



# EXPERT CONSULTATION on

HOW INDIA IS ENABLING AND LEVERAGING

# IMMUNIZATION FOR BETTER HEALTH



**WOMEN'S**  
COLLECTIVE FORUM

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## Foreword

### How India is Enabling and Leveraging Immunization for Better Health



India's immunization journey embodies the nation's resolve to protect every life, from cradle to adulthood, through equitable and innovative public health strategies. This report, emerging from multi-zone expert consultations convened by the Women's Collective Forum in partnership with IIT Kharagpur, captures a collective vision for transforming immunization into a cornerstone of universal health coverage.

At its heart, the deliberations reveal persistent gaps of policy-programme disconnects, equity challenges in zero-dose children and underserved communities, and siloed efforts across sectors that demand urgent, community-rooted action. Yet, they also illuminate pathways forward: robust cross-sectoral partnerships, life-course immunization leveraging schools, workplaces and health centres, and digital tools like eVIN and U-WIN to ensure last-mile reach.

Frontline workers like ASHAs and ANMs, trusted community anchors, must be strengthened with training, incentives and flexible service models to bridge urban-rural divides and combat hesitancy. Integrating vaccines with maternal health, nutrition and adolescent programs aligns with our mission to advance gender equity, enabling women as health champions in their families and communities.

The private sector's role through Corporate Social Responsibility (CSR) outreach, cost-sharing and data integration complements government efforts, fostering a 4P model of public-private-people partnerships. This report's recommendations on policy modernization, demand generation and technological equity provide a blueprint for resilient systems that leave no one behind.

I extend my appreciation to the experts, WCF partners, CII and IIT Kharagpur team who invested their time and experience in shaping these dialogues. As we look ahead, the goal is clear: to build an immunization ecosystem that is inclusive, innovative, and prepared for tomorrow's challenges. I am confident that the pathways outlined here will contribute meaningfully to that mission

### **Mrs Smriti Z. Irani**

Founder & Chairperson

The Alliance for Global Good: Gender Equity & Equality

Advisor – Women's Collective Forum

## Foreword

Immunization is among the most effective and equitable public health interventions, forming a critical foundation for disease prevention, outbreak control, and population health security. India has made notable progress in expanding immunization coverage, introducing new vaccines, and strengthening delivery systems through sustained policy commitment and programmatic innovation. However, rapid demographic transitions, urbanization, population mobility, emerging infectious threats, and rising expectations of accountability require immunization systems to evolve beyond routine service delivery into more resilient, integrated, and adaptive models.



It is within this evolving context that the report, “How India is Enabling and Leveraging Immunization for Better Health,” has been developed. This report synthesizes insights from a series of structured expert consultations conducted across regions, bringing together perspectives from public health, clinical medicine, health systems research, technology, policy, academia, industry, and civil society. The intent was not merely to catalogue challenges, but to identify actionable and contextually relevant pathways that can strengthen immunization performance across diverse settings.

A key message emerging from these deliberations is the urgent need to reinforce policy frameworks by bridging the gap between national intent and ground-level implementation. Clear delineation of roles, stronger accountability mechanisms, and predictable financing are essential to ensure that immunization priorities are consistently translated into action at state, district, and urban levels. The consultations further emphasized that immunization outcomes cannot be sustained by the public sector alone. Effective engagement of private healthcare providers, educational institutions, municipal systems, and civil society organizations is indispensable for improving coverage, strengthening data systems, and building public trust.

The report also highlights the importance of transitioning toward a life course approach to immunization. While childhood vaccination remains fundamental, India’s changing epidemiological and demographic profile necessitates greater focus on adolescents, adults, and the elderly. Leveraging existing platforms such as schools, workplaces, antenatal services, and urban primary healthcare networks can address missed opportunities and enhance prevention across the lifespan.

Technology and data systems were identified as powerful enablers when integrated thoughtfully into programme design. Unified data frameworks, interoperable digital platforms, predictive analytics, and real-time dashboards can significantly improve surveillance, planning, and accountability. At the same time, sustained investment in frontline workforce capacity, digital literacy, and data interpretation is critical to ensure that technological advances translate into improved decision-making and outcomes.

It was a great opportunity for our multidisciplinary team from IIT Kharagpur to collaborate with Women's Collective Forum in this initiative. We view this report as a strategic and translational resource for policymakers, programme managers, researchers, and development partners. Our humble effort will be successful when it contributes meaningfully to India’s pursuit of universal, life course immunization and a more resilient health system.

### **Dr. Goutam Saha**

Chairperson, Centre of Excellence in Affordable Healthcare, and  
Professor, Dept. of Electronics and Electrical Communication  
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## Foreword

### How India is Enabling and Leveraging Immunization for Better Health

India's immunization programme stands as a testament to the nation's public health resolve, delivering cost-effective protection against vaccine-preventable diseases through decades of political commitment, scale, and innovation. This report offers a timely, evidence-based examination of how India is enabling and leveraging immunization as a cornerstone of universal health coverage.



This report on “How India is Enabling and Leveraging Immunization for Better Health,” developed through multi-zone expert consultations convened by the Women's Collective Forum and IIT Kharagpur, reflects on the hard-won progress of expanded routine coverage with Mission Indradhanush, new vaccine introductions, robust cold-chain logistics, enhanced surveillance, and digital platforms like eVIN and U-WIN that track beneficiaries and optimize supply in hard-to-reach areas. Life-course strategies and intensified drives have bolstered resilience, particularly for underserved urban migrants and tribal populations.

Yet challenges persist: vaccine hesitancy, coverage gaps in dynamic urban settings, supply complexities, workforce strains, and the urgent need for adolescent/adult immunization. Adaptive solutions demand integration with primary care, data-driven decisions, and community trust-building to sustain momentum.

The CII Centre for Health underscores that immunization thrives on multi-stakeholder synergy. Industry's role in private-sector integration, service innovation, R&D, and global vaccine leadership is pivotal to bridging public-private divides and scaling impact.

I commend the Women's Collective Forum, IIT Kharagpur team, and expert contributors for this forward-looking synthesis. These insights equip policymakers and partners to fortify a resilient, equitable immunization ecosystem for India's health future.

### Dr Randeep Guleria

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We also recognize with appreciation the contributions of specialists from vaccine development and regulatory affairs, including Dr. Ashish Sahai (Serum Institute of India), Dr. D. Mallikarjuna Rao (Dr. Reddy's Laboratories), and Dr. Priyanka Bhatia (GSK India), as well as scientists from the Indian Council of Medical Research such as Dr. Debjit Chakraborty and Dr. Pramit Ghosh (ICMR–NIRBI). Their scientific and regulatory insights brought valuable perspectives to the discussions.

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The consultation greatly benefited from the collective wisdom, diverse experience, and collaborative spirit of all participants, which together ensured that the outcomes are well-informed, practical, and reflective of the broader health ecosystem. Their commitment to advancing public health through knowledge sharing and partnership is sincerely acknowledged and deeply appreciated.

Ms. Nidhi Mehrotra, PhD Scholar from Rajiv Gandhi School of Intellectual Property Law, Indian Institute of Technology Kharagpur acted as the mainstay for ground work and organization of the events, and also processing of the qualitative information obtained. Mr. Raj Panda, Technical Project Staff from Dr. B. C. Roy Multi-Speciality Medical Research Centre, Indian Institute of Technology Kharagpur made valuable contribution in audio-visual management and uninterrupted recording of the dialogues. The support provided by Ms. Mehrotra and Mr. Panda are also acknowledged.

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# List of Abbreviations

<b>ABDM:</b>	Ayushman Bharat Digital Mission
<b>AEFI:</b>	Adverse Events Following Immunization
<b>ANM:</b>	Auxiliary Nurse Midwife
<b>ANMOL:</b>	ANM Online
<b>ASHA:</b>	Accredited Social Health Activist
<b>BCC:</b>	Behavior Change Communication
<b>CBO:</b>	Community Based Organization
<b>CHC:</b>	Community Health Centre
<b>CoWIN:</b>	Covid Vaccine Intelligence Network
<b>CSR:</b>	Corporate Social Responsibility
<b>CSO:</b>	Civil Society Organization
<b>E-VIN:</b>	Electronic Vaccine Intelligence Network
<b>GIS:</b>	Geographic Information System
<b>HWC:</b>	Health and Wellness Centre
<b>HIV:</b>	Human Immunodeficiency Virus
<b>HMIS:</b>	Health Management Information System
<b>HPV:</b>	Human Papilloma Virus
<b>ICDS:</b>	Integrated Child Development Services
<b>IHIP:</b>	Integrated Health Information Platform
<b>IEC:</b>	Information, Education, and Communication
<b>IDSP:</b>	Integrated Disease Surveillance Programme
<b>ILR:</b>	Ice Lined Refrigerator
<b>INAPH:</b>	Information Network for Animal Productivity and Health
<b>KPI:</b>	Key Performance Indicator
<b>MCP:</b>	Mother and Child Protection Card
<b>MCTS:</b>	Mother and Child Tracking System
<b>NCCMIS:</b>	National Cold Chain Management Information System
<b>NCD:</b>	Non-Communicable Disease
<b>NDHM:</b>	National Digital Health Mission
<b>NFHS:</b>	National Family Health Survey

<b>NGO:</b>	Non-Governmental Organization
<b>NIS:</b>	National Immunization Schedule
<b>NPR:</b>	National Population Registry
<b>NTAGI:</b>	National Technical Advisory Group on Immunization
<b>PEP:</b>	Post-Exposure Prophylaxis
<b>PHC:</b>	Primary Health Centre
<b>POSHAN:</b>	Prime Minister's Overarching Scheme for Holistic Nourishment
<b>RCH:</b>	Reproductive and Child Health
<b>RKSK:</b>	Rashtriya Kishor Swasthya Karyakram
<b>SBCC:</b>	Social and Behavior Change Communication
<b>SHG:</b>	Self Help Group
<b>ULB:</b>	Urban Local Body
<b>UNICEF:</b>	United Nations Children's Fund (formerly United Nations International Children's Emergency Fund)
<b>UPHC:</b>	Urban Primary Health Centre
<b>U-WIN:</b>	Universal Immunization WIN (Universal Immunization Working to Improve Newborn and Child Health)
<b>VHND:</b>	Village Health and Nutrition Day
<b>VLCP:</b>	Village Level Child Protection Committee
<b>WHO:</b>	World Health Organization

# Executive Summary

The expert consultations were convened to deliberate on the topic “How India is enabling and leveraging immunization for better health”. Strategies to enhance the effectiveness and coverage of immunization services in India through cross-sectoral collaboration and the adoption of digital innovations were emphasized. This aligns with the national agenda of achieving Universal Immunization Coverage and strengthening epidemic and emergency preparedness with programs like Intensified Mission Indradhanush, and the India Digital Health Mission.

The Objectives of the Consultation was to assess the current status and challenges of intersectoral coordination in immunization; to explore the role of digital technologies and innovations in enhancing immunization care; and to recommend actionable policy interventions for improving data systems, coverage, and accountability.

## Theme I: Strengthening Policy Frameworks for Immunization

### Key Highlights:

- **Policy-Program Disconnects:** Experts identified gaps between national-level immunization policies and ground-level program implementation, particularly in terms of operational resilience, agility, and clarity.
- **Lack of Role Clarity Across Stakeholders:** Absence of explicitly defined roles and responsibilities for public, private, and civil society stakeholders often lead to fragmented efforts and weakened accountability.
- **Weak Enforcement Mechanisms:** Although immunization is recognized as a public health priority, there are limited legal mandates or incentives at the state and district levels to ensure compliance, particularly in urban and private healthcare settings.
- **Integration with Other Health Schemes:** Immunization efforts remain siloed and are not consistently integrated with nutrition, maternal health, school health, and adolescent programs, which limits their reach and impact.
- **Financing Gaps:** Suboptimal and irregular funding, especially for outreach services, IEC/BCC activities, and data infrastructure, continues to affect program sustainability.

### Policy Recommendations:

1. Establish a National Immunization Policy Review Commission to periodically evaluate alignment between UIP guidelines and implementation realities.

2. Legislate Immunization Accountability Frameworks that clearly define roles of health departments, municipal bodies, schools, and private clinics.
3. Institutionalize Multi-Sectoral Convergence between immunization and complementary schemes (e.g., POSHAN Abhiyaan, RKSK).
4. Introduce Conditional Incentives and Penalties to promote higher coverage, particularly in underserved and urban areas.
5. Secure Dedicated Budget Lines within state health budgets for immunization strengthening activities, including digital systems and communication outreach.

## Theme II: Cross-Sectoral Partnerships Toward Immunization

### Key Highlights:

- **Existing Infrastructure:** Systems such as the Integrated Disease Surveillance Programme (IDSP) facilitate real-time outbreak detection. Data flows from community health workers to district and national levels.
- **Data Discrepancies:** There is frequent divergence in immunization coverage estimates between government sources and non-governmental organizations, often attributed to variations in denominators and data reporting protocols.
- **Shared Ownership of Data:** A consistent theme was the urgent need for establishing shared ownership and joint accountability mechanisms between public, private, and non-governmental entities.
- **Inclusion of Private Sector and Schools:** The private healthcare sector and educational institutions play a significant role in urban immunization but are often excluded from formal reporting systems.
- **Community Participation:** The involvement of ASHAs, ANMs, and school health nurses in data collection and community engagement was identified as a critical enabler for effective immunization campaigns.

### Policy Recommendations:

1. Develop a Unified Data Protocol to harmonize denominators and indicators across sectors.
2. Institutionalize Data-Sharing Mechanisms between government bodies, NGOs, and private health providers.
3. Mandate Immunization Record Submission at school entry to ensure compliance.
4. Integrate Private Clinics into Reporting Systems using simplified digital formats.
5. Establish a Joint Review Platform at the district level for regular reconciliation of data.

## Theme III: Opportunities for a Life Course Approach in Immunization

### Key Highlights:

- **Beyond Childhood Immunization:** Experts emphasized the need to broaden the focus from infant and child immunization to include adolescent, adult, and elderly populations for vaccines such as HPV, Hepatitis B, Influenza, and COVID-19.
- **Demographic Shifts & NCD Risk:** With India's growing adult and elderly population and rising burden of non-communicable diseases, adult immunization offers a critical preventive strategy.
- **Missed Opportunities:** Several touchpoints in the life course, antenatal care, adolescent health programs, workplace health checkups, are underutilized for administering catch-up or adult vaccines.
- **Workplace and Urban Strategies:** There is a growing opportunity to integrate life course immunization into urban primary health networks, workplaces, universities, and digital platforms.
- **Health Literacy and Demand Generation:** Low adult vaccine literacy and awareness are significant barriers. Experts called for sustained campaigns targeting parents, teachers, employers, and health workers.

### Policy Recommendations:

1. Develop and Roll Out a National Life Course Immunization Strategy, covering vaccines across all age groups.
2. Leverage Existing Platforms such as Ayushman Bharat–HWCs, schools, colleges, and antenatal clinics for vaccine delivery across the life span.
3. Promote Workplace Immunization through CSR engagement, health insurance schemes, and labor laws.
4. Mandate Health Education Curricula to include age-specific immunization awareness in schools and universities.
5. Invest in Behavioral Research and IEC Campaigns tailored to adults and adolescents to increase demand and reduce hesitancy.

## Theme IV: Scope of Technologies in the Spectrum of Immunization Care

### Key Highlights:

- **Digital Surveillance:** Tools such as AI-enabled triggers in IDSP and real-time dashboards are being used for early outbreak detection and case clustering.

- **Data Quality and Interpretation:** Emphasis was placed on acknowledging data limitations and promoting the use of statistical confidence intervals to guide decision-making, rather than assuming absolute figures.
- **Technological Training for Health Workers:** Mobile-based training and digital learning platforms can enhance the capacity of field workers and ensure protocol adherence.
- **Visualization and Analytics:** GIS-based mapping, real-time dashboards, and integrated analytics were recommended for informed planning and policy review.
- **EdTech for Immunization Awareness:** Schools were recognized as strategic venues for digital health education and behavioral interventions among children and parents.

### **Policy Recommendations:**

1. Invest in Predictive Analytics to forecast outbreaks and guide resource allocation.
2. Develop a National Immunization Data Hub to unify public and private sector data inputs.
3. Deploy Mobile Training Platforms for frontline workers on immunization schedules and cold chain management.
4. Leverage School Health Programs through structured EdTech modules on immunization.
5. Create a National Framework for Technological Integration within the Universal Immunization Programme (UIP).

The consultation underscored the need for a comprehensive roadmap that incorporates technological advancements and multi-stakeholder collaboration into the core design of immunization policies. The following immediate steps are proposed:

- Constitution of a National Technical Working Group on Data and Technology for Immunization.
- Development of a Cross-Sectoral Immunization Dashboard for public access.
- Launch of pilot initiatives integrating private sector reporting in select urban districts.
- Strengthening of state-level convergence forums to harmonize NGO and government efforts.



# **Background and Structure of the Expert Consultations**

## Background

Immunization remains one of the most cost-effective and impactful public health interventions globally, significantly contributing to reductions in morbidity and mortality across all age groups. The Immunization Agenda 2030 (IA2030) articulates a vision that “everyone, everywhere, at every age” benefits from vaccines, emphasizing recovery from COVID-19 disruptions, equity, and leaving no one behind.<sup>[1]</sup> WHO’s latest global coverage updates underscore both gains and remaining gaps; for example, in 2024 an estimated 14.3 million “zero-dose” children still received no vaccines, and DTP3 coverage stood at 85% globally.<sup>[2]</sup>

In India, where demographic diversity, geographical disparities, and socio-economic inequities intersect, the importance of a robust and inclusive immunization strategy cannot be overstated. India’s immunization pathway reflects decades of institution-building. The Expanded Programme on Immunization (EPI), launched in 1978, matured into the Universal Immunization Programme (UIP) in 1985—now one of the world’s largest, protecting against several vaccine-preventable diseases with a massive service-delivery footprint under the National Health Mission<sup>[3]</sup>. This foundation underpins sustained reductions in child mortality and provides the platform for new vaccines, digital systems, and a stronger life-course approach.

## Achievements and persistent gaps

### Long-term coverage trends

Survey evidence shows substantial gains in full immunization coverage (FIC) over three decades. NFHS-5 (2019–21) reported 76.6% of children aged 12–23 months fully immunized nationally, up from 62% in NFHS-4 (2015–16) and ~35% in NFHS-1 (1992–93)<sup>[4,5]</sup>. The number of districts with <50% FIC dropped sharply between NFHS-4 and NFHS-5, indicating improvement in historically under-performing geographies<sup>[4,5]</sup>.

### Post-pandemic recovery and administrative performance

While COVID-19 disrupted routine services worldwide, India’s program mounted catch-up efforts. Administrative data from the Government of India indicate national FIC of ~93.2–93.5% in FY 2023–24 (HMIS), reflecting accelerated outreach and campaign modalities alongside routine system strengthening<sup>[6]</sup>. These figures coexist with survey-based coverage estimates (NFHS/WUENIC) and should be interpreted jointly, recognizing differences in methods, timing, and denominators<sup>[2,4,6]</sup>.

### Zero-dose and equity dynamics

India’s recent zero-dose trajectory is encouraging but unfinished. UNICEF/WUENIC updates documented a decline in zero-dose children from 2.7 million (2021) to 1.1 million (2022) in India<sup>[7]</sup>. Globally, zero-dose burdens remain concentrated in a subset of countries; recovery is ongoing and uneven across subpopulations [8]. Within India, equity gaps persist by wealth, maternal education, urban-rural residence, and social group, with clusters of under-immunization that require granular micro-planning and convergence with social programs<sup>[4,5,8]</sup>.

## Programmatic drivers and dropout

Administrative analysis by MoHFW cites high Penta-1 (DTP-containing first dose) coverage (~93%) and reduced DTP1→DTP3 dropout to ~2% (2023)—important markers of system recovery and cohort tracking<sup>[9]</sup>. Such gains are consistent with focused strategies—Mission Indradhanush (MI), Intensified MI (IMI), and improved session micro-planning—but require sustained attention to migrant/urban poor settlements, difficult-to-reach tribal pockets, and conflict-affected or remote areas, where dropouts and missed opportunities persist<sup>[1,4,9]</sup>.

## Data systems, denominators, and quality

Several discrepancies arise when comparing household surveys (NFHS), administrative HMIS, and special studies, often due to denominator choice, reporting completeness, and timing. The IMI Coverage Evaluation Survey (CES) documented such issues and helped benchmark improvements and remaining gaps after intensification rounds<sup>[10]</sup>. Strengthening shared data protocols, interoperability, and district-level reconciliation can reduce divergence and sharpen accountability—points also echoed in your expert consultations.

## Supply chain modernization and technology

India has scaled eVIN (Electronic Vaccine Intelligence Network) nationwide, enabling real-time stock visibility and temperature monitoring across nearly 29,000 cold chain points and 733 districts<sup>[11]</sup>. Economic assessments report measurable savings (e.g., improved stock management), and broader “systems” benefits in record-keeping and decision-support<sup>[12,13]</sup>. Building on eVIN and COVID-era CoWIN, the U-WIN platform aims for name-based, anywhere-access, life-course immunization tracking within India’s digital health architecture<sup>[14,15]</sup>. These advances, while promising, also raise governance, data-quality, and equity questions—how to ensure last-mile functionality and inclusion for underserved populations<sup>[1,2]</sup>.

## Policy and strategic levers

The Government launched Mission Indradhanush (2014) and subsequently Intensified Mission Indradhanush (IMI) to reach zero-dose and under-immunized cohorts. Peer-reviewed analyses show that IMI improved vaccination in high-risk areas through cross-sectoral mobilization<sup>[16]</sup>, and cost-effectiveness analyses demonstrate favorable cost per dose and cost per zero-dose child reached, with >90% probability of cost-effectiveness at 1× GDP per capita per DALY averted in sampled districts<sup>[17]</sup>. Subsequent phases (e.g., IMI 4.0, 2022) prioritized 374 districts via multi-variant scoring to push recovery post-COVID-19<sup>[18,19]</sup>.

## Life-course immunization: an emerging frontier

While childhood vaccines remain the bedrock, life-course immunization (adolescents, adults, older adults) is increasingly salient amid demographic and epidemiological transitions. India has taken steps such as replacing TT with Td in adolescents and pregnancy<sup>[3]</sup> and moving toward HPV vaccine introduction (NTAGI

recommendation; prioritization in the 2024 Budget) to reduce cervical cancer burden<sup>[20–22]</sup>. Evidence and policy commentaries indicate the need to institutionalize adult/adolescent vaccination platforms through primary care, schools, workplaces, and urban health networks<sup>[20,22]</sup>.

It is needless to say that, India's achievements are tangible: long-run FIC gains, zero-dose reductions, strengthened supply chains, and intensified campaigns. Yet the residual gaps—equity, data harmonization, sustained urban strategies, and a fuller life-course orientation, etc. — define the agenda ahead with obvious pathways to further cement the achievements. These gaps along with the notion of sustaining the progress, precisely, are what the expert consultations were designed to illuminate and help resolve.

## Why these expert consultations—and why now?

The Women's Collective Forum (WCF), in collaboration with the Centre of Excellence in Affordable Healthcare (CoE-AH), and experts from Dr. B. C. Roy Multi-Speciality Medical Research Centre, Rajiv Gandhi School of Intellectual Property Law, and School of Medical Science and Technology at IIT Kharagpur initiated a strategic knowledge partnership to lead a national discourse on "How India is Enabling and Leveraging Immunization for Better Health". This initiative was centred around curating actionable public health evidence through regionally grounded consultations that explore the full spectrum of immunization care in India.

The partnership recognizes immunization not merely as a vertical program, but as a critical pillar of universal health coverage. The aim is to generate real-time, practice-driven insights to improve accessibility, affordability, and acceptability of vaccines across the life-course. The initiative also seeks to explore the role of affordable technologies in enhancing immunization delivery, data systems, and coverage monitoring. The consultations were conceived within a strong policy moment: administrative recovery post-pandemic, sustained government commitment (MI/IMI), and rapid digitization (eVIN→CoWIN→U-WIN).

Crucially, this platform engaged a wide array of stakeholders—including policy advisors, healthcare providers, technologists, development sector actors, and grassroots organizations—to drive context-specific, transformative change in India's immunization landscape. Additionally, the role of private sector engagement in bolstering the immunization ecosystem were examined, with a focus on understanding the incentive structures, potential collaborations, and integration points with the public health system.

### **Against this backdrop, overall, four persistent system challenges motivated the dialogues:**

1. Policy–program alignment: Translating national guidelines into operational resilience at district and urban local-body levels remains uneven. Clarifying institutional roles and enforceable accountability mechanisms is central to

closing the “design–delivery” gap<sup>[3,10,16,17]</sup>.

2. **Convergence across sectors:** Routine immunization intersects with maternal–newborn–child health, nutrition, school health, and social protection, yet operational links are often weak—particularly with private clinics and schools in urban settings. Standardized data-sharing protocols and district-level reconciliation can improve visibility, reduce duplication, and accelerate coverage<sup>[10,14,15]</sup>.
3. **Equity and data quality:** Zero-dose and dropout clusters persist along social and geographic gradients. A shared denominator and indicator framework across HMIS, surveys, and special studies is essential for targeting and monitoring equity, including intra-urban slums and migrant populations<sup>[4,5,8,10]</sup>.
4. **Life-course expansion:** Demographic shifts and chronic disease risks argue for adolescent/adult/older-adult vaccination strategies alongside childhood services. The NTAGI recommendation on HPV and the Td transition exemplify the pivot; scaling these requires delivery nodes (schools, workplaces, HWCs/UPHCs) and SBCC for demand<sup>[3,20–22]</sup>.

By convening government, academia, civil society, providers, technologists, and industry, the consultations aimed to transform experience and evidence into actionable, consensus-driven recommendations to advance equity, quality, and reach.

## How the consultations inform India’s next phase

### Policy frameworks and accountability

Discussions highlighted the value of periodic policy reviews, potentially through a standing mechanism, to ensure UIP guidelines align with on-ground realities—urban governance, private sector participation, and municipal stewardship included. Legislated or formalized accountability frameworks can clarify roles across health departments, municipal bodies, schools, and private clinics, reducing fragmentation and enabling performance-linked monitoring<sup>[3,10,16]</sup>.

### Cross-sectoral partnerships and data systems

Participants underscored the need for unified data protocols and interoperable platforms that integrate public, private, and NGO reporting—leveraging U-WIN design principles for a name-based, life-course record. District-level joint review platforms can reconcile denominators, harmonize indicators, and convert data into micro-plans that reach zero-dose children efficiently<sup>[10,14,15]</sup>.

### Life-course immunization and demand generation

Extending immunization beyond childhood will require service integration (e.g., Ayushman Bharat-HWCs/UPHCs, antenatal platforms, school health, workplaces) and behavioral interventions tailored to adolescents/adults. The move toward HPV within UIP illustrates how policy endorsement, financing, delivery pathways, and communications must progress together to realize population impact<sup>[3,20–22]</sup>.

## Technology as an enabler – not a silo

The consultations positioned technology—eVIN, U-WIN, analytics dashboards, GIS, predictive models, mobile training/EdTech—as an enabling layer across the ecosystem. Two imperatives emerged:

First, embed data-quality governance and equity-safeguards (offline functionality, inclusive ID strategies) in design; second, ensure digital tools drive closed-loop actions (supply, session planning, defaulter tracking, supportive supervision) linked to performance management<sup>[11–15]</sup>.

## The role of this report and the road ahead

This report translates the consultations into a practical roadmap. The subsequent chapters (Policy & Governance; Cross-Sectoral Partnerships; Life-Course Approaches; Technology & Data) elaborate targeted recommendations to:

1. Sharpen policy-program alignment and accountability;
2. Institutionalize data-sharing and joint reviews;
3. Operationalize life-course delivery nodes; and
4. Scale digital innovations with quality, privacy, and equity.

India’s immunization journey has demonstrated high ambition and resilience. The next phase is about institutionalizing convergence, codifying accountability, and making technology truly work for the last mile—so that every child, adolescent, adult, and older person can benefit from vaccines, everywhere, across the life course  
[1–4,6–9,11–22].

## Structure of the Consultations

Four Expert Consultations on the topic were organized. Each of the Consultations focused on the Immunization Care spectrum in a particular region of India. Across the four dialogues the immunization scenario in Eastern and North-Eastern parts, Southern part, Western Part, and Northern part were captured and critically examined. The discussion topics and framework are appended in Box 1.



## Theme-wise Agenda

### Strengthening policy framework:

- Equity in immunization and accessibility
- Vaccine hesitancy, adverse events, and myths regarding vaccination
- Monitoring of immunization services
- Immunization services from a programmatic perspective: challenges and scopes
- Policy frameworks: future directions and strengthening strategies

### Cross-sectoral partnership approach to Immunization:

- Immunization care and services at the field level: challenges, experiences, and scopes
- Vaccine hesitancy and role of cross-sectoral partnerships
- Ensuring equitability and access to vaccination services through partnerships

### Opportunities for a life-course approach:

- Current status of life-course approach for immunization care
- Programmatic outlook to life-course approach in immunization services
- Issues in synchronizing policy for life-course approach in vaccination: challenges and scopes

### Scope of technologies in the spectrum of Immunization Care:

- Technologies for equitable delivery of immunization services
- The current status and future direction of digital technologies for immunization services
- Newer vaccines, vaccine trials, and secondary uses of vaccines - current status and future directions

Based on programmatic arrangements and easy accessibility considerations on the part of the experts and stakeholders attending each dialogue one central city was chosen in each of the four decided regions and a single-day dialogue was organized in each of those venues. For Eastern and North-Eastern region the dialogue was organized in Kolkata, for Southern Region in Bangalore, for Western region in Pune, and for Northern region in Lucknow.

In each of these events subject matter experts, medical professionals including faculty members and scientists, policy makers, and stakeholders including NGOs and CBOs were engaged to examine all possible angles related to the immunization landscape in the region. In Pune (i.e., Western Zone), additionally, the Vaccine manufacturers took part as one of the most important stakeholders in the Vaccine supply chain. Each of these expert consultations were structured based on the four


identified themes, and for each theme relevant experts and/or stakeholders contributed as the lead discussants, while the other experts and stakeholders also contributed through feedback and interaction mode. The dialogues ensured that the immunization landscape in India was critically analyzed in an objective and unbiased manner and engaging different experts and stakeholders. These dialogues revealed the remarkable progress in the field of immunization, as well as, highlighted pathways for further advancement. While majority of the discussions focused on the Public Health System in India, which was noted to be one of the most robust systems globally, the panel members also focused on the private sector engagement to complete the actual spectrum of immunization care particularly when focusing on a life-course approach.

Following each event, exhaustive transcripts were generated based on the recordings (obtained with consent from the participants). These transcripts were analyzed through codes, themes and domains based on the four identified pillars/ focal points. Subsequently collating the information, this report has been prepared. In the subsequent chapters, the findings according the four key areas are presented. While the initial part in each chapter details the findings in each of the dialogues, the conclusive portions highlight the major points and recommendations that emerged.

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**Strengthening  
Policy  
Frameworks**

## Eastern Zone

### Strengthening Policy Frameworks for Immunization: A Systems and Equity-Oriented Perspective

The Eastern Zone consultation on immunization policy in India emphasized a critical reorientation toward equity-driven, evidence-informed, and context-sensitive frameworks. Discussions highlighted that immunization must be positioned not as a standalone vertical but as an integrated pillar of the broader health system, requiring systemic strengthening, participatory governance, and behavioral insight.

#### Behavioral Drivers Beyond Awareness

A central argument was that vaccine uptake is influenced by far more than awareness alone. Behavioral and sociological determinants—including community norms, peer influence, and trust in institutions—shape vaccination decisions. Therefore, strategies that focus merely on information dissemination fall short. Sustained dialogue, co-created messages, and culturally contextual communication are essential for genuine engagement. Additionally, segmented communication tailored to individuals at different stages of behavior change—unaware, hesitant, or resistant—must replace one-size-fits-all approaches.

#### Strengthening Frontline Workforce Capacity

The quality and capacity of the healthcare workforce—especially at the frontline—emerged as a key concern. Training programs must be followed by rigorous evaluation and knowledge integration. Frontline providers need sufficient understanding not only of vaccine schedules and side effects but also of how to address growing vaccine hesitancy. Continued professional development, behavior-focused skill-building, and supervisory mentoring were proposed to enhance service effectiveness and community trust.

#### Data Quality and Feedback Loops

The importance of data was underscored repeatedly. Current health data systems suffer from unreliable denominators, weak interoperability, and fragmented feedback loops. The Health Management Information System (HMIS), though widely used, may offer misleading insights unless triangulated with periodic surveys and contextual interpretation. Participants called for robust mechanisms for data validation at the community level and actionable feedback loops that inform microplanning and policy decisions in real time.

#### Life-Course Approach and Regulation of Optional Vaccines

A strong case was made for embedding adult immunization within policy discourse. India's focus on childhood immunization must transition to a life-course approach, particularly as populations with non-communicable diseases increasingly seek preventive interventions. Similarly, optional vaccines—administered outside the Universal Immunization Programme (UIP)—require stringent regulation, oversight of

cold chain practices in private facilities, and consideration for inclusion via insurance or incentive-based mechanisms.

### **Bridging Research and Policy Gaps**

The consultation also identified research gaps across three domains: vaccine development and technology, social-behavioral research, and implementation science. The lack of systematic evidence synthesis hinders timely policy response. To bridge this gap, institutional support is needed to generate and translate multi-disciplinary research into policy mandates.

### **Reaching the Urban Migrant and Mobile Populations**

Urban immunization systems were flagged for their limited reach among migrant and transient populations. Timely linkage of such groups to services remains elusive due to weak operational mechanisms and overburdened community health workers. Innovative community-led approaches—such as involving landlords or neighbors in identifying new families—were proposed to strengthen tracking and outreach.

### **Climate Resilience and Crisis-Responsive Strategies**

Climate-induced disruptions and displacement were recognized as emerging challenges that will test the resilience of immunization systems. Adaptive policies must include provisions for mobile, crisis-responsive vaccination strategies to protect progress made over decades and ensure continuity during environmental or humanitarian emergencies.

### **Toward a Future-Ready National Immunization Policy**

Finally, the need for a reinvigorated, context-sensitive national immunization policy was strongly advocated. While India has a National Vaccine Policy (2011) and National Health Policy (2017), neither adequately addresses contemporary challenges such as adult vaccination, pandemic preparedness, or life-course immunization. A future-ready policy must be equity-oriented, backed by real-time, disaggregated data, informed by interdisciplinary research, and developed through structured dialogue between scientists, implementers, and legislators.

## South Zone

### Strengthening Immunization Frameworks: Lessons from Rabies Control and the Broader Vaccine Policy Landscape

The South Zone deliberation spotlighted the need for robust and inclusive immunization policies, using rabies control as a compelling case study to reflect both systemic strengths and persistent shortcomings. The discussion reaffirmed the urgency of integrating neglected vaccines, enhancing programmatic alignment, and expanding the immunization framework beyond childhood to a full life-course approach.

#### The Rabies Challenge: Policy Commitment vs. Field Realities

Rabies, a preventable but fatal disease, exemplifies the disconnect between commitment and implementation. Despite India's pledge to eliminate dog-mediated human rabies deaths by 2030 under the "Zero by 30" global target, significant inequities remain. Access to post-exposure prophylaxis (PEP), particularly rabies immunoglobulin (RIG), is poor in many states, especially in the northeast and eastern regions. While digital innovations such as the "Zoning" platform offer potential for real-time vaccine availability tracking, fragmented procurement systems—where each state independently procures vaccines—undermine uniform access and quality. Experts advocated for central procurement of rabies vaccines and integration within national immunization schemes to ensure equitable distribution, consistent quality, and policy coherence.

#### Beyond Childhood: The Case for Expanding the National Immunization Schedule

A broader concern was raised regarding the limited scope of India's National Immunization Schedule (NIS), which remains heavily centered on childhood vaccines. Many essential vaccines—such as HPV for adolescents and influenza or pneumococcal vaccines for elderly and high-risk groups—are yet to be systematically included. This omission, despite strong scientific recommendations and successful state-level pilots (e.g., Kerala and Sikkim), reflects a persistent gap between evidence and policy action.

#### Operationalizing the Life-Course Approach

A clear call was made to operationalize a life-course approach to immunization. As India's demographic profile evolves, with an increasing burden of non-communicable diseases and aging populations, immunization policies must adapt accordingly. Equity was identified as the guiding principle—ensuring no population segment is excluded due to geography, age, socio-economic status, or service delivery gaps.

## **Bridging the Health Literacy Gap**

Several implementation barriers were also discussed. There is often a lack of community awareness about the purpose and nature of vaccines administered. Many caregivers follow immunization schedules passively, guided by frontline workers, without adequate understanding or empowerment. This trust-based compliance—while helpful in achieving coverage—masks deficits in health literacy and informed consent, particularly when vaccination involves complex schedules or adverse reactions.

## **The Persistence of Zero-Dose Children**

The persistence of “zero-dose” children—those who have not received even a single vaccine—was highlighted as a major concern. Despite high reported national coverage rates, millions remain unvaccinated due to systemic exclusions. Experts urged a shift from percentage-based metrics to absolute coverage targets, with granular analysis of who these children are, where they reside, and why they are left out. Without this targeted approach, even the most advanced delivery technologies risk reinforcing existing inequities.

## **Invisible Data: The Private Sector Blind Spot**

Another major gap lies in the invisibility of private-sector immunization data. In urban areas, a significant share of vaccinations occurs through private providers, yet this data is neither captured nor integrated into national systems. This creates a distorted view of coverage and undermines comprehensive planning.

## **Harnessing Frontline Knowledge and Community Assets**

Stakeholders emphasized the importance of leveraging India’s existing human infrastructure—especially the field-level insights of ASHAs and Anganwadi workers—who often maintain precise child tracking lists. However, this knowledge remains underutilized in policy formulation and microplanning. Greater investment in frontline capacity and community engagement is essential for bridging last-mile gaps.

## **Cross-Sectoral Coordination: The Need for Shared Accountability**

The sessions also underscored the critical role of intersectoral and intra-sectoral coordination. Rabies control, for instance, requires alignment across health, animal husbandry, education, and local governance. Yet, policy fragmentation and unclear role demarcation frequently obstruct joint efforts. Within the health sector itself, poor coordination between departments such as Medical Education and Health & Family Welfare poses additional challenges. Structured, shared-goal frameworks are needed to operationalize cross-sectoral accountability.

## **People-Centric Policy: Transparency, Dialogue, and Trust**

Finally, discussions emphasized the necessity of real-time, transparent, and community-informed policy design. Immunization must not only be science-based but also people-centric—rooted in the lived realities of marginalized populations and

responsive to their concerns. New technologies, vaccines, and policies must be introduced alongside robust community dialogue, behavior change strategies, and trust-building mechanisms. Without early-stage advocacy, even scientifically sound interventions—such as the HPV vaccine—may face societal resistance and low uptake.

### **In Conclusion: Evolving Toward an Equity-Driven Immunization Ecosystem**

In conclusion, the South Zone consultation reaffirmed that the immunization policy ecosystem must evolve into a dynamic, equity-driven framework. Centralized procurement for neglected vaccines, expansion to life course immunization, better integration of private-sector data, and community participation were identified as key pillars. Policymaking must move beyond aspirational declarations to accountable, adaptive systems that ensure no one is left behind.

## West Zone

### Strengthening Policy Frameworks for Immunization: Implementation Realities and Innovations from the Western Zone

The Western Zone consultation brought forward critical insights into the operational and strategic dimensions of India's immunization ecosystem.

#### Embracing Context-Specific Microplanning

Experts emphasized that India's vast geographic and sociocultural diversity renders a uniform, one-size-fits-all approach ineffective. Microplanning must be context-sensitive and localized, particularly in underserved and tribal regions, where tailored strategies are necessary to enhance coverage and impact.

#### Strengthening Capacity Building through Vernacular Training

A key recommendation was to strengthen capacity building among frontline workers, particularly as new vaccines are introduced into the system. Training must be continuous, practical, and vernacularized—not simply translated. Linguistic contextualization ensures that field-level staff not only understand technical updates but can apply them in routine operations. Capacity building must also be assessed in real time to prevent miscommunication and service gaps, as seen in past campaigns where inadequate training led to confusion and vaccine hesitancy.

#### Refining Community Mobilization for the Most Vulnerable

Participants highlighted that current community mobilization guidelines are overly generic. Target populations vary greatly in behavior, cultural practices, and accessibility, and mobilization strategies must reflect these nuances. While a large proportion of families willingly seek immunization, the most vulnerable—often 20–30%—require more intensive engagement to overcome barriers related to access, mistrust, and misinformation.

#### Sustaining Surveillance Beyond Donor Support

Concerns were raised over India's readiness to maintain vaccine-preventable disease surveillance in the face of donor withdrawal from programs like the National Polio Surveillance Project. Without clear national mechanisms to assume these responsibilities, critical surveillance capacity could be lost. Institutions such as medical colleges may serve as useful anchors in absorbing and sustaining surveillance functions.

#### Missed Opportunities at Tertiary Facilities

Additionally, missed opportunities for immunization (MOI), especially in tertiary facilities like district hospitals, continue to undermine coverage. Children with minor illnesses often go unvaccinated due to unclear operational guidance, representing a major gap in service delivery.

## Addressing Adverse Event Underreporting

Another recurring issue was the underreporting of adverse events following immunization (AEFI). Despite available guidelines, weak implementation, fear of punitive action, and lack of crisis communication systems have resulted in poor documentation. Experts urged that policy documents explicitly define benchmarks for AEFI reporting and include provisions for structured responses to public concerns. Only by strengthening transparency and responsiveness can public trust in vaccines be sustained.

## Leveraging Digital Innovations for System Strengthening

Digital innovations, especially those proven during the COVID-19 response, were recommended for broader adoption in routine immunization. A centralized digital platform could support beneficiary tracking, schedule follow-ups, and real-time documentation. These tools are already improving supply chain functions such as buffer stock management and could be extended to coverage monitoring and feedback integration. Experts emphasized the importance of collecting structured, frontline feedback—particularly after new vaccine introductions—and suggested incentives for data collection, alongside robust referral systems to ensure concerns are addressed.

## Redistributing Frontline Workloads and Engaging Male Decision-Makers

Frontline health workers remain overburdened, with blurred role demarcations leading to inefficiency and burnout. A clear redistribution of responsibilities across ASHAs, ANMs, medical officers, and supervisors is necessary to ensure workload balance and accountability. The gendered nature of routine immunization outreach was also discussed. Female ASHAs predominantly interact with mothers, leaving male decision-makers disengaged from immunization dialogues. In settings where paternal influence is critical, this disconnect can lead to vaccine dropouts. Introducing male health mobilizers or modifying outreach timings to include men were proposed as potential solutions. Such strategies, though context-dependent, are essential for improving acceptance and uptake.

## Urban Immunization: Infrastructure and Procedural Barriers

In urban contexts, facility infrastructure and rigid procedural norms present additional challenges. Assessments of health centers in Mumbai revealed gaps in basic equipment, cold chain readiness, and vaccine storage logistics. Urban immunization efforts are often hampered when mobilized families are turned away from immunization sites due to catchment restrictions. These procedural issues undermine community trust and future compliance.

## Expanding the Immunization Horizon: Adult and Geriatric Vaccines

The discussion also underscored the need to formally expand immunization strategies to include adults and geriatric populations. As India's population ages and the burden of chronic diseases rises, vaccines such as those for influenza and pneumococcal infections must be made accessible. However, affordability remains a

barrier. Experts recommended exploring insurance-linked mechanisms or state-supported schemes to reduce out-of-pocket costs and ensure wider coverage.

### **Ensuring Training Effectiveness and Accountability**

Finally, despite the presence of structured training protocols such as Training of Trainers (ToTs), there is limited oversight of whether knowledge is effectively passed down to grassroots workers. Without this assurance, gaps in service quality, vaccine hesitancy, and community mistrust will persist. The consultation called for annual health facility assessments, improved training follow-through, and gender-sensitive, community-responsive delivery models to ensure India's immunization policy is implemented equitably and effectively.

## **North Zone**

### **Advancing Equity and Systemic Integration in Immunization**

The North Zone consultation offered a panoramic view of India's immunization landscape, addressing progress made and challenges that persist in ensuring equity, access, and sustainability. While National Family Health Survey (NFHS) data indicate steady improvements—with approximately 77% of children now fully immunized and narrowing urban-rural and gender gaps—significant disparities remain, particularly among lower socio-economic groups, marginalized castes, and tribal or migratory populations. These groups face persistent barriers related to accessibility, awareness, and systemic follow-up, which result in continued immunization dropouts and the presence of zero-dose children in multiple states.

### **Urban Hesitancy and Trust Deficits**

Emerging concerns in urban settings further complicate this scenario. Urban vaccine hesitancy, especially among educated populations, was cited as an increasingly prevalent issue. Instances from Aligarh and similar academic environments revealed that highly educated parents may reject immunization due to mistrust in delivery protocols and doubts about aseptic procedures. This calls for differentiated training approaches for urban vaccinators, emphasizing communication skills, transparency, and trust-building.

### **Enhancing Data and Tracking Systems**

The discussions underscored the need for robust, disaggregated data systems capable of identifying and tracking missed populations over time. Population mobility, particularly among urban poor and tribal groups, complicates follow-up mechanisms, emphasizing the need for integrated digital tracking tools, including Aadhaar-enabled registries.

## Leveraging Local Partnerships and Institutions

The group recommended tapping into local governance models—such as Surat Municipal Corporation’s cross-sectoral partnerships—and engaging municipal bodies, corporates, educational institutions, and tribal welfare departments to co-create immunization outreach mechanisms. Medical colleges and public health associations were identified as underutilized assets that could provide support for advocacy, operational research, and evidence synthesis at the district level.

## Strategic Frameworks for Vaccine Policy

Contributors emphasized that vaccine policy must be understood as an evolving process—part of a broader continuum that integrates disease burden, vaccine characteristics, health system readiness, and community preferences. This process was conceptualized through the “5P” and “6E” frameworks, which link public health problems, product availability, program strength, community practices, and policy design to goals of efficiency, evidence, equity, empowerment, empathy, and economics. The economic argument for vaccines—underscored by a \$44 return on every dollar spent—was identified as a critical narrative to strengthen intersectoral and fiscal commitment.

## Decentralized Implementation and One Health Integration

Decentralized planning was presented as essential for effective implementation. District and sub-district task forces were recognized as key arenas for adapting national strategies to local contexts, ensuring relevance and responsiveness. Participants also highlighted the need for immunization policies to anticipate emerging challenges, including climate-sensitive diseases and zoonotic threats, reinforcing the value of a One Health approach.

## Diagonal Integration with Other Health Services

The dialogue called for a shift from vertical to diagonal integration of immunization with programs such as nutrition, family planning, sanitation, and primary healthcare. This would enable resource optimization, reinforce demand generation, and ensure holistic service delivery. Health system strengthening—through innovations in logistics, digital tracking, and cold chain infrastructure—was cited as a key enabler. Several speakers noted that the government-run cold chain network now surpasses many private sector systems in robustness and reliability. However, coverage in remote areas remains constrained by inadequate staffing, underutilized teleconsultation potential, and weak follow-up mechanisms.

## Institutional Resilience and Urban Strategy Gaps

The role of political will was recognized as pivotal but insufficient in isolation. Sustainability of immunization programs must be grounded in institutional frameworks and policy coherence, rather than fluctuating political interest. Urban immunization strategy, in particular, was flagged as fragmented due to parallel service structures—such as the Mohalla Clinics in Delhi—that dilute the clarity and reliability of public delivery systems. The need for unified, one-roof models of care delivery was emphasized to reduce confusion, increase uptake, and foster public trust.

## Private Sector Inclusion and Cost Equity

Equity concerns were brought to the fore in discussions on private sector vaccination, where significant cost disparities limit access. Speakers proposed public-private cost-sharing models and regulatory strategies to expand access to optional vaccines. Practical models from Bihar and Bangladesh were cited, including shared payment systems that make high-cost vaccines more affordable without compromising safety or quality.

## Frontline Workers and Community Trust

The consultation acknowledged the importance of community trust—particularly in frontline workers like ASHAs, ANMs, and Anganwadi workers—who remain the most trusted interface between the health system and the public. Efforts must focus on strengthening their capacities, reducing workload pressures, and enhancing their communication skills. Flexible timing of vaccination sessions, incentives for evening clinics, and branding of government immunization services were recommended as strategies to improve service acceptability in urban areas

## Way Forward: Systemic Strengthening for Equity

In conclusion, the North Zone deliberations reaffirmed that while India's immunization policies are scientifically robust, their translation into effective, equitable, and resilient systems demands contextual adaptation, intersectoral collaboration, and continuous innovation. Priorities must include improving data systems, addressing human resource gaps, operationalizing adult and life-course immunization strategies, and embedding One Health into surveillance and response frameworks. Through sustained community engagement, institutional integration, and forward-looking policy vision, India can continue to strengthen its immunization architecture as a driver of health equity and national development.

## Key Highlights of the session:

### I. Action themes highlighted under this session are:

- ☑ Recognize and address the excessive burden on frontline healthcare workers (FLHWs).
- ☑ Expand immunization coverage to include adult and geriatric populations.
- ☑ Incorporate insurance mechanisms to enhance affordability and access.
- ☑ Define explicit roles and responsibilities within the immunization workforce.
- ☑ Conduct participatory action research to understand perspectives of left-out and marginalized communities.
- ☑ Analyze immunization data with granularity and intersectionality to identify gaps in equity.
- ☑ Develop tailored immunization strategies and communication for urban, mobile, and hard-to-reach populations.
- ☑ Strengthen coordination between ASHA, ANM, and other frontline workers to improve service delivery.
- ☑ Explore ways to increase male participation in ASHA worker roles and healthcare delivery.
- ☑ Develop strategies to build trust and improve communication with vaccine-hesitant communities, particularly the Muslim community.

### II. Policy Recommendations:

#### 1. Equity in Immunization

- Equity remains central to all immunization and health interventions.
- Need for granular and intersectional data analysis to better understand inequities.

#### 2. Optional Vaccines and Policy Inclusion

- Many optional vaccines (not under UIP) are being used but lack regulation, governance, and support.
- There's a need to explore embedding optional vaccines in the immunization framework.
  - Insurance coverage, cost subsidy, or governance mechanisms can be explored.

- Current challenge: private storage, quality control, and cold chain issues in optional vaccines.

### 3. Research and Evidence-Based Policy

- Emphasis on a three-pronged research model:
  - Vaccine development and technological innovations
  - Social and behavioral research to understand vaccine hesitancy
  - Implementation research to study delivery bottlenecks
- Need for integrating research into national immunization policy.
- Institutionalize evidence-driven processes (via NTAGI, technical subgroups).
- Incorporate disease burden forecasts and emerging pathogens into vaccine planning (e.g., adult vaccines, future pandemics).
- Existing National Vaccine Policy (2011) is outdated. Need to update or create a comprehensive National Immunization Policy.
  - Policy should embed:
    - Life-course approach
    - Research agenda
    - Data use for decision-making
    - Inclusion of optional and emergency vaccines
    - Integration with universal health coverage

### 4. Urban Health Access Challenges

- Migrants and urban poor face delayed or no connection to health systems.
- Need for:
  - Early tracking and connection mechanisms when people move into cities
  - Community involvement (e.g., landlords helping tenants access ASHAs/health centers)
- Urban ASHAs and frontline workers are overburdened, requiring operational reforms.

## 5. Quality Assurance in Vaccine Delivery

- Concerns about vaccine quality in the private sector (expiry, cold chain lapses).
- Urgent need for policy and regulatory oversight for non-UIP vaccines.
- Government vaccine programs have robust cold chain systems; private sector lacks standardization.

## 6. Life-Course and Special Situation Immunization

- Current policies overly focus on childhood immunization.
- Paradigm shift needed toward life-course immunization, including:
  - Adult immunization
  - Mass gatherings
  - Travel-related vaccinations
  - Emergency response (e.g., pandemics)

## 7. Delays in Translating Technical Recommendations into Policy

- A disconnect between advisory bodies and policy implementation.
- Streamlining decision-making and reducing delays in policy execution.

## 8. Policy Modernization & Strategic Framing

- Update and institutionalize the National Vaccine Policy, aligning it with current challenges, technologies, and epidemiological realities.
- Position vaccines as investments in human capital and national productivity, not just preventive tools.



Figure 1. Word cloud based on discussion of the first session



# **Cross-sectoral partnership approach to Immunization**

## East Zone

### Building Cross-Sectoral Synergies Through Local Governance and Civil Society

The Eastern Zone consultation underscored that cross-sectoral partnerships are essential for improving both reach and trust in immunization systems, especially in socio-culturally complex and geographically challenging regions. A prominent theme was the need to move beyond a purely health-sector-centric model of immunization to one that actively engages local governance, civil society, and complementary sectors such as education, nutrition, and rural development.

Participants emphasized that frontline workers—ASHAs, ANMs, and Anganwadi workers—are more than just implementers; they serve as crucial bridges between the community and the health system. However, their effectiveness is significantly enhanced when supported by Panchayati Raj Institutions (PRIs), who possess both local legitimacy and decision-making influence. In regions where PRIs have been sensitized and activated, participants observed measurable improvements in immunization microplanning, cold chain management, and outreach for zero-dose children. However, this support remains inconsistent, and a systematic effort to embed PRIs into immunization governance was recommended.

Here is a refined, sub-headed summary of the East Zone consultation segment, with all key information retained and expert names omitted:

#### Strategic Cross-Sectoral Partnerships for Equitable Immunization

A systems-level framework was proposed for strengthening India's immunization agenda through multi-sectoral coordination. Emphasizing the One Health approach, the dialogue identified 23 stakeholder groups—spanning healthcare delivery systems, NGOs, the education sector, and ministries like Defence, Home Affairs, and Finance—as critical for improving vaccine accessibility, particularly in remote and conflict-prone regions. The education system, especially underutilized school health programs, was highlighted as a potential platform for promoting adolescent and adult immunization.

Private healthcare providers, media, digital platforms, and medical academia were seen as essential allies in expanding coverage, countering misinformation, and generating behavioral insights on vaccine hesitancy. Digital innovations like U-WIN and collaboration with the IT sector were recommended for real-time tracking and communication. Tailored planning, localised messaging, and the involvement of local governance bodies (e.g., Panchayati Raj Institutions) were deemed necessary to achieve equitable vaccine delivery in hard-to-reach populations including slum residents, nomadic groups, and border communities.

## Community-Level Challenges in Service Delivery and Trust

Grassroots insights revealed operational concerns, including the use of opened or damaged vaccine vials and poor communication with caregivers regarding side effects. Mothers were described as primary decision-makers, yet insufficiently empowered with information. Administering multiple injections in a single visit was seen as contributing to vaccine refusal in subsequent sessions. Training gaps among ASHAs and poor follow-up further exacerbated these issues. The need to engage adolescent girls as future decision-makers and build trust through sensitive, consistent communication was emphasized.

## Policy Shifts, Incentives, and Community Mobilization

Withdrawal of monetary incentives was identified as a factor in declining immunization uptake. School-based campaigns and collaboration with local governance units, such as Gram Sabhas and VLCPCs, were suggested to identify and support hesitant families. Community awareness groups demonstrating real case studies were described as effective in rebuilding trust and tackling misinformation triggered by minor side effects or religious concerns.

## Gaps in Logistics, Workforce Coordination, and Minority Inclusion

Persistent gaps in physical infrastructure and vaccine supply, coupled with overburdened health workers, contributed to poor community participation. Intra-team coordination was found lacking among ASHAs, ANMs, and block-level officials. Targeted training and transparent communication in SC/ST and minority areas were recommended to reduce fear and improve engagement.

Teenage pregnancies and their invisibility in health records were also flagged, with a call for improved coordination with schools and community-based structures. It was proposed that qualitative data, local case studies, and community feedback be integrated into microplanning and accountability mechanisms—especially involving Panchayati Raj Institutions.

## Urban Complexity and Redefining “Community”

Urban immunization challenges were contextualized within the fluid and fragmented nature of urban populations. Outdated rural-centric policies, inaccurate population estimates, and workforce shortages were identified as major roadblocks. Despite high mobile connectivity, urban middle and upper classes remain difficult to engage due to low trust in public systems.

Private-sector marketing success was contrasted with public immunization outreach failures, raising the question of why life-saving vaccines aren't promoted as effectively. Suggested strategies included digital counseling (e.g., IVR), service design that attracts urban residents to attend proactively, and leveraging COVID-19-era logistical systems for routine immunization. Regulation and monitoring of private practitioners were flagged as urgent gaps in urban immunization governance.

## Addressing Vaccine Hesitancy in Vulnerable Populations

Vaccine hesitancy—fueled by misinformation (e.g., infertility fears) and religious resistance—was tackled through engagement of religious leaders and targeted community mobilization, including mothers’ meetings and inter-agency collaboration. The immunization of transient populations and migrants faced documentation and mobility challenges, addressed through flexible re-registration protocols, maternal recall, and NGO support.

Dropout mapping via household listing allowed targeted immunization camps and strengthened outbreak responses (e.g., for measles). A call was made for improved recordkeeping at UPHCs, mass media-based awareness using animations, and community group training through government missions.

## Common Threads and Recommendations

Across discussions, several cross-cutting themes emerged:

- Immunization efforts must go beyond technical efficiency to include emotional intelligence, structural justice, and cultural competence.
- Frontline workers need not only better training, but also tools for inclusive dialogue, dignity-based communication, and stigma mitigation.
- Success depends on integrated data systems, digital platforms, flexible service models, and trust-building at every level of the health system.
- These insights reaffirm the importance of context-specific, cross-sectoral, and community-embedded approaches to strengthen immunization systems in India’s diverse and evolving landscape.

## West Zone

### Expanding Ownership Through Inter-Departmental Coordination and CSR Engagement

In the West Zone consultation, participants highlighted persistent fragmentation in immunization delivery and oversight, often resulting from the perception that immunization is the sole responsibility of the health department. To overcome this, a more inclusive, inter-departmental governance model was strongly advocated—one where immunization is treated as a shared public good, supported and co-owned by multiple arms of local and state administration.

### Collaborative Community-Centric Models

NGOs have demonstrated the power of structured community engagement to improve immunization outcomes in underserved urban areas. By integrating community members, local governance, health staff, and other stakeholders into early microplanning, several models have built culturally sensitive, trust-driven systems. Governing councils composed of government officials, doctors, ASHAs, and

NGO partners design joint solutions, oversee logistics, and ensure accountability. Strategies such as male engagement initiatives and BCC-focused home visits have significantly increased vaccine uptake—for instance, in Bhiwandi, coverage rose from 57% (2017) to 88% (2025).

### **Tackling Vaccine Hesitancy Through Local Networks**

Key barriers like stock-outs, economic pressures, misinformation, and fear of side effects were addressed through sustained follow-ups, tailored messaging using visuals, and leveraging influential local figures. Religious leaders, elderly women (“basti ki nani”), and Mahila Arogya Samitis played a pivotal role in reassuring hesitant families. Special provisions were made for undocumented migrant families through partnerships with UNICEF and WHO.

### **Integrated Health Interventions for Systemic Impact**

NGOs working on malnutrition emphasized the need to link immunization with education, sanitation, and maternal health. Awareness campaigns highlight how poor immunization coverage exacerbates intergenerational malnutrition. Collaborative efforts with UPHCs and community volunteers help sensitize both service providers and families, contributing to holistic and preventive health outcomes.

### **Gender Dynamics and Family Decision-Making**

Understanding household power structures is critical. Vaccine refusal often stems from male dominance, misinformation, or blame dynamics post-vaccination. NGOs addressed this by engaging fathers directly in evening sessions and using interactive, family-friendly methods to encourage participation. Preparing households logistically before immunization days improved turnout, especially among mothers with caregiving burdens.

### **NGO Coordination and Role Delineation**

In dense urban regions, NGOs practice informal coordination via Immunization Task Forces and ward-based mapping to avoid service duplication. While not always directly collaborative, mutual respect and predefined geographies ensure efficient outreach and prevent overlap.

### **The ‘Tech + Touch’ Model for Scalable Impact**

Organizations like ARMMAN utilize a dual approach—technology for scale (via IVRS, SMS, WhatsApp videos) and community “Sakhis” for personalized engagement. This has reached over 61 million women, with flexible systems that accommodate migration. Call centers provide emotional and informational support, while digital content is tailored to pregnancy or child development stages.

### **Data Challenges and the Need for Shared Protocols**

Persistent issues in cross-sectoral data sharing include differing population definitions, lack of access, duplication, and underreporting—especially from private providers. NGOs often identify more cases than official records reflect. Experts called

for aligned definitions, joint responsibility, and transparent surveillance integration to bridge these gaps.

## **Schools and Medical Colleges as Strategic Platforms**

Initiatives such as designated school health nurses, mandatory immunization card submission, and engaging Vaccination Week activities in schools were highlighted as effective methods to boost awareness. Medical colleges adopting villages provide another grassroots entry point for immunization sensitization.

## **Rethinking Structural Collaboration**

Cross-sectoral collaboration must go beyond community engagement to include procurement, supply chains, and delivery. Experts stressed the importance of clearly defined roles, operational accountability, and a systems-thinking approach to immunization governance. Success depends on identifying the right partners and assigning appropriate responsibilities—completing the puzzle for effective, coordinated public health outcomes.

## **Broad Working Mechanisms**

Education and tribal welfare departments were identified as key collaborators. Their deep-rooted community networks and established institutional presence could be leveraged for school-based vaccination drives, awareness campaigns, and mobilization in tribal settlements. There were suggestions for joint review mechanisms and synchronized social behavior change communication (SBCC) campaigns that involve teachers, Anganwadi staff, and community health workers to present a unified message and reduce conflicting narratives about vaccination.

Urban local bodies (ULBs), especially in rapidly growing cities and peri-urban areas, were recognized as both under-engaged and under-resourced in terms of immunization delivery. Municipal leadership, it was argued, should be empowered through policy mandates and capacity building to take ownership of immunization logistics, particularly for underserved urban areas where population movement and service fragmentation are common.

Corporate Social Responsibility (CSR) emerged as a promising avenue to supplement state resources. Participants noted several successful public-private collaborations where CSR funding supported vaccine storage equipment, community mobilization campaigns, and training of immunization staff. However, they cautioned against ad hoc involvement, suggesting that CSR engagement should be formally embedded in state immunization strategies, with clear roles, responsibilities, and reporting mechanisms.

Academic institutions, medical colleges, and professional associations were also recognized as essential but underutilized actors. These entities could contribute to operational research, real-time data analysis, monitoring and evaluation, and capacity building of health workers. Participants proposed institutionalizing partnerships through memoranda of understanding (MoUs) or working groups to ensure continuity and accountability.

## North Zone

### Leveraging Institutional Platforms and Youth Engagement for Collective Impact

Deliberations in the North Zone placed emphasis on leveraging structured institutional platforms to foster sustainable convergence across departments. The Ayushman Bharat School Health Programme was widely seen as a promising platform to incorporate immunization awareness and periodic service delivery. However, participants lamented that siloed functioning between health and education departments has prevented the full realization of such opportunities. There were calls for dedicated inter-sectoral convergence forums at the district and sub-district levels, with clearly defined coordination roles and regular review mechanisms.

### Multi-Level Collaboration Framework

A three-level model for collaboration was proposed:

- **Community Level:** Institutions like Anganwadi Centres already deliver health, nutrition, and early childhood services. However, there is an urgent need to formally integrate Panchayats, SHGs, ASHAs, and frontline workers into routine immunization delivery and social mobilization.
- **Primary Care Level:** At the sub-centre and PHC levels, success depends on synchronized efforts of cold chain technicians, sanitation staff, transport authorities, and schools, unified under shared calendars and coordination mechanisms.
- **District, State, and National Levels:** Drawing lessons from India's polio and COVID-19 campaigns, experts advocated for high-energy, cross-departmental task forces with clear mandates, shared resources, and real-time data exchange to enable responsive delivery.

### Operational Innovations and Field Learnings

Real-world solutions were showcased from states like Uttar Pradesh, Telangana, and Odisha:

- **Extended-hour immunization centers** catered to working individuals.
- **Community mobilization through local governance**, such as involving Gram Pradhans, fostered trust.
- **Counseling sessions in schools and households** built awareness and reduced misinformation.

Efforts such as mobile tracking for migrant populations, reward-based recognition for immunization-complete families, and specialized counseling for high-risk households were highlighted as essential for tailoring interventions to localized needs.

## Community Engagement and Civil Society Roles

Civil Society Organizations (CSOs) emerged as key intermediaries between government programs and underserved populations. They played critical roles in:

- Correcting misinformation, such as myths about infertility and vaccination.
- Tracking migratory and urban-poor populations using digital reminders and neighborhood mapping.
- Transforming community volunteer models into ownership-driven structures where immunization was seen as a shared responsibility.

Behavior change communication was driven by door-to-door campaigns, mothers' group meetings, microplanning, and the use of local influencers. The approach underscored that "one size does not fit all," and localized strategies were crucial to reach diverse population groups effectively.

## Digital Transformation and Data Integration

Experts unanimously advocated for robust digital infrastructure:

- Loss of paper-based records like MCPC cards was flagged as a barrier to follow-up doses.
- Centralized digital platforms, integrated with initiatives like Ayushman Bharat and One Nation One Ration Card, were proposed to enhance traceability and accountability.
- Digitization was also linked to improved inter-ministerial coordination, drawing lessons from the Swachh Bharat Abhiyan's multi-sectoral model.

## Policy Gaps and Systemic Challenges

Persistent challenges were identified, including:

- Limited inter-sectoral accountability beyond health departments.
- Inadequate cold chain and supply chain mechanisms, particularly in the private sector.
- Lack of structured immunization programs for international travelers and vulnerable groups such as urban poor and migrants.
- Resource constraints and fragmented data systems were recurrent issues, demanding integrated planning.

## Reframing the Gender Debate and Building Trust

While the presence of male ASHA workers was briefly discussed, the consensus was that systemic trust-building through technology and consistent service delivery should take precedence over debates on provider gender. Behavioral change efforts should focus on stakeholders across all levels—from caregivers to policymakers.

Participants pointed out that the involvement of youth groups, such as the National Service Scheme (NSS) and Nehru Yuva Kendra Sangathan (NYKS), remains largely symbolic in most states. Yet, these platforms have enormous potential for peer education, tracking of zero-dose children, and behavior change communication in both rural and urban areas. Training youth volunteers to disseminate vaccine-related information, organize immunization camps, and support real-time data collection was recommended as a sustainable strategy.

Digital platforms, community radio, and local cable television networks were cited as tools for multisectoral outreach, especially for vaccine promotion among hard-to-reach urban populations. The group also discussed integrating private sector healthcare providers—both formal and informal—into public immunization efforts. Many private practitioners operate in peri-urban slums and migrant communities, and their endorsement of vaccines can play a significant role in increasing acceptance. Participants advocated for the development of coordination frameworks where private providers are included in immunization planning and reporting, while also receiving periodic training on cold chain protocols and vaccine safety.

Participants agreed that inter-sectoral partnerships must be designed to operate beyond the duration of campaigns or crisis periods. Sustainability requires institutional arrangements, shared budgeting, and common metrics of success. Cross-cutting policy mandates and decentralized co-planning were proposed as essential enablers.

## South Zone

### From Transactional Convergence to Structural Co-Ownership and Innovation

The South Zone consultation presented a forward-thinking vision for convergence, arguing that it must evolve from periodic, compliance-driven coordination into a model of structural co-ownership. While routine convergence between health, ICDS, and education is mandated in many national programs, participants noted that these are often seen as administrative obligations rather than opportunities for shared planning, innovation, and accountability.

### Addressing Geographic and Social Disparities in Immunization

The immunization landscape in India remains characterized by stark disparities—both across and within states. While some states deal with aging populations requiring adult vaccination strategies, others, such as those in the Northeast, grapple with geographic isolation and limited access. Within urban areas, marginalized groups like slum residents often show significantly lower immunization rates, sometimes as low as 40–50%, despite being surrounded by healthcare infrastructure. Migratory populations frequently fall through the cracks, shuttling between villages and cities, resulting in disrupted vaccination cycles. Urban health data often masks these pockets of low coverage.

Additionally, the prevailing monitoring system focuses largely on meeting numerical targets at the district level, sidelining critical factors like service quality, community experience, and responsiveness of outreach. Vaccine hesitancy is rising, increasingly fueled by misinformation spread through digital platforms. There is a pressing need to strengthen digital literacy and create robust, trustworthy health communication networks.

## Challenges of Reaching Migrant Communities

Migrant families—typically residing in makeshift shelters—face several interlinked challenges. They often lack clean water, stable housing, and access to frontline health workers. Language and cultural barriers, coupled with a history of neglect, have eroded trust. Requirements such as Aadhaar cards and consistent mobile numbers hinder vaccine registration and follow-up, particularly as families move frequently across regions.

Innovative state-level models that deliver vaccines directly to these settlements throughout the year—not just during campaigns—have demonstrated promise. However, intra-system inconsistencies remain a hurdle. Some healthcare centers demand a minimum number of children for sessions, while others provide services to even smaller groups. Community leaders from within the migrant population have shown potential as mobilizers, fostering trust and supporting localized vaccine drives. Technology and compassionate policy flexibility are both essential to reach these transient communities effectively.

## Strengthening the Immunization Ecosystem: Recipient, Provider, and Vaccine

A comprehensive view of immunization challenges must account for the three core elements: the recipients of vaccines, the providers who administer them, and the vaccines themselves.

Among recipients, especially those experiencing homelessness, health-seeking behavior is often deprioritized due to more immediate survival needs like food and shelter. Even when outreach occurs, mistrust and misinformation—such as fears of severe side effects—discourage vaccine uptake.

Among providers, there is a persistent shortage of healthcare professionals willing to serve in underserved areas. Cultural elitism, urban-rural divides, and lack of incentives keep doctors away from field-based service. Nurses are often reduced to clerical roles, leaving a vacuum in patient-facing care. Despite an adequate vaccine supply, systemic disconnects result in wastage or underutilization, especially when service denial is based on incomplete documentation—contrary to existing inclusive policies.

Building capacity among healthcare workers, especially from within vulnerable communities, and leveraging digital media to counter misinformation, are urgent needs. Social media can be repurposed to create relatable, accurate content on critical vaccines like HPV.

## Gender and Cultural Barriers in Service Delivery

Immunization programs continue to be shaped by structural exclusions. Male participation in health delivery remains rare, reinforcing gender stereotypes. Care responsibilities disproportionately fall on women, and immunization hours clash with their informal labor demands.

Marginalized groups—particularly from certain religious or caste backgrounds—often face microaggressions and subtle disrespect from health personnel. These biases manifest in body language, address forms, and interpersonal interactions, eroding trust and discouraging participation. Cultural and linguistic mismatches between providers and tribal or minority communities only widen this divide.

Respectful, culturally attuned communication must be embedded in training for ASHAs and ANMs. Recruitment practices must prioritize local language fluency and representation from the communities being served.

## Towards a Respectful and Inclusive Immunization Strategy

Current field practices often lack sensitivity to lived realities. Communities facing stigma—such as sex workers—may avoid health services altogether due to fear of being identified by their address. The assumption that “providers know best” dominates health education, leaving little room for community feedback.

Innovative models involving peer educators and two-way participatory education can bridge this gap. Community health councils could anonymously surface concerns about disrespect or service gaps.

Additionally, punitive accountability frameworks often scapegoat frontline workers while shielding senior personnel. This discourages honest reporting and suppresses operational insights that could enhance program responsiveness.

## Reimagining the Frontline and Building Systemic Resilience

A resilient immunization system requires more than operational efficiency. Emotional intelligence, cultural competence, and structural fairness are critical. Immunization outreach must be reimagined as a dialogue rather than a directive. Frontline workers need not just logistical tools but also the language of empathy, inclusive service frameworks, and protection against systemic blame.

Unless the system listens actively, respects diverse realities, and evolves accordingly, immunization efforts risk being resisted—not due to rejection of healthcare—but because communities continue to feel rejected by the system itself.

Finally, participants emphasized the transformative role that local leadership, especially district magistrates and municipal commissioners, can play in operationalizing convergence. In districts where regular multi-sectoral review meetings are held, immunization performance indicators have improved significantly. This success was attributed to shared microplans, transparent tracking systems, and a culture of inter-departmental support. Participants recommended

that these practices be documented and scaled through national guidelines and knowledge-sharing platforms.

The inclusion of self-help groups (SHGs), Mahila Mandals, and women's federations in immunization awareness and mobilization was discussed as a critical innovation. These groups are already active in maternal and child health domains and can easily be integrated into local immunization strategies. In addition, partnerships with digital technology institutions were cited as vital for developing immunization tracking tools, dashboards for zero-dose monitoring, and AI-enabled decision-support systems for microplanning.

Participants argued that convergence should be measurable. Indicators such as the number of joint meetings held, departments participating in immunization microplans, or co-financed activities could be tracked and published at district and state levels. Auditing mechanisms, rewards for high-performing districts, and peer learning exchanges were suggested to institutionalize convergence as a performance metric rather than an informal administrative practice.

## Key Highlights of the session:

### I. Action themes highlighted under this session are:

- ☑ Effective immunization requires collaboration beyond health departments, including education, infrastructure, NGOs, and private sectors.
- ☑ Emphasis on shared ownership of immunization data to reduce discrepancies and build trust.
- ☑ Lack of proper data integration from private clinics and rural setups contributes to underreporting.
- ☑ Need for Community Anchors.
- ☑ Educational institutions can mandate immunization documentation during school admissions.
- ☑ Lack of reliable data affects policymaking, funding, and monitoring.

### II. Policy Recommendations:

- Develop a Shared Data Governance Framework
  - Define a unified protocol for data collection, verification, and sharing across sectors (government, NGOs, private).
  - Encourage real-time digital dashboards with common access.

- Formalize Role Clarity in Multi-sectoral Meetings
  - Issue clearly defined TORs (Terms of Reference) for each sector in district task forces.
  - Include immunization KPIs in performance appraisals of partner departments (e.g., education, ICDS).
- Mandate Immunization Documentation in Public Services
  - Require immunization cards at school admissions and welfare enrolments
  - Link immunization status with routine child health services across sectors.
- Improve Data from Private Sector & Urban Areas
  - Introduce simplified, mandatory reporting formats for private providers.
  - Engage Resident Welfare Associations (RWAs) and urban clinics in outreach.
- 5. Invest in Community-based Surveillance & Feedback
  - Utilize ASHAs, ANMs, school nurses, and local leaders to generate early warnings and track dropouts.
  - Promote participatory models where community voices feed into program design.



Figure 2. Word cloud based on discussions of the second session



# **Opportunities for a life-course approach**

## East Zone

### Expanding Beyond Childhood Immunization Through Systems Integration and Health Equity

The East Zone deliberations emphasized the necessity of evolving India's immunization strategy beyond childhood to address vaccine-preventable diseases across the lifespan. Experts noted that although childhood immunization coverage has improved significantly, the system has not adequately adapted to incorporate adolescent, adult, and geriatric needs. A key concern raised was the absence of structured delivery platforms for vaccines like HPV, tetanus boosters, influenza, and hepatitis B in adults, despite growing epidemiological evidence supporting their utility. The rabies vaccine, while available, remains largely reactive and limited to dog-bite cases, lacking proactive community-based deployment.

### Awareness, Advocacy, and Adolescents as a Starting Point

The East Zone deliberations emphasized the necessity of evolving India's immunization strategy beyond childhood to address vaccine-preventable diseases across the lifespan. Experts noted that although childhood immunization coverage has improved significantly, the system has not adequately adapted to incorporate adolescent, adult, and geriatric needs. A key concern raised was the absence of structured delivery platforms for vaccines like HPV, tetanus boosters, influenza, and hepatitis B in adults, despite growing epidemiological evidence supporting their utility. The rabies vaccine, while available, remains largely reactive and limited to dog-bite cases, lacking proactive community-based deployment.

### Family-Centered and Contextualized Engagement

Family dynamics in patriarchal settings were flagged as pivotal to immunization decision-making. Antenatal visits offer crucial opportunities for engaging extended family members, promoting a broader community sense of ownership over health practices. However, frontline health workers remain overburdened, juggling multiple responsibilities—ranging from nutrition to anemia and immunization—thus affecting service quality.

### Provider Behavior and Systemic Gaps

Vaccination hesitancy among healthcare providers themselves was highlighted as a significant barrier. Instances where private practitioners withheld vaccines due to personal judgment without evidence-based criteria demonstrate how provider attitudes can undermine public trust. Moreover, discrepancies in data reporting systems (e.g., HMIS) further weaken planning and monitoring.

## Monitoring Mechanisms and Data Validity

Innovative supervision strategies were discussed, particularly in HIV programs, including remote mentoring, WhatsApp tracking, and documentation via immunization cards. Maternal recall alone was deemed unreliable, emphasizing the need for systematic recordkeeping. Notably, even tertiary care facilities show low adult vaccination rates, reflecting a broader gap in outreach and health literacy—even among the educated.

## Systemic Barriers to Life-Course Immunization

Barriers include fragmented service delivery, outdated training modules, inconsistent policy direction, and insufficient funding. Adolescents, often viewed as asymptomatic, are overlooked in health strategies despite their vulnerability. Regular capacity-building and updated guidelines for frontline workers were identified as urgent needs.

## Addressing Vaccine Hesitancy and Trust Deficits

Vaccine hesitancy was acknowledged as pervasive, cutting across socio-economic and professional strata—including doctors, religious figures, and policymakers. Combatting it requires a combination of attitudinal shifts, policy support, cultural sensitivity, inter-sectoral coordination, and a confident, well-informed healthcare workforce.

## Travel and Event-Specific Immunization Gaps

### *Travel and Event-Specific Immunization Gaps*

Removing vaccine hesitancy was considered foundational to any immunization strategy. It was proposed that communication materials—such as one-minute videos, visual stickers, and FAQs—be made widely available to improve public understanding of vaccine protocols and benefits. Lack of targeted messaging was described as a missed opportunity, particularly in travel-related contexts.

### *Lack of Travel Immunization Policy*

India currently lacks a structured immunization framework for international travellers. Unlike domestic programs such as the UIP, outbound travel vaccines are not standardized. Examples were shared where required vaccines like yellow fever or MMR were difficult to access, even in government-mandated contexts such as the Kumbh Mela, indicating poor planning and coordination.

### *Cold Chain Integrity and Regulatory Oversight*

Concerns were raised about private sector vaccine handling, with reports of improper cold chain maintenance in chemist shops and vaccination centers. This threatens vaccine efficacy and calls for improved regulatory mechanisms and routine inspections.

### ***Port Health Organizations and Border Surveillance***

There is an urgent need to train immigration staff and Port Health Organization personnel in vaccine verification protocols. Missteps in scheduling—such as the simultaneous administration of live vaccines—can lead to vaccine failure. Basic training in vaccine documentation and schedule compliance was deemed essential.

### ***Digital Innovations and AI for Awareness***

Digital integration was encouraged—using SMS/WhatsApp-based alerts and AI-driven systems to respond to public queries in local languages. Such systems could bridge awareness gaps, especially regarding travel vaccines and post-vaccination care.

### ***Revitalizing Public Sector Manufacturing***

Despite India's reputation as a global vaccine supplier, domestic shortages persist, particularly for vaccines like cholera and yellow fever. The shutdown of key public sector manufacturing units was seen as detrimental. Reviving and strengthening public facilities was advocated to ensure equitable access.

### ***Ethical Conduct and Integrity in Practice***

Concerns about certificate forgery and bypassing actual vaccination were highlighted. Strict ethical standards were emphasized, especially for high-risk diseases like yellow fever. Human-centered care—via patient education and personalized responses—was advocated as a model for building trust in vaccination systems.

## **System Strengthening and Integrated Policy Vision**

### ***Private Sector Dominance and Policy Vacuum***

Current adult immunization is largely privatized, with fragmented practices and profit-driven motives. A lack of national policy perpetuates inequities despite domestic manufacturing capacity. Experts emphasized the need to adopt globally established frameworks adapted to India's realities.

### ***Holistic Health Integration***

Life-course immunization should not function in isolation. It must be integrated with maternal health, NCDs, and mental health strategies. Existing strengths—UIP workforce, child health programs, and manufacturing capacity—should be leveraged to build a holistic continuum of care.

### ***Resilience in Conflict Zones***

Policy must account for regional diversity and crisis zones (e.g., Northeast, Maoist-affected areas). Innovations such as military air bridges, drones, or emergency protocols were recommended to maintain cold chain integrity in hard-to-reach regions.

## ***Leveraging Partnerships and Global Learning***

Collaborations with multilateral agencies (e.g., UNICEF, WHO) can support scaling efforts. Lessons from other nations can inform India's policy design, particularly in multitasking workforce models and integrated delivery platforms.

Participants stressed the need for synchronizing immunization with other health services throughout the life span. For instance, antenatal care, school health programs, adolescent reproductive health services, and geriatric clinics can serve as effective entry points for life-course immunization. However, this would require clear operational protocols, trained personnel, and multi-departmental coordination. Experts also called for enhanced community education and sensitization to overcome socio-cultural barriers, especially around adolescent vaccination like HPV, which continues to be met with resistance in conservative settings. Importantly, discussions pointed to leveraging digital health infrastructure to create longitudinal immunization records linked with health IDs to ensure continuity of care across age groups.

## **West Zone**

### **Institutional, Behavioral, and Policy Enablers for Life-Course Immunization**

In the West Zone, experts highlighted that the current immunization architecture remains predominantly pediatric, with adult and elderly vaccines not yet prioritized in policy or implementation. They identified a critical gap in the programmatic inclusion of vaccines for chronic disease-prone populations such as diabetics and individuals with cardiovascular conditions—populations highly susceptible to diseases like influenza, pneumococcus, and shingles. The COVID-19 pandemic had momentarily pushed adult vaccination into focus, but there was concern that post-pandemic momentum may be lost without sustained policy commitment.

The West Zone expert consultation emphasized the need to evolve India's immunization landscape through a life-course approach—spanning childhood, adolescence, adulthood, and old age. Discussions focused on leveraging educational institutions, strengthening routine health interactions, building behavioral trust, developing strategic policies, and aligning regulatory frameworks to foster age-inclusive and equity-driven immunization.

### **Educational Institutions as Catalysts for Culture Change**

A strong case was made for embedding immunization awareness into the educational ecosystem. With a majority of the adult population passing through or connected to schools and colleges, these institutions present strategic platforms for outreach and attitudinal change. Formal collaboration with the education sector could help integrate health messaging into daily routines, reaching up to 80% of the population over time.

Training modules on immunization should be introduced within medical and paramedical curricula to create a workforce equipped not only with technical competence but also the communication skills needed for effective community engagement. Building vaccine literacy in adolescent students—through initiatives like dedicated immunization classes for grades 8 or 9—was also proposed as a proactive step. This strategy would not only address current awareness gaps but also cultivate a vaccine-positive mindset in future parents and citizens.

### **Mainstreaming Adult Immunization into Preventive Healthcare**

India's immunization efforts have historically focused on childhood vaccination, with adult immunization largely limited to post-exposure cases or travel-specific needs. This gap reflects a broader oversight in preventive health delivery. It was emphasized that adult vaccination must be integrated into routine services—similar to screenings for hypertension or diabetes—at every possible touchpoint in the health system.

Routine visits to outpatient departments, health checkups, and workplace clinics present missed opportunities to screen adults for vaccine eligibility. Making vaccination part of regular medical counselling, supported by training programs for providers and public-facing campaigns, could improve uptake and normalize adult immunization within standard care practices.

### **Strategic Mapping, Prioritization, and Phased Rollout**

To systematize life-course immunization, a matrix-based framework was proposed. This would classify the population into distinct age groups (e.g., early childhood, adolescence, adulthood, and elderly) and identify context-relevant interventions for each stage. Current programmatic gaps—such as weak coverage under home-based young child care programs—could be addressed through targeted reinforcements.

Importantly, the strategy should avoid overwhelming the system or public. A phased, incremental rollout was recommended—starting with modest targets like a 10% increase in uptake or awareness—allowing real-time course correction and trust-building. Efforts should initially focus on “ready-to-go” populations most likely to accept vaccination, before gradually expanding across socio-economic and demographic strata.

Vaccines should be prioritized based on disease burden, incidence, and severity of complications. Epidemiological evidence should drive which vaccines are introduced first, ensuring the highest return on investment for public health. Mass media, physician prompts, and simplified decision checklists can aid in outreach and informed decision-making.

## Operational Integration and Missed Opportunity Interventions

The consultation highlighted the need to build vaccine-related assessments into all relevant service delivery points, not just immunization-specific visits. Whether during outpatient consultations, inpatient care, or pharmacy encounters, every health system interaction must be leveraged to assess immunization status and offer vaccines when appropriate.

Tools such as educational videos in waiting areas, posters, physician reminders, and mobile alerts can help prompt both providers and patients. Systemic integration of such prompts into digital health records and service pathways is essential for sustained behavioral nudges.

## Policy Frameworks and Regulatory Pragmatism

A recurring theme was the absence of a dedicated national policy for adult immunization. Without such a policy, even the most well-intentioned initiatives risk remaining fragmented, underfunded, or underprioritized. A comprehensive policy must be backed by population-level data, strategic financing, and targeted communication.

Importantly, a critique was raised regarding the current regulatory environment. The tendency to apply “gold standard” regulatory models—while appropriate in technical terms—may inadvertently delay or restrict the rollout of broadly beneficial public health interventions. A shift toward pragmatic, people-centric regulation was proposed, where the proven safety and utility of interventions for the majority should serve as sufficient grounds for policy action.

Public health decisions must be guided by population-level truths—as taught in foundational public health education—not just bureaucratic compliance. When the majority stands to benefit from an effective intervention, that benefit constitutes a moral and scientific imperative for policy implementation.

In the end, policy fragmentation was a recurring theme. For instance, while HPV vaccines have received technical approval, their roll-out in state programs is sporadic and poorly monitored. Participants also pointed to the need for a centralized life-course immunization roadmap that integrates inputs from multiple departments—health, education, women and child development, tribal welfare, and geriatrics. Experts recommended structured IEC campaigns tailored for different age groups and life stages, as well as incentives for uptake among working-age adults. Further, it was suggested that medical colleges and professional societies should play a stronger role in creating demand and advocating for expanded immunization schedules. The group emphasized that the life-course approach must be anchored in preventive healthcare and positioned as a cornerstone for universal health coverage.

## North Zone

### Infrastructure Readiness and Strategic Communication for Lifespan Immunization

This consultation segment offered an in-depth examination of life course immunization—a public health strategy that extends vaccination beyond infancy and childhood to encompass adolescents, adults, and the elderly. Discussions focused around infrastructural preparedness and behavioral dimensions necessary for adopting a life-course immunization strategy. Participants acknowledged that India’s cold chain infrastructure—previously focused on pediatric vaccines—requires significant augmentation to support vaccines with varying storage requirements across age groups. They emphasized that adult immunization demands distinct delivery mechanisms, with health facilities equipped for high-volume service, extended hours, and integrated counselling services.

The discussions centered around designing an inclusive, evidence-based, and context-sensitive immunization framework, addressing the multifaceted dimensions of product selection, delivery mechanisms, behavior change, system readiness, and policy integration.

### The Three P’s of Life Course Vaccination: Product, Place, People

A structured approach to life course vaccination was proposed, anchored in the “Three P’s” framework:

- **Product:** Prioritization of vaccines suitable for adolescents and adults was emphasized, including cervical cancer, pneumococcal, influenza, hepatitis, and the emerging adult TB vaccine. The challenge lies in determining which vaccines are essential based on epidemiological evidence and aligning public health priorities accordingly.
- **Place:** Delivery platforms must move beyond traditional immunization centers. Schools—especially for adolescent vaccination—have demonstrated success globally, such as in HPV vaccine rollouts. For adults, new models such as workplace campuses, industrial zones, and office complexes must be leveraged to improve accessibility.
- **People:** Stakeholders were identified across three categories: vaccine providers, recipients (now autonomous decision-makers), and community influencers. A fundamental behavioral shift occurs in adult immunization, where individuals must actively choose to vaccinate. Thus, tailored awareness campaigns, rights-based communication strategies, and the involvement of influencers like teachers, religious leaders, and digital personalities are essential.

Healthcare workers require capacity building to address nuanced concerns from adult populations and manage Adverse Events Following Immunization (AEFI) effectively. Clear protocols and training in crisis communication were recommended as vital components of this preparedness.

## Current Status and Evidence Gaps in Adult Immunization

India's current life course immunization efforts remain limited and largely reactive—focused on post-exposure prophylaxis (e.g., rabies, hepatitis B) or risk-specific scenarios like travel or chronic conditions. A transformative shift toward a preventive immunization approach necessitates:

**Evidence generation:** Systematic reviews and meta-analyses of global and local data are required to establish the disease burden, cost-effectiveness, productivity gains, and healthy aging benefits associated with adult immunization.

**Demand generation:** Convincing healthy adults to proactively vaccinate is a behavioral hurdle, especially when even childhood immunization faces resistance in parts of the population.

**Awareness and provider readiness:** Low awareness about adult vaccines is common not just among the public, but also among frontline providers such as doctors at PHCs and CHCs. Education and sensitization are thus key.

A critical missing piece is a national policy on life course immunization, along with an assessment of whether India's current health infrastructure—particularly human resources—is equipped to handle expanded immunization coverage.

## Strategic Integration and Unified Data Systems

Integration of adult immunization efforts with existing programs (e.g., the National Programme for Health Care of the Elderly or the School Health Program) was proposed to optimize delivery platforms. However, siloed functioning of these programs presents coordination challenges that must be proactively addressed.

A centralized, interoperable vaccine registry was proposed as foundational. At present, immunization data is scattered across multiple portals (e.g., IDSP for rabies, separate databases for HIV or childhood vaccines), which hinders continuity of care. A unified, lifelong vaccine record for each citizen was seen as essential for effective rollout.

## Addressing Vaccine Hesitancy, Prioritization, and Implementation Challenges

Behavioral and logistical aspects of vaccine acceptance were explored. Hesitancy toward non-childhood vaccines—due to perceived irrelevance, low risk perception, misinformation, or socio-cultural norms—was identified as a major obstacle. Examples from the COVID-19 rollout revealed persistent reluctance even among well-informed individuals, indicating the need for stronger communication strategies.

While India's vaccine manufacturing is cost-effective, economic feasibility alone does not justify large-scale implementation. Strategic prioritization is necessary, focusing on:

- High-risk populations;
- Diseases with significant economic or public health burdens;
- Vaccine candidates with strong evidence for effectiveness and acceptance.

Awareness gaps exist even among stakeholders and implementers. Without structured educational efforts in schools, workplaces, and medical institutions, both awareness and operational readiness remain constrained. Use of school infrastructure for adolescent vaccination was encouraged, but it was cautioned that non-clinical personnel (e.g., teachers) should not be tasked with administration unless properly trained.

### Preparing for Systemic Readiness and Long-Term Success

A forward-looking roadmap was proposed for immunization logistics, integrating:

- Smarter manpower planning to avoid overburdening existing health workers;
- Digital tools for monitoring, tracking, and data visualization;
- Interlinked policies aligning life course immunization with national health goals.

Existing weaknesses in the Universal Immunization Programme (UIP)—such as record-keeping inconsistencies, staff shortages, vaccine stockouts, and logistical delays—were flagged as persistent risks that could compromise expanded vaccination efforts unless specifically addressed.

The experts discussed integrating adult vaccines with non-communicable disease (NCD) clinics and health and wellness centres, thereby using existing platforms to deliver broader preventive care. The North Zone's dialogue underlined the need for robust data systems and longitudinal tracking to identify dropouts, coverage gaps, and opportunities for re-immunization specifically in the context of life-course approach.

## South Zone

### **Institutionalizing the Life-Course Framework and Enabling Policy Alignment through Integration, Ethics, Evidence, and Equity**

The South Zone experts provided a forward-looking view, calling for institutionalizing the life-course approach through both policy innovation and systemic alignment. They argued that despite multiple pilot programs and sporadic state-level initiatives, there is no cohesive national policy mandating adult immunization. The lack of standardized protocols for vaccines like rabies, HPV, and tetanus among adult populations was seen as a major gap.

The expert insights delved into the multifaceted dimensions of adopting a life-course approach to immunization in India. Discussions revolved around policy gaps, programmatic feasibility, equity, ethics, evidence generation, and logistical preparedness—highlighting the necessity of moving beyond fragmented child-focused vaccination models toward inclusive, age-spanning immunization systems.

### **Evolving Policy and Programmatic Vision**

The life-course approach to immunization is currently in its infancy in India. While health policies such as RMNCH+A have adopted life-cycle perspectives, immunization programs lag in this integration. There is growing recognition that vaccines like the pneumococcal vaccine—relevant across age groups—must be made accessible not just to children but also to adults with chronic conditions through the public health system.

A unified, integrated immunization program—rather than multiple vertical efforts—is viewed as a more pragmatic and cost-effective model. Delivering certain vaccines through secondary or district-level hospitals rather than primary care settings could optimize resource use without overwhelming frontline staff.

### **Addressing Data Gaps and Equity Concerns**

There is a stark lack of data on vaccine coverage among marginalized and high-risk populations, such as those with sickle cell disease. Despite vaccines being available under existing frameworks, their uptake remains undocumented, reflecting implementation and surveillance gaps. Experts called for collaborative evidence generation—bringing together research institutions, practitioners, and policymakers—to develop actionable insights and robust cost estimations necessary for scaling life-course vaccination programs.

Equity also emerged as a critical lens. Concerns were raised around the invisibility of adult groups in current immunization efforts—especially the elderly and those with comorbidities—and the moral imperative to close these gaps.

## Ethical Dimensions of Adult Vaccination

A unique ethical challenge discussed was the risk of stigma and privacy breaches when vaccinating adults with underlying or stigmatized health conditions. In contrast to childhood vaccination, where group-based administration is normalized, adult immunization—especially when disease-specific—can inadvertently reveal sensitive medical information. These concerns warrant explicit ethical safeguards and merit structured policy dialogue to ensure dignity, confidentiality, and non-discriminatory delivery.

## Leveraging Existing Infrastructure and Systems Readiness

India's robust immunization logistics—developed through decades of childhood immunization efforts and the COVID-19 campaign—provide a strong foundation for expanding to other age groups. Infrastructure for cold chains, procurement, and vaccine delivery is largely in place. The task now is to reframe service delivery to include adult and geriatric populations.

Experts emphasized that scaling life-course immunization must start with prioritized, high-risk groups (e.g., elderly, people with comorbidities), guided by cost-effectiveness and epidemiological relevance. Targeting these segments before rolling out to the broader population mirrors best practices in preventive care.

## Demand Generation and Risk Communication

Public demand for vaccines is strongly influenced by perceived risk. The uptake of COVID-19 vaccines during crisis was driven by widespread fear and awareness. For other vaccines like BCG revaccination, adult influenza, or pneumococcal vaccines, similar urgency is lacking—posing barriers to uptake.

Therefore, Community Engagement and Risk Communication (CERC) is vital. Communicating personal relevance, public benefit, and long-term protection can build trust and increase acceptance, particularly in adult and elderly populations.

## Special Case: Rabies Pre-Exposure Prophylaxis

The rabies vaccine was discussed as a compelling case for pre-exposure immunization. A two-dose intradermal regimen in toddlers (18–24 months) could generate long-term immunological memory, reducing reliance on post-exposure interventions and improving program efficiency. India has sufficient manufacturing capacity for rabies vaccines, but regulatory and public perception hurdles must be addressed.

Implementing such strategies requires regulatory approval based on Indian evidence, even if efficacy has been established internationally. Experts emphasized that aligning with WHO's 2030 goal of zero dog-mediated human rabies deaths necessitates pre-emptive immunization efforts in endemic regions.

## Cost-Effectiveness and Political Economy of Vaccine Introduction

Policy resistance to expanding immunization—particularly for the elderly—often stems from cost concerns. The lack of comprehensive cost-benefit data impedes vaccine introduction. Policymakers may perceive elderly immunization as low priority, despite its potential to reduce healthcare burden and improve quality of life.

The case of HPV vaccination illustrated the political and economic tensions. Although proven effective in preventing cervical cancer, HPV vaccination was earlier withdrawn due to cost concerns. However, sub-national efforts (e.g., by state governments and NGOs) are now exploring affordable procurement models to reintroduce it within adolescent school health programs.

Experts called for evidence-based decision-making, cautioning against undue influence from lobbying and advocating for transparent, science-led policy frameworks. Evaluating vaccines based on disease burden, demographic need, and societal impact must guide national strategies.

## Toward a Coordinated National Framework

Despite isolated efforts by hospitals and private sector actors to administer adult vaccines, there is no overarching national policy guiding life-course immunization. Experts stressed the need for synchronized policy development—balancing universal coverage goals with targeted expansion based on demand, feasibility, and scientific rationale.

A dual approach was proposed: ensuring full coverage of current childhood vaccines under UIP, while simultaneously designing and rolling out adult and geriatric immunization pathways. This requires aligning health priorities, regulatory approvals, funding, community engagement, and operational logistics.

Participants highlighted that life-course immunization must be seen as part of a continuum of care rather than discrete age-specific interventions. They recommended embedding immunization within the lifecycle services offered under national health missions, particularly through Health and Wellness Centres (HWCs) and comprehensive primary health care. The South Zone emphasized engaging with professional societies, academic institutions, and regulatory bodies to develop guidelines, conduct implementation research, and generate community-level evidence to inform policy.

The need for convergence was echoed, particularly across maternal health, adolescent health (RKSK), elderly care (NPHCE), and occupational health programs. Examples from districts where immunization has been integrated into maternity and adolescent health outreach were shared as best practices. Experts also called for improved financing mechanisms, either through existing schemes like Ayushman Bharat or through innovative insurance models, to cover life-course vaccines. Finally, it was emphasized that institutional commitment, public awareness, and operational readiness must evolve together if India is to effectively transition toward a life-course immunization model that is inclusive, sustainable, and responsive to emerging epidemiological realities.

## Key Highlights of the session:

### I. Action themes highlighted under this session are:

- ☑ importance of expanding this view to include adolescents, adults, pregnant women, and the elderly.
- ☑ low demand, poor awareness, and weak data systems were identified as key challenges in adult and adolescent vaccination coverage.
- ☑ Frontline workers like ASHAs, ANMs, and teachers can be important influencers and information carriers throughout the life course
- ☑ Existing platforms like IDSP are underutilized in capturing age-wise immunization data. Denominator inaccuracies and under-reporting in private settings were discussed.
- ☑ Encouraging community ownership and awareness via local champions, teachers, and civil society organizations was seen as critical.

### II. Policy Recommendations:

- Adopt a National Life Course Immunization Framework:
  - Develop and implement a comprehensive national strategy that defines age-wise immunization schedules and delivery mechanisms.
- Establish Shared Data Protocols:
  - Promote interoperability between NGO and government systems, with unified definitions and denominator baselines to prevent data mismatches.
- Institutionalize School-Based Immunization Tracking:
  - Mandate immunization documentation during school admissions and designate school health officers or nurses to monitor schedules.
- A. Incentivize Private Sector Reporting:
  - Create incentives or mandates for private clinics to report immunization data to national systems like IDSP.
- B. Develop a Digital Life Course Vaccination Record:
  - Implement a single digital immunization ID or passport linked with Aadhaar/health IDs to track vaccines throughout a person's life.

C. Foster Public–Private–People Partnerships (4P Model):

- Move beyond government-NGO partnerships to a holistic 4P model that includes community ownership and private innovation.



Figure 3. Word cloud based on the discussions of the third session



**Scope  
of technologies  
in the spectrum of  
Immunization Care**

## North Zone

### Toward a Unified and Ethical Digital Backbone for Immunization

Deliberations from the North Zone emphasized the need for a cohesive, ethically governed, and future-ready digital infrastructure to support immunization across the country. Participants identified significant fragmentation in existing data systems—such as HMIS, eVIN, CoWIN, and state-specific platforms—which often operate in silos, limiting their potential to enable synchronized decision-making. Experts stressed that the absence of a standardized national immunization data policy impairs data sharing, quality assurance, and accountability. They called for policy-level consensus on data architecture, privacy, interoperability, and ethical safeguards.

Discussions underscored the potential of Aadhaar-based unique identifiers to build longitudinal immunization histories—critical for monitoring continuity of care, especially among migrant, urban poor, and slum-dwelling populations. GIS-based tools were also highlighted for their potential to identify immunization deserts and spatially map zero-dose clusters. Predictive models using real-time analytics could help flag children at risk of dropout or missed doses, enabling targeted outreach.

However, technology adoption must be context-sensitive. The group emphasized that digital tools must complement, not complicate, frontline workflows. Innovations such as offline-capable mobile apps for ANMs, voice-based inputs for low-literacy settings, and simplified dashboards can help bridge the gap between digital ambition and field-level functionality. Training and continuous feedback loops were also highlighted as essential to building trust and confidence among field workers.

The role of technology in India's immunization ecosystem has expanded dramatically, encompassing ten critical domains—each reflecting the evolving synergy between digital innovation and public health practice.

### Immunization Tracking and Program Performance:

India's journey began with manual immunization records, evolving through MCTS (Mother and Child Tracking System), then the RCH portal, and more recently CoWIN during the COVID-19 pandemic. These platforms enabled Aadhaar-linked validation and real-time vaccination tracking. The current shift to U-WIN under the Universal Immunization Programme (UIP) aims to establish India's first digital immunization registry. Despite progress, interoperability challenges persist across platforms, necessitating integration with Aadhaar or ABHA IDs to ensure portability and continuity of care.

### **Vaccine Delivery Innovations:**

Newer delivery systems such as intradermal jet injectors, microneedle patches, and intranasal vaccines are emerging as alternatives to traditional injectable formats. These offer potential for ease of use, improved acceptance, and reduced dependency on cold chain infrastructure.

### **Vaccine Logistics and Cold Chain Monitoring:**

The development of systems like eVIN and NCCMIS has allowed real-time tracking of cold chain equipment, vaccine stocks, and supply chain dynamics. Technologies such as blockchain and Vaccine Vial Monitors (VVMs) are being explored for last-mile assurance, quality control, and integrity validation.

### **Data-Driven Decision-Making:**

A range of data sources—HMIS, private providers, logistics tools, and certification portals—now inform immunization planning. Integration enables identification of zero-dose and partially vaccinated populations and guides targeted campaigns to close equity gaps.

### **Vaccine R&D Technologies:**

India has rapidly adopted mRNA, DNA, viral vector, and subunit platforms—especially during COVID-19—reducing vaccine development time to under 100 days. AI and machine learning now support antigen modeling, immune response simulation, and hypothetical efficacy forecasting, accelerating innovation in vaccine development.

### **Real-World Impact Assessment:**

Beyond coverage data, technologies now support real-time assessment of vaccine effectiveness via electronic health records and ID-linked datasets, allowing precise monitoring of disease prevention and program outcomes.

### **Vaccine Safety Surveillance:**

Tools like AEFI and SafeVac, along with citizen-driven reporting platforms, enhance post-vaccination surveillance. Causality assessments follow WHO-based algorithms to identify links between vaccines and adverse events

### **Integrated Disease Surveillance:**

Digital consolidation of platforms such as IDSP and IHIP enables lab-based disease detection and early warning systems, strengthening public health response capabilities.

### **Public Sentiment Monitoring:**

The rise of misinformation and vaccine hesitancy—amplified during MR and HPV campaigns—has prompted the use of digital tools to monitor social media sentiment. These insights support real-time risk communication strategies and community engagement.

## Systemic and Infrastructural Challenges:

Despite advancements, digital adoption faces persistent barriers—poor network connectivity, inadequate digital access, and workforce capacity gaps. Many frontline workers still lack functioning phones or basic digital literacy, hindering the utility of mobile-based systems or toll-free reporting lines. Even when digital tools are available, lack of financial support for essentials like mobile data recharges remains a bottleneck.

In addressing these gaps, there is a growing consensus that technological innovation must be matched with systemic readiness and contextual adaptability. Platform design should prioritize interoperability, reduce redundant data entry, and align with existing workforce realities. Fragmented systems—such as separate portals for immunization, maternal health, and HR records—must give way to a unified digital ecosystem where data is entered once and shared seamlessly across services.

Another key challenge is the underutilization of citizen-facing digital tools. Though immunization data is increasingly digitized, parents and caregivers often remain unaware of it. Systems like DigiLocker can offer direct access to vaccination certificates and longitudinal health records, but only if usability, awareness, and design are centered around the user.

Furthermore, concerns around data privacy and sovereignty remain pressing. Platforms must comply with national data localization mandates and store citizen information on Indian servers to maintain regulatory oversight and public trust.

There is also a critical need to rethink the scalability and design of cold chain infrastructure. Existing systems should be optimized for broader health services, not restricted to immunization logistics alone. Greater cross-utilization of resources like ambulances and vaccine transport units can improve cost-effectiveness and system efficiency.

Finally, geographic and demographic realities—such as outdated census baselines, overburdened frontline workers, and regional disparities—demand that digital solutions be flexible, decentralized, and tailored to local needs. A single ANM serving over 17,000 people cannot be expected to sustain seamless digital operations without proportional staffing and infrastructure support.

In summary, India's immunization technologies have evolved rapidly, but their full potential can only be realized through inclusive design, regulatory reform, and systemic integration. True transformation lies not in the tools themselves, but in their alignment with human, infrastructural, and contextual realities—ultimately fostering an equitable, responsive, and resilient immunization ecosystem.

Importantly, the experts emphasized that technology should not replace the human element of immunization care. Rather, it must serve as an enabler for equitable, transparent, and efficient service delivery—rooted in ethical stewardship and responsive to ground realities.

## East Zone

### Inclusive, Contextual, Bottom-Up Immunization Solutions through Research, Technology, and Ground Realities

In the East Zone, the discourse revolved around making digital tools accessible, contextually relevant, and inclusive for diverse and often underserved populations. While acknowledging the progress made through eVIN, ANMOL, and CoWIN, participants pointed out the challenges faced in hard-to-reach areas of Jharkhand, Odisha, Bihar, and West Bengal—where linguistic diversity, limited digital infrastructure, and intermittent electricity restrict technology penetration.

This segment of the consultation brought forth critical reflections on India's immunization ecosystem, spanning policy, research, implementation, and digital innovation. Key themes included demand-driven vaccine development, the behavioral dimensions of vaccine uptake, digital systems for immunization logistics, and the practical challenges faced by frontline health workers. A unified call emerged: to bridge systemic gaps through inclusive, evidence-based, and context-responsive approaches.

### Driving Immunization Forward Through Critical Inquiry and Research

Participants underscored that research in immunization must be rooted in continual questioning of existing norms, protocols, and priorities. Immunization policies and schedules must remain responsive to evolving evidence, disease epidemiology, and societal needs.

Vaccines were broadly classified into three categories:

- Those included in the national program and routinely administered;
- Those available but not yet part of routine public immunization (e.g., influenza, typhoid conjugate, varicella);
- And vaccines under development (e.g., dengue, malaria, shigella, Klebsiella).

A core argument was that vaccine demand must be generated through critical re-evaluation of need. For example, with India having achieved polio-free status, stakeholders questioned whether fewer doses might now suffice. Similarly, emerging evidence supports single-dose HPV vaccination as potentially non-inferior to the current two-dose schedule.

India-specific research is needed to support such decisions. Efforts are underway to generate local evidence for pneumococcal and influenza vaccines in the elderly. Concerns were raised about the lack of accessible technology to routinely assess antibody titers, especially in adults and immunocompromised populations, which would be essential for optimized, personalized immunization.

In light of frequent dog-bite cases in rural areas, a provocative suggestion emerged around the use of rabies vaccines for pre-exposure prophylaxis. This could significantly reduce disease risk where immediate post-exposure care is often unavailable. Participants also emphasized the need to factor in genetic and ethnic diversity in immune responses, an area still under-researched in India.

### **Reframing Communication: From Disease Messaging to Health Literacy**

It was highlighted that most communication efforts in India remain disease-specific and reactive. True vaccine literacy must evolve beyond episodic campaigns and become embedded across life stages—through education systems, media, workplaces, and community platforms. The vision shared was for health literacy to be as normalized and pervasive as financial literacy, empowering citizens to take informed decisions throughout their lives.

### **Technology as a Transformative Force in Immunization**

Technology was presented as a pivotal enabler in addressing systemic inefficiencies. A cloud-based vaccine logistics platform has revolutionized cold chain monitoring by integrating mobile apps, temperature loggers, and real-time dashboards. This has enhanced stock visibility, reduced wastage, and ensured cold chain integrity.

A national digital immunization registry—originally developed for COVID-19—now serves as a foundational architecture for routine immunization. Its features include QR-coded certificates, beneficiary tracking, session scheduling, and seamless integration with private providers. The system demonstrated scalability and citizen responsiveness, setting a precedent for future digital health infrastructure.

Experts advocated further leveraging digital tools such as:

- AI-based outbreak prediction;
- Mobile health solutions for remote outreach;
- Digital upskilling platforms for community health workers;
- Real-time dashboards for stock management and monitoring adverse events;
- Integrated misinformation management frameworks.

There was a strong call for a national digital immunization policy that mainstreams such innovations with clear governance frameworks.

### **Ground-Level Insights and Operational Challenges**

A grounded critique was offered on the gap between technological design and field implementation. For instance, while vaccine logistics platforms claim near-total coverage, actual data capture is often 40–50% due to sensor misplacement or poor telecom infrastructure. There is a need to allow flexibility in selecting region-specific network providers to improve data reliability.

Challenges with identity-linked data systems were also flagged. In tribal and mobile populations, lack of standard ID documents restricts registration on digital platforms. Additionally, shortages of Auxiliary Nurse Midwives (ANMs) severely hamper the functioning of even the best digital tools, especially at the sub-center level.

It was also observed that frontline workers, such as ASHAs and ANMs, are overburdened with trainings—sometimes consuming half their working month—limiting their availability for immunization service delivery.

In colder regions, operational issues like ILRs (Ice Lined Refrigerators) failing at sub-zero temperatures, and the impracticality of heating entire rooms to keep vaccine fridges running, were discussed. Lighter, more region-appropriate vaccine carriers were proposed, particularly for low-volume areas.

A pressing concern was the loss of vaccination records when new vaccine combinations are introduced. Digitization of the Mother and Child Protection (MCP) Card was suggested to preserve longitudinal data and streamline updates.

The importance of combination vaccines to reduce the injection burden on children was emphasized, though attention must be paid to differences in administration routes to avoid complications like abscesses. Technological aids for correct administration protocols were recommended.

Overall, Experts advocated for bottom-up digital innovation—tools co-created with community health workers and beneficiaries to ensure usability and sustainability. For instance, QR-coded immunization cards, mobile apps with vernacular audio prompts, voice call reminders for parents, and pictorial dashboards were seen as means to strengthen participation, especially among populations with limited literacy and technological exposure. Integrating digital innovations with traditional outreach mechanisms like VHNDs and ASHA mobilization was recommended to ensure continuity.

The experts emphasized the strategic use of digital systems to improve visibility and inclusion of marginalized groups. Migrant tracking systems, real-time birth cohort mapping, and dynamic updating of session plans were highlighted as crucial for capturing and serving mobile and tribal populations. Experts also pointed out that supervisory systems must be digitized to reduce paperwork, improve transparency, and allow prompt field course corrections. The East Zone discussions called for an approach where technology becomes a facilitator of equity—tailored to linguistic, cultural, and infrastructural contexts, and embedded in participatory public health practice.

## West Zone

### Systematizing Accountability and Portability through Digital Innovation

The role of technology in immunization must extend beyond logistical efficiency to include community engagement, behavioral insight, and systemic enablement. While public health systems shoulder operational responsibilities, successful immunization outcomes also depend on the agency of individuals and communities. The COVID-19 pandemic illuminated the complex interplay between personal choice and collective duty, but even outside of crisis situations, immunization efforts often rely on assumptions of automatic compliance, leading to misplaced blame when uptake is low. A paradigm shift from blame-based accountability to systems that enable providers and beneficiaries is needed—anchored in data, policy, and localized empowerment.

A suite of digital infrastructures is now shaping India's immunization landscape. The **Electronic Vaccine Intelligence Network (eVIN)** has become essential in managing vaccine stocks, cold chain monitoring, and reducing both stock-outs and wastage. Building upon this, the **U-WIN platform**, modeled on the CoWIN system and integrated with the National Digital Health Mission (NDHM), is poised to serve as India's first digital immunization registry. This holds particular promise for mobile populations, offering continuity of care through portable, real-time immunization records.

Complementary tools such as **geospatial mapping** and microplanning platforms are vital for identifying immunization cold-spots and underserved pockets. Their integration into adaptive microplanning ensures tailored service delivery over uniform models. Similarly, electronic supply chain systems like OpenLMIS and DHIS2 offer end-to-end tracking of stock flow and coverage, with custom dashboards to support decision-making at the block level.

Cross-sectoral lessons from veterinary systems, especially digital platforms like INAPH for livestock immunization, offer valuable parallels for zoonotic disease control—particularly relevant in tribal and agrarian regions where human-animal contact is high. Such integration is critical in advancing a true **One Health** approach.

Three guiding principles are imperative in the next phase of digital transformation:

- **Interoperability** — Platforms such as eVIN, U-WIN, and NDHM must interface seamlessly through open APIs and unified dashboards to reduce duplication and streamline data flows.
- **Inclusivity by Design** — Systems must accommodate local languages, offline use, and audio-visual interfaces to be accessible to frontline workers and communities with limited digital literacy.
- **Integration with Social Determinants** — Digital tools must interface with data on nutrition, education, and social welfare to identify missed or hidden beneficiaries, such as undocumented migrants or marginalized communities.

However, digital innovations must not replace field empathy and contextual engagement. If used solely for surveillance or top-down monitoring, they may erode trust. Conversely, if designed to facilitate listening and adaptation, they can make immunization truly responsive. Building community advisory groups at local health centers, strengthening digital literacy among caregivers, and establishing feedback loops that inform policy in real time are essential parallel strategies.

Technological breakthroughs in programmable thermostable vaccines and needle-free delivery systems (e.g., microneedle patches or dissolvable formulations) also represent transformative opportunities. When linked with digital platforms and geospatial data, these innovations allow for adaptive delivery—particularly in hard-to-reach and mobile communities. A single, heat-stable, time-released dose can overcome dropout barriers in overworked or transient populations, reducing dependence on cold chain logistics and repeat visits.

However, community trust remains the cornerstone of success. Health workers—whether ASHAs, male mobilizers, or peer educators—must be equipped not just with technology, but with training in empathy, dignity, and cultural competence. Social hierarchies and biases must be consciously addressed for innovations to gain acceptance and impact.

The digital back-end must also evolve to offer practical value for providers and recipients. Real-time alerts, counseling prompts, and personalized outreach reminders can transform data collection into actionable support. The goal is to create not just efficient systems, but equitable, transparent, and community-centered immunization ecosystems.

The rise of social media as a health communication tool, particularly in rural India, is another frontier. Platforms like Instagram and WhatsApp are already being used by influencers and community voices to disseminate health messages, stories, and interviews. These hyperlocal digital ecosystems can become potent public health allies—if curated ethically and systematically. Health systems can harness these decentralized channels to shape vaccine narratives and address myths in real time, recognizing the shift from one-way communication to participatory dialogue.

Looking ahead, the integration of national vaccine registries with broader digital health architectures—such as those under the Ayushman Bharat Digital Mission (ABDM)—presents an opportunity to build intelligent, patient-centered systems. Seamless linkage between electronic health records and immunization data could enable predictive analytics, targeted outreach, and population-level surveillance.

Yet, structural constraints remain—especially in clinical trial governance. Despite India's scientific infrastructure, regulatory delays hinder participation in global vaccine research. Rigid mandates for localized phase 3 trials and long startup timelines exclude India from multinational studies, limiting early access to innovations. More flexible regulatory pathways and coordinated global partnerships are needed to unlock India's full potential in vaccine research.

Finally, as artificial intelligence and digital tools increasingly enter clinical research—for recruitment, follow-up, and monitoring—there is a growing need for ethical safeguards. Data privacy, consent, and cross-system compatibility must be integral to future planning.

In essence, technology must be understood not as a panacea, but as a catalyst. Its value lies not in more data or tools alone, but in expanding trust, access, and equity—toward a future where no one is left behind in immunization care.

## South Zone

### Building Resilient, Interoperable, and Predictive Digital Ecosystems

The South Zone offered a holistic and forward-looking perspective, calling for convergence of digital health systems into a unified, interoperable, and predictive ecosystem. Participants emphasized leveraging the Ayushman Bharat Digital Mission (ABDM) to integrate platforms like CoWIN, eVIN, and IHIP into a seamless data continuum. This integration would enable a “single immunization record” accessible across levels of care and health facilities, serving both public and private sectors.

Experts highlighted the potential of AI and machine learning in transforming immunization logistics and planning. Predictive models could be developed to forecast vaccine demand, anticipate supply bottlenecks, and identify dropout-prone populations. GIS-integrated dashboards could dynamically visualize vaccine uptake across regions, enabling real-time decision-making at state and district levels.

The South Zone discussions also proposed robust governance mechanisms—using digital feedback systems, mobile-based grievance redressal tools, and automated supervisory alerts. These tools were seen as critical to ensure not only service quality, but also responsiveness to community needs. Participants recommended involving tech startups, health-tech incubators, and research institutions in designing agile tools for evolving challenges such as adult vaccination, new vaccine introductions, and climate-sensitive immunization strategies.

The discussion foregrounded the complex and multidimensional challenges in India’s immunization ecosystem—from regulatory hurdles in vaccine development to practical gaps in system interoperability and behavioral dimensions of vaccine uptake. Three interlinked themes emerged: the regulatory and technological pipeline of vaccines, the socio-behavioral complexities of immunization delivery, and the human-centric design of digital tools.

### Regulatory and Technological Landscape: The Vaccine Development Journey

The vaccine development pipeline in India is stringent, multilayered, and often protracted. Regulatory oversight begins at the research stage:

- **Recombinant DNA technologies** require approvals from the **Institutional Biosafety Committee (IBSC)** and **Review Committee on Genetic Manipulation (RCGM)** under the Department of Biotechnology.
- Preclinical safety (toxicology) studies must be completed before initiating clinical trials.
- **Clinical trials (Phases I–III)** are governed by the **Drugs Controller General of India (DCGI)** under CDSCO, with **Subject Expert Committees (SECs)** reviewing protocols, raising queries, and often requesting resubmissions—introducing further delays.
- Final approval requires submission of comprehensive dossiers encompassing preclinical, manufacturing, toxicology, and trial data.
- Post-approval, state-level clearances are needed for manufacturing and distribution. Even minor changes to production processes demand re-validation, sometimes involving fresh clinical studies.

While the COVID-19 pandemic accelerated adoption of novel platforms like **mRNA and viral** vectors, it also prompted vaccine R&D for emergent diseases before formal recognition as public health threats. A notable innovation discussed was **anti-drug vaccines**—targeting substances like opioids or cocaine—ushering in a shift from infectious disease focus to behavioral and societal health interventions. Such vaccines could benefit from **plant-based or nanotechnology-enabled delivery platforms** to enhance systemic targeting.

The integration of **AI and data analytics** holds promise for optimizing immunization programs—allowing granular trend monitoring, predictive modeling, and real-time public health decision-making.

### Real-World Gaps in Immunization Systems: Interoperability, Ethics, and System Responsiveness

Despite India's digital advancements, systemic fragmentation and siloed operations continue to hinder impact.

A **case from Tamil Nadu** was highlighted, where a visiting unvaccinated child died of diphtheria. Despite the family's education and international background, vaccine hesitancy persisted. Even after prolonged treatment and disability, the family's stance remained unchanged. This was characterized as a **violation of child rights**, necessitating intervention not just from the health sector, but from **external affairs, child development, and education ministries**.

The incident exposed several systemic issues:

- **Digital non-interoperability:** Platforms used by Anganwadis, tribal welfare, and school education systems collect critical health and immunization data—but do not communicate with each other.

- **Hardware and access constraints:** Workers are expected to run complex apps on 2G phones without support or consultation.
- **Lack of user involvement:** Ground-level staff are excluded from the design process of digital tools, leading to inefficiency and frustration.
- **Absence of follow-up mechanisms:** Children identified as malnourished or vaccine-deficient through platforms like **Swasthya** are not consistently tracked or supported.

Additionally, there are **ethical concerns:** Technology-based immunization research often lacks transparent **informed consent** processes. Reports of **data collection without consent**—even in BCG-related studies—undermine trust and violate ethical norms.

A compelling statement summarized the issue:

“We don’t talk because we don’t like people from other sectors. Let at least the apps talk to each other.”

## Technology, Behavior, and Trust: Designing for People, Not Just Systems

Behavioral and motivational dimensions are foundational to vaccine uptake, as emphasized through reflections on HIV and immunization campaigns.

- Risk perception is the central driver of vaccine behavior. If individuals do not believe they are at risk, even the most user-friendly digital tools will have limited impact.
- During COVID-19, centralized databases (NPR, CoWIN) enabled outreach, but public fatigue and distrust eventually led to disengagement—people began blocking calls or ignoring messages.
- The saturation of uncoordinated mobile applications, where each health program has its own data entry tool (for TB, leprosy, immunization, etc.), leads to provider burnout and fragmented data ecosystems.

A behavioral analogy captured the challenge:

“You cannot make someone stop smoking unless they want to. The same applies to immunization.”

The design of health apps must shift from provider-centered to user-centered approaches:

- Apps should reflect the technological literacy, access, and behavior of their intended users.
- Co-design processes involving ASHAs, ANMs, and caregivers are essential.
- Instead of adding to information overload, apps should integrate and streamline workflows, avoiding “unopened mobile notifications” syndrome.

Finally, vaccine misinformation was flagged as a growing crisis. Anti-vaccine narratives—especially on social media—continue to erode trust. There is an urgent need for:

- A structured misinformation response strategy as a core component of immunization planning.
- Integration of community influencers, frontline workers, and digital educators in a coordinated narrative-building effort.

The South Zone discussions cautioned that technology alone cannot solve systemic issues. It must be paired with capacity building, ethical safeguards, and public trust mechanisms. Consent frameworks, data anonymization protocols, and regular public consultations were seen as essential to building confidence in digital platforms. The group concluded that resilient digital ecosystems are not static systems but living frameworks—adaptable to shifting epidemiological, demographic, and policy realities.

## Key Highlights of the session:

### I. Action themes highlighted under this session are:

- ☑ Emphasis on innovations like electronic Vaccine Intelligence Network (eVIN) and CoWIN platform for better planning, real-time tracking, and reporting.
- ☑ Big data analytics and digital dashboards have enhanced outbreak prediction, monitoring vaccine coverage, and identifying dropouts or low-coverage regions.
- ☑ Issues around denominator inflation, inconsistent reporting from private sectors, and ASHA/ANM underreporting were highlighted.
- ☑ Use of interactive digital content, roleplays, and exhibition-style awareness drives in schools to enhance children's and parents' vaccine literacy.
- ☑ Geo-tagged dashboards are used to trace hidden cases missed in official reports.
- ☑ Recognized that a large share of the population accesses private clinics, yet their data is not adequately captured..

## II. Policy Recommendations:

1. Establish Unified Immunization Data Protocol
  - Create a national protocol for data collection, ownership, and access applicable to both public and private sectors.
  - Institutionalize shared data ownership models with clear accountability frameworks.
2. Strengthen Private Sector Reporting Mandates
  - Mandate immunization data submission from private clinics with built-in digital formats linked to national dashboards.
3. Enhance Digital Training at Grassroots Level
  - Build robust digital capacity-building modules for field workers on data reporting, tech usage, and immunization follow-ups.
4. Promote School-Based Vaccination Surveillance
  - Integrate immunization checks into school health records; mandate submission of vaccine cards during school admission.
  - Expand Vaccination Weeks and digital education initiatives in schools.
5. Foster Inter-Departmental Tech Collaboration
  - Encourage cross-ministerial platforms (Health, IT, Education) to co-develop and deploy immunization tech solutions.
6. Incentivize Technology Adoption
  - Provide grants or tax incentives for tech companies developing immunization management tools or AI surveillance platforms.
7. Standardize Confidence-Based Reporting
  - Promote statistical literacy among health managers; encourage confidence interval-based interpretations instead of rigid data targets.
8. Scale AI Surveillance Nationwide
  - Expand use of AI-based triggers and outbreak prediction tools through integration with state and district dashboards.

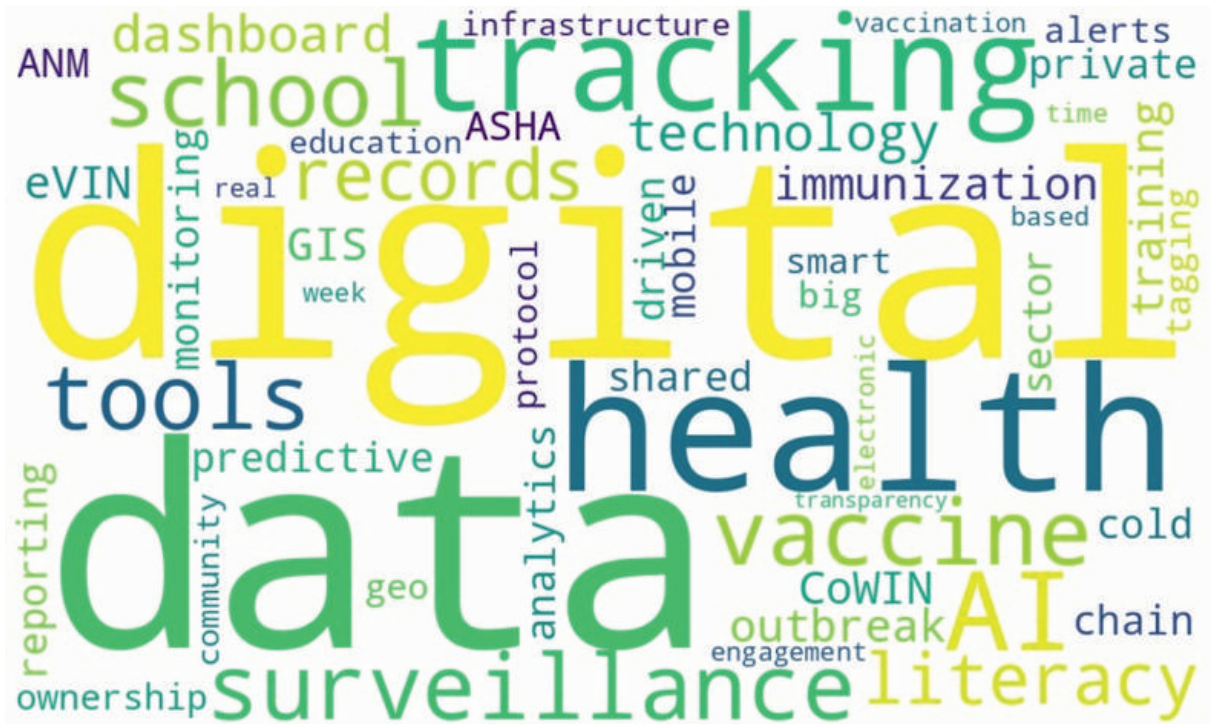


Figure 4. Word cloud based on the discussions of the fourth session.

# Annexure I

## Glimpses from the events









### **Indian Institute of Technology Kharagpur**

The Indian Institute of Technology Kharagpur (IIT Kharagpur), established in 1951, started its journey from a detention camp of the soldiers of our freedom movement. With an aim to train engineers to build new India, IIT Kharagpur soon became a model of modern technological education. It led to establishment of other IITs and, the IIT system during its platinum jubilee is recognized as a global brand. IIT Kharagpur's pioneering spirit continued with its thrust into disciplines like management, law, architecture, humanities, medicine etc. The biggest among the IITs now offers widest possible choices of undergraduate, postgraduate, and doctoral programs. It has a strong culture of research, innovation, and entrepreneurship, supported by world-class laboratories, interdisciplinary centres, and industry collaborations, and its alumni network includes leading scientists, technologists, entrepreneurs, and policymakers in India and around the world.

### **Centre of Excellence in Affordable Healthcare**

IIT Kharagpur has been in the forefront of Healthcare R & D for many decades now in which faculty members from many academic units are contributing in different ways. Making healthcare affordable among masses remains a key focus area in this endeavour and the Board of Governors, IIT Kharagpur resolved to establish a Centre of Excellence in Affordable Healthcare (CoE-AH) in 2023. This CoE aims to conduct multidisciplinary applied research focused on developing affordable and inclusive healthcare technologies and systems. It fosters interdisciplinary collaboration to develop patient-centric solutions that improve overall well-being and quality of life. The core faculty of CoE is supported by faculty members from other departments and schools with active participation of medical domain experts from IIT Kharagpur's Dr. B C Roy Multi-specialty Medical Research Centre. In addition, the CoE collaborates with experts of other institutes of India and abroad.



### **About The Women's Collective Forum (WCF)**

The Women's Collective Forum (WCF) is a pan-sectoral platform focused on equity-led systems transformation through scalable, institutionally grounded models.

Its enterprise initiative, SPARK – The 100K Collective, addresses the “missing middle” of women-led businesses—enterprises that are already established but remain excluded from formal finance, markets, digital systems, and regulatory frameworks. Through bootcamps in 300 locations, SPARK will work with 100,000 women entrepreneurs to strengthen their capacity to engage with capital, platforms, and institutions, ensuring that systems become navigable for those already building.

Beyond enterprise, WCF collaborates with leading health, technology, and management institutions to advance maternal health protocols, disease elimination, and the integration of new health technologies. In law and governance, WCF supports implementation of India's evolving criminal law frameworks with a focus on survivor-centricity and institutional accountability.

WCF also convenes cross-sectoral dialogues to highlight India's leadership in frugal innovation and systems change, engaging with global leaders and national platforms to translate research into policy and practice.

Across all these areas, WCF's model is consistent: build partnerships that connect evidence to institutions, and design approaches that can scale to strengthen systems for equity.



#### **Connect with Us**

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