

Enhancing Quality, Capital, and Capacity for Equitable Newborn Screening Through We R.E.A.C.H. framework: The SISHU Initiative in Rural India

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Background: Rural and tribal regions of India continue to face inequities in universal newborn screening and follow-up care. Limited diagnostic infrastructure, fragmented systems, workforce shortages and high equipment costs prevent early identification of conditions that contribute to neonatal morbidity and mortality. The SISHU (Standardizing Infant Screening and Health for the Underserved) initiative was launched to address these gaps by creating a self-maintaining system that delivers universal screening based on evidence-based guidelines for heart disease, hearing loss, jaundice, limited genetic conditions and hip dysplasia, alongside targeted screening for hypoglycemia, sepsis and early cerebral palsy.

To achieve this, the initiative integrated established quality-improvement methods with a novel process framework, We R.E.A.C.H., designed to bridge gaps towards equitable newborn care. Lean methodology and the Quality–Cost–Delivery (QCD) framework were used to identify inefficiencies, redesign workflows and simplify tasks so that quality rested on the system rather than frontline staff or families. Kaizen principles, through PDSA cycles, enabled iterative frontline feedback, behavioral reliability and a culture of continuous improvement. Together, these approaches strengthened system performance and ensured that every infant requiring referral or follow-up was accurately identified, tracked and supported.

The We R.E.A.C.H. Framework- Resource-aligned, Evidence-supported, Access-driven, Capacity-enhancing Health System Integration provides the foundation for equitable implementation. By focusing on the “we”, solutions were designed *with* rural communities rather than *for* them, valuing local knowledge and cultural context as essential sources of expertise. Evidence-based tools were adapted to rural workflows, and capacity was built through training, mentorship and decision-support. Community participation was strengthened through parent and community health worker engagement. Health-system integration was achieved through standardized policies and digital monitoring systems that ensured tracking of completed and failed screens. This dual-framework approach advanced both process quality and equitable access.

Methods: The intervention began at Vivekananda Memorial Hospital (VMH), a rural secondary hospital in Karnataka, and later scaled to four affiliated primary facilities. Guided by We R.E.A.C.H., the team successfully implemented congenital heart disease screening, hearing screening using otoacoustic emissions, routine predischarge bilirubin assessment, and genetic screening using cord TSH and hemoglobin electrophoresis. Additional components included physical examination for hip screening and targeted screening for hypoglycemia, sepsis and early cerebral palsy. Implementation was supported by low-cost technologies developed through academic and industry partnerships, including smartphone-based OAE, a dual-sensor pulse

oximetry probe and Picterus Jaundice Pro tool. Evidence-based algorithms were contextualized to rural workflows, and digital systems improved documentation, adherence and follow-up.

Results: In 2025, VMH achieved 99.8% comprehensive newborn screening coverage among 407 deliveries. CCHD screening rose from 0% to 99% with strong guideline adherence. Universal OAE screening achieved timely follow-up, bilirubin assessments improved early detection of hyperbilirubinemia risk, and genetic screening reached near-complete uptake. The model successfully scaled to facilities serving ~4,000 annual births, demonstrating feasibility and early scalability.

Conclusion: The SISHU initiative shows that equitable newborn screening in low-resource settings is achievable with integration of the We R.E.A.C.H. framework for process and Lean–Kaizen–QCD systems for quality improvement. This combination created a reliable, community-aligned and operationally robust model capable of reducing preventable neonatal morbidity and mortality across underserved regions.



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