SMART INDIA HACKATHON 2025

- **PROBLEM STATEMENT ID - SIH25220**
- **PROBLEM STATEMENT TITLE - Digital Contact Tracing and Screening Tool for MDR Pathogens in Hospitals**
- **THEME - MedTech / BioTech / HealthTech**
- **PS CATEGORY - Software**
- **TEAM ID - 100006**
- **TEAM NAME - SIxH Pointers**

SIxH Pointers

PROPOSED SOLUTION

SMART INDIA HACKATHON 2025

Aayulink is an Ayushman Bharat Digital Mission (ABDM)-compliant platform that **digitizes health records** to combat the **spread of multi-drug resistant pathogens**. We provide clinicians with **AI-powered tools** for real-time proximity tracing in hospitals, while our **national dashboard** tracks pathogen and drug resistance trends, building a resilient and connected healthcare ecosystem for India.

Your Health History, Reimagined for Infection Control: We use ABHA ID to unify records into one secure profile, enabling real-time MDR pathogen tracing.

From Data to Defense: Our AI converts patient data into actionable insights, tracing MDR transmission and preventing outbreaks—automating the process.

Preventing the Next Outbreak: Our system delivers instant infection data, enabling staff to contain MDR threats immediately.

Stay Ahead of Health Trends: With Nationwide Health Pulse, monitor health trends and outbreaks to protect your community.

Doctors access your ABHA ID-linked reports only with your time-bound, OTP-verified consent, ensuring your privacy.

Monitor the 'Nationwide Pulse' for real-time alerts on public health trends and epidemics, empowering you to prepare and stay safe.

Key Features

Our AI maps MDR transmission risks from hospital data, turning complex analytics into proactive outbreak prevention.

When a new MDR case is confirmed, our system instantly provides infection control with a contact tracing report for rapid containment.

SIxH Pointers

TECHNICAL APPROACH

SMART INDIA HACKATHON 2025

Server-Side

User Interface
Our server-rendered **React** app uses **shadcn/ui** and **Framer Motion** to power secure portals, ABHA ID integration, and animated data visualizations.

Backend Logic
Our **Express.js** backend uses **bcrypt** and **JWTs** to secure the MDR algorithm API, which clients access using authenticated **Axios** requests.

AI Processing
We use the **Gemini API** to analyze pathogen data from **MongoDB**. Reports are hosted on **Cloudinary**, and high-risk findings automatically trigger alerts for authorities.

Geospatial & Mapping
Leaflet are used to build interactive maps that visualize pathogen spread and outbreak hotspots, guiding nationwide planning.

Deployment
Deployed on **Vercel**, the application uses a **global CDN**, automated builds, and auto-scaling to ensure fast, reliable performance at a nationwide scale.

Client-Side

Login/SignUp
User/Admin can login using time bound OTP.

MDR Tracing
Admin can track the movement of patients to find infected patients.

Digital Records
Patients have their records digitised and arranged.

National Pulse
Admin/User can monitor nationwide outbreaks

TechStack

Gemini, JWT, CARTO, Framer Motion, React, AXIOS, Vercel, Cloudinary, Leaflet, shadcn-ui

SIxH Pointers

FEASIBILITY AND VIABILITY

SMART INDIA HACKATHON 2025

CHALLENGES AND RISKS

AI Reliability and risk of **AI Hallucinations** in summaries or chatbot responses

Risk of incorrect or delayed entry of **MDR** test results or ward movement logs

Inaccurate exposure analysis due to incomplete tracing or unreported movements

Balancing quick emergency access vs patient **privacy**

STRATEGIES TO OVERCOME CHALLENGES

RAG Pipeline can ensure AI answers only from verified records

Emergency window for critical data and full patient data accessible only through **OTP consent**

Incorporate **MDR databases** to identify resistance patterns, predict outbreaks and guide control

QR based e-prescription for pharmacy verification, auto status update

FEASIBILITY ANALYSIS

OPERATIONAL

- Enables infection control teams to **monitor MDR cases, ward transfers, and exposure risks** in real time for fast actions.
- **User-Friendly** Workflow →OTP consent is simple.

TECHNICAL

- Ayushman Bharat Digital Mission **(ABDM) APIs**.
- **Data analytics and machine learning** to track **MDR trends** and forecast high-risk zones.

ECONOMIC

- **Early detection and control of MDR outbreaks** significantly reduce treatment costs.
- **Reduces paperwork, storage costs** and **time spent** in retrieving reports.

SIxH Pointers

IMPACT AND BENEFITS

SMART INDIA HACKATHON 2025

IMPACTS

SOCIAL IMPACT

- Reduces **MDR** infection spread.
- Supports India's **AMR** fight.
- Empowers patients and builds trust.
- Enhances **hospital safety** and **patient care**.

ECONOMIC IMPACT

- **Cost saving** for Healthcare Providers.
- **Increased Efficiency.**
- **Optimized** Resource Ultilisation.

ENVIRONMENTAL IMPACT

- Reduces unnecessary **medical waste** in hospitals.
- Lowers **antibiotic overuse**, limiting environmental **drug residues.**
- Encourages **sustainable** and eco-**friendly hospital** practices.

MEDICAL IMPACT

- Faster **diagnosis** and **treatment** of **MDR** infections.
- Reduced **hospital-acquired** infections.
- Improved patient **safety** and **care quality.**

TECHNOLOGICAL ADVANCEMENT

- **AI-based MDR** detection & risk scoring.
- **Digital contact** tracing via ABHA IDs.
- Real-time **hospital dashboards.**
- **AI & cloud-based** infection control.

BENEFITS OF THE SOLUTION

FOUR PILLARS

1 MDR Detection & Risk Management

- Accurately identifies **MDR infections** and calculates exposure risk.
- **Prioritizes patient and staff safety** by highlighting high-risk contacts.

2 Patient Data Sovereignty

- **Empowers patients** with full control over their health data through consent-based management.
- Aligns with the **DPDP Act, 2023** for legal and secure data handling.

3 ABDM Integration

- Ensures smooth compliance with **ABDM's federated health data standards.**
- Enables trusted and secure information exchange as a certified **Health Information User (HIU).**

4 Nationwide Surveillance & Analytics

- Aggregates hospital data to **track pathogen trends** and drug resistance.
- Supports hospital decision-making and **national AMR monitoring.**

SIxH Pointers

RESEARCH AND REFERENCES

SMART INDIA HACKATHON 2025

KEY REFERENCES

- Live Deployment - AayuLink : The Aadhar for your Health
- Source Code - https://github.com/TANiSH-17/SIH-2025
- Demo Video - https://youtu.be/Jhk9VMpVu0Y

National Digital Health Policy

- Click - Ayushman Bharat Digital Mission (ABDM) - Core Components & Federated Architecture
- Click- FHIR Implementation Guide for ABDM v6.5.0 - National Resource Centre for eHealth Standards
- Click- The Digital Personal Data Protection (DPDP) Act, 2023 - Ministry of Electronics and IT

Scientific & Technical Foundation

- Click- Antimicrobial resistance - World Health Organization (WHO)
- Click- Control of multidrug resistant bacteria in a tertiary care hospital in India
- Click- Multidrug-Resistant Organisms (MDROs): What Are They? - CT.gov

AI in Healthcare: Ethics and Best Practices

- Click- Framework to Assess Clinical Safety and Hallucination Rates of LLMs
- Click- Ethical Guidelines for Application of AI in Biomedical Research and Healthcare -ICMR.