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The Case for an ICMR Centre in Southern Rajasthan: A Review with Focus on Udaipur, Salumbar and Pratapgarh

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ABSTRACT

Southern Rajasthan, anchored by the Udaipur, Salumbar and Pratapgarh districts, is home to one of India's largest concentrations of Scheduled Tribe communities, chiefly the Bhil, Garasia, Meena and Damor. The region carries an overlapping burden of inherited blood disorders, undernutrition, anaemia, endemic and vector-borne infections, tuberculosis, rising non-communicable disease and occupational and environmental illness linked to mining and industry. Despite this, the region has no permanent institute of the Indian Council of Medical Research (ICMR). The nearest ICMR institutes serve either the western desert (Jodhpur) or central India (Jabalpur), and most research in southern Rajasthan is carried out through short-term, project-based visits. This review summarises the available evidence on health needs in the region, examines the existing research landscape, and argues that a dedicated ICMR centre in the Udaipur–Salumbar–Pratapgarh belt would generate locally relevant evidence, strengthen the public health system, and support national elimination goals.

Keywords: ICMR, southern Rajasthan, tribal health, sickle cell disease, Udaipur, Salumbar, Pratapgarh, health research infrastructure

1. INTRODUCTION

India's health research system rests on the premise that evidence must be generated close to the people it is meant to serve. The Indian Council of Medical Research, the apex body for biomedical research under the Department of Health Research, pursues this through a network of permanent institutes and regional centres. Each was set up to address a particular regional or population-specific problem: desert health, tribal health, malaria, tuberculosis, nutrition, and so on.

Southern Rajasthan has a strong claim to a place in that network. The Aravalli and Vagad hills of Udaipur, Salumbar, Pratapgarh, Banswara and Dungarpur form a contiguous tribal belt with a distinct ecology, a distinct genetic and cultural profile, and distinct patterns of disease. Yet research here has largely depended on the goodwill of individual medical colleges, non-governmental organisations and externally funded projects. This review asks a practical question: what would a permanent ICMR presence add that the current arrangement cannot?[1, 2]

2. THE REGION: GEOGRAPHY AND PEOPLE

Udaipur is the cultural and medical hub of Mewar and houses a government medical college and several large private teaching hospitals that attract patients from across southern Rajasthan, Gujarat and Madhya Pradesh. Salumbar, carved out of Udaipur as a separate district in 2023, is predominantly tribal and rural. Pratapgarh, a district since 2008, lies on the Malwa–Mewar–Vagad frontier and has a large tribal population as well. Together with Banswara, Dungarpur and Sirohi, these districts fall within the tribal sub-plan area of the state.[3, 4]

Terrain shapes health in this region. Hamlets, locally called *phalas*, are scattered across forested hills, often with poor road connectivity. Seasonal and distress migration to Gujarat and to urban construction and mining work is common, which complicates continuity of care, vaccination, tuberculosis treatment and antenatal follow-up. Agriculture is largely rain-fed and small-holding, and food insecurity and seasonal dietary gaps are well recognised in tribal districts. These conditions create a setting where national averages conceal very different local realities, which is precisely why locally generated data matter.[5, 6, 7, 8, 9]

3. THE BURDEN OF DISEASE

3.1 Sickle cell disease and haemoglobinopathies

Sickle cell disease (SCD) is the clearest example of a region-specific problem. A pilot study published in the Indian Journal of Medical Research screened tribal students in Maa-Baadi institutions and hostels across the five tribal sub-plan districts of Rajasthan and found an overall SCD prevalence of 5.8 per cent, with most cases heterozygous (trait) and a small fraction homozygous. District-wise figures varied widely, with Sirohi highest at 10.5 per cent, followed by Banswara, Udaipur (6.53 per cent) and Pratapgarh (5.51 per cent). Among tribes, Garasia communities showed the highest prevalence, at roughly 13.8 per cent.[4, 10]

Other studies point the same way. A population-based screening study in two blocks of southern Rajasthan, published in *Scientific Reports*, reported sickle cell trait at nearly 10 per cent and disease at about 0.3 per cent, with a combined prevalence above 15 per cent among the Garasiya. A hospital-based study from Udaipur's tertiary centre found that a substantial share of clinically suspected patients had a sickling disorder, including HbSS and sickle-beta thalassaemia. Earlier paediatric work in Udaipur and Sirohi tribal areas had reached similar conclusions.[1, 11]

These studies, valuable as they are, differ in design, sampling frame and laboratory method, and several are pilots or hospital-based. No single institution holds a longitudinal registry of cases, genotype–phenotype data, or outcomes under hydroxyurea and newer therapies. India has committed to eliminating sickle cell disease as a public health problem by 2047, and a national mission is under way. Parliamentary replies record that screening and treatment funds have been allocated to districts in Rajasthan, including Udaipur and Pratapgarh. Delivering on that mission requires exactly the kind of sustained, locally anchored research a regional centre would provide: cohort follow-up, newborn screening pilots, counselling models and cost-effectiveness studies.[3, 4, 5, 12, 13, 14, 15, 16, 17]

3.2 Undernutrition and anaemia

National surveys have repeatedly shown that tribal districts of Rajasthan carry high levels of stunting, underweight and anaemia among children and women. Anaemia in this region is particularly hard to interpret because nutritional iron deficiency, haemoglobinopathies and malaria can coexist in the same individual. Iron supplementation programmes designed for nutritional anaemia may need adjustment where sickle cell and thalassaemia are common. Questions such as the right screening sequence, the safety and effectiveness of supplementation in carriers, and the role of millets, local foods and fortification cannot be answered from national data alone.[7, 8, 18, 19, 20, 21]

3.3 Infectious diseases

Tuberculosis remains a major concern in tribal and migrant populations, where undernotification, delayed diagnosis and treatment interruption are persistent problems. Malaria, though greatly reduced nationally, continues to need surveillance in forested and hilly pockets, and the post-monsoon season brings dengue, scrub typhus and diarrhoeal outbreaks to the wider region. Udaipur's lake and hill ecology, combined with seasonal migration, makes it a useful site for studying vector dynamics and importation of infection.[1, 2] A permanent unit could run entomological surveillance, antimicrobial resistance monitoring and outbreak response research as a continuing activity rather than a one-off.[22, 23, 24]

3.4 Non-communicable diseases

The assumption that tribal populations are shielded from lifestyle disease is increasingly doubtful. ICMR's Desert Medicine Research Centre has itself run trials in Udaipur's tribal population on diet and lifestyle intervention for hypertension, hypercholesterolaemia and diabetes risk reduction using Anganwadi centres as the delivery platform. That such studies are being commissioned shows both the importance of the problem and the fact that it is currently approached from outside the region. Rising salt intake, tobacco and alcohol use, and changing diets make this a moving target that requires continuous observation.[25, 26, 27]

3.5 Occupational and environmental health

Southern Rajasthan has a long mining and mineral-processing history, including lead-zinc mining and smelting in the Udaipur belt, along with quarrying of marble, soapstone and other stone in neighbouring areas. Workers in stone and mineral industries face risk of silicosis and tuberculosis co-morbidity, and communities near industrial sites may face questions about heavy metals and water quality. Groundwater fluoride and other geogenic contaminants are recognised concerns across Rajasthan. Documentation specific to the Udaipur–Salumbar–Pratapgarh belt is patchy, which itself is an argument for systematic research. Readers should treat the occupational and environmental claims here as a prompt for study rather than as quantified burden estimates.[28, 29, 30, 31]

3.6 Maternal, child and mental health

Home deliveries in remote hamlets, adolescent marriage, limited antenatal coverage and neonatal mortality remain concerns in tribal districts, and mental health, substance use and suicide are under-researched. Traditional healers, known as *bhopas*, remain an important first point of contact, and understanding how formal and traditional systems interact is a legitimate research question that only long-term field presence can answer. [1, 2, 3, 4, 5, 6, 7]

4. THE EXISTING RESEARCH LANDSCAPE AND ITS LIMITS

ICMR's institutes are located to serve defined needs. The Desert Medicine Research Centre in Jodhpur, established in 1984, focuses on health problems of arid and desert regions of western Rajasthan. The National Institute of Research in Tribal Health in Jabalpur, formerly the Regional Medical Research Centre for Tribals and also established in 1984, works on tribal health in and around central India. Both do valuable work, and both have reached southern Rajasthan through projects, for example sickle cell screening in tribal sub-plan districts and intervention trials in Udaipur. But the southern Rajasthan tribal belt is neither desert nor central India. It has its own ecology, its own tribal groups and its own disease profile.[1, 2, 3, 4, 32, 33, 34]

Other actors are active. Medical colleges in Udaipur contribute clinical studies. IIM Udaipur's Centre for Healthcare, working with the non-profit Basic Healthcare Ser-

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vices, is implementing the ICMR and Gates Foundation supported EQUIP-HWC project on comprehensive primary care in Salumbar district. This is encouraging: it shows that ICMR already invests in the region and that local institutions have the appetite and capacity to collaborate.[35, 36, 37]

But project-based research has structural weaknesses. Staff are hired on short contracts and leave when funding ends. Data are rarely consolidated across projects. Laboratory capacity, for example for HPLC-based haemoglobin analysis or molecular diagnostics, is built for each study and then dismantled. Community trust, which takes years to build, has to be rebuilt each time. A permanent centre would convert these recurring costs into durable assets.[3, 7, 9]

5. WHAT AN ICMR CENTRE WOULD DELIVER

A population-based research platform. A health and demographic surveillance site covering representative blocks of Udaipur, Salumbar and Pratapgarh would give the region something it lacks: a denominator. With reliable denominators, researchers can measure incidence, track outcomes, and evaluate programmes over years.

A sickle cell and haemoglobinopathy programme. The centre could host a registry, a reference laboratory for confirmatory diagnosis, newborn and adolescent screening pilots, counselling and pre-marital screening research, and trials of treatment protocols suited to low-resource settings. It could also support the national elimination mission by training and quality-assuring district laboratories.

Translational and implementation research. Much of what India needs from research is not new drugs but better delivery: how to get a tuberculosis patient in a remote hamlet to complete treatment, how to run a health and wellness centre with limited staff, how to make screening acceptable. Implementation science requires embedded teams who understand local systems, and a centre would provide them.

Infectious disease surveillance and response. Entomological, serological and genomic surveillance, combined with rapid outbreak investigation, would strengthen early warning for the region and for neighbouring Gujarat and Madhya Pradesh.

Occupational and environmental health research. A dedicated unit could study silicosis, heavy-metal exposure, fluoride and water quality, informing both clinical care and regulatory action.

Capacity building. Southern Rajasthan has strong medical education institutions but limited research training. A centre would offer PhD and postdoctoral positions, short courses in epidemiology and biostatistics, and mentorship for medical college faculty, retaining talent that currently leaves for metropolitan institutions.

Indigenous knowledge and ethics. Documentation and scientific evaluation of traditional food and healing practices, conducted with community consent and benefit-sharing, would bring ethical rigour to a field where extractive research has been a concern.

6. WHY UDAIPUR, SALUMBAR AND PRATAPGARH

Udaipur offers what any research institute needs: an airport, rail and road connectivity, tertiary hospitals, medical and pharmacy colleges, a university ecosystem and an existing culture of collaboration. Salumbar offers a predominantly tribal field site with an active primary care research project already in progress. Pratapgarh extends coverage to a distinct tribal and ecological zone with documented sickle cell burden, and its proximity to Madhya Pradesh and Gujarat makes it valuable for studying cross-border population movement. A centre headquartered in Udaipur with field units in Salumbar and Pratapgarh would combine institutional strength with field access, a model that has worked for other ICMR units.

The case is strengthened by the fact that this belt shares ecological and ethnic continuity with Banswara, Dungarpur and Sirohi, as well as with tribal districts of Gujarat and Madhya Pradesh. A centre here would serve a population far larger than any single district.

7. CHALLENGES AND RECOMMENDATIONS

Several hurdles deserve honest acknowledgement. Recruiting and retaining scientists in a district-level location is difficult; incentives, housing and partnership with local universities will matter. Land, infrastructure and recurring budgets must be secured. Duplication with existing ICMR institutes should be avoided by defining a clear mandate, with tribal health, haemoglobinopathies, occupational health and primary care implementation as the likely core, and by formal collaboration with DMRC Jodhpur and NIRTH Jabalpur.

We suggest a phased approach. First, a field unit or ICMR-supported extramural centre of excellence could be established in Udaipur, built on existing medical college and IIM Udaipur partnerships, to establish a surveillance site and sickle cell registry. Second, on demonstrated output, the unit could be upgraded to a regional centre with its own laboratories and scientific staff. Third, a permanent institute status could follow, with field stations in Salumbar and Pratapgarh. Throughout, community advisory boards, transparent data governance and state government partnership should be built in from the start.

8. CONCLUSION

Southern Rajasthan's tribal belt faces a distinctive combination of problems that national averages obscure and that outside project teams cannot fully address. Sickle cell disease alone, with prevalence figures in the high single digits in some groups and a national elimination target for 2047, justifies sustained local research. Add undernutrition, tuberculosis, rising non-communicable disease and occupational exposures, and the case for a permanent, regionally embedded research institution is strong. An ICMR centre in Udaipur, with field presence in Salumbar and Pratapgarh, would produce evidence relevant to policy, build local scientific capacity, and give tribal communities a lasting stake in the research that concerns them.

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