

RMRC_Gorakhpur

ICMR-Regional Medical Research Centre, Gorakhpur

Research Priorities

1. **JE/AES diseases burden reduction in eastern Uttar Pradesh: Multi-sectoral Approach.**
 - Demystifying infectious and non-infectious causes of Encephalitis.
 - Monitoring resistance to doxycycline & Azithromycin in scrub typhus isolated from AES/AFI cases: - Development of multiplex rapid diagnostic kit for scrub typhus & other rickettsia spotted fever groups.
 - To Establish AFI surveillance system at block level in collaboration with VRDL.
 - Vaccine coverage, safety, efficacy and vaccine interchangeability study.
2. **Demonstration of TB burden reduction in eastern Uttar Pradesh and North Himachal Pradesh.**
3. **Mapping NCD risk factors and suggestive corrective measures.**
4. **Social determinants of health in Gorakhpur and Lahaul and spiti region.**
 - To determine the burden of caregivers of AES disabled patients and its impact on their social, physical and mental health in eastern Uttar Pradesh.
 - Prevalence of regional public health problems and health awareness in the Gorakhpur region of eastern U.P. and intervention needs.
5. **Understanding clinico-epidemiology of other regional health issues and their possible solutions**
 - Demonstration project for reduction of hepatitis in eastern UP & Lahul and Spiti.
 - Identify factors associated with viral, bacterial and parasitic diarrhea.
 - Development of rapid and reliable method – nucleic acid lateral flow immunoassay (NALPHIAs) to detect *Chlamydia trichomatis*.
 - Novel resistance mechanism in prevalent bacterial and viral pathogens in eastern U.P. (scrub typhus, Herpes virus, nosocomial infection).
 - Sero & molecular epidemiological surveillance of *Leptospira* and associated risk factors.
 - Demonstration of reduction and elimination of malaria in low density areas of eastern UP.
 - Entomological surveillance and Integrated Vector Management for JE, dengue and chikungunya-and cost benefit economic analysis

RMRC_Bhubaneswar

Intramural Research priorities of ICMR-RMRC Bhubaneswar

1. Development of a model for elimination of lymphatic filariasis in the endemic districts of Odisha.
2. Development and implementation of “One Health” strategy for controlling zoonotic diseases of public health importance (Scrub Typhus, Anthrax, Japanese Encephalitis).
3. Implementation research into multimorbidity (multiple NCDs) to improve patient outcomes.
4. Strengthening primary healthcare delivery in urban population.
5. Development of an intervention strategy to improve diagnosis and treatment of TB in vulnerable population.

RMRC_Port Blair

1. Reduction of malaria among Nicobarese (Indigenous tribe) in the entire Nicobar group of islands.
2. Risk reduction of leptospirosis (Andaman fever) in the south, middle and north Andaman groups of islands.
3. Prediction of 10-year cardiovascular disease risk among tribal (Nicobarese) and non-tribal population of Andaman and Nicobar group of Islands.
4. Assessment of the reproductive health problems among the tribal and non-tribal women of Andaman and Nicobar Island.
5. Development of a rapid, cost-effective, and bedside technique for the early diagnosis of leptospirosis.

ICMR- RMRC, Dibrugarh

1. Demonstration project for significant reduction of some communicable diseases (TB and Malaria) in high-burden settings.
2. Implementation research on Community-based intervention for prevention and control of hypertension using a mobile application with a decision support system.
3. Targeted therapeutic discoveries for different non-communicable diseases (cancers and intestinal inflammation).
4. Development of sensitive, specific, rapid and low-cost diagnostics for different communicable diseases (malaria, respiratory virus, cysticercosis and paragonimiasis) and non-communicable diseases (hemoglobinopathy).
5. Artificial Intelligence modelling data-driven approach for early prediction of colon adenocarcinoma metaasis & Paragonimiasis.

ICMR-NIIH, Mumbai

Top 5 priority research areas (challenges to address in next 5-10 years) for solution oriented research.

1. Address key issues in the management of the haematological disorders by undertaking randomised control trials.
2. Identify the gaps in the new-born screening and comprehensive care for sickle cell disease (SCD) and develop implementation strategies.
3. Development of an implementation model for improved transfusion therapy in Indian multiply transfused patients.
4. Development of assays/ tests for early diagnosis and prevention of haematological disorders.
5. Reducing morbidity and mortality and burden of IEI through early diagnosis and personalised medicine using multi-omics approach.

NIRRCH-Mumbai

1. Addressing maternal mortalities by devising effective strategies for preconception and periconception care to ensure a safe pregnancy, with special emphasis on women from under-served areas.
2. Identifying predictive biomarkers for high-risk pregnancies such as pre-eclampsia, gestational diabetes.
3. Identifying the risk factors predisposing Indian women to gynecological disorders such as polycystic ovarian syndrome, endometriosis, and uterine fibroids and investigating mechanisms underlying the pathobiology of these disorders.
4. Developing strategies for better management of infectious diseases in neonates (neonatal sepsis) and children (latent tuberculosis, diarrhoea).
5. Identifying the factors contributing to intrauterine fetal death/stillbirths.

NIIR NCD_Jodhpur

1. Implementation research for effective delivery of services under Ayushman Bharat – Comprehensive Primary Health Care Services (CPHC) and Pradhan Mantri Jan Arogya Yojana (PM-JAY).
2. Implementation research for strengthening the National Programme for Prevention & Control of Cancer, Diabetes, Cardiovascular Diseases & Stroke (NPCDCS) and other programmes for preventing and controlling selected NCDs.
3. Development of comprehensive care models for sickle cell disease among the tribal population.
4. IT-based interventions to augment national health programmes at the primary health care level.
5. Impact of air pollution on respiratory diseases and strategies for risk reduction.

NITM_Belagavi

1. Clinical trial for safety and efficacy of Integrative Medicines for cancer care (Efficacy of cocoa in reducing adverse events in breast cancer patients receiving doxorubicin-based chemotherapy: A multicentre randomized controlled trial).
2. Clinical trial for safety and efficacy of NITM leads for common NCDs (Osteoarthritis & Diabetic wounds).
3. Clinical trial on the safety and efficacy of adjunct traditional medicines for Integrative Healthcare in pulmonary TB patients.
4. Laboratory studies on Traditional medicine-based leads against priority pathogens in India to combat AMR.
5. Laboratory studies of Traditional medicine-based leads for management of obesity.

NIV_Pune

1. An umbrella project for the development and validation of newer diagnostics for timely diagnosis of viruses and other pathogens of public health importance: –

Example projects under this priority:

- Development of point of care assay for Hepatitis A/E viruses, Chandipura virus and Pertussis
- Development of serological assays for JEV, RSV, Measles, Mumps and Rubella
- Development and evaluation of a multiplex real time RT-PCR for simultaneous detection of Dengue, Chikungunya and Zika virus (human and mosquito samples) and Coxsackievirus A-16, CVA-6 and EV-71 (from HFMD cases)

2. Vaccine Research for viral diseases including basic research for development and evaluation of vaccine candidates, immune responses & vaccine hesitancy.

Example projects under this priority:

- Development and evaluation of vaccine candidates (using mRNA, inactivated, CRISPR Cas-9 and recombinant technologies) for viruses of public health importance (KFDV, EV-71, JE).
- Vaccine induced immune response for vaccine preventable diseases [Ex. MMRV]
- Vaccine hesitancy assessment for improving uptake of viral vaccines in UIP and hesitancy for influenza vaccine uptake in pregnant women: a multicentric study.

3. Viral Therapeutics

- Evaluation of antiviral activities of compounds, repurposed drugs and mouse monoclonal antibodies against viral diseases like dengue, chikungunya, Zika, Nipah, Chandipura, Rabies, SARS CoV-2 and Varicella Zoster Virus.

4. Epidemiological research on viruses and other pathogens of public health importance.

Example projects under this priority:

- Multi-centric study to assess the population immunity for viral diseases which are vaccine preventable and those for which vaccines are planned to be introduced (HPV, Hep A, dengue, chikungunya & chickenpox)
- To study climate effect on occurrence of mosquito and tick borne viruses across various agro climatic zones
- Burden of RSV among hospitalized children: multicentric study

5. Virus evolution and pathogenesis

Example projects under this priority:

- Genomic surveillance and characterization against viral diseases like Influenza, RSV and SARS CoV2, Dengue, Chikungunya, Zika, JE, Non-polio enteroviruses, Chandipura, Rabies, Hepatitis, Enteric Viruses, Measles, Mumps, Rubella, Varicella and of unidentified viruses from the virus repository.
- *In-vitro* and *in-vivo* pathogenesis and host immune response to SARS-CoV-2, dengue and chikungunya, Influenza and RSV.
- Assessment of the immune mechanism of chikungunya sequale, effect of immuno-modulators on monocyte mediated immune response to dengue and identification of biomarkers for predicting severe dengue.

NIPathology_New Delhi

1. Establishment of predictive tool for drug resistant leishmaniasis.
2. CRISPR-Cas systems in *Acinetobacter baumannii*: role in bacterial fitness, antibiotic resistance and implications for antibacterial therapy.
3. Development of AI based tool for differential diagnosis of cancers.
4. Establishment of role of traditional medicine and plant extracts in urothelial cancer.
5. Characterization of noninvasive markers for early detection of aggressive carcinoma of prostate gland and gallbladder cancer.

NCDIR_Bengaluru

1. NCD monitoring survey on risk factors, diseases and health systems.
2. Development of Benchmarking tools to monitor quality of care for cancer and stroke in health Facilities.
3. Implementation of e-Audit framework to improve MCCD recording and reporting in health Facilities.
4. Use of telemedicine for improving continuum of care for diabetes and hypertension.
5. Models to empower primary care physicians to provide comprehensive care for NCDs (risk assessment, early detection, referral and chronic care).

NIN_Hyderabad

1. An innovative formulation of multiple-micronutrient powder for reducing anemia and developmental disparities among pre-schoolers in *Anganwadis*: Transition to Scale.
2. Effect of technology driven multi sectoral nutrition interventions to improve dietary intakes (IYCF) and nutritional status of children.
3. Identification of metabolomic biomarkers' role in DR- NCDs (cardiovascular disease and T2D) to predict food models and optimisation of nutrition.
4. Application of nutrigenomics to develop personalized nutrition guidelines using AI to prevent NCDs and autoimmune disease.
5. Effectiveness of Iron fortified rice supplied through Public Distribution System (PDS) in reducing the prevalence of anemia among Women in reproductive age group.

NIE_Chennai

1. Sero-epidemiology of priority infectious diseases in India.
2. Primary care and community-based interventions for control of NCDs (hypertension, diabetes and their determinants).
3. Health systems approach to reduce mortality due to tuberculosis in India.
4. Digital health interventions to improve quality of programmatic data.
5. Trials for interchangeability of vaccines used in UIP (JE vaccine).

NARFBR, HYDERABAD

- 1 Generation, characterization, and utilization of lab-grown animal models for biomedical research, including pre-clinical testing of translational biomedical devices, vaccines, antimicrobials, and biologicals in the country.
- 2 Development of animal models for diseases of national importance, including common infectious diseases like influenza, dengue, and coronaviruses, etc. and metabolic diseases such as human osteoporosis, atherosclerosis, etc.
- 3 Development and validation of diagnostics for monitoring laboratory animal health and zoonotic diseases.
- 4 Research on alternatives to animal models for testing of pharmaceutical drugs and medical devices.
- 5 Establishment of genetically modified animal models for communicable and non-communicable diseases.

NIMR_New Delhi

1. **Delivery:** Operational research to guide malaria diagnosis, treatment and vector control.
2. **Delivery:** Implementation research for developing tailored strategies for malaria elimination in different epidemiological settings.
3. **Discovery:** Basic research to develop novel malaria control tools.
4. **Development:** Validation of tools for improving malaria case management, prevention and vector control.
5. **Description:** Epidemiology of vector borne diseases to better understand the dynamics in order to support their control.

NICPR_NOIDA

Intramural Research Priorities of NICPR

1. Development of potential cancer biomarkers for diagnosis, prognosis and therapeutics of common cancers in India by assessment of key non-invasive molecules (eg. DNA, RNA, proteins), microbiome and tumor immune response (in development of cancer, its progression and response to therapy).
2. Study the role of nutrients, physical activity and circadian alignment as signaling pathways in the pathogenesis of Cancers/NCDs and to develop and test interventions for improving metabolic health.
3. Gap analysis of factors for reducing demand for tobacco and development of counseling models for preventing tobacco initiation and improving quit rates; demonstration model for integrating tobacco cessation counseling in the National TB Elimination Programme and Reproductive and child Health Programme.
4. Assessment of non-invasive strategies for early identification of oral cancer in Oral Potentially Malignant Disorders (OPMDs) and develop interventions strategies including Behavior Change Interventions.
5. Demonstration model for strengthening the 3 pillars of the WHO Call for Cervical Cancer Elimination (Vaccination, Early Diagnosis and Management) in partnership with State governments and community based organizations.

NIRTH_Jabalpur

1. **Saharia Tuberculosis Elimination Project (STEP): Towards End-TB mission**

Objectives:

- A. To enhance TB notification rate through active case finding, employing smart technologies.
- B. To strengthen the existing healthcare system through capacity building at village/ panchayat/ block/ district level and awareness generation in places dominated by the *Saharia* tribe.
- C. To support the National Tuberculosis Elimination Program for TB reduction/ elimination using the T4 (Trace, Test, Treat and Track) strategy in 11 districts of three states inhabited by the *Saharia* tribe.

2. **DISCUSS - Designing and Implementing Strategies for augmenting Community Understanding and health Service utilization in Sickle cell disease.**

Objectives:

- A. To assess the awareness and perception about sickle cell disease among the tribal and other communities.
- B. To explore the availability, accessibility and functionality of health-care facilities/ frontline health workers in relation to sickle cell disease.
- C. To develop, implement and evaluate need-based health communication strategies for improving health-seeking behaviour pertaining to sickle cell disease.
- D. To identify the gaps and sensitise the health administrators on remedial measures that might aid to the mission to eliminate sickle cell disease.

3. **Deciphering epigenetic determinants of metabolic syndrome in tribes of Madhya Pradesh.**

Objectives:

- A. To delineate the association of genes with metabolic syndrome through Genome Wide Association Studies (GWAS) in tribes.
- B. To determine the association of dietary habits with hypertension and diabetes.
- C. To study the role of socio-cultural and economic factors (including mental stress) associated with lifestyle affecting disease outcome.

4. **Development of CRISPR-based point-of-care diagnostics for leprosy and tuberculosis**

Objectives:

- A. To design isothermal amplification assay for *Mycobacterium leprae* and *M. tuberculosis* DNA.
- B. To develop simple visual assays for detection of amplicons of *M. leprae* and *M.*

tuberculosis.

- C. To perform CRISPR-based detection of *M. leprae* and *M. tuberculosis* amplicons.
- D. To conduct field evaluation of the newly developed diagnostics.

5. Improving accessibility of the Particularly Vulnerable Tribal Groups of Madhya Pradesh to the public health system through the “Social Vaccine” approach.

Objectives:

- A. To assess the perception, decision making and practices related to health, disease and public health care services utilisation.
- B. To conduct public health facility surveys and identifies the gaps in its accessibility and affordability by the community.
- C. To promote utilisation of public health services in tribal families and communities.
- D. To evaluate the impact of intervention strategy by adopting before and after design.

RMRIMS_Patna

1. **Disease epidemiology and entomological concerns (Leishmaniasis)** Epidemiological study to assess associated factors for conversion of asymptomatic cases into VL/PKDL.
2. **Clinical & Diagnostic pathology (PKDL, VL-HIV)**
 - Identification of novel biomarkers for PKDL/VL-HIV/VL-TB.
3. **Clinical pharmacology and drug development (PKDL, VL-HIV, VL-TB)**
 - Pharmaco-vigilance of current drugs used for the treatment of VL, PKDL VL-HIV, and VL TB.
 - To develop new chemotherapeutics for VL and PKDL (pre-clinical).
4. **Operational / Implementation research: VL**
 - An evidence based Model to improve early VL cases detection in a highly endemic district of Bihar.
 - Monitoring of vector susceptibility/resistance to insecticides being used for IRS under Kalaazar elimination program.

NIRT_Chennai

Intramural Research Priorities of NIRT

- 1. Early diagnosis (Point of Care Diagnostics) for TB using new Diagnostics and Digital tools:**
 - a. Non-sputum based specimens for diagnosis of TB (Stool, Urine).
 - b. Children and Elderly gp and Extrapulmonary ideal specimens.
 - c. Biomarker identification to:
 - i. identify treatment response,
 - ii. progression from latent to active TB disease.
 - d. Artificial Intelligence for TB diagnosis (chest x-ray / CT scan).
- 2. Short-course of Treatment for Adult and Pediatric TB - drug trials.**
- 3. TB Vaccines - Preventive vaccine /Therapeutic vaccine.**
- 4. Addressing Social determinants of TB - Implementation research.**
- 5. Post-TB Lung Health.**

NIREH_Bhopal

1. Problem and risk assessment of health effects due to emerging environmental pollutants such as plasticizers, micro (nano) plastics, heavy metals, volatile organic compounds(VOCs) and Ultrafine Particulate Matter (UFPM).
2. Development of diagnostic biomarkers for trans-generational environment associated diseases and toxicities.
3. Community based approaches for improving crop residue and solid waste management.
4. Risk assessment of children's environment health associated with built environment and poor WASH habits.
5. Risk assessment of impact of extreme climate events through bio-monitoring.

JALMA_Agra

Five research priorities of ICMR- NJIL & OMD, AGRA

1. Artificial Intelligence based tool development for early diagnosis of leprosy.
2. In search of better chemotherapeutic agents for leprosy treatment, research on Bedaquiline for leprosy will be done.
3. In search for Biomolecules for TB from natural products will continue and leads obtained from ongoing studies showing promise in animal studies will be further refined and if found promising, clinical trials will be conducted.
4. Research on development of better diagnostic tools for extra pulmonary tuberculosis will be undertaken.
5. Drug resistance in tuberculosis is the challenge and development of an algorithm for identification of early drug resistance cases and early successful treatment.

NIMS_New Delhi

- 1. Stochastic model of HIV transmission and estimation of key parameters used for HIV burden estimation in India.**
 - Rate of transmission among high-risk groups and from high to low (general) risk population.
 - Rate of HIV transmission from infected mother to child.

- 2. Intervention model to improve the mother and child health care in the selected population.**
 - Identification of hot spot areas using key indicators (ANC, institutional delivery, infant mortality).
 - Intervention strategy/model for improvement of key indicators in the selected areas.

- 3. Strategies for early risk detection and management of CVD.**
 - Risk behaviours and prediction model of CVD.
 - Application of digital devices for prevention of the CVD occurrence.

- 4. High risk areas of dengue in India and model for prevention of dengue occurrence.**
 - Identification of high-risk areas using the last five years' data
 - Comprehensive study on developing prevention models.

- 5. Evaluation of the National Programme for prevention and control of cancer, diabetes, cardiovascular diseases, and stroke (NPCDCS).**
 - Process and outcome evaluation of programme.
 - Identification of gap and scope of improvement.

NIOH_Ahmedabad

1. Development of biomarkers and assays for early diagnosis of occupational diseases: blood biomarkers, genotoxicity assays, functional immunotoxicity assays, etc.
2. Establishment of methodologies for quantitative risk assessment of occupational exposures (chemical/ biological agents) and risk prevention (hazards elimination or control of risk) by integrating human biomonitoring data.
3. Prevention of work-related musculoskeletal disorders (WMSDs) in desk work (IT, bank, telecom) through multi-level interventions: task and work schedule re-design, ergonomic workstation, periodic assessment of bone mineral content and percent body fat, short-time physical activity breaks at workplace, implementing a moderate-to-vigorous physical activity regimen, nutritional supplements (vitamin D, protein) etc.
4. Prevalence, determinants and patterns of multimorbidity in different collar jobs (blue, white and pink) and their prevention through workplace health programs.
5. Therapeutic interventions for occupational diseases (prevention and treatment): targeting gut/brain axis by manipulating gut microbiota with polyphenols and prebiotics for neurocognitive abnormalities due to chemical toxins (polychlorinated bisphenols, lead, arsenic), novel antifibrotic therapy for silicosis in animal model, physiotherapy-based muscle strengthening for musculoskeletal disorders.

NARI_Pune

1. Research to address gaps in prevention, control and care of HIV/ STIs and co-infections through development of new diagnostics and antivirals, demonstration projects, counselling interventions.

Example projects under this priority:

- Development of newer point of care molecular diagnostics for resistant N. gonorrhoea, M. Genitalis.
- Discovery and development of newer antivirals through various approaches such as nanoformulations, microRNAs, phytomolecules and use of bio-informatics.
- Identifying the barriers and development of strategies for linkage of co-infected PLHIV to National Viral Hepatitis Control programme (NVHCP).
- A demonstration project to increase HIV screening through various approaches including HIV Self-test among youth (18-24) in India.
- Development and implementation of evidence based counselling interventions for improved screening of household contacts of open TB cases (Feasibility and RCT).

2. Research related to prevention and care of Human Papilloma Virus infection and related Morbidity.

Example projects under this priority:

- Study on modulation of cellular organelles & interferon signaling during Human Papilloma Virus infection and study on the role of miRNAs in HPV-induced malignancies.
- HPV Vaccine acceptance study among parents of adolescent girls in India / Studies to inform the roll-out of HPV vaccine in India.
- To develop RNAi mediated therapeutics against Human Papilloma Virus infection and in HPV induced cervical and colorectal cancers.
- Mathematical modeling to understand HPV vaccination as a preventive intervention among MSM and FSW.
- Implementation research for cervical and breast cancer screening by engaging with AYUSH practitioners in rural areas.

3. Research to study the Implementation of proposed new guidance for elimination of Vertical transmission of HIV & Syphilis (Hepatitis) in few Indian states (EVTHS).

- NARI will work with NACO and SACS of selected states in India to develop implementation projects for proposed new interventions within the existing programs focusing on identifying best practices and strategies.

- Development and implementation of evidence based interventions for timely third trimester viral load testing and syphilis treatment among pregnant women with HIV.
- Early diagnosis and outcomes of pregnancies among HIV infected women.

4. HIV cure research: To identify the potential of various drugs, compounds, Immunotherapeutic approaches to reactivate and subsequently eliminate reactivated latent reservoirs of HIV.

Examples of different approaches under this priority:

- Innate immune modulators and/or immune checkpoint inhibitors.
- CAR NK cell therapy in eliminating the latent HIV reservoirs - Matricellular proteins.

5. Evidence generation for identifying eliminable diseases like HIV, Syphilis and TB.

Example projects under this priority:

- Mathematical Modelling for interventions to achieve elimination.
- Validation of National and Sub-national program data for preparation for elimination.

NICED_Kolkata

Five research Priorities

1. Mitigating Antimicrobial resistance:

Demonstration project on controlling antimicrobial resistance through multi-dimensional approach (e.g. multi-tier stewardship program, behavioural change communication, use of point of care diagnostics, potential phage therapy and microbiome research) in designated districts of West Bengal.

2. Development of AI empowered algorithm to mitigate AMR:

Development of Pharmaco-Kinetic driven AI empowered algorithm to mitigate Antimicrobial resistance in Tuberculosis/ sepsis.

3. Control of Diarrheal Diseases with special reference to Cholera:

Demonstration project on targeted introduction of 'Oral Cholera Vaccine (OCV)' following identification of cholera hot spots across India

4. Microbiome and Omic based study:

- Integration of Microbiome and Multiomics approach to identify disease modulators in Gastrointestinal Carcinoma for development of targeted therapeutics.
- Biomarkers detection in Inflammatory Bowel Diseases using OMICS based approach and identification of therapeutic targets.

5. Development of cost effective POCTs, ethnomedicines and candidate vaccines:

- Development of cost effective POCTs for Acute febrile illness and gastrointestinal infections.
- Development and up scaling of bivalent (S. Typhi and S. Para A) vaccine against Enteric fever. Development of herbal formulations against NASH, infective hepatitis and enteric fever.

VCRC_Puducherry

1. Development of micro- and macrofilaricides.
2. Assessment of the impact of integrated vector management on LF transmission.
3. Roll out of DEC fortified salt for LF elimination in a few endemic settings: research studies on safety acceptability, quality control; strategic implantation research on DEC fortified salt rollout in communities in a few endemic districts and assessment of impact on LF transmission.
4. Discerning and monitoring of long term impact of global warming and climate change on LF and dengue transmission risk in India.
5. MULTI-OMICS Approaches: Delineating molecular networks at the interactions of vectors, pathogens and human interactions for biomarker discoveries for drugs, diagnostics and vaccines for VBDs and tools for vector control.