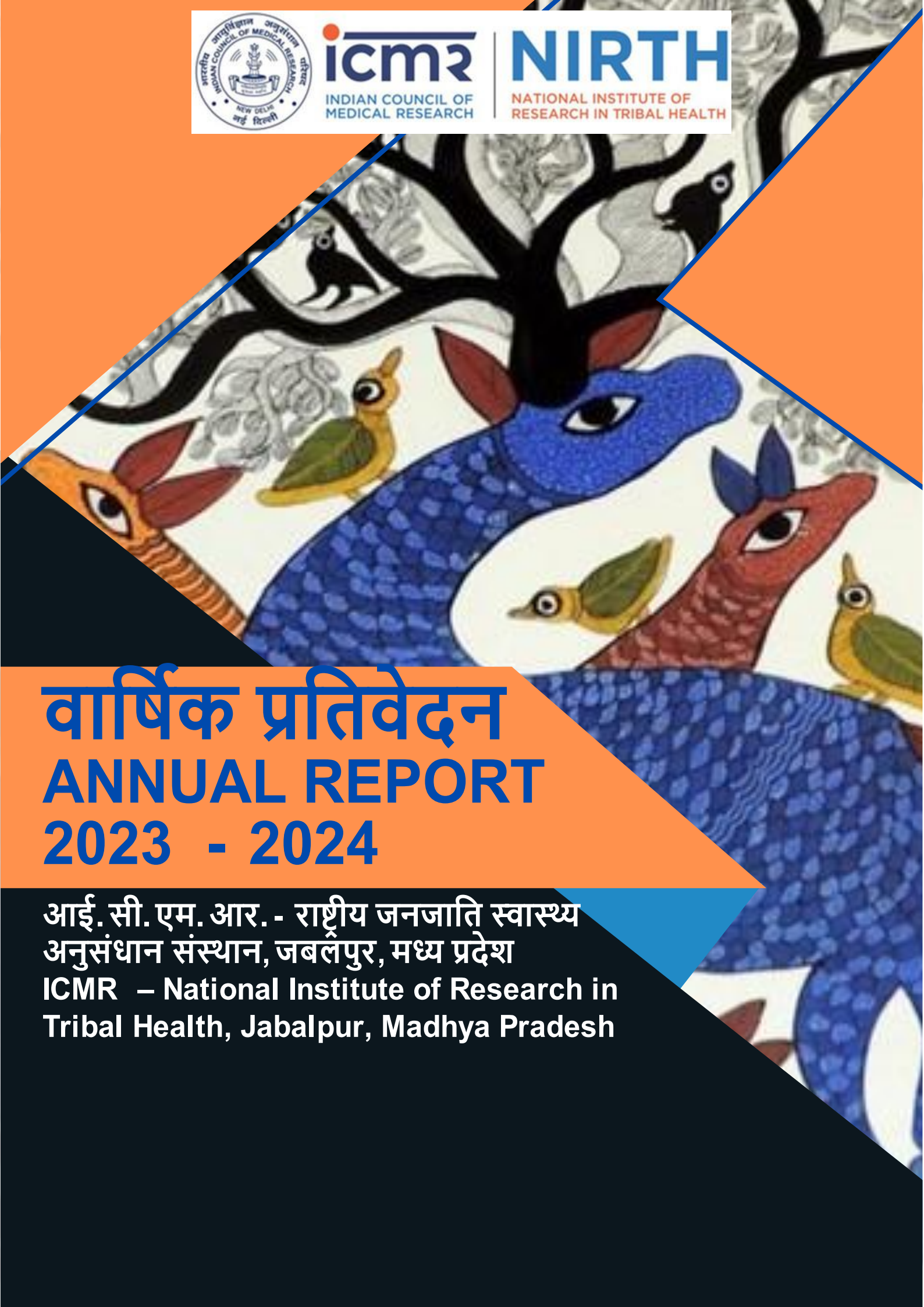

INDIAN COUNCIL OF MEDICAL RESEARCH

NATIONAL INSTITUTE OF RESEARCH IN TRIBAL HEALTH

वार्षिक प्रतिवेदन
ANNUAL REPORT
2023 - 2024

आई. सी. एम. आर. - राष्ट्रीय जनजाति स्वास्थ्य अनुसंधान संस्थान, जबलपुर, मध्य प्रदेश

ICMR – National Institute of Research in Tribal Health, Jabalpur, Madhya Pradesh

PREFACE

It is with immense pride that I present the Annual Report 2023-2024 of the ICMR - National Institute of Research in Tribal Health (NIRTH), Jabalpur. This report highlights the institute's ongoing efforts in advancing scientific research, improving healthcare outcomes, and addressing the unique health challenges faced by tribal communities across India.

Over the past year, ICMR-NIRTH has made significant contributions in the fields of infectious diseases, non-communicable diseases, genetic disorders, malnutrition, and public health interventions. Our dedicated scientists and researchers have worked extensively on disease surveillance, epidemiological studies, and the development of innovative healthcare solutions tailored to tribal populations. Through strategic collaborations with national and international organizations, we continue to bridge healthcare gaps and promote evidence-based policies.

The institute has also been actively engaged in capacity building, training programs, and community outreach initiatives, ensuring that our research translates into impactful health interventions at the grassroots level. Our commitment to fostering scientific excellence and innovation has led to new insights that contribute to national health strategies and policies.

I extend my heartfelt appreciation to our researchers, scientists, and support staff for their dedication and relentless efforts. I am also grateful to Indian Council of Medical Research, Department of Health Research, Ministry of Health and Family Welfare, Government of India and our esteemed partners for their continued support and encouragement.

As we move forward, ICMR-NIRTH remains steadfast in its mission to improve the health and well-being of tribal communities through research, innovation, and collaboration. I am confident that with collective efforts, we will continue to make meaningful contributions to public health and scientific advancements.

Dr. Rajnarayan R. Tiwari

Director (Additional Charge)
ICMR – NIRTH, Jabalpur

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SCIENTIST PROFILE

Dr. Aparup Das is a population geneticist and molecular evolutionary biologist by training. He has brought his extensive training and experience on genomics and DNA sequence analyses in Drosophila and Malaria, and application of these modern biological techniques to understand malaria epidemiology in India and Africa. After obtaining graduate and post-graduate degrees in Zoology from Utkal University in Bhubaneswar and doctorate degree from the Banaras Hindu University in Varanasi, Dr. Das proceeded for a four-year post-doctoral study at the Ludwig Maximilians University in Munich, Germany, to be trained in genomics and bioinformatics.

After coming back to India in 2005, he joined as a scientist at the ICMR-National Institute of Malaria Research at New Delhi, where he served for 12 years to study molecular epidemiology of malaria.
In May 2016, he joined as the Director of the ICMR-Centre for Research in Medical Entomology in Madurai, Tamil Nadu and thereafter shifted to the ICMR-National Institute for Research in Tribal health as its director. Over past 14 years of his research on molecular epidemiology of malaria in India and Cameroon (Africa), Dr. Das and his research group had unravelled several interesting genetic features of the malaria parasites, drug resistance, mixed species infections, population dynamics of mosquito vectors, host susceptibility of malaria and pharmacogenomics related to malaria.

Dr. Tapas Chakma, Scientist 'G', pursued his medical education at Government Medical College, Jabalpur, starting in 1981. After earning his medical degree, he briefly worked at Divisional Railway Hospital, Jabalpur, before joining ICMR-National Institute of Research in Tribal Health (NIRTH), Jabalpur, in 1989. He later completed his post-graduation in Applied Epidemiology from SCTIMS, Trivandrum. With over 35 years of dedicated research in tribal health, Dr. Chakma has significantly contributed to understanding and addressing major public health challenges, particularly tuberculosis, fluorosis, and malnutrition among tribal communities. His pioneering work includes identifying the high prevalence of tuberculosis among the Sahariya tribe, leading to government interventions.

He was the first medical doctor to enter Patalkot Valley in 1992 to study goitre prevalence, which later declined due to his recommendations. His extensive research on fluorosis in Madhya Pradesh identified contaminated water sources and led to policy changes and intervention programs that prevented thousands from developing severe fluorosis-related disabilities. His intervention model, focusing on safe drinking water and nutritional supplementation, influenced the National Program for Fluorosis Prevention and Control. His contributions were recognized in ICMR's "Touching Lives" publication, with a foreword by Prime Minister Narendra Modi. Dr. Chakma has published over 50 research papers in national and international journals. His work on hypertension among tribal populations revealed a significant burden, including a unique subset of lean and thin hypertensive individuals. He has served on numerous national technical committees and received prestigious awards, including the Dr. B.C. Roy Oration Award (2019) and the Thakkar Bapa Award (2022) for his contributions to tribal health. His expertise continues to shape policies and improve healthcare for marginalized communities.

Dr. K. B. Saha, Scientist 'G' is a distinguished social scientist specializing in anthropology, ethnomedicine and population studies. He holds a Ph.D. in Population Studies from the International Institute for Population Sciences (IIPS), Mumbai, where he also completed his Master of Population Studies. With a strong academic foundation in anthropology and zoology, Dr. Saha has extensively contributed to the understanding of tribal health, reproductive health, and disease epidemiology. His research interests lie in the socio-behavioural dimensions of health and healthcare access among marginalized communities. He has been honoured with several academic accolades, including the Prof. S.N. Singh Memorial Award and the Government of India Fellowship for Population Studies.

Currently, serving as Scientist 'G' at the ICMR-National Institute of Research in Tribal Health (NIRTH), Jabalpur, Dr. Saha has over two decades of experience in research and academic mentorship. His work has significantly influenced malaria control strategies, ethnomedicine documentation, and behavioural health studies among tribal populations. He has led multiple projects funded by organizations like ICMR, Tata Trusts, and the Ministry of Health & Family Welfare, focusing on malaria interventions, immunization strategies, and the impact of COVID-19 on tribal communities. Additionally, he has supervised Ph.D. students and played a key role in mentoring young researchers in public health.

Dr. Saha has an impressive publication record with research articles in high-impact journals such as The Lancet, Acta Tropica, and Tropical Medicine & International Health. His work on malaria elimination, traditional medicine practices, and health-seeking behaviour has gained national and international recognition. With an H-index of 20, his contributions to public health research continue to shape policies and interventions aimed at improving healthcare access and outcomes for vulnerable populations.

Dr. S. Rajasubramaniam S is skilled in Molecular biology and cell signalling. His team is currently focused on providing diagnostic services for various Hemoglobinopathies besides training and developing human resources for 19 states with Tribal population in collaboration with Ministry of Tribal Affairs. In future, his team is aiming to develop a non-invasive diagnostic procedure for oral cancer.

Dr. Pushpendra Singh, PhD, is working as Scientist F at ICMR-NIRTH, Jabalpur, India. His research focuses on Microbial Genomics, Molecular Epidemiology and Anti-Microbial Resistance (AMR). Major thrust areas of research work are on Molecular diagnostics for infectious diseases such as Leprosy, Tuberculosis, Scrub typhus and viral diseases. He is also joined in his research efforts by a team of young researchers in the Virology and Zoonoses laboratory where diagnosis and research work on more than 20 different viruses are performed regularly. At ICMR-NIRTH he has contributed in establishing a research group working on Leprosy research which is supported by 3 international funding agencies and many national and state level funding agencies such as ICMR, DHR, DBT and State Govt. He is also mentoring DBT-Ramalingaswami Fellows and DBT-BioCARe awardee Scientists at ICMR-NIRTH and has supervised ICMR-SRF and ICMR-Research Associates.

His motivated team routinely organises various trainings for school, college and University students, project staff as well as for the researchers/scientists/faculty members from within and outside the institute at the Central Instrumentation Facility (CIF) at the ICMR-NIRTH.

Dr. Pushpendra Singh completed his PhD at ICMR-National JALMA Institute f Leprosy and Other Mycobacterial Diseases, Agra under the guidance of Dr. Vishwa Mohan Katoch. He pursued postdoctoral research studies at the Swiss Federal institute of Technology (EPFL), Lausanne, Switzerland and the National Hansen's Disease Program (NHDP) at Baton Rouge, LA, USA. He was awarded the Ramalingaswami Re-Entry Fellowship and the UGC-Asstt Professorship position at the Maharaja Sayajirao University of Baroda, Vadodara, Gujarat (2016-2019). He joined ICMR-NIRTH in 2019 as Scientist E.

Dr. Pushpendra Singh is also actively involved in several multicentric studies. His long-term goal is to develop point-of-care diagnostics and identify biomarkers for various pathogens where differential diagnosis in field settings can play a crucial public health impact. His research work has been published in several leading journals such as NEJM, Nature Reviews Disease Primer, PNAS USA, Nature Communication etc.

Dr. Dinesh Kumar, working as Scientist E in the Institute, ICMR-National Institute of Research in Tribal Health (NIRTH), Jabalpur. He has passed B.Sc. (Hon's), M.Sc. in Statistics/Biostatistics from Banaras Hindu University (BHU), Varanasi and a Ph.D. from Bundelkhand University (BU), Jhansi. He has experience more than 24 Years in socio-behavioural, health system and implementation research. I have published more than 55 research articles in national and international journals. He has received grants for research in tribal health other than ICMR, from the Ministry of Tribal Affairs (MoTA) and the National Academy of Sciences India (NASI) in the capacity of Principal Investigators. Along with completed several National Taskforce projects like Universal Health Coverage (UHC), COVID on MCH, and AMR as PI and Co-PIs.

He has participated in several workshops and training viz. National Burden of Disease, Survival Analysis in Biomedical Research, Statistical Epidemiology, etc. He has presented several research articles at national and international conferences and visited 3 countries: Brazil, Thailand and the UK. He has been awarded 2 ''International scholarships'' from WHO/TRD, Thailand, for Participating in the 6th FERCAP (Forum for Ethical Review Committees in Asia and the Western Pacific), and Royal Society of Tropical Medicine and Hygiene (RSTMH), London, U K for participating in the Centenary Celebration Meeting the Millennium Development Goals.

Dr. Vidhan Jain, PhD, is a Scientist D and In-charge TB C and DST lab and SRL-HIV at ICMR-NIRTH, Jabalpur, India. His research focuses on microbiology and immunology of pathogens of human disease like malaria and TB with special emphasis on biomarker for adverse outcomes. Dr. Jain completed his PhD at ICMR-NIRTH, Jabalpur. He has contributed in the field and lab-based studies in leading journals such as malaria journal, pathogen and global health, Am J Trop Med Hyg. He has presented his findings at prestigious national and international conferences.

Beyond research, Dr. Jain has been actively involved in academic training and mentorship during MSc. Public Health Entomology program. His long-term goal is to enhance knowledge in malaria and TB disease with clinical applications.

Dr. Rituraj Niranjan Ph.D., PDF (USA), is a Scientist-D and Talent Search Scientist (ICMR-TSS) at the ICMR-National Institute of Research in Tribal Health, Jabalpur, India. With a strong background in cellular and molecular immunology, his research focuses on immune system-associated disorders, including the immunopathogenesis of dengue fever, immune dysfunctions in vector-borne diseases, fibrosis, neuroinflammation, and nanoparticle-based drug delivery systems. He has made significant contributions to understanding the role of Interleukin-15 (IL-15) in immune disorders and matrix metalloproteinases in dengue hemorrhagic fever.

Dr. Niranjan earned his Ph.D. in immuno-neuropharmacology from Jawaharlal Nehru University, New Delhi, and completed postdoctoral fellowships in the USA at the University of Arkansas for Medical Sciences, Cincinnati Children's Hospital, and Case Western Reserve University. Recognized for his outstanding research, Dr. Niranjan has been ranked among the top 2% of scientists worldwide for the past three years. He has published more than 40 research articles in high-impact journals, focusing on infectious and inflammatory disorders. Before joining ICMR as a Talent Search Scientist, he served as a scientist at IIT Kanpur and the ICMR-Vector Control Research Center, Puducherry. His ongoing projects explore novel therapeutics for dengue, autophagy-based treatments, and the role of Indian medicinal plants in combating neuroinflammation and viral infections.

Dr. Ravindra Kumar, M.Sc., Ph.D. Scientist D, ICMR-National Institute of Research in Tribal Health, Jabalpur Assistant Professor, AcSIR, Uttar Pradesh. Dr. Ravindra Kumar is a distinguished scientist specializing in Genetics and Molecular Haematology. He is currently serving as Scientist D at ICMR-National Institute of Research in Tribal Health (ICMR-NIRTH), Jabalpur, Madhya Pradesh. Additionally, he holds an academic position as an Assistant Professor at AcSIR, Uttar Pradesh. With over a decade of experience, Dr. Kumar has made significant contributions to haematological research, particularly in thalassemia and sickle cell disease. Dr. Kumar has played a pivotal role in multiple research projects funded by ICMR, SERB-DST, DBT, CCRAS and NHM, focusing on genetic disorders, tuberculosis, and anaemia. He has been the principal investigator and co-investigator of several high-impact studies aimed at improving healthcare outcomes in tribal populations.

His contributions to scientific literature include over 120 publications in reputed journals, and he has actively reviewed papers for leading journals. In addition to research, Dr. Kumar has extensive teaching experience, mentoring MD and DM students and served as a guest faculty in genetics courses. He has organized and participated in numerous national and international conferences, CMEs, and workshops, fostering advancements in molecular diagnostics and disease management. His accolades include the Young Scientist Award (DST-Fast Track Scheme), Dr. Dhirendra Nath Das Best Paper Award (Hematocon 2015), and the prestigious "Achiever" award by Thalassaemic India in 2023. He has also received travel grants and research fellowships from DST, CSIR, and UGC. He served as member of various national levels committees formed for the designing and formulating National Sickle Cell Anaemia Elimination 2047 guidelines. Currently, Dr. Kumar is leading efforts in optimizing sickle cell disease management and rare genetic disorders through multi-centric research and implementation projects. His administrative expertise extends to serving as a Nodal Officer for Model Rural Health Research Unit, IT in-charge, and a member of various committees at ICMR-NIRTH. His work continues to impact public health policies and genetic research, particularly in tribal communities, making significant strides toward improving diagnostic and therapeutic approaches for haematological disorders.

Dr. Nishant Saxena works as a Scientist at the Indian Council of Medical Research – National Institute of Research in Tribal Health, Jabalpur, India (ICMR-NIRTH). Prior to joining the ICMR, Dr. Saxena worked with the Anthropological Survey of India. He holds a master's degree in Anthropology and a DPhil in Cognitive and Behavioural Sciences from the University of Allahabad. He is also a trained health communication expert wherein he was part of the inaugural batch of ICMR Health Communications Course. Dr. Saxena is a member of the prestigious International Union of Anthropological & Ethnological Sciences (IUAES) and its Commission on Medical Anthropology and Epidemiology.

He is also an Honorary Scientific Advisor to the Institute of Translational Health Science, Mohali, Punjab and Member of the Expert Group of CSIR-TKDL Unit on Development of SOPs for Documentation of Oral Traditional Knowledge in India. His current research and academic interests lie at the intersection of traditional medicine (ethnomedicine) in tribes of India and public health system. In addition, he is also engaged in population-based health surveys and implementation research in sickle cell disease among tribes. Further, Dr. Saxena has contributed on a range of topics related to anthropological discourses on tribes of India through participation in academic dialogues like international/national conferences, seminars, workshops, etc., and through numerous publications in peer-reviewed journals with notable publications in journals *The Lancet*, *Lancet Infectious Diseases*, and *the BMJ*. He also has many book chapters to his credit.

Dr. Suyesh Shrivastava is a Scientist 'C' at the ICMR-National Institute of Research in Tribal Health (NIRTH), Jabalpur, India. He holds an MBBS from S.S. Medical College, Rewa, and an MD in Community Medicine from Aligarh Muslim University (AMU), Aligarh. Currently pursuing his Ph.D. at AcSIR (CSIR), he has extensive experience in community medicine, public health research, and epidemiology. Over the years, he has served in various academic and research positions, including as an Assistant Professor and Senior Resident, contributing to the advancement of healthcare in tribal and rural populations. Dr. Shrivastava has led multiple research projects focusing on tribal health, metabolic syndromes, essential diagnostics, tuberculosis, and anaemia. His contributions to epidemiological studies have been instrumental in shaping public health interventions. He has also played key roles as a Principal Investigator (PI) in several ICMR-funded projects and has been actively involved in outbreak investigations, healthcare assessments, and interventional studies in underserved regions. His commitment extends beyond research, as he serves as the Nodal Officer for multiple healthcare initiatives, a member of institutional ethics and sports committees, and an in-charge of sickle cell clinics. With numerous publications in peer-reviewed journals, Dr. Shrivastava has significantly contributed to public health literature, addressing critical healthcare challenges among tribal and rural populations. His research interests span non-communicable diseases, infectious diseases, and healthcare accessibility. Through his academic and professional endeavours, he continues to work towards improving healthcare systems and policies in India, particularly in resource-limited settings.

Dr. Anil Kumar Verma is a Scientist-C at ICMR-NIRTH, Jabalpur, specializing in Life Sciences. He earned his Ph.D. from Jawaharlal Nehru University, New Delhi (2012) and holds an M.Sc. in Biochemistry. His research focuses on malaria diagnostics, infectious diseases, and public health interventions, with publications in EClinicalMedicine, Lancet Infectious Diseases, and PLoS One. Dr. Verma has played a key role in multiple WHO, ICMR, and NASI-funded projects, working on malaria diagnosis, treatment efficacy, antimicrobial resistance, and disease elimination strategies. His contributions include developing novel diagnostic tools and strengthening disease surveillance systems.

He has been recognized with several prestigious awards, including the Dr. D.S. Kothari Post-doctoral Fellowship (UGC), ICMR travel grants, and CSIR-NET qualification. His academic excellence includes ranking among the top in his university. Dr. Verma has attended specialized training workshops on bioinformatics, NGS, and molecular biology and has presented his research at renowned national and international conferences.

Dr. Qaiser Farooq Dar is a distinguished researcher in the field of statistics & Operational Research, specializing in biostatistics. He completed his Post-doctoral Research Program at Incheon National University, South Korea, following his doctoral studies at the Department of Statistics, Ramanujan School of Mathematics Sciences, Pondicherry University. His academic journey also includes a master's degree in Statistics from the University of Kashmir, Srinagar. Prior to his current position, Dr. Dar served as a Biostatistical Scientist at the Sher-I-Kashmir Institute of Medical Sciences (SKIMs) in Srinagar. His remarkable contributions to the field have been recognized with several outstanding paper awards, including the prestigious Young Researcher and Young Scientist Award from India in 2020.

Currently, Dr. Dar holds the position of Scientist-C and and Assistant Professor-AcSIR at ICMR-NIRTH, Jabalpur, M.P, India. Dr. Dar is working on the project “Prediction and classification of complications in sickle cell disease patients using machine-learning algorithms: A Decision Supporting System”. He actively engages with various research organizations, both nationally and internationally, and has organized numerous conferences. Additionally, he plays a crucial role as a reviewer for several esteemed scientific journals. Dr. Dar's research interests span a wide spectrum, and his prolific output includes over 35 research publications in high-impact scientific journals of international repute. His dedication to advancing statistical methodologies in the context of health research underscores his commitment to improving public health outcomes.

Dr. Satyendra Pandey is a scientist and expert in the field of Entomology and Vector Borne Diseases. Prior to his current position, Dr. Pandey served more than 10 years as a State Consultant (Entomologist), under the NVBDCP-National Health Mission, at the Directorate of Health Services, Bhopal, Madhya Pradesh. He also served more than 02 years as a District Vector Borne Disease Consultant at the office of the Chief Medical and Health Officer district Chhindwara, Madhya Pradesh. His remarkable contributions to the field have been recognized with several outstanding certificates in the field of disease control activities under VBDs. Currently, Dr. Pandey holds the position of Scientist-C at ICMR-NIRTH, Jabalpur, M.P, India. He actively engages with the Master of Public Health Entomology programme and various ongoing research activities in the institute.

Dr. Vagisha Rawal is a Scientist 'C' at ICMR-NIRTH, Jabalpur, with expertise in entomology and insect behavior. She holds a B.Sc. (Hons) Zoology, M.Sc. Zoology, M.Phil., and Ph.D. in Insect Behavior from Delhi University. Before joining ICMR-NIRTH, she served as an Assistant Professor at Sri Venkateswara College, Delhi University, for eight years, gaining extensive teaching and research experience. Her research focuses on vector-borne disease control, genomic surveillance of vectors and parasites, and integrated vector management. At ICMR-NIRTH, she oversees the M.Sc. Public Health Entomology program in collaboration with Pondicherry University, teaching and supervising student dissertations.

Additionally, she plays an active role in institutional committees, serving as the Nodal Officer for M.Sc. Public Health Entomology, Liaison Officer for PWDs and OBCs, and a member of the Internal Complaint Committee, Student Grievance Committee, and Staff Quarter Allotment Committee, while also managing hostel affairs.

Dr. Sandeep Kumar has done his Ph.D. in chemoprevention of colon cancer from Panjab University Chandigarh. Thereafter, he did his postdoc training in the field of head and neck cancer at CSIR-Institute of Himalayan Bioresource Technology, Palampur (H.P.), India. He is exploring local tribal medicines for the effective prevention and treatment of chronic diseases such as cancer and diabetes using mouse model at ICMR-National Institute of Research in Tribal Health, Jabalpur (M.P.).

Dr. Harshwardhan Vijay Shende is currently Scientist B at ICMR-NIRTH, Jabalpur. He has PhD from Tata Institute of Social Sciences, Tuljapur, Maharashtra. He has joined the ICMR-NIRTH, Jabalpur on 28th March 2022. He pursues the interest in social aspect of Sickle Cell Disease. He is also the co-investigator in two ongoing sickle cell projects on prediction modelling of complications in sickle cell disease patients and Implementation research for optimizing the comprehensive Sickle Cell Anaemia (SCA) care services.

He also presented the oral paper on “Sickle Cell Disease and Social Stigma: Unravelling the Complex Barriers and Challenges in India” in international conference on Sickle Cell Disease in Chandrapur which was held during 04 to 06 October 2024.

His long-term goal is to prepare the strategies for reducing and managing the stress, anxiety and depression among sickle cell patients.

Dr. Vijay Pratap Singh, PhD, is a DBT Ramalingaswami Fellow at ICMR-NIRTH, Jabalpur, India. His research focuses on genome maintenance in placental development, a critical aspect of maternal-fetal health. The placenta, a highly polyploid organ, is vulnerable to genomic instability, which can impact pregnancy outcomes, fetal growth, and maternal well-being. Using advanced molecular and genetic tools, Dr. Singh investigates key regulators of genome stability in placental cells. His work explores how DNA damage and repair mechanisms influence placental aging, parturition, and embryo development, providing new insights into pregnancy complications and their connections to aging and cancer.

Dr. Singh completed his PhD at CSIR-CCMB, Hyderabad, and Jawaharlal Nehru University, New Delhi, followed by postdoctoral research at the Stowers Institute for Medical Research, USA. He has contributed significantly to the field, publishing research articles in leading journals such as Developmental Cell, Development and authoring book chapters on reproductive health. He has presented his findings at prestigious national and international conferences and delivered invited talks on placental biology, DNA damage, and maternal health. His recent studies highlight the importance of maintaining genomic integrity for healthy pregnancy outcomes.

Beyond research, Dr. Singh is actively involved in academic training and mentorship. He has received training in specialized courses such as the Placenta Biology Course at the University of Cambridge, UK. His long-term goal is to bridge fundamental research with clinical applications, contributing to maternal and fetal health advancements. By deepening the understanding of placental biology, his work paves the way for potential therapeutic interventions to improve pregnancy outcomes and address broader health challenges associated with genomic instability.

Title: Assessment of Neonatal Screening Approaches for Sickle Cell Disease and The Effect of Early Intervention in Management of the Disease in Tribal Population.

Details of PI, Co-PI and Co-I:

Principal Investigator: Dr. Rajasubramaniam S (Scientist F, ICMR-NIRTH, Jabalpur)

Study PI: Dr. Anita Nadkarni (Scientist F, ICMR-NIIH, Mumbai**)**

- **Status of Project (completed, ongoing and new):** Ongoing
- **Type of funding (Extramural, Intramural, International):** Extramural
- **Name of funding agency:** ICMR

Description of project:

Objectives

To undertake a newborn screening program for Sickle cell anaemia (disease) in tribal populations of different states for

a) Early detection
b) To understand the magnitude of the problem and
c) To understand the barriers for undertaking such programme.

Specific Objectives

1. To establish a cohort to study the clinical trajectories of affected individuals.
2. To assess the benefit of early comprehensive care of affected babies.
3. To evaluate the genotypic and phenotypic correlation to understand role of genetic modifiers for disease severity

Methodology

Sample Collection: The samples were collected either through cord blood at the time of birth or by heel prick methods in EDTA vials depending on the feasibility at the CHC-Samnapur Dindori and CHC-Nainpur, Mandla (Madhya Pradesh). A total of 928 new born blood samples were collected. Initially these samples were screened for haemoglobinopathies at ICMR-NIRTH, Jabalpur. Sickle positive samples were retested after 6 weeks for confirmation.

Progress of the study: The study is ongoing in 3 tribal dominated districts of Madhya Pradesh namely in Samnapur CHC, Dindori District, Nainpur CHC in Mandla District and Elgin hospital in Jabalpur District. Here majority of newborns were screened.

During the report period 2536 new born babies were tested for various Hemoglobinopathies (Table 1), among them 221 were found to be Sickle cell carriers, 14 were homozygous for Sickle Cell Disease and 1 was sickle β-thalassemia (SBT) and 0 newborn were found to be β-thalassemia major, while 2 newborns were identified to be β-thalassemia carrier (Table 2).

In Madhya Pradesh site, Gond and Baiga tribes are the predominant tribes, accordingly these 2 tribes were included for screening. In the Gond group of tribes, sub groups Armo, Maravi, Tekam, Inwati, Markam, Marti, Uikey and Pandro are included. In Baigas, Bhartiya, Bharti etc were included. In addition, Bharia and Kol tribes were also encountered in the study population. Among the new born babies tested, babies of Scheduled caste and Other Backward class communities were also screened to avoid any ethical concerns. Table 3 shows the number babies screened among the Gond Group,

Baiga Group and other tribes. At these study sites, targeted screening is also being carried out among pregnant women (2nd and 3rd trimester) attending the Gynecology OPD as per the request of local administration (Data not shown). For this screening pregnant women are tested for various Hemoglobinopathies. If any pregnant woman was found to be positive for Sickle Cell Trait/Disease or Beta-thalassemia trait/major, their spouses are tested. If the husband was also positive for trait or disease, then these couples were considered as "high risk". Their pregnancy was followed up and cord blood/fetal sample was collected at the time of delivery for testing of the suspected Hemoglobinopathies.

Table 1: Year wise distribution of new born screened at ICMR NIRTH Madhya Pradesh

CENTER	Total samples screened on HPLC	AA	AS	SS	Other Hemoglobio – pathies	Disease neonatal	Treatment
OCT 2019 to MAR 2020	818	684	123	9	2	1	8
APR 2020 to MAR 2021	1717	1455	235	22	5	30	21
APR 2021 to MAR 2022	3362	3085	234	18	25	71	18
APR 2022 to MAR 2023	4325	3956	331	25	13	104	20
APR 2023 to 1DEC 2023	2536	2295	221	15	5	110	10
TOTAL	12758	11475	1144	89	50	316	77

Table 2: Community wise distribution of new born screened at ICMR NIRTH Madhya Pradesh

Name of the tribal area	Nainpur, Mandla, Samnapur, Dindori, Elgin Hospital, Jabalpur
Tribal community screened (ST)	690
Non tribal community screened	1846
Scheduled Tribe	690
Scheduled Caste	333
Other Backward Class	825
General	202
Muslims	259
Unknown	227
Total number of the samples screened in the 3-study site	12758
Number of the villages screened	985

Table 3: Overview of Hemoglobinopathies status among new born screened at ICMR NIRTH Madhya Pradesh

Hemoglobinopathies	Total

Sickle Cell Carrier	**221**
Sickle Cell Disease	**14**
Sickle Beta Thalassemia	**1**
Beta Thalassemia Trait	**2**
Beta Thalassemia Major	**0**
Hb AD	**3**
Normal	**2295**

Table 4: Tribe wise distribution of new born screened in ICMR NIRTH Madhya Pradesh

Name of Tribe/Sub-tribe	Mandla (Nainpur)	Dindori (Samnapur)	Elgin hospital (Jabalpur)
Gond Group			
Armo	**1**	**0**	**1**
Gond	**0**	**0**	**16**
Maravi	**40**	**25**	**6**
Inwati	**6**	**0**	**0**
Markam/Marti/Marskole	**26**	**28**	**4**
Uikey	**65**	**5**	**1**
Pandro	**16**	**3**	**0**
Tekam	**10**	**10**	**3**
Dhurway	**19**	**43**	**4**
Jhangela	**0**	**0**	**0**
Saiyam	**6**	**1**	**0**
Neti	**9**	**3**	**0**
Baiga Group			
Baiga	**0**	**0**	**1**
Bharti/Bhartiya	**44**	**1**	**5**
Bharia			
Bharia	**0**	**0**	**0**
Kol Tribe			
Kol	**0**	**0**	**27**
Others			
Banjara, Aadhiwasi, etc.	**52**	**0**	**0**
Total	**294**	**119**	**68**

Follow up of SCD cases

Clinical evaluation of newborns of current period (year 5) were carried out along with the follow up of sickle babies recruited during previous years. Among the current year newborn babies, 7 Sickle homozygous new born babies from Mandla and 4 babies from Dindori District and 4 babies from Jabalpur District (Elgin hospital) were followed up (Table 4) (Fig 1). Among the previous year recruits,

7 episode of pain including pedal edema was seen, 67 events AFI (acute febrile illness) and 3 ARI episodes were observed.

Table 5 shows the incidence of clinical events among the sickle disease babies.

Table 5: Incidence of clinical events in SS cases:

	Clinical Events	**Events per person year (years of observation=2023-24, n=89)**
1	Hospitalizations	5
2	Painful events	7
3	Blood transfusions	3
4	Acute febrile illness (AFI)	67
5	Acute respiratory infection (ARI)	13
6	Vaso occlusive crisis	2
7	Sepsis	0
8	Stroke	1
9	Sequestration crisis	2
10	Anemia	18
11	Splenomegaly	1
12	Death	2
13	Others (joint swelling-1, scabies-2 COVID-19, Shingles, GI infection)	3

Among the current year recruited sickle affected babies, one male child (5 months old) had one episode each of ARI and AFI; a male child of age 4 months had one episode of AFI (Table 5). In addition, 1 heterozygous baby and 1 normal were also followed up as controls. Genetic counselling of parents for avoiding the birth of sickle homozygous babies in future pregnancies through prenatal diagnosis was also done.

Table 6 depicts the various haematological parameters observed during the follow up 69 sickle homozygous babies beginning with follow-up 1 to 49, the percent Mean haemoglobin levels increased from 7.7g/dL to 10.3 g/dL. The HbS levels showed a linear increase from 29.05% to 38.0% during the same period with concomitant decrease in fetal Hb.

Hydroxyurea was initiated for 46 babies who were older than 1 year. The mean fetal haemoglobin at 11^{th} follow was 27.2 and it increased from 29.3% at 15^{th} follow up and to 31.15% at 18^{th} follow up in post hydroxyurea therapy. Three babies required hospitalization and blood transfusion due to failure to adherence routine to follow-up and poor compliance of hydroxyurea. The babies reported poor appetite.

Table 6: The changes in the haematological pattern during the follow-up of SS individual

Age in months	**1-3 FU**	**4-6 FU**	**7-9 FU**	**10-12 FU**	**13-15**
	(n=48)	**(n=33)**	**(n=21)**	**(n=18)**	**(n=7)**
WBC ($x10^3$/µl)	10.31±2.8	9.1±0.95	7.13±2.53	11.5±5.51	9.64±3.74
RBC ($x10^{12}$/l)	4.06±0.89	4.3±0.14	3.16±0.31	3.61±0.76	3.3±0.04
Hb (g/dl)	8.6±0.85	8.9±0.43	7.5±0.71	9.9±0.3	8.3±0.17
MCV (fl)	63.3±3.09	62.86±4.34	79.2±10.56	79.63±10.62	74.34±0.05
MCH (pg)	22.1±2.64	23.1±0.45	30.33±3.67	29.1±5.57	28.26±0.05
RDW (%)	24.9±10.01	19.3±1.69	23.06±13.42	16.4±2.72	15.83±2.36
HbA0 (%)	1.6±0.15	1.5±0.05	1.9±0.20	2.1±0.77	1.6±0.15
HbF (%)	33.1±5.11	27.94±1.56	27.2±7.76	29.25±1.30	29.5±0.35
HbS (%)	62.68±4.78	66.79±1.55	67.81±5.70	55.3±0.79	65.32±0.75

Table 7 shows the medication and vitamin supplements prescribed to various sickle babies during the follow-up. Majority of children reported upper respiratory tract infection and afebrile illnesses.

Table 7: All 5-year Details of Management of Disease patient:

Management	**Total babies SCD (89)**
	No of babies received
Antibiotic prophylaxis	69
Penicillin	46
Amoxiclave	23
Folic acid	69
Hydroxyurea	46
Blood transfusion	02
Other treatment (cough, cold, fever, Scabies)	69

Genetic modifiers:

Efforts were also made to characterize the XmnI polymorphisms and alpha thalasemmia status among the sickle affected babies. Three babies tested +/+ genotype for XmnI. Thirtythree babies showed alpha thal deletions (-3.7 and -4.2 deletion).

Table 9: Shows genetic modifiers observed among the Sickle Cell Disease babies

Alpha genotype	**n**	**XmnI**	**n**
αα/αα	13	+/+	3
-α/αα	33 (4.2-1;3.7-1)	+/-	45
α/α	2	-/-	1

Biochemistry:

Twenty-six sickle babies were also analysed for various biochemical parameters such as SGOT, SGPT, Total Bilirubin (Direct & indirect), Creatinine levels etc. Table 10 shows the individual parameters. The average values were found be near normal except for SGOT.

Table 10. shows the levels Bilurubin (Direct and Total), SGPT, SGOT and S Creatinine levels during the follow up period

Sickle babies	S Bilirubin total	S Bilirubin Direct	SGPT	SGOT	S Creatinine
413	0.67	0.25	15.9	53	0.57
898	0.74	0.36	31.8	79	0.88
1069	0.76	0.29	18.8	54.8	0.64
1449	0.71	0.26	14.1	79.5	0.9
1457	1.93	0.79	30	72.4	0.62
1676	1.16	0.46	14.1	72.4	0.74
1869	0.48	0.2	17.6	63.6	0.98
2420	0.9	0.28	17.6	83.1	0.82
2977	0.67	0.29	24.7	97.2	0.62
3154	0.99	0.34	15.9	76	0.95
3365	0.95	0.43	38.9	104.3	0.63
3795	1.09	0.42	14.1	67.1	0.66
6263	0.95	0.54	25.9	53	0.72
876	1.29	1.2	31.82	65.42	0.5
250	1.61	0.58	21.27	51.27	0.53
3251	2.06	0.48	19.45	53.04	0.57
1075	1.21	0.74	21.22	33.59	0.18
30	0.64	0.34	28.2	136.1	1.31
175	0.65	0.41	30	54.8	0.66
218	1.82	0.91	17.6	58.3	0.66
301	1.48	0.71	21.2	72.4	0.76
499	1.18	0.7	22.9	56.5	0.62
557	0.81	0.39	28.2	79.5	0.78
856	0.65	0.33	28.2	64.4	0.75
1002	0.91	0.54	21.2	63.6	0.6
1579	0.86	0.45	44.2	81.3	0.68
1924	1.13	0.67	19.4	63.6	0.62
2019	1.12	0.63	26.5	125.5	1.09
Mean	1.05	0.49	23.59	71.95	0.71
SD	0.41	0.22	7.53	22.26	0.20

Research work which remains to be done under the project:

During the report period 89 Sickle Homozygous and 8 Sickle-beta thal – babies were identified and in all a total of 81 sickle homozygous. Among them 9 babies were lost to death. As per proposal one hundred babies need to be identified and followed up.

Images shows various sickle babies from 3 study sites.

- View of New born follow up camp at Nainpur, Mandla District
- Evaluation of Sickle homozygous new born for clinical parameters
- Father Mother with Sickle homozygous infant at the follow up camp
- View follows up of children at their home.
- View due to follow up of children distribution of blanket
- View sample draw of sickle babies for biochemistry parameters sickle babies due to follow up

Title: A non-inferiority randomized trial to assess the efficacy of Low dose Hydroxyurea (10mg/kg/day) vs Fixed dose hydroxyurea (20mg/kg/day) in treatment of Sickle cell disease patients.

Details of PI, Co-PI and Co-I:

Principal Investigator: Dr. Rajasubramaniam S (Scientist F, ICMR-NIRTH, Jabalpur)

Study PI: Dr. Naveen Khargekar, Scientist E, ICMR-NIIH, Mumbai

- **Status of Project (completed, ongoing and new):** Ongoing
- **Type of funding (Extramural, Intramural, International):** Extramural
- **Name of funding agency:** ICMR

Description of project:

Objectives:

1. To determine the efficacy of low dose(10mg/kg/day) vs Fixed dose(20mg/kg/day) Hydroxyurea in treatment of SCD patients.
2. To compare the toxicity of low dose hydroxyurea with fixed dose Hydroxy-urea.
3. To measure the incidence of Vaso-occlusive crises, infections and growth of children in both the arms.

Methods:

Study design: This will be a prospective non-inferiority trial to assess the low dose hydroxyurea treatment vs standard dose Hydroxyurea in children with sick-le cell disease, using a randomized open labelled treatment assignment.

Patient Eligibility: Homozygous Sickle cell children aged 2 years and above till 10 years of age.

Inclusion Criteria:

a) Confirmed diagnosis of Sickle cell disease.
b) Age above or equal to 2 years of age.
c) Creatinine less than or equal to 1.4 mg/dl and/or estimated glomerular filtration rate greater than 45ml/min/1.73 m2
d) Liver function tests (specially ALT and conjugated bilirubin) less than or equal to 4 times upper limit of normal.

Exclusion Criteria:

a) Red blood cell transfusion in the last 3 months or a HbA level greater than 5% in SCD patients.
b) Child already on Hydroxyurea treatment.
c) Creatinine level greater than 1.4 mg/dl
d) Liver function tests (ALT and conjugated bilirubin) greater than 4 times upper limit of normal.

Sample Size:

HbF% at Baseline: 10%

Target HbF%: 20%

85% of participants on Fixed dose(20mg/kg/day) would achieve the target HbF%

75% of participants on low dose (10mg/kg/day) would achieve the target HbF%

Non-Inferiority margin: 20%

With significance level(alpha): 5%
Power: 90%
Percentage of success in standard arm: 85%
Percentage of success in experimental arm: 75%
Non- inferiority limit: 20%
Sample size required per group: 270
Total Sample size: **540** (All sites included)

Consenting: Trained Medical Staff at each centre will describe the hydroxyurea intervention study and offer the opportunity to join the research study. Informed consent will be obtained, after which the baseline and randomization procedures will be initiated.

Randomization: Enrolled participants will be randomized into one of the two intervention arms.

1. Low dose hydroxyurea(10mg/kg/day)
2. Fixed dose of hydroxyurea (20 mg/kg/day)

Block randomization will be used. Children will be randomized (in 8 blocks) into treatment groups (low dose or fixed dose) by order of entry in the study, based on a predetermined randomization list prepared by ICMR-NIIH. It's an open labelled study with participants and clinical study personnel treating the participants will know which arm a child is in.

Study Treatment:

All the intervention in the both arms will be active hydroxyurea.

A. Packaging, Administration and storage of Hydroxyurea: The study treatment will be provided by Beta Drug LTD pharmaceuticals, in the form of hydroxyurea formulations, including 500mg capsule. The medication is stable at room temperature and does not require refrigeration. The capsules will be opened and weighed and the amount of HU needed for the child per day will be provided by the local pharmacy at each centre. These formulations have been demonstrated stable with mixing or crushing, with dissolution in a wide array of liquids such as water, juice for immediate use. Medication will be stored in local pharmacy and a 3-month supply of medication will be dispensed with each clinic visit. At each visit, enough medication will be dispensed to last until the next scheduled visit.
B. Investigational Agent
C. Low dose: For participants who are randomized to low dose arm, using month 0 weight, the daily dose will be calculated using available tablet sizes and the dosing calculator with a goal of 10 ±2.5 mg /kg/day. Each interval visit, clinical examination, laboratory studies will be used to assess treatment toxicity, mainly haemoglobin level or neutropenia and also reticulocytopenia or thrombocytopenia. The daily dose will be held or lowered as per treatment toxicity guidelines outlined below.
D. Fixed Dose: For participants who are randomized to the fixed dose arm, using month 0 weight, the daily dose will be calculated using available tablet sizes and the dosing calculator with a goal of 20 ± 2.5 mg/kg/day. At each interval visit, clinical examination, laboratory studies will be used to assess treatment toxicity, mainly haemoglobin level or neutropenia and also reticulocytopenia or thrombocytopenia. The daily dose will be held or lowered as per treatment toxicity guidelines
E. Study Progress: The study is a multi-centric Task Force study under ICMR-NIIH as lead centre. During the report period 56 patients have been recruited namely in the two arms (Arm I-

10mg-27 patients and Arm II -20mg- 29 patients). In the baseline Transcranial Doppler, ECHO, USG, X-ray, Iron Studies and Vit B12 levels were carried out. In all 5 patients showed severe adverse reaction and 11 patients showed adverse reaction. These reactions on scrutiny were found to be not associated to test drug. Two patients withdrew from study. In general, Mild cystitis – 3, Mild splenomegaly -4 Mild splenomegaly with mild cystitis – 2 Mild hepatosplenomegaly- 2 and Cholelithiasis – 4 were noted among patients.

Title: Strengthening genomic surveillance for vector borne diseases endemic in India.

Details of PI, Co-PI and Co-I:

Principal Investigator: Dr. Pragya Yadav, Scientist-F, ICMR-NIV, Pune

Site Principal Investigator: Dr. Pushpendra Singh, Scientist-E ICMR-NIRTH, Jabalpur

- **Status of Project (completed, ongoing and new):** Ongoing
- **Type of funding (Extramural, Intramural, International):** Extramural
- **Name of funding agency:** ICMR, New Delhi

Description of project:

Background: India's diverse climate and geography make it susceptible to emerging and re-emerging vector-borne diseases (VBDs), posing significant public health challenges. Recent outbreaks, notably the 2024 resurgence of the *Chandipura* virus (CHPV) in Gujarat, underscore the urgency for enhanced surveillance and response strategies. Between early June and August 15, 2024, Gujarat reported 245 cases of acute encephalitis syndrome (AES), with 82 fatalities—a case-fatality rate of 33%. Of these, 64 cases were confirmed as CHPV infections, marking the largest outbreak in two decades. CHPV, a member of the *Rhabdoviridae* family, is primarily transmitted by sandflies and predominantly affects children under 15 years of age. The virus can cause rapid-onset symptoms, progressing from fever to coma and, in severe cases, death within 48 to 72 hours. Currently, there is no specific treatment or vaccine for CHPV; management focuses on supportive care and preventive measures, including vector control and public awareness campaigns. In response to such health threats, India has established a network of Virus Diagnostic & Research Laboratories (VRDLs) equipped for genomic surveillance. These laboratories analyse pooled genomic sequence data to identify pathogens, monitor circulating strains, and assess viral diversity in hosts and vectors. Enhancing the capacity of VRDLs, especially in diverse regions, is crucial for early detection, outbreak containment, and understanding pathogen evolution. This approach aligns with the One Health perspective, recognising the interconnectedness of human, animal, and environmental health. Implementing robust monitoring and evaluation frameworks alongside national genomic surveillance strategies can strengthen existing networks and improve public health responses to VBDs. India's proactive efforts in bolstering genomic surveillance and laboratory capacities are vital steps toward mitigating the impact of emerging and re-emerging vector-borne diseases, thereby enhancing public health outcomes.

Objective:

1. To enhance the capacity of the genomic surveillance of CCHF, KFDV, Zika, Dengue, and other endemic diseases in India.
2. To utilize the genomic surveillance network for understanding the potential evolution of these diseases in India

Methodology: The methodology for enhancing diagnostic capabilities and conducting comprehensive surveillance of vector-borne diseases in India encompasses several key components:

a. Diagnostic Capacity Enhancement: Selected Virus Research and Diagnostic Laboratories (VRDLs) will receive specialized training in field sample collection, laboratory biosafety protocols, molecular diagnostics, and next-generation sequencing (NGS). Emphasis will be placed on biosafety training to ensure safe handling of pathogens. These VRDLs will focus on diagnosing

and sequencing human clinical samples suspected of containing Dengue, Zika, Kyasanur Forest Disease Virus (KFDV), and other endemic diseases. Due to the high-risk nature of the Crimean-Congo Hemorrhagic Fever (CCHF) virus, its diagnostics and NGS will be conducted at the Indian Council of Medical Research-National Institute of Virology (ICMR-NIV) in Pune, which houses a Bio-Safety Level-4 (BSL-4) facility.

b. Sample Collection Sites: Surveillance efforts will target specific regions across India, including Rajasthan, Gujarat, Uttar Pradesh, Madhya Pradesh, Karnataka, and Tamil Nadu. Samples such as tick and mosquito pools, as well as monkey necropsy specimens, will be collected from these areas. Given the elevated biosafety requirements, samples related to CCHF, including human clinical specimens and ticks (Hyalomma species), will be sent to ICMR-NIV Pune for advanced testing and sequencing.

Laboratory Investigations:

a. Molecular Diagnostics: Viral nucleic acids will be extracted using automated systems, followed by virus-specific real-time PCR assays targeting pathogens like CCHF, KFDV, Zika, and Dengue. Positive samples, along with a subset of negative ones, will undergo NGS on the Illumina platform to ensure comprehensive analysis.

b. RNA Sequencing: Extracted RNA will be quantified, and ribosomal RNA will be depleted using the NEBNext rRNA Depletion Kit (Human/Mouse/Rat) from New England Biolabs. Subsequent steps include library preparation—comprising fragmentation, adapter ligation, amplification, and quantification—culminating in sequencing on an Illumina system.

c. DNA Sequencing: DNA libraries will be prepared using the Nextera XT DNA Library Prep Kit (Illumina), quantified with the KAPA Library Quantification Kit, and sequenced on the Illumina NextSeq platform. Data analysis will be performed using the CLC Genomics Workbench, with reads mapped to the human genome using BWA-MEM.

d. NextSeq System Sequencing: Prepared DNA and RNA libraries will be denatured, diluted, and loaded onto the NextSeq 500/550 system using the High Output Kit v2.5 (75 Cycles) as per Illumina's guidelines. Generated BCL files will be converted to FASTQ format for analysis. For samples with unknown etiologies, de novo assembly will be employed to construct contiguous sequences (contigs), which will then be analysed using tools like Taxonomer and BLAST to identify potential pathogens.

Expected outcomes: Enhanced preparedness of India towards the threats of endemic high-risk viral diseases by strengthening the genomic surveillance network.

Work done:

This study identified the transmission of Chikungunya virus (CHIKV) vector borne disease infection in clinically suspected cases of Madhya Pradesh for CHIKV and determined the seropositivity of anti-CHIKV IgM antibodies in a cohort of suspected cases analysed positivity rates across different age groups, area types (urban and rural), seasonal trends & transmission. The clinically suspected for the CHIKV were tested for the presence of IgM antibodies against CHIKV using enzyme-linked immunosorbent assay (ELISA).

Capacity building and training: Staff training will be done for Biosafety as well as NGS data analysis, organized in January 2025 by the ICMR-NIV, Pune for the selected network laboratories to strengthen the genomic surveillance capacities of the laboratory.

Title: Development of a sustainable network of laboratories in India for identification, monitoring and research on virus and bacteria causing acute encephalitis syndrome and other novel pathogens through capacity building in advanced biomedical technologies.

Details of PI, Co-PI and Co-I:

Principal Investigator: Dr. Shanta Dutta, Scientist G, ICMR-NIRBI, Kolkata

Site Principal Investigator: Dr. Pushpendra Singh, Scientist-E, ICMR-NIRTH, Jabalpur

- **Status of Project (completed, ongoing and new):** Ongoing
- **Type of funding (Extramural, Intramural, International):** Extramural
- **Name of funding agency:** ICMR, New Delhi

Description of project:

Background: Early recognition of an outbreak and rapid response are the key parameters in containing an emerging disease before it turns into epidemic or pandemic. The project proposes to develop a network of laboratories with preparedness to use advanced biomedical technologies such as serological and molecular techniques, next generation sequencing (NGS) and bioinformatic tools to predict and combat emerging viral and bacterial diseases, establishing a surveillance and monitoring system for acute encephalitis syndrome (AES) in India.

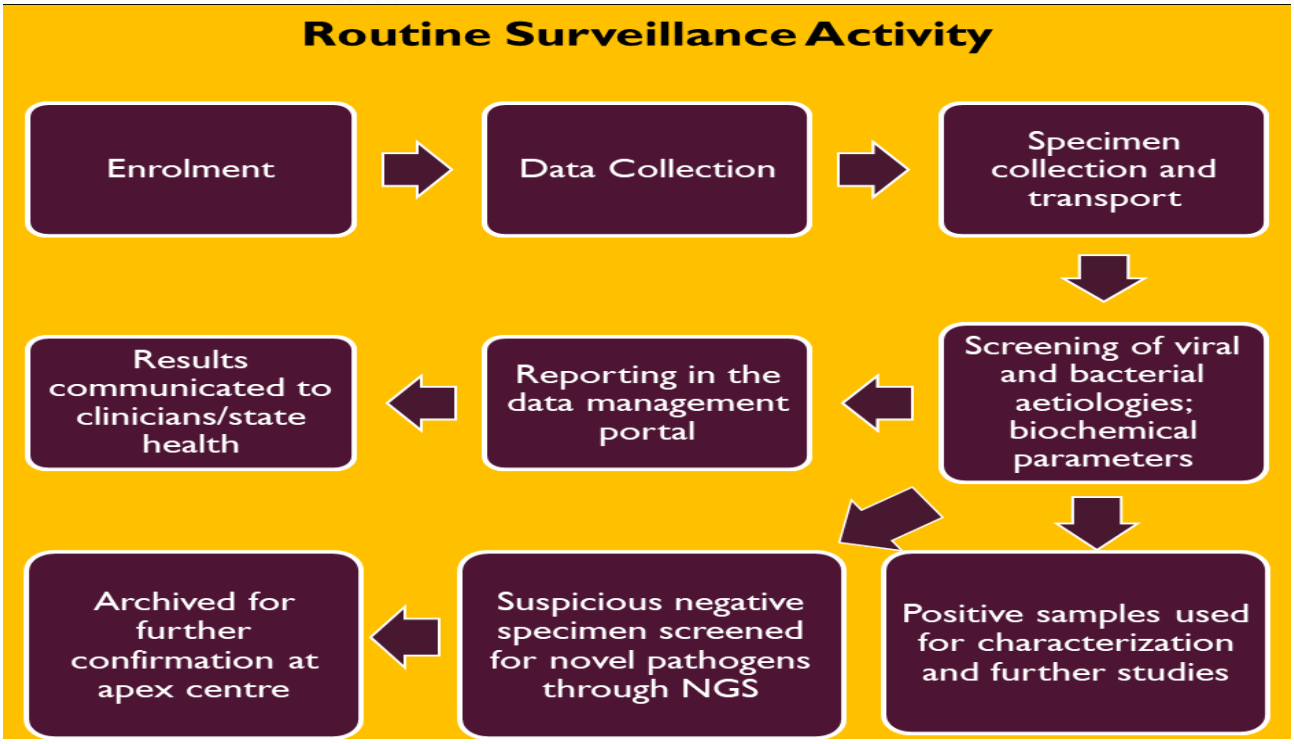
Novelty: The novel lies in the fact that it focusses on utilization of advanced tools to address the cause of AES and other novel pathogens and simultaneous development of infrastructure, strengthening of capacity of ICMR institutes located at different geographical regions of India for rapid diagnosis of cases and advanced research capable of rapid response in future outbreaks/epidemics.

Objectives:

The study aims at strengthening of the laboratories for identification of viral and bacterial aetiologies of AES and other novel emerging pathogens through serological, molecular, and NGS facilities. Additionally, capacity building at the network institutes will be carried out at ICMR-NICED on the advanced biomedical techniques.

Methods:

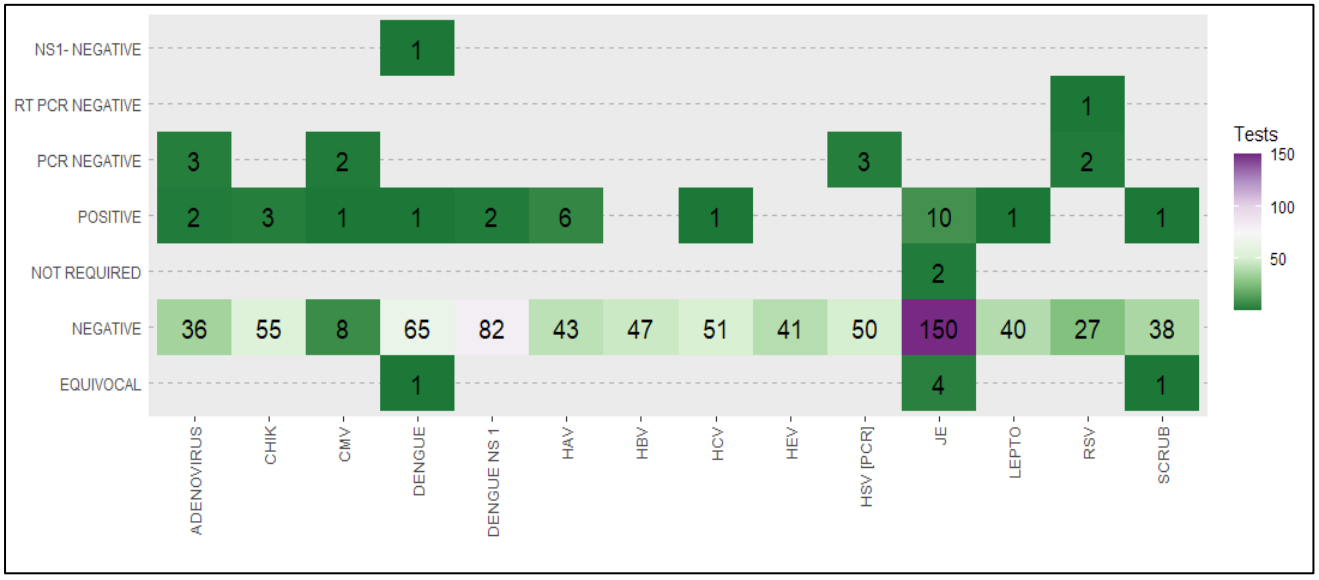
Patients of AES will be identified using standard WHO definition and predefined inclusion/exclusion criteria. Specimens will be collected and transported to the laboratories and tested as per algorithm. Identification and characterization of novel pathogens will be performed using NGS with standard bioinformatics pipeline.



Expected outcome:

The network laboratories may continue for regular surveillance and monitoring of aetiologies of AES and strengthen the capacity of ICMR and other institutes in using advanced biomedical techniques for rapid response to any disease outbreak or epidemic.

We have completed the collection and testing of a total of 241 samples till July 2024 whose results are represented in the Figure below.



Title: Molecular Mechanisms of Immunomodulation Imparted by Mycobacterium indicus pranii (MIP) Against Multibacillary Leprosy.

Details of PI, Co-PI and Co-I:

Principal Investigator: Dr. Pushpendra Singh (Scientist E, ICMR-NIRTH, Jabalpur)

Co-Principal Investigator: Dr. Tarun Narang (Associate Professor, Postgraduate Institute of Medical Education & Research (PGIMER), Chandigarh, Chandigarh),

- **Status of Project (completed, ongoing and new):** Ongoing
- **Type of funding (Extramural, Intramural, International):** International
- **Name of funding agency:** Leprosy Research Initiative (LRI) Netherlands

Description of project:

Mycobacterium indicus pranii (MIP, earlier known as Mycobacterium w) is a non-pathogenic mycobacterial species. It is a potent invigorator of immune response and exhibits promising immunomodulatory effects against leprosy and tuberculosis in several studies and has been approved by the Drug Controller General of India and the US Food and Drug Administration. It reverses the immunological anergy (state of T cell unresponsiveness) to M. leprae antigens, particularly among the lepromatous leprosy cases which are known to be the major contributors in the continuing transmission of leprosy bacilli. In the present proposal, we aim to investigate the effect of the MIP vaccine on appropriate cell lines and individual immune cell populations (using vaccinated vs. non-vaccinated leprosy patients).

In addition, the emergence of drug resistance is a concern and a threat for many infectious disease intervention programs, especially those that have secondary prevention (chemotherapy) as the main component of their control strategy. The effectiveness of the first- and second-line drugs needs to be determined. It is imperative to determine the proportion of individuals who are harbouring drug-resistant M. leprae strains. Hence, this study has also aimed at developing multiplexed PCR assays. In polar lepromatous cases, the chances of re-infection are also very high as the patients do not mount anti- M. leprae Cell-mediated immunity. Therefore, developing an assay that can differentiate between endogenous reactivation vs. exogenous re-infection is also very important, particularly in the endemic settings where chances of (new) exposure remain significant.

Methodology: The study's clinical trial approval has been obtained during the current reporting period and the trial number has been provided. Therefore, the progress on this front has been slow which is regretted. Therefore, No Cost Extension would be required.

During this reporting period, the standardization experiments of the flow cytometry have been completed. In addition, a multiplexed assay for drug resistance determination has been optimized. The method for genome-wide sequencing from clinical samples has been developed for differentiating various M. leprae strains.

Results and Conclusions: During the current reporting period, we have worked on pathogen genomics aspects. A multiplexed PCR assay has been standardized and the problems of non-specific bands have been resolved by optimizing the PCR conditions. The protocol for differentiation between the strains has also been tested wherein the SNP-genotypes of M. leprae strains are identified. Since a great majority of the strains belong to the same genotype, the differentiation can be done by genome-wide comparison. For this, the method for selective depletion of the host tissues and separation of M. leprae bacilli using various enzymes such as Trypsin and Chymotrypsin has been performed successfully yielding genome-wide coverage of 14 strains (enrichment of 17 to 200fold). At this level of coverage, it is possible to differentiate between relapse and reinfection.

Title: Molecular characterization, Genome sequencing and Comparative analysis of different strains of *Orientia tsutsugamushi* from Central India.

Details of PI, Co-PI and Co-I:

Principal Investigator: Dr. Pushpendra Singh (Scientist E, ICMR-NIRTH, Jabalpur)

Co-Principal Investigator: Dr. Manjunathachar H.V. (Scientist C, ICMR-National Institute of Traditional Medicine (ICMR-NITM)

- **Status of Project (completed, ongoing and new):** Ongoing
- **Type of funding (Extramural, Intramural, International):** Extramural
- **Name of funding agency:** ICMR, New Delhi

Description of project:

Background:

An obligatory intracellular gram-negative bacterium called *Orientia tsutsugamushi* is the cause of the systemic, potentially fatal zoonotic disease scrub typhus. This disease's clinical manifestations and symptoms are highly nonspecific. From this point on, laboratory testing like ELISA and PCR are crucial to diagnosing infection. Despite the broad effect of scrub typhus, only a few strains of genome information are available globally and in India. The primary objective of the project is to know the prevalence of scrub typhus infection using serological and molecular tests and to identify the circulating *Orientia tsutsugamushi* strain in Central India. The goal of the present research project was to fill the research gap by sequencing the whole genomes of several circulating strains of *Orientia tsutsugamushi* to identify virulent-associated genes, phylogeographic markers, and genome duplications. The development of vaccinations and diagnostics particular to a given location would be greatly impacted by the presence of local antigenic variation.

Objectives:

1. To study the changing pattern in sero-epidemiology of scrub typhus and its associated risk factors.
2. Serological and molecular diagnosis of scrub typhus among acute febrile cases from tertiary care units.
3. To study the circulating/novel genotypes of O. tsutsugamushi in central India by genome sequencing and comparative genomic analysis

Methodology:

Patients with a fever of ≥ 38°C for at least 2 days with or without eschar with any of the signs & symptoms with demographic and clinical history were included in this study. 3 ml of whole blood was collected from each patient. After transportation to the laboratory, the serum will be separated from the blood and subjected to serological tests, and blood samples will be used for DNA extraction. The PCR was performed to amplify the tsa56kda gene of Ot. The PCR product was subjected to sequencing for genotype identification. Since the only source of the pathogen DNA is through the clinical sample

(blood) which contains a vast majority of host DNA, it is important to enrich the DNA preparation for bacterial cells to achieve genome-wide coverage in a cost- and effort-effective manner. The study involves selectively lysing host cells using various enzymatic cocktails, pelleting the bacilli, and removing the released DNA. The enriched bacterial cell pellet is used for DNA extraction. The total gDNA extracted from blood samples was used for genomic library preparation using Illumina library preparation reagents. The denatured sample library will be hybridized to a biotinylated non-Illumina library prepared from human DNA. The hybridized human DNA sequences will be then removed using streptavidin magnetic beads. The enriched preparation will be sequenced, followed by bioinformatics analysis, genome assembly, variant identification, and annotation. The phylogenetic relatedness of the strains will be investigated.

The detailed methodology of the project is depicted below.

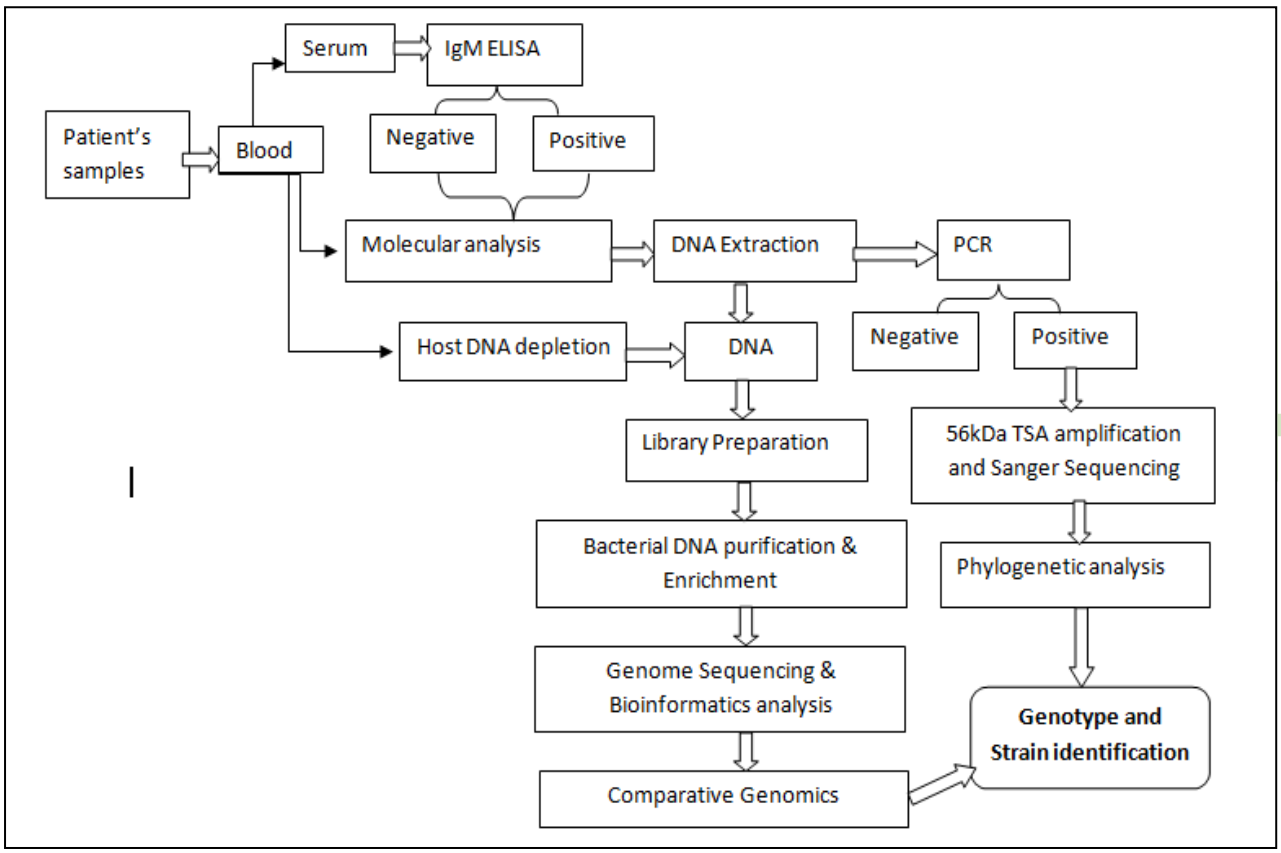


Fig A: The detailed methodology of the project

Expected Outcome:

Total n=2797 Blood samples were collected from suspected Scrub Typhus patients between April 2023 to March 2024. Among them, n=2512 samples were tested for IgM ELISA, of which 197 tested positive for scrub typhus infection. Nested PCR targeting the 56kda gene was performed on 2512 samples, of which 143 were found positive. All positive samples were sequenced using Sanger sequencing methods. After sequencing the 126 good sequences were analysed and the phylogenetic tree was constructed using CodonCode Aligner, Mega Software, and IQTree software. Phylogenetic analysis revealed the Gilliam strain is predominantly found followed by the Karp and Kato-like strain in this

region. A genomic library was prepared from a positive Scrub Typhus (ST) sample using an Illumina Kit, and this library has been submitted for whole genome sequencing. The whole genome sequencing results for ST 448 yielded a total of 33,764,236 reads, each with a length of 101 base pairs, and were sequenced in a paired-end manner. These reads were then aligned to the genomes of *Orientia tsutsugamushi* and human genome. After alignment, it was determined that 97% of the reads mapped 6 onto the human genome, with only 3% of the reads mapping to the *Orientia tsutsugamushi* genome.

A genomic library of 5 Ot positive DNA samples was prepared using an Illumina Kit, and this library has been submitted for whole genome sequencing.

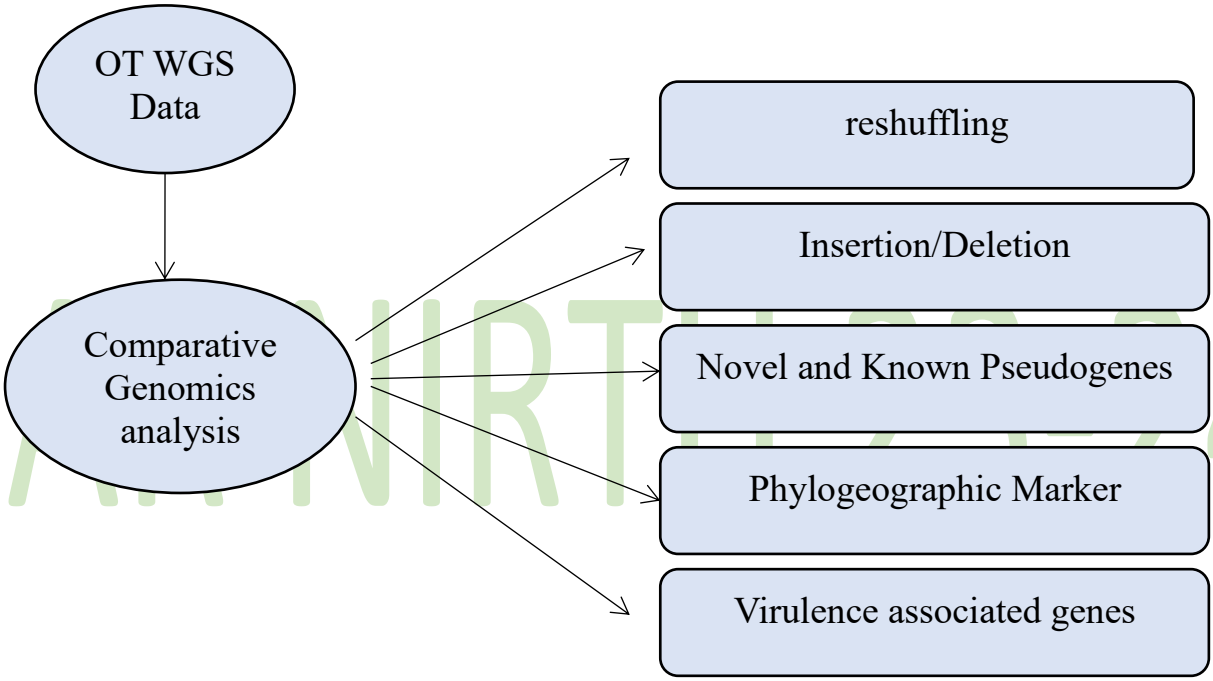


Fig B: Expected outcome of the project that will be investigated further

Novelty:

Development of new primers and probes: Comparative genomic analysis of different genomes of *Orientia tsutsugamushi* strains were done bioinformatically using mauve software and found several copies of repeated sequences. Further, new primers and probe were designed that targets the unique specific repetitive sequences present in *Orientia tsutsugamushi* genome to detect the scrub typhus through PCR and qPCR. we have designed novel primers (as detailed above) and probe were used that targets the 155 bp conserved region of multi-copy repeat units present in genomes of *Orientia tsutsugamushi* strains, including the lineages circulating in India also. We have used these primers for detecting DNA of *O. tsutsugamushi* and our preliminary results indicate consistently higher positivity when compared to the two-step nested PCR targeting the 56 KDa gene region.

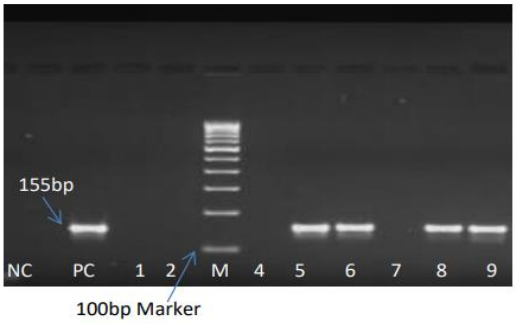


Fig 1: Visualization of 155bp PCR product on 2% agarose gel: Samples shown in wells 5, 6, 8 and 9 showed the desired size band while the samples in wells 1, 2, 4 and 7 didn't exhibit amplification.

(NC=Negative control, PC=Positive control, M= 100bp ladder, 1, 2, 4-9= Samples)

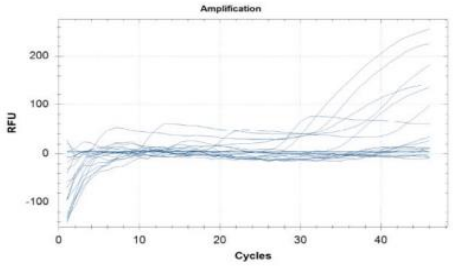


Fig.2: Amplification of 155bp region in probe based qPCR

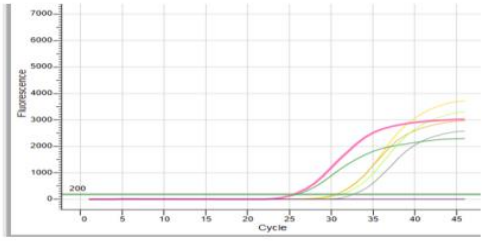


Fig 3: Amplification of 155bp region in SYBR based qPCR

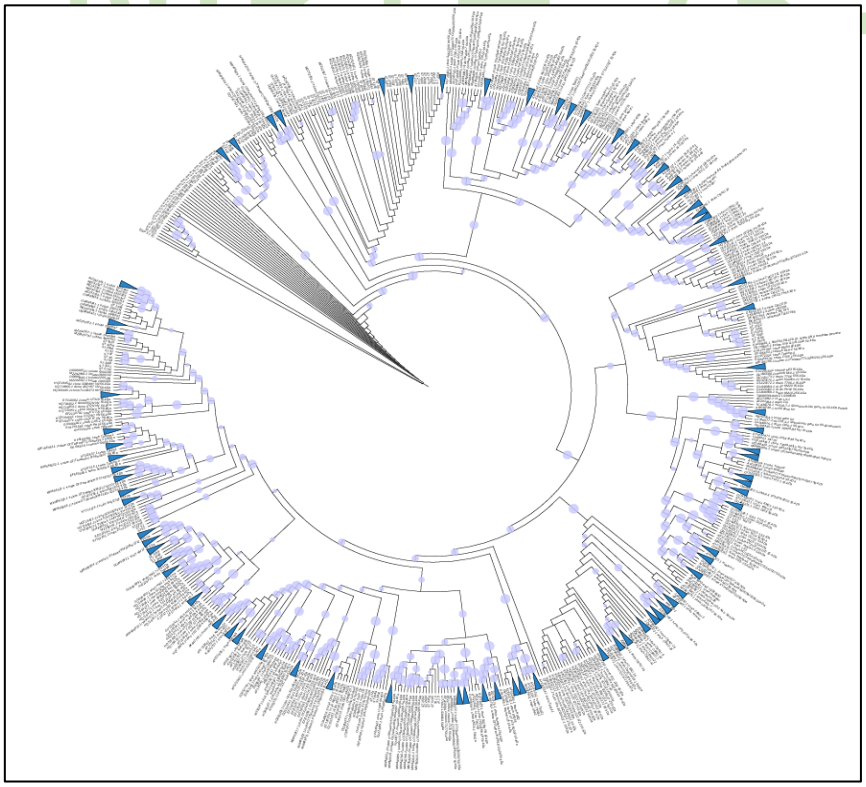


Fig4: Phylogenetic tree of 56kDa sequences from different strains of OT from different geographical regions in the world with the strains sequenced at the ICMR-NIRTH Jabalpur.

Title: Studies on bionomics of two malaria vectors, *Anopheles culicifacies* and *An. fluviatilis* with special reference to their behaviour in response to intervention measures (IRS/ LLINs) in Chhattisgarh state, India (MERA-India).

Details of PI, Co-PI and Co-I:

Principal Investigator: Dr. Vidhan Jain (Scientist D, ICMR-NIRTH, Jabalpur)

Co-Principal Investigator: Dr. Anil Verma (Scientist C, ICMR-NIRTH Jabalpur), Dr. Tapan Barik (Asst. Professor, Dept. of Zoology, Berham University, Berhampur, Odisha), Dr. M. P. Singh, Technical Officer, ICMR-NIMR, Field Unit, NIRTH Jabalpur MP

- **Status of Project (completed, ongoing and new):** Completed
- **Type of funding (Extramural, Intramural, International):** Extramural
- **Name of funding agency:** MERA-India

Description of project:

Brief introduction: Malaria continues to be a public health problem in India with socio-economic implications as the disease is more prevalent in rural, tribal and forested underserved/ difficult to reach areas. The majority of malaria in India is reported from the states in eastern and central part of the country that have large forest and hilly areas inhabited by tribal populations. These states include Odisha, Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra and some north-eastern states like Tripura, Meghalaya and Mizoram. Currently, strategies for vector control for malaria rely heavily on the wide-scale implementation of insecticide-based interventions, including indoor residual spraying (IRS) and long-lasting insecticidal nets (LLINs), targeting the adult mosquito vectors. With the increased use of LLINs in many areas changes in resting behaviour of vector from human dwelling to cattle sheds has been observed in Odisha. Study has been initiated in another malaria endemic state of Central India with following objectives.

Objectives:

1. To generate data on daytime resting and feeding of *An. culicifacies* and *An. fluviatilis* vectors in areas with IRS/LLIN.
2. Study on quantitative indices of the use of interventions and impact on resting and feeding behavior of the vectors and behavior of the community and resultant impact on transmission of malaria.
3. To identify the sibling species composition and differential response to insecticides.
4. To assess the vector susceptibility to insecticides and its intensity in order to suggest/strengthen the ongoing intervention measures for the control/elimination of malaria.

Methodology: Mosquitoes were collected from indoor resting collections (cattle shed, human dwellings), outdoor resting collections (lower parts of trees, plant leaves, rocks) using mouth aspirators and torch. Pyrethrum spray catches were done from 6 AM to 10 AM. Light trap catches (indoor and outdoor) were done using CDC light trap from dusk to dawn. Human landing catches were also done. Proposed sample size, for each type of survey/collections/methods was as follows: Vector Incrimination: An. culicifacies - 3060, An. fluviatilis – 755, Sibling species determination: An.

culicifacies - 295, An. fluviatilis – 65, Blood meal analysis: An. culicifacies - 1525, An. fluviatilis – 500. Sibling species determination was done as described by Singh et al 2004 and Goswami et.al. 2006, blood meal analysis was done as described by Mohanty et al., 2007 and vector incrimination analysis is done following Snounou et al. 1993. Insecticide susceptibility tests were done followed by protocol of WHO,2016; GPIRM, 2011, Parity determination was done using Beklemishev et al, 1959 method.

Results: In the study area, during 12 visits (January 2022 to July 2023), a total of 6,292 anophelines were collected out of which 4,948 anophelines (78.6%) were catched from indoor resting i.e. human dwelling (HD = 12.8%) and cattle shed (CS = 87.2%) in the study villages of districts Kanker (n = 3,070) and Jagdalpur (n = 1,878) by spending 288 hours (144 hours in each district). Using CDC indoor (LTI) and outdoor light trap (LTO) a total of 1,144 anophelines (18.2% of all anopheles) were collected (out of 48 traps: 24 in district Kanker and 24 in Jagdalpur). Of all light traps CDC outdoor light trap contributed 76.8% (879 mosquitoes) and indoor light trap contributed 23.16% mosquitoes (265 mosquitoes). Only, 195 anophelines (3.1% of all anopheles) were collected in total catch using pyrethrum spray (72 rooms). Outdoor collections and human landing collections could not be done very efficiently and total 5 anophelines were collected. An. culicifacies, An. subpictus, An. nigerimus, An. vagus were frequently catched in indoor resting collections. The average indoor resting per man hour anopheline density (MHD) in Kanker was 21.3 of which 56% vectors were Anopheles culicifacies followed by An. subpictus (36%), An. vagus (4.2%), An. fluviatilis (1.4%) and An. annularis (1.2%). Whereas in Jagdalpur, the overall anopheline MHD was 13.0, of which 50% were An. subpictus followed by Anopheles culicifacies (30.8%), An. vagus (9.3%), An. Varuna (2%), An. fluviatilis (1.7%) and An. annularis (1.5%). The proportion of An. culicifacies was found higher in Kanker whereas proportion of An. fluviatilis was similar between in Jagdalpur and Kanker. Mosquito density on both the study sites peaked during the rainy season but decline in winter season. In the month of February 2023 after winter season there was an increase in the anopheline density in both the districts but in summer density again declined. Vector density was highest in CHC Durgkondal, Kanker followed by CHC Antagarh, Kanker, CHC, Darbha, Jagdalpur and CHC, Bakawand, Jagdalpur. In light traps proportion of unfed anophelines increased compared to human dwelling and cattle sheds and prevalent mosquito spp. were An. nigerrimus followed by An. pallidus, An. annularis, An. subpictus, An. vagus and An. culicifacies, in decreasing order. Out of 110 An. culicifacies dissected parous status ranged 80-98% in different CHCs by tracheolar skein methods. HBI (human blood index) of An. culicifacies was 0.096 (217 tested) and An. fluviatilis (11 tested) was 0.090. Infection rate of An. culicifacies for malaria parasite was 0.24% (2 mosquitoes had P. falciparum infection by PCR out of 801 tested). Sibling spp. determination of 60 An. culicifacies revealed 91.7% BCE group and 8.3% AD group whereas out of 14 An. fluviatilis 93.4% were U/V and only 6.6% were T. An. culicifacies were resistant to DDT 4%, Malathion 5%, Alphacypermethrin and Deltamethrin 0.05%. For 5X concentration, mosquitoes showed moderate resistance intensity (MRI) in Kanker district and low resistance intensity in Jagdalpur. Mortality in 10X concentration in both the districts was 100% in 2022 with adequate replicate testing and <98% in 2023.

Title: Immune response to precautionary third dose of COVISHIELD/COVAXIN among healthy adult population: an ICMR Cohort study, India.

Details of PI, Co-PI and Co-I:

Core – Principal Investigator: Dr. Nivedita Gupta (Scientist G In-charge Virology Unit, Division of Epidemiology & Communicable Diseases), Dr. Leyanna Susan George (Scientist-E, Clinical Studies, Trials & Projection Unit Division of Epidemiology & Communicable Diseases), Dr. Priya Abraham, Director, Indian Council of Medical Research-National Institute of Virology, Pune.

Site Principal Investigator: Dr. Vidhan Jain (Scientist D, ICMR-NIRTH, Jabalpur)

Co-Principal Investigator: Dr. Anil Verma (Scientist C, ICMR-NIRTH Jabalpur), Dr. Tapan Barik (Asst. Professor, Dept. of Zoology, Berham University, Berhampur, Odisha), Dr. M. P. Singh, Technical Officer, ICMR-NIMR, Field Unit, NIRTH Jabalpur MP

- **Status of Project (completed, ongoing and new):** Completed
- **Type of funding (Extramural, Intramural, International):** Extramural
- **Name of funding agency:** ICMR, New Delhi

Description of project:

Objectives:

Primary – Characterise SARS-CoV-2 specific humoral and cellular immune response after homologous precautionary third dose of Covishield/Covaxin vaccine at different time points.

Secondary – Estimate the incidence of SARS-CoV-2 symptomatic infections post third dose of Covid-19 vaccine

Brief methodology: Study have two arms assessment of humoral immune response (against S1RBD and N protein) and cell mediated immune response. In order to assess humoral response at each centre 35 participants in Covishield arm and 35 in Covaxin arm have been proposed for enrolment with the eligibility criteria of two doses of homologues vaccine with total duration of 9 months. Serum samples collection at enrolment and 1 month, 3 months, 6 months, 9 months, 10 months, 11 months, 12 months, 15 months, 18 months and 24 months after the booster dose has been proposed. Overlapping peptide pools of N, S and M, SARS Covid antigens were included for Th1 and Th2 in-vitro cellular immune response using isolated PBMCs at three centres only (NARI, ICMR-NIV, NIE/NIRT Chennai). PRNT50 assays were also proposed.

Results: We approached 62 eligible participants but only 42 consented for the study. Out of 42, one participant has not taken booster dose. Out of 41 (38 in Covishield and 3 in Covaxin arm) till now we have sent 41 baseline serum samples, 37 samples of 1-month follow-up, 33 samples of three-months follow-up, 32 samples of six-months follow-up, 21 samples of nine-eleven-month follow-up, 7 samples of twelve months follow-up, 9 samples of fifteen-month follow-up, 10 samples of eighteen-month follow-up and 8 samples of twenty-four-month follow-up to NIV Pune.

Title: Dengue Shock Syndrome (DSS): Study on the role of blood matrix metalloproteinase-14 (MT1-MMP/MMP-14) associated to innate immune cells and its contribution to endothelial dysfunctions.

Details of PI, Co-PI and Co-I:
Principal Investigator: Dr. Rituraj Niranjan (Scientist D, ICMR-NIRTH, Jabalpur)
Co-Principal Investigator: Jayashree AK
Co – Investigator: S. Muthukumaravel, D. Paneer

- **Status of Project (completed, ongoing and new):** Ongoing
- **Type of funding (Extramural, Intramural, International):** Extramural

Description of project:

Brief background and rationale:

Understanding the pathophysiological mechanism associated to plasma leakage in dengue shock syndrome (DSS), has become a huge challenge due to its complex interactions of innate immune cells (macrophage, neutrophils and eosinophils). We have recently published that, matrix metalloproteinase-14 (MT1-MMP/MMP-14 or MMP-14) is overexpressed in monocytes in response to NS1 antigen of dengue type-2 serotype and participates in the dengue pathogenesis (Niranjan et. al. 2019). We also found that, eosinophils cells show very high levels of MMP-14 and MMP-2 expressions in response to dengue antigens (please see preliminary data, Annex-1. Fig. 1.). Interestingly, MMP-14 was found to regulate angiogenic activity, via its interactions with VEGF-R1, that results in the inactivation of MMP-2 (Han, Dugas- Ford et al. 2015, Abu El-Asrar, Mohammad et al. 2018). It is important to note that, hyperpermeability of endothelium is the key feature of the angiogenesis in many diseases (Nagy, Dvorak et al. 2012). Newby in 2006, and other have reported that MMP-14 activates MMP-2 and MMP-9, they in turn induce apoptotic effects (Newby 2006, Aldonyte, Brantly et al. 2009, Kim, Lee et al. 2019). Therefore, it is speculated that, upregulation of MMP-14 may induce angiogenic activity or cause cell death of endothelium leading to plasma leakage and dengue shock syndrome.

Objectives:

1. To assess the expression profile of MMP-14 and associated mediators on blood innate immune cells (monocytes, neutrophils and eosinophils) in dengue patients and in experimental models.

2. To investigate the role of MMP-14 in angiogenesis or apoptosis mediated endothelial dysfunctions associated to DSS/DHF.

3. To understand the effects of anti-MMP-14 agents and their role in regulating MMP-14 mediated endothelial dysfunctions associated to DSS/DHF.

Methodology:

HL-60 cells differentiated in to eosinophils were used in the present study. qPCR was performed for expressions analysis of genes in response to NS1 antigen of the DENV. Expression analysis of the genes

responsible for the apoptosis or angiogenesis was done in response to HL-60 secretome in A549 lung epithelial cells.

Results:

In the present study, we have inoculated THP-1 cells with whole DENV-2 serotype of dengue virus with or without atorvastatin (drug) and studied the expression profiles of MMP-2, MMP-8, and MMP-14. We observed a significant increase in the MMP-2 levels in the THP-1 infected with DENV-2 compared to the control group (without DENV-2 infection) as well as other groups; also, significant decrease in the expression levels of MMP-2 was seen in the DENV-2 + Atorvastatin infected group and only atorvastatin treated group (Figure). Higher expression of MMP-14 was observed in the DENV-2 infected group compared to the control group. However, lower level of MMP-14 level was also observed in the DENV-2+ atorvastatin treated group compared to the DENV-2 infected group and atorvastatin treated group. Homogenous expression of the GAPDH was observed in all the treated and control groups (Figure). Similarly, a significant increase in the expression of MMP-9 was observed in the DENV-2 infected group compared to the respective control group. A significant decrease in the expression of MMP-9 was observed in the DENV-2 + atorvastatin and only atorvastatin treated group compared to the DENV-2 infected group (Figure).

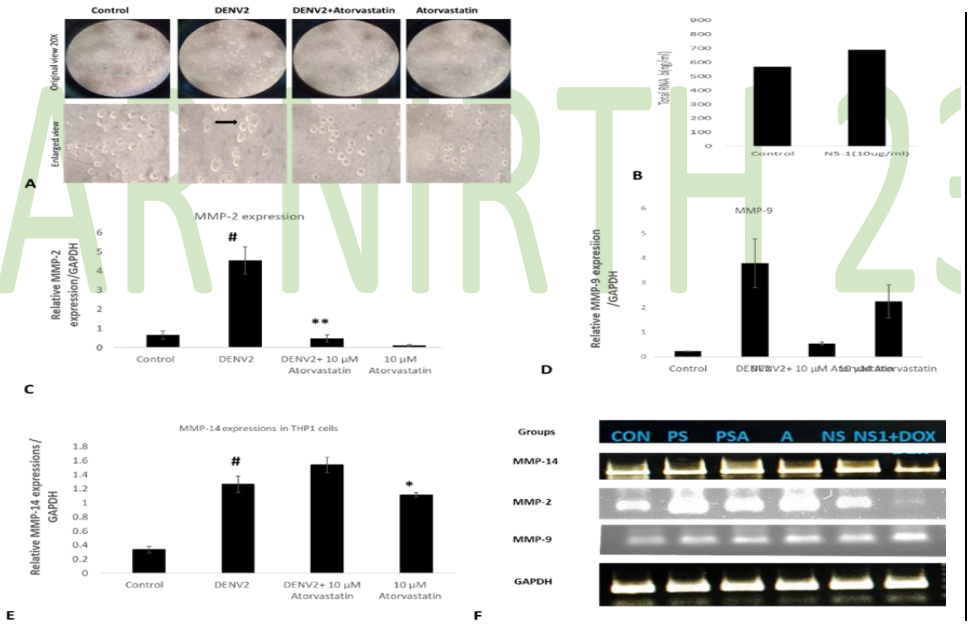


Figure. Effect of atorvastatin against DENV-2 virus in THP-1 monocytes cells. Figure represents the expression of MMPs genes in the DENV-2 serotypes infected THP-1 cells in the presence and absence of atorvastatin. A. morphological assessment and cytopathic effect on the THP-1 monocytes cells in presence and absence of atorvastatin. B. Total transcriptome (total RNA in presence and absence of DEN2 virus. C. Represents the expression of MMP-2 genes in the DENV-2 serotypes infected THP-1 cells in the presence and absence of atorvastatin. D. Represents the expression of MMP-9 genes in the DENV-2 serotypes infected THP-1 cells in the presence and absence of atorvastatin. E. represents the relative mRNA expression/GAPDH of MMP-14 gene in the in THP-1 cells infected with DENV-2 serotype. F: Represents the final quantitative PCR product run in the agarose gel. #<0.05, **<0.01 and ***p<0.001 significant compared with control.

Further, we show that NS1 antigen of DENV type 2 serotype significantly enhance the expression profile of toxic mediators in the HL60 cells differentiated to the neutrophils. When these toxic mediators are exposed to the lung epithelial cells they induce apoptosis of the lung epithelial cells. Treatment of NS1 antigen along with atorvastatin has significantly revered the release of toxic mediators by neutrophils and does not cause apoptosis of the lung epithelial cells when exposed by the secretome.

It is well known and established that BCL 2 protein cascade is involved extensively in the intrinsic apoptotic pathway and are mediators of mitochondria and ER involved apoptosis (Reed, 2002). In the present study neutrophil induced with NS1 antigen has secreted various toxic mediators in the secretome and it causes BCL2 gene alterations in epithelial cells leading to apoptosis or death. The critical step in a cell committing towards apoptosis following an intrinsic stimulus, is the

oligomerization of the pro–apoptotic pore formers (BAX, BAK) leading to MOMP and the release of apoptotic factors. This process is regulated by the BH3 – only proteins (BAD, PUMA, NOXA) by dislodging the pore-formers from anti–apoptotic proteins and allowing their oligomerization (Shamas-Din et al., 2013). In this study, secretome (collected media) from NS1 stimulated neutrophil has up regulated the expression of BAD in epithelial cells which indicates apoptosis initiation.

Dapk1 (Death associated protein kinase-1) is an important apoptosis and autophagy regulator and is established as a stress– responsive, Ca2+/ CaM dependent Ser/Thr kinase (DeVorkin et al., 2014 and Wang et al., 2020). This present study reveals that, secretome from NS1 stimulated neutrophil has shown to up regulate Dapk1 expression in epithelial cells suggesting that neutrophils may be involved in epithelial cell apoptosis in dengue infections.

Caspases are aspartate– specific cysteine proteases that are primary mediators of apoptosis following extrinsic and intrinsic stimuli. Cas 3 and 6 are the effector caspases that coordinate execution of apoptosis along with Cas7 (Li & Yuan, 2008). Their expression by cells would imply that the cell is in execution stages of apoptosis. Our study reveals that there is an increase in Cas3 in epithelial cells exposed to NS1 activated neutrophils.

In conclusion, it may be said that activated neutrophils are involved in the induction and execution of epithelial cell distress or apoptosis. The exposure of epithelial cells to NS1 activated neutrophils leads to the up regulation of BAX, BAD, Dapk1, Cas3 genes. This suggests that, interaction of NS1 activated neutrophils with the alveolar epithelial cells may be partially participate in the development of acute respiratory distress syndrome (ARDS) in dengue disease. The exposure of epithelial cells by secretome from NS1 plus atorvastatin treated neutrophils leads to an up regulation of BCL 2 gene. This suggests that atorvastatin may help in protecting of the epithelial cell lining by inducing the over expression of anti-apoptotic markers. The present results are encouraging; however, further investigations are required to clarify the findings.

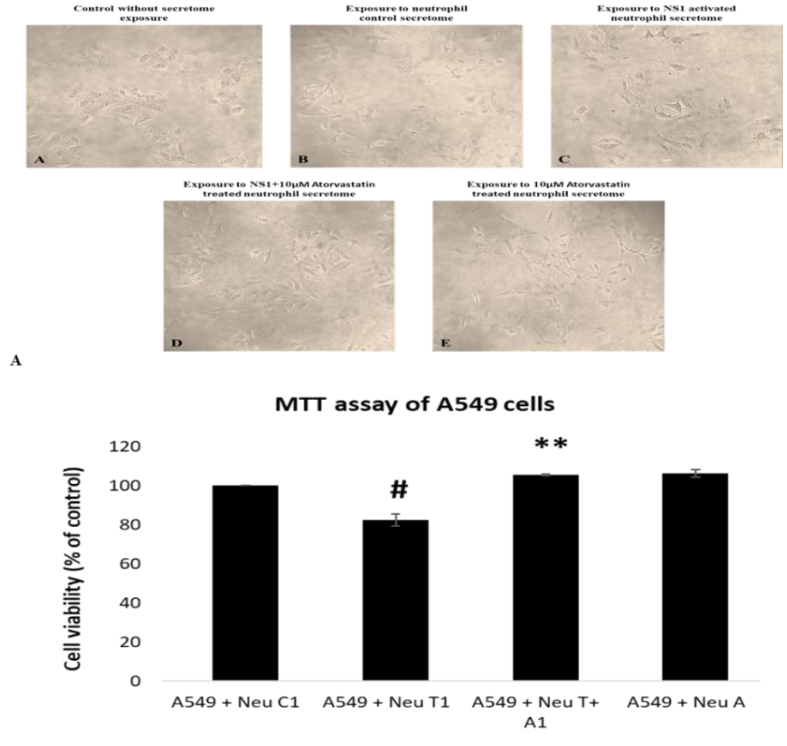


Figure: A) Morphological assessment of A549 cells after 24 hours of exposure to neutrophil secretome. The morphology of epithelial cells upon exposure to neutrophil secretome was changed after a 24hr time interval and observed at 20x magnification. Some epithelial cells upon exposure to NS1 exposed neutrophil secretome were found to be detached from surface of culture vessel and some were found to have changed morphology. A) Control non – exposed cells, B) cells after exposure to neutrophil control cell secretome, C) cells after exposure to NS1 treated neutrophil secretome, D) cells after exposure to secretome of neutrophil cells treated with NS1 + 10µM Atorvastatin and E) cells after exposure to secretome of neutrophils cells treated with 10µM of atorvastatin B) Cell toxicity assay for A549 epithelial cells upon exposure to neutrophil secretome. Histogram represents the cell viability of A549 epithelial cells upon exposure to secretome harvested from treated neutrophil cells. # $p < 0.05$ compared with control and ** $p < 0.01$ compared with NS1 treated group.

Title: Elucidating the role of nanoparticles and associated mechanisms in modulating matrix metalloproteinases activities/expressions in dengue viral disease: nanotherapeutics for dengue shock syndrome (DSS/DHF).

Details of PI, Co-PI and Co-I:

Principal Investigator: Dr. Rituraj Niranjan (Scientist D, ICMR-NIRTH, Jabalpur)

Co – Investigator: S. Muthukumaravel, Jayashree AK

- **Status of Project (completed, ongoing and new):** Ongoing
- **Type of funding (Extramural, Intramural, International):** Extramural

Description of project:

Background:

Dengue viral disease is a constantly increasing mosquito transmitted infection which affect the populations globally (Anoop et al. 2010; Tian et al. 2019). The incidences of dengue viral fever have increased about 30 folds during the last 50 years (Isa et al. 2021; Kraivong et al. 2021; Lim et al. 2019; Urakami et al. 2017). Bite of mosquito (Ae.aegypti and Ae. Albopictus) infected with a dengue virus transmits the disease (Banerjee et al. 2020). Dengue seems to have a broad range of clinical findings, along with scientific advances and results (Del Moral-Hernandez et al. 2014; Katzelnick et al. 2021). Majority of the affected persons recover after a self-limiting moderate treatment course (Kayesh and Tsukiyama-Kohara 2021; Nanaware et al. 2021). A small percentage of the affected group is only leading to severe illness, mostly represented by plasma leakage either with haemorrhagic condition (Barros et al. 2019; Richardson-Boedler 2021). The In vitro results and histopathological reports have shown that 3 organ systems serve as an important role in progression of DHF/DSS.i.e. the body's immune, the liver and the endothelial cells of the vascular system (Orsi et al. 2014). Although intensive steps have been taken to pinpoint the exact cause of DHF / DSS, the potential reasons involved in the progression of DHF / DSS remains challenging. It has been given that skin cells are structurally and functionally same as that of dendritic cells and it also indicated as a prime target for the dengue infection (Orsi et al. 2014).

Rationale: Nanotechnology is a rapidly growing area providing many new applications in modern health systems. Modern day therapeutics involves nanomaterials-based drugs in the cure of several diseases. Recent reports highlights, the effects of various kinds of nanoparticles (NPs) on the certain matrix metalloproteinases. It has been observed that, nanoparticles affect the expression or activity of matrix metalloproteinases either by inhibiting their expression or their activities. Development of drugs against the plasma leakage in dengue shock syndrome/Dengue haemorrhagic fever (DSS/DSF), has become a huge challenge due to complex interactions of innate immune cells and their mediators. In severe dengue cases, plasma leakage is linked with high levels of matrix metalloproteinases. On the other hand, it has been described that varies nanoparticles significantly affects the expressions and activity of matrix metalloproteinases. Therefore, it is speculated that, various nanoparticles may act against the dysfunctional matrix metalloproteinases and have a protective role in dengue pathogenesis.

Objectives:

1. To assess the effects of nanoparticles on the expression profile of MMPs and associated mediators on blood innate immune cells (monocytes, neutrophils and eosinophils) in dengue viral disease.
2. To investigate the autophagic or endoplasmic reticulum stress mediated mechanisms of nanoparticles associated to MMPs expressions in dengue viral disease.
3. To understand and establish the mechanisms of nanoparticles in regulating the MMPs mediated endothelial dysfunctions associated to DSS/DHF.

Methodology: Human monocyte cell line, THP-1 was used in the study. Ethical Approval was obtained from human ethical committee of the institute as well as from the animal ethical committee of the institute. Dengue virus detection by RT-PCR and serotyping was done using the protocol described by Lanciotti et al. 1992. Culture and maintenance of THP-1 cells was done using the protocol described earlier using specific growth medium. Exposure of THP-1 cells with purified NS1 antigen of DENV type 2 serotype as well as with DENV was done for 24 hours. Cell viability by MTT and trypan blue dye exclusion assay, bright field microscopy for assessment of cell morphology, cytokines measurements by ELISA, estimation of protein by Bradford assay were done. RNA isolation and quantification were done before the expression analysis using tri reagents provided by sigma. cDNA synthesis was accomplished using the kits following the protocol as described by our lab (Niranjan et al. 2019) with desired modifications. Assessments of matrix metalloproteinase genes mRNA expressions were done using real-time PCR. Agarose gel electrophoresis was done to see the amplification patterns of genes after PCR for the confirmation of expressions. Statistical analysis was accomplished using GraphPad prism software.

Results:

In the present study we found, a higher gene expression of MMP-2 and MMP-14 in monocyte cells exposed with DENV-3 as compared to control. But, when we treated the DENV-3 exposed monocytes with increasing conc. of AgNPs at 5, 10, 15 µg/ml, we found a decrease in expression of both genes with increasing concentrations. MMP-14 shows very high gene expression in presence of dengue virus. According to reports, MMP-8 plays a function in re-epithelialization, apoptosis prevention, and anti-inflammatory endothelial migration. This present study shows a significant increase in expression of MMP8 in the presence of DENV-3 as compared to control but in the presence of AgNPs with varying conc. along with DENV3, no such increment in expression is seen. MMP-13 inhibits apoptosis, anti-inflammation, and endothelial migration. This present study shows no significant role/expression of MMP13 in response to DENV3 and AgNPs. MMP9 is a gelatinase involved in angiogenesis & amp; neurogenesis. MMP9 is involved in cell migration, inflammation modulation, the induction of inflammatory cascades, and neutrophil activation. MMP-9 is thought to have a part in the dengue virus sickness by activating other cells, which may then cause DHF or DSS. This present study shows a significant increase in expression of MMP9 in the presence of DENV-3 as compared to control but in the presence of AgNPs at conc. 5, 10, 15 µg/ml along with DENV3, down regulation of expression is seen with increasing conc. of AgNPs. MMP7 is a matrilysins that process cell surface molecules & amp; digest ECM components. The suspected role of MMP7 in the dengue virus is that it may cause cite-specific inflammation and other immune cell activation. We found no significant expression of MMP7 in monocyte cells in response to DENV3 and AgNPs. This present study shows a significant increase in expression of MMP7 in the presence of DENV-3 as compared to control but in the presence of AgNPs with varying conc. along with DENV3, no such increment in expression is seen. According to

reports, MMP-1 plays a function in re-epithelialization, keratinocyte migration, apoptosis prevention, and anti-inflammatory endothelial migration. This present study shows a significant increase in expression of MMP1 in the presence of DENV-3 as compared to control but in the presence of AgNPs with varying conc. along with DENV3, no such increment in expression is seen.

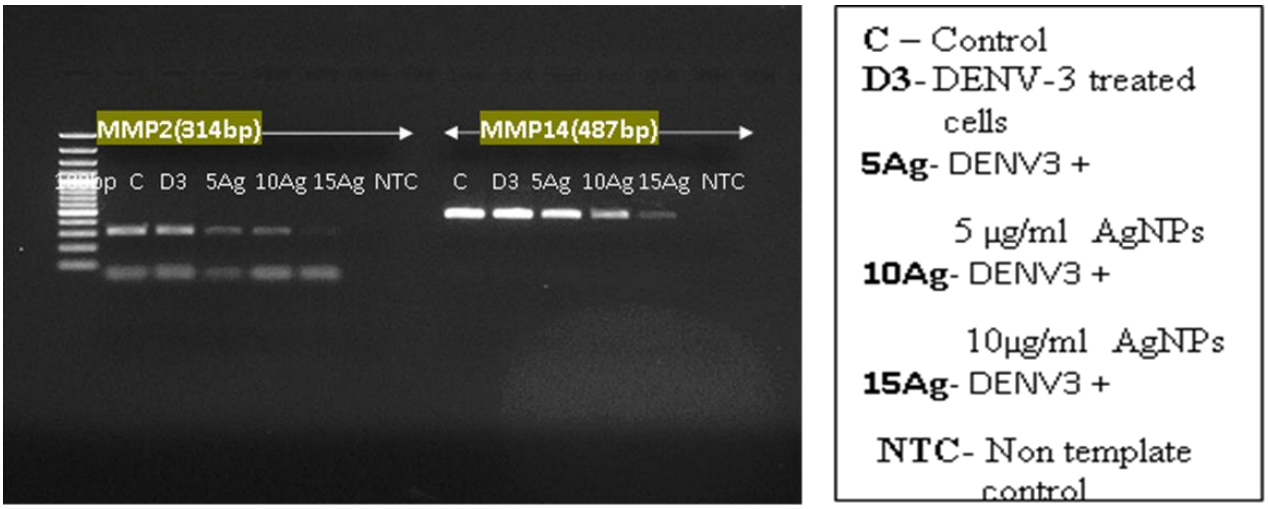


Figure: mRNA expression of MMP2 & MMP14 gene showing a change in expression in comparison to control in monocyte cells exposed to DENV3 & Ag NPs.

This present study shows a slight increase in expression of MMP 1 in the presence of DENV-3 as compared to control but in the presence of AgNPs with varying conc. along with DENV3, there is a significant decrease in expression is seen. Overactivation of MMP2 plays important role in dengue severity. It is reported that MMP2 may induce apoptosis of cells & activation of other cells that may cause DHF/DSS. In this study we confirmed the expression of MMP2 gene expression in response to dengue virus exposure, which has been done by reverse transcriptase PCR and found upregulated expression of MMP2 gene. ELISA was performed to check the virus titration in the supernatant of THP-1 cells infected with all four dengue serotypes (because from this DENV-3 supernatant, we treat later monocytes along with AgNPs, which is the basis of the whole experiment). It was scientifically analysed, that IL-13 is significantly increased during the period in dengue exposure as compared to control samples.

Translational Potential: The translational potential of the current research is very high from a therapeutics point of view. The identification of silver and gold nanoparticles as anti-dengue potential provide a way forward for the development of noble therapeutics. We have also identified some important targets as MMPs which can later be used for the development of future therapeutics against severe dengue viral disease (DHF/DSS). The identification of matrix metalloprotease as a noble biomarker for the disease severity can also have great translational potential and can provide an assessment of disease severity. This study also points towards the beneficial effects of silver and gold nanoparticles which may be useful in the management of severe form of dengue viral disease.

Title: PAN India Antigenic Characterization of Dengue Viruses: Early warning signal for a potential pandemic.

Details of PI, Co-PI and Co-I:

Site Principal Investigator: Dr. Rituraj Niranjan (Scientist D, ICMR-NIRTH, Jabalpur)

- **Status of Project (completed, ongoing and new):** Ongoing
- **Type of funding (Extramural, Intramural, International):** Extramural

Description of project:

Emerging and re-emerging infectious diseases caused by flaviviruses pose significant challenges to the human population all over the world. Flaviviruses (such as Dengue, Japanese encephalitis, Zika, and West Nile) are RNA viruses, transmitted mainly by mosquitoes. Genomic mutation of RNA viruses is a natural phenomenon of evolution for their survival that results in antigenic variant strains and hence escape from the host immune response. The endemic nature of Flaviviruses in India combined with JE vaccination in certain regions of India and the looming availability of Dengue and Zika vaccines in near future, make a perfect recipe for the antigenic variance of these viruses resulting in the evolution of new strains that may result in an epidemic. Furthermore, since Dengue/JE/Zika/WNV share antigenic properties, the infection of one virus may pre-dispose the generation of antigenic variants of other viruses upon subsequent infection. Early recognition of antigenic variant strains, causing an outbreak, will facilitate rapid response before the outbreak turns into an epidemic or pandemic.

Objectives:

1. To study antigenic characteristics of dengue viruses circulating across India.
2. To develop Spatio-temporal antigenic maps on a real-time basis to indicate the antigenic evolution of dengue viruses across India

Methodology:

1. Collection of samples- Collaborating with the health care authorities for sample collection with all permissions and ethical clearances. With proper storage and transportation of samples to the laboratory.
2. Confirmation by Diagnostic test - Confirming the Dengue positive sample by various diagnostic tests such as NS1 ELISA, IgM ELISA and IgG ELISA.
3. Virus isolation and Propagation- Isolating the virus from collected samples by culture method and propagating it in suitable cell lines to obtain sufficient viral material for further analysis.
4. Serotype determination: Determining the Serotype of sample collected by RT- PCR (Lanciotti et al., 1992). Oligonucleotide consensus primers were designed to anneal to any of the four dengue virus types and amplify a 511-bp product in a reverse transcriptase-polymerase chain reaction (PCR) and then type-specific primers are used for second round of amplification (Nested PCR).
5. Analysis by Sequencing: Determine the antigenic properties of different dengue virus strains and serotypes by sanger sequencing. Compare the sequences of circulating viruses with historical strains to identify potential antigenic drift.

Results:

As of now, 1150 samples have been collected from various locality in nearby regions of Jabalpur, with all necessary approvals and ethical clearance. Out of which 97 samples were from pediatric population. All collected samples were subjected to an NS1 ELISA test for confirmation. 133 samples confirmed positive for NS1 ELISA. To obtain enough viral material for further analysis, only NS1 positive samples were propagated in C6/36 cell line which shows great susceptibility for Dengue virus growth. To get a high titer of virus, the positive serum samples were passaged three times. 50 serum samples have been cultured thus far. To ensure the virus isolation and propagation, these harvested samples were tested with NS1 ELISA.

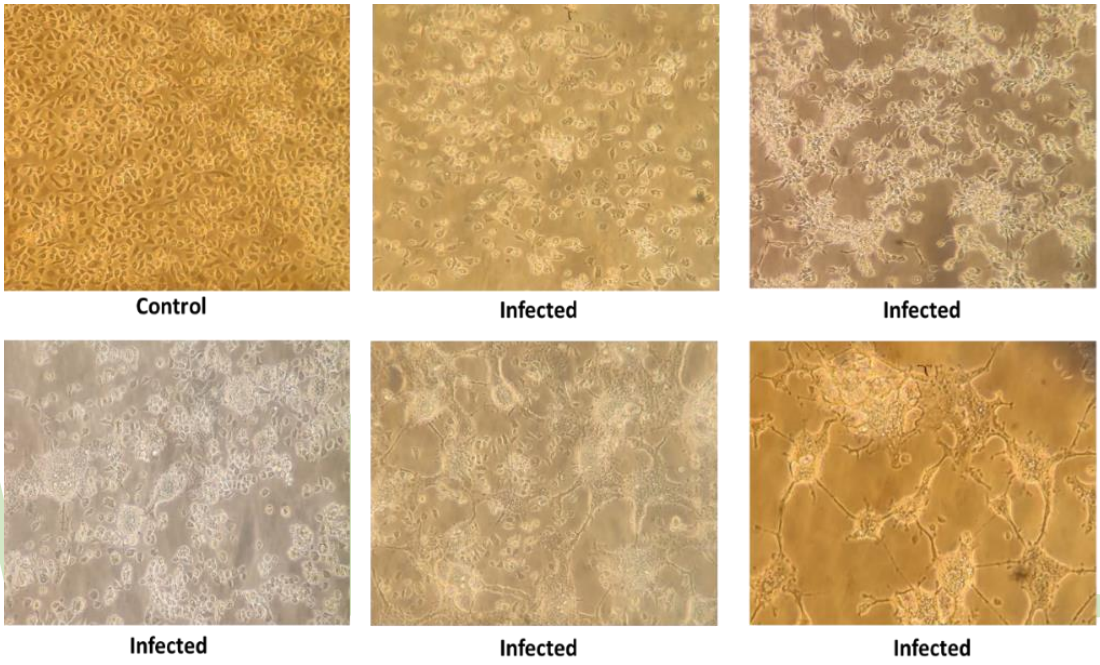


Fig. Control C6/36 cells and Infected C6/36 cells showing Cytopathic effect (CPE)

These samples were serotyped using Reverse Transcriptase PCR, as described by Lanciotti et al. (1992). Total of 38 harvested samples have been processed for RNA extraction by using Qiagen viral RNA extraction kit. By ensuring the quality of extracted RNA using nanodrop, this RNA proceeded to RT-PCR. Correctly sized DNA product (511 bp) was obtained for each of the dengue viruses after amplification with consensus primers Dl and D2. Each DNA product was correctly typed with a second round of amplification with the type-specific primers. 4 dengue serotype 1 virus sample (need reconfirmation) and 34 samples containing dengue type 2 virus were found positive by the RT-PCR method. Furthermore, sequencing targeting the C and PrM regions was conducted, which showed that 38 samples matched with Dengue serotype-2 sequences. A total of 19 samples from various locations and age groups of patients were sent to NIRBI for WGS.

Title: Assessment on role of coded drug Ayush PJ-7 and other plant-based molecules/Drugs against matrix metalloproteinases mediated immunopathogenesis of dengue viral disease and establishment of their mechanism of action.

Details of PI, Co-PI and Co-I:

Principal Investigator: Dr. Rituraj Niranjan (Scientist D, ICMR-NIRTH, Jabalpur)

Site Principal Investigator: Dr. Jeevan K. (Research Officer (Animal/Experimental Pathology), Regional Ayurveda Research Institute, Aamkho, Gwalior, MP)

Co-Principal Investigator: Dr. Avinash Kumar Jain (Research Officer (Ayurveda), CCRAS Hqrs., Janakpuri, New Delhi)

- **Status of Project (completed, ongoing and new):** Ongoing
- **Type of funding (Extramural, Intramural, International):** Extramural

Description of project:

Background and rationale:

The matrix metalloproteases (MMPs), play a pivotal role in various diseases including dengue (Luplertlop et al., 2008). We have recently published that; matrix metalloproteinases are overexpressed on monocytes in response to dengue antigens (Niranjan et al. 2019). On the other hand, various plant based herbal medicine have shown their beneficial effects in the severe cases of dengue pathogenesis however their mechanism of actions remains unknown (Rajapakse et al. 2019; Mohd Abd Razak et al. 2019). Carica papaya extract, is one of the examples which shows its protective effect in dengue patients (Dhungat and Gore 2016). The drug caripill is also in use of which effects are still debated and its mechanism is also not known. Other plants-based extracts/molecules (Catharanthus roseus, Mollugo cerviana) may possess anti-dengue activities (Goh, Mok, and Chu 2020). In addition to this, there are several other plants-based extracts/molecules (Catharanthus roseus, Mollugo cerviana) which may possess anti-dengue activities (Goh, Mok, and Chu 2020). However, the exact role of these herbal extracts/medicine associated to the dengue pathogenesis is not yet known (Ali et al. 2020). Therefore, the present study is designed to investigate the role of herbal plant-based extract/medicine on the mediators of inflammation and overexpression of MMPs on immune cells (immunopathogenesis) in dengue viral disease.

Objectives:

Primary objectives:

- To investigate the role of plant-based molecules/drugs or their components on immune cells and their mediators in the dengue viral disease.
- To understand the mechanisms of plant-based molecules/drugs or their components associated to the expressions of matrix metalloproteases on immune cells in dengue viral disease.

Secondary objectives:

- understanding of effects of various combinations to elucidate synergistic effects of some plants extracts

Methodology:

The project was planned on following methodologies.

1. Plant extracts (molecules): At first commercially available plant extracts as well as fresh leaf extracts will be prepared in the laboratory such as fresh leaf extract of Carica papaya, Catharanthus roseous and Mollugo pentaphylla.
2. Cell lines: THP-1 human monocyte, HL-60 cells, HDMVECn or EXPand endothelial cells line and others will be used in this study.
3. Reverse Transcription-Polymerase Chain Reaction (RT-PCR) or real time PCR for transcriptional analysis of genes in response to plant extracts/molecules
4. Assessment of effects of plant extracts on the endothelial permeability in vitro using Trans well assay: different plant extracts (carica papaya e.t.c.).
5. Overexpression and RNA interference
6. Measurements of effects of plant extracts on vascular leakage in the peritoneal cavity
7. Immunocytochemistry for co-localization and expressions of proteins
8. Exosome preparations and effects of plant extracts on expressions of MMPs
9. Assessments of cell specific effects of plant extracts (herbal molecules) using Fluorescent activated cell sorting (FACS): Cells
10. ELISA for the estimation of cytokines and MMPs
11. Immunoprecipitation for the analysis of the protein-protein interactions

Results:

The collection of medicinal plants has been done by field visits to different areas. The collected plants were given to botanist for authentication of same. The processed plant extracts were subjected to extraction procedure. Various parameters like quantity of plant material, volume of solvent and its ratio, time and temperature were standardized for extraction procedure. The powder form of plant was then processed for extraction by maceration. The cell lines of A549 cells (human lung adenocarcinoma cell line) were maintained by passaging it regularly & maintaining proper conditions for its growth. To check the cytotoxicity of plant extract MTT assay was performed with the prepared plant extract. Further as the project involves checking effect of drug against matrix metalloproteinases mediated immunopathogenesis in dengue, we started standardization of MMP with the use of standard laboratory protocols for measuring MMP activity, including common assay methods like PCR. The standardization involved following procedures. The different MMP genes like MMP 1, MMP 2, MMP 7, MMP 8, MMP 10 & MMP 13 were selected for standardization. Also, GAPDH was used as reference gene which serves in normalization with sample variation quality.

For plant extract Immuno 0014 the % cell viability was observed to be increased form 64.63% to gradually 172.63% with decreasing concentration. While in case of Immuno 0015 the viability was observed to be decreased from 140% to 100% with decrease in concentration.

In case of MMP standardization experiment, the RNA isolation was performed from the DENV (1, 2, 3&4) infected samples. The highest concentration of isolated RNA was 1452.9 ng/µl which was associated with DENV2. After normalization of synthesized RNA, the c DNA synthesis was performed. The c DNA dilution ratio was also standardized. The annealing temperature of primers was taken into consideration. It was then followed by RT-PCR in which GAPDH was used as reference. The RT-PCR product was then analyzed by gel electrophoresis. From the gel electrophoresis results it was inferred that expression of MMP-14 and MMP-9 was increased in DENV2 exposed cells. No visible bands were seen in case of MMP-10 which indicate mild or no expression of MMP-10 in cells infected with all

different DENV. In case of MMP-2 the prominent expression was observed against all the 4 serotypes infected cells. On other hand MMP 7 expression was observed to be negligible. Also, for the MMP 8 & MMP 13 the no expression was observed. Further the expression of GAPDH was observed to be more prominent in case of DENV 2 infection while for DENV 3 & DENV 4 a quite low expression was observed.

Present Status: Ongoing

Title: Deciphering the immunological, molecular and genetic mechanisms of "Antibody Dependent Enhancements (ADE)" of dengue virus particles: relevance for immunopathogenesis and vaccine developments.

Details of PI, Co-PI and Co-I:

Site Principal Investigator: Dr. Rituraj Niranjan (Scientist D, ICMR-NIRTH, Jabalpur)

Co – Investigator: Dr. Anil Verma (Scientist C, ICMR-NIRTH Jabalpur)

- **Status of Project (completed, ongoing and new):** Ongoing
- **Type of funding (Extramural, Intramural, International):** Extramural

Description of project:

Background and Rationale:

Dengue is one of the key health problems, that affects massive population world-wide and is an emerging disease of the tribes in India. In some cases, secondary infection is more severe than primary due to the already existing antibodies, this mechanism is called antibodies dependent enhancements (ADE). Antibody-dependent enhancement (ADE) may drive higher viral loads in these secondary infections and is purported to result from antibodies that recognize dengue virus but fail to fully neutralize it. However, the exact mechanism of ADE of dengue virus is completely unknown and need extensive investigations. FcyR is understood to be a key regulator in the mechanism of ADE however its role on innate immune cells is not clearly understood in dengue virus replications. Autophagy is believed to participate in the virus replications and intracellular mechanisms. Therefore, the present study is planned to understand the mechanism of antibody dependent enhancements of dengue virus replications.

Objectives:

1. To investigate the Fcγ receptor (Fcy-R) expressions patterns (constitutive and inducible) in immune cells in dengue patients' samples.
2. To understand the serotype specific mechanisms in Fcy receptor mediated ADE in immune cells and its pathological perspective.
3. To elucidate the role of autophagic pathway in antibody dependent enhancements (ADE) of dengue virus particles replication.

Methodology:

Experimental designs: both in vivo (patients' samples) and in vitro studies was be done. Cell lines: THP-1 human monocyte, cells were used in the present. Dengue virus identifications and serotyping was done using, Lanciotti et al.1992 with desired modifications. Virus titer was measured using real time PCR and PFA, and by NS1 ELIZA. Cell viability was done by MTT assay (Mossman et. al., 1983). Real time PCR for transcriptional analysis of FcyR and associated genes was done by Niranjan et al. 2016.

Results and discussion:

To study the mechanism of ADE we have developed an in vitro model of monocytes culture system. To chive the mechanism of anti-body dependent enhancements in response to dengue virus we have exposed the monocytes with all four serotypes till four successive generations passaging and

estimated the virus concentrations using NS1 ELIZA. We have observed that there is sequential decrease in the virus concentrations in all four generations of monocytes cell cultures. We have also tested the expression profile of FcyR receptor gene in response to virus antigen and its inhibition by atorvastatin. We have observed that NS1 antigen of dengue virus serotype 2 has significantly increased the expression profile of FcyR receptor gene expression which was inhibited by atorvastatin in dose dependent manner.

In general, virus-specific antibodies are considered antiviral and play an important role in the control of virus infections in several ways. However, in some instances, the presence of specific antibodies can be beneficial to the virus. This activity is known as antibody-dependent enhancement (ADE) of virus infection. The ADE of virus infection is a phenomenon in which virus-specific antibodies enhance the entry of virus, and in some cases the replication of virus, into monocytes/macrophages and granulocytic cells through interaction with Fc and/or complement receptors. These viruses share some common features such as preferential replication in macrophages, ability to establish persistence, and antigenic diversity. For some viruses, ADE of infection has become a great concern to disease control by vaccination. Consequently, numerous approaches have been made to the development of vaccines with minimum or no risk for ADE. It is known that antibodies to dengue viruses at sub neutralizing concentrations enhance dengue virus infection of Fc gamma R+ cells. This phenomenon called antibody-dependent enhancement (ADE) occurs when virus-antibody complexes bind to the Fc gamma R via the Fc portion of the Ig. It has been hypothesized that ADE may be responsible for the pathogenesis of the severe manifestations of dengue virus infection including dengue haemorrhagic fever/dengue shock syndrome. In the present study we have observed that, the virus FcyR receptor expression is increased in response to virus antigen which indicate that its activation and increased response towards ADE in monocytes cells. This means that further exposer with the virus will leads to high replication and increased virus production or titre.

Present Status: Ongoing

Title: A pilot demonstration project for the reduction of tuberculosis in Saharia Tribe.

Details of PI, Co-PI and Co-I:

Central Coordinators: Dr. A M Khan (Scientist G and Director In-Charge, ICMR NJIL&OMD), Dr. R. Joshi (DDG, TB), Dr. Manjula Singh (Scientist F, ICMR HQ, New Delhi), Dr. A. Mathur (Additional DDG, TB, CTD, MOHFW), Dr. Sanjay Mattoo (Joint Director, CTD, MOHFW)

Local Coordinators: Dr. Aparup Das (Director, ICMR-NIRTH, Jabalpur)

Principal Investigator: **Dr. Ravindra Kumar** (Scientist C, ICMR-NIRTH, Jabalpur)

Co-Principal Investigator: Dr. Pushpendra Singh (Scientist E, ICMR-NIRTH, Jabalpur)

Co-Investigators: Dr. Suyesh Shrivastava (Scientist C, ICMR-NIRTH, Jabalpur), Dr. Harpreet Singh (Scientist F, BMI, ICMR HQ., New Delhi), Dr. Manjeet Chalga (Scientist D, ICMR HQ., New Delhi)

Collaborators: Dr. A.M Khan (Scientist G and Director ICMR-JALMA, Agra), Dean and faculties of Shivpuri Medical CollegeDr. S.N. Bindal (DTO), Medical officers

- **Status of Project (completed, ongoing and new):** Completed
- **Type of funding (Extramural, Intramural, International):** Extramural
- **Name of funding agency:** ICMR, New Delhi

Description of project:

In order to demonstrate reduction in tuberculosis (TB) in Saharia dominated district (Sheopur) of Madhya Pradesh using innovative operational strategies, and to establish mechanisms and processes for enhanced testing and treatment of tuberculosis cases, a research project was undertaken. Panchayats sarpanch and secretaries, health and wellness centers, ASHA and ANMs are involve for finding of presumptive TB cases. Screening camps were organized daily in each block. Screening was performed through hand held X-Ray device in symptomatic individuals. Confirmation of tuberculosis was performed by Truenat. All identified patients were referred to DTC for initiation of treatment. All the patients contact was also screened for tuberculosis. TB preventive therapies (TPT) were given to all negative contacts as per standard NTEP guidelines. Further, several camps for awareness generation on drug adherence and preventive aspects of TB were conducted. In total, 826 camps were organized in all the three blocks covering 625 villages of Sheopur during the reported period. A total of 11,116 X-rays and 6,461 sputa (on spot samples) were taken for diagnosis. Of which 887 patients, 662 microbiologically confirmed, 199 clinically confirmed and 26 cases were of extra pulmonary TB. Of the 662 Samples, 31 were found to be resistant to rifampicin, and 04 were found to be resistant to isoniazid. Treatment was started for all patients. Contact screening of 1955 family members of 808 M.tb patients was done. Out of these 1955 contacts, 22 were found positive for M.tb. TPT was started for 1939 contacts. Ready-to-eat therapeutic food pouches (RUTF) were given to 800 patients who are under BMI 18.5 kg/m2. This first-of-kind intervention project using modern techniques in field setting (hand-held X-ray, molecular diagnosis, etc.) taken up in a highly endemic district of Madhya Pradesh where Saharia tribal populations live, could successfully be demonstrated.

Photographs related to project:

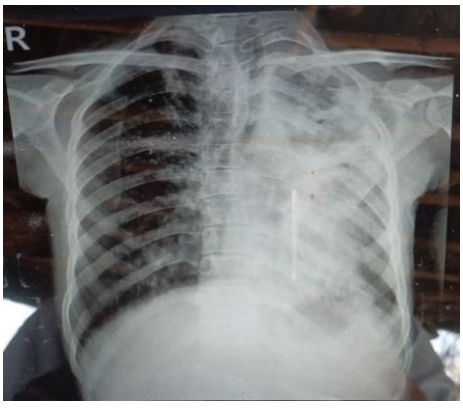
Hand held potable X-ray Machine

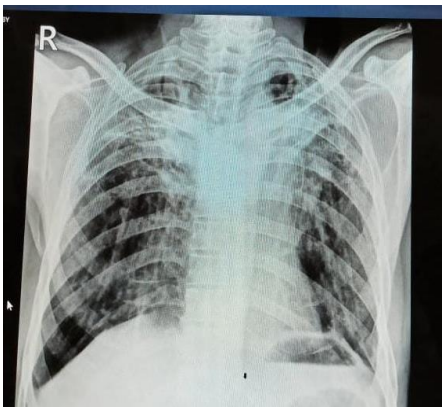
X-ray technician taking X-ray during the camp in Fulda village, Sheopur block

Health *mela* in Sheopur block

Health Camp in Karhal block

Handheld X-ray Machine/patients X-ray done by X-ray technician





Title: To study the dynamics of sickling inside blood capillary mimicking microfluidics system to fabricate a portable point-of-care electronic device for the detection of sickle cell disease.

Details of PI, Co-PI and Co-I:

Principal Investigator: Dr. Ravindra Kumar (Scientist C, ICMR-NIRTH, Jabalpur)

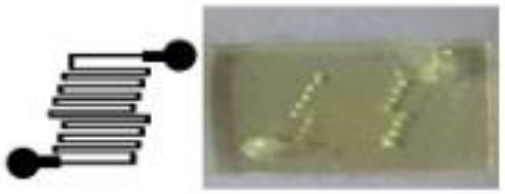
Co-Principal Investigator: Dr. Rajasubramaniam S (Scientist F, ICMR-NIRTH, Jabalpur)

- **Status of Project (completed, ongoing and new):** Ongoing
- **Type of funding (Extramural, Intramural, International):** Extramural
- **Name of funding agency:** ICMR, New Delhi

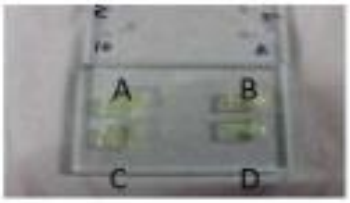
Description of project:

The aim of this project is to develop and validate a microfluidic device for the diagnosis of sickle cell anemia. During the reported period Dr Jaydeep Bhattacharya's laboratory, JNU New Delhi conceptualized and optimized the design of the microfluidic device. A Successful technique to develop hypoxia inside these channels has been developed. Testing of open microfluidic device was performed at ICMR-NIRTH on few samples. Open microfluidics system was also able to flow the blood but due to some interactions of the photopolymer with the reagents of solubility assay it was unable to diagnose the samples with good sensitivity and specificity.

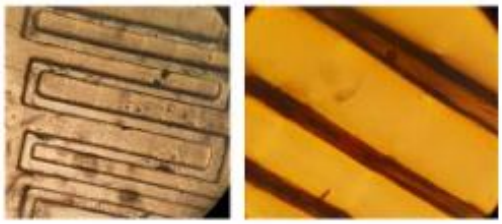
Photographs related to project:



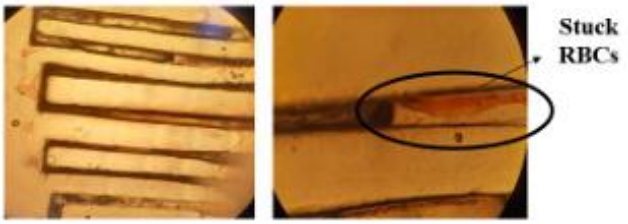
Design of Microfluidic Channel



Microfluidic Channel
A)10 µm B) 8 µm
C) 5 µm D) 2 µm



Normal Blood



Sickle Cell Anemia Blood

Title: Establishment of Centre of Excellence in SCD.

Details of PI, Co-PI and Co-I:

Principal Investigator: Dr. Ravindra Kumar (Scientist C, ICMR-NIRTH, Jabalpur)

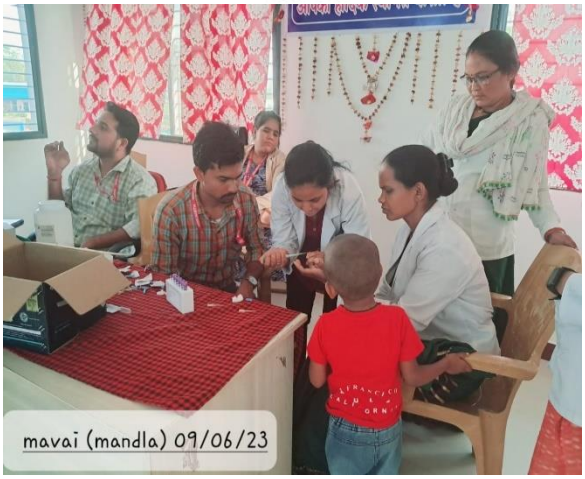
Co-Investigators: Dr. Rajasubramaniam S (Scientist F, ICMR-NIRTH, Jabalpur), Dr Asha Tiwari (Department of Paediatrics, NSCB Medical College, Jabalpur)

- **Status of Project (completed, ongoing and new):** Ongoing
- **Type of funding (Extramural, Intramural, International):** Extramural
- **Name of funding agency:** NHM, Bhopal

Description of project:

In Madhya Pradesh, Sickle Cell Disease (SCD) is mainly confined to the tribal predominant areas. Twenty districts of MP come in SCD belt. To provide training to state healthcare workers such as ASHA, ANMs, CHOs, Medical Officers, Pathologist for screening and management of SCD, different training sessions were conducted at block levels. Training on diagnosis of Sickle Cell Disease was given to healthcare workers of eighteen districts of Madhya Pradesh. Training was given to a total of 17,105 participant. Out of these 17,105 participants, 3,275 were CHO, 7,522 were ASHA worker, 2,788 were ANM, 1,880 were AMO, 1,141 were MPW, 293 were laboratory technicians and 206 were medical officers. Training on various diagnostic method such solubility, Sickle scan, Hemotype SC and HPLC was given. This training program emphasized on deep understanding of SCD including its introduction, pain crises, factors, prevention causes, symptoms, measures and inheritance patterns. For audit of screening of SCD in Jhabua and Alirajpur district, I along with the team visited five blocks of the district Jhabua & four block of the Alirajpur. For the diagnosis of unusual/ unknown variants samples are sent to ICMR-NIRTH through respective districts. Sanger sequencing of the HBB and HBA genes were performed to analysis the unusual/ unknown variants. So far, four samples have been received from Jhabua and one sample from Khandwa districts for molecular diagnosis.

Photographs related to project:



AR NIRTH 23-24

Title: Mission program on paediatric rare genetic disorders.

Details of PI, Co-PI and Co-I:

Principal Investigator: Dr. Ravindra Kumar (Scientist C, ICMR-NIRTH, Jabalpur)

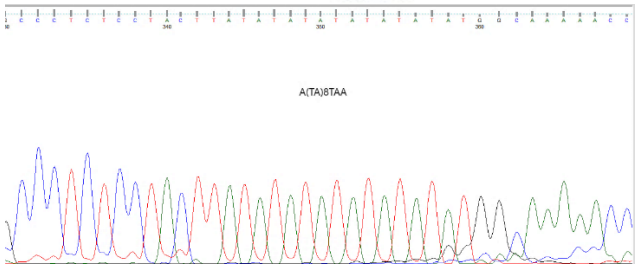
Co-Investigators: Dr. Asha Tiwari (Department of Paediatrics, NSCB Medical College, Jabalpur)

- **Status of Project (completed, ongoing and new):** Ongoing
- **Type of funding (Extramural, Intramural, International):** Extramural
- **Name of funding agency:** Department of Biotechnology (DBT)

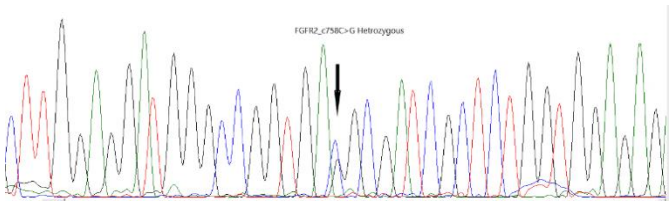
Description of project:

Genetic research has identified over 3000 genes linked to monogenic disorders. Traditional methods like chromosomal breakpoint mapping and linkage analysis, while effective, are labour-intensive and inadequate for sporadic or phenotypically heterogeneous disorders. Next-generation sequencing (NGS), especially whole genome sequencing (WGS), has revolutionized gene identification by detecting both coding and non-coding DNA variations, structural variants, deletions, and duplications, thus improving diagnostic accuracy and genetic counselling. NGS cost reductions have made molecular diagnostic tests more accessible. Despite the global progress, India lacks a reference genetic database for its diverse population, complicating genetic variation interpretation. This study aims to create an Indian-specific genetic variant database, aiding rare disease gene identification and cost-effective diagnostics, aligning with India's Sustainable Development Goals and National Health Mission objectives. ICMR-NIRTH, has achieved significant milestones in its mission to address rare genetic disorders affecting children. With the recruitment of 58 cases representing a diverse spectrum of diseases, the project has laid a foundation for comprehensive research and understanding. Strategic collaborations with hospitals across different regions of Madhya Pradesh, Chhattisgarh have expanded the program's reach and enriched its dataset. The collaboration with esteemed institutions such as AIIMS Raipur, AIIMS Bhopal, Medical Colleges of Indore, Rewa, and others is particularly noteworthy. These partnerships likely bring in additional expertise, resources, and perspectives, enhancing the overall research capabilities and potential for positive outcomes. The initiation of MLPA in our centre further indicates a commitment to utilizing advanced technologies for genetic analysis. Overall, these accomplishments highlight the institute's dedication to making meaningful strides in the field of rare genetic disorders and improving healthcare outcomes for affected children.

Public health impact on the community: The pan-India initiative aims to improve prenatal diagnosis, genetic counselling, and disease management by leveraging multiple genetic centres to create a genetic variant database.



The proband, suspected of having Crigler-Najjar Syndrome, carries the variant ($A(TA)_8TAA$) in the promoter region of the UGT1A1 gene in a heterozygous condition.



The proband, suspected of Apert Syndrome, carries the variant FGFR2_c.758C>G in a heterozygous condition.

Title: Study of endothelial adhesion molecules for Vaso-occlusive crises in the SCD patients.

Details of PI, Co-PI and Co-I:

Principal Investigator: Dr. Ravindra Kumar (Scientist C, ICMR-NIRTH, Jabalpur)

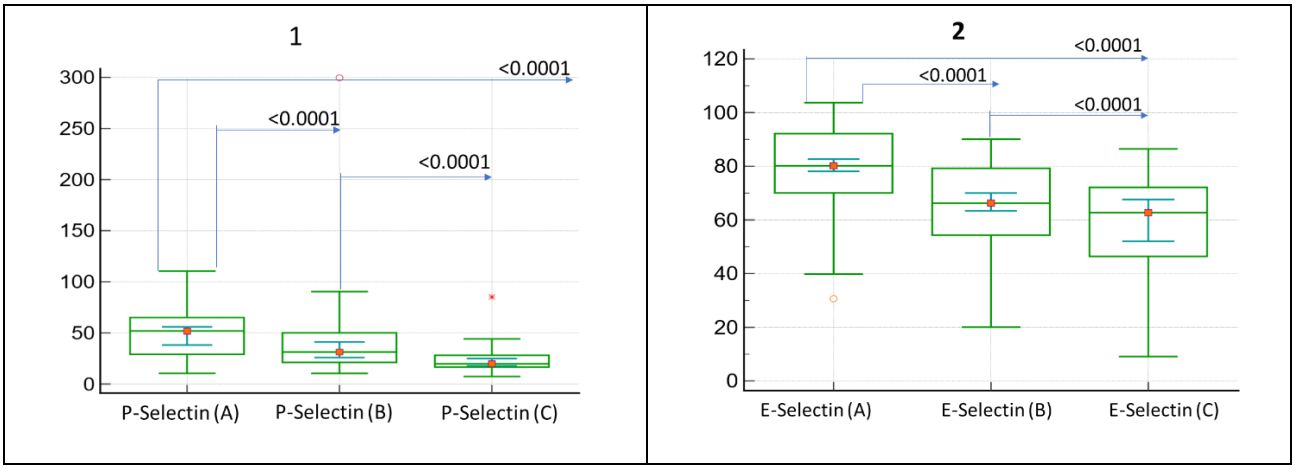
- **Status of Project (completed, ongoing and new):** Ongoing
- **Type of funding (Extramural, Intramural, International):** Extramural
- **Name of funding agency:** ICMR, H.Q. New Delhi

Description of project:

The main objective of the study is to evaluate the endothelium adhesion molecules as a possible biomarker for the early detection of vaso-occlusive crises (VOC). Plasma levels of ICAM-1, VCAM-1, and E-selection, as markers of endothelial dysfunction in SCD patients in a steady-state, during VOC and healthy controls were measured. Association of common SNPs of VCAM, ICAM, P-selectin and E-selectin genes with plasma levels of P-selectin and E-selectin during VOC and Steady State were measured. A total 80 patients were admitted for the crises such as VOC, high fever, jaundice etc. at NSCB Medical College Jabalpur and District hospital, Jabalpur were recruited. Out of 80, 42 patients are male (mean age =17.95 ± 7.9 years) and 38 are females (mean age= 17.42 ± 8.7 years).

EDTA and plain samples were collected after taking written informed consent. All three-time point (during crises, post crises and one month later after hospitalization) samples were collected from 80 patients in different durations. The third samples could not be collected in 32 patients.

Standardization of human ELISA kits of P-Selectin, E-selectin, ICAM1 and VCAM1 was performed. ELISA has been performed for all 80 samples through Human ELISA kits to evaluate the difference in level of P-selectin, E-selectin, ICAM1 and VCAM1. Mean level of E-selectin, VCAM1, ICAM1 and P-selectin of 80 patients calculated on three-time intervals such as during the crises (1), after the crisis (2) and at steady state (one month later) (3) are shown in Figure 1.



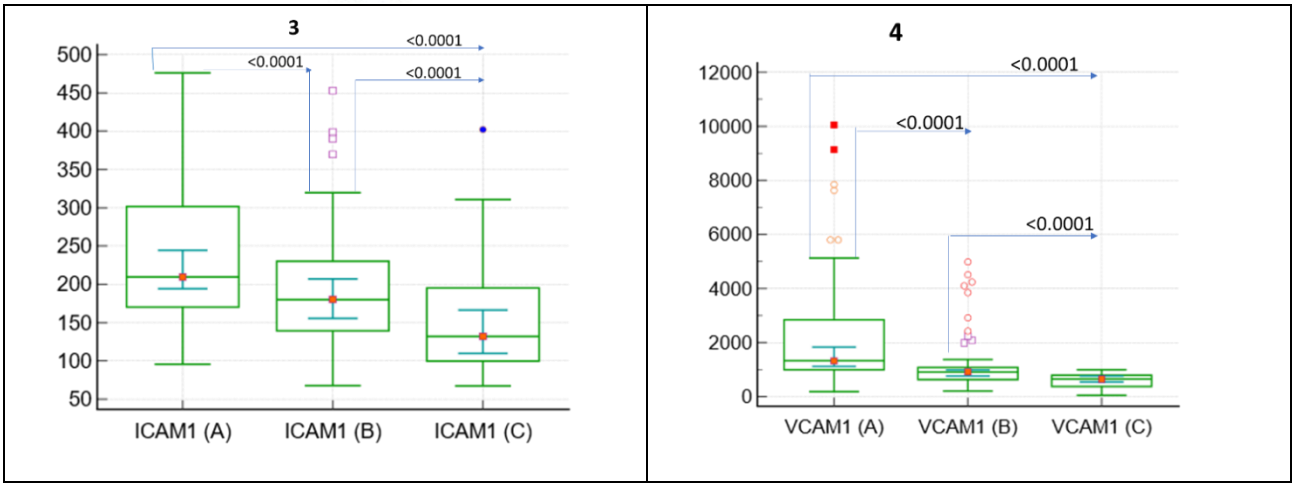


Figure 1: Concentration (ng/ml) of P-Selectin (1), E-Selectin (2), ICAM1(3) and VCAM1(4) in serum of SCD patients (A- shows during crisis; n=80, B- during discharge of hospital; n=71, C- shows steady state; n=48).

DNA was extracted from all the 80 samples by salting out method. Primer for target regions were designed by using BLAST tool at NCBI portal and standardization of PCR was performed. PCR-RFLP has been performed for three SNPs of SELP gene. Further analysis is ongoing.

Title: Connecting the Unconnected: An incentive-based study to connect the traditional tribal healers of Baiga tribe to public health system.

Details of PI, Co-PI and Co-I:

Principal Investigator: Dr. Nishant Saxena (Scientist C, ICMR-NIRTH, Jabalpur)

Co-Investigators: Dr. K. B. Saha (Scientist G, ICMR-NIRTH, Jabalpur), Dr. Dinesh Kumar (Scientist E, ICMR-NIRTH, Jabalpur), Dr. Suyesh Shrivastava (Scientist C, ICMR-NIRTH, Jabalpur), Dr. R. K. Mehra (CMHO Umaria), Dr. Brijesh Patel (District Health Officer & DMO, Dindori)

- **Status of Project (completed, ongoing and new):** Ongoing (new initiative)
- **Type of funding (Extramural, Intramural, International):** Extramural
- **Name of funding agency:** ICMR New Task Force scheme Project

Description of project:

Work under the ICMR Task Force new scheme extramural project entitled "Connecting the Unconnected" has been initiated in the Dindori and Umaria districts of Madhya Pradesh. The project focuses on connecting the tribal traditional healers from the Baiga tribe (a PVTG in Madhya Pradesh) with the public healthcare system to improve the healthcare delivery in these remote and far-flung tribal areas. The project is also documenting the traditional healthcare practices prevalent in the area.

In the first phase of the study, the focus is on collecting the baseline data on healthcare-seeking behavior for which household survey is being undertaken. Data is also being collected using structured pretested interview schedules from tribal traditional healers (TTHs), frontline health workers like ASHA, Community Health Officers (CHOs) at Health and Wellness Centres (HWCs). Data entry and analysis is yet to be initiated.

Title: Assessment of the malaria situation and the role of Anopheles species in its transmission in selected international border areas adjoining the Districts of the North-Eastern States.

Details of PI and Co-I:

Principal Investigator: Dr. Ipsita Pal Bhowmick (Scientist D, RMRC Dibrugarh)
Co- Investigator from ICMR-NIRTH: Dr. Nishant Saxena (Scientist C, ICMR-NIRTH, Jabalpur)
Co-Investigators: Dr. Pramit Ghosh, Scientist E and OSD to DG, ICMR

- **Status of Project (completed, ongoing and new):** Ongoing
- **Type of funding (Extramural, Intramural, International):** Extramural
- **Name of funding agency:** ICMR Task Force Project

Description of project:

ICMR Task Force ongoing study entitled, "Assessment of the malaria situation and the role of Anopheles species in its transmission in selected International border areas adjoining the Districts of the North-Eastern States". Apart from epidemiological and entomological studies, the project has an objective to assess the prevalent community behaviours and their influencing factors related to prevention and control of malaria including border migration issues. The project spans the international border areas of 7 Districts in 5 States (Tripura, Mizoram, Meghalaya, Arunachal Pradesh and West Bengal). The study encompasses quantitative surveys and qualitative data collection to identify some of the gaps which further require customized qualitative studies in different study sites. NIRTH is providing support for the qualitative studies part.

Title: Metabolic Syndrome among three PVTGs of Central India.

Details of PI, Co-PI and Co-I:

Principal Investigator: Dr. Suyesh Shrivastava (Scientist C, ICMR-NIRTH, Jabalpur)
Co-Principal Investigator: Dr. Tapas Chakma (Scientist G, ICMR-NIRTH, Jabalpur)
Co-Investigators: Mr. Arvind Kavishwar, (P.T.O., ICMR-NIRTH, Jabalpur)

- **Status of Project (completed, ongoing and new):** Completed
- **Type of funding (Extramural, Intramural, International):** Extramural
- **Name of funding agency:** ICMR

Description of project:

The project is based on the assessment of metabolic syndrome among three PVTGs of central India with included Baiga, Bharia and Saharia tribes. The study was executed in 7 districts of central India which were Dindori, Gwalior, Chhindwara, Anuppur, Morena, Shivpuri and Gaurella-Pendra-Marwahi (GPM). There was total 5701 respondents participated in the study in which 3561 were males and 2140 were females. In the total population 2486 respondents belonged to the Saharia tribe from 3 district (Gwalior, Shivpuri & Morena), 2443 respondents belonged to Baiga tribe from 3 districts (Dindori, Anuppur & GPM). Bharia tribe comprised of 772 respondents from 1 district (Chhindwara). The prevalence of metabolic syndrome was observed highest in Baiga tribe.

Status- Completed: The project has been successfully completed in March 2024 and project report has been submitted. The manuscript for the same is under preparation.

Title: Understanding availability of Essential Diagnostics in health care systems: identifying barriers and facilitators.

Details of PI, Co-PI and Co-I:

Principal Investigator: Dr. Suyesh Shrivastava (Scientist C, ICMR-NIRTH, Jabalpur)

Co-Investigators: Dr. Dinesh Kumar (Scientist E, ICMR-NIRTH, Jabalpur), Dr. Nishant Saxena (Scientist C, ICMR-NIRTH, Jabalpur), Dr. Surendra Kumar (Scientist D, ICMR-NIRTH, Jabalpur)

- **Status of Project (completed, ongoing and new):** Ongoing
- **Type of funding (Extramural, Intramural, International):** Extramural
- **Name of funding agency:** ICMR

Description of project:

In 2019, National Essential Diagnostic List (NEDL), a breakthrough step to make availability of quality diagnostics an essential component of the health care system that is aspiring to provide universal access to affordable, accessible and good quality health services. This study focusses to elucidate the status of health care levels in Indian States and shed light on the drawbacks, necessary measures, evidence of effective approaches, pathways and build a strong case for more focus and investment on diagnostics.

Availability: If a test as listed in NEDL is available in-house, within the health facility, or can be obtained via out-sourced laboratory services, then it will be recorded as available.

Availability of essential inputs: The standards of Indian Public health Standards (IPHS) under National Health Mission will be used for assessing necessary infrastructure.

The study is ongoing and has collected the data in 9 out of 10 selected districts of MP, which are Ujjain, Indore, Morena, Mandla, Balaghat, Chattarpur, Rajgarh, Rewa, Sidhi, Hoshangabad. The data is collected from the district hospitals, Community health centres (CHC), Primary health centre (PHC) and Health Sub Centre (HSC).

Civil hospital- 15 out of 25 completed

PHC- 72 out of 80 completed

CHC- 45 out of 66 completed

District hospital- 4 left out of 10

HSC- 72 completed out of 80

Title: Prevalence of Anaemia in tribal population of Gaurella, Pendra, Marwahi (GPM) district of Chhattisgarh.

Details of PI, Co-PI and Co-I:

Principal Investigator: Dr. Suyesh Shrivastava (Scientist C, ICMR-NIRTH, Jabalpur)

Co-Principal Investigator: Dr. Tapas Chakma (Scientist G, ICMR-NIRTH, Jabalpur)

- **Status of Project (completed, ongoing and new):** Ongoing
- **Type of funding (Extramural, Intramural, International):** Intramural
- **Name of funding agency:** ICMR

Description of project:

The administration of GPM district of CG reached out to team of ICMR NIRTH and requested to carry out a study to determine the prevalence of anemia in adolescent tribal females of the district. The study was planned with the objectives-

1. To estimate the prevalence of anaemia in tribal population of GPM district of Chhattisgarh
2. To estimate the prevalence of microcytic hypo chromatic anaemia in tribal population of GPM district of Chhattisgarh.

The data collection, laboratory work and analysis are complete of 1143 participants. Report and manuscript preparation is ongoing.

Title: Role of Leptin, Ghrelin and APOB gene in Metabolic syndrome.

Details of PI, Co-PI and Co-I:

Principal Investigator: Dr. Suyesh Shrivastava (Scientist C, ICMR-NIRTH, Jabalpur)

Co- Investigator: Dr. Tapas Chakma (Scientist G, ICMR-NIRTH, Jabalpur), Dr. Rajasubramaniam S (Scientist F, ICMR-NIRTH, Jabalpur), Dr. Ravindra Kumar (Scientist C, ICMR-NIRTH, Jabalpur)

- **Status of Project (completed, ongoing and new):** Ongoing
- **Type of funding (Extramural, Intramural, International):** Intramural
- **Name of funding agency:** ICMR

Description of project:

Single nucleotide polymorphisms (SNPs) of Leptin & Ghrelin gene have been identified on the risk factors of MetS. APO-B is involved in building chylomicrons in intestine. The occurrence of SNP in the non-coding region of the leptin gene (LEP) may cause different concentrations of leptin and this may play a role in

human obesity. The project was started with the objectives- 1) To determine the different single nucleotide polymorphism (SNPs) of ghrelin and leptin affecting the risk factors of metabolic syndrome. 2) To assess the role of Leptin, Ghrelin & APOB gene in lean metabolic syndrome patients.

The samples from both cases and control have been collected. The samples processing is about to start shortly.

Title: Improving the knowledge of Diabetes, its treatment and complications among Health Care Providers working in Tribal area: An Interventional study.

Details of PI, Co-PI and Co-I:

Principal Investigator: Dr. Suyesh Shrivastava (Scientist C, ICMR-NIRTH, Jabalpur)
Co-Principal Investigator: Dr. Tapas Chakma (Scientist G, ICMR-NIRTH, Jabalpur)
Co-Investigator: Dr. K. B. Saha (Scientist G, ICMR-NIRTH, Jabalpur)

- **Status of Project (completed, ongoing and new):** Ongoing
- **Type of funding (Extramural, Intramural, International):** Intramural
- **Name of funding agency:** ICMR

Description of project:

Poor disease knowledge is one of the main reasons for inadequate self-care behaviours and glycaemic control. Since the tribal population relies on the primary health care workers such as ASHAs, ANMs, Anganwadi workers, assessment of their knowledge is necessary so that a proper counselling can be provided. The project initiated with the objectives. 1.To assess the diabetes specific knowledge of health care workers. 2.To improve the knowledge of the health care workers through training and retraining.

Status- The project is ongoing. Data collection is completed and report preparation is on process.

Title: M.Sc. Public Health Entomology.

Details of PI, Co-PI and Co-I:

Nodal Officer(s): Dr. Anil Kumar Verma (Scientist C, ICMR-NIRTH, Jabalpur), Dr. Vidhan Jain (Scientist D, ICMR-NIRTH, Jabalpur)

- **Status of Project (completed, ongoing and new):** Ongoing
- **Type of funding (Extramural, Intramural, International):** Extramural
- **Name of funding agency:** ICMR

Description of project:

On instruction of the DG, ICMR-New Delhi, the Director, ICMR-VCRC, Puducherry, expanded the M.Sc. Public Health Entomology Course to other ICMR institutes with the capacity and mandate to conduct research on vector borne diseases. Accordingly, the Director, ICMR-VCRC invited us to join the network of institutes to offer master's degree course at ICMR-NIRTH centrally be coordinated by ICMR-VCRC, Puducherry with the objective.

1. To create a pool of public health entomologist in the country for research and public health work on vector borne diseases.

   Brief results: Out of 10 seats (5 for category -I +5 for category-II) approved by Pondicherry University, a total of Seven (7) candidates (6 Cat-I +1 Cat-II) were admitted at ICMR-NIRTH, Jabalpur in 2022-24 session on instruction of ICMR-VCRC, Puducherry. The theory and practical course for first semester and second semester completed. The exams for Batch-I, first semester and Second Semester were scheduled held in May 2023 and Oct/Nov2023. All students participated in end semester theory and Practical exams and the results were as follows

Semester	Batch	Total No. of students Passed Pass (arrear)
First Semester	I	4 + (2 with arrear in one paper + 1 arrear in three papers)
Second Semester	I	5 +(1 with arrear in one paper + 1 arrear in four papers)

Further, a total of 8 (6 for category -I +2 for category-II) took admission in Batch-II in ICMR-NIRTH Jabalpur in Session 2023-25. The course for theory and practical for first semester (Batch-II) and Third Semester (Batch-I) is almost complete. The semester exams are scheduled in March/April 2024

Conclusion: Ongoing

Title: Determination of resistance frequency and intensity among field populations of malaria vectors to public health insecticides in use in endemic districts of Madhya Pradesh and Maharashtra (India).

Details of PI, Co-PI and Co-I:

Principal Investigator: Dr. Anil Kumar Verma (Scientist C, ICMR-NIRTH, Jabalpur)

Co-Principal Investigator: Dr. Vidhan Jain (Scientist D, ICMR-NIRTH, Jabalpur)

- **Status of Project (completed, ongoing and new):** Ongoing
- **Name of funding agency:** ICMR

Description of project:

In India, transmission of malaria has been persistent in many States, and multiple vectors transmit the disease. Vector control using chemical insecticides remains to be one of the most effective measures to prevent transmission of vector borne diseases, particularly malaria, in India. The principal objective of vector control is to reduce malaria morbidity and prevent mortality by interrupting and reducing the levels of transmission. Insecticide-based vector control methods vary considerably in their applicability, cost and sustainability. In India, currently, malaria vector control relies largely on wide-scale use of insecticide-treated bed nets and indoor residual spraying (IRS). However, one of the major impediments for effective implementation of the vector control interventions is development of resistance in vectors to the insecticides

1. To detect insecticide resistance and determine its intensity among malaria vectors in Madhya Pradesh and Maharashtra (India).
2. To develop an updated database on insecticide resistance frequency and intensity among malaria vectors for planning insecticide use in malaria elimination programme.
3. To facilitate capacity building at institutional level for conducting studies on insecticide resistance.

Brief results: The project started in November 2023 with recruitment and training of project staff. However, it was initially hampered due to Vidhan Sabha elections in Madhya Pradesh. After identification of study sites in Balaghat (Madhya Pradesh and Gadchiroli (Maharashtra) sampling started. In this project the following Insecticides are be tested (as per the proposal) in three different ecotypes (plane, forrest and ecotype) against major malaria Vectors. Anopheles *culicifacies and Anopheles fluviatilis.*

Adulticides and concentration:

1. DDT (4%)
2. Malathion (5%)
3. Alphacypermethrin (0.3%, 1.5% and 3%)
4. Deltamethrin (0.05%, 0.25% and 0.5%)

The initial insecticide tests conducted on wild caught *Anopheles culicifacies* in Balaghat indicate possible resistance (PR) against Alpha Cypermethrin 0.3% and Deltamthrin 0.5%.

Conclusion: Ongoing

Relevant figure/ graph;

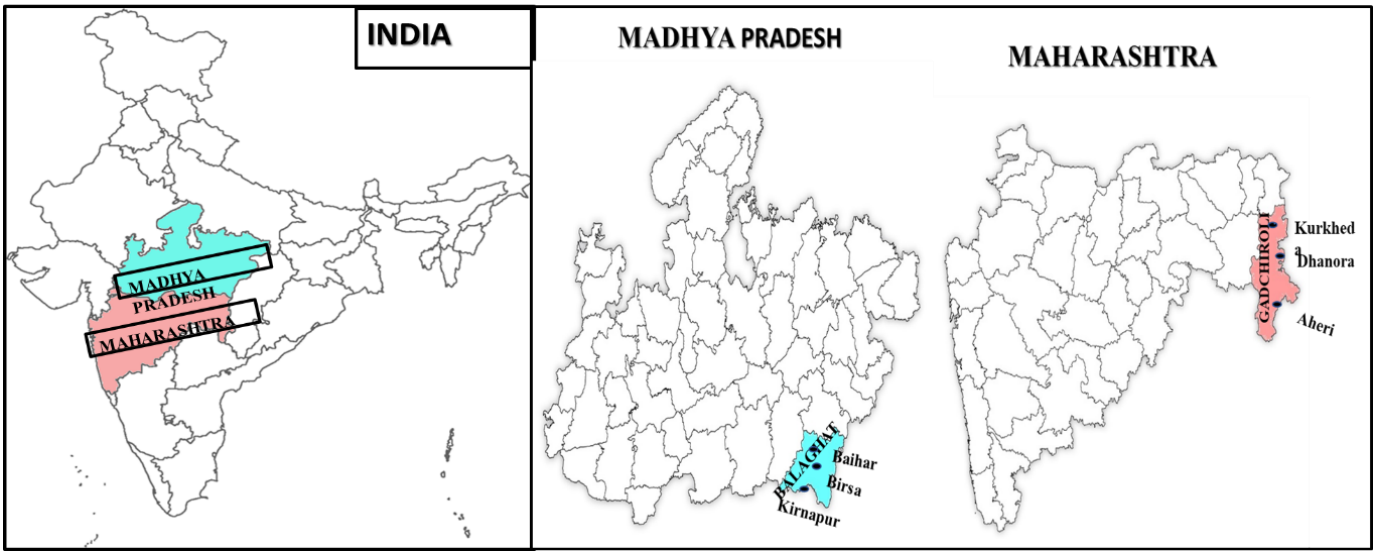


Fig : Map Showing Study sites in Balaghat (Madhya Pradesh and Gadchiroli (Maharashtra)

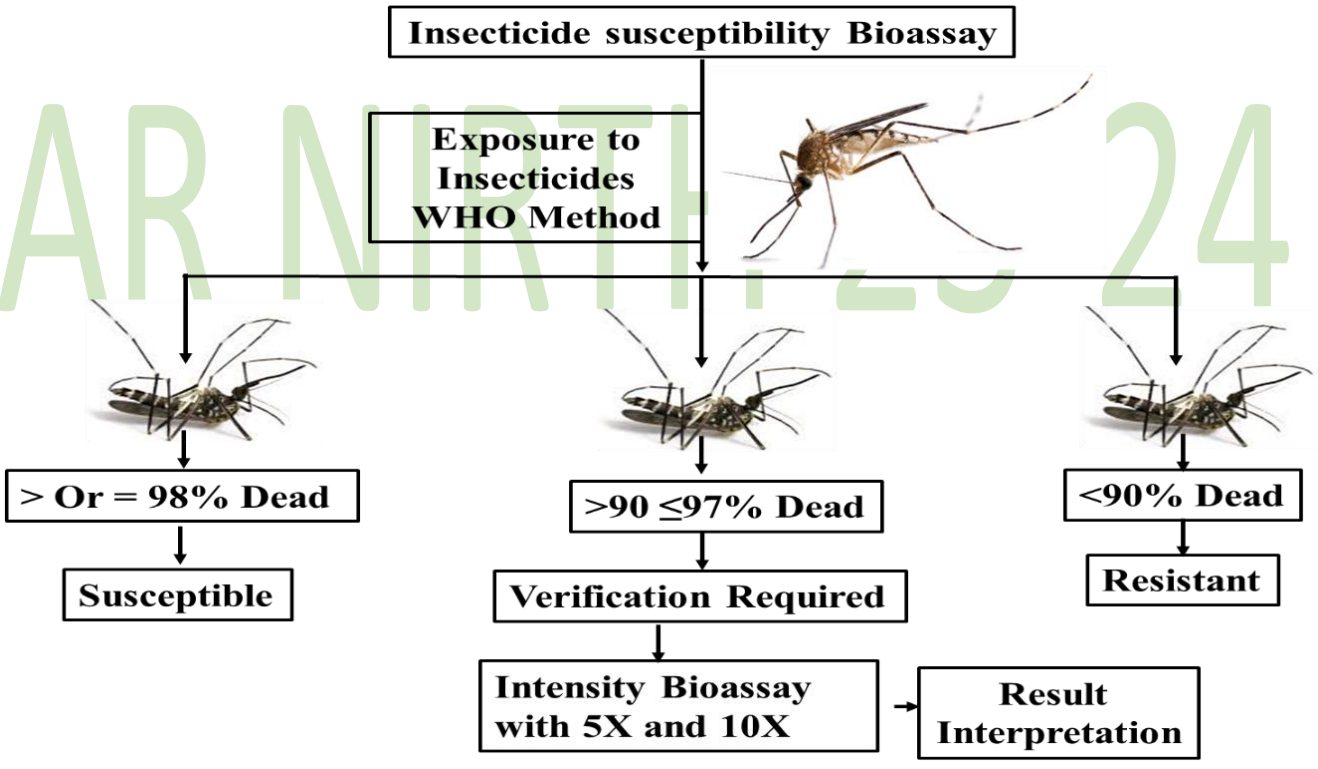


Fig: Schematic representation of methodology for Insecticide susceptibility Assay*.

***Interpretation of test results:** Susceptibility criterion status based on % mortality – S (susceptible) ≥98% mortality;PR (possible resistance) ≥90% - <98% mortality; CR (confirmed resistance) <90% mortality

Photo: Project Staff collecting mosquito (*Anopheles culicifacies*) for determination of Insecticide Resistance in the field (Baihar, Balaghat)

Title: Morbidity Profile of Sickle cell disease in Central India.

Details of PI, Co-PI and Co-I:

Principal Investigator: Dr. Surendra Kumar (Scientist D, ICMR-NIRTH, Jabalpur)

Co-Principal Investigator: Dr. Rajasubramaniam S (Scientist F, ICMR-NIRTH, Jabalpur)

- **Status of Project (completed, ongoing and new):** Ongoing
- **Type of funding (Extramural, Intramural, International):** Intramural
- **Name of funding agency:** ICMR – NIRTH

Description of project:

Objectives of the study:

1. To study the clinical and haematological profile of the sickle cell disease patients.
2. To develop strategies for management and prevention of the sickle cell disease in context to Central India.

Methodology: All the Registered Patients were referred from various OPD's of NSCB Medical College, Jabalpur and various district hospitals of the state to genetics laboratory of NIRTH for the diagnosis of haemoglobinopathies. Patients those identified as sickle cell disease were registered in sickle cell clinic for detail clinical assessment and follow up. The clinical history, clinical findings and various investigations were recorded in structural proforma and advised them to come for follow-up every three months.

Findings: Sixty-five sickle cell disease patients were registered in the Sickle cell clinic (in collaboration with Government Medical College, Jabalpur) during April 2023-March 2024. All these patients were from Dindori, Jabalpur, Katni, Mandla, Narsingpur, Panna, Seoni districts. About 55.4% were Male and 44.6% were female. Majority (38.5%) of the patients were belonged to Scheduled caste and 30.8% were from tribal communities. About 26.2% were Other backward class and 4.5% were from Muslim & others. About 63% of patients had history of multiple blood transfusions (blood transfusions of more than 2 times) and 24.6% of patients had no history of blood transfusion. About 55.4% of the patients had their onset of the disease before 5 years of age followed by 5-10 yrs age (20%), 10-15 yrs (16.9%) and 15-20 yrs (6.2%). Joint pains (83%), Fever (78.5%), abdominal pain (64.6%), Bony pain (21.5%), fatigue (21.5%) and joint swelling (12.3%) were major sign and symptoms observed in these patients.

Highlight of project in 2-3 bullets:

- Sixty-five sickle cell disease patients were registered in the Sickle cell clinic during April 2023-March 2024.
- Majority (38.5%) of the patients were belonged to Scheduled caste and 30.8% were from tribal communities.
- About 55.4% of the patients had their onset of the disease before 5 years of age followed by 5-10 yrs age (20%).

About 63% of patients had history of multiple blood transfusions (blood transfusions of more than 2 times).

REGULAR ACTIVITIES

1. Model Rural Health Research Unit, Jheet, Block-Patan, Chhattisgarh

Nodal Officer: Dr Ravindra Kumar, Scientist D, ICMR-NIRTH
Co-Nodal Officer: Dr Nishant Saxena**,** Scientist C, ICMR-NIRTH

CONSTRUCTION PROGRESS

MRHRU, Jheet research laboratory construction work is almost completed. The furniture, AC and other capital items are in place. Electricity connection has been done.

Multi-Disciplinary Laboratory Testing in Biochemistry, Molecular Biology, and Pathology.

PROJECTS

1. The project of **Assessment of Health-Related Quality of Life of Individuals of Sickle Cell Trait and Disease** was carried out in CHC Jheet, during the month of *November 2022 to June 2023*. The population from villages of Durg district were taken. study the tools included Sociodemographic information (age, gender, marital status, educational level, number of siblings, occupation, employment, monthly family income), clinical status (diagnosis, date of diagnosis, relevant personal history, age at first symptom, number of hospital admissions, number of blood transfusions, number of hospital admission due to episodes of pain crisis, presence of complications and health problems related to the disease, Anthropometric

measurement (Height/weight) and use of medications) and SF-36 Health-related quality of life questionnaire of study subjects. MRHRU project staff conducted an awareness program at different Anganwadi centre (PHC/CHC) Centre's and distributed posters regarding sickle cell awareness.

Block Medical Officer, Dhamdha and Ahiwara (Block), Chhattisgarh, and the MRHRU team during conversation with patients.

Door to door data collection for the Sickle Cell Disease in Limtara village, block- Dhamdha

2. **A study on the prevalence of metabolic syndrome in tribal and non-tribal population of Patan block of Chhattisgarh state: a pilot study,** was undertaken. The study was conducted by visiting certain villages with the assistance of sarpanch health staff, Anganwadi workers, etc., Jheet and their surrounding villages, Ghughuva, Mahuda, Ufra, and Jamgoan village. With their consent, blood samples were collected for biochemistry and hematology testing. In a total sample population of 290, 149 were belonged to the tribal ethnic group and 141 were non- tribal people. 14.8% of the tribal population had Metabolic Syndrome and 17.7% of the non- tribal population had the same. Data analysis has been done. Manuscript for the same is communicated.

MRHRU—Jheet staff during the collection of blood sample and demographic survey in Ghughowa village, block- Patan.

Awareness program on Metabolic syndrome signs and symptoms and recommendations, held in Ufra Village by the MRHRU -Jheet staff.

Biochemistry analysis of samples being performed in the old CHC campus, MRHRU- Jheet.

3. **Prevalence and Characteristics of Chronic Kidney Disease (CKD) in Supebada village of Devbhog block and Piperkhutta village of Manpur Block in Gariyaband District**. Data of 261 individuals were taken with household surveys and analysis of the samples was done in AIIMS Raipur. This project was started in the month of *May 2023*. total of 257 participants fulfilled inclusion and exclusion criteria and were invited to participate in the study. Out of which, 163 belonged to village Supebeda and 94 belonged to village Pipalkhuta. The mean age of the study participants was 45.54 +14.86 years. Approximately half (n=124, 48%) were females. The prevalence of CKD in the study population as defined by GFR<60/ml/min was 23.3% (n=60). Participants from Supebeda has significantly higher prevalence of CKD as compared to Pipalkutta (30.7%, n=49 vs 11.7%, n= 11, p <0.001). Majority of CKD were in Stage III CKD (N= 23,10.6%) followed by stage IV (n=14, 6.7%) and Stage V (n=4, 1.9%). Thirty-nine (18.9%) patient had A2 Albuminuria and 30 patients had (14.4%) has A3 albuminuria. Six patients had nephrotic range proteinuria (defined as ACR> 2200 mg/gm). Participants from Supebeda had higher prevalence of A3 proteinuria than Pipalkutta (n=27, 26.0% vs n=4, 5.0%, p30 mg/gm. Thirty-nine (18.9%) patients had A2 Albuminuria and 30 patients (14.4%) had A3 albuminuria. Six patients had nephrotic range proteinuria (defined as ACR> 2200 mg/gm). Manuscript for the same is under preparation.

MRHRU- Jheet staff during data and morning blood sample collection for the study of prevalnce of Chronic Kidney Disease in Supebeda Village, Block Devbhog, Chhattisgarh.

EVENTS ORGANIZED

1. The Swachhata Hi Seva (SHS) campaign was celebrated with fervour at the MRHRU Jheet, Chhattisgarh in collaboration with CHC, Jheet, Chhattisgarh from *15th September to 2nd October 2023*. Under the campaign the focus was on undertaking shramdaan activities aiming to generate jan andolan through community participation, providing impetus on implementation of the Swatchh Bharat Mission of the Hon'ble Prime Minister of India, disseminating the importance of sampoorna swachhta and to reinforce the concept of Sanitation as everyone's business. In this programme an event entitled "Ek Tarikh Ek Ghanta" was also organized on 1-10-23 to push a cleanliness drive around the MRHRU. The campaign ended on the birth anniversary of the revered Father of the Nation Mahatma Gandhi Jii. Some glimpses of the activities undertaken at MRHRU Jheet are provided below:

Staff of MRHRU, Jheet and CHC, Jheet taking oath for cleanliness

Cleanliness drive

Shramdan under *Ek Tarikh Ek Ghanta* Programme by the MRHRU Jheet staff

MRHRU team with children and staff of Lilas Public School, Motipur, participating in the drive

2. The Ayushman Bhav campaign initiative was celebrated with enthusiasm by the team of MRHRU Jheet. This campaign is envisaged to saturate all health care services in every village/ town in line with the commitment of Hon'ble Prime Minister to ensure reach to the last mile and enable access to health care services to everyone in the society. In line with this a camp for blood donation, organ donation, and hygiene health-related information was organized by the team comprising of staff of MRHRU, Jheet, CHC staff, and Block Medical Officer, Patan Durg at Community Health Centre, Patan, Durg on *26.09.2023* wherein the local residents of the area participated with vigour. Also, cleanliness drive and tree plantation within the campus of MRHRU was also undertaken on 27.9.2023 as part of the campaign. Some glimpses of the activities are shown below:

Ayushman Bhav campaign at CHC Patan by MRHRU Jheet

Glimpses from camp organized for dissemination awareness on organ donation, blood donation and hygiene maintenance

Inside campus cleanliness drive

Planting Areca palm tree in pots by MRHRU team

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PUBLISHED BOOKS/BOOK CHAPTERS

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3. Saxena SS, Saxena N. Ethnography and Health Research: The Ins and Outs. In Madhulika Sahoo, S Jayavelu and Anjali Kurane (Eds.), Ethnographic Research in the Social Sciences. 2023. Routledge, UK. DOI: https://doi.org/10.4324/9781003392774
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5. Bishwal S, Niranjan R. MicroRNAs and dengue viral disease. DOI: https://doi.org/10.1016/B978-0-323-99661-7.00010-2 In book: MicroRNA in Human Infectious Diseases. January 2024. Elsevier Publisher.
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MEETINGS ATTENDED

DR. RAJASUBRAMANIAM S

1. One day CME "Sickle Cell Disease; Diagnosis and management': (invited Faculty), Conducted by ICMR-CRMCH on 24.01.2024 for one day.
2. Attended one day “Workshop on Basics of Ethical Issues in Biomedical Research, Conducted by ICMR-NIRTH on 19.05.2023 for one day.
3. Invited Speaker in Webinar on “Emerging Horizons in Sickle Cell Anaemia: Understanding, Treatment and Embracing Hope Conducted by Pandit S. N. Shukla University, Shahdol on 19 to 20, June, 2023 for two days.
4. Sensitization Workshop on "A Mission to eliminate Sickle Cell Anaemia by 2047" Conducted by Ministry of Tribal Affairs, GoI on June 19, 2023 for one day.
5. Participations in Health Camp Organized by NHM, Madhya Pradesh at Mandla on June 18-19, 2023 for Sickle Cell screening NHM, Madhya Pradesh.

DR. PUSHPENDRA SINGH

1. Basics of Ethical Issue in Biomedical Research, conducted by ICMR-NIRTH Jabalpur for one day on 19th May 2023.
2. WHO Workshop on Measles and Rubella Global Network, conducted by NIV Pune Sept 2023.
3. WHO Certificate Course for MR conducted by WHO, dated March 2024 – April 2024.
4. Expert consultation on Prioritizing diseases for elimination organised by ICMR-NARI, Pune.

DR. DINESH KUMAR

1. Participated in webinar ‘on extramural call review address by DG, ICMR’ on 9th May, 2023.
2. Participated in webinar ‘on extramural call review address by DG, ICMR’ on 17th May, 2023 at 2.30pm.
3. Participated virtually in the workshop on ‘Basics of Ethical Issues in Biomedical Research’ on 17th May, 2023 at 4.30pm.
4. Participated in webinar on ‘Intellectual Property for Scientists’ to Capacity Building Communication (CBC) organized by ICMR, New Delhi on 14/09/2023.
5. Participate in workshop on ‘Foundation Course in Implementation Research’ conducted by ICMR-NIIRNCD, Jodhpur, Rajasthan during 06/09/2023 to 08/09/2023.
6. Participated in virtual release of the 3rd Edition of the Common Protocol for Uniform Evaluation of Public Health Pesticides for Use in Vector control on December 18,2023, at ICMR, New Delhi.
7. Participated on ‘Evidence Based Medicine (EBM) & GRADE Methodology’ conducted by ICMR-New Delhi on 12th February 2024.

DR. RAVINDRA KUMAR

1. Deep Dive Training on Cyber Security. It was conducted by IIPA, New Delhi, from 18th March, 2024 to 22nd March, 2024.
2. Resource person in workshop on “Prevention and Management of Hemoglobinopathies. It was conducted by ICMR-BMHRC, Bhopal, from 27th Feb, 2024 to 28th Feb, 2024.

3. State Level SCD Conference Madhya Pradesh. It was jointly conducted by NASCO, ICMR-NIRTH and NHM Bhopal, on 03rd Jan, 2024.
4. Ethical and Regulatory Aspects of Clinical Research. It was conducted by NIH (via videocast), from 20th September, 2023 to 01st November, 2023.
5. Resource person in National CME on Rare Disease "For the Rare-Please Take Care". It was conducted by AIIMS, Bhopal, on 30th September, 2023.
6. Resource person in Workshop on "Research Opportunities and Higher Studies in Germany". It was conducted by JNU, New Delhi, on 28th July, 2023.
7. Resource person in Brainstorming event on Exploring the Healing Heritage: Unveiling the scope of traditional tribal medicines in central India. The current landscape, unmet needs and future directions. It was conducted by AIIMS Bhopal, on 25th July, 2023.
8. Panel Discussion on Holistic Management of Sickle Cell Disease. It was conducted by NHM, Bhopal and Mandla District, on 19th June, 2023.
9. Accelerating TB Elimination: Learnings from TB Prevalence Surveys. (organised by ICMR-NIRT, Chennai, on 10th June, 2023).
10. Keynote speaker at the National webinar on thalassemia (organised by Kaptipada Degree College, Mayurbhanj, Orissa, on 08th May, 2023).

DR. NISHANT SAXENA

1. Participated in Valedictory Session of ICMR Health Communications Course (IHCC), 27-28 April 2023, Ahmedabad organized by ICMR Communications Unit, New Delhi in collaboration with GHS and MICA, Ahmedabad. I completed the course successfully and received certificate and felicitation from DG ICMR Dr Rajiv Bahl.
2. Completed the NIH, USA online course titled " "Ethical and Regulatory Aspects of Clinical Research". The course was coordinated by the ICMR Bioethics Unit.

DR. SUYESH SHRIVASTAVA

1. Medical Certification of Cause of Death (MCCD) training. (Conducted by ICMR – NIMS, New Delhi from 11th Oct, 2023 to 13th Oct, 2023.
2. Interactive Investigator's meet to discuss and finalize the implementation strategy of the project entitled "General health screening with special focus on Tuberculosis, Anemia, Haemoglobinopathies& Malnutrition and Ayurvedic Interventions for better health outcomes in Students of Ekalavya Residential Model Schools (EMRS) functioning under M/o Tribal Affairs". It was conducted by M/o Tribal Affairs and CENTRAL COUNCIL FOR RESEARCH IN AYURVEDIC SCIENCES (CCRAS), Headquarter, New Delhi from 22nd March, 2024 to 23rd March. 2024.
3. Basics of Ethical issues in Biomedical Research (Conducted by ICMR-NIRTH, Jabalpur, on 19th May, 2023.
4. Webinar on Assessment Process of ICMR. (Organised by ICMR-HQ, New Delhi, on 16th June, 2023).
5. Webinar on Public Procurement for ICMR Institutes/Centres. It was conducted by ICMR-HQ, New Delhi, on 26th June, 2023.

6. Webinar on an awareness session on 'Manthan' portal, a digital platform initiative led by the Office of PSA. It was conducted by ICMR-HQ, New Delhi, on 23rd August, 2023.
7. Webinar on Challenges in medical publishing: an editor's view. It was conducted by ICMR-HQ, New Delhi, on 25th August, 2023.
8. Webinar on Scientific Leadership. It was conducted by ICMR-HQ, New Delhi, on 31st August, 2023.
9. Webinar on Intellectual Property for Scientists. It was conducted by ICMR-HQ, New Delhi, on 14th September, 2023.
10. Webinar on Optimal Adaptive Screen Design for Barrett's Esophagus. It was conducted by ICMR-NIMS, New Delhi, on 26th September, 2023.
11. Webinar on Science Communication for Scientists. It was conducted by ICMR-HQ, New Delhi, on 19th October, 2023.
12. Webinar on Rare genetic disorders. It was conducted by ICMR-NIRTH, Jabalpur, on 29th February, 2024.
13. Webinar on Understanding the role of social media in scientific and research communication. It was conducted by ICMR-HQ, New Delhi, on 07th March, 2024.
14. Webinar on Implementation research by DG, ICMR, New Delhi on 20th March, 2024.
15. Meeting to discuss the sampling plan of health facilities of project entitled "Understanding availability of Essential Diagnostics in health care systems: identifying barriers and facilitators "and review of coordination unit activity." It was conducted by ICMR-HQ, New Delhi, on 12th May, 2023.
16. NEDL project meeting with NHSRC. It was conducted by ICMR-HQ, New Delhi, on 06th November, 2023.
17. NEDL Agenda Meeting by ICMR-HQ, New Delhi, on 26th September, 2023

DR. ANIL KUMAR VERMA

1. Attend the valedictory function of ICMR-Health Communication Course on 27-28 April 2023 at NIOH, and Mudra Institute of Communication and Advertising (MICA), Ahmedabad organized by Communication Unit, ICMR HQ.
2. Attended a Workshop on Basics of Ethical issues in Biomedical Research held at ICMR-NIRTH, Jabalpur on 19th May 2023 organized by ICMR-NIRTH, Jabalpur.
3. Attended a Webinar on "Scientific Leadership" on 31 August 2023, 02:00 PM in virtual mode organized at ICMR HQ.
4. Attended a Webinar on "Mapping the effects of climate and urbanization on transmission of mosquito-borne diseases" by Professor Dr Michael C Wimberly, Department of Geography and Environmental Sustainability, University of Oklahoma on 12/09/2023 organized by NIMR and MERA-India.
5. Attended a 3-day Hands-on training on "Monitoring of insecticide resistance in malaria vectors" organised by ICMR and MERA- India held from 2nd August 2023 to 4rth August 2023 at NIMR, New Delhi

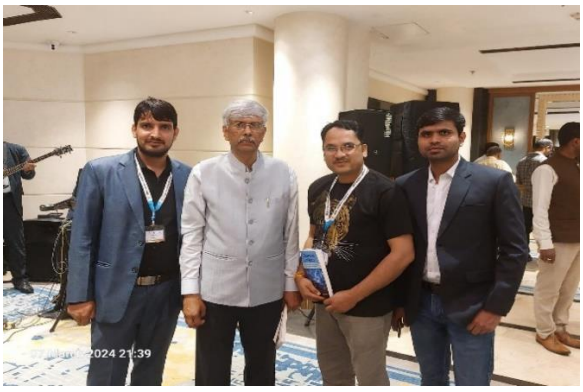
DR. QAISER FAROOQ DAR

1. Attended international conference in virtual mode on Global Business and Trade organized by Incheon National University, Incheon South Korea during 16-18, August 2023, also presented paper titled as “Optimization for improving energy efficiency under consideration of $C0_2$ emission and impact on Human Health, A Case of Climate Change in Asian Countries”.
2. Attended international conference in virtual mode on mathematical modelling in physical sciences, organized by IC-MSQUARE 2023, Belgrade, Serbia, during 28-31, August 2023, also presented paper titled as “Mathematical modelling for estimation of impact and determinants of Climate Change on the Health of the indigenous population in India”.
3. Attended meeting in virtual mode organized by Indian Ocean Rim Association (IORA) Secretariat, Mauritius, on 28, Feb 2024, also presented paper titled as “Impact of climate change on the human health in Small Island Developing States SIDS): A public health perspective on the International Workshop on Impacts of Climate Change on Small Island Developing States”.
4. Attended meeting and deliver a lecture on “Application of Bio-statistics in Health Research Perspective” at National Institute of Biologicals, NOIDA, Uttar Pradesh, India, on 28/07/2023.
5. Attended meeting in virtual mode and deliver a lecture on “How Bio-Statistics as a Backbone of Public Health Research” Department of Biosciences and Technology, M.M.E.C Maharishi Markandeswar University, Mallana Ambala (HR), on 12/12/2023.
6. Attended meeting and deliver a lecture on “Sample Size Calculation and Sampling Techniques” Workshop on Research Methodology, (Jointly organized by GMC, Datia and MRHRU, Badoni, Datia), at Government Medical College, Datia M.P, on 21/02/2024.
7. Successfully completed the “Young Scientist Induction program” organized by Capacity Building Commission, Government of India and The Office of the Principal Scientific Advisor to the Government of India, at IIM Visakhapatnam, during 29/01/2024 to 16/03/2024.
8. Attended meeting on the “Health System Costing” organized by ICMR-NIV, during 06-8 Feb. 2024.

Dr. Qaiser Farooq Dar, Scientist-C, ICMR-NIRTH receiving certificate of workshop on Health System Costing at ICMR-NIV, Pune.

9. Attended and successfully completed the "Young Scientist Induction program" organized by Capacity Building Commission, Government of India and The Office of the Principal Scientific Advisor to the Government of India, at IIM Visakhapatnam, during 29/01/2024 to 16/03/2024 in hybrid mode.

Dr. Qaiser Farooq Dar, Scientist-C, ICMR-NIRTH, Jabalpur receiving complication certificate of Young Scientists Induction Program.



Two scientists of ICMR-NIRTH with **Dr. Arabinda Mitra**, Office of PSA, GOI (The Office of the Principal Scientific Advisor to the Govt. of India).

DR. SATYENDRA PANDEY

1. Attended and successfully completed the "Young Scientist Induction program" organized by Capacity Building Commission, Government of India and The Office of the Principal Scientific Advisor to the Government of India, at IIM Visakhapatnam, during 29/01/2024 to 16/03/2024 in hybrid mode.

Dr. Satyendra Pandey, receiving complication certificate of Young Scientists Induction Program.

ORGANIZED OR CONDUCTED WORKSHOP/ TRAINING/ SEMINARS

DR. RAJASUBRAMANIAM S

1. Training of 300 Health Professionals (MO, CHO, ASHA, ANM) for Sickle Cell Anaemia Screening using POCT.

DR. PUSHPENDRA SINGH

1. Dengue ELISA trainings – 08
2. HPV training – 02
3. COVID Trainings – 07
4. Biosafety trainings – 03
5. Inhouse training (re-orientation training)
6. CIF related trainings (NGS, ddPCR, visits organised) – 10
7. Hands-on-trainings were organized at ICMR-NIRTH through the active participation of the Project PI and team – 03
8. Hands-on training on Next Generation Sequencing (NGS).

Photos: Hands-on training on Next Generation Sequencing (NGS)

Lecture taken by Dr. Pushpendra Singh on Next-Generation Sequencing (NGS)

Lecture taken by Dr. Pushpendra Singh on Sequencing Technologies and their applications

NGS machine (Illumina) demonstration

Research poster presentation and Lab visit

NGS machine (Ion-Torrent S5) demonstration

NGS machine (Ion-Torrent S5) demonstration

Group Photos with Participant and resource persons.

Group Photos of Participant, resource persons and Director ICMR-NIRTH

Dr. Rituraj Niranjan

1. Workshop on basics of ethical issues for biomedical research among marginalized communities. Basics of human ethical issues in biomedical research was organized in which many faculties at various levels and students participated. It was held on 19/05/2023 at ICMR-NIRTH, Jabalpur, M.P and was attended by 96 participants.
2. Two Days' workshop on Tribal Health was organized at ICMR-NIRTH, Jabalpur, M.P, from 12/03/2024 to 13/03/2024, where 25 MBBS students and faculties of various institutions participated.
3. A training was provided to about 100 undergraduate students of various schools on the basic methodologies and general exposer to science. It was held on ICMR-NIRTH, Jabalpur on multiple dates.

DR. NISHANT SAXENA

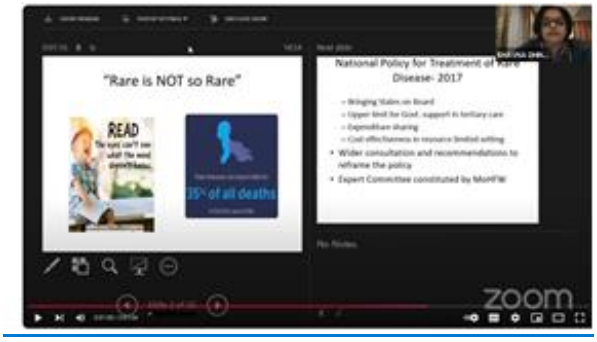
1. Convened a panel entitled "Health for all" and the indigenous groups: Experiences from the past and envisioning future possibilities and barriers in the 19th IUAES-WAU World Anthropology Congress 2023, New Delhi, 14-20 October 2023. The panel had 12 papers of which 3 papers were international. About 55 participants attended the panel.
2. MoU with SPU Balaghat University and jointly organized Workshop on Tribal Health on 25.10.23 wherein I delivered an invited talk on "Traditional medicine in Tribes of India". Participants were faculty and students of SPU University and number was about 50 participants.
3. Delivered invited talk in the brainstorming session jointly organized by NIRTH and AIIMS Bhopal on "Tribal health and indigenous healing traditions" at AIIMS Bhopal on 25.7.23. MoU was also signed on the occasion. Participants were about 200 participants.

DR. SUYESH SHRIVASTAVA

1. Training on Medical Certification of Cause of Death (MCCD) training 6 Dec 2024

DR. RAVINDRA KUMAR

1. Organised webinar on Rare Genetic Disorders on 29 Feb 2024.



2. State Level SCD Conference Madhya Pradesh on 3 Jan 2024 jointly organized by NASCO and NHM Bhopal.

DR. ANIL KUMAR VERMA

1. **Training organized:** Malaria Microscopy Training for lab technicians: The training of malaria microscopy was organized in three batches (with max. 20 participants in each batch) from 4th September to 20th December 2023. A total of 47 lab technicians (Batch-I:16, Batch-II :17, Batch-III: 14) from different Primary Health Centre/Community Health Centre across the state of Madhya Pradesh attended the program. The training included sessions on theory and hands-on exposure on malaria microscopy. Further, training on counting of malaria parasites, reporting and quality control of malaria microscopy was also imparted during the workshop.

Photo: Certificate distribution to participants by Director, ICMT-NIRTH, Jabalpur

Photo: Group picture of participants with Director

Photo: Group picture of participants in front of reception area.

SIGNIFICANT/ NOTABLE CONTRIBUTIONS IN RESEARCH

1. ICMR-NIRTH contributed for the preparation operational guidelines for national sickle cell anaemia elimination mission. The mission was launched by the Hon'ble Prime-Minister of India on 1 July 2024 at Shadol District of Madhya Pradesh.
2. ICMR-NIRTH contributed towards the development of training modules for training of master trainers on SCD.
3. ICMR-NIRTH contributed in preparation of six different counselling and awareness modules on Sickle Cell Disease for the mission.
4. ICMR-NIRTH has provided training on sickle cell disease to 17,105 healthcare workers from 18 districts of the Madhya Pradesh.
5. ICMR-NIRTH along with NHM, Bhopal conducted a Symposium on Holistic Management of Sickle Cell Disease on World Sickle Cell Day on 19 Jun 2023 at Mandla district. Hon'ble governor of Madhya Pradesh, Shri Mangubhai Patel and Hon'ble Minister of Steel, Shri Faggan Singh Kulsthe graced the occasion.
6. ICMR-NIRTH have identified high prevalence of hypertension in Baiga PVTGs.
7. Dr Tapas Chakma, Scientist G received prestigious "Thakkar Bapa Award" from Tribal Welfare Dept, Govt of MP in recognition of his contribution in Tribal Health Research.
8. MoU was signed with prestigious research and academic institutions like, AIIMS Bhopal, AIIMS Deoghar **and Sardar Patel University, Balaghat, MP** for fostering research on tribal Health.
9. ICMR-NIRTH-Institutional Ethics Committee for Biomedical Research in Human is registered with the DHR. The institute has also conducted one-day training on "Basics of Ethics in Biomedical Research" for the faculty members of various universities and Medical Colleges of Madhya Pradesh.
10. ICMR-NIRTH has developed a point of care device of diagnosis of leprosy. The assay is in validation state.

EVENTS

Details

ICMR-NIRTH celebrates its 41st foundation day on 1st March 2024 with great enthusiasm. Dr. Deepak Saxena, Director, IIPH Gandhinagar was the Chief Guest on the occasion and delivered the foundation day lecture on Evidence to policy: role of research institutions. Padma Shri Dr Yazdi Italia was the guest of honour and speaking on the occasion he briefed on Sickle Cell Control programme and its origin. Dr. Aparup Das, Director, ICMR-NIRTH welcomed the dignitaries, guests and briefed the research activities and achievements of the Institute. Participants and winners of the National Sports Day were provided with certificates on the occasion. A cultural programme was organized by the staff and students of the institute. Dr. KB Saha, Scientist G extended the vote of thanks. Dr. Nishant Saxena, Scientist C coordinated all the events on the dais.

Symposium on Holistic Management of Sickle Cell Disease on World Sickle Cell Day on 19 Jun 2023 at Mandla district. Hon'ble governor of Madhya Pradesh, Shri Mangubhai Patel and Hon'ble Minister of Steel, Shri Faggan Singh Kulsthe graced the occasion.

Hon'ble governor of Madhya Pradesh, Shri Mangubhai Patel and Director ICMR-NIRTH signed MoU with AIMI, Bhopal.

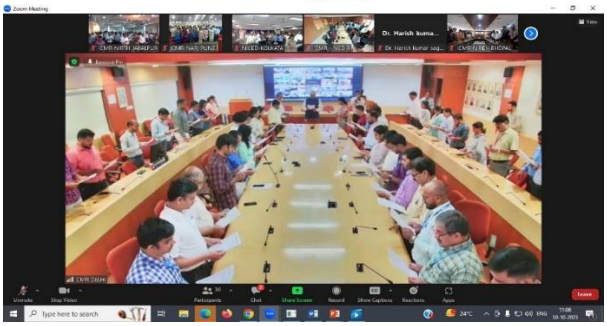
National Science Day was observed on 28th of February 2024. Speaking on the occasions Dr. Aparup Das, Director, ICMR-NIRTH highlighted the role technological advancements for improving quality of life. Dr. Ruchi Jain Dey, Asst. Professor and Ramalinga-swamy Fellow, BITS Pilani, Hyderabad delivered invited talk on indigenous technology for drug design and diagnostics. Students of B. Pharma from Sri Ram Institute of Technology, Jabalpur visited the institute on this occasion and interacted with the Scientists. Dr Tapas Chakma, Scientist G extended the vote of thanks.

International Women's Day was observed at ICMR-NIRTH on 11 March 2024. Prof. (Dr.) Kavita Sachdeva, Head ENT, NSCB Medical College, Jabalpur was the Chief Guest and she shared her struggles and oath to success. Speaking on the occasion Dr. Aparup Das, Director and Dr K. B. Saha, Scientist G expressed their views and also felicitated the female staff and students of the institute.


Dr. Rajiv Bahl, Secretary, DHR and DG, ICMR, New Delhi visited ICMR-NIRTH, Jabalpur on 26-27 November 2023 and Chaired the meeting on strategic review and research priority setting. In addition, there were sessions of informal interactions with Scientists of the institute and poster gallery by young researchers.

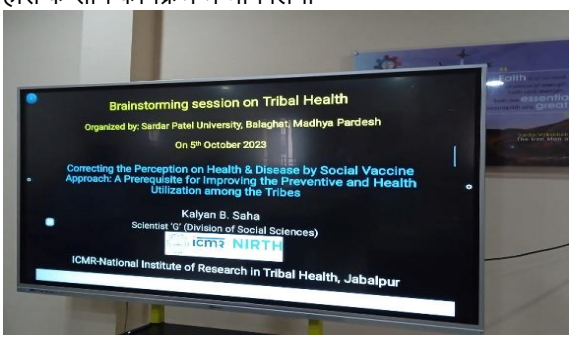
Joining hands for a cleaner India! IN On October 1, 2023, ICMR NIRTH conducted various cleanliness activities as part of #Shramdaan for #SwachhataAbhiyan, #SwachhataHiSeva, and #GarbageFreeIndia.

ICMR-NIRTH, Jabalpur celebrated the 148th Birth Anniversary of Sardar Vallabhbhai Patel by taking the 'National Unity Day' pledge which was administered by Dr. Tapas Chakma, Scientist G. All scientists, officers, staff, and students participated in the event. #EktaDiwas #NationalUnityDay2023.




ICMR-NIRTH, Jabalpur is observing Vigilance Awareness Week-2023 from 30-10-2023 to 05-11-2023 under the theme, “Say no to corruption; commit to the Nation ''. The week started with the administration of the Vigilance Pledge (online event) by Dr. Rajiv Bahl, Secretory DHR and DG ICMR. Dr. Aparup Das, Director ICMR-NIRTH along with all scientists, officers, staff, and students, participated in the event.
#vigilanceawarenessweek2023


आई.सी.एम.आर. - नेशनल इंस्टिट्यूट ऑफ़ रिसर्च इन ट्राइबल हेल्थ (राष्ट्रीय जनजातीय आयुर्विज्ञान अनुसन्धान संथान) जबलपुर ने 75 वां गणतंत्र दिवस बड़े हर्ष उल्लास और उत्साह के साथ मनाया गया निदेशक महोदय डॉ .अपरूप दास ने उदबोधन प्रस्तुत किया इस अवसर पर डॉ. आर.सी. धीमन सीनियर कंसलटेंट (वैज्ञानिक जी- रिटायर्ड) डॉ. तापस चकमा डॉ. कल्याण साहा एवं डॉ. सुरेंद्र कुमार ने भी अपने विचार व्यक्त किये सभी वर्ग के कर्मचारियों ने अभूतपूर्व हर्ष उल्ल्हास के साथ कार्यक्रम में भाग लिया



An MOU was signed on 5th October 2023 between ICMR-NIRTH and Sardar Patel University, Balaghat, MP for research and academic collaboration. A workshop on tribal health was organized on the occasion by the university where Dr. Aparup Das, Director, NIRTH briefed the house about the research activities at NIRTH, and its future plan of action and prioritized the joint activities. Others present on the occasion include Hon. Chancellor Er. Diwakar Singh, Er. Biplab Paul, VC, of the university and Dr. K. B. Saha, Scientist G, Dr. Suyesh Shrivastava, Scientist C, Dr. Nishant Saxena, Scientist C from ICMR-NIRTH.

ICMR-NIRTH LAB VISIT OF GIRLS STUDENT UNDER VIGYAN JYOTI PROJECT

ICMR-NIRTH JABALPUR organized Lab visit of the girls' students (3rd in row) of Jawahar Navoday Vidyalaya Bargi Nagar, Kendriya Vidyalaya GCF-2 and Kendriya Vidyalaya CMM Jabalpur on 26-09-2023 under the "Vigyan Jyoti Project" (Phase – IV), a Department of Science & Technology, Govt of India initiative to promote interest in Science Technology Engineering Mathematics (STEM) among the girl's student & Empowering Girls in STEM. Visit of the various laboratories of ICMR-NIRTH Jabalpur and demonstration of lab activities to the participating girls' students was organised. Some photographs of the event.

ICMR NIRTH organized an Expert Group Meeting on 3 & 4 July 2023 to review the priority research projects of the institute. The Committee was chaired by Padma Shri Prof. (Dr.) Aditya Prasad Dash, Honourable VC, Asian Institute of Public Health University, Bhubaneswar.


ICMR NIRTH felicitates Prof. (Dr.) Aditya Prasad Dash, Honourable VC, Asian Institute of Public Health University, Bhubaneswar, and its Former Director on 3 July 2023 for being conferred with the Padma Shri–2022.

Leading at the dais, Dr. Aparup Das, Director, ICMR-NIRTH along with Dr. Tapas Chakma, Scientist G, and Dr. K.B. Saha, Scientist G, Prof. B. Ravindran, Former Director ILS Bhubaneswar, Prof. K. Ghosh, Former Director ICMR-NIIH Mumbai and Dr. Anup Anvikar, Director, ICMR-NIMR, New Delhi. The event was graced by eminent scientists and professors from different institutes of repute as well as ICMR-NIRTH scientists, officials, staff, and students.


NATIONAL SPORTS DAY राष्ट्रीय खेल दिवस

ICMR-National Institute of Research in Tribal Health (ICMR-NIRTH), Jabalpur celebrated National Sports Day on 29/08/2023 with full enthusiasm, zeal and sports spirit. On this occasion of National Sports Day, Dr. Aparup Das, Scientist 'G' and Director, led a Fit India pledge for all the employees and officially initiated the beginning of the games and sports activities.

ICMR-National Institute of Research in Tribal Health (ICMR-NIRTH), Jabalpur celebrated 77th Independence Day of India with great pride, zeal and enthusiasm. Dr. Aparup Das, Scientist 'G' & Director, ICMR-NIRTH hoisted the National flag in ICMR-NIRTH campus followed by recitation of the National Anthem. The scientist, administrative, technical and project staff and their family members participated with full patriotism.

9th International Day of Yoga was celebrated with full enthusiasm at ICMR-NIRTH Jabalpur at assembly area. Yoga exercise as per the common protocol were performed at 6:30 am in the morning by Mr. Arvind Kavishwar, PTO this institute and nearly 30 participants were present. In the afternoon Dr. Aparup Das, Director ICMR-NIRTH Jabalpur welcomed the invited Guest and audience and focus the importance of Yoga in day-to-day life. Dr. Mrs. Reena Mishra, Assistant Professor, Department of Yoga, Rani Durgawati Vishwavidyalaya delivered a Guest lecture on the theme of 9th International Day of Yoga "Yoga for Vasudhevkutumbakam" her lecture was interactive and she also focused on the Dhyan and meditation during the discourse of her lecture. The programme ends with a grand success.

During Motivational talk to the students of Poornayu Ayurved Chikitsalaya evam Anusandhan Vidyapeeth, Jabalpur. Lecture by Dr. Vijay Singh to the students about Diagnosis of Ruminant Viral Diseases at Animal Biotechnology Centre, NDVSU, Jabalpur.

APPENDICES (COMMITTEES)

SCIENTIFIC ADVISORY COMMITTEE (SAC)

1. Prof. Deepak B. Saxena – Chairperson
2. Prof. Puneet Misra – Member
3. Prof. Sanjay K. Mohanty – Member
4. Dr Sanjay Kumar Bhadada – Member
5. Prof. Giriraj R. Chandak – Member
6. Prof. Rajpal Singh Kashyap – Member
7. Prof. Amit Awasthi – Member
8. Prof. Tulika Seth – Member
9. Prof. Aquil Ahmed – Member
10. Dr. Reena Tilak – Member
11. Prof. Suman Dhar – Member
12. Dr. Vinod Scaria – Member
13. Head RCN – Member
14. Head NCD – Member
15. Head ECD – Member
16. Program – Officer (Tribal Health) – Member
17. MoTA Representative – Member
18. State Government – Member
19. Director, NIIH – Member
20. Director, NIRTH – Member

INSTITUTIONAL ETHICS COMMITTEE

1. Dr. Neena Valecha- Chairperson
2. Dr. Pradeep Kumar Kasar- Vice Chairperson
3. Dr. Sradul Singh Sandhu- Member
4. Dr. Monica Lazarus- Member
5. Dr. Sanjay Gedam- Member
6. Dr. Jitin Bajaj- Member
7. Ms. Anagha Paul- Member
8. Mr. Akhil Khare- Member
9. Mr. Narayan Matolya- Member
10. Dr. Ravindra Kumar- Member
11. Dr. Suyesh Shrivastava- Member
12. Dr. Rituraj Niranjan- Member Secretary (Alt)
13. Dr. Tapas Chakma- Member Secretary

INSTITUTIONAL ACADEMIC COMMITTEE

1. Dr. Kalyan B Saha, Scientist 'G' – Chairman
2. Dr. Surendra Kumar, Scientist 'D' – Member
3. Dr. Ravindra Kumar, Scientist 'C' – Member
4. Dr. Nishant Saxena, Scientist 'C' – Member
5. Dr. Anil Kumar Verma, Scientist 'C' – Member Secretary

RECRUITMENT SCRUTINY COMMITTEE

1. Dr. Vidhan Jain, Scientist 'D'
2. Dr. Rituraj Niranjan, Scientist 'D'
3. Dr. Suyesh Shrivastava, Scientist 'C'
4. Dr. Ravindra Kumar, Scientist 'C'
5. Dr. Nishant Saxena, Scientist 'C'
6. Dr. Qaiser Farooq Dar, Scientist 'C'
7. Mrs. Nazia A. Ali, Technical Officer – B
8. Shri Lalit Kumar Sahare, Technical Officer – B
9. Mr. Mahendra Jaideo Ukey, Technical Officer – B
10. Mr. Surendra Kumar Jhariya, Technician – II

PUBLICATION SCREENING COMMITTEE

1. Dr. R. R. Tiwari, Director (Addl. Charge)- Chairman
2. Dr. Tapas Chakma, Scientist 'G'- Member
3. Dr. Kalyan B Saha, Scientist 'G' – Member
4. Dr. Rajasubramaniam S, Scientist 'F'- Member
5. Dr. Pushpendra Singh, Scientist 'F'- Member
6. Dr. Dinesh Kumar, Scientist 'E'- Member
7. Dr. Ravindra Kumar, Scientist 'C'- Member
8. Dr. Anil Verma , Scientist 'C'- Member
9. Dr. Suyesh Shrivastava, Scientist 'C'- Member
10. Dr. Nishant Saxena, Scientist 'C'- Member Secretary

ANNUAL REPORT COMMITTEE

1. Dr. Qaiser Farooq Dar, Scientist 'C' – Chairperson
2. Dr. Satyendra Kumar Pandey, Scientist 'C'- Member
3. Dr. Sandeep Kumar Mahiwal, Scientist 'B'- Member
4. Sh. Arvind Kavishwar, Principal Technical Officer- Member
5. Sh. Deepanshu Bhatia, Technical Assistant- Member
6. Ms. Diksha Singh, Technical Assistant- Member
7. Ms. Meghna Mondal, Technical Assistant- Member

STUDENT GRIEVANCE REDRESSAL COMMITTEE

1. Dr. R.R Tiwari, Scientist 'G'- Director (Addl. Charge) and Chairman
2. Dr. Tapas Chakma, Scientist 'G'- Member
3. Dr. Kalyan B Saha, Scientist 'G'- Member
4. Dr. Anil Verma , Scientist 'C'- Member and OBC Representative
5. Ms. Pooja S Lamkhade- Member and Student Representative

INSTITUTIONAL REFRESHMENTS COMMITTEE

1. Sh. Mahendra Jaidev Ukey, Technical Officer- B
2. Sh. Sanjeev Kumar Shukla, Field Lab Attendant
3. Sh. Kaushal Kumar Shukla, Field Lab Attendant
4. Sh. Vikas Kumar Gupta, Upper Division Clerk
5. Smt. Mala Prajapati, Technician-1
6. Sh. Prem Singh Gond, Lab. Assistant-1

INSTITUTIONAL CAFETERIA COMMITTEE

1. Dr. K.B Saha, Scientist- 'F' – Chairperson
2. Mrs. Reena Shome, Technical Officer- 'B'- Member
3. Mr. Lalit Kumar Sahare, Technical Officer- 'B'- Member
4. Mr. Nitish Singh Parihar, Technical Assistant – Member
5. Ms. Anjali Rajput, Upper Division Clerk- Member
6. Mr. Anil Vinodia, Laboratory Assistant-1 – Member

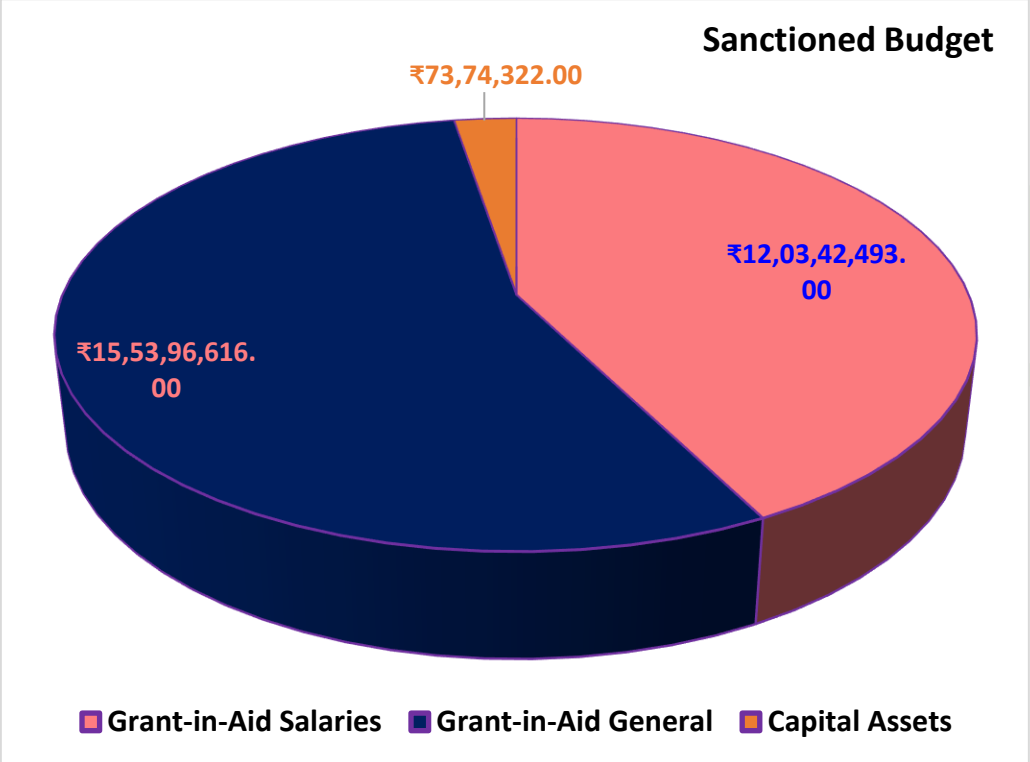
INSTITUTIONAL STORE INDENT COMMITTEE

1. Dr. Tapas Chakma, Scientist 'G'
2. Dr. Ravindra Kumar, Scientist 'C'
3. Dr. Nishant Saxena, Scientist 'C'
4. Sh. R.K Thakur, Administrative Officer
5. Sh. Shokat Azam Sheikh, Accounts Officer
6. Sh. Milind Dixit, Section Officer (Stores)

BUDGET 2023-24

FY 2023-24 BUDGET INFORMATION

Sr. No.	Head	Sanctioned Budget
1.	Grant-in-Aid Salaries	₹ 12,03,42,493.00
2.	Grant-in-Aid General	₹ 15,53,96,616.00
3.	Capital Assets	₹ 73,74,322.00
Total Budget Received (1 + 2 + 3)		₹ 28,31,13,431.00



राजभाषा नीति के कार्यान्वयन एवं अनुपालन से संबंधित प्रगति रिपोर्ट

आईसीएमआर–राष्ट्रीय जनजाति स्वास्थ्य अनुसंधान संस्थान, जबलपुर में भारत सरकार, गृह मंत्रालय, राजभाषा विभाग की राजभाषा नीति के समुचित कार्यान्वयन एवं अनुपालन के लिए सतत प्रयास किए जा रहे हैं। प्रतिवेदन अवधि के दौरान इस संस्थान में हिंदी के प्रगामी प्रयोग एवं सरकारी कामकाज में हिंदी के प्रयोग को बढ़ावा देने हेतु किए गए प्रयासों का संक्षिप्त विवरण इस प्रकार है :–

1. राजभाषा कार्यान्वयन समिति

राजभाषा विभाग के आदेशानुसार इस अनुसंधान संस्थान में 'राजभाषा कार्यान्वयन समिति' गठित है :–

1. डॉ. राजनारायण आर0 तिवारी, निदेशक (अतिरक्ति प्रभार)	–	अध्यक्ष
2. डॉ. कल्याण ब्रत साहा, वैज्ञानिक 'जी'	–	सदस्य
3. श्री राजेन्द्र कुमार ठाकुर, प्रशासनिक अधिकारी	–	सदस्य
4. श्री शोकत आजम शेख, लेखा अधिकारी	–	सदस्य
6. श्री मिलिंद दीक्षित, कार्यवाहक अनुभाग अधि0 (भंडार)	–	सदस्य
7. श्री हाकिम सिंह ठाकुर, कनिष्ठ अनुवाद अधिकारी	–	सदस्य

सामान्यतः प्रत्येक तीन माह में इस समिति की बैठक होती है, जिसमें इस अनुसंधान संस्थान में राजभाषा कार्यान्वयन एवं अनुपालन की स्थिति की समीक्षा की जाती है तथा सरकार द्वारा निर्धारित लक्ष्यों को प्राप्त करने हेतु आवश्यक उपायों की संस्तुति की जाती है। प्रतिवेदन अवधि तक इस समिति की कुल 97 तिमाही बैठकें आयोजित की जा चुकी हैं।

2. हिंदी पत्राचार एवं टिप्पणी–लेखन

प्रतिवेदन अवधि के दौरान इस केन्द्र द्वारा 'क' क्षेत्र को मूलतः हिंदी में लगभग 50 प्रतिशत और उससे अधिक पत्राचार किया गया। साथ ही सरकार द्वारा निर्धारित लक्ष्य के अनुरूप हिंदी पत्राचार को 'क' क्षेत्र के अलावा 'ख' एवं 'ग' क्षेत्रों के साथ भी मूल हिंदी पत्राचार को बढ़ाने के लिए प्रयास किए जा रहे हैं। अधिकांश फाइलों पर भी हिंदी में टिप्पणियां लिखी जाती हैं। पिछली बैठकों में संस्थान द्वारा मूल हिंदी पत्राचार एवं मूल रूप से हिंदी टिप्पणी–लेखन का प्रतिशत और बढ़ाए जाने तथा संस्थान में प्रतिवर्ष हिंदी की नई पुस्तकों की खरीद पर कार्यान्वयन के कदम उठाए गए हैं।

3. धारा 3(3) एवं राजभाषा नियम–5 का अनुपालन

राजभाषा अधिनियम, 1963 (यथासंशोधित 1967) की धारा 3(3) के अनुपालन में सामान्य–आदेश/परिपत्र, सूचना के अंतर्गत रिक्त पदों के विज्ञापन, निविदा सूचना एवं निविदा प्रपत्र आदि निर्दिष्ट दस्तावेजों के अतिरिक्त रिक्त पदों के विज्ञापन आदि भी हिंदी/द्विभाषी रूप में जारी किए जाते हैं।

4. प्रशिक्षण

इस संस्थान के अधिकांश अधिकारियों एवं कर्मचारियों को हिंदी का कार्यसाधक ज्ञान/प्रवीणता प्राप्त है और प्रशासनिक अनुभागों – स्थापना, लेखा एवं भंडार अनुभागों में तैनात कर्मचारियों द्वारा अधिक से अधिक मूलतः हिंदी में सरकारी कामकाज निष्पादित करने का प्रयास किया जाता है।

राजभाषा विभाग के निर्देशों के अनुसार, जिन कर्मचारियों को हिंदी टंकण एवं हिंदी आशुलिपि के सेवाकालीन प्रशिक्षण की आवश्यकता थी, उन सभी को हिंदी शिक्षण योजना, राजभाषा विभाग, जबलपुर कार्यालय से हिंदी टंकण/हिंदी आशुलिपि का प्रशिक्षण दिलाया गया है। वर्तमान में केवल एक आशुलिपिक हिंदी आशुलिपि प्रशिक्षण के लिए शेष हैं, उन्हें शीघ्र ही हिंदी शिक्षण योजना के माध्यम से हिंदी आशुलिपि का प्रशिक्षण दिलाया जाएगा।

5. विभागीय परीक्षाओं में द्विभाषी प्रश्न –पत्र उपलब्ध कराना

सरकार द्वारा जारी निर्देशों के अनुसार इस केंद्र में अधीनस्थ सेवाओं की भर्ती परीक्षा एवं विभागीय परीक्षाओं में द्विभाषी प्रश्न–पत्र उपलबध कराए जा रहे हैं।

6. प्रशिक्षण कार्यक्रमों एवं वैज्ञानिक विषयों पर व्याख्यानों में हिंदी को प्रमुखता

इस संस्थान में अनुसंधान कार्य से संबंधित प्रशिक्षण कार्यक्रमों और वैज्ञानिक व्याख्यानों आदि में हिंदी को प्रमुखता प्रदान की जाती है, जिससे अधिक से अधिक लोगों तक इसका लाभ पहुँच सके।

7. हिंदी–दिवस/हिंदी–पखवाड़ा

राजभाषा विभाग के निर्देशों के अनुसार हिंदी के प्रचार–प्रसार एवं मूलतः हिंदी में सरकारी कार्य करने को बढ़ावा देने के उद्देश्य से संस्थान में प्रति वर्ष हिंदी–दिवस एवं हिंदी–पखवाड़ा मनाया जाता है। इस दौरान निदेशक महोदय द्वारा सभी अधिकारियों एवं कर्मचारियों से सरकारी कामकाज अधिकाधिक हिंदी में करने की अपील की जाती है एवं अधिकारियों व कर्मचारियों के लिए हिंदी की विभिन्न प्रतियोगिताएँ आयोजित की जाती हैं।

इस वर्ष 14.09.2023 से 29.09.2023 तक 'हिंदी–पखवाड़ा' मनाया गया। इसके अंतर्गत संस्थान के वैज्ञानिकों, अधिकारियों एवं कर्मचारियों के लिए हिंदी टंकण (कम्प्यूटर पर), हिंदी निबंध–लेखन, हिंदी वाद–विवाद एवं हिंदी कविता–पाठ प्रतियोगिताएं आयोजित की गईं। दिनांक 29.09.2023 को 'हिंदी–पखवाड़ा' के समापन के अवसर पर संस्थान के तत्कालीन निदेशक डॉ. अपरूप दास ने हिंदी प्रतियोगिताओं के विजेताओं को संबोधित कर उन्हें आगे और अच्छे प्रदर्शन के लिए प्रेरित किया तथा प्रमाण–पत्र एवं नकद पुरस्कारों से उनका उत्साहवर्धन किया।

'हिंदी–पखवाड़ा' के अंतर्गत संपन्न इन हिंदी प्रतियोगिताओं के विजेताओं तथा उन्हें प्रदान किए गए नकद पुरस्कारों की सूची इस प्रकार है :–

क्रम.सं.	प्रतियोगिता	पुरस्कार प्राप्त करने वाले अधि./कर्म.	नकद पुरस्कार
1.	**हिंदी टंकण प्रतियोगिता**		
	प्रथम	श्री राहुल कोष्टा, उच्च श्रेणी लिपिक	रु. 5000/–
	द्वितीय	श्री नरेन्द्र कुमार झारिया, उच्च श्रेणी लिपिक	रु. 3000/–
	तृतीय	श्री दयानंद विश्वकर्मा, उच्च श्रेणी लिपिक	रु. 2000/–
	सांत्वना (1)	कु0 अंजली राजपूत, उच्च श्रेणी लिपिक	रु. 1000/–
	सांत्वना (2)	श्री सुबाष चंद्र मुदुली, निजी सहायक	रु. 1000/–
2.	**हिंदी निबंध–लेखन प्रतियोगिता**		
	प्रथम	श्री रामस्वरूप उइके, तकनीशियन–1	रु. 5000/–
	द्वितीय	श्री विवेक कुमार चौकसे, तकनीकी सहायक	रु. 3000/–
	तृतीय	कु0 अंजली राजपूत, उच्च श्रेणी लिपिक	रु. 2000/–
	सांत्वना (1)	श्री संतोष कुमार पाटकर, तकनीशियन–2	रु. 1000/–
	सांत्वना (2)	श्री मुकेश सिंह कछवाहा, एमटीएस (तक.)	रु. 1000/–
3.	**हिंदी वाद–विवाद प्रतियोगिता**		
	प्रथम	श्री संतोष कुमार पाटकर, तकनीशियन–2	रु. 5000/–
	द्वितीय	श्रीमती नाजिया अली, तकनीकी अधिकारी–बी	रु. 3000/–
	तृतीय	श्री विवेक कुमार चौकसे, तकनीकी सहायक	रु. 2000/–
	सांत्वना (1)	श्री सार्थक सोनी, आशुलिपिक	रु. 1000/–
	सांत्वना (2)	श्री सुरेन्द्र कुमार झारिया, तकनीशियन–सी	रु. 1000/–
4.	**हिंदी कविता–पाठ प्रतियोगिता**		
	प्रथम	श्री विवेक कुमार चौकसे, तकनीकी सहायक	रु. 5000/–
	द्वितीय	श्री सुबाष चंद्र मुदुली, निजी सहायक	रु. 3000/–
	तृतीय	श्रीमती रीना सोम, तकनीकी अधिकारी–सी	रु. 2000/–
	सांत्वना (1)	श्रीमती नाजिया अली, तकनीकी अधिकारी–बी	रु. 1000/–
	सांत्वना (2)	श्री दीपचंद खातरकर, वरि0तकनीशियन–3	रु. 1000/–

योग– रु. **48,000**/–

(कुल राशि – अड़तालीस हजार रुपए मात्र)

STAFF LIST

- **List of Staff 2023 – 2024**

Sr. No	NAME	DESIGNATION
1.	Sh. RAJENDRA KUMAR THAKUR	ADMINISTRATIVE OFFICER
2.	Sh. ANKIT KUMAR MISHRA	SECTION OFFICER
3.	Sh. ABHISHEK SARAF	SECTION OFFICER
4.	Sh. MILIND DIXIT	PRIVATE SECRETARY
5.	Sh. SUBASH CH. MUDULI	PERSONAL ASSISTANT
6.	Sh. HAKIM SINGH THAKUR	JR. TRANSLATION OFFICER
7.	Sh. ARVIND KAVISHWAR	P.T.O.
8.	Sh. SACHCHIDANAND SINGH	P.T.O.
9.	Mrs. REENA SHOME	TECHNICAL OFFICER-C
10.	Sh. ASHOK KUMAR GUPTA	TECHNICAL OFFICER-B
11.	Mrs. CANINA LUKE	TECHNICAL OFFICER-B
12.	Sh. LALIT K. SAHARE	TECHNICAL OFFICER-B
13.	Sh. MAHENDRA JAIDEV UKEY	TECHNICAL OFFICER-B
14.	Mrs. NAZIA ANWAR ALI	TECHNICAL OFFICER-B
15.	Sh. SUBHASH S. KUMBHARE	SENIOR TECHNICIAN (3)
16.	Sh. PURUSHOTTAM PATEL	SENIOR TECHNICIAN (3)
17.	Sh. ASHOK KUMAR SAINI	SENIOR TECHNICIAN (3)
18.	Sh. RAM KUMAR VERMA	SENIOR TECHNICIAN (3)
19.	Sh. DEEPCHAND KHATARKAR	SENIOR TECHNICIAN (3)
20.	Sh. BALRAM SINGH PATEL	SENIOR TECHNICIAN (3)
21.	Sh. PRADEEP KUMAR NAMDEO	SENIOR TECHNICIAN (2)
22.	Sh. MAHENDRA KUMAR JAIN	LABORATORY ASSISTANT-1
23.	Sh. GENDA LAL GOND	SENIOR TECHNICIAN (2)
24.	DR. SHIV KUMAR SINGH	SENIOR TECHNICIAN (2)
25.	Sh. BAISHAKHU LAL	ASSISTANT
26.	Sh. AMAN SIYOTE	ASSISTANT
27.	Sh. VIVEK KUMAR CHOUKSEY	TECHNICAL OFFICER-A
28.	DR. SRI KRISHNA	TECHNICAL OFFICER-A
29.	Sh. NITISH SINGH PARIHAR	TECHNICAL OFFICER-A
30.	Sh. SAHAS RAM SHUKLA	LAB. TECHNICIAN
31.	Sh. RAMESH KUMAR BHATIA	INSECT COLLECTOR
32.	Sh. SANJEEV KUMAR SHUKLA	FIELD LAB.ATTENDANT
33.	Sh. KAUSHAL KUMAR SHUKLA	FIELD LAB.ATTENDANT
34.	Sh. RAJU HARIJAN	DRIVER
35.	Sh. OM PRAKASH DUBEY	DRIVER
36.	Sh. DHARMENDER K. LODHI	DRIVER
37.	Sh. LALJU SINGH	PEON
38.	Sh. HARI BARMAN	TECHNICIAN (2)
39.	Sh. SURENDRA K. JHARIYA	TECHNICIAN (2)
40.	Sh. SANTOSH KUMAR PATKAR	TECHNICIAN (2)
41.	Sh. PRAKASH SANGLE	TECHNICIAN (1)
42.	Sh. SHASHI BHUSHAN DUBE	TECHNICIAN (1)
43.	Sh. RAMSWAROOP UIKEY	TECHNICIAN (1)
44.	Mrs. MALA PRAJAPATI	TECHNICIAN (1)
45.	Sh. ANUP K. VISHWAKARMA	TECHNICIAN (1)

46.	Sh. NARENDRA K. JHARIYA	UPPER DIVISION CLERK
47.	Sh. SARTHAK SONI	STENOGRAPHER
48.	Sh. SHARAD KUMAR KOSTA	UPPER DIVISION CLERK
49.	Sh. RAHUL KOSHTA	UPPER DIVISION CLERK
50.	Sh. VIKAS KUMAR GUPTA	UPPER DIVISION CLERK
51.	Ms. ANJALI RAJPUT	UPPER DIVISION CLERK
52.	Sh. DAYANAND VISHWAKARMA	UPPER DIVISION CLERK
53.	Sh. ANIL VINODIA	LABORATORY ASSISTANT-1
54.	Sh. RAMESH KUMAR AHIRWAR	LABORATORY ASSISTANT-1
55.	Sh. MALIKHAN SINGH	LABORATORY ASSISTANT-1
56.	Sh. AJAY KUMAR SONI	LABORATORY ASSISTANT-1
57.	Sh. JAGDISH PRASAD THAKUR	LABORATORY ASSISTANT-1
58.	Sh. SURESH KUMAR BURMAN	LABORATORY ASSISTANT-1
59.	Sh. MADAN SINGH MARAVI	LABORATORY ASSISTANT-1
60.	Sh. PREM SINGH GOND	LABORATORY ASSISTANT-1
61.	Sh. SONE LAL DUMAR	LABORATORY ASSISTANT-1
62.	Sh. GANGA BAHADUR	LABORATORY ASSISTANT-1
63.	Sh. PRITAM LAL GOND	LABORATORY ASSISTANT-1
64.	Sh. PAPPU LAL DUMAR	LABORATORY ASSISTANT-1
65.	Sh. SANTOSH KUMAR KOL	LABORATORY ASSISTANT-1
66.	Sh. DHARMENDRA DHARWEY	TECHNICIAN (1)
67.	Sh. MUKESH S. KACHHWAHA	MTS(Tech)
68.	Sh. ARAKH CHAND MALIK	LABORATORY ASSISTANT-1
69.	Mrs. SHASHI PRABHA MISHRA	LABORATORY ASSISTANT-1
70.	Sh. SHAMSHAD ALI ANSARI	LABORATORY ASSISTANT-1
71.	Sh. SANTOSH KUMAR HALDKAR	LABORATORY ASSISTANT-1
72.	Sh. VINAY KUMAR BALMIK	LABORATORY ATTENDANT-2
73.	Sh. SANTOSH KUMAR MARAVI	LABORATORY ATTENDANT-1
74.	Sh. RAJA SONKAR	MULTI TASKING STAFF (GEN)

- **NEWLY RECRUITED STAFF DURING 2023 – 2024**

Sr. No	NAME	DESIGNATION	Date
1.	Sh. AMAN SIYOTE	ASSISTANT	04.10.2023
2.	Sh. ARPIT MOURYA	TECHNICAL ASSISTANT	12.03.2024
3.	Sh. DEEPANSHU BHATIA	TECHNICAL ASSISTANT	12.03.2024
4.	Sh. SAURABH SINGH	TECHNICAL ASSISTANT	14.03.2024
5.	Sh. VIJAY KUMAR DWIVEDI	TECHNICAL ASSISTANT	14.03.2024
6.	Sh. PANKAJ DHEER	TECHNICAL ASSISTANT	15.03.2024
7.	Sh. TARENDRA DIGARSE	TECHNICAL ASSISTANT	18.03.2024
8.	Sh. CHANDAN KUMAR	TECHNICAL ASSISTANT	18.03.2024
9.	Sh. ANAND KUMAR	TECHNICAL ASSISTANT	18.03.2024
10.	Sh. GAURAV SHARMA	TECHNICAL ASSISTANT	19.03.2024
11.	Sh. TARANAND SINGH	TECHNICAL ASSISTANT	19.03.2024
12.	Ms. MODALI SRAVANI	TECHNICAL ASSISTANT	19.03.2024
13.	Sh. RATNESH MISHRA	TECHNICAL ASSISTANT	20.03.2024
14.	Sh. CHIRANTAN MAITY	TECHNICAL ASSISTANT	21.03.2024
15.	Ms. DIKSHA SINGH	TECHNICAL ASSISTANT	21.03.2024
16.	Ms. ANKITA MOURYA	TECHNICAL ASSISTANT	22.03.2024

17.	Sh. BHUPENDRA MEENA	TECHNICAL ASSISTANT	27.03.2024
18.	Sh. SURENDRA SINGH MEHRA	TECHNICAL ASSISTANT	27.03.2024
19.	Sh. SHIVAM NIGAM	TECHNICIAN-1	12.03.2024
20.	Sh. MOHIT SAINI	TECHNICIAN-1	13.03.2024
21.	Ms. PALAK JAIN	TECHNICIAN-1	13.03.2024
22.	Ms. AYUSHI NAGRIYA	TECHNICIAN-1	14.03.2024
23.	Sh. SHUBHAM CHAUDHARI	TECHNICIAN-1	15.03.2024
24.	Sh. WASEEM KHAN	TECHNICIAN-1	18.03.2024
25.	Sh. MONU DALAL	TECHNICIAN-1	20.03.2024
26.	Sh. LAVLESH KUMAR MAURYA	TECHNICIAN-1	26.03.2024
27.	Sh. NITIN UPADHYAY	TECHNICIAN-1	26.03.2024
28.	Sh. VAIBHAV BISHT	TECHNICIAN-1	27.03.2024
29.	Sh. HARSH SONKAR	LAB.ATTENDANT-1	13.03.2024
30.	Ms. EKTA BARKADE	LAB.ATTENDANT-1	20.03.2024
31.	Ms. BHARTI SHIV	LAB.ATTENDANT-1	27.03.2024

- **TRANSFERRED OUT FROM NIRTH 2023 – 2024**

Sr. No	NAME	DESIGNATION	Transferred	Date
1.	Sh. ARUN RANCHANDRA SABLE	STO-2	NIV, Pune	25.05.2023

- **RETIREMENT 2023 – 2024**

Sr. No	NAME	DESIGNATION	Status	Date
1	SH. RAMESH KUMAR GOND	SENIOR TECHNICIAN – 3	Retired	30.04.2023
2	SH. VIJAY KUMAR KACHHI	LABORATORY ASSISTANT – 1	Retired	30.04.2023
3	SH. VISHWANATH YADAV	SENIOR TECHNICIAN – 1	Retired	31.05.2023
4	DR. B.K. TIWARI	P.T.O.	Retired	30.06.2023
5	SH. PRAMOD KUMAR CHOUBEY	UPPER DIVISION CLERK	Retired	30.06.2023
6	SH. AJESH KUMAR DUBEY	SENIOR TECHNICIAN – 2	Retired	30.06.2023
7	SH. SUKHLAL VISHWAKRA	LABORATORY ASSISTANT – 1	Retired	30.06.2023
8	SH. SURESH KUMAR DUBEY	DRIVER	Retired	30.06.2023
9	SH. SHREE RAM MISHRA	SENIOR TECHNICIAN – 3	Retired	30.06.2023
10	SH. MANOHAR LAL BARMAN	FIELD WORKER	Retired	31.08.2023
11	SH. UMESH PRASAD GAUTAM	LABORATORY ASSISTANT – 1	Retired	30.09.2023
12	SH. AJAY MOHAN KANOJIA	FIELD LAB.ATTENDANT	Retired	31.10.2023
13	SH. KAMTA PRASAD JAYASHWAL	LABORATORY ASSISTANT – 1	Retired	30.11.2023

Published by:
Director
आई. सी. एम. आर. - राष्ट्रीय जनजाति स्वास्थ्य अनुसंधान संस्थान,
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