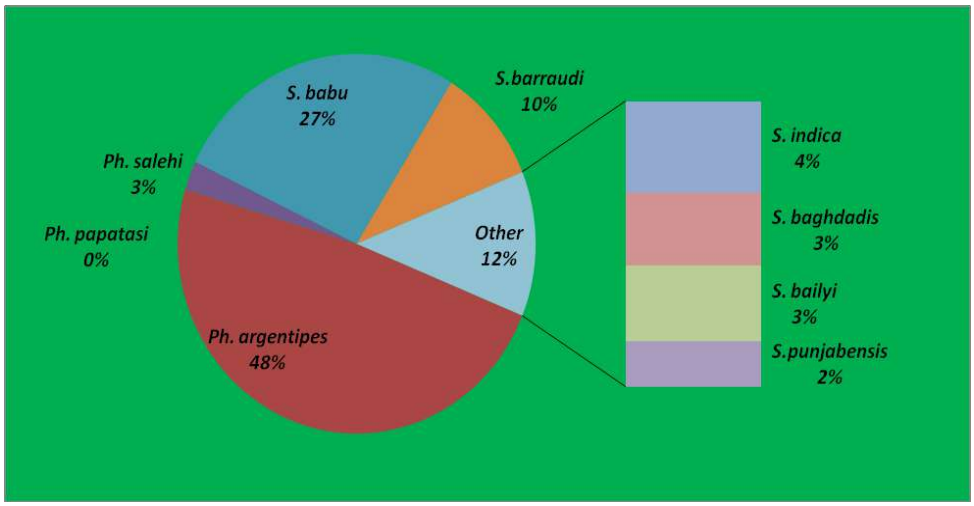
GRAPH 3: Total & percentage prevalence of sandflies species in cattlesheds in Samastipur



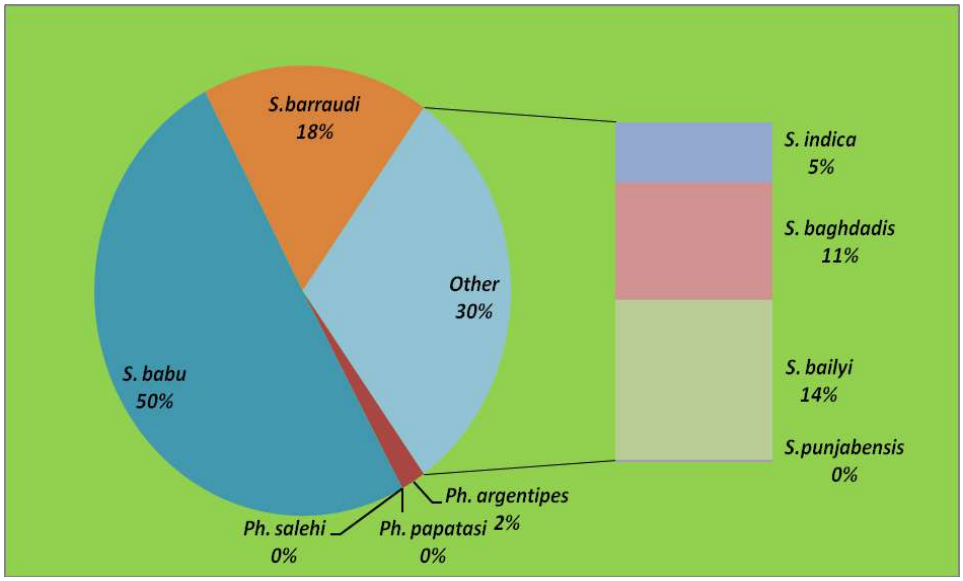
GRAPH4: Total & percentage prevalence of sandflies species in human dwelling in Samastipur



GRAPH 5: Total and percentage of sandflies in Patna and Samastipur on bamboo plantation



GRAPH 6: Total and percentage of sandflies in Patna and Samastipur on Palm Trees



2. Studies on colonization and biology of sandflies P. argentipes in laboratory

The biology of sandfly P. argentipes was studied in the laboratory. The field collected female sandfly was kept singly in a vial to lay the eggs and the eggs were counted. After counting the eggs they were transferred to rearing pots. The eggs hatched and larval food was given in pot. Female sandfly laid 29.77±20.6 (Mean ± SD) eggs. The range was 0-70. The oviposition period was recorded as 4.75 ± 0.98, range was 3-7 days. The larval period was as 21.2 ±1.3, rage-18-22 days. The total pupal period was 6.45±6.7 (range- 5-9 days). The total life cycle complete in 33.4±1.10 days, rage 31- 34 days from egg to adult emergence. Table- 5

The sax ratio and productivity was also noticed. The productivity was 16.72, 16.62 for F1, F2 progeny.

The sax ratio was recorded as 62.23, 56.62 for F1, F2 generation.

Table- 5：Biology of P. argentipes in laboratory

	Mean ± SD	**Range**
Oviposition	29.77±20.6	0-70
Oviposition period (days)	4.75±0.98	3-7 days
Larval		
I instar	4.95±0.15	4-5 days
II instar	5.95±0.022	5-6 days
III instar	4.17 ±0.50	3-5days
IV instar	6.25±0.49	5-7 days
Total larval period	21.2±1.3	18-22 days
Tata pupal period	6.45±6.7	5-9 days
Adult (Egg to emergence)	33.4±1.10	31-34 days

Table-6： Some biological aspect of laboratory reared P. argentipes

Factors	**F1**	**F2**
No. of blood fed female	267	168
No. of egg laid	7105	7188
No. of Ist instar larvae	4384	6047
No. of Pupae	2042	2856
No. of Adults	1188	1195
No. of males	456	412
No. of Females	732	783
Productivity	16.72	16.62
Sex Ratio	62.29	52.62

3. Studies on movement of sandflies *P. argentipes* inside dwelling and outside

The movement of vector sandflies *P. argentipes* was measured on the wall. This was done to know that how much distance cover in one flight/hop. The 50 sandflies *P. argetipes* movement was measure in human dwelling and cattleshed with the help of torch light. The each hop movement or distance cover in one movement was measured by scale. The mean movement was 7.4 cm (Mean= 7.4, SD 5.14 range 0.5 – 60 cm) in one hop. It was found that the sandflies *P. argentipes* moves by hop and cover distance 0.5 cm to maximum 60 cm in one hop inside the dwelling.

But outside of the dwelling and nearby bamboo plantation, it showed different result. The sandflies can fly and reach at different height of plant or distance. For this we placed, CDC light trap at the height of 6 - 8 feet from ground level on wooden stick. The sticks were coated with castor oil so that the sandflies can't reach by hop to the light trap, without flying they cannot reach to the light trap. The study was carried out near the bamboo plantation. We put 4 traps near the positive breeding site (bamboo plantation). In each trap 3-4 (male and female) vector *P. argentipes* sandflies were trapped in these traps. It shows that they can also fly outside.

4. Studies on Nnocturnal activity of sandflies *P. argentipes*

The nocturnal activity of vector sandflies is very important in endemic area of VL. To know the landing rate of vector sandflies, two goats were selected for the study. The study was carried out for 3 nights on fourth night interval. The hourly sandflies were collected using mouth aspirator and torch light by two insect collectors. The collected sandflies were kept in a separate test tube vials and brought to the laboratory. The numbers counted and species were identified.

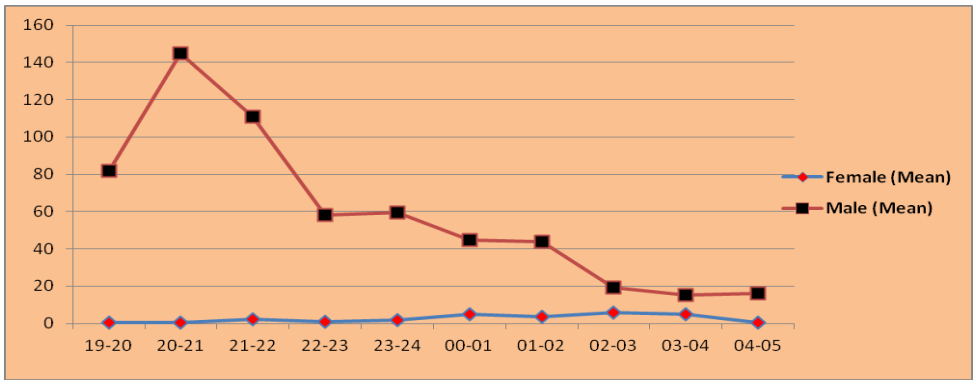
Results:

The results are presented in the **Table 7 and Graph 7**. It was observed that males of sandflies *P. argentipes* were outnumbered over females. The male *P. argentipes* attracted first towards female for matting. The activity of males start first by sun set and with in hour reach peak between 20-21 hrs and after that there number start declining. The number of females collected hourly was very less during 19.00 to 24.00 hrs and increase after 12.00 mid night and decline after 04.00 hrs. Therefore it is important on point of infection transmission that after midnight the female became active for seeking blood meal and subsequent transmit the infection.

Table- 7: Nocturnal landing of sandflies *P. argentipes* on Goat

Hours	Female (Mean)	Male (Mean)
19-20	0.67	82
20-21	0.33	145
21-22	2.3	110.67
22-23	1	58.33
23-24	2	59.67
00-01	5	44.67
01-02	3.67	43.67
02-03	6	19.33
03-04	5	15.33
04-05	0.67	16

Graph- 7: Nocturnal landing of sandflies *P. argentipes* on Goat



B- Monitoring of National Programme

a) Monitoring of Indoor Residual Spray activity of insecticide Alpha –cypermethrin in Saharsa district of Bihar w.e.f. 04.04.2016 to 07.04.2016

Observation:

1. The incidence of kala-azar cases in the district are in decline trend.
2. The highest case per 10,000 population was found in Saur bazaar PHC i.e.3.26 in year 2015
3. The cases are being diagnosed with RDTK and available in sufficient quantity in district.
4. The Kala-azar cases are being treated with single dose Ambisome at Sadar Hospital Saharsa.
5. The drug Miltafosin 10 mg(523) and 50mg(1946), and Ambisome (203) were available at district
6. The Synthetic pyrethroid Alph-cypermethrin 34787 kg was available with district.
7. The IEC materials were provided by NGO New Concept.
8. The IRS with synthetic pyrethroid was being carried out from 18.03.2016 in all the affected PHCs.
9. I have visited 5 PHCs and 8 villages for monitoring of IRS activities.
10. The CARE INDIA is actively participated in the district and their employees are actively supervising the IRS at village level.
11. The IEC activities are also being carried out in the villages.
12. The quality of IRS was satisfactory without any refusal.
13. The spray personnel were made a complained that shoes provided with them are no use as they are uncomfortable and people are not allowing them with shoes in their houses.
14. It was also observed that the involvement of PHC level medical officer was nil in all PHC as we have not found any Doctor during my visit to PHC.
15. The fund was released on time.
16. The proper records are being maintained.

Table- 8: Kala-azar cases in Saharsa district

			Year wise cases			Cases/10000
S.N	**Name of PHC**	**Total population**	**2013**	**2014**	**2015**	**population in 2015**
1.	Sadar prakhand	298220	68	60	34	1.14
2.	Panchgachhiya	257373	71	37	28	1.09
3.	Mahishi	198630	60	48	34	1.7
4.	Nowhatta	147173	21	25	12	0.82
5.	Simiribakhatiyarpur	295075	141	110	65	2.2
6.	Banmaitahri	152858	81	78	35	2.29
7.	Salkhua	113897	39	37	21	1.84
8.	Sonbarsa	232952	110	56	56	2.4
9.	Sourbazar	220950	197	129	72	3.26
10.	Patarghat	149853	49	27	24	1.6
	Total		**837**	**607**	**381**	

Table-9: Human Recourses in the district

SN	Designation	Sectioned	In position	Trained
1.	Civil surgeon	1	1	
2.	ACMO	1	1	
3.	DVBDO	1	1	Yes

4.	District VBD consultant	1	1	Yes
5.	AMO	45	32	No
6.	MO	95	39	Two
7.	malaria Inspector	8	0	
8.	Finance cum logistic Assistant	1	0	
9.	Data Entry operator	1	0	
10.	KTS	6	3	yes
11.	Lab. Technician	26	10 Regular+18 contract	No
12.	basic Health Inspector	23	1	No
13.	basis Health Worker (Malaria)	96	0	No
14.	Health Educator	14	11	1
15.	MPW(F) ANM Regular	198	141	No
16.	ANM(Contract)	152	145	No
17.	ASHA	1622	1471	400+700

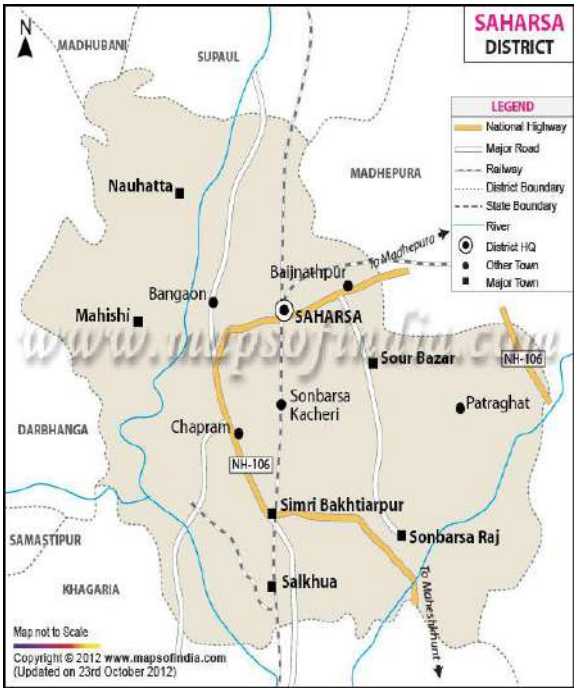


Table 10: Monitoring and supervision of IRS in Saharsa district

S.N	PHC	Village	House Checked	Discharged rate of pump	Refusal at community level	IEC activities	Quality of IRS
1.	SonBazar	Jalseen	25	Good	No	Yes	Satisfactory
2.		Shishwa mushahari	25	Good	No	Yes	Satisfactory
3.	Sonbursa	Kachra	25	Good	No	Yes	Satisfactory
4.		Kataiya	25	Good	No	Yes	Satisfactory

5.	Simiri-bakhatiyapur	Sakara	25	Good	No	Yes	Satisfactory
6.		Gopalpur phulwariya	25	Good	No	Yes	Satisfactory
7.	Salkhua	Khachurdeva	25	Good	No	Yes	Satisfactory
8.	Panchgachhia	Sealbazar ward no.8	25	Good	No	Yes	Satisfactory

b) Monitoring of Indoor Residual Spray activity of insecticide Alpha–cypermethrin in West Champaran district of Bihar

- IRS activities were carried out as per action plan in the district.
- DDT was being sprayed in the district to control vector of kala-azar in West Champaran district
- The MOIC and block health manager were seen in the field for monitoring nd supervision of IRS activities
- Quality of IRS was satisfactory in the visited villages.0
- The coverage was also satisfactory in the district.0
- The community were satisfied with the spray of DDT in regards to quality and coverage
- IEC activities were carried out properly and banner and posters were seen in the visited villages
- The fund was relieved on time and adequate supply of insecticide was in the district

c) Monitoring of Indoor Residual Spray activity of insecticide Alpha –cypermethrin in Siwan district of Bihar

- Spray operation was carried out as per schedule plan
- Dates for visits of squads to the villages for spray activities were mentioned in the action plan
- No MOIC/Block Health Manager were found in the filed to supervise the spray activities
- Local staff were found in the field for supervision of spray activities
- Roots and cattleshed were sprayed satisfactorily
- Community member were satisfy with spray operation
- The acceptance of synthetic pyrethroid were very high
- The IEC activities were carried out in the district and banner poster were seen in the field

d) Monitoring of Mass Drug administration in for elimination of lymphatic Filariasis in Bhagalpur and Araria district of Bihar

- Mass drug Administration was carried out in Bhagalpur and Areria district of Bihar
- It was observed that action plan for MDA was not prepared in both districts
- Night blood survey was conducted in these districts
- Drug distributor were identified for distribution and administration of drug
- Drug DEC and Albendazole were available in the both districts.
- Supervision teams were formed for supervision of administration of drugs
- IEC activities were carried out in the both district, and banners and posters were seen in the villages
- Consumption was poor due to lack of proper knowledge and motivation.

C. Outbreak Investigation:

1. Outbreak investigation of AES/JE in Muzaffarpur district of Bihar

Central team consisting members from NVBDCP, NCDC and LHMC visited district Muzaffapur from 24th to 29th June 2016 regarding AES/JE reported outbreak. The visit was made made on the request of

Govt. of Bihar as district Muzaffarpur reported AES unknown cases in past but not the JE cases. The NCDC Patna branch has provided entomological data to support finding of investigation.

Entomological findings

To establish JE transmission the team visited the affected villages to correlate the availability of JE vector population density, breeding source/ water bodies to establish transmission. Three PHCs Gangapur (overed 2 villages), Paro (covered 2 villages) and PHC Kanti (covered 2 villages) were chosen for entomological surveillance, presence of *Culex vishnui* gp, water bodies/breeding sources. The team surveyed the areas and found no water collections /water bodies in an around 1.5 km from the patient house. The team during entomological collection at houses could not found *Culex vishnui* gp. and *Culex triteaniorhynchus* adult & larvae. To establish amplifying host i.e. pigs, the team also surveyed the area and found only 2 pigs which is 1.5 km away from the patient house. The other factor of high temperature in month of May and June may also one of the reasons for non availability of the vectors. The given table is showing the areas where team has done entomological surveillance. The findings rules out roll of JE vector in transmission.

District	Block PHC	Villages	Presence of water bodies for breeding of JE vector(s)	Presence of *Culex vishnui* gp, *Culex triteaniorhynchus* Adults/Larvae	Presence of Pigs in the area
Muzaffarpur	Mushari	Gangapur	Nil	Nil	2 Pigs were present 1.5 Km away from patient house
		TulsiAnandpur	Nil	Nil	Nil
	Paroo	Anandpur Kharauna	Nil	Nil	Nil
	Kanti	Salempur	Nil	Nil	Nil
		Jaymalabad	Nil	Nil	Nil

2. Outbreak investigation of cute Encephalitis syndrome among children in Gaya district of Bihar

In response to the letter from Secretary Health, Government of Bihar dated 1st July 2016, a central team of experts was formulated for investigation of child deaths in Gaya district. The team visited from 2nd to 6th July 2016. The NCDC, Patna branch was a part of team and provided entomological support in investigation.

Field visits and Entomological details:

For investigation of possibility of JE transmission, the team visited two affected villages (Makpa in Tekari PHC and Kainha Bigha of Belaganj PHC) and Belaganj PHC to assess the availability of JE vector population density, breeding source/water bodies for establishment of transmission. The team surveyed the areas and found no water bodies around the village. During entomological collection, breeding of culex species of mosquito was not seen, however evidence of adult sandfly was seen. Some samples of sandflies were collected for identification by the team member from the NCDC, Patna.

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.

5.13 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.

Plague Surveillance work

Plague was a major public health problem in many states of India in the earlier part of the past centaury. 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. 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 2016-2017, 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 272 rodents and 12 dog and 43 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.. *Rattus rattus* (192), *Bandicota indica* (04), *Bandicota bengalensis* (74) *Rattus rattus turkmeniansis (3).*

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 **2708** rodents viz. *Tatera indica cauvierii* (908), *Rattus rattus* (1585), *Bandicota indica* (211),*and Bandicota bengalensis* (4) and Dog 12 sera samples

were collected. The samples were also received by weekly / monthly basis from the respective states plague units .Also 43 human blood samples were collected during our survey

Table-1: Particulars of states and seaports visited by the NCDC team during 2016-17

State	Place	Sera sample received							Total	
		Ti	***Rr***	***Bi***	***Rn***	***Mm***	***Bb***	***Rrt***	**Rodent**	**Dog**
Andhra Pradesh	Vizag Seaport	0	7	4	0	0	0	0	11	0
Maharashtra	Pune	0	25	0	0	0	0	0	25	8
Gujarat	Surat (R)	0	58	0	0	0	0	0	58	0
	Surat SMC	0	63	0	0	0	0	0	63	0
Uttarakhand	Barkot	0	13	0	0	0	0	2	15	15
Tamil Nadu	Chennai Seaport	0	22	0	0	0	28	0	50	0
West Bengal	Kolkata Seaport	0	4	0	0	0	46	0	50	0
Grand Total		0	192	4	0	0	74	2	272	23

Table- 2: Particulars rodent and dog sera samples collected state plague control units and received by the NCDC Bengaluru during 2016-17

State	Place	Sera sample received							Total	
		Ti	***Rr***	***Bi***	***Rn***	***Mm***	***Bb***	***Rrt***	**Rodent**	**Dog**
Karnataka	Kolar	522	577	0	0	0	4	0	1103	0
Andhra Pradesh	Palamaner	118	113	0	0	0	0	0	231	0
Gujarat	Surat (R)	0	54	0	0	0	0	0	54	12
	Surat SMC	0	463	92	0	0	0	0	555	0
Tamil Nadu	Hosur	268	100	0	0	0	0	0	368	0
	Coonoor	0	278	119	0	0	0	0	397	0
Grand Total		908	1585	211	0	0	4	0	2708	12

Rr- *Rattus rattus* ***Ti-*** *Tatera indica cauvierii,* ***Bi-*** *Bandicota indica,* ***Bb-****B.bengalensis,* ***Rn-****Rattus norvegicus,* ***Mm-****Mus musculus,* ***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 2016-17.

Place	Period of collection	Number of human sera received
Pune (MH)	Sept-2016	11
Barkot (UK)	July-2016	32
Total		43

Table- 4:Particulars of rodent organs samples collected by NCDC Bengaluru team during 2016 - 17

State	Place	Organ sample received							Total
		Ti	***Rr***	***Bi***	***Rn***	***Mm***	***Bb***	***Rrt***	**Rodent**
Andhra Pradesh	Vizag Seaport	0	8	4	0	0	0	0	12
Maharashtra	Pune	0	28	0	0	0	0	0	28
Gujarat	Surat (R)	0	103	0	0	0	0	0	103
	Surat SMC	0	63	0	0	0	0	0	63
Uttarakhand	Barkot	0	18	0	0	2	0	7	27
Tamil Nadu	Chennai Seaport	0	40	0	0	0	41	0	81
West Bengal	Kolkata Seaport	0	6	0	0	0	74	0	80
Grand Total		0	266	4	0	2	115	7	394

Table-5: Particulars of rodent organs samples collected by state plague units during 2016 -17

State	Place	Sera sample received							Total
		Ti	***Rr***	***Bi***	***Rn***	***Mm***	***Bb***	***Rrt***	**Rodent**
Karnataka	Kolar	537	811	0	0	0	4	0	1352
Andhra Pradesh	Palamaner	118	113	0	0	0	0	0	231
Gujarat	Surat (R)	0	116	0	0	0	0	0	116
	Surat SMC	0	483	92	0	0	0	0	575
Tamil Nadu	Hosur	268	100	0	0	0	0	0	368
	Coonoor	0	280	119	0	0	0	0	399
Grand Total		923	1903	211	0	0	4	0	3041

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

Plague Bacteriology and Microscopy

The rodent organ and smears processed by the NCDC, Bengaluru team are given in the Table. The collected rodents were dissected and the organ samples from Liver and Spleen were harvested and stored in Carry Blair Transport Media and transported to laboratory. The Preliminary screening test has been carried out, for further confirmation of the results samples were sent to Zoonosis division NCDC Delhi. 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: Particulars of rodent organ smears received and examined by NCDC Bengaluru during 2016 -17

State	Place	Organ smear sample received /tested							Total Rodent
		Ti	***Rr***	***Bi***	***Rn***	***Mm***	***Bb***	***Rrt***	
Karnataka	Kolar	537	811	0	0	0	4	0	1352
Tamil Nadu	Hosur	0	0	0	0	0	0	0	0
	Coonoor	0	0	0	0	0	0	0	0

	Chennai Seaport	0	40	0	0	0	41	0	81
Andhra Pradesh	Vizag Seaport	0	8	4	0	0	0	0	12
Maharashtra	Pune	0	28	0	0	0	0	0	28
Andhra Pradesh	Palamaner	118	107	0	0	0	0	0	225
Gujarat	Surat RDD	0	219	0	0	0	0	0	219
	Surat SMC	0	546	92	0	0	0	0	638
Uttarakhand	Barkot	0	18	0	0	2	0	7	27
West Bengal	Kolkata Seaport	0	6	0	0	0	74	0	80
Grand Total		655	1783	96	0	2	119	7	2662

***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 fleas specimens collected by various state plague units, Kolar, Karnataka State and Anti Plague Unit, Palamaner, Andhra Pradesh, Plague Control Unit Pune Maharashtra state, Surat RDD team from Gujarat, Plague control unit, Barkot, Uttarkhand state REP surveys conducted by NCDC Bangalore team and Chennai, Visakhapatnam, and Kolkata seaport were processed and identified by NCDC, Bangalore and the particulars of unit /place wise collection and fleas species and indices are given in Table-08.

During **2016 -17** a total of 421 rodent fleas were retrieved from 1334 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 specific flea index of *X cheopis* is below the critical level at all places surveyed

Table- 8: Details of fleas collected and identified during the year -2016 -17

State	Place of collection	Total Rodents collected	Total Fleas collected	Absolute Flea index	Specific Flea Index		
					X a	***X c***	***N f***
Karnataka	Kolar	575	101	0.18	0.12	0.06	0.00
Andhra Pradesh	Palamaner	186	16	0.09	0.05	0.02	0.00
	Vizag seaport	12	2	0.16	0.16	0.00	0.00
Tamil Nadu	Chennai seaport	81	22	0.27	0.27	0.00	0.00
Maharashtra	Pune	28	23	0.82	0.54	0.28	0.00
West Bengal	Kolkata seaport	80	102	1.27	1.27	0.00	0.00
Gujarat	Kandla Seaport	179	104	0.58	0.01	0.57	0.00
	Surat RDD	103	30	0.29	0.00	0.29	0.00
	Surat SMC	63	16	0.25	0.13	0.12	0.00
Uttarakhand	Barkot	27	5	0.18	0.00	0.00	0.18
Total		1334	421	0.31			

***X c**-Xenopsylla cheopis, **Xa**-Xenopsylla astia, **Nf**- Nosopsylla fasciatus.*

Studies on Dengue / Chikungunya

NCDC, Bangalore branch is a sentinel lab for testing Dengue and Chikungunya in Karnataka state in this regard during 2016-17 received 150 human sera samples for Dengue IgM ELISA test and 09 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.

Entomological surveillance of vector of yellow fever, Dengue, Chikungunya 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 01.06.2016 to 03.06.2016 Pre monsoon) and 15.011.2016 to 18.11.2016 (post monsoon). The findings of the survey were conveyed to the concerned officers of KIAL and APHO for further corrective measures.

Soil Transmitted Helminthiasis (STH) Survey in Karnataka state

A STH survey has been initiated in Bagalkot district of Karnataka state and a team from NCDC, Bengaluru visited during the month. The particulars of the survey is given below of August, 2016

Name of the districts of Karnataka state	Number of stool samples examined	Number of stool samples positive		
		Al	***Tt***	***As***
Bagalkot	**51**	**25**	**0**	**0**

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

Training/Seminar/Symposia/Workshop organized

- Training on Rodent Borne Diseases for 12 M.Sc Medical Entomology students from VCRC (ICMR) Pondicherry from 18th to 21st July, 2016.
- Field Epidemiology Training Programme (FETP) for 6 fellows from India and Nepal from 07.09.2016 to 21.10.2016.
- NCDC & IVRI Joint Orientation Training Course on Zoonotic Diseases of Public Health Importance for Medical and Veterinary Professionals at IVRI, Hebbal Bengaluru. From 07.03.2017 to 10.03.2017

Field visits made during 2016-17

- Plague Surveillance work and REP survey at Chennai Seaport. (TN) from 09.05.2016 to 13.05.2016.
- Plague Surveillance work and REP survey at Barkot (UK) from 26.06.2016 to 02.07.2016.
- Soil Transmitted Helminthes Survey at Bagalkot of Karnataka state from 07-10.08.2016.
- Plague Surveillance work and REP survey at Beed (MH) 29.08.2016 to 02.09.2016
- Field exercise for FETP team at Chikkaballapura on 27.09.2016.
- Plague Surveillance work and REP survey at Surat Municipal Corporation and Surat Rural District (GJ) from 23.10.2016 to 28.10.2016.
- Plague Surveillance work and REP survey at Visakhapatnam Seaport (AP) from 19.12.2016 to 23.12.16.
- Plague Surveillance work and REP survey at Kolkata seaport from 16.01.2017 to 20.01.2017.
- Official visit to NCDC Delhi from 16-17.03.2017.

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

- Organized ISMOCD / IAE Conference in Bengaluru at DHS Bangalore on 27.04.2017.

- Delivered a talk on "One Health: Need for linkages between human and veterinary health expert at ICAR-National Institute of Veterinary Epidemiology and Disease Informatics on 30.04.2016.
- Participated in IX Joint Annual conference of ISMOCD & IAE at KVC, Hebbal, Bengaluru from 10.06.2016 to 12.06.2016.
- Branch Officers Meeting and NCDC Anniversary celebration, NCDC Delhi from 27.07.2016 to 30.07.2016
- Delivered lecture on "Plague surveillance in India and "Kyasanur Forest Disease" at NCDC Delhi and IVRI Izatnagar Joint Orientation training course on zoonotic disease of public health importance for medical &veterinary professionals at NCDC Delhi from 29.11.2016 to-30.11.2016.
- Implementation of Leptospirosis and Rabies project in Karnataka state at DHS, Karnataka and Bengaluru Medical College, Bangalore from 23.01.2017 to 24.01.2017.
- IDSP Physical and Financial progress and Food Safety at SIHFW Seminar Hall, Magadi Road Bengaluru on 10.02.2017.
- High Power Meeting on Elimination of Malaria in Karnataka state at Vidhan Soudha, Bengaluru on 21.03.2017.

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- Shyamal Biswas, Ravi Kumar, Shiv Kumar, Veena Mittal, A Prakash(2016*)*
- Sericulture and the Development of Resistance to Various Insecticides in Xenopsylla cheopis (Rodent flea), Efficient Vector of Human Plague in Active Enzootic Plague foci of Kolar District, Karnataka, and Chittoor District, Andhra Pradesh, India, Journal of Communicable Diseases Vol 48, No 2 (2016)

5.14 NCDC, Jagdalpur Branch

Dr. Sandip Shrirang Jogdand
Deputy Director

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. It was under the Administrative control of the Director, National Centre for Disease Control, 22, Shamnath-Marg, Delhi-54.

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) To assist the state health authorities in field investigations as may be undertaken by them and providing them with technical assistance wherever necessary.
b) To train personnel in Epidemiology and control of communicable diseases.

Broad Mandates:

i. Research
ii. Training
iii. Service Activities:
    1. Malaria diagnosis
    2. Water-bacteriology, during outbreak investigation.
iv. Routineactivities undertaken during the period
    - Water testing
    - Test for malaria
    - Orientation and demonstration to medical students visiting the branch
v. Outbreak Investigation: Mosquitos detection and collection for controlling of JE in various blocks of Bastar District.

An entomological survey was conducted in the JE affected area namely Bakwand, Nangur&Darva blocks in Bastar District. Also Entomological survey was carried out in Badkileypal, Lohandiguda, Bastar and andTokapaal blocks of Bastar District as requested by CMHO, Jagdalpur and directions received from HQ.

Research project

"Preliminary study of Insecticide Susceptibility Status at villages in Bastar(Jagdalpur)&Sukma District"

Study was be done in 5 different Villages with 2 unsprayed & 3 sprayed village during 21st september,2016 to 24th september2016 .Mosquito collection from indoor resting collection& cattle shed was carried out in 5 villages between 05.30 am to 8.30 am in the morning by suction tube method . The collected mosquitoes were transported to the NCDC Branch laboratory in 10% glucose solution soaked in cotton pads and wrapped in a wet cloth. Processing of the collected mosquitoes (identification) was carried out. Insecticide susceptibility status of fed An. culicifacies, was determined using WHO specified insecticide impregnated papers with diagnostic concentrations of Alphacypermethrin (0.05%) as per standard WHO technique. Fed healthy females were introduced into different exposure tubes lined from inside with insecticide impregnated paper Alphacypermethrin 0.05%. One replicate was exposed against one Insecticide tested having twenty(20) number of mosquitoes in replica. Control experiments were done simultaneously with 1replicate having 20 no. of Mosquitoes for insecticides. Mosquitoes were exposed for one hour .Then the mosquitoes were kept in the recovery tube for 24 hours and the percentage of mortalities were calculated by scoring the dead and alive mosquitoes after 24 hours recovery period.

Results :

Total 253 anopheles mosquitoes and 170 culex mosquitoes were collected from households and cattle shades
The susceptibility test results for An. culicifacies to Alpha cypermethrin 0.05% are summarised in table
The results reveal thatAn.culicifaciesspecies had 100 percent mortality against Alphacypermethrin 0.05% in unsprayed village while in sprayed village it show 95% mortality against Alpha cypermethrin 0.05 % .

Pilot Study on anopheline fauna 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 present pilot study was carried out at villages :Lamker and Bodapara (Bastar block), Telanganapur and Rajur (Tokapal block) , Gumiyapal and Deurgaon (Tokapal block), Kurandi and Suliyaguda (Nagur block), Negiras and Soras (Londiguda block), Bedaumargaon (Bakawand block), Pandripani and Biringipal (Jagdalpur block)

Adult mosquitoes were collected from indoor and outdoor situation and analysed for species, parity status, abdominal condition & density pattern.

A study on *Aedesaegypti* (L) in Jagdalpur town & suburbs

Study Area :05 wards of Jagdalpur town and adjoining rural localities, v*iz.*Asna, Adawal, Sargipal&Palli, which are under Jagdalpur Municipal Corporation.
Study area was divided into five zones for adult collection. The mosquito collection was carried out in different areas of Jagdalpur namely: Pallivillage,pavi,

Pavirchandward,Shivmandirward,Sanjaynagarward,Jawahar ward, Ramaiyaward,Santoshi ward and Rajendranagaar ward. The mosquitoes indoor resting collection was carried out from permanent five randomly selected catching station in each zone between 05.30 to 08.30 hrs. and 16.00 to 19.00 hrs. collection also will be made from outdoor and cattle shed.

Study area selection, entomological collection pertaining to Aedesaegypti (L) mosquito and Potential breading places survey for Aedesaegypti (L) has been carried out. Identification and preservation of emerged and collected mosquitoes carried out. During larval collections a **total 13*Aedesalbopictus,* 89*Aedesvittatus,*mosquitoes were emerged out.**

5.15 NCDC, Coonoor Branch

Dr.Vikas Janardan Gode
Assistant 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 rat flea *Xenopsylla cheopis* (Delhi & and Coonoor strain is being maintained at NCDC, Coonoor. The specimens are being utilized for training and laboratory susceptibility tests against 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 two 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 **455** rodents were trapped which includes viz. *Rattus rattus* **(306)** and *Bandicoota indica* (**149).** A total of **453** 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 **128** fleas comprising of *Xenopsylla cheopis* were recorded. (Table- 2)

(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 Unit of Nilgiris from April 2016 to march 2017

Month	Plague Control Units				Total No. of Rodent Collected	No. of Flea Collected	AFI	SFI
	Coonoor		Ooty					
	Rr	Bi	Rr	Bi				
April	07	03	15	09	34	09	0.3	0.3
May	04	08	08	-	20	04	0.2	0.2
June	43	02	19	01	65	17	0.3	0.3
July	-	02	28	17	47	15	0.3	0.3
August	03	07	25	08	43	11	0.3	0.3
September	01	06	33	12	52	16	0.3	0.3
October	13	02	11	-	26	08	0.3	0.3
November	14	-	16	04	34	11	0.3	0.3
December	08	12	10	06	36	08	0.2	0.2
January	06	04	09	11	30	07	0.2	0.2
February	11	11	11	06	39	08	0.2	0.2
March	-	05	11	13	29	14	0.5	0.5
Total	110	62	196	87	455	128	0.3	0.3

N

B: Rr= *Rattus rattus, Bi= Bandicoota indica, AFI= Absolute flea index, SFI= Specific flea index*

Manpower Development

Training on epidemiology, outbreak investigation of communicable disease & prevention and control of major public health problems to 89 students and 2 faculty members from PSG Nursing college, Coimbatore on 2nd Nov, 2016

Field Visits

- Dr.Vikas Janardan Gode along with NCDC team visited Nucleus Jerssey and Stud Farm (NJSF), Ooty to collect human blood sera samples for examination of brucellosis infection among the NJSF staff. A total of 68 samples were collected and sent to Zoonoosis division NCDC, Delhi for IgM (ELISA) and IgG antibodies examination. As per the result obtained from the Zoonoosis division 33 samples and 68 samples were found positive for IgM and IgG respectively.
- Dr.Vikas Janardan Gode NCDC, Coonoor branch visited Shahibganj district, Jharkhand to monitor MDA for Lymphatic filariasis from 14th Feb, 2017 to 21st Feb, 2017.
- On request of the Officer in-Charge health section of Military Hospital, Wellington , Coonoor Nilgiri district regarding the breeding status of Anopheles mosquito and their malaria transmission in wellington area Coonoor, The Officer in-Charge NCDC, Coonoor along with team visited the above area and carried out larval breeding survey on 3rd June, 2016. During the survey 4 places were surveyed and found Culex spp and Anopheles spp in a lower density. In this regard we have informed the Officer in charge of Military hospital stating that there are no chances of malaria transmission due to the higher altitude and climatic conditions which are not favaourable.

5.16 NCDC, Rajahmundry Branch

Dr K Regu
Joint Director & Incharge

Broad mandate

1. Research, mainly operational research on different aspects of filariasis and other communicable diseases like Malaria, Dengue, Chikungunya, Yaws & STH etc.
2. Training to various public health personnel on Lymphatic Filarisis.
3. Provide services to public through Filarial & Malaria clinics.
4. Supervision of ongoing National Disease Control Programmes and advise to State and NGOs.
5. Outbreak investigations and control of Communicable Diseases

Routine activities undertaken during the period:

Training (Manpower Development):

i. Ten days training course on Elimination of Lymphatic Filariasis for the personnel involved in NFCP & UMS from18-07-2016 to 22-07-2016
ii. Five days training on Lymphatic Filariasis for Medical Officer/Biologist/Entomologist /Programme Officers from 21-11-2016 to 02-12-2016

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.

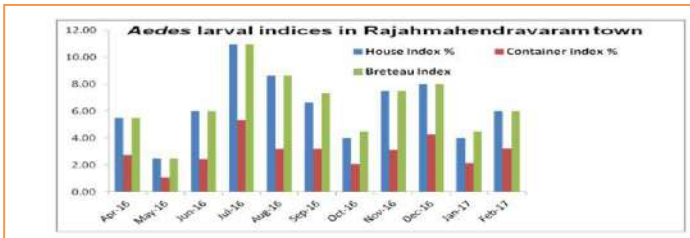
Night clinic for Micro filaria:	Total blood slides examined – 1143 Total blood slides found positive – Nil
Filaria Clinic:	Total no. of filaria cases treated - 5149 Total no. of old cases treated - 4006 Total no. of new cases treated - 1143 Ratio of old & new cases :1:4
Malaria Clinic:	Total blood slides examined- Nil Total blood slides found positive-Nil S.P.R. -- Nil No. of PF cases –Nil
Examination of STH samples: in 6 districts	Total no. of samples - 478 Total Stool samples found positive-203
Cross checking of Filaria Slides for micro-Filaria from 18 NFCP units of Andhra Pradesh.	No. of Negative Slides cross-checked- 208 No. of Slides found positive for mf - nil Discrepancy per cent - nil
Lymphedema Management Clinic:	Demonstrated to prevent further ADL attack:316

Research Project

Surveillance of Aedes species of mosquitoes the vectors of Dengue/DHF and Chikungunya in different areas of Rajamahendravaram – 2016

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

Fig:1.*Aedes* larval indices in Rajahmahendravaram (Rajahmundry) town



3. Phase III field evaluation of DuraNet LLIN against malaria vector mosquitoes.

Baseline household survey for population enumeration was carried out in 12 villages under PHC Indukurupeta. The details are as under.

S.No.	Name of the village	No.of Houses visited	Population enumerated
Subcentre - Chinnabhimapalli			
1.	Chinna Bhimpalli	**241**	**676**
2.	Indukuru	**327**	**1006**
3.	Pedda Bhimpalli	**224**	**616**
4.	Godrathimanda	**5**	**19**
5.	Lothupalem	**149**	**434**
6.	Kothaveedhi	**73**	**221**
7.	Chapralapalli	**31**	**84**
Subcentre – Sarabhavaram			
8.	M.Ravi Lanka	**133**	**292**
9.	Kamalam palem	**54**	**159**
10.	Uppayapalem	**54**	**188**
11.	Sarbhavaram	**283**	**917**
12.	S.Ramanapalem	**104**	**296**
	Total	**1678**	**4908**

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

S. No	No.of Houses searched	No.of Houses Positive	No.of containers searched	No.of containers positive	Name of the area visited	House Index %	Container Index %	Breteau Index 2.0
1	50	1	90	1	Burugupudi	2.0	1.11	2.0
2	50	2	124	2	Korukonda	4.0	1.69	4.0

3	50	2	109	2	Venkannapeta	4.0	1.83	4.0
4	50	3	128	3	Palakadiyam	6.0	2.34	6.0
5	50	31	133	36	Gandepalli	62.0	27.07	72.0
6	50	10	149	10	Mallepalli	20.0	6.71	20.0
7	50	5	150	5	N.T Rajapuram	10.0	3.33	10.0
8	50	11	135	11	Anaparthy	22.0	8.15	22.0
9	50	5	151	5	Kuthukuluru	10.0	3.31	10.0
10	50	2	152	6	Alamuru	4.0	3.95	4.0
11	50	7	147	8	Jonnada	14.0	5.44	14.0
12	50	3	100	4	Hukumpeta	6.0	4.0	8.0
13	100	10	233	11	Kondaguntutru	10.0	4.72	11.0
14	100	--	254	--	Jegurupadu	--	--	--
15	100	2	234	2	Narendrapuram	2.0	0.85	2.0
16	100	3	256	3	Palacherla	3.0	1.17	3.0
17	100	5	199	5	Bobbarlanka	5.0	2.51	5.0
18	50	--	135	--	C.Bhimpalli	--	--	--
19	50	--	113	--	M.Ravilanka	--	--	--
20	50	4	124	4	P.Bhimpalli	8.0	3.22	8.0
21	50	2	103	2	S.Ramanaplaem	4.0	1.94	4.0
22	50	1	106	1	Lothupalem	2.0	0.94	2.0
23	50	1	98	1	Kothaveedhi	2.0	1.02	2.0

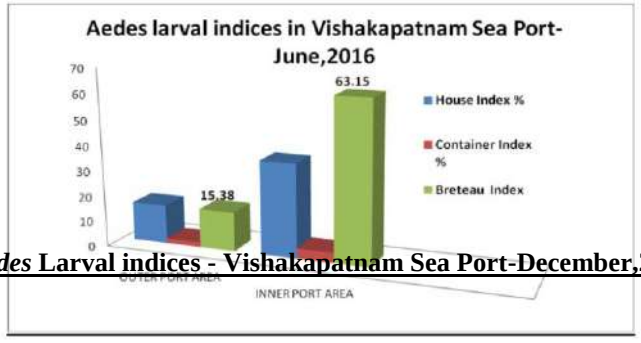
Major Contributions of the organization

A. Surveillance of Aedes species of mosquitoes the vectors of Yellow fever Dengue/DHF, chikungunya and Zika virus in Vishakhapatnam Sea Port

The survey was headed by Dr. L.J. Kanhekar, Joint Director, NCDC, Delhi. The study was carried out twice a year in June -2016 and December-2016.

S.No	Name of the Area	House Index %	Container Index %	Breteau Index	Remarks
1.	OUTER PORT AREA	15.38	1.89	15.38	--
2.	INNER PORT AREA	36.84	4.05	63.15	1. Number of water accumulations found in inner port area. 2. Metallic Scraps also acting as good source for mosquito breeding.

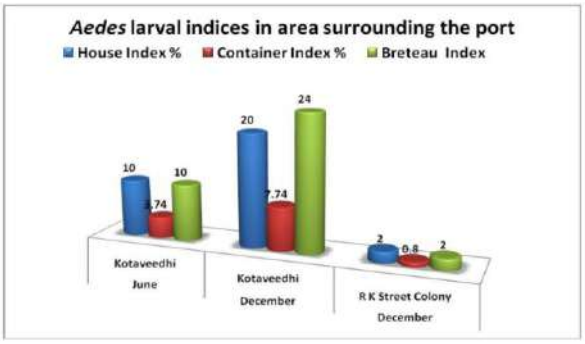
Aedes Larval indices - Visakhapatnam Sea Port-June, 2016

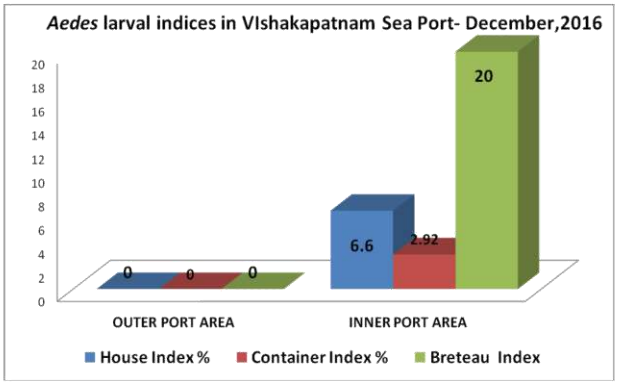


***Aedes* Larval indices - Vishakapatnam Sea Port-December,2016**

S.No	Name of the Area	House Index %	Container Index %	Breteau Index
1.	OUTER PORT AREA	**00**	**00**	**00**
2.	INNER PORT AREA	**6.6**	**2.92**	**20**

***Aedes* Larval indices – Surrounding Vishakapatnam Sea Port**





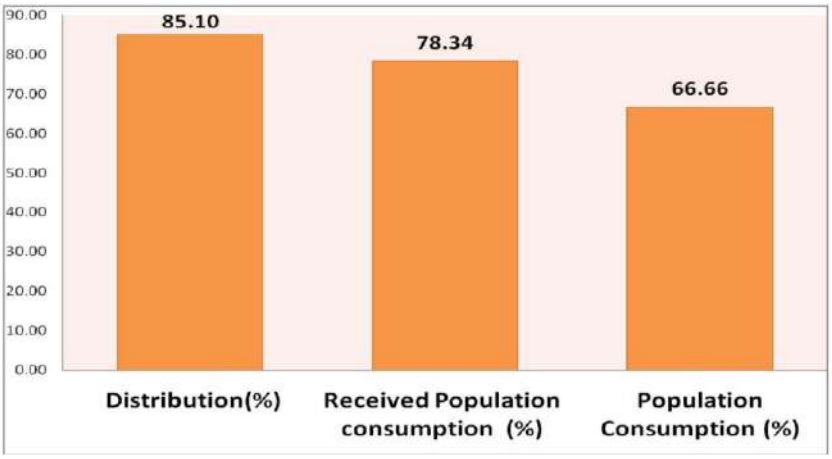
C. MDA Compliance study in 17 PHC's of Warangal district, Telangana State

The Mass drug Administration (MDA) compliance study was carried out in 17 PHC's of Warangal district . The study details are as under:

S. No	Name of the PHC	Received			Not Received			Swallowed		Consumption	Distribution %	Received Population consumption %	Population Consumption %
		M	F	Total	M	F	Total	M	F				
1.	Alimpur	9	18	27	1	2	3	8	15	23	90.0	85.19	76.67

2.	Mutsyala	11	11	22	2	6	8	9	6	15	73.3	68.18	50.00
3.	A.Palem/ G.Gudem	11	11	22	4	4	8	6	9	15	73.3	68.18	50.00
4.	Chintapalli	15	15	30	--	--	0	12	13	25	100.0	83.33	83.33
5.	Inavole	10	14	24	2	4	6	7	11	18	80.0	75.00	60.00
6.	Dantalapally	17	13	30	--	--	0	17	12	29	100.0	96.67	96.67
7.	Atmakur	13	15	28	--	2	2	6	7	13	93.3	46.43	43.33
8.	Velidanda	7	14	21	2	7	9	5	11	16	70.0	76.19	53.33
9.	Chinna Pendyala	9	17	26	--	4	4	6	16	22	86.7	84.62	73.33
10.	Bollikunta	12	13	25	3	2	5	12	10	22	83.3	88.00	73.33
11.	Kunur	13	15	28	2	--	2	11	12	23	93.3	82.14	76.67
12.	Gangapuram	15	14	29	1	--	1	13	12	25	96.7	86.21	83.33
13.	Nawabpet	13	17	30	--	--	0	10	14	24	100.0	80.00	80.00
14.	Mondrai	7	3	10	10	10	20	6	3	9	33.3	90.00	30.00
15.	Chennur	10	16	26	2	2	4	9	15	24	86.7	92.31	80.00
16.	Pedda Pendyala	9	18	27	2	1	3	3	11	14	90.0	51.85	46.67
17.	Chagal	14	15	29	--	1	1	10	13	23	96.7	79.31	76.67
TOTAL		**195**	**239**	**434**	**31**	**45**	**76**	**150**	**190**	**340**	**85.10**	**78.34**	**66.67**

Overall Distribution, Received Population and consumption % in Warangal District



C. Soil Transmitted Helminthiasis (STH) prevalence study in six districts of Andhra Pradesh

As per the instructions of DPD, NCDC, Delhi, conducted Soil Transmitted Helminthiasis (STH) prevalence study in six districts of Andhra Pradesh. The details are given below:

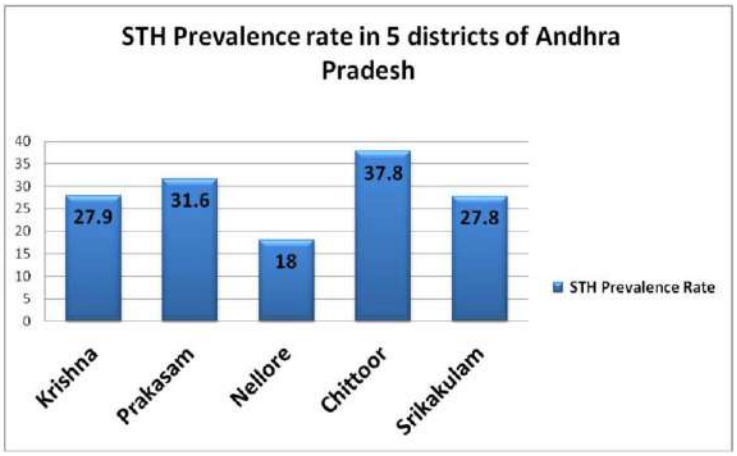
S.No.	Name of the District	No. of Vials distributed	No. of Samples Examined	No. of Positive samples	Prevalence Rate
1	Krishna	100	61	17	27.9

2	Prakasam	100	57	18	31.6
3	Nellore	96	61	11	18.0
4	Chittoor	100	4	28	37.8
5	Srikakulam	87	54	15	27.8

6. East Godavari District is selected for evaluation of drug efficacy.

S.No.	Name of the school	No. of positives*
1.	MPPP School Hukumpeta, Rajahmundry (rural)	24
2.	MPPP School, Satellite city B-Block, Rajamundry (Rural)	48
3.	MPPP School, Yarrakonda, Highway	18
4.	MPPP School, Yarrakonda, near water tank	13
5.	MPPP School, Kadiyam	11
Total		**114 (PR=47.3%)**

The Deworming-Day in Andhra Pradesh was on 30th August 2016. The positive cases were administred the drug Albendazole, the details are as under:



Name of the School	Ascaris Positive Children Traced	Consumed albendzole in presence of NCDCofficials	Not consumed & reasons
Hukkumpeta MPPP School	22	20	2 - persons out of station
Satellite City MPPP School	47	45	One -absent due to illness One –Health Problem
Dowlaiswaram MPPP School – High Way	18	15	One -Absent, Two - due to Illness
Dowlaiswaram MPPP	13	13	-
School – Water Tank			
Kadiyam MPP School	9	9	-
TOTAL	**109**	**102**	

D. Antigenemia study by Filariasis Test Strips (FTS) in Rajanagaram village of East Godavari district

Study using Filariasis Test Strip (FTS) received from NVBDCP Delhi was carried out in Rajanagaram village of East Godavari district.The overall study results are given as under:

No. of Samples tested		**No. Positive of Samples**		**% positive**	
Male	Female	Male	Female	Male	Female
29	43	3	6	10.34	13.95
72		**9**		**12.5**	

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

Study using night blood smear collection for microfilaria was carried out in Madurulanka village of West Godavari district.A total of 137 slides were collected and examined. None was positive for microfilaria.

5.17 NCDC, Kozhikode Branch

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

Broad mandate

1. Training and Capacity building
2. Research
3. Specialized services and
4. Outbreak investigation and control

Units within the Branch

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

Routine activities undertaken during the period

1. 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.
2. Research on lymphatic filariasis relevant to *B.malayi* infection/ other vector born diseases.
3. Investigation on the outbreaks of dengue, Japanese encephalitis, chikungunya etc.

Main activities

1. Research in Lymphatic Filariasis and other Communicable diseases
2. Training to Medical Officers/Biologists and Para Medical staffs about Lymphatic Filariasis and its elimination and other vector born diseases.
3. Diagnosis and treatment of microfilaria carriers and management of filarial patients through filaria clinics
4. Entomological surveillance of vectors of Filariasis, Dengue, Chikungunya, Yellow fever, Zika virus, Japanese
5. encephalitis etc.
6. Outbreak investigation of communicable diseases
7. One day lecture cum demonstration classes on lymphatic filariasis and other vector borne diseases to Medical
8. students, Homeo Medical students, Nursing students, Health Inspectors, Junior Health Inspectors, Public Health
9. Nurses, Arts and Science students, Sanitory Inspector students, etc
10. Research in Lymphatic filariasis and other vector born diseases
11. Training to Medical Officers/Biologists and Para Medical staffs about Lymphatic filariasis and its elimination and other Vector Borne Diseases.
12. Diagnosis and treatment of microfilaria carriers and management of filaria patients through filaria clinics
13. Entomological surveillance of vectors of Filariasis, chikungunya, dengue, Japanese encephalitis other routine activities.

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	Night clinic
	Patients attended	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**

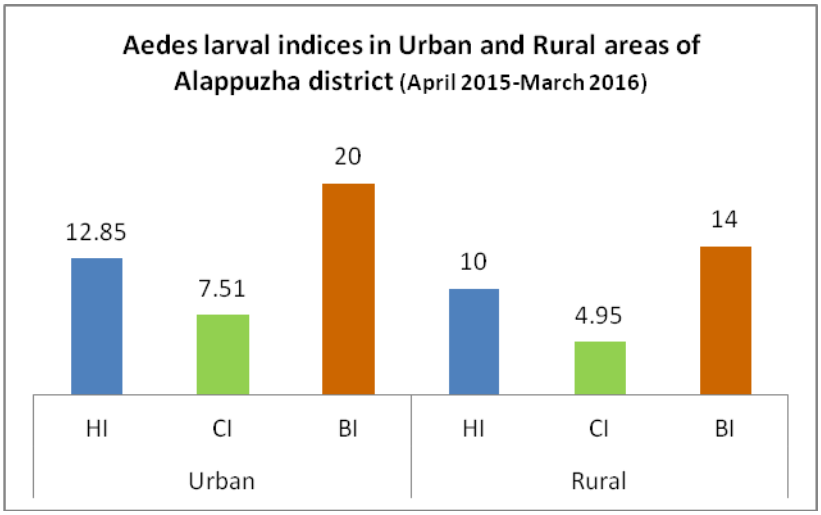
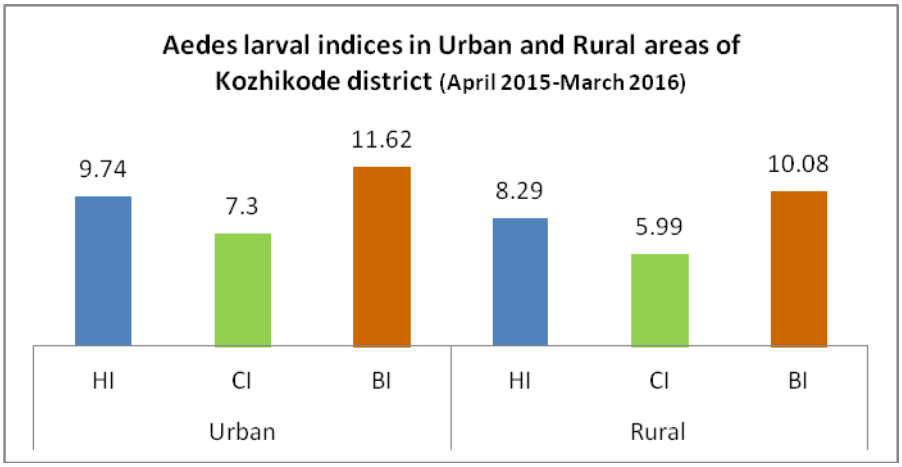


Table : *Aedes* larval indices in Urban and Rural areas of Kozhikode district.

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:

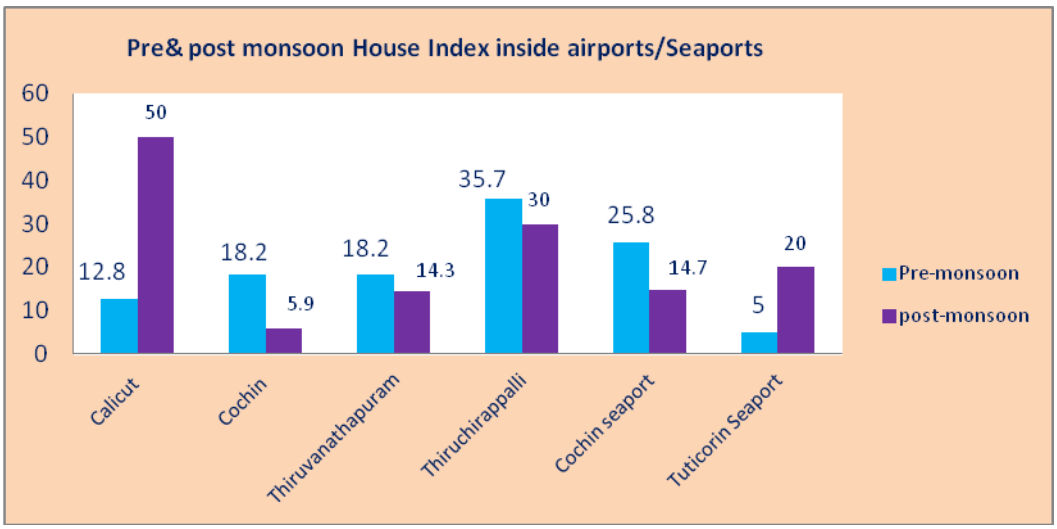
Pre -monsoon-*Aedes* larval indices inside & around International Airports/Seaports of Kerala & Tamil Nadu (May 2015)

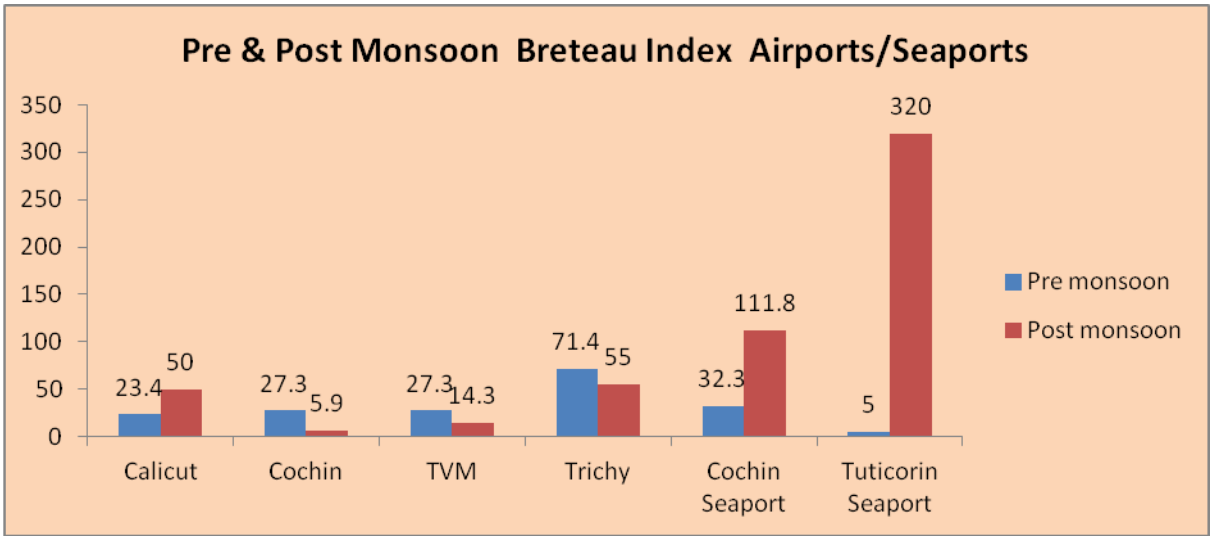
	Inside			**Around**			
Airport/Seaport	HI %	CI %	BI	HI %	CI %	BI	Species
Kozhikode Airport	**12.8**	8.7	**23.4**	**11.9**	20.3	11.9	*Ae.albopictus*
Cochin Airport	**18.2**	3.9	**27.3**	**14.56**	10.06	**32.03**	*Aedes aegypti & Ae.albopictus*
Thiruvanthapuram Airport	**18.2**	5.5	**27.3**	8.0	3.50	5.40	*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.

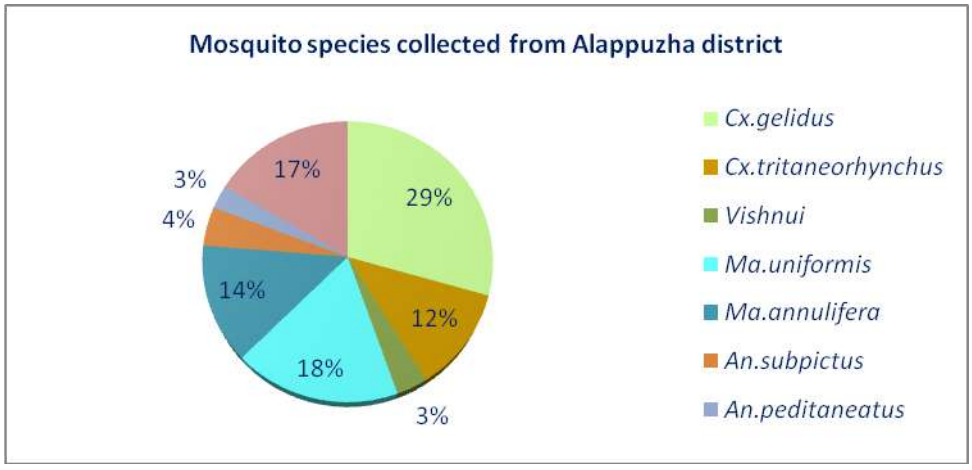
- **Entomological surveillance of vectors of JE in Alappuzha district (Vayalar) Rural**

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



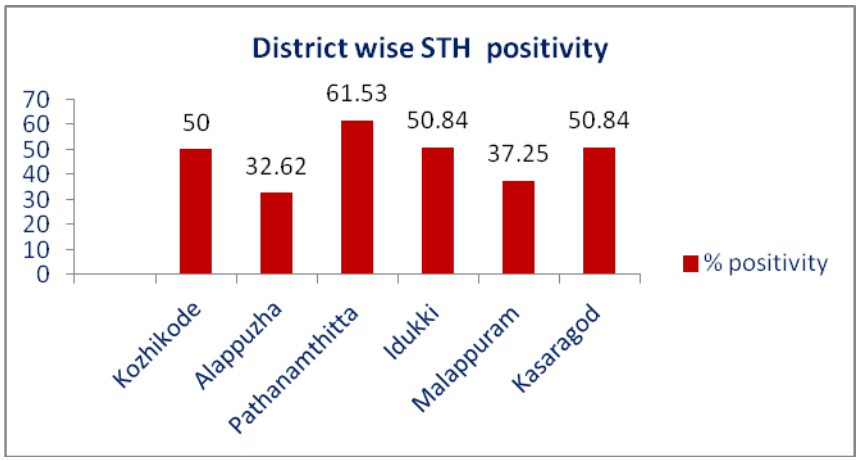
- **Soil Transmitted Helminthes study in different parts of Kerala**

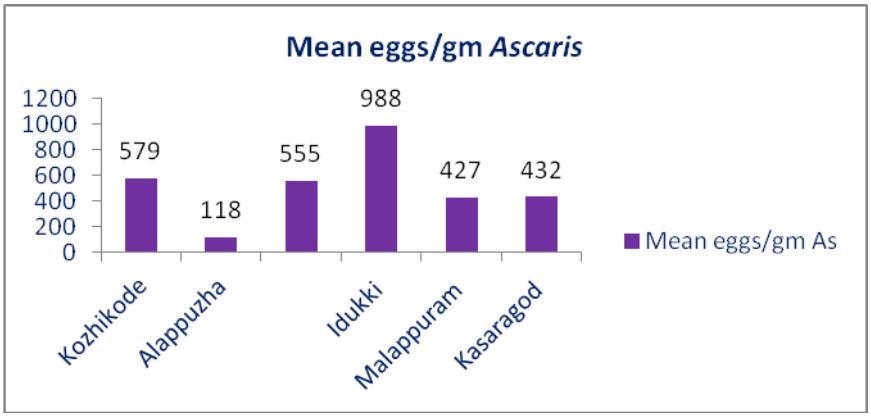
Study on Prevalence and Intensity of STH in school children of 9 to10 years in Alappuzha, Malappuram, Idukki, Pathanamthitta, Kozhikode and Kasaragod districts of Kerala were conducted. Stool samples were collected from students of 4th & 5th standards (8-10 age groups) and examined using Kato-Katz test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

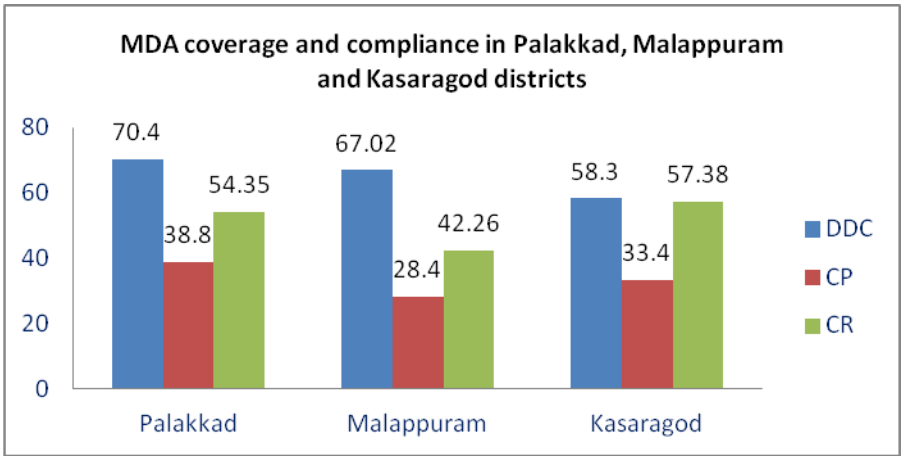
- **Study on coverage and compliance of MDA in Palakkad, Malappuram and Kasaragod districts.**

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.

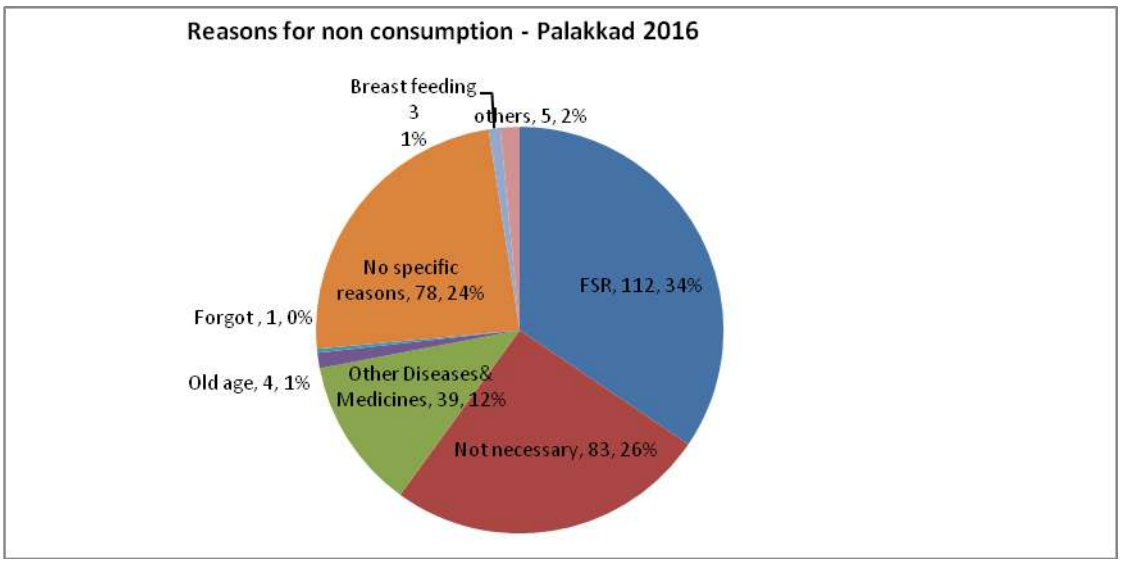
Table: Coverage and compliance study in Palakkad, Malappuram and Kasaragod

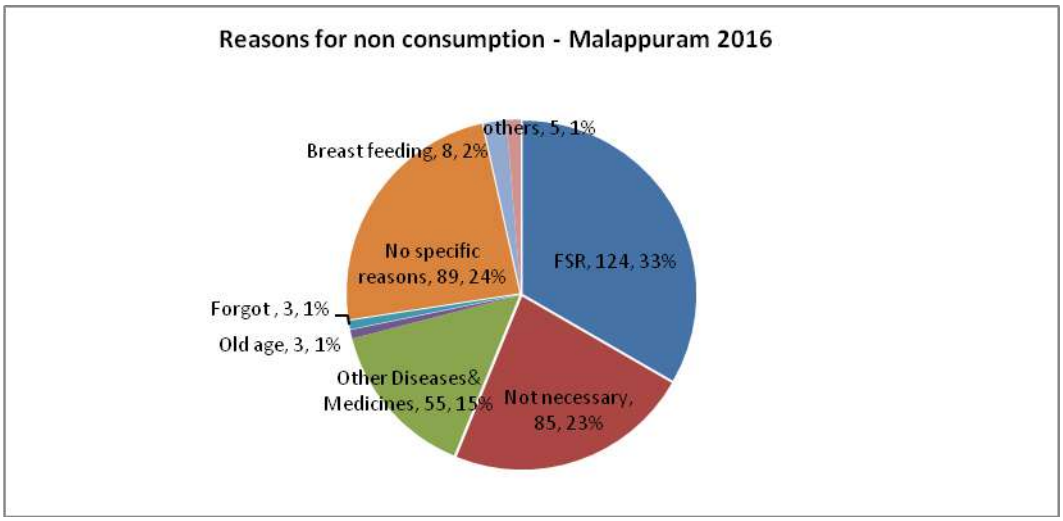
l No	District	Population Interviewed	Population Received Drugs	Population Consumed Drugs	Drug distribution %	Drug consumption %(Population)	Drug consumption % (in terms of receipt)
1	Palakkad	915	644	355	70.4	38.8	55.1
2	Malappuram	961	646	273	67.02	28.4	42.3
3	Kasargode	930	542	311	58.3	33.4	57.4
	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

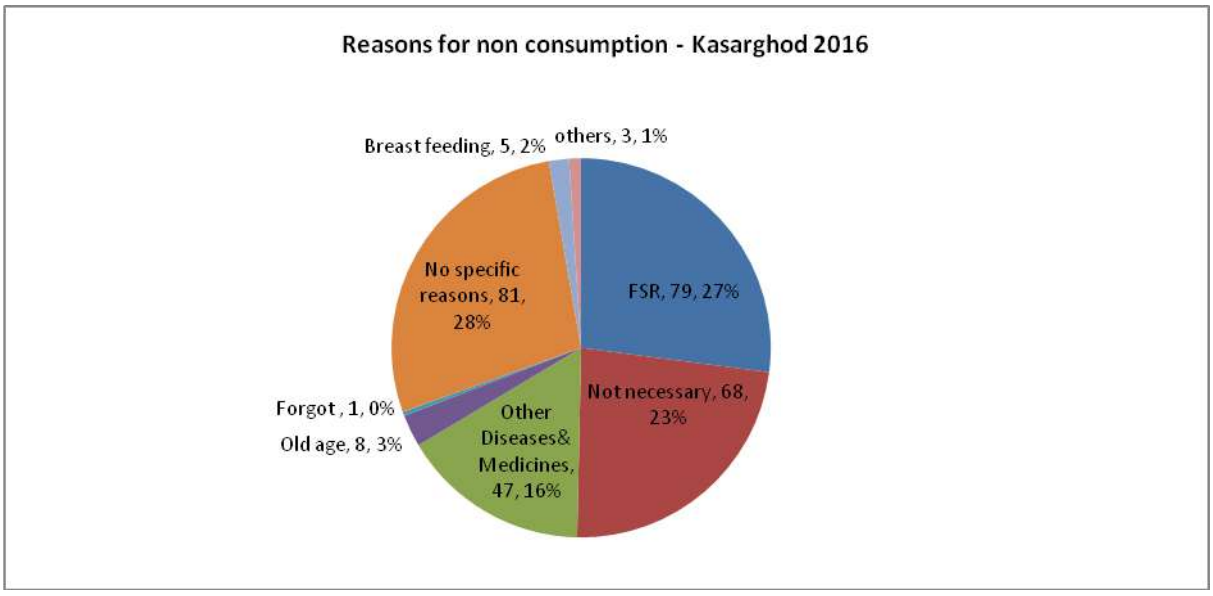
Fig: MDA Drug coverage and compliance in Kerala-2016



*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

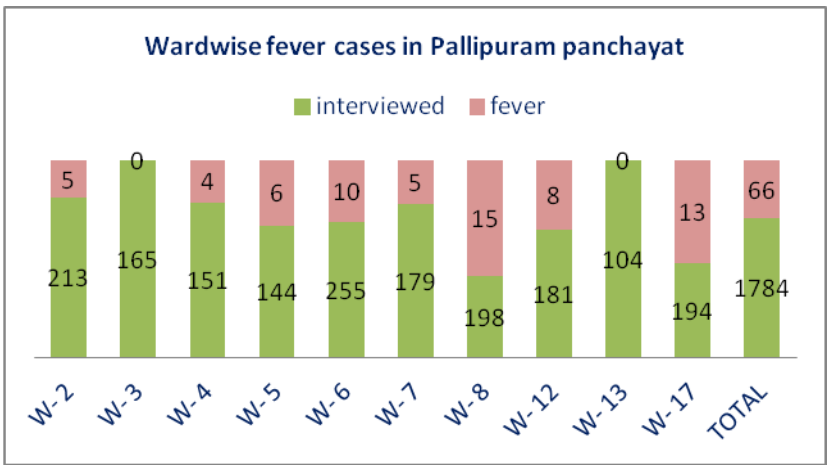
A focal outbreak of dengue fever was reported in Pallipuram grama panchayat area of Alappuzha district in Jan-Feb 2016. A total of 4 confirmed dengue cases were reported. The district health authorities have implemented various control activities in this Panchayat. Therefore, to assess the gravity of 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

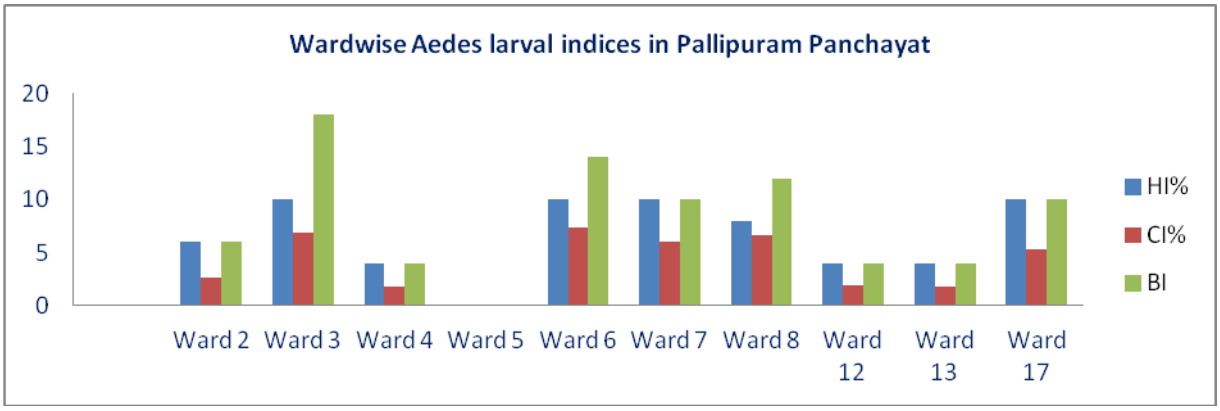
Area	Male		Female		Total	
WARD 5	interviewed	positive	interviewed	positive	interviewed	positive
Ward 6	129	5	126	5	255	10
Ward 7	76	0	103	5	179	5
Ward 8	87	6	111	9	198	15
Ward 2	100	0	113	5	213	5
Ward 17	93	5	101	8	194	13
Ward 12	93	2	88	6	181	8
Ward 13	49	0	55	0	104	0
Ward 3	86	0	79	0	165	0
Ward 4	81	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.

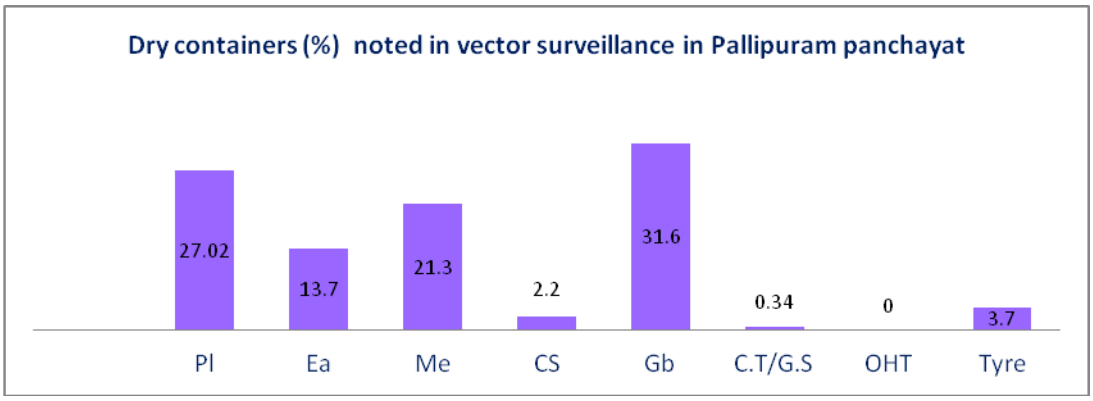
Fig: Ward wise fever cases in Pallipuram panchayat



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.

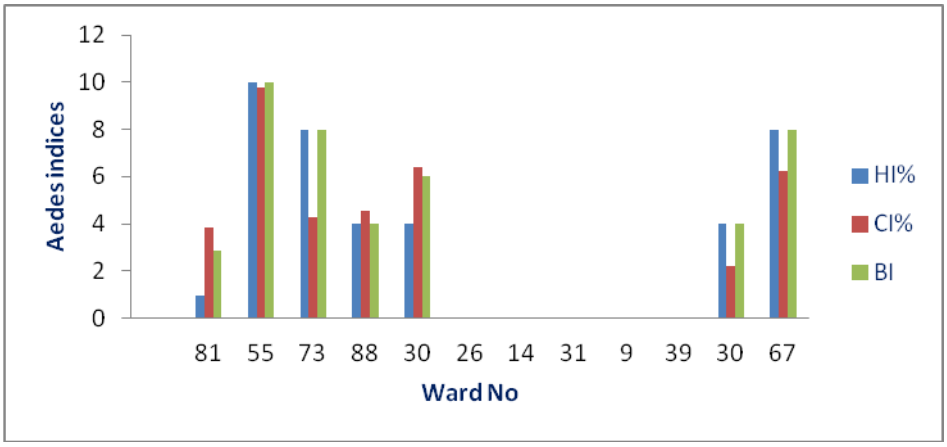
Alappuzha district is endemic for dengue. Year wise - number of confirmed dengue cases reported in Alappuazha district from 2011 to 2015 are 36, 81, 184, 46 & 157 respectively.

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.

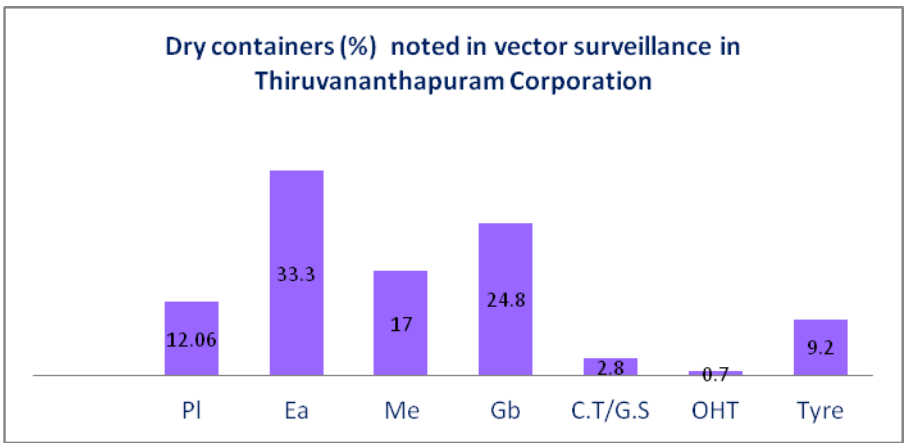
2. Investigation of dengue in Thiruvananthapuram Corporation

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.

5.18 NCDC, Varanasi Branch

Dr A K Yadav
Medical Officer & Incharge

Mandate

1. 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).
2. Carrying out operational research & training to support National Programme of elimination of Lymphatic Filariasis.
3. Supervision of Yaws Eradication Programme (YEP) activities in Mirzapur & Sonebhadra District of Uttar Pradesh.
4. Support to Integrated Disease Surveillance Project (IDSP) in the State of Uttar, Pradesh.
5. Outbreak investigation of various Communicable disease in the State of Uttar Pradesh & other States as per the direction of NCDC HQ
6. Services to Public through weekly Night & Day Filaria Clinic and Lympoedema Management clinic of filarial patient.
7. 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 2016-17

MONTH	NEW CASES	ACUTE	CHRONIC	+ve for mf.	mf. rate (%)
April, 2016	167	80	87	10	5.98
May, 2016	330	225	105	6	1.81
June, 2016	362	177	185	8	2.20
July , 2016	238	109	129	3	1.26
Aug. 2016	175	88	87	1	0.57
Sept. 2016	277	133	144	1	0.36
Oct. 2016	193	78	115	0	0
Nov. 2016	116	52	64	1	0.86
Dec. 2016	112	44	68	1	0.89
Jan. 2017	59	23	36	0	0
Feb., 2017	124	40	84	0	0
March 2017	152	57	95	1	0.65
Total	**2305**	**1106**	**1199**	**32**	**1.38**

All the new cases are provided anti filarial drug from this centre after initial registration and monthly follow ups are done regularly. The figure does not include cases of follow up visits made by the patient after 30 days.

Day Filaria Clinic

A total of 17550 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 2016-17 month wise cases attending Day Filaria Clinic are given in Table- 2.

Table 2: Total Patient treated in day Filaria Clinic in 2016-17

Month & Year	No. of Patient treated
April, 2016	1456
May, 2016	1915
June, 2016	2145
July , 2016	1509
Aug. 2016	1733
Sept. 2016	1299
Oct. 2016	1354
Nov. 2016	1401
Dec. 2016	1183
Jan. 2017	1063
Feb., 2017	1195
March 2017	1297
Total	**17550**

Lymphoedema Management Clinic

In addition to Filaria Clinic, a 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 1994 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 2016-17

Month & Year	No. of patient with Lymphoedema Grade (s)			Total No. of Patient
	I	II	III	
April, 2016	36	63	69	168
May, 2016	57	65	82	204
June, 2016	54	75	71	200
July , 2016	62	81	79	222
Aug. 2016	67	65	56	188

Sept. 2016	69	62	49	180
Oct. 2016	32	64	48	144
Nov. 2016	27	40	46	113
Dec. 2016	36	41	51	128
Jan. 2017	35	61	56	152
Feb., 2017	43	49	53	145
March 2017	42	57	51	150
Total	**560**	**723**	**711**	**1994**

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 2016-17 is given in Table No. 4

Table 4 : Details of training courses conducted by the branch during the year 2016-17

Sl. No.	Name of the project	Date with duration		Place	No. of Participants
		From	To		
1	Training Course in Filariology for Health Medical Officers/ Biologist/ District Programme Officers	01.08.16	05.08.16	NCDC, Varanasi	03 All of from Maharashtra
2	Training Course in Filariology for Filaria Inspectors/Technicians	19.09.16	30.09.16	NCDC, Varanasi	04 2- Chhattisgarh 2- U.P.
3	Training Course in Filariology for Health Medical Officers/ Biologist/ District Programme Officers	03.10.16	07.10.16	NCDC, Varanasi	02 All of from Maharashtra

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:** Already given in separately for each Training in Table- 4.

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 field 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. **Follow-up measures undertaken/Envisaged:** After training programme participants/trainees are encouraged to communicate with centre for any problem encountered in the field.

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

Ongoing Research Projects:

(i) **Duration of clearance of circulating MicroFilarial Antigenimia after DEC drug intake:** Centre is provided with 500 ICT Kits (Allere USA) from NVBDCP in January, 2016 . These Kits are being used in the positive patients after treatment with DEC +Alb. at regularl intervals to acertain the presence of *micro Filarial Antigen* in serum.

(ii) Orthopaedic manifestations in the patients of Lymphatic Filariasis: In this study we are differentiating between the patients of actual Lymphatic Filariasis from other cases of bone & joints diseases presenting with similar complaints of Lymphoedema with the help of the questionnaire, filled by the patients attending Day & Night Filaria Clinic.

(iii) An operational study on Home Based Care on Lymphoedema Management in Rurual Areas of Varanasi to prevent & reduce number of attacks of ADL for the patients suffering from filariasis.

Plan of action for 2017-18:

i. To undertake new Research Projects in the field of LF/other Vector Borne Communicable Diseases of Public Health Importance.
ii. To undertake Advocacy Workshop on LF & MDA for Medical Officers/Biologists/District Programme Officers of U.P.
iii. To act as Nodal Officer for surveillance of YEP in Sonebhadra & Mirzapur Districts of U.P.
iv. To continue the study titled "Duration of clearance of circulating Filarial Antigenimia after DEC + Alb therapy in which Filarial Antigen Card test should be carried out to detect the clearance of filarial Antigen.
v. To undertake study titled "Orthopaedic manifestations in the patients of Lymphatic Filariasis" in which we will differentiate between the patients of actual Lymphatic Filariasis from bone & joints diseases with the help of questionnaire.

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

5.19 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 three rounds of NID/SNID a total of 93 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	358	30	
2.	Malaria (MP slides) Test	345	00(*P. vivax*) 0 (PF)	
3.	Water examination	Nil	Nil	
4.	Cholera test	Nil	Nil	

Pulse Polio Programme (IPPI) in three rounds of NID/SNID a total of 93 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.

Outbreak Investigation

Fever outbreak investigation at Ramgrah and Mundawar area of Alwar District for 14 days (20-09-16 to 03-10-16)

Project Field evaluation of DuraNet LLIN against Malaria vector

Selection of PHC, Haldina and Sub-Center Lily and Haldian under Malakhera Block of Alwar was carried out during 22/11/2016 to 25/11/2016.

6. Outbreak Investigations

1. Public Health Surveillance in Simhasth 2016 Ujjain, Madhya Pradesh by NCDC Team

Director General of Health Services Government of India directed National Centre for Disease Control New Delhi to send a team in to Simhasth 2016 Ujjain Madhya Pradesh for Public Health Surveillance. Simhasth is a religious mass gathering, held in the bank of Shipra River every 12 year. It is one of the biggest human mass gathering on Earth .About 5 Crore people visited in Simhasth from 22nd April to 21st May 2016.And to 2,71,121 people, health care was served by 42 permanent and temporary hospital located in zones and sectors.18480 patients were admitted in these zone and sector hospitals .No major outbreak was detected. One natural calamity occurred in which 7 people died and 50 injured due to heavy rain.

Such mass gathering are consider to have potential for public health incident, outbreak and causality. It increase demand of existing system.so from NCDC Additional Director Dr. C.S.Agrawal ,Officiating NPO Dr. Pradeep Khasnobis, SSO Dr. SheelaMeena visited the Mela site prior to beginning of KumbhMela and set up an indicator based surveillance system integrated with IDSP reporting system with the help of district health administration. A standardised reporting format was developed and sentinel reporting sites were mapped out. NCDC Assistant Directors and Epidemic Intelligence Service (EIS) Officers were deployed on rotation for supporting public health surveillance and response in Simhastha, Ujjain during whole mela period. NCDC and GDD team was always on call or taking daily updates from the field and supported field teams. Daily reporting was done from 42 reporting units. District surveillance unit compiled daily zonal and sector wise reports and results were shared with the surveillance team for analysis and planning response. Officers visited reporting sites on daily basis to support the flow of data, checked the data quality and completeness, looked for clustering of cases and sensitized medical officer and health staff about case definition to make uniform provisional diagnosis.

2. Outbreak Investigation of Acute Gastroenteritis at a Residential School Associated with Consumption of Curd, Mirzapur District, Uttar Pradesh, India – February 2017

Authors: Rajesh Sahu[1], *A. Ray*[1], *R. Singh*[3], *V. Kumar*[3], S. *Venkatesh*[1], C.S. Aggarwal[1], A.K. Pandey[3], P. *Khasnobis*[1]
[1]National Centre for Disease Control, New Delhi, [3]State Surveillance Office, (IDSP), Uttar Pradesh

Background: There were approximately 600 million foodborne illnesses and 420,000 deaths in 2010 globally. In 2015, acute diarrheal diseases and food-poisoning accounted for 778/1935 (40%) of outbreaks in India. A suspected food-poisoning outbreak occurred in a residential school in Mirzapur, India in February 2017. We investigated to describe epidemiology, identify risk factors, and recommend preventive measures.

Methods: We defined a case as abdominal pain, vomiting, or diarrhea (≥3 loose stools in 24 hours) in a school resident during 1-2 February 2017. We searched for cases by reviewing registers at the school and nearby health facilities. We also did active case search on campus. We conducted retrospective cohort study among students with multivariate analysis. Two stool samples were sent for microbiological testing. We also assessed food sources and food handlers.

Results: Among 468 students interviewed (93% response rate), we identified 204 cases (58% male) with 44% attack rate. Median age was 14 years (range=10-18 years). Symptoms included abdominal pain (85%), vomiting (44%), diarrhea (40%), dizziness (38%), and fever (18%). Most (65%) cases recovered within 24 hours. There were no deaths.

Consuming curd (relative risk [RR]=15.4, 95% confidence interval [CI]=5.8-40.4), apple (RR=2.5, 95% CI=1.5-3.4) and panjiri(sweetened wheat flour)(RR=3.7, 95% CI=2.1-6.7) were associated with illness. All were served as prasad, a religious offering. Only consumption of sweetened curd (adjusted odds ratio=36.1, 95% CI=12.1-107.8) was significantly associated with illness after multiple logistic regression. Median incubation period was 9 hours (range=1.5 hours-2 days). No organisms were isolated from stool samples. Curd from the vendor was made from raw milk. There were no illnesses among food-handlers.

Conclusion: This was an outbreak of acute gastroenteritis in a residential school associated with consumption of curd likely contaminated with preformed toxins. We recommend boiling or pasteurization of milk, curdling under aseptic conditions, and health education of food-handlers.

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3. Outbreak investigation of acute diarrheal disease during a religious festival associated with drinking contaminated pipeline water, Radhakund, Uttar Pradesh, India – November 2016

Authors: Rajesh Sahu[1], *S. Choudhary*[1], *T. Dikid*[1], *S.V. Sodha*[2], C.S. Aggarwal[1], A.K. Pandey[3], *R. Yadav*[2], *E. Saroha*[2], S. *Venkatesh*[1], P. *Khasnobis*[1]
[1]National Centre for Disease Control, New Delhi, [2] Centers for Disease Control and Prevention (CDC), India, [3]State Surveillance Office, (IDSP), Uttar Pradesh

Background: In 2015, there were >12 million acute diarrheal disease (ADD) cases with 1216 deaths reported in India with 75,347 cases and 320 deaths from Uttar Pradesh state. A suspected ADD outbreak was reported from Radhakund, Uttar-Pradesh (population = 7511) on November 11, 2016 during a religious festival with >10,000 tourists. We investigated to describe the epidemiology, identify risk factors, and recommend preventive measures.

Methods: We defined a suspect case as ≥3 loose stools within 24 hours in a resident of Radhakund between October 31 and November 11, 2016. We identified cases by reviewing hospital records and by house-to-house survey. We conducted a 1:2 unmatched case-control study using a structured questionnaire to identify risk factors. Stool for cultures were not collected by hospitals and no active cases were present during the investigation for testing. We assessedwater-supply and sanitation of the town and tested water samples for faecal contamination.

Results: We identified 339 cases (69% female); 285 (84%) were tourists.Median age was 60 years (range 1-80 years).There were 117 (35%) hospitalizations and two deaths. Symptoms reported included diarrhea (100%), vomiting (94%), abdominal pain (23%), and fever (3%). Among 44 cases and 81 controls, only drinking water from pipeline-A(aOR=12.7 [95% CI = 4.9 – 33.0]) and illiteracy (aOR=4.1 [95% CI = 1.5 – 11.3]) were associated with illness in multivariate analysis. We observed sewage overflow from community toilets near tube-wells supplying pipeline-A. Pipeline-A is >40 years old with frequent cracks and leaks. Among four water samples from pipeline-A, two were positive for *Vibrio cholerae*.

Conclusion: This was an ADD outbreak during a mass gathering in Radhakund associated with drinking water from a contaminated pipeline. We recommended chlorination of water, relocation of public toilets away from tube-wells, repair of pipeline-A, routine water surveillance and enhanced sanitation facilities for tourists.

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4. Outbreak investigation of acute diarrhoeal disease - Nagpur District, Maharashtra, India, 2016.

Authors: Prasoon Sheoran[1]A Rammayyan[1], HK Shukla[1],T Dikid[1], R Thakre[2],Y Sawai[2], C S Aggarwal[1],SV Sodha[3], R Yadav[3], S Kulkarni[1]
[1] National Centre for Disease Control,Delhi, India.[2]Health Department, ZilaParishad, Nagpur, Maharashtra, India.[3]Centre for Disease Control and Prevention, Delhi, India

Background: Acute diarrhoeal disease (ADD) accounts for 12 millioncases and 1.87 million deaths annually in India.On 13 July 2016, an ADD outbreak was reported fromSawargaonvillagefrom Nagpur District, Maharashtra. We investigatedto describe the epidemiology and provide recommendations.

Methods: We defineda case as loose stools in a resident of Sawargaon village between 9 - 31 July 2016. We searched for cases by enhanced passive surveillance. We collectedstool samples for bacterial culture and tested water from multiple water sources for faecal coliforms. We alsoreviewedsanitary practices and rainfall data inSawargaon village.

Result: We identified 889 cases (51% female)with 280 hospitalizations (31%) and two deaths.Median age was 27 years (range 6 months-90 years). Attack rate was 10%. Cases starteda week after heavy

rainson 11 July.Two of nine stool samples tested positive for *Vibrio cholerae* O1 serogroup and 16water samples were positive forfaecal coliforms from multiple sources including wells, handpumps, and taps.Among all households in Sawargaon village, 24% had no toilets and open defecation was commonly observed on the river bed at Sawargaon. District authorities started chlorination of water sources on 13 July and cases declined soon after.

Conclusion: This ADD outbreak in Sawargaonvillagewas likely associated with drinking contaminated ground water. Contaminationprobably occurred afterheavy rainfall in this opendefecation area. We recommended providing chlorinateddrinking water, promoting safesanitation practices and building more public and private toilets.

5. Outbreak investigation of rubella and measles in southeast district, Delhi, India, June-July 2016

Authors: Sushma Choudhary[1], F. Zaffar[1], S.Sodha[2], E.Saroha[2], M.Dhuria[1],C. S. Aggarwal[1], S.Venkatesh[1], C. Singh[3]

[1] National Centre of Disease Control, India[2] Centers for Disease Control and Prevention (CDC), India [3]Directorate General of Health Services, Delhi, India

Background: India targets measles elimination and rubella control by 2020 but reported 10,059 measles and 41,460 rubella cases in 2014. In Delhi, measles-containing vaccine (MCV1) is offered at 9 months and measles-mumps-rubella (MMR) vaccine at 15 months. On May 6, 2016, an outbreak of fever and rash in migrant community within an urban slum of Delhi southeast district was reported. We investigated to describe the outbreak, assess vaccination coverage, and recommend prevention and control measures.

Methods: We defined a case as fever and maculo-papular rash between March 1 and May 30, 2016 in a Delhi southeast district resident. We did house-to-house survey and collected blood samples from 10 cases for measles and rubella IgM antibody testing. We assessed vaccination coverage of 12-35 month-old children by stratified sampling with calculated sample size of 102 per birth cohort.

Results: Among 48 cases (56% female), median age was 33.5 months (range: 4 months-20 years). There were two hospitalizations (4%) and no deaths. Among case-patients, 12 (25%) received MCV1, none MMR, and 36 (75%) vitamin A. All ten blood samples were positive (eight rubella IgM, two measles IgM). Among eligible 12-23 month-olds, 61% (95% CI=51%–70% received MCV1, 81% (95% CI=68%-91%) MMR, and 34 (95% CI=24%-43%) vitamin A. Among 24-35 month-olds, 78% (95% CI=69%-86%) received MCV1, 69% (95% CI=59%-77%) MMR, and 69 (95% CI=58%-77%) vitamin A. Reasons for non-vaccination reported by mothers of 74 unvaccinated children included unawareness of vaccine benefits (31%), sick child (26%), and missing immunization record (15%). We observed deficient cold chain in vaccine depots and history of MMR stockout from November 2013 to July 2014.

Conclusions: We confirmed this mixed outbreak of rubella and measles in a migrant urban community. We recommend increasing cold chain accessibility to session sites, availability of immunization records, community awareness about vaccination benefits and contraindications.

6. Investigation of mixed outbreak of Rubella and Measles in Govindpuri and Harkesh Nagar areas of southeast district, Delhi, June-July 2016

Introduction- On 6th may 2016,18 cases of fever and rash were reported to IDSP Delhi by SMO NPSP Delhi1 fromGovindpuri area of southeast district of Delhi .On 31st May a team comprising of 2 EIS Officers was deployed by HOD epid., NCDC to investigate the outbreak. Team visited the area from 1st th to 10th July 2016 with the objectives to describe the epidemiological characteristics of the outbreak, assess cold chain, vaccination coverage , to recommend control measures and to prevent future outbreaks.

Govindpuri is a re-settlement colony located in the centre of southeast district of Delhi. Govindpuri is divided into Balmukundkhand ,Girinagar, 16 lanes numbered 1-16, Govindpuri extension, adjacent to Govindpuri is a settled slum(Nehru and Navjeevan camp) and Harkeshnagar which is also a re-settlement colony.

Methods- Passive and Active case search:Passive case search was done by reviewing OPD records of catering dispensaries (DGD Kalkaji and MCWC Kalkaji) of the affected area. Active house to house case search was done with the help of anganwadi workers

Assessment of cold chain: We assessed cold chain using checklist. Vaccine depots of the two health centres and six immunization sessions were observed for cold chain and immunization practices

Vaccine coverage survey: We did coverage survey for measles dose one (MCV) and measles-mumps-rubella(MMR) in the slum of Govindpuri having population of 17,416. Population catered by 17 anganwadi centers was considered as 17 strata, stratified sampling technique was used with a sample size of 102 from each age group ie.12-23 and 24-35 months.Assessment was based on vaccination card and Maternal recall.

Laboratory Investigation: Ten serum samples were sent to National Measles Laboratory, NCDC , Delhi for IgM ELISA testing for Measles and Rubella

Results- Total 48 cases were identified in Govindpuri and Harkesh nagar area during the outbreak period , of them 27(56%) were females, 30(63%) were under fives, median age was 33.5 months (range 4 months to 20 years). Two cases were hospitalized for post measles pneumonia. No death was reported. Among cases, 12 (25%) received MCV1, none MMR, and 36 (75%) vitamin A

Cold chain was found deficient, lacking equipments(ILR, Deep freezers etc.).MMR was out of stock from November 2013 to July 2014.
Vaccine coverage survey in Govindpuri slum: Among eligible 12-23 month-olds, 61% (95% CI=51%–70%) received MCV1, 81% (95% CI=68%-91%) MMR, and 34% (95% CI=24%-43%) vitamin A. Among 24-35 month-olds, 78% (95% CI=69%-86%) received MCV1, 69% (95% CI=59%-77%) MMR, and 69% (95% CI=58%-77%) vitamin A.
Reasons for non-vaccination amongst 74 unvaccinated children included unawareness of vaccine benefits 23(31%), sick child 19(26%), and missing immunization record 11(15%).
Lab Investigations: Out of ten serum samples tested, eight were positive for rubella IgM and two for measles IgM

Conclusion and Recommendations: It was a mixed outbreak of rubella and measlesbetween March-May 2016 occurred due to deficient cold chain, lack of routine immunization services and migratory behavior of population .Vaccination only by special immunization campaigns is not sufficient to achieve full immunization coverage.

Recommends: Increasing access to session sites, improving cold chain, increasing availability of immunization records, improving MCV1,MMR, and vitamin A coverage, increasing community awareness about vaccination benefits and contraindications. Mission Indradhanush campaign targeting children upto two years may consider children upto five years.

7. 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 37054 books and bound journals, 123 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.

Details of Periodicals/Books/Newspapers/Magazines available in Library During 2016-17:

1.	(a) Newspapers (English/Hindi)	:	26
	(b) Magazines (English/Hindi)	:	23
2.	Books	:	85
3.	Administrative Books	:	149
4.	MPH Dissertation/Thesis	:	02

8. Visits of Dignitaries and Experts

- Dr. Henk Bekedam, WHO Representative to India visited NCDC on 30.05.2016 to familiar about activities carried out by NCDC, interact with faculty. He discussed and explored future collaborative activities for strengthening key programme area under NCDC.
- Shri J.P. Nadda, Hon'ble Union Minister of Health & Family Welfare dedicated to the nation Epidemiology & Disease Control Complex, Administrative Block and inaugurated the Staff Quarters (Type-II) and unveiled plaque commemorating "Eradication of YAWS from India" on 30.09.2016
- Smt Anupriya Patel, Hon'ble Minister of State, Ministry of Health & Family Welfare, inaugurated the newly shifted branch of NCDC, Varanasi from Bhelupur to Dehlwaria in October, 2016
- Dr Rosa M. Peran I Sala, Senior Policy Advisor, Division of International Affairs Ministry of Health, Welfare & Sport, The Netherlands visited NCDC, Delhi on 21.12.2016
- His Excellency Dr Myint Htwe, Minister of Health & Sports Myanmar, along with a delegation, visited NCDC on 14.03.2017

9. Visits of NCDC Officers

Dr Sunil Gupta, Addl Director:

- Attended WHO supported Bi-regional consultation on AMR in Asia at Tokyo Japan from 14th to 15th April 2016
- Attended annual review Meeting of IDSP state surveillance officers at Jaipur(Rajasthan) from 8th to 10th June 2016
- Attended annual conference of Indian Society of Malaria and other Communicable Diseases held at Bangalore from 10th to 12th June 2016
- Participated in the WHO supported workshop on Use of WHONet software for AMR surveillance held during 27th to 29th July 2016 at Hotel Four Points Sheraton ,New Delhi
- Attended WHO intercountry meeting at WHO SEARO, New Delhi dated 9th Sept 2016 on Use of IT in AMR surveillance
- Attended the WHO supported national Workshop for integration of Influenza surveillance at Hotel Lalit, New Delhi from 4th to 5th Oct 2016
- visited Guru Ram Rai Institute, Dehradun and delivered a lecture dated 3rd Dec., 2016 on Influenza Surveillance
- Attended Expert meeting for developing National Action Plan on AMR in Vey sector at Indian council of agricultural research , Pusa Campus , Delhi dated 05.12.16
- Attended BRICS countries meeting on disease surveillance and AMR dated 15 & 16 Dec. 2016 at Hotel lalit ,New Delhi organized by MOHFW
- Attended Indo-Netherland Joint Meeting on AMR held at residence of Netherland ambassador, New Delhi dated 19th Dec 16
- Attended AMR meeting organized by Neeti Foundation at India Habitat centre dated 20th Dec 2016
- Attended the FAO-ICAR collaborative meeting on developing national action plan on AMR dated 27th Dec 2017 at Pusa campus ICAR, New Delhi
- Attended the meeting on AMR organized at Bangalore by ICAR/FAO/NIVEDI from 18th – 19th January 2017
- Attended an Indo-Dutch Teleconference on AMR on 1st February 2017 at Netherland Embassy.
- Attended the National Conference of Hospital Infection Society of India from 9th – 10th February 2017 and delivered a talk on : Country response , AMR containment
- Attended a two day meeting of researchers organized by FAO/ICAR at Central Institute for Fisheries Technology, CIFT, Kochi on 27-28 March 2017 to discuss the research needs, capabilities and priorities for AMR in India

Dr. Charu Prakash, Additional Director

- Attended workshop on Biorisk Management (BRM) as per GAP-III Implementation for Diagnostic facilities from 28th March to 1st April 2016 at Bangkok, Thailand.
- Attended workshop on Strengthening capacity and internal quality assurance for SEAR Measles and Rubella laboratory network from 15th -20th August 2016 at Thimpu, Bhutan.

Dr Sandhya Kabra, Additional Director & In charge:

- Visited districts Kanchipurum and Cuddalore of Tamilnadu along with CDC consultants for field review and participated in a training workshop in Chennai during 20th - 23rd June 2016.
- Visited Gujarat to meet Health Secretary to discuss implementation of Quality Management of system in district laboratories on 12th August 2016.
- Visited Tamil Nadu during October 2016 for coordination for baseline laboratory assessment
- Visited Chennai from 7th – 11th November 2016 for assessment of Tamil Nadu District labs and Medical Colleges.
- Visited Ranchi from 17th-18th November 2016 regarding advocacy Meeting with Additional Chief Secretary for strengthening of laboratories and system assessment.
- Visited Bhopal, Madhya Pradesh from 15th – 16th December 2016 for advocacy meeting for lab assessment and systems lab assessment and training of experts (approx. 45) in F-LAT

visited Ranchi, Jharkhand from 16th – 19th January 2017 for assessment of labs in district hospitals and medical colleges.

- Visited Chennai, Tamil Nadu from 13th – 14th and 16th – 17th February 2017 for wet lab Microbiologists training workshop. This training workshop was attended by 15 district Microbiologists, 10 Medical College faculty members, PGs and other staff.
- Visited Vadodara on 15th March 2017 to assess one lab of Vadodara to develop as Model central lab with focus on AMR, HAI & BMW.
- Visited Damoh, Katni, Jabalpur and Narsinghpur, Madhya Pradesh from 20th – 24th March 2017 for baseline assessment of laboratories at district labs as a part of the central assessment of 51 districts and 6 Medical Colleges.

Dr Simrita Singh, Joint Director:

- Attended "Foundation for Quality India (FQI) 150th NABET accredited certificate course" in ISO15189:2012 Internal Auditors and Quality Management System during 8th-11th August 2016 at NCDC,Delhi
- Attended "National Workshop on Influenza Surveillance" organized by WHO with the goal of integrating the 12 IDSP influenza Laboratories and the 6 ICMR laboratories to further strengthen the Influenza Surveillance system in the Country during 4th -6th October 2016 at Hotel Lalit, New Delhi
- Attended symposium on Antibiotic Resistance Organized by WHO on 17th November 2016 at LHMC, Delhi
- Headed the Central Health Team to investigate the outbreak of H5N1 at Memnagar Rescue Centre, Ahmedabad, Gujarat during January2017

Dr Partha Rakshit, Deputy Director:

- Visited Eastern & North Eastern India to assess various labs in for inclusion as network labs under National Viral Hepatitis Surveillance Programme
- Visited Jakarta April 2016 for Regional Action Plan for SEARO countries during
- Visited Mumbai on 28th July 2016 for the World Hepatitis Day
- Visited Tamil Nadu in November 2016 to assess district hospitals labs

Dr Sarika Jain, Asstt Director

- Attended the meeting entitled: AMR research innovation: addressing India's priorities at India Habitat Centre, New Delhi dated 7th Dec 2016 organized by ICMR
- Attended the Workshop on Capacity Building and strengthening of Hospital Infection Control on 14th -15th Dec. 2016 organized by AIIMS and ICMR at AIIMS, New Delhi
- Attended an Indo-Dutch Teleconference on AMR on 1st February 2017 at Netherland Embassy.

Dr. Purva Pankaj Sarkate. Assistant Director

- Attendend workshop on Biorisk Management (BRM) as per GAP-III Implementation for Diagnostic facilities from 28th March to 1st April 2016 at Bangkok, Thailand.
- visited Ghugari Block Jabalpur, Madhya Pradesh from 18th -22nd August 2016 for investigation of Cholera outbreak.
- visited Maharajgunj, Uttar Pradesh from 17-19th April 2017 for investigation of Chicken pox outbreak.

Dr Sanjim Chadha, Assistant Director:

- Visited Telangana, Hyderabad during 2[1st]- 2[3rd] February 2017 to review the rising trends of cases and deaths related to H1N1.
- Attended "Foundation for Quality India (FQI) 150th NABET accredited certificate course" in ISO15189:2012 Internal Auditors and Quality Management System during 8th-11th August 2016 at NCDC,Delhi
- Attended "National Workshop on Influenza Surveillance" organized by WHO during 4th -6th October 2016 at Hotel Lalit, New Delhi
- Attended symposium on Antibiotic Resistance Organized by WHO on 17th November 2016 at LHMC, Delhi

- Attended workshop on Influenza Surveillance Data Management organised by WHO-SEARO and US CDC during 16th -20th January 2017 at Pune
- Attended workshop on "16S rRNA Sequence Based Bacterial Identification" during 14th -16th February 2017 at Gurgaon, India.

Dr. Mahesh Waghmare, Assistant Director

- attended the Workshop on Capacity Building and strengthening of Hospital Infection Control on 14th -15th Dec. 2016 organized by AIIMS and ICMR at AIIMS, New Delhi
- Gorakhpur, AES/JE – June-July 2016
- Rabies in animals, Delhi Zoo 2016
- AES, Malkangiri, Odisha Oct 2016
- H5N1, Odisha Dec 2016
- H5N1, Odisha Jan 2017

10. Training, Guest Lectures Organized

- Organized World Health Day – 2016 Seminar: A Healthy life despite diabetes (also exhibition & sessions on Nutrition and foot care) Beat Diabetes in collaboration with PGIMER/Dr. RML Hospital on 07.04.2016 at PGIMER Auditorium, Delhi
- Organized Symposium on the occasion of "World Day for Safety and Health at Work" (eminent expert from IBHAS and AIIMS participated and delivered the guest lectures) on 28.04.2016 at NCDC, Delhi
- Organised Guest Lecture on Health progress during MDS and way forward during SDG" by Dr. Premaramchandran, Former Advisor (Health) Planning Commission on 18.05.2016 at NCDC, Delhi
- Organized CME on "Use antimicrobials rationally to contain antimicrobial resistance" on 25.05.2016 at NCDC, Delhi
- Organized Hindi workshop for officials of NCDC on "Use of Hindi in Administrative and technical work " on 26 & 27 May, 2016 at NCDC, Delhi
- Organized World No Tobacco Day with the theme "Get Ready for Plain Packaging" on 30.05.2016 at NCDC, Delhi
- National Review workshop of Integrated Disease Surveillance Programme (IDSP) from 09 – 11 June, 2016 at Jaipur (Rajasthan)
- Filariology for Filaria Inspectors/Technicians from 13-24 June, 2016 at NCDC, Kozhikode
- Lecture and demonstration session on 'International Day for Yoga' for faculty and staff members of NCDC on 21.06.2016
- Workshop by Experts from CDC (Atlanta) on Acute Diarrheal Disease and Food Borne Disease Surveillance under the Chairmanship of Director, NCDC on 24.06.2016
- Training on 'Biosafety practices in Public Health Laboratories' on 28.06.2016
- Training Course on Elimination of Lymphatic Filariasis for Medical Officers/Biologists/distt. Programme Officers on 11.07.2016 at NCDC, Kozhikode
- Training Course on Filariology for Medical Officers/Biologists and Programme Officers from 18 – 22 July, 2016 at NCDC, Rajamahendravaram
- 107th Institute Day with the theme "Arboviral Diseases: India's Preparedness & Response" was celebrated with DGHS was Chief Guest, and Guests of Honour were Spl. DG, WR (WHO) and JS (KLS) on 29.07.2016
- BRICS workshop on "Strengthening Health Surveillance System and Best Practices" on 1st & 2nd August, 2016 at Bengaluru
- Foundation for Quality India (FQI) 150th NABET accredited certificate course in ISO 15189:2012 Internal Auditors and Quality Management System from 8 - 11 August, 2016
- Leadership training workshop for EIS Officers from 9-12 August, 2016
- Ten working days Training Course on Lymphatic Filariasis (LFE) for Fliaria Inspectors & Lab. Technician from from 19 – 30 Sept, 2016 at NCDC, Varanasi
- Hand-on-training workshop for State Data Mangers on Updataion of Meta Data & Data Standards (MDDS) codes and cleaning of master data on IDSP portal from 20 - 23 Sept, 2016
- Public Health Emergency Workshop on 21.09.2016
- Scientific Symposium on the theme "Rabies Educate, Vaccinate, Eliminate" during the World Rabies Day on 28.09.2016
- Three months Field Epidemiology Training Programme (Aug – Oct, 2016), concluded on 28.10.2016 at NCDC, Delhi
- Conducted a Workshop on 'Building the bridge between air quality, weather and health in India' at Juniper Hall, India Habitat centre in collaboration with National Institute of Health (NIH), USA & Centre for Diseases Control (CDC) Atlanta on 7th & 8th Nov 2016 to devise strategy for registry or surveillance by triangulation of data from hospitals and related stakeholder
- Scheduled training course in Lymphatic Filariasis Elimination for Medical Officers/Biologists/Distt Programme Officers from 07 – 11 Nov, 2016 at NCDC, Kozhikode
- Antibiotic Awareness Programme as part of World Antibiotic Awareness Week on 17.11.2016 at LHMC, New Delhi

- Training course in Filarialogy for Filaria Inspectors/Technicians/Health Inspectors from 21 Nov – 2 Dec, 2016 at Rajahmundry
- World Heart Day, organised a scientific session in which Prof. Dr. Sandeep Bansal renowned Cardiologist, Head of Cardiology, VMMC & Safdarjung Hospital delivered the lecture on "Preventable Approach for CVDs" and answered the quires of the participants. Mrs. Swapna Chaturvedi, Senior Dietician from AIIMS also focused on the diet to reduce the risk for cardiovascular disease on 24.11.2016
- Workshop on "Influenza and Zika Virus Disease Preparedness and Response" wherein participants were oriented on the latest guidelines of MoH/FW on Influenza, Zika Virus Disease and furtherance workshop can be organized for dissemination till district level on 24.11. 2016 at Dr. RML Hospital, New Delhi
- NCDC-IVRI Joint Orientation Workshop on Zoonotic Diseases of Public Health importance for medical and veterinary professionals from 28 Nov – 02 Dec, 2016
- Constitution Day was organised. On this occasion a Pledge to the Preamble of Indian Constitution was read out followed by a guest talk on 'Living by the Constitution - The Real Strength of India" delivered by Sh. M. Pracha, Senior Advocate on 29.11. 2016
- Workshop on Reprioritization of Diseases/Disease group under IDSP from 6 – 7 Dec, 2016
- National Workshop on Development of National Action Plan on Anti-microbial Resistance (NAP-AMR) from 8 – 9 Dec, 2016
- Symposium on "Capacity Building for Cancer Control in India" by Guest Speakers, Dr. Himanshu Chauhan, DADG (NCD) DGHS and Dr. T. Kannan, Head, Medial Onocology, SVIMS, Tirupati under the chairmanship of Dr. S.P. Kataria, Head, Deptt. of Medical Oncology, Safdarjung Hospital & VMCC, New Delhi on 20.12.2016
- Guest Lecture on "Containment of AMR uses One Health Approach - The Netherlands experience" by Dr Rosa M. Peran I Sala, Senior Policy Advisor, Ministry of Health, Welfare & Sport, The Netherlands on 21.12.2016
- Training course in Filariology for Filaria Inspectors/Technician from 19 – 30 Dec, 2016 at NCDC, Kozhikode
- Training course in Filarialogy for Filaria Inspectors/Technicians/Health Inspectors 21 Nov – 2 Dec, 2016 at Rajahmundry
- Awareness programme on Digital Payment and Health for Officers, Faculty and Staff of NCDC on the occasion of Celebrations of New Year 2017 on 02.01.2017
- One Day Training Workshop on Emerging Infectious Diseases for SSOs of IDSP and RDs on 31.01.2017 at Nirman Bhawan /NCDC
- Training of Veterinary Officer at Zoonosis Division (PG students of National Diploma in Equine Husbandry Medicine & Surgery at RVC Centre & College, Meerut Cantt) on 31.01.2017
- One day National Seminar on Rheumatic Fever/Rheumatic Heart Disease jointly organized by DteGHS, NCDC and NIHFW on 02.02.2017 at NIHFW, New Delhi
- Joint Orientation training of zoonotic disease of public health importance for medical and veterinary professionals from 1 – 10 March, 2017 at NCDC, Bengaluru
- Organised a lecture regarding the new Biomedical Waste Managements rules for all the officers of laboratory divisions of NCDC on 07.03.2017
- "EQAS Workshop on HIV Testing" for technical officers & Lab. Technician of SRLs and Quality Managers of SACS on 7 & 8 March, 2017
- WHO In-country Fellowship Training Programme on "Prevention & Control of Communicable Disease for Para-medical Personnel of South-East Asia Region" from 15 March to 11 April, 2017
- Folk Media Campaign/Nukkad Natak show for HIV/AIDS awareness o 24.03.2017 at NCDC, Delhi
- Training on Biomedical Waste Management Rules, released by MoHFW, for all the officers, staff and daily wagers of the laboratory divisions of NCDC on 30.03.2017

11. Scientific Publications

- Shrivastava, A., Kumar, A., Thomas, JD., Laserson, KF., et al. Association of acute toxic encephalopathy with litchi consumption in an outbreak in Muzaffarpur, India, 2014: a case-control study. Lancet Glob Health. 2017; 5(4):e458-e466.
- Singh, Swati, Kaushal, A., **Gupta, Sunil.** and Kumar, A. (2016) Gene specific **i**mpedimetric bacterial DNA sensor for rheumatic heart disease, *Ind. J. Microbiol. (Springer)* DOI 10.1007/s12088-016-0620-6.
- Singh S, Kaushal A, **Gupta Sunil** and Kumar A (2016) Amperometric detection of pathogen causing rheumatic heart disease. *Cell. Mol. Biol. (Omics International)*62 (3): 1-3. DOI:10.41 72 / 1165 -158X .1000137
- Singh, S., Kaushal, A., Gautam, H., **Gupta, Sunil.** and Kumar, A. (2017) Ultrasensitive nanohybrid DNA sensor for detection of pathogen to prevent damage of heart valves, *Sensors and Actuators B Chemical (Elsevier Science)*,doi.org/10.1016/j.snb.2017.02.043
- 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, 65(8): 804-13; 2016.*
- Uma Sharma, Megha Singhal, Supriya Singh, Artee Chaudhary, Sunil Gupta, S. Venkatesh, Arvind Rai and Mohammad Husain. Early Screening of HIV-1 from Dried Blood Spots in Infants Born to HIV-1 Positive Mothers from North Indian States. *Clin Res HIV/AIDS, 3(1): 1032; 2016*
- Uma Sharma, Poonam Gupta, Megha Singhal, Supriya Singh, Sunil Gupta, S. Venkatesh, Arvind Rai and Mohammad Husain. Comparative Genetic Variability in HIV-1 Subtype C *nef* Gene in Early Age Groups of Infants. *Journal of Medical Virology, 2017.* DOI:10.1002/jmv.24820
- Sanjim Chadha, Simrita Singh, Manisha Batra, Thakur Datt, Sweta T. Kothari, G. Arun Kumar, Sunil Gupta, S. Venkatesh. Evaluation of a new commercial master mix for diagnosis of Influenza A H1N1 by real- time reverse transcriptase PCR in view of outbreak preparedness *Journal of Virological Methods* (Under review)
- P. Sharma, V. Mittal, M. Chhabra, R Kumari, et al. Molecular epidemiology and evolutionary analysis of dengue virus type 2, circulating in Delhi, India. Virus Disease. 2016;1-5
- P. Singh, M. Chhabra, P. Sharma, et al. Molecular epidemiology of Crimean-Congo hemorrhagic fever virus in India. Epidemiology and Infection. 2016; 144, (16):3422-3425.
- P. Singh, P. Sharma, S. Kumar, M. Chhabra, et al. Continued persistence of ECSA genotype with replacement of K211E in E1 gene of Chikungunya virus in Delhi from 2010 to 2014. Asian Pacific Journal of Tropical Disease, 2016; 6(7), 564-566.
- Zoonotic Diseases of Public Health Importance.2016; (Link: http://www.ncdc.gov.in/)
- R. Thakur, Y. Kumar, V. Singh, N. Gupta, V.B. Vaish and S Gupta. Serogroup distribution, antibiogram patterns and prevalence of ESBL production in Escherichia coli. Indian Journal of Medical Research,2016;143:521-524
- Y. Kumar, N. Gupta, V.B. Vaish and S. Gupta. Distribution trends and antibiogram pattern of Salmonella enterica serovar Newport in India. Indian Journal of Medical research.2016;144:82-86
- 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, 65(8): 804-13; 2016.
- Priyanka Singh Pankaj Sharma, Sachin Kumar, Mala Chhabra, M. Rizvi, V. Mittal, D. Bhattacharya, S. Venkatesh, Arvind Rai. Continued persistent of ECSA genotype with replacement of K211E in E1 gene of chikungunya virus in Delhi from 2010 to 2014
    - Asian Pacific Journal of Tropical Disease, 6(7): 564-566; 2016.
- Priyanka Singh, M. Chhabra, P. Sharma, R. Jaiswal, G. Singh, V. Mittal, A. Rai, S. Venkatesh. Molecular epidemiology of Crimean-Congo haemorrhagic fever virus in India Epidemiology and Infection, 2016
- Uma Sharma, Megha Singhal, Supriya Singh, Artee Chaudhary, Sunil Gupta, S. Venkatesh, Arvind Rai and Mohammad Husain. Early Screening of HIV-1 from Dried Blood Spots in Infants Born to HIV-1 Positive Mothers from North Indian States.
    - *Clin Res HIV/AIDS, 3(1): 1032; 2016*
- Uma Sharma, Poonam Gupta, Megha Singhal, Supriya Singh, Sunil Gupta, S. Venkatesh, Arvind Rai and Mohammad Husain. Comparative Genetic Variability in HIV-1 Subtype C nef Gene in Early Age Groups of Infants. Journal of Medical Virology, 2017. (In press)

12. Administration, Budget and Stores

Dr. Sandhya Kabra
Additional Director & Head (PBA)
Mr. Prakash Doval
Administrative Officer
Mr. A.K. Malhotra
Administrative Officer
Mr. Pankaj Kumar
Stores Officer

Planning, Budgeting & Administration is the back-bone of the NCDC. This is the pivotal point of all the activities.
Planning of Institute activities in relation to Five Year Plan and Annual Plan are envisaged in PRC Section. The PRC Section is also dealing with Officers matters, vigilance clearance, RTI, VIP references etc. During the year 2016-17, 83 Nos. of RTI and 10 Nos. of VIP References were dealt with in PRC Section.

Budgetary Component of Plan & Non Plan budget is looked after in Budget Section. Financial aspect of the employees pay & deduction and other related matter are dealt here. The Accounts Section is dealing with preparation of all salary bills, Medical, Tuition fees, OTA, TA, LTC etc.

The HRD Management is dealt in Establishment Section. As on 31.03.2017, the section is dealing 8 court cases, in CAT New Delhi-3, CAT Jabalpur-1, CAT Allahabad-2, High Court Kerala-1 and High Court Allahabad-1. During the year 2016-17, 11 recruitments are made under DR and 22 recruitments made under promotion quota. The Establishment is also dealing with Direct Recruitment, Promotions, Transfers.

NCDC Budget: 2016-17

Exp. Statement showing the B.E , R.E & Exp. In respect of NCDC for 2016-17

Sr. No.	Name of the Scheme	2016-17		
		BE	RE	Exp
1	NCDC (Non-Plan)	3540.00	2884.00	2736.28
	NCDC (Plan)	2118.00	1500.00	1397.87
	NCDC (Main Institution- NP+Plan)	5658.00	4384.00	4134.15
2	NCDC (Upgradation) (Revenue)	200.00	83.00	35.26
	NCDC (Upgradation) (Capital)	2620.00	2620.00	2614.00
3	Estt. of 30 branches branches (Incuding 8 existing branches of NCDC) in all States and one UT			
	Revnue	200.00	25.00	26.54
	Capital	386.00	100.00	0.00
4	National Rabies Control Programme	824.00	824.00	343.84
5	Leptospirosis Control Programme	65.00	65.00	8.14
6	Coordination of Prevention and control of Zoonotic Diseases			
		75.00	28.00	14.30
7	Viral Hepatitis	262.00	27.00	0.12
8	Anti Micro Resistance	158.00	100.00	83.25
	Total	**10448.00**	**8256.00**	**7259.60**

Stores Section

The Stores/Procurement Section is responsible for procurement of Chemicals, Diagnostic Kits, Machinery & Office Equipments, stationery/misc. items, liveries/ uniforms for Group D Staff, Ration for animals etc. by calling tenders/through Govt. Agencies by adopting procedures as laid down in Govt. purchase procedure. Stores Keeper is also responsible for issuing all these items and other related stationery & general items to all the Divisions/Sections of this Institute for their day to day requirements.

In order to achieve these objectives, the Section has been involved in the following activities during 2016-17:

- 323 Nos Supply Orders in the F.Y. 2016- 17. Total 273 Receipts/Supplies had been confirmed by the Stores Keeper as per Stores R.V. No. (Receipt Voucher No.)
- All the tenders are floated on NCDC website as well as CPP Portal for their wider publicity and for fetching most competitive rates is a recent effort from Stores, as per GFR Guidelines. Process already initiated for complete e-Procurement.

National Centre for Disease Control, ***Directorate General of Health Services***,
(Ministry of Health & Family Welfare, (Government of India),**Shamnath Marg, Delhi, Delhi - 110054**
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