सत्यमेव जयते

National Centre for Disease Control (NCDC)

Annual Report 2014 -15

National Centre for Disease Control
Directorate General of Health Services
(Ministry of Health & Family Welfare , Government of India)
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www.ncdc.gov.in

NCDC-Annual Report/2014-15

Directorate General of Health Services
Ministry of Health & Family Welfare
Government of India

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22- Sham Nath Marg, Delhi-110054
Tel: **00-11-23913148** Fax: **00-91-11-23922677** email: dirnicd@nic.in **www.ncdc.gov.in**

Scientific contents were compiled by Dr. S. Venkatesh and Dr. Charu Prakash based on inputs provided by respective heads Dr Veena Mittal, Dr Sunil Gupta, Dr Anil Kumar, Dr R.S. Sharma, Dr Arvind Rai, Dr S.K. Jain, Dr S. Marwah, Dr. Pradeep Khasnobis, Dr Sonia Gupta, Dr C.S. Aggarwal

Coordinated/ Compiled by Dr Artee, Dr Chhaya Chauhan , Dr Priyanka & Ms Uma Sharma & Dr Arvind Rai.

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.

Copied & Circulated by the Pankaj Kumar, Stores Officer, **National Centre for Disease Control**, 22- Shamnath Marg, Delhi-110054


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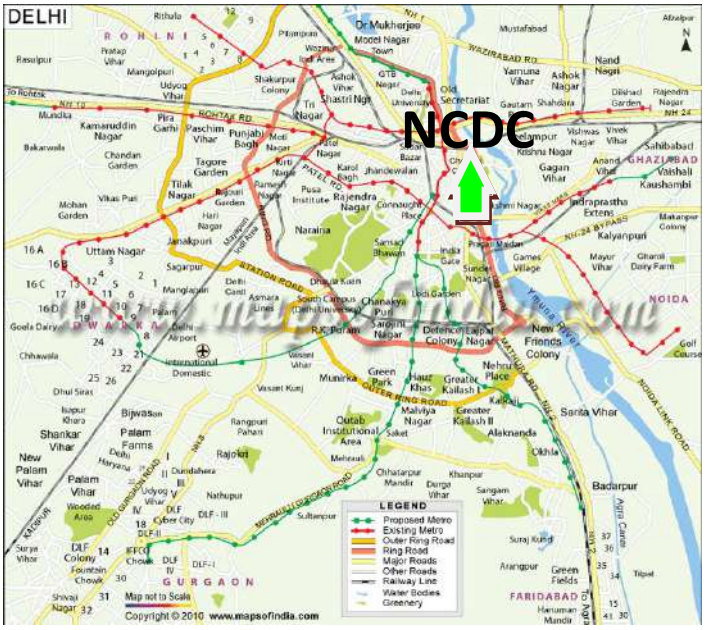
1. Introduction

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, and a newly-created centre for NCDs. 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).

In each division there are several sections and laboratories dealing with different 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.

Recently, Ministry of health has approved proposal for decentralized presence of NCDC by establishing NCDC branch in each state/UT.

- **Mandate of NCDC**

2. Mandate of NCDC

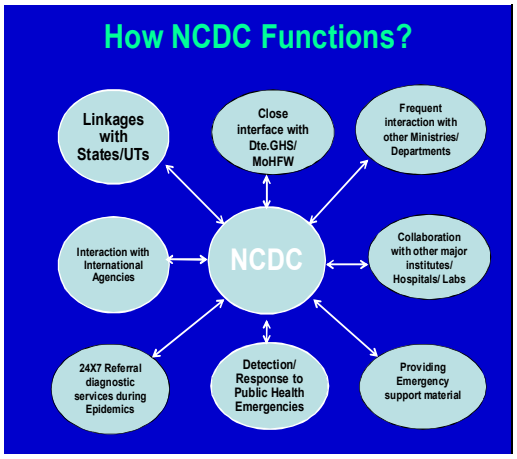
NCDC is envisaged as a *Centre-par-excellence* to give further impetus to the advancement of knowledge in prevention and control of communicable/ infectious diseases with specific focus on:

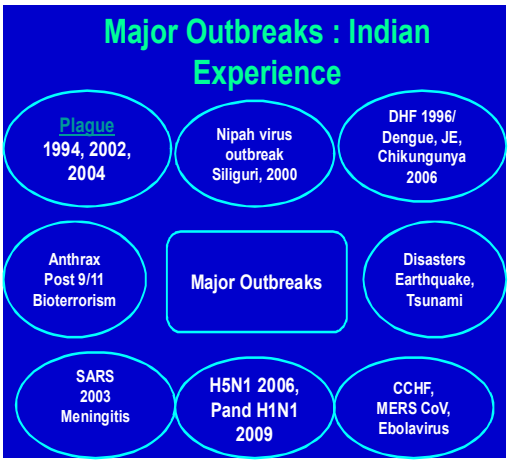
- **Countrywide surveillance of epidemic-prone communicable diseases**
- **Epidemic/ outbreak investigations and their containment**
- **Referral diagnostic support services**
- **Training & manpower development**
- **Technical advisory**
- **Applied & operational research**

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 NICD. 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.

- **Upgradation of NICD into NCDC**

3. Upgradation of NICD into NCDC

- NIC is a premier public health institute in the country tasked to meet the challenges of emerging and re-emerging diseases. The upgradation is essential as no major upgradation has taken place for decades. Laboratories are required to be strengthened through procurement of modern equipment to make the diagnostic services modernized, including induction of rapid diagnostic support services. Proposal also envisages creation of newer centres, newer divisions and upscaling of the existing ones to cope-up with the ever increasing horizon and magnitude of emerging, re-emerging and new diseases. The mandate of the Institute broadly covers three areas viz. services, trained health manpower development and research. The expected outcomes from proposed upgradation, amongst others, would include:

- Enhanced scope of referral diagnostic support services for disease outbreak investigators and networking of public health laboratories.
- Enhanced data management capacity under Integrated Disease surveillance.
- Enhanced capacity for development of trained manpower in public health.
- Trained, Central Rapid Response Teams (RRTs) available for 24x7 for disease outbreak control.
- Enhanced quality operational research for better diseases control.
- Preparedness against probable threats of bioterrorism.

NCDC upgradation: Progress made

- 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 HSCC has been engaged as DPR consultant and The National Buildings Construction Corporation (NBCC) as Executing Agency for construction of civil works and services.
- 103 new Scientific and 11 new administrative posts created under upgradation of NCDC.
- The construction work started in February, 2013 after obtaining final approval on building plans from North Delhi Municipal Corporation (NDMC) on 28th January, 2013.
- The Hon'ble HFM laid the Foundation Stone on 28.04.2013.
- 60% work has been completed till March, 2015.
- Further work is in advanced stages and is likely to be completed in 24 months.

Upgraded NCDC: New Centres/ Scientific Departments

(Approved vide O.M. No.T.14018/23/2009-PH II, dated 27th December, 2010, MoH &FW)

Central Administrative Complex

- Office of the Director of NCDC
- Central Administrative Wing
- Accounts & Budget Section
- Academic & Research Cell
- Planning & Coordination Cell
- Central Stores & Procurement Cell
- Information Technology (IT) Cell

Central Facilities

- Central Library/ Archival & *e*-Library
- Central Auditorium/Conference Complex
- Guest House & Hostel Complex
- Central Recreation Unit & Central Cafeteria
- Central Maintenance Wing & Other Supportive Services

Epidemiology & Disease Control Complex

1. **24x7 Disease Control Cell**
2. ***Centre for Integrated Disease Surveillance***
3. **Centre for Infectious Diseases**
   - Vector-borne & Other Arboviral /Exotic Diseases
   - Air-borne Respiratory Diseases
   - Blood-borne Diseases & STDs
   - Water/ food-borne Diseases
4. **Centre for Vaccine Preventable Diseases**
   - Polio/ Measles/MMR /Meningitis vaccination strategies
   - Rabies vaccination strategies
   - Viral Hepatitis vaccination policy

- Newer vaccines: vigilance & policies

6. Centre for International Health & Bioterrorism Prevention
- International Health, Health Intelligence & Communication
- International Health Regulations (IHR)
- Ethical & IPR Considerations
- Vigilance on Bioterrorism and Prevention Initiatives

7. Centre for Disaster Epidemiology & Emergency Response
- Post-disaster control of diseases
- Disaster Epidemiology & Management

8. Centre for Medical Informatics & Bio-statistics
- EDUSAT Earth Station & Information Technology Cell
- Central Computer Facility
- Bioinformatics & MIS Biostatistics & Data Analysis

9. Centre for Manpower Development
- Planning & coordination of National/ International/ WHO Trainings
- Organizing Workshops, Seminars, Meetings and Conferences

Referral Diagnostics & Lab Services Comlpex

Central Facilities
- 24x7 Central Sample Collection & LIMS-based *e*-reporting
- Central BSL-3/BSL-4 Facility
- Central Electron Microscopy Unit
- Central Instrumentation Facility
- **Central Animal House**

1 Centre for Viral Diseases & Vaccines
- Polio/ Enteroviruses Reference Laboratory
- Measles/ Respiratory Viruses Reference Laboratory
- National Nodal Lab for Endemic/Pandemic-prone Viruses
  (SARS, Corona, Nipah, Inf A H5N1, H1N1 & other emerging viruses)
- Congenital Viruses (Rubella, CMV, HSV) Laboratory
- Viral Hepatitis Laboratory

2 Centre for HIV/AIDS & Related Diseases
- National AIDS Reference Centre
- HIV Serology & Quality Control
- AIDS: Cellular Immunology Laboratory
- HIV: Molecular Diagnostic Laboratory
- VCTC: HIV/AIDS Counseling Centre

3. Centre for Arboviral & Zoonotic Diseases
- Arboviral/Exotic Viral Infections
- Plague Reference Laboratory
- Kala-azar & Toxoplasma Laboratory
- Laptospira Reference Laboratory
- Typhus/Rickettssial & Newer Zoonotic Infections
- Rabies Reference Laboratory

4. Centre for Bacterial Diseases & Drug Resistance
- Cholera/Typhoid & other Enteric Bacterial Infections
- Pulmonary & Extra-pulmonary Tuberculosis Laboratory
- Meningitis and other Respiratory Bacterial Infections
- Anaerobic Bacteriology
- Bacterial STDs, Chlamydia/ Mycoplasma Reference Lab
- Bacterial Drug Resistance Unit

5. Centre for Biotechnology & Molecular Diagnostics
- Molecular Diagnostics & DNA Fingerprinting of Disease Pathogens
- Gene Cloning & DNA Synthesis Laboratory
- Molecular Virology/Bacteriology Reference Laboratory
- Real-time PCR for Quantization & Prognostic Follow-up
- Drug Resistance Gene Monitoring Laboratory

6. Centre for Parasitic & Fungal Diseases

Human Parasitic Diseases
- Malarial/ Helminthic Infections
- Intestinal Parasites & Amoebiasis

Human Fungal Diseases

- Deep mycosis
- Superficial mycosis

7. Centre for Clinical Biochemistry & Toxicology

- Clinical Biochemistry/Hematology
- Environmental Toxicology
- IDD Reference Lab
- Protein Chemistry & Antigen Assays

8. Centre for Pathology & Immunohistology

- Clinical & Diagnostic Pathology
- Immunohistology

9. Centre for Medical Entomology & Vector Management Complex

Medical Entomology & Disease Ecology

- Vectors of Malaria, Dengue, JE, Filaria, Kala-azar, Ectoparasites
- Transmission dynamics & Vector Ecology
- Archival Museum

Integrated Vector Management

- Chemical Control of Disease Vectors
- Alternate methods of Vector Control
- Environmental management methods for Disease Control

- **National Health Programs & New Initiatives**

4.1 Integrated Disease Surveillance Program (IDSP)

Dr Pradeep Khasnobis
Sr CMO (NSFG) & Acting NPO
Dr Lata Kapoor
Deputy Director
Dr Himanshu Chauhan
Assistant Director
Dr. Saurabh Goel
Assistant Director
Dr Ruchi Jain
Assistant Director
Dr Jyoti
Assistant Director
Dr Nishant Kumar
Assistant Director
Dr Ganesh Lokhande
Assistant Director
Dr Pranay Verma
Assistant Director
Dr Sanket Kulkarni
Assistant Director
Dr Suhas Dhondore
Assistant Director
Dr Mangesh A Patil
Assistant Director
Dr Amol Patil
Assistant Director

Integrated Disease Surveillance Project (IDSP) was launched with World Bank assistance in November 2004. The project continues in the 12th Five Year Plan (2012-2017) with domestic budget as Integrated Disease Surveillance Programme under NHM for all States at an outlay of Rs 640.40 crores.

Project 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.

Current Status of IDSP Implementation

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.

Human Resources and Training

Considering the non-availability of health professionals in the field of epidemiology, microbiology, entomology and Veterinary Consultant 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, one Veterinary Consultant and one entomologist each at the State headquarters. The recruitment of 408 epidemiologists, 117 microbiologists 22 entomologists and 4 Veterinary Consultants has been completed under IDSP till March 2015. Training of State/District Surveillance Teams (Training of Trainers) and Rapid Response Teams (RRTs) has been completed in all 36 States/UTs. 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) has been initiated for the District Surveillance Officers. 712 District Surveillance Officers have already been trained in this special 2- week FETP.

IT Network

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. This portal based reporting from the district level upwards makes IT network the backbone of IDSP. An extensive network 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) is in place under the programme and efforts to improve it are ongoing.

SHOC (Strategic Health Operations Centre)

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

- The objective of Strategic Health Operation Centre (SHOC) are to strengthen disease surveillance & response using latest information, communication technology and to act as a command centre to manage disease outbreaks, public health emergencies or disaster situation. The SHOC was activated to manage the upsurge in H1N1 cases in the Country since January 2015. The situation was constantly monitored by the SHOC duty officers and periodically reviewed by the response leadership.

Data Management

Routine Reporting*:* Under IDSP data are 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 to enable early detection of any deviations and appropriate response by RRTs. 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 90% districts in the country report weekly surveillance data on epidemic prone diseases through e-mail or portal.

Outbreak Management

In addition, States and districts have been asked to notify the outbreaks immediately to the system. On an average of 30-35 outbreaks are reported every week to Central Surveillance Unit (CSU). From 553 outbreaks of epidemic prone diseases that were reported and responded through IDSP in 2008, the number has gone up to 1562 outbreaks in 2014. 363 outbreaks in 2015 have been reported and responded to in 2015 till 29th March. Officers from IDSP CSU have been actively involved in responding to outbreaks and providing support to SSUs and DSUs. In the report period, the notable outbreaks include:

- Avian Influenza outbreak in 3 districts of Kerala (Kottayam, Pathnamthitta and Allapuzha) and Avian Influenza outbreak in Chandigarh that occurred in month of December 2014.
- Hepatitis E outbreaks at Sambalpur, Odisha and Jaipur, Rajasthan in the month of December 2014.
- H1N1 outbreak at Hyderabad, Telangana in January 2015
- Crimean Congo Hemorrhagic Fever (CCHF) outbreaks in Jodhpur, Rajasthan and Noida Uttar Pradesh in Dec 2014 - January 2015

Media scanning and verification cell

Media scanning and verification cell was established under IDSP in July 2008 to detect and share media alerts with the concerned States/Districts for verification and response. A total of 3116 health alerts have been detected till March 2015 since its establishment in July 2008.Majority of alerts were related to diarrheal, food borne and vector borne diseases. This is an important mechanism for event based surveillance in the Country.

State-wise total no. of outbreaks reported by all States/UTs in 2008, 2009, 2010, 2011, 2012, 2013, 2014 & 2015 (upto week ending 29.03.2015). * No report sent by State/UTs.

Sl. No.	State / UTs	Year								Total
		2008	2009	2010	2011	2012	2013	2014	2015	
1	Andaman & Nicobar	0	0	0	0	0	1			1
2	Andhra Pradesh	72	64	75	91	97	123	64	11	597
3	Arunachal Pradesh	6	6	6	10	9	7	8	1	53
4	Assam	16	30	53	97	75	70	84	20	445
5	Bihar	1	6	21	144	181	134	86	29	602
6	Chandigarh	3	3	2	1	5	0			14
7	Chhattisgarh	1	7	2	55	45	58	50	10	228
8	Dadra and Nagar Haveli	0	0	1	0	0	2	3	3	9
9	Daman & Diu	0	1	1	0	2	0		1	5
10	Delhi	3	1	0	3	1	4	4	4	20
11	Goa	2	3	0	2	1	8		2	18
12	Gujarat	24	49	83	150	102	117	109	26	660
13	Haryana	10	9	18	21	19	15	27	9	128
14	Himachal Pradesh	3	13	7	4	13	5	11	7	63
15	Jammu & Kashmir	*	*	2	23	43	54	33	5	160
16	Jharkhand	*	5	4	29	24	50	53	16	181
17	Karnataka	54	97	89	196	156	251	163	33	1039
18	Kerala	17	47	54	56	80	76	74	20	424
19	Lakshadweep	*	*	*	*	*	*	2		2
20	Madhya Pradesh	16	65	70	89	65	98	83	8	494
21	Maharashtra	99	27	65	141	215	256	205	35	1043
22	Manipur	1	2	2	4	1	4	4	1	19
23	Meghalaya	5	3	2	1	1	1	3	1	17
24	Mizoram	5	0	0	0	1	1	2	1	10
25	Nagaland	0	1	2	1	0	1	1		6
26	Odisha	17	38	19	55	36	113	87	5	370
27	Puducherry	3	2	4	1	2	0	5	1	18
28	Punjab	17	22	18	44	34	24	21	6	186
29	Rajasthan	8	43	84	68	41	33	33	11	321
30	Sikkim	3	0	2	4	1	3	3		16
31	Tamil Nadu	50	113	90	127	173	149	122	36	860
32	Telangana							7	5	12
33	Tripura	1	2	2	7	3	4	13	1	33
34	Uttar Pradesh	40	67	98	34	40	37	35	29	380
35	Uttarakhand	27	30	25	36	23	33	19	9	202
36	West Bengal	49	43	89	181	95	232	148	17	854
	Grand Total	553	799	990	1675	1584	1964	1562	363	9490

Disease-wise total no. of outbreaks reported by all States/UTs in 2008, 2009, 2010, 2011, 2012, 2013, 2014 and 2015 (up to week ending 29.03.2015)

S. No.	Diseases/Illness	Year								
		2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total**
1	Acute Diarrhoeal Disease	228	332	411	532	467	576	344	44	**2934**
2	Acute Encephalitis Syndrome	6	5	11	31	6	13	38		**110**
3	Acute Respiratory Illness	4	3	3	2	2		1		**15**
4	Anthrax	2	6	3	9	1	10	6		**37**
5	Chickenpox	12	45	47	70	100	121	96	51	**542**
6	Chikungunya	25	61	25	77	55	72	63	8	**386**
7	Cholera	20	34	34	58	94	96	38	3	**377**
8	Crimean-Congo Hemorrhagic Fever (CCHF)				2	1	8	6	4	**21**
9	Dengue	42	20	40	57	169	130	113	11	**582**
10	Diphtheria	1	1	1	5	4	4	7		**23**
11	Dysentery		1	3	9			1		**14**
12	Enteric Fever	6	10	10	12	8	1	19	3	**69**
13	Fever with Rash								6	**6**
14	Food Poisoning	50	120	184	305	255	370	306	77	**1667**
15	Influenza A H1N1					5	1		2	**8**
16	Influenza A H3N2					1				**1**
17	Influenza B					2	1			**3**
18	Jaundice								3	**3**
19	Kala-azar	1		3	6	1	1		1	**13**
20	Leptospirosis	6	3	6	14	11	12	6	1	**59**
21	Malaria	44	34	37	86	12	43	53	7	**316**
22	Measles	40	44	94	177	110	89	191	94	**839**
23	Meningitis	2	3	1	2					**8**
24	Mumps		2	3	10	19	25	17	11	**87**
25	Pertusis			1			1	1		**3**
26	Rubella		1	2	1	5	7	12	4	**32**
27	Scrub Typhus	3	1	1	4	9	4	4		**26**
28	Viral Fever/PUO	32	39	41	88	138	272	150	11	**771**
29	Viral Hepatitis	28	31	24	99	93	99	81	17	**472**
30	Others	1	3	5	19	16	8	9	5	**66**
	Total	**553**	**799**	**990**	**1675**	**1584**	**1964**	**1562**	**363**	**9490**

Others:- KFD, Alcohal Poisoning, Trichinellosis, Viral Exanthemas, Epidemic Dropsy, Hand Mouth & Foot Disease, Brucelosis

Strengthening of Laboratories

District laboratories are being strengthened for diagnosis of epidemic prone diseases in a phased manner. Till date 75 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 20 states(Gujarat, Punjab, Rajasthan, Uttarakhand, Karnataka, Tamil Nadu, Maharashtra, Andhra Pradesh, West Bengal, Bihar, Assam, Odisha, Tripura, Kerala, Haryana, Jammu & Kashmir, Manipur, Madhya Pradesh, Chhattisgarh and Jharkhand) involving 96 labs. NCDC is the nodal agency for H1N1 surveillance and laboratory testing. 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.

EBOLA Disease Surveillance

IDSP is undertaking the EBOLA Virus Disease (EVD) Surveillance for the country. Under this activity IDSP is carrying out EBOLA related Surveillance and monitoring through State/District surveillance units. IDSP assisted in RRT and TOT training of States for EVD.

Workshops and Trainings

- *Training on Data Management under IDSP* was organized for South Zone at Chennai on 29-30 January 2015. Participants were from five states namely Andhra Pradesh, Kerala, Puducherry, Tamil Nadu and Telangana. The technical sessions were on finance management, use of portal/ IDSP software, data reporting and analysis. Hands on training was held on IDSP portal and data reporting and analysis.
- Commemoration of ten years of functioning of IDSP was held on 26th November 2014. During the function, a book describing ten years of journey of IDSP was released by DGHS Prof. Jagdish Prasad. Previous Project Directors and National Programme Officers were also felicitated on this occasion. This was followed by an IDSP National Review Workshop held from 26th to 28th November 2014, at NCDC, Delhi. The workshop was attended by Director NCDC, representatives from CSU, SSOs and representatives from ISRO, NIC, etc.
- Capacity building workshop on Quality Management System (QMS) was held for IDSP state microbiologists from 17 states on 17th -20th November 2014.One officer each from NVBDCP and RNTCP also participated in this workshop.
- Half day training was organized for the Armed Forces Medical Services on Ebola Virus Disease on 31st October 2014. The training was attended by representatives from Armed Forces medical and paramedical staff and faculty from NCDC.
- The Integrated Disease Surveillance Project (IDSP) conducted a two-day regional training of state epidemiologists, data managers and finance consultants for the north-eastern states (Assam, Nagaland, Tripura, Manipur, Mizoram Meghalaya, Arunachal Pradesh and Sikkim) on 31st July and 1st August 2014 at the State Surveillance Unit (SSU), Assam. The trainees were trained on weekly data reporting, data analysis and report generation on the IDSP portal
- A three days meeting of stakeholders regarding sharing the final results of the Lab Assessments of the IDSP Public health labs conducted in November – December 2014 and to develop an action plan towards strengthening the identified gaps was held on 15-17 April 2014 at NCDC. State Surveillance Officers and State microbiologists (IDSP) from 13 states and 11 Assessors in addition to officers from IDSP, NCDC attended this meeting.
- SHOC Table Top Exercise: 24th – 28th, Feb, 2014 - As a follow-up to the Infectious Disease Outbreak Plan (IDOP) and SOP development which took place in 2013, a tabletop exercise was done in order to test and improve the Plan & SOPs developed by NCDC staff. The hands-on allowed NCDC staff to exercise their roles in the SHOC and learn more about the utility of the SHOC.

4.2 Yaws Eradication Programme (YEP)

Coordinator: **Division of Parasitic Diseases**

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 came down from 3571 in 1996 to 46 in 2003. No Yaws case reported from 2004 to till date.

Brief description of activities: House to house active search for cases was carried out in 2014-2015 in yaws endemic states and districts. No yaws case was found during search period. Sixth Independent Appraisal of Yaws Eradication Programme in India was held in May - June, 2014. As part of programme strategy, YEP has been repeatedly evaluated at various levels including ground level appraisal by independent experts from time to time. Earlier the programme has been evaluated five times by independent experts in the year 2000, 2002, 2004, 2005-06 and 2007.Sixth Independent Appraisal of Yaws Eradication Programme (YEP) was undertaken in two phases from 07 -15 May 2014 & 17-26 June 2014 with the objective to assess activities of Yaws Eradication Programme. Methodologies for appraisal of YEP were:

(a) Discussion with health officials;
(b) Verification of records;
(c) Visit to medical college, district hospital, CHC/PHC, subcentres and identified villages;
(d) Interaction with community members;
(e) Case verification including suspect case and old case, if any
(f) Verification of sero-survey at field level.

During these two phases, sixteen teams of experts visited sixteen districts of all ten states under YEP. Each team comprised of independent expert, representative from WHO country office, NCDC officer, state/ district representative and dermatologist from district. In phase I, eight teams visited Assam, Chhattisgarh (3 teams), Jharkhand, Gujarat, Madhya Pradesh and Maharashtra. In the phase II, eight teams carried out the appraisal in Andhra Pradesh (2 teams), Orissa (3 teams), Tamil Nadu (2teams), and Uttar Pradesh. Teams from Andhra Pradesh, Assam, Jharkhand, Tamil Nadu, Maharashtra, Gujarat, and Uttar Pradesh reported satisfaction on the activities carried by the respective state and districts. All these states have carried out YEP related activities regularly. The appraisal team reported good coverage during the search. In Chattisgarh, district Dhamtari & Mahasamund has done good work. All the teams recommended using IDSP Early Warning System (EWS) reporting format for yaws reporting.

The broad recommendations of the appraisal teams included:

- All the teams opined that it is right time to work towards achieving yaws eradication certificate from WHO as i) no case of yaws has been detected since 2004 despite of continuous active case search, routine monthly reporting and maintenance of rumour register at all levels, ii) cash award announced also did not bring up any confirmed case
- Sero-survey has been conducted as per the scientific protocol during 2009, 2010 and 2011. All the serum samples were found negative by RPR test, indicating cessation of yaws transmission in the country. So, there is no need to continue this activity further.
- Continuous training/orientation programme for all MOs, MPWs, LHVs and other paramedical staff be a part of routine activities of YEP.
- Involvement of other peripheral field staff of other departments, viz.,IDSP, NLEP, Anganwadi, Veterinary, forest officials Panchayat and Tribal welfare departments to be ensured.

- The state health officials including CDMO/CM&HO/CMO/DMO/DDHS/JDHS and PHC Medical Officers should continue to take proactive measures in the for implementing the activities of YEP. The programme activities should be actively reviewed at state HQ
- IEC campaign to be vigorously pursued like the "weekly haat survey". The members observed that at this fag end of the programme, it is essential that the programme becomes much more visible. Hence, "Cash Incentive scheme for Case and informer" to be given wide publicity through audio-visual media.
- In addition to the existing reporting all the erstwhile endemic districts of Yaws should start reporting

Yaws on IDSP Early Warning Signal (EWS) format to strengthen surveillance of yaws.
Subsequently, Seventh Meeting of the Task Force was held on 25th July 2014 under the chairmanship of DGHS. The task force periodically reviews and takes view on technical issues pertaining to the Yaws Eradication Programme (YEP).

The meeting was organized with the following objectives:

1. Review the implementation of the recommendation of last Task force meeting held on 11.02.2009.
2. Review the report of the 6th Independent appraisal held on 7th to 15th May and 17-26 June, 2014
3. Permission to initiate the process towards the declaration of Yaws eradication from India

The Task Force recommended that:

1. As inspite of continuous activities under the Yaws eradication programme such as active case search, rumour reporting & investigation as well as awareness generation in the community about Yaws disease and wide publicity of the cash incentive scheme, no new Yaws case has been detected in the country after November 2003. The sero-survey carried out as per scientific protocol could not find any sero-positivity in 1-5 years children indicating no transmission of Yaws infection in the community, "The country should prepare its case for getting eradication certificate from World Health Organization (WHO) and NCDC should initiate next steps in this direction".
2. State and district level review meetings should devote more time for discussion of YEP
3. Sero survey may be discontinued
4. IEC activities including awareness about cash incentive may be intensified.

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.

4.3 Gunieaworm Eradication Programme

Coordinator: *Division of Parasitic Diseases*

The department is keeping a watch on reported suspect cases of Guinaeworm disease throughout the country. In January 2015, on the request of Director, Public Health & Preventive Medicine, Tamil Nadu, a rumor case of Guinea worm reported from Sivaganga district of Tamil Nadu was investigated. A multidisciplinary committee comprising of senior faculty members of NCDC was constituted. It was found that the epidemiological & morphological features suggested that the case was not of Guinea worm, which was later identified as Dirofilaria repens by Indian Veterinary Research Institute, Bareilly.

4.4 Support to Elimination of Lymphatic Filariasis

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

Table: Details for morbidity management & night blood smears examined

Sr. no.	Activities undertaken	Nos examined
	Morbidity management	
1	NCDC branch Kozhikode for morbidity management	747
2	NCDC branch Rajahmundry for morbidity management	2710
3	NCDC branch Varanasi for morbidity management	3024
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	93 tested and 16 found positive for mf infection
2	Night blood smears were examined by NCDC branch Kozhikode for filaria infection.	276 tested none found positive for mf infection
3	Night blood smears were examined by NCDC branch Rajahmundry for filaria infection.	1104 tested and four found positive for *W. bancrofti* infection.
4	Night blood smears were examined by NCDC branch Varanasi filaria infection.	1444 tested and 31 found positive for *W. bancrofti* infection.
Cross checking of Night Blood smear for mf infection		
1	Night Blood Smears (NBS) received from various NFCP Units were cross-checked by Rajahmundry branch	1083 tested and only three slide was found positive for mf infection
2	Night Blood Smears (NBS) received from various NFCP Units were cross-checked by Kozhikode branch	876 tested and three was found positive for mf infection
3	Night Blood Smears (NBS) received from various NFCP Units were cross-checked by Varanasi branch	Nil

A team comprising of independent expert, representative from WHO country office, NCDC officer, state/district represnetative and a dermatologist from district carrying out Yaws appraisal

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 to be undertaken

- Surveillance for Containment of Antimicrobial Resistance in various geographical regions.
- Rationale use of antibiotics.
- Development & implementation of national infection control guidelines.
- Training and capacity building of professionals in relevant sectors.
- IEC for dissemination of information about rational use of antibiotics.
- Development of National Repository of Bacterial strains / cultures.

Current Status

- Two separate groups i.e. the Expert Working Group and the Steering Committee has been constituted under the chairmanship of the DGHS for implementation of the program.
- In the first phase of the program 10 Medical College Labs have been identified and the Memorandum of Understanding has been signed between these Colleges and NCDC, in the 2nd phase 3 more colleges have been included following which transfer of funds from MOH&FW IFD is underway.
- A common unified National Treatment Guidelines for treatment of different infectious diseases is in the process of finalization, which can serve as a guide to all the hospitals to formulate their own guidelines on basis of which physicians will be trained. In this regard there have been two meetings of the Expert Working Group in the months of February & March.
- Awareness guidelines are under preparation.
- The laboratory network will be expanded in a phased manner so as to include another 20 medical college laboratories so that finally we will have a 30 laboratory network.

4.6 National Program on Prevention & Control of Viral hepatitis in India

Coordinator: **Division of Microbiology**

The activities under this programare:

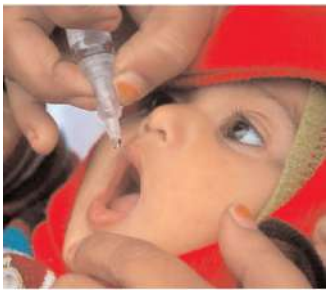
- Surveillance of viral hepatitis has been initiated to get the exact burden of various types of viral hepatitis (A,B,C,D,E) in different geographical locations . A network of ten laboratory is being set up for carrying out surveillance in hospital. Memorandum of Understanding has already been signed by the four medical colleges (SKIMS, Srinagar & MMC, Chennai, Patna medical college, Bihar, JIPMER Pondicherry) & surveillance activities are in the process of expansion to other six more colleges. The Prevention, Control and Treatment guidelines for viral hepatitis have been prepared by the expert working group and are under the final stages of development. Once developed it will help the health care provider to properly give treatment specially for HBV & HCV
- Handbook on Safe Injection practices on viral hepatitis was developed by expert working group.This will support to increase the awareness on prevention of blood transmitted pathogens like HBV, HCV, HIV etc. among health care providers & help in prevention & control of hepatitis B,C.
- NCDC has also developed fact sheets on Hepatitis A, B, C and E which along with Safe Injection Practices guidelines handbook is uploaded on official website of NCDC.
- A book on “Viral Hepatitis-The Silent Disease Fats and Treatment Guidelines” has been developed and uploaded at NCDC website for Experts comments and the book was sent for approval from DGHS for final printing in February, 2015.

4.7 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, 16685 contact stool specimens & 8406 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 from where 107 sewage samples were collected and tested. Positive isolates were tested at NCDC, Delhi. No wild poliovirus since October, 2010 has been reported.



A child receiving
polio vaccine drops in
Bhopal, Madhya Pradesh, January 2014

4.8 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.

4.9 Programme for Prevention and Control of Leptospirosis

Coordinator: **Division of Zoonosis**

Leptospirosis is public health problem in Gujarat, Kerala, Karnataka, Tamilnadu, 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 has been approved and 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. It is expected that there will be significant reduction in mortality and morbidity due to leptospirosis.

4.10 Intersectoral Coordination for Prevention and Control of Zoonotic Diseases

Coordinator: **Division of Zoonosis**

Major public health zoonotic disease in India are Rabies, Brucellosis, Toxoplasmosis, Cysticercosis, Echinoccoccosis, JE, Plague, Leptosprisois, Scrub typus and KFD. New emerging disease of public health importance is Avian Influenza, Nipah, Trypanosomiasis, CCHF and H1N1. Since the country has vector, susceptible host and conducive environment it also faces potential threat from Yellow fever, SARS, Hanta virus, Rift valley fever, Ebola and Marburg. 75% of emerging and reemerging infections are zoonotic. New pathogens (viruses) continue to emerge and spread across countries. For effective prevention and control of zoonotic diseases there is requirement of muti-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 Intersectoral Coordination for Prevention and Control of Zoonotic Diseases has been approved and is being implemented. The strategy includes strengthening of intersectoral 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. It is expected that continuous collaboration will be set up which will help in outbreak investigations and response and prevention and control of zoonoses.

4.11 Global Disease Detection-India Centre (GDD-IC)

Coordinator: **Division of Epidemiology**

Global Disease Detection-India Centre in collaboration with CDC Atlanta started functioning at NCDC in 2012. The objectives of GDD India Centre are to build epidemiological and laboratory capacity for detection and response to Emerging and Remerging infectious diseases. The focus is on development of human resources, both in epidemiology and laboratory and sharing best practices for detection and response to emerging infections, wherever required. NCDC in collaboration with the GDD-IC has operationalized Strategic Health Operations Centre (SHOC) for rapid response to infectious diseases notably for H1N1 response in the country and AES outbreak response in Muzaffarpur, Bihar in 2014.

Tabletop exercise conducted to test and improve the Plan and SOPs developed at NCDC during 24th–28th February 2014, by NCDC-GDD(IC)

- **Scientific Reports: NCDC Headquarters**

5.1 Division of Epidemiology

Dr Anil Kumar
Addl Director & Head
Dr Prabha Arora
Joint Director
Dr AK Bansal
Joint Director
Dr Aakash Srivastava
Joint Director
Dr Arti Bahl
Deputy Director
Dr Tenzin Dikit
Dry director
Dr Ananya Laskar
Assistant Director
Dr Meera Dhuria
Assistant Director
Dr Roopali Roy
Assistant Director
Dr Girish Makhija
Assistant Director
Dr Himanshoo Chauhan
Assistant Director

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 18 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.

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 started from 21July-17 October, 2014. Participants: Nepal and India).

2. One month Regional Training Programme on Prevention and Control of Communicable Diseases for paramedical personnel of South East Asia Region from 28th October to 24th November, 2014. A total of 9 participants from 2 countries (including 3 Timor Leste and 6 from India) attended the training.
3. A one-week epidemiology training was conducted in Guwahati and Mumbai in the month of March and June respectively for epidemiologists from western and North-Eastern states respectively. A total of 45 participants attended each training.
4. 10th batch of MPH (FE) was inaugurated on 1st Aug 2014 in which 2 students joined. Currently one student is continuing with the training course.
5. Third cohort of India EIS training has been started on 16th September 2014. A total 11 officers from Medical discipline are currently undergoing the training.
6. A three day training workshop on National Health Programmes was conducted from 21st – 23rd January 2015 for Public Health Specialists in the Central Health Services working in different health programmes, organisations and institutions around the country.
7. A three day workshop on Surveillance Evaluation was held from 28-30 January 2015 for the 3rd cohort of EIS officers in which their mentors and supervisors from Delhi evaluated them.
8. Dr. Shilpa Sharma undertook a five months internship from the period 15th January 15, 2014 to May 30, 2014.During this period she conducted a study on comparative assessment of water quality in high and low acute diarrheal diseases incidence block of Alwar district, Rajasthan and also participated in an outbreak investigation of Measles in Ghazipur District, NCR.

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

Meetings cum workshop were organized and the division coordinated with IHR stakeholders to develop and finalize the National Implementation Plan for IHR 2014-16. The division also contributed to process of submission of request for two-years extension for implementation of IHR to WHO Headquarter. 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. The division coordinated with the GDD-IC for their partnership in capacity building for implementation of IHR in India. Further action plans for development of core capacities in the field of chemical safety, risk communication and surveillance are being taken up.

Global Disease Detection-India Centre

Details are mentioned under the Chapter on Programs.

Epidemic Intelligence Services (EIS)

The third cohort of the India EIS training was launched on 15th September 2014 with the initiation of one month inception course for EIS trainees was held at NCDC from 16th September to 15th October 2014. It is a Govt of India initiative in collaboration with US Centres for Disease Control, Atlanta. A total of 17 officers (six in second cohort and eleven in third cohort) are attending the training programme.

CD Alert

A bulletin on communicable diseases and an important tool for Rapid Dissemination of Information towards Control of Diseases is published by the National Centre for Disease Control, Delhi. It is widely circulated to different parts of the country including Directorates of Health Services of different States, Districts, Primary Health Centres, Medical Colleges and individuals. Many a times, the important topics covered in CD Alert have been reproduced, in part or whole, by IMA for dissemination of knowledge. The CD Alerts give an inside view of the disease including the global scenario, Indian scenario and also the diagnostic facilities of the particular disease within our country. The first issue was published in August 1997 on emerging and reemerging diseases and a total of seventy five issues have been published so far. A CD Alert on Pandemic Influenza A (H1N1) was updated on January 2015 and draft for CD Alert on Crimean Congo Hemorrhagic fever (CCHF) currently under process.

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

It is a quarterly publication of the National Centre for Disease Control (NCDC) and the first issue was released on 4th October 2012 by Hon'ble Secretary, Ministry of Health and Family Welfare, Government of India. The purpose of this newsletter is to provide a forum for sharing information on outbreaks,

programme updates from various departments at NCDC, technical and programmatic news and updates including capacity building and information on selected documents and guidelines, forthcoming conferences, world days and monitoring of disease trends. So far, nine issues have been successfully published and widely circulated. Work is currently underway for 10th and 11th issue of the newsletter.

5.2 Division of Microbiology

Dr. Shashi Khare
Addl Director & Head
Dr. Charu Prakash
Addl Director
Dr. Somnath Karmakar
Addl Director
Dr. Simrita Singh
Deputy Director
Dr Sarika Jain
Assistant Director

Details of Routine Activities Undertaken by the Division of Microbiology from April 2014 to March, 2015

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.
- Outbreak investigations for unknown pathogens

Two **New Initiatives** *namely, National Programme on Containment of Anti-Microbial Resistance & National Programme on Prevention and Control 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 The Various Labs:

Coxsackie B Virus: To find out the association between myocarditis and Coxsackie B virus, paired serum samples from 16 cases from different hospitals were received and tested. All the samples were found negative for Coxsackie B group (B1-B6) virus infection.

Measles: Two sixty seven (267) clinically suspected cases of SSPE were reported to the laboratory. One twenty four (124) of these cases were confirmed by laboratory tests showing of high titre anti measles antibodies in serum and CSF samples. No such case, so far, is reported following measles vaccination.

- Virus isolation
  - Throat swabs:- 13 tested (02 positive & 11 negative)
  - Urine samples:- 06 tested (03 positive & 03 negative)
- Five samples which tested positive for L20B were processed for sequencing.

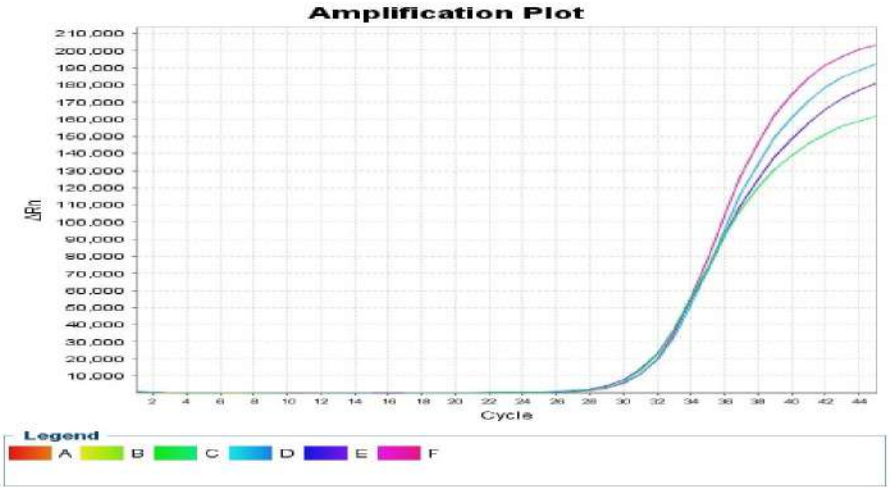
Viral Hepatitis: A total of 809 serum samples were ested for various markers of viral hepatitis.

Congenital Viruses: A total of 441 samples from women having bad obstetric history and congenitally malformed babies and viral encephalitis cases were tested for antibodies against Rubella, Cytomegalo virus & Herpes simplex virus infections. 42 serum and 14 CSF were tested for HSV encephalitis.

Viral Encephalitis: 374 cases from viral encephalitis from Delhi hospitals were received and tested for anti-measles, Varicella (12 positive and 34 negative) , Mumps -3 tested (03 negative) EBV IgM 184 samples (Positive -08 and Negative –176) EV -71 (03 negative), and Anti Parvo B-19 , 138 sample (131 negative and 07 positive) antibodies. 265 measles IgM samples received. 106 samples found to be positive and 159 samples found to be negative.

Influenza H1N1 (Swine Flu): 11124 Nasal and throat swabs from all over the country from suspected cases of Swine flu were tested. Out of which 2609 for H1N1positive, 188 for H3N2 positive, 363 positive for Influenza A untypable and 36 positive for Influenza B.

- ***Influenza surveillance:-*** 1009 Nasal and throat swabs from (Kasturba & Gokul Puri PHC) suspected cases of Swine flu were tested. Out of which 08 for H1N1positive, 30 for H3N2 positive, 16 positive for Influenza A. untypable and 06 positive for Influenza B.
- ***Influenza Outbreak (Jan 2015 to March 2015):-*** 10767 Nasal and throat swabs from all over the country from suspected cases of Swine flu were tested. Out of which 2596 for H1N1positive, 161 for H3N2 positive, 361 positive for Influenza A untypable and 35 positive for Influenza B.



Amplification plot for different gene targets of influenza virus on real time RT-PCR depicting positive sample with curve

- ***Sequence-based genomic characterization of circulating strains of influenza viruses:-*** The influenza virus is responsible for human respiratory infections and is a source of seasonal epidemics and occasional pandemics, which causes significant morbidity and mortality, in humans throughout the globe. Initially, RNA isolation was performed from the clinical samples (Nasal and throat swab). Matrix (M) gene of 232 bp specific for influenza virus was of amplified. After that positive samples were sequenced for M gene

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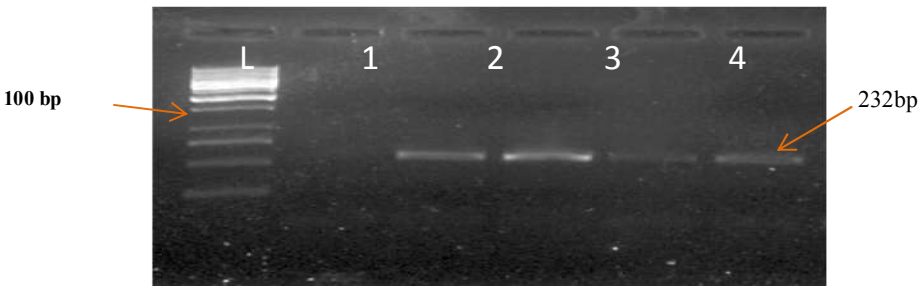
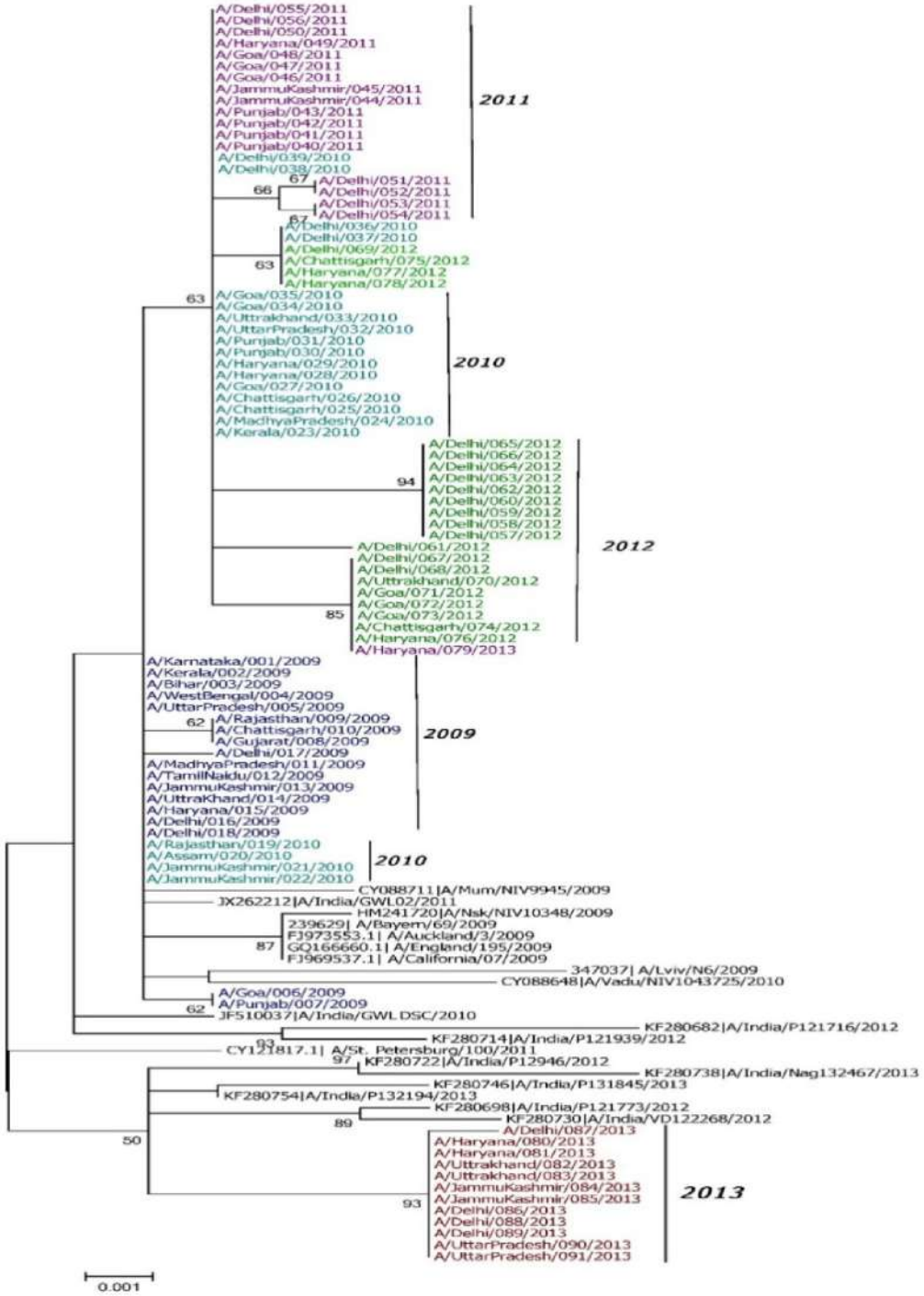


Gel picture of Matrix (M) gene (232bp) of influenza virus



Phylogenetic tree of Matrix (M) gene of influenza virus

Phylogenetic analysis by maximum likelihood method of the M gene shows maximum homology to the Texas 2012 strain as shown in figure. Phylogenetic tree of matrix gene showed all samples from 2009-2012 in one branch and samples from 2013 in another branch. Samples from 2009 was at base of top branch with A/Califonia.07/2009 and 2010-2011 samples were at the base of outer branch. Majority of

samples from 2012 and some from 2011 and 2010 formed 4 separate terminal branches. Whereas samples from 2013 formed separate major branch at bottom of the tree with A/St. Petersburg/100/2011 strain.

Tuberculosis

- A total of 31 clinical samples (mainly sputum and few other samples like CSF, pleural fluid, Pus and urine) obtained from suspected cases of tuberculosis.
- No samples were found to be positive in culture.
- In addition, 60 serum samples obtained from different States of India and evaluated serological diagnostic RPR test kits for YAWS Diseases. Not found positive samples.

Bacteriology

- 28 samples (CSF, blood) obtained from suspected cases of pyogenic meningitis were processed.
- 570 clinical samples from suspected diphtheria cases in Delhi were processed for diphtheria cases in Delhi. Out of which 71 samples are found to be positive for C. diphtheria
- 313 urine samples were subjected to culture examination out of which 67 were positive. Blood culture was carried out in 150 samples of which 21 were positive. 51 Pus, throat swabs were processed out of which 15 were positive.
- 29 blood samples were processed for widal test of which 3 were positive.
- 115 Throat swabs were received from CMO, Bijnor (UP) for identification of C. diphtheriae.

Antimicrobial Resistance (AMR) Study

Monitoring of Carbapenem resistance in environmental, Community and Hospitalized Patients having Urinary Tract Infections (UTI).Four hundred fifty one (451) samples were processed from Environmental, Community and Hospitalized Patients having Urinary Tract Infections (UTI) for AMR Studies.

Diarrheal Disease Laboratory

A total of 344 stool samples and Rectal swabs were collected from different hospitals of Delhi out of which, 44 are positive for Vibrio cholera O1 , 2 non O1, Nil Salmonella, 10 Shigella sp., 32 Enteropathogenic E. coli., 1 Giardia lamblia.51 samples were received from different states referred as field samples. 23 were positive for V. cholerae O1, 1 for Shigella sp.

New project initiated

Surveillance study on Rotavirus in 0-5 year children of Aruna Asif Ali Hospital, Delhi. Number of samples received: 30 samples, 5 were positive for Rotavirus.

Environmental Laboratory

A total of 253 drinking water samples belonging to different drinking water sources (collected during outbreak investigations of water borne diseases, samples from air-line caterers serving VVIP flights, referred samples from schools, hospitals, domestic sources etc.) were tested for bacteriological standards by the MPN Coliform method. 177 of these were found satisfactory, while the remaining 76 were unsatisfactory. During the year, 445 sewage water samples were collected from seven different sites of Delhi and processed and sent to Virology laboratory for virus isolation. Out of 445 samples, 104 samples received from Punjab.

Mycology Laboratory

A new project was initiated in Jan 2014 in collaboration with Aruna Asaf Ali hospital on "Early detection of neonatal septicemia due to bacterial or fungal pathogens in a Pediatric ICU of a Delhi Govt hospital."Mycology Laboratory diagnostic services were provided to referred patients from different Government Hospitals / Medical Centers of Delhi. Out of 43 clinical samples (CSF - 14; Tissue - 11; Skin – 02; throat Swab-01, Sputum – 05, pus -03; Blood Culture -05, urine -2, 2 samples were positive- one from CSF for Cryptococcus neoformans and one from skin/nail for Aspergillus fumigatus.

In addition, assisted in measles, jaundice, encephalitis and Diarrhoeal disease outbreaks and conducted applied research projects.

Major Achievements

- WHO accredited national polio laboratory testing more than 100 samples / day
- 12 labs under IDSP are carrying out Influenza surveillance
- Around 10 research projects/ MD thesis /PHD on various topics have been carried out.
- Indo Swedish collaboration for Antimicrobial resistance

Projects Completed recently

1. Study of *"Clinical, Laboratory and Radiological criteria to differentiate Viral from Non-Viral Community acquired LRTI"* (Oct2013 to March 2014). For the Degree of DNB-Pediatrics from DDU hospital.
   Findings: Circulation of RSV was dominant in the community during the study period.
2. To study the *"Etiological Profile of Acute Encephalitis Syndrome in Children"*. Thesis for the degree of M.D. Pediatrics, University of Delhi (2012-2015).
   Findings: The most common etiological agent detected was EV-71 beside Measles, HSV-1 and other viral pathogens.
3. *"Healthcare Associated Infections in a Pediatric Surgery Neonatal Intensive Care Unit for identification of antimicrobial susceptibility patterns of microorganisms causing various hospital acquired infections (HAI)in study Neonates"*
   - Klebsiella pneumonia was the commonest gram negative bacilli and Staphylococcus was the most common gram positive cocci isolated from HAI cases.
   - Isolates of K. pneumoniae did not show any resistance to colistin and only 2.8% resistance to imipenem.
   - Approximately 46% of Coalgulase negative Staphylococcus isolates showed methicillin resistance.
4. *"A study of Healthcare Associated Infections in Neonatal unit of a tertiary care hospital."*
   - E. coli was the most commonly implicated pathogen. Some of the strains of E. coli were resistant to most of the antibiotics.
   - None of the HAI cases were of viral origin.
5. *"Comparison of Trans-Placentally acquired anti-measles antibodies in HIV exposed VS HIV unexposed infants at 6 months of age"*.
   - HIV exposed uninfected cases showed a significantly better seroconversion following measles vaccinations as compared to HIV infected cases at 6months of age.
   - Hence Measles vaccine is safe in HIV exposed infants, whether HIV infected or uninfected.
6. *"DST project on Electrochemical DNA Biosensor for Meningitis"*
   - Standardized of different parameters for development of electrochemical DNA Biosensor for Meningitis.

Ongoing Research Projects

1. Study of Viral Etiology and Clinical Course in Children admitted with Bronchiolitis" thesis for M.D. Pediatrics from Kalawati Saran Children Hospital.
   - Virology lab is processing throat/ nasal swabs for viral etiology for pathogens like influenza, RSV, Para influenza by Real Time and conventional PCR.

2. Study of Etiology , Clinical- epidemiological profile and association of Myocarditis in Children with Acute Encephalitis Syndrome" thesis for M.D. Pediatrics from Dr. B. R. Ambedkar University, Agra.
   - Processing the CSF samples for various viral pathogens like- EBV, CMV, AV, HSV-1, HSV-2, VZV, EV, PV, HHV-6, HHV-7, B-19 by multiplex real time PCR.
   - Virus isolation in CSF.
   - Serology for Measles, Mumps, Coxsackie-B, rubella

3. Molecular detection and characterization of influenza viruses in patients with influenza like illness from Delhi at NCDC.
    - An epidemic of Pdm influenza A (H1N1) was detected in Delhi during the study period , strengthening the fact that surveillance for influenza viruses in communities is important for providing the information about the circulating strains.

Proposed Activities of NCDC (Virology Lab)

1. The task force for the global health is collaboration with Jeffery Modell Foundation, Centers for Disease Control and Prevention, Atlanta and WHO Geneva has initiated a multi centric global study on immuno-deficient vaccine derived Polioviruses. The objective of the study is to determine the prevalence of polio virus excretion in patients with B cell immunity defects known to be associated with prolonged excretion after oral polio vaccine administration. The identified subjects may also be valuable for subsequent research for an antiviral agent or agents for treatment of prolonged poliovirus excretion. The NCDC Polio lab will be a part of the study. The study will be to determine the prevalence of poliovirus excretion in immune deficient children.

2. NCDC has already been doing testing for measles for many years. Now NCDC is going to be a part of Measles Elimination Project in collaboration with WHO as the Virology Laboratory of NCDC has been approved for this project. The staff has been trained for testing of Measles samples and will also send some staff for training of testing of Measles samples for the workshop to be held in Dec. 2014.

3. NCDC has already been a part of National Polio Surveillance Project (NPSP) At present, we are doing Poliovirus isolation and Intra-typic differentiation of poliovirus. For genomic sequencing of polio virus samples are sent to ERC, Mumbai. Soon genomic sequencing analysis of Poliovirus isolation will be started in our laboratory. Primer/Probes and Protocol has been finalized for it.

Short Term Project Undertaken:

1. Kriti Khanna, B. Tech (Biotechnology) *student* from Amity Institute of Biotechnology, Amity University, NOIDA (UP) has undertaken project work entitled, "Detection of teratogenic viruses with special reference to Rubella, Cytomegalo and Herpes viruses in pregnant women and babies with congenital infection by ELISA and conventional PCR" at Microbiology Division of National Centre for Disease Control (NCDC), Delhi for 6 weeks (5^{th} May, 2014 to 17^{th} June, 2014).

2. Arubhi Bansal, B. Tech (Biotechnology) *student* from Amity Institute of Biotechnology, Amity University, NOIDA (UP) has undertaken project work entitled, "Detection of Influenza Group of Viruses in Patients with Acute Respiratory Infections by Real time – PCR" at Microbiology Division of National Centre for Disease Control (NCDC), Delhi for 6 weeks (5^{th} May, 2014 to 17^{th} June, 2014)

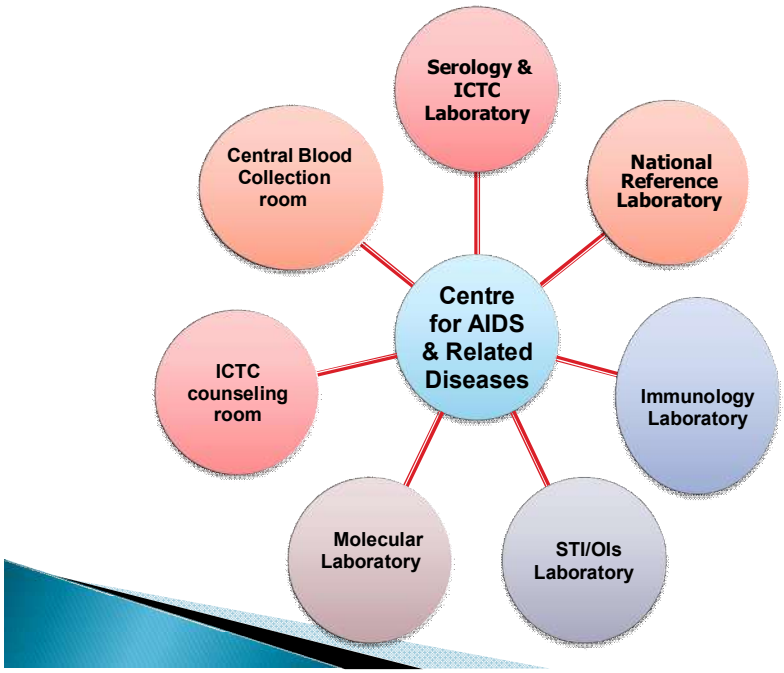
Outbreaks Investigations Carried Out:

Outbreaks investigated by Dr.Somenath Karmakar

(1) Visited Srinagar floods from 8^{th} to 12^{th} September.2014 Revisited Srinagar to accompany Hon'ble HFM Shri Harshvardhanji and for disease surveillance following floods (14-22 September 2014).
(2) Visit to Jaipur to review swine flu situation in Rajasthan 23-24 Jan 2015
(3) Visit to Kollam, Kerala to investigate outbreak of Bird flu at a Govt turkey farm 30-Jan-6 Feb 2015 .
(4) Avian influenza outbreak in Amethi District of Uttar Pradesh 15-20 March 2015

5.3 Centre for AIDS & Related Diseases

Dr. Shashi Khare
Additional Director & Head
Dr Pranil Kamble
Assistant director



Broad mandates of the Division:

1) HIV/ AIDS related activities:

- Confirmation of HIV sero-status of all samples received from 13 State Reference Laboratories (SRLs) and their linked Integrated Counselling and Testing Centres (ICTCs), which are showing indeterminate or discordant results.
- National AIDS Control Organization (NACO) designated referral laboratory for HIV-2 confirmation of patients referred through ART Centres of seven states of Delhi, Punjab, Chandigarh, Haryana, Rajasthan, Jammu & Kashmir and Himachal Pradesh.
- Preparation and distribution of proficiency testing (PT) panel to linked SRLs and their associated ICTCs
    - Eight member panel for SRLs
    - Bulk four-member panel for distribution by SRLs to their associated ICTCs
- Compilation and analysis of the PT panel results received from the SRLs and feedback to the participating SRLs.
- Participation in National EQAS for HIV serology, Syphilis serology and Absolute CD4 T Lymphocyte count
- Activities related to Consortium of NRLs on Kit Quality testing of HIV, HCV and HBV diagnostic kits
- Absolute CD4/CD3 count in HIV positive samples referred from DDU ART centre and other linked ART centres and PPTCT centres by FACS Count.
- To provide HIV counselling and testing services to clients on his or her own free will or as advised by a treating physician.

- Rechecking of samples as part of quality control under HIV sentinel surveillance.
- Dried Blood Spot (DBS) testing under Integrated Biological & Behavioural Surveillance (IBBS) Surveillance.
- Dried Blood Spot (DBS) testing under National Family Health Survey (NFHS-4).
- Quality control testing of HIV positive and negative samples referred from Non-SRL laboratories/ hospitals
- Confirmation of HIV status for samples referred by Non-SRL laboratories/ hospitals
- Diagnosis of common opportunistic infections in HIV-positive patients in stool and sputum respectively
- Serological diagnosis of syphilis by RPR and TPHA
- Conducting EQAS Workshops for SRL In charges and technical officers and Quality Managers of State AIDS Control Society (SACS).
- Organization of training programs for technical staff of SRLs on serological testing of HIV and development of Quality Management System in HIV laboratories.
- Support to National Health Programs e g NACO

2) Other Activities

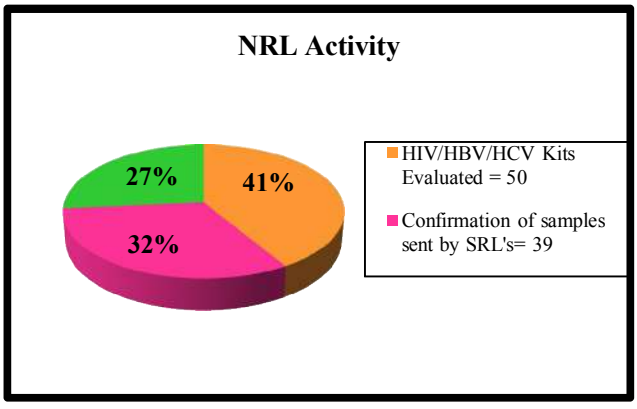
- Support to courses run at NCDC i.e. MPH

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

A. National Reference Laboratory

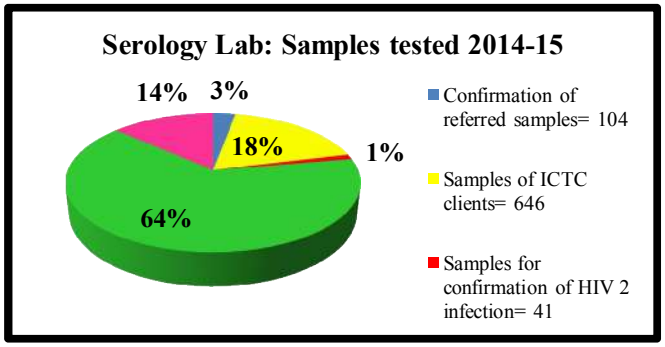
- Confirmation of samples sent by linked SRLs: 39 samples, for which a total of 138 tests were performed.
- External Quality Assessment Scheme (EQAS) for HIV Serology
  a. Conducted one round of EQAS for HIV serology for 13 linked SRLs and their ICTCs in the states of Delhi, Haryana, Rajasthan and Jammu & Kashmir.
  b. Reports of EQAS activity was compiled and sent to Apex Laboratory (NARI, Pune)

- **Consortium of NRLs for Kit Quality:**
  HIV/ HBV/HCV diagnostic kits evaluated. A total of 50 (13 HCV ELISA, 16 HIV Rapid, 15 HIV ELISA, 03 HCV Rapid and 03 HBsAg Rapid) kits were evaluated, for which a total of approximately 25,000 tests were carried out.
- Blood bags collected from various blood banks of Delhi: 32 blood bags were used for characterization of HIV, HBV and HCV panels.
- 3223 aliquots of HIV, HCV and Negative panels were prepared, for kit evaluation.
- In-house calibration of laboratory equipments such as pipettes, Refrigerators, Deep freezers and centrifuges were carried out.



B. Serology Laboratory

- Confirmation of HIV infection on samples referred by hospitals/ blood banks other than SRLs: 104
- HIV testing of clients visiting ICTC: 646
- HIV-2 confirmatory diagnosis of all the patients referred through ART centres of seven states under NACO: 41
- Rechecking of samples as part of quality control of samples referred by hospitals/ blood banks other than SRLs: 479



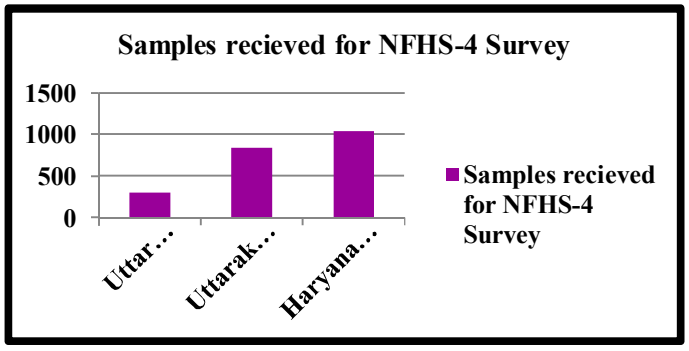
C. Dried Blood Spot (DBS) testing of samples under IBBS surveillance

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

This centre has been designated as one of the 16 laboratories for testing of DBS samples under NACO. Approximately 11,200 samples will be sent to NCDC for DBS testing from domains of Delhi, Uttar Pradesh and Jharkhand. Total number of DBS samples received under IBBS surveillance: 2277.

D. National Family Health Survey (NFHS-4)

- National family Health Survey-4 (NFHS-4) is a project funded by International Institute for Population Sciences (IIPS), Mumbai which has been appointed by the Ministry of Health & Family Welfare as the nodal agency to conduct this project.
- NFHS-4 aims to provide updates and evidence of most of the health & nutrition indicators in general population.
- Estimation of prevalence of HIV infection in key population of India is also one of the major components of the project.
- The IIPS, under the direction from the Ministry of Health & Family Welfare has identified six labs across the country, where the Dried Blood Spot (DBS) samples on filter paper cards would be sent for HIV testing.
- NRL-NCDC is one the laboratories selected for HIV testing in NFHS-4.
- NRL-NCDC is assigned to test HIV DBS samples from Uttarakhand, Haryana, Uttar Pradesh, NCT Delhi & Himachal Pradesh.
- DBS samples from Uttar Pradesh, Uttarakhand and Haryana for the 1st Phase of NFHS – 4 has been received. Details of the sample are given as below:



E. Immunology Laboratory

CD4/CD3 cell estimation was performed on 4599 samples referred from Anti Retroviral Treatment (ART) Centre, Deen Dayal Upadhyay Hospital and other linked PPTCTCs of Delhi.

F. Opportunistic Infections/STI Laboratory

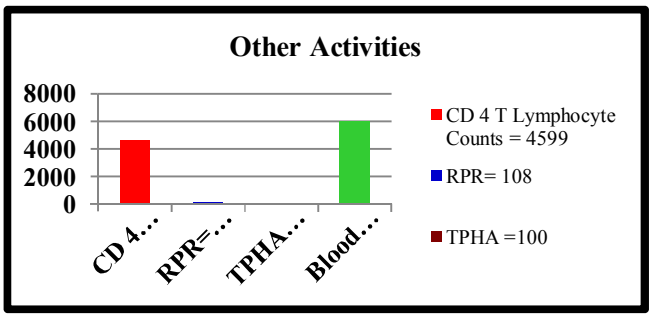
- Qualitative RPR: 108
- Semi-quantitative RPR: 30
- TPHA: 100

G. Integrated Counselling & Testing Centre (ICTC)

A total of 645 direct walk-in-clients were provided pre test counselling while 575 subjects were given post test counselling.

H. Blood Collection Unit:

This unit acts has a central sample collection facility. During the period a total of 6007 samples were collected and distributed to the respective laboratories for testing.



Major Achievement of the Division

a) The centre has been awarded **certificate for outstanding erformance** in quality assurance in HIV testing and achieving international standard as per ISO 15189 by National AIDS Control Organization (NACO).

b) NABL accreditation

- Centre got renewal of NABL accreditation in the field of Medical testing according to ISO 15189:2007 from 14.2.2014 to 14.2.2016.
- The Desktop audit after one year of renewal of NABL accreditation has been successfully accomplished.

Research Activity

Comparative study of Cytokine profile in HIV1 and HIV 2 infected individuals.
Key findings: A shifting trend in the cytokine profile from Th1 to Th2 was seen in HIV-1 and HIV-2 infected individuals with disease progression. This is characterized by a decline in the production of IL-2 and IFNγ with an increase in the production of IL4 and IL6.

Number of field visits made by various officers during 2014-15
Dr. Aarti Tewari, Specialist (Micro) was deployed in the flood affected areas of Srinagar (Jammu & Kashmir) from 07th October, 2014 to 21st October, 2014.

Workshop organized
Organized a workshop on **"External Quality Assessment Scheme for HIV Testing"** for Officer-in-Charges, Technical officers of SRLs and Quality Managers of SACSs on 16th March, 2015 at NCDC, Delhi.

Important visitors to the Division

- MPH students from Amity University, NOIDA visited this Division on 20th March, 2014 for orientation on various activities carried out at this Centre.
- Orientation visit of 3rd Year MD (Community Medicine) students from three medical colleges – MAMC, LHMC and UCMS on 19th and 21st November, 2014.

5.4 Division of Zoonosis

Dr Veena Mittal
Addl Director & Head
Dr Dipesh Bhattacharya
Addl Director & Head (PBA)
Dr Mala Chabbra
Joint 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, Chikungunya & CCHF) Toxoplasmosis, Brucellosis, Leptospirosis, Rickettsiosis, Hydatidosis, Neurocysticercosis and Anthrax.Major Role and Activities of Division during 2014-15 are as follows:

A. Referral diagnostic services for the year 01.04.2014 – 31.03.2015

Rabies	
(a)Post-mortem diagnosis in animal brain samples by Negri body, FAT, BT	08
(b) Diagnosis in hydrophobia cases	11
(c)Assessment of antibodies by ELISA test	
(i) Human	111
(ii) Animal	NIL
Kala-azar	
(a)Parasitological diagnosis by smear examination and culture	29
(b)Serological diagnosis by IFA test	168
Toxoplasma	
Serological and diagnosis by IFA test	347
Brucellosis	
Serological diagnosis by tube agglutination test	166
Rickettsiosis	
Serological diagnosis by Weil Felix test	910
Hydatidosis	
Serology by ELISA	26
HANTA VIRUS	
Serological diagnosis by IgM &IgG ELISA	1
LYME DISEASE	
Serological diagnosis by IgM & IgG ELISA	14
Arboviral diseases	
Serological diagnosis by IgM ELISA test for Japanese Encephalitis.	960
(i)Human sera samples	369
(ii)Human CSF	591
IgM ELISA test for Dengue	356
IgM ELISA test for Chikungunya	96
Plague	
Serological diagnosis by PHA and PHI in rodent Sera	1646
Culture for isolation of Y.pestis from rodent organs	6150
Neurocysticercosis	
Serological diagnosis by ELISA	52
Leptospirosis	
Serological diagnosis by ELISA	387

Anthrax	Nil
Viral isolation	
Chikungunya	Nil
Dengue	04
JE	35
Rabies	09
AES	34
Lymes Disease	NIL
Hanta virus	NIL
MOLECULAR DIAGNOSIS	
Rabies	26
CCHF	9
Ebola	106

B. Training courses/Expert group meetings

1. Interstate Plague Co-ordination meeting (organised by PSU Bangalore) from 3 – 4 April, 2014 at Veterinary Council of India, Bangalore
2. A team visited AIIMS to provide training on Hospital Infection Control & PPE on 20/01/2015

C. (1) Research projects undertaken

1. To study the epidemiological profile of Kala-azar patients in Delhi
2. Serological studies in Toxoplasmosis in different Delhi Hospitals.
3. Surveillance of Plague in different parts of the country.
4. Molecular characterisation of Rabies virus.
5. Sero-epidemiological studies for rickettsial diseases (scrub typhus & Indian tick typhus) in patient with pyrexia of unknown origin
6. Etiological diagnosis of AES in Muzaffarpur

C. (2) Pilot Programs

Division runs important Pilot programs on *National Rabies Control Programs, Programme for Prevention and Control of Leptospirosis and Strengthening of Intersectoral Coordination for Prevention and Control of Zoonotic Diseases.* Details of these activities are mentioned in the chapter on National programs.

Ebola

Diagnostic facilities were established for serological and molecular diagnosis of Ebola.BSL III facilities were used for this purpose. Following tests were carried out:

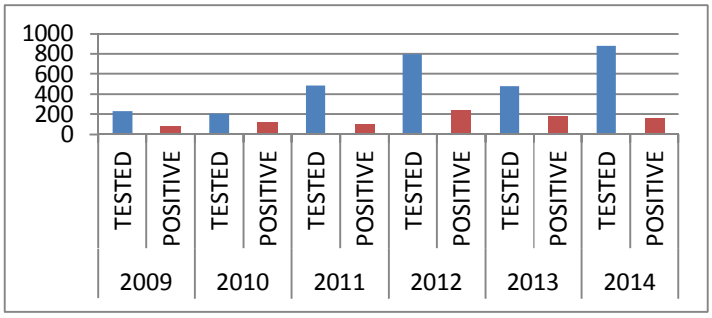
- Commercial IgM ELISA was put up for blood, urine and saliva samples.
- Real Time RT-PCR test for ***np*** gene using CDC approved Ebola virus Zaire specific primers and probes
- Real Time RT-PCR test for ***vp*** gene
- Conventional RT PCR for ***gp*** gene (580 base pair) and filo (***np*** gene)
- Sequencing of RT-PCR product of 580 base pair ***gp*** gene and ***filo*** gene (***np*** gene) were put up.

Total one hundred six (106) samples were tested and one person who was diagnosed and treated for Ebola at Liberia and declared negative there had negative blood, urine, saliva samples but his semen sample tested positive at NCDC.

Rickettsial Disease

Earlier this Disease was reported mostly along hilly forest tract but now is widely distributed in India. Infection to man is accidental and usually associated with clearance of forest areas, bushy areas, changing climatic and environment conditions. Now the disease is reported from Delhi, Haryana, Gujrat, J&K, Karnatataka, Kerala, Manipur, Nagaland, Sikkim, Uttrakhand, UP, WB, Meghalaya, AP, Arunchal pradesh, TN, MP, Rajasthan, Chattisgarh, Punjab, Puducherry, Himhacal Pradesh. In 2009 samples

received in the Division were 229 with 81 deaths, the number raised to 878 in 2014 with 154 deaths. The Division is providing referral diagnostic services for Rickettsia including Scrub Typhus.



Year wise sample tested and positive for Scrub Typhus

Acute Encephalitis Syndrome (AES)

Prospective surveillance of AES at Muzzafarpur: To identify the aetiological agent of AES in Muzzafarpur Zoonosis Division Co-ordinated laboratory component and carried out testing for AES. The following activities were undertaken:

- Participated in development of protocol
- Developed guidelines on sample collection storage and transportation
- Provided training at Muzaffarpur on collection, storage and transportation
- The samples were tested for Flavivirus group, Chandipura, JE and West Nile.
- Samples received at NCDC had been logged and stored
- Two scientists visited CDC for testing of samples for pathogen discovery 10-25 July 2014.
- Samples had been sent to CDC for toxicity testing, and MCPG/metabolite detection
- Litchi fruit samples had been sent to USA for analysis of MCPG/metabolites

40 CSF samples from AES suspected cases at Muzaffarpur Bihar were tested in CDC for advanced molecular diagnostics to evaluate for potential novel pathogen. The tests carried out at CDC were:

- The samples were processed for 16S RNA PCR which was negative in all samples
- Pan-Viral multiplex PCR for 8 viral families (Flavivirus, Alphaviurs, Bunya virus, Paramyxovirus, Polyoma Rhabdo, Herpes, Adeno virus) covering approx 50 viruses which can cause AES which was negative in all samples.
- High throughput sequencing for pathogen discovery did not show the presence of viral agent.
- Pan enteroviral PCR : Negative in 40 CSF samples

5.5 Division of Biotechnology/ Molecular Diagnostics

Dr Arvind Rai
Joint Director & Head

The division provides referral diagnostic support during outbreaks/ epidemics, samples referred from hospitals/ other divisions for molecular diagnosis, epidemiological studies, surveys, outbreaks and applied research. The division also provides advisory role and other multifarious activities towards prevention and control of a cascade of epidemic prone disease of larger public health importance. The division actively participates in teaching, training, other academic and manpower development activities, conferences, workshops, seminar, symposia etc organized by the Institute from time to time. The division is collaborating with different divisions of NCDC and with outside organizations/Institutes. The major thrust areas of activities are Hepatitis (HBV/HCV), HIV, H1N1 Swine Flu, H5N1 Avian influenza, Dengue, Chikungunya, Anthrax and other epidemic-prone diseases. The division is providing summer training/ project training to M.Sc/B.Tech students from different Universities/Institutes and also conducting research activities leading to Ph.D degree from GGSIP University, Delhi and other Indian Universities. This includes the following major aspects:

- Fool-proof Molecular Diagnostic support for confirmation of pathogen.
- Tracing the origin and source of infection of emerging/re-emerging diseases.
- Tracking-down the route's of pathogen transmission.
- Identifying reservoirs sustaining transmission.
- Identifying new, emerging and re-emerging pathogens.
- Genotyping and Sub-typing of strains.
- Characterizing drug-resistant strains.
- Identifying links between cases and infections.
- Linking pathogen variants to endemicity and epidemicity.
- Monitoring the progress of disease control activities.

Key Activities

Referral Molecular Diagnostic Support Services

- During the period, 1000 PCR/RT-PCR/gene fingerprinting/sequencing for other important disease pathogens (*e.g.* H1N1, Dengue, HIV, HBV/HCV, Ebola, CCHF etc) was carried-out.
- Supported Respiratory Virology Lab of Microbiology Division in performing nearly 10,000 referral diagnostic tests for *Pandemic H1N1and seasonal Influenza virus during major outbreak in early 2015*.
- Over 100 gene sequences belonging to important human disease pathogens carried-out by our division, were accepted (accession numbers) by the Global Genome Bank (NCBI), NIH, USA.

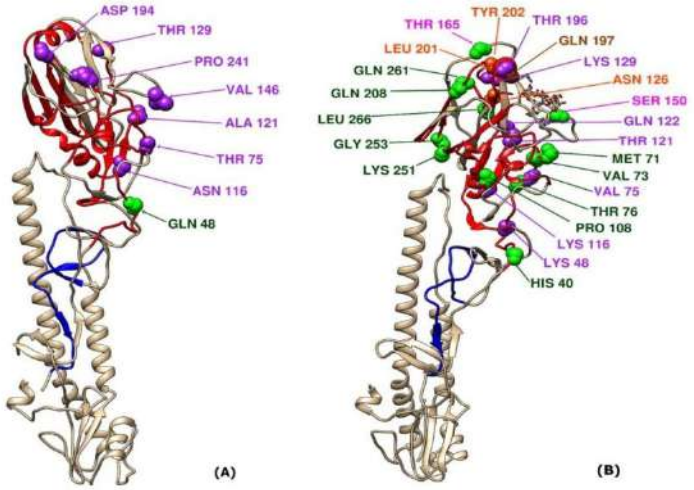
Other Activities:

Imparted training to *students leading to Ph.D degree* (one student submitted Ph.D thesis in 2015 to GGSIP University, Delhi), imparted training and teaching to students perusing *MPH course* at NCDC under GGSIP University, Delhi; and specialized training imparted.

Applied Research Activities

1. Drug resistance study on circulating strain of Influenza B virus

Drug resistance data from India showed that there were very few cases of amantadine drug resistance associated with Serine to asparagine (S3IN) mutation prior to 2009 in A/H1N1 virus. Whereas, A/H3N2 viruses showed an increase in resistance to from 22.5 per cent in 2005 to 100 per cent in 2008 onwards with S3IN mutation. All the samples from our analysis has S31N mutation in M2 gene and were therefore found to the resistant to M2 ion channel blocker (amantadine drug). But none of the sample had H275Y or other mutation associated with oseltamivir (Tamiflu) drug resistance.

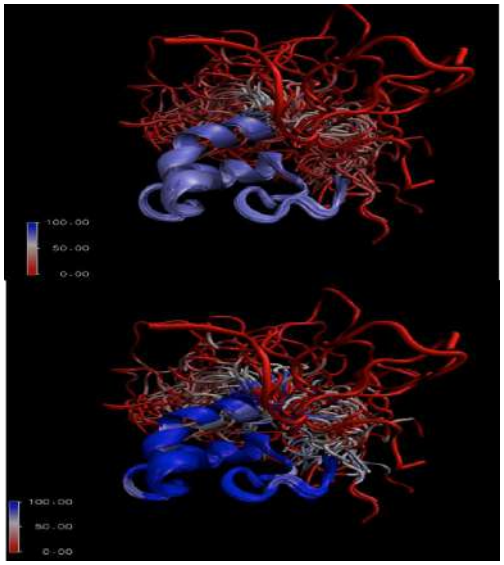


3D protein structure of (A) Victoria lineage HA protein (PDB: 2RFU) (B) Yamagata lineage HA protein. Both the structures depicting regions with conserved epitope in Blue Color and less conserved epitope in Red Color. Sites showing amino acid changes showed in sphere and different colors.

There are two lineages of influenza B virus (Victoria lineage and Yamagata lineage). In present study we have seen the circulation of only Victoria lineage strain during the year 2011, while co-circulation of both Victoria and Yamagata lineage in India was noted during the years 2012-13. Yamagata lineage had very low epitope conservancy in HA protein in comparison to the Victoria lineage. This indicate that the previous influenza B virus infection may provide immunity against the current Victoria strain but they may not be effective in neutralizing influenza B virus infection caused by the current Yamagata lineage strain. Influenza B virus strains were found to be sensitive for oseltamivir drug.

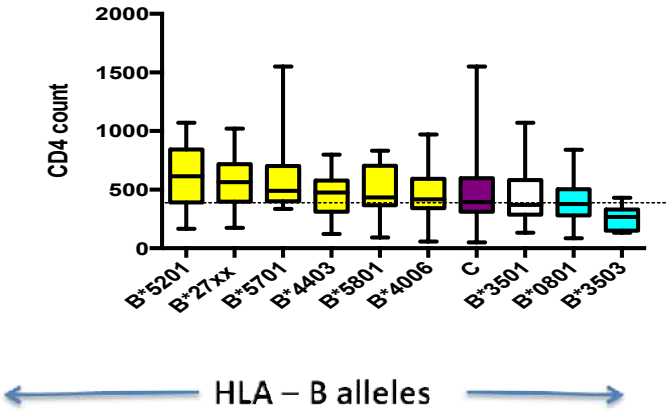
2. Molecular characterization of HIV-1 and host factors in pregnant women

Human Immunodeficiency Virus (HIV) continues to pose considerable burden worldwide. Studies conducted globally have primarily focussed on pathogenesis of HIV in adults. There has been a lot of focus on prevention of mother to child transmission, but emphasis on saving the mothers, which forms an even greater social responsibility has been lacking. Pregnant women form a special population group due to the immunological condition during pregnancy. In this study we looked at viral and host genes in HIV infected pregnant women in order to better understand the viral-host interplay. We hypothesized that the female body during the gestation phase possibly acquires certain strategies to impede or at least alleviate the disease progression caused due to HIV during the crucial immune compromised pregnancy phase, which would otherwise adversely affect the mother. This would be through several viral and host genes. In our study we performed molecular studies on viral and host genes in pregnant women. The molecular insight into viral genes helped us look at how the virus acts in pregnant women. Host genes also form an essential determinant of susceptibility/resistance to HIV infection.



Vpu protein models of pregnant risk group aligned according to structural similarity

The viral genes that have been looked at include *env* (V3-V5), *vpu* and *gag (p24*) genes. The host genes that were studied include defensins, tetherin; DC SIGNR, and Human Leukocyte Antigen. Our molecular analysis of disease progression parameters such as co-receptor usage, number of N-glycosylation sites and entropy revealed a stronger immune selective pressure in pregnant women, as the immune system in pregnant women did not allow the virus to switch co-receptor, escape immune surveillance by creation of N-glycosylation sites or allow accumulation of mutations. Our study on host genes indicated occurrence of protective polymorphisms in significantly higher percentage in HIV infected pregnant women. Addtionally we also observed expression of protein tetherin which is involved in release of the virus, occurred during the phases of pregnancy accounting for maximun risk of transfer of the virus from mother to child, i.e during labour and postpartum (breastfeeding).



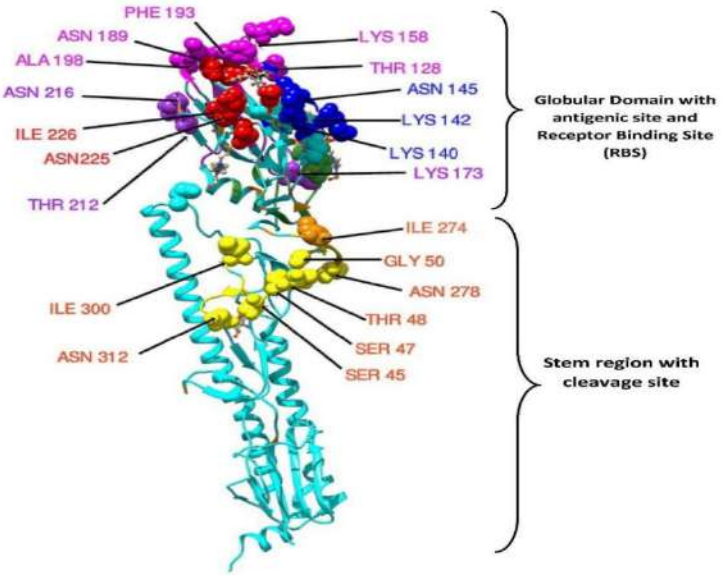
HLA-mediated immune control showing immune regulation of the alleles

HLA is the most significant host factor involved in regulating progression of HIV in an individual. HLA distribution patterns vary among geographically distinct populations and have been shown to play a pivotal role in establishment of a founder virus. These HLA-mediated mutations or HLA footprints, are essential towards understanding viral CTL responses. Of all the HLA molecules,

HLA-B alleles have a dominant role in selecting anti-viral CTL responses. High frequency HLA alleles had a major impact on evolution of the virus, and thus create HLA footprints. Thus, strongly suggesting that any vaccine developed anywhere in the world will not be effective in HIV positive Indian women of childbearing age, until these escape mutations have been considered while designing the vaccine.

3. Sequence-based genomic characterization of circulating strains of influenza A

The Present study shows that pdm (09) H1N1 virus strain circulating during 2009- 2013 was antigenically similar to the vaccine strain (A/California/07/2009) with no change in the glycosylation pattern. Increased genetic distance observed in the samples during the period (2009-2013), indicates that the virus is evolving and acquiring point mutations with the maximum changes in HA and NS1 gene followed by NA. Genetic analysis of influenza A (H3N2) virus has shown that both HA and NA gene have acquired lots of non-synonymous substitutions in the antigenic sites. These changes indicating the role of antigenic drift in emergence of antibody escape mutants and



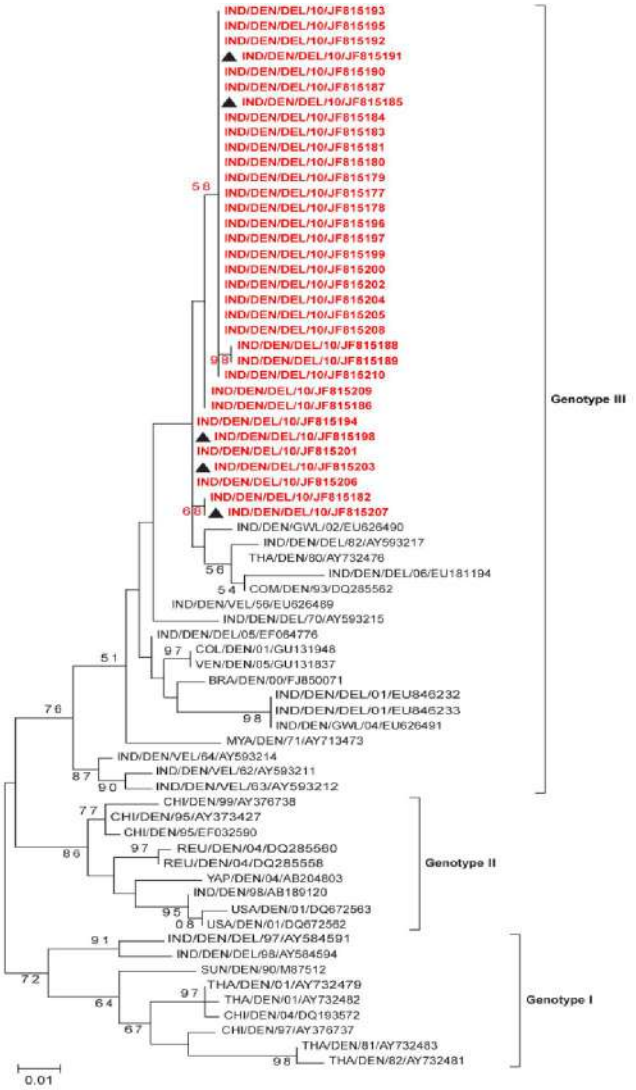
Position of various antigenic sites is depicted on HA protein of influenza A virus

new antigenic variants. Phylogenetic analysis of Influenza A virus (H3N2) found that study samples of HA1 gene region formed separate cluster for samples from each year (2011-2013). On the basis of which, we can say that the influenza A (H3N2) strain circulating in India is similar, but not identical to the strains reported from Europe and the other part of Asia.

4. Molecular studies of circulating Dengue virus isolates to identify strain differentiation and mutations in the *cPrM* gene region.

Dengue virus (DENV) is one of the most important arboviral pathogen. DENV is frequently associated with epidemics that have great economic and social impact in various regions of the world. There are four distinct antigenic groups or serotypes of DENV (DENV-1 to DENV-4) that are responsible for dengue infection. A number of phylogenetically distinct lineages, termed genotypes, have been also identified within each serotype, which may differs in both geographical distribution and virulence**.** Infection with any one serotype generally leads to a mild, self limiting febrile illness classical dengue fever (DF). A few cases of DF may also lead to severe life

threatening dengue hemorrhagic fever (DHF). Outbreaks of dengue in 1996, 2003 and 2006 were caused due to DENV-2 & DENV-3 serotypes, the pattern of circulating serotypes in Delhi is continuously changing. In recent studies, DENV-1 has found to be predominant serotype replacing the earlier existing DENV-2 and DENV-3 serotypes. DENV-1 has been circulating in India since the 1940s. Molecular characterization and comparative genomic analysis has been useful approach to define genetic markers associated with genotype, infectivity and disease severity.

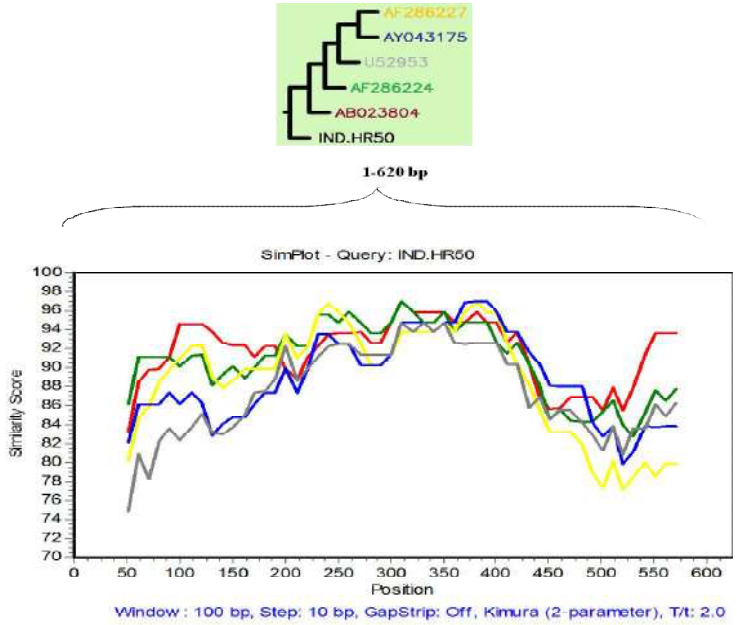


Phylogenetic tree of Dengue virus based cPrM gene region generated by the maximum likelihood method. Bootstrap support values (based on 500 replication) above 50% are shown at the branch node.

Phylogenetic tree was constructed to unveil the extent of genetic heterogeneity and trace the phylogeny of DENV-1 strains that circulated in Delhi during the current decade. Active circulation of DENV-1 genotype III was reported. *CprM* gene junction was found to be AT rich (~ 53%). Nucleotide sequence alignment revealed only substitutions (mostly synonymous), without insertion or deletion. CprM gene sequences revealed clustering of isolates from different countries in three distinct genotypes (I, II, III). All Indian DENV-1 sequences belonging to different outbreaks, clustered in genotype III in close proximity with the sequences from Comoros and Thailand.

5. Genotypic analysis of nef gene from HIV-1 infected Rapid Progressors and Long-term Nonprogressors

The HIV-1 *nef* protein is a 25- to 27-KDa regulatory protein known to perform multiple functions including CD4 and MHC-I down regulation, infectivity, actin remodeling, and viral spread leading to clinical progression to AIDS. These functions are accomplished through amino-acid motifs present at specific sites. Interactions between these motifs and associated host molecules have been suggested to be responsible for difference in disease progression resulting in rapid progression or delayed progression. The study was designed to perform quantitative analysis of HIV-1 proviral DNA/RNA using real-time PCR and sequence analysis to determine amino-acid substitutions along the whole length of *nef* including various functional motifs that are considered to be responsible for discernible difference in disease progression in patients presenting with rapid and delayed progression to AIDS.

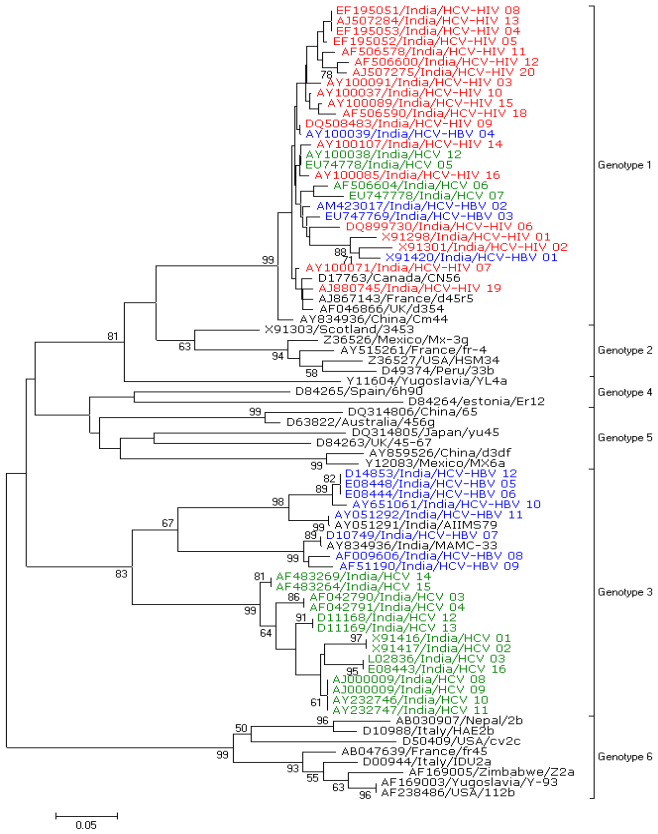


The SimPlot program was used for comparing isolate IND.HR50 with the vaccine candidates from India (Red Line), South Africa (Blue and Yellow Lines), Brazil (Grey Line) and Zambia (Green Line).

Complete *nef* subtype C sequences from 33 RPs and 7 LTNPs were compared and it was observed that in the majority of the sequences from both the groups, highly conserved functional motifs showed subtle changes. However, drastic changes were observed in two isolates of LTNPs where the arginine cluster was deleted while in one of them additionally, the acidic residues were substituted with basic residues (EEEEE→RK(R)KKE). The deletion of the arginine cluster and the mutation of acidic residues to basic residues are predicted to delay disease development by abolishing CD4 downmodulation and causing diminution of major histocompatibility complex Class I (MHC-I) downregulation, respectively. Nonetheless, this is an exclusive finding in this study, which necessitates analysis of them at functional level.The study revealed that certain amino-acid residues were characteristic for each group of patient populations. It was also observed that the motifs showed different mutations/substitutions that varied from patient to patient. The result of the studies show that HIV-1 proviral DNA load of long term non-progressor's (LTNPs) was higher than that of rapid progressor,s RPs but the difference between the loads was not statistically significant. A statistically significant negative correlation was found between HIV-1 proviral DNA load and CD4 count of RPs whereas in LTNPs no such correlation was observed.

6 . Genomic variability in the 5'UTR region of Hepatitis C virus

Hepatitis C virus (HCV) co-infection with human immunodeficiency virus (HIV) is assuming greater significance in recent years. Scanty reports on the genomic diversity of HCV in HCV/HIV co-infected cases from different parts of the world are available in literature with conflicting observations. The present study was therefore, intended to unveil the extent of nucleotide variability in the 5'UTR of HCV in Indian patients with concurrent HCV/HIV infection.



Phylogenetic tree, depicting relationship of HCV mono-infection (in green color) and HCV/HIV co-infection isolates (in red color) HCV/HBV co-infection isolates (in blue color) generated by Neighbor-joining method using MEGA software

Phylogenetic analysis revealed that all the sequences belonging to HCV genotype 1 grouped together but in different clades. All the HCV/HIV co-infection genotype 1 sequences formed a clade with other global HCV genotype 1 reference which was distinctive from the clade formed by HCV mono-infection genotype 1 sequences along with other global HCV mono-infection genotype 1 reference sequences. Our study sequences of HCV/HIV co-infection genotype 1 clustered together in an altogether different subclade.

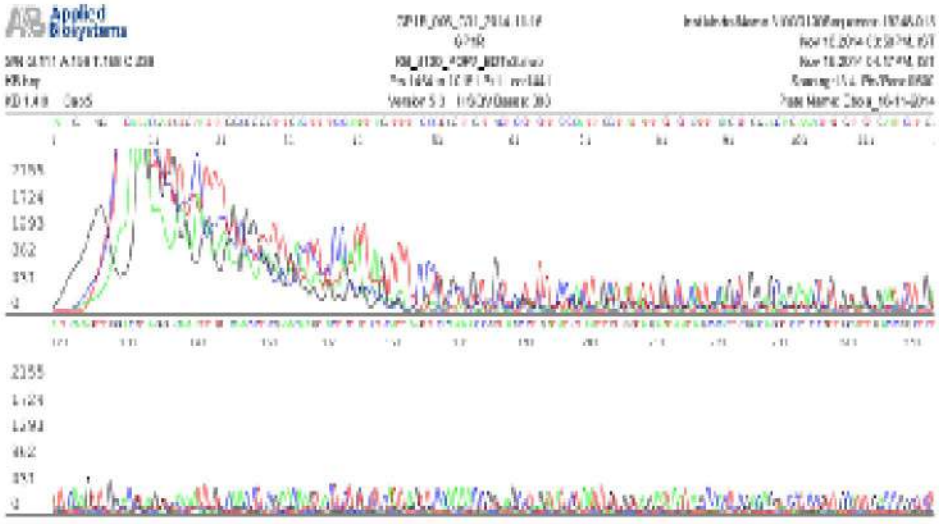
7 Molecular typing of Ebola virus

Ebola (EBO) virus disease (formerly known as Ebola Hemorrhagic Fever) is a severe, often fatal illness, with a mortality rate up to 90%. The illness affects humans and non human primates. There

are 4 known species of Ebola virus: Zaire (EBO-Z), EBO-R, Sudan, and Cote D Ivoire. Two gene regions *Gp* and *filo(Np)* are used for molecular confirmation of Ebola virus. The standard procedure was followed for isolation of viral RNA from clinical samples. The reverse transcription polymerase chain reaction (RT-PCR) was carried out for *Gp* and *filo(Np)* gene regions.

Bands of 580 bp and 419 bp PCR product of Ebola virus on 1.2% agarose in TAE with 100 bp and1kb DNA ladder

The amplified fragments of 580 bp and 419 bp were visualized after electrophoresis on ethidium bromide stained 1.2% agarose gel. Gel electrophoresis revealed bands of *Gp* gene (580bp) and *Np* gene (419 bp) of ebola virus. Nucleotide sequencing of *Gp and Np* gene regions of ebola positive sample was carried out on 3130xl genetic analyser. After obtaining the sequencing data for both the genes, sequence alignment was carried out by using Clustal W Multiple Alignment. A BLAST search was carried out for both genes to confirm the virus type. BLAST search revealed 97 % homology with Ebola Zaire strain. This strain has its origin from Guinea, Africa



Electropherogram of Gp gene of Ebola virus

8. Genetic Variability in HIV-1 *nef* Gene Sequences in Infants born to HIV-1 +ve mothers

Molecular characterization of *nef* gene sequences in HIV-1 infected infacnts and children (below 18 months) born to HIV-1 infected mothers from northern states of India was carried out. Functional motifs of the gene essential for nef activity were analysed and evolutionary relationships were dissected

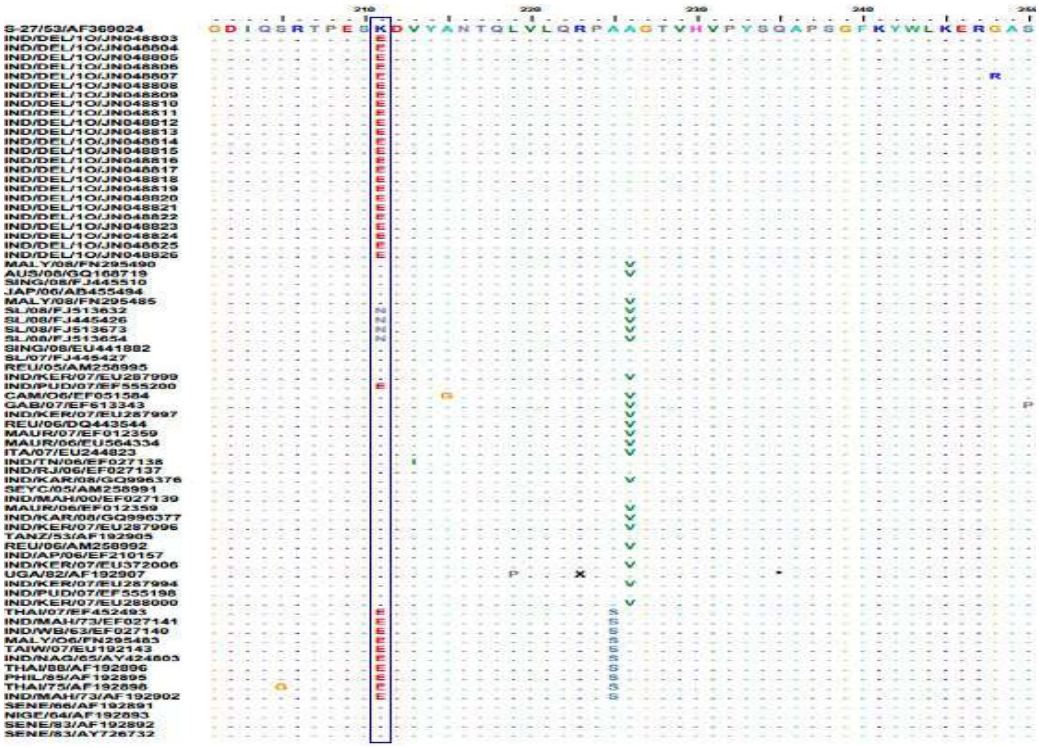
HLA Binding epitopes of nef gene sequence present in HIV-1 subtype C strains in India

Allele	Epitope Sequence	Residue Start Position	Affinity Binding Score
HLA-A1	GLEGLIYSK	104	36
	RTEPAAEGV	29	22.5
	NSENSSMGG	2	6.75
	NTDTNNADC	54	2.5
	NADCAWLRA	59	2.5
	QVPLRPMTY	81	2.5
HLA-A2	LKWKFDSHL	189	572.969
	LTFGWCFKL	**145**	**421.363**
	GKWSKSSIV	10	236.732
	MTYKGAFDL	**87**	**84.543**
	GAFDLSFFL	**91**	**14.947**
	VGFPVRPQV	74	4.197
HLA-A*0201	**GAFDLSFFL**	**91**	**143.580**
	ILDLWVYHT	117	11.655
	LTFGWCFKL	**145**	**10.8244**
	MTYKGAFDL	**87**	**9.361**
	ALTSSNTDT	49	7.452
	VGFPVRPQV	74	2.856
HLA-A*0205	GVGAASQDL	36	14
	GAFDLSFFL	**91**	**7.56**
	MTYKGAFDL	**87**	**4.284**
	LTFGWCFKL	**145**	**4.284**
	NEGEDNCLL	165	2.94
	ILDLWVYHT	117	1.36
	RQEILDLWV	114	180
HLA-B7	FPVRPQVPL	76	120
	RPQVPLRPM	79	30
	GVGAASQDL	36	20
	GAFDLSFFL	**91**	**12**
	AHRHMAREL	198	12
	DVRERIRRT	22	5
HLA-B8	YSKKRQEIL	110	80
	DVRERIRRT	22	12
	GAFDLSFFL	**91**	**1.2**
	FLKEKGGLE	98	1.2
	DPREVEEAN	157	1.2
HLA-Cw*0602	**GAFDLSFFL**	**91**	**6.6**
	AHRHMAREL	198	6.6
	LKWKFDSHL	189	6
	KEKGGLEGL	100	4.4
	KKRQEILDL	112	4.4
	QDLDKHGAL	42	4

Similarity analysis of the gene with the vaccine candidate sequences was also studied and HLA binding motifs were predicted. Out of a total of 65 HIV-1 positive infant's samples amplified, 57 were found to be PCR positive for the *nef* gene, which were then sequenced and analysed. Viral subtyping of the samples characterized majority of the isolated as subtype C followed by A1. All the HIV-1 subtype C full length nef gene sequences were aligned with the consensus subtype C sequences consisting of 207 residues and studies for the genetic variabililty, especially in the domains, which are structurally and functionally important for the biological activity of the gene. The phylogenetic tree was constructed using the sequences of the present study and previously reported sequences. It was observed that sequences of the present study are interdigitated with those of the previously reported Indian subtype C nef sequences forming a sub-clade. HLA-A and B alleles that are prevelant in Indian population, were screened to predict promiscuous HLA-binding epitopes in the Indian HIV-1 consensus *nef* gene sequence of subtype C. Several epitopes were identified in the consensus sequence and some had a very high affinity binding score (estimate of half-time of dissociation of a molecule) as shown in Table. The consensus amino acid sequence of *nef* revealed the occurrence of GAFDLSFFL as HLA binding epitope with highest frequency.

9. Mutational study in circulating ECSA genotype of Chikungunya virus

Chikungunya virus caused massive outbreaks in the Indian Ocean Island nations, South East Asia and India after its re-emergence in 2005. Molecular epidemiology of CHIKV circulating in North India was carried out using sequence alignment and phylogenetic analysis. Phylogenetic analysis of the sequences obtained from studied *E1* gene region along with sequences retrieved from database belonged to all geographical regions was done. The phylogenetic tree revealed that the Southern, Central, Western and Northern Indian chikungunya virus strains were very closely related to the strains of 2006 Reunion islands, all of them representing the ECSA genotype.

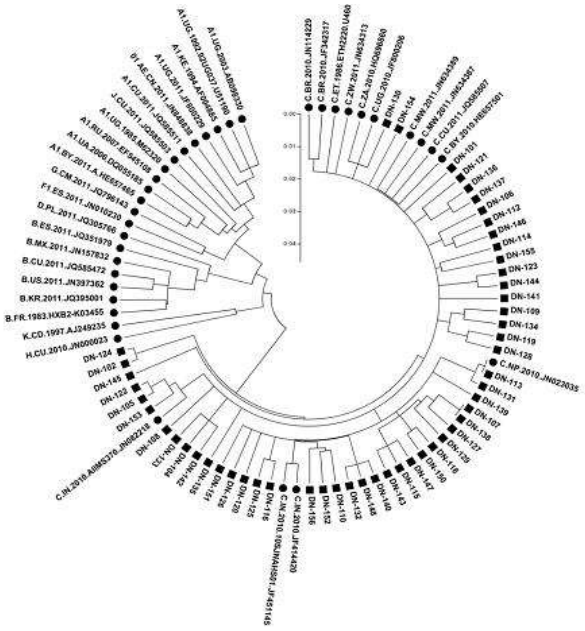


Amino acid alignment of *E1* gene compared with prototype revealed that 7 amino acid replacement with 2 changes of aspartic acid to glutamic acid at position 75 and 284 (D75E, D284E); 1 change of lysine to glutamic acid at position 211 (K211E); 1 change of asparagine to serine at position 216 (N216S); 1 change of methionine to valine at position 269 (M269V) and 1 change of valine to alanine at position 322 (V322A) were occurred.

Among variations seen in *E1* gene, two amino acid residues K211E, A226V deserves special mention. The mutation K211E of *E1* gene was found in CHIKV strains circulating in National capital region Delhi since 2010. It appears that *E1*-211 has a high propensity for mutation. *E1*-211 located in the domain II of *E1* glycoprotein.

10. Drug resistance associated mutations in protease gene of HIV-1 from North India

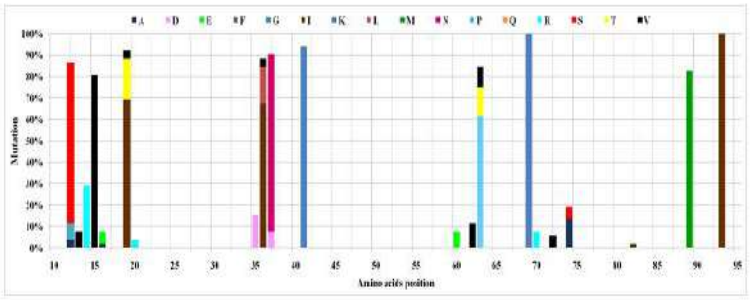
This study aimed to evaluate the prevalence of resistance mutations in the protease gene of HIV-1 strains isolated from North Indian antiretroviral (ARV) treatment-naive patients and to assess the phylogenetic relatedness of these strains with known HIV-1 strains.



Phylogenetic tree of the protease region of HIV-1 subtype C.

Fifty-four HIV-1 strains isolated from treatment-naive patients (n = 54) were included in this study. Resistance genotyping for the protease gene was performed using semi-nested PCR and DNA sequencing. The sequences were aligned (ClustalW) and a phylogenetic tree was built (MEGA 4 software). Drug resistance (DR) pattern was analyzed using the Stanford HIV-DR database and the IAS-USA mutation list.

For subtyping purposes, all the nucleotide sequences were submitted to the REGA HIV-1 subtyping tool version 2.0l. All the strains (100%) were found to belong to the C subtype and to harbor at least two secondary mutations in the protease gene. The most frequent mutations were H69K and I93L (52 of 52 strains), followed by I15V (80.7%), L19I (69.2%), M36I (67.3%), R41K (94.2%), L63P (61.5%), and L89M (82.7%).



Frequency of mutation in the protease gene in HIV-1 subtype C
drug naïve patients from position 10 to 99

This study confirms that HIV-1 subtype C predominates in northern India. Protease secondary mutations associated with drug resistance to protease inhibitors (PIs) were present with high frequency in the HIV-1 subtype C strains isolated from north Indian ARV treatment-naive patients, but no primary resistance mutations were found in this region. We suggest that resistance testing in HIV-1 infected patients should ideally be performed before the initiation of therapy to tailor the treatment for the individual to achieve the optimal therapeutic outcome.

Support to Outbreak Investigations

Pandemic Influenza A (H1N1)
In collaboration with Respiratory Virology Lab of Microbiology Division gene sequencing of circulating strains Influenza A (H1N1) were performed.

Hepatitis C outbreak, Srinagar (2014)

Serum samples suspected of HCV infection, received from district Kulgam, Jammu & Kashmir, were processed for RNA extraction and amplified by RT-PCR for HCV specific 5`UTR (249 base pair). Positive samples were then sequenced for genotyping. Outbreak belonged to HCV genotype 3a.

Dengue outbreak (Delhi, 2014)
Molecular characterization and genotyping was done for dengue serum suspected samples. DENV-1 genotype III and DENV-3 genotype III, which are relatively considered milder strains in terms of severity of disease and circulation of DENV-2 genotype IV were reported.

Ebola outbreak (2014)
One clinical specimen suspected of Ebola virus infection was processed for RNA extraction and amplified by RT-PCR for ebola specific gene regions *Gp* and *filo(Np)*. Sequencing and BLAST search of partial filo gene (*np* gene) showed 97% homology with Zaire strain (originated in Guinea).

5.6 Department of Parasitic Diseases

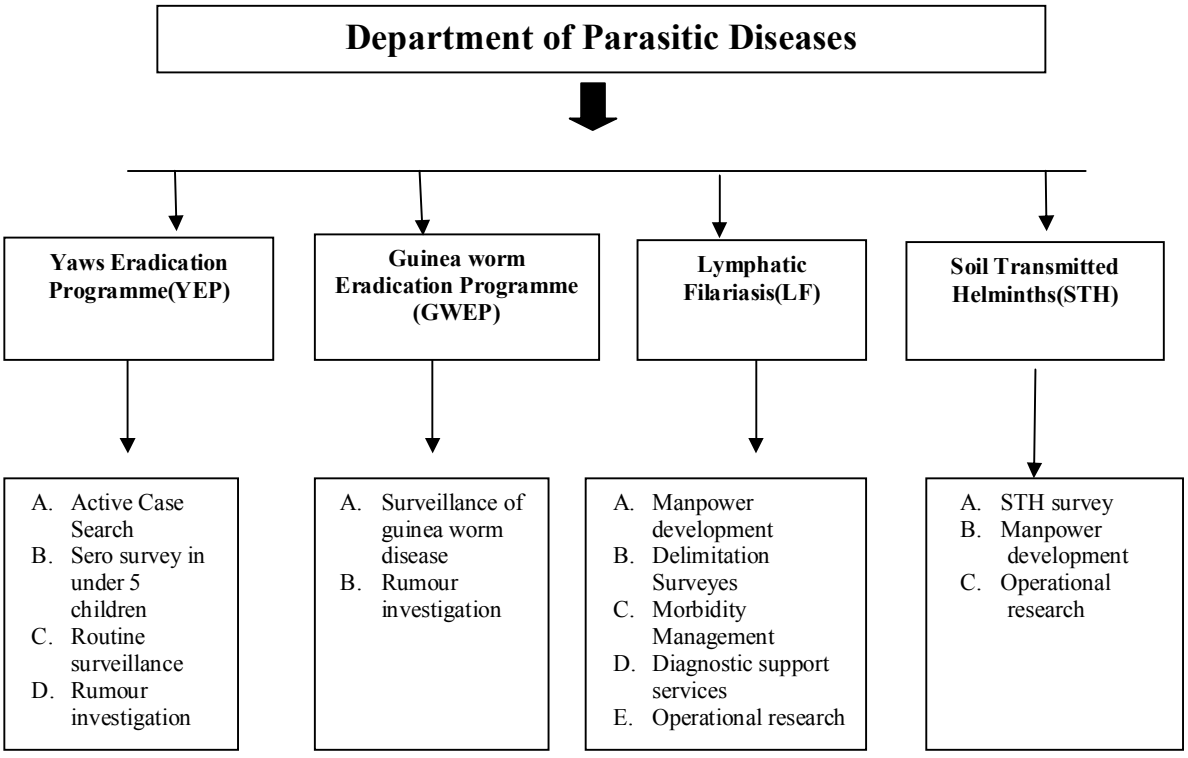
Dr. S K Jain
Joint Director & Head
Dr. T. G. Thomas
Joint Director
Dr. Vinay Garg,
Assistant Director
Dr Sandeep Jogband
Assistant Director

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 came down from 3571 in 1996 to 46 in 2003. No Yaws case reported from 2004 to till date.

Brief description of activities

House to house active search for cases was carried out in 2014-2015 in yaws endemic states and districts. No yaws case was found during search period.
Sixth Independent Appraisal of the Yaws Eradication Programme in India. The appraisal of YEP activities was held in May – June, 2014.
As part of programme strategy, YEP has been repeatedly evaluated at various levels including ground level appraisal by independent experts from time to time. Earlier the programme has been evaluated five times by independent experts in the year 2000, 2002, 2004, 2005-06 and 2007. Sixth Independent Appraisal of Yaws Eradication Programme (YEP) was undertaken in two phases from 07 -15 May 2014 and 17 – 26 June 2014 with the objective to assess the various activities of Yaws Eradication Programme.

Methodologies for appraisal of YEP were:
(g) Discussion with health officials;
(h) Verification of records;
(i) Visit to medical college, district hospital, CHC/PHC, subcentres and identified villages;
(j) Interaction with community members;
(k) Case verification including suspect case and old case, if any
(l) Verification of sero-survey at field level.

During these two phases, sixteen teams of experts visited sixteen districts of all ten states under YEP. Each team comprised of independent expert, representative from WHO country office, NCDC officer, state/ district representative and dermatologist from district. In phase I, eight teams visited Assam, Chhattisgarh (3 teams), Jharkhand, Gujarat, Madhya Pradesh and Maharashtra. In the phase II, eight teams carried out the appraisal in Andhra Pradesh (2 teams), Orissa (3 teams), Tamil Nadu (2teams), and Uttar Pradesh.

Teams from Andhra Pradesh, Assam, Jharkhand, Tamil Nadu, Maharashtra, Gujarat, and Uttar Pradesh reported satisfaction on the activities carried by the respective state and districts. All these states have carried out YEP related activities regularly. The appraisal team reported good coverage during the search. In Chattisgarh, district Dhamtari & Mahasamund has done good work. All the teams recommended using IDSP Early Warning System (EWS) reporting format for yaws reporting.

The broad recommendations of the appraisal teams included:
- All the teams opined that it is right time to work towards achieving yaws eradication certificate from WHO as i) no case of yaws has been detected since 2004 despite of continuous active case search, routine monthly reporting and maintenance of rumour register at all levels, ii) cash award announced also did not bring up any confirmed case
- Sero-survey has been conducted as per the scientific protocol during 2009, 2010 and 2011. All the serum samples were found negative by RPR test, indicating cessation of yaws transmission in the country. So, there is no need to continue this activity further.

- Continuous training/orientation programme for all MOs, MPWs, LHVs and other paramedical staff be a part of routine activities of YEP.
- Involvement of other peripheral field staff of other departments, viz.,IDSP, NLEP, Anganwadi, Veterinary, forest officials Panchayat and Tribal welfare departments to be ensured.
- The state health officials including CDMO/CM&HO/CMO/DMO/DDHS/JDHS and PHC Medical Officers should continue to take proactive measures in the for implementing the activities of YEP. The programme activities should be actively reviewed at state HQ
- IEC campaign to be vigorously pursued like the "weekly haat survey". The members observed that at this fag end of the programme, it is essential that the programme becomes much more visible. Hence, "Cash Incentive scheme for Case and informer" to be given wide publicity through audio-visual media.
- In addition to the existing reporting all the erstwhile endemic districts of Yaws should start reporting Yaws on IDSP Early Warning Signal (EWS) format to strengthen surveillance of yaws.

Subsequently, Seventh Meeting of the Task Force was held on 25th July 2014 under the chairmanship of DGHS. The task force periodically reviews and takes view on technical issues pertaining to the Yaws Eradication Programme (YEP).

The meeting was organized with the following objectives:

1. Review the implementation of the recommendation of last Task force meeting held on 11.02.2009.
2. Review the report of the 6th Independent appraisal held on 7-15 May and 17-26 June, 2014
3. Permission to initiate the process towards the declaration of Yaws eradication from India

The Task Force recommended that:

1. As inspite of continuous activities under the Yaws eradication programme such as active case search, rumour reporting & investigation as well as awareness generation in the community about Yaws disease and wide publicity of the cash incentive scheme, no new Yaws case has been detected in the country after November 2003. The sero-survey carried out as per scientific protocol could not find any sero-positivity in 1-5 years children indicating no transmission of Yaws infection in the community, "The country should prepare its case for getting eradication certificate from World Health Organization (WHO) and NCDC should initiate next steps in this direction".
2. State and district level review meetings should devote more time for discussion of YEP
3. Sero survey may be discontinued
4. IEC activities including awareness about cash incentive may be intensified.

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.

Activities related to Guinaeworm

The department is keeping a watch on reported suspect cases of Guinaeworm disease throughout the country. In January 2015, on the request of Director, Public Health & Preventive Medicine, Tamil Nadu, a rumor case of Guinea worm reported from Sivaganga district of Tamil Nadu was investigated. A multidisciplinary committee comprising of senior faculty members of NCDC was constituted. It was found that the epidemiological & morphological features suggested that the case was not of Guinea worm, which was later identified as Dirofilaria repens by Indian Veterinary Research Institute, Bareilly.

Activities related to Lymphatic Filariasis

Details for morbidity management & night blood smears examined

Sr. no.	Activities undertaken	Nos examined
Morbidity management		
1	NCDC branch Kozhikode for morbidity management	747
2	NCDC branch Rajahmundry for morbidity management	2710
3	NCDC branch Varanasi for morbidity management	3024
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	93 tested and 16 found positive for mf infection
2	Night blood smears were examined by NCDC branch Kozhikode for filaria infection.	276 tested none found positive for mf infection
3	Night blood smears were examined by NCDC branch Rajahmundry for filaria infection.	1104 tested and four found positive for *W. bancrofti* infection.
4	Night blood smears were examined by NCDC branch Varanasi filaria infection.	1444 tested and 31 found positive for *W. bancrofti* infection.
Cross checking of Night Blood smear for mf infection		
1	Night Blood Smears (NBS) received from various NFCP Units were cross-checked by Rajahmundry branch	1083 tested and only three slide was found positive for mf infection
2	Night Blood Smears (NBS) received from various NFCP Units were cross-checked by Kozhikode branch	876 tested and three was found positive for mf infection
3	Night Blood Smears (NBS) received from various NFCP Units were cross-checked by Varanasi branch	Nil

Soil-transmitted helminthiases (STH)

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). A National workshop to develop "National Plan of Action for Prevention and Control of Soil Transmitted Helminths in India" was organized in January 2004 aimed at prevention and control soil transmitted helminths in the country. The workshop was attended by representatives of ICMR, WHO, MCD & UNICEF as well as NGOs like VHAI. Core group of experts was constituted to monitor recommendations of workshop. The core group observed that there is lack of representative data on STH burden in the country; prevalence of STH in 'Non school going population' was also unknown. Also, guidelines for mass drug Administration of Albendazole/mebendazole were not available in India. Ecological divisions were considered as basis for conducting prevalence surveys.

With an objective to estimate STH prevalence rates in different regions, NCDC has once again after a period of seven years, embarked upon a journey to map the disease load in the community. The current surveys have been conducted among school going children in Delhi and Allepey (Kerala). NCDC has been identified by the Ministry of Health 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.

Recently, an expert's group meeting to deliberate on methodology of conducting STH prevalence surveys was organised at NCDC in June 2015. The meeting saw discussions on the topic among experts from WHO, medical college faculty, NGO representatives as well as Officials from the Ministry. The updated action plan for STH mapping shall be acted upon for the purpose.

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.

With an objective to estimate STH prevalence rates in different regions, NCDC has once again after a period of seven years, started the process of surveying STH infection rates among the school going children in the community. The surveys have been started among students Municipal Corporation Schools located in Delhi. Two of the MCD demarcated zones have been surveyed and stool samples processed using WHO standardized Kato-katz technique. The current surveys have preliminarily shown prevalence for Ascaris lumbricoides in the range of 29% to 32% thereby indicating that we should advocate once a year mass deworming activity in Delhi region. Similar surveys in other parts of the country shall be conducted in due course of time involving regional stakeholders and technical partners.

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.

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

Officer Name	Place & purpose	Period
Dr. S.K. Jain	Gandhi Nagar and Ahwa Dang district of Gujarat Independent Appraisal of YEP	7 to 15 May 2014
	Hyderabad and Khammam district of Andhra Pradesh Independent Appraisal of YEP	17 to 26 June 2014
	Kallakurichi District, Tamil Nadu to investigate the rumour of Yaws	10 to 11 July 2014
	Bhubaneswar, Odisha to attend sensitization meeting of District Nodal officers of Yaws Eradication Programme	26.8.2014
	Srinagar, Kashmir to assess the Public health situation & assist local health authorities following floods in Jammu & Kashmir, as a member of Central Public Health Team	8 to 12 September, 2014
	Srinagar, Kashmir to assess the Public health situation & assist local health authorities following floods in Jammu & Kashmir, as a member of Central Public Health Team	14 to 20 September, 2014
	Deputed by Ministry of Health & FW as a part of Central team to assess the Standard procedures and logistics available to fight the threat from Ebola virus disease at Mumbai International airport	25 to 26 October, 2014

	Deputed by Ministry of Health & FW as a part of Central team to assess the Standard procedures and logistics available to fight the threat from Ebola virus disease at Calicut International airport, Cochin International airport and Cochin Seaport	5 to 7 November, 2014
	Jaipur as a part of Central Public Health team to assess the H1N1 Influenza situation, assist and advise the state in instituting public health measures.	23 to 24 January 2015
	Jammu as a part of Central Public Health team to assess the H1N1 Influenza situation, assist and advise the state in instituting public health measures.	28 February to 2 March 2015
Dr Vinay Kumar Garg	Deputed by Ministry of Health & FW as a part of Central team to assess the Standard procedures and logistics available to screen the suspects of Ebola virus disease at Coimbatore International airport and assess Medical College preparedness for same	23rd Nov 2014 to 24th Nov 2014

5.7 Medical Entomology & Vector Management

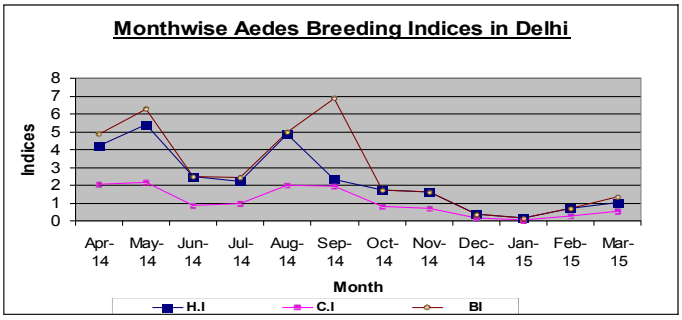
Dr R S Sharma
Addl Director & Head
Dr L J Kanhekar
Joint Director
Dr Roop Kumari
Joint Director

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

Ongoing Research Projects

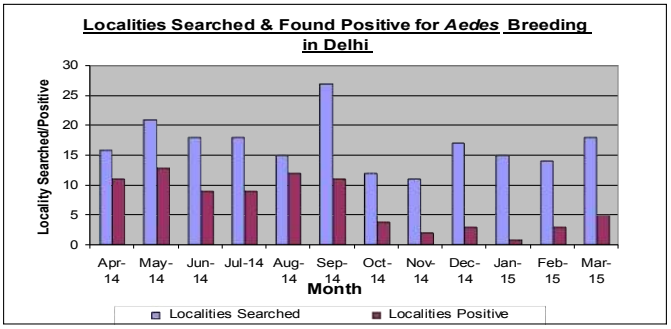
Entomological surveillance and detection of early warning signals for Dengue outbreak in Delhi

Vector surveillance has been carried out on regular basis in different parts of Delhi. The objective is to know the seasonal dynamics of the Dengue vectors in relation to Dengue virus activity in mosquitoes for early warning signal to predict Dengue outbreak. Findings for the mentioned period as per the project are given below.Trend of month-wise breeding indices of *Aedes* mosquitoes in Delhi is given in Figure 1 which shows that House Index (HI) and container index (CI) were found highest in the month of May-2014, while Breteau index was maximum in the month of September 2014.



Trend of month-wise breeding indices of Aedes mosquitoes in Delhi

Total of 202 localities searched for *Aedes* breeding and total 83 localities were found positive. Maximum breeding was found during the month of May followed by August. Details of localities searched and found positive is given at Table & Figure. Reports for positive breeding sites are communicated regularly to MCD and NVBDCP for necessary control measures.



Localities searched and found positive for Aedes breeding in Delhi

Breeding was mostly found in peri domestic areas in plastic black syntax tanks, plastic storage water containers, cemented tanks, planted pots, earthen mud pots while in tyre, birds feeding pots and plastic disposable unused containers.

Dengue Virus Detection in vector mosquitoes by ELISA method

Virus antigen detection is the process to detect presence of Dengue virus in their respective dried vector mosquito (adult mosquitoes) by ELISA. This method for detection of dengue virus in vector mosquitoes has been standardized by Dr Roop Kumari, Joint Director, who is in charge of the laboratory. .All the larvae samples collected during field visits were reared in the laboratory for adult emergence and then identified species-wise and sex-wise for each locality. These samples are given specific pool numbers and have not more than 50 mosquitoes each. It is a manual process of ELISA method in which dengue antigen has been detected by using specific monoclonal antibodies and conjugate.

During the period, 202 localities were searched for Aedes breeding out of which 83 localities were found positive for Aedes larvae after rearing in lab 161 mosquito pools of 1060 mosquitoes were tested and 17 pools were found positive. Details are given in Table .

Dengue virus detection details (April-2014 to March-2015)

No. of Locality Searched	No. of Locality Positive	No. of Mosquitoes/ Pools Tested	No. of Pools Positive*
202	83	1060/161	17 pools positive

*Pools positive was from Dr Ambedkar Hospital (1), Delhi Cantt. (2), Mehraulli (3), Jharoda Dairy (1), Kakrola Farm (2), Mandi Gaon (2), Peeragarhi (1), Kirvi Place (1), Sarai Kaley Khan (1), ,Gurgaon(1) , Farida Bad Sector 5 (1) Nazafgarh- Nangli Dairy (1)

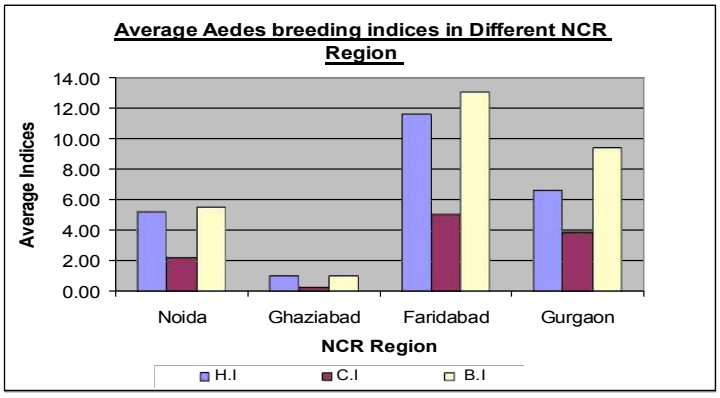
Aedes Surveillance in NCR

Aedes surveillance has been carried out in the four NCR regions of Delhi namely Noida, Ghaziabad, Gurgaon & Faridabad. Reports for positive breeding sites are regularly communicated to Director, Health

Average Aedes breeding indices in NCR regions

	H.I	C.I	B.I
Noida	5.26	2.26	5.55
Ghaziabad	1.12	0.37	1.12
Faridabad	11.5	5.13	3.04
Gurgaon	6.69	3.90	9.43

services of respective states and NVBDCP for necessary control measures. Average *Aedes* breeding indices in different NCR regions is given in Table and Figure.



Average Aedes breeding indices in different NCR regions

Airport/Seaport Survey

Entomological surveillance of vector of Yellow Fever, dengue and chickungunya mosquitoes in and around international airports and sea ports and vector control measures

As per the International Health Regulations, the Airport/Sea ports and surroundings (about 400meters) should be free from *Aedes* mosquitoes; the vectors of Yellow fever and dengue. In view of its international health regulations importance, it was decided to conduct an entomological surveillance in and around the International Airports and Sea ports. *Aedes* survey was carried out by C.M.E&V.M in Goa Airport/Seaport, Amritsar Airport and Vishakhapatnam Seaport. Details of the survey are given below:

Aedes survey details for Airport/Seaport conducted by C.M.E&V.M.

Name of Seaport/Airport	Period	Entomological Surveillance		
		HI	CI	BI
Goa Airport	Pre-monsoon	8.0	3.4	8.0
Goa Airport	Post-monsoon	10.25	8.14	--
Goa Seaport	Pre-monsoon	12	13.95	12
Goa Seaport	Post-monsoon	33.02	16.64	--
Vishakhapatnam Seaport	Pre-monsoon	31.57	4.81	31.57
Amritsar Airport	Pre-monsoon	0	0	0

Breeding was found in plastic syntax tanks, plastic container with storage water, tyres, discarded plastic cups and metallic pots.

Capacity Building

A training for Entomologists was organized by Centre for Medical Entomology & Vector Management in collaboration with Integrated disease surveillance Project at NCDC from 9th–13th March 2015. Twenty two entomologists recruited under IDSP, NVBDCP consultants (Entomologists) participated in this training. For successful culmination of the training, different experts in the field of medical entomology were invited to deliver lectures on various specialized topics. The training comprised of overview lectures and discussion on malaria, filaria, dengue, Japanese encephalitis, Kala-azar, Scrub typhus, Chikungunya, Plague, CCHF and sampling methods, entomological surveillance, outbreak investigation and control, insecticide resistance and epidemiological aspects of vector borne disease transmission. Two field visits i.e. one outstation field visit in Karnal, Haryana and one local field visit in Delhi were carried out under the supervision of .Dr Kanhekar, Joint Director and Dr Roop Kumari, Joint Director of CME VM Division and Dr Bala Krishnan, Joint Director from NCDC Bengaluru branch. Field training was provided to them on

various aspects of entomological/epidemiological data collection, monitoring of records, methods of surveillance of various disease vectors, etc.. In view of recent outbreaks of CCHF & Scrub typhus, special emphasis was given to teach sampling methods and identification of ticks, mites and fleas. After completion of this training, participants were capable to undertake entomological surveillance of disease vectors, monitoring of monthly density, susceptibility status of vectors and support for preparation of district/State action plan for control of vector borne diseases.

Field visit in Karnal, Haryana–methods of teak collection

Flagging method- in the cattle grazing ground & Cattle body search method




National Reference Entomological Museum

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

National Reference Entomological Museum


National Reference Entomological Museum

Major Achievements

- **CCHF outbreak** has been investigated by officers of this division during the month of January 2015. On the directions of Director, NCDC a central team consisting of Dr Anil Kumar, Additional Director, Dr Roop Kumari, Joint Director, Dr UVS Rana, Consultant and Dr Rupali Roy, Asst. Director from National Center for Disease Control, New Delhi, visited Jaipur & Jodhpur from 22nd to 27th Jan 2105 to investigate outbreak of Crimean Congo Haemorrhagic Fever. Dr LJ Kanhekar carried out survey on 29/1/15 for vectors of CCHF in Mohalla Pattiwala, Kanth, Distt. Moradabad (U.P) as case of CCHF occurred at Kanth & female patient died due to CCHF. Mammal *viz*., monkey, dog, cat horses and cattle were observed in the locality & ticks were collected from 8 cattle shed. Also, Dr Roop Kumari, Joint Director, visited Jodhpur, Rajasthan, for outbreak investigation of CCHF on 23/1/15.
- Based on the entomological surveillance of Dengue vectors and detection of dengue virus in vector mosquitoes in Delhi, early warning signals were issued to Municipal Health Officer, MCD, Delhi to take appropriate preventive measures to prevent the possible outbreak.
- List of high-risk localities was communicated to Municipal Corporation of Delhi and NVBDCP for action taken. Also presented this report in the meeting of Hon'ble Health Minister of Delhi Govt. and meeting on Action Plan organized by NVBDCP.
- Dengue virus was detected in *Aedes* mosquitoes collected from Faridabad, Gurgaon and Delhi.
- Dr R S Sharma and Dr Roop Kumari are the members of **Dengue task force** for providing technical guidance for prevention and control of dengue in Delhi.
- Dr Roop Kumari participated in **DDT expert group meeting in UNEP, Geneva from 10-12 November 2014**.
- Dr R S Sharma attended **WHO Expert group meeting at Geneva** from 17 -19 March 2015.
- A meeting of **Insecticide Expert Group** was also organized by CME &VM on 18th Dec 2014 to discuss about field trails of insecticides.
- Aedes surveillance in international Airports/ seaports was also carried out in Goa, Amritsar, Kandla and Vishakapatnam.
- Capacity building for staf of Goa airport/seaport conducted on vector surveillance and control.
- Capacity building for State entomologist recruited under IDSP was conducted by the division from 9th to 13th March 2015.

5.8 Division of Malariology & Coordination

Dr C S Aggarwal
Additional Director& Head
Dr Pranil Kamble
Assistant Director
Dr Shikha Vardhan
Assistant Director

Broad objectives/ activities

- 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

The Division has been created in the month of February 2015 as a new initiative to deal with the public health issues arising out of occupational and environmental pollution, contamination.

- ***Prepared an annual plan and budget outlay in coordination with Environment Health Division of the Directorate general of Health Services.***
  As an initial activity of the division, the annual plan of action for the year 2015-16 has been prepared. It has been done with consideration of the proposed activities the centre going to undertake in the areas of surveillance, monitoring, training and research.
- ***Training in disaster management***
  Officers of the Centre attended a five days Training of Trainers for Preparation & Implementation of Hospital Disaster Management Plan: Focus on Emergency Health Services (NCRMP)" from 16 to 20th February 2015, at National Institute of Disaster Management, Delhi.
- ***Meetings with stakeholders:***
  To get the perspectives from the stakeholders in the area of environmental health, meetings were conducted with major stakeholders as Central Pollution Control Board. These drifted towards conceptualizing the epidemiological studies in the thrust areas.
- ***Involvement in field investigations/outbreak investigations by officers of the Centre:***
  Two officers of the Centre are involved in development of technical, laboratory, clinical and toxicological guidelines for conducting investigations and collection of various samples for Acute Encephalopathy Syndrome (AES) in Muzaffarpur (Bihar) and Malda (West Bengal). Methylenecyclopropylglycine (MCPG), the toxin present in litchi fruit, is being investigated for possible link to occurrence of AES in these localities.

- Officers of the Centre supported SHOC (Strategic Health Operations Centre) activities during its activation for H1N1 Influenza outbreak. Technical inputs were provided by undertaking data analysis and interpretation.
- Officer of this Centre has lead Central Team for investigation of an outbreak of avian influenza in Alappuzha district of Kerala state during November-December 2014, outbreak of H1N1 Influenza in

Karnataka state during February 2015, and outbreak of avian influenza in Amethi district, Uttar Pradesh during March 2015.

- ***Other activities of the Officers of the Centre***
  - Dr Shikha Vardhan coordinated the MPH-FE training of the first & second semester MPH-FE students
  - Dr Shikha Vardhan visited *Sri Guru Ramdasji International Airport, Amritsar*" along with attached isolation /Quarantine facilities and *Guru Nanak Dev Hospital, Amritsar* for Ebola Virus Diseases preparedness.
  - Dr Shikha Vardhan attended *Measles, Rubella & CRS Training Workshop under India EIS programme.*
  - Dr Pranil Kamble is associated with HIV surveillance component of National Family Health Survey 4 (NFHS 4) at the Centre for AIDS and Related Diseases (CARD) at NCDC, Delhi.
  - Dr Pranil Kamble is associated with laboratory testing of samples for HIV as part of Integrated Biological and Behavioral Surveillance (IBBS) in Northern States under NACO.
  - Dr. Pranil Kamble has been assisting in day to day functioning of the CARD Division at NCDC, Delhi.

5.9 Centre for Non-Communicable Diseases

Dr Sonia Gupta
Addl Director & Head
Dr Chhavi Pant Joshi
Assistant Director
Dr Rinku sharma
Assistant Director

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 main achievements till 31.2.15 are as follows

1. An Expert Group meeting for strengthening of Biochemistry lab was organized on 13 February 2015. The meeting was chaired by Dr NS Dharmshaktu, Addl. DG, Dte. GHS. The committee comprised of HODs from AIIMS, MAMC, NEERI, IARI, Jamia Hamdard Institute, UCMS and senior officers from DRDO, ICMR and Water Testing Lab, Guindy.

   The Committee suggested that a state of art laboratory infrastructure should be created for NIDDCP and NPPCF, water & soil testing and a good laboratory for practice of immunology, toxicology, genetics & molecular biology as NCDC is the national apex centre for IDD, Fluorosis, and outbreak investigations of new emerging and remerging health problem of public health importance. Whereas routine labs to be created for Clinical Biochemistry and Hematology to support outbreaks. The committee also made recommendations on bridging manpower gaps, infrastructure and development of network linkages.

2. One Assistant Director presented in the 'Plenary Session on NCDs' in the 42nd IAPSM conference held in February 2015, at King Georges Medical University (KGMU), Lucknow. The topic of presentation was 'Non Communicable Diseases – Progress and Way Forward'. Other presenters of the session were eminent speakers like Dr JS Thakur, Professor PGIMER Chandigarh who presented on 'Epidemiology of NCD' and Dr Damodar Bachani, Dy Commissioner (NCD) MoHFW who presented "National response and way forward'.

3. One Assistant Director from Centre for NCDs was sent to PGIMER Chandigarh in March 2015 for attaining national course on public health approaches to Non Communicable Diseases. This course included Epidemiology and impact of NCD; Public health intervention for prevention and control of NCD; Thematic sessions on Tobacco control, Physical activity, Diet and alcohol; Surveillance, Monitoring and Evaluation for NCDs; Research priority for NCDs; Cancer control; Mental health; Multispectral and Integrated actions; and Global, Regional and national initiatives.

5.10 Statistical Monitoring and Evaluation Cell

Ms. Shobha Marwah
Addl. Director & Head
Mr. Pawan Dhamija
Addl. Director

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	14
7.	2011-13	6
8.	2012-14	6
* 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) carried out during January 2014 to March 2015:

- Coordination with GGSIPU over Admission and counselling for **MPH (FE) Batch 2014.**
- Actions for advertisement of admission notice including processing for admission of WHO candidates and also writing to DHSs of all states: **MPH (FE) Batch 2014 and 2015.**
- 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.

- Affiliation/Academic Audit by the University -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.
- The processing of the applications of The 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.

Training/workshop carried out by the Division

Conducted two Training programmes on Biostatistics including computer training for NCDC officers/staff including those of officers/staff of NCDC branches during June – July 2014

- **Scientific Reports: NCDC Branches**

5.11 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.

Other Activities

1. Monitoring of Filaria elimination programme in Bihar

The Mass Drug Administration for elimination of Filaria in Munger and Banka Districts were monitored and observations and recommendations were given to programme manager.

Munger:

- In Munger 7 villages from 3 PHC and 1 urban area were visited.
- In Kataria village of Sadar PHC the drug was received in the evening on 18.02.15.
- The population received the drugs is given in the attached table.
- The 1 Drug distributers was given the target to 1100-1200 populations to cover in 3 days.
- Only one poster was displayed in the PHC.
- In urban area of Munger Mikeing was going on.

In urban area the Drug distributer was distributing the pamphlets, in rural area pamphlets were not distributed. As the drug distributer was not given any IEC material. Not a single person had consumed the drugs. When I convinced them they had taken drug in front of me and District Filarial officer, Medical officer of Dharhara PHC were also present.

- Non consumption of drug was due to failure of proper IEC in the district.
- The proper entry was not in proforma, also noticed in many places as they are writing on plain papers or loose sheet.
- The supervisor was not found in the field in visited villages.

Banka:

There was no Filaria officer posted in the district, the Medical Officer I/C of Kataria PHC was given addition charge of Filaria.

- In Banka district 5 villages from 3 PHC were visited during 19th & 20th Feb.2015.
- Banka also single Drug distributor was given huge target of population (1100-1200) to cover under MDA.
- No IEC activities were carried out.
- In the villages drugs were being distributed.
- Only 20-25% of targeted populations were covered up to 20.02.2015.
- No one has taken the drugs. Populations were keeping the drugs in their houses.
- The villages told that why should I take the drugs, when we are not having filarial.
- The Drug distributor was not properly trained.

The entry was not proper as they were writing on loose sheet, registers and very few on prescribed proforma. In few places drug distributor was taking the help of her small children (below 8 years of age in making the entry in register or giving the drug. When I asked her, she told how I can complete the huge target by as single person. The MDA success can be imagined.

Recommendations

Before MDA, proper training must be organized. Proper IEC and BBC and increase number of Drug distributors/ supervisiors in the field not on papers.

Supervision of Indoor Residual spray of DDT 50% in Gopalganj and Siwan district of Bihar.

The **Gopalganj & SIWAN district of Bihar** is highly endemic for Kala-azar disease. The districts were visited for Monitoring and Supervision of IRS activities for Kala-azar Elimination Programme. The DDT spray operation was monitor and supervised as per the Check list. In Gopalganj (3 PHCs & 5 villages) , Siwan (4PHC & 10 Villages) were monitor and supervise for IRS. Details are presented in the attached check list.

Major Observations

The DDT spray for Kala-azar elimination programme is being carried out as per schedule in Gopalganj and Siwan district.
The villages are being sprayed as per action plan.
The spray workers were well trained in IRS in both districts.
Supervisory teams formed for supervision of DDT spray and are supervising the IRS.
The involvement of ASHA was not good in Gopalganj whereas in Siwan they are actively involved.
The IEC activities, school children were involved.
The mikings were also used in both districts.
In Siwan district Gram Pradhan were actively involved and they were sensitized at district head quarter about the benefit of IRS and were asked to help in IRS. The District Magistrate also issued a letter to all Gram pradhan for IRS.
The quality of IRS is Gopalganj was patchy while in Siwan it was **very Good** in visited villages.
The CARE has provided toolkit along with a motorcycle rider for repairing of spray pumps in the field itself so that the quality of spray may not hamper.
The DPO CARE in both districts were actively involved in IRS activities.
In Siwan district the best spray team will be awarded a certificate for good quality spray so there was a competition in spray team to show the best quality spray. This activity is monitored by CARE team.
The CARE has provided stop watch and other materials to the spray team.
Mounted slide of sandflies were provided with team to show to villagers, the transmitting agent, this activity has broken the refusal rate in Siwan.
In Siwan district the DMO has drop 18 spray personnel who were creating problem in the spray that's why the spray was going on very smoothly and uniformly.
The WHO team also reported patchy spray in Gopalganj during presentation with civil surgeon & DMO of Gopalganj.
The Community was accepting the Spray but the field workers were not spraying their house as recommended in Gopalganj.
Very few villagers refuse, to take DDT spray in their houses due to spots of DDT on the walls as their houses were cemented and well maintained.

Recommendations

In Siwan it is recommended that the spray should be done only upto 6 feet height only as they are doing beyond 6 feet.
The DMO Gopalganj should remove the non performing spray team as they are creating problem in the field though they are well trained.
In Gopalganj the spray team should reach in village well in time as they reach in village very late and doing spray very fast that's the quality of spray hamper.

3. Maintenance of Sandfly colony in the laboratory.

The sandfly *Phlebotomus argentipes* a vector of kala-azar, were maintained in the laboratory, the immature stages were shown to various participants to attending training in the state.

Research project:

Study on behavior changes of *Ph.argentipes* vector of visceral leishmaniasis in India was sanctioned by National Vector Borne Disease Cotrol Programme.

The broad objective of the project:

- To study the biology of vector sandflies.
- To know the feeding pattern of vector sandflies.
- To study the resting behavior of vector sandflies.
- To know the species composition of sandflies.
- To know the age structure and survival of vector sandflies.
- To know the biting behavior and /man vector contact of vector species.
- To understand the population dynamics of vector sandflies.
- To know the vector susceptibility status of vector sandflies *(Ph.argentipes)*

Outbreak investigations carried out by the Division

AES outbreak in Muzaffarpur was carried out along with NCDC team during May to July 2014.

5.12 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 Lab for testing of human blood samplesfrom Karnataka state.

Investigation of disease out-breaks
Investigation of Kyasanur Forest Disease (KFD) outbreak at Wyanad district of Kerala state.

Plague Surveillance work

Plague was a major public health problem in the many states of India in the earlier part of the past country. Its enzootic foci exist in seven (7) states of the country and resulting periodic outbreaks. The National Centre for Disease Control (NCDC) Bengaluru Branch is coordinating plague surveillance activities of the following endemic areas of the country viz. Chittoor district, Andhra Pradesh; Niligiris and Krishnagiri districts, Tamil Nadu; Kolar and Bengaluru rural districts, Karnataka; Beed district, Maharashtra; Surat, Urban and Rural district, Gujarat; Barkot, Uttarkashi district Uttarkhand and Rohru, Shimla district, Himachal Pradesh. The National Centre for Disease Control (NCDC) Bengaluru Branch has received rodent sera, organ samples, flea specimens, Dog /Human sera samples from the above states on weekly / monthly basis. The samples are being processed in the laboratory and test results are furnished to the state health authorities on a fortnightly basis. The NCDC Bengaluru Branch team also has periodically visited the above endemic areas/states for monitoring Plague Surveillance activities and also to collect rodent, Dog and Human blood samples, rodent organ samples and flea specimens. The above samples are being processed in the laboratory and reports are furnished to the concerned state Health Authorities for further measures.

During the reporting period of 2014-2015, the particulars of Plague Surveillance activities carried out by the NCDC Bengaluru branch team in various states and Seaports are given in the Table. A total of 470 rodents and 51 dog and 157 human sera samples (Table -3) were collected during the visit of NCDC, Bengaluru team to various endemic areas, the number rodent species collected and their number in parenthesis viz.. *Tatera indica cauvierii* (2) *Rattus rattus* (324), *Bandicota indica* (94), *Rattus norvegicus(25) Meriones hurrianae*(7) and *Bandicota bengalensis* (18).

During the reporting period the particulars of rodent and dog sera samples collected by the various state Plague control Units are given in Table. A total of 4615 rodents viz. *Tatera indica cauvierii* (1096), *Rattus rattus* (3250), *Bandicota indica* (259), *Rattus norvegicus (5), Bandicota bengalensis* (04) *and Mus musculus (1)*, and Dog 812 sera samples were collected. The samples were also received by weekly / monthly basis from the respective states and also human blood samples stored in the laboratory for further necessary action.

Particulars of states and seaports visited by the NCDC team during 2014-15

State	Place	Sera sample received							Total	
		Ti	*Rr*	*Bi*	*Rn*	*Mh*	*Bb*	*Mm*	Rodent	Dog
Karnataka	Bangalore (R)	0	74	3	0	0	0	0	**77**	**-**
Andhra Pradesh	Visakhapatnam	0	14	35	0	0	0	0	**49**	**-**
Gujarat	Surat (R)	0	4	0	0	0	0	0	**4**	**15**
	Surat SMC	0	45	6	0	0	0	0	**51**	**2**
	Kandla seaport	2	24	21	24	7	0	0	**78**	**-**
Maharashtra	Pune	0	32	0	0	0	0	0	**32**	**3**
Uttarakhand	Barkot	0	0	0	0	0	0	0	**0**	**-**
Tamil Nadu	Vellore	0	36	3	0	0	0	0	**39**	**31**
	Thiruvanamalai	0	15	3	0	0	0	0	**18**	**-**
	Tuticorin seaport	0	8	14	1	0	0	0	**23**	**-**
Himachal Pradesh	Rohru	0	47	0	0	0	0	0	**47**	**-**
Kerala	Wyanad	0	17	0	0	0	0	0	**17**	**-**
	Cochin seaport	0	8	9	0	0	18	0	**35**	**-**
GRAND TOTAL		**2**	**324**	**94**	**25**	**7**	**18**	**0**	**470**	**51**

Particulars rodent and dog sera samples collected state plague control units and received by the NCDC Bengaluru during 2014-15

State	Place	Sera sample received							Total	
		Ti	*Rr*	*Bi*	*Rn*	*Mh*	*Bb*	*Mm*	Rodent	Dog
Karnataka	Kolar	344	644	0	0	0	0	0	**988**	**-**
Andhra Pradesh	Palamaner	490	698	3	0	0	0	0	**1191**	**-**
Gujarat	Surat (R)	0	51	0	0	0	0	1	**52**	**23**
	Surat SMC	0	587	76	0	0	4	0	**667****	**789****
Maharashtra	Pune	0	0	0	0	0	0	0	**0**	**-**
Tamil Nadu	Hosur	262	221	17	5	0	0	0	**505**	**-**
	Coonoor	0	1049	163	0	0	0	0	**1212**	**-**
GRAND TOTAL		**1096**	**3250**	**259**	**5**	**0**	**4**	**1**	**4615**	**812**

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

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

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.

Particulars of rodent organ smears received and examined by NCDC Bengaluru during –2014-15

State	Place	Organ smear sample received							Total
		Ti	***Rr***	***Bi***	***Rn***	***Mh***	***Bb***	***Mm***	**Rodent**
Karnataka	Bangalore (R)	0	167	5	0	0	0	0	**172**
	Kolar	344	673	0	0	0	0	0	**1017**
Andhra pradesh	Palamaner	490	770	3	0	0	0	0	**1263**
	Vishakapatanam	0	45	65	0	0	0	0	**110**
Gujarat	Surat (R)	0	176	0	0	0	0	1	**177**
	Surat SMC	0	0	0	0	0	0	0	**0**
	Kandla seaport	2	100	23	20	15	0	0	**160**
Maharashtra	Pune	0	41	0	0	0	0	0	**41**
Uttarakhand	Barkot	0	0	0	0	0	0	0	**0**
Tamil Nadu	Vellore	0	93	4	0	0	0	0	**97**
	Thiruvanamalai	0	33	9	0	0	0	0	**42**
	Tuticorin seaport	0	11	16	1	0	0	0	**28**
Himachal Pradesh	Rohru	0	63	0	0	0	0	0	**63**
Kerala	Wyanadu	0	30	0	0	0	0	0	**30**
	Cochin seaport	0	14	9	0	0	29	0	**52**
GRAND TOTAL		**836**	**2216**	**134**	**21**	**15**	**29**	**1**	**3252**

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

Entomological Study

The rodent ecto-parasitic fleas are being retrieved from the trapped domestic, peridomestic and wild rodents in Plague Surveillance work. The above flea specimens are preserved in 70% alcohol and transported to laboratory for mounting and identification. During the reporting period various State Plague Control Units i.e. Plague Control Unit, Kolar, Karnataka State and Anti Plague Unit, Palamaner, Andhra Pradesh, Plague control unit ,Pune, Surat RDD team from Gujarat, Plague control unit, Barkot, Uttarkhand state conducted routine surveys, and also REP survey carried out at Vellore , Tiruvanmalai of Tamil Nadu state, Wyanad of Kerala state,Visakhapatnam seaport (AP), Kandla seaport (GJ) by NCDC, Bangalore team. The flea specimens collected during the Survey were identified by NCDC, Bengaluru and the particulars of unit /place wise collection and fleas species and indices are given in Table-08. During 2014-15 a total of 1271 rodent fleas were retrieved from 2417 rodents trapped from the domestic and peri-domestic situations during REP survey the absolute and specific flea indices *Xenopsylla cheopis, Xenopsylla astia* have been calculated and given in Table-7. The results evident that in Surat RDD and Kandla seaport areas showing flea indices *X cheopis* more than critical level. The results were communicated RDD Surat and PHO Kandla to take antiflea measures for to control the fleas however in remaining places the specific flea index of *X cheopis* is below the critical level.

Leptospirosis

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

has established a diagnostic laboratory for Leptospirosis in the recent past. Following tests are being carried out at NCDC laboratory. ELISA test: Using IVD Leptospira IgM serum antibody detection assay ELISA kit. During the reporting period 2014-15 a total of 25 human blood sera samples were received from different districts of Karnataka, for the diagnosis of Leptospirosis and cross check. 25 samples were tested at Leptospirosis Laboratory, Zoonosis division, NCDC, Delhi for IgM antibody detection by ELISA method, out of these 7 were found to be positive the details of the findings are presented in Table.

Human sera received for diagnosis of Leptospirosis for IgM test During April-2014 to March-2015

State	Districts	Total Samples Received	Total Tested For IgM	IgM Positive (%)
Karnataka	**Shimoga**	4	4	2 (50.0)
	Udupi	21	3	5 (14.2)
	GRAND TOTAL	**25**	**7**	**5 (1.75)**

Studies on Dengue / Chikungunya:

NCDC, Bangalore branch is a sentinel lab for testing Dengue and Chikungunya in Karnataka state in this regard during 2014-15 received **614** human sera samples for Dengue IgM ELISA test and **01** 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.

Outbreak Investigations

Investigation of KFD outbreak at Wyanad (KL)

The infected ticks transmit infection to monkeys, the amplifying host, which disseminate infection to man.. KFD is caused by the bite of infected *Haemophysalis spp*. tick to human visited monkey death hot spot areas .The disease is endemic to 6 districts of Karnataka state and in recent years spreading to neighboring states. A total of 113 suspect cases attended the Sulthan Bathery taluk hospital of which 81 cases were tested in the laboratory and 43 (53%) confirmed for KFD virus by reverse transcription PCR. The attack rate is 6.9 cases / 10,000 persons with a case fatality of 5.3%. In the affected area the vector ticks *Haemophysalis spp*. were collected and a total of 18 *Macaca radiata* monkey deaths were reported and 5 tested positive for KFDV by RT-PCR. The state health authorities were recommended for vector control by insecticide dusting on monkey death hot spot areas and use of personal protection measures and vaccination to target group for control and prevention of KFD outbreaks.

Research Projects

To study on the Prevalence of Rickettsial infections in various geographical areas of the country.

The Rickettsial infection including Scrub typhus has been reported from many parts of the county. The prevalence of Rickettsial infection / Scrub typhus fever in the states of Karnataka, Andhra Pradesh, Tamil Nadu and Maharashtra has been well documented. This is a zoonotic disease most commonly occurring in the rural areas where the rodents are reservoirs and maintain the cycle in the nature man accidentally acquire the infection by the bite of larval (chigger) mite which requires early detection and treatment. Underdiagnosed and misdiagnosed Rickettsial infections are important public Health problem. Keeping in mind its nonspecific sign and symptoms it is the need of the hour to have a proper screening / surveillance in the various parts of the of the country.

During the reporting period 2014-15 a total of 36 human sera samples were collected from different places visited by the NCDC Bangalore team and tested for Rickettsial infection by Weil Felix test . The details of the laboratory tests are presented in Table-10. A total number of 36 samples were tested from 5 states and 3 (8.3%) samples were positive for scrub typhus from, Vellore, (TN) and Kandla (GJ).

Hhuman sera received for Rickettsial disease during- April-2014 to March-2015

Place of collection	**No of samples tested**	**Positive result**		
		OX19	**OX2**	**OXK**
Rohru(HP)	8	-	-	-
Palamaner (AP)	10	-	-	-
Kandla seaport (GJ)	2	-	-	1
Vellore (TN)	13			2
Mananthawadi (KL)	3	-	-	-
Total	**36**	**0**	**0**	**3**

Manpower Development

Training on various aspects of communicable diseases has been imparted to medical and academic college students who visited the branch on various occasions.

Field visits made during 2014 – 2015

- Plague Surveillance work and REP survey at Palamaner (AP) and Kolar (KA) 21.04.2014 to 25.04.2014.
- Visit to NCDC Coonoor Branch from 29.04.2014. To 30.04.2014.
- To participate in VI Independent Appraisal of YAWS Eradication Programme at Dima Hasao,Dist. Assam, from 06.05.2014 to 16.05.2014
- Plague Surveillance work and REP survey at Tuticorin seaport (TN) 25.05.2014 to 30.05.2014.
- For monitoring of Yaws Eradication Programme at Odisha state from 02.06.2014 to 10.06.2014.
- For participation in YEP independent appraisal team visited Mayurbhanj, district of Odisha state from 16.06.2014 to 27.06.2014.
- Plague Surveillance work and REP survey at Beed (MH) from 14.07.2014 to 18.07.2014.
- Plague Surveillance work and REP survey at Visakhapatnam Seaport (AP) from 03.08.2014 to 08.08.2014.
- Visit to NCDC Coonoor Branch from 12.08.2014 to 14.08.2014.
- Plague Surveillance work and REP survey at Rohru (HP) from 21.09.2014 to 27.09.2014.
- Visit to NCDC Coonoor Branch from 27.10.2014 to 29.10.2014.
- Plague Surveillance work and REP survey Kandla Seaport (TN) from 10.11.2014 to 15.11.2014.
- Plague Surveillance work and REP survey at Vellore and Thiruvanamalai (TN) from 07.12.2014 to13.12.2014.
- Plague Surveillance work and REP survey at Surat (GJ) from 05.01.2015 to 10.01.2015.
- Plague Surveillance work and REP survey at Wyanad (KL) from 02.02.2015 to 07.02.2015.
- Investigation of KFD outbreak at Wyanad (KL) from 11.02.2015 to 14.02.2015.
- Visit to NCDC Coonoor Branch from 13.03.2015 to 14.03.2015.
- Plague Surveillance work and REP survey Cochin Seaport (KL) from 15.03.2015 to 20.03.2015.

Meetings / symposia attended

- Branch Officer Meeting at NCDC Delhi from 29th to 31.07.2014.
- Participated as a faculty capacity enhancement programme at National Institute of Biotic stress management (NIBSM) ICAR Raipur (CG) from 1st to 3.08.2014.
- Participation in X Joint Annual Conference of ISMOCD & IAE at NIMR Goa from 09.10.2014 to 12.10.2014 and presented a paper..
- Participated in Ebola virus RRT and preparedness workshop at EMR/DGHS & ROH & FW, Bangalore from 3rd to 05.11.2014.
- Participated in the workshop on Weather and Climate Informatics for Pro-Active Healthcare (WACIPH) at CSIR C-MMACS, Bangalore from 26th to 27.11.2014.
- Attend the branch review meeting at NCDC & DGHS Delhi and to participate in Public Health Entomology Course curriculum meeting at NCDC, Delhi from 15.12.2014 to 19.12.2014.
- To attend Hindi Translation Workshop at ISRO, Bangalore from 19.01.2015 to 20.01.2015.
- To attend NVBDCP regional Annual action plan meeting at NVBDCP, Bangalore from 28.01.2015 to 30.01.2015.
- Training for Entomologist of IDSP on Vector Borne Diseases and Control at NCDC, Delhi from 10.03.2015 to 12.03.2015.
- Training for DSO, Epidemiologist, Entomologist on KFD from Karnataka state at Shimoga (KAR) from 25.03.2015 to 28.03.2015.

5.13 NCDC, Jagdalpur Branch

Mr. Ram Dayal
Senior Statistical Officer

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

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

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

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

Routine activities undertaken during the period

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

Research project

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

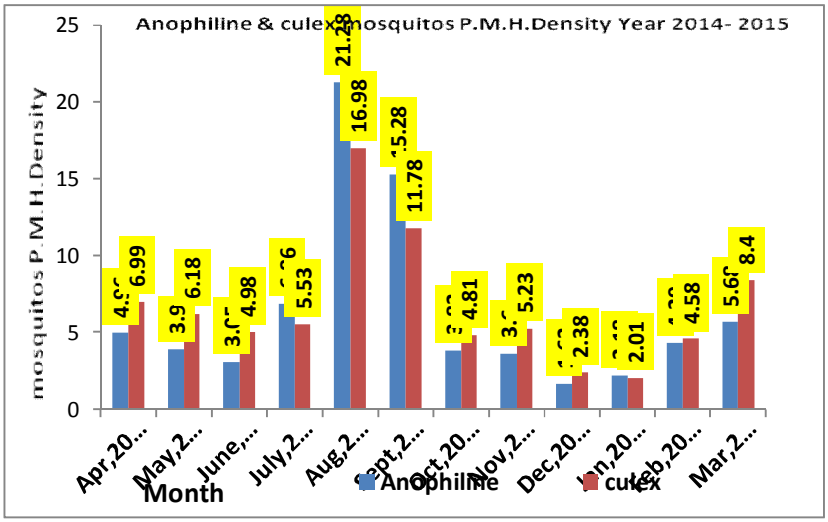
Chhattisgarh state was created in 2000 out of the erstwhile Madhya Pradesh state. The state is divided in to 27 district and has a population of about 25 million of that about one-thirds are tribal. About 44% of the land is occupied by forest. Malaria is a major public health problem and the state contributes about 13% of

the total malaria cases reported in the country. *An. culicifacies* is the dominant malaria vector species supported by *An. fluviatilis* in the hilly forested area of the state. Perennial and persistent transmission of malaria is well known in this state due to *Plasmodium falciparum*, efficient anthropophagic vectors, congenial climatic conditions for mosquito breeding, high man-vector contact, lack of awareness and low socio-economic condition.

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

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

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



During the study period 12 Anopheline mosquitos were recorded**.**

A study on *Aedes aegypti* (L) in Jagdalpur & suburbs and serological confirmation of dengue cases

As the dengue/viral fever is commonly reported as outbreaks, it is essential to survey community to determine the density of vector mosquitoes, to identify larval habitats (which for *Ae. aegypti* are usually artificial or natural water holding containers close to or within human habitations) and for documentation to promote and implement plans for their elimination by appropriate, effective control measures.

NCDC Jagdalpur branch had carried out entomological studies on *Ae. aegypti* during outbreak investigations in the year 2001, and 2004 at Raipur, Chhattisgarh.

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 selection, entomological collection pertaining to Aedes aegypti (L) mosquito and Potential breading places survey for Aedes aegypti (L) has been carried out. Identification and preservation of emerged and collected mosquitoes carried out. During larval collections a total 183 *Aedes albopictus,* 152 *Aedes vittatus,* 03 *Aedes edwardri* and 05 *Aedes unilinetus* mosquitoes emerged..

5.14 NCDC, Coonoor Branch

Dr N Balakrishnan
Joint Director & Officer in Charge

Broad Mandate

- To study the epidemiology of major communicable diseases prevalent and to assist in their outbreak investigations in this region.
- To undertake studies on the taxonomy, biology, ecology of heamatophagus arthropods of public health importance.
- To maintain cyclic colonies of vector mosquitoes for conducting laboratory bioassay experiments and trainings.
- To impart training to the public health/academic personnel on various aspects.

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

Routine activities undertaken during the period

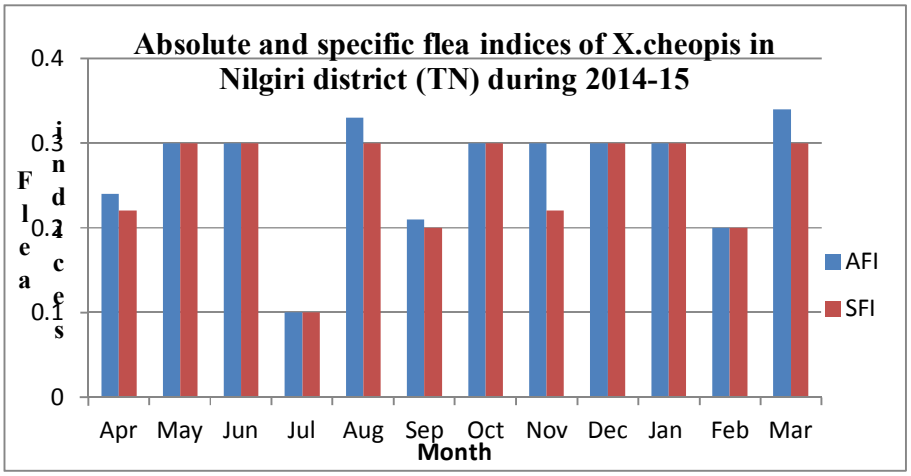
a) Maintenance of cyclic colonies of vector mosquitoes.
b) Maintenance of cyclic colonies of rat flea.
c) Entomological study of vector density in the Nilgiris, Tamil Nadu.

Brief description

The cyclic colonies of the following mosquito vectors are being maintained at Mettupalayam field station viz., *Culex quinquefasciatus* (Mettupalayam strain), *Aedes aegypti* (Kallar strain) and *Anopheles stephensi* Mettupalaiyam strain). The specimens are being utilized for various laboratory experiments, training/demonstrations to visitors and also supplied to teaching/research institutions on demand.The cyclic colonies of rat flea *Xenopsylla cheopis* (Delhi and Nilgiris Strains) are being maintained at NCDC, Coonoor. The specimens are being utilized for training and laboratory susceptibility tests against the various insecticides.

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

The Nilgiris district of Tamil Nadu state has long been recognised as a potential plague endemic area due to the existence of favourable climatic conditions and a wide spectrum of rodents and flea fauna. In this district there are seven plague control units functioning under the control of DPH & PM, Government of Tamil Nadu to carry out anti plague measures.



A Research Project was initiated during 1992 by the NCDC, Coonoor branch in collaboration with five Plague Control Units (PCU) viz, Naduvattam, Ootacamund, Kotagiri, Coonoor and Manjoor situated in the various geographic locations of the Nilgiris district. During the reporting period, a total of **1178** rodents were trapped which include rodents collection by the state PCU's a by the rodent ectoparasite (REP) survey of this branch and the following rodent species collected viz. *Rattus rattus* **(1036)** and *Bandicoota indica* **(142)**. A total of **1178** rodent organ samples and **1132** sera pools were prepared from the rodents and the laboratory test results show that none of them found to be positive for *Y.pestis*.

The ectoparasitic fleas were collected from the rodents and identified and also the flea indices were computed. During the study a total of **252** fleas comprising of *Xenopsylla cheopis* (**235)** and S*tyvalius Spp.* **(17)** were recorded. The total flea index and specific flea index of *Xe.cheopis* were **0.2** and S*tyvalius Spp.* **0.01** respectively and they are below the critical levels (Figure).

Vertical distribution of dengue and chikungunya vectors and their endemicity levels in Nilgiri hills (Nilgiris district) and adjoining foot hill areas of Coimbatore district

In recent years Dengue and Chikungunya have been reported from various states of the country and also responsible for many outbreaks. The Nilgiri hills and its down hill areas are known for their richness of mosquito fauna but relatively free from these diseases. However in recent years many number of dengue and chikungunya cases have been reported from adjoining Coimbatore and Erode districts and neighboring Kerala state. A mosquito breeding survey has been carried in the potential *Aedes* larval breeding habitats. A total of 13 localities situated at a height ranging between the altitude of 300 metres mean sea level and 2200 metres msl in the study area with different climate and vegetation is selected for the study.

The dengue vector mosquitoes *Aedes aegypti and Ae. albopictus* are known to breed in many of the urban and rural areas. The former is known to breed in 6 localities of the study area situated at an altitude of 300 to 1000 msl where as the latter found to breed in 8 localities situated in an altitude of 300 to 1800 msl. The *Ae. albopictus* is well prevalent and recorded from many of the breeding habitats surveyed while *Ae.aegypti* was recorded from a few breeding habitats in the hilly areas. The House, Container and Bruteau indices computed for the *Aedes* breeding in localities surveyed found to have values above critical levels in 6 of the 13 areas surveyed. The towns of the Nilgiri hills situated above the altitude of 2000 metres did not support the breeding of *Aedes* vector mosquitoes where as the foot hill areas and other surrounding towns found to have the breeding of both vectors and also their breeding indices are above critical levels. The results evident that altitude of a locality found to influence on the distribution and abundance of these vector mosquitoes.

Since both *Aedes* vectors species are prevalent in many of the study localities surveyed and their breeding indices above critical levels in the towns viz., Karamadai, Sirumugai, Mettupalaiyam, Burliar and Coonoor, in order to contain the probable out breaks of dengue and chikungunya diseases appropriate control measures need to be undertaken by the health authorities.

Manpower Development

78 Students & 2 Faculty members from PSG Nursing College, Coimbatore underwent training on vectors and their role in disease transmission.

5.15 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, chikun gunya, 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.

Routine activities undertaken during the period: 2014 – 2015

Training (Manpower Development):

i. Five days training on Elimination of Lymphatic Filariasis for Medical Officers / Biologists/ District Programme Officers from 27-10-2014 to 31-10-2014.
No. of Participants-Eight(8)

ii. Ten days training course on Filariology for Filaria Inspectors/Technicians from 01-12-2014 to 12-12-2014
No. of Participants-Ten (10)

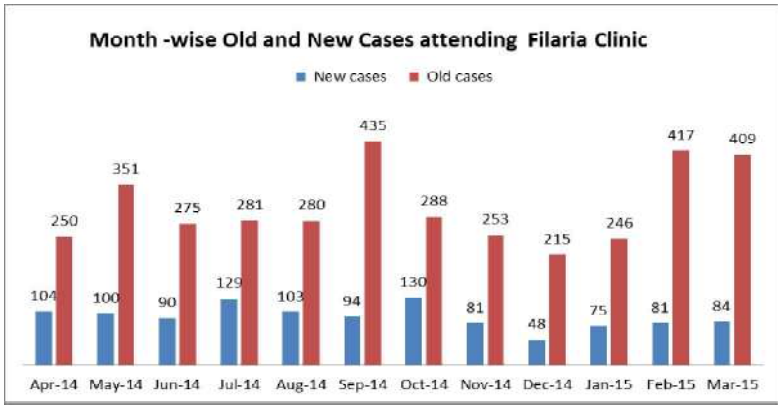
Main Activities of the Division:

i. Training on Lymphatic Filariasis to different categories of personnel working in State Health Departments.
ii. Research on Lymphatic Filariasis and other Communicable Diseases.
iii. Outbreak Investigation and control of Communicable Diseases.
iv. Service to Filaria Patients etc.

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.

The month-wise attendance of patients at Filaria Clinic



Mosquito larval surveys in river Godavari:

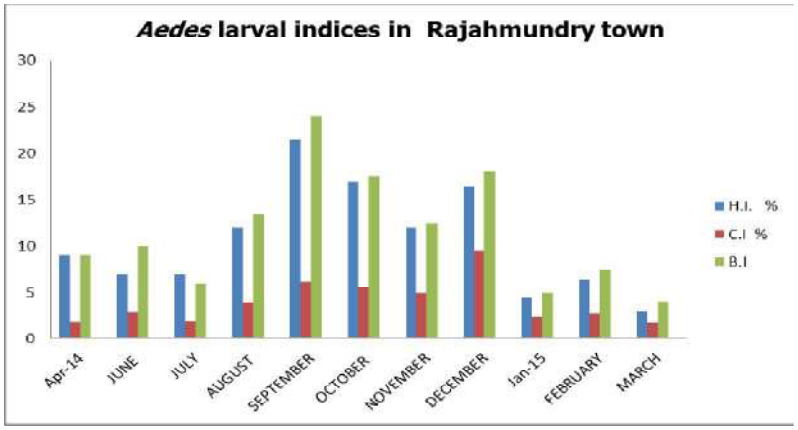
The water in the Godavari river at Rajahmundry was polluted due to disposal of untreated sewage, plastic and other articles, a study to assess larval breeding in the river was studied during December, January and February months. The larvae found were collected and reared in the laboratory. *Aedes aegypti*, the major

vector of Dengue and Chikungunya was found breeding in floating containers such as plastic bags/ plastic cups etc. and *Culex quinquefasciatus*, the vector of Bancroftian Filariasis in the polluted river water. The findings were intimated to the Municipal authorities and immediate remedial measures were undertaken and the sewage water is treated before letting into the river. The subsequent studies showed that larval breeding was absent.

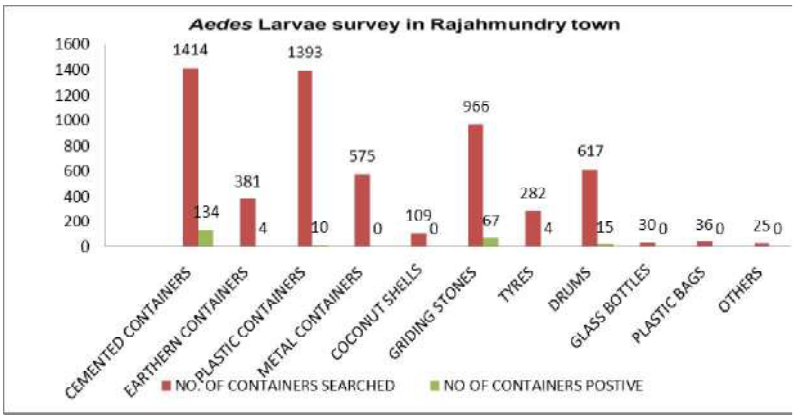
Major Achievements

1. Two scheduled trainings conducted in Filariology for Medical Officers/ Biologists (Five Working Days) and Filaria Inspectors/ Technicians (Ten Days). Total Participants were 18.
2. Filaria Day Clinic for treatment and management of patients. New Patients – 1119 and Old Patients – 3700 were given treatment and advice.
3. Research Studies of Filaria Prevalence in East Godavari, *Aedes* Surveillance in some dengue endemic areas of East Godavari district, plant nurseries and Rajahmundry Town. The findings of study were intimated to local health authorities then and there, which too helped to prevent outbreaks of dengue.

Surveillance of *Aedes* species of mosquitoes ,vectors of Dengue/DHF and chikungunya in Rajahmundry Town



House Index, CI=Container Index, BI=Bretaeu Index



The results of the studies were given to the Municipal Authorities then and there for remedial action.

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

We have covered 9 areas around Hostels and collected 985 blood slides, out of which 10(1.02%) were found positive for Microfilariae. All were due to *Wucherria bancrofti.* All the positive cases were given appropriate treatment

Micro filarial Prevalence among hostel students and the community around the hostels of East Godavari district

Name of the Area	No.of Hostels surveyed	No.of Blood Smears ollected		Total	No.of Blood SmearsPositive for Mf		Total	Mf Rate (in %)	Mf Density
		Male	Female		Male	Female			
Rajahmundry	1	0	199	199	0	0	0	0	NIL
Dowleiswaram	1	114	0	114	1	0	1	0.88	1
Kadiyam	1	0	96	96	0	0	0	0	0
Korukonda	2	110	107	217	0	1	1	0.46	4
Rajanagaram	2	56	53	109	0	0	0	0	0
Peddapuram	4	202	238	440	1	1	2	0.45	17
Total	11	482	693	1175	2	2	4	0.340	9.75
Name of the Area	**No.of Areas surveyed around Hostels**	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**	**Mf Rate (in %)**	**Mf Density**
Rajahmundry	2	46	42	88	1	0	1	1.14	10
Dowleiswaram	1	31	54	85	0	0	0	0.00	0
Kadiyam	1	49	96	145	0	0	0	0.00	0
Korukonda	2	87	92	179	0	1	1	0.56	2
Rajanagaram	2	148	119	267	4	0	4	1.50	10.25
Peddapuram	1	93	128	221	3	1	4	1.80	6.5
Total	9	454	531	985	8	2	10	1.015	7.90

The results of the study were provided to the local Health authorities for appropriate action.

Surveillance of *Aedes* species of mosquitoes , the vectors of Dengue/DHF and chikungunya in Dengue endemic rural areas of East Godavari District of Andhra pradesh.

Aedes aegypti was found as the predominant species. *Aedes albopictus* was also reported from most of the areas studied. The result of the study was given to the local and State Health authorities in time for action.

Study on present status of micro filaria , intensity of infection and transmission in Urban and rural areas of East Godavari district, A.P

A total of 233 *Culex quinquefasciatus* mosquitoes were dissected for filarial infection , none was found positive. The result of the study was intimated to the District, State and National Health authorities for further action.

Manpower Development

Training course in Lymphatic Filariasis Elimination for Medical Officers/ District Programme Officers from 27-10-2014 to 31-10-2014 (Five days). The respective sponsoring authorities will utilize their knowledge.

Lymphedema Morbidity Management Clinic

Mosquito larval surveys in river Godavari

The water in the Godavari river at Rajahmundry was polluted due to disposal of untreated sewage, platic and other articles, a study to assess larval breeding in the river was studied during December, January and February months. The larvae found were collected and reared in the laboratory. *Aedes aegypti*, the major vector of Dengue and Chikungunya was found breeding in floating containers such as plastic bags/ plastic cups etc. and *Culex quinquefasciatus*, the vector of Bancroftian Filariasis in the polluted river water. The findings were intimated to the Municipal authorities and immediate remedial measures were undertaken and the sewage water is treated before letting into the river. The subsequent studies showed that larval breeding was absent.

5.16 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
  - *Details of the Supervisor of the unit*:- Dr.R.Rajendran, Deputy Director/Scientist III, M.Sc, Ph.D
  - *Broad mandates of the unit*
    1. Training and Capacity building
    2. Research
    3. Outbreak investigation and Control
  - *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 vector born diseases
2. Training to Medical Officers/Biologists and Para Medical staffs about Lymphatic filariasis and its elimination and other Vector Borne Diseases.
3. Diagnosis and treatment of microfilaria carriers and management of filaria patients through filaria clinics
4. 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. **1196** patients attended the clinic
- Night Clinic: Twice in a week i.e. Mondays and Tuesdays for collection /examination of night blood smear from individuals attending the night clinic. **296** blood smears were tested. Clinico-parasitological and entomological surveys
- Evaluation of Yaws Eradication Program in Andhra Pradesh, Madhya Pradesh and Tamil Nadu.
- Regular collection of mosquitoes and larva of vectors of filariasis and clinicoparasitological surveys for detection and treatment of mf carriers and filaria patients are carried out as per request of the local authorities.
- 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 preserved material

The month wise attendance of patients in the Filaria clinics

Month/Year	Day clinic	Night clinic
	Patients attended	Examined
April 14	101	35
May 14	95	20
June 14	118	25
July 14	69	13
August 14	77	24
September14	91	21
October 14	109	73
November 14	114	21
December 14	124	41
January 15	81	23
February 15	86	5
March 15	131	6
Total	**1196**	**307**

1. Medical College, Calicut - 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

- Supply of other material-like normal and infected blood, media, stain and teaching materials/aids etc. to District Medical Offices, Medical colleges and Nursing Colleges, Schools, local bodies and other research institutions as per request on public interest.etc.
- NFCP units in Kerala send blood slides for cross checking to this centre routinely. A total of **1733** slides were received, cross checked and the results were intimated to the concerned DVC Units with necessary suggestions for improvement.
- Filariasis Diagnostic services: **78** 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 **61** were positive for filarial antibodies and **32** were negative for antibody (Wb). Necessary advice and treatment were provided to the patients.
- Morbidity management clinic in lymphatic filariasis is conducted for the benefit of filaria patients.
- Conducted several classes on chikungunya and dengue prevention and control to different categories of persons
- Surveillance of *Aedes* species of mosquitoes in and around Kozhikode, Trivandrum and Cochin International Airports and Cochin seaport, to study the incidence of Yellow fever vector.
- Conducted classes on MDA against Lymphatic Filariasis to different categories of persons.
- Guidance to M.Sc and M.Phil students in Zoology/Entomology for their dissertation Works.

Major achivements

- 11 of the 14 districts in Kerala are endemic for Lymphatic Filariasis. By 2013, 5 districts entered in TAS stage and qualified by 2014. This is achieved due to the combined efforts t of NCDC and State Health Department.
- NCDC, Calicut branch played an important role in updating the records and reports on YEP in the states of Andhra Pradesh, Tamil Nadu and Maharashtra. This branch was part of the 6th Independent approval team on YEP.
- 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-42.
- Yellow fever vector surveillance in and around Airports/Seaports of Kerala and Tamil Nadu
- Surveillance 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 outbreaks of dengue in these districts.

- Filaria Day clinic for treatment and management of patients. 1196 patients were given treatment and advice.
- The Government of Kerala has identified 1.5 acres of land at Thiruvananthapuram for NCDC, Calicut branch
- Cross checking of blood slides received from District Vector Control Units of Kerala.**1733** slides were cross checked and the results were intimated to the concerned DVC Units with necessary suggestions for improvement.
- Prior to 2014 MDA, NCDC, Calicut branch has conducted many awareness campaigns to Community, Medical Officers, para medical staff Local body members etc. to enhance drug compliance rate in Palakkad, Kozhikode and Malappuram districts and assessed the infection rates (microfilariae).
- Extension activities - Resource support to other institutions, Public health intervention activities etc.

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

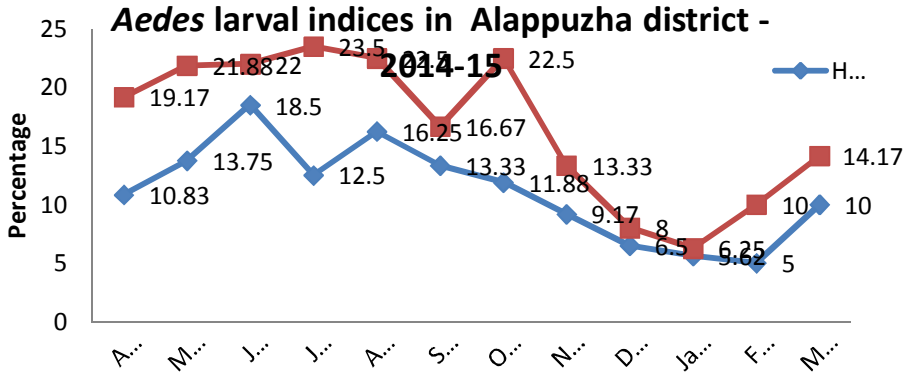
Monthly *Aedes* larval indices were monitored in Alappuzha and Kozhikode districts. *Aedes albopictus* is the predominant species encountered from all the three towns. Alappuzha and Cherthala towns are free from *Ae. Aegypti* and Kozhikode town reported both. The breeding indices were high and above the critical levels from June to November of the year By monitoring the *Aedes* larval indices, the local health authorities are informed periodically about the larval breeding indices so that control activities can be effectively implemented and the mosquito born diseases can be prevented.

Aedes larval indices in Alappuzha district 2014- 15

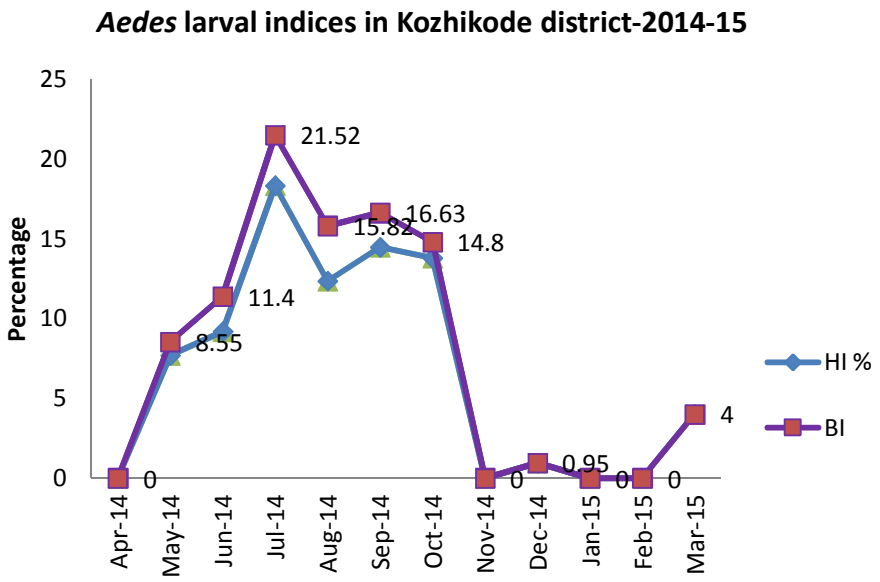
Locality	Houses Checked	Houses +ve	Containers Checked	Containers +ve	HI %	CI %	BI
TOTAL	**1760**	**205**	**4543**	**303**	**11.64**	**6.67**	**17.22**

Aedes larval indices in Calicut district 2014-15

Locality	Houses Checked	Houses +ve	Containers Checked	Containers +ve	HI %	CI %	BI
TOTAL	**2996**	**379**	**4520**	**443**	**12.65**	**9.80**	**14.79**



Aedes larval indices in Kozhikode district-2014-15



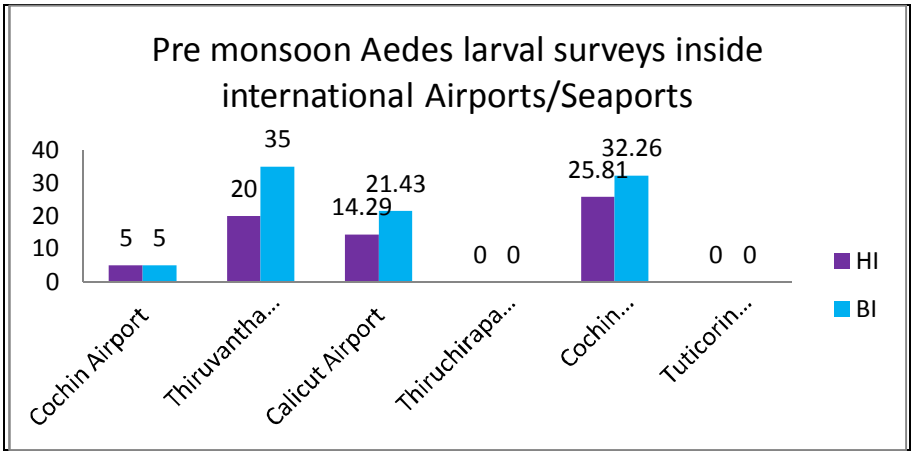
Surveillance of *Aedes aegypti*, the vector of yellow fever, dengue and Chikungunya in and around International Airports and Seaport of Kerala and Tamil Nadu (Pre & Post monsoon)

As part of the surveillance of *Aedes aegypti*, the vector of Yellow Fever, Dengue and Chikungunya, pre and post monsoon larval surveys were conducted in and around International Airports and Seaports of Kerala and Tamil Nadu. The results of the study are given below:]

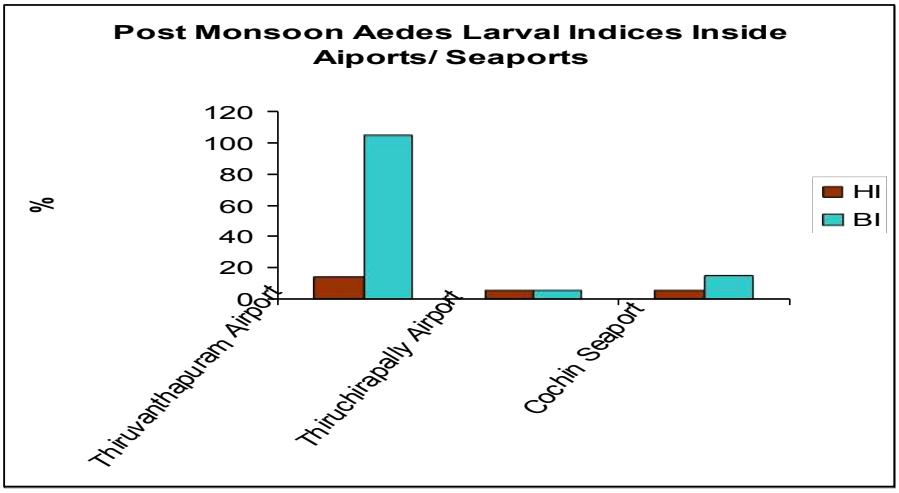
*Post Monsoon Aedes larval indices **around** International Airports/Seaports*

Airport/Seaport	Premises checked	Premises +ve	Containers checked	Containers +ve	HI %	CI %	BI
Cochin Airport	99	2	168	3	2.02	1.79	3.03
Thiruvananthapuram Airport	101	3	212	10	2.97	4.72	9.90
Calicut Airport	105	1	41	1	0.95	2.43	0.95
Thiruchirapally Airport	100	13	245	17	13.0	6.94	17.0
Cochin Seaport	158	9	246	13	5.69	5.28	8.23
Tuticorin Seaport	110	12	115	16	10.9	13.9	14.5

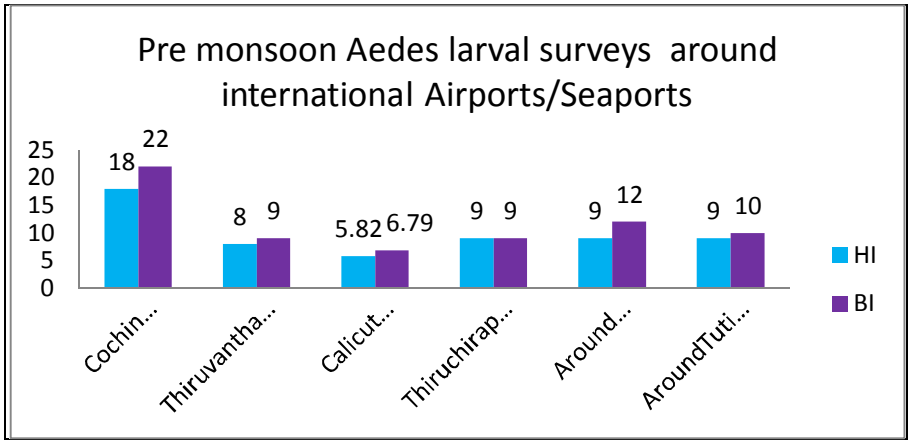
During the present study, *Aedes aegypti* was found from Kozhikode, Thiruvananthapuram, Tiruchirapalli Airports and Tuticorin Seaport. Cochin Airport and Seaport was found free from *Aedes aegypti*. However *Aedes albopictus* was reported from all the Airports and Seaports.



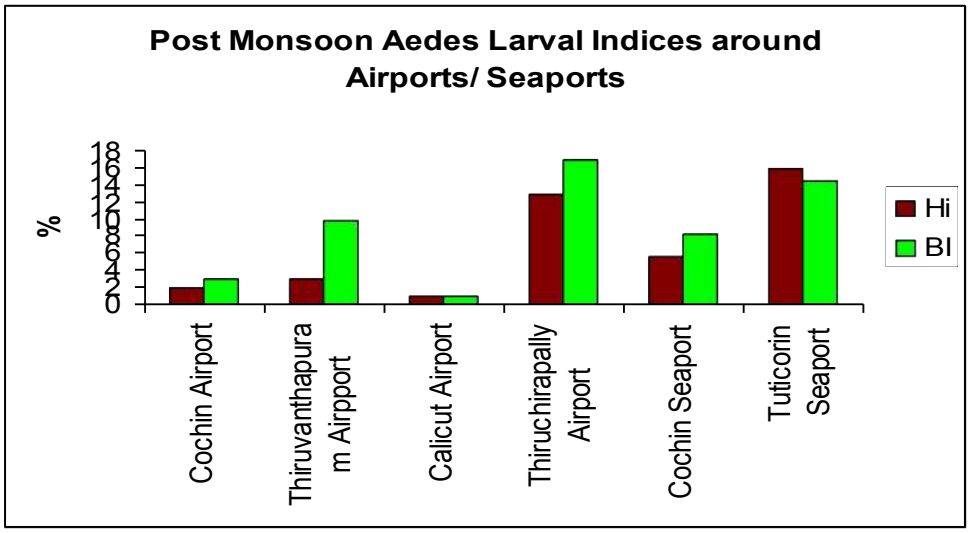
*Post Monsoon Aedes Larval Indices **Inside** Airports/ Seaports :*



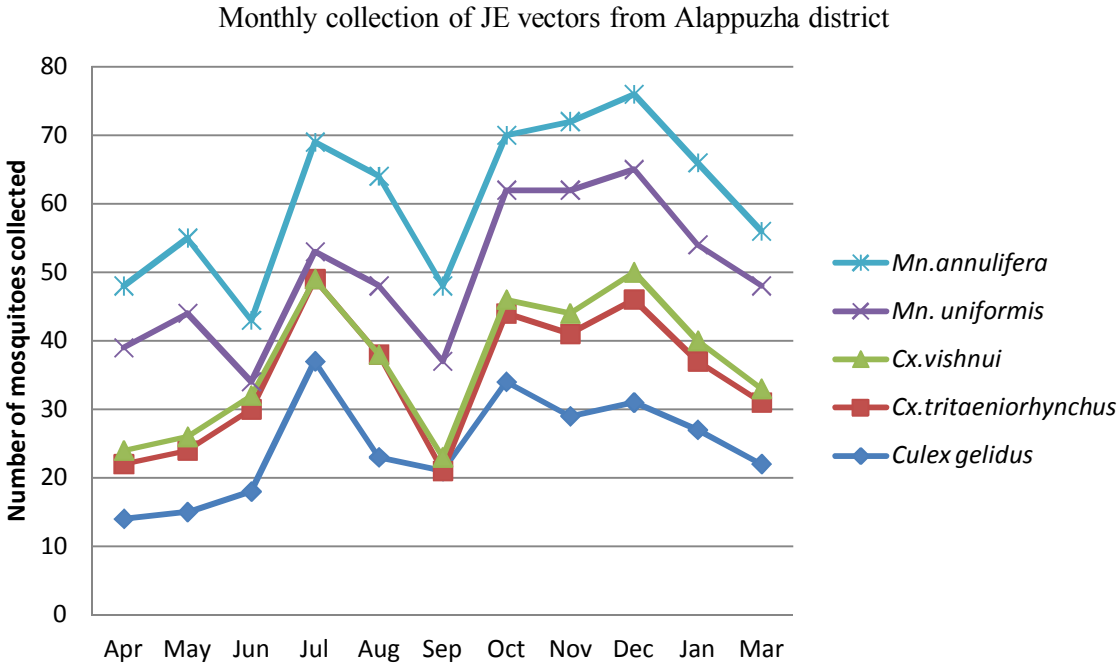
*Pre monsoon Aedes larval indices **around** Airports/Seaports*



*Post Monsoon Aedes Larval Indices **Around** Airports/ Seaports:*



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



MDA Parasitological and entomological surveys in Palakkad, Malappuram and Kozhikode districts

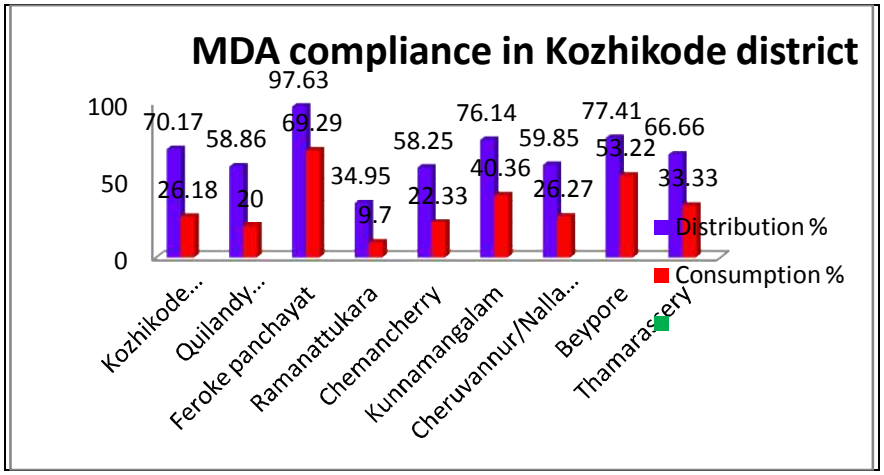
As part of the evaluation of MDA programme, pre-MDA Parasitological and entomological surveys were conducted in different parts of Palakkad, Malappuram and Kozhikode districts during 2014. A total of 473 *Culex* and *Anopheline* mosquitoes were dissected for filarial infection and one out of 400 *Culex quinquefasciatus (0.25%)* was found positive for infective larvae in Palakkad district and out of 384 *Culex quinquefasciatus* mosquitoes dissected, one *Culex quinquefasciatus* (0.26%) was found positive for infective larvae in Ponnani of Malappuram district.

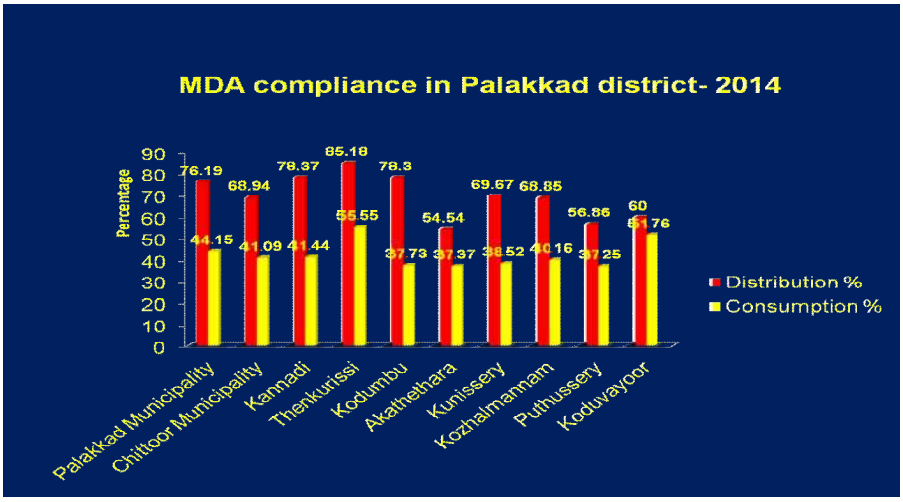
MDA coverage and compliance studies in Kozhikode, Alappuzha and Palakkad districts

The Mass Drug Administration programme with DEC and Albendazole combination to eliminate lymphatic filariasis was implemented in Kerala during March 2014 in six endemic districts. A study to

evaluate the drug distribution coverage, consumption coverage etc was done by this centre in Kozhikode and Palakkad districts. The results of the study are given below.

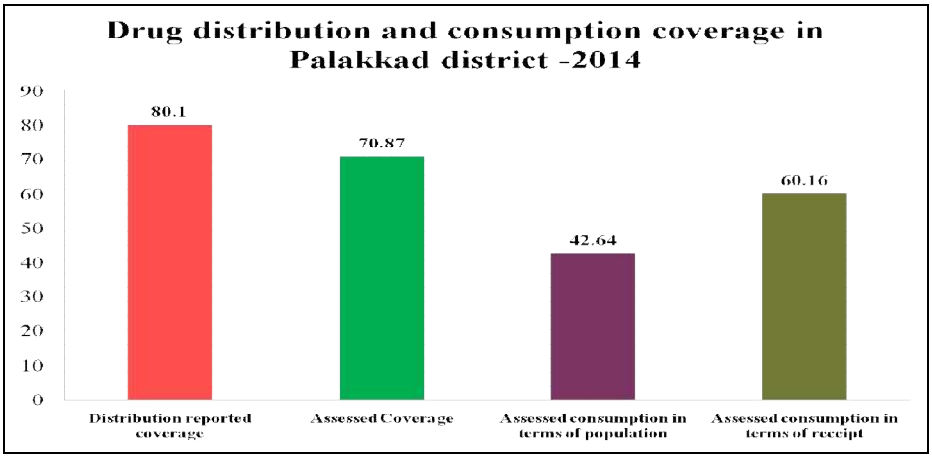
Drug distribution and consumption in different areas of Kozhikode district-2014

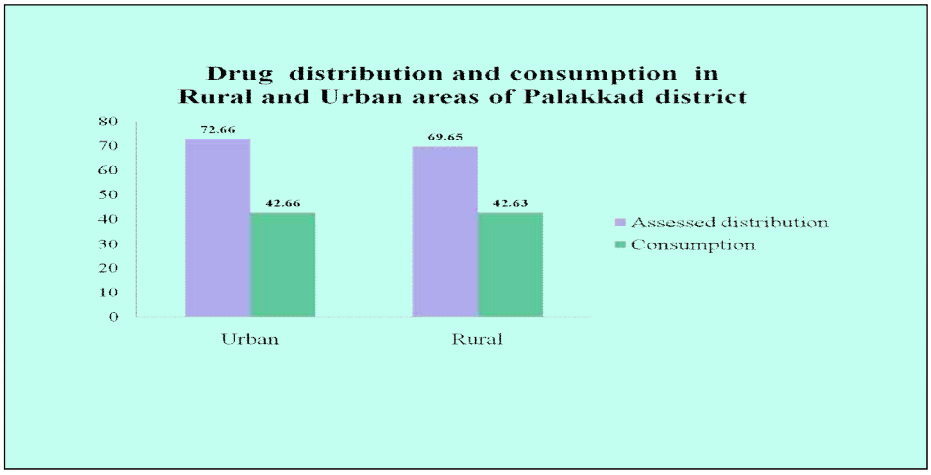




Drug distribution and consumption coverage in Palakkad district -2014

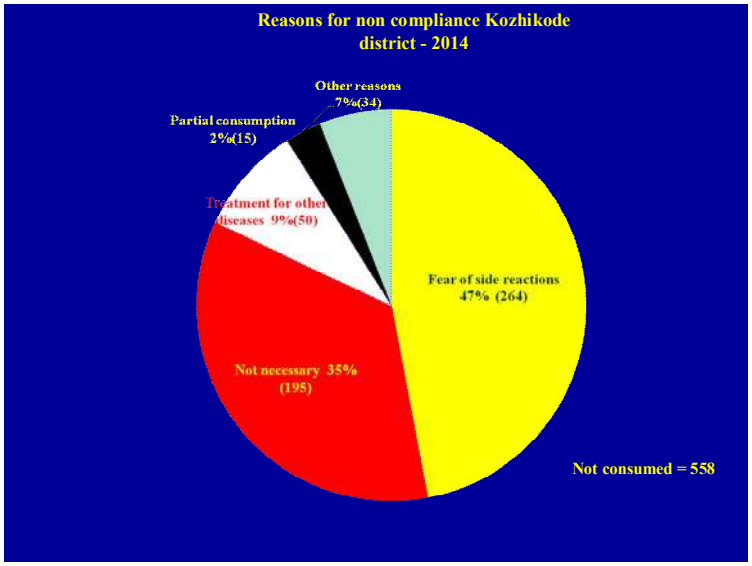
	Inter viewed	Rece ived	Distri bution %	Cons umed	consumption %	
					In terms of receipt	In terms of total population
Palakkad Municipality	231	176	76.19	102	57.95	44.15
Chittoor Municipality	219	151	68.94	90	59.60	41.09
URBAN TOTAL	**450**	**327**	**72.66**	**192**	**58.71**	**42.66**
Kannadi	111	87	78.37	46	52.87	41.44
Thenkurissi	135	115	85.18	75	65.21	55.55
Kodumbu	106	83	78.30	40	48.19	37.73
Akathethara	99	54	54.54	37	68.51	37.37
Kunissery	122	85	69.67	47	55.29	38.52
Kozhalmannam	122	84	68.85	49	58.33	40.16
Puthussery	102	58	56.86	38	65.51	37.25
Koduvayoor	85	51	60.0	44	86.27	51.76
RURAL TOTAL	**882**	**617**	**69.95**	**376**	**60.94**	**42.63**
GRAND TOTAL	**1332**	**944**	**70.87**	**568**	**60.16**	**42.64**



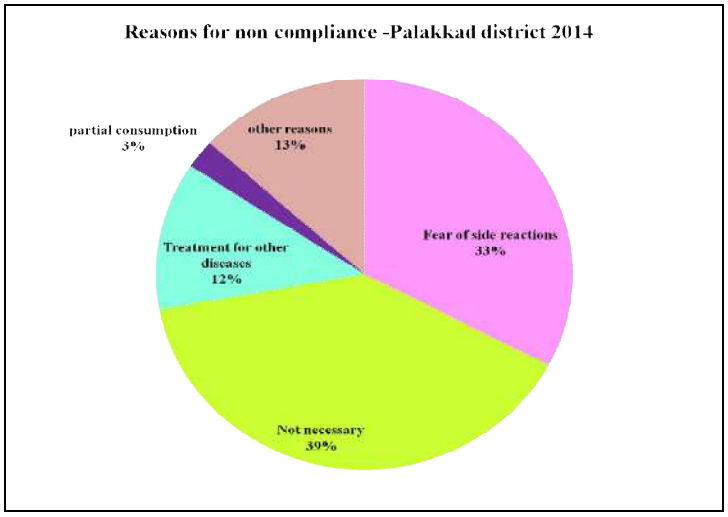


Drug distribution coverage in Kozhikode and Palakkad districts were 67.18% & 70.87 % respectively. Consumption rate in terms of total population interviewed was 30.99% & 42.64% respectively. However the drug consumption coverage in terms of drug receipt was 46.13% and 60.16 %.

Reasons for non-compliance Kozhikode District 2014



Reasons for non-compliance in Palakka district 2014



Comparison of the drug distribution and consumption coverage during different rounds of MDA in Kozhikode and Palakkad districts are given in figures 15-16. The drug distribution and consumption coverage of MDA reveal that most of the people who received the drug did not consume mainly due to 'fear of side reactions' even though no side reactions were reported. Intensive IEC activities to create awareness among the masses about lymphatic filariasis and MDA programme are necessary to achieve the required level of consumption. The findings of our studies were provided to the state and national authorities for further necessary action.

Trainings/ Workshops

- Training course in Lymphatic Filariasis Elimination for Medical Officers /Biologists/District Programme Officers. (Five Days)

- Training course in Filariology for Filaria Inspectors/Technicians (10 days)

Membership of Officers of the Branch

A. Dr.K.Regu, Joint Director & Head
a) Life member in the Indian Society for Malaria and other communicable Diseases, Delhi
b) Member in the Indian Academy of Entomology and
c) Member in the technical advisory committee on Health in Kozhikode Corporation

B. Dr.R.Rajendran, Deputy Director
a) Executive Committee Member in the Association for Advancement of Entomology, Trivandrum
b) Life member –Indian Society for Malaria and other communicable diseases, Delhi
c) Life member, Indian Public Health Association, Kolkota

5.17 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 2000 hrs. - 2200 hrs. and examined for evidence of microfilariameae.

Night Filaria Clinic at NCDC, Varanasi during 2014-15

MONTH	NEW CASES	ACUTE	CHRONIC	+ve for mf.	mf. rate (%)
April, 2014	212	98	114	--	--
May, 2014	217	89	128	4	1.84
June, 2012	307	120	187	6	1.95
July , 2014	355	162	193	9	2.53
Aug. 2014	241	107	134	5	2.07
Sept. 2014	255	107	148	4	1.56
Oct. 2014	160	64	96	2	1.25
Nov. 2014	143	50	93	3	2.09
Dec. 2014	81	36	45	4	4.93
Jan. 2015	108	39	69	2	1.85
Feb., 2015	141	50	91	3	2.12
March 2015	133	71	62	1	0.75
Total	**2353**	**993**	**1360**	**43**	**1.82**

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

Day Filaria Clinic

A total of 15860 **repeat** visits were made by the patient attending day filarian clinic. The entire patient is provided with anti filarial therapy and they are also advised washing and care of affected body part for prevention of ADL attacks.

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 1896 Lymphoedema patient were registered for the Lymphoedema Management. They were demonstrated proper foot care, hygiene and maintenance to prevent further ADL attacks.

Manpower Development

- **Title of the training/seminar/Workshops (in following tables)**
  Since its inception, this centre have conducted several training courses for Medical Officers/Biologists & Technicians/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.

  i. **Broad objectives** To give sufficient exposure to the participants in the field of Parasitology, Entomology, method of survey, vector identification, morbidity management, epidemiology of filariasis, control and evaluation of the programme.
  ii. **Duration and dates:** Given in separately for each Training in Table
  iii. **Target participants:** Medical Officers/Biologist/District Programme Officers & various categories of Para-Medical Personnel (Filaria Inspectors & Technicians) involved in Filaria Control Programme & Urban Malaria Scheme from Filaria endemic States/Union Territories of Country
  iv. **Expected outcome:** Participants are expected to gain sufficient knowledge and skills to effectively contribute towards the control of Lymphatic Filariasis
  v. **How the expected outcome of the Activity will beneficial for the national Programme:** The trained man power development in the 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 2015.
  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

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

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

Training courses conducted by NCDC, Varanasi during 2014-15

Sl. No.	Name of the project	Date with duration		No. of Participants
		From	To	
1	Training Course in Filariology for Health Inspectors/Technicians, Varanasi	10.11.14	21.11.14	07
2	Conducted training programme for Medical Officer of U.P. State Government on MDA Programme held in the March, 2013	13.12.14 to 14.12.14	---	24
3	Conducted training programme for Medical Officer of U.P. State Government on MDA Programme held in the March, 2013	25th Feb, 28th Feb., 15	---	42
4	Conducted one training/ orientation programme for MBBS/PG students of Department of PSM regarding Lymphatic Filariasis	04.03.2015	---	5

Plan of action for 2015-16:

i. Undertake new Research Projects in the field of LF/other Vector Borne Communicable Diseases of Public Health Importance.
ii. Undertake Advocacy Workshop on LF & MDA for Medical Officers/ Biologists/District Programme Officers of U.P. supported by WHO.
iii. Act as Nodal Officer for YEP in Sonebhadra & Mirzapur Districts of U.P.
iv. Undertake 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. The study is hampering due to non availability of Filaria Antigen Kit at the branch.
v. 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 disease in the help of questionnaire.

5.18 NCDC, Alwar Branch

Dr Naveen Chharang
Deputy Director & Incharge

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 & outbreak/ epidemic etc. Support to intensive Pulse Polio Programme (IPPI).

Routine activities undertaken during the period : This unit renders services & training in public Health i.e FETP, Para Medical FETP, MPH, Malaria & NVBDCP, EIS like Courses and during health emergency situation like flood, earthquake, cyclone, tsunami & outbreak/ epidemic etc. Support to intensive Pulse Polio Programme (IPPI) in four round of NID/SNID a total of 194 doses were given to the children under 5 years of age at this center. Training Program.. **NPSP:** Five round of NID/SNID a total of 188 doses were given to the children of under 5 years of age under my supervision at this center.

Laboratory services

S.No.	Test Conducted	Total Specimens	Found Positive	Remarks
1.	Widal Test	404	93	
2.	Malaria(MP Slides) Test	505	2(P.Vivax.) 0 (PF)	
3.	Cholera Test	NIL	NIL	
4.	Water Examination	15	All Satisfactory	

Outbreak Investigations: H1N1Outbreak Investigation in Rajasthan State from 19.02.2015 to 24.02.2015

Manpower Development: FETP, Para medical FETP, NVBDCP Malaria Epidemiology, EIS like trainees, MPH , workshops

MPH	Study of Diseases Surveillance System.
Malariology Training Course	Field exercise on Vectors & Vector Borne diseases Control in Alwar District
RFETP (Batch)	1. Study of Surveillance System 2.Epidemic Investigation 3.Institutional Data Analysis 4.KABP Study of Dengue fever
EIS like Trainees Immunization Coverage Survey	Immunization Coverage in Children.
Para-Medical Course on Prevention and control of Communicable Disease	To find out the prevalence of ARI among under five years children and treatment seeking behavior of Slum areas of Alwar town.
Malaria logy, NVBDCP	Field exercise on Vectors & Vector Borne diseases Control in Alwar District


• Outbreak Investigations

Outbreak Investigations

. No	Date of investigation initiated (DD-MM-YYYY)	Disease	Place	By
1	02-04-2014	Mumps	SAS Nagar, Mohali,Punjab	Dr. Mohan Papanna
2	25-04-2014	Measles	Ghazipur, Delhi	Dr. Rajesh & Dr. Pankaj
3	28-04-2014	Hepatitis A	Malappuram district, Kerala	Dr. Arghya & Dr. A R Pasi
4	30-06-2014	Measles	naugaon block, Uttarkashi	Dr. D Somashekar
5	25-09-2014	Rapd Needs Assessment Post Floods	Srinagar, Jammu and Kashmir	Dr. Rajesh & Dr. Somshekar
6	14-10-2014	ADD (Probably Cholera)	Mungeli & Bilaspur (Chattisgarh)	Dr. Pankaj & Dr. Arghya
7	26-10-2014	Anthrax	Simdega, Jharkhand	Dr.Priyakant & Dr. Pasi
8	29-10-2014	Acute Diarrheal Disease	Andikkupam and Anditheru village,Cuddalore district,Tamil Nadu	Dr. Anoop & Dr. Valan
9	14-12-2014	Hepatitis E	Sambalpur (Odisha)	Dr. Vikram & Dr. Amol
10	17-12-2014	Suspected Encephalitis	Malkangiri district Odisha	Dr. Priyankant & Dr. Mohan P
11	22-01-2015	Measles	Vill Laogaon, District:Nagaon, Assam	Dr. Taku
12	23-01-2015	Hepatitis A	Kangra (Himachal Pradesh)	Dr. Vikram
13	28-01-2015	Foodborne disease outbreak	Jamla, Sabarkanta, Gujarat	Dr. D Somashekar
14	10-02-2015	Shellfish Food poisoining	Navaneetha nagar,Cuddalore district,Tamil Nadu	Dr. Anoop Velayudhan
15	12-02-2015	KFD	Wayanad, Kerala	Dr. Preeti
16	18-02-2015	Water Borne Disease and HEP E	Raipur, CHHATTISGARH	Dr. Mohan Papanna
17	19-02-2015	H1N1	Jaipur Rajasthan	Dr. Rajesh & Dr. Neeraj
18	02-03-2015	Rubella	Dharwas district, Karnataka	Dr. Kalpana
19	19-03-2015	Foodborne Outbreak	Pali, Rajasthan	Dr. Neeraj & Dr. Harish
20	21-03-2015	Measles	Mewat (Haryana)	Dr. Vikram
21	25-03-2015	Measles	Vill Bhelterghat, District:Goalpara, Assam	Dr. Taku

+

1. Mumps Outbreak among School Children SAS Nagar in Punjab, March 2014

On 6th March 2014, the Civil Surgeon in Mohali (SAS Nagar) in Punjab received a report from the Senior Medical Officer of PHC Gharuan regarding an unusual rise in Mumps cases from the Government Middle School of Baroli village.

Team from District Headquarters visited the school and 15 cases were line listed based on clinical features such as unilateral/bilateral tender swelling in the parotid region & pain in the ear on opening the mouth. They collected blood samples from 9 of these cases and sent them to District Priority Lab, Mohali. Three samples were found to be positive by IgM ELISA for mumps. Following the medical camp at the school a community survey of 200 households was carried out on 7th March 2014 and no mumps cases were found. The National Centre for Disease Control joined local health authorities to conduct an outbreak investigation on 2nd April, 2014.

118 children attended the government primary/middle school. Twenty six children had mumps of whom 13 were in the age group of 5-9 years and 13 were in the age group of 10-14 years.Primary school children had an attack rate of 33%(22/67) compared to 8%(4/51) among middle school children.15 cases were reported from 2nd- 5th March and the last case was reported on 7th April 2014.Eight children from 4 families were epidemiologically linked with a lab-confirmed case.

20 samples were tested at the District Priority Lab, Mohali. 12 were positive; 7 were negative; 1 indeterminate; 6 not tested as children were not available for sample collection.

We observed that primary schoolstudents from all grades shared the same class room on more than one occasion during in the 1-1 ½ months prior to the first case due to shortage of staff. Further, there were only 2 ill-ventilated classrooms for all the 5 grades .Middle school had 3 class rooms, one for each grade.

History of contact with a mumps case >2 hours within 2 feet within 1 month prior to onset of symptoms (OR: 9.7; 95% CI:3.2-29.5) had a strong association. Other factors such as living in a Kachha house (OR: 4.3; 95% CI: 1.38-13.2) and sharing the room/bed by the family members (OR:4.8;95%CI:1.3-18) were also found to be associated with Mumps.None of cases or controls received Mumps immunization.

During this outbreak 26 cases of mumps occurred among 118 children attending Govt Middle at Baroli village. Children were at high risk of mump as none of these children were immunized against mumps.

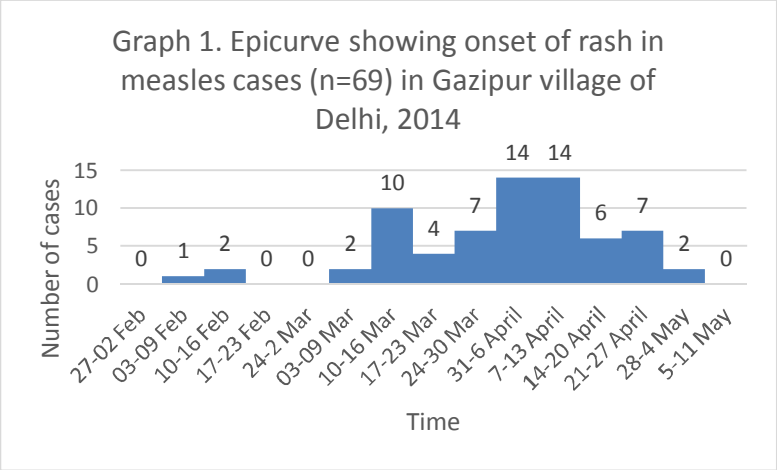
2. Measles Outbreak Investigation, Ghazipur Village, Delhi, March-April 2014

Measles is a highly contagious vaccine preventable viral disease, mostly affects children.An unexpected occurrence of suspected measles cases was reported on 16 April 2014 from Ghazipur village, East Delhi. Ghazipur is urban slum, divided into eight blocks namely block A to H. These was no measles outbreak reported in Ghazipur in last 5 years.A team from NCDC visited affected area on 17 April 2014 and started the investigation with objectives to describe the epidemiological characteristics of the measles outbreak and identify associated risk factors.

A measles case was defined as fever and maculo-papular rash with cough, coryza, or conjunctivitis in a resident of Ghazipur with onset of rash during 1st February-30th April 2014. Six blood samples were collected for testing by IgM Elisa at National Centre for Disease Control Laboratory. Case-patients were interviewed about household characteristics and vaccination status. A community-based survey was performed to identify case-patients, calculate age-specific attack rates (AR) and to estimate vaccination coverage and vaccine effectiveness (V.E.) in B-block. A case-control study was conducted to identify risk factors using two age-matched controls per case, one from the same house and other from the neighbourhood. Migratory behaviour was defined as living in Ghazipur for <3 years. We performed conditional logistic regression using EpiInfo-7.

Among 69 measles cases identified in Ghazipur village, median age was 3 years (range: 0.5-21 years). Two of six samples tested positive for measles. In B-block, the highest AR was among children aged 0-5 years (25.1/1000). One-dose measles vaccination coverage among 1-5 year-olds was 61.6% and

V.E. was 89.6%. Independent risk factors for measles were migratory behaviour (matched odds ratio [MOR]: 6.3; 95% confidence interval [CI]: 1.4-29.1), >2 children sharing one room (MOR: 2.6; 95% CI: 1.1-6.4) and >3 families sharing one toilet (MOR: 12.3; 95% CI: 1.6-95.5).



Low vaccination coverage was likely cause of this outbreak, supplemented by migratory behaviour of resident population, living in overcrowded environments, and lack of awareness amongst community regarding measles vaccine. We recommended strengthening routine-immunization, including outreach-services for migratory populations, and periodic campaigns to ensure World Health Organization recommended ≥95% two-dose measles vaccination coverage.

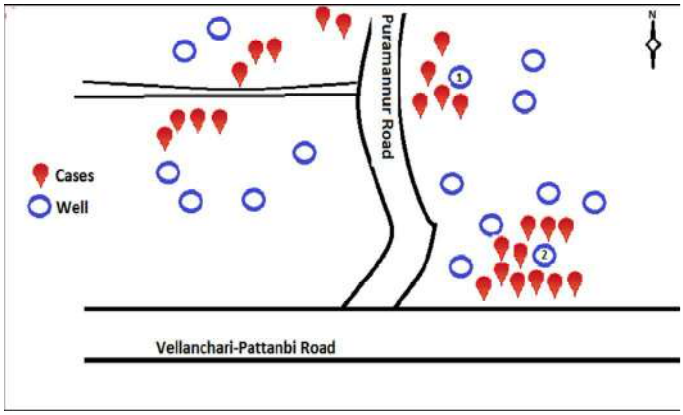
3. Hepatitis A outbreak in Puramannur area, Malappuram, Kerala, Feb-Apr 2014

Hepatitis A is an enterically transmitted viral disease, highly prevalent in India and predominantly among children. In April 2014, Malappuram district reported 20 cases of hepatitis from Puramannur village of Irimbilium PHC. We investigated this outbreak to describe the epidemiological characteristics of disease and propose recommendations to prevent future outbreaks.

Total population of Puramannur area was 763, with 418 females and 345 males residing in 117 households.. A total of 12 out of 117 households reported cases of hepatitis A in last 2 months; 25 cases from these 12 households met our clinical case definition.Over all, the attack rate of hepatitis A was 3.3%. The attack rate in male and females were 3.7% and 2.9% respectively. The age of cases ranged from 6 – 23 years with a median of 15 years. The attack rate was maximum (11.3%) in the age group of 10-14 years, 10.8% in the age group of 14-29 and 7.2% in the age groups of 5-9 years.

Out of 25 cases, 23 and 21 had undergone laboratory investigation for Sr Bilirubin and Sr SGPT level respectively. All investigated individuals had raised Sr Bilirubin and Sr SGPT level. Out of 25, only 2 cases were investigated for anti HAV Ig M and were positive.

All 12 households reporting hepatitis A cases had water supply from well 1 or 2. There was clustering of cases around well no. 1 & 2 as shown in the map below.The houses around the well no.1 in the map are close to a mosque and located nearly 1kilometer apart from the houses around well no.2.Both the wells were close to pit latrines & walls of the wells were not lined.Puramannur area doesn't have any sewage system. Most of the houses have closed pit latrines for excreta disposal & were very close to the wells.



Analysis of case control study revealed that drinking water from well no. 1 or 2 (OR =250, 95%CI 75.3 - 827.5, p=0.0001) and not using any method of water purification at household level (OR=113.9, 95%CI 13.6–953.6, p=0.0001) was significantly associated with this outbreak.

Puramannur experienced hepatitis A outbreak which was associated with drinking water from wells 1&2, possibly due to cross contamination of the wells.The age group of cases in this outbreak and from other similar studies indicates that there may be an upward shift in age at which children gain natural immunity against hepatitis A. IEC activities in the community regarding lining the wall and regular chlorination of wells were recommended to prevent future outbreaks.

Gram panchayat took responsibility of ensuring the chlorination of domestic wells regularly; educate public regarding cementing the walls of wells & construct septic latrines.

4 Measles Outbreak in Naugaon Block, Uttarkashi , Uttarakhand, India, April-August, 2014

Although India is working toward measles elimination, measles still prevails as an outbreak prone disease reported with 310 outbreaks and 10059 cases till August,in the year 2014. There is a need to understand the epidemiology of measles outbreaks to help achieve elimination. In June, 2014, Uttarakhand state reported 18 children with fever and rash, including one death in Naugaon block, Uttarkashi district. Suspecting measles, an outbreak investigation was conducted from July 30 –August 6, 2014.

A suspected measles case was defined as onset of fever and rash with ≥1 of cough, coryza, or conjunctivitis during April 1-August 5, 2014 in a resident from either of two affected villagesin Naugaon block. We did house to house survey for active case finding and assessed measles vaccination coverage among 9 -59 months old children. Measles vaccination status was determined by vaccination card or mother's history with record verification of at least one dose of measles vaccine.Weassessed risk factors by 1:1 unmatched case-control study.Controls were persons aged <15 years from case-patient's house orneighbourhood without fever, rash, cough, coryza, or conjunctivitis. Case management with vitamin A wasalso assessed.We performed serologic test using ELISA for measles-specific IgM antibodies.

There were 65 cases with one death; median age was 4 years (range: 8 months-21 years). Age specific attack rates were highest in 1–4 (23/49, 41%) and 5-9 years groups (21/70, 30%). Measles vaccination coverage was 51% (37/73). Among cases, 14 (21.5%) were managed with vitamin A. Among 17 serum samples tested, 14 were positive.75% (44/58) of cases and 57% (33/58) of controls not being vaccinated for measles (OR: 2.36, 95% CI:1.07-5.34) and sharing the room with > 2 children (OR: 5.1, 95%CI: 1.1-35.9) were significant risk factors.

Low vaccination coverage and close contact with the cases led to propagation of this outbreak. Outbreak response immunization, case isolation, case management with vitamin A and > 95% coverage with two doses of measles vaccineare needed.

5 Post-flood Rapid Need Assessment in Srinagar, J & K, India, September, 2014

The state of Jammu and Kashmir experienced torrential rainfall during 2-6 September 2014 causing flooding of the river Jhelum. About 350 villages submerged across the state and the capital city Srinagar was severely affected with many parts inundated. Around 250 deaths were reported and over 2 Lakh population were evacuated during the floods. The Integrated Disease Surveillance Programme (IDSP) reporting units in Srinagar were also affected and limited data was available. To assess the impact of the floods and to assess population health and safety needs, we conducted a rapid needs assessment in the capital Srinagar from 27 September-1 October.

Based on the Community Assessment for Public Health Emergency Response (CASPER) tool of the Centre for Disease Control and Prevention (CDC), Atlanta, USA, we conducted a cross-sectional study in Srinagar city. We selected a representative sample of 210 households using two-stage cluster sampling method. In the first stage, we selected 30 clusters by probability proportional to size to the number of housing units within the 2011 census blocks. In the second stage, we randomly selected seven households from each of the 30 clusters. We collected information on demographics, functional needs, injuries, illnesses and communication using a standardized questionnaire. We used households as units and calculated weighted proportions using Epi-Info software version-7.

Of 210 interviewed households, 93 (44%; Confidence-Interval [CI]: 38%-51%) had children <5 or elderly >65 years. Overall, 120 (57%; CI: 50%-64%) households reported significant damage, 104 (50%; CI: 43%-56%) were evacuated, and 33 (16%; CI: 12%-21%) reported injuries. Electricity, tap-water and working toilets were lacking in 22% (CI: 17%-28%), 13% (CI: 10%-18%) and 11% (CI: 8%-16%) of households, respectively; 6% (CI: 3%-10%) lacked adequate food supply. Collectively, 138 (66%; CI: 59%-72%) households received messages to boil/chlorinate drinking water. Moreover, 22% (CI: 17%-28%) of households reported cough, cold, fever, rashes or loose motions; 143 (68%; CI: 62%-75%) experienced agitation, anxiety, depression or nightmares since the flooding. Of 178 households with a member on medicines for non-communicable diseases, 71 (40%; CI: 33%-47%) did not have a week supply. Restoring basic amenities (30%; CI: 23%-36%) and repairing houses (30%; CI: 23%-36%) were the most urgent needs expressed.

Floods damaged more than half of the households in Srinagar, disrupting basic essentials, and causing mental trauma. There was non-availability of prescription medicines for NCD's. These findings using CASPER methodology, obtained and reported within seven days, helped the state health authorities to prioritize assistance to people with psychological symptoms post disaster, ensuring availability of prescription medicines in the health facilities, improve plans for immediate supply of basic essentials and to address the issues for immediate assistance in repair of unsafe houses.

6 Acute diarrheal disease outbreak investigation in Mungeli and Bilaspur district, Chhattisgarh, October 2014

On 12 September 2014, an adult male died of acute watery diarrhoea and dehydration in Sarasdol village in the Achanak Mar Tiger Reserve of Mungeli district, Chhattisgarh.Subsequently, 149 more cases of similar acute watery diarrheal disease (ADD) were reported in seven discrete villages of Mungeli and the neighboring district of Bilaspur between July and October 2014.We investigated this outbreak to describe the epidemiological characteristics of disease and propose recommendations for control.

A total of 150 cases were identified from seven villages between July and October, 2014. All three deaths were reported from Sarasdol village with case fatality rate of 4%(3/71).The median age of cases was 25 years (range 6 months-85 years); and 41% were male. More cases were seen in the15-24 age group (n=34, attack rate – 22.7%) followed by 25-44 year age group (n=28, attack rate – 18.7%).

In September and October 2014, bacterial cultures of eighteen stool samples including six samples from these seven clusters were performed by Jan SyasthyaSahyog(JSS) laboratory. Isolates of Vibrio cholerae were recovered from 7 stool samples including 4 from these clusters, later sero-confirmed by Regional medical Research Centre for Tribals (RMRCT), Jabalpur, suggesting proportion of these outbreaks were due to cholera. All the seven affected villages had different type of water sources like

hand pump, well and piped water.All the villages had practice of open air defecation.In the worst affected Sarasdol village, cases were clustered around a particular well which was close to a waste pit.

Retrospective cohort study was conducted inworst affected Sarasdol village. Drinking water from a particularwell was significantly associated with development of illness with a RR of 7.4 (95% C.I. 3.7-14.6, p-value <0.001). The attack rate among people those drinking water from this well was 63%. Drinking water without boiling or chlorinating, was significantly associated with illness with a RR of 3.9 (95% C.I. 1.9-8.4, p-value <0.001).

Frequent and ongoing clusters and outbreaks of ADD in several neighboring villages of Bilaspur and Mungeli Districts from July through October 2014. Clinical illness symptoms are concerning for cholera; lack of specimen collection and laboratory testing greatly limited the number of patients who were given a confirmed diagnosis. In addition to the four patients lab confirmed cases, the remaining 146 of total 150 identified cases met the clinical case definition for suspected cholera. These findings indicated there are outbreaks concerning for cholera as well as, potentially, other causes of watery diarrhea.

Case ascertainment and field visits suggested that the multiple ADD clusters were not due to a single point source. However, study in Sarasdol village indicated that contamination of drinking water sources was the primary cause of the focal outbreak there. Absence of drinking safe water additionally placed individuals at greater risk for developing illness.

Immediate disinfection of all the water sources was carried out. For early diagnosis of cholera, state health department initiated the process of procuring rapid diagnostic kits.

7 Outbreak investigation of Anthrax, Kuruchdega Village in Simdega of Jharkhand, India

An outbreak of cutaneous anthrax was reported from a remote district of Jharkhand in India. We investigated the outbreak and evaluated potential risk factors to guide public health intervention.

A detailed evaluation of the cases using medical record review and interviews was conducted. Venous blood specimens were obtained and evaluated using blood culture in RIMS microbiology laboratory, Ranchi. We ascertained additional cases and conducted a 1:2 case control study to assess risk factors. Thirteen patients (all male; median age 30 years; range 18-58 years) including 5 deaths were reported; the attack rate was 11.1% and case fatality rate was 38%. In one/three blood cultures, *Bacillus anthracis*was confirmed. Among the 13 case-patients, 77% had cutaneous lesions in the upper extremities.

All cases and controls (13/26)had consumed dead bull meat; 77%of cases (10/13) were involved in the slaughtering, chopping and handling the dead bull meat. Slaughtering, handling or chopping dead bull meat were actions significantly associated with having anthrax(Odds Ratio (OR) 74; 95 % confidence interval (CI): 19.5 – 845.9).Men were 35 times more likely than females to have anthrax (95 % CI: 3.9 – 312.2). People with an agricultural occupation were 25 times more likely to have anthrax as compared to those working as labourer (95 % CI: 2.8 – 200.6).

In this outbreak, anthrax was likely transmitted through unprotected contact with anthrax- affected animal hide and meat. Screening of cattle, sheep and goats for any symptoms, and administration of 1 ml anthrax spore vaccine subcutaneously to each animal within 5 km radius was recommended. The community was educated regarding disposal of dead carcases, handling and slaughtering of infected animal and personal hygiene.

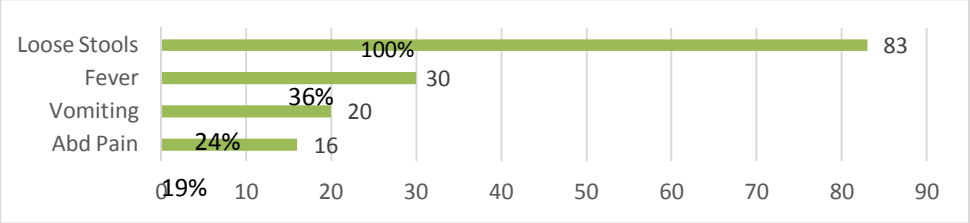
8 Outbreak Investigation of Acute Diarrheal Disease (ADD) in Andikuppam and Anditheru Villages, Cuddalore District, Tamil Nadu, October 2014

Cases of acute diarrheal disease were reported via the First Information Report (FIR), sent from the District Surveillance Unit,IDSP Cuddalore from two primary Health Centres (PHC), Thondamanatham and Karaikadu in Cuddalore.83 cases were found after passive and active case search with symptoms of loose stools,fever,abdominal pain and vomiting from 21st to 31st October 2014 in Andikuppam

and Anditheru,2 contiguous villages(fig 1) . The most common presenting symptom was loose stools with mucous or blood. The attack rate was higher among females (16.61%) and in age group of 11–20 years (23.2%)(table 1). The epicurve depicts a point source outbreak, with highest number of cases reporting onset of loose stools on 28th October (fig 2). Household clustering was seen (fig 3). The descriptive study indicated that 91% of the Cases in Andikuppam and Anditheru had taken water from a particular Overhead tank-1 (OHT 1) for drinking purposes. There were no cases reported after 31st October 2014.

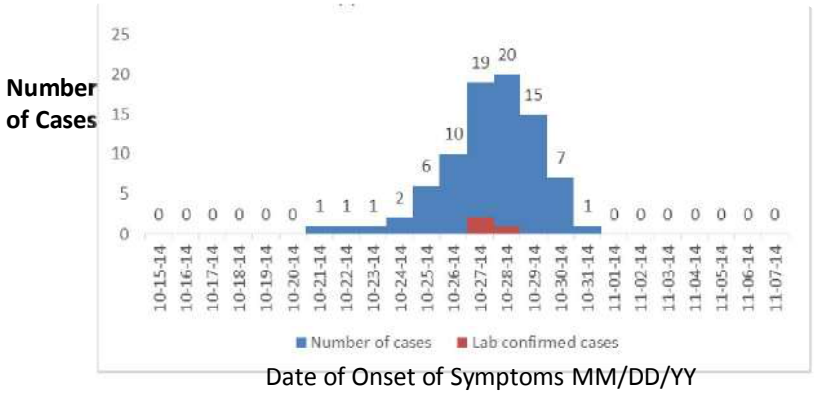
31 samples were (12 Faecal swabs,5 stool samples and 9 rectal swabs) tested, 3 faecal samples grew Shigella sonnei. The species was identified by rapid test kits for Shigella. The GFN reference laboratory for Cuddalore, district,Madras Medical College isolated Shigella sonnei in, 1/ 14 samples sent(table 2). The OHT1 is reported to be cleaned by the pump operator on 19th October with bleaching powder after stopping water supply to Andikuppam village for 2 hours. No logs or registers are maintained for tank cleanings nor are the cleaning carried out at definite intervals. Matched case control study was done. Cases (81) were matched for age and village. Bivariate analysis was done to identify risk factors. Exposures found significant were analyzed using conditional logistic regression. Drinking water from Overhead tank 1 (AOR: 7.1, 95%CI: 2.6–19.6; PAF: 67.8%), and contact with existing case in the family (AOR: 4.1, 95%CI: 1.6–10.4; PAF: 30.7) were associated with the illness.(tables 3-6). The ADD outbreak in Andikuppam and Anditheru vilages was caused due to drinking contaminated water from OHT1. Based on our findings we recommended Boiling and filtering of water before drinking,Cleaning and chlorination of Overhead tank 1 and monitoring of cleaning of all overhead tanks regularly and Health promotion messages in the community with emphasis on hand washing

The bar chart representing symptoms by frequency of the cases reported from Andikuppam and Anditheru villages of Cuddalore district during the ADD outbreak October 2014.(n=83)



Combined ADD attack rate of both villages Andikuppam and Anditheru, Cuddalore district

Age group In years	Number of person affected	Total population in both villages	Combined attack rate (%)
<1	0	4	0
1-10	13	65	20
11-20	25	108	23
21-30	10	106	9
31-40	14	90	16
41-50	10	69	15
51-60	8	58	14
61-70	3	43	7
71-80	0	17	0
81>	0	2	0
Total	83	562	15



Distribution of ADD cases in Andikuppam and Anditheru illage, Cuddalore District October 2014, by date of symptom onset. (n=83)

Spot map depicting the cases and source of water supply to the Villages Andikuppam and Anditheru (Combined map of both the villages)

Laboratory Results of ADD outbreak at Andikuppam and Anditheru Village, Cuddalore

S No	Sample type (number of person samples)	Tested at	Date (no: of person samples received)	Test Done	Result
1	**Faecal swab(12)**	Cuddalore district Microbiology lab	29/10/14(8) 31/10/14(3) 1/11/14(1)	Microscopy, culture, biochemical tests and Serotyping for species identification	*Shigella* spp grown in culture and *Shigella sonnei* typed in **2/12** samples. *E coli* in 10/12 samples
2	**Rectal swab(11)**	Cuddalore district Microbiology lab	29/10/14(11)	Microscopy, culture, biochemical tests and Serotyping for species identification	*Shigella spp* grown in culture and *Shigella sonnei* typed **1/11** samples. *E coli* in 10/12 samples
3	**Stool sample(8)**	Cuddalore district Microbiology lab	29/10/14(5) 31/10/14(1) 1/11/14(2)	Microscopy, culture, biochemical tests and Serotyping for species identification	
4	**Faecal swabs(14)**	Madras Medical College, Chennai	30/10/14(11) 1/11/14(3)	Microscopy, culture, biochemical tests and Serotyping for species identification	*Shigella Sonnei* grown in culture in 1/14 sample. No enteric pathogen in 13/14 samples
5	**Water(4)**	Water testing Laboratory, Guindy, Chennai	28/10/14(4)	Enriched in Selenite F broth and plated in SS agar.	4/4 positive for coliform bacteria. Negative for *Vibrio cholera, salmonella-Shigella* group of organisms,(no growth in culture)

9 Hepatitis E outbreak in Sambalpur, Odisha, India 2014

Hepatitis E infection, caused by the hepatitis E virus (HEV), is a common cause of acute hepatitis in developing countries with poor sanitation and hygiene. Large HEV outbreaks reported from Asia and Africa have been associated with faecal contaminated drinking water. In the month of May 2014, local media started reporting increased cases of jaundice in Sambalpur town Located in the western part of Odisha state. Consequently, to get the exact burden, a house to house case search for Jaundice case was conducted by the department from 11th Nov to 18th Nov 2014 which detected 365 cases from Sambalpur municipality. This was more than usual 4-26 patients reported each month previously, so we investigated this outbreak with the objectives of (1) describing the outbreak, (2) identifying the source, and (3) initiating preventing measures.

We conducted a case control study and recruited 113 cases and similar number of age & sex matched neighbourhood controls from wards having an attack rate of ≥ 4 per 1000 population.
For all participants included in the study, information on personal, socio-demographic characteristics, sources of drinking water, other probable exposure factors & common events were obtained. Our descriptive investigation detected the overall attack rate of 2% (365/ 183147) and majority 244 (66.8%) of the cases were found in 5-14 age group who had an attack rate of 2.5 per 1000 population. Females were affected more 239 (65.5%). Seven case fatalities were reported. The epidemic curve was largely multimodal. Of the 19 blood samples collected 12 tested positive for IgM anti-HEV and none for IgM anti-HAV. Of the 24 water samples lifted from various end points of distribution pipes 12 reported faecal contamination & the water samples from two water supplies schemes also reported faecal contamination. The town does not have sewer disposal system and open channels drain the sewer into two nallahs. There is widespread use of plastic pipes for water supply to houses and majority of these pipes pass through the channels draining sewer. There were frequent leakages.

Few personal habits/ practices like, use of water for drinking without using any purification methods (OR 1.9, CI 1.12 – 3.23; p=0.02), using mug/ ladle for drawing water from drinking water storage container (OR 2.6, CI 1.15 – 6.05; p=0.03 and eating from street side vendor (OR 2.02, CI 1.18 – 3.48; p=0.01) were found significantly associated with illness compared to those who did not practice these habits.

Consumption of untreated water, using mug/ ladle to draw water and eating street food were strongly associated with illness. Plastic water pipes passing through the sewer was a potential source of faecal contamination of drinking water.Health education was provided by the Health authorities to drink boiled or purified water and to avoid food from street vendors . Massive infrastructure overhaul was initiated to drain and treat sewer of the town.

10 Unexplained Neurological Illness in Children, Malkangiri district, Odisha, India 2014

Malkangiri district in Odisha reported 15 deaths due to unknown neurological illness during November- December 2014.We investigated to study the epidemiological characteristics of the outbreak and evaluated potential risk factors associated with the outbreak . Medical records of all the admitted cases of Suspected Encephalitis in the Malkangiri District Hospital were reviewed and a line-list was prepared. The past outbreak reports of 2009 and 2012 from the district Integrated Disease Surveillance Programme (IDSP) unit were reviewed Interviews with family members (15) of the death cases and the treating paediatrician at District Hospital, Malkangiri were conducted.

Out of 15 reported cases in 2014, all are under 5 years, male and female were affected in a ratio of 2:3 with a median age of 3 years. The overall attack rate was 4.4 % (15/340) and the attack rate was maximum among the age group of 1-3 years (6.95%). The case fatality rate (CFR) was 93.3 % 14/15). There were no cases/deaths under the age of 1 year. The majority (83.3%) of the cases belong to Hindu religion and all of them are from Tribal Koya Community. No cases/deaths reported from nearby Bengali community. All patients are from below poverty line (BPL) family with an average income of approximately INR 1200/month.The blood and CSF specimen collected from the cases and contacts were negative for JE, Chandipura, West Nile and Nipah Virus.

The houses in the affected villages were roofed with tiles or asbestos sheets. Maximum households in these villages were electrified. Cattle and goat sheds were away from the human dwellings. In a few cases, mixed dwellings were seen. Tube-wells were the only source for drinking water. The interrogation with villagers revealed that there was no migration of birds to these villages during the last one month.Emergency Active Surveillance (EAS) system with daily reporting was established in the district and a line list of vulnerable villages was prepared. The district NVBDCP team was engaged to support IDSP unit for active surveillance of AES suspected case from community level .

11 Outbreak of acute viral hepatitis in Kangra valley, Himachal Pradesh, India, 2014-2015.

India is classified as high endemic for viral hepatitis A (HAV) infection and each year several outbreaks are reported throughout the country. *Following press reports in January 2015,the jaundice outbreak in* Kangra town of Himachal Pradesh Valley was investigated with the following objectives: (1) assess the magnitude, (2) identify the source, and (3) initiate preventive measures.

An active case search was done in entire Kangra town to identify case-patients during 1st Nov'14 to 23rd Jan'15 using clinical case definition of viral hepatitis. We conducted a 1:1 case-control study, enrolling age- and sex-matched neighbourhood controls; data on exposures were collected using a structured questionnaire. Serum specimens from five cases were tested for IgM anti-HAV and IgM anti-HEV. End-point water specimens from households of case-patient were tested for fecal coliforms using most probable number methods. The overall attack rate was 1.6 (149/ 9528), the highest being 4/100 population in one particular ward among eight wards. There were no case fatalities. Epicurve suggested a propagating outbreak. Among 149 patients, 62% were in 5-14 age-group with no gender differences. All five serum samples tested positive only for IgM anti-HAV. No contamination was detected in water samples.

Those having contact with jaundice patients in previous two weeks (OR 1.6; 95% CI 1.03-2.6; $p<0.05$) and those not washing hands with soap before meals (OR 4; 95% CI 1.96-6.9; $p<0.001$), were more likely to be cases. The findings suggested that it was a person to person spread of hepatitis A outbreak. Promotion of personal hygiene and sanitation among residents of Kangra town was recommended.

District health authorities provided health education on promotion of personal hygiene and sanitation using miking, distributing pamphlets and messages using radio and electronic media.

12 Food poisoning in Jamla village, Himmatnagar, Sabarkanta district, Gujarat

An outbreak of food poisoning occurred on 23.1.2015 in the Jamlavillage, Himmatnagar, Sabarkanta district, Gujarat state. As part of the Global food borne infection network project, this outbreak was investigated from 28th Jan to 31st Jan, 2015 with the objectives to describe the epidemiological characteristics, to determine the associated risk factorsand to provide recommendations.
The incident resulted after consuming lunch in a pre-marriage function. We interacted with the district and the Primary Health Centerofficials andalso the family, which hosted the function. A case was defined as "any person of any age who is resident of Jamla, MotaVadal, Jhadar and Virpur villages who had consumed food in the community feeding hosted in Jamla village on 23rd Jan, 2015" who experienced abdominal pain or vomiting. House to house survey conducted for case ascertainment and utilized the opportunity by conducting a cohort study for risk factor analysis. We defined the cohort as "any person of any age who wasfrom 'X' community and resident of Jamla, Vadal, Jhadar and Virpur villages and had consumed lunch hosted in Jamla village on 23rd Jan, 2015". Households were enquired on attending the function and collected information on food items consumedand development of illness. 'Y' dairy in Himmatnagar, which supplied the milk products was visited and inspected storage facilities and power backup system. We enquired the catererwho prepared food items.

132 persons in 114 households were interviewed, of which 67 persons met case definition and 65 were healthy persons and based on householder's information, additional 23 (who were not present during the visit) persons who met case definition were included for descriptive analysis; Out of 90 cases, females were 46 (M:F 1:1.04). Median age was 38 years and ranged from 10 to 68 years. 63 (77%) cases had abdominal pain, 56 (71%) cases had vomiting and10 (14%) cases had diarrhea. There was no death. Average time period from food consumption and onset of illness was 5hrs 30mins (Range- 2 to 9 hrs). Among ill persons, 98% consumed basundi, 93% gota (pakoda) and 90% of jhalebi.

Higher risk of developing disease were observed among those who consumed basundi (RR-13.9, CI 2.03-95.26), burfi(RR-2.8, CI 1.5-5), jhalebi (RR-3.09, CI 1.5-6.1), mixed vegetable dish(RR-2.2, CI 1.3-3.6) and gota(RR-2.4, CI 1.1-5.4). No clinical specimen were collected.

Average incubation period of about 5 hrs 30 mins (ranged 2hrs to 9hrs) suggests possibility of food poisoning due to toxins. There was power failure in the 'Y'dairy for 10 hrs a day before the function and there was no power backup system. Food preparation involved lot of handling by food handlers. It was recommended for IEC on proper storage of milk products and utilization of milk based food items with in shelf life period, to maintain hygienic practices in preparing food items requiring lot of manual handling and to collectclinical specimens in all suspected food borne outbreaks.

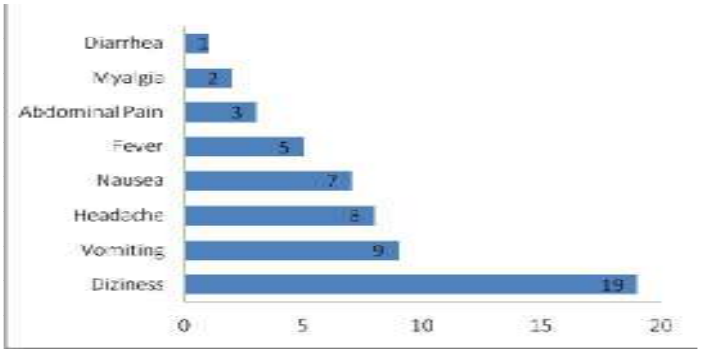
13 Food Borne Outbreak Investigation Report, Cuddalore district, Tamil Nadu.

Background: Cases of acute food borne illness were reported via the First Information Report (FIR), sent from the District Surveillance Unit by the District Epidemiologist, IDSP on 2nd February 2015, from Cuddalore district,Tamil Nadu. 20 cases were reported with symptoms of loose stools, fever and vomiting on from Navaneetha Nagar, Ward 43 of Cuddalore Municipality Area (population 222) on 29th January with complaints of vomiting and giddiness. it was reported that all had consumed Clams, a shell fish which was purchased from an unknown vendor

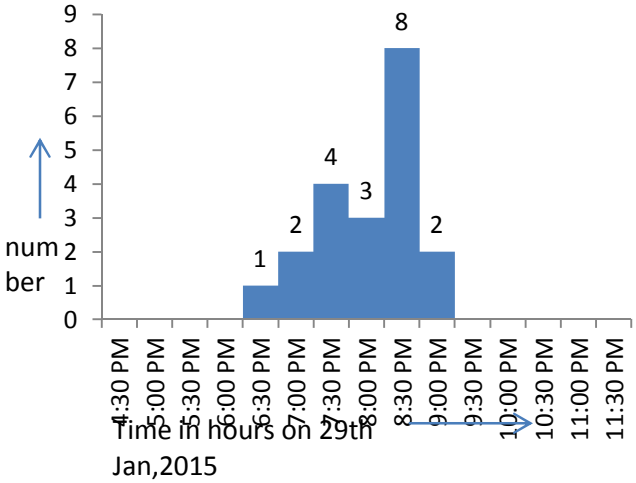
All 20 affected persons consumed clams on 29th January. Among the 202 unaffected, none had consumed clams. Among the 20 cases, the most common presenting symptom was dizziness (19 persons) followed by vomiting (9 persons)(Fig 1). None had any amnesic symptoms. Food specific attack rate for clams was 100% . It was cooked in 3 households. Of the 20 cases, 8 (40%) were male. The maximum attack rate (28.6) was seen in the age group of 60 to 64 years (table 1). median incubation period was calculated to be 15 minutes (range 0 to 60 minutes).The epidemic curve depicts a point source outbreak, with highest number of cases reporting onset of symptoms on 8.30 pm (Fig 2). Mapping of the cases among 55 households in the community shows 6 affected houses and no apparent clustering. There were more than one case in a household. No stool specimens were collected as no one had diarrhoea.

The shell fish was identified as Meretrix Meretrix ,a type of Clam. It is a bivalve filter feeder mollusc; which by itself, is not toxic but could have accumulated heavy metals or algal toxin as bio accumulation from water in which it lives.As all 20 persons who had eaten the clams had fallen ill (100% attack rate) and all cases had a food history of eating the clams (100% case exposure). The symptoms are consistent with shell fish poisoning, which can be Neurotoxic or of a Diarrheic type. Investigation supports the hypothesis for shellfish consumption being associated with the illness outbreak..

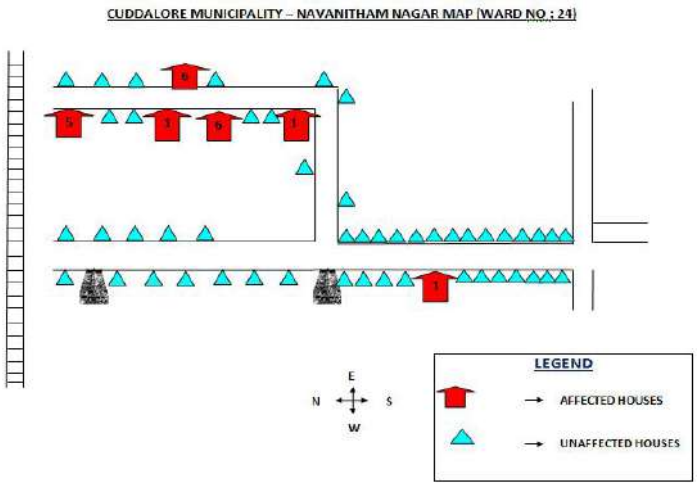
Information Education Communication (IEC) campaigns saying that the consumption of shell fish be avoided in the post monsoon season to discourage collection of shell fish from polluted water like near factory effluent release pipes or sewage disposal areas and to have targeted educational campaign on signs, symptoms and diagnosis of shellfish poisoning for general public, physicians and other healthcare providers were recommended. Coordination mechanisms with municipal corporation and food safety departments for timely intervention and future preparedness was also recommended.



Symptoms by frequency of the cases reported from Navaneetha Nagar, Cuddalore district, January 2014 (n=20).



Time distribution of cases in Navaneetha Nagar, Cuddalore District January 2015, by onset of symptoms (n=20).



Spot map depicting the cases in Navaneetha Nagar,January 2015

14 Outbreak investigation of Kyasanur Forest Disease, Wayanad district, Kerala, 2015

On 6th February, 2015District Surveillance officer, IDSP Wayand reported 16 positive cases of KFD to IDSP, NCDC, New Delhi and in the EWG meeting it was decided to investigate this outbreak which started on 12.2.2015. In 2015, a total of 113 KFD cases (confirmed=43; suspected=70) were reported at the time of investigation. The case fatality rate was calculated to be 5.3% as a total of 6 deaths had occurred. Among the 113 cases, 62% were females. The median age of cases was 40 years, ranging from 3 to 70 years and majority. The first case was diagnosed on 16th January 2015 and the cases started increasing from 29th January 2015. The maximum cases were reported from PHC Poothady which had an attack rate of 14.1 per 10,000 population which was in close vicinity to the affected Chikenji forest area.

A total of 81 blood samples were sent for testing to Manipal Virology Research Center (MVRC) for KFDV by RT-PCR. Out of these 43 (53.1%) were positive for KFDV.All the samples were also tested for Dengue, Leptospirosis and scrub typhus which came out to be negative.
A total of 18 monkey deaths (Macacaradiata) have been reported from various parts of Wayanad district. Samples of all the monkeys were sent for testing by RT-PCR for KFDV, 5 were tested positive for KFD (27.8%). These are preliminary findings and official report is still awaited. Entomological investigations showed that the main vector (Hemophysalisspinigera) responsible for transmission of KFD was found in abundance in affected area, but the results of laboratory are still awaited.

A retrospective cohort study was conducted on 41 individuals hired by forest department for working in Chikenji forest area and 23 of them developed the disease (attack rate of 56.1%). The main risk factors responsible for occurrence of the disease were those involved in fire line work (RR=3.4, CI=1.0-11.9); history of tick bite (RR=3.1, CI=1.1-8.6); working near the area of monkey death (RR=2.2, CI=1.1-4.5) and those who saw a monkey death (RR=1.8, CI=1.2-2.8). A matched case control study was further conducted. 59 cases (26 laboratory confirmed & 33 clinical cases) and 118 healthy cases were enrolled.Visit to the chikenji forest area during last one week (OR=4.01, CI=1.5-10.9), taking animals for grazing in the forest (OR=3.9, CI=1.9-7.7), exposure to monkey death (OR=3.5, CI=1.8-6.9) and collection of leaves around the house (2.06, CI=1.09-3.9) were the significant risk factors associated with occurrence of the illness. This is the first ever outbreak of KFD in Wayanad district.The first monkey death led to the outbreak and it was confined to chikenji forest area only. Females and population aged >14 years were more affected. Visit to chikenji forest area, fireline work, exposure to monkey death and working near to the place of monkey death were the main factors associated with KFD. Recommendations:

1. To carry on the active surveillance as well as referral and treatment services for KFD cases.
2. To impart health education regarding the use of personal protective measures before entering the forest.
3. To start the tick control in the forest through malathion/ pyretheroids dusting and controlled burning in 50m radius of monkey death.
4. If necessary develop a vaccination policy for high risk population.

15 Outbreak Investigation of Jaundice in Raipur, Chhattisgarh February-March 2015

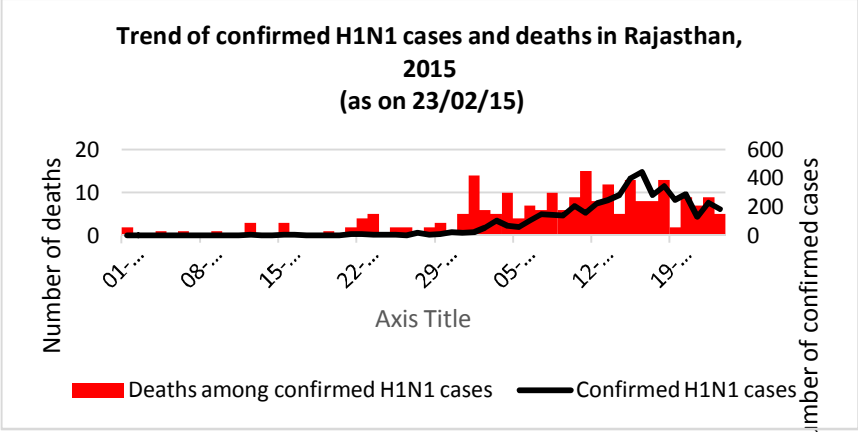
From December 2014 to January 2015 an unusual rise in number of Jaundice cases were reported to Raipur district IDSP unit with nine deaths. The State Surveillance Officer, IDSP Chhattisgarh requested the National Centre for Disease Control (NCDC) to conduct an investigation. NCDC outbreak investigation was initiated in Raipur on 19th February 2015.

On review of surveillance and outbreak reports, areas most affected by jaundice in Raipur were DDU Nagar with attack rate of 1% (222/24568) during 2014 and Hirapur attack rate of 1.5% (335/21781) during 2015. A total of nine deaths occurred due to jaundice/Hep E of which 5 were males and one pregnant women. The median age of the deceased was 29 years (IQR: 24-38 years). Additionally, outbreaks of Hep E had also occurred in Jagganath Nagar, Baijnath Para, Subhas Nagar of Raipur Municipal Corporation(RMC).

The ongoing jaundice outbreak at Hirapur was investigated. A total of 1354 people were tested in Hirapur of which 249 patients fulfilled the criteria for jaundice case definition. The median age was 26 years (IQR 19-34) and the age group commonly affected was between 15-44 years and 61.5% were males. The epi-curve shows multiple peaks with cases occurring on 15th January 2015 followed by maximum number of cases occurring from 1st -14th February 2015(Fig 1). Maintenance of water pipes was initiated by RMC during 2nd week of December following which outbreak was declared on January 28th 2015. Of 249 patients reporting icterus, 68% gave history of dark urine, 43% anorexia, 42% fever, 37% abdominal pain and 24% vomiting.

16 H1N1 Outbreak Investigation, Rajasthan, India, 2015

H1N1 influenza is a highly contagious respiratory disease.An outbreak H1N1 was reported from Rajasthan in the first week of January 2015.Our team from NCDCvisited Jaipur, Rajasthan from 19-23 February 2015 to conduct an epidemiological assessment of mortality due to H1N1 in Rajasthan. A lab confirmed H1N1 case was defined as "An individual with laboratory confirmed pandemic (H1N1) virus infection by one or more of the following tests: polymerase chain reaction (PCR); viral culture; 4-fold rise in H1N1 virus-specific neutralizing antibodies". We collected current H1N1 deaths data and also last 5 yeardata from state IDSP unitfor descriptive analysis. Information of death cases was obtained from Sawai Man Singh (SMS) Hospital Jaipur by visiting OPD, ICU, Swine flu isolation ward and by reviewing available death audit report of 50 confirmed H1N1 cases.Cleaning and analysis of data was done on Microsoft Excel. H1N1 outbreaks are historically evident in Rajasthansince2009.Maximum number of H1N1 deaths are reported this year but the proportion of death among confirmed positive cases is low andsimilar to 2009.

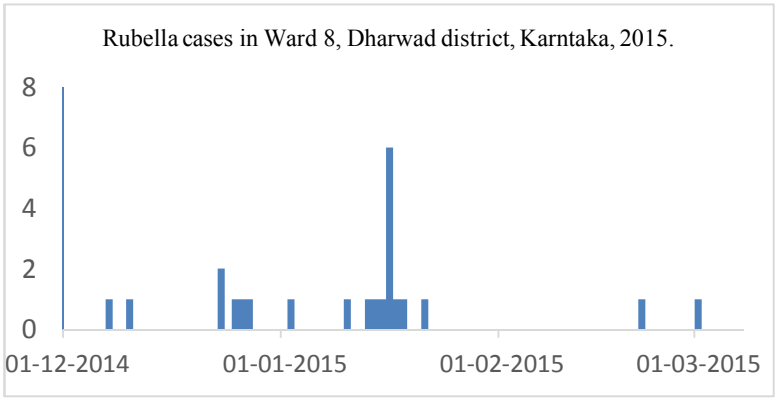


First confirmed documented death from H1N1 in Rajasthan was noticed on 1 January 2015. Till 23 February, 129 deaths (56%) deathswerefrom Jaipur, Ajmer, Jodhpur and Nagaur districts. About 77% (177) deaths were reported in 25-64 year age group with maximum 45% between 25-34 year age group. In females maximum deaths were in 25-34 year age group (34%) while in males in 35-44 year age group (27%).90% of deaths occurred within a week of hospitalization. Majority (80%) RT-PCR for H1N1 test were conducted in Government laboratories. Analysis of 50 confirmed H1N1 deaths audit by the SMS hospital showmedian days between date of onset of the symptoms and death was 10 days. Pre-existing comorbidities among cases were T2DM (16%), coronary artery disease (8%), and 6% deaths were among pregnant/post-partum patients. The immediate cause of death were Acute Respiratory Disease Syndrome and Bilateral Pneumonia.

The number of H1N1 deaths in Rajasthan is more in 2015 in comparison to previous years but the proportion of deaths waslow. A large number of deaths occurred in otherwise healthy workingpopulation. We recommended for ensuringavailability of antiviral drugs, strengthening referral and vaccination in high risk groups including health care providers and laboratory staff.

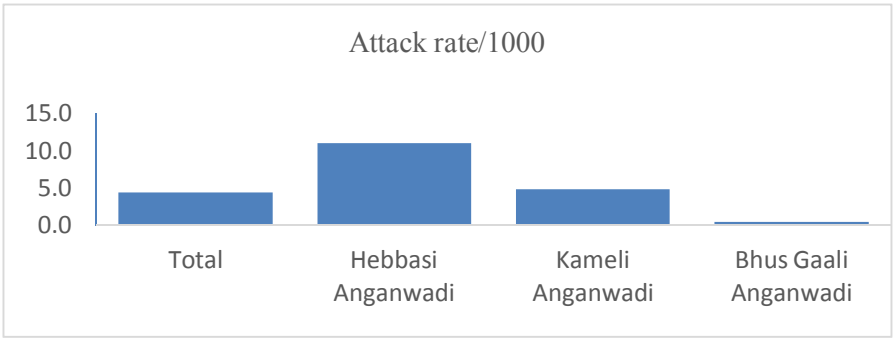
17 Rubella outbreak in Ward 8 of Dharwad district, Karnataka, 2015

Rubella outbreaks are often underdiagnosed and underreported. The public health importance of rubella is mainly due to the burden of congenital rubella syndrome. Dharwad district of Karnataka reported of suspected measles in Habelli agasi ward no 8 of Dharwad district on 27/1/2015. The surveillance Medical Officer along with local health workers team did the active surveillance in the area. They identified 21 cases with fever and rash. On 31/1/2015, five samples of blood collected during active surveillance turned negative for measles antibodies and positive for rubella antibodies by IgM Elisa.Since the surveillance used the measles case definition, we decided to use the rubella case definition to identify rubella cases and to describe the outbreak in terms of time,place and person. There were 23 cases of rubella. The index case occurred on the 7th of December, 2014.

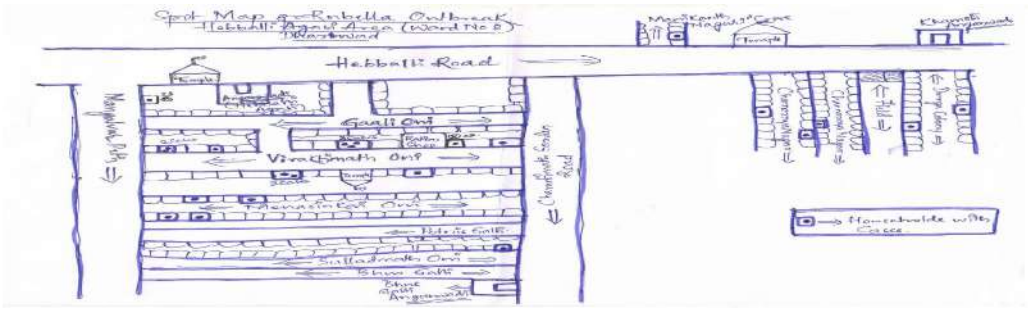


Epidemic curve of rubella cases in Ward 8, Dharwad district, Karnataka, 2015

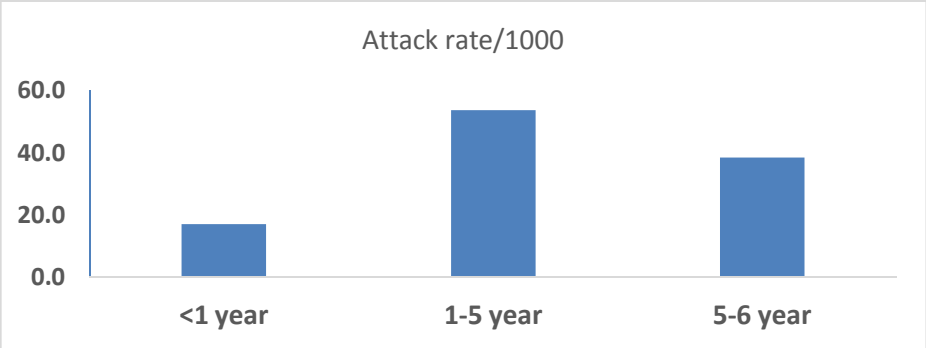
Attack rates of rubella cases in the three anganwadi centres in Ward 8, Dharwad district, Karnataka, 2015



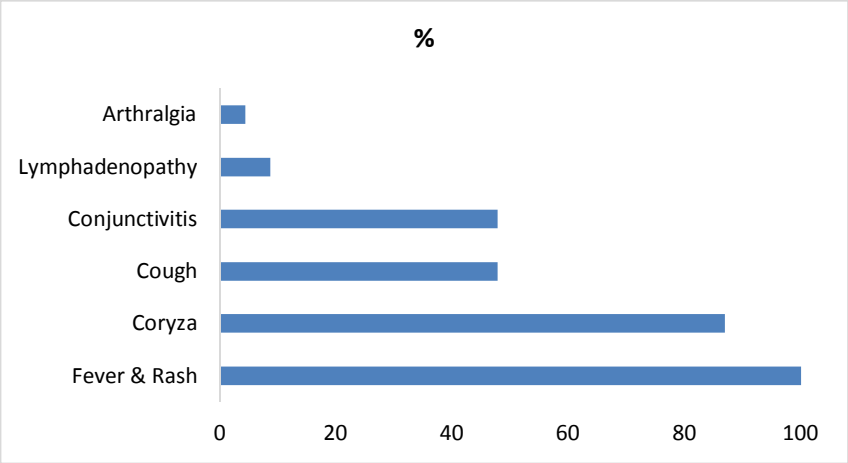
Spot map, Rubella cases in Ward no.8, Dharwad district. Karnataka, 2015



te Attack rates of rubella cases among the different age groups, ward 8, Dharwad district, Karnataka, 2015



Symptoms profile among the rubella cases, Dharwad district, Karntaka, 2015



The last case occurred on the 1st of March, 2015.(Figure 1) Among the twenty three cases, 16 cases occurred in the Hebbasi Agasi anganwadi, 6 cases in the Kameli anganwadi and one case in Bhus Galli anganwadi. The overall attack rate was 4/1000 population (23/5208). The attack rate among the males was 3.7/1000 population (9/2412) and among the females was 5(14/2796). The attack rate was highest in the Hebbasi Anganwadi, (Figure 3), attack rate being 11/1000 population (16/1458), followed by 4.8 in Kameli anganwadi(6/1250) and 0.4 in Bhus gali anganwadi(1/2500). The attack rate was equal among both males and females in Hebbasi Agasi anganwadi, but higher among females in the other anganwadi. In addition to fever and rashes, majority of the cases had coryza, while half of the cases had cough and conjunctivitis. But the prevalence of arthralgia and lymphadenopathy was less. The age distribution was between 9 months to 13 years, except one case which was 23 years old. The attack rate was highest among the age group 1 to 5 years {(Attack rate; 53.7(11/205)}, followed by 5 to 6 years {Attack rate;38.5(3/78)} and less than 1 year{16.9(2/118)}.(Figure 4). The range of the age was narrow among females, that are 9 months to 6 years, but among the males it was between 9 months and 13 years.

The surveillance Medical officer along with the local health workers team collected five samples of blood from the Hebbasi Agasi Anganwadi. All the five samples were positive for rubella antibodies by IgM ELISA.There was a rubella outbreak in Dharwad district of Karnataka. The outbreak lasted between 7th December 2014 and 1st March, 2015. The attack rate is higher in Hebbasi Agasi anganwadi, among females and in the age group of 1 to 5 years.

18 Acute gastroenteritis outbreak, Pali District, Rajasthan, India – March 2015

On 17.03.2015, NCDC Delhi learned of a foodborne outbreak with increased numbers of acute Gastroenteritis cases reported from Pali district in Rajasthan. Two Epidemic Intelligence Service (EIS) officers were deployed to verify and investigate the outbreak. The team from NCDC reached on 21 March 2015 to state IDSP Jaipur and on 22 March 2015 to Pail, Rajasthan to investigate the outbreak. Objective were to describe the epidemiological characteristics of the outbreak, to determine the risk factors associated with the outbreak and to recommend measures for preventing AGE outbreaks

We collected data from the District IDSP unit of Pali, Rajasthan and admission records of Bangar Hospital, Pali to analyse the acute gastroenteritis situation. An unmatched retrospective 1:2 case control study was conducted with *case definition*: A person of any age taken dinner at IG Vatika guest house, Pali,Rajasthan on 12th March 2015 and followed by symptoms (any or all) nausea, vomiting, abdominal pain, diarrhoea or fever within 24 hours after the dinner.

Total 101 persons interviewed out of which 33 developed symptoms of gastroenteritis (Cases) and 68 who did not develop any symptom (controls). Cleaning and analysis of data was done on Microsoft Excel and epi info7. Neither food nor vomitus / stool samples were collected for laboratory confirmation of the outbreak.All age groups were affected with maximum cases in the age group between 15- 34 years.First case was reported at 12.11 am on 13 March 2015 with symptoms of nausea, vomiting and abdominal pain or spasm and last patient reported at 6.30 AM. No Patient reported after that. The Mean duration between meal and onset of the first symptom was 4.0 hours (2.5-6 hours).Exposure rate for Rabdi Ghewar came to be 86% with Odd's Ratio of 93.0 (23.27-371.58) and those who consumed Rasmalai had exposure rate of 81.19% and Odd's Ratio of 32.29 (10.16-102.58). Other factors where non-significant.

we conclude that it was a Food Born Outbreak in with association of milk product based food preparation (Rabdi Ghewar and Rasmalai both) in the community feast. Improper prolonged storage may have caused enterotoxin production and since Rabdi Ghewar and Rasmalai are partial cooked milk preparations, it may have carried the enterotoxin to cause the illness in persons who had consumed Rabdi Ghewar and Rasmalai in the community feast.

Information, education and communication on proper storage and cooking of all food items, especially milk products.Surveillance teams of district and state are recommended to conduct a rapid foodborne epidemiological investigation Food samples can be collected and stored with refrigeration but the epidemiological investigation should guide what's tested.Strengthening of health authorities for food borne surveillance system and follow it with efficient education and extension activity or various aspects of food safety.

19 Simultaneous outbreaks of measles in villages of district Mewat, Haryana, India 2015

Measles is a highly infectious disease that causes mortality in both developing and industrialized countries.Following early warning signal regarding detection of 11 measles cases from village Madapur and Padheniby IDSP Mewatwe investigated the outbreak with the objectives of (a) to describe the epidemiological characteristics of the measles outbreak, (b) to identify risk factors associated with the outbreak, and (c) to recommend control and prevention measures to prevent future outbreaks.

Madapur: The overall attack rate was 0.8 per and the highest was for age less than one year per 100 population with median affected age being 1.9 [IQR 0.7 – 3] with no case fatality. Both genders were equally affected. Two of the fourteen case patients were found to be vaccinated for measles. Four families reported multiple cases with one of them reporting three cases.

Padheni: The overall attack rate was 0.3 with highest being 2.4 for age group 1-4 yrs. Females had an attack rate of 0.2 compared to 0.5 per 100 population for males. The median age of affected children was 4 [IQR 3 - 7]. Nine of the eleven case patients were found to be vaccinated for measles. There was no case fatality.Five families living in three houses at one residential compound situated at the outskirts of the village reported these cases.

Of the five samples processed at NPSP reference laboratory at SMS Medical College, Jaipur, three samples came positive for measles specific IgM antibodies for village Madapur. For Padheni village, all the nine blood samples processed at NCDC, Delhi were positive for measles specific IgM antibodies. For village Madapur, children who came in contact with the case-patients were seven times more likely to get illness compared to those who did not (OR 7.04: 95% CI 1.62-35.4; p<0.001). Other probable exposures turned out to be insignificant in our study. For village Padheni, none of the risk factors were found to be significantly associated with the outbreak.**DLHS** 4 (2012-13) reported measles vaccination for Mewat district as 41% which fell to 28.3% for rural areas of the district. District Health Information System (DHIS-2) reported measles-1 vaccination achievement of 57% for the year 2013-14. We observed the vaccine effectiveness to be 10.3% and 19.75% for Madapur and Padheni respectively. Our study detected that the children who had contact with measles case was more likely to develop disease. Also vaccine efficacy for both the villages was less and it could still be lesser for Madapur village as two of the cases included in the study were of less than nine months who did not get any opportunity for measles immunization as they were not eligible for the same under UIP.

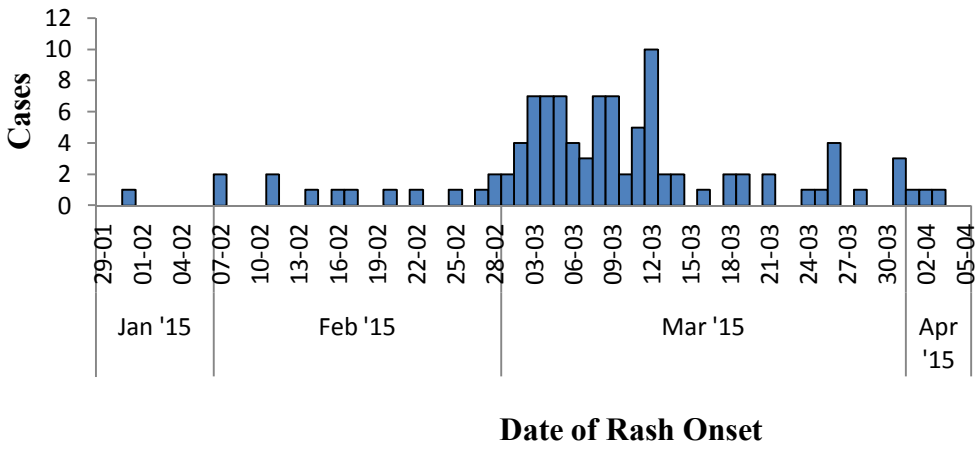
Health authorities provided health education to restrain from coming in contact with the measles cases. They have geared up their strategies to increase vaccine coverage and steps have been initiated to strengthen logistics of vaccine cold chain, handling and distribution to improve vaccine effectiveness.

20 Outbreak of Measles in Bhelterghat,Ghanapara and Pekbeki, Goalpara, Assam, India, 2015

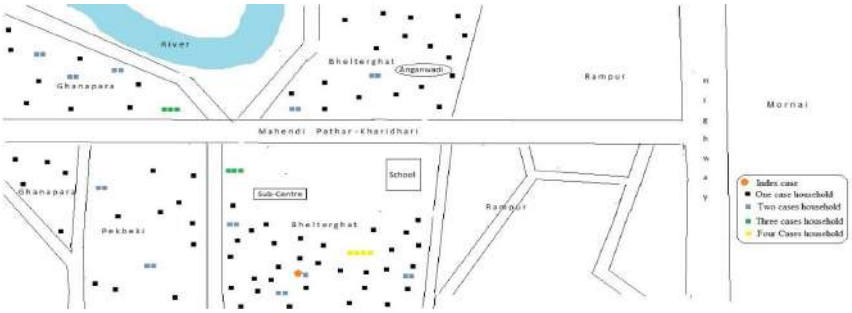
Although measles deaths have fallen worldwide from an estimated 542,000 in 2000 to 122,000 in 2012, there are still 21.5million children that did not receive a single dose of measles vaccine in 2013. Among those unvaccinated for measles, 6.4 million live in India, leaving India vulnerable to measles outbreaks. On March 20, 2015, the District Surveillance Unit(DSU), Goalpara reported 73 children below the age of 18 years with fever and rash from Mornai Primary Health Centre (PHC). We investigated the outbreak with the following objectives: (a) ascertain themagnitude of the outbreak including the source (b) help improve the managementof the cases (c) analyze data including estimation of vaccine efficacy (d) propose recommendation for control.

The index case occurred on 31 January 2015.We identified 103 cases with an attack rate of 8% by active case search using the WHO standard case definition. There were no deaths. Attack Rate was highest in children aged between 6-9 months (92%) followed by 10-24 months (19%). Females (12% attack rate) were more affected in Bhelterghat whereas males were more affected in Ghanapara and Pekbeki.

Distribution of Measles cases by Date of Rash Onset, Bhelterghat, Ghanapara and Pekbeki, Goalpara, Assam, India, 2015



Distribution of Measles Cases by Households, Bhelterghat,Ghanapara and Pekbeki,Goalpara



Attack Rates of Measles by Age and Gender, Bhelterghat, Ghanapara and Pekbeki, Goalpara

Characteristics		Bhelterghat			Ghanapara&Pekbeki		
		Cases	Population	Attack Rate	Cases	Population	Attack Rate
Age group (in months)	**6 – 9**	6	7	**86**	5	5	**100**
	10-24	10	83	12	14	42	**33**
	25- 36	5	49	10	5	45	**11**
	37-60	23	87	**26**	9	96	9
	61-108	12	191	6	2	161	1
	109-180	9	198	4	1	237	0.4
	181-216	2	65	3	0	93	00
Gender	**Female**	40	321	**12**	15	343	4
	Male	27	359	7	21	336	**6**
Total		67	680	10	36	679	**5**

Attack rates of measles by age and vaccination status, Bhelterghat,Ghanapara andPekbeki, Goalpara

	Children immunized against Measles			Children not immunized against Measles		
Agegroup (in months)	**Cases**	**Total**	**Attack rate (%)**	**Cases**	**Total**	**Attack rate (%)**
6-9	1	2	50	10	10	**100**
10-24	4	19	21	20	106	**19**
25-36	4	23	**17**	6	71	8
37-60	6	18	**30**	26	165	**16**
61-108	2	62	3	12	290	4
109-180	3	259	1	7	176	4
181-216	0	117	0	2	41	5
Total	20	500	**4**	83	859	**10**

Attack rates of measles by age and vaccination status, Bhelterghat,Ghanapara and Pekbeki, Goalpara

	Children immunized against Measles as per card			Children immunized against Measles as per Mother's history			Children not immunized against Measles		
AgeGroup (in months)	**Cases**	**Total**	**Attack rate (%)**	**Cases**	**Total**	**Attack rate (%)**	**Cases**	**Total**	**Attack rate (%)**
6-9	0	0	0	1	2	**50**	10	10	**100**
10-24	2	12	**17**	2	7	**28**	20	106	**19**
25-36	4	13	**31**	0	10	0	6	71	8
37-60	3	9	**17**	3	9	**33**	26	165	**16**
61-108	0	2	0	2	60	3	12	290	4
109-180	0	2	0	3	257	1	7	176	4
181-216	0	0	0	0	117	0	2	41	5
Total	9	38	**24**	11	462	**2**	83	859	**10**

Measles vaccination coverage and accumulation of susceptible population in Bhelterghat,Ghanapara and Pekbeki, Goalpara

Year	**Birth cohort**	**Vaccination coverage of Mornai PHC (%)**	**Expected V.E. (%)**	**Individual immunized each year in PHC**	**Susceptible individuals left each year PHC**	**Cumulative number of susceptible individuals in PHC**
2012	3872	86%	85	3330	542	542
2013	4010	93.25%	85	3740	270	810
2014	4148	93.15	85	3864	284	1094

We conducted a door-to-door search for active cases. Majority 859/1359 (63%) were not immunized against measles. Maximum cases (65%) were clustered in Bhelterghat (attack rate of 10%) followed by Ghanapara (21%) and Pekbeki (14%). Among the 103 cases, only 20 (19 %) were immunized against measles. The measles immunization coverage for the current year as per the nine vaccination cards available at the sub centre and mother's interview was only 37% (500/1359).Thus, there was accumulation of large number of susceptible children (63%) in the area.Attack rates of measles by age and vaccination status indicated 20 case patients of 500 immunized (4%) children as compared to 83 case patients of 859 non-immunized children (10%).The calculation of vaccine efficacy among those exposed to the vaccine yielded an estimate of 60% (95% CI= 33.4 – 74.3).All five samples were positive for IgM antibodies for measles. All cases were treated with vitamin A supplementation during the outbreak.

A measles outbreak affected the village of Bhelterghat, Ghanapara and Pekbeki, Goalpara, Assam, India between 31stJanuary 2015 and 3rd April 2015.Measles immunization coverage was low in this area. This was one of the most likely reasons for measles outbreak in the area.The efficacy of the vaccine was far below the expected standard. This could be due to the problem in the cold chain, age at which the health workers are immunizing the children or the injection technique. On the basis of the result of the investigation, we recommend (a) to conduct trainings every six months to one year for all

the staff involved in cold chain maintenance, re-orient them on correct injection technique and that the age of the child must be nine months at the time of vaccination. (b) Strengthening of the routine immunization service delivery to increase coverage of measles vaccine by emphasizing on Information, Education and Communication in the community about the benefits of the vaccine.


• Manpower Development

Manpower Development

1. *Training on Data Management under IDSP* was organized for South Zone at Chennai on **29-30 January 2015**. Participants were from five states namely Andhra Pradesh, Kerala, Puducherry, Tamil Nadu and Telangana. The technical sessions were on finance management, use of portal/ IDSP software, data reporting and analysis. Hands on training was held on IDSP portal and data reporting and analysis.

2. Commemoration of ten years of functioning of IDSP was held on **26 November 2014**. During the function, a book describing ten years of journey of IDSP was released by DGHS Prof. Jagdish Prasad. Previous Project Directors and National Programme Officers were also felicitated on this occasion. This was followed by an IDSP National Review Workshop held from 26th to 28th November 2014, at NCDC, Delhi. The workshop was attended by Director NCDC, representatives from CSU, SSOs and representatives from ISRO, NIC, etc.

3. Capacity building workshop on Quality Management System (QMS) was held for IDSP state microbiologists from 17 states on **17-20 November 2014**. One officer each from NVBDCP and RNTCP also participated in this workshop.

4. Half day training was organized for the Armed Forces Medical Services on Ebola Virus Disease on **31 October 2014**. The training was attended by representatives from Armed Forces medical and paramedical staff and faculty from NCDC.

5. The Integrated Disease Surveillance Project (IDSP) conducted a two-day regional training of state epidemiologists, data managers and finance consultants for the north-eastern states (Assam, Nagaland, Tripura, Manipur, Mizoram Meghalaya, Arunachal Pradesh and Sikkim) on **31July and 1August 2014** at the State Surveillance Unit (SSU), Assam. The trainees were trained on weekly data reporting, data analysis and report generation on the IDSP portal.

6. A three days meeting of stakeholders regarding sharing the final results of the Lab Assessments of the IDSP Public health labs conducted in November – December 2014 and to develop an action plan towards strengthening the identified gaps was held on **15-17 April 2014** at NCDC. State Surveillance Officers and State microbiologists (IDSP) from 13 states and 11 Assessors in addition to officers from IDSP, NCDC attended this meeting.

7. SHOC Table Top Exercise: **24-28, February 2014** - As a follow-up to the Infectious Disease Outbreak Plan (IDOP) and SOP development which took place in 2013, a tabletop exercise was done in order to test and improve the Plan & SOPs developed by NCDC staff. The hands-on allowed NCDC staff to exercise their roles in the SHOC and learn more about the utility of the SHOC.

8. Three months Regional Field Epidemiology Training Programme for the health personnel of South East Asia Region started from **21 July to 17 October, 2014**. A total of 6 participants from 2 countries (3 from Nepal and 3 from India) participated in the training.

9. One month Regional Training Programme on Prevention and Control of Communicable Diseases for the paramedical personnel of South East Asia Region from **28 October to 24 November, 2014**. A total of 9 participants from 2 countries (including 3 Timor Leste and 6 from India) attended the training.

10. Interstate Plague Co-ordination meeting (organised by PSU Bangalore) from **3-4 April, 2014** at Veterinary Council of India, Bangalore.

11. On **20 January 2015**, NCDC team visited AIIMS to provide training on Hospital Infection Control & PPE on

12. An Expert Group meeting for strengthening of Biochemistry laboratory was organized on
13 February 2015. The meeting was chaired by Dr NS Dharmshaktu, Addl. DG, DGHS. The committee comprised of HODs from AIIMS, MAMC, NEERI, IARI, Jamia Hamdard Institute, UCMS and senior officers from DRDO, ICMR and Water Testing Lab, Guindy.

13. Conducted two Training programmes on Biostatistics including computer training for NCDC.

14. A meeting of **Insecticide Expert Group** was also organized by CME &VM on **18 December 2014** to discuss about field trails of insecticides.

15. Organized a workshop on **External Quality Assessment Scheme for HIV Testing** for Officer-in-Charges, Technical officers of SRLs and Quality Managers of SACSs on **16 March**, **2015** at NCDC, Delhi.

(Upto March, 2015)

IDSP conducted a two-day regional training of state epidemiologists, data managers and finance consultants for the north-eastern states on 31st July and 1st August 2014 at the State Surveillance Unit (SSU), Assam

- **Scientific Reports: NCDC Library**

Scientific Reports: NCDC Library

Dr Lata Kapoor
Deputy Director&n 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 36944 books and bound journals, 97 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 2014-15:

1.	(A)	Newspapers (English/Hindi)	:	46
	(B)	Magazines (English/Hindi)	:	29
2.		Administrative Books	:	49
3.		MPH Dissertation/Thesis added during the period	:	07
4.		Serial Publications of NCDC News letter	:	03

http://www.ncdc.gov.in/writereaddata/linkimages/Newsletter_05134471212421.pdf

5.		Journals not subscribed due to space problem as upgradation of NCDC is going on.		
6.		Annual Report obtained from organization/Institutes.	:	34

• List of Publications during 2014-15

List of Publications during 2014-15

1) Appearance of L90I and N205S Mutations in Effector Domain of NS1 Gene of pdm (09) H1N1 Virus from India during 2009–2013
Sachin Kumar, Shashi Khare, Bano Saidullah, Inderjeet Gandhoke, Hanu Ram, Supriya Singh, L S Chauhan, Arvind Rai
Advances in Virology *09/2014;861709 , 2014.*

2) Dominance shift of DENV-I towards reemergence and codominant cieculation of DENV-2 and DENV-3 during post monsoon period of 2012
Sharma Veena Mittal, Mala Chhabra, , Priyanka Singh, , D Bhattacharya, LS Chauhan & Arvind Rai
Virol Retrovirol*, 1(1);104, 2014.*

3) Sequence heterogeneity in human immunodeficiency virus type 1 nef in patients presenting with rapid progression and delayed progression to AIDS
Poonam Gupta, Mohammad Husain, Charoo Hans, Hanu Ram,Supriya Singh Verma, Mohammad Misbah, L S Chauhan, Arvind Rai
Archives of Virology *04/2014; 159(9), 2014.*

4) Novel molecular alterations in the ORF 2 capsid gene of hepatitis E virus in patients with acute liver failure in North India
Jayanta Borkakoti, Giasuddin Ahmed, Syed Akhtar Hussain, Arvind Rai, Premashis Kar
Archives of Virology *08/2014; 159(12), 2014.*

5) Evaluation of gidB alterations responsible for streptomycin resistance in Mycobacterium tuberculosis
Jitender S Verma, Yash Gupta, Deepthi Nair, Nikhat Manzoor,Rajinder S Rautela, Arvind Rai, Vishwa M Katoch
Journal of Antimicrobial Chemotherapy *07/2014; 69(11), 2014.*

6) Molecular characterization on the basis of ha, na and m gene revealed changes in critical amino acid positions of influenza a (h3n2) virus circulating in india during 2011-2013
Sachin Kumar, Shashi Khare, Bano Saidullah, Inderjeet Gandhoke, Hanu Ram, L. S. Chauhan, Arvind Rai
American journal of infectious diseases *03/2014; 10(3):118-131, 2014.*

7) Zero prevalence of primary drug resistance-associated mutations to protease inhibitors in HIV-1 drug-naive patients in and around Aligarh, India
Mohd Azam, Abida Malik, Meher Rizvi, Arvind Rai
J Infect Dev Ctries 8(1):079-085, 2014.

8) An Update on JE Vaccine Development and Use
Pankaj Sharma , Veena Mittal, Mala Chhabra, Priyanka Singh, L S Chauhan, Arvind Rai
J. Commun. Dis.*1(1): 1- 10,2014.*

9) MGA Genosensor for Early Detection of Human Rheumatic Heart Disease
Swati Singh, Ankur Kaushal, Shashi Khare, Ashok Kumar
Appl Biochem Biotechnol 173(1):228-38, May 2014

10) Plague and Other Yersinia infections.
Veena Mittal
API textbook *10thedn., 2014*

11) Chikungunya Fever. Atlas of Paediatrics and Tropics
Mala Chhabra
American cademy of Paediatrics *2nd edition, 2014*

12) Rodent borne diseases of Public health importance.
***Rodent Newsletter**, 2014*

13) Studies on rodent and flea surveillance in erstwhile plague endemic News Cumbum Valley Area, Theni district of Tamil Nadu state
Bala Krishan, Veena Mittal
Rodent letter, 2014

14) Study of metabolic syndrome and its risk components in patients attending tertiary care center of uttarakhand.
Rajeev Goyal, Ashok Kumar, Monil Singhai
***Indian J Clin Biochem**; 29(3): 362–366. Jul. 2014*

15) Emergence of Dengue Problem in India – A Public Health Challenge
RS Sharma, R Kumari, PK Srivastava, K. Barua, LS Chauhan
J Com Dis 46(2), 2014

16) Japanese Encephalitis Situation in India and its Prevention and Control
Roop Kumari
***National Congress on Veterinary Public Health New Delhi,** Nov 24 and 25th Nov 2014*

17) Role of Integrated Vector Management for Prevention and Control of Japanese Encephalitis/Acute Encephalitis Syndrome (JE/AES)-A Review
Roop Kumari, RS Sharma, VK Raina, LS Chauhan.
***J Com Dis** 46(1):93-108, 2014.*

18) Integrated vector Management- concept, principles and implications in Indian context for prevention and control of Japanese Encephalitis (JE/AES)
Roop Kumari, R.S. Sharma, V.K. Raina & L.S. Chauhan
***Abstract book of "Brain Storming Conference on Emerging New Epidemiological Dimensions of Japanese Encephalitis (JE) & Other Acute Encephalitis Syndrome (AES)"** held at Madurai from 26-27/06/2014*

19) Detection of early warning signals for dengue outbreak
Roop Kumari, RS Sharma, LS Chauhan
X Joint Annual Conference of ISMOCD & IAE held at Goa during 10th – 12th October, 2014

20) Vector Control: Present status and Challenges in INDIA
R.S.Sharma, Roop Kumari, L.J.Kanehkar, L.S.Chauhan
***X Joint Annual Conference of ISMOCD & IAE** held at Goa during 10th – 12th October, 2014*

21) Surveillance for vector of yellow fever, Dengue, Chikungunya and Malaria in and around airport & seaport of Goa to meet the requirement of international health regulation
Ved Parkash, Roop Kumari, RS Sharma, T.G.Thomas, Mohd. Mujib, L.J.Kanehkar, Arora Prabha, A.K Mandal, L.S.Chauhan
***X Joint annual conference of ISMOCD & IAE,** held at Goa during 10th – 12th October, 2014*

22) Study of Potential Breeding Sites of Dengue Vectors in Schools of City Zone of Delhi for Prevention of transmission of Dengue**.**
Bisht Babita, Roop Kumari, AKRawat
***X Joint Annual Conference of ISMOCD & IAE**, held at Goa during 10th – 12th October, 2014*

23) Larvicidal Activity of *Cassia occidentalis* (Linn.) against the Larvae of *Bancroftian Filariasis* Vector Mosquito *Culex quinquefasciatus.*
Deepak Kumar, Rakesh Chawla, P. Dhamodaram, and N. Balakrishnan
Journal of Parasitology Research, Volume 2014, Article ID 236838, 5 pages

24) Canine Filarial infections in a human Brugia Malayi endemic area of India.
Reghu Ravindran, Sincy Varghese, Suresh N. Nair, Vimal Kumar M Balan, Bindhu Lakshmanan, Riyas M Ashruf, Swaroop S Kumar, Ajith Kumar K, Gopalan, Archana S Nair, Aparna Malayil, Leena Chandrashekar, Sanis Juliet, Devvada Kopparambil, Rajendran Ramachandran, Regu Kunjupillai and Showkath Ali Kakada.
Biomed Research International, 2014. ID 630160.9P

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- **Admininistration, Budget, Stores, Hindi Cell**

NCDC Administration

Dr Dipesh Bhattacharya
Additional Director & Head(PBA)
Mr. Prakash Doval
Administrative 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 2014-15, 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. At present the section is dealing 14 court cases, in Delhi High Court-1, Tiz Hazari-1, CAT-9, CAT Jabalpur-1, CAT Allahabad-1, High Court of Kozhikode-1. During the year 2014-15, 22 recruitments are made under DR and 24 recruitments made under promotion quota. The Establishment is also dealing with Direct Recruitment, Promotions, Transfers.

NCDC Branches

The institute has eight branches located in different parts of the country. Though originally conceived and established for carrying out some specific activity, these branches now represent NCDC in the geographical area where they are situated. The branches are multipurpose in function and carry out various activities including investigation of out-breaks of communicable diseases, rendering expert advice to the states on matters pertaining to public health etc. In addition to these activities each of the branches lays special emphasis on diseases of importance in the area of its location. Administrative control of NCDC Branches are under PBA Division.

- Procurement Section of NCDC has been given Credit Code No.for Credit facility in booking H1N1 related items & the said Credit has also been extended to other branches in urgency, with the approval of competent authority.
- Maintained approx. 50 Nos. of Laboratory & 400 Nos. of Office Equipments.

- Co-ordinating purchases of eight Branches of NCDC by issuing sanctions for quotations called by these Branch Incharges.
- Maintained proper Bin Card System for maintaining Stock/Issue Ledger of all stocks (app. 1500 items).
- Letter of Credit for Import of Items is also being managed by Stores/Purchase Section of NCDC.
- Offered comments and streamlined IDSP& GDDIC purchases, which were most often referred for procurement/comments. However, all items are issued by the Stores Section to IDSP.

NCDC Budget: 2014-15

(Fig. in Lacs of Rupees)

Sr. No	Name of the Scheme	BE 2014-15	FE 2014-15	Exp 2014-15
1	NCDC (Plan)	1270.00	996.40	945.06
2	Yaws Eradication Prog.	30.00	27.00	27.00
3	G.W.E.P (3601) Cash Grant	0.00	0.00	0.00
4	NCDC (Upgradation) (Revenue)	400.00	118.20	86.27
	NCDC (Upgradation) (Capital)	7100.00	7071.30	7071.26
5	Establishment of			
	30 branches (including 8 existing	200.00	0.00	0.00
	Branches)			
6	National Rabies Control	967.00	225.00	215.00
	Programme			
7	Leptospirosis Control Programme	75.00	55.00	55.00
8	Coordination of Prevention and			
	control of Zoonotic Diseases	100.00	10.00	6.02
9	Viral Hepatitus	200.00	7.27	7.27
10	Anti Micro Resistance	200.00	20.00	15.03
	Total(Plan)	10542.00	8530.17	8427.91
	NCDC (Non-Plan)	3000.00	2350.44	2305.88
	Grand Total(Plan+NP)	13542.00	10880.61	10733.79

NON-PLAN

(Fig.in lacs of Rupees)

Sub-head	B.E. 2014-15	R.E. 2014-15	FE 2014-15	Expdt. 2014-15
070101 - Salary	2704.55	2620.78	2123.00	2091.70
070102 – Wages	22.40	23.60	19.18	18.96
070103 – OTA	5.86	5.86	3.53	2.71
070106 - Medical Treatment	37.00	34.25	28.60	27.25
070111 - Travel Expenses	65.00	65.00	44.25	42.42
070113 - Office Expenses	80.00	80.00	71.24	66.37
070114 - Rent, Rates & Taxes	13.24	14.00	10.06	9.80
070116 – Publications	20.00	20.00	6.09	5.60
070121 - Material & Supply	22.00	18.40	17.80	15.37
070127 - Minor Work	5.15	5.15	1.92	1.37
070150 - Other Charges	24.80	24.96	24.77	24.33
TOTAL	**3000.00**	**2912.00**	**2350.44**	**2305.88**

PLAN

(Fig.in lacs of Rupees)

Sub-head	B.E.	R.E.	FE	Expdt.
	2014-15	2014-15	2014-15	2014-15
070101 –SALARIES	326.00	326.00	318.00	310.76
070102 WAGES	40.00	40.00	40.00	38.93
070103 -O.T.A	2.00	2.00	0.40	0.26
070106- MED. TREATMENT	10.00	10.00	2.00	1.49
07010111-TRAVEL EXP.	70.00	70.00	55.00	53.76
070113-OFFICE EXP.	510.00	510.00	320.00	316.32
070114- RENT RATES &TAXES	0.00	0.00	0.00	0.00
070116- PUBLICATION	70.00	60.00	17.00	16.50
070120- OTHER ADMIN. EXPENSES	10.00	15.00	6.00	4.98
070121-SUPPLY & MAT.	40.00	20.00	10.00	8.82
070124-POL(New)	40.00	40.00	40.00	39.72
070127- MINOR WORKS	36.00	36.50	10.00	10.00
070128- PROFESSIONAL SERVICES	20.00	20.00	10.00	6.91
070134-STIPEND/SCHOLARSHIPS	1.00	0.50	0.00	0.00
070150- OTHERCHARGES	80.00	80.00	153.00	121.61
079913-IT (Office Expenses)	15.00	15.00	15.00	15.00
TOTAL	1270.00	1245.00	996.40	945.06
070531 –YEP	30.00	40.00	27.00	27.00
TOTAL	**1300.00**	**1285.00**	**1023.40**	**972.06**
Major Head-3601				
010231-GWEP	0.00	10.00	0.00	0.00

NEW INITIATIVES/SCHEMES (Fig.in lacs of Rupees)

S. No.	Name of the Scheme	B.E. 2014-15	R.E. 2014-15	F.E. 2014-15	Act Exp 2014-15
1	Major Head-2210				
	Minor Head-06800				
	National Centre for Disease Control				
	2414-(Upgradation)				
	241401 –Salaries	40.00	30.00	0.00	0.00
	241413 - Office Expenses	20.00	10.00	0.20	0.03
	241414 - Rent Rates & Taxes	20.00	0.00	0.00	0.00
	241420 - Other Administrative Exp.	10.00	0.00	0.00	0.00
	241426 – Advertisement/ Publicity	10.00	0.00	0.00	0.00
	241428 - Professional Services	300.00	300.00	118.00	86.24
	TOTAL	**400.00**	**340.00**	**118.20**	**86.27**
	Major Head-4210				
	42100420008-Capital				
	421004200080053-Major Works	7050.00	5050.00	7050.00	7050.00
	421004200080051-Motor Vehicle	50.00	50.00	21.30	21.26
	Total-Capital	**7100.00**	**5100.00**	**7071.30**	**7071.26**
2	Major Head-2210				
	Minor Head-06800				

	35 - Strengthening of existing branches and Establishment of 27 branches of NCDC				
	350013 - Office Expenses	20.00	0.00	0.00	0.00
	350026 - Advertisement & Publicity	10.00	0.00	0.00	0.00
	350028 - Professional Services	30.00	0.00	0.00	0.00
	350014 - Rent Rates & Taxes	40.00	0.00	0.00	0.00
	350031- Grant-In-Aid(General)	0.00	0.00	0.00	0.00
	TOTAL	**100.00**	**0.00**	**0.00**	**0.00**
	Major Head-4210				
	24 - Strengthening of existing branches and Establishment of 27 branches of NCDC				
	240052-Mach. & Equip.	0.00	0.00	0.00	0.00
	240053-Major Works	100.00	0.00	0.00	0.00
	TOTAL	**100.00**	**0.00**	**0.00**	**0.00**
3	Major Head-2210				
	Minor Head-06800				
	36- Strengthening intersectoral Coordination of prevention and control of Zoonotic Diseases.				
	360011-Travel Expenses	20.00	0.00	0.00	0.00
	360020-Other Admn. Expenses	54.00	0.00	0.05	0.03
	360026-Advertisement & Pub	6.00	0.00	0.00	0.00
	360031-Professional Services	20.00	0.00	9.95	5.99
	Total	**100.00**	**0.00**	**10.00**	**6.02**
4	Major Head-2210				
	Minor Head-06800				
	2405 - Leptospirosis Control Programme				
	240511 - Travel Expenses	5.00	1.00	0.00	0.00
	240520 - Other Admn. Expenses	0.12	0.12	0.00	0.00
	240526 - Advertisement & Publicity	2.00	2.00	0.00	0.00
	240528 - Professional Services	7.88	6.88	0.00	0.00
	Total	**15.00**	**10.00**	**0.00**	**0.00**
	Major Head-2210				
	Minor Head-06800				
	5008 - Leptospirosis Control				
	Programme -Uts w/o legislature(New)				
	240500801 – Salaries	5.00	5.00	5.00	5.00
	240500850 - Other Charges	4.00	0.00	0.00	0.00
	Total	**9.00**	**5.00**	**5.00**	**5.00**
	Major Head-3601				
	Minor Head-02263				
	1203 - Leptospirosis Control (New)				
	120331-Grants-in-aid(General)	50.00	50.00	50.00	50.00
	Major Head-3602				
	Minor Head-02263				
	1302 - Leptospirosis Control (New)				
	130331-Grants-in-aid(General)	1.00	0.00	0.00	0.00
	Major Head-2210				
	Minor Head-06800				
5	2506 - Project on Prevention and Control of Human Rabies				

	240611 - Travel Expenses	105.00	105.00	14.56	14.56
	240620 - Other Admn. Expenses	101.00	101.00	14.56	14.56
	240621 - Supplies and Materials	304.00	290.00	44.72	44.72
	240626 - Advertisement & Publicity	28.00	28.00	4.16	4.16
	240628 - Professional Services	180.00	180.00	26.00	26.00
	Total	**718.00**	**704.00**	**104.00**	**104.00**
	Major Head-3601				
	Minor Head-02263				
	1204-Control of Human Rabies (New)				
	120431-Grants-in-aid(General)	238.00	110.00	110.00	100.00
	Major Head-3602				
	Minor Head-02263				
	1303-Control of Human Rabies (New)				
	130331-Grants-in-aid(General)	11.00	11.00	11.00	11.00
	Grand Total	**967.00**	**825.00**	**225.00**	**215.00**
	Major Head-2210				
	Minor Head-06800				
6	37 - Viral Hepatitis				
	370011-Traval Expenses	5.00	0.00	0.00	0.00
	370013-Office Expenses	20.00	1.50	0.06	0.06
	370021-Material & Supply	80.00	8.50	7.21	7.21
	370050-Other Charges	30.00	0.00	0.00	0.00
	370026-Advertisement & Pub.	20.00	0.00	0.00	0.00
	370028-Professional Services	45.00	0.00	0.00	0.00
	Total	**200.00**	**10.00**	**7.27**	**7.27**
7	38 - Anti - Micro Resistance				
	380011-Traval Expenses	1.00	0.00	0.00	0.00
	380020-Other Admn. Expenses	1.00	5.00	5.00	0.25
	380028-Professionlal Services	100.00	0.00	0.00	0.00
	380016-Publication	1.00	0.00	0.00	0.00
	380021-Material & Supply	90.00	15.00	15.00	14.78
	380050-Other Charges	3.00	0.00	0.00	0.00
	380026-Advertisement & Pub	4.00	0.00	0.00	0.00
	Total	**200.00**	**20.00**	**20.00**	**15.03**

Integrated Disease Surveillance Programme
Sub Head wise Revised Budget Estimate for the year 2014-15
AFE and Expenditure as on 31.03.2015

(Rs. in Thousands)

Demand No. 47 Dept of Health - FW. (PLAN)	**Budget Estimates**	**Revised Estimates**	**Final Estimates**	**Expenditure**
1	**2**	**3**	**4**	**5**
2210-Medical and Public Health (Major Head)				
06001 Direction & Administration (Minor Head)				
0906 Integrated Disease Surveillance Project (GC)				
090611 Domestic Travel Expenses	1500	1500	1000	954
090613 Office Expenses (New)	2500	1500	1000	980
090620 Other Administrative Expenses	200	100	50	560
090621 Supply and Material	7000	7000	16000	15706
090626 Advertisement and Publicity	500	500	500	204
090628 Professional Services	25000	18000	15200	15160
090631 Grant-in-Aid -General	12500	7500	7500	5874
090650 Other Charges	800	400	50	0

0999 Information Technology (New)				
099913 Office Expenses	5000	3500	1900	1630
Integrated Disease Surveillance Project (GC)	55000	40000	43200	41068
06101 Prevention and Control of Diseases (Minor Head)				
4611 Integrated Disease Surveillance Project-UTs w/o legislature				
461101 Salaries	7000	11000	9100	5750
461150 Other Charges	3000	4000	1900	1851
Integrated Disease Surveillance Project UTs W/o Legis	10000	15000	11000	7601
Sub Total - 2210	**65000**	**55000**	**54200**	**48669**
2552 North Eastern Areas (Major Head)				
00288 Public Health-Prevention and Control of Diseases (Minor Head)				
1009 Integrated Disc. Surveillance Project				
100931 Grants-in-aid-General	70000	70000	59150	59101
00789 Scheduled Caste Sub Plan (Minor Head)				
6509 Integrated Disease Surveillance Project				
650931 Grants- in- Aid- General	19400	25000	15250	15224
00796 Scheduled Tribe Sub Plan (Minor Head)				
6808 Integrated Disease Surveillance Project				
680831 Grants- in- Aid- General	**10600**	**15000**	**7400**	**7399**
Sub Total - NE 2552	**100000**	**110000**	**81800**	**81724**
3601 Grants - In Aid to State Goverments (Major Head)				
02263 Public Health-Prevention and Control of Diseases (Minor Head)				
0806 Integrated Disease Surveillance Project (New)				
080631 Grants-in-Aid -General	**316600**	**305000**	**269500**	**269494**
Sub Sub Total 3601 Grant Gen	**316600**	**305000**	**269500**	**269494**
02789 Scheduled Caste Sub Plan (Minor Head)				
3507 Flexible Pool for Communicable Diseases-Integrated Disease Surveillance Project (New)				
350731 Grants-in-Aid -General	**87700**	**100000**	**94600**	**94559**
Sub Sub Total 3601 Grant SC	**87700**	**100000**	**94600**	**94559**
02796 Scheduled Tribes Area Sub Plan (Minor Head)				
3507 Flexible Pool for Communicable Diseases-Integrated Disease Surveillance Project (New)				
350731 Grants-in-Aid -General	**47900**	**58500**	**50000**	**49998**
Sub Sub Total 3601 Grant ST	**47900**	**58500**	**50000**	**49998**
Sub Total - 3601	**452200**	**463500**	**414100**	**414051**
3602-Grants-in-aid to Union Territory Goverments (Major Head)				
02263 Public Health- Prevention and Control of Diseases (Minor Head)				
0805 Integrated Disease Surveillance Project (New)				
080531 Grant-in-Aid -General	10300	**12500**	**10400**	10375
02789 Scheduled Caste Sub Plan (Minor Head)				
3506 Flexible Pool for Communicable Diseases – IDS Project (New)	2500	**2500**	**2250**	2250
350631 Grants –in-aid –General				
SubTotal 3602	**12800**	**15000**	**12650**	**12625**
G. Total IDSP	**630000**	**643500**	**562750**	**557069**

NCDC Procurement/ Stores Section

Sh. Pankaj Kumar
Stores Officer

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 2014-15 :

- Called approx. 50Nos. Limited Tenders & approx. 25 Nos. Direct/Single & Govt. Purchases for procurement of approx. 1500 items by issuing approx. 375 Nos Supply Orders in the F.Y. 2014-15. Total 750 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.
- Stores also involved in Logistics for Swine Flu H1N1 & related Pandemic emergencies from NCDC to Delhi Airport and co-ordination with different States regarding receipt of items under guidance of EMR, Dte GHS.

Hindi Cell

राष्ट्रीय रोग नियंत्रण केन्द्र के हिन्दी अनुभाग द्वारा समय–2 पर अधिकारियों द्वारा अपेक्षित हिन्दी अनुवाद के कार्यों के अतिरिक्त हिन्दी सप्ताह 2014 के दौरान दिनांक 16.10.14 एवं 17.10.14 को राजभाषा हिन्दी में विभिन्न प्रतियोगिताऐं आयोजित की गई, जिसमें संस्थान के कर्मचारियों ने बड़े उत्साह के साथ भाग लिया । इन कार्यक्रमों में संस्थान के भाषण प्रतियोगिता में **8,** निबन्ध प्रतियोगिता में **18,** श्रुतलेख प्रतियोगिता में **26** एवं सुलेख प्रतियोगिता में **23** कर्मचारियों ने भाग लिया ।
उपरोक्त प्रतियोगिताओं में विजेताओं की सूची निम्न प्रकार से है :

1. **<u>निबन्ध प्रतियोगिता</u>**
   प्रथम पुरस्कार – श्री रमेश शर्मा
   द्वितीय पुरस्कार – कु. विद्यावर्धिनी आर.
   तृतीय पुरस्कार – श्री अजय पांडे
   सांत्वना पुरस्कार – श्री रविशंकर पुरी गोस्वामी
2. **<u>श्रुतलेख प्रतियोगिता</u>**
   प्रथम पुरस्कार – श्री ज्ञानेश चन्द्र पांडे
   द्वितीय पुरस्कार – श्री अवनीन्द्र कुमार द्विवेदी
   तृतीय पुरस्कार – श्री नवीन कुमार
   सांत्वना पुरस्कार – कु. दिनेश रानी
3. **<u>सुलेख प्रतियोगिता</u>**
   प्रथम पुरस्कार – श्री उपेन्द्र सिंह
   द्वितीय पुरस्कार – कु. राजेश कुमार
   तृतीय पुरस्कार – श्री अजय पांडे
   सांत्वना पुरस्कार – श्री कैलाश सिंह

4. **<u>भाषण प्रतियोगिता</u>**
   प्रथम पुरस्कार – श्री चेतन प्रकाश
   द्वितीय पुरस्कार – श्री संजीव कुमार शर्मा
   तृतीय पुरस्कार – श्री राधे लाल कोरार्म
   सांत्वना पुरस्कार – श्री अवनीन्द्र कुमार द्विवेदी

- **Appendex:** **List of NCDC Faculty & Staff**

List of NCDC Faculty & Staff (As on July, 2015)

NCDC Head Quarter - Officers

Dr. L.S. Chauhan	Director (Upto September 2014)
Dr. S. Venkatesh	Director (Since October 2014)
Dr. Shashi Khare	Additional Director
Dr. Veena Mittal	Additional Director
Dr. R.S.Sharma	Additional Director
Ms. Shobha Marwah	Additional Director
Dr. P.K.Dhamija	Additional Director
Dr. Charu Prakash	Additional Director
Dr. Dipesh Bhattacharya	Additional Director
Dr. Kiran Kapoor	Additional Director
Dr. C. S. Aggarwal	Additional Director
Dr. Anil Kumar	Additional Director
Dr. Kaushal Kumar	Joint Director
Dr. Somnath Karmaker	Joint Director
Dr. Sudhir Kumar Jain	Joint Director
Dr. Mala Chhabra	Joint Director
Dr. L. J. Kanhekar	Joint Director
Dr. Arvind Rai	Joint Director
Dr. T. G. Thomas	Joint Director
Dr. (Smt.) Roop Kumari	Joint Director
Dr. Prabha Arora	Joint Director
Dr. A.K. Bansal	Joint Director
Dr. Lata Kapoor	Deputy Director
Dr. Simirita Singh	Deputy Director
Dr. Tanzin Dikid	Deputy Director
Dr. Megha Pravin Khobragade	Deputy Director,
Dr. Arti Bahl	Deputy Director
Dr. Himanshu Chauhan	Assistant Director
Dr.Ananya Ray Laskar	Assistant Director
Dr. R.D. Gupta	CMO
Dr. Aakash Srivastava	CMO (NFSG)
Dr. Pradeep Khasnobis	CMO (NFSG)
Dr. Malti Gautam	CMO (NFSG)
Dr. Sonia Gupta	CMO(SAG)
Dr. Tarun Kumar	CMO
Dr. W.D. Bhutia	CMO (SAG)
Sh. Prakash Doval	Administrative Officer
Sh. Pankaj Kumar	Stores Officer
Sh. Ram Dayal	Statistical Officer
Sh. Ajay Pandey	Statistical Officer
Smt. Shashi Talwar	Assistant Library & Information Officer
Sh. Mukesh Kumar	Private Secretary
Smt. Kanchan Bhardwaj	Private Secretary
Sh. Subal Biswas	Private Secretary
Sh. Harmeet Singh Sachdeva	Private Secretary
Dr. Sandhya kabra (on deputation)	Assistant Director
Dr. Anaya Ray Laskar	Assistant Director
Dr. Shikha Vardhan	Assistant Director
Dr. Girish Kumar Makhija	Assistant Director
Dr. Jyoti	Assistant Director
Dr. Ruchi Jain	Assistant Director
Dr. Saurabh Goel	Assistant Director
Dr. Nishant Kumar	Assistant Director
Dr. Pranay Kumar Verma	Assistant Director
Dr. Chinmoyee Das	Assistant Director

Dr. Raghuram Shayam Sundar Rao	Assistant Director
Dr. Rupali Roy	Assistant Director
Dr. Vinay Kumar Garg	Assistant Director
Dr. Chavi Pant Joshi	Assistant Director
Dr. Simmi	Assistant Director
Dr. Pranil Madhukar Kamble	Assistant Director
Dr. Sandip Shrirang Jogdand	Assistant Director
Dr. Sanket Vasant Kulkarni	Assistant Director
Dr. Mangesh Ashok Patil	Assistant Director
Dr. Rinku Sharma	Assistant Director
Dr. Meera Dhuria	Assistant Director
Dr. Suhas Sambhaji Dhandore	Assistant Director
Dr.Monil Singhai	Assistant Director
Dr. Sarika Jain	Assistant Director
Dr. Amol Rangrao Patil	Assistant Director
Dr. Ganesh Shrihari Lokhande	Assistant Director

NCDC Branches

Dr. N. Balakrishnan	Joint Director, Bangaluru
Dr. K. Regu	Joint Director, Kozhikode, Rajahmundry
Dr. Ram Singh	Joint Director, Patna
Dr. R. Rajendran	Deputy Director, Kozhikode
Dr. Naveen Chharang	Deputy Director, Alwar
Dr. Hari Om Gupta	SMO, Alwar
Dr. Ravi Shankar Singh	SMO, Patna
Dr. Awadesh Kumar Yadav	Medical Officer, Varanasi

NCDC Staff

Sh. A. K. Malhotra	Superintendent
Smt. G. J. Jayalakshmi	Superintendent
Sh. Balram Kashyap	Superintendent
Sh. Beeru Kumar	Head Clerk
Sh. Subhash Chandra	Head Clerk
Sh. Verinder Singh	Upper Division Clerk
Sh. B.K. Grover	Upper Division Clerk
Smt. Snageeta Guru	Upper Division Clerk
Sh. Ashok Kumar	Upper Division Clerk
Smt. M. Roopamani	Upper Division Clerk
Smt. Manju Sharma	Upper Division Clerk
Sh. Joy Mukherjee	Upper Division Clerk
Smt. Prem Lata	Upper Division Clerk
Sh. Sanjeev Kumar Sharma	Upper Division Clerk
Smt. Renu Kumar	Upper Division Clerk
Sh. G. C. Pandey	Upper Division Clerk
Sh. R.D. Bharti	UDC-Cum-Computer
Sh. Jagdish Chandra	UDC-Cum-Computer
Sh. Rajinder Kumar	Computer
Smt. Brijesh Kumari	Accountant
Sh. Rajesh Kumar	Store Keeper

Ms. Mukesh Kumari	Junior Hindi Translator
Smt. Diksha Madnani	L.S.G. Monitor
Sh. D.K. Sharma	Artist
Sh. Vinod Kumar	Draftsman
Sh. Suraj	Lower Division Clerk
Sh. Dinesh Meena	Lower Division Clerk
Sh. Bheem Singh Meena	Lower Division Clerk
Sh. Kailash Singh	Lower Division Clerk
Sh. Manjeet Kumar	Lower Division Clerk
Sh. Radhe Shyam	Lower Division Clerk
Smt. Manjeet Sharma	Stenographer Gr. II
Sh. Kulvinder Singh	Mechanic
Sh. Ashok Kumar Sharma	Sanitary Inspector
Sh. Naveen Kumar	Junior Statistical Officer
Sh. Shyam Lal	Junior Statistical Officer
Smt. Meenakshi Sharma	Junior Statistical Officer
Sh. Mahender Singh	Junior Statistical Officer
Sh. Pushpender Hada	Library & Information Assistant
Smt. Sangeeta	Library & Information Assistant
Sh. Deepak Pant	Library & Information Assistant
Sh. Girish Tuteja	Library & Information Assistant
Dr. (Mrs.) Ranjana Anand	Assistant Research Officer
Sh. R. Sethu Mohan	Assistant Research Officer
Sh. H.L. Meena	Assistant Research Officer
Sh. R. Ravi Kumar	Assistant Research Officer
Sh. Mohd. Muzib	Assistant Research Officer
Sh. Vijay Kumar Singh	Assistant Research Officer
Sh. A. K. Varma	Assistant Research Officer
Smt. Sunita Malik	Assistant Research Officer
Sh. Mukesh Kumar	Assistant Research Officer
Sh. R.S. Rautela	Assistant Research Officer
Sh. Raja Raman Jha	Assistant Research Officer
Smt. Sunita Patel	Assistant Research Officer
Sh. D.K. Saxena	Assistant Research Officer
Dr. Pramod Kumar	Assistant Research Officer
Smt. Neeru Kakkar	Assistant Research Officer
Ms. Shilpi Dhan	Assistant Research Officer
Smt. Alice Verghese	Assistant Research Officer
Smt. Yosman	Assistant Research Officer
Sh. Raishuddin	Assistant Research Officer
Sh. Harish Chand Gahlot	Research Assistant
Sh. Mahesh Chandra	Research Assistant
Sh. Bansi Lal Sharma	Research Assistant
Sh. R.K. Meena	Research Assistant
Sh. R. K. Pandey	Research Assistant
Ms. Niti Akoj	Research Assistant
Smt. Suman Gupta	Research Assistant
Smt. Sasmita Kar	Research Assistant
Sh. Udayvir Singh	Research Assistant

Sh. Suresh Chandra	Research Assistant
Smt. Saroj Bala	Research Assistant
Smt. Rekha Jaiswal	Research Assistant
Sh. Charan Singh	Research Assistant
Sh. Harinder Bhagat	Research Assistant
Smt. Meena Dutta	Research Assistant
Sh. Naresh Chandra Sharma	Research Assistant
Sh. Girraj Singh	Research Assistant
Sh. Charanjit Singh	Research Assistant
Sh. Vijayananth P.	Research Assistant
Ms. Swati Chauhan	Research Assistant
Sh. Sunil Kumara S.	Research Assistant
Ms. Usha Gupta	Research Assistant
Sh. Manoranjan Mishra	Research Assistant
Sh. Awanindra Dwivedi	Research Assistant
Smt. Anushree S.B.	Research Assistant
Sh. Subhash Chander	Technical Assistant
Sh. Anil Kumar	Technical Assistant
Sh. Kaushal Singh	Technical Assistant
Smt. Sharda Singh	Technician
Smt. Anila Rajendran	Technician
Sh. Vikram Jeet Yadav	Technician
Smt. Surbhi Mahajan	Technician
Smt. Priyanka	Technician
Sh. Sameer Kerketta	Technician
Sh. Ramesh Sharma	Technician
Sh. Rajesh Kumar	Technician
Sh. Chandan Singh	Technician
Sh. K.S. Pandey	Technician
Sh. Sachin Khandelwal	Technician
Smt. Preeti Sagar	Technician
Smt. Poonam	Technician
Sh. Vinay Singh	Technician
Smt. Jyoti	Technician
Sh. Radhey Lal Koram	Technician
Sh. Sattender Kumar	Technician
Sh. Abhay Kumar Sharma	Technician
Sh. Ved Prakash	Technician
Smt. Uma Sharma	Technician
Sh. Anil Kumar	Technician
Sh. Pritam Singh	Technician
Sh. Thakur Datt	Technician
Sh. Shashi Kant Sharma	Technician
A. Anbrasan	Technician
Sh. Dinesh Shah	Technician
Sh. N.S. Rawat	Technician
Sh. Karamvir Verma	Technician
Sh. U.C. Dixit	Technician
Ms. Neha Aggarwal	Technician
Sh. Ishwar Singh	Technician
Ms. Vidya Vardhini R	Technician
Ms. Harmanpreet Kaur	Technician
Ms. Somya Sharma	Technician
Ms. Priyanka Yadav	Technician
Sh. Ravi Shankar P. Goswami	Technician
Sh. Trilok Chand	Technician
Ms. Preeti Khatri	Technician
Sh. Srinivasulu P.	Technician

Sh. Ravi Kumar Kota	Technician
Sh. Anand Singh	Laboratory Assistant
Sh. Dinesh Rani	Laboratory Assistant
Sh. Chetan Prakash	Laboratory Assistant
Smt. Priya Singh	Laboratory Assistant
Sh. Madan Singh	Laboratory Assistant
Sh. T.C. Pathak	Laboratory Assistant
Sh. Radhey Shyam	Laboratory Assistant
Sh. M.C. Chauhan	Laboratory Assistant
Sh. Subhash Chand Sharma	Laboratory Assistant
Ms. Manisha Baweja	Laboratory Assistant
Ms. Shweta Kaushik	Laboratory Assistant
Sh. Ramesh Kumar	Laboratory Assistant
Sh. S. S. Rawat	Laboratory Assistant
Smt. Saroj Bala	Laboratory Assistant
Sh. J.S. Negi	Laboratory Assistant
Sh. C.S. Parate	Laboratory Assistant
Sh. Ravinder Nath	Laboratory Assistant
Sh. S. K. kush	Laboratory Assistant
Sh. Ramesh Kumar	Laboratory Assistant
Sh. Randhir Singh	Laboratory Assistant
Smt. Saraswati Paeik	Laboratory Assistant
Sh. Vinod Kumar	Laboratory Assistant
Sh. Braham Prakash	Field Worker
Sh. Ram Nath Manjhi	Field Worker
Smt. Sarla	Field Worker
Sh. Anil Kumar (Under Suspension	Field Worker
Sh. Mohan Lal	Field Worker
Sh. Anand Kumar	Field Worker
Sh. Surendra Kumar Yadav	Field Worker
Sh. Pradeep Kumar	Insect Collector
Sh. Bijender Kumar	Insect Collector
Sh. Ram Chander Bansofar	Insect Collector
Sh. Prem Chand	Insect Collector
Sh. Rajesh Kumar	Insect Collector
Sh. Vinod Kumar-II	Insect Collector
Sh. Satish Kumar	Insect Collector
Sh. Mehar Singh	Insect Collector
Sh. Rajeev Kumar Sharma	Insect Collector
Sh. Balraj singh	Insect Collector
Sh. Abbas Ali	Insect Collector
Sh. Bhagwan Sahai Meena	Insect Collector
Sh. Joginder Singh	Insect Collector
Sh. Parveen Kumar	Insect Collector
Sh. E. Marandi	Insect Collector
Sh. Ramesh Chand	Insect Collector
Sh. Dinesh Kumar	Insect Collector
Sh. Vinod Kumar-III	Insect Collector
Sh. Rajpal Singh	Insect Collector
Sh. Mh. Imtiaz	Insect Collector
Sh. Amar Singh	Insect Collector
Sh. Idrees Khan	Insect Collector
Sh. Gulam Sabir	Insect Collector
Sh. Man Mohan Singh Mehra	Insect Collector
Sh. Diwan Singh	Insect Collector
Sh. Krishan Singh	Laboratory Attendant

Smt. Veena Pani Devi	Laboratory Attendant
Sh. Om Prakash Singh	Laboratory Attendant
Sh. Subhash	Laboratory Attendant
Sh. Ram Narain Ram	Laboratory Attendant
Sh. Hodel Singh	Laboratory Attendant
Sh. Joginder	Laboratory Attendant
Sh. Yoginder Prasad	Laboratory Attendant
Sh. Ashok Kumar	Laboratory Attendant
Sh. Vikas Lochav	Laboratory Attendant
Sh. Deepak Kumar	Laboratory Attendant
Sh. Suresh Kumar	Laboratory Attendant
Sh. Kaptan	Laboratory Attendant
Sh. Manoj Kumar	Laboratory Attendant
Sh. Laxmi Naraian Boyat	Laboratory Attendant
Sh. Munesh Sharma	Laboratory Attendant
Sh. Morris Sampson	Laboratory Attendant
Sh. Rakesh	Laboratory Attendant
Sh. N. Kesavan	Laboratory Attendant
Sh. Prem chand	Laboratory Attendant
Sh. Prabhu Nath Prasad	Laboratory Attendant
Sh. Vemu Periah	Laboratory Attendant
Ms. Babita Singhal	Laboratory Attendant
Smt. Savitri Devi	Laboratory Attendant
Sh. Ram Lal	Laboratory Attendant
Sh. Karamvir	Laboratory Attendant
Sh. Parveen Kumar	Laboratory Attendant
Sh. Puran Mal	Head Animal Attendant
Sh. Pratap Singh	Animal Attendant
Smt. Pushpawati	Animal Attendant
Smt. Hira Devi	Animal Attendant
Sh. Ram Bhool	Animal Attendant
Smt. Mamta	Animal Attendant
Smt. Mayawati	Animal Attendant
Sh. Rajender Kumar	Animal Attendant
Smt. Krishna	Animal Attendant
Sh. Sunil Kumar	Animal Attendant
Sh. Naveen Kumar	Animal Attendant
Sh. Madan Lal	Animal Attendant
Sh. Rajender Kumar	Animal Attendant
Smt. Krishna	Animal Attendant
Sh. Sunil Kumar	Animal Attendant
Sh. Naveen Kumar	Animal Attendant
Sh. Madan Lal	Animal Attendant
Smt. Bimla	Animal Attendant
Sh. Som Pal	Animal Attendant
Sh. Harish Kumar	Animal Attendant
Sh. Shiv Kumar	Animal Attendant
Sh. Namo Narain Meena	Animal Attendant
Sh. Samar Nath	Animal Attendant
Sh. Jitender	Animal Attendant
Sh. Upendra Singh	Animal Attendant
Sh. Raju	Animal Attendant
Smt. Krishna Devi	Animal Attendant
Sh. Devender	Animal Attendant
Sh. Kuldeep Singh	Animal Attendant
Sh. Krishan Lal	M.T.S.
Sh. Mukesh Kumar	M.T.S.
Sh. Rajender Kumar	M.T.S.

Sh. Ashok Kumar	M.T.S.
Sh. Rajinder Ram	M.T.S.
Sh. Daulat Ram	M.T.S.
Sh. Sanjeev Kumar	M.T.S.
Sh. Bijender Singh	M.T.S.
Sh. Man Singh Meena	M.T.S.
Sh. Rajan Prasad	M.T.S.
Sh. Brij Kishore Mehto	M.T.S.
Sh. Vijay Pal Singh	M.T.S.
Sh. Ranjeet Kumar	M.T.S.
Sh. Balbir	M.T.S.

Sh. Krishna Prasad	Staff Car Driver
Sh. Girish Chand	Staff Car Driver
Sh. Sudhir Kumar	Staff Car Driver
Sh. Raghubir Singh	Staff Car Driver
Sh. Mishru Ram	Staff Car Driver
Sh. Prakash Ekka	Staff Car Driver
Sh. Ravinder Singh	Staff Car Driver

National Centre for Disease Control , ***Directorate General of Health Services***,
(Ministry of Health & Family Welfare , (Government of India),**Shamnath Marg, Delhi, Delhi - 110054**
www.ncdc.gov.in **Tel: 00-11-23913148** **Fax: 00-91-11-23922677** email: dirnicd@nic.in