Annual Report 2014-15

Department of Health Research
Ministry of Health & Family Welfare
Govt. of India
New Delhi

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Foreword

I take pleasure in presenting the Annual Report of the Department of Health Research, Ministry of Health & Family Welfare for the year 2014-15.

In order to address the challenging tasks of finding solutions to the complex health problems in the country and to give a focus to health research, the new Department of Health Research (DHR) was created on the September 17, 2007 under the Ministry of Health & Family Welfare.

The Department has rolled out five new schemes in 2013-14 to fulfill its mandate for creating necessary infrastructure for promoting health research in medical colleges and rural areas in the States/UTs.

The Department is engaged in creating a policy framework to help create our own cost-effective tools, processes and other interventions to reduce dependence on health products developed abroad, through a nation-wide translation research initiative.

Knowledge Management Policy of the Department envisages capturing, creating, sharing & managing the knowledge. The mission of the policy is to develop an efficient Health Knowledge Management System for improving the quality of health services. Under this policy, 5 projects have been sanctioned to generate appropriate quality of data.

The Department has also been given a mandate of developing guidelines for recognition/ accreditation of health research institutes.

The Department has made significant progress during 2014-15 as under:

Out of the 12th Plan target of establishing 80 Multi-Disciplinary Research Units (MRUs) in the Govt. Medical Colleges, 62 MRUs have already been approved and funds were released to 41 MRUs upto December, 2014.

12 Model Rural Health Research Units (MRHRUs) have already been sanctioned against the 12th Plan target of setting up 15 MRHRUs. The remaining three MRHURs are expected to be approved during 2014-15.

5 Regional Viral Laboratories, 8 State level Laboratories and 28 Medical College level Viral Labs have been approved under the scheme for 'Establishment of a Network of Virology Laboratories for Managing Epidemics and Natural Calamites'.

126 Biomedical research projects have been sanctioned under the Grant-In-Aid(GIA) Scheme. Under the Scheme for Development of Human Resources for Health Research(HRD Scheme), 34 fellowship (both in India & abroad) and grants to 8 Institutes have been sanctioned.

Further, in order to improve the research governance, various policy initiatives to map and recognize the Health Research Institutions are being taken. A draft Legislation for Assisted Reproductive Technologies, the Biomedical and Health Research Regulation Bill, 2011 and Policy for recognition of new system of Medicine, have been developed.

In addition, DHR through ICMR has made many important scientific contributions to face the challenges of national crises like H1N1 pandemic and Crimean Congo Fever.

During the year, the ICMR has launched the non-invasive techniques for diagnosis of kala-azar. Research activities have further been strengthened under the ICMR flagship programmes i.e Tribal Health Research Forum, Vector Borne Disease Science Forum, Special Support to Medical colleges and Translational Research. Other important research activities carried out during the year include the continuation and further strengthening of National Anti Microbial Resistance Surveillance Network, National Hospital Based Rotavirus Surveillance Network, Research cum Intervention project on AES/JE and Gastrointestinal Tract Pathogen Repository. Under the International Co-operation, agreement on Co-operation on Health Research was signed with Russia & Sweden during the current year.

I look forward that the Department will fulfill its mandated function of quality medical research for public health needs in the years to come.

(Secretary, DHR)

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Introduction

The Department of Health Research (DHR) was created as a separate Department within the Ministry of Health & Family Welfare by an amendment to the Government of India (Allocation of Business) Rules, 1961 on the 17th Sept, 2007. The Department became functional from November 2008 with the appointment of first Secretary of the Department.

2. The aim of the DHR/ICMR is to bring modern health technologies to the people through research and innovations related to diagnosis, treatment methods and vaccines for prevention; to translate them into products and processes and, in synergy with concerned organizations introduce these innovations into public health system.

The following 10 functions (nine new functions, plus the ongoing function of administering the ICMR) have been allocated to the Department of Health Research:

i. Promotion and co-ordination of basic, applied and clinical research including clinical trials and operational research in areas related to medical, health, biomedical and medical profession and education through development of infrastructure, manpower and skills in cutting edge areas and management of related information thereto.

ii. Promote and provide guidance on research governance issues, including ethical issues in medical and health research.

iii. Inter-sectoral coordination and promotion of public - private - partnership in medical, biomedical and health research related areas.

iv. Advanced training in research areas concerning medicine and health, including grant of fellowships for such training in India and abroad.

v. International co-operation in medical and health research, including work related to international conferences in related areas in India and abroad.

vi. Technical support for dealing with epidemics and natural calamities.

vii. Investigation of outbreaks due to new and exotic agents and development of tools for prevention.

viii. Matters relating to scientific societies and associations, charitable and religious endowments in medicine and health research areas.

ix. Coordination between organizations and institutes under the Central and State Governments in areas related to the subjects entrusted to the Department and for the promotion of special studies in medicine and health.

x Administering and monitoring of Indian Council of Medical Research.

3. With a view to fulfill its mandate of nine new functions, the DHR had formulated following five new schemes and all these schemes have since been approved and rolled out in 2013-14:

1. Establishment of Multidisciplinary Research Units (MRUs) in Govt. Medical Colleges
2. Establishment of Model Rural Health Research Units (MRHRUs) in the States.
3. Establishment of Network of Research Laboratories for Managing Epidemics and Natural Calamities.
4. Human Resource Development for Health Research
5. Grants in Aid scheme for inter- sectoral convergence & promotion and guidance on research governance issues.

4. During the year under review, the Department made significant progress in the implementation of the aforesaid schemes. 20 MRUs, 4 MRHRUs and 22 Viral Research & Diagnostic Labs (3 Regional Labs, 3 State Level Labs and 16 Medical College Level Labs) were approved during the year. With the aforesaid addition, the cumulative coverage has reached 62 MRUs, 12 MRHRUs and 41 VRDLS (5 Regional Labs, 8 State Level Labs and 28 Medical College Level Labs). Funds have been released in respect of 41 MRUs, 12 MRHRUs and 26 VRDLs. Besides this, 24 fellowships and support to 5 Institutes was sanctioned under the HRD Scheme. 86 research projects were also approved under the GIA Scheme. 17 MRUs in the medical colleges and 4 MRHRUs have already initiated the research activities. These schemes are largely helping in building up a strong and effective eco-system for carrying out health research in the country and for introduction of new technologies, new methods of treatment and products/processes into the public health system.

5. The Department has also been working on bringing suitable legislations aimed at (i) regulating ethical issues pertaining to biomedical and health research, (ii) regulating medical, social, ethical and legal aspects of surrogacy and (iii) assisted reproductive technology services in the country, and also for regulating the processes for recognition of any proposed alternative systems of medicine.

6. Other areas where there has been considerable progress also include, setting up of data repositories on medical and health research for wide public access as part of the national knowledge management, policy Mapping of Health Research Institutions, Health Research Policy, and Accreditation of Health Research Institutes.

7. During the year, the Indian Council of Medical Research continued to serve as the fulcrum for the Department of Health Research, and further intensified its research and development for the benefit of the Indian public. It is pertinent to mention that, the proposed seamless integration between the ICMR (generation of new knowledge) and the DHR (Putting this new knowledge to public good) which began in recent past, has been progressing well in the right direction. Some of recent important achievements of ICMR during 2014-15 are: development of indigenous affordable technologies for patient care and public health, strengthening the network laboratories for viral diagnosis and research, joint programmes on vector borne diseases and diseases affecting tribal and other marginalized communities. These are dealt in detail in the foregoing Chapters on ICMR.

Administration and Finance

Department of Health Research has started functioning in its new office located in Indian Red Cross Building from the current financial year. With total area of 11375 sq ft, it houses the officers, namely, the Secretary, DHR, two Joint Secretaries & other officers/staff, including the contractual staff in the PMIUs.

2. The Department is still functioning with a very small complement of staff. While six posts were transferred from the Department of Health & Family Welfare (DoHFW) to this new Department, sixteen additional posts, in different grades, were subsequently created in this Department with the approval of the Department of Expenditure. The latest status regarding the sanctioned strength of the Department and the number of posts filled so far, is as under:

S. No.	Name of post	No. of posts transferred from DoH&FW	No. of addl. Posts created	Total sanctioned strength	No. of posts filled.
1.	Jt. Secretary	1	1	2	2
2.	Director/Deputy Secretary	1	1	2	2
3.	Scientist 'E'	0	1	1	0
4.	Under Secretary	1	1	2	2
5.	Scientist 'C'	0	2	2	0
6.	Section Officer	1	2	3	3
7.	Assistant	1	4	5	2
8.	Private Secretary	0	2	2	2
9.	Stenographer	0	2	2	1
10.	Lower Division Clerk	1	0	1	1
Total		**6**	**16**	**22**	**15**

3. The position of filing up of posts is as follows:

- **Scientists:** The posts of Scientist 'E' and Scientist 'C' can be filled up only after the Recruitment Rules for these posts are approved by the Department of Personnel & Training (DoPT) and the Union Public Service Commission. The proposal in this regard has been referred to DoPT.
- **Secretariat Posts:** While the Central Secretariat posts have been encadred by Department of Personnel & Training in July, 2012, postings against some posts are yet to be made by them. Moreover, the cadre controlling authority for the Department of Health Research is the Department of Health &Family Welfare and, therefore, actual posting of officers/staff is first made by Department of Personnel & Training to the Department of Health & Family Welfare and, thereafter, further postings are made by that Department to Department of Health Research. DoH&FW has been requested

for posting of staff in the DHR against the vacant sanctioned posts from time to time. However, as a stop gap arrangement, one consultant (one retired Deputy Secretary) has been engaged for handling the important work in the Department. The Project Management & Implementation Units(PMIUs) have been established in the Department for effective implementation of all the five schemes rolled out during the year 2013-14. The establishment matters of the Department of Health Research are handled by the Department of Health & Family Welfare alongwith other support functions such as Budget, Cash, Official language matters, PAO etc.

- **Additional Posts:** Steps have also been initiated by Department of Health Research for augmentation of its existing strength by way of creation of additional posts.
- **Grievance Redressal Mechanism:** DHR has grievances redressal mechanism in place with Deputy Secretary, DHR as the Nodal Officer for the purpose. During the year 2014-15, a total number of 4 grievances were received. All were addressed and disposed off.
- **Constitution of complaints committees for Prevention of Sexual Harassment of women in work places:** Department has set up complaint redressal mechanism to prevent sexual harassment of women in the working places of the DHR with four member committee. There was no complaint during the year.
- **E-Governance initiatives:** In order to promote and strengthen ICT enabled e-Governance in the country, Department of Health Research has taken several initiatives to digitize certain activities, as follows:
    - DHR has established Local Area Network (LAN) connectivity through NIC and leased line circuits, to facilitate speedy implementation of e-Governance Policy of Government.
    - In respect of the 5 newly launched schemes, action will be taken to develop web-based softwares for Physical and Financial monitoring of the schemes.
    - Module for online (monitoring) of the 'Grant-in-Aid Scheme for Inter-sectoral convergence & coordination for promotion & Guidance on Health Research' has already been developed and made functional. Facility in the portal has also been provided for online submission of research proposals both under the GIA Scheme as well as under the scheme of Establishment of Multi-Disciplinary Research Units (MRUs) in the Govt. Medical Colleges. Department's website is being redesigned with add-on features to incorporate all requisites of the standard Govt. of India Guidelines for Websites (GIGW).
    - Department has implemented the Aadhar based Biometric Attendance System (BAS) wherein all employees are marking their attendance on digital devices.

Finance:

(i) Allotment:

The Approved outlay for the 12th Plan for the Department is Rs. 10029 Crores. Out of the approved allocation of Rs. 10029 Crores, an allocation of Rs.5259 Crores has been earmarked for the schemes/programmes of Department of Health Research and Rs. 4770 Crores for the various activities/programmes of ICMR. The scheme-wise allocations are as follows:

(Rs. in crores)

S. No.	Schemes	12th Plan Outlay (2012-17)	Approved project Cost as per EFC/CCEA	Budgetary Allocation i.e. BE for 2012-13 to 2014-15
1.	HRD scheme of DHR	812.00	597.00	98.00
2.	MRU in State Medical Colleges	1118.00	503.83	150.00
3.	MRHRU in the States	246.00	67.66	44.00
4.	Establishment of a Network of laboratories for Managing Epidemics and Natural Calamities	1084.00	646.00	114.00
5.	Grant-in-Aid scheme of DHR	1953.00	1242.00	108.00
6.	Grant-in-Aid to ICMR	4770.00	4770.00	1580.00
7.	Governance and departmental expenses	46.00	46.00	18.00
	Total	**10029.00**	**7872.49**	**2112.00**

(ii) Expenditure:

The expenditure incurred by the Department during 2013-14 and 2014-15 was as

(Rs. in crores)

Particulars	2013-14			2014-15		
	BE	RE	Actual	BE	RE	Actual (upto December, 2014
DHR	195.00	95.00	89.42	195.00	105.00	90.56
ICMR	531.00	480.00	480.20	531.00	505.00	390.58
Total	726.00	575.00	569.62	726.00	610.00	481.14

4. A statement indicating the BE/RE (2014-15) and actual expenditure upto 12/2014 under Plan and Non-Plan and BE (2015-16) under Plan and Non-Plan is given at **Annexure-I**

Monitoring & Evaluation of the Schemes

5. A strong and effective mechanism for implementation, monitoring and evaluation of the physical, financial and research programmes of the schemes is already provided in the structure of the schemes. Project Management and Implementation & Units (PMIUs) have been established in the DHR and ICMR with requisite administrative and scientific support staff for periodic monitoring of the progress of implementation of the schemes with reference to the outcomes and deliverables expected to be achieved under each scheme.

6. Teams have been constituted for undertaking field visits for onsite review of the progress of implementation of the schemes, establishment of Multi-Disciplinary Research Units (MRUs) in the Govt. Medical Colleges; Model Rural Health Research Units (MRHRUs) in the States and Virology Diagnostic & Research Labs. The teams also provide guidance and suggestions to the concerned medical colleges/institutions for addressing the problems and bottlenecks faced by them in executing the schemes.

7. Review Meetings are held by Secretary, DHR from time to time with the stakeholders, namely, the representatives of the State Health Departments, Principals/ Nodal Officers of the medical colleges, subject area experts, etc for detailed review of the progress of implementation of the schemes.

Action has also been initiated to develop web-based softwares for online physical and financial monitoring in respect of all the 5 schemes.

Audit Observations

A statement indicating the audit observations pertaining to Department of Health Research (ICMR) is given at **Annexure-II**

Establishment of Multi-Disciplinary Research Units (MRUs) In State Government Medical Colleges

Health research is predominantly carried out in the Medical Colleges/Institutions providing education in allied subjects. Medical Colleges are the back bone of both teaching and providing specialized services to patients in India. They are also expected to set the trends in the thinking process and innovations to improve the understanding of the diseases and their management. However, over the years it has been noticed that majority of medical colleges have confined themselves to routine patient care and teaching based on conventional methods. Presently, quality medical research is largely confined to a handful of institutions and medical colleges in the country that too in few States only. The standard of papers published/ research projects undertaken by the students of post-graduate courses/PhD in most of the Medical Colleges are not inspiring. The Department observed that it may be attributed both to the lack of appropriate facilities for conducting research and a lack of motivation and knowledge on the part of faculty and students in Medical Colleges for conducting research.

2. Due to lack of infrastructural facilities, the Medical Colleges have not been pursuing newer methods of investigation for understanding the pathological diagnosis, treatment and management practices. Even for State Governments, Health Research has not been perceived as a priority area. This has also affected the quality of clinical services being provided.

3. Therefore to promote and encourage quality medical research in the country and provide assistance to the Medical Colleges to set up appropriate research facilities, the Department of Health Research formulated the **MRU** Scheme in the year 2013-14 for XIIth Plan and continued with its implementation during the year.

4. The target of the scheme, which has been approved and rolled out during the year 2013-14, aims to provide infrastructural support, in terms of civil works, equipment and recurring expenditure, to carryout research **focused on non-communicable diseases**, to various State Govt. Medical Colleges across the country.

5. The scheme entails setting up of 80 **MRU**s (45 in 2014-15) in the Government Medical Colleges/ Institutions during the 12th Plan period. The faculty of the Medical College will be encouraged to carry out research projects on national and regional priorities. Total estimated cost of the project is Rs.503.85 crores.

Funding Norms:

6. Rs.5.25 crore per **MRU** towards equipment & civil works. In addition, recurring expenditure of Rs.34.00 lakhs per annum towards staffing on contractual basis and consumables, etc.

Action expected from the State Governments:

- To provide requisite space (minimum 300 sq mtr), free of cost, at the concerned Medical College.
- Signing of MoA with the Department of Health Research for taking over the liability of running the centres after five years. This would be about Rs.34 lakhs per year per Medical College.

Status of Implementation

- Against the total target of covering 80 medical colleges, 49 MRUs have been approved. (36 in 2013-14 and 13 in 2014-15).
- Funds have been released to 41 MRUs (29 in 2013-14 and 12 in 2014-15)
- ♦ Funds to 8 medical colleges (4 approved in 2013-14 and 4 in 2014-15) could not be released since UCs are pending in respect of other schemes of Ministry of Healthy & Family Welfare.
- ♦ Against the BE provision of Rs. 80.00 crores and RE provision of Rs. 31.00 crores under Plan during 2014-15, expenditure upto December, 2014 is Rs. 27.78 crores.

List of medical colleges covered for establishment of MRUs during the year 2013-14 is given in table (1) below:

Table (1)
List of Government medical colleges sanctioned the establishment of Multi-Disciplinary Research Units (MRUs) in the Government Medical Colleges/ Institutions (till 31-12-2014)

S.No.	State	Name of the medical college
1.	Andhra Pradesh (2)	Siddhartha Medical College, Vijaywada
		SV Medical College, Tirupati
2.	Telangana (1)	Osmania Medical College , Hyderabad
3.	Assam (1)	Silcher Medical College and Hospital, Silcher
4.	Chhattisgarh (1)	Pandit JNM Medical College, Raipur
5.	Gujarat (2)	M.P.Shah Medical College, Jamnagar
		Surat Municipal Institute of Medical Education & Research(SMIMER), Surat
6.	Haryana (1)	Pandit B.D. Sharma PGIMES , Rohtak
7.	Himachal Pradesh (1)	Indira Gandhi Medical College, Shimla
8.	Jammu & Kashmir (2)	Govt. Medical College, Jammu
		Govt. Medical College, Srinagar
9.	Jharkhand (1)	MGM Medical College, Jamshedpur
10.	Karnataka (3)	Mysore Medical College and Research Institute, Mysore
		Shimoga Instt. of Medical Sciences, Shimoga
		Karnataka Institute of Medical Sciences, Hubli
11.	Kerala (2)	Medical College, Thiruvananthapuram
		Calicut Medical College, Calicut, Kerala
12..	Manipur (1)	Regional Institute of Medical Sciences, Imphal
13.	Punjab (3)	Government Medical College, Amritsar
		Govt. Medical College, Patiala
		Guru Gobind Singh Medical College & Hospital, Faridkot
14.	Chandigarh UT(1)	Government Medical College, Chandigarh
15.	Rajasthan (2)	Dr. S.N. Medical College, Jodhpur

		Sardar Patel Medical College, Bikaner.
16.	Tamil Nadu (5)	Madras Medical College, Chennai
		Tirunelveli Medical College, Tirunelveli
		Coimbatore Medical College, Coimbatore
		Dr.ALM Post Graduate Institute of Basic Medical Sciences, Taramani
		Chengalpattu Medical College, Chengalpattu
17.	Tripura (1)	Agartala Govt. Medical College, Agartala
18.	Uttarakhand (1)	Govt. Medical College, Haldwani (Nainital)
19.	West Bengal(1)	R.G. Kar Medical College, Kolkata
20.	Delhi (NCT) (2)	University College of Medical Sciences, Delhi
		Vallabh Bhai Patel Chest Institute, Delhi
21.	Madhya Pradesh (3)	S.S. Medical College, Rewa
		Netaji Subhash Chandra Bose Medical College, Jabalpur
		M.G.M. Medical College, Indore
22..	Orissa (2)	S.C.B. Medical College, Cuttack
		VSS Medical College, Burla
23.	Goa (1)	Goa Medical College, Panaji
24.	Maharashtra (1)	Seth G.S Medical College & KEM Hospital Mumbai
Total (24 States/UTs)		**41 Medical Colleges**

List of medical colleges approved for MRUs but funds could not be released due to non-completion of codal formalities, including settlement of pending UCs against other schemes of MoHFW, is given in Table (2) below:

Table (2)

S.No.	State/Medical College
1.	Maharashtra: Dr. Vaishampayan Memorial Government Medical College, Sholapur
2.	UP: G.S.V.M Medical College, Kanpur
3.	Madhya Pradesh: GR Medical College, Gwalior,
4.	J&K: Sher e Kashmir Institute of Medical Sciences, Srinagar
5.	HP: Dr. R.P. Govt. Medical College, Kangra at Tanda.
6.	Orissa: M.K.C.G. Medical College, Berhampur.
7.	Rajasthan: J.L.N. Medical College & Associated Group of Hospital, Ajmer.
8.	UP: Institute of Medical Sciences, Banaras Hindu University,Varanasi.

Initiation of research activities by the MRUs:

6. The concept research proposals, after approval from the respective Research Advisory Committee from the respective Medical Colleges, which were funded in September 2013, were invited for review at ICMR. A total of 114 concept research proposals on Non-communicable Diseases (NCDs) were screened in a Special Project Review Committee meeting on 13.11.2014. A total of 53 research proposals were shortlisted. The details are given in Table (3) as under:

Table (3)		
S.No.	Name of Medical College	No. of Research Proposals shortlisted
1	Osmania Medical College, Hyderabad, Andhra Pradesh.	2
2	Silcher Medical College and Hospital, Assam	3
3	Pandit B.D. Sharma PGIMES , Rohtak, Haryana	2
4	Indira Gandhi Medical College, Shimla, Himachal Pradesh	2
5	Govt. Medical College, Jammu, Jammu & Kashmir	3
6	Govt. Medical College, Srinagar, J & K	5
7	MGM Medical College, Jamshedpur, Jharkhand	4
8	Mysore Medical College and Research Institute, Mysore, Karnataka	4
9	Shimoga Instt. Of Medical Sciences, Shimoga, Karnataka	4
10	VSS Medical College, Burla,, Orissa	3
11	Government Medical College, Amritsar, Punjab	3
12	Madras Medical College, Chennai, Tamil Nadu	3
13	Tirunelveli Medical College, Tirunelveli, TamilNadu	4
14	Coimbatore Medical College, Coimbatore, Tamil Nadu	2
15	Dr.ALM Post Graduate Institute of Basic Medical Sciences, Taramani, TamilNadu	5
16	Govt. Medical College, Haldwani (Nainital) Uttrakhand	2
17	Vallabh Bhai Patel Chest Institute, Delhi	2

Establishment of Model Rural Health Research Units (MRHRUs) in the States

Public health system in India has a wide network of primary health centers at the periphery, plus referral, secondary and tertiary level hospitals at district, state and other levels. Over the last more than 60 years, preventive, diagnostic and therapeutic services have been provided through this network managed by States. It has been observed that a big gap exists between PHC/CHC and tertiary care hospitals with state-of-art- facilities created by centre and also by some of the state governments. The professionals and policy makers have a general view that modern methods of diagnosis and management cannot be practiced at peripheral level. There is a mental block among a large number of professionals and policy makers who think that modern methods of diagnosis and management cannot be practiced at rural settings.

2. Medical doctors working in the State public health system do not get opportunity for orientation on modern advances in a regular fashion in their settings and therefore, are unable to utilize advances in medical science in their work. Because of this, the transfer of technology to the end users becomes very difficult.

3. Further, wide variations exist in the pattern of diseases prevalent in different geographical areas, the local conditions which require development of state/area specific, disease specific strategy to provide better health care facilities ensuring that the modern technology is available to the general public. Transfer of research finding/technology at the rural level has been found to be major lacuna in the provision of quality medical services to rural population.

4. To bridge the gap, Department of Health Research has developed a scheme for the 12th Plan period to **'Establish Model Rural Health Research Units (MRHRUs)** in the States, under the initiative of infrastructure development for health research in the country. The scheme is based on the experience of establishing such a Unit at Ghatampur under National JALMA Institute for Leprosy and Other Mycobacterial Diseases (ICMR), Agra, where the methods of diagnosis and treatment as well as epidemiology are shown to be workable deep at grass root rural settings. These Units have been envisaged to function as an interface between the new technologies developers (Researchers in the medical/other institutions; State or Centre), Health Systems Operators (Centre/state health services) and the Beneficiaries (community).

5. The Model Rural Health Research Units set up under the scheme would undertake the following functions:

- Develop state/area specific models depending upon the disease profile, morbidity patterns and local conditions for transfer of the technology for providing better health care services to the rural masses.
- Training the health professionals of State health system for the use of modern field adaptable methods and the model developed.

- Undertake various research projects in close coordination with the State Government institutions and others that are relevant and beneficial to the rural population.
- The Units will develop State specific models depending on the disease profile, topography and the local conditions as per the priorities & location identified by the State Govt. in close coordination with State health authorities.

6. The **MRHRU** will be an interface between patient, health providers and health research to provide latest / sophisticated technology for diagnosis and management of diseases in rural areas. The activity will be entirely supported by DHR for its sustenance. In total, 15 MRHRUs are to be established during the XII Plan period. Each MRHRU has to be linked to the nearest ICMR institute to mentor and guide the research activities of MRHRU relevant to local needs. The research activities carried out at each MRHRU are monitored/ guided by the Committee, consisting of eminent Scientists of National repute with representation from state govt. medical colleges, state health services and other concerned state health officials, constituted with the approval of Secretary, DHR. Total estimated cost of the project for entire XIIth Plan is Rs.67.66 crores.

Funding Norms:

Rs.3.00 Crores per MRHRUs sanctioned for civil works/Equipment. Besides, recurring expenditure of Rs.50 lakhs towards staffing, consumables, *etc*.

Action expected from the States:

- Provide requisite land sufficient to construct covered space of about 620 sq. meters, in close proximity to the PHC/CHC, free of cost.
- Signing of MoA with the DHR for implementation of the programme.

Status of Implementation

- ♦ This path breaking initiative finds a special mention in the Hon'ble Finance Minister's Budget Speech for 2014-15.
- ♦ 12 MRHRUs already sanctioned and an amount of Rs.22.40 crores has been released during 2013-14 (Rs.12.40 crores) & 2014-15 (Rs.10.00 crores).
- ♦ Against the BE provision of Rs. 20.00 crores and RE provision of Rs. 13.00 crores under Plan during 2014-15, expenditure upto December, 2014 is Rs. 10.00 crores.
- ♦ List of 12 approved MRHRUs sanctioned till 31-12-2014 in the various States is given in the table (4) below:

Table (4)				
S. No.	**State**	**Location of MRHRU**	**ICMR mentor Institute/ Centre**	**Linked Medical College**
1	Assam	PHC Chabua	RMRC, Dibrugarh	Assam Medical College & Hospital, Dibrugarh
2.	Himachal Pradesh	CHC, Haroli	NJIL&OMD, Agra	Dr RPG Medical college, Tanda
3.	Rajasthan	Bhanpur Kala, Government Health Clinic, Jaipur	DMRC, Jodhpur	SMS Medical College, Jaipur
4.	Tamil Nadu	State Rural Health Centre at Tirunelveli	NIE, Chennai	Tirunelveli Medical College
5.	Tripura	Kherengbar Hospital Khumulwung	RMRC, Dibrugarh	Agartala Government Medical College
6.	Karnataka	PHC, Sirwar, Manvi Taluk, Raichur	RMRC, Belgaum	Raichur Institute of Medical Sciences, Raichur.
7.	Punjab	CHC Bhunga (Hoshiarpur)	NIOP,New Delhi	Govt. Medical College, Amritsar
8.	Maharashtra	Sub District hospital (SDH), Dahanu (Thane)	NIRRH, Mumbai	Grant's Medical College and JJ Group of Hospitals, Mumbai
9.	Andhra Pradesh	Old RHTC Premises, Chandragiri (Dist. Chittoor)	NIN Hyderabad	S.V. Medical College, Tirupati
10.	Odisha	Block, CHC, Tigiria	RMRC Bhubaneshwar	S.C.B. Medical College, Cuttak
11.	Madhya Pradesh	Datia	RMRCT, Jabalpur	G.R. Medical College, Gwalior
12.	Chhattisgarh	PHC,Lakharam Block (Bilaspur)	RMRCT, Jabalpur	Chhattisgarh Institute of Medical Sciences, Bilaspur

Initiation of research activities by the MRHRUs:

7. In order to review and monitor the research activities at Model Rural Health Research Units (MRHRUs), a Special Project Review Committee (SPRC) has been constituted with the eminent experts. Two meetings of SPRC have been held on 14.8.2014 and 22.12.2014.

8. ICMR being the implementing agency has also formulated the guidelines for composition of Research Advisory Committee (RAC), Terms of Reference and Procedure for Land Transfer by State to Department of Health Research. The MRHRUs of Himachal Pradesh, Rajasthan, Tamil Nadu, Assam and Tripura have constituted the RAC and have submitted the research proposals after approval through respective RAC.

9. All the research projects submitted by these MRHRUs have been reviewed by SPRC and the details are given in the Table (5) as below:

Table (5)		
S. No.	**Name of the MRHRU Project**	**No. of Research Proposals shortlisted**
1.	MRHRU at CHC Haroli (Tanda) HP	6
2.	MRHRU at PHC, Chabua, Assam	3
3.	MRHRU at Kherengbar Hospital, Khumulwung, Tripura	3
4.	MRHRU at Kallur (Projects approved by RAC)	5
5.	MRHRU at Bhanpur Kala, Govt. Health Clinic, Jaipur, Rajasthan	4

10. Besides this the other MRHRUs namely at Punjab, Karnataka and Maharashtra are being informed to constitute RAC and get their research projects reviewed through RAC. The recently sanctioned 4 MRHRUs at Orissa, Chhattisgarh, Madhya Pradesh and Andhra Pradesh are also in the process of initiating the establishment of MRHRUs in the identified locations as indicated in their MoA.

Network of Research Laboratories for Managing Epidemics and Natural Calamities

It is well known that diagnosis of viral diseases is a major problem in most parts of country and outbreaks of new viral agents is a common phenomenon. The inadequacy of specialized laboratories in the country especially at secondary and tertiary level has been noticed in the past as well as during the recent HINI crises that gripped the nation. In the context of biological agents being used as weapons for man-made disaster as well as outbreaks of new viral agents, it is considered necessary to establish a network of laboratories for viral diagnosis. Such a network and active research programme is needed to generate evidence for interventions for various viral infections which are endemic to the country. With National Centre for Disease Control (NCDC) and National Institute of Virology (NIV), acting as the apex laboratories for surveillance and research respectively for this purpose, it is considered essential to establish a network of laboratories across the country. These labs will supplement the activities of the Integrated Disease Surveillance Project (IDSP) coordinated by NCDC, Delhi with special focus on viruses and will also be expected to deal with all common viruses such as the following:

1. Viruses transmitted by respiratory route: Measles, Rubella, Mumps, Influenza viruses (A, B and C), Parainfluenza virus, Adenoviruses, Respiratory Syncitial Virus, Rhinoviruses, Polio, Coronaviruses.
2. Viruses transmitted by intestinal route: Hepatitis A, E. Rotavirus, Astroviruses, Calciviruses, Norwalk viruses, Enteroviruses.
3. Vector Borne Disease Viruses: Dengue, Chikungunya, Japanese encephalitis, West Nile, Kyasanur Forest Disease, Chandipura.
4. Zoonotic viruses: Rabies, Nipah virus, Hanta Virus
5. Viruses transmitted by body fluids: HIV, Hepatitis B and C.

2. Priority will be given to develop infrastructure and expertise for diagnosis of viruses with a potential to cause outbreaks and/or which are responsible for significant disease burden like Measles, Influenza viruses (A, B and C), Respiratory Syncitial Virus, Polio, Hepatitis A, E, Rotavirus, Enteroviruses, Dengue, Chikungunya, JE *etc*. These laboratories will be expected to develop expertise for diagnosis of specific viruses circulating in their geographic area. To cope with the emergent situation and urgent need for Virology Diagnostic facilites in the wake of outbreaks & endemic viral infections, ICMR had started a Virology Diagnostic Laboratory (VDL) Network Programme in the extramural adhoc mode. The VDL Network programme involves identification of institutions/ research centres/laboratories in medical colleges, which are in need of the facility and accept the offer to open/establish/upgrade the viral diagnostic laboratories. ICMR invites research proposals from the selected laboratories / institutions in the format of Ad Hoc Extramural Research Project and funds are facilitated by ICMR with regard to

infrastructure development and running of the VDL for a period of five years. Thereafter, which the state government/ health authorities are required to take over the facility (including its trained manpower) and maintain it at their end.

Ongoing laboratories under the ICMR System

- From 2009-12 a total of 14 Virus Diagnostic Laboratories (VDLs) have been established in fourteen states of the country. Details are as follows:
- Nine Grade I laboratories and five Grade II Laboratories under ICMR system as per details given in Table (6) below:

Table 6

S.No.	Name of the Centre	Grade	Date of Inception of Lab
1.	Chhatrapati Sahuji Maharaj Medical University, Lucknow	I	March 2010
2.	Regional Medical Research Centre, Bhubaneshwar	I	March 2010
3	Regional Medical Research Centre, Port Blair	I	March 2010
4	Kasturba Medical College, Manipal	I	March 2010
5	National Institute of Virology Field Unit, Allapuzha	I	March 2011
6	SMS Medical College, Jaipur	I	March 2011
7	Rajiv Gandhi Centre for Biotechnology, Thiruvanthapuram	I	March 2011
8	King's Institute of Preventive Medicine, Chennai	I	Dec. 2011
9	Rajendra Memorial Research Institute of Medical Sciences, Patna	II	Dec.2011
10	Regional Medical Research Centre for Tribals, Jabalpur	II	Dec.2011
11	Rajendra Institute of Medical Sciences, Ranchi	II	Dec.2011
12	Andhra Medical College, Visakhapatnam	II	Dec.2011
13	Regional Medical Research Centre, Dibrugarh	I	Mar. 2013
14	Government Medical College, Agartala	II	Mar. 2013

ICMR is providing equipment, manpower and consumables to different grades of laboratories for a total period of five years. Thereafter, as per the MoA signed between ICMR and VDL, the activity is expected to be taken up by the Institution itself. All labs are currently ongoing and need to be continued during the 12th plan period

Establishment of a new network of VDLs under the DHR Scheme

3. Concurrent establishment of new VDL labs as well as Review of the progress of established labs at completion of two & four years is being undertaken by senior experts of ICMR on a regular basis. Most of the functional VDLs are now well established with basic diagnostic techniques for viruses are generating data from their respective centres. DHR/ICMR envisage involving all VDLs in well-planned epidemiological studies related to viruses of national relevance to bring out data representative of the entire nation. Uniform Protocols/SOP's/Trainings/Quality Assurance/Quality Control methods will be followed by all the Laboratories.

4. While ICMR initiated the programme in a research project mode and its 14 centers have contributed immensely, DHR has developed a new scheme to cover the entire country. The scheme envisages establishment of three tier laboratories - 10 Regional Labs, 30 State level Labs and 120 Labs in the State Government Medical Colleges for timely diagnosis and management of viral epidemics and new viral infections. The scheme has been approved during the year 2013-14 at an estimated cost of Rs. 646.83 crores. The geographic spread of the labs will be taken care of while establishing the

labs, to cover the entire country and the States not having any medical college will be linked to the labs in the nearby States/area.

Objectives

- Create infrastructures for timely identification of viruses and other agents causing significant morbidity at public health level and specific agents causing epidemics and/ or potential agents for bioterrorism.
- Develop capacity for identification of novel and unknown viruses and other organisms & emerging-reemerging viral strains and develop diagnostic kits.
- Provide training to health professionals.
- Undertake research for identification of emerging and newer genetically active/ modified agents.

5. The expenditure on the establishment of labs at the State level and at the Medical Colleges would be shared between the Central Government and State Governments in the ratio of 75:25 (90:10 in respect of North-Eastern, Hilly States, including Sikkim and J&K). Expenditure on the Regional Labs would, however, be fully borne by the Central Government.

Funding Norms

Regional Labs: The Non-recurring cost of a Regional Level Lab is about Rs. 15.00 crores for the development of infrastructure, which include civil works (Rs.4.20 cr), furnishing & furniture (Rs.50 lakh) and equipment (Rs.10.25 cr.).The recurring cost of Regional Lab per annum is Rs 81 lakhs, towards staffing (Rs.46 lakh), Consumables & Contingencies and Training (Rs.35 lakhs).

State Level Labs: About Rs.6.58 crores, comprising upto Rs.50 lakhs under civil works mainly for renovation/modification of the buildings and Rs.6.08 cr. for equipments. In addition, recurring expenditure of about Rs.50 lakh per Lab for engaging trained technical man power on contractual basis and expenses on training, consumables and contingencies.

Medical College Level Labs: About Rs. 1.44 crore for equipment and civil works /renovation of building. In addition, recurring expenditure of Rs.30 lakhs per annum, comprising expenses on staffing, consumables & contingencies and training.

Requirements from the States

- Allocating a building on the premises of a medical college / institution for the establishment of the Viral Research & Diagnostic Lab (VRDL) or to provide space of mutually agreed dimensions (approx. 250-300 sq. meters for State Level Lab and approx.200-300 sq. meters for Medical College Level Lab) , free of cost, in existing premises for the establishment of the VRDL.
- To sign MoA with the DHR.
- Deputing a mutually agreed number of its personnel to work in the VRDL.
- Deputing personnel (including those belonging to the State Health Service) to undergo training/ attend workshops at the VRDL.

- Sharing of expenditure on the establishment of labs at the State level and at the Medical Colleges between the Central Government and State Governments in the ratio of 75:25 (90:10 in respect of North-Eastern, Hilly States, including Sikkim and J&K).

Status of Implementation

- **22 Viral Research & Diagnostic Labs (3 Regional Labs, 3 State Level Labs and 16 Medical College level labs) were approved during the year 2014-15.** With the aforesaid addition, the cumulative coverage has reached 41 VRDLS (5 Regional Labs, 8 State Level Labs and 28 Medical College Level Labs).
- However, funds have been released in respect of 26 VRDLs only (4 Regional Labs, 6 State level labs and 16 Medical College level labs) upto December, 2014.
- **Against the BE provision of Rs. 35.00 crores and RE provision of Rs. 30.00 crores under Plan during 2014-15, expenditure upto December, 2014 is Rs. 26.21 crores.**
- List of VDLS sanctioned till December 2014 is given in the table 7 below

Regional Labs

1. PGI Chandigarh
2. Regional Medical Research Centre (RMRC), ICMR, Dibrugarh (Assam)
3. AIIMS, Bhopal (MP)
4. NICED Virus Unit, ICMR, (Kolkata)

State level Labs

1. Indira Gandhi Medical College, Shimla (Himachal Pradesh)
2. Sher-i-Kashmir Institute of Medical Sciences, Srinagar (J&K)
3. B.J. Medical College, Ahmedabad (Gujarat)
4. NEIGRIHMS, Shillong, (Meghalaya)
5. Bangalore Medical College and Research Institute, Bangalore (Karnataka)
6. Guwahati Medical College, Guwahati (Assam)

Medical College Level Labs

1. Govt. Medical College, Jammu (J&K)
2. Osmania Medical College, Hyderabad (AP)
3. PGI, Rohtak (Haryana)
4. Govt. Medical College, Amritsar (Punjab)
5. Indira Gandhi Medical College, Nagpur (Maharashtra)
6. Patna Medical College, Patna (Bihar)
7. M.P. Shah Medical College, Jamnagar, (Gujarat)
8. Sri Venkateswara Institute of Medical Sciences, Tirupati (Andhra Pradesh)
9. Siddharth Medical College, Gunadala, Vijaywada (Andhra Pradesh)
10. Late Sri Baliram Kashyap Memorial Govt. Medical College, Jagdalpur (Chattisgarh)
11. Dr. Rajendra Prasad Government Medical College, Tanda (Himachal Pradesh)
12. Mysore Medical College & Research Institute, Mysore (Karnataka)
13. Government Medical College, Patiala (Punjab)
14. Madurai Medical College, Madurai (Tamil Nadu)
15. Government Medical College, Theni (Tamil Nadu)
16. Govt. Medical College, Trivandrum (Kerala)

List of VRDLs approved but funds not yet released due to non-completion of requisite codal formalities:

Regional Labs

1. JIPMER, (Puducherry)

State level Labs

1. SCB Medical College, Cuttak (Odhisha)
2. Regional Institute of Medical Sciences, Imphal, (Manipur)

Medical College Level Labs

1. Sarojini Naidu Medical College & Hospital, Agra, (UP)
2. G.S.V.M. Medical College, Kanpur (UP)
3. Uttar Pradesh Rural Institute of Medical Sciences & Research, Saifai, Etawah,(UP)
4. Dr. S.N. Medical College, Jodhpur (Rajasthan)
5. Government Medial College, Agartala, (Tripura)
6. Silchar Medical College, (Assam)
7. Government Medial College, Miraj, Sangli, (Maharashtra)
8. Kakatiya Medical College, Nizampura, Warangal, (Telangana)
9. Government Medical College & Hospital, Chandigarh, (Punjab)
10. R G Kar Medical College & Hospital, Kolkata, (West Bengal)
11. IPGMER, Kolkata, (West Bengal)
12. Jawarhar Lal Nehru Institute of Medical Sciences, Imphal, (Manipur)

Grant-In-Aid Scheme for Inter -Sectoral Convergence & Coordination for Promotion and Guidance on Health Research

The scheme launched during 2013-14 aims at providing support in the form of grant-in-aid for carrying out research studies to identify the existing knowledge gap and to translate the existing health leads into deliverable products. There will be special focus on encouraging innovation, their translation and implementation by collaboration and cooperation with other agencies by laying special stress on implementation research so that there is a better utilization of available knowledge. The Scheme has been approved by Cabinet Committee on Economic Affairs (CCEA) on 6th February, 2014 at a total estimated cost of Rs.1242 crores.

2. The Scheme has the following components for funding:

(1) Research studies with emphasis on public health

The objective of this component is to support research studies on disease burden, risk factors, diagnosis & treatment, *etc* of major diseases. The studies will be limited to Non-communicable diseases. In this category a total number of 287 studies, with the maximum duration of 3 years and cost range between Rs.50 lakh - Rs.3 crores each, can be funded at a total estimated cost of Rs. 289.00 crores.

(2) Translational Research Projects

The objective of this component is to translate the already identified leads into products and processes in the area of human healthcare, through coordination among the agencies involved in basic, clinical and operational research for use in the public health system. It is proposed to take up 75 leads already available with ICMR, 25 leads from Extramural projects funded by ICMR and 15 leads from other Science & Technology Departments/Organisations. Total No. of 115 projects with a duration of 1-4 years and cost range of Rs.3-10 crores can be funded with a total estimated cost of Rs. 510 crores during the 12th Plan period.

(3) Inter-sectoral Co-ordination Including Funding of Joint Projects

The Objective of this component is to promote joint/collaborative research projects with other agencies involved in bio-medical/health research in the country for optimum use of resources and transfer of knowledge. Total number of 181 projects with a cost range of Rs. 50 lakh-10 crore and duration of 2-3 years per project can be funded under this component, at a total estimated cost of Rs.298 crores

(4) Cost effectiveness analysis of health technologies through a health technology assessment system

The aim of the studies would be to come up with appropriate recommendations and guidelines on cost effective but viable technology/process/diagnostics for managing various diseases, to facilitate public choice and controlling health care costs, while maximizing

health outcomes. 171 projects with a cost range of Rs.50 lakh to Rs.2 crores and duration of 1-3 years can be funded under this component at a total estimated cost of Rs.136 crores.

(5) Support to ICMR and non-ICMR scientists for participation in conferences abroad in identified priority areas of the Department and conduct of national & international seminars & conferences.

The component is intended to provide financial support for taking part in international conferences/seminars/symposia etc. The activity of organizing international conferences/ seminars/symposia to share experiences on health research issues is also proposed under this component. Non-ICMR scientists would mainly cover the faculty of the medical colleges. Total estimated cost of this component is Rs.6.00 crores.

STATUS OF IMPLEMENTATION

Year-2013-14		
Component of the Scheme	**No. of Projects Sanctioned**	**Funds released (Rs. in Crore)**
Research Studies with emphasis on Public Health	40	4.95

Year 2014-15		
Component of the Scheme	**No. of Projects Sanctioned**	**Funds released (Rs. in Crore)**
Research Studies with emphasis on Public Health	66	15.43
Translation Research	6	0.40
Intersectoral Co-ordination	5	0.71
Cost effectiveness analysis of health technologies through a health technology assessment system	9	5.29
Total	**86**	**21.83**

In addition to above, concept research proposals from eligible Institutions/Individuals were invited against a "**Call for Proposals under GIA Scheme**" through DHR online web portal. Total 451 research proposals were received against this advertisement. The Screening Committee has recommended 149 concept research proposals to be developed into full length proposals for online submission. Till date, 79 full length research proposals have been received which are under review process.

Scheme for Human Resources Development for Health Research

The scheme for **Human Resource Development for Health Research** (HRD) is intended to create a pool of talented health research personnel in the country by upgrading skills of faculty of medical colleges, mid- career scientists, medical students etc by specialized training in priority areas of health research in leading national and international institutions. Financial assistance to institutions for up- gradation of infrastructure to enable such institutions to provide training with state of the art technologies and development and implementation of online web based courses on health research is also an important component of the scheme. The scheme also has a separate component specifically for training of women scientists who have had a break in their career and for encouragement of Non-resident Indians (NRIs), Persons of Indian Origin (PIO) and Overseas Citizen of India (OCI) serving abroad in health research activities, to come back to India for undertaking research in identified areas.

2. Total approved cost of the scheme is Rs 597 crores for the 12th Plan period, involving award of 2585 fellowships and development of 1694 research projects by the trainees.

PRIORITY AREAS OF RESEARCH	
Toxicology	Quality Control (QC) and Quality Assurance (QA)
Genomics	Modern biology
Proteomics	Biotechnology
Geriatrics	Genetics
Stem cell research	Drugs chemistry
Clinical trials	Operational research
Good clinical practices (GCP)	Health informatics
Good laboratory Practices (GLP)	Medical ethics
Disease modeling	Health economics
Environmental health	Mental health/clinical psychology
Any other area recommended by the committee as per National Health Policy/ National Health Goals	

BENEFICIARIES:

- Regular employees of Govt. Medical colleges/ Institutions
- Private Institution/ NGOs (Registered with the DSIR, Govt. of India) as research institutions.
- Individual scientists in regular employment in the Universities, medical colleges, postgraduate institutions, recognized research and development laboratories and NGOs.
- Scientific/Professional Bodies & Associations.

COMPONENTS OF THE SCHEME

(1) Support to Institutions for imparting training of the Fellows:

Support to 50 selected domestic institutions for providing training to candidates selected by the Department under this scheme in specially designed programmes/ identified priority areas. Such identified institutes will be given one time grant upto Rs. 50 lakh for gap filling/ up gradation of facilities and up to Rs. 10 lakh per year for five years to meet the expenses on equipments, consumables, etc.

(2) Short Term Fellowships

i. Short term training (1-3 months) in Indian institutions to the researchers employed as regular faculty (not above the age of 55 years)

ii. Short term fellowships for training abroad in identified areas (1-3 months) to persons employed as regular faculty (not above the age of 55 years).

iii. Short term specialized training (1-3 months) to mid-career or senior level faculty of medical colleges working/involved with three other approved schemes of DHR.

(3) Long Term Fellowships

i. Long term training fellowships (6 to 12 months) at Indian Institutions to persons employed as regular faculty, not above the age of 45 years.

ii. Long term fellowships for training abroad in identified priority areas (6 to 12 months) to persons employed as regular faculty, not above the age of 45 years.

iii. Long term training (6-12 months) to the faculties of medical colleges in Indian institutes (at least 2 persons per medical college per year) working/involved with three other approved schemes of DHR.

(4) Fellowship programme specifically for women

This fellowship is for women candidates who have had a break in their career to bring them into the mainstream of health research.

(5) Fellowship programme for young scientists in newer areas

This programme aims to fulfill the objective of creation of inclination / attitude of research among young bright students from the medical colleges / universities.

(6) Start-up Grant for projects

Start-up grants, with an average cost of Rs. 30 lakh per research project, for three years, will be considered for each fellow /trainee, who has developed a research project.

(7) Strengthening of research through the establishment of online courses and web portal on health research for students, faculty and other researchers

This programme will help prospective institutions and individuals to access resources- both financial and technical on research and promote research across the country. This facility will include the following facilities:

- Online courses along with contact programmes in relevant institutions
- Online resource material for researchers

- Online mentoring for researchers
- Interactive forums and e groups for researchers

(8) Support to Scientific/Professionals/Association/Bodies

Support will be provided to Scientific /Professionals/ Associations/Bodies engaged in the fields of medicine, surgery, microbiology, pathology etc. for undertaking various activities/ events with a view to promote higher standards in medical/health research and for devising guidelines for policy making and prevention and management of different diseases.

(9) Programme to encourage health research personnel [Non-resident Indians (NRIs), Persons of Indian Origin (PIOs), Overseas Citizens of India (OCI)] serving abroad, to come back to India for undertaking research in identified areas

This initiative aims to bring back and attract Indian scientists working abroad to pursue medical/health research in India. There is provision to support brilliant medical doctors/ scientists of Indian origin from all over the world who wish to return to India, to take up research positions in the ICMR or other medical college/institute of their choice to pursue their research objective.

STATUS OF IMPLEMENTATION:

Year -2013-14:

Fellowships:

S.No.	Types of Fellowships	No. of fellows	Sanctioned Amount (Rs. in lakhs)
1.	Long Term in Foreign Institutes	4	69.5
2.	Long Term in Indian Institutions	3	16.5
3	Short Term in Indian Institutions	3	4.6
Total		**10**	**90.60**

Support to Institutes:

S.No.	Name of the Institute	Area	Non-recurring (equipment etc (Rs.in lakhs)	Recurring @ Rs.10.00 lakhs per year	Total first year Sanctioned Amount (Rs.in lakhs)
1.	J. N. Medical College, Belgaum	GLP	Nil	10.00	10.00
2.	JSS College of Pharmacy, Mysore	Drug Chemistry	19.0	10.00	29.00
3.	Manipal College of Nursing, Manipal	Geriatrics	8.10	10.00	18.10
Total:					**57.10**

Year : 2014-15

Fellowships

Type of Fellowships	No. of fellows	Sanctioned Amount (Rs in lakhs)
Short Term Fellowships in Foreign Institutes	14	102.00
Long Term Fellowships in Foreign Institutes	6	116.00
Long Term Fellowships in Indian Institutes	1	1.90
Short Term Fellowships in Indian Institutes	3	4.40
Total amount sanctioned		**224.30**

(ii) Support to 5 Institutes

	Name of the Institute	Area	Sanctioned Amount (Rs in lakhs)
1.	National Institute of Virology, Pune	Modern Biology	10.0
2.	National Institute for Research in Reproductive Health, Mumbai	Genetics	10.0
3.	All India Institute of Medical Sciences, New Delhi	Operational Research	16.0
4.	Post Graduate Institute of Medical Education and Research, Chandigarh	Environmental health	57.10
5.	Nootan Pharmacy College, Visnagar, Gujarat	Quality Control & Quality Assurance	27.75
Total amount sanctioned			**120.85**

3. During 2014-15, applications were invited twice in the months of August and December, 2014 for Long & Short Term Fellowships in Indian and Foreign Institutes, support to Women researchers who had a break in their career, young scientists in newer areas of research, Fellowship to NRI/PIO health researchers to return back to India, besides support to Indian institutes. Over 300 applications were received. These applications are under the process of selection and approval.

Knowledge Management Policy

Knowledge Management (KM) envisages capturing, creating, sharing and managing knowledge. KM comprises of three components (i) People who create, share and use knowledge as part of their daily work and help shape a knowledge sharing organizational culture (ii) Processes which include methods to acquire, create, organize, share and transfer knowledge to fit different situations and (iii) The technology including the mechanisms to store and provide access to data, information, and knowledge that must be integrated with the way people work, and address their real needs.

The implementation of any KM policy in Health sector will have essential ingredients and processes for improving the health of people by imparting benefits of various health programmmes to the targeted communities and improving the quality of education and research which will lead to evidence based policy. However, KM in health sector faces three major challenges:

Unsatisfactory quality of data

With good quality data better policies can be framed, better decisions can be made thus improving the implementation of Health care programmes and quality of medical research.

Non-availability of data for knowledge generation

Most of the data being captured may not be available in a suitable form for creating databases. Availability of digitized data in unified format helps in improving data quality and developing standards for knowledge generation.

Inadequate dissemination of knowledge

There is a serious unavailability of information and knowledge to end-users which include health professionals, researchers, patients and students. Dissemination of quality information and knowledge through agencies like DAVP and appropriate media such as Internet, Information Kiosks etc. can provide relevant information to the end-users.

Health professional should take advantage of the data, experience, and expertise available in their own and other organizations to create and share their own knowledge with others.

The policy would catalyze creation of knowledge and translation of that knowledge from research setting to real world application in order to improve the health of common man specially marginalized sector of our society.

The focus of this policy would be creating an environment for connecting knowledge related activities in health into a coherent action plan.

Mission

To develop an efficient Health Knowledge Management System for collection, dissemination and utilization of knowledge for improving the quality of Health Services, Education and Research.

Service delivery

In order to create harmony among various health service providers and to impart their knowledge and services to the public at all times, the following essential components are proposed:

Empowering end user for better access to Health Service by:

1. Making available updated information about the service infrastructure such as manpower, equipment, medicines, *etc*. available at different levels *e.g*. sub-centre, Primary Health Centre, Community Health Centre, District Hospital, Zonal Hospital, medical college and other tertiary care hospital, *etc*.
2. Providing online information about functional status of the infrastructure *i.e*. availability of doctors, medical supplies including devices, vacant beds, surgical/ medical/ diagnostic facilities *etc*. at a given time.
3. Providing information about geographical locations and other logistics of various health service providers.
4. Promoting overall user awareness about available information sources by training of end users.
5. Promoting access to financial resources including insurance.
6. Ensuring access to all sections of society.

Enriching health professionals with knowledge about available resources around them by standardizing and linking functional, infrastructural and logistic information available with different health care service providers in Government and private sectors.

Increasing accountability of health care professionals and services towards human life by:

1. Developing a well defined referral system for efficient utilization of resources between central, state and other public/private health care providing institutes.
2. Creating a mandatory forward and back referral pathway over a period of 5-10 years. Responsibilities of every individual in the pathway to be enforced to ensure perfect accountability involving human life.

Connecting remote areas and difficult terrains by effective use of telemedicine:

Expert opinions of specialists need to be ensured on a structured fixed time interval basis as well as on emergency basis. The existing satellite connections and the optical-fibre-based National Knowledge Network (NKN) would be valuable in this context.

Efficiently handling health aspects of disasters by using Data Mining and Business intelligence tools on available data for finding information quickly about available resources around disaster site and mobilizing these resources.

Establishing a user friendly but informative electronic medical record system:

This record system should be in a standardized, internationally compatible format.

Education

In order to improve the quality of medical education uniformly across the country with help of knowledge network, following policy guidelines are proposed:

Sharing knowledge by

1. Establishing an efficient physical network, connecting all medical/dental / nursing/other health related professional colleges
2. Creating tele-education portal to house resources which can be accessed online.
3. Creating and networking digital/ resources libraries for educational materials such as lectures, slides, video clippings, *etc.* which can be accessed online as well as offline.
4. Organizing prescheduled interactive lectures and practical sessions by prominent teachers through tele-education national and international networks.
5. Developing unified high quality standards in health education across the country
6. Updating knowledge of health professionals by conducting online continued medical education/ special training programmes.
7. Evaluating quality of in-service health personnel by conducting online examinations.
8. Training in-service health personnel by organizing localized interactive training courses.
9. Enforcing regulations for tele-education applications by following existing guidelines of regulatory bodies like Medical Council of India, Medical Universities, Dental Council of India, Nursing Council, Pharmacy Council, various councils for alternate medical systems, other relevant bodies for physiotherapy and other disciplines.

Research

Knowledge is both a key input for and output of health research. For increasing use of knowledge in medical research- both clinical and basic research, following measures are proposed:

- **Creating information culture** by adopting recent advances in information and Communication Technologies. Improving interaction between national and international researcher and stakeholders working in different subject areas by developing collaborative networks and alliances
- **Creating an information system** and a policy framework to facilitate Indian medical researcher abroad to return and join Indian medical research institutions.
- Enhancing research to policy through **collaborations and exchange of information** between researchers and health professional ; between researchers and other stake holders involved in policy making (political leadership, planners and civil servants etc)
- Enhancing **public-private partnership (ppp)** in health. Preparing national information system of research funding by different funding agencies.

- **Developing database of research resources** such as manpower, equipment, *etc.* available with different laboratories/ medical/ dental colleges/ universities, *etc.*
- **Developing disease database** including clinical, epidemiological, genetic, biological and social parameters.

Achieving high impact of research by effectively communicating research outcomes:

1. Balancing between responsibility to share information for betterment of health of people and protecting intellectual property generated through research.
2. Empowering health research institutions to use tools of Knowledge Management for improving quality research as per the guidelines of Medical Council/ Dental Council of India.
3. Providing access to research data to other scientists and students for secondary analysis by taking care of ethical, copyright and IPR issues. Managing research priorities based on periodical in-depth analysis of existing research data.
4. Creating a National Health Knowledge Repository for free access to all researchers.
5. Encouraging the use of knowledge management for creation of different application groups and development of various disciplines like biomedical engineering.

Strategy for implementing knowledge Management Policy:

Broad strategy for implementing knowledge management policy for health is as under:

1. There will be three important components/ tiers: policy framing, strategy planning and monitoring.
2. An expert advisory group should be constituted under the chairmanship of the Secretary, Department of Health Research with following mandate:
   (a) examine the policy document and modify it if necessary
   (b) decide the priority areas
   (c) classify the priority areas into short term, midterm and long term goals for implementation
3. Three technical sub committees will be constituted in the areas Service Delivery, Education and Research to manage knowledge network for help with following mandate:
   (a) carry out feasibility study/ studies, pilot study/ studies, model projects and preparing proposal
   (b) define parameters to be included in feasibility study
   (c) create liaison between the study group and other stakeholders of the proposed
   (d) Knowledge network to facilitate preparation of feasibility report
   (e) examine the feasibility study report and present it to the Secretary, Department of Health Research
   (f) devise a strategy for implementation along with other stake holders
   (g) To monitor implementation of work

Funding of the different components of knowledge Management Network:

(i) The Responsibility of different stakeholders in providing infrastructure, manpower and other resources needs to be defined by consultative process among centre, state, other public and private stakeholders.

(ii) While the network connectivity may be provided by Central Systems, department of information technology, UGC etc, the local supplementary support could be provided by State systems.

(iii) A dedicated system will be required for keeping it functional all the time. For this IT connectivity will have to be ensured along with funds allocated for this purpose.

(iv) A strategic plan for providing financial support for development of modules, appropriate software, professionals for data analysis on specific areas, mechanisms of review will have to be drawn for estimating the financial inputs.

Establishment of an Appropriate Authority:

For developing and implementing a comprehensive plan for utilization of knowledge network for health service delivery, medical education and research, an appropriate Authority under the Department of Health Research in the Ministry of Health and Family Welfare, Govt. of India may be desirable. Such an authority with committed resources will be responsible for strategic planning, implementation and review of the progress from time to time. This Authority / Cell may establish units in the states for action at the local level.

Achievements

Action has been initiated for setting up of necessary infrastructure for its implementation. First workshop to develop a pathway to implement KMP was held at Dr. R.P. Govt. Medical College, Tanda (HP) on 28th December, 2013. Besides creating a framework, a number of concept proposals to undertake model projects to implement KMP were discussed and several were selected for developing full proposals.

As a follow up of the workshop, 10 proposals were received at ICMR which would serve as model projects to begin with. All the proposals were reviewed on 25.7.2014 at ICMR & 5 were recommended to be initiated.

List for brainstorming on the model projects under Knowledge Management Policy

S.N.	TITLE OF THE PROJECT	DETAILS OF PI	RECOMMENDATIONS
1	School Based Surveillance of Acute Pharyngitis and Rheumatic Fever, RHD Among School Children Using Mobile Phone Based Reporting System; Prospective Randomized Cluster Intervention Trial.	Dr. P.C.Negi Prof. & Head Cardiology IGMC, Shimla, HP Duration: 2 Years	Recommended
2	Application of Information Technology In Primary Health Care At Rural Health Centre, Pohir, Field Practice Area of Department of Community Medicine, DMC&H Ludhiana (Punjab)	Dr. Anurag Chaudhary, Professor & Head, Community Medicine, Dayanand Medical College & Hospital, Old Campus, Civil Lines, Ludhiana, Punjab Duration:2 Years	Not Recommended

3	To evaluate the Role of Telemedicine In Diagnosis of Retinal Diseases In Tribal Population of Keylong, Lahaul & Spiti of Himachal Pradesh Using Fundus Photography	Dr. Gaurav Sharma,Assistant Professor, Department of ophthalmology, Dr R.P.G.M.C. Kangra, Himachal Pradesh Duration:2 Years	Recommended
4	To Study The Pattern of Health Problems And Medicine Utilization Using Mobile Phone In District Kangra of HP	Dr. Parveen Kumar Sharma, Assoc. Professor, Department of Pharmacology, Dr. R.P. Government Medical College, Kangra at Tanda (HP) Duration: 2 Years	Not Recommended
5	Geriatric Friendly Clinic :Primary Health Care - An Age-Friendly Approach	Dr. Rakesh Kakkar, Professor Department of Community Medicine, HIMS, Dehradun, Duration: 2 Years	Recommended
6	To make a Database of Local Population on Adverse Events After Immunization In Children	Dr Anil Kumar Rawat, Associate Professor, HIMS, Dehradun Duration: 1 Year	Not Recommended
7	Impact of 24-Hour ACS Helpline on the Thrombolytic Rate In Acute Coronary Syndrome In Kangra District: A Cluster Controlled Trial	Dr. Vivek Chauhan, Assistant Professor, Department of Community Medicine, Dr. RPGMC, Tanda. Duration: 1.5 Years	Recommended
8	Effect of Standard E-Management Guidelines to Improve Treatment Compliance Among Patients With Type-2 Diabetes Mellitus of Urban, Rural And Tribal Area of HP	Dr. Dinesh Kumar, Assistant Professor, Department of Community Medicine,Dr. RPGMC, Kangra at Tanda, HP Duration: 3 Years	Recommended
9	Social Media, Peer Group Network(PGN) Usage For Raising Awareness of Breast Cancer And Utilization of Knowledge In Adolescents And Young Adults (Aya) For Community Demand Generation For Screening	Dr. Sonia Puri, Associate Prof Deptt of Community Medicine GMCH-32, Chandigarh Duration: 2 Years	Not Recommended
10	Monitoring of Indicators Reflecting Hand Hygiene Compliance And Evaluation of Health-Care Workers Knowledge And Perception of Health Care-Associated Infections.	Dr. Sandeep Dogra, Assistant Professor, Dept. of Microbiology, Govt. Medical College, Jammu Duration: 1 Year	Not Recommended

National Health Research Policy

The establishment of Department of Health Research (DHR) in the Ministry of Health is a recognition by the GOI of the key role that health research should play in the nation. The weakness of the publically funded health structures and the research infrastructure is a key limiting factor in realizing the full benefits of this commitment to research. The fact that the almost 300 medical colleges in the country are not contributing of their best to health research is highlighted by the fact that in 2007, 96% of the research publications in India emanated from 9 medical colleges. Much of this published research is not on priority health concerns and the translation of key research findings into policy, which could improve the health of the people, is very limited and needs to be enhanced. Epidemiological know-how, surveillance technology and diagnostic services which are essential for determining health priorities are very poorly developed. There is also a compelling need to build multidisciplinary research blending physical, medical and social sciences. Besides, there is also an equal urgency to establish regulations, strict ethical norms and transparency, standardize methodology and international standards of research. Such capacity is necessary for undertaking operational research as also large-scale evaluation of diagnostics and trials of drugs, devices of both modern and traditional systems of medicine. It is in this context that the DHR has formulated a draft National Health Research Policy.

Vision of National Health Research Policy:

To maximize the returns on investments in health research through creation of a health research system to prioritize, coordinate, facilitate conduct of effective and ethical health research and its translation into products, policies and programmes aimed at improving health especially of the vulnerable populations.

Objectives of the National Health Research Policy:

The broad objectives of the National Health Research Policy are:

(i) Identify priorities for effective and ethical health research to enable the achievement of the objectives of National Health Policy (NHP 2002), NRHM, Bharat Nirman and National Food Security Act as well as global commitments such as Millennium Development Goals (MDG) and International Health Regulations (IHR), ensuring that the results of health research are translated into action.

(ii) Foster inter-sectoral coordination in health research including all departments within the Government, Private Sector and the Academia to promote innovation and ensure effective translation to encourage/ accelerate indigenous production of diagnostics, vaccines, therapeutics, medical devices etc.

(iii) Focus on the marginalized, the vulnerable and the disadvantaged sections of society.

(iv) Strengthen national networks between research institutes, academia and service

institutes, and encourage PPP.

(v) Put in place strategies and mechanisms for assessing the cost-effectiveness and cost benefits of interventions for health.

(vi) Develop and manage human resources and infrastructure for health research and ensure that international collaborative research contributes to national health.

Prescription of the NHRP:

1. Create a National Health Research System
2. Establish a National Health Research Management Forum
3. Operationalize a 10-point action programme

National Health Research System (NHRS):

In order to achieve inter-sectoral coordination and to make national priorities for health research, a new architecture of national health research system is envisaged. Health research system is a concept that integrates and coordinates the objectives, structures, stakeholders, processes, cultures and outcomes of health research towards development of equity in health and in national health system. It is a system for planning, coordinating, monitoring and managing health research resources and activities, and for promoting research for effective and equitable National Health Development. Health Research in the country would be developed into a National Health Research System (NHRS) wherein all research agencies, cutting across Ministries and sectors, identify priority areas of research and coordinate with each other to avoid duplication, fragmentation, redundancy and gaps in knowledge, in order to enable the results of research to transform health as a major driving force for development.

Goals of the NHRS:

1 To generate and communicate knowledge that helps to form the National Health Plan and guide its implementation, and thus contribute, directly or indirectly, to equitable health development in the country;

2. Adapt and apply knowledge generated elsewhere to national health development; and

3. Contribute to the global knowledge based on issues relevant to the Country.

Functions of NHRS:

The National Health Research System would be responsible for:

1. Developing National Health Research Plan

The DHR is responsible for the National Health Research Plan aligned with the Five Year Plans of GOI and its implementation and monitoring.

2. Set priorities

A Priority Research Agenda will be developed in tune with the National Programmes, and relevant to national and local needs.

3. Engage with Private Sector

The private sector, pharmaceutical industry, biotechnology and biomedical technology oriented industries, private educational institutions, hospitals and nursing homes, research

foundations and institutions, private practitioners, NGO's and CBO's working on a not-for-profit basis etc. are now major stake holders in health care research and delivery. The National Health Research System would recognize their important role in health research and shall foster their participation in the system as partners. These engagements have to be concurrent and intense rather than linear and loose.

4. Strengthen International Linkages:

In the current global scenario international collaborative efforts are recognized as one of the factors in successful research because of the complimentarity of technology transfer, capacity building and access to diseased populations. There are a large number of potential partners and in the choice of partners the priorities of the National Health Research Plan and national interest shall be paramount. Linkages with International Developmental partners and WHO and other UN Agencies shall be further developed and strengthened to ensure that India plays a legitimate role as an emerging economy.

5. Ensure Ethical Research

The Bill on Research on Human Subjects and establishment of the National Biomedical Research Authority therein along with the guidelines developed by other agencies shall regulate all research. The Health Research System shall review these Guidelines from time to time, and harmonize them with International Guidelines. Facilitation of training in ethical research shall be the responsibility of the DHR. A major achievement has been the establishment of a National Clinical Trial Registry and all clinical trials are mandated to be registered by the DCGI.

6. Ensure Targeted Financing:

The National Health Research System shall be responsible for ensuring equity in resource mobilization and allocation of public funds. It shall endeavor to ensure that the allocation/ expenditure on health research is at least 2% of the allocation / expenditure on health. International funds will also be mobilized in keeping with the priorities. The NHRS would track the resources available and spent on research in the country and monitor its impact on health. Though a minimum of 2% of health expenditure has been achieved, this may be too small a figure considering that the allocation for health itself is meager in relation to the population and health concerns of the country.

7. Monitor and Evaluate impact of health research:

To ensure that resources are used efficiently and in line with agreed priorities, there is a need for continuous monitoring and evaluation. The health research system will develop explicit policies and procedures for reviewing proposals, and for monitoring and evaluating the output and impact of those that are funded. Indicators will be developed to monitor the development and effectiveness of the health research system. Indicators would also be defined for assessing health status, health system effectiveness, efficiency and affordability, in order to capture the contribution of research in reducing inequities. Direct indicators of National Development, would serve as indirect indicators of the efficacy of Health System Research as a vehicle of development. Set mechanisms to ensure that best practices are encouraged, and practices are evidence based.

8. Partnership with State Health System:

Encourage health research within State's help. Set state level health research system by strengthening partnership between central and state systems.

Assess Health Research System:

The health research system would need to be assessed periodically to provide evidence that it is functioning optimally.

The **NHRS** shall be managed by a National Health Research Management Forum (**NHRMF**).

The National Health Research Management Forum (NHRMF)

The National Health Research Policy envisages a System wherein all present and prospective players have their own space. However, an overarching National Health Research Management Forum is proposed, having representation of all key stakeholders, the DHR as its Secretariat, and the following functions / terms of reference:

i) To advise on and evolve national health research policies and priorities and evolve mechanisms and action plans for their implementation;

ii) develop a 5 year projection of the plans for health research and prepare an annual National health research plan;

iii) do a mid-Plan appraisal for course correction, as needed

iv) promote the development of health research activities in the country;

v) review biomedical & health research management, and suggest strategies to overcome problems in implementation of policies;

vi) suggest mechanisms to nurture a scientific environment to attract talent and develop human resources for biomedical and health research; and

vii) facilitate utilization and dissemination of research results and advocacy for health research.

Structure of NHRMF

The NHRMF will be Chaired by the Minister of Health & Family Welfare and co-chaired by Minister of Science & Technology. The Minister(s) of State for Health would be the Vice-chairperson(s). The Secretariat shall be in the DHR and its Secretary shall be the Member-Secretary. All Secretaries of various departments in S&T would be the members, DGHS and 8-10 eminent scientists/ public health experts (numbers flexible) as well as selected representatives from State Governments would be the other members. These experts would also be the Chairmen of the various working groups which would be constituted to address the following areas:

1. Development and Evaluation of interventions for promotion, restoration, maintenance and protection of health.
2. Human resource management and infrastructure development
3. Knowledge management
4. Encouragement to translational research and originality in basic science research, and innovations
5. Optimizing intra- and inter-sectoral networks, coordination and collaboration especially with private sector and industry.

6. Track current resource flow and future requirements to address priority areas of health research.
7. Establishment of priorities for health research.
8. Implementation of health research policy, planning, monitoring and evaluation.

Responsibilities of NHRMF

Stewardship

This would encompass a range of activities for the national health system intended to ensure quality leadership, productivity, strategic direction and coherent action. Sub-functions would include Strategic Vision, Policy Formulation, Priority Setting, Performance and Impact Assessment, Promotion and Advocacy, and the setting of norms, standards and frameworks for the sound practice of research. The aim is to provide best practices for research management.

Financing

The essential functions of the System as regards finances would be to address issues related to resource generation, targeted allocation and judicious utilisation. On the basis of recommendations of the National Health Research Management Forum, funds would be allocated in ways that are consistent with national priorities. External Partners would be apprised of these priorities, while a national capability to monitor where and how research funds are being spent, and the quantities involved, would be created and put in place. Ensure that funds are spent where the burden of disease is. Efforts would be made to invest at least 2% of national health expenditure in research and research capacity strengthening.

Knowledge Generation

The research system would generate knowledge relevant to the Indian health situation, appraise the measures available for dealing with health problems, and suggest the actions likely to produce the greatest improvement in health.

Utilization and Management of Knowledge

The Research System fully endorses the principle that the research process does not end with Knowledge Generation, but includes the translation of results into policy or action, or absorption into the existing knowledge / technology base. For this to happen, links will be strengthened between researchers, policy makers, health and development workers, non-governmental organizations, communities, and media. Vertical and horizontal connectedness will be improved upon. More specifically, for better utilization and management of knowledge, an information culture would be fostered, supported by enhanced use of information technologies currently and likely to be available. A synergy with Knowledge Management Policy would be made.

Capacity Development

A long-term approach to the development and maintenance of research capacity will be adopted. Efforts will be focused on both the quantity and quality of skills available / needed, including research techniques, research priority setting, research management, use of research ('demand' side), policy and systems analysis, communications, development of partnerships including medical colleges and rural health research centres. A situation analysis done periodically would ensure a phased and realistic plan for constructive and sustained capacity development. Thus, both the 'Supply' and 'Demand' sides of the research

system needs will be addressed. It will encourage policy research.

The 10-point Action Programme -

1. Harmonize optimally National policies in a variety of areas (education, social sciences, population, agriculture, nutrition, science, *etc*) to facilitate inter-sectoral collaboration and partnership, so that maximum developmental returns can occur from health research.
2. Ensure true inter-sectorality of health research and harness the resources in areas such as social sciences, economics and traditional systems of medicine.
3. Facilitate priority setting to guide the direction of health research and prepare Five-year Plan and strategy documents
4. Encourage the development of fundamental and basic research in areas relevant to health to ensure that a national critical mass of scientists who can contribute towards the benefits of modern technology to health research is created.
5. Foster translational research to ensure that the products of basic research can be appropriately utilized in health systems and services.
6. Establish linkages between health research and national health programmes to identify key operational issues and facilitate the operationalization of evidence based programmes and to obtain feedback for the optimization of health research
7. Build and integrate capacity for research in National Health Programmes, research institutions and in the private sector (profit and non-profit organizations) both in rural and urban research settings utilizing as far as possible areas of excellence already available in the country.
8. Ensure that the global knowledge base is available for national programmes, and that research is channeled in relevant directions without unnecessary duplication by the optimal use of information, communication and networking technology.
9. Manage global resources and transnational collaborations optimally to ensure that collaborative health research primarily facilitates the development of national health systems and services.
10. Generate the evidence-base for health systems and services, to be significant promoters of equity and contribute to national development so that health research becomes a poverty reduction tool.

Achievement

The Policy is under the consideration of the Government for approval. Action has been initiated for setting up of necessary infrastructure for implementation.

Mapping of Health Research Institutes

During the year under report, The Directory of Health Research Institutions, supported by the WHO is being updated. This data base contains more than 800 Health Research Institution from India. The institutions belong to ICMR, CSIR, DST, DRDO, DSIR, Department of Biotechnology, Ministry of Health & Family Welfare, Department of AYUSH, Department of Pharmaceuticals, Ministry of Social Justice & Empowerment, and Medical Colleges with active research, NGOs and Private Organizations. A CD with "user friendly software" is available for users. The database can be searched on the DHR web site (http://202.141.106.123/httpdocs/DHRI/DHRIDefault.aspx).

Updation and analysis of the Database of Research Papers published by ICMR institutes in Scholarly Journals with Value addition has been completed for all the institutes/RMRCs till 2010 and as part of ICMR centenary celebrations a "Compendium of ICMR Research Papers (1919-2010)- A consolidation" have been published. Along with this two more publications namely "ICMR's Most Cited Research Papers: A Chronicle (1950-2010)" and "Citation Classics of ICMR's research Papers (1950-2010) –Five Most Cited Papers in Priority Area of the Council" have been brought out. The PDFs of the documents can be accessed on ICMR website http://icmr.nic. in/Publications/centenary books/compendium/index.htm,

http://icmr.nic.in/Publications/centenary_books/Most%20Cited%20Research%20Papers/ index.htm, "http://icmr.nic.in/Publications/centenary_books/citations_classic/index.htm. respectively.

Accreditation of Health Research Institutes

The DHR has been given the mandate of developing guidelines for accreditation of Health Research Institutes. The institutions engaged in research activities related to basic, applied, epidemiological and translational research may get recognition under this scheme. Two meetings with experts have been held and the draft guidelines and format for application form developed.

Achievement

Guidelines for application and its processing as well as criteria for accreditation / recognition as Health Research Institute have been finalized. Approval of the competent authority has been accorded and process initiated for actual implementation for accreditation / recognition of Health Research Institutions. An advertisement has been placed on the ICMR and DHR websites to invite the applications from the concerned organizations seeking recognition. This provision of granting recognition and inviting applications will be available throughout the year. So far 12 applications have been received for granting recognition and reviewed. The subcommittee has recommended 5 applications.

Implementation of the Schemes in the North Eastern Region

1.1 Department of Health Research does not have any provision for State-wise budget allocation for the various schemes/programmes. However, the Department is taking due care and also taking pro-active steps to ensure sanctioning of proposals in the North Eastern Region under the following five schemes rolled out for implementation since 2013-14:

1) Establishment of Multi-disciplinary Research Units (MRUs) in Govt. Medical Colleges

2) Establishment of Model Rural Health Research Units (MRHRUs) in the States.

3) Establishment of Network of Research Laboratories for Managing Epidemics and Natural Calamities.

(4) Scheme for Human Resources Development for Health Research

(5) Grant-in-Aid Scheme for Inter -Sectoral Convergence & Coordination for Promotion and Guidance on Health Research

1.2 Scheme-wise position of implementation of the above schemes in NE states:

(1) Multidisciplinary Research Units (MRUs) in Govt. Medical Colleges:

S. No.	Name of the State	Name of the medical college sanctioned the MRU	Funds released (Rs. in lakhs)	
			2013-14	2014-15 (Upto January, 2015)
1	Assam	Silcher Medical College and Hospital, Silcher	125.00	-
		Fakhruddin Ali Ahmed Medical College, Barpeta	-	Release of grant in aid under process.
2.	Manipur	Regional Institute of Medical Sciences, Imphal	125.00	-
3.	Tripura	Agartala Govt. Medical College, Agartala	125.00	-

1.3 There are 10 medical colleges in the NE States. Efforts will be made to cover few more medical colleges under the scheme during the 12th Plan period.

(2) Model Rural Health Research Units (MRHRU):

Status of Implementation of the scheme in NE States:

2.1 MRHRUs have been sanctioned in the following NE States:

S.No.	State	Location of MRHRU	ICMR mentor Institute/ Centre	Linked Medical College	Funds released (Rs. in lakhs)	
					2013-14	2014-15
1	Assam	PHC Chabua	RMRC, Dibrugarh	Assam Medical College & Hospital, Dibrugarh	150.00	100.00
5.	Tripura	Kherengbar Hospital Khumulwung	RMRC, Dibrugarh	Agartala Government Medical College	150.00	-

(3) Establishment of Network of Research Laboratories for Managing Epidemics and Natural Calamities:

Status of Implementation of the scheme in NE States:

3.1 The Virology Research & Diagnostic Labs (VRDLs) have been approved in the following institutions under the scheme:

S.No.	Name of the State	Name of the medical college sanctioned the VRDL	Funds released (Rs. in lakhs)	
			2013-14	2014-15 (Upto January, 2015)
1	Assam	Regional Medical Research Centre (RMRC), ICMR, Dibrugarh **(Regional Lab)**	631.00	-
		Guwahati Medical College, Guwahati **(State level lab)**	-	297.00
		Silchar Medical College, Silchar **(Medical College level lab)**	Funds will be released after completion of certain codal formalities.	
2.	Manipur	Regional Institute of Medical Sciences, Imphal **(State level lab)**	Funds will be released after completion of certain codal formalities.	
		Jawarhar Lal Nehru Institute of Medical Sciences, Imphal **(Medical College level lab)**	Funds will be released after completion of certain codal formalities.	
3.	Meghalaya	1. North Eastern Indira Gandhi Regional Institute of Health & Medical Sciences (NEIGRIHMS) Shillong, **(State level Lab)**	297.00	-
4.	Tripura	Government Medical College, Agartala **(Medical College level lab)**	Funds will be released after completion of certain codal formalities.	

(4) Scheme For Human Resources Development For Health Research:

Implementation of the scheme in NE States:

No expenditure could be incurred in the NE States during 2014-15, due to non -receipt of any proposal from that region.

(5) Grant-In-Aid Scheme For Inter -Sectoral Convergence & Coordination For Promotion And Guidance On Health Research:

Implementation of the scheme in NE States:

No expenditure incurred in the NE States in 2014-15, due to non -receipt of any proposal from that region.

INDIAN COUNCIL OF MEDICAL RESEARCH

ICMR carries out intramural research through its institutes/centres. Of 32 institutes/centres 17, deal with communicable diseases and coordinated by Division of Epidemiology and Communicable Diseases; 7, with non communicable diseases (NCDs) and are coordinated by Divsion of NCD; 2, deal with diseases related to reproductive and child health (RCH) and are coordinated by Division of RCH; 3, deal with diseases related to nutrition and are coordinated by Division of Nutrition and 3, deal with diseases related to basic medical sciences (BMS) and are coordinated by Division of BMS.

Centre for Research in Medical Entonology(CRME), Madurai

Mission: To develop CRME as the world's best institute in Medical Entomology, particularly in the field of Vector-Borne Diseases

Vision: To provide excellent knowledge on vectors and vector-borne diseases to achieve better health through application of modern tools.

Manpower: Scientist (6), Technical (23), Admn.(11), Total: 40

Budget:

(i) Plan : Rs. 437.01 lakhs
(ii) Projects : Rs.111.00 lakhs

Major projects undertaken during this year:

1. Japanese Encephalitis
2. Lymphatic Filariasis
3. Dengue/Chikungunya
4. Molecular Biology
5. Biomedical Research
6. Outbreak Investigations

Number of the projects on-going with CRME since 2013-2014:

1. Japanese Encephalitis
2. Lymphatic Filariasis
3. Dengue/ Chikungunya
4. Molecular Biology
5. Taxonomy & Biodiversity
6. Biomedical Research
7. Vector Control

Achievements during the year

The monitoring of JE virus activity in Thanjavur district, Tamil Nadu - Study revealed that JE vectors abound with huge bird and pig population exist. The JEV is intensively circulating in nature as evidenced by seroconvesion results in school going children and virus infection in vector mosquitoes, giving rise to support the hypothesis of 'silent transmission' going on in the known non-endemic district.

JE virus transmission dynamics in Tirunelveli zone: Besides the characteristic feature of 'silent transmission', another important trait emerged is the involvement of *Anopheles subpictus* which however needs more investigation.

Major achievements having public health importance

(i) A critical density for the major JE vector *Culex tritaeniorhynchus* was determined to bring about effective exposure to infection.

(ii) A co-relationship was built between the JE incidence and the vector incrimination.

(iii) Role of several new mosquito vectors, including *Culex quinquefasciatus*, *Anopheles subpictus* and *Armigerus subalbatus*, was established in JE transmission.

(iv) Role of newly emerging major vector *Cx. gelidus* on the cost of *Cx. Tritaeniorhynchus* was established, vis-à-vis changed agricultural and socio-ecological characteristics in Vridhachalam distt., TN.

(v) "Silent" JEV transmission was demonstrated in non-endemic Thanjavur and Trinelveli districts, suggesting high seroconversion in the region despite JE vaccination recently.

(vi) A substantive role of vector control in controlling lymphatic filariasis by sustaining the benefits of Mass Drug Administration(MDA) in keeping low the *mf* rate and the infection/infectivity rate in the vector mosquito, *Culex quinquefasciatus*.

(vii) Preponderance of dengue/chikungunya vector, *Aedes albopictus*, is reaffirmed in the Western Ghat tribal areas.

(viii) Two new traps (*AlboTyag* and *DenAedTyag)* for *Aedes albopictus/Aedes aegypti* were developed and are under process of patent application.

(ix) The Indian mosquito taxa were inventorized (now standing at 403) for the first time after the magnum opuses by Christophers (1933) and Barrau (1934) listing close to 300 species then.

(x) Identification books for larval and adult stages of vectors of major mosquito-borne infections in India were prepared and supplied to all institutions engaged in public health programmes.

The silent JEV transmission in this study indicates that there is some shift or alteration is taking place in mode of JEV infection / activity in this area. This longitudinal study reveals vector incrimination with JEV, indicating a possible public health threat in the near future and helps programme people to develop appropriate control strategies to avoid the probabilities of future outbreaks. As of now, no JE surveillance studies have been carried out in this region, and this study is to make an attempt to understand the disease scenario and vector dynamics in relation with weather variables. In Tirunelveli district, the role of *An. subpictus* has to be studied along with other JE vectors.

Assessment of the Added Impact of Vector Control for Augmentation of Mass Drug Administration (MDA) to Eliminate Lymphatic Filariasis in South India - Under the Global Programme for Elimination of Lymphatic Filariasis, mass drug administration (MDA) programme is being implemented in Tamil Nadu by the State Health Department with partial assistance from the Govt. of India. Three rounds of MDA with diethylcarbamazine citrate (DEC) have been completed by March 2000. With the fourth round of MDA carried out in March 2001, albendazole was co-administered with DEC in some districts of Tamil Nadu

state. In the revenue block, Tirukoilur of Villupuram district, Tamil Nadu, so far eight rounds of MDA with the combination of DEC+ALB have been carried out.

Implementation of vector control - As per the project design, a total of 24 villages were selected for vector control (VC). In 12 villages (MDA+EPS arm), the cesspits and unused wells were modified /cleaned and applied with Expanded Polystyrene Beads(EPS). In other 12 villages (MDA+EPS+PIC) deltamethrin impregnated curtains were fixed in all the households of the 12 villages in addition to the application of expanded polystyrene beads in modified cesspits and larvivorous fishes in unused wells, as an integrated vector control strategy. The implementations of vector control in the 24 VC villages were carried out by the village community members with active supervision of selected village volunteers and local public health personnel. The villagers were mobilized with various health education campaigns.

Mainatenance / upkeep of vector control during the post intervention period by-

- Social mobilization of community
- Reapplication of EPS beads
- Introduction of Larvivorous fish (*Gambusia affinis*)
- Distribution of deltamethrin impregnated curtains
- Minor engineering work-on Cesspits & Drains

Community knowledge and perception on Lymphatic Filariases-post survey - Post survey evaluation was carried out to understand the Knowledge, Attitude and Practices (KAP) on lymphatic filariasis disease, its vector bionomics and vector control methods in the study area Tirukoilur. Four cluster of villages selected in each strategy arm viz., MDA alone arm, MDA+EPS arm and MDA+EPS+PIC. In all the three arms, majority (>90%) of the respondents had heard about filariasis disease. The knowledge on mode of transmission was significantly higher in vector control arm than in MDA alone arm.

Three years of vector control demonstrated a significant reduction in the vector density and transmission intensity index, in both the Vector Control(VC) arms, with highest impact observed in (Mass Drug Administration) MDA+EPS (beads)+ PIC (Polypropylene Impregnated Curtains) arm. More duration is required to demonstrate the impact of vector control on human infection. Use of PIC did reduce the vector density significantly, but the process of procurement, impregnation, distribution and usage by the community requires a strong IEC campaign with behavioural change, in addition to considering the cost component.

Future Plans

Projects mentioned below will be undertaken.

Sl. No.	Title of the Research Project	Funding
1	Laboratory screening of various sugar sources for mosquito salivation for application in rapid detection of Japanese encephalitis virus	*IMR/ EMR
2	Screening of molecular markers of drug resistance and genetic diversity of *Plasmodium falciparum* and *P. vivax* populations in Ramnad district	*IMR/ EMR
3	Barcoding of mosquito fauna of public health importance in Tribal area, Tamil Nadu and the creation of a vector DNA sequence data base	*IMR/ EMR
4	Scrub Typhus – an emerging public health problem in the tribal population of Western Ghats regions, Tamil Nadu, India	*IMR/EMR (ICMR TF)
5	Studies on immune response in filariasis vector *Culex quinquefasiatus* ingesting bacteria from the secondary infections of ADL cases	IMR
6	Development of an Improved Surveillance System for Dengue and Chikungunya Control for Tribal villages of Vathalmalai area using Remote Sensing and GIS	EMR-ICMR VSF
7	Climate Changing impacts on vectors of dengue and chikungunya in Western Ghats regions	EMR
8	Monitoring development of insecticide resistance in dengue vectors (*Aedesaegypti*and *Ae. albopictus*) in endemic region in India.	EMR
9	A mobile mosquito control system using web technologies and electromechanical Systems.	EMR / DST
10	A multi populational taxonomic study on *Stegomyia aegypti* (*Aedes aegypti*) (Linnaeus, 1762) in India: relevance to dengue transmission	IMR
11	*Studies on Wolbachia* induced limitation of dengue virus transmission in *Aedes aegypti*	EMR
12	Development of transgenic *Aedes Avwaegypti* mosquito model towards evolving effective novel control strategies of dengue.	*IMR / EMR
13	Prevalence of malaria vectors in a pilgrimage hot centre in Rameswaram, Ramanathapuram, TN, Southern India	ICMR-VCF
14	Laboratory testing of insecticides against vectors of public health importance	IMR
15	Molecular taxonomic treatment to the possible species complex of *Anopheles stephensi* Liston from different physiographic ecosystem (Rajasthan Thar desert, Karnataka rural and Chennai/ Delhi metropolises)	IMR
16	Development of a sewer inspection and cleaning mobile robot-Manipulator system for mosquito breeding control	EMR
17	Ecology of dengue vectors and dengue virus infection in dengue endemic villages in Warangal district, Telangana	EMR
18	Preparation of a monograph on taxonomy and public health importance of mosquito fauna in India	EMR (ICMR TF)
19	Biological control of dengue/ chikungunya vector Aedesaegypti larvae by using *Bradinopygageminata* (Anisoptera: Libellulidae) in limited urban area, Madurai	IMR*/EMR

*when planned for EMR funding with initial IMR funding, then IMR funding generally for one year only.

Grievances / complaints / representations received & disposal details:

Sl. No.	Details of Representation	Representation submitted by	Disposal of representation
1.	Regarding implementation of MACP	Shri S. Jayakumar, UDC vide letter dated 05.09.2013	MACP granted vide this office lr No. CRME/EST/2013/L 332 dated 29th October 2013
2.	Representation regarding promotion to the post of Assistant	Shri S. Jayakumar, UDC vide letter dated 05.09.2013	Promoted to the post of Assistant vide this office lr. No. CRME/EST/2014/L 61 dated 25th April 2014
3.	Representation regarding up gradation under MACP	Shri C. Ponnusamy, UDC	MACP granted vide this office lr No. CRME/EST/2013/L 333 dated 29th October 2013
4.	Filed the court case against CRME/ICMR at CAT, Chennai	Shri V. Murugesan, Attendant (Services)	Disposed of as per the direction of CAT Order dated 1st December 2014

Enterovirus Research Centre (ERC), Mumbai

Mission and vision: Enterovirus Research Centre (ERC) has been involved in detecting transmission chain of wild poliovirus and vaccine derived poliovirus in the country by testing stool specimens from AFP cases and environmental samples. ERC has also undertaken projects on bivalent and trivalent polio vaccines in highly endemic areas in western UP, epidemiological studies on Non-Polio Enteroviruses, outbreak investigations, molecular and immunological studies to understand Enterovirus infections.

In 2012, India was taken off the global list of polio-endemic countries. The most significant achievement of ERC has been in the contribution of India's polio-free certification by WHO in March 2014.

Manpower: Scientist (4), Technical (13), Admn. (13), Supportive (14), Total=44, Project Staff (42) extra

Budget: Non-Plan Rs 239 lakhs, Plan – Rs 124 lakhs, Extramural – Rs 553 lakhs

Major Projects undertaken

Poliomyelitis Surveillance - Stool samples from cases of acute flaccid paralysis from India and neighboring countries (Bangladesh, Sri Lanka and Myanmar) are tested at ERC for the detection of wild poliovirus transmission. Although, India has been declared polio free since March 2013 by WHO, AFP Surveillance still continues to detect importation of wild poliovirus from neighboring polio endemic countries. Poliovirus isolated in other WHO polio laboratory network in India, Bangladesh, Sri Lanka and Myanmar were also received at ERC for further characterization by genomic sequencing and maintaining poliovirus bank.

Year	Total AFP cases tested	Polioviruses positive cases	NPEV cases
2013	4764	117 (2.45%)	1432 (30.06%)
2014	4443	94 (2.11%)	1436 (32.32%)

Detection of vaccine derived polioviruses (VDPV) - During poliovirus surveillance discordant polioviruses are also isolated. Complete VP1 sequencing of discordant isolates was used for molecular characterization to confirm presence of VPDVs. Type 2 VDPVs were isolated

from 2 AFP cases during the period of March to November 2014, out of which 1 case was from Rajasthan and 1 from Gujarat.

Supplementary surveillance for detection of wild poliovirus - In 2014, a total of 117 sewage samples were collected in Mumbai and 56 samples in Patna. No wild poliovirus were detected. A total of 8 poliovirus 2 VDPVs were detected in sewage samples of which 3 were from Mumbai, 2 from Patna and 3 from Delhi. No wild poliovirus circulation was observed during environmental supplementary surveillance in India.

Enterovirus infections in apparently healthy children from AES affected area in Gorakhpur district, Uttar Pradesh - A project on Enterovirus surveillance was undertaken to study the prevalence of HEV infections in healthy children in Gorakhpur, UP. Stool samples from ~5800 healthy children below 5 years collected between September 2013 and August 2014 were screened for the presence of HEV using virus culture method. HEV isolation was observed among 49.6% (2860/5769) children with high susceptibility of children below 3 years (74.3%) as compared to children of higher age group (4-5 years) to HEV infection. A very high prevalence of EV infection was observed throughout the 12 months period with minimum in March 2014 (31.5%) and maximum in July 2014 (71.2%). A total of 82 different Enterovirus types (out of 108 known types) were isolated.

Isolation and identification of a new human enterovirus serotype EV-A121- Human enteroviruses (HEVs) pose serious threats to children with a wide range of clinical conditions ranging from mild symptoms to serious conditions. HEV serotypes are identified by VP1 gene sequencing. HEV serotypes are grouped into four species: HEV-A, -B, -C and –D. Enterovirus surveillance among healthy children below 5 years from Gorakhpur, UP was undertaken between September 2013 - August 2014. A large collection of stool samples (~5800) were analysed for HEV infection. The HEV serotypes were identified by VP1 sequencing. A new HEV was isolated from a 30 months old female child in October 2013 which was designated as EV-A121. The new Enterovirus EV-A121 was accepted by ICTV. This is the first report of identification of a new serotype of human Enterovirus in India.

Genetic Diversity of Enterovirus A71 in India - EV-A71 is the second most important Enterovirus of public health significance after polioviruses causing HFMD, AFP, aseptic meningitis, encephalitis with severe neurological sequel and sometimes death. Outbreaks of EV-A71 caused HFMD have not been reported in India. We isolated EV- A71 from cases of AFP, HFMD and encephalitis reported in Mumbai during the past 5 years and studied their phylogenetic relationships. It was observed that three genogroups of EV-A71 were circulated in India. A new genogroup (G) was discovered during this study. Genogroups D and G were found circulated in wide geographic area. Multiple genogroups of EV-A71 and high sequence divergence within the genogroup D and G reveal that EV-A71 has been spreading across the country for several years. The genogroup D and G appear to be indigenous genogroups in India as these have not been reported in any other country. The two genogroups may be less virulent than other genogroups as they have not caused outbreaks of AFP, HFMD or meningitis/encephalitis.

Role of Toll Like Receptors in Enterovirus infection - The study on poliovirus infection revealed some important findings on the differential activation of innate immune responses to Sabin vaccine type 1 and Wild type 1 Poliovirus in human neuronal cells and muscle cells. The information will help to study signaling pathways for mutated Sabin attenuated strains (Vaccine derived polioviruses) to determine how the vaccine virus infection pathway shifts towards wild type. This may lead to understand attenuation of poliovirus.

Future Plans

Enterovirus Research Centre, Mumbai is ICMR's nodal centre conducting research on Enteroviruses. The Centre plays an important role in the surveillance of human Enteroviruses in India including polioviruses and non-polio Enteroviruses (NPEV). The centre also serves as the WHO Global Specialized Polio Laboratory receiving stool samples and poliovirus isolates from AFP cases from National Polio laboratories for virological investigation.

During the next five years, the following priority activities are proposed

- Studies for identification and mitigation of risks to polio eradication program in India with main emphasis on AFP surveillance (wild poliovirus, VDPV, VAPP), Importation of wild poliovirus, Risk analysis.
- Improvement of supplementary surveillance for poliovirus.
- Completion of Laboratory Containment of wild poliovirus.
- Studies towards developing post polio eradication vaccination policies including Population immunity survey, Introduction of IPV in routine immunization.
- Epidemiology of non-polio Enteroviruses including outbreak investigations, CNS infections, geographical distribution of common Enteroviruses.
- Studies on pathogenesis of Enteroviruses including Virus cell interaction, Enterovirus receptor structure function relationship, cell tropism, Immunological response to Enteroviruses.
- Development of new vaccine and rapid diagnostic tests for Enteroviruses.

Grievances/complaints/representations received by Grievance Committee, Enterovirus Research Centre (ERC), Mumbai& disposal details:

Sr. No	Date of Receipt/ Grievant	Nature of Grievance	Grievance Closing Date	Status	Remarks
1	06/06/2014/ ERC Employees Association	Delay in Re-designation of Technical Staff	-	Decision pending	*13th Oct 2014*: processed and sent to ICMR with directors recommendation, *25th Nov 2014:* objection raised by technical staff regarding anomalies, *10th Dec 2014*: re-designation to be reconfirmed with help of NIRRH admin personnel in Jan 2015
2	06/06/2014/ Mr V V Kadu	Pay scale Anomaly	29-10-2014	Resolved	Resolved and closed
3	23/06/14 New Pension Scheme employees	Retrieving fund for New Pension Scheme from ICMR HQ	-	Decision pending	*30th Oct 2014*: Letter sent to Sr. FA as per discussion at ICMR HQ, No proper reply received from ICMR, Re-sent to Sr. FA on *12th Dec 2014*
4	12/08/14 Mr T Y Jadhav	Implementation of MACP	29-10-2014	Resolved	Resolved and closed

Dr. (Mrs) Madhu C. Mohanty, Scientist-C, Grievance Officer, ERC, Mumbai.

Genetic Research Center, Mumbai

Mission and Vision

Genetic Research Center has a mandate to perform research into the genetic basis of human disorders and to minimize the occurrence of these disorders in the community.

The vision of the institute is three pronged:

1. **Service:** Providing service and attending to individuals with genetic disorders, classify them clinically into syndromes, diagnose them using cytomolecular techniques, genetic counseling, out-patient based treatment and follow-up and prenatal diagnosis in at-risk pregnancies
2. **Research:** Areas of research include: Chromosomal disorders and single gene diseases particularly inborn errors of metabolism, genodermatoses and skeletal dysplasias
3. **Creating databases of various genetic diseases:** Creating databases of 'Disease-ome' in India for the various genetic diseases. This may help in rapid screening, diagnosis and prevention.

Manpower: Scientists (3), Technical (5), Admn. (1), Others (2).

Budget: Rs.135 lakhs (app.)

Major Projects undertaken

1. Molecular basis of lysosomal storage diseases
2. Clinical and Molecular characterization of genodermatoses
3. Molecular analysis of SCN1A gene in cases of Dravet Syndrome

Details of projects on-going

1. Molecular basis of lysosomal storage diseases

Lysosomal storage diseases are inborn errors of metabolism due to deficiency of specific enzyme leading to storage of abnormal substrate in organs such as brain, reticulo-endothelial system, bone, skin, eyes, etc. The disorders can be clinically recognized by symptoms such as neuroregression, coarse facies, and skeletal changes. Biochemical diagnosis was based on specific leucocyte enzyme assay. Till date 220 patients have been characterized.

2. Clinical and Molecular characterization of genodermatoses

Genetic skin diseases such as the ichthyosis (disorders of keratinization), xeroderma pigmentosum, Griscelli syndrome type 2 (disorder of pigmentation) and epidermolysis bullosa are childhood disorders with significant mortality and morbidity. They are autosomal recessive in inheritance. Clinical affection includes skin pigmentary anomalies such as poikiloderma, ocular and cutaneous photosensitivity, albinism, vesiculobullous or scaly rash and predisposition to hematological and skin cancer. Till date, 169 cases have been characterized and under follow up.

3. Molecular analysis of SCN1A gene in cases of Dravet Syndrome

Dravet Syndrome also known as severe myoclonic epilepsy of infancy (SMEI) is an infantile epileptic encephalopathy that occurs in the first year of life. Mutations in the voltage-gated sodium channel SCN1A gene is the main genetic cause of Dravet Syndrome and are accounted for 70-80% of patients. The aim of the project is to identify novel and known mutations in SCN1A gene in cases of Indian Dravet Syndrome.

Achievements

- **Clinical implications of Mutations in Genetic Disorders -** Genetic Research Center is a referral center for diagnosis and research in human genetic disorders. Objectives: To classify genetic disorders referred to GRC from 2011 till date according to International Classification of Diseases (ICD-10). To determine utility of the various genetic tests such as cytogenetics, biochemical and molecular, to identify common or recurrent mutations leading to disease, to follow up these patients for the treatment received, complications and their response, to determine mortality and study the causes. Results: A total of 2318 patients were included in study. The three major classes were congenital malformations, metabolic disorders and mental retardation accounting for 68 % of cases. Molecular characterization was possible for 837 patients, with mutation identified in 67 % patients. Most disorders are treatable if not curable. Work with regulatory authorities is needed to make diets, specific drugs locally available. There is an urgent need to develop network of specialized centers for treatment and care of genetic disorders. Prevention by prenatal diagnosis is essential especially for fatal genetic disorders.

Major achievements having public health importance

- **Prenatal diagnosis:** The Center is a national referral center for prenatal diagnosis of genetic disorders. Till date, 45 families have benefitted from the benefits of genetic technology.

Future Plans

- **Human resource development:** The Centre is a member of the ICMR Task Force on creating Medical Genetic Centres across India. The Centre will organize short term programs for training medical practitioners in genetic counseling. This will aid appropriate diagnosis, timely referral, management and prevention by prenatal diagnosis.
- **Birth Defect Registry:** The Centre in association with NIRRH Field Units will set up a prospective Birth Defect registry to gauge the magnitude of birth defects. A wide network will increase the outreach of services and research of the Center. The training component will increase awareness about genetic disease. The prenatal component will reduce burden of genetic disease in the community.

Institute of Cytology & Preventive Oncology (ICPO), NOIDA

Cancer prevention is one of the mandates of the institute. Following approaches are followed:

1. Epidemiological studies and early cancer detection activities
2. Basic Molecular studies
3. Human resource development

Budget: Non-plan-Rs.357 lakhs; Plan-Rs.543 lakhs; Extramural – Rs.1.13 lakhs

Manpower: Scientific(22), Technical (21), Admn.(26), Project staff (16).

Cancer prevention activities: Early detection of cancer by population screening

ICPO has initiated programme of cancer prevention by directly approaching the population in Gautam Budha Nagar District of Uttar Pradesh, with the aim to educate the population

and screen them for early detection of Cervical Oral and Breast cancer. We are getting frequent requests from RWA's and gram panchayats for initiating screening programs in the sectors and villages. Following screening programmes were conducted during the year:-

- Health awareness camp at sector 26 Noida on 13th April 2014
- Cancer screening at Amity University on 16th April 2014 & 7th May 2014
- Screening camp at PHC Bisrakh held on 11th Sep 2014 & 16th Oct 2014
- Screening camp at CHC, Badalpur on 1st Nov 2014
- Screening camp at ICPO on cancer awareness day 7th Nov 2014
- Screening camp at CHC, Bhangel on 12th Nov 2014
- Screening camp at IITF from 15th to 27th Nov 214

Table showing outcome of screening/awareness camps		
	834	
Total No of Pap smears	**661**	
Epithelial cell abnormalities detected	**4**	(Malignancy-1, HSIL-1, ASC-US-1, AGC-1)
Breast lumps detected	**21**	
FNAC	**16**	
Surgery	**2**	(tubulopapillary lesion, Fibrocystic disease with apocrine differentiation)

Web portal developed for information on cancer in India

ICPO has developed a web portal for providing information on different aspects of cancer. It covers information on various cancers like risk factors, method of diagnosis and its availability in adjoining areas, symptoms, treatment available etc. It has information in the

form of pictorial/cartoon, etc. for better understanding by the layman. It is made interactive to get more information from experts from ICPO in respective field.

Screening for cervical cancer

Validation study for Magnivisualizer developed at ICPO and launched by Government of India - ICPO developed a low cost magnifying device that can be used in field conditions both by clinicians and Paramedical staff for the detection of cervical and oral cancerous and precancerous lesions. This instrument was launched by the Government of India on 23rd December 2013. Our results again confirmed that using this simple device has improved the detection of various lesions cervix and oral cavity, and can be useful in cancer prevention programme. It was used to screen the population of 4500 persons along with the conventional yellow light torch. In addition, we examined the oral cavity of 1329 chronic tobacco users (who volunteered). Cytobrush smears were also taken for cytology. All the patients with tobacco related lesions were referred to collaborating GTB Hospital, Shahadra Delhi for biopsy and further management. 156 lesions were detected by Magnivisualizer. With the help of a torch our Dentist could identify 104 (7.8%) lesions, only and it was possible to differentiate only 62 (59.6%) lesions into various categories. On the other hand, Magnivisualizer detected 156 (11.7%) lesions and differentiated 153 (98.1%) lesions into different categories. A biopsy was done for 14 cases of Leukoplakia where histology revealed epidermal hyperplasia with hyperkeratosis. No dysplastic lesions were confirmed. Magnivisualizer detected OSMF (Oral sub mucous fibrosis) in 88 cases and hyperkeratinized cells (cytologically) in 65 cases and candida in 7 cases. Magnivisualizer detected 8 cases of candidiasis, which were confirmed by cytology also. One case detected as suspicious for cancer by Magnivisualizer and by cytology and was confirmed by histology as squamous cell carcinoma of tongue. The sensitivity for detecting the benign lesions compared to cytological benign abnormalities was found to be 81-90%.

The comparative performance of Magnivisualizer vs tungsten light for the examination of the cervix (20.5% vs. 12.7%) and oral cavity (24.8% vs. 16.5%) revealed that Magnivisualizer detected 1.5 to 1.6 times more lesions compared to tungsten light. Ninety percent of the cervical lesions detected by Magnivisualizer were also detected positive by cytology (LSIL +).

Digital Magnivisualizer - After initial encouraging results and acceptance by the government of India as economical device that can be used for early detection of cancer and hence prevention, ICPO scientist have initiated the development of Magnivisualizer with attached digital photography system. It has been planned to make it possible to document and transmit the pictures through available mobile network to respective doctors like gynecologist, dentists or the pathologist for instant diagnosis or advice for future course of action. We hope to develop it two years.

Molecular Screening for Cervical Cancer

The major activities and achievements in the field of Molecular screening of cervical cancer are as given below:-

I. ICPO has been recognized as a National Referral Centre for HPV & Cervical Cancer Screening.

II. ICPO has developed Multiplex PCR to detect various HPV types in one PCR reaction saving biological material, cost and time. It is proposed to develop kit for the detection of

HPV DNA by PCR. It will contain all the reagents for DNA extraction and amplification of HPV DNA and its detection.

III. Detection of variant HPV types in Indian population for the purpose of developing HPV vaccines.

Basic Molecular understanding of cervical carcinogenesis:

Understanding transcriptional regulation of cervix cancer using microarray data and promoter sequence analysis - Computational methods involving the combination of gene expression data from microarray experiments and promoter sequence analysis of a curated gene set was utilized for identifying potential regulatory elements.

HIV and HPV co-infection among female sex workers. Funded by ICMR; Duration: 2012-2014 - Results achieved- Cervical, oral, and anal scrapes have been received at ICPO for 300 subjects. Preliminary results show HPV positivity. HPV 16 was the most prevalent genotype found in the samples analyzed. Multiple HPV genotypes detected. Work is currently in progress.

Oral Cancer

Molecular and Clinico-Epidemiological Studies on Oral Precancer and Cancer among Tobacco users in India - The oral cancer is responsible for 3% to 10% of cancer mortality worldwide (The State of Oncology 2013, IPRI). It is the one of the most common cancer in India; as 4 in 10 of all cancers are oral cancers in men and accounts for 7.6% of all the cancers in India, 49.3% in Asia and 2.1 in the world.

Studies on Genetic and Epigenetic alterations in head and neck cancers prevalent in north eastern region of India - Head and neck cancer is sixth most frequently observed cancers and one of alarmingly increasing cancer in Indian population. Tobacco, betel nut chewing, cigarette smoking and other dietary life style habits play important role as a risk factors in carcinogenesis process in synergy with host genetic factors. The present study tries to identify the role of epigenetic mechanism in the process of oral carcinogenesis from the population of north eastern states of India as these particular populations has unique genetic and dietary habits like eating smoked fish, increased usage of betel quid and tobacco products.

Therapeutics

Development of Epidermal Growth Factor Receptor Inhibitor Database (EGFRIndb) - EGFRIndb is a literature curated database of 4581 small synthetic molecular inhibitors of EGFR. Database allows searching, browsing as well as has a tool for structure based searching. It will serve as a useful resource in drug discovery and provide data for docking, virtual screening and QSAR model development to the cancer researchers.

DNA vaccines against HPV

Development of DNA vaccine constructs of Indian specific Human Papillomavirus type 16 variants – *Enhancement of Immunogenicity of L1 constructs and characterization of T-cell epitope based E6/E7 constructs* - Cervical cancer is the second most common cancer among women worldwide, and leading cause of cancer related deaths in India. Persistent infection with high risk Human Papillomavirus (HR-HPV) is an established factor for the development of cervical cancer, especially HPV-16 followed by HPV 18 which causes more than 70% of cervical cancer cases in India. We prepared a series of variant constructs after cloning to plasmid vectors for preparation of DNA vaccine constructs and evaluated their

immunogenicity in animal model (BALB/c mice). In addition, there is a need to enhance the efficacy of these DNA based vaccine constructs, therefore using either genetic (IL-12 or TLR9 agonist) or non genetic adjuvant, work is ongoing to enhance the immunogenicity. Hence there is an utmost requirement to explore the possibility of development of Indigenous DNA based vaccine especially for Indian women.

Multi-disciplinary approach to combat cancer by targeted drug delivery using intelligent polymeric nanoparticles - The different Nanoparticles (PLA, Triblock 5000, Triblock 10000, Triblock 7500 and Multi-block NPs) synthesized and physical characterization at IIT, Delhi. The in vitro study of cellular uptake of the drug-targeted delivery of nanoparticles is being undertaken in breast cancer cell lines by flowcytometry.

Human Resource Development programmes - It is continuous programme to train medicos, paramedics, graduates and post graduates in the various fields that will be helpful in the larger interest of cancer prevention. Following persons were trained during the year:

Cytopathology:	11
M.D. Students guided	4
Two to 12 months Trainees (molecular division)	64
Short-term fellows from Indian Academy of Science	11
Post-doctoral / Pre-doctoral research (SRF/JRFs)	7

National AIDS Research Institute (NARI), Pune

Mission: To establish research initiatives that has an interface with intervention and policy development to prevent and control the spread of HIV/AIDS epidemic

Vision: To build a research capability of distinction to face the challenge of growing HIV/AIDS in India.

Manpower: Scientist (21), Technical (37), Admn. (8), Others (5). Total= 71. Besides, there are 117 number of staff working in Clinical Trial Unit (CTU).

Budget: Salaries Rs 510 lakhs, Grants in aid Rs 221 lakhs, Capital- Rs 5 lakhs

Extramural Fund- Rs 913 lakh

Major Projects undertaken
Effectiveness of Antiretroviral Therapy in Free ART Centres in Pune City

Details of the projects on-going with the Institute

The Institute is having 17 Extramural and 9 Intramural projects going on at present.

Achievements of projects funded by Institute which completed

New Knowledge Generation

- **Identification of HIV modulated cell signaling pathways in context with persistence of HIV after activation**

  Activation of latent HIV in presence of potent antiretroviral drugs is an important approach in cure research. Reactivated HIV escapes elimination through immune response by secreting IL-10. The in vitro study demonstrated that use of Bryostatin

may be safer as anti-latency agent. Further studies need to be initiated to validate this finding.

- **The role of miRNAs in the pathogenesis of HIV/AIDS and their utility as biomarkers of disease progression and therapy failure**
- **Study on *gag* mutations associated with Resistance to Protease Inhibitors in Indian HIV-1 Subtype C**
- Provisional Patent Application entitled "Triaminotriazine derivatives as potent reverse transcriptase inhibitor of HIV-1" (Application no: 3238/MUM/2014) was filed at the Mumbai Patent Office on 13th October, 2014 in India and Patent Cooperation Treaty (PCT).

Major achievements having public health importance

- **Effectiveness of Antiretroviral Therapy in Free ART Centres in Pune City**

This cross-sectional study was conducted in 846 eligible consecutive patients who were initiated on ART between 10-14 months in four free ART centres in Pune. The overall frequency of virologic failure at one year was 12.3% (95% CI 10.2-14.7%). NARI ART centre had the lowest treatment failure of 4.4% among four ART centre (N.S.). The risk of virological failure was found to be 2.19 (95% CI 1.40-3.44) and 4.39 (95% 2.61-7.39) folds among those who do not live with their partner and those who were not adherent to ART respectively. *These findings also indicate that virologic monitoring should be considered in monitoring patients on first line for early detection of treatment failure without impacting second-line antiretroviral therapeutic options. Intensified efforts for counselling among those who do not live with their partners need to be undertaken in the program.*

- Analysis of Indian Blood Bank Association (IBBA) data revealed that of the 9667 female sex workers living in 23 districts of four high HIV prevalence states, 15.6% reported anal sex in heterosexual relationships. *This finding is important from public health perspective as clinicians treating them should be made aware of anal STIs and their management. It also underscores the importance of prioritizing research on rectal microbicides in addition to vaginal microbicides.*
- A retrospective data was analysed from 689 patients who were registered as Pre-ART patients as their CD4 counts were higher than the cut-off for initiation of ART at NARI ART centre. These patients are expected to undergo CD4 count every 6 months to enable timely initiation of ART. The Loss to Follow up (LFU) was defined as missing two visits for estimation of CD4 counts. The LFU rate in March 2013 was found to be 11%. Of those who were LFU, 71% were women. Of women who were LFU, 21% were female sex workers. The high rates of LFU among sex workers who belong to core transmitter group warrants devising appropriate strategies to ensure that they remain linked with care program in ART era where treatment as prevention is assuming importance in programming.

Future Plans

The future directions of HIV research are getting intensified towards chronic morbidities and cure. In view of this, it is imperative that the Institutional focus of research needs to be modified to enable healthy living among those who are infected. It is also an opportunity to use these leads to treat other chronic morbidities occurring among HIV uninfected

population. The rapid scale up of free ART program and targeted interventions among at risk sub-populations have led to dramatic reversal in new infections in India. However, with declining HIV estimates the pressures to integrate it with the National Health Mission. In order to modify the priorities following steps will be taken:

1. Efforts will be made to delink provision of routine services from scientific work. Services such as HIV serology, CD4 count, DBS PCR, Plasma Viral Load will be provided with responsibilities given to the Technical staff for routine work with supervision from Scientists.
2. Linkages with other institutions will be strengthened
3. Multi-disciplinary clusters for a prioritised area of research will be formed. An effort will be made to identify gaps in the capacity of a cluster so that capacity building needs will be addressed rapidly.
4. A National network of organisations or private practitioners representing different geographic areas and sub-speciality will be initiated as an institutional initiative to enable the scientists in undertaking descriptive and interventional studies including clinical trials through this network rapidly.
5. A similar network of community-based NGOs representing different regions will also be established to undertake field-based studies, interventions and for implementation science research so as to enable representative studies rapidly that can provide feedback to the program/s.

The institute will develop **Clusters** to focus on broad themes as **-** Implementation Science Research , National HIV Trial Network, HIV Cure Research, Immunosenescence, Hepatitis & Herpes virus cluster, Neurocognition, HIV associated malignancies, Tuberculosis and other infectious co-morbidities, Metabolic disease & Pharmacogenetics

Grievances/complaints/representations received & disposal details: There were no grievances or representations received against scientists or other staff of the Institute. A complaint against Dr. Hari Om Singh Sc-B was received on June 6, 2014. The enquiry was completed by the Complaints Committee on June 9, 2014. The documents were sent to the Council on September 30, 2014. The decision of the Council is awaited.

National Centre for Disease Informatics and Research (NCDIR), Bangalore

Vision

The main broad and overall objective of the centre is to sustain and develop a national research data-base on cancer, diabetes, CVD and stroke through recent advances in electronic information technology with a national collaborative network, so as to undertake aetiological, epidemiological, clinical and control research in these areas.

Mission

1. Plans, directs, develops, supports, coordinates and evaluates a national programme of cancer surveillance (electronic or otherwise) involving the collection and analysis of reliable data on magnitude and patterns of cancer so as to answer key questions about cancer incidence and mortality in different demographic and population settings;

2. Plans, facilitates and supports programmes of surveillance (electronic or otherwise) of other diseases (diabetes, CVD, stroke) involving the collection and analysis of reliable data on magnitude and patterns so as to answer key questions about disease incidence and mortality in different demographic and population settings;
3. Designs, undertakes and implements multi-registry/centric collaborative aetiologic research studies in-keeping with recent advances in epidemiological research;
4. Evolves, coordinates and evaluates a national standardized programme on patterns of patient care and survival in different anatomical sites of cancer, diabetes, CVD and stroke;
5. Develops human resources in use of disease data base and informatics for research.
6. Will actively seek public-private partnership to fulfill any of the objectives and/or mission statements stated above and/or specific function statements outlined below.

Budget: Rs. 190 lakhs for Intramural & Rs.1161 lakhs for Extramural projects.

Ongoing projects

1. 29 Population Based Cancer Registries
2. 29 Hospital Based Cancer Registries including HBCRs in Regional Cancer Centres funded by Ministry of Health and Family Welfare, Government of India
3. Development of an Atlas of Cancer in North East Region
4. Patterns of Care Survival Studies on Cancer Breast, Cancer Cervix and Head and Neck Cancers
5. Translational Research under NCRP
6. Development of an Atlas of Cancer in Punjab State

Achievements of Project

Population Based Cancer Registries

Software Developments:

- ✓ Integration of Hospital Based Cancer Registry and Population Based Cancer Registry
- Offline and Offline
- Online and Online
- ✓ Online PBCR - incidence and mortality data entry
- ✓ Generation of tables and graphs as per book report
- ✓ Data download program – Online to Offline (NCRP Server)
- ✓ Improvements on Phonetics, All Cause deaths and Data Importer

Hospital Based Cancer Registries - Patterns of Cancer Patient Care and Survival

The project on **Patterns of Cancer Patient Care and Survival** for three sites of cancer viz., cancer breast, cancer cervix and head & neck cancers is on-going and several centres have been able to achieve 70% follow-up on the 2006-08 data. Data of 2006-2008 has been analysed and discussed in the 3rd meeting of Research Area Panel on Cancer of NCDIR held

on 14-15 October 2014 at NCDIR, Bangalore.

Software Developments

- ✓ Follow up alert is activated during the login time. This is to enable at least a 5 year follow-up.
- ✓ Programming is done for getting Follow up status based on particular date.
- ✓ Data entry integration of HBCR and POCSS, Details of Stage and Treatment & Follow up details is also completed.

HBCRs evolved into Patterns of Care and Survival Studies

- ✓ New Quality Checks are introduced and programming has been done for the same. The Report provides both error wise / case wise listing and has been sent to all POCSS centres.
- ✓ Follow up Listing is done based on range of pin codes & PBCR areas both online and offline.
- ✓ Interim Survival Analysis has been done for pooled data through software programmes.

Development of an Atlas of Cancer in Punjab State: The project on **"Development of an Atlas of Cancer in Punjab State"** has been a major activity. It contains participating Institutions activity online, Summary of Progress Report – Institution wise and Details of status of data – District and Institution wise *etc*. Dynamic output tables for listing of cases for district wise centre wise and site wise have been programmed. Programme has been done for generating reports based on pooled districts / centres. Reports on Malwa region can also be generated dynamically.

As of now there are 154 centres that have registered (141 centres from Punjab State, 3 from Chandigarh 2 from Haryana State and 1 from Jammu & Kashmir, 4 from Delhi State and 3 from Rajasthan). So far data on about 71,635 cancers has been received. The provisional Punjab Cancer Atlas report has been prepared and discussed during 3rd meeting of Research Area Panel on Cancer of NCDIR held on 14-15 October 2014 at NCDIR, Bangalore.

Pathology Software: NCDIR-NCRP has developed an online Pathology Software Module which could be used for reporting of both malignant and non-malignant cases. As of now 105 institutions across the country have registered to use this module and 22 centres have started using the software. So far data on about 2986 cancers has been received. Based on the feedback received from the centres, this module has been revised into three formats i.e. (a) Basic Form for the Lab purpose (b) Basic + Additional Form with additional details like Hospital Registration number, detailed address of the patient *etc*., and (c) Advanced Form for the registry use.

Radiotherapy Module: NCDIR-NCRP has developed an online Radiotherapy Software Module also. Using this module one can enter the identification information of the patient along with diagnostic details as well as treatment details and reports can be printed / saved in PDF. This module has been made into two formats (a) Basic (b) Cancer Registry Format. As of now 11 centres have been given the online access of this module.

Medical Oncology Module: NCDIR-NCRP has developed an online Medical Oncology Software Module. Data capture section has been developed and ready for dispatch to the centres.

Surgical Oncology Module: NCDIR-NCRP has developed an online Surgical Oncology Software Module. Data capture section has been developed and is being tested.

Future Activities:

1. Hospital Based Cancer Registries – Data Management Software
2. Hospital Based Cancer Registries in Sources of Registration of already existing PBCRs at Bangalore, Chennai, Delhi, Mumbai and Kolkata
3. Setting up of Population Based Cancer Registry at ICPO, Noida
4. Population Based Cancer Survival Study on Cancer Breast, Cancer Cervix and Head & Neck Cancers including infrastructure for NCDIR, Bangalore
5. Development of an Atlas of Cancer in Haryana State (Collaborating Centres in Delhi, Chandigarh, Punjab and Haryana)
6. Development of Population Based Stroke Registry including infrastructure for NCDIR, Bangalore
7. Budget for setting up of national model to monitor the magnitude of non-communicable Diseases Setting up of A Study on the Magnitude and Patterns of Causes of Heart Failure and including infrastructure for NCDIR, Bangalore

National Centre for Disease Informatics and Research: State wise Collaborating Centers

Sl. No.	State	PBCR	HBCR (incl. RCCs)	POCSS	HBCRDM Registered & Transmitting	PCA - Registered & Transmitting	NE Atlas
1	Jammu & Kashmir		2	1	1		
2	Himachal Pradesh		1		1		
3	Punjab	1		1		52	
4	Chandigarh (UT)		1	1	1	2	
5	Uttarakhand				1		
6	Haryana		1		1	1	
7	Delhi (UT)	1	1	1	2	4	
8	Rajasthan		1		1	1	
9	Uttar Pradesh		2		1		
10	Bihar		1	1			
11	Sikkim	1					
12	Arunachal Pradesh	2					2
13	Nagaland	1					2
14	Manipur	1	1				1
15	Mizoram	1	1				
16	Tripura	1	1				2
17	Meghalaya	1					3
18	Assam	3	2	3	1		6
19	West Bengal	1	1		1		1

20	Jharkhand						
21	Odisha		1		2		
22	Chhattisgarh		1		1		
23	Madhya Pradesh	1	2		1		
24	Gujarat	2	1	1			
25	Daman & Diu (UT)						
26	Dadra & Nagar Haveli (UT)						
27	Maharashtra	7	2	2	1		
28	Telangana	1	1		2		
29	Andhra Pradesh				3		
30	Karnataka	1	1	5	11		
31	Goa						
32	Lakshadweep (UT)						
33	Kerala	2	1	3	8		
34	Tamil Nadu	1	2	1	5		
35	Puducherry (UT)		1		1		
36	Andaman & Nicobar Islands (UT)						
Total		**29**	**29**	**20**	**41**	**60**	**17**

PBCR = Population Based Cancer Registries HBCR = Hospital Based Cancer Registries inclu. Regional Cancer Centres

POCSS = Patterns of Care and Survival Studies HBCRDM = Hospital Based Cancer Registries Data Management Software

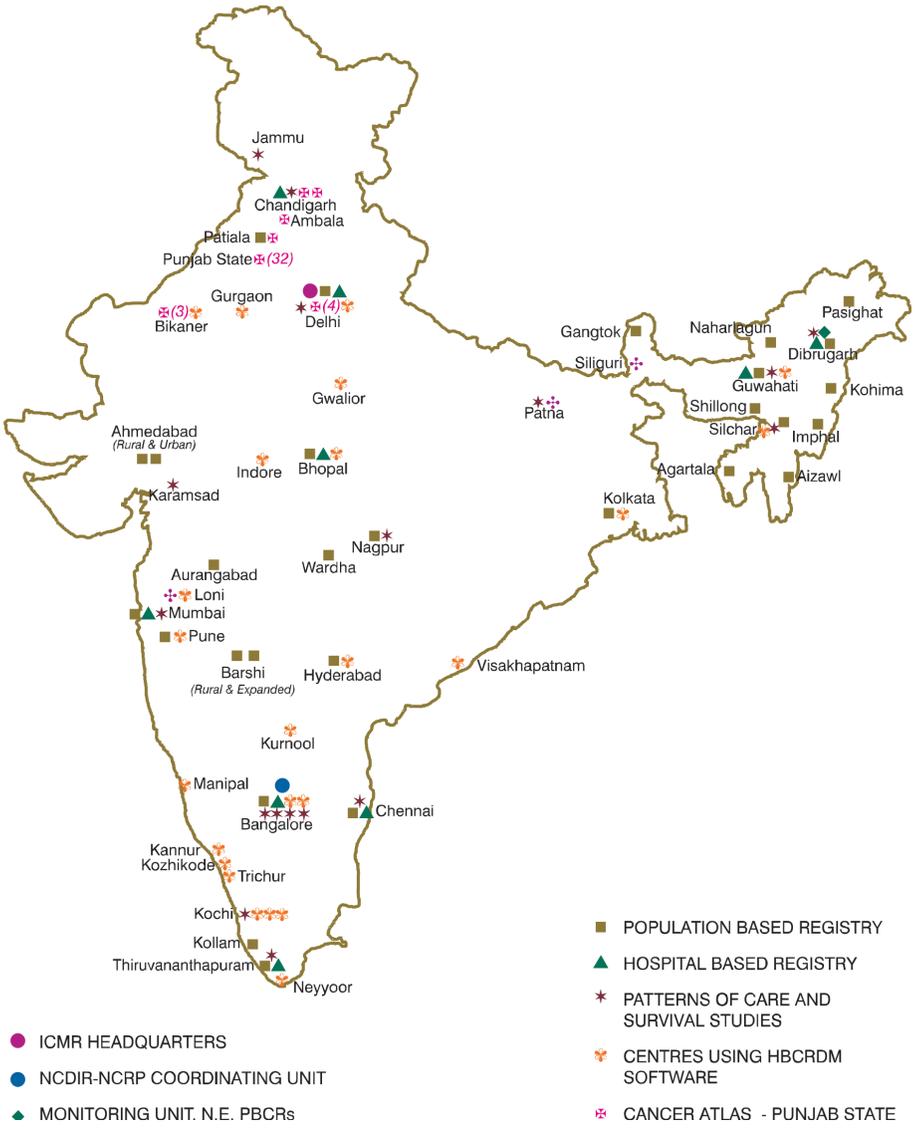
PCA = Dev. of an Atlas of Cancer in Punjab State NE Atlas = Development of an Atlas of Cancer in North East Region

Apart from the above, 51 centres have been registered under the project on "Development of Stroke Registry in India" and 101 medical colleges have been registered under the project on "Development of Population Based Diabetes Registry"

NATIONAL CENTRE FOR DISEASE INFORMATICS AND RESEARCH

NATIONAL CANCER REGISTRY PROGRAMME - NETWORK

(Indian Council of Medical Research)



National Institute of Cholera and Enteric Diseases(NICED), Kolkata

Vision

Improving public health in India by reducing morbidity and mortality due to gut infections, HIV and various enteric disorders of local, regional and national importance. Children, women and underserved population remain central to this endeavor.

Mission

- Build national research network to facilitate surveillance, prevention and management of diarrhoeal diseases.
- Conduct basic, translational and operational research towards improving public health in India.

- Train students, researchers as well as care providers in formal and informal sectors for capacity enhancement towards achieving the institute's goal.
- Collaborate with reputed national /international institutions working in areas of mutual interests.

Manpower: Scientists 30, Technical Staff 50, Administrative Staff 60 and other supportive staff 12; Total 152

Budget: Plan – Rs 991 lakhs, Non-Plan – Rs 948 lakhs

Major Projects Undertaken : Seven intramural & 3 extramural projects undertaken and a total of 22 of Intramural Projects are ongoing.

Achievements

Environment, community and individuals - Salient findings of investigations under this endeavor are given below: -

- Change in tidal waves and wind pressure in Diamond Harbour area of the Bay of Bengal were found in this investigation to be concurrently associated with increase in salinity of river water and growth of *V. cholerae*.
- The study on role of gut micro-flora in neonatal sepsis revealed that micro-biota in the gut have a role in causing it against which colonization of gut with commensal bacteria was recognized as a natural barrier.
- *Salmonella Typhi* (ST) isolated from clinically suspected typhoid fever cases attending hospitals in Kolkata were characterized for their antimicrobial resistance profile and molecular subtypes. Increased fluoroquinolone resistance (20.2%) and reduced susceptibility (>75%) to ciprofloxacin were observed among ST Kolkata isolates during 2009-2013 leading to cases of treatment failure. The isolates (>90%) were susceptible to azithromycin. Moreover a PCR based rapid diagnostic method for typhoid fever was also assessed.
- A survey was carried out in urban slums of Kolkata to assess attitudes and practices of parents regarding health care utilization where children had suffered from diarrhoea within the last fortnight. As low as 47% of the mothers or primary care takers of children in this survey sought proper advice for management of diarrhoea of children.Those seeking treatment were guided by the perceived severity of diarrhoea in children to seek health care.
- Implications of *Helicobacter pylori* strains in gastro-duodenal diseases and gastric cancer were studied.

Investigations indicating areas for future intervention

- A study on *V.cholerae* cytolysin (VCC) identified structure function relationship of the toxin secreted by the organism and identified critical areas which could potentially be targeted for therapeutic intervention.
- Factors for intestinal colonization of *V. cholerae* in animal model have been studied.
- Novel norovirus recombinants were identified in viral gastroenteritis cases in Kolkata. Twelve interesting astrovirus recombinants were detected.
- A study highlighted the role of certain cellular proteins in regulation of rotavirus replication. and provided clue to develop inhibitors against crucial host proteins, which could be used as an adjunct therapy for management of rotaviral diarrhoea.

- Porin has been shown to have the capability to turn on adaptive immune system as well as to carry out immune counter-regulation. The information is of relevance to vaccine producers.

Major Achievements Having Public Health Importance

Diarrhoea related research – (i) NICED conducted a community based study in rural West Bengal in the district of South-24 Parganas. Adult behaviour such as 'dipping a pot to draw water from storage vessel in a household' was found associated with diarrhoea in children aged ≤ 2 years in this investigation. The study also identified bacterial, protozoal, helminthic and viral co-infections in symptomatic rotavirus gastroenteritis in children. Information generated through this investigation helped plan a rotavirus vaccine trial, which is currently in its initial phase of implementation. (ii) Efforts to take blood culture of children clinically suspected of typhoid fever were undertaken by NICED during a community outbreak of diarrhoea following tropical cyclone AILA. Laboratory investigations carried out by NICED unearthed the outbreak as of cholera. It also helped formulate a treatment guideline forming the basis of government circular disseminated by the Chief Medical Officer of Health (CMOH) of Purbo-Medinipur - a coastal district badly hit by the cyclone. This intervention further modified the prescription practices of the treating physicians.

HIV related research – (i) Specific cases of discrimination were identified and stigma around HIV was explored under a community based concurrent mixed methods study. Survey respondents not attending school and believing in mosquito-borne HIV transmission had twice the odds of having fear of contracting HIV through noninvasive contact. In contrast, correct knowledge of mother-to-child HIV transmission was associated with judgmental attitudes, and knowledge of the role of condoms in HIV prevention was associated with shame. Qualitative investigations corroborated these findings, documented the denial of rights of people living with HIV, and revealed that discrimination resulting from fear of contagion directed against women had a moral dimension. Thematic issues and communication strategies were identified by analyzing these baseline assessment findings and translated into an intervention package. (ii) Through an initiative titled 'technical assistance to the National AIDS Control Organization (NACO), Ministry of Health and family welfare, Government of India, NICED played a pivotal role in conducting a situation assessment among injecting drug users (IDUs) of Punjab. The study revealed an alarming situation of dual epidemic of HIV and Hepatitis C virus (HCV) in IDUs of the State. Correlates of these viral infections were also identified that informed future intervention efforts by the State as well as federal Government.

Future Plans

- Investigations of diarrhoeal and other enteric disease outbreaks as and when necessary.
- NICED will conduct training in the field of diarrhoea and HIV diseases. Two core missions of NICED namely 'Capacity Enhancement' and 'Network Development' will be achieved through these activities.
- Countrywide hospital based rotavirus surveillance network, of which NICED is an integral part, will be harnessed upon to identify major bacterial and parasitic pathogens causing diarrhoea in under-5 children. Community based surveillance of diarrhoea will be initiated in conjunction with prescription audit as well as identification of socio-behavioural factors that might influence incidence of diarrhoeal diseases. Profiling of

antibiotic sensitivity and resistance of enteric pathogens will be another component of these community based activities.

- Lead molecules identified by NICED and having potential for further development into vaccine against enteric infections will be further researched. Vaccine already developed and qualified through Phase I & II will be taken up for large scale Phase III clinical trials as deemed appropriate. Drugs with potential for reducing morbidity and mortality due to enteric diseases will also be put in to trial through collaboration with various institutes and community based organizations.
- NICED will also be engaged in developing rapid diagnostic tools for enteric infections.

Grievances/Complaints/Representations Received and Disposal

During the period of January to December 2014, NICED received 12 no. of representations and disposed 7 of it. Rest of the 5 number of representations is under process. During this period no cases of Grievances and Complaints received.

National Institute of Epidemiology (NIE), Chennai

Vision

To be a catalyst for a vibrant national health system through responsive research, education and training in epidemiology and public health

Mission

To effectively contribute in enhancing the quality of life of Indian citizens and influencing public health practice and policies through research, education and training.

Manpower: Scientist-18, Technical-75, Admn.-30, Supportive-19, Total=142

Budget: Plan-Rs 744 lakhs, Non-Plan- Rs 343 lakhs, Extramural- 927 lakhs

Major Projects undertaken

1. *National Hospital Based Rotavirus Surveillance Network Project
2. *Hospital based surveillance for bacterial meningitis
3. *Data management of Virus Research and Diagnostic Laboratory Network
4. *Integrated Biological & Behavioural Surveillance (IBBS)
5. *WHO / TDR multi-centric trial on 'Uniform MDT regimen for all types of leprosy patients'
6. *Socio-cultural features and stigma of leprosy for treatment & control in general health services in India: Cultural epidemiological study
7. *Occurrence of relapse, non responsiveness to treatment in leprosy and screening of M. Leprae isolates for drug resistance using molecular and mouse footpad techniques
8. Mapping and Size Estimation of Hijras and other Transgender Populations in states of India

9. Comprehensive approach to condom promotion yields results among long distance truckers who are clients of female sex workers in India: The case of Avahan interventions
10. Coverage and effectiveness of Japanese Encephalitis vaccine, Gorakhpur, Uttar Pradesh
11. Evaluation of hypertension management in the Non-Communicable Disease program in Chennai, Theni and Villupuram districts: Tamil Nadu Health Systems Project
12. Causes of referral out of female clients admitted in Comprehensive Emergency Obstetrics and Neo-natal Care (CEmONC) centres and maternal & foetal outcomes: A cross sections study, Tamilnadu, India,
13. *Health Systems preparedness for interventions for diabetes, hypertension, chronic respiratory diseases, cardiovascular disease and cancers and deaths due to non-communicable diseases among the tribal population in India
14. Health impact of Quarry works in sub-urban areas in Chennai
15. Prevalence of soil transmitted helminths among school children in Madhya Pradesh, 2014

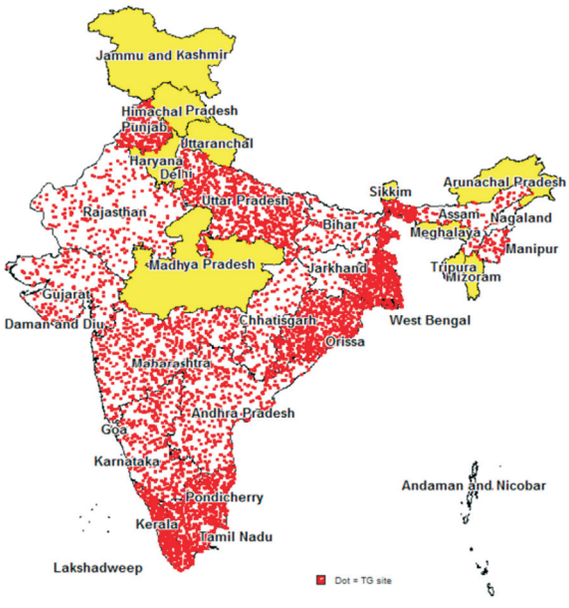
*= ongoing project

Achievements

- **Mapping and Size Estimation of Hijras and other Trans-Gender (TG) Populations in states of India**

This UNDP funded project conducted in 17 Indian states mapped areas in which Hijras and other male-to-female TG people reside and/or where they can be potentially reached and estimated the size of these populations.

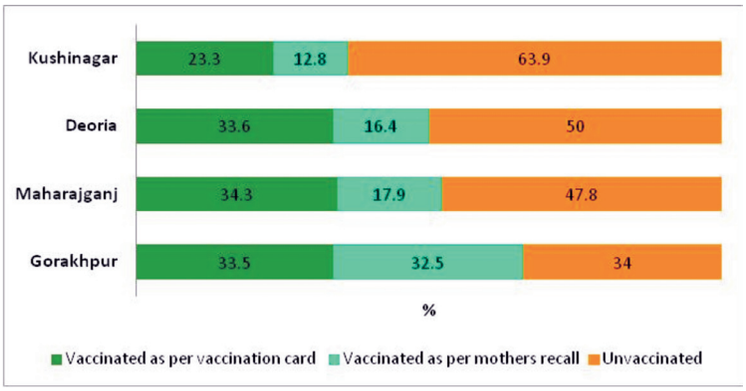
The total transgender population across the 17 states was 62137 (range: 53280-74297), 79% of them in urban. Five states (Uttar Pradesh, West Bengal, Tamil Nadu, Maharashtra and Odisha) had 60% of the TG sites. This mapping exercise will be useful to NACO for developing targeted interventions for TG population.



- **Coverage and effectiveness of Japanese Encephalitis vaccine, Gorakhpur, Uttar Prades**

The coverage of JE vaccine in Gorakhpur division was low, whereas the effectiveness of single dose of vaccine was comparable with other published studies.

Based on the recommendations of Research-Cum-Intervention project on JE/AES, mass JE vaccination campaign was conducted in the division in 2014



- **Evaluation of hypertension management in the Non-Communicable Disease programme in Chennai, Theni and Villupuram districts: Tamil Nadu Health Systems Project**

Government of Tamil Nadu has been implementing community and clinic based interventions for Non-Communicable diseases in 32 districts of Tamil Nadu since 2012 through the World Bank funded Tamil Nadu Health Systems Project (TNHSP). Opportunistic screening is being offered in all Primary Health Centers (PHCs) and hospitals for hypertension, diabetes, cancer cervix and cancer breast for those visiting these facilities for any ailment or accompanying the patient. NIE has been working in collaboration with TNHSP, Govt. of Tamil Nadu for concurrent evaluation of the Non-Communicable Disease program. NIE has successfully completed evaluation of diabetes and hypertension roll out in all 32 districts of Tamil Nadu. Manuscripts based research findings are being developed.

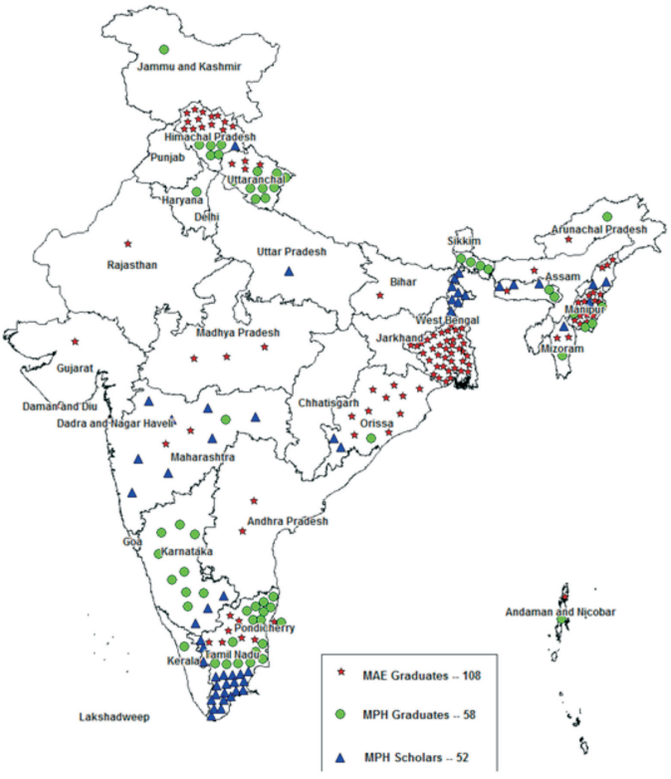
- **Comprehensive approach to condom promotion yields results among long distance truckers who are clients of female sex workers in India: The case of Avahan interventions**

The 'Avahan' interventions in India aimed to mitigate enhanced risks of transmission of HIV by truckers to their sex partners, including spouse. All components of 'Avahan' interventions among long distance truckers showed significant impact on consistent condom use with FSWs. Ensuring sustainability of these interventions would be critical for HIV control among this key bridge population in India.

Major Achievements Having Public Health Importance

Public Health Training Programmes

As graduates of the Master of Applied Epidemiology and Master of Public Health courses of NIE, a workforce of 200 trained epidemiologists/public health specialists is now available from 23 Indian states/Union Territory. NIE also has initiated a one-year Post- Graduate Diploma in HIV Epidemiology in 2012 and on-line post-graduate Diploma in Bioethics in 2011.



National Hospital Based Rotavirus Surveillance Network Project

The National Rotavirus Surveillance Network project is an ongoing ICMR task force study coordinated by national Institute of Epidemiology, Chennai and initiated in 2012. The surveillance is being carried out in 28 hospital based clinical recruitment sites in 17 states and one union territory spread across the country. Rotavirus disease burden estimates are being generated over a period of four years. The national prevalence rate of rotavirus gastroenteritis for the period October 2013 to October 2014 is 39%.

Future Plans

1. Up-gradation of ICMR School of Public Health at NIE Academic Centre by establishing:
    a. Academic Centre to (i) Scale up the ongoing MPH programme (ii) Engage in translational health systems research (iii) Develop and launch new training programmes for various target audience in the Country (iv) Conduct training programmes in the context of National Health Mission (v) Conduct research methodology training for medical colleges (vi) expand Online courses at regional and global level (vii) Design and conduct of short-term courses for inter-disciplinary research and training. (viii) Set-up health information and communication unit
    b. Clinical Research Centre: The Clinical Research Centre is expected to meet needs of both, health care for the neighborhood population and facilitate conduct of clinical research through easy access to patients in the neighborhood community under the Ayapakkam cohort study.
2. Establish the Model Rural Health Research Unit (MRHRU) in Tirunelveli and Multidisciplinary Research Unit (MRU) in Chennai

3. Expand the surveillance sites under the Hospital Based Sentinel Surveillance of Bacterial Meningitis
4. Initiate surveillance studies for vaccine preventable diseases and non-communicable disease risk factors

Grievances/complaints/representations received & disposal details

All the queries received directly or from ICMR have been appropriately addressed.

National Institute of Immunohaematology (NIIH), Mumbai

Vision

a. Research for the benefit of the common man.

b. Research to advance the frontier of knowledge.

c. Science for humanity.

Mission

1. To develop cost effective technologies for the diagnosis and management of haematological disorders.
2. To develop core-competence in the cutting edge areas of Haematology research like Stem Cell Biology, Molecular Biology etc and other related areas.
3. To help in the research and development of plasma based or recombinant therapeutic products with Pharmaceutical companies through public – private partnership.
4. To develop manpower with expertise in the field of various areas of Haemtology and Transfusion Science through M.Sc, Ph.D programmes summer training for students, short term trainings , DM, and training facilities for different Medical Colleges and state Govt hospitals in the country in areas of public health importance.
5. To develop modules of interactive research with other ICMR and non ICMR Institutes, to solve haematological challenges of national importance i.e thalassemia, nutritional anemia, viral disorders causing haematological complications.
6. To develop basic research programmes to understand physiology and biology of different haematological disorders.
7. To develop satellite centres across the country for study of haematological disorders.

Manpower: Scientist-13, Technical-30, Admn.-20, Supportive-19, Total=82

Budget: Plan : Rs.408.7 lakhs and Non Plan : 465.37 lakhs

Major Projects Undertaken

Under Tribal Research Forum

1. Neonatal screening for sickle cell anemia and other hemoglobinoaptheis in the tribals of south Gujarat and Madhya Pradesh .
2. Establishment of Prenatal diagnosis of hemoglobinopathies in Assam and Madhya Pradesh (Just initiated)

3. Micro-mapping of G6PD deficiency in tribal areas (To be started)

Other projects

1. Delta globin gene mutations as a cause of borderline hemoglobin HbA_2 in β thalassemia carriers.
2. Genetic polymorphisms in bilirubin metabolism genes and their association with unconjugated hyperbilirubenima in adults
3. Molecular pathology of hemophagocytic syndrome in India
4. Leukemic stem cells and its association with clinical outcome.
5. Prenatal diagnosis in congenital immunodeficiency disorders.
6. Fanconi anemia gene mutation in India
7. Newborn Screening for Hemoglobinopathies and Red Cell Enzymopathies in Tripura

Achivements

1. Newborn screening programme for sickle cell disorders carried out at Valsad in south Gujarat showed that 10 to 15 % of the newborn children were carriers of sickle cell gene and 1.5 to 1.8% of the newborns had the homozygous form of the disease.

At Jabalpur the newborn screening was initiated with screening of antenatal mothers and the babies born to sickle heterozygous mothers are screened.

We offered prenatal diagnosis of sickle cell disease to 19 tribal couples referred from Gujarat, MP and Maharashtra

2. The laboratory for newborn screening of hemoglobinopathies and red cell enzymopathies at Tripura is now well established and several babies with Hb E disease and HbE trait have been identified. Screening for G6PD deficiency and Pyruvate kinase deficiency is also being undertaken. Babies with these abnormalities are being followed up.
3. Delta globin gene mutation was shown to be one of the important causes of β thalassemia carrier state with normal or borderline HbA2 levels
4. Oxidant damage to the red cell membrane is one of the causes for hemolysis of the red cells in hereditary hemolytic anemias. Israeli scientists showed that fermented papaya preparation may have strong anti-oxidant activity. We tested the same in an in-vitro system with chemically damaged red cells and could demonstrate significant ameliorating effect of a fermented papapya preparation against membrane damage in red cells from sickle cell anemia patients.

5. Acute myeloid leukemia is known for relapsing inspite of high dose chemotherapy in a large number of patients except those who belonged to APL (AML – 3). Our study showed that those patients with higher number of leukemic stem cells usually show relapse in a short period of time.
6. We have identified 3 polymorphisms of Warfarin metabolism which are very important in adjusting and deciding Warfarin dose for those who are on anticoagulation therapy.
7. Several unique mutations in Bernard Soulier syndrome were identified and this is being used in prenatal diagnosis.
8. Newborn screening for sickle cell disease showed 1.5 - 2% of the children born in tribal areas are born with homozygous sickle cell disease.
9. We have established the molecular diagnosis of RhD antigen in antenatal mothers . This will save unnecessary use of precious anti-RhD immunoglobulin given to RhD mothers.
10. Several training programmes were conducted as a part of the intramural translational projects.

Major Achievements Having Public Health Importance

1. Genetic testing for Gilbert's syndrome.
2. Delta globin gene mutations were found to be an important determinant of normal HbA2 thalassemia carriers.
3. 1.5 – 2% of the newborn in the affected endemic tribal areas are born with homozygous sickle cell anemia and 10 -15% are carriers.
4. In central India we lose about 5-7% of the newborns who are born with sickle cell anemia due to infection and other sickle cell complications in early childhood which can be prevented.
5. A patent has been filed for detection of Natural Killer (NK) cell function using small amount of blood samples.

Future Plans

1. National sickle cell and hemoglobinoapthy centre at Chandrapur: The plan is to develop the centre as the State of the Art National Hemoglobinopathy Center. In addition this centre will be involved in:
   (a) Development of adequate manpower for diagnosing managing and preventing sickle cell anemia, thalassemia and other hemoglobinopathy related disorders
   (b) Developing hemoglobinopathy registry in India

(c) Several projects will be undertaken by this centre on - Cost effective diagnostic methodology, cost effective management strategy, IEC programmes and developing research proposals where other interacting challenges with other hemoglobinopathies like nutrition, parasitism, infection and drug addiction are also simultaneously investigated.

2. Molecular Hematology centre at Nahur. This centre will be dedicated to:
   (a) Understanding etiopathogenesis of various hematological disorders at genetic and proteomic level
   (b) Development of different clinical trials for management of various hematological disorders
   (c) To develop a Hemato – Virology Centre with advanced cell culture facility
   (d) To develop a Nutritional Hematology Centre
3. R & D centre for taking various techniques to the bedside through translational route.
4. Proposal for a National Stem Cell Research Centre and Regenerative Medicine
5. Training and development of transfusion medicine manpower in the country
6. Developing alternative sources for red cells
7. Development of rare donor registry
8. Developing National registries for various hematological disorders.

Grievances/Complaints/Representations Received and Disposal Details:

Nil from our Institute. Last year we have received 7 RTI applications which have been replied in the stipulated time period.

National Institute of Malaria Research (NIMR), Delhi

Vision & Mission

The National Institute of Malaria Research is one of the permanent institutes of the Indian Council of Medical Research and undertake field research in malariology and helps to develop and train scientists/programme personnel in India. The research activities at NIMR are directed towards developing new and innovative methods of malaria control and assist the control programme in implementing. The primary task is to find short-term as well as long-term solutions to the problem of malaria through basic, applied and operational field research.

Staff & Budget

The institute has 226 staff members including 32 scientists, 95 administrative staff and 99 technical staff.A budget of Rs.21.9 Crores was received by the institute during the year. NIMR also received extramural grant of Rs.9.2 Crores from various national and international agencies.The institute has a long term activity, 'Integrated Disease Vector Control', with field units in 10 sites in different states addressing the issues specific to those areas in collaboration with state health department. A budget of Rs.12.4 Crore was sanctioned to this project.

Research Activities

Research on various aspects of malaria and other vector borne diseases was carried out which included bio-ecology of vectors, molecular and proteomic studies on vector-parasite interactions, evaluation of vector control interventions that included efficacy and community acceptance of long lasting insecticidal nets(LLINs) and other interventions and epidemiological studies included molecular studies on population genetic diversity of malaria parasites, drug resistance and host's immune responses.

The institute was actively involved in operational research in close collaboration with National Vector Borne Disease Control Programme (NVBDCP), Delhi. The therapeutic efficacy studies of antimalarials revealed evidence of failure to artesunate + sulfadoxine/ pyrimethamine which led to change in the drug policy to artemether +lumefantrine in the north-eastern states. In addition, the institute is also monitoring the therapeutic efficacy of artemisinin along the international borders to detect the possible emergence of resistance to this drug.

Clinical trials for safe and effective prevention as well as treatment of malaria in pregnancy were carried out. They showed that the combinations of artesunate+SP as well as artesunate+ mefloquine were safe and effective. They also showed that intermittent screening and treatment can help to identify malaria cases early, and thus prevent complications.

An operational research project 'Comprehensive Case Management of Malaria'is being carried out in collaboration with Government of Odisha to assess the impact of universal access to diagnosis and treatment on malaria incidence in different transmission settings. There has been significant increase in access to diagnosis and treatment in all intervention areas. The proportion of cases being detected and treated within 24 hours of fever has increased significantly. In the low transmission settings, improved case management is showing impact by way of reduced malaria.

During this year, studies were carried out on species succession in North-East where three *Anopheles* species, *An. pseudowillmori, An. nigerrimus* and *An. culicifacies* were reported and the prominent vector species *An. culicifacies*was incriminated as vector. The continued study in G.B. Nagar (U.P.) indicated disappearance of another important vector, *An. fluviatilis* from the study areas that were found earlier in 2012 due to the absence to thick aquatic vegetation in the main breeding habitat, NTPC canal.

The institute conducted field trials on two brands of LLINs in Orissa and Haryana. A new technique for determining insecticide susceptibility using bottle assay was standardized and was found comparable to existing WHO insecticide susceptibility test, and this decreases the reliability on imports. In-line with the requirement of new insecticides and tools for insecticide-resistance management, studies with insecticides with novel mode of action were conducted e.g. neo-nicotinoids and have shown promise.

Parasite Biology

A study of the virulence *(vir* genes) and transporter of CQR*(Pvcrt-o*genes*)*has indicated increased expression levels of these genes in severe infections. Increased expression of *Pvcrt-o*genes may be responsible for the changing trends of complicated *P. vivax* malaria.

Future studies

The institute has planned following studies in the fields of epidemiology, vector biology, control and parasite biology:

- Studies to monitor safety and efficacy of antimalarial combinations
- Monitoring efficacy of antimalarials & insecticide resistance
- Operational research to improve the antimalarial therapy
- To study the safety of primaquine as anti-relapse agent in vivax malaria
- Association of G6PD deficiency and malaria
- The safety of mefloquine in troops
- Clinical and laboratory features of severe malaria
- Health impact assessment of mega projects
- Molecular characterization of *P.falciparum phosphor-ethanolamine Methyltransferase* (Pfpmt) gene: a novel antimalarial drug target
- Dynamics of host-parasite co-evolution and binding affinities between three receptor-ligand systems in malaria in India and also look into the Geographic genetic profiling of human *Plasmodium* malaria
- Evaluating new vector control tools/insecticide molecules/ combination of interventions to mitigate and manage insecticide resistance.

National Institute of Medical Statistics (NIMS), Delhi

The Institute handled following ten research projects during the year 2014-15, out of which 3 have been completed and 7 are ongoing.

Manpower: Scientists (14), Technical (26), Admn & Supportive (19); Total=59.

Budget: Plan - Rs.147 lakhs; Non-plan- Rs.4431 lakhs; Extramural Rs. 48 lakhs.

Completed Studies

Maternal Health Care in Rural and Urbanized Villages of Delhi – A Comparative Study - The study aimed to determine the status of maternal health care in rural and urbanized villages of Delhi and identify socio-economic factors associated with maternal health care status. The survey has found that there is no statistical difference in awareness and ANC registration between the two types of the villages. The analysis also revealed that the woman's and husband's education and family economic status has significant influence on the utilization of Ante natal care (full ANC) services. However, there was no significant difference in institutional deliveries in two types of the villages. The factors like type of family and caste are found to be associated with post natal care.

Knowledge Network Project

The project aimed to undertake review of literature on the data gaps in the global literature on research and programs involving truckers and clients of female sex workers; and collaborate with 'Avahan' (an initiative for the prevention and control of HIV in India) partners to document the programmatic learning and prepare articles to publish in peer review journals.

A study on the potential gain in life expectancy after elimination of specified causes of death in selected states of India - The study aimed to construct abridged life tables and multiple-decrement life tables; and estimate the potential gain in life expectancy after partially

and completely eliminating specific causes of death. The percentage of medically certified deaths to total registered deaths was 13.5% and this pertains only to urban area. Among these deaths, cause of death groups contain infectious and parasitic diseases of the nervous system, diseases of the circulatory system, respiratory system and pregnancy, childbirth and puerperium, constituted major portion of the total medically certified deaths in 2003 in India (54%), Bihar (71%), Maharashtra (58%), Rajasthan (52%), Tamil Nadu (53%), and Kerala (58%). A simulation exercise on the gain in life expectancy due to elimination of above causes was undertaken.

Ongoing Studies

Clinical Trials Registry – India

The objectives of the CTRI are to (a) establish a public record system by registering all clinical trials on health products that are drugs, devices vaccines, herbal drugs etc. (b) create a more complete, authentic, public and readily available data including ongoing and completed clinical trials; (c) provide a corrective system against "positive results bias" and "selective reporting" of research results to peer review publication, (d) increase awareness and accountability of all the participants involved in clinical trials.

Two dissemination workshops were organized at Madurai and Jamnagar in collaboration with WHO and Centre for Research in Medical Entomology, ICMR and Institute of Post-Graduate Training and Research in Ayurveda, Jamnagar, capacitating clinical researchers towards registration of clinical trials and their uses. Over 5300 trials have been registered with CTRI while over 1400 are either under review or awaiting approval.

National Integrated Biological Behavioural Surveillance (IBBS) - The aim of the study are to generate evidence on risk behavior among high risk group (HRG) to support planning and prioritization of programme efforts at district, state and national levels in order to understand HIV related behavior and HIV prevalence among key risk groups in different regions by linking behavior with biological findings. It would eventually measure and estimate the change in HIV-related risk behavior and HIV prevalence among key risk groups, between baseline and end line for NACP-IV.The NIMS is coordinating the survey in the States of Chhattisgarh, Madhya Pradesh and Orissa.

Acceptance level, Knowledge, Attitude and Practice (KAP) on Indian System of Medicine in North East Areas - The objectives of the study are to measure the levels of KAP of the people of North East areas on Indian system of Medicine; study the common diseases treated by Indian system of Medicine; and study the association between socio-demographic characteristics, satisfaction and /or trust on Indian system of Medicine.

Baseline and End-line Household Malaria Surveys in World Bank Project States, India - The study is undertaken in collaboration with the National Institute of Malaria Research (NIMR) with the objectives to estimate the key indicators related to coverage and care seeking in the malaria control programme. The types of malaria indicators to be estimated were classified as (1) household level (IRS and bed nets related indicators) and (2) individual level (use of bed net, treatment seeking for fever).

Malaria Burden study to validate the assumptions of mortality estimates - The study is undertaken in collaboration with the National Institute of Malaria Research (NIMR) with the objective to validate assumptions used in the model to estimate deaths due to malaria by conducting a longitudinal prospective study at the national level.

Burden of disease due to cancer - It aimed to estimate the disease burden due to cancer through various measures viz. life time risk and premature mortality in terms of absolute number of cases.

Exploratory Geo-spatial analysis to study the Utilization of RCH Services in North-East States -The broad objectives of the study is to explore the spatial patterns and associations of utilization of reproductive and child health services in the north-east states of India by undertaking spatial statistical analysis.

Training Programmes

- Summer training for the PG students of Statistics of BHU (6 students), AMITY University NOIDA, May-June 2014 (4 students).
- Statistical methods in monitoring and evaluation in health programme for the researchers of NIPCCD, 10-14 Feb 2014 (18 participants).
- Research protocol development for the scientists of National JALMA Institute of Leprosy and SN Medical College, Agra, 9-11 July 2014 (22 participants).
- Health data management and analysis using STATA, 27-30 Oct 2014 (20 participants).

National Institute of Nutrition (NIN), Hyderabad

Vision

To achieve optimal nutrition of vulnerable segments of population such as women of reproductive age, children, adolescent girls and elderly by 2020.

Mission

To enable food and nutrition security conducive to good health, growth & development and increase productivity through dedicated research, so as to achieve the National Nutrition Goals set by the government of India in the National Nutrition Policy.

Manpower: Scientific (62), Technical (177), Admn. (51), Suportive / Others (116). Total = 406

Budget: Plan-Rs2046 lakhs, Non-Plan-Rs2208 lakhs, Extramural-Rs.1110 lakhs

Research Highlights

- Following media reports about unusual number of infant deaths among tribal families of Attappady, Palakkad District in Kerala, rapid assessment was carried out. Although the nutritional status of tribes was poorer as compared to the other tribes in Kerala, the infant deaths were mostly still -births and were attributable to lapses in the healthcare delivery system and facilities. The state government was alerted and immediate corrective measures were taken.
- Two new skim milk based, ready to eat supplementary food products with different ratios of cereal, pulse, skim milk, sugar and fat, fortified with micronutrients were developed by AP Foods Ltd., for management of under-nutrition among young children. These were assessed for their acceptability in comparison to the currently existing soy-based ready to eat supplementary food. It has been found acceptable and recommendations

about its supply, handling, storage and distribution were made to state government.

- At the behest of the Government of Meghalaya, a study was carried out at district level in all 7 districts of the State. District-wise data was created and geographical areas with similar patterns of prevalence of under-nutrition and factors contributing to this status were identified.
- A study explored foetal immune programming with Probiotic and Prebiotic (Synbiotic) supplementation in pregnant dams. Cell mediated immunity showed intergenerational effect with synbiotic supplementation.
- **Project Grow-Smart:** A randomized controlled interventional trial was carried out among infants and pre-schoolers in 26 villages of four state administrative blocks (mandals) from Nalgonda District in the state of Andhra Pradesh (now in Telangana), India. Determinants of anaemia in infants were male gender, maternal anaemia, low infant ferritin and high C-reactive protein. Maternal anaemia, maternal low education, child age, high C-reactive protein and soluble transferrin receptor were significant risk factors for anaemia in preschoolers.
- A study was undertaken to that the efficacy of polyphenol-rich dietary ingredients as proteasome inhibitors and their role as anticancer agents. It was observed that *Murraya koenigii* leaf extract induced cell death in a panel of human cancer cell lines and was observed to be associated with decrease in the proteasome activity
- A study was conducted to impart education on nutrition and physical activity through participatory approach and peer education using **Oorja clubs** (school nutrition clubs). The study demonstrated that an integrated approach on nutrition education combining interactive lecture methods and participatory approaches engaged students in training their peers and proved to be effective in educating students in nutrition and importance of physical activity

Food and Drug Toxicology Research Centre (FDTRC)

- A study was conducted on prevalence of fluorosis in Doda District of Jammu and Kashmir. The fluoride levels were highest in the Golibagh followed by Malwas village resulting in high intake of fluoride. Dental fluorosis was more common in girls than boys. High level of urinary fluoride excretion was observed in affected individuals. There were also kidney, bone,vitamin D and liver related abnormalities in children exposed to fluoride.
- In order to assess the effect of excess nitric oxide in pathophysiology of motor neuron degeneration in Neurolathyrism, guinea pigs were fed lathyrus seeds with low and high toxin (ODAP). Low toxic variety had 100 mg/100 g of β-ODAP within 30 days of feeding there was 38% decrease in body weight of a low toxin group and 42% decrease in high toxin variety fed group. Three animals out of 8 in low toxin group and 5 out of 8 in high toxin group were affected with neurolathyrism after two months.
- When the thermal stability of oxytocin in milk and digestive stability of Oxytocin (OT) in vitro and in vivo was assessed, it was found that there was no thermal degradation of Oxytocin by boiling. The study also revealed that exogenous OT injections do not influence its content in milk and OT administered orally is rapidly digested during intestinal passage.

- A study was initiated to assess quality and safety of rice and wheat during their distribution in the Public Distribution System (PDS) chain. Aflatoxin analysis was carried out on non-PDS rice samples and rice products collected from retail and wholesale markets. Out of the 25 non-PDS rice samples, aflatoxins were detected in 9 samples of which majority were below the Limit of Detetction (LOD). PDS-rice samples also did not indicate presence of aflatoxins.

National Centre for Laboratory Animal Sciences (NCLAS)

- Studies on anti obesity properties of *Garcinia* species indicated that the maximum activity against hyperlipidemia was exhibited at high dose level of *Garcinia indica* (5%). It reduced body fat significantly without any toxicity. Since this compound is antiglycating, it helps in correcting insulin resistance. The results of the present study indicate that further studies can be conducted to explore its mechanism of action so that a good antihyperlipidemic and antiglycating agent could be developed.
- A study evaluated promising plant extracts and active constituents for anti-obese, anti-diabetic and hepato-protective properties in WNIN/GR-Ob rats. There was a significant reduction in the body weights and food intake of animals treated with the plant extract. There was a significant increase in the lean body mass and reduction in the total body fat content in treated animals but no significant changes were seen in bone mineral content and density.
- Rats fed with High Fat Diet (HFD) when treated with *Piper nigrum* have shown reduced physical parameters like food intake, growth. Significant increase was found in body composition parameters like lean body mass. Decrease in total body fat and % fat was observed in the HFD rats treated with piperine extracts. This effect of *Piper nigrum* on obesity can be explored further with respect to its mechanism of action to translation research.

Future Plans

1. Improving health and nutritional status of vulnerable segments of population by implementing multi-component health and nutritional education intervention- a sustainable model in some high-burden districts of different states like Jharkhand, Uttar Pradesh, Gujarat, Telangana etc
2. Establishment of Model Rural Health Research Units (MRHRUs) by handholding some medical institutes in the states of Andhra Pradesh and Telangana
3. Evaluation of various on-going nutrition and welfare programmes on the nutritional status of vulnerable population
4. Studies on age related loss of bone mineral density, muscle mass and muscle strength in elderly population
5. Assessing impact on promoting food-group based nutrition intervention for pregnant women and first two years of life in improving the birth weights and nutritional status of children.
6. Creating agents of change by making school children partners in nutrition communication
7. Promoting nutricereals in combating non-communicable diseases
8. Studies on prevalence and control of fluorosis

9. Promoting vendor education using normative communication models to promote safety of street foods
10. Promoting dietary diversity by developing dietary diversity score

National Institute of Occupational Health (NIOH), Ahmedabad

Vision

To create safe work environment through intensive research, technology development and knowledge dissemination, in order to improve upon the health and well being of the workers.

Mission

- To promote intensive research and activities in occupational and environmental health;
- Occupational dynamics, in the changing environmental contexts, ascertain safe limits;
- To apply basic data in devising new technique(s) for clinical, experimental and intervention;
- To establish inter-organizational coordination for research and occupational health delivery.

Manpower: Scientific (33), Technical (103), Administrative (55), Supportive (Engineering etc.) (3) & Others Nil.

Budget: Non-Plan-Rs1414 lakhs, Plan- Rs1529.23 lakhs

Achievements

1	**Health effects of workers in sewage treatment plants**	
	Working in sewage treatment plants (STPs) can involve exposure to different types of microorganisms and chemicals. Three different plants of Ahmedabad were monitored for airborne microorganisms. The aero-biological monitoring was done in two different seasons (summer & winter). The spirometry revealed that 88.8% of the subjects were not having any pulmonary impairment while 5.6% and 2.8% had restrictive and obstructive type of pulmonary function impairment, respectively. The viable bacteria were recorded higher during the winter compared to summer season. The concentrations of airborne endotoxin were generally low.	
2	**Study of occupational risk factors associated with brucellosis among dairy farm workers in endemic districts of Gujarat**	
	The study aimed to investigate the sero-prevalance of Brucellosis. 365 veterinary personnel (veterinarians, para veterinarians, livestock inspectors and semen collectors) working in state animal husbandry department, Gandhinagar and in dairies situated in Anand and Vadodara districts were included. Sero-prevalance of brucellosis observed was 13 to 20% among veterinarians, para veterinarians, livestock inspectors and semen collectors.	
3	**Psycho social stressors and mental health problems among workers exposed to chronic occupation associated noise**	

	A prospective and descriptive survey of mental health problem profile of workers associated with the chronic exposure of occupational noise, with exposure levels of ≥ 80 dB for more than 2 yrs with minimum 4-5 days/week was performed on textile mill workers. This study suggests higher prevalence of depression and anxiety among workers exposed with high workplace noise.	
4	**Identification of occupational health risk pollutants and their metabolites among foundry workers**	
	Compared with ACGIH guideline on heat stress (in terms of WBGT index), severe heat stress was in the moulding, melting sections, while heat stress in shaking out and blasting sections were in the limits. The dust concentration was predominantly higher in shaking out, blasting and finishing sections compared to moulding, melting sections. The time weighted average concentrations of nano-particles in finishing section were high and the proportionate dust concentration in PM1.0 was on an average 70%, while in PM2.5 it was 75% of total suspended particulate matter, existed in the working area. Cu, Cr, Fe, Mn, Zn and Co were found in the atmospheric dust while Pb and Cd were absent. The heavy metals Cu, Cr, Fe, Mn, Ni and Pb levels were significantly high among workers exposed to the workplace metal fumes than control.	
5	**Environmental and biomonitoring of women workers exposed to pesticides in tea plantation with special reference to DNA damage**	
6	**Study of thyroid hormones and lifestyle factors in male infertility**	
	The study was conducted to understand the role of heavy metals, reproductive and thyroid hormones with respect to semen quality. A total of 351 subjects have been enrolled. The subjects were grouped based upon thyroid hormone profile, as hypothyroid, hyperthyroid and normal thyroid hormone profile and compared with semen quality and reproductive hormone level. Fast progressive motility was significantly lower in both hypothyroid and hyperthyroid subjects. LH was significantly higher in hyperthyroid patient as compared to subjects with normal thyroid hormone profile. Azoospermic and oligozoospermic subjects showed non-significantly higher blood lead level as compared to subjects with normal sperm count. In asthenozoo- spermic and teratozoospermic subjects' blood Pb level was slightly higher as compared to subjects with normal sperm motility and morphology.	
7	**Impact Assessment of an Occupational Health: Internet-Delivered Intervention**	
	Website has become an essential component of health institute and its designing involves both technical and administrative decision making. It enables institute to decide what content should be posted on website. In this study, Google analytics tool was used to track visitors' behavior and pinpointed the motivation behind information seeking in context of occupational health. This study used a real life example of an internet delivered intervention about occupational health. The application of the web analysis informs about the approaches for enhancing visibility of the occupational health website, provides an indicator of engagement with occupational health, and informs future expansion of the site as a global resource for occupational health professionals.	

Major achievement having public health importance

Utility of personal cooling garment for use in outdoor hot environment	
Personal Cooling Garment (PCG) has gained increased attention due to heat stress and strain. The PCG developed by NIOH can be used in various occupations, to increase the thermal comfort of individuals. The study was conducted in hot environments of iron foundry and construction workers during summer months to evaluate the efficacy of a battery operated PCG. Results revealed that the PCG vest worn was able to attenuate the physiological strain levels as compared to the identical exposure with Habitual Clothing. All workers stated that the vests provide relief from heat stress and thermal discomfort. PCG provided a practical and economical way of alleviating the discomfort and physiological effects of heat stress.	

Study of occupational risk factors associated with Brucellosis among dairy farm workers in districts of Gujarat
The study aimed to investigate the sero-prevalance of Brucellosis among veterinarians, para veterinarians and livestock inspectors and semen collectors. Serological screening of 365 veterinary personnel showed the sero-prevalance of Brucellosis ~ 13 to 20% among occupational groups. This suggests prevalence of brucellosis in this group need intervention.
Poison Information Centre and Laboratory support - Referral cases of poisoning from hospitals - 388 Acetylcholine esterase, 91 Copper, 2 lead poisoning received.
ENVIS Centre on Occupational and Environmental Health (MoEF) ENVIS NIOH is involved in publication of ENVIS-NIOH Newsletters quarterly on current issues related to occupational and environmental health, Bibliographies on the important occupational diseases *(Industrial Effluents, Occupational Skin Hazards)* also published. During the year 4 newsletters *(E-Waste Health Hazards, Agriculture and Health, Environmental Health Legislations in India, Major Industrial Disasters in India)*, 2 News letters in Hindi (Shor Evam Swasthya Dushprabhav, Keetnashak Evam Swasthya Dushprabhav) are published.

Future Plan

Research Activity for future and some ongoing will be continued

1	Monitoring of Pesticide Residues at National Level (Ministry of Agriculture-ongoing)
2	Multicentric study to Assess the Health Effects of Pesticides on General Population
3	Occupational health assessment survey among asphalt associated job workers in India
4	Occupational safety hazards and health effects in Indian automotive industries- an inventory status study
5	Hearing threshold status and risk estimates of hearing handicaps among Indian Railway drivers
6	Sensitisation program for occupational health- An outreach program for medical graduates
7	A prevalence study of morbidity, risk factors and occupational stress among information technology workers and development of a suitable intervention.
8	Evaluation of health risk in chromite miners and factory workers exposed to chromium compounds: An environmental-cum-epidemiological study
9	Prevalence of human brucellosis, characterization and identification of biotypes, molecular detection and sequencing of Brucella strains in veterinarians, para-veterinarians and community involved in dairy activities in India (Intramural)
10	A cross-sectional survey to assess the occupational hazards among hairdressers
11	Body burden of carcinogenic organic pollutants (Poly chlorinated biphenyls and Pesticides) due to consumption of food and health Risk assessment (ICMR)
12	Occupational exposure to aflatoxins among oilseed mill workers (Intramural)
13	Prevalence and factors associated with Non-Alcoholic Fatty Liver Disease (NAFLD) with respect to occupation: a hospital based study(Intramural)
14	Relationship, if any, between spontaneous abortion and occupational, environmental exposure (Intramural & submitted for funding)
15	ENVIS NIOH Centre on Occupational and Environmental Health (MoEF)
16	Poison Information Centre and Laboratory support

8. Grievances/complaints /representations received and disposed

	Total RTI received	**Disposed**
1	39	39
	Grievances	**Disposed**
2	1 (online)	1
	1 (Physical)	Under process (With Grievance committee)

National Institute of Pathology (NIOP), Delhi

At National Institute of Pathology the thrust areas of research are tumor biology, infectious diseases including *leishmaniasis, tuberculosis, leprosy* and *chlamydiasis*, stem cell biology and environmental toxicology. The scientists conduct both basic as well as translational research leading to development of **Vaccines** for prevention and **Biomarkers** for screening, diagnosis, prognosis and prediction of drug response/resistance for various diseases **with mission to bring lab to bed**.

Manpower: Scientist (18), Technical (51), Admn./Others (26), Total= 95

Budget received by the National Institute of Pathology is Rs. 906.50 lakhs during 2014-15.

Major Projects Undertaken

Tumor Biology

Study of gene expression in early onset (<40 years) and late onset (>55) breast cancer cases have identified discriminating signatures associated with early onset cancers. Also patterns specific to Stage 2 and Stage 3 of breast cancer were identified.

Study on association of environmental risk factors and polymorphisms in DNA repair and cell cycle genes with breast cancer risk in Northeast Indian population showed Betel quid chewing conferring an elevated risk for breast cancer attributable to betel quid carcinogens and minor roles of BRCA2 mutation and C allele of RAD51. Non betel quid chewers were found at slightly lower risk due to the protection offered by the Pro/Pro-TP53 genotype.

Genome-wide analysis of genetic alterations in patients with esophageal cancer from NE India using single nucleotide polymorphism arrays identified FGF12 as a potential biomarker. Nasopharyngeal carcinoma (NPC) in North east region showed high association of HLA class I region and expression of Epstein Barr Virus (EBV). Thus the association with HLA Class III sub region in NPC pathogenesis is important since it is known to play an important role in the escape of tumor cells from host immune surveillance and may be responsible for decreased recognition and killing of cancer cells.

Leishmaniasis - Increasing incidence of relapse in Visceral Leishmaniasis (VL) cases treated with miltefosine raised the concern for its immediate surveillance in the field to safeguard efficacy. Paromomycin (PMM) is a new treatment option registered for the treatment of VL in India. Although no clinical resistance has yet been reported, it is crucial to understand the mechanism of resistance towards PMM to ensure its long term effectiveness. Tolerance to PMM was induced in three different field isolates which showed 6-7 fold reduced susceptibility towards the drug.

Chlamydiasis - Genital *Chlamydia trachomatis* infection causes serious disease sequelae, one of which is Reactive Arthritis (ReA). All infected patients positive for HLA-B27 showed moderate to severe effusion with multiple joint involvement and disease duration <6 months. Results suggest that the presence of HLA-B27 gene probably causes moderate to severe disease in the *C. trachomatis*-positive ReA/ uSpA patients and screening for HLA-B27 should be considered in such patients.

Tuberculosis - Mycobacterium undergoes reductive evolution with the ancestors losing some genes and gaining few others enabling their intracellular survival in the host environment and pathogenicity. This trend is also clearly evident from analyses of mycobacterial genomes where a distinct pattern of decreasing genomic content is seen as one moves

from nonpathogenic pathogens (NP) to opportunistic pathogens (OP) to true pathogens (TP). Although the genome size of opportunistic and true pathogens are reduced compared to the genome size of non-pathogen, the genome of true pathogens have acquired few enzyme-coding genes. Therefore, they may have a likely association between these acquired enzymes and the virulence of these OPs and TPs.

Despite the availability of many diagnostic tests, sputum smear and culture are still used to estimate the therapeutic response/end point in TB cases. Development of better diagnostic that could specifically guide clinicians for determining treatment endpoint is one of the high priorities in TB research. We have identified four signature sequences specific to *M. tuberculosis*. This is being validated on a large scale in patients in collaboration with hospitals

Adult Stem Cell Biology - Investigations have been carried to identify a cost-effective non-xenogenic product suitable for resurfacing burn wounds.

Experimental Bio-Monitoring - To investigate on the association between Intra Uterine Growth Retardation (IUGR) and PAH exposure in pregnant women residing in and around Delhi, analysis has been done for various PAH extraction in placental tissue, maternal and cord blood by HPLC which showed presence of Naphthalene, Pyrene, Acenaphthylene, Phenanthrene, Chrysene, Benzo(a) anthracene, Benzo(g,h,i)perylene, Benzo(k)fluranthrene, Benzo(a)pyrene and acenaphthene. On the basis of the preliminary results, Naphthalene is highly detected in 39% IUGR and 8% AGA cases. Pregnant women may be exposed through indoor air pollution, moth balls and tobacco smoke. Second highest PAH, detected is pyrene in 32% of IUGR cases while 5% control also showed the presence of pyrene, may be exposed through dietary sources (grilled and smoked food) and second hand cigarette smoke. However 25% women exposed through Acenaphthene and phenanthrene and 21% through acenaphthylene and benzo (a) pyrene.

Achievements

- Study of gene expression in early onset (<40 years) and late onset (>55) breast cancer cases have identified discriminating signatures associated with early onset cancers. Also patterns specific to Stage 2 and Stage 3 of breast cancer were identified.
- Study on breast cancer enhances our understanding of AR function in breast cancer and it provides novel targets for the therapeutic intervention.
- Genome-wide analysis of genetic alterations in patients with esophageal cancer from NE India using single nucleotide polymorphism arrays identified FGF12 as a potential biomarker.
- HLA class III genes play an important role in the escape of tumor cells from host immune surveillance and may be responsible for decreased recognition and killing of cancer cells in Nasopharyngeal carcinoma in North east region.
- Four signature sequences specific to *M. tuberculosis* have been identified as novel genetic markers for diagnosis of tuberculosis.

Major Achievements having Public Health Importance

- Developed mono-clonal antibody to *C.trachomatis*
- Developed DOT –BLOT assay for diagnosis of sequalae to *Chlamydia trachomatis* infection using cHSP60

- Construction of tissue microarray for various cancers-breast, prostate, urinary bladder, gliomas, mennigiomas, esophageal cancer
- LAMP assay for detection of *L. donovani* in clinical samples
- Development of Live attenuated Leishmania Vaccines
- Development of a cost-effective & improved technology to grow cultured epithelial autografts (CEA)

National Institute for Research in Environmental Health (NIREH), Bhopal

The Institute is 31st permanent institute of ICMR, was established on 11th October, 2010 at Bhopal. The goal of the institute is to understand the mechanisms of chemical–induced injury through basic, clinical, translational and community research and to develop diagnostic and therapeutic tools to chemical threat agents including toxic industrial and agricultural chemicals, toxins and other chemicals.

The aim of the Institute is to address national environmental health research issues in general with short and medium term goals to address the health research needs of the gas exposed population of Bhopal in the areas of (a) respiratory diseases (b) eye related diseases (c) cancers (d) renal diseases (e) genetic disorders (f) congenital disorders (g) women related medical issues (h) second generation children and (i) mental health and other relevant aspects.

The institute started with the strength of 44 staff of erstwhile Centre for Rehabilitation Studies (CRS) taken on contractual basis by ICMR in February, 2011from a couple of rooms in the Kamla Nehru Hospital Building, Bhopal. The clinical research wing was inagurated on 12 April, 2012. By the end of 2013 five new intramural projects were initiated in NIREH and during 2014 the focus of research of NIREH remained on Population Based Long Term Epidemiological Study, Genetics, Epigenetics & Cytogenetics, Chronic Obstructive Pulmonary Disease, Chronic Kidney Disease.

Staff

A total of 184 permanent posts belonging to Scientific cadre (66), Technical cadre (84), Administrative cadre (26) and Engineering cadre (8) have been sanctioned by the Govt of India for NIREH. All 39 staff members of erstwhile CRS, Bhopal, Govt of MP, who were taken on contractual basis in NIREH after its establishment have been adjusted against the sanctioned permanent posts of NIREH w.e.f 4th September, 2013. During the first phase of recruitment 29 Scientific Gp. A Posts have been advertised during 2014-15 by ICMR and are under various stages of screening. Similarly, a total of 28 Gp. B and C posts of Technical, Administrative and Engineering cadres have been advertised by NIREH which are under process. The **current manpower** is : Scientific (5), Technical (22), Administrative (3) & supportive (10). Total =40.

Budget

Plan budget is Rs. 200 lakhs, non-plan is nil, Intramural is Rs.44,51,567/- & extramural is nil.

Research studies undertaken

Population based long term epidemiological studies on health effects of Bhopal toxic gas Exposure:

A long term population based epidemiological study on the health effects of the toxic gas has been continuing since 1985 (1985-1994 by ICMR under BGDRC; 1996-2010 under Centre for Rehabilitation Studies, Government of M.P; 2011 onwards under NIREH) which is following cohorts of exposed and unexposed persons at six monthly intervals for morbidites and mortality. During 2014, 48th (Feb-June) and 49th (Sept-Dec) rounds of survey were completed. During the 48th round of survey a cohort of 27,181 individuals from severely exposed (n=7,827), moderately exposed (n=8,089), mildly exposed (n=5,924) and unexposed/control (n=5,341) areas was followed up. Any morbidity recorded was 22.8% in severely exposed, 17.6% in moderately exposed and 18.2% in mildly exposed areas compared to 9.8% in unexposed areas. Crude death rates were similar in the exposed (4.6/1,000 population) and unexposed cohort (4.5/1,000 population). Respiratory disorders were the primary cause of death recorded in the exposed cohort with nearly three times higher mortality due to respiratory disorders (2.15/1000 population) than in the unexposed (0.74/1000 population) cohort.

Long term genetic effect(s) of MIC gas, if any, on the Bhopal Population exposed in December, 1984:

In this pilot study (DOS Nov 2013) the cytogenetic status of 100 gas exposed and 100 unexposed individuals among those screened earlier under multi-centric genetic screening study of ICMR in Bhopal during 1986-1990 is being examined and compared with the previous genetic status to exclude the possibility of long term effects, if any, of MIC gas. Among the 800 retrieved pre-screened cases (543 exposed, 257 unexposed) only 267 were reportedly present in Bhopal of which 169 were contacted. Three generation pedigree of 145 consenting cases (125 exposed, 20 unexposed) was prepared and cytogenetic analysis of 22 subjects (7 exposed cases and their family members) was completed. Results obtained with the limited number of samples studied so far revealed cultures with low mitotic index (36% cases), assemblage of D/G group (>90% cases) and spontaneous aberration (22% cases).

A study on the prevalence of morbidity of selected population/families with reference to drinking water utilization

This study (DOS Nov 2014) is looking in to the prevalence of morbidities in a sample population and its correlation with reference to the use of drinking water sources in two areas *viz*. areas up to 1 km radius from UCIL boundary (Stratum I; Sample size 1,092 families) and areas between 2.5-5.0 km radius from UCIL boundary (Stratum II; Sample size 1,092 families). So far, 722 individuals belonging to 140 families in the two strata have been surveyed for morbidities and 401 individuals examined clinically.

Services to gas exposed people of Bhopal

Special Respiratory Clinic

A special respiratory clinic has been functioning at NIREH with the help of Kamla Nehru Hospital and Bhopal Memorial Hospital and Research Centre. Under this programme patients with chronic respiratory symptoms, identified in the field during epidemiological surveys, are transported to NIREH for examination and advised treatment. Till September 2014, a total of 370 patients were examined and investigated of which 119 were found to be suffering from COPD and 65 from bronchial asthama and other co-morbidities.

Community based health services

Under this programme severely and chronically ill patients having recurrent exacerbations of bronchial asthma and COPD, cardiac, gastrointestinal, neurological, ophthalmic morbidities who need emergency care/specialized care are being provided the benefit of referral to BMHRC, Bhopal for investigations and door step ambulance service. So far, a total of 256 patients have been referred to BMHRC for treatment.

Respiratory Physiotherapy Centre: The Centre was started by NIREH doctors at one of the Health Centres of BMHRC, Bhopal. One Physiotherapist is providing daily services. All the identified COPD patients screened by a NIREH doctor are referred for physiotherapy. So far, 46 patients have been provided physiotherapy.

Future plans : In the next 3-4 years time the staff recruitment and construction of permanent campus of NIREH is on the agenda. Various research studies will be planned based on the achievement of staff recruitment and facilities/infrastructure created.

National Institute for Research in Reproductive Health, (NIRRH) Mumbai

Vision: The vision of the National Institute for Research in Reproductive Health is to improve overall reproductive health through the generation of new knowledge; the application, translation and dissemination of knowledge, and the development of human resources.

Mission: The institute conducts basic, clinical, translational, socio-behavioural, operational and community research with a larger goal to promote human reproductive health and well-being. Our specific aim is to reduce the burden of morbidities triggered by infertility associated reproductive disorders, sexually transmitted infections/ reproductive tract infections/HIV, exposure to reproductive toxicants, menopause and osteoporosis. A reduction in maternal as well as neonatal mortalities and morbidities is also our target.

Manpower: Scientist-44, Technical-99, Admn.-44, Others-87, Total=274. Out of 274 Staff Sanctioned, 237 are working & 37 posts under various categories are vacant.

Budget: Rs 2407 lakhs

Major Projects undertaken

Fertility Regulation

- **Development of Antifertility Vaccine for Male using Synthetic Peptides of 80kDa HSA and hSPI -** Acute toxicity studies demonstrated safety of the peptide and are being further investigated for preclinical toxicity in collaboration with NIN, Hyderabad. R17 synthetic Peptide of Human Seminal Plasma Inhibin (hSPI) has also been found to induce immunological infertility in male rabbits and marmosets. These animals regained fertility with decline in antibody titer.
- **Gender Equity-Focused, Male-Centered Family Planning for Rural India -** The study aims to enhance young couple's contraceptive knowledge and acceptance of spacing methods through gender equity focused family planning interventions delivered by the village health care providers (local doctors practicing mainly Homeopathy). The intervention CHARM (Counselling Husbands to Achieve Reproductive Health and Marital Equity) consists of 3 sessions (first 2 sessions for husband alone and third session for the couple). Each session was conducted after one month's gap. These sessions were focused on contraceptive knowledge, safe motherhood, husband's involvement in

reproductive health including family planning, discussion and decision making about use of contraceptive methods, marital communication between couple; gender equity issues and violence. Over 80% husbands/couples attended the sessions. Following baseline survey and 9 month survey, 18 month follow up survey was initiated. Preliminary results from the study indicate program's effectiveness in increasing contraception use and planned pregnancies among women, via intervention with their husbands. These results suggest the feasibility of working with men within an existing health infrastructure, suggesting its likely sustainability and scalability across rural India.

- **Intervention to Enhance Acceptance of Contraceptive Use among Couples by Reducing Domestic Violence from Husband -** The objective of the study was to understand the effectiveness of an intervention model in improving contraceptive use among couples by reducing domestic violence by husband in slum communities namely, Kajupada and Tunga village areas covered under the Health post of the Municipal Corporation of Greater Mumbai (MCGM). A total of 1136 women aged group 18-39, having at least one child, and not using any contraceptive methods were screened and baseline information on socio-demographic- economic and domestic violence were collected using structured questionnaire. It was found that 17.1% women had experienced domestic violence in the past 12 months preceding the survey. These women were counselled on marital communication (individual and couple) to reduce partner violence and accept contraception. Additionally, all 1136 women were provided family planning counselling to enhance the knowledge about various family planning methods and remove the myths and misconception related to it and same for their husband as group counselling. Around 90% women received counselling on various contraceptive methods and 70% women who had experienced domestic violence received counselling on marital communication. To see the impact of intervention, endline survey show that approximately 49% non-user women using family planning methods. It was also found that 3% percentage point decreased in domestic violence and 8.9% increase in contraceptive use.

Group counselling

Couple counselling

Infertility and Reproductive Disorders

- **A Genetic Analysis of Polycystic Ovary Syndrome (PCOS) with Special Emphasis on Genes Involved in Insulin Resistance -** Studies to delineate the genetic basis of polycystic ovary syndrome (PCOS) development have been undertaken using candidate gene approach for genes contributing towards insulin resistance and identifying presence of putative risk alleles which show association with PCOS and its related traits.
- **Inventory of Secreted Proteins and their Modified Forms in Uterine Fluid -** Considering the relevance of uterine secretions in embryonic growth, development and attachment,

studies were undertaken to identify protein components of the uterine fluid in rats and humans. Our previous studies demonstrated lower levels of HMGB1 (High Mobility Group Binding Protein-1) in the receptive phase as compared to the pre-receptive phase in human uterine fluid. Further adverse effects were observed on endometrial histology and pregnancy, following administration of an excess of HMGB1 into the uterine horn in rats. These observations underscore the importance of lower level of inflammatory molecules during the receptive phase and also during the implantation.

- **A Study on Cystic Fibrosis Transmembrane Conductance Regulator gene screening in Indian infertile men having Congenital Bilateral Absence of Vas Deferens -** Congenital bilateral absence of vas deferens (CBAVD) occurs in 2-6% of infertile but otherwise healthy men and is associated with mutations in cystic fibrosis transmembrane conductance regulator gene (CFTR). Further studies are ongoing.
- **Autoimmune Markers for Early Diagnosis of Endometriosis -** A multicentre study has been initiated for validation of peptide ELISA based on epitopes of Tropomyosin 3 (TPM3), Stomatin like Protein 2 (SLP2) and Tropomodulin 3 (TMOD3) proteins for non-invasive diagnosis of endometriosis. Total study participants recruited so far in Mumbai, Kolkata, Goa and Nagpur centres were: Group I: Endometriosis (n=307); Group II: Disease Control (n= 71) and Healthy Controls (n=104). These biomarkers also show high sensitivity (≥80%), specificity (≥60%) for diagnosis of early stages of endometriosis.
- **Studies to Elucidate the Molecular Mechanism of Estrogen Action on Spermiation -** Spermiation, the sperm release process, is imperative to male fertility and reproduction. The study suggests that both estrogen and androgen regulate specific genes in seminiferous tubules that could play a role in spermiation.
- **Studies to Elucidate Molecular Mechanisms of Estrogen Action in Imprint Acquisition in the Male Germ Cells -** Maintenance of normal male fertility relies on the process of spermatogenesis which is under complex endocrine control of gonadotropin and steroid hormones. Although testosterone is the primary sex steroid in males, estrogen is locally produced in the testis and plays a very crucial role in male fertility. The two ERs have both overlapping and distinct roles in maintenance of male fertility.

Osteoporosis

Prevalence of osteoporosis is high in women due to decrease in estrogen secretion at menopause. Understanding the mechanism of bone remodeling, differentiation of bone cells and study effect of estrogen on these processes may aid in its identification. This leads to an increased secretion of cytokines that activate osteoclasts, resulting newer biomarkers and molecular signatures.

Reproductive Tract Infections including STI/ HIV

- **Identification, Isolation and Characterization of Naturally Occurring Antimicrobial Proteins/peptides (AMPs) for the Prevention of Sexually Transmitted Infections including HIV/AIDs**

  (a) **Characterization of AMPs isolated from Indian mud crab, *Scylla serrata* -** SsALF-24 attenuated lipopolysaccharide (LPS)-induced cellular immune responses in human vaginal cells has been reported. Studies were extended to see whether TLRs sense pathogen induced autophagy. Autophagy is evolutionally conserved

process has recently been shown to be an important component of the host innate immune system.

(b) **Characterization of AMPs isolated from rabbit vaginal fluid and their role in vaginal innate immunity -** The development of molecules, which prevent new HIV-1 infections, is highly warranted. In the present study, a panel of human hemoglobin (Hb)-α subunit derived peptides and their analogues were designed *in-silico* and their anti-HIV-1 activity was evaluated. Of these peptides, HbAHP-25, demonstrated significant anti-HIV-1 activity with a potential to inhibit early stages of HIV-1 infection.

(c) **Understanding the Mechanism of Sexual Transmission of HIV -** Presence of distinct viral variants and different numbers of variants remained the challenge in control and management of HIV/AIDS which need to be investigated in larger populations by Next Generation Sequencing (NGS), which may provide the guidelines for designing the strategies for management of disease progression, antiretroviral drug therapy, development of effective vaccine and microbicides.

- **Approaches for Controlling Biofilm formation by *Gardnerella vaginalis* -** Biofilm formation by the anaerobic bacterium, *Gardnerella vaginalis*, is associated with recurrence of *bacterial vaginosis* (BV), a common vaginal condition affecting women in the reproductive age group. A targeted peptide based approach was adopted and the action of two rationally designed peptides, GVBAP-7 and GVBAP-11 on biofilm formation by *G.vaginalis* was examined. Both the peptides exhibited moderate anti-biofilm activity. Suitable sequence modifications will be carried out to enhance the anti-biofilm activity of these peptides.

Reproductive Cancers

- **Membrane Bound Estrogen Binding Proteins in Prostate Cancer Cell Lines and their Functional Significance –** Prostate cancer is one of commonest hormone-responsive cancers in men. Epidemiological evidences and animal experiments have implicated estrogens in prostate carcinogenesis. It is well established that prostate expresses conventional estrogen receptors (alpha and beta) in the nuclei of epithelial and stromal cells. However, there exists no information on the presence and functional relevance of plasma membrane bound estrogen receptors in prostate cancer cells. The presence of estrogen binding proteins on the cell surface of androgen-dependent and -independent prostate cancer cells has been demonstrated in the preceding years. Experiments were conducted to characterize membrane -bound estrogen binding sites. It was concluded that the cell surface ER could be identical to the conventional estrogen receptors.
- **Stem Cell Biology - A novel population of pluripotent stem cells termed Very Small** Embryonic-Like stem cells (VSELs) was studied in depth and characterized in human cord blood and adult mouse reproductive tissues and pancreas. They serve as a back-up pool for tissue-specific stem cells, are mobilized in large numbers in response to disease and are possibly also implicated in cancer initiation.

Maternal and Child Health

- **Induction of Lactation by Oral Administration of Aqueous Extracts of Traditional Plants**

Oral administration of aqueous extracts of traditional plants entitled *Pennisetum Americanum*, *Lepidium Sativum*, *Cyperus Rotundus*, *Foeniculum Vulgare*, *Ipomoea Digitata*, *Trigonella*

Foenum-graecum, *Gmelina Arborea* and *Ricinus Communis* up to the dose of 2000 mg/kg body weight induced lactation and found to be safe.

National Centre for Primate Breeding and Research (NCPBR)

National Center for Primate Breeding and Research (NCPBR) at Sasunavagar, Thane District, near Mumbai aims to breed rhesus monkeys for biomedical research. The facility includes construction of a quarantine building, in-door and outdoor breeding (corals and corncribs), experimental animal and laboratory facility. The facility will also breed specific pathogen free animals (SPF) (Animals free of Simian Retroviruses 1-5 (SRV), Simian T Lymphotropic Virus (STLV) and Herpes B).

The revised RCE for entire NCPBR project estimated to Rs. 292.81 Crores was submitted to ICMR and to DHR for further approval. Proposal for acquiring additional 25 acres of land for NCPBR project is in the advanced stage at the office of Chief Conservator of Forest, Borivali, Mumbai.

National Centre for Preclinical Reproductive and Genetic Toxicology

The Centre has undertaken research using animal models in the area of endocrine disrupters (EDs) as these have been documented to be associated with many adverse effects in the human. Studies have demonstrated that exposure of neonatal male rats to Bisphenol-A leads to disruption of HPT axis, impairment in spermatogenesis, significant decrease in expression of steroid receptors and their co-activators at protein and transcript level, leading to decrease in sperm count and motility during adulthood. Results indicate that apart from endocrine action, BPA could exhibit its effect via epigenetic machinery.

The Centre has collaborated in various intra and inter-institutional projects and also provided toxicity testing services to the industry/academic/research institutions for safety evaluation of their products. During the reporting period thirteen staff and students from various academic Institutions were trained in genetic toxicity testing.

ICMR Biomedical Informatics Centre

- **Developing a Gene Based Database on Infertility –** A database with detailed information on cases of infertility is the need of the day. This database would be beneficial to both researchers and clinicians for studying the role of different genes in infertility and for screening mutation respectively. Data collection has been completed for 22 genes and is still ongoing.
- **Studies on Antimicrobial Peptides -** The database of antimicrobial peptides, developed by the center and available online has been updated to include information on families of antimicrobial peptides

NIRRH-ICMR Field Units

ICMR had established Human Reproduction Research Centres (HRRCs) in the 1980's in 31 Medical Colleges spread across the country. Recently the functioning of these HRRCs was reviewed and they were transferred to NIRRH in 2013. An Apex Committee was formed by ICMR which decided to reorganise the HRRCs and they are now designated as Field Units of NIRRH. Additionally, thirteen new Field Units have been created so there are a total of 44 NIRRH Field Units spread all over the country. The major objective of these Field Units is to identify local reproductive health problems and formulate and implement research projects to address the identified reproductive health problem. A Project Review Group consisting of experts in the field appointed by the Director General, ICMR was constituted and has

reviewed projects to be implemented through the Field Units.The office of the NIRRH Field Unit has been established at the Institute and the staff to manage the said units has been deputed from NIRRH.

Achievements

- **Hormonal Regulation of Telomerase and its Implications in the Pathogenesis of Prostate Cancer.**
- **Deciphering the Functional Significance of Heat Shock Protein 90 Beta (HSP90β) in Ovarian Autoimmunity-**Results have given us an insight in understanding the disease pathophysiology and highlighted the important role of HSP90 in ovarian generation of follicles essential for normal ovarian functioning**.**
- **Association of Host immunogenetic factors with HPV infection and its predisposition to cervical cancer in Indian women-** Human papillomavirus is the main cause of cervical cancer. However, persistent infection is seen only in few women and among them only a fraction develops cervical cancer, highlighting the association of host immunogenetics in development of such complications. The study had two main objectives to evaluate both HLA and cytokine polymorphisms in women with or without HPV infection and with or without cervical cancer. The study revealed that multiple HPV infection is the major cause of cervical cancer.

Major achievements having public health importance

- Three different diagnostic kits validated and ready for launch
- Database developed and made available for public use
  - A catalogue of proteins in human follicular fluid
  - Endometrial receptivity related genes
  - Antimicrobial peptides
- Anti-HIV molecules identified
- Animal models for endometriosis and endometrial hyperplasia developed
- Inter-institutional collaborations initiated through IIT-B Health Care Consortium
- The study of 'Near Miss' obstetric events and maternal deaths revealed hypertension and hemorrhage as major causes of maternal morbidity and mortality
- Assessment of services for prevention and management of infertility in Primary Health Care system revealed a need for incorporation of infertility services in the national program.
- Cervical Cancer Screening programme sustained by Municipal Corporation of Greater Mumbai.
- Modern Rural Health Research Unit (MRHRU) established at Dhanu, Maharashtra
- NIRRH-FU activity initiated at NIRRH

Future plans

- Work to be strengthened in the areas of Fertility Control, Maternal and Child Health, Environmental Reproductive Health Hazards, Gender Issues, Adolescent Health as per

recommendations of the High Power Committee constituted by ICMR to evaluate the ongoing activities proposed by ICMR in the 12th Plan.

- Implementing research projects through NIRRH-FUs and MRHRU
- Focus on Translational Research
- Establishment of the Centre of Excellence for Female Fertility Disorders (CFFD) whose research focus will be on polycystic ovarian syndrome (PCOS), poor ovarian reserve (POR), endometriosis, spontaneous abortions and birth defects
- Human Resources development through organizing short and long term structured courses in the area of reproductive health

Grievances/complaints/representations received & disposal details: Number of Grievances / complaints /representations received were 10, out of which action taken on 3 and 7 sent to ICMR for necessary action.

National Institute for Research in Tuberculosis (NIRT), Chennai

Vision

To be a Centre of Excellence for Research in Tuberculosis and an opinion leader on TB control policies.

Mission

- NIRT is mandated by the Indian Council of Medical Research to provide scientific understanding and technologies needed to support the fight against TB.
- NIRT supports and promotes Directly Observed Treatment Short-course (DOTS) in the Revised National Tuberculosis Control Programme (RNTCP) of the Government of India by providing better tools and refining existing tools for diagnosis, treatment and monitoring of TB through controlled clinical trials and scientific research.
- NIRT endeavours to provide training programs to researchers and programme personnel in both basic and clinical sciences.
- NIRT is committed to the dissemination of knowledge and leads in the development and use of the technologies needed to synthesize, analyze and disseminate information about TB.

Manpower: staff strength of institute is scientific (35), Technical (89), Admn. (103) & Engg./ supportive(52). Total : 279 Staff Strength of epidemiology unit – scientific (2), Technical (81), Engg. (6), Admn. (71). Total = (160).

Budget: Total budget (plan & non plan) received is Rs. 3771.55 lakhs

Major projects undertaken

Completed projects

1. Psychosocial issues facing MDR patients
2. Viability and retrieval of *M. tuberculosis* from selective Kirchner's medium using bovine albumin serum instead of fetal calf serum.
3. Pharmacokinetics of anti-TB drugs in HIV-infected children with TB.

4. Use of alternative biomarkers other than IFN-γ for diagnosis of TB.
5. Role of Serine/threonine protein kinase, pknE in the modulation of intracellular signalling events in *M. tuberculosis*
6. Role of Chemokines, DC-SIGN and Toll-like receptor gene variants on immunity to TB.
7. Immunology of Helminth-TB co-infections: Helminth infections coincident with active PTB inhibit mono - and multifunctional $CD4^+$ and $CD8^+$ T-cell responses in a process dependent on IL-10.
8. Immunology of TB and its co-morbidities: IL-10-, CTLA-4- and PD-L1-dependent contraction of circulating $CD4^+$ T follicular helper cell subsets in active PTB

Ongoing projects

- Randomized clinical trials
- Department of Socio - Behavioral Research
- Department of Bacteriology
- Department of Biochemistry & Clinical Pharmacology
- HIV Laboratory studies
- Department of Immunology
- Department of Epidemiology
- Biomedical Informatics
- International Centre for Excellence in Research

Major achievements having public health importance

1. Interim findings of the clinical trial using moxifloxacin indicate promise for a 4-month regimen for treatment of TB.
2. The pharmacokinetic study of anti-TB drugs in children provided evidence to the National programme that the existing drug doses were inadequate and that there was a need to increase the doses.
3. The pharmacokinetic study of rifabutin in HIV-infected patients with TB demonstrated the need to increase the existing 150 mg thrice weekly dose of rifabutin during concomitant ritonavir administration. The RNTCP has increased the dose of rifabutin from 150 mg thrice weekly to 300mg thrice weekly during ritonavir co-administration.
4. Drug resistance survey in Tamil Nadu showed high rates of ofloxacin resistance even among new patients.
5. Self help groups can contribute to TB control by increasing case finding and serving as DOT providers.

Future Plans

1. Clinical trials
   (i) for shortening treatment of tuberculosis (TB) and MDR TB using new drugs
   (ii) prevention of TB among household contacts using newer regimens

(ii) mobile phone based interventions to reduce several risk behaviour among MSM

(iv) newer regimens for treatment of INH resistant TB

2. Studies on extra pulmonary TB and smear negative TB
3. Pharmacovigilance and pharmacoepidemiology
4. Newer biomarkers for diagnosis of TB.
5. Pharmacokinetic studies of new drugs
6. Rapid molecular detection of drug resistance
7. Setting up of centre for implementation research & training

Status of Grievances

Seven grievances were received & all were resolved.

National Institute for Virology (NIV), Pune

Mission

High quality applied and basic research in the area of epidemiology, molecular biology, immunology, diagnostics, vaccinology, prevention and control strategies for viruses of public health importance, by creating a center of excellence, safe workplace and risk-free environment through establishment of state-of-art laboratories and development of appropriate human resources.

Vision

To provide knowledge database, reliable diagnosis and effective vaccines for the viral diseases of public health importance. In addition proper management as well as their prevention and control are endeavored.

Manpower: Scientists (37), Technical(169), Engineering (40), Admn. (53), Other (90) Total=389

Microbial Containment Complex (MCC) Pashan- Scientists(0), Techical(0), Engg.(2), Admn. (3), Other (7), Total=12

Budget:

NIV: Non Plan- Rs 1735 lakh, Plan- Rs 1333 lakh

MCC: Non Plan- Rs 61 lakh, Plan- Rs 736 lakh

Projects

A total of 3 Extramural projects & 18 Intramural projects initiated; 19 Extramural & 47 Intramural projects are Ongoing and 6 Extramural & 18 Intramural projects completed during 2014.

Diagnostic services rendered to the country: over 25,000 samples were tested for 29 viral diseases.

A total number of 55 **publications** published during Jan-Dec 2014.

Highlights of Activities

Major activities of public health importance:

- **Japanese encephalitis virus outbreak, West Bengal:** Acute Encephalitis Syndrome (AES) cases were admitted in North Bengal Medical College, Siliguri, and Darjeeling. Japanese encephalitis was confirmed as ethological cause and the age shift in JEV cases were noticed during the outbreak investigation.
- **Kyasanur Forest Disease (KFD) virus, Kerala:** During January-April, 2014, KFD outbreak was confirmed in Thirthalli area, which covered 10 PHC in this states. Human samples, monkey specimen and tick pools were confirmed positive from these areas at NIV, Pune. A proactive field investigation undertaken during 18-22 May 2014 further substantiates the recent KFD activity in the area.
- **Crimean Congo Haemorrhagic Fever outbreak, Gujarat State:** During March 2014, a CCHF case in Sirohi district, Rajasthan was confirmed. During this year, 7 CCHF human cases were found positive from Kutch, Anand, Amreli and Aravali districts. The confirmed case of CCHF in Rajasthan and Aravali, Gujarat shows the spread of this disease into new areas.
- **No human transmission noted following Avian Influenza outbreak, Kerala:** Clinical samples from 5 patients with ILI/SARI symptoms were tested for Influenza H5N1 diagnosis. Two of these patients were veterinary specialists and the others were symptomatic persons from the affected area. All the five samples were negative for Influenza A&B and H5N1 viruses.
- **EBOLA preparedness and role of apex laboratory:** In the current scenario of emergence of Ebola virus, the workshop on the "Preparedness for quick laboratory diagnosis of Ebola virus" was organized for the 16 Medical Research/diagnostic laboratories (BSL-3) in India for the capacity building in the country. The objective was to cover Biosafety aspects, work practices of BSL-3 laboratory, molecular diagnosis of Ebola virus and International Air Transport Association (IATA) Awareness, Cold Chain Management (CCM) and Dangerous good declaration.
- During training adequate knowledge, hands-on experience and laboratory reagents & other materials were provided to trainees, explaining Emerging and Re-emerging diseases, current scenario of Ebola outbreaks and vectors involved in transmission of the disease, Good Laboratory Practices (GLPs). NIV, Pune as apex laboratory provided continuous diagnosis services to country and also prepared document **"National guideline to handle Ebola suspected patient and control practices"**.

Technology development

Under translational research six ELISA kits were developed to provide early diagnosis or preparedness for viruses of public health importance *viz:*

- Hepatitis E diagnostic ELISA.
- KFD IgM detection ELISA for human.
- IgG assay for detection of anti CCHF antibodies in Sheep and Goat.
- IgG assay for detection of anti CCHF antibodies in Bovine.
- ELISA for detection of anti Chandipura virus IgM in human.

- Antigens capture ELISA for detection of JEV from mosquito.

Knowledge generation

A total of 55 research articles in various scientific journals were published. A synopsis of the major achievements is summarized as follows:

- ***Influenza disease burden in rural communities of India:*** A population-based longitudinal burden of disease study was carried out at two study sites in rural parts of India: Vadu and Ballabgarh. The study documented the previously unrecognized burden of influenza hospitalization in a rural community and high incidence following the emergence of influenza A(H1N1)pdm09 viruses in India. Incidence rates of influenza-associated hospitalization were up to 11 times higher in Vadu compared to Ballabgarh for certain age groups.
- ***Immune response gene (non-MHC) polymorphisms in dengue disease pathogenesis:*** The immune response gene polymorphisms for development of dengue fever or dengue hemorrhagic fever were studied.
- ***Understanding the efficacy of adjuvants in candidate vaccine development for HEV and influenza viruses:*** A vaccine against Hepatitis E is important particularly for pregnant women since the mortality rate during infections is 20%. NIV, Pune developed liposome encapsulated NE protein based candidate vaccine for HEV and found it to be highly protective. Further assessment of the mode of action of this formulation showed that there are distinct differences in pregnant and non-pregnant mice, which needs further evaluation.

Human Resource Development

VRDL: Training imparted to 60 participants on 05 different modules of 21/27 VRDLs

WHO Trainings: Workshops were conducted on Biosafety, DENV and human Influenza diagnostics.

Preparedness: Engineering workshop for maintenance of BSL-2 & -3 laboratories.

National Preparedness: "Training workshop for quick laboratory diagnosis of Ebola virus" organized for the 16 Medical Research/diagnostic (BSL-3). laboratories

New Initiatives

Rotavirus countrywide surveillance

Measles countrywide network

Countrywide survey for CCHFV antibodies in domestic animals

AES Surveillance, Central India

Academics: M.Sc. (Virology) (nineteen students graduated in 2014 and 21 enrolled) and PhD program.

Future Plans

- The strengthening of the diagnostic virology initiative under a seamless single window rapid clearance facility is major initiative undertaken. This program will be interfaced with a BioRepository Program for proving excellent reference standards for diagnostics and quality issues. Further, a new program on diagnostic reagent development has

been approved which will cater to EQAs and support the Virus Diagnosis Laboratory Program of DHR.

- Further strengthening of the BSL4 Laboratory will be undertaken to strengthen capacity building in training national manpower for responses to highly contagious viruses as recently demonstrated by the Ebola outbreak.

Service offered: Over 25,000 samples tested for 29 viral diseases.

Grievances/complaints/representations & Disposal details: Nil.

Swatch Bharat Program initiative at NIV inaugurated by Dr. D. T. Mourya, Director with enthusiastic participation of staff, students, colleagues at all campuses.

Release of "Biosafety Manual of BSL-2 and -3 laboratories" and "Glimpses of NIV Research; 1953 to 2014" by the hands of Dr. V. M. Katoch, Secretary DHR & DG, ICMR at NIV Pune

National JALMA Institute for Leprosy & Other Mycobaterial Diseases (NJILOMD), Agra

Vision

The vision of the Institute is to conduct R&D programme to bring out innovations related to diagnostics for leprosy and tuberculosis, to study endemicity of leprosy and tuberculosis and explore disease transmission dynamics, develop new treatment regimens for leprosy and tuberculosis with/without immunomodulators like Mw vaccine.

Mission

- Research activities on Leprosy covering themes like – understanding disease better using electrophysiological, immunological, molecular and electron microscopic tools; developing better technologies for diagnosis,; studies on transmission of leprosy; improving treatment regimens & surgical methods; studies on drug metabolism and kinetics.
- Research activities on Tuberculosis & Other Mycobacterial Diseases including early & rapid diagnosis, drug sensitivity testing, operational research in TB, molecular epidemiology in field area, treatment using RNTCP protocols, vaccine studies in animals with other partners.

Manpower: Scientist (23), Total Man Power:140+1(Sci F RE) +Consultants (Admin) 2

Budget received by the Institute (during April-Dec.2014)

Plan : 758.09 Lakhs : Non-Plan : 902.90 Lakhs : Total : 1660.99 Lakhs

Salient findings

During 2014, the Institute has made significant progress in its research programmes on tuberculosis, leprosy and other mycobacterial diseases. Besides the clinical and laboratory based research, the programmes of the Model Rural Health Research Unit at Ghatampur are important from a public health point of view. A MRHRU is being established at Una,

Himachal Pradesh under DHR, with nodal services to be provided by the Institute.

Studies on Leprosy

NJIL&OMD is the apex national institution on leprosy and undertakes research on clinical, therapeutic (medical and surgical) and epidemiology of leprosy.

Molecular studies

To understand the transmission of leprosy are a part of the multi-centric and multi-State ICMR project. During the year, these studies progressed in selected areas of Uttar Pradesh (Ghatampur and around), Chhatisgarh and Tamil Nadu. Results showed the presence of DNA and RNA of *Mycobacterium leprae* in the water and the soil samples of the areas in which leprosy is prevalent. Such presence was noted in Ghatampur (now and earlier also) and also Chhatisgarh. This information will be used to trace the sources and determine transmission dynamics of the disease in high endemic pockets so that new strategies to block transmission are developed.

Immunological Studies in Leprosy

Understanding the role of CCL 2 and associated gene in leprosy susceptibility and in leprosy reactions (ICMR-TASK FORCE).

Alternate Drug Regimens for Leprosy: Follow up of the cases on uniform MDT (initially suggested by the Institute as a common regimen for leprosy) showed that it is a good alternate to the standard regimen and is user friendly.

Evaluation of different treatment regimens being used at MRHRU, Ghatampur, Kanpur Nagar, India (UMDT, Standard PB regimen plus Clofazimine , Standard MB regimen plus supervised Ofloxacin + minocycline): An interim analysis of follow up of patients on various regimens of leprosy has suggested that lower duration regimens can be used with same efficacy in the programmatic conditions for treatment of leprosy .This project also has the objectives of follow-up of patients treated for leprosy and TB using Standard as well as alternate regimens for leprosy/tuberculosis in the various leprosy and TB surveys undertaken at MRHRU, Ghatampur, Kanpur Nagar earlier and the digitalization of records and implementation of data management system at MRHRU, Ghatampur for analysis of impact of different interventions. The project has made considerable progress and an approximately 30% of the patients have completed 24 months of follow up.

Studies exclusively on Tuberculosis

Molecular epidemiological studies of tuberculosis

Institute is engaged in studies based on molecular epidemiological markers. Seventy two isolates from Agra, 44 from Lucknow region were included and more number of isolates from Himachal Pradesh and North East region are being included.

The Institute is also continuously involved in drug resistance problem in tuberculosis. The just completed study on Genetic polymorphism in *Mycobacterium tuberculosis* isolates from tuberculosis patients from Sahariya Tribe of North Central India (an ICMR-TF funded study) has revealed high burden of tuberculosis among the male patients of Sahariya tribe as well as their counterparts. Of 47 isolates from patients from Sahariya, 18 were resistant to anti-TB drugs: 13 mono-drug resistant, 4 multidrug resistant and 1 poly-drug resistant. Of the isolates from 14 non-tribal counterparts, two were monodrug resistant and 4 were multidrug resistant.

Immunological studies in tuberculosis

Th 17, gamma delta T cells, T regulatory cells and IgG subclasses in TB patients and their healthy contacts: A follow up study.

Analysis of SNPs in TLRs, TIRAP, MCP 1, MiRNAs in tuberculosis and understanding the possible role of these molecules in immuno-pathogenesis.

Proteomic approaches to study mechanisms of drug resistance in tuberculosis - To understand mechanism of resistance to aminoglycosides (drugs of choice especially for category II TB patients) and fluoroquinolones. Twelve proteins were found to be consistently increased. The major finding implicates that the genes/proteins involved in iron metabolism (Rv1876) and the two hypothetical proteins (Rv3224 & Rv3867) might be playing a crucial role in contributing resistance to second line drugs. Three hypothetical proteins are being studied for functional significance.

Programmes undertaken as one of the National Reference Laboratories for Tuberculosis - As a National Reference Laboratory, the Institute is involved in providing help/ guidance to four states (Uttar Pradesh, Himachal Pradesh, Uttarakhand and Assam) in their External Quality control Assay (EQA) and anti-TB drug sensitivity testing. As National Reference Laboratory for tuberculosis, NJIL&OMD has accredited 19 laboratories across the country for Line Probe Assay (LPA) so far and these laboratories are capable of taking the load of patients in their respective geographic areas for early diagnosis of suspected drug resistant tuberculosis.

National facilities: BSL-3 Facility and Mycobacterial Repository Center - This facility is running as a permanent facility of Indian Council of Medical Research. This center has established linkages with a number of Institutes and centers. The number of participating centers currently is 45. Nearly 5350 isolates from different parts of country are being maintained in the Repository which continues to supply the reference material to different investigators all over the country as the main resource for evaluation of the new compounds identified in the Open Source Drug Discovery programme of CSIR. The Institute is also providing expertise/ help to other scientists who face difficulties in the characterization of mycobacterial isolates across the country. As a part of Repository, formal / informal training is provided in identification, handling of pathogens under Biosafety conditions, preservation of isolates, sensitivity screening and newer molecular DNA fingerprinting methods for characterization of mycobacteria to scientists and technicians from different parts of the country. Besides, its role a National Reference Laboratory for TB and National Centre for Molecular Drug Resistance Surveillance in Leprosy, the Institute continued to serve as a National Facility for Animal Experimentation in tuberculosis. This BSL-3 facility has been providing collaborative support to several Institutions for testing their drugs and vaccine candidates against tuberculosis.

Human Resource Development - As a partner in NLEP and RNTCP, this Institute provides training to programme managers, doctors and laboratory staffs in different states. The earlier programmes like research training in life sciences and project training for Postgraduate students for research training in life sciences and project training, MD thesis and Ph.D thesis also continued. The Institute has been running fortnight Summer Training Courses involving refresher course in biotechnology and allied subjects, biosafety procedures, updates on health problems like tuberculosis, leprosy and HIV infection.

Programmes of the Model Rural Health Research Unit (MRHRU), Ghatampur - During the year, the MRHRU at Ghatampur continued to assess the impact of various interventions

(Standard and new methods developed by Institute) in leprosy and tuberculosis. These studies include the translational programmes for assessment of the long term impact of the cases treated with different regiments in leprosy and tuberculosis. The unit is also undertaking studies the transmission dynamics of leprosy employing molecular epidemiological tools. The focus has continued to be on strengthening the working linkages with state health systems.

Major Projects undertaken

The following projects are underway at the Unit during the year 2014-15: -

(a) Evaluation of different treatment regimens being used at MRHRU, Ghatampur, Kanpur Nagar, India.

(b) Improving health and nutritional status of vulnerable segment of population by implementing multi-component health and nutrition education intervention as a sustainable model of intervention.

(c) Determining the efficacy and safety of immunomodulator as an adjunct therapy in pulmonary tuberculosis (Cat II & I).

(d) A study on the endemicity of leprosy and utilization of health services in selected areas of Uttar Pradesh, Chattisgarh and Tamil Nadu.

(e) Elucidating the strain differentiation and transmission dynamics of *M. leprae* through Inter Simple Sequence Repeats (ISSR-PCR) marker.

Major achievements having public health importance

The UMDT for all leprosy patients validated by the Institute has been made available for the National Leprosy Control Programme. The results of the role of Mw in the prevention of and management of leprosy and TB is of public health value. The pioneer work carried out at the MRHRU at Ghatampur has resulted in the development of other MRHRUs which in the long run will help to identify the health problems and improve the health of rural population in India. The endemicity of leprosy in various parts of the country and the transmission dynamics of leprosy have been studied, which would be useful to leprosy control related activities. The RLEP-PCR and ISSR-PCR have been found to be better diagnostic tools for leprosy. Data from TB Drug resistance studies carried out have been made available to the program. Hypothetical proteins have been identified and characterized in aminoglycoside and ofloxacin resistant *M. tuberculosis* isolates and attempts are being done to validate the findings. Novel information regarding the role of important genes of host immune responses is unfolding in the leprosy and tuberculosis patients of this region of northern India.

Future Plans

1. Continuation of Studies related to prevention of leprosy in endemic areas using Mw; surveillance for drug resistance in leprosy, TB and HIV patients; epidemiology and transmission of TB & Leprosy; and newer regimens for treatment.
2. Continuation of cohorts of TB and leprosy patients treated with various regimens.
3. Studies to understand the role of Type 1 and Type 2 macrophages in various clinical forms of leprosy patients.
4. Exploring molecules which have given indication to be used as markers for prognosis of Type 1 and Type 2 reactions in leprosy in previous studies.

5. Explorative studies on host genetic markers for HIV/TB diseases and occurrence of IRIS.
6. Studies on novel mechanisms of resistance in tuberculosis and search on novel drug targets based on proteomic approach.
7. Further studies on biofilm formation by *M. tuberculosis*.

Grievances/complaints/representations received & disposed details:

One Grievance from Sri S. Masih, Ex-SO(Stores) regarding revision of his Grade pay on MACP was settled. Grade pay of Rs.4800 given by MACP Board as final MACP.

Rajendra Memorial Research Institute for Medical Sciences (RMRIMS), Patna

Mission

Visceral Leishmaniasis (Kala-azar) is the major thrust area of research for RMRIMS. The Institute has been continuously conducting various research activities on clinical, basic and applied aspects of kala-azar.

Vision

The vision of RMRIMS is to provide technical support to the policy makers and implementers to combat the kala-azar disease at the ground level through conducting high quality research on diagnosis, treatment and control as well as capacity building to the different stakeholders. Besides Kala-azar, the Institute is rolling forward to broaden its research focus on HIV/AIDS, tuberculosis and other tropical diseases and come forward as a centre of excellence on the land of Bihar.

Manpower: Scientist (18), Technical (21), Admn. (15), Supportive/Others (50), Total=104

Budget: Non-Plan – Rs 212 lakhs, Plan – Rs 1650, Extramural – Rs 487 lakhs

Major Achievements

Epidemiology

Sentinel surveillance of 2773 kala-azar cases, enrolled at the sentinel sites established in endemic areas of Bihar, revealed rapid diagnostic test (RDT) as the main diagnostic tool (98.8%). Majority of the cases were treated with miltefosine (43.1%), followed by SAG, Amphotericin-B and combination therapy. Final cure rate observed was about 86% and relapse rate was 8.5%. The finding suggests for an extensive study on PKDL conversion from the VL cases specially treated with single dose ambisome under programme mode. Followed by impact assessment of ASHA training in intervention PHCs in terms of increased referral of kala-azar cases from 6.21% to 27.94%, the second round training for ASHAs was conducted. The post training assessment revealed increase of referral to the tune of 43.48% i.e. almost **7-**fold increase in referral by ASHAs after repeat training.

Diagnostics

A non-invasive method for diagnosis of kala-azar by rK39 test in oral fluid samples was developed with sensitivity of 99% and specificity 100%. Third-party revalidation in more samples is underway. Another noninvasive PCR-based diagnostic test for kala-azar using

urine samples was found to be 90% sensitive and 95% specific. Evaluation of nested PCR in early diagnosis of PKDL is under way.

Therapeutics

Under a clinical study on efficacy and safety evaluation of single dose ambisome (10 mg/kg body wt) for treatment of children VL cases, 36 patients were treated. All the 25 patients followed-up (till date) for one-month were found initially cured but one relapsed after initial cure. Apart from rigor, cough, vomiting, elevated SGOT and SGPT (recovered), no major adverse event was observed. Comparative evaluation of efficacy and safety of Amphotericin B in two different doses (0.5 and 1 mg/kg) in treatment of PKDL reveals equal efficacy with minimum toxicity.

Operational Research

GIS, Geo-statistics and Remote Sensing based model was developed to explore breeding site and risk assessment of *P. argentipes* in kala-azar endemic region of Bihar. Altogether 12 environmental factors including climatic (i.e. humidity and temperature), soil characteristics (i.e. soil moisture and soil pH) and others environmental factors (i.e. distance to agricultural land, water body and pile of garbage, type of water body, type of vegetation cover, land density of agricultural field, water body and sparse vegetation cover) were identified as significant variables to predict the breeding habitat of *P. argentipes*.

Under environmental management of vector control, comparative effectiveness of different interventions: (i) brick cement (ii) brick powder and lime (iii) wire mesh and (iv) glazed tiles were assessed in 10 houses for each intervention. Fortnight surveys were made to assess the pre-density before intervention in March 2014. Post intervention assessment done from April to Dec. 2014 revealed that wire mesh intervention was not accepted by residents. The reduction in sand flies density was found remarkably in three interventions except wire mesh. These interventions can be supplement to the integrated vector management programme.

Disease Database Management System (DDMS) has been taken up in 8 kala-azar endemic districts to keep track of impact of IRS operation on kala-azar incidence.

Virology

Virlogy lab continued the diagnostic support for several viral diseases such as diarrhea (viral gastroenteritis), acute encephalitis syndrome (AES), influenza, enterovirus, H1N1, VZV, herpes simplex I and II, Dengue, Chikungunya, EBV, CMV, Rubella, Measles, Swine flu, HAV, HBV, HCV, HEV. Altogether 19 viruses are being diagnosed routinely.

Some uncommon viruses like EBV, HSV, CMV and VZV, rubella and measles were also detected during the year and found IgM positive. Out of 579 blood samples tested for hepatitis B & C, 58 were positive for HBV and 15 for HCV.

During outbreak investigation for Chicken Pox, reported in Punpun on 03rd Feb 2014 and in Bihta on 5th June 2014, one sample was found positive for VZV in each area. Other outbreak investigational support includes seasonal outbreak of AES in paediatric age group in Mzaffarpur (reported on 10th June 2014) and outbreak of mysterious disease in Gaya district (reported on 16th September 2014). None of the samples tested was found positive.

Tribal Health Research

DISHA project - Followed by training cum sensitization meeting, household listing, mapping and demographic survey of 12 clusters in tribal population of Ranchi district, Jharkhand,

identified by CDC, N. Delhi, was completed. Baseline survey of the clusters using pre-tested study tools was initiated.

Hemoglobinopathies study - With objective to estimate prevalence of hemoglobinopathies viz. thalesemia, sickle cell anemia etc. in tribal population of Bihar, demographic details of 177 tribal households of Jamui district has been captured. Out of 153 blood samples investigated, 8 cases (5.2%) had abnormal haemoglobin (β-Thalasemia trait, Hb-S, Hb-E) and 73 cases (49.3%) were found mild to moderate hypertensive.

Others

In the parasite repository, total 115 leishmania isolates have been preserved, of which 106 collected from kala-azar patients, 5 from skin lesions of PKDL patients, 1 procured from sand fly gut and 3 reference isolates. Till date 36 isolates have been characterized by molecular method for their purity. Apart from this, 1101 sera samples of various categories have also been preserved in sera bank for research purpose.

The Institute provides voluntary counseling and HIV testing through ICTC and the confirmed cases are treated at ART centre (now upgraded to ART plus) as per NACO guidelines. Out of 4241 samples tested, 546 were found HIV positive with 121 HIV-TB co-infection. During the year, 633 HIV positive patients are on pre-ART and 504 on ART.

In MDR/XDR TB lab., out of 500 samples referred from TBD centres, 164 (32.8%) were AFB positive and 156 (31.2%) were culture positive. The AFB positivity in samples collected from RMRI OPD and ART centre was 14.7% (96 out of 650) and 25.9% (14 out of 54) respectively.

Major achievements of Public importance

Increased referral of suspected cases of kala-azar after proper training to ASHAs suggests their involvement in early case detection under programme mode.

The RDT-based novel noninvasive highly sensitive and specific diagnostic method using oral fluid and urine samples may be implemented in programme mode for diagnosis of VL at peripheral level. It may also be helpful in community-based screening for leishmania infection, specially for the individuals reluctant to provide blood samples.

GIS and Remote Sense-based model developed to map vector density and hot spot mapping may be helpful for planning control strategies.

Insecticide Quantification Kit (IQK) was found as effective rapid kit for qualification of DDT on walls that can be implemented in programme to monitor indoor residual spray (IRS) quality.

Durable wall lining, found highly effective in control of *P. argentipes*, may be an alternative to IRS. Further, significant reduction in sandfly density using environmental intervention viz. brick cementing, brick powder and lime and glazed tiles can be supplement to the integrated vector management programme.

Future Plans

Besides in-time completion of all the ongoing research projects, the Institute will continue its research for improved diagnostic, treatment and control strategies for kala-azar. Development of antigen-based diagnostic test will be prioritized. The Institute has planned to broaden its thrust area from kala-azar to other tropical disease prevalent in the region after inception of

Samrat Ashoka Tropical Disease Research Centre, which is supposed to be functional soon in phase-wise manner.

Vector Control Research Centre (VCRC), Pondicherry

Mission

- Develop strategies for prevention and control of vector-borne diseases
- Develop epidemiological surveillance tools for vector-borne diseases
- Undertake human resource development activities to meet local/state/ national/ international challenges.

Vision

Vector-borne disease free India

Manpower: Scientists(16), Technical (91), Admin. (21) & Others/Supportive (37).

Funds received during 2014- 15:

Plan-Rs 670.42 Lakhs, Non Plan- 836.38 Lakhs

Extramural - Rs.511.02 Lakhs

Total - Rs. 2017.82 Lakhs

Major projects undertaken: Intramural on Lymphatic Filariasis, KFD/Leishmaniasis, Microbial / Chemical agents for vector / parasite control and Microbial / Chemical agents under Translational Research Fund.

Projects ongoing: Intramural on Lymphatic Filariasis, Dengue/Chikungunya/JE, KFD/ Leishmaniasis, Microbial / Chemical agents for vector / parasite control & Microbial / Chemical agents under translational Research Fund) and Extramural projects on Lymphatic Filariasis under translational Research, Malaria/ Leishmaniasis/Scub Typhus, & Dengue/ Chikungunya/JE & microbial / chemical agent.

Achievements

Tolerability, efficacy and operational feasibility of Artesunate Combination Therapy (ACT) (Artesunate - Sulphadoxine-Pyrimethamine): as 1st line anti-malarial drug for falciparum malaria control in a tribal area of Odisha state, India.

The study was carried out in Laxmipur upgraded primary health centre area with a population of 61,772 in Koraput district of Odisha state. The objectives were to evaluate the performance of diagnosis and treatment of malaria by ASHAs and to assess the therapeutic efficacy of ACT against uncomplicated *Pf* infections at community level including the Adverse Drug Events (ADE), if any.

The ACT is well tolerated. The major adverse effect was abdominal pain which lasted for up to 3 days after starting the treatment. However, the symptom was mild as it was easily tolerated by the study patients. Performance of ASHAs was satisfactory. However, regular replenishment of RDT kits and drugs is necessary. Training of ASHAs at regular interval will be crucial in malaria control in this area. Information generated is useful to make programmatic decisions relating to antimalarial drug policy.

Comparative assessment of the efficacy of two rounds of indoor residual spraying with DDT 75% @ one g/m² and DDT 50% @ one g/m² against, *Anopheles fluviatilis,* the malaria vector in Odisha State

The objective of the study was to evaluate the comparative efficacy of indoor residual spraying of DDT WDP 75% @ one gm/m² with that of DDT WDP 50% @ one gm/m² against the malaria vector, *An. fluviatilis*.

Most of the operational aspects such as ease of handling, application, perceived side effects etc. relating to the two formulations were comparable. However, the requirement of DDT in terms of quantity for a given population, State/ district level, would be around 30% less with DDT 75% than with DDT 50% and such difference would considerably reduce the cost towards transportation, storage space, handling etc.

Scrub Typhus: Establishment of disease and vector surveillance to assess the extent of disease occurrence and vector prevalence

This study was undertaken to establish facilities and to build capacity for laboratory diagnosis of scrub typhus and to develop expertise on vector surveillance.

The epidemiological and clinical profiles of 145 clinically suspected scrub typhus cases were obtained from Pondicherry Institute of Medical Sciences, Indira Gandhi Medical College & Hospital, Aarupadai Veedu Medical College and Sri Manakula Vinayagar Medical College, Pondicherry during 2011-2013. The cases were mainly from the coastal regions of Pondicherry and nearby villages and from surrounding Tamil Nadu areas. A total of 6 genotypes of *Orientia tsutsugamushi* were identified and most of the samples (11) belonged to genotype ISS–11.

A total of 6378 mites belonging to 9 species of trombiculids were recovered from the trapped rodents. *Leptotrombidium (L) deliense*, the established vector of scrub typhus in India, was the predominant species (55.9%) followed by *Leptotrombidium insigne* (28.9%) and *Schoengastilla sp.* (7.8%). The study demonstrated the prevalence and abundance of the chigger mite, *Leptotrombidium (L) deliense*, the known vector of scrub typhus, for the first time in Puducherry region. The higher infestation rates of chigger mite vectors observed in the present study is an evidence for the risk of transmission of scrub typhus in Puducherry.

A team of trained manpower with skills on collection methods and identification of mites has been formed. Laboratory facilities for diagnosis of scrub typhus and the molecular characterization of the pathogen have been established.

Forecasting JE mosquito vectors abundance through Geo Environmental risk determinants, using Remote Sensing & GIS

The study was undertaken to ascertain the relationship between JE mosquito vector(s) abundance with different stages of paddy cultivation and to link RS imageries and environmental variables corresponding to ground characteristics towards forecasting JE vector abundance using Remote Sensing & GIS.

The study was carried out in JE endemic areas in two districts viz., Cuddalore in Tamil Nadu and Bellary in Karnataka. A total of three villages, one each from three different PHCs in each district were selected, where paddy cultivation is in practice. Vector abundance (immature density and adult density) and paddy growth stages were monitored for a period of 30 months. Satellite data (RISAT-1) corresponding to the different stages of paddy growth was

obtained from National Remote Sensing Centre, Hyderabad, using which the backscatter coefficient (σ0) was derived.

The abundance of JE vector, *Culex tritaeniorhynchus* peaked when the paddy was at its heading stage and dipped when the crop reached the maturing stage. The prediction model for forecasting JE vector abundance using remote sensing and GIS developed will be helpful in monitoring risk of JE transmission.

Human Resource Development

M.Sc. Public Health Entomology: During the year 2014, 10 students completed the course. A total of 21 students are currently undergoing this course.

Ph.D. Programmes: Seventeen full time (Zoology – 10; Microbiology – 5; Chemistry - 2) and two part-time Internal (one each from Zoology and Microbiology) candidates continue their Ph.D. programme.

Future Plans

Sl. No.	Project Title
	Lymphatic Filariasis
1	Prediction and evaluation of antigenic determinants on proteins of *Wuchereria bancrofti*.
2	Development and demonstration of strategies to enhance community compliance for MDA in Palakkad district of Kerala state.
3	Using Intervention Mapping to develop theory and evidence based programme to accelerate Mass Drug Administration compliance to achieve Lymphatic Filariasis elimination in areas with persistent transmission in India.
	Malaria/Leishmaniasis/Scrub Typhus
4	Prevalence of vector borne parasites and pathogens, with potential zoonosis risk to human, in domestic/ peri-domestic rodents in Pondicherry.
	Dengue/Chikungunya/JE
5	Monitoring JE Vector abundance in Gorakhpur, Uttar Pradesh, using RS and GIS
	Microbial/Biological/Chemical agents for vector/parasite control
6	Development of improved production process and/or formulation of *Bacillus thuringiensis* var. *israelensis* (VCRC B17).
7	Field Evaluation of pupicidal metabolites *of B. subtilis subsp. subtilis* (VCRC B471) and *Pseudomonas fluorescens* (VCRC B426) against malaria vectors. (Submitted to DHR Under Grant-In-Aid (GIA) scheme).
8	Field trial of *Romanomermis iyengari* against vector mosquitoes in rice fields - a study on effective dosage, level of parasitism and recycling potential.

Grievances / Complaints / representations received and disposal details - Nil

Virus Research Center, Kolkata

Vision

The vision of Virus Research Centre, Kolkata is to conduct research and develop strategies for prevention, treatment, and control of emerging and reemerging viral diseases threatening the Eastern part of the country.

Mission

To conduct research, services and training on viral diseases, including the basic and applied research on Hepatitis B, Hepatitis C, Dengue, Japanese Encephalitis, Chikungunya, Herpes Simplex, CMV, opportunistic infections of HIV, along with the outbreak response, Surveillance for viral disease, Diagnostics, and Summer/Winter training of students of different Universities and Institutions all over India

Manpower and Budget received by the Institute

Intramural project of the Unit		Extramural project of the Unit	
Total Manpower	Budget sanctioned (Lakhs)	Total manpower	Budget sanctioned (Rs. In Lakhs)
20	162.00	11	51.65

Major Achievements

Studies on HIV-HBV Co-infection in Eastern India

- A cross-sectional study on 62 HBsAg positive cases on Lamivudine (3TC)-containing ART for ≥6 revealed increased prevalence of HBeAg positivity, serum HBV-DNA load >2,000IU/ml increased with increasing length of treatment.
- Patients with 3TC-resistant triple mutation showed markers of liver damage in blood.
- In 18 months of follow-up study no significant difference was observed between the two treatment regimens in respect to HBV DNA suppression, ALT normalization and anti-HBe sero-conversion rate.
- After 24 months of treatment, HBsAg loss was monitored in both the treatment regimens, but no significance could not be found.
- No drug-resistant mutation was detected in either of the therapy regimen.

Year wise confirmation of JEV cases

Year	Sample No.	TOTAL RT-PCR DONE	RT-PCR POSITIVE	POSITIVITY (%)
2011	311	119	92	77.31
2012	179	75	59	78.67
2013	81	71	60	84.51
2014	106	Not yet done		

- A total of 701 HCV suspected blood samples were screened from this region.
- Serological results indicated 59.05% were anti-HCV sero-reactive, of these samples 73.43% (304) were RNA positive.
- A total of 400 HAART naïve newly diagnosed HIV/AIDS patients with CD4 count 100 and below, admitted or visiting the OPDs of different Medical College & Hospital in Kolkata; 147 renal transplant subjects of Department of Nephrology, SSKM Hospital, Kolkata, and 10 autologous hematopoietic stem cell transplant patients with multiple myeloma admitted in the Department of Hematology, at Calcutta Medical College Hospital, Kolkata, at six months after transplantation were also included in the study. Prognosis of CMV EOD was poor as indicated by higher death rates among subjects with lower CD4 count and specific cut-off values were found to have useful potential for identification and treatment of CMV infected HIV/AIDS patients in due time to avoid CMV EODs among HIV/AIDS subjects. Targeted intervention programs seemed to be

required urgently to make these cut-offs operational in order to minimize the burden of CMV EOD in this vulnerable population.

- The centre synthesized four analogues of HM-7, and found that analogues HC-II-34-20 and HC-II-34-21 have better anti-HSV activity.
- *Preliminary toxicity study* showed that HM-7 is safe below 50 mg/kg body weight.
- A hospital-based study was conducted to detect the prevalence of HEV infection in patients with acute sporadic hepatitis in West Bengal. Analysis of 285 patients of both sexes at different ages with acute viral hepatitis (AVH) revealed that HEV was the most common cause (41.8% of patients), followed by HBV (21.4 %), HAV (17.2 %) and HCV (4.6 %), and the commonest co-infection was HBV-HEV (3.8 %). Only 14.7% of patients had no viral marker.
- Three major genotypes and 7 subtypes of HCV circulated in this region, of which Gen-3 is the major genotype followed by Gen-1 and Gen-6.
- New HCV subtypes and genotype-6 is slowly evolving in East and North-Eastern part of India.

Major achievements having public health importance

- HIV-HBV co-infected patients experiencing prolonged ART with 3TC as only anti-HBV drug, showed high prevalence of 3TC-resistant triple mutation in *pol* gene of HBV, with potential of infecting unvaccinated as well as vaccinated individuals. This underscores the need for screening for this mutation in our country in order to manage these patients from public health viewpoint.
- Molecular typing revealed that a DENV I, II and III serotypes are in circulation in Kolkata, and those who are having more than two infections, suffer from DHF.
- Serological and molecular diagnosis of JE reveals an increasing public health problem in West Bengal. Acute encephalitis syndrome (AES) revealed the occurrence of JE virus genotype I and III infection in Patients of West Bengal in 2010.
- Molecular evolutionary and bio-informatics approaches revealed evolution of JEV at a local level. Such naturally occurring evolution is likely to affect the disease profile and vaccine efficacy against JEV
- Socio-economic status and environmental conditions were statistically significant contextual risk factors for JE incidences in West Bengal and such study constitutes a new report of this region. JE cases are still predominated among children and young adults - a threat to paediatric population.
- A year wise study of CHIKV infections revealed gradual dominating activity with Dengue-like clinical features since its re-emergence in 2006-2010 in west Bengal. A comparative study of clinical features between Monotypic and Dual infection cases with Chikungunya and Dengue Virus revealed that fever, joint pain, rashes, headache, myalgia, and nausea/vomiting are the common in both monotypic and dual-infection. Severe arthralgia and swelling of joints were common in CHIKV positive cases and abdominal pain was associated with DENV infection. Diarrhoea was reported only by the dual infected patients.
- A cost effective RT-PCR method has been standardized for mass screening of arboviral infections.

- The genomic variation of HCV circulated in Eastern and North-eastern part of India.
- We have found new HCV genotype (genotype 6) and subtypes emerging in this region.
- Found recombinant HCV strain (Gen1a/3a) first time from this region.
- Isolated an alkaloid (HM-7) having potent *in vitro* and *in vivo* antiviral activity, and established its mode and mechanism of action, which may lead to develop a non-nucleotide anti-HSV agent.
- A hospital-based study on the prevalence of HEV infection in acute sporadic hepatitis cases of West Bengal showed that HEV is the most common cause of Acute Viral Hepatitis, followed by HBV, HAV and HCV; while HBV-HEV was the commonest co-infection and 14.7% patients had no viral marker, indicating that West Bengal is an endemic zone for HEV infection.

Future plan

- Characterization of occult HBV infection among HIV co-infected patients.
- Entomological studies in relation to the spread of Japanese Encephalitis, Chikungunya and Dengue infection.
- Determination of viral etiology of the acute encephalitic syndrome cases in the state of West Bengal.
- Comparative interstate studies in the eastern part of India on the circulating strains of JEV, DENV, CHIKV, WNV.
- Influence of Essential Micronutrients in relation to Japanese Encephalitis Infection
- More emphasis on HCV genomic variation among high risk group population and treatment resistant HCV patients.
- Rapid detection of RNA viruses in patients.
- More emphasis on public health related emerging viruses and their characterization.
- Risk of CMV transmission to recipients of familial replacement blood donation compared to voluntary donation: a comparative study.
- Studies on newly emerging Viral Opportunistic Infections among HIV Seropositive Patients admitted to metropolis hospitals in Kolkata.

Grievances/complaints/representations received and disposal details: Nil

Desert Medicine Research Centre (DMRC), Jodhpur

Vision

Desert Medicine Research Centre (DMRC), which was founded on 27th June, 1984 has the vision to become a nodal Centre of Research, Reference and Training in dengue, malaria and life style diseases e.g. hypertension, diabetes and nutrition with the collaborative efforts of all the stake holders.

Mission

Improvement of health of people in desert through research.

Mandate:

- To undertake and promote research on health problems specific to desert areas.
- To study changing pattern of health problems, especially in view of the various developmental activities.
- To strengthen scientific and technical expertise of state/local health agencies for their use.
- **Manpower:** Scientists (13), Technical Staff (13), Administrative Staff (14) & Supportive Staff (18) Total = 58

Major Achievements

Vector Control

1. **Surveillance of pyrethroid resistance in *Anopheles stephensi* strains of Rajasthan and studies on genetic and biochemical mechanisms of pyrethroid resistance in *An. stephensi* -** The current susceptibility status of *An. stephens* was determined in the study villages against DDT, malathion, alpha-cypermethrin, cyfluthrin and permethrin and a larvicide – temephos. The experiments of *An. stephensi* against alpha-cypermethrin in village Baitu of Barmer district and Bhanipura in Bikaner district, against cyfluthrin in villages Thob of Barmer district and Tejpala of Jaisalmer district exhibited intermediate resistance in the species, which warrants further verification of the results. *An. culicifacies* in village Raimala of Jaisalmer district has also exhibited intermediate resistance against temephos, which needs further verification.

2. **Use of insecticide treated nets (ITNs) in alternative forms for the protection against malaria transmission in the desert -** The survey has been carried out in the six villages of Jaisalmer district during post monsoon period (September 2013) and in winter season (January 2014). Five species of Anopheles were reported from the study villages including *Anopheles stephensi* and *Anopheles culicifacies*. The malaria cases of the villages where intervention has been made in the form of insecticide treated bed nets were significantly decreased than the control villages. Mosquito density in the control villages were increased during the study period, however in the intervention clusters the density has been decreased after intervention. The study is in progress.

3. **Current status of insecticide resistance among mosquito vectors in Rajasthan State – a collaborative study -** The studies have been carried-out in Bikaner and Nagaur districts. In Both the districts, *An. stephensi* exhibited intermediate resistance against DDT in all the study villages Jamsar, chawandia and Alay, however, against synthetic pyrethroids, alpha-cypermethrin and cyfluthrin, the species was found totally susceptible. The study in other districts is in progress.

Tuberculosis

1. **Standarization of a rapid method for direct drug sensitivity testing of *Mycrobacterium tuberculosis* from sputum samples -** The project is to standardize, safe, simple, economic, closed method of direct drug sensitivity testing of *M. tuberculosis* from sputum samples in seven days. Sputum samples from 111 patients admitted at KN Chest hospital with suspicion of MDR-TB were collected. Method was followed blindly and results were available on 7th day for 103 samples. Out of the 111 samples, results of LPA were available for 45 samples. LPA showed 25 as sensitive to rifampicin, of which 18 were

also detected as sensitive by our method, giving sensitivity of 72.0%. The method, however, needs to be more refined.

2. **Rapid culture and direct drug sensitivity testing of *Mycrobacterium tuberculosis* to ioniazid and rifampicin using liquid culture media -** The project is to standardize and evaluate rapid method for culture and sensitivity of *M. tuberculosis* and to support RNTCP with culture of *Mycobacterium tuberculosis* from sputum samples. The new method was used by us for 11 sputum samples which were also examined by RNTCP using LPA. Method was followed blindly and results were available on 7th day. LPA showed 6 as sensitive to rifampicin, of which 5 were also detected as sensitive by our method.

Non-Communicable Diseases

1. **Effectiveness of diet and lifestyle intervention through Information Education Communication (IEC) tools with Angan Wadi Centres (AWCs) of Tribal population of Udaipur District of Rajasthan as the centre of knowledge dissemination for hypertension (including hypercholesterolemia and diabetes) risk reduction** (a cluster randomised controlled trial) - In above task force study on hypertension, Kotra tehsil, of Udaipur district, with 90% of tribal population is selected as the study area to conduct the study. Based on coverage area of an AWW centre, 12 clusters have been selected and divided randomly in intervention and control groups equally. So far 5 clusters have been covered.

Nutrition

1. **Nutritional status of elderly rural population and development of appropriate intervention model using existing health system -** Project has been initiated in Luni Tehsil of Jodhpur. The project aims the clinical assessment, anthropometric measurements, assessment of micronutrient deficiencies, viz Iron, Zinc, Vitamin A and E etc and the assessment of the dietary intake of the elderly population. Base line survey of 400 household has been completed. Two training programmes have been conducted. There is monthly follow up.

2. **National Nutrition Monitoring Bureau (NNMB) Unit -** The current survey is on non-communicable diseases. The survey has been completed in Jodhpur and Jaipur cities and is being carried out in Kota city. The preliminary analysis of the survey completed in Jodhpur city, indicated that around 12.7 % of adults are diabetic, 14.53 % are hypertensive and 17.4 % are hypercholestrolemic.

3. **Annual Health Survey- Clinical Anthropometric and Biochemical Component (CAB) -** Survey was initiated in Rajasthan on behalf of the Ministry of Health and Family welfare.

4. **Biomedical Informatics Centre of ICMR:** The broad objectives are, to identify genetic loci associated with diseases of national interest, to develop solution for controlling pathogens causing diseases such as HINI (2009) pandemic influenza viruses, Dengue viruses, Tuberculosis and Malaria through determining pathogen gene sequences and their analysis in genomic database and designing surveillance system besides developing approaches for controlling drug resistance by malaria parasite in Rajasthan. Data mining was done on various scientific data bases to develop knowledge stock of risk factors associated with Type II diabetes.

Major Achievements having Public Healht Importance

- The warning points of dengue virus activity has been communicated to state health department for controlling dengue vectors and its prevention at suggested sites thought the project, 'Translational Research for development and testing of ICMR-DMRC module of Dengue control for Rajasthan'
- The insecticide resistance status of the important malaria vectors of western Rajasthan is worked out. It has direct relevance to the national malaria control programme. It provides important information for consideration, while conducting indoor residual spray operations.

Future Plans

The centre will use conventional clinical, epidemiological and laboratory methods as well as modern biological tools of genomics, proteomics and bioinformatics to focus on Human physiology, Geographical genomics, Nutrition and associated morbidities/diseases, Operational Research, vector-borne diseases, Medicinal and Insecticidal plants, Infectious and Non-Communicable diseases.

Grievances Received & their Redressal

During the year, no grievances were received.

Regional Medical Research Centre (RMRC), Belgaum

Mission and Vision

- Resource Centre for expertise, infrastructure and technologies for biomedical research.
- National Centre for Research in Herbal Medicine.
- Human resource development and capacity building in the region regarding
  - ◊ Collaborations with TRM practitioners of the region
  - ◊ To create general awareness and
  - ◊ To promote scientific temperament

Manpower: Scientists (5), Technical (13), Admn. (7), Engineering (2), Others (30).

Budget: (sanctioned) Salaries – Rs.105 lakhs; General – Rs.68 lakhs & Capital – Rs. 5 lakhs. Total =Rs.178 lakhs

Major Projects undertaken

Traditional Medicine/ Medicinal Plants

- **Ethnomedicobotany of Belgaum region and pharmacognostic studies on selected medicinal plants:** The present study was taken up to document the existing knowledge of traditional medicine from Belgaum region and to develop pharmacognostic tools for better identification of the genuine plants drugs for selected medicinal plants. Traditional practitioners use medicinal plants, animal products for the treatment as medicine. Total 243 medicinal plants were documented for the treatment of various disorders from traditional practitioners. 50 species of medicinal plants were documented from crude drug shops, which were in trade.

- **Elucidating anti-arthritic potential of selected medicinal plants and their fractions in Wistar rats:** In the present study, it is aimed to develop a safe and cost effective anti-arthritic agent to treat arthritis based on the traditional herbal knowledge. The lead has been obtained from our study of community based traditional healing system. Two plants, namely *Plumbago zeylanica* Linn. (bark) and *Holoptelea integrifolia* have been selected for the study. The studies on isolation and characterization of major compounds in active fractions of both the plants have also been made. Five compounds have been isolated and characterized from HIHY#1, while 4 compounds have been studied in PZHY#1.

Phytochemistry

- **Chemoprofiling of the medicinal and aromatic plants from Western Ghats region of North West Karnataka -** The chemoprofiling of medicinal and aromatic plant RMRC-BM IP_156, which is used traditionally for treatment of diabetes, is under progress. This investigation revealed that, among the all collected samples, two groups were identified viz., phenyl derivative and terpenoid groups, despite being morphologically identical plants.

Translational Research

- **Preclinical evaluation of safety and efficacy of the extract of the plant RMRC-BM IP_156 for anti-diabetic activity and characterization of active fraction/compound(s).** This is ongoing intramural activity. This project was proposed during 4th SAC in January 2011 as "Screening of anti-diabetic activity of RMRC-BM IP_156". Herbal based Traditional Medicine has been practiced in several regions of India. The preliminary screening of decoction, organic extract and its one fraction showed encouraging results. Fraction No. 1 was further purified and one compound was isolated, characterized and identified by Infrared Spectroscopy, Mass Spectrometry and ^{1}H-&^{13}C- NMR. Different doses of compound IP_01 were further screened for their anti diabetic activity on STZ induced animal model, which showed remarkable activity.
- **Sensitization of multidrug resistant ABCB1 overexpressing oral carcinoma KB cells to paclitaxel by glaucarubinone from *Simarouba glauca DC*.** Chemosensitizing potential of glaucarubinone (GLU) was investigated to enhance the antitumor efficacy of Paclitaxel (PTX) in KB cells. The present findings illustrate the modulatory role of GLU on PTX sensitization in ABCB1 over-expressing KB cells.

National Hospital Based Rotavirus Surveillance Network (West Zone- Regional Level): The prevalence of rotavirus observed in last 11 months (Nov, 13 – Sept, 14) was 31.8%. GARV positivity was found to be high in the month of November and December in JNMC, Belgaum and KIMS, Karad respectively. Majority of the cases enrolled in the study belong to the age group of 7-12 months (34.3%) and (42.7%) for JNMC, Belgaum and KIMS, Karad respectively. Majority of GARV positive cases were associated with mild or some dehydration.

Major Achievements

- The Centre has played important role in tracking epidemic like JE and disease of local interest and have helped local state authorities.
- Leads obtained from pre-clinical studies for joint pain / arthritis shall be taken up for clinical evaluation.

- Basic studies carried out in the area of malaria, filariasis, diarrhea will help in treatment and preventing these diseases.

Major achievements having public health importance

- Identification of various pathogens and other services: RMRC has been providing identification & characterization services with respect to various infectious diseases/ pathogens to various State/Govt. hospitals, District Health Units and Medical Colleges throughout Karnataka.
- Outbreak investigation: Cholera in rural area of North Karnataka.
- Investigation on the suspected JE outbreaks/cases in Udupi and Belgaum district.

Future Plans

1. Lead of anti-arthritic formulations will be taken for limited clinical evaluation.
2. Identifying alternative source for production of Shikimic acid using biotechnological approaches.
3. Chemoprofiling of medicinal and aromatic plants from Western Ghats and screening of their biological activities.
4. Continuation and consolidation of support to State Health Authorities in infectious diseases, and vector borne diseases.
5. Construction and establishment of Model Rural Health Research Centre at Sirwar, Raichur District.
6. National Rotavirus Surveillance Network

Regional Medical Research Centre (RMRC), Bhubaneshwar

Vision

Developing excellence in Research & Development (R&D) relevant to the regional health needs. At present it is one of the leading referral Centre for filariasis globally and referral Centre on malaria and malnutrition in this region.

Mission

Providing solutions to regional health problems through research, assistance to public health and man power training. To contribute to improve health through pursuit of excellence in research, advanced training and partnership in control programmes

Manpower: Scientist-15, Technical-29, Supportive/Others-42, Total-86.

Budget: Plan-Rs.470 lakhs; Non-Plan-Rs.205 lakhs; Extramural-Rs.650 lakhs.

Highlights of Activities

Addressed research issues on vector borne diseases, diarrhoeal disorders, bacterial meningitis, viral diseases, tuberculosis, and non-communicable diseases like under-nutrition, diabetes, hypertension and sickle cell disease and undertaken different outbreak investigations in close collaboration with State Health Department, Medical Colleges and Hospitals. Studies are sponsored either by ICMR Task Force, DST, DBT, Gates Foundation, NVBDCP or MOHFW.

Undertaking various HRD programmes through Pre-PhD, PhD and MSc dissertation/training programme. Following are the highlights of the major research activities of the centre carried out during current year.

- **Lymphatic Filariasis-** The National Filaria Control Programme (NFCP) targets to eliminate lymphatic filarisis in the country by 2017 through mass administration of single annual dose of DEC (6mg/kg) with Albendazole (400mg). In one of the study it was observed that at least 80% of children who are asymptomatic but infected got reversal of pathology with standard MDA regimen (DEC+albendazole) given annually or bio-annually. Even those having overt lymphoedema exhibiting lymphatic pathology got reversed with reversal of lymphoedematous swelling. This can be used as a strong advocacy tool for MDA improving compliance and focusing the programme more on children.

  The other study was a hospital based clinical trial, biannual regimen of Albendazole 800 mg and DEC 300 mg has been found to suppress significantly the frequency and density of Mf. It could also clear adult parasite (100%) in one year and significantly reduce antigen level. This regimen can shorten the period of MDA and possibly be targeted for hot spot areas.

- **Malaria-** Malaria survey conducted using molecular tool in Badampahar CHC (Mayurbhanj Dist) and Ghatgaon CHC (Keonjhar Dist) has revealed *P malariae* mono infections in 11.6% of cases and mixed infections were 14.2% in Ghatagaon and 6% in Badampahar suggests use of molecular method as an alternate tool for surveillance to overcome such problems. Multiplex PCR has detected *An. culicifacies* sibling species A, B, C, D and E in the malaria endemic regions of Odisha. *An. culicifacies* B was the most abundant species, followed by *An. culicifacies* C and E. High sporozoite rate and HBF in *An. culicifacies* E indicates the role of this sibling species in malaria transmission in Odisha.

- **Diarrhoeal Disorders-** The centre is continuously monitoring to identify the bacterial pathogens causing severe diarrhoea like *V.cholerae* and their drug susceptibility pattern to help the local health authorities in providing early warning of epidemic and appropriate drug against *V.cholerae* prevalent strains. The Phase IV Oral Cholerae Vaccine (OCV) trial conducted first time globally in public health setting in Satyabadi block of Puri in collaboration with IVI Korea and Govt. of Odisha has revealed that the vaccine is 66% effective and individual cost per vaccine delivery was 0.98 $.

  - **Tuberculosis (National Reference Laboratory) Lab activity-** Tuberculosis Culture and DST laboratory of RMRC, Bhubaneswar has been designated as National Reference Laboratory by Central TB division in the month of October 2013. So far 141 MDR TB follow up samples from 7 tribal dominated districts has been tested and results used for case management.

  - **Bacterial meningitis in under five children-** The Centre undertook investigation of bacterial meningitis under the network of hospital based sentinel surveillance of bacterial meningitis funded by Ministry of Health & Family Welfare, Govt. of India. One thousand fifty eight clinically suspected cases of meningitis within 1 month to 59 months age were admitted to paediatric hospital (SVPPGIP), Cuttack. The laboratory investigation revealed HiB in 4.5% and *S.pnenumoniae in 14% of* patients. The information provides a basis for introduction of HiB and Pneumococcal vaccine to the children in India.

- **Grade I Virology Laboratory Activity-**This Centre is continuing surveillance and outbreak investigation of important viral diseases in the region through the established Grade-I viral lab as a part of network of viral research and diagnostic laboratories in India. During 2013-14, fourteen outbreaks were investigated that revealed Hepatitis A & E, Measles, Chickenpox, Dengue, Chick and JE. JE outbreak has been confirmed from Keonjhar district affecting tribal population which is the second report following the report from Malkangiri district last year.

Translational Research

The centre has taken effort to develop two PCR based tools for public health use. One is to monitor the information of vector prevalence, incrimination of vector for malaria transmission, identification of the sibling species of vector and chloroquine (CQ) sensitivity of the parasite ingested by the vector. The other tool developed by the centre is to detect all serogroups of *V. cholerae* in a single PCR test. In-house validation of the technique has been done at NICED Kolkata and a kit has been developed that can be used for rapid diagnosis of cholera. Applicability of both the tools is being now field tested.

Besides above, a LAMP assay technique for diagnosis of malaria is under standardization for field use.

Baseline survey for health status of under five children including immunization coverage and anthropometry is being carried out along with training need assessment of grass root health workers in sampled population from low and high tribal density blocks is being analyzed to formulate the strategy for intervention to reduce under five morbidity and mortality in tribal population of Rayagada and Kalahandi. The State Health collaboration is being taken from the beginning so that the technology can be transferred and the strategy can be administered within the frame work of the existing health system, while strengthening the IMNCI programme to improve under five health status to the level of State average.

Human Resource Development - This centre is providing training/facility to students and post docs of biomedical discipline in the region. During this year, 1 Post Doc fellow, 15 Ph D scholars (ICMR, CSIR, DST, Lady TATA), 10 Pre PhD trainee, 32 M. Sc dissertation students, 50 paramedical workers and 5 library trainees has been provided.

Future Plan

The centre has planned to undertake studies on both public health and basic science. In the field of filariasis assessment of anti sheath antibodies as an alternate tool to detect immune status in human filariasis and characterization of host and parasite factors among residual microfilaraemic individuals following MDA programme in filariasis , impact of MDA on reduction /reversal of morbidity in early disease, identification of endemic district and high risk pockets of filariasis in the endemic areas covered under MDA will be carried out to ascertain the national programme on elimination of LF.

In the field of Malaria, centre has planned to develop vector control strategy for perennial malaria transmission area, mapping of the vectors responsible for different vector borne diseases in Odisha, identify and characterize the genes responsible for Artemesinin resistance, usefulness of Nitric Oxide (NOx) as an adjunct therapy in the treatment of cerebral malaria due to *P falciparum,* search for immunological markers for early detection of cerebral malaria using experimental model, develop a comprehensive vector control strategy for vector borne diseases in irrigation canal command area and specific strategy for urban mosquito control.

For control of hepatitis, development of preventive strategy against Hepatitis C virus in primitive tribes through risk behaviour intervention and for cholera, a prevention strategy for tribal blocks of Odisha has been proposed.

In order to help the RNTCP programme to control TB, validation of newer diagnostic methods for laboratory diagnosis of Tuberculosis, evaluation of LED microscopy and Line Probe Assay and Study of demographic distribution of types of drug resistance in a tribal district of Orissa using modern biological techniques will be done.

In the areas on non-communicable diseases, the centre has planned to develop a strategy for prevention of hypertension in tribal community and a strategy for early detection of diabetes mellitus (Type II).

In addition the centre has planned to establish new field units at Kandhamal and Keonjhar DHQ Hospital, a short Term Training for Students and young faculties to increase the biomedical manpower in this region, establish a disaster management cell, an epidemic cell and E – library (Knowledge Resource Centre).

Grievances Received & their Redressal: During the period total 27 grievances/ complaints have received and disposed off successfully.

Regional Medical Research Centre, NE (ICMR), Dibrugarh

Mission and Vision

The mission of the institute is to promote bio-medical research in priority areas in north-eastern states of India and build up scientific man power.

Manpower: Scientist-18, Admn.-14, Technical-27, Others-18, Total: 77

Budget: Salary: 600 lakhs; General: 560 lakhs

Major Projects undertaken

Cancers: A total of 5 studies were pursued on stomach, lung, breast and oesophageal cancers including cancer registry. Epidemiological study of the risk factors in the development of primary lung cancer revealed that tobacco smoking (Manipur: O.R=1.80, p=0.039; Mizoram: O.R=3.34, p=0.001), chewing of tobacco with betel nut (Manipur O.R=1.57, p=0.041, & Mizoram O.R= 2.91, p=0.023), use of firewood for cooking (Mizoram (O.R=1.71, p=0.033), consumption of smoked meat (Mizoram :O.R=3.53, p=0.001),and use of soda (alkali) in cooking curry (Manipur :O.R=6.44, p=0.046) increases the risk of lung cancer.

A population based matched case-control study of Genetic and Molecular Epidemiology of Stomach Cancer in Mizoram showed that Tobacco smokers & smoke dried fish/ preserved meat consumers carrying C/C genotype had a higher risk of stomach cancer. Squamous cell carcinoma was mostly predominant (90.7%) among the oesophageal cancers in NE India. In the Comparative Study of Genetic, Clinical and Epidemiological Factors of Breast Cancer, genetic mutations in BRCA1 gene was found in 12% & 2.4% cases in Mizoram and Tripura respectively.

Hypertension and Cardiovascular diseases: A community based study to assess the impact of community based dietary salt restriction in the reduction of blood pressure among tea garden workers was carried out to bring down daily salt consumption to 6 gm/day. Salt consumption could be reduced physically by market survey and could be corroborated with laboratory documentation of lower urinary sodium. The prevalence of hypertension also

decreased from the initial 52.4% to 39.3% after 8-10 months of follow up with intensive IEC activities.

Diabetes: In the NE component of ICMR INDIAB study, the overall type 2 diabetes mellitus (T2DM) & Prediabetes prevalence was 5.4% & 11.8% respectively in Assam. Ratio of known to newly diagnosed T2DM was 1:0.8 with the ratio in urban & rural areas being 1:0.5 & 1:1 respectively. In Mizoram the prevalence of diabetes & Prediabetes was 5.7% & 5.8% respectively with a higher prevalence in urban compared to rural areas. The overall ratio of known diabetes to newly diagnosed diabetes was 1:1, with a ratio of 1:0.9 & 1:1.5 in urban and rural areas respectively.

Mosquito borne diseases: Studies on malaria drug development, prevention, pathogenesis, drug resistance, immune response and outbreak investigations were pursued. Collaborative projects with Dibrugarh University & Guwahati University were undertaken for screening of indigenous medicinal plants and synthetic hybrid compounds for antimalarial activity. Two newly synthesized hybrid derivatives were found to have appreciable antimalarial activity. Nine out of 66 extracts of indigenous medicinal plants showed promising anti-plasmodial activity.

The field bio-efficacy evaluation of DRDO Defender Net revealed that it was effective only up to 5 washes in the laboratory bioassays and no significant impact of Defender LLIN on mosquito densities was evident over the plain net in Phase II village hut level bio-efficacy trial in Assam.

Following the reports of large number of malaria cases and deaths in Tripura (May-June 2014), the institute has carried out the confirmation, genesis and progress of the epidemic by monthly as well as daily analysis of malaria situation during the outbreak period and by retrospective analysis. The involvement of *An. baimaii* on the basis of evidences of high salivary gland infectivity to *P. falciparum* is found.

Japanese encephalitis (JE)/Acute encephalitis syndrome (AES): Under the ICMR task force multisite initiative to find out the aetiology of AES in India and establishment of ICMR sample bank of AES cases, 43.18% of samples collected from suspected patients were found to be positive for JE. The JE equivocal and negative AES samples were positive for IgM antibody against Chikungunya (1/49, 2.04%), Leptospirosis (20/70, 28.57%), Rubella (1/31, 3.22%), HSV-1 (6/63, 9.52%) and HSV-2 (2/54, 3.7%).In a study on Eco-Epidemiological Perspectives of Emerging West Nile (WN) Virus in a total of 37 cases out of 168 (22.02%) were found to be WN positive. All the 10 blood samples collected from pigs tested for antibody titre against WNV showed a protective antibody titre.

Visceral Leishmaniasis: In an exploratory study of Visceral Leishmaniasis in endemic areas of Assam a total of 168 kala-azar cases have been reported and 4 PKDL cases from the study locations have been identified and confirmed by PCR. Entomological collections revealed presence of sand fly (*Phlebotomus* spp.) in the study locations. In the subsequent follow up two new cases were found positive by rK39 diagnostic test.

Paragonimiasis: For identification of immunodiagnostic antigenic fractions of *Paragonimus* species by western blotting, 675 crabs were collected from Assam, Meghalaya and Arunachal Pradesh of whom 36 were found infected with metacercariae. An ELISA based diagnostic kit for *Paragonimiasis* is ready for commercial use.

Bacterial diseases: Prevalence of Multi Drug Resistance (MDR) & Rifampicin Resistance (RR) was 5.71% & 6.6% respectively in *Mycobacterium tuberculosis* isolates from newly

diagnosed cases and 11.1% (MDR) & 26.6% (RR) from previously treated cases in Assam. The common bacterial isolates obtained from surveillance of neonatal infections were *Acinetobacter spp, Enterococcus spp, Staphylococcus aureus*, *K. pneumoniae, and E.coli*.

Viral diseases: In the ongoing Phase II multisite monitoring of human influenza viruses 138/576 (23.9%) samples were PCR positive [influenza-A (106) and influenza-B (32)] and viruses could be isolated from 49 samples. In the ICMR Task Force study on hospital based rotavirus surveillance network, the overall prevalence of rotavirus diarrhea was found to be 45.4 % (95% CI: 41.4% - 49.4%,n=266/586). Three capacity building projects**,** ICMR Virology network Lab-Grade-I (VDL-1) and Nodal molecular virology lab & Establishment of a network of Laboratories for managing epidemics and natural calamities have been initiated.Out of 955 tested samples, Influenza A was positive in 3% (4 /132), RSV–A in 15.4% **(**10/65**),** hMPV in 6.3% (6/96**)** of them.Various outbreak investigations were also carried out in Assam and other NE States. In a study of the host innate immunity and hepatitis B persistence, 97.9 % (n= 95/97) of the subjects were positive for HBcAb, 29.9% for HBeAg and 61% for HBeAb.

Socio-behavioural: Study to explore and contextualize sexual and injecting risk behaviours among Female Sex Workers (FSW) and sexual interface between FSWs and Injecting Drug Users (IDU) in Churachandpur district of Manipur as well as Assessment of Health Related Quality of Life (HRQoL) and Functional Status of Community Dwelling Elderly Persons in a Rural Setting of Assam was conducted.

Survey on haemoglobinopathy for the CAB component of the Annual Health Survey (AHS) in Arunachal Pradesh and Sikkim were continued.

Major achievements having public health importance

- A community based intervention by dietary salt restriction and intensive IEC activities brought down daily salt consumption and decreased the prevalence of hypertension after 8-10 months of follow among tea garden workers of the study site.
- Identification of immunodiagnostic antigens of Paragonimus westermani An ELISA based diagnostic kit for Paragonimiasis is ready for commercial use.

Future Plans

Non Communicable Disease: Perfecting the module for hypertension control through community participation; Estimate burden of diabetes in NE; Monitor burden of leading cancer and document environmental, dietary and genetic risk factors with ultimate aim at control; Capacity building for pre-natal diagnosis of haemoglobinopathy.

Communicable Disease: Map drug resistance in malaria parasite; Develop mobile based malaria surveillance system across NE Region; Control of *Paragonimiasis* in NE through community involvement; Develop immunodiagnostic kits for *Paragonimiasis* and NCC; Develop viral disease surveillance network throughout NE ; Mapping drug resistance and characterize MTB isolates; Map insecticide resistance of vectors of malaria, filarial , JE & dengue; Map vector borne diseases with an aim for control; Develop algorithm for clinical diagnosis of neonatal sepsis

Grievances/complaints/representations received & disposal details: None

Regional Medical Research Centre (RMRC), Port Blair

Mission and Vision

- To undertake studies on hospital based surveillance of diseases and on risk reduction/ elimination of infectious diseases, outbreak investigations and devising appropriate control measures, assessing health and nutrition status of marginalized communities, ecology of infectious diseases with reference to vector borne diseases
- To extend support to National Health Programmes
- Human Resources Development-Impart training and PhD programmes

Manpower: Scientists (7), Technical (13), Admn. (4) & Supportive (10).

Budget: Non-plan –Rs216 lakhs, Plan- Rs.177 lakhs.

Major Projects Undertaken

Elimination/Risk reduction of infectious diseases - Effectiveness and operational feasibility of mass DEC fortified salt as a supplementary intervention to Mass Drug Administration (MDA) towards elimination of the lone foci of diurnally subperiodic *Wuchereria bancrofti* in Andaman & Nicobar islands - Persistence of microfilaraemia is evident after six rounds of mass drug administration with DEC (MDA), prevalence of infection remains at 3.3%. with antigenemia of 3.2% in 2-4 age class and 2.9% in 6-7 age class. It is evident that MDA alone is unlikely to achieve elimination, administration of DEC fortified salt was considered as an additional measure. The above mentioned project has been initiated for hastening the process of elimination.

Hospital based surveillance diseases

Viral Research and Diagnostic laboratory (Grade I) network at RMRC, Port Blair - The centre is providing diagnostic services to the entire UT of A & N Islands, for diseases suspected of viral aetiology. The surveillance detected 58 cases of Chikungunya and 109 cases of dengue. Influenza surveillance detected 10 cases. More than 1,200 children with respiratory tract infection were screened for various viral agents. The vial infective agents detected included Human Metapneumovirus (7), respiratory syncytial virus (24) and adenovirus (81). As part of viral diarrhoea surveillance, a total of 564 children were screened and enteroviruses were detected in 53. The viral diseases surveillance conducted by us detected infection with 24 different viral agents during the reporting period.

National Hospital Based Rotavirus surveillance study for paediatric inpatients and outpatients - Rotaviral etiology of the diarrhoea was confirmed in 169 /476 inpatients cases (35.5%). Out of them, 405 (85.1%) were from Andaman Islands and the remaining 71 (14.9%) were from Car Nicobar Island in Nicobar district (tribal area). Among 405 inpatients from Andaman Islands, 135 were attributable to rotaviral infection with a positivity of 33.3%, among the 71 inpatients recruited from Nicobar district, 34 were attributable to rotavirus with a positivity of 47.9%.

Antibiotic resistance patterns and distribution of genetic markers of drug resistance among the Escherichia coli mediated on diarrhea/urinary tract infections in Andaman and Nicobar Islands - Stool samples were collected from 696 pediatric patients with diarrhoea and processed for isolation of bacterial enteric pathogens. The frequency of resistance to third generation cephalosporin was 61.4% and that of resistance to fluoroquinolones was

44.6%. Carbapenem resistant was observed in 6.6% of the isolates and among these one isolate harboured VIM gene for metallo-β-lactamases.

Community based surveillance

National Nutrition Monitoring Bureau (NNMB) - diet and nutritional status of the individuals and prevalence and determinants of non communicable diseases: The study was initiated to assess the diet and nutritional status of the individuals and prevalence and determinants of non communicable diseases (NCDs) i.e. obesity, hypertension(HTN),diabetes mellitus(DM) and dyslipidemia among adults(>18years) in urban population of A&N islands. The prevalence of diabetes mellitus was observed to be higher in men(13.4%)when compared to women(9.4%).A total of 3688(1691 men & 1997 women) participants were analysed for their blood pressure (BP) levels, among them it was observed that 444(12.0%) were hypertensive (BP >140/90mmHg) and 1060(28.7%) were pre-hypertensive (BP 120-139/80-89 mmHg). The prevalence of pre-HTN in men and women was 38.6% and 20.4% respectively and that of hypertension was 16.1%and 8.1% respectively in men and women. A total of 1784(968 men & 816 women) participants were analysed for dyslipidemias based on their lipid profiles. Among the 1784 participants analysed, 76(4.3%) were found to be having hypercholesterolemia(TC levels >240mg/dl) and 235(13.2%) were observed to be having their TC levels above optimal range(borderline 200-239mg/dl) .The prevalence of hypercholesterolemia is slightly higher in men (4.9%)than in women(3.6%)

Setting up of Tribal Health Research Units in ICMR Institutes

Obesity/overweight, diabetes, hypertension and dyslipidaemia among the Nicobarese of Nancowry - A nutritional survey among Nicobarese adults residing in Nancowry group of islands was conducted. The prevalence of overweight was 31.7% and that of obesity was 5%. Another 5% were underweight. The overall prevalence of hypertension (140/90 mm of Hg) was 30.5%, of which 8.5% had severe hypertension (160/100 mm of Hg). Another 39% were pre-hypertensives. Prevalence of diabetes mellitus was 7.5% and that of Impaired Fasting Blood Glucose (IFBG) was 13.4%. Hypercholesterolemia was observed in 16.4% of the subjects, low HDL levels 64.2% and high triglyceride levels are observed in 17.9%.

Nutritional status of Nicobarese preschool aged children - Prevalence of stunting among the Nicobarese (58.5%) was higher than the other populations of the islands as well as the all India prevalence. However, the prevalence of under-weight (14.7%) and severe wasting (3.5%) are much lower. While anaemia prevalence was 70.5% among settler children, it was only 19.4% among the Nicobarese preschool children.

Basic and Applied Research

Development of DNA vaccine for Leptospiral infection - The efficacy of a synthetic consensus DNA vaccine developed against the Leptospira membrane lipoprotein LipL45 was tested. The results demonstrated that LipL45 based DNA has immunogenic potential and used for the development of DNA vaccine.

Development of DNA vaccine for Leptospiral infection - Vaccine approaches have been focused on targeting bacterial motility, lipopolysaccharides (LPSs), lipoproteins, outer-membrane proteins (OMPs) and other potential virulence factors. The efficacy of a synthetic consensus DNA vaccine developed against the Leptospira membrane lipoprotein LipL45 was tested. The results demonstrated that LipL45 based DNA has immunogenic potential and used for the development of DNA vaccine.

Community based intervention for non-communicable risk reduction among the Nicobarese tribe of Car Nicobar Islands, Andaman and Nicobar Islands: The hospital based programme for identification of hypertensives has been rolled out in all the 16 villages of Car Nicobar and a total of 930 cases of hypertension have been identified.

Ecology of Leptospires: Mapping of the environment for the ability to support survival of leptospires, physical, chemical biological properties that determine the survival and quantification of leptospiral contamination using molecular tools: The study revealed a significant positive relationship between endemicity and richness of iron, manganese and copper in soil. Results indicate that presence of iron, manganese and copper influence the survival of the pathogen or transmission of leptospirosis. Soil nutrient status analysis could be useful for devising site specific control strategies.

A comparative whole genome analysis towards unravelling the virulence factors three leptospiral isolates form patients with variable severity and recovered at different times: Three strains *viz*. CH31 isolated from patients associated with mild illness whereas DS-15 and DS -18 isolated from patients with pulmonary involvement with variable severity were sequenced and analysed. It was also observed that in addition to *Sph,* several other genes were absent in CH 31 which could be reason that this strain was not associated with severe pulmonary complications.

Health and nutritional survey among the Onges of Little Andaman: A health and nutritional survey conducted among the Onges in 1997 had identified several nutritional deficiency disorders and to remedy this, their rationing system was modified. A follow up survey was conducted during the month of January 2014, which covered all the 112 Onges at Dugong Creek settlement in Little Andaman Island. The nutritional intervention had little effect on the nutritional status of 0-5 year aged children. The nutritional status of older children has improved considerably and that of the adults remains unchanged. Hypertension, diabetes and low HDL levels are becoming prevalent.

Investigation of outbreak of Dengue in Havelock Island: During May-June 2014, suspected cases of dengue and chikungunya fever were reported to PHC in Havelock Island, South Andaman district. Investigations were undertaken to identify and characterize the aetiological agent. Concurrently, entomological investigations showed prolific Aedes breeding in the affected villages. Of the 24 *Ae. albopictus* pools (Male:3; Female:21), two female pools were found positive for dengue type 3 amplicons, which was further confirmed by sequence analysis. While none of the pools of *Ae. aegypti* were positive for either DENV or CHIKV amplicons.

Investigation of Rotavirus outbreak in Diglipur: An outbreak of Rotaviral diarrhoea was suspected in Diglipur area, North Andaman in December 2013. Detailed clinical data was collected from the patients. The epidemic apparently started abruptly on 1 December, reached a peak by 11 December and then started abating and apparently ended by 29 December 2013. The trend in the occurrence of cases over time is consistent with a common source outbreak with continuous exposure. Almost every child in the age group of 0-10 years in Radha Nagar village suffered from diarrhoea during the outbreak.

Ecology of leptospirosis: Formation of coaggregates and biofilm with soil bacteria and its role in the survival in environment: Studies were conducted to demonstrate environmental biofilm formation by leptospira with other bacteria and the ability of leptospira to survive environment. *Azospirlillum brasilense* was found to be high intensity biofilm forming bacteria with Leptospira in the paddy field environment. Self aggregating strains of Leptospira were

found to form more readily than other strains. The biofilm formation starts by formation of aggregates between Leptospira and Azospirillum cells, which adhere with each other finally resulting in mature biofilm. The tolerance of Leptospira to UV radiation as well as high temperature was found to be increased in the presence of Azospirillum. It is clear that Leptospira is benefited from this interaction by acquiring the ability to survive under harsh environmental condition. Thus biofilm formation may play an important role in transmission dynamics of leptospirosis.

Major Achievements Having Public Health Importance

- The feasibility of eliminating diurnally subperiodic filariasis from Nancowry group of islands by supplementing Mass Drug Administration (MDA) with administration of DEC fortified salt was established. The elimination programme on the verge of launching.
- Strengthened viral disease diagnosis and surveillance in Andaman and Nicobar Islands. Detected infection with 24 viral pathogens through the viral diseases surveillance programme of the Grade-I virology network laboratory.
- The work of collecting data on ethno-medical practices and use of medicinal plants by the tribes was extended to Onges. The programme has now covered Nicobarese of Car Nicobar, Nancowry group of islands and Great Nicobar, Karens of Middle Andaman and Onges of Little Andaman. Biodieversity registers have been created using the data collected.
- The study of NCD risk factors among the Nicobarese was extended to the sect of the tribe living in remote Nancowry group of islands and the survey showed that the prevalence of hypertension and other NCD risk factors, though lower than that observed among the Nicobarese of Car Nicobar, is still high
- Identified several Leptospiral genes coding for proteins with known and unknown functions that are differentially regulated in strains causing pulmonary complications. This opened the way for further research on the pathogenic basis of pulmonary complications in leptospirosis, the most common cause of mortality.
- Identified emergence of Carbepanem resistance among enteric and urinary pathogens and existence of strains of bacteria harbouring *NDM* gene.
- DNA vaccine development work has shown the suitability of LipL45 gene as a possible ideal vaccine candidate.
- Showed the importance of soil nutrient status assessment in environmental control of leptospirosis.
- Showed that soil bacteria could influence the transmission of leptospirosis in both ways. On the one hand they may prolong the survival by forming biofilms with increased stress resistance and on the other hand they may exert a direct inhibitory effect on Leptospira. The research has opened up an avenue for research on environmental control of leptospirosis.
- Health and nutritional survey among the Onges conducted about 15 years after rationalizing their rationing system in response to the findings of an earlier study showed that there has been no improvement in the nutritional status of under-five children. However, the situation among older children and adolescents has substantially improved.

- Investigated outbreak of dengue in Havelock Island and identified existence of DENV-3 in the islands as well as natural infection of *Aedes albopictus* with dengue virus. The outbreak was contained in collaboration with the Directorate of health Services, A&N administration.

Future Plans

- Nutritional disorders, tuberculosis, malaria, lymphatic filariasis, genetic disorders and chronic non-communicable diseases are some of future areas of research. Chronic non-communicable diseases, particularly the lifestyle related diseases, are emerging as the major health problems not only among the urbanized settler population, but even among the tribes, who are considered to have lifestyles closer to the nature.
- The centre has initiated necessary steps for elimination of Lymphatic filariasis, tuberculosis and risk reduction of leptospirosis. The future research plans of the Centre are specifically to address the outstanding research questions in the thrust areas of the Centre's research *viz*. leptospirosis, viral diseases, tribal health and chronic non-communicable diseases. Improving laboratory diagnosis and prevention and control, particularly environmental control and vaccine development are the other important areas that need active research.
- Elimination of diurnally subperiodic filariasis from Nancowry, elimination of malaria in Car Nicobar and intensified tuberculosis control and working towards elimination of tuberculosis in Car Nicobar.
- Risk reduction of leptospirosis in South Andaman

Leptospirosis

1. Vaccine development – continue DNA vaccine development
2. Genome based studies on pathologic basis and virulence
3. Pathogenesis of severe pulmonary haemorrhage in leptospirosis
4. Prevention and control – environmental control utilizing soil bacteria and altering soil nutrient status; social determinants and behaviour modification, communities' attitude and receptiveness to behaviour modification
5. Improving diagnosis – optimizing target antigens/combinations of antigens, use of nano-technology for diagnosis; developing algorithm for clinical diagnosis of febrile cases

Viral diseases

Dengue surveillance including vector surveillance with special emphasis on *Aedes albopictus,* Surveillance of severe dengue and molecular epidemiology of dengue and Other viral diseases surveillance – Influenza, HFMD, vaccine preventable viral diseases, rotavirus and other viral diarrhoeas, viral haemorrhagic fevers and encephalitis.

Tribal Health

Nutritional transition and its impact & Ethno-medicine and health care practices

Chronic non-communicable diseases

NCD risk factor surveillance in tribes and settlers, Genetic markers of hypertension and Community based intervention for NCD risk reduction in tribes.

Infrastructure Development

Animal house, Hostel for Ph.D. scholars and short-term trainees, Internet connectivity improvement-VSAT and Strengthening field stations.

Human Resource Development

Improving facilities for Research scholars – Strengthening library, computational facilities and accommodation.

Grievances/ Complaints/ Representation Received and Disposal Details: So far this centre has not received any public grievance.

National Institute for Research on Tribal Health (Formerly RMRCT), Jabalpur

Mission and Vision

- To plan, conduct & co-ordinate research in order to bring out specific health problems & health needs of the tribals of the country.
- To conduct epidemiological studies in the major health problems of the region.
- To investigate haemoglobinopathies in tribals & other communities.
- To advise and assist the Government in planning, monitoring and evaluating the regional health program and in training of health functionaries.

Manpower: 16 Scientists, 91 Technical, 21 Administrative, 37 others, Total : 165

Budget: The institute received a total of 925.67 lakhs as plan and non plan budget, in this financial year.

Major Projects undertaken

Studies on HRP2 and HRP3 expression in *Plasmodium falciparum* parasites from endemic States of India: (A prospective evaluation) - Study sites were selected from eight states (North East State, Orissa, Madhya Pradesh, Chhattisgarh, Jharkhand, Maharashtra, Gujarat and Rajasthan). A total of sixteen sites have been established for screening and collection of blood samples. A total 21156 suspected malaria cases were screened by microscopy of which 2109 were found positive for malaria (SPR 10.0). Out of 2109 cases, 1306 *P. falciparum* malaria cases were enrolled in the study from all the study sites, a total of 39 cases have shown false RDT results (3.0%).

Bionomics of malaria vectors and their sibling species and to establish their role in malaria transmission in Chhattisgarh, India.

The anopheline fauna of study village consisted 13 species in Korea and 12 species in Bastar district of which *An. subpictus* was the most abundant species in indoor resting collection. The average Per Man Hour density (PMH) of anopheles mosquito was 26.2 of which 26% were *An. culicifacies* and 9.37% were *An. fluviatilis* in indoor resting collection. The average per man hour density of *An. culicifacies* for Bastar and Korea district was 7.1 (95% CI 5.83-8.37) and 7.2 (95% CI 4.87-9.52) respectively while *An. fluviatilis* was 0.38 (95% CI 0.01-0.74) in Bastar district and 4.08 (95% CI 1.00-7.17) in Korea district. *An. culicifacies* was found to breed in all the places such as rocky pit, rocky stream, running stream and seepage water while majority of *An. fluviatilis* breed in seepage water.

Detection and molecular confirmation of *Plasmodium ovale curtisi* and *P. ovlae wallikeri* in India-A study on severe malaria was undertaken among patients attending Govt. Maharani Medical College and Hospital, Jagdalpur district Bastar, Chhattisgarh (CG) state. Blood samples from 250 patients were tested by PCR for the presence of *P. falciparum* mono-infection to rule out mixed infections. Results revealed that, one case was having mixed infection of *P. falciparum*, *P. vivax* and *P. ovale* and two cases were found with mono infection of *P. ovale*. The mixed infection patient died within 48 hrs in hospital. The mixed infection was confirmed as *P. ovale curtisi,* while the other case was found as *P. ovale wallikeri*.

Situation analysis of Mass Drug Administration (MDA) in the control of Lymphatic Filariasis – study on coverage & compliance rate and impact on transmission of infection in selected areas of Madhya Pradesh - Status of infection in human population and infection and infectivity in vector was assessed to assess the impact of MDA was assessed in 11 endemic districts of Madhya Pradesh. Total of 4735 persons from five districts has been examined and 120 (2.6%) were found positive for microfilaria. Infection and infectivity rate in vector was 4.3% and 2.5% from 161 specimens. In Katni district, MDA compliance rate was studied covering 30 villages. 876 HH were surveyed. MDA Coverage rate was 59% and compliance rate was 37%.

Newborn Screening for Sickle Cell Disease and providing Comprehensive care to understand the Natural History of Sickle Cell Disease in Tribal Populations in Madhya Pradesh and Gujarat - The study mainly aims to undertake a targeted newborn screening program for Sickle cell disease in tribal and populations in 2 states and follow up all newborns with Sickle Cell Disease along with a similar number of Sickle Cell Trait and Normal newborns to evaluate morbidity and mortality.

New born screening clinic was established on September 12, 2013 at the Gynecology Department of NSCB Medical College Jabalpur. Till now, 2103 pregnant women were tested for sickle cell anemia and beta thallassemia. Among them 130 women were found to be Sickle cell trait and 15 women were Sickle cell disease (homozygous) and 24 women were β-thallassemia carriers. The spouses (67) of these women were also tested for sickle and β-thallssaemia carrier status. Thirteen husbands were found to be heterozygous for sickle cell disease and 3 for β-thalassemia trait. These high risk couples (16) are being monitored and at the time of birth of their child, efforts will be made to test the new born for sickle cell disease. Among these 16 high risk couple 2 sickle trait babies have been born during the monitoring period. In addition, 237 cord blood samples have been screened.

Morbidity Profile of Sickle cell disease in Central India - The study aims to study the clinical and hematological profile of the sickle cell disease. This year forty nine sickle cell disease patients were registered in the Sickle cell clinic. Twenty percent of patients had history of multiple blood transfusions (blood transfusions of more than 2 times) and 32.6% of patients had no history of blood transfusion. About half of the patients had their onset of the disease before 3 years of age. Patients and their parents were advised to give appropriate treatment and after intervention, there was remarkable reduction in the percentage of severity cases and shifted to mild category.

Establishment of grade II Virology Laboratory - The project aims to provide molecular and serological diagnosis of viral disease of public health importance and investigate outbreaks of diseases of viral origin. The VRDL is giving diagnosis of 15 different viruses using 35 different serological and molecular tests. The VRDL is also conducting molecular studies on dengue,

hepatitis A , E and Influenza virus. Since Jan 2014 more than 4500 tests were conducted on samples collected from patients suspected of suffering with viral disease/s. The laboratory also investigated outbreaks of dengue in urban and rural areas of Madhya Pradesh. Dengue virus 1 and 3 were detected from outbreaks of Shivpuri and Mandla. Dengue viruses 1, 2 and 3 were detected from the samples referred to us collected during Bhopal outbreak.

IEC intervention to improve KAP related to tuberculosis and its impact on risk factors and TB disease burden amongst Saharia - a primitive tribe of Madhya Pradesh - This study is planned to execute a need based IEC intervention in saharia tribal dominated area having high prevalence of PTB and to assess the risk factors for pulmonary tuberculosis among them. It consists of three phases, phase I (baseline survey) and Phase II (IEC intervention) activities have been completed. Various components of IEC intervention were – Group / Community meetings; training to ASHA, Anganwadi and other volunteers; street plays / nukkad natak in local language; health camps; awareness rallies involving community members and school children; awareness programmes & health quiz for school children; patient visits; film shows and wall paintings for slogans and messages in the local language. Cured patients and the best performing DOT providers were involved as TB 'doot' to educate other patients & their families on various aspects of TB and to encourage them for treatment adherence and completion. In addition, calendars and pamphlets with slogans and messages on TB in local language were prepared and distributed to patients & their families, schools, local leaders, health workers, ASHA and Anganwadi workers. Endline survey (phase III) comprising of TB disease and KAP survey including risk factors for PTB is in progress.

National Hospital based Rotavirus Surveillance Network (ICMR task force study) - The major objective of this project is to develop a national hospital-based multi-site surveillance system for rotavirus disease in India. For this study the samples collections sites are Netaji Shubhash Chandra Bose Medical College, Jabalpur and Kamla Nehru Medical College, Bhopal. Till now 37 & 35 children are enrolled in the study at Jabalpur & Bhopal respectively. Of these 3 are positive for group A rotavirus at Jabalpur and 5 at Bhopal. Mixed genotypic infection was seen in most of the samples.

Impact assessment of an intervention package to improve maternal and child health services among primitive Baiga tribe of Dindori district in Madhya Pradesh - The objectives of the study is to provide intervention for improving the utilization of maternal and child health care services, to generate the awareness for proper pregnancy care and promote institutional delivery and to determine the level of utilization of maternal and child health care services and its benefits. The study design is case & control with the sample of 500 married women in 24 villages. The studies have been designed to cover two phases. The Phase-I, implementation of IEC intervention in creating awareness among women has completed in intervention villages with the support of Block Medical Officer, Health worker, Anganwari, ANM and ASHA, etc. About 253 women educated by group discussions and 84 women by interpersonal communication on issues of maternal and child health care in reproductive age.

Setting up of Tribal Health Research Unit (THRU) - The THRU has initiated a new study on the association of sickle cell and malaria at field clinic, Maharani Medical College and Hospital, Jagdalpur, Chhattisgarh in November 2013. It was observed that the prevalence of sickle cell trait and sickle cell disease among malaria patients were 6.7% and 0.3%. While the prevalence of sickle cell trait and sickle cell diseases among non-malaria patients were 16.1% and 2.3%, respectively. More importantly the prevalence of sickle cell trait was

significantly lower among malaria patients than non-malaria patients ($p<0.001$). The study is ongoing.

The Unit has prepared a document on *"An overview of tribal population in India"* based on secondary data and it has been published as a Special Issue of the Tribal Health Bulletin, Volume 20, January 2014. The unit also develops a database on district wise forest area and the tribal population of India for online access and it is available at the RMRCT website under Tribal Health Research Forum (THRF).

Major achievements having public health importance

- **Outbreak investigations**

Dengue outbreaks-Institute investigated outbreaks of Dengue in April – May 2014 in the districts of Narsingpur, and Mandla.The causative agent was confirmed within 48 hours in all the outbreaks.

Dengue & Malaria outbreak-An outbreak of Malaria & Dengue was undertaken in Shivpuri district where 8 deaths due to fever were also recorded. This was the first outbreak of two vector borne diseases (dengue and *P.vivax*) and calls for careful monitoring of the situation.

- The institute is actively pursuing establishing two MRHRU one each in Madhya Pradesh and Chhattisgarh. The part of funds is released by ICMR already.
- The institute was awarded the first prize in the stall competition in 'The Public Information Campaign (जन सूचना अधिकार)' held during 10th – 12th Dec. 2014 at School of Excellence, Madhav Nagar, Katni. This campaign was organized by the Press Information Bureau, Ministry of Information & Broadcasting, Government of India.

Future Plans

The Institute is involved in setting up a RMRCT at Raipur Chhattisgarh and will be submitting a SFC document for this centre. The institute will also be setting up a Field station in Lahaul & Spiti District, Himachal Pradesh, this activity is approved by SAC.

The Institute is actively pursuing establishing two MRHRU one each in Madhya Pradesh and Chhattisgarh

The projects approved for MP are as below:

- Study of pulmonary tuberculosis and its risk factors in Gwalior Division of Madhya Pradesh
- Study on prevalence of Haemoglobinopthies in and around Datia
- Study on Growth and nutritional status of Saharia preschool children

The projects approved for Chhattisgarh are as below:

- Study on Tuberculosis burden and future intervention
- Study on Growth and nutritional status of tribal children in and around Bilaspur
- Study on Prevalence of Haemoglobinopthies in and around Bilaspur

The centre is also preparing SFC document for setting up Infectious diseases laboratory that will have BSL 3 component and will be working on viruses and bacteria especially on the emergence of antibiotic resistance in bacteria.

Grievances/complaints/representations received & disposal details: Nil.

EXTRAMURAL RESEARCH & OTHER PROGRAMMES

Communicable Diseases

ICMR strengthened its extramural research by providing funding for adhoc, Task Force and fellowship projects to scientists of non-ICMR institutes, medical colleges and universities. The Division's extramural activities have contributed significantly in understanding epidemiology of infections like leprosy, Tuberculosis, HIV/AIDS, diarrheal diseases, viral infections, other microbial infections, immunology of infections, in areas of Antimicrobial Resistance and Zoonosis.

Biosafety Level IV (BSL - IV) laboratory established at the NIV, Pune, was inaugurated and has been made operational for research on highly contagious micro organisms. Indigenously developed Japanese Encephalitis vaccine in public private partnership mode by the collaboration of NIV, Pune with the Bharat Biotech India Pvt. Ltd. Hyderabad is nearly ready.

Ongoing Schemes and targets completed during the year along with major achievements of public health importance

DHR/ICMR expanded the network of Virology Labs (VDL). A Resource Centre for VDL has been set up at NIV, Pune to impart formal trainings to VDL staff and also conduct QA/QC for the network. In addition, an online data mining system for VDL was established at NIE, Chennai to meaningfully interpret the data from all VDLs.

Viral Research & Diagnostic Laboratories (VRDLs) were established under the DHR scheme on "Establishment of a Network of Laboratories for Managing Epidemics and Natural Calamities". DHR/ICMR established following 14 new Viral Research & Diagnostic Laboratories (VRDLs) in different states of the country. The list is provided below:

Regional Viral Research & Diagnostic Laboratories

i. All India Institute of Medical Sciences, Bhopal, M.P.

i. National Institute of Cholera & Enteric Diseases, Virus Unit, Kolkata, W.B.

State Level Viral Research & Diagnostic Laboratories

i. Banglore Medical College and Research Institute, Bangalore, Karnataka

ii. Gauhati Medical College, Guwahati, Assam

Medical College Level Viral Research & Diagnostic Laboratories

i. Sri Venkateswara Institute of Medical Sciences, Tirupati, Andhra Pradesh

ii. Late Sri Baliram Kashyap Memorial Govt. Medical College, Jagdalpur, Chattisgarh

iii. Dr. Rajendra Prasad Government Medical College, Tanda, Himachal Pradesh

iv. Mysore Medical College, Mysore, Karnataka

v. Madurai Medical College, Madurai, Tamil Nadu

vi. Government Medical College, Theni, Tamil Nadu

vii. Govt. Medical College, Patiala, Punjab

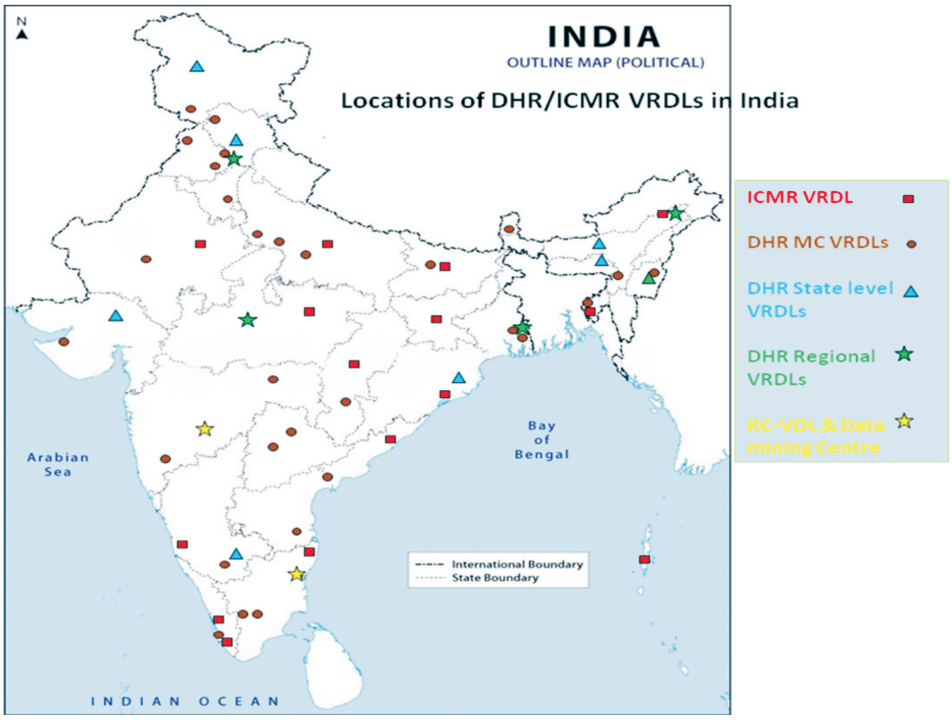
viii. Indira Gandhi Govt. Medical College, Nagpur, Maharashtra

ix. Govt. Medical College, Trivandrum, Kerala

x. Siddharth Medical College Gundala, Vijayawada, Andhra Pradesh

As of now, DHR has released funds for establishing 26 VRDLs (12 in 2-13-14 and 14 in 2014-15).

Future targets: As per the guidelines of DHR, a total of 60 labs (5 Regional, 15 State Level and 40 Medical College Level)need to be established during 2015-2016 depending upon availability of funds.



A Research cum Intervention project on AES/JE was launched by DHR/ICMR as part of the multipronged strategy developed for prevention, case management and rehabilitation measures for prevention and control of JE/AES in Gorakhpur. ICMR initiated the project on 1st November 2012 involving seven ICMR Institutes in 5 highly endemic blocks of Gorakhpur for AES/JE (Bhathat, Khorabar, Chargaon, Belghat and Campierganj with one control block with low incidence of JE/AES in Deoria (Mazhgaon block).

The project includes simultaneous measures for detection of sero-prevalence of JE antibodies in pigs, vector control measures using bednets, Indoor Residual Spray and release of larvivorous fishes in water bodies of 5 identified blocks. Besides this studies are being carried out to detect the transmission of enteroviruses in stool samples and correlate these viruses with disease, vaccine efficacy studies to evaluate the compliance and coverage of JE vaccine and identify the reasons for non-compliance for JE vaccine study by doing socio-behavioral studies. Till date, the salient results of the studies carried out under the project are:

Studies related to enteroviruses

- Distribution of the above neurotropic viruses has been plotted for all five blocks.
- Overall, high prevalence of enterovirus infections have been recorded in the study area.

Epidemiological studies

- Results indicate that JE negative AES accounted for ~90% AES cases in the Gorakhpur division. Incidence of JE on the other hand is showing a decline since 2010.
- Study indicates that the coverage of JE vaccine in the Gorakhpur division was low (36%-66%) indicating urgent need to improve JE vaccine coverage to achieve high population immunity before the next transmission season. It is also necessary to make mothers aware about the need to administer two doses of JE vaccine, which are given free of cost in all the public health facilities in the division. A letter has been sent to Secretary Health & Family Welfare & DGHS to conduct another round of mass vaccination in the districts with reported low vaccination coverage.

Investigation of outbreak of AES/JE in Eastern UP in August-September 2014

- In all 120 samples were collected from 29th August to 12th September 2014. All these samples were subjected to concurrent testing for various viral and bacterial agents simultaneously at KMC, Manipal, EVRC and NIV.
- In all enrolled patients differential diagnosis of dengue, malaria, leptospirosis and meningococcal meningitis was considered and excluded. The clinical signs and symptoms of presence of eschar with fever, rash and hemorrhagic manifestations were considered suggestive of Rickettsial etiology. JE etiology was found in very few patients. On laboratory testing, the predominant etiological agent has again turned out to be scrub typhus (*Orientia tsutsugamushi*), which was detected in 67/120 cases (56% positivity), JE (2.5%), enteroviruses (7%) and human parvovirus (8%). Some cases of mixed infection with two etiological agents were also detected. Overall possible etiology could be detected in 63% of the cases in a total sample size of 120 patients.

Antimicrobial resistance (AMR)

In order to strengthen the surveillance on antimicrobial resitance ICMR has set up Anti Microbial Resistance Surveillance and Research Network (AMRSRN) to enable compilation of data of antimicrobial resistance(AMR) at different levels of health care. So far, six Nodal Centers (NCs) have started functioning which are focussing on: Enterobacteriaceae, Fungal pathogens, Gram negative nonfermenters, Enteric fever, Diarrhoeagenic bacteria and gram positive organisms including Methicillin Resistant *Staphylococcus aureus*, VRE. ICMR has identified 25 medical colleges and hospitals in 17 states in 5 zones across the country to act as regional centers (RCs). Efforts will be made to initiate the Regional network during 2015-2016. The data generated by (AMRSRN) will give an evidence for the drug resistance patterns in the country and this will be utilized to frame treatment guidelines and also revise guidelines periodically.

Zoonotic Diseases

Under the Joint Panel of ICMR-ICAR on Zoonotic diseases, studies on key Zoonotic diseases have been supported. In 2014-15, eleven studies were ongoing on various aspects of Zoonotic diseases viz., epidemiology and molecular characterization and other aspects of rickettsial infections, *mycobacterium paratuberculosis*, diseases in equines and others.

Under the Task Force on " Hospital based surveillance of rickettsial disease", studies were recently initiated at three centers viz. IGMC (Shimla), GMC, (Haldwani) and SKIMS (Kashmir) by the DHR with aim to establish fever surveillance for rickettsial diseases for describing

clinico-epidemiological characteristics and trend of rickettsial diseases and to establish the screening and confirmatory tests for rickettsial diseases.

ICMR is also funding taskforce surveillance research project on rotaviral diarrhoea since July 2012. This project "National Hospital Based Rotavirus Surveillance Network (NRSN)" is going on in 4 zones (North, South, East and West) comprising of 28 hospital-based clinical recruitment sites (CRS) across 17 states and one Union Territory in the country. This study will assess the epidemiological aspects of rotavirus disease in India and provide essential information before and during introduction of new interventions against rotavirus.

Recently, ICMR/DHR took the lead and initiated a joint programme in collaboration with MOH&FW and DBT to commercialize the indigenous technologies developed by Indian scientists so as to give our country an affordable diagnostic for TB and MDR–TB. In this effort, three technologies were identified and a multicentre study including 4 participating sites (i.e NIRT, Chennai, NJIL&OMD, Agra, AIIMS, Delhi and LRS, Delhi) for validation of these kits has been funded by DBT and validation has been initiated w.e.f 1/11/14. The information has also been put up on ICMR and DBT websites for inviting proposals for evaluation of technologies developed by Indian scientists/companies and for external validation under the ICMR's joint programme.

Translational Research

Two Field units attached to RMRC, Bhubaneswar have been established at Rayagada and Kalahandi, which are backward tribal dominated districts with poor health indicators. Several studies are being carried out in close collaboration and partnership with state govt.

Another study on development of LAMP Assay for diagnosis for malaria infection has been initiated by RMRC, Bhubaneswar. The translational value of the study is that the assay once standardized can be used to diagnose malaria (*P. falciparum* and *P. vivax*) in conditions with low parasitaemia (submicroscopic) for treatment of the patients as well as monitoring the programme with higher specificity than the RDK at CHC level hospitals.

Activities in NE States: As a part of Initiatives by the Division under North-East, to enhance the research in the Communicable Diseases in NE, concept proposals have been received under the broad areas covering Epidemiological studies of VL; Designing of diagnosis platform for gut microbiota analysis; Development of HIV viral loads assay; Integrated intervention study to improve anti-tubercular treatment outcome; HIV-1 drug resistance mutations and antibiotic resistance in *M.tuberculosis*; Genotypic characterization of rota virus strains among children in a tertiary care; TB and pregnancy complications among tribal population, Influence of drug and sexual network on HIV related risk among FSWs; Prevalence risk, effect, economic loss and control strategy of Brucellosis in humans and cows; Efficacy and predation of indigenous larvivorus fishes against malaria vector; Socio-demographic profile alongwith KAP of TB and AIDS; Prevalence and outcome of group B *Streptococcus* colonization in pregnant women and their neonates; Infectious reservoir of asymptomatic *Plasmodium* infection in ethnic communities along international borders; Cloning and functional characterization of *L. donovani*.

Besides this proposals are invited in priority areas through 'Call for Proposals'. **Under the 1st call**, **6 proposals and in 2nd call 12 proposals have been approved in principle** and efforts will be made to fund these projects during this year.

Future Studies to be initiated in NE

- Prevalence of chikungunya virus activity in Assam and Meghalaya.

- Prevalence of bacterial pathogens colonizing genital tract in pregnant women and comparison with those causing early onset neonatal sepsis.
- Molecular typing of *Taenia solium / cysticerci* and comparative analysis of human and animal isolates from North and North East India.
- Study of interepidemic survival of *V. cholerae* in outbreak prone areas of Assam.
- Multi-site epidemiological and virological survey of Nipah virus in North East region.
- Evaluation of loop mediated isothermal amplification and PCR in clinically suspected and radiologically confirmed Neurocysticercosis patients in Northeast India.

Non-Communicable Diseases

Oncology

Ongoing Activities and Major Achievements:Review of Cancer Management Guidelines

Under Task Force Project on Review of Cancer Management Guidelines, the consensus documents on management of buccal mucosa cancer, colorectal cancer, stomach cancer and gall bladder cancer are published.

Control of Cancers - Multiorgan Approach:

An operational research project on screening for cancers of cervix, breast and oral cavity was initiated in three districts of Himachal Pradesh. The major components of the study are anti-tobacco community education; education regarding risk factors of cervical and breast cancers; screening for early diagnosis of cancers of oral cavity, cervix and breast, by the paramedical workers. The state government of Himachal Pradesh expressed their willingness for their continued participation with the modified coordination mechanism.

Assessment of Cancer Occurrence Scenario in Punjab:

In order to assess the cancer occurrence scenario in South Western Punjab, ICMR initiated a Population Based Cancer Registry at Patiala and a Hospital Based Cancer Registry in Chandigarh. The study on Development of an Atlas of Cancer in Punjab state was initiated with aim to obtain an overview of patterns of cancer in the state of Punjab and calculate estimates of cancer incidence wherever feasible. Preliminary findings of two year study showed prostrate, oesophagus, lung, lymphoid leukemia and liver as leading sites in males while breast, cancer uterus, oesophagus, ovary and gall bladder in females.

Indo Foreign Research Projects in Oncology: Indo-German Collaboration on Research in Oncology

Development of Chimeric Genetic Vaccine against Human Papillomavirus Type 16:

The investigators have identified four major variations which may play important role in the immunogenicity against HPV by affecting the binding affinity of immunogenic peptide (epitope). The immunogenicity was tested *in vivo* using balb/c mice.

Nano carriers for intracutaneous targeting in management of skin cancer and skin diseases, Mumbai - The study was aimed at synthesis of a novel cationic lipid, designing and characterization of cationic and non-ionic charged nano carriers system namely liposomes, leciplex and invasomes. The nanocarriers were characterized for interaction of drugs with nanocarrier matrix followed by electron microscopy studies. The systems investigated are scalable and there is good scope of its translation into medically feasible outcome.

Indo-INSERM Collaboration on Cancer Research

Effect of Cellular and Immune Response in Mice and patients with Acute Promyelocytic leukemia treated with Arsenic Trioxide - The project was aimed to study the antibody response induced by all trans retinoic acid (ATRA) and arsenic trioxide (ATO) in mouse model of acute promyelocytic leukemia as well as their effect on immunosuppressive cells: describe the immune suppression status of APL patients in India and France using induction therapy. Through this project there has been successful transfer of the mouse model of leukemia and the use of DNA plasmid vaccine to Indian laboratory.

Indo-University of Minnesota Collaboration - The ICMR has signed a Memorandum of Understanding with the University of Minnesota, USA, to undertake collaborative research in the field of biomedical sciences.

HLA haplotypes frequency analysis within India: pre requisite for bone marrow donor registry and cord blood bank planning" - The objective of the study is to provide a detailed estimate of haplotype frequencies across India and in relevant regional populations. It is proposed to analyze existing HLA family typing to estimate HLA haplotype frequencies in the Indian national and regional populations. Collaboration with Indian BMT centres, renal transplant centres and cord blood banks will be used to catalogue the frequency and regional diversity of HLA haplotypes. Data will be shared with scientific community.

Other Collaborations -The Memorandum of Understanding was signed with National Cancer Institute and ICPO (ICMR) and between Rajiv Gandhi Cancer Institute (RGCI) and ICPO (ICMR) for undertaking collaborative research activities.

Future Plans

Task Force on Breast Thermography

A multi-institutional pilot study to evaluate capability of infra red thermography of breast to demonstrate breast cancers with clinical, mammographic & pathological correlation - It is proposed to evaluate the technical capability of breast thermography, standardize the technique and interpretation of breast thermography, efficacy of breast thermography to demonstrate breast cancer and comparison of braest thermography with clinical mammography and pathological findings.

Molecular Basis of Genesis of Breast Cancer - The project entitled "Comparative Study of Genetic, Clinical and Epidemiological Factors of Breast Cancer in Rural and Urban Area of India," is proposed to be initiated with the aim to understand prevalence of breast cancer among rural and urban populations, reasons of variation, if any; analyze the genetic susceptibility by single nucleotide polymorphism (SNP) in familial and sporadic breast cancer.

Cancer Monograph - The Division is in the process of compiling cancer research activities undertaken in the form of centrally commissioned projects, important research out puts in ad-hoc research schemes and major research programmes undertaken by the ICMR institutes engaged in the cancer research.

Review of Cancer Management Guidelines - The consensus document for management of oesophagus, soft tissue sarcoma, NHL, tongue, etc. are at different stages of preparation.

Collaboration of Research on Investigating Prevalence of Various Types of Cancer and other Alarming Health Issues Attributed to Increasing Pollution of Rivers Including Ganga - As a collaborative effort; to begin with, it is proposed to develop cancer registries in the urban population of mid size and large size cities along Ganga river (NCDIR, Bangalore); study Ganga water pollution and its impact on human health (BMHRC, Bhopal); national model to study magnitude of various non communicable diseases and projects in close collaboration with Indian Institute of Technology based on results obtained through previous research.

Cancer of Gall Bladder - It is proposed to constitute task force on studies on understanding the etiological factors of cancer of gall bladder, biological processes associated with pathogenesis and identification of better modalities for its early detection and treatment.

Oesophagus Cancer - Task force on understanding pathogenesis and identification of oesophagus cancer is proposed.

Memorandum of Understanding on Cooperation in Cancer - The MoU between ICMR, NCI (USA), NCI (Jhajjar) and DBT on cooperation in cancer is being formulated.

DIABETES - Ongoing Activities

ICMR-Indian National Diabetes Study (ICMR-INDIAB)-North East - The study is aimed to estimate prevalence of pre diabetes and diabetes among rural and urban population in north eastern region of the country. A sample size of 32,000 individuals covering the North-East regions representing eight states in India namely Sikkim, Assam, Meghalaya, Tripura, Mizoram, Manipur, Nagaland and Arunachal Pradesh is proposed. In Assam, response rate was 97.9% and the urban residents had significantly higher cholesterol, triglycerides, LDL cholesterol and cholesterol to HDL ratio compared to the rural. The study conducted in Assam state resulted in training of approximately 120 personnel at field level besides capacity building. In Mizoram, response rate was 99.1%. The Responders and non-responders were compared and there was no significant differences in general characteristics between them.

Registry of People with Diabetes in India with Young Age at Onset-phase II - The phase II of the project was initiated during 2012 following short listing of applications through call for proposals placed on ICMR website. Eight centres were initiated as ICMR Regional Collaborating Centres (AIIMS, GTB Hospital; New Delhi; Assam Medical College, Dibrugarh; SCB Medical College, Cuttack; PD Hinduja Hospital and KEM Hospital, Mumbai and PGI Chandigarh) and as Collaborating centre at RIMS, Imphal. Other four centres at Srinagar (J & K), Karamsad (Gujarat), Manipal (Karnataka) and Hyderabad (AP) have completed their formalities.

Prevalence of Diabetes Mellitus and Impaired Glucose Tolerance in Raika and Other Communities of Similar Lifestyle in Rajasthan - The cross sectional study aims to understand prevalence of diabetes mellitus and impaired glucose tolerance in Raika community and other camel breeders in Rajasthan with similar life style living in same geographical, socio-economic conditions & camel milk consumption. The study was carried out by DMRC, Jodhpur in rural villages of Jodhpur and Barmer district of Rajasthan which are having Raika population. The consolidated report of both centres is yet to be received by ICMR.

Indo US Joint Statement on Collaboration in Diabetes Research - In June 12, 2012, India's Health and Family Welfare Minister Hon'ble Shri Ghulam Nabi Azad and U.S. Health and Human Services Secretary Kathleen Sebelius signed a joint statement to begin a formal research relationship between the National Institutes of Health and the Indian Council of Medical Research. Joint Steering Committee was constituted. The priority areas of collaborative research were identified in the joint workshop. The collaborative research projects are received in response to Funding Opportunity Announcement (FOA) placed on ICMR and NIH websites.

Major Achievements

ICMR-Indian National Diabetes Study (ICMR-INDIAB)-Phase I - The project was aimed to understand the prevalence of pre diabetes and diabetes in four states viz: Tamilnadu, Jharkhand, Chandigarh and Maharashtra. The overall weighted prevalence of diabetes (both known and newly diagnosed) in Tamilnadu was 10.4%, Jharkhand, 5.3%, Chandigarh, 13.6% and Maharashtra, 8.4%. The prevalence of prediabetes was 8.3%, 8.1%, 14.6% and 12.8%

respectively. The prevalence of hypertension, dyslipidemia and metabolic syndrome are highest in Chandigarh compared to other states.

Role of Camel Milk in Diabetes

HLA Profiling in Raika Community of Rajasthan - The study was aimed to investigate the distribution of disease predisposing genes for type 1 diabetes in the Raika community of Rajasthan as compared to the non-Raika community living in the same geographical region and to evaluate the occurrence of known protective alleles for type 1 diabetes in the HLA complex i.e. HLA-DRB1*02 and its molecular subtypes. The study was undertaken at two centres viz; Delhi and Bikaner. The T1D associated HLA haplotype distribution in both Raika and non Raika was similar to that observed among North Indians.

Understanding genetic basis of resistance to diabetes in the Raika community - The multicentric study at four centres viz; Bikaner, Delhi, Hyderabad and Coordinating unit, Delhi was aimed to (i) evaluate the association between genetic polymorphism of candidate genes implicated in type 2 diabetes in Raika community and (ii) compare the susceptible genetic polymorphism in Raika community and non-Raika communities residing in the same geographical region.

Task force on Genetic Analysis of MODY and Neonatal Diabetes in India - The project was aimed to screen genes for Maturity Onset Diabetes in Young (MODY) and neonatal diabetes. The study population includes unrelated patients, diagnosed with non-insulin dependent diabetes before 25 yrs of age and also has a positive family history of diabetes from various parts of India. The 3 novel variants and 11 known polymorphisms in *HNF1A* gene were identified; which helped in management of patients.

Centres for Advanced Research (CAR)

ICMR Advanced Centre for Genomics in Type 2 Diabetes Mellitus - Novel mutations in MODY and neonatal diabetes identified which helped in shifting treatment pattern from insulin to Oral Hypoglycemic Agents. Manpower development and wet laboratory training workshops to train young researchers are being continued.

Future Plans

Diabetes Atlas (India) - The challenge is to record the existing data on diabetes and therefore, establish population based monitoring and control in order to provide health care for people with diabetes. The conventional approach is to review the published literature so as to central linkage of records specific for diabetes.

Diabetes Cohort Study - A longitudinal cohort study was proposed that would help understand the factors involved in the development of Type 2 Diabetes Mellitus & its complications and provides opportunities for interventions at different levels and collateral studies. The information from this cohort study would become available at the different levels of the natural course of diabetes viz: Prediabetes to Diabetes Mellitus; Diabetes Mellitus to Diabetes complications and their surrogate markers and Diabetes complications to diabetes related deaths.

Genome Wide Association Studies in Type 1 Diabetes - The Task Force project on "Genomics of Type 1 Diabetes," is ongoing at AIIMS, Delhi; MDRF, Chennai and SKIMS, Srinagar. It was suggested to undertake pilot study so as to replicate the susceptible genes in DNA of samples collected under ongoing Task Force study. The Coordinating unit at All India Institute of

Medical Sciences, Delhi would facilitate the DNA collected from all the three regions. It is proposed to replicate 15-20 genes in DNA samples collected from three regions.

Bio Bank of People with Diabetes with Young Age at the Onset - The Council has initiated Task Force on "Registry of People with Diabetes with Young Age at the Onset". The study is presently ongoing at nine centres and data has been collected at all centres. A detailed protocol would be formulated in consultation of Principal Investigators of Collaborating Centres and Experts.

ICMR-Indian National Diabetes Study (ICMR-INDIAB)-Phase II - Based on findings of the phase-I, it is expected to include 17 states and one union territory. It is proposed to survey 72,000 individuals from 17 states and 1 union territory in the main land of India. The five states have completed survey in 2013-2014 and remaining states are yet to be funded by Department of Health Research.

Revised Guidelines for Management of Type 2 Diabetes

The Guidelines for the Management of Type 2 Diabetes were released by Director General, ICMR in March, 2005. In view of few changes in management of diabetics based on recent data available nationally and internationally, it is now proposed to revise the Guidelines for better management of type 2 diabetes patients.

Cardiovascular Diseases

Web Based Management for Acute Coronary Events (MACE) Registry network - The aim of MACE registry is to improve the quality of care for patients with ACS by describing differences in and relationships between, patient characteristics, treatment practices, and in-hospital and post discharge outcomes in different parts of the country. A pilot study for Web Based Management for Acute Coronary Events (MACE) Registry network has been initiated in 11 centres around the country.

Designing a biobank for biological samples collected from a mega study on acute coronary events in Indians - The biobank facility for storing different fractions of blood, urine and saliva under ICMR INSERM (Indo French) collaborative study is being maintained at ICPO, NOIDA. A pilot study for utilization of samples for genomic and proteomic studies for developing biomarkers for CAD and developing retrieval system is in the process.

Research on Disability

The ICMR has constituted a Core Group and 5 Working Groups on the Research on Disability. These Groups have identified the core areas of action. Document on current status of disability in India and a Draft Blue Print has been prepared.

Mental Health

Task Force Study on Epidemiology of Drug Abuse and Dependence in the State of Punjab has been initiated. The aim of the Task Force is to study the epidemiology of psychoactive substance use and dependence in the State of Punjab.

Neurological Sciences

Population Based Stroke Registry - The objectives of this study was to develop feasibility for acquiring data on first stroke in rural and urban area. The incidence data of first ever stroke in rural population of Chinthamani Taluk was 60.1 per lakh population. The case fatality rate was 27.37 on 28th day of follow-up after the onset of acute event. Only 89% had CT

scan. A validation study involving house to house survey in a sub sample population of 50,000 has been undertaken and data is being analyzed.

Evaluation of development of neurosurgery skills by hands-on skills training and interactive virtual training modules (web based, tele-education and virtual simulation) - Neurosurgical procedures require neurosurgical skills training. Various sub modules under the virtual training platform namely web based platform, eLearning module and tele-education system have been developed. A Learning Management System and Content Management System (LMS+CMS) based e-learning platform has been set up at IIT Delhi server. The modules for analyzing skills training in neurosurgery have been identified and divided into sub-modules for evaluation. Micro-suturing, high-speed drilling, neuro-endoscopy experiments have been standardized. Neuro-Endo-Trainer and Drill-Stencil-Trainer have been developed and have been submitted for an Indian patent to ICMR's IPR cell.

Vascular Cognitive Impairment - A multicentric study on "Development and validation of a comprehensive clinical and neuropsychological test battery for use in the Indian context for patients with Vascular Cognitive Impairment " is being conducted at Nizam's Institute of Medical Sciences, Hyderabad; Apollo Gleneagles Hospital, Kolkata, SCTIMAST, Trivandrum and AIIMS, New Delhi. A comprehensive test battery for illiterates and literate population is being designed and validated. Human resource in the form of trained psychologists (12) has been developed.

Centre for Advanced Research - Centre for Advanced Research (CAR) for "Innovations in Mental Health and Neurosciences: Manpower Development and Translational Research" has been initiated.

Environmental Health

Climate Change Project - Multicentric Collaborative study on impact of Global warming and ultra violet radiation (UVR) exposure on ocular health in India is ongoing at AIIMS New Delhi, National Physical Laboratory, New Delhi, Guwahati and Hyderabad to study the effect of environmental factors and UVA & B radiation on eye diseases. This study has completed one component of vector borne disease and the final report is under review. The second component is expected to be completed in 2015.

Centre For Advanced Research On Environmental Health: Air Pollution - This CAR will be completing its tenure in 2015. Data collection for the M-C and adult cohorts is complete. The data analysis is being undertaken and the final complete report is likely to be available in June, 2015.

Chronic Disease Health Research

The Task force project, entitled "A study on association of Oral Precancer with use of Pan Masala" done in 2010-2012, to generate evidence on the health effects of use of Plain Pan Masala and establish the role of plain pan Masala in occurrence of oral precancer. 369 cases of Oral Precancer were observed in 11635 non tobacco areca nut chewers (3.17 %), whereas 11878 cases of Oral Precancer were observed in 97165 tobacco users (12.22 %), and among non users 464 cases of Oral Precancer were observed in 293869 non users (0.16 %). Only 57 cases of Oral Precancer were observed in 32238 sample non users (0.18%),

The Task force project **"Development of a Model for Strengthening of existing health system to address Non Communicable Diseases in India"** was conducted. The project aimed at assessing the existing health system's ability to carry out NCD screening, prevention and

control activities. An NCD risk assessment tool was developed based on data from the ICMR-AIIMS STEPs survey. The major conclusions of the study are:

1. Health workers after training in relevant measurements (Waist circumference, blood pressure, weight, and height) can be used for NCD risk assessment.
2. Opportunistic screening at primary and secondary level health facilities appears to be feasible and a cost effective strategy for early case detection.
3. There was no impact of introduction of NCDs activities on other national programs or on workload of the workers at the implementation level seen in the project.
4. ASHAs and lay volunteers can be trained in risk assessment and family and community education related to NCDs.
5. A strengthened PHC can serve a focal point for NCD Prevention and Control.

ICMR signed a MoU with the **Global Alliance for Chronic Diseases (GACD)** for undertaking research on chronic NCDs. In response to the joint call for proposals on Implementation research for the prevention and control of type 2 diabetes, 26 Letter of Intent applications were received and 4 applications were invited to submit full proposals.

Gastroenterology

- **"Prevalence of celiac disease in indigenous populations of southern, northern, and north-eastern parts of India and identification of reasons for difference in its prevalence"** A multi-site task force project was completed at CMC Vellore, AIIMS, New Delhi and Guwahati Medical College. There was a gradient from Delhi to Guwahati to Vellore with 69.4%, 54.9% and 12.5% respectively in the three sites showing changes consistent with celiac disease. This suggests that the presence of biopsy changes in serology positive patients correlates positively with the population prevalence of celiac disease in the concerned geographic region.

Oral Health

Task force project on cleft lip and palate - Pilot phase at three centers; Center for Dental Education and Research, AIIMS, New Delhi, Safdarjung Hospital, New Delhi and Medanta Hospital, Gurgaon was undertaken. Key observations of the study included:

- The *'Indicleft Tool"* to capture the Cleft patients data was developed and standardized.
- Wide variation in age at primary lip (range 2 to 180 months) and palatal surgery (3 to 228 months) was noted.
- A significant percentage of cases required lip and nose revision surgeries (36% and 35% respectively)
- Fifty five present cases had a post-surgical oronasal fistula
- A large proportion (77.5%) of the operated UCLP cases had complex orthodontic treatment needs.
- A high proportion of patients had hearing defects (44.7%) and many of these also had concomitant tympanic membrane afflictions (nearly 40 % cases), in one or both the ears.

- Around fifty percent (49.7%) cases had clinically relevant speech intelligibility problems.

Further Plans

The Multi-centric study would be initiated across all the regions of the Country in order to

i. Identify pattern of the congenital birth defects of face, cleft lip and palate in India.

ii. Establish the baseline data of spectrum of problems of cleft patients, protocols of treatment given to these children and their actual treatment needs.

iii. Ascertain risk factors associated with congenital birth defects of face: nutritional, environmental and genetic.

Reproductive and Child Health

Child Health

Surveillance study in Child health for estimating burden of disease - This task force study is ongoing at 6 sites –Assam, Uttar Pradesh, Himachal Pradesh, Maharashtra, Tamil Nadu, West Bengal to determine the etiological agent causing sepsis in the neonates and their antibiogram. At 4 sites district hospitals were selected and at two sites 2 medical colleges representing rural hospitals (Assam and Himachal Pradesh). Project was initiated on 1st July 2011, a total of 18895 neonates have been screened and 1936 enrolled till June 2014. Blood culture was positive in 16.3% clinically suspected sepsis cases, 14.2% were sepsis screen positive.

Childhood Pneumonia: Multicentric project to determine etiological agents of pneumonia in <5years children is approved in principle. Another pilot study to validate the ARI Monitor developed by SHARE INDIA and BITS-Pilani for detection of pneumonia in rural children aged less than five years in Medchal mandal, Andhra Pradesh has been approved and awaiting for funding.

Studies on paediatric HIV: In a study frequencies of B cell subsets in peripheral blood of HIV-1 infected children and the efficacy of Highly Active Antiretroviral therapy (HAART) in normalizing the B cell pool was evaluated in a sample of 46 HIV-1 infected children and and 50 HIV uninfected healthy children. The study concluded that HIV infection leads to over-activation of B cells, with expansion of activated B cells and tissue like exhausted memory B cells. Depletion of memory B cells is observed in HIV infected children. HAART tends to normalize the abnormalities caused by HIV in B cell compartment although full reconstitution of B cell compartment was not observed in this study

Studies on identification of Bifidobacteria in Breast milk of Indian women by various molecular tools and their bioprospects as probiotics - Present study involves isolation and identification of Bifidobacteria in Human breast milk and comparison of these new bacterial species obtained with the already existing ones & bio-prospecting of the above confirmed strains of Bifidobacteria for employing them as probiotics. They can be stocked at the National Collection Centre(s) & can easily colonize in human intestine and thus help in the treatment of various gastrointestinal diseases and enhancement of immunity.

Role of molecular neuro-biochemical markers in diagnosis and prediction of outcome of meningitis in children - In a study carried out at Pediatric Emergency unit, Dept. of Pediatrics, Advanced Pediatric Centre, PGIMER, Chandigarh, in 280 cases serum and CSF concentrations of neurobiochemical markers were evaluated in cases of acute bacterial meningitis(117) and aseptic meningitis(n=75). Serum IL-6 was found to be a useful marker to distinguish between bacterial versus aseptic meningitis.

Future Plans

Interventional studies for improved survival in preterm and Low Birth Weight (LBW) infants would be initiated. A Centre for Advanced Research on Community based Maternal, Newborn and Child health is being established at Sewagram Wardha, another Centre for advanced research on Pediatric immune deficiency disorders is being established at PGIMER, Chandigarh. An implementation research project "' ImTecho"' providing mHealth solution as a job aid for ASHA worker is going to be initiated in Bharuch District, Gujarat. A Centre for advanced research on Childhood Emergency Care is proposed to be established.

Research is proposed to be carried out in childhood pneumonia, Infant and Child Feeding, paediatric kidney diseases in coming years.

Women's Health

Pre-eclampsia (PE) affects 5-7% of all pregnancies remains a leading cause of maternal and prenatal morbidity and mortality. Early detection of **preeclampsia** through use of a combination of biomarkers (PAPP-A, PIGF, free B HCG levels), uterine artery doppler and maternal factors in 1st trimester of pregnancy are being carried out.

Maternal Near Miss (MNM) has emerged as a compliment for investigation of maternal deaths. Complications were more likely to be among women more than 35 years of age, illiterate, pregnancy order 4 or more, and not registered as compared to the controls. Rates of vaginal delivery and live birth were higher in controls while rates of operative procedures and blood transfusion were higher among women with complications and near miss cases. The second delay i.e. the delay in reaching the adequate health facility was identified as a major contributor both for complicated cases as well as MNM cases. The most important reasons were that the complaints persisted even after visiting the hospital and incompetence of the health personnel at the first point of contact in managing the patients. Development and validation of **e-partograph** for use on mobile phones and tablets was initiated.

Preterm birth is a major determinant of neonatal morbidity and mortality in India. Studies addressing the etio-pathogenesis of preterm labour including association between maternal proinflammatory cytokine genes and associated polymorphisms; maternal genitor-urinary infection; Gene–Environment interaction and high risk phenotypes in the etiology of preterm birth; epidemiological studies on risk factors, predictors and impact of health care delivery system; use of bedside tests for diagnosing preterm labour, clinical trial to compare the efficacy, safety and effects of Caffeine versus Aminophylline for Apnea of Prematurity (AOP) and neonatal outcome among women conceived by Assisted Reproduction Techniques are ongoing. Studies are also being carried out on use of antenatal Doppler in prediction of **fetal and infant development** and role of long chain polyunsaturated fatty acids and neutrotropins on infant growth and neuro-development.

Preparedness of adolescent girls for marriage in rural area of Vadu, Pune indicated a need to reduce communication gap between parents and their adolescent children.

Research to address the **reproductive health issues of tribal population** was initiated and the major themes identified included assessment of reproductive health parameters and health seeking behavior including childbirth practices; assessing micronutrient status among tribal population and administration of appropriate interventions to improve nutritional status and study of malaria in pregnancy among tribal population and administration of appropriate interventions to improve pregnancy outcome. These will be continued in the next year.

Based on the situational analysis, a package of intervention was designed at experimental site which included (i) Training staff (ii) Counseling on correct and consistent condom use and importance of dual protection (iii) accompanied referral to family planning clinics using a referral slip (iv) Maintenance of MIS (v) Provision of IEC material on contraception and importance of dual protection (vi) repeated counselling during quarterly follow-up.

Promoting Sexual and Reproductive Rights in Primary Health Care Settings in Urban Bengaluru - The study aimed to improve the health care response to women experiencing domestic violence (DV) through training of health providers and equipping them with tools/ aids to implement the intervention. Comprehensive training module on gender based

violence and response guidelines for primary health care providers was developed including posters, handbook for the community health volunteers, visual job aids to help identify cases and protocol for response. In addition, a comprehensive referral system of community organizations was established. As an innovation, mobile based Apps were developed as tools to guide the users in the process of identification and response to women experiencing DV. There is a need for constant engagement of the providers and advocacy to integrate this intervention into the existent system of health delivery and efforts are ongoing towards having a city-wide policy in Bangalore involving various stake-holders

Research to develop **women initiated HIV/STIs prevention technologies like topical Microbicides-** A cross-sectional Task Force study was conducted in 9138 Female Sex Workers (FSWs) in six districts with historical evidence of concentrated HIV epidemic from three high HIV prevalence states of India, namely Maharashtra, Andhra Pradesh and Karnataka. HIV incidence by Pooled PCR was significantly different from serological assays. The low HIV incidence estimates obtained suggest that efficacy trials for vaginal microbicides would require large sample sizes in India.

Diabetes

Low cost non invasive Blood glucose monitoring - The noninvasive Photo Glucometer based on the principles of Photo Plethysmography, is tested on 1135 subjects. The LabVIEW and Micro controller based models find suitable for the working range from 70mg/dl to 360mg/dl with effective transfer characteristics in the step size of 5mg/dl with good gender discrimination.

An Analysis of the effect of Type II Diabetes Mellitus on Male Fertility rates in Mysore Population. The DNA fragmentation in semen was more among diabetics. Oxidative stress was more in semen samples of diabetics.

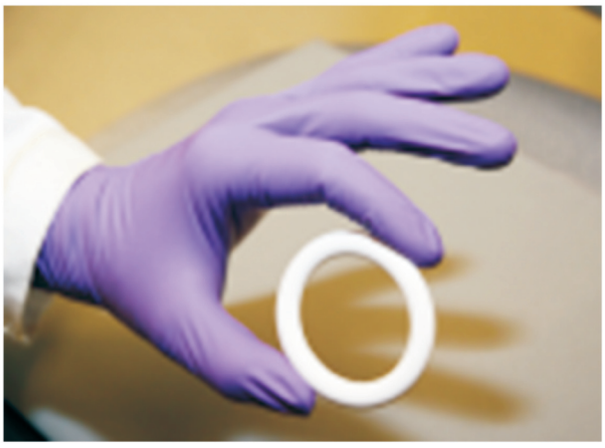
Development of low glycaemic noodles from sweet potato and low calorie sago from cassava as anti-diabetic foods. Developed noodles from different sweet potato reported to contain anti-diabetic compounds, tested the noodles for their low glycaemic action under *in vitro* conditions and in animal models, and developed resistant cassava starch based sago. Out of the two varieties *viz.,* Sree Arun (pale cream fleshed) and ST-14 (orange fleshed), the former found the most suited for spaghetti/noodle making.

Fertility Regulation

Phase-III Clinical Trial with an Intravasal Injectable Male Contraceptive – RISUG® - The Phase-III Clinical Trial is currently going on at five centers in the Country. To increase the enrollment of the subject under the trial, seven new Centres have been identified at the following places i.e. (i) S.S. Hospital, Patna; (ii) Guwahati Medical College, Guwahati; (iii) KEM Hospital, Mumbai; (iv) AIIMS, New Delhi; (v) Kamineni Academy of Medical Sciences & Education & Research Centre, Hyderabad; (vi) King George Medical University, Lucknow and (vii) Kalinga Institute of Medical Sciences KIIT University, Bhubaneswar. These centers are under process of completion of codal formalities. Total around 182 subjects have received RISUG injection and all these subjects have been followed for their efficacy and safety. No side effects have been noticed in any of the subjects post RISUG injection. All subjects are maintaining the clinical efficacy of the drug except two subjects who received RISUG injection last year but are showing sever oligozoospermia.

Evaluation of Progesterone Vaginal Ring as a New Contraceptive Option in India - The ongoing study with Progesterone Vaginal Ring (PVR) as a new contraception option for

lactating women which envisages to evaluate the safety, contraceptive efficacy and continuation rates of the Progesterone Vaginal Ring (PVR) and Copper-T 380A IUD in breastfeeding women during the first postpartum year of use indicated that the method is safe and efficacious with only one pregnancy reported with each of the method. A total of 789 women have been enrolled in the study (PVR-459 women, CuT -330 women) till date and they were followed up for 3938 and 3458 woman-months of PVR and IUD use respectively The continuation rate in PVR and IUD users at 12 months of use was observed to be 58.6 % and 81.7% respectively. The most common reason for discontinuation with PVR was use related issues and with CuT IUD were menstrual related problems.



Infertility

The Assisted Reproductive Technology (Regulations) Bill – 2014: With the formation of the new Central Government, the Cabinet Note along with the proposed draft ART (Regulation) Bill were again circulated to all the concerned Ministries and Departments of Govt. of India for their comments. Based on the comments received from various Departments and Ministries of Govt. of India, the draft Cabinet Note and draft ART (Regulation) Bill were revised and sent to Department of Legal Affairs and Legislative Department, Ministry of Law and Justices, Govt. of India. Both the Departments have examined the draft Cabinet Note and ART Bill and have suggested some modification. The Ministry of Law and Justices has also suggested obtaining the comments from remaining Departments and Ministries of Govt. of India. The Department of Health Research has sent reminders to the remaining Departments and Ministries of Govt. of India for their comments. After receiving their comments and based on the suggestions of Ministry of Law and Justices the draft Cabinet Note and the ART Bill will be revised and the revised draft Cabinet Note and ART Bill will be submitted to the Ministry of Law and Justices for the concurrence of the Hob'ble Minister of Law and Justice.

National Registry of ART Clinics and Banks in India: The contact details of more than 1405 ART Clinics and Banks have been identified in 26 States and Union Territories of the Country. Out of 1405 ART Clinics and Banks around 783 ART Clinics and 140 Banks have confirmed their contact details (total 923) and remaining are in the process of confirmation. 783 ART clinics have submitted their duly field performa. Out of that, the performas of 274 ART clinics have been found in compliance with the provisions of the proposed ART (Regulation) Bill. Therefore these 274 ART clinics have been enrolled under the National Registry of ART Clinics and Banks in India of ICMR. An enrolment no. has been issued to these 274 ART clinics and their contact details are available on ICMR web site as enrolled

ART clinics under the National Registry of ART Clinics and Banks in India. The performas of remaining ART clinics are under evaluation.

Capacity building: 3 short courses and 2 training workshops were organized:

1. How to Teach Evidence Based Child Health" at
   a. PGIMER, Chandigarh on 10th – 11th May 2014, no. of participants 20
   b. RPGMC, Tanda, from 3rd - 5th July, 2014 , no of participants 49
   c. NEIGRIHMS, Shillong on 27th Nov 2014 no of participants 26
2. "How to Practise Evidence based child health" (teaching about use of statistical methods and STATA 13 for carrying out meta-analysis) and "Protocol development for qualitative research methods and health management review" conducted at PGIMER, Chandigarh in collaboration with CHMS, IIM, Ahmedabad on 29th-30th November 2014.

Activities in North East Region

1. **Capacity building for health research in North East states:** Seed Grant scheme is ongoing for North east states in which a grant upto Rs. 10,00,000 is provided to young and mid level faculties to build capacity for undertaking research activities to address local health problems. This amount has recently been increased to 20,00,000. During the year a total of 12 projects have been funded, and 28 projects are ongoing
2. Two Multidisciplinary Research Units (MRUs) of ICMR in the North-east: (i) MRU (ICMR), State Referral Hospital, Falkawn, Mizoram and (ii) MRU (ICMR), Healthcare Laboratory and Research Centre, Naga Hospital Authority, Kohima, Nagaland Region were approved and funds released in March, 2014.

Nutrition

Details of Studies Undertaken

Ad-hoc Studies

- One of the important activities of the Division is to support individual researchers working in different parts of the country. Currently, the Division of Nutrition is supporting 25 projects, 5 projects were completed during the period 2014-15; whereas approx. 33 projects are under consideration. The projects received from different parts of the country including the North-East and tribal regions are being supported. The projects range from community based intervention studies on impact of dietary salt restriction in the reduction of blood pressure among tea garden workers of Assam to supplementation trials and molecular level studies.
- A recently completed study on impact of community based dietary salt restriction in the reduction of blood pressure among tea garden workers of Assam reported the overall prevalence of hypertension to be 50.7% (Male: 52.9%, Female: 47.7%). Further, the study revealed that following intervention and follow up of 6-8 months, mean Systolic Blood Pressure (SBP) reduced from the baseline value of 139.5 ± 26.5 to 135.5 ± 15.2 mmHg (p=0.018) and Diastolic Blood Pressure (DBP) reduced from 84.3 ± 14. 8 to 80.7 ± 10.7 mmHg (p= 0.03); whereas no improvement was observed in the control group.
- Another study on Iodine status in 3 regions of Uttarakhand revealed that in all the three districts (Nainital, Udham Singh Nagar and Pauri Garhwal), the Iodine deficiency existed in the Neonates as seen by Thyroid Stimulating Hormone (TSH) levels. The high TSH value amongst neonates indicated the low intake of Iodine amongst pregnant women. The study also reported that Pregnant women in all the three study districts were iodine deficient as indicated by low median Urinary Iodine concentration and lower intake of adequately iodized salt.
- A Task Force study entitled "Improving health and nutritional status of vulnerable segment of population by implementing multi-component health and nutrition education intervention as a sustainable model of intervention" has been sanctioned for 54 districts in the country where prevalence of under-nutrition and anaemia was reported to be high as per DLHS-2 survey or where Model Rural Health Research Units have been established by Department of Health Research.
- A Task Force study entitled "Effectiveness of diet and lifestyle intervention through Information Education Communication (IEC) tools with Anganwadi Centres (AWCs) as the centre of knowledge dissemination for hypertension (including hypercholesterolemia and diabetes) risk reduction – a cluster randomised controlled trial" is being carried out at 10 sites across the country, including 7 in tribal belt. All biochemical analysis (haemoglobin, glucose and lipid profile) of the biological samples collected under the study is being done at NABL accredited laboratory at 'Centre for promotion of Nutrition Research and Training (CNRT), ICMR. A total of 60,000 samples have to be analyzed under the study. Till date, around 15,000 samples have already been collected and analyzed under the project.
- **Centre for Promotion of Nutrition Research and Training with Special Focus on North-East, Tribal and Inaccessible Population -** During the year 2014-15, the laboratory at

the Centre carried out the analysis of over 12,000 serum, urine samples, blood spots on filter paper for various nutritional parameters like haemoglobin, glucose, lipid profile, ferritin, folic acid, Vitamin B12, Vitamin A, Vitamin E etc collected under the multicentre intervention Task Force study on Hypertension or under various small collaborative projects with the aim to facilitate researchers/students for their degrees and providing assistance to medical colleges/universities where adequate facilities for research are not available. Currently 4 Ph.D students are enrolled with the centre.

National Nutrition Monitoring Bureau (NNMB)

The Indian Council of Medical Research (ICMR) established National Nutrition Monitoring Bureau (NNMB) in 1972 in the States of Kerala, Tamil Nadu, Karnataka, Andhra Pradesh, Maharashtra, Gujarat, Madhya Pradesh, Orissa, West Bengal and Uttar Pradesh. The DG, ICMR and Secretary, DHR, GoI, has sanctioned 6 more new NNMB units in the States/UTs of Assam, Andaman & Nicobar Islands, Bihar, Delhi, Rajasthan and Puducherry in the year 2012. The house-to-house survey is going on.

Special Activities

1. **Khesari Dal**: Considering demands on lifting ban on Khesari Dal (*Lathyrus sativus*), an Expert Committee on Khesari Dal was constituted to evaluate the safety of its consumption, which recommended a study carried out by NIN, Hyderabad in three districts of Chattisgarh, i.e. Raipur, Bilaspur and Durg, where the consumption of Khesari dal is high. The study has been completed.
2. **DHR Apex Committee on GM food:** As a follow up of Parliamentary Standing Committee, the Apex Committee of DHR on Genetically Modified (GM) Foods was constituted by Secretary, DHR & DG, ICMR in 2011. Subsequently a sub-committee under the Apex Committee was constituted to address specific issues on GM foods. Committee met several times during the year to discuss the issues.
3. **Task Force on Micronutrients has been constituted to** address interdisciplinary areas with respect to Operational, Communication, Education, Methodology and Capacity Building etc in partnership with Ministry of Women & Child Development and ICAR.

Major Achievements having Public Health Importance

1. The Task Force on Hypertension supported by ICMR through Division of Nutrition is an intervention study. An advisory have been issued to all those whose biochemical investigations showed high levels for glucose or lipid profile or low levels of haemoglobin. The study has helped in identifying those with Impaired Glucose Tolerance and the population is being counselled for dietary modifications to address the issue. Cases of newly diagnosed diabetics and hypertensives have been advised for treatment.
2. The Task Force on Nutrition sanctioned for 54 districts in the country on the directives of the Planning Commission, has an inbuilt intervention component to improve the health and nutritional status of vulnerable segment of population through existing health personnel in the study locale.
3. The laboratory at CNRT analyzed serum samples collected under WHO trial on Vitamin A supplementation among infancy.

Future Plans

1. Continuation of ongoing activities of task force, ad-hoc, centre of excellence and fellowship programme as well as CNRT, ICMR.
2. Development of nutrition surveillance system in the country.
3. Strengthening inter-agency collaboration with ICAR, FSSAI, DBT etc. and task force on micronutrients.
4. To promote research activities and develop R&D facilities in less representative states/ areas and especially in medical colleges and institutes located in inaccessible/ difficult/ tribal dominated areas as well as in north-east regions. Regional workshops for research methodologies and writing of the research proposal will be organized.
5. Setting up of centre of excellence in unrepresented areas like Srinagar, Jammu, Himachal Pradesh, Uttarakhand etc.
6. To develop Delhi slum areas to demonstrate that a comprehensive approach with better nutrition habits, hygiene and life style can improve the quality of life.

Basic Medical Sciences

Details of Ongoing Studies

Molecular Medicine

Emerging Areas in Molecular Medicine conducted at Jawaharlal Nehru University, New Delhi- The current research areas are focused into two broad categories namely infectious diseases and metabolic disorders that include but are not limited to malaria, leishmaniasis, diabetes, neurodegenerative disorders, gastric diseases, cancer, bacterial infections and drug metabolism. The research objectives of the study on iron and oxygen in pathobiology are as follows: i)Role of mechanism of HIF-1 activation by insulin is reported. Earlier Reactive Oxygen Species (ROS) was reported to down-regulate astro-glial ferroxidase GPI-ceruloplasmin by an mRNA decay mechanism. Now the role of ROS in regulation of neuronal ferroxidases like APP and Ferritin is being investigated.

The laboratory is interested in characterizing the small Molecular Weight (MW) biomarkers of diseases by state of the art mass spectrometry based metabolomics technology. A patent pending technology developed in collaboration between JNU-SCMM and CSIR-NCL for high throughput metabolomics was used. Technology is currently explored in collaborations with several hospitals and in different infectious niche related to *Pseudomonas* sp. that result in Biofilms. Other studies taken up recently are as follows: i) Development of radioprotectors for cancer therapy and elucidate their mechanisms of actions ii) Design, synthesis and evaluation of topoisomerase ia poison inhibitors as bactericidal agents in order to overcome gyrase resistance

Centre for Molecular Medicine at Dept of Human Genetics, SGPGIMS, Lucknow - The centre setup w.e.f. from 30-3-2012 for 5 years with following objectives 1) Establishment of an infrastructure facility for carrying out research in genomic disorders namely mental retardation and malformations, 2) Registry and DNA banking of patients and families with genetic disorders for research in understanding etiopathogenesis and genotype –phenotype correlation, 3) To define the spectrum of mutations in monogenic disorders and new genetic disorders in Indian patients & establish a regional referral facility for DNA diagnostic tests, 4) Carrying out research in multifactorial disorders namely genetics of renal transplantation, reproductive failure and cancers, and 5) Organization of a teaching, training programs in the field of molecular medicine (new molecular techniques like microarray) and medical genetics and genetic counseling with the aim of increasing awareness about genetics amongst clinicians and to create trained manpower with the expertise in molecular techniques and clinical genetics.

The immediate translation to clinical or public health utility can be achieved in clinical and research by way of genetic counselling and prenatal diagnosis.

Establishment of a centre for excellence in Molecular Medicine- Advanced Program in Basic and Applied Immunogenetics conducted at AIIMS, New Delhi - Major highlights of the progress are as follows: a) Technology development; b) HLA and non HLA (MICA) antibodies in organ transplantation; c) Genetics of autoimmune diseases (Type 1 Diabetes as a model); d) HLA-G in HSCT with particular reference to GvHD development; e) Quality assurance and f) Teaching / training / workshops / meetings. There are significant findings related to non HLA (MICA) antibodies in organ transplant.

Anatomy

A study entitled **"Morphometry and ultrastructure of atrioventricular valve apparatus in human hearts"** was carried out at Post Graduate Institute of Medical Education and Research, Chandigarh. The aim of the work was to study the anatomical, histomorphological and ultrastructural characteristics of tricuspid and mitral valve apparatus of human hearts with aging alterations. The degenerative valve changes are an age dependent condition undetected most of the times in the clinical settings, until the symptoms become severe. Hence, it is important to screen patients even with the mildest symptoms to rule out an overt degenerative valve disease.

A study entitled **"Surgical Anatomy of Vasculobiliary Apparatus of Liver as Applied To Liver Transplantation"** was carried out at Department of Anatomy, PGIMER, Chandigarh. The objective was to evaluate the anatomical relationship of extrahepatic and intrahepatic course of hepatic artery, portal vein and bile duct before giving off second order branching. 100 cadaveric livers were dissected minutely to study the extra and intra hepatic vasculo-biliary anatomy of liver.

Human Genetics

A study entitled "Study of subtelomeric imbalances in Indian children with idiopathic mental retardation using real time quantitative PCR" was carried out at Genetic Unit, AIIMS, New Delhi. The objective was to assess the feasibility of quantitative PCR for subtelomeric screening in Indian children with idiopathic mental retardation and the aim being to incorporate in regular patient care services. The idea was to develop a screening strategy in cases with idiopathic MR to screen for common region where there was high probability of finding a genetic defect followed by screening of other subtelomeric chromosomal region. Because of its sensitivity, accuracy and reproducibility, real-time quantitative PCR is a valuable method for detection of copy number variations in children with idiopathic mental retardation. It is a suitable technique to confirm copy number variations. It is definitely a reliable, high throughput, easy to perform & cheaper method of detecting copy number changes.

A study entitled "Association between smoking and genetic factors in the development of chronic obstructive pulmonary disease" was carried out at Dept of Anthropology, Sri Venkateswara University, Tirupati, Andhra Pradesh. Chronic Obstructive Pulmonary Disease (COPD) is the third leading cause of death worldwide. A total of 386 male smokers (236 patients and 150 controls) were selected. The development of COPD, upon exposure to tobacco smoke, is the cumulative effect of defects in several genes. This study managed to reinforce the theories of oxidant-antioxidant imbalance, protease-antiprotease imbalance and inflammation upon which the etiology of COPD has been built.

A study was carried out to see the association of clinical symptoms with smoking in Northern India COPD patients at Tertiary Care Hospital.A total of 204 COPD patients and 204 health controls were included in the study. Age as well as gender were confounding factors for the study. The clinical profile was associated with the smoking history and it was observed that none of the clinical symptoms were significantly associated with quantity of smoke in the northern Indian population. The genetic factors involved in the susceptibility to COPD were studied. Although cigarette smoking is major risk factor for COPD but, there is a substantial body of epidemiological evidence linking occupational exposures to dusts, gases/ vapors, and fumes to chronic airflow destruction, with a substantial population attributable risk (15-20%) in non-smokers.

Medicinal Plants

Center for Advanced Research in DNA fingerprinting and diagnostics of Medicinal plants from Eastern and North-Eastern India, Bose Institute, Kolkata in collaboration with Manipur University and Botanical Survey of India, Kolkata, set up from 17.9.2007 to 18-8-2014. The objective of the centre are as follows: i) DNA Fingerprinting / DNA Profiling of medicinally important plants for development of Species Specific Marker towards: a) Authentication of medicinal plants b) Supplementing drug assessment protocols c) Documenting plant genetic resource for establishing ownership rights in benefit sharing as well as resolving IPR conflicts. d) Developing passport data for export of valuable plant material. ii) Assay of Medicinally Important Compounds in plants under different environmental conditions. iii) Developing diagnostic Medicinal Trait Related DNA Marker towards: a) Discovery of medicinal - Trait related gene b) Wild germ-plasm screening for selecting superior genotypes c) Identifying non-conventional source of food and medicinal plants in the wild.iv) Human resource development through Hands-on-Training aiming at Transfer of Technology to laboratories particularly of the NE.

The outcome of studies done is as follows: 1)The Species Specific AFLP markers were developed in this study would be useful for supplementing conventional drug assessment protocols in authentication of the two medicinal plant species (*Zanthoxylum* species) for resolving adulteration-related problems often faced in herbal medicine production. 2) The gingerols ,the most potent being 6 gingerol, is useful in treatment of common cold, cough, colic, dyspepsia, fever including flu, sore throat, spasms, painful affections in bowel and stomach, in heart ailments, problems of the circulatory system as well as in cancer therapy.

Other Programmes

- **Short Term Studentship (STS)** This is the only programme in India for undergraduate medical students to pursue a small research project on any topic of their choice in their own medical college. There was a steep 44% jump in the number of applicants in 2014. A total of 6416 students registered and 4038 proposals were received which were evaluated online by 188 subject experts. 1307 proposals were approved and have completed their research during summer vacations and 1111 STS reports were submitted online. Application and proposal submission and its review and evaluation by experts are done ONLINE. Proposals were received from 269 medical colleges and 42 dental colleges from all parts of the country. The program has helped to create a pool of young medical scientists in the country.
- **Establishment of Exclusive Herbarium And Plant Repository for Non Codified plants at National Innovation Foundation, Ahmedabad:** It is set up w. e. f 1-2-2011 with following objectives : 1)Establishment of exclusive herbarium and repository for 5000 non-codified plants . 2) Storage of crude drugs and plant extracts of therapeutic nature. 3) Phased manner collection of Non-codified plants for establishing herbarium. 4) Collection of Non-codified plants samples claimed to have therapeutic value for establishing repository 5) Fingerprinting at chemical and DNA level for elite materials through outsourcing to referral labs. A facility has been established for keeping the 5000 plant samples. The herbarium and crude drug repository will serve as the first step for validations of grassroots practices/claims. This is the first herbarium and crude drug repository of plants established in the country.

Cochrane Library in India: National access to the Cochrane Library in India was initiated in 2007 to improve healthcare and brings together research on the effectiveness of healthcare

treatments and interventions and provides access to the highest quality, independent information on existing and new healthcare interventions. Its initial tenure has completed on 31-12-2012 and is further extended for another 3 years. **The National access to the Cochrane Library completed fourth year .**

Medical Innovation Fund: A study Anti-HIV activity of a formulation comprising recombinant human Surfactant Protein D (SP-D), at NIRRH, Mumbai, is conducted under this scheme . The use of human SP-D as a microbicide to prevent sexual transmission of HIV is novelty of the project.

Collaborative Programme: Task Force project for Validation of "Innovative Claim of Herbal Healers initiated w.e.f 16-10-2014 - with the objective of validation and value addition to hitherto undocumented non-codified, unique Traditional Knowledge (TK) entered in National Innovation Foundation database.

Guidelines Developed

Bioethics

International Recognition for Institutional Ethics Committees- In order to improve the quality of ethical review and to build the capacity of the ethics committees to international standards, ICMR has supported several training courses, including Human Subject Protection Course (HSPC) and Standards Operating Procedures (SOP) Training and Survey of Institutional ethics Committee Trainings. The courses were organized in association with Forum for Ethical Review Committees in Asia and Western Pacific Region (FERCAP) for in-depth training and capacity building of ethics committees at Mumbai and Chennai. Following this National Institute of Epidemiology (NIE), Chennai and National Institute for Research in Reproductive Health (NIRRH), Mumbai along with YRG Care, Chennai have received international acclaim and recognition certificate from Strategic Initiatives for Developing Capacity in Ethical Review (SIDCER) during the FERCAP Conference in Philippines, 23-25th November, 2014.

The Biomedical and Health Research Regulation Bill, 2014 was drafted in which a mechanism has been proposed to register, monitor, evaluate institutions and ethics committees involved in biomedical and health research with provisions to penalise for unethical practices through a Biomedical and Health Research Authority to be established by the Central Government. The Authority would register, monitor and evaluate the performance of an Ethics Committee, evolve suitable performance appraisal systems, norms and mechanisms for enforcing accountability and transparency, assess the need for providing protection to vulnerable sections of society, determine the nature and definition of informed consent in changing settings, determine the potential conflict of interest and also promote awareness and training. Every Ethics Committees registered under this Act shall be entrusted with the function to safeguard participants, formulate and lay down standard operating procedures (SOPs), carry out a comprehensive review of ethical aspects, ensure compliance of general principles & to periodically monitor the study. The draft Bill was sent for Inter-Ministerial consultation and after incorporating the suggestions it was submitted to the Ministry of Law before submission to Cabinet for approval.

Stem Cell Research

National Guidelines for Stem Cell Research and the guidelines were released on 21st January 2014. The word 'Therapy' was removed. It covers both basic & translational research not therapy. Any stem cell use in patients, other than that for hematopoietic stem cell reconstitution for approved indications, is investigational at present. Any stem cell use in patients must only be done within the purview of an approved and monitored clinical trial. Every use of stem cells in patients outside an approved clinical trial shall be considered as malpractice. It excludes research with animal stem cells.

National Apex Committee for Stem Cell Research and Therapy (NAC-SCRT) was constituted as per the ICMR-DBT Guideline for Stem Cell Research and Therapy (2007) in 2010 with an aim to carry out following two main functions: i) General oversight of the field of stem cell research and therapy in India and formulation of policy related to it. ii)Review of specific controversial or ethically sensitive research and proposals for therapeutic use of stem cells/ differentiated derivatives. The progress achieved in view of following: Establishment of the secretariat at ICMR and Chairman's Office and the following work has been done so far: The Draft of the revised guidelines for stem cell research 2012 was finalized by the NAC-SCRT. The guidelines were released on the ICMR website on 21st January 2014. NAC-SCRT secretariat responded to queries from institutions/individuals/stakeholders on matters relating to stem cell research after consulting the Committee. The process of IC-SCR registration is now streamlined and the revised format for IC-SCR registration is made available on the NACSCRT website. So far, NACSCRT has received 76 applications of Institutional Committee for Stem Cell Research (IC-SCR) of which 5 fulfilled the requirement as specified by NAC-SCRT and were recommended for registration. The necessary information is awaited from the remaining institutes for further consideration. Website dedicated to NAC-SCRT with online facility for registration has been created and is now active. The future work is: i) Developing formats for annual reports, human embryonic cell lines registration etc. ii) Representation of complaints/issues directed to NAC-SCRT. Iii) Registration of IC-SCRs.

Major Achievements having public health importance

Sincere efforts are made to link with public health for expected deliverables in the areas like: 1.Access affordability (Generic Drugs, Drug utilization, pharmaco-economics) 2. Safety (Pharmacovigilance registries for e.g. for drug induced liver diseases (DILI). 3. Effectiveness (Drug utilization & outcome research) 4. Variability (Pharmaco-genetics) 5. Antibiotic stewardship (coordinating with antimicrobial resistance network) 6. Rational use and standard treatment guidelines 7. Molecular pharmaco-epidemiology. The idea is to have a robust database for almost every type of therapy, Three working Groups are formed. One on identifying national priority areas related to diseases, drugs, populations with policy and / or practice related problems through - network. Second Working Group on creation of representative database with coverage by geographical areas, health settings,neglected marginalized areas, diseases of national importance, and third Working Group is set up for capacity building for collecting,collating, analyzing relevant information and translating it into policy and action.

Future Plans

Advancement of Physiological Sciences in India (ICAPS): The Indian Council of Medical Research funded Workshop for the Advancement of Physiological Sciences in India (ICAPS) which bears three strategic priorities: (i) enhancing national capabilities in biomedical research; (ii) recognizing excellence in research in physiological sciences; (iii) inspiring the next generation. The purpose of the ICMR National Workshop Program lies in creating a

forum for 'mentoring' young aspiring faculty members and scientists towards a career and a healthy culture in research in physiological sciences. From three workshops held at Agartala Government Medical College (AGMC) (Five projects were developed) Mental Health and Neurosciences, Bangalore(5 concept project approved) and All India Institute of Medical Sciences, Delhi(1 concept project approved). The projects approved will be initiated.

Following Advanced Centres will be set up: Advanced center for Clinical Pharmacology for antibiotic stewardship and research in the field of antimicorbial usage at PGIMER, Chandigarh and CMC, Vellore & collaborating centres. ICMR Network Project For *Advanced* Pharmaco-vigilance Capacity Building and Research in India at AIIMS Delhi & collaborating centres; Advanced Centre for Translational Research with Ayurvedic and Unani Medicinal Preparations in Respiratory and Allied Disorders at Patel Chest Institute Delhi; Advanced Centre for Clinical Pharmacology in Hematological Diseases Aiming at Personalized Medicine under Dr Poonkuzhali Balasubramanian, Vellore; Establishment of an Advanced Centre for Clinical Pharmacology in Diabetes Research using Traditional Medicine – Munashi, Mumbai; Advanced centre for clinical pharmacology: vector borne diseases NIMR Delhi; Advanced Centre for Clinical Pharmacology for Capacity building in Preclinical and Clinical Research at Seth GS Medical College and KEM Hospital,, Mumbai & Collaborating Centres;

A study on Training Programme in Clinical Trial Methodology - to train man power in various aspects of clinical trials is approved with the objective to identify thrust areas for research; constitution of subcommittees for identifying key research question within the thrust areas, will be initiated.

Medical Innovation Fund: Feasibility and development of Digital Magnivisualiser," at ICPO, Noida approved will be initiated. The purpose of developing magnivisualizer is as follows: A) To improve the sensitivity of visual inspection of cervix for precancerous and cancerous lesions. B)To reduce the numbers of nonspecific results of visual inspection. C)To provide a low cost simple device.

A **Task Force on Indian Normative for Clinical Laboratory Parameters (INCLAP)** - which aims to set up our own standards of Clinical Laboratory Parameters and Normative Values in view of the varied ethnicity of people of India totally different from the western population on the basis of which current range of values for different tests are available, a proposal for pilot study was finalized with the involvement of medical colleges by the technical coordinating centres at NIN Hyderabad as per suggestions of Expert Group and endorsed by Biomedical Board of ICMR. It will be initiated.

Grievances /complaints/representation received and disposal details - A representation was received from Dr Raman Kapur, President, Society of Medical Acupuncture to amend the order No R1405/25/96-U & H (R) (Pt) Govt of India (MOHF&W) dated 25th November 2003 by including Acupuncture in the practices of physiotherapy and dentistry. The above issue was deliberated in two Expert Group meetings which recommended the following:

- Qualified Dental Surgeon with a degree recognized by Dental Council of India also may learn and practice acupuncture for the treatment of pain.
- Physiotherapists may be permitted to practice Acupuncture under referral by a medical practitioner.

An order dated 4-12-2014 has thereafter been issued by DHR which allows dentists to practice Acupuncture as mode of therapy after undergoing a certificate course.

International Health

The International Health Division (IHD) in ICMR co-ordinates international collaboration in biomedical research between India and other countries as well as with national & international agencies such as Ministry of Science & Technology, Indian and foreign missions and WHO etc. There are few specific agreements signed by the Ministry of Health and Family Welfare with other countries and rest are those signed directly by ICMR/DHR with international organizations/ institutions such as INSERM in France, German Federal Ministry of Education and Research (BMBF) and Helmholtz Association (HGF) in Germany; National Institutes of Health(NIH) in USA; University of Minnesota (UoM), USA; International Aids Vaccine Initiative (IAVI), USA; Canadian Institutes of Health Research (CIHR) in Canada; University of Sydney, Australia; London School of Hygiene and Tropical Medicine (LSHTM) and Medical Research Council (MRC) in UK; Academy of Finland (AF) in Finland; Global Alliance for Chronic Diseases (GACD); Research Council of Norway (RCN), Norway; Russian Foundation for Basic Research (RFBR), Russia. The Department of Health Research (DHR) has signed a Memorandum of Understanding with National Institute of Health & Care Excellence (NICE), UK.

Purpose of International Cooperation - The purpose of these Memoranda of Understanding (MoU) and Joint Statements has been the exchange of scientific information; exchange of scientists/technicians; joint execution of scientific projects and organization of joint scientific meetings, seminars, workshops and symposia in identified areas of cooperation.

Joint Working Group (JWG) and Joint Steering Committee (JSC) Meetings - The regular meetings of Joint Working Group (JWG) or Joint Steering Committee (JSC) with various countries/international institutes/organizations are organized to review, develop and finalize joint collaborative programmes, decide future plans of action and identify priorities for bilateral cooperation.

In addition, the International Health Division (IHD) has also represented ICMR in various bilateral/multilateral Joint Committee Meetings coordinated by MEA, DST and MOH & FW, GoI for cooperation with various countries.

Following JWG/JSC meetings under various MoUs and Joint Statements have been held & attended:

1. 1st Joint Working Group (JWG) Meeting on 29-30 April, 2014 between India and Saudi Arabia at MOHFW, New Delhi.
2. 1st Joint Working Group (JWG) Meeting between India and United Kingdom on Health held on 3rd September, 2014 at MOHFW, New Delhi.
3. 7th Meeting of Joint Working Group (JWG) under the Indo-Swedish MoU on cooperation in the field of Healthcare and Public Health held at Stockholm, Sweden on 18-19 September, 2014.
4. 7th Meeting of Indo-Russian JWG on Science & Technology at New Delhi on 23rd September, 2014.
5. 3rd Indo-US Working Group Meeting on Health at New Delhi on 14th November, 2014.
6. Indo-US Joint Committee Meeting (JCM) at New Delhi on 17th November, 2014.
7. 10th Meeting of Indo-German Committee (IGC) on Science & Technology held on 20th November, 2014 at New Delhi.

8. Indo-Sweden Bilateral Meeting between Hon'ble Ministers of both countries at New Delhi on 24th November, 2014.

The International Workshops/ Meetings held under Bilateral/Multilateral Programmes:

1. Indo-Canada Mental Health Experts' Group Meeting held on 29.09.2014 at ICMR, New Delhi.
2. ICMR-FORTE Joint Workshop on Ageing and Health held on 24-25th Nov., 2014 at ICMR, New Delhi.

The following MoUs have been signed during this period

1. Addendum – three for GACD Secretariat funding at UCL, London signed in June, 2014 under existing ICMR-GACD MoU.
2. Memorandum of Understanding between The Research Council of Norway and Indian Council of Medical Research on Health Research was signed on 14th October, 2014 in Norway.
3. Memorandum of Understanding (MoU) between Indian Council of Medical Research (ICMR) and International Aids Vaccine Initiative (IAVI) on Cooperation in AIDS Vaccine Development was signed in October/November, 2014 in New York and ICMR Hqrs., New Delhi respectively.
4. Memorandum of Understanding between the Indian Council for Medical Research and the Russian Foundation for Basic Research on Cooperation in Health Research was signed on 11th December, 2014 at Hyderabad House, New Delhi.

Dialogues initiated and documents forwarded to Govt. of India for approval of Indo-US Joint Statement on Environmental and Occupational Health; Maternal and Child Health; NIAID, USA & ICER, Chennai; ICMR-University of Sydney, Australia and NHMRC, Australia; ICMR and Drugs for Neglected Diseases Initiative (DNDi), Switzerland; MoU between DHR and ICAV, Canada; Bill & Mellinda Gates Foundation (BMGF), USA; London School of Hygiene and Tropical Medicine (LSHTM), UK & ICMR; MoI between ICMR & FORTE, Sweden.

Exchange Visits - The IHD supports and coordinates the international travel of Indian scientists engaged in approved bilateral collaborative research projects under various MoUs and Joint Statements with other countries. A total of 7 exchange visits of scientists / officials to and from India were arranged under various international collaborative programmes / projects.

Health Ministry's Screening Committee (HMSC) - The research projects involving foreign assistance and/or collaboration in biomedical/health research are submitted by the Indian investigators to ICMR for approval of Govt. of India through Health Ministry's Screening Committee (HMSC). The International Health Division of ICMR acts as the Secretariat for HMSC. The projects are peer reviewed by the concerned Technical Divisions at ICMR and then placed before the HMSC for consideration and decision. During the year 2014-15, three meetings of Health Ministry's Screening Committee were organized, wherein 72 projects were considered and out of which 51 projects were approved for international collaboration / assistance with agencies from USA, Germany, France, Canada, Australia, UK, WHO, European Union and several other foundations and foreign universities. Out of which, two projects are co-funded by ICMR.

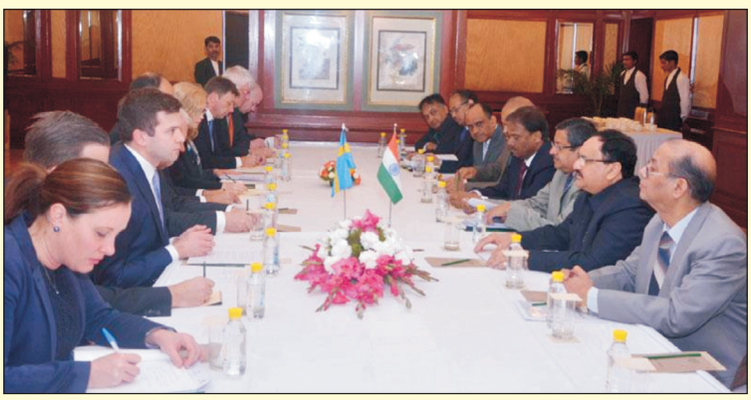
International Visitors / Dignitories - The Division also organized visits by various visitors to ICMR from foreign countries / agencies such as High Commissioner of Australia, European Union; INSERM, France; NICE, UK; MSF & LSHTM, UK; Deptt. of Health, UK; University of Oxford, UK; UoS, Australia; UoM, USA; FORTE, Sweden; IAVI, USA; NIH, USA; RFBR, Russia; CDC, USA etc.

International Fellowship Programme - The ICMR International Fellowship Programme for Indian biomedical scientists aims to augment capacity strengthening of institutions involved in basic, applied, epidemiological and clinical sciences through exposure of Indian researchers to the latest international advancements in knowledge, to understand the disease and find strategies for their prevention and cure. The ICMR International Fellowships have been awarded to six Senior and twelve Young Indian scientists during the year 2014-15.

The reports of 12 Young and 6 Senior ICMR International Fellows who had undertaken the Fellowship during the years 2013-14 have been placed on ICMR website during 2014.

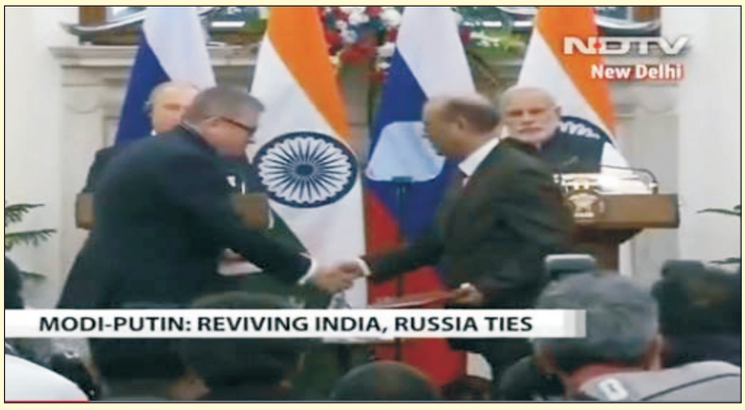
Joint Call for Proposals - The Joint call for ICMR-MRC, UK (Mental Health) & Indo-US Joint Statement on Diabetes were uploaded on ICMR website.

Announcement made for submission of applications for transfer of human biological material for commercial purposes and/or research and development of commercial products with deadlines as 30th April, 2014, 31st July, 2014, 31st October, 2014 and 31st January, 2015 and 166 cases were considered by the Committee in its three meetings held so far on 28th May, 2014, 25th Aug., 2014 and 27th Nov., 2014, of which 78 cases were approved.



A meeting between Hon'ble Minister of Health & Family Welfare, GOI, Shri J.P. Nadda & Hon'ble Minister for Health Care, Public Care and Sport, Mr. Gabriel Wikstrom, Government of Sweden. Also present at the function were Sh. Lov Verma, Secretary (HFW) & Dr V M Katoch, Secretary (DHR), H.E. Mr. Harald Sandberg, Ambassador of Sweden to India, Dr Jagdish Prasad, DGHS and other senior officers of the Ministry of Health & Family Welfare and ICMR along with members of the Swedish delegation held during 24 November, 2014 at New Delhi.

Signing of MoU between ICMR and International AIDS Vaccine Initiative (IAVI), USA on cooperation in AIDS Vaccine Development in October/November, 2014 at ICMR Hqrs New Delhi



Dr. V.M. Katoch Secretary Department of Health Research, MOH&FW and Director General, ICMR from India and Academician Vladislav Ya PANCHENKO, Chairman of RFBR from Russia signed the MoU between ICMR and RFBR on cooperation on Health Research at Hyderabad House, New Delhi on December 11, 2014 in the presence of the Hon'ble Prime Minister of India and H.E. President of Russia.

Academician Vladislav Ya PANCHENKO, Chairman of RFBR & Dr. Alexander N. Sharov attended discussion meeting on implementation plan of ICMR-RFBR MoU on December 12, 2014 at ICMR Headquarters, New Delhi.

Publication Information and Communication

ICMR continued its multifaceted activities in the field of publication and information for dissemination of biomedical information generated through research to different target groups. The Indian Journals of Medical Research completed 100 years of its uninterrupted publication during the year under report.

PUBLICATION

Periodicals

Indian Journal of Medical Research

The Indian Journal of Medical Research (IJMR) entered in 102nd year of its uninterrupted publication in July 2014. The IJMR continued to publish quality original research articles in the area of biomedical research as well as review articles (both solicited and unsolicited) on topics of contemporary biomedical interest. Other regular sections such as Editorials, Commentaries and Letters to the Editor (Research Correspondence), Viewpoints, Perspectives, Systematic reviews with meta analysis, and Students' IJMR along with a new Section "Clinical Images" started during the centenary year were also continued to be published. During 2014, of the articles published under various categories/sections, 52% were original research articles (Fig.1). The quality of peer review was maintained by involving reviewers both from India as well as foreign countries. During 2014, about 30-35% reviewers were from countries other than India.

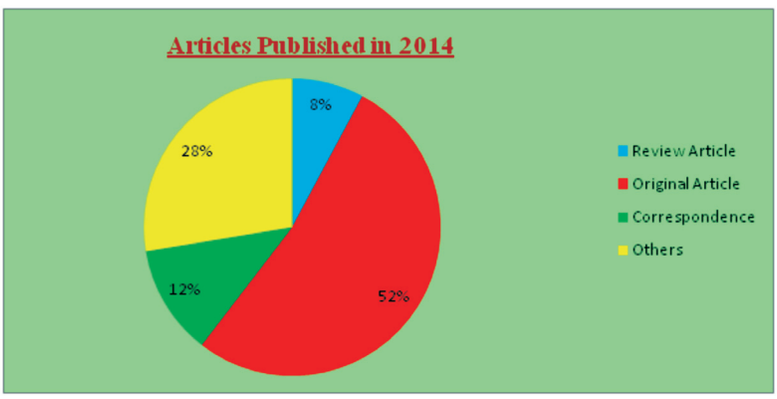


Figure 1: Category-wise articles published during the year 2014

A Supplement on "Reproductive Health & Strategies for Family Planning" was brought out in November 2014. A total of 16 review articles, four Perspectives contributed by renowned experts in the field and three original research article were published in this Supplement.

The Impact factor of the IJMR for 2013 was 1.661.

ICMR Patrika

The publication of ICMR Patrika, a monthly Hindi Bulletin was continued. The Patrika featured artricles on various health research topics like Bancroftian filaria *rog* ; *Electromagnetic Vikiran ke Khatre; Bharat mein Vitamin A Sampooran Karyakram); Bharat mein Vaiksinon aur Tikakaran ka Sankshipt Itihas ; Bharat mein atiraktadab prabandhan ki disha mein behtar prayas; Bharat mein Haemophilia ki sthiti aur Samajik Prabhav; Swasth Hriday ke liye Anukool Parivesh ; Madhumeh : Sanket aur Lakshan*

Non Periodicals

Annual Report : Annual Report (both English and Hindi) of ICMR as well as DHR were brought out during the year under report.

Popular Books

1. The Hindi version of 'Dietary Guidelines for Indians- A Manual' was prepared and published as '***Bhartiyon ke lie Aahar Sandashika- Ek Niyamavali'*** .
2. Brought out the Hindi version of "Diet and Heart Disease" as "***Ahar aur Hriday Rog"*** These books were released by the Secretary, DHR & DG, ICMR on 18th Feb., 2015 at ICMR Hqrs.
3. ICMR's National Institute of Nutrition, Hyderabad in association with Devnar Foundation for the Blind, Secunderabad brought out three of its popular publications *viz* (i) Dietary Guidelines for Indian-A Manual (ii) Diet and Diabetes (iii) Diet and Heart Disease in Braille for visually challenged individuals. The books were released by Secretary, DHR, Govt of India on February 18, 2015.

ICMR Awards for Popular Medical Books in Hindi for the Biennium 2012-13

Out of a total of 9 books received the book entitled "*Vigyan ki Vikalangata par Vijay"* by Shri Vinod Kumar Mishra was adjudged for the First Prize of Rs 1.00 lakh.

Hindi Day Lecture

Prof. S. K. Sharma, Head, Department of Medicine, AIIMS, New Delhi delivered popular lecture in Hindi on *" Nidra evam Swasthya* (Sleep & Health)" at the ICMR *Hqrs* on 13th Oct., 2014.

BIOMEDICAL INFORMATION & COMMUNICATION

Scientometric Studies

Annual Research Output of ICMR Institutes

The annual document '2013 Research Output of ICMR Institutes' with analysis of publications from all the institutes including Regional Medical Research Centres has been brought out. A total of 684 papers were published by the ICMR institutes during the calendar year 2013. The National Institute of Cholera and Enteric Diseases (NICED), Kolkata topped the tally with 79 papers followed by the National Institute for Research in Reproductive Health (NIRRH), Mumbai (66), National Institute of Nutrition (NIN), Hyderabad (62) , National Institute of Immunohaematology (NIIH), Mumbai (47), National Institute for Research in Tuberculosis (NIRT), Chennai (47), National Institute of Malaria Research (NIMR), New Delhi (46) and National Institute of Virology (NIV) , Pune (42). Of the 376 journals used for publishing 684 papers, 199 journals had an impact factor (IF) 2013 equal to or greater than 1.000.

The average IF / paper of the Council for the calendar year 2013 was 3.103.

Library & Information Services

The subscription for the e-journals Lancet, Science, Nature, and NEJM for all ICMR Library & Information Centres has been continued in consortia mode. Subscription for full text electronic data base ProQuest Health & Medical Complete including ProQuest Medical Library (covers about 3000+ journals) has been renewed for one more year for six ICMR institutes including ICMR Hqrs.

The subscription to J-Gate Plus has also been renewed for one year. J-Gate provides access to millions of journal articles available online offered by 12356 Publishers. It presently has a massive database of journal literature, indexed from 41,125 e-journals with links to full text at publisher sites. J-Gate offers two types of products/services: **J-Gate Portal:** a. Table of Contents (TOC) for 41,125 e-journals. b. Database - A comprehensive searchable database with 36,569,422 articles, with 10,000+ articles added every day. **J-Gate Customized Services:** a. J-Gate Custom Content (JCC)- Local Intranet /Internet solution to libraries, providing e-access for subscribed journals. b. J-Gate Custom Content for Consortia (JCCC) - JCC extended to a homogeneous group of libraries for sharing "subscribed" journal resources.

Subscription to DELNET institutional membership has been renewed. The following databases are available from DELNET which can be accessed through online by the institutional members.

1. Union Catalogue of Books (2.04 crore bibliographic records)
2. Union Catalogue of Periodicals (36 thousand records)
3. Database of Periodical articles (9.22 lakh records)
4. CD–ROM Database (22 thousand records)

Training programmes on JCCC@ICMR and J-Gate Plus were at Bhubaneswar and Ahmedabad.

Human Resource Development in Biomedical Communication

ICMR has signed a Memorandum of Understanding with Central Council for Research in Unani Medicine (CCRUM) under the Department of AYUSH. As part of this agreement, ICMR organized one workshop on Research Paper Writing and one on preparation and writing of research proposal for funding. Scientists and technical staff of CCRUM Headquarters and its regional laboratories/centres attend these workshops.

Dissemination of Biomedical Information

ICMR carried out large number of education and extension activities during the year in different parts of India to disseminate the activities and achievements of ICMR at various platforms as well as to enhance the outreach of ICMR. A brief description on the same is as follows:

2nd Rajasthan Science Congress held during 1-3 May, 2014 at Dr K N Modi University, Niwai, Rajasthan

ICMR Participated in 2nd Rajasthan Science Congress held during 1-3 May, 2014 at Dr K N Modi University, Niwai, Rajasthan and showcased its various scientific activities and achievements through informative posters and audio-video programmes. Many dignitaries including former DG, ICAR Dr R S Paroda, Scientists, Academicians, Students and local people visited the ICMR Pavilion.

12th Infra-Educa 2014 held at Pragati Maidan, New Delhi from 21-22nd June, 2014

ICMR also participated in an information campaign entitled "12th Infra-Educa 2014" held at Pragati Maidan, New Delhi between 21-22nd june, 2014 organized by Friendz Exhibition and Promotions for dissemination and promotion of scientific culture among the students and displayed informative posters on various activities and achievements of ICMR. Students

visiting the ICMR Pavilion were elaborated on various training programmes and courses conducted by ICMR in the area of biomedical and health research.

3rd Science Expo 2014 a mega Exhibition held at Solan, Himachal Pradesh during 18-20 September, 2014

ICMR participated in 3rd Science Expo 2014-a mega Exhibition held at Solan, Himachal Pradesh during 18-20 September, 2014 organized by voluntary agency SANSA Foundation and displayed important scientific activities and achievements of various ICMR Institutes. Large number of students and local people participated in the exhibition.

Health Pavilion of the Ministry of Health & Family Welfare, Govt. of India during India International Trade Fair (IITF), 2014 held at Pragati Maiden from 14-27th November, 2014

ICMR put up an exhibition in the Health Pavilion designed by Ministry of Health & Family Welfare, Govt. of India during India International Trade Fair (IITF), 2014 held at Pragati Maiden from 14-27th November, 2014.

Kangra Avishkar Expo-2014 held at Kangra, Himachal Pradesh during 12-14 December, 2014.

ICMR participated in Kangra Avishkar Expo-2014 held at Kangda, Himachal Pradesh during 12-14 December, 2014. The exhibition was inaugurated by DG, CSIR Dr P S Ahuja. Posters on the important activities and achievements of ICMR were displayed and a lecture on '*Paustik Ahar Swasthya Jeevan Ka Aadhar*' was organized specially for the students for creating awareness for healthy diet.

ICMR Participation Kangda Avishkar Expo-2014

Pride of India Mega Science Expo during 102nd session of the Indian Science Congress held in Mumbai from 3-7th January, 2015

Pride of India Mega Science Expo during 102nd session of the Indian Science Congress held in Mumbai from 3-7th January, 2015

ICMR participated in Pride of India Mega Science Expo organized as part of 102nd session of the Indian Science Congress at Mumbai from 3-7th January, 2015 and showcased its activities and achievements through 125 attractive and vibrant posters on the major research activities and achievements of public health importance. Topic of display included the Nutrition, Environmental and Occupational health, malaria, leprosy, tuberculosis, cancer, cholera and enteric diseases, HIV/AIDS etc. There were display on different indigenous and affordable technologies developed by the ICMR scientists. Video films on the activities and achievements of the ICMR and its institutes were also shown throughout the period in Hindi as well as in English. Union Minister of Science & Technology, Dr Harsh Vardhan, visited the ICMR Pavilion on 3rd January, 2015, appreciated the efforts and shared his experiences with Secretary DHR & DG, ICMR, Dr V.M. Katoch. Many Scientists, Academicians, media persons, Students and local people visited the ICMR Pavilion which was awarded the Most Informative Pavilion Award presented by Shri Ram Naik, Hon'ble Governor of UP in the presence of Shri Suresh Prabhu, Hon'ble Union Minister of Railways in Valedictory Function.

Pravasi Bharti Diwas and Vibrant Gujarat in Gandginagar, Gujarat during 7-13th January, 2015

ICMR participated in Mega Science Expo organized as part of Pravasi Bharti Diwas and Vibrant Gujarat Global Trade show in Gandhinagar, Gujarat during 7-13th January, 2015 and showcased its activities and achievements through attractive and vibrant posters on major

research activities and achievements of public health importance. These posters highlighted the major research activities of the ICMR in the area of Nutrition, Environmental and Occupational health, malaria, leprosy, tuberculosis, cancer, cholera and enteric diseases, HIV/AIDS and regional health problems.

The significant feature was the display of ICMR's indigenously developed affordable technologies that include the Magnivisualizer for detection of cervical cancer, kit for beta thalassemia, non-invasive procedures for kalazar detection, ferritin estimation, Cooling Jacket for persons working under heat stress conditions, *etc*. Scientists who developed these technologies were also present to answer the queries of the visitors.

Other important feature of the exhibition was the live demonstration of malaria parasite, aquatic and adult stages of vector mosquitoes, insecticide treated bed nets, larvivorous fishes like Guppy and Gambusia, etc.

Video films on the activities and achievements of the ICMR and its institutes were also shown.

Pravasi Bharti Diwas and Vibrant Gujarat in Gandginagar, Gujarat during 7-13th January, 2015

12th Agriculture Science Congress Expo, Karnal, Haryana from 3-6 February, 2015

ICMR participated in the 12th Agriculture Science Congress Expo held at National Dairy Research Institute (NDRI) from 3-6 February, 2015 at Karnal, Haryana and displayed attractive and informative posters for dissemination of ICMR activities and achievements. The Exhibition was inaugurated by Hon'ble Governer of Haryana Shri K S Solanki. Large number of participants and local people visited the ICMR Pavilion and interacted with ICMR Scientists.

Participation in World Book Fair

ICMR participated in New Delhi World Book Fair held at Pragati Maidan in New Delhi during 14-22nd February, 2015 and put up the display and sale of ICMR publications. ICMR stall was visited by large number of people and books on nutrition were in great demand.

ICMR participated in World Book Fair held in New Delhi during 14-22nd February, 2015

Web-based Extramural Project Management System

The web-based Extra Mural Project Management System developed by ICMR is now fully functional. The pre-proposals received within a month or on deadline are scrutinized and evaluated by the Committee within a fixed time period and decision is communicated to investigators for both selected and non-selected proposals by next month. The Principal investigators (PIs) of the selected pre-proposal are asked to expand their pre-proposal into detailed project in the format of the ICMR *ad-hoc* projects within a period of not more than 6 months Online as well hard copies along with a CD with soft copy.

During the year, financial module has also been designed and developed. The functional ease and practicality of module has been established by the "Online Processing Unit" of ICMR. All the 'Forms' have been uploaded with the appropriate 'Data'.

The procedure for enlisting, viewing, uploading of documents required for 'codal formalities' and financial concurrence have been and are available to PI's for their use. The PO's can also view these documents and take necessary action.

There has been an increase in the number of proposals received by ICMR using this system. In the year April 2014- March 2015 ICMR received 2657 pre-proposals in this period using e-PPS. These proposals were reviewed and of these, 735 pre-proposal were shortlisted for submission of detailed proposals. One of the reasons to this increase can be attributed to the ease of proposal submission process in e-PPS.

A total of 888 full proposals were received and marked to respective technical divisions for processing, during the year under report. During the period, recommendations of Experts/Project Review Committees pertaining to a total of 825 detailed proposals were communicated online. Of these 126 projects were approved by PRC for further processing, 52 projects were technically approved with clarifications on certain issues and rest were not found suitable for funding.

An initial analysis of the data called from the system for 'ad-hoc' proposals being submitted from the different parts of India, have clearly indicated change of productive institutions, subject areas being covered by investigators and the pattern of Cities and the 'Major Discipline' being chosen by investigators. Some of the remote cities, which have entered in the ICMR Extramural Project Scheme, are East Khasi Hills, Ri-Bhoi, West Garo Hills, Aizawl, Bhadrak, Dhenkanal, Ganjam, Mayurbhanj, Karaikal, East Sikkim, Dharmapuri, Dindigul, Erode, Midnapore and Nadia.

Recently, the online system has also been customized for Online Submission of Proposals under GIA Scheme of DHR. Under the scheme, already around 546 (450 under GIA-General & 96 against a call on Zoonosis) pre proposals have been received, PO's have been registered, proposals were marked and expert meeting has been done. The format for System generated E-mail content of the result has been standardized and all the results were communicated Online. The format for Full Proposals & documents required for Codal Formalities has also been standardized and are available on the DHR Online Portal. Submissions of full proposals are being done on DHR online portal. Programme officers, experts and disbursing officers are being provided access after proper registration onto the system.

Bio-Informatics Centre

Bioinformatics Centre (BIC) was established as Integrated Research Information System (IRIS) in 1983 under the Division of Publication & Information (P&I) at ICMR with a mandate to computerize activities of ICMR. It was renamed as Bioinformatics Centre in 1999 with an extended mandate to nucleate and support informatics in medical research. Bioinformatics Centre is providing wide range of services to the scientific fraternity as well the administration and finance. During the period 2014-15 BIC was primarily involved in managing Task-Force 'Biomedical Informatics Centres of ICMR, Management of Research in the area of Bioinformatics and Medical Informatics and providing services to ICMR.

Activities

Task-Force Projects

Recent developments in genomics and proteomics are changing the paradigm of medical research from *hypothesis-driven* to *data-driven* research. ICMR initiated a task-force 'Biomedical Informatics Centres of ICMR'. Under the task-force ICMR established 20 Biomedical Informatics Centres at premier medical research institutes and medical colleges across India. The mandate of these Centres is to nucleate and promote informatics in medical research through increasing awareness, providing services and initiating collaborative research projects.

The Centres initiated approximately 60 collaborative research projects and published 34 peer-reviewed papers in National and International journals. The Centres conducted 6 workshops/ training programs on basic bioinformatics and biostatistics. The Centres have contributed to developing trained manpower by helping 15 young researchers in their short and long term projects. The Centres have developed 18 databases of clinical/biomedical information. A comprehensive web portal highlighting the activities of Biomedical Informatics Centres is available at **http://bmi.icmr.org.in.**

ICMR Computational Genomics Centre - In order to provide a centralized resource for ICMR research laboratories and medical research community of India, BIC prepared a proposal for establishing a centralized ICMR Computational Genomics Centre with mandate to provide consultancy, services, expertise and infrastructure to medical researchers for analysis and interpretation of high throughput Genomics data. The proposal has been accepted by ICMR.

Research Management - Currently there are 11 ongoing ad-hoc projects and 38 fellowship proposals. Nearly 19 adhoc projects are approved and pending due to non-availability of funds. BIC is taking initiatives to promote projects on medical informatics and those involving use of primary patient data.

DHR Website - BIC has developed website for Department of Health Research (DHR) http://www.dhr.gov.in. The site is maintained and updated regularly by BIC. Site highlights DHR organizational structure, staff, activities and schemes initiated by DHR. Announcements related to workshops, call for proposals, employment opportunities are flashed on the Website for wider publicity. BIC has developed a beta version of DHR website using an open source Content Management System (CMS).

ICMR Website - BIC has developed and maintains ICMR web site http://www.icmr.nic.in which highlights activities of ICMR headquarters and its institutes. It is regularly updated

with information related to workshops, call for proposals, employment news, grant schemes, annual reports, IJMR *etc*.

The site is linked to other ICMR resources including web-based email access, searchable general circulars, Gastrointestinal Tract Pathogens Repository (GTPR), National Culture Collection of Pathogenic Fungi (NCCPF), Health Account Scheme, Vector Borne Diseases Science Forum, Medicinal Plant Unit, Biomedical Informatics Centres of ICMR, Indo-German Science Centre for Infectious Diseases, National Apex Committee for Stem Cell Research and Therapy (NAC-SCRT), Management of Acute Coronary Event (MACE) Registry, International Symposium on Accelerating Research on Multipurpose Prevention Technologies for Reproductive Health and Extramural and Intramural information system.

Information is received from ICMR Institutes mainly through email and reply is also sent after updating the same on ICMR Website. Updation of databases related to Publications, Projects, Scientists profile, Seminars/Symposia, general circulars *etc* is done regularly.

Intramural, extramural and IJMR Databases

BIC is maintaining databases and information systems on i-series AS400 server which pertain to both extramural and intramural research. The information covers Projects Detail, Publications, Scientists Profile, Seminars/Symposia/Conferences. Information generated through this system is used to answer time bound and parliament questions, queries from the ministry as well as from the DG, ICMR. Data related to IJMR contents is also maintained on the same server.

ICMR Network and Management - Servers maintained by BIC are ICMR Blade Server which includes icmrhqnd.in for domain logins, AV server is antivirus server , icmrntserver is a local host for OPA File Tracking System and intranet, bmi.icmr.org.in for BIC Website, TMG Proxy Server, STS / MACE Server, TMG Server & Remote Server, FIN SERVER, ICMR Exchange server for email logins of all employees of ICMR headquarters and its institutes. Management of ISP links for providing Internet and Video conferencing are (NKN, NIC, Ernet). Troubleshooting of servers and centralized antivirus solutions, e-mail and other support is provided by BIC to ICMR headquarters and institutes.

Online Recruitment System - BIC has developed a two stage e-recruitment portal for ICMR. Portal allows online registration of applicants and online submission of applications by the applicants. The portal allows online reviewing and evaluations of applications.

Final report Uploading System - BIC has developed an online system for uploading final reports of projects. This system allows uploading final report, Display of Abstract, Conclusion and the Report as whole. The system also allows search by Project No, Division File No, String search on Title, based on Project Investigator-wise and Program Officer-wise.

Legal Cell Management Information System (LCMIS) - BIC has developed ICMR Legal Cell Management Information System (ILCMIS) which provide the information about ICMR's court cases in various Hon'ble courts. It will provide the information about the subject of the case, Name, location & state of the court the case is currently running, details about the petitioner & respondent and their lawyer, case status,(next Hearing date) and affidavit details.

Human Resource Development

Junior Research Fellowship - During the period under report the Council conducted 13th National Level Examination for Selecting JRFs to augment Biomedical Research in the country. Every year 150 **JRFs** (i.e. 120 for Life Sciences and 30 for Social sciences including biostatistics) are selected for doing Ph. D. in Biomedical Sciences in different institutions. Number of candidates appeared in the year 2014-15 was approx.10,000. The examination was conducted at **12 centers** (Bangaluru, Bhopal, Bhubaneswar, Chandigarh, Chennai, Delhi, Guwahati, Hyderabad, Kolkata, Mumbai, Sri Nagar and Varanasi). A total of 643 JRFs is on-going (2010-2014) at various national level institutions. The value of existing fellowships is at present Rs.16, 000/- p.m., (will be increase Rs. 25,000/- p.m.) The annual contingency grant is up to Rs.20, 000/- p.a. + HRA.

Financial assistance to MD/MS/DM/MCH thesis in priority areas of Biomedical Research. (50/Yr.) - Financial assistance of Rs.25, 000/- is provided to (50/year) MD/MS/DM/MCH students who are in the 2nd year of MD/MS course. The Selection Committee recommended financial assistance to a total of 531**MD/MS/DM/MCH thesis** out of 1897 proposals received so far. Out of 335 -thesis protocol 59 protocols/candidates awarded financial assistance during reporting period.

MD, Ph. D. Programme 25 slots/ year - Programme was revived to identify young medical graduates with brilliant academic record for pursuing post-graduation & later to absorb them in research cadre. The candidate who passes all MBBS examinations in the first attempt with 60% or more aggregate marks is eligible for the examination. Under this programme selected medical graduates are provided financial assistance for 4 to 5 years. The eligible candidates were selected through national level examination.

Programme is on-going at three universities i.e. King George University, Lucknow, NIMHANS, Bangalore & Sri Ramachandra Medical College, Chennai. During 2014-15 out of 15 allotted slots, 10 were selected. So far 85 candidates have joined the MD/PhD programme, *8* candidates have submitted their thesis.

International Conference/Training/Workshops to Non ICMR scientist Support Scheme - One of the major mandates of the Council is capacity building of biomedical scientists of the country by providing them financial assistance for participating in International Conference/ Training programmes/ Workshops etc. Out of total 1854 applications 563(30.36%) applicants were supported during january-December 2014

Post Doctorate Fellowship Programme (50/ yr) - To identify and support young Ph.Ds. for the conduct of research using ICMR Institutes & working for priority areas of Health Research. So far 239 applications were received by the ICMR, **201 applications** were short listed for personal discussion and 102 were selected. Out of total 102 selected PDF's 75 have joined different ICMR institutes, 44 PDF's completed their studies and 28 PDF's still continue their study for the year 2014-15. A total of 39 new PDF's proposals were received by division during January to December 2014. Out of 39 proposals 13 were approved for funding and 8 **PDF's** were ongoing.

16 ICMR's Institutes shown their interest viz: NIN, Hyderabad, NICED, Kolkata, NIRRH, Mumbai, NIOP, New Delhi, NIRT, Chennai, NJILOMD, Agra, NIMR, New Delhi, NIIH, Mumbai, DMRC, Jodhpur,NIE, Chennai, RMRIMS, Patna, ICPO, Noida, NIREH, Bhopal, RMRC - Bhubaneswar, Dibrugarh, Belgaum.

ICMR Awards - A total of 215 applications were processed for evaluation through different committees for selection for the year 2011 & 2012.

Short Term Visiting Fellowship-50 per year - The objective of the award of the Short Term Visiting Fellowship programme is to provide opportunity to a scientist employed in a medical college, research institute, university etc. and actually engaged in research in the field of biomedical sciences to learn advanced research techniques/ methods in use in other institutes in India. The tenure is three months.

Grant-in-aid for Organising Seminars/Symposia/Workshops - To update knowledge transfer from lab to land at national and international level in the concerned area through Conference/ CME/programmes/ Workshops etc. scheme is ongoing and out of total 902 applications 416 applicants were approved during January to December 2014.

Intellectual Property Rights/Translational Research

The mandate of IPR Unit is to assist ICMR supported research (intramural/ and extramural) in technical, legal and other IPR-related issues to ensure IP protection and dispersion of knowledge and to facilitate technology transfer, licensing and commercialization under IPR policies which needs regular & periodic monitoring.

The Ex Union Minister for Health and Family welfare**, Dr. Harsh Vardhan l**aunching the Non - invasive Kala Azar detection kit, developed by ICMR, at Patna on September 02, 2014.

Release of technologies

"Non-Invasive Rapid Diagnostic Test for Kala-azar (Visceral Leishmaniasis) using urine Samples" developed by Dr. Dharmender Singh, RMRIMS, Patna. It was launched by Honorable Ex Health & Family Minister Dr. Harsh Vardhan, on September 02, 2014 at RMRIMS, Patna.

The kit is a breakthrough in kala-azar diagnosis since it is novel, purely non-invasive, user-friendly and point of care rapid diagnostic test which can be used in the endemic field. The kit avoids multiple needle pricks, thus reducing the risk of transmission of HIV, HbsAg, and HCV. The results can be read visually within 10-15 minutes.

During the year, a total of eleven patents were filed with four of them filed on inventions by intramural institutes namely National institute of Virology (NIV); Pune, Enterovirus Research Centre (ERC); Mumbai, Vector Control Research Centre (VCRC); Puducherry and National Institute for Research in Reproductive Health (NIRRH); Mumbai. These inventions belong to the fields of chikungunya treatment and mosquito larvicidal formulations. Filing of remaining seven patents are done on inventions by extramural research with institutes such as All India Institute of Medical Sciences (AIIMS); Delhi, Sree Chitra Tirunal Institute of Medical Sciences & Technology (SCTIMST): Kerala and King George's Medical University (KGMU); Lucknow. These inventions pertain to Blood Glucose Level Detection, Neuro-endoscopy, Neuro-drilling and in vitro Virus Detection.

Four patents filed during this period are PCT applications belonging to fields of cancer treatment, detection of human gene polymorphism and RNAi agent for viral inhibition.

Besides patent filing, efforts were focused to promote technology transfer. A criteria for selecting the collaborators from private healthcare sector was finalized and a transparent process was materialized which included periodic display of novel inventions on ICMR's website seeking collaboration with private/public sector companies for further upscaling and development.

A total of fifteen novel technologies are in the process of upscaling. These technologies promise healthcare application for masses and are also commercially appealing and in an outline belong to sectors of diagnostics, immunodiagnostics, cancer detection and, garments *etc*. Amongst these, technologies of blood glucose level detection and cancer lesions visualizations are on the verge of transfer.

Also the common protocols and standard operating systems for biopesticides, biolarvicides, insecticides and insect growth regulators have been displayed on ICMR's website to invite the proposals for NVBDCP for public health programmes. The IPR Unit endured its training of women scientists under the Women Scientists' scheme of TIFAC/DST.

Major ICMR/DHR Achievements in the area of Innovations and Affordable Technologies

Affordable Indigenous Technologies launched:

- Strips and detection system(s) for Diabetes (13th Jan,2014)
- New test for detection of pathogenic bacteria in food and Technologies for Vitamin A and Ferritin estimations (20th Feb, 2014)
- Development of PCR based diagnosis procedure for visceral leishmaniasis from Urine samples- (Non-invasive method): launched on 2nd September, 2014
- Novel noninvasive method for diagnosis of visceral leishmaniasis by rK39 testing of sputum samples: launched on 2nd September, 2014

Technologies Ready for Launch

- Diagnostic kit for lung fluke disease (paragonimiasis)
- Kits for leptospirosis – prevalent in Karnataka, Gujarat, Tamil Nadu and other states.
- Kit for diagnosis of chlamydial infection prevalent in women.
- Kits for hormone assays: for various sex hormones useful for reproductive health problems
- Cooling jacket for persons exposed to hot atmosphere

Technologies Targeted for 2015-16:

- New rapid molecular methods for detection of drug resistance in TB
- New test methods for diagnosis of chikunguniya, Crimean-Congo Haemorrahagic fever, dengue
- An immune-chromatographic dipstick kit for cholera
- Biocides for mosquito control
- Rapid Test for assessing osteoporosis
- Ergonomic cycle rickshaw
- Non-invasive test for diabetes, test for glycosylated haemoglobin
- Genomic Chips for cancer diagnosis and classification

Medicinal Plants

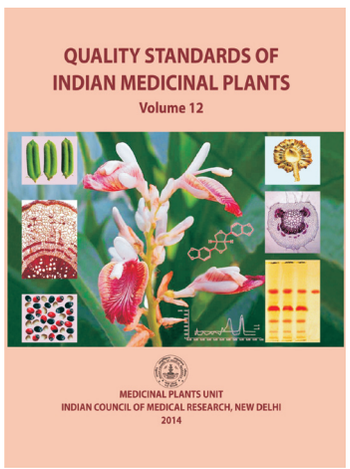
Task Force Projects

Review Monographs on Indian Medicinal Plants - The programme aims at consolidation of Indian research contributions (published information) at the various National laboratories/ institutions across the country in the area of medicinal plants and present the compiled information in series on "Reviews on Indian Medicinal Plants".During the year work is under progress on the L and M series of plants.Earlier, 13 volumes of Reviews on Indian Medicinal Plants (with botanical names starting with A-K) covering multidisciplinary research data on about 3679 plants, running into about 9282 printed pages and covering about 56964 citations were published.

Each monograph includes regional names of the medicinal plant, its sanskrit synonyms as well as the Ayurvedic description (wherever available), ethnobotanical studies, apart from the habitat and the parts used, properties and uses on one hand, and the details of botanical, pharmacognostical, chemical, pharmacological and clinical data on the other, backed by compete references and bibliography on each aspect of the information cited, besides the colour photographs of important medicinal plants.

Quality Standards of Indian Medicinal Plants

During the year the Quality Standards on 35 medicinal plants were developed, monographs prepared, finalized, technically reviewed and published as Vol. 12 as part of series on "Quality Standards on Indian Medicinal Plants".



Earlier 11 volumes have been brought out containing quality standards of a total of 414 plants. Monographs on another 35 plants are being finalized for 13th volume.

Generation of Phytochemical Reference Standards (PRSs) and Development of Repository of Reference Phytoconstituents of Important Indian Medicinal Plants - PRSs are ideally those compounds in the plant which are therapeutically active. However, in many cases the therapeutic activity of the plant is attributed to a number of phytoconstituents present in the plants. Under such circumstances any compound that is unique to the plant or the major compound or the major chemical constituent can be regarded as the PRS. The third volume of Phytochemical Reference Standards of Selected Indian Medicinal Plants containing monographs of 30 PRS was published.

Earlier two volumes containing 70 Phytochemical Reference Standards have been published. The work on other volumes in the series is in progress.

Medicinal plants monographs on diseases of public health importance

The activity aims at integration of leads/scientific information on diseases (including etiopathogenesis) and plant drugs as given in the ancient texts (ISM) and Allopathic system of medicine on one hand and the multidisciplinary research data generated on these plant remedies with focus on pharmacological, toxicology, clinical, phytochemical, pharmacognostic, on the other. The monograph on Perspectives of Indian Medicinal Plants in the management of Diabetes Mellitus was published.

Adhoc Project:

Development of a website exclusively dealing with Medicinal Plants - A website has been developed exclusively on the units activities and hyperlinked with the ICMRs main website is regularly being updated.

Future Plans

1. **Review Monographs on Indian Medicinal Plants -** To continue and strengthen the ongoing activities. It is planned to complete preparation of Review monographs till Z alphabet.
2. **Quality Standards of Indian Medicinal Plants -** To develop quality standards of another 100 plants.
3. **Medicinal plants monographs on diseases of public health importance -** To expedite completion of disease based monographs on diseases of public health importance in the thrust areas.
4. **Safety Review monographs on Indian medicinal plants -** To develop safety review monographs on plants used by the industry

5. Other initiatives

It is proposed to initiate/follow up initiatives/extend studies to new centres in areas like projects on standards on plant extracts etc. It is also proposed to intiate steps for development of databases on other aspects of medicinal plants, human resource development and dissemination of information through digital and conventional means.

Health System Research (HSR)

The Health Systems Research (HSR) Division is engaged in carrying out research activities for strengthening the various building blocks of the health system in the country through supporting ad-hoc and multi-centric Taskforce projects.

Ad-hoc Projects

Adolescent health care - A study from Karnataka focused on adolescent health issues pertained to males. Boys in the age-group of 16-19 years are aware of premarital sex, rather than the younger group of 13-15 years. All adolescents agreed that premarital sex is socially unacceptable. The study noted that the mothers are aware of various issues of adolescence but are hesitant to discuss with their sons regarding sexual health matters. However, the awareness regarding adolescent health was low among fathers. The teachers were hesitant to discuss these issues with students. Sex education and its importance of being provided in schools were stressed by the teachers. During discussion with adolescent boys, it was found that none of the boys were aware that any service or helpline existed to solve their doubts regarding adolescence related issues. Most of them agreed that they would avail services from doctors and other health care providers, who could guide them in friendly manner.

Another study is in progress in the state of Karnataka reported the reproductive and adolescent health problems of girls. This study is ongoing and is documenting the access and utilization of various adolescent health programs in two districts.

Gender Perspectives of Health

A study from six districts of Rajasthan has tried to develop competency framework for mainstreaming gender-responsive health services. It assessed the health care providers' understanding and perspective on gender equality and equity with a focus on adolescent health care services. The competency framework is being finalized for providing gender-response services by various levels of health care providers, including quality control, Standard Operating Procedures (SOPs) using structure, processes and outcome framework of quality.

Health Care Delivery and Access

This study reported the awareness and prevalence of health insurance and other related issues pertaining to acceptance of health insurance by the community. About 72% of rural households in southern Karnataka are aware of health insurance. Mostly they got information and availed the health insurance through women self-help groups. Government insurance schemes are popularly known and adopted by these households. A significant proportion of households (about 30%) have shown their willingness to pay, and were willing to pay Rs. 500-1000 as a yearly premium. Majority of these people prefer government hospitals to private hospitals for major illnesses.

A study from Kerala looked into maternal and child health care issues among scheduled tribe population with a focus on health infrastructure and manpower deployment. This study highlighted the health and nutritional status of children in Wayanad tribal district. The results revealed that the under-nutritional status of the Paniya tribal children is high compared to other groups in the region. The higher levels of wasting, stunting and underweight indicate the chronic malnutrition. Other diseases like skin diseases, atopic dermatitis, vitamin deficiencies and bronchial asthma are also reported to be high. This is mainly due to lack

of awareness among community, in addition to non-availability of health services and poor infrastructure in the existing health facilities.

Other HSR issues

A study is going on in a nursing college in Karnataka to document the impact of supervisory support training program on the performance of health workers posted at PHCs. It tried to find out the level and problems related to supervision in PHCs. A supervisory support training module is being developed for the use by the health assistants. It is also evaluating the impact of supervisory support training program in terms of supervisory satisfaction among health assistants and health workers.

Multi-centric task force projects on Community-based intervention for improving migrants' health care and health system's responsiveness

Two Taskforce studies related to Community-based interventions for improving the health care access among internal migrants living in 13 cities have been completed recently. These cities included six metro cities (Delhi, Kolkatta, Mumbai, Hyderabad, Bangalaore and Lucknow) and seven fast growing smaller cities (Aligarh, Bhubaneswar, Imphal, Jaipur, Ludhiana, Nasik and Visakhapatnam).

The interventions, based on the findings of comprehensive formative research, are implemented, through local health system in systematically selected clusters along with an equal number of control clusters. All these clusters are inhabited by recent (<10 years of migration) migrants. Partnership with state/municipal health officials, non-governmental organization and industries was the key in this intervention who address the supply-side issues. Community mobilization activities were undertaken at community level to improve the demand for health care. These activities have been undertaken by the local health institutions in collaboration with local non-governmental and community-based organizations. Data of all 13 centers are to be collated for combined analysis. The preliminary observations, based on the center-wise reports received so far revealed that both health system's responsiveness and migrants' access have improved in intervention clusters when compared with control clusters. The final outcome of this study would be a migrant-specific health care delivery model.

Social & Behavioural Research

During the year, 17 projects were completed, 11 new projects and two fellowships were funded and 4 projects continued.

Major Achievements

Effectiveness of Integrated Treatment for Alcohol use and Intimate Partner Violence in Men with Problem Drinking in South India - This longitudinal randomized control trial was carried out at St. Johns Research Institute and Medical College, Bangalore. A total 177 problem drinkers (88 in enhanced intervention group and 89 in the standard intervention group) were involved in the trial which looked at the impact of culturally adapted enhanced treatment module compared to standard intervention in reducing intimate partner violence and reducing depression and anxiety in wives and children of male alcohol dependent patients. Results revealed that enhanced treatment was superior to standard intervention in reducing acts of spousal abuse and violence and improving mental health status of spouses of alcohol dependent subjects. Thus, treatment approaches that specifically targets spousal abuse in the context of heavy alcohol use needs to be incorporated as part of intervention offered to individuals and families of patients with harmful use of alcohol.

A Study on Gaps in Reproductive Health Services for Adolescents in Delhi - National Capital Territory of Delhi with highest per capita spending on health and multitude of agencies providing health care services to its inhabitants is focusing its strategies and policies towards strengthening of available services for its inhabitants with special focus on the Adolescent Reproductive and Sexual Health (ARSH). This study was conducted to find out the availability and type of ARSH facilities in both Public and Private Sector to address the reproductive health needs of adolescents in Delhi. The results show that there is a paucity of data on private and non-governmental health facilities providing ARSH services at all the district headquarters. There is need to address the issues like privacy, confidentiality, community awareness for stigma alleviation, adolescent friendly ambiance, participation of adolescents in planning and evaluation of ARSH services can help in improving the quality of ARSH services in public health facilities.

Self Injurious Behaviors (SIB) and Psychopathology among Adolescents and Young Adults in Bangalore - The study explored the occurrence, methods, characteristics and reported reasons for SIB among school, pre-university and undergraduate college students and its sociodemographic and mental health correlates. 1571 youth completed the Functional Assessment of Self Mutilation questionnaire and measures of psychopathology, the Youth Self Report or the Adult Self-Report.

Results indicated that 40.7% reported SIB in the past year, with a male preponderance and higher rates among youth between 13- below 18 years. The rate of non-suicidal self-injury was 33.9%, with 16.7% of self-injurers reporting associated suicidal intent. Moderate/severe forms of SIB were reported by 19.4%, most commonly cutting (8.2%) and burning (7.7%). 21.3% used only minor methods; most frequently biting self (19.6%) and self-hitting (17.2%). Multiple self-injury methods were most often endorsed and 14.8 years was the mean age of onset. SIB served both to regulate internal emotional states (automatic reinforcement) and to influence others in the environment (social reinforcement). Self-injuring youth had significantly higher levels of internalizing problems, externalizing problems and total problems.The study results suggest for awareness building and targeted preventive intervention approaches among vulnerable school and college youths.

Understanding the Sexual and Reproductive Health (SRH) Perspectives and Needs of Female Sex Workers and Factors Determining their Access to Services - The issues related to menstruation, contraception, pregnancy, abortions and menopause are inadequately addressed. The study aimed at exploring various dimensions of SRH related to FSWs from their perspectives and needs. It was conducted by Karnataka Health Promotion Trust (KHPT) in co-ordination with Niramay Arogya Dham (NGO) and Kranti Mahila Sangh (CBO) working with FSW communities in Solapur for more than 6 years. 500 women participated in this study. The methodology consisted of face-to-face interviews, Focus Group Discussions and Clinical examinations to assess reproductive health status of FSWs. The tool was designed in local language by the sex worker community representatives.

The learning will help the FSW and their CBOs in relating this study to their own community members and understanding the SRH status of their members. It will help the prevention programme by National AIDS Control Organisation (NACO) as well as the National Rural Health Mission (NRHM) in understanding health seeking behavior of the FSW community on SRH matters and identify gaps in the service delivery/access.

Relationship of Demographic Variables, Socio-Cultural Issues and Selected Psychological Constructs with the Positive Mental Health of North Indian Adolescents - The current study was undertaken on 1932 adolescents residing in urban and rural areas of Delhi-NCR and its adjoining areas. The Participants were either school dropouts (N=120) or attending school (N=1812) in the age group of 11-19 years. The results broadly indicated that early adolescents have higher mean scores on all factors of positive of mental health whereas older adolescents have higher score on difficulties. Male adolescents were higher on negative mental health constructs whereas females were higher on positive mental health constructs. Rural adolescents had higher mean score on positive mental health whereas urban adolescents had higher mean score on difficulties score. Adolescents who attended government school possessed higher difficulties as compared to private school adolescents. Private school adolescents had higher mean score on positive mental health. Dropouts broadly showed lesser positive mental health as compared to school going adolescents.

A Community Based Approach in Designing a Modal TB Sensitization Programme for Self-Help-Group (SHG) in Thiruvalluam Dist of Tamil Nadu - It was observed that at the end of 3rd month, a significantly higher proportion of members in the intervention group had involved in TB advocacy, identified symptomatics and referred them to the PHCs when compared to their counterparts in the control group. However, at the end of the 6th month, it was observed that such a significant difference was only observed in terms of identification and referral of symptomatics and not in other activities between the intervention and control group members. A community driven TB sensitization model based on participatory action approach using self help groups in TB control has proven to be an effective strategy in TB control. Once sensitized, they can be considered a powerful force in promoting TB awareness, identification and referral of chest symptomatics and also as community DOTS providers.

Development, Testing and Validation of a Tool to 'Screen' Physical, Psychological and Mental health issues in Adolescents- This study was conducted with the objectives of developing and validating a screening tool for common issues during adolescence. Data were collected from Center for Adolescent Health, Lady Hardinge Medical Collage, New Delhi during July 2012 to Sep. 2013. The proceedings of this phase resulted in Draft-2 of the tool. This tool was validated on 372 adolescents in school and attending OPD. This tool also provides information on risk factors for development of non-communicable diseases

(physical activity, sedentary behavior, dietary intakes, and tobacco use), and about the health center functioning. The LHMC Adolescent Screening Tool can be used in adolescents 10-19 years of age (both boys and girls in school or in OPD) to identify an adolescent having or not having medical issues requiring evaluation or emergency care.

Assessment of Sexual and Reproductive Health (SRH) Needs of HIV Infected Adolescents in Six Districts of Karnataka- The issues ranging from information needs to social support, counseling, treatment etc. were investigated in 600 infected adolescents of 11-19 yr age. On the basis of study results, it is recommended that service providers/ counselors need to be reoriented with regard to SRH need of adolescents, sexuality needs to be discussed and preventive services needs to be strengthened. Further, adolescents health clinics needs to be strengthened to address specific concerns of adolescents.

Socio-Cultural Dimension of Sustainability of Sensitizing Self Help groups (SHGS) to Reproductive-health Via Empowerment and Engagement (SSSTREE) - The study aimed to utilize the current model of Self Help Group (SHG) functioning to build capacity to increase awareness and health felt needs to access services for reproductive health and cervical cancer screening among rural women at the community level in a sustainable and cost-effective manner. The study was conducted in five districts spread over three states i.e. Tamil Nadu, Chhattisgarh and Rajasthan. The Kolar district in Tamil Nadu was the primary intervention site. With SSSTREE intervention, thousands of rural women were benefitted and hence thousand families. Through the Health Mela, nearly 1000 women were addressed and through FGDs and workshops, about 1200 women were imparted with knowledge on all aspects of women's health.

One of the major achievement is that the women learnt and understood more about the health issues like menstrual hygiene, RTI/STI, HIV, sexual hygiene, family planning, pregnancy care, abortion, child care, government schemes and entitlements, cervical cancer and about services available at health care facilities. The very fact that women are now able to identify symptoms of RTI/STI is a matter of great significance

Future Plan

The unit plans to take up the studies in the identified high priority areas of delivery and utilization, adolescents health and behaviour, health equity, life style related diseases, reproductive health, stigma related diseases and issues related to gender in health. Some of these issues will be addressed jointly with Indian Council for social Science Research (ICSSR).

Annexure-I

BE/ RE (2014-15) and Actual Expenditure upto 12/2014 under Plan & Non-Plan and BE (2015-16) under Plan and Non-Plan for Department of Health Research **(Rs. in Crores)**

S. No.	Scheme/ Programme	Budget Head	2014-15			2014-15			2015-16	
			PLAN			NON PLAN			PLAN	NON-PLAN
			BE	RE	Actual expenditure upto 12/2014	BE	RE	Actual expenditure 12/2014	BE-2015-16	BE-2015-16
1	2	3	4	5	6	7	8	9	10	11
1	Secretariat-Social Services	Secretariat-Social Services	5.00	1.50	0.94	10.00	6.82	0.40	0.00	10.00
2	Human Resource Development for Health Research	Advanced Training in research in medicine and health	17.00	5.00	3.65	0.00	0.00	0.00	0.00	0.00
		International cooperation in medical and health research	2.00	0.60	0.15	0.00	0.00	0.00	0.00	0.00
3	Grant-in-aid Scheme for inter-sectoral convergence & promotion and guidance on research governance issues	Inter-sectoral coordination in medical, biomedical and health research	26.00	23.00	21.83	0.00	0.00	0.00	0.00	0.00
		Promotion & guidance on research governance issues.	3.00	0.40	0.00	0.00	0.00	0.00	0.00	0.00
		Matters relating to scientific societies and associations, charitable and religious endowments in medicine and health research.	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Coordination with Governments/ organizations	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Managing epidemics and national calamities	Matters relating to epidemics, natural calamities and development of tools to prevent outbreaks	31	25	26.21	0.00	0.00	0.00	0.00	0.00
5	Development of infrastructure for promotion of health research	Promotion, coordination and development of basic, applied and clinical research	72.00	28.50	27.78	0.00	0.00	0.00	0.00	0.00
		Establishment of Model Rural Health Research Units.	18.00	11.00	10.00	0.00	0.00	0.00	0.00	0.00
6	ICMR	ICMR	477.40	454.00	390.58 (Including NER)	281.67	315.18	229.33	0.00	295.00
7		Provisions for Projects/Schemes of North East areas.	0.00	61.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total		726.00	610.00	481.14	291.67	322	229.73	0.00#	305.00

To be incorporated on receipt of ceiling of budget provision under Plan from MOF.

Annexure II

Status of pending ATNs/PA reports as on 2.2.2015

S.No.	Year	Number of Paras/ PA reports on which ATNs have been submitted to PAC after vetting by Audit.	Details of the Paras/PA reports on which ATNs are pending		
			Number of ATNs not sent by the Ministry even for the first time	Number of ATNs sent but returned with observations and Audit is awaiting further re-submission by the Ministry	Number of ATNs which have been finally vetted by Audit but have not been submitted by the Ministry to PAC
1	2000	Nil	Nil	One	Nil
2	2005	One	Nil	Nil	Nil
3	2007	Nil	Nil	One	Nil
4	2011	Nil	Nil	One	One
	Total	One	Nil	Three	One