

NABH Digital Health Excellence 2026

NABH APEX — Category 2

Digital Dashboards and Analytics for Clinical and Quality Decision-Making

Q-ARM

Quality Audit & Risk Management Portal

An In-House Built · AI-Assisted · NABH-Aligned · Integrated Digital Quality Platform

Submitted by

AAYUSH NRI LEPL HEALTHCARE PVT LTD.,

Vijayawada, Amaravati, Andhra Pradesh, INDIA · 200 Beds · 600+ Staff ·

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Developed by: Nageswara Rao Karri, CMT, MBA (HM)

Senior Manager – Quality & HIM, AI Architect & Digital Strategist

Q-ARM v6.7.2 · Build 1792801574 · Live Since Jan-2026



1. Executive Summary

Q-ARM — Quality Audit and Risk Management Portal — is a fully integrated, in-house built, AI-assisted digital quality management platform developed entirely by **Nageswara Rao Karri, Senior Manager – Quality & HIM, Aayush Hospitals, Vijayawada**. It runs live on the hospital's private LAN, requires no internet connectivity, costs zero in licensing, and is wholly owned by the hospital. Through 11 seamlessly integrated modules, Q-ARM manages the complete hospital quality lifecycle — from KPI monitoring and clinical auditing to committee governance, patient experience, incident reporting, policy management, training, utility tracking, and NABH compliance reference — in one unified platform.

No commercial quality management system in India combines all these capabilities in a single platform. Q-ARM delivers enterprise-grade quality governance at ₹0 recurring cost, with a depth of NABH alignment that no off-the-shelf product can match — because it was built by someone who works with these standards every day.

11	57	639	15	216	₹0
Integrated Modules	NABH KPIs Tracked	OEs Browsable	Committees Managed	Memberships Tracked	Vendor Cost

2. Background — The Problem Q-ARM Was Built to Solve

Every hospital pursuing NABH accreditation faces the same invisible wall: quality management is fragmented across paper forms, Excel spread sheets, Word documents, physical binders, and WhatsApp groups. KPI data lives in 14 different files. Committee minutes are typed, printed, and distributed by hand. Incident root cause analysis is done in free text. Policy documents sit in unlocked binders accessible to anyone. Hand hygiene compliance rates are tallied manually at month-end.

The Quality department of Aayush Hospitals has faced this wall and made a decision: not to wait for a vendor, not to negotiate a software contract, and not to accept the fragmentation as inevitable. They built Q-ARM.

The operating principle behind every line of code in Q-ARM: "Don't trust my words, trust the verification. Fast never wins the race — this is healthcare." — Karri Nageswara Rao, Senior Manager – Quality & HIM, Q-ARM v6.7.2

Before and After — The Transformation

Area of Practice	Before Q-ARM — Manual, Fragmented	After Q-ARM — Digital, Integrated
KPI Monitoring	14 Excel files. Monthly reports prepared 2-3 days after month-end. No trend analysis. No benchmark. Leadership sees numbers, not stories.	57 NABH indicators tracked monthly. Live presentation mode with trend charts, benchmark spotter lines, RCA and CAPA on every slide.
Hand Hygiene Auditing	Paper forms. Manual monthly compilation. No real-time visibility.	WHO 5-moment digital audit. Real-time analytics. Category-wise and department-wise heatmaps. Instant print reports.
Medication Chart Audit	Manual review. Compliance estimated subjectively.	NABH 6th Edition aligned multi-section checklist. Drug-name-wise error tracking. Doctor-wise and section-wise analytics.
Medical Records Audit	Paper checklists. Excel-based results. No analytics.	48-parameter NABH-aligned digital audit across 8 sections. Instant session-wise analytics and reports.
Committee Governance	Physical registers. Word minutes. WhatsApp distribution. No acknowledgement trail.	Full digital lifecycle: schedule → attendance → AI minutes → distribution → per-member acknowledgement with timestamp and status.
Incident Reporting	Paper forms. Free-text RCA. No severity classification. No CAPA structure.	4-stage workflow: Reporter → Dept Head → Quality → Management. Structured RCA and CAPA with evidence. Sentinel event alert to Top Management.
Policy Documents	Physical binders. No version control. No access restriction. No accountability.	Watermarked PDF viewer: viewer name + date + time on every page. Print disabled. Download absent. Access permanently logged.
NABH Standards Reference	Physical book. Manual page search. No keyword lookup.	Complete 6th Edition digitised: 639 OEs with full interpretation. Keyword search. Category filter. Chapter-by-chapter Browse.
KPI Presentation	PowerPoint updated manually before every meeting. Data always one step behind.	Live Presentation Mode: click "Start" and all 57 KPIs appear as slides, one per KPI, with live data, trends, RCA and CAPA.
Staff Training	Excel attendance registers. No analytics. No competency tracking.	Digital training records: schedule, attendance, assessment scores, competency evaluation, real-time analytics.
Patient Experience	Paper satisfaction forms. No PREM/PROM structure. No post-discharge tracking.	CareVoice: structured PREM and PROM surveys. In-patient and post-discharge tracking. Patient safety dimension.
Utility Monitoring	Monthly data in isolated Excel files. No trend visibility.	5 utilities tracked monthly with trend charts: Drinking Water RO, Dialysis RO, DG Units, Electricity, and more.

3. Platform Architecture — Design Philosophy

Q-ARM is built on a deliberately minimal, dependency-free stack: a single HTML portal file of approximately 39,000 lines paired with a Node.js server. No React framework. No database server. No cloud API. No CDN. Every capability runs from two files hosted on the hospital's own LAN server at 192.168.1.86:3000 — making Q-ARM fully operational during internet outages, immune to cloud vendor failure, and deployable with zero IT setup.

Design Principle	What It Means for Q-ARM and the Hospital
Single-file architecture	The entire portal — all 11 modules, all dashboards, all analytics, all forms — runs from one HTML file. Deploying a new version means replacing one file. No build pipeline. No framework updates. No deployment complexity.
LAN-first, internet-independent	Q-ARM runs at 192.168.1.86:3000 on the hospital network. It works during internet outages, router failures, or any cloud service disruption. Patient and staff data never leaves the hospital premises — not a byte.
Zero framework dependency	No React, no Angular, no Vue, no Bootstrap CDN. Every line of CSS and JavaScript is written directly in the file. No external library can break or be discontinued.
Server key-value store	All data is stored in a structured flat-file KV store on the hospital server. No database to install, configure, back up separately, or maintain. Simplicity is the reliability strategy.
Role-based module access	10+ user roles, each with a defined list of accessible modules. IPC Auditors see only the Hand Hygiene module. Pharmacy Auditors see only MCA. Committee Members see only Committees. Guidelines, Policies, Manuals are available for easy access. No accidental access. No information leakage.
Automated daily backup	At 5:45 PM IST every day, Q-ARM automatically backs up all audit data, committee records, evidence files, and application files to a dedicated 4TB external drive (E:\QARM_BACKUP\). 90-day rotation with automatic old backup deletion. Zero manual intervention.
Zero licensing cost	Built entirely in-house. No vendor. No subscription. No support contract. No annual renewal. The hospital owns every line of code, every feature, every data record — permanently.
CareVoice on separate port	The CareVoice patient experience module runs as a distinct service on port 3002, architecturally isolated from the main portal for security and scalability.

4. Module Deep-Dives — Every Capability Explained

4.1 KPI Manager — 57 NABH Indicators, Live Analytics and Presentation Mode

The KPI Manager is Q-ARM's flagship module and the primary USP of this submission. It is the only system in India — commercial or otherwise — that combines monthly NABH indicator data entry, trend analytics with benchmark spotter lines, evidence attachment, structured RCA and CAPA, and a live full-screen presentation mode in a single integrated screen, covering all 57 NABH-mandated indicators across 12 departments.

4.1.1 The 57 NABH Indicators — Complete Coverage

All 57 NABH 6th Edition Key Performance Indicators are pre-loaded into Q-ARM with their complete definitions: indicator description, numerator, denominator, multiplier, unit of measurement, frequency, data collection remarks, and HIS guidance. No manual setup required. Indicators are organised across 12 clinical and support departments:

Department	NABH KPIs Tracked
Nursing	Initial assessment time (ICUs and Wards), Return to ICU within 48 hours, Return to Emergency within 72 hours, Incidence of pressure ulcers, Incidence of patient falls, Nurse-patient ratio (ICU and Wards), Appropriate handovers (Nurses)
Laboratory	Reporting errors per 1000 tests, Safety precaution adherence, Waiting time for diagnostics, POCT results leading to clinical intervention
Radiology	Reporting errors per 1000 tests, Diagnostic waiting time, Intravenous contrast extravasation rate
Pharmacy	Medication error incidence, Adverse drug reactions, Emergency drug stock-outs, Rational prescription percentage
Operation Theater	Unplanned OT return, WHO safe surgery checklist compliance, Prophylactic antibiotic compliance, Surgery rescheduling rate
Blood Bank	Transfusion reaction rate, Turnaround time for blood and blood component issue
Infection Control	CAUTI rate, VAP rate, CLABSI rate, SSI rate, Hand hygiene compliance, Needle stick injury rate
Doctors	ICU standardised mortality ratio, Appropriate handovers (Doctors)
Out-Patient Dept.	Waiting time for outpatient consultation
Billing	Discharge time (Cash patients), Discharge time (Credit patients)
Quality	Mock drill variations, Near miss percentage
HIM	Medical records with incomplete/improper consent
Department-specific (18 indicators)	Cardiology: Door-to-balloon time, Beta-blocker prescription in CHF; Neurology: Door-to-needle time; ICU: Sepsis Hour-1 bundle; Nephrology: Dialysis Hb targets; Obstetrics, Ophthalmology, Gastroenterology, Pulmonology, Paediatrics, Oncology, Physiotherapy, Emergency, and more

4.1.2 Monthly Data Entry — Structured and Formula-Driven

- Data entry screen for each indicator: numerator and denominator fields with pre-filled labels from the NABH definition
- Formula auto-calculates the KPI value (rate, ratio, percentage, or absolute number) from entered figures
- Unit of measurement displayed: %, Ratio, Minutes, /1000 patient-days, /1000 tests, /1000 catheter-days
- Monthly data saved to server KV store keyed by indicator + year-month — historical data retained indefinitely
- Available saved periods shown as hints when opening Presentation Mode — user knows exactly which months have complete data
- Custom benchmark: each indicator can have a hospital-defined target or NABH reference value set

4.1.3 Trend Analytics with Benchmark Spotter Lines

- Line trend chart for every KPI showing month-on-month performance across a configurable date range: 3, 6, 12, 36, 60, or 120 months of history
- Benchmark spotter line: a thick, bright horizontal reference line drawn at the hospital's own benchmark or NABH target — visually makes the target impossible to miss
- Shaded danger zone: the area above or below the benchmark line (depending on whether higher or lower is better) is shaded in a warning colour, so underperformance is immediately visible
- Multiple chart types: line trend chart for time-series, bar chart for monthly comparison, horizontal bar chart for department-wise benchmarking, combination charts showing actual performance line alongside benchmark reference
- Chart.js powered: rendered natively in the browser, no external API calls, works fully offline

4.1.4 The Presentation Mode — Q-ARM's Primary USP

Presentation Mode is the most innovative feature of Q-ARM. Click "Start Presentation" and Q-ARM launches a full-screen, dark-themed presentation — one KPI per slide — designed for leadership review meetings, quality committee sessions, and NABH assessor visits. No PowerPoint. No preparation. No data lag. The slides are generated live from the month's actual data at the moment you click.

What each presentation slide contains:

- KPI name, full definition text, numerator and denominator formula, unit of measurement — the complete NABH context
- Trend chart rendered live: the line chart with benchmark spotter line and danger zone shading, for the selected trend period
- Current period value displayed prominently with benchmark comparison — above or below target shown visually
- Supporting data table: monthly numerator, denominator, and calculated value for every month in the trend range
- Evidence panel: attached images and PDFs visible inline on the slide — up to 10 attachments, each up to 5MB
- RCA panel (expandable): Root Cause Analysis documented directly on the slide — visible to the committee without any screen switching
- CAPA panel (expandable): Corrective Action and Preventive Action documented inline with satisfactory evaluation status
- Navigation: ← Prev and Next → buttons to move between KPI slides without closing the presentation
- Slide counter: shows current position, e.g. "17 / 57" — so the committee knows how far through the review they are

Presentation launch options:

- Filter: All indicators / General NABH indicators only / Department-specific indicators only
- Order: By department / By NABH serial number / By NABH chapter
- Date range: Select any From–To month range for the trend period displayed on each slide

4.1.5 RCA and CAPA — Integrated, Not Separate

- Root Cause Analysis captured per KPI per month — stored alongside the indicator data, not in a separate system or document
- CAPA structured into two fields: Corrective Action (the immediate fix applied) and Preventive Action (the systemic change to prevent recurrence)
- CAPA satisfactory evaluation: Quality team marks whether CAPA has been reviewed, implemented, and closed
- All RCA and CAPA visible directly on the presentation slide — the committee sees the full picture without switching screens
- Historical RCA and CAPA preserved: every month's analysis is retained, creating a longitudinal quality improvement record

4.1.6 Evidence Upload

- Images (photographs, screenshots) and PDF files attached per KPI per month — up to 10 attachments, 5MB each
- Evidence renders as thumbnails on both the data entry screen and the presentation slide
- Direct visual proof for NABH assessors: the supporting document is visible alongside the indicator value — no separate evidence folder to navigate

4.2 NABH Guidelines Browser — Complete 6th Edition, Searchable Inside the Platform

Q-ARM contains the entire NABH 6th Edition loaded and indexed natively — all 10 chapters, 100 standards, and 639 Objective Elements with full interpretation text. This eliminates the need for staff to carry the physical book, search through PDF files, or wait for the Quality department to answer standard-specific queries. Every OE is accessible in seconds from any device on the hospital network.

4.2.1 Complete Coverage

Chapter	Content
Chapter 1 — AAC	Access, Assessment and Continuity of Care
Chapter 2 — COP	Care of Patients
Chapter 3 — MOM	Management of Medication
Chapter 4 — PRE	Patient Rights and Education
Chapter 5 — HIC	Hospital Infection Control
Chapter 6 — CQI	Continuous Quality Improvement
Chapter 7 — ROM	Responsibilities of Management
Chapter 8 — FMS	Facility Management and Safety
Chapter 9 — HRM	Human Resource Management
Chapter 10 — IMS	Information Management System

Objective Elements by category: Core — 105 OEs, Commitment — 457 OEs, Achievement — 60 OEs, Excellence — 17 OEs. Total: 639 OEs, all with full description, interpretation, and HIS guidance text.

4.2.2 Browse the Guide

- Chapter-level navigation with colour-coded chapter headers — each chapter has a distinct accent colour for instant visual orientation
- Standards listed within each chapter with their OE count displayed
- Expand any standard to read all its OEs with full interpretation text and HIS data capture guidance
- OE category badges (Core / Commitment / Achievement / Excellence) colour-coded for visual scanning at a glance
- Chapter search: filter chapter list by keyword to jump to the right chapter instantly
- Direct chapter link: every KPI in the KPI Manager has its corresponding NABH chapter mapped — clicking the chapter code opens the relevant section of the Guidelines Browser

4.2.3 Keyword Search

- Full-text search across all 639 OEs simultaneously — searches description text, interpretation text, and HIS guidance all at once
- Results show chapter code, standard code, OE code, and a preview of the matched text
- Filter results by OE category (Core / Commitment / Achievement / Excellence) — focus on only the mandatory elements if needed
- Filter results by chapter — narrow the search to a specific domain (e.g. "search for 'handover' only in Chapter 9 HRM")
- Results are instantaneous — no page reload, no server query, pure in-browser search
- Practical use: a nurse can search "fall prevention" and immediately see every NABH OE related to falls across all chapters — a task that took minutes with the physical book now takes seconds

4.3 CareVoice — Patient Experience Intelligence (PREM and PROM)

CareVoice is Q-ARM's dedicated patient experience module, running as a secure separate service at port 3002. It captures Patient Reported Experience Measures (PREM) and Patient Reported Outcome Measures (PROM) for both in-hospital patients and post-discharge follow-up — directly aligned with NABH PRE 7b (patient experience capture) and PSQ 4d (patient reported outcome measures).

- PREM Surveys — Patient Reported Experience Measures: captures in-patient experience across structured domains including communication with doctors and nursing staff, pain management, hospital environment (cleanliness, quietness), responsiveness of hospital staff, discharge information quality, medication communication, and overall hospital rating — Source of the Questionnaire: CAHO
- PROM Surveys — Patient Reported Outcome Measures: captures patient-reported health outcomes before and after care, including functional status, symptom burden, quality of life, and subjective recovery experience — using validated measurement approaches — Source of the Questionnaire: In-house
- Post-Discharge Follow-up Tracking: structured tracking of discharged patients — capturing recovery status, adherence to discharge instructions, and early readmission events — supporting NABH PRE 3c and AAC 12 discharge process requirements
- Patient Safety Dimension: specifically captures whether patients felt safe during their admission, whether safety concerns were raised and addressed, and whether the environment felt secure — a critical PREM domain under NABH PSQ standards
- Survey analytics: response rates, domain-wise scores, trend tracking over time, department-wise patient experience comparison
- Architectural isolation: CareVoice runs on port 3002 separately from the main quality portal on port 3000, ensuring that patient experience data is stored and managed independently from clinical audit data

4.4 Employee Master — Single Source of Truth for the Entire Platform

The Employee Master is the foundational data layer of Q-ARM. Every other module that needs staff information draws from this single, authoritative source. There is no separate staff list maintained in any other module — eliminating name-spelling mismatches, employee code inconsistencies, and department naming conflicts across the system.

- Central registry: all hospital employees and doctors with employee code, full name, department, designation, role category, and employment status (Active / Inactive)
- Hand Hygiene Audit: auditee name auto-populated from employee code — auditor types the code and the name, department, and category appear automatically, eliminating data entry errors
- Committee module: member name resolution for acknowledgements uses the Employee Master to resolve canonical names — ensuring that G RANJITHA ADAM logged in as "GRANJITHA ADAM" still matches her correct committee membership record, even with spacing variations
- PPE Audit: auditor's department auto-populated from the Employee Master based on their employee code — no manual entry of department during an audit session
- Training module: staff attendance captured by selecting from the Employee Master — no free-text name entry that might create duplicate records
- Incident Reporting: reporting officer, evaluating officer, and all responsible parties resolved from the Employee Master — creating attributable, traceable records
- Bulk CSV upload: the entire hospital staff roster can be loaded at once — supports thousands of records, ideal for initial setup or mass updates after HR changes
- Soft deactivation: inactive employees can be deactivated without deleting historical records — all past audits and committee attendances remain attributed correctly
- Department-wise filtering: any module can filter, group, or analyse by department using the master as the reference — ensuring consistent department names across all analytics

4.5 Policies and Manuals — Secure Watermarked Digital Repository

The Policies and Manuals module is a secure, access-controlled digital repository for all hospital policy documents. Its defining innovation is the confidentiality protection system: every document is rendered through a browser-based PDF viewer with the viewing staff member's name, current date, and current time watermarked across every page — with print and download functions disabled at the application level.

4.5.1 Five Document Categories

- Policies — Hospital-level governance policies: Patient Rights and Responsibilities Policy, Infection Control Policy, Medication Management Policy, Consent Policy
- Manuals — Comprehensive procedural manuals: Nursing Manual, Quality Manual, Biomedical Waste Manual, CSSD Manual, Operation Theatre Manual, IPC Manual
- Handbooks — Quick reference guides: New Employee Induction Handbook, Emergency Response Handbook, Patient Safety Handbook
- Guidelines — Clinical and administrative guidelines: Antibiotic Stewardship Guidelines, Hand Hygiene Guidelines, Fall Prevention Guidelines, Pressure Ulcer Prevention Guidelines, WHO Safe Surgery Guidelines
- Clinical Pathways — Evidence-based department-specific care pathways by specialty: Stroke care pathway, Sepsis care pathway, AMI care pathway

4.5.2 Watermarked Confidential Viewing — The Core Innovation

- Every document opens inside Q-ARM's built-in browser-based PDF viewer powered by PDF.js — the document is rendered in-browser and never downloaded to the user's device
- Watermark applied dynamically on every page: the viewer's full name, current date (DD/MM/YYYY), and current time (HH:MM:SS) are rendered as a diagonal text overlay across the entire page canvas
- The watermark is applied as a canvas overlay after each page renders — it appears on every page automatically, whether the document is 2 pages or 200 pages
- Print function suppressed at the application level — the browser's print command is intercepted and disabled for this viewer
- Download button is absent from the interface — the file URL is never exposed to the user's browser
- Accountability enforced: if a staff member photographs the screen and distributes the policy document, the watermark identifies exactly who accessed it, on which date, at what time — making unauthorised distribution traceable
- Protects hospital intellectual property: SOPs, clinical guidelines, care pathways, and management policies remain confidential while still being accessible to authorised staff

4.5.3 Organisation Structure

- Chapter-wise organisation within Policies type — policies grouped by NABH chapter for quality team navigation
- Department-wise organisation within Handbooks and Clinical Pathways — staff find their department's documents directly
- Search functionality across all document titles — locate any policy by keyword without browsing
- Version tracking: each document upload date is recorded — most recent version always displayed
- NABH alignment: directly supports written guidance requirements across all 10 NABH chapters — IPC manual, MOM guidance, COP protocols, PRE policies, HRM competency frameworks, FMS safety manuals

4.6 Education and Training — Staff Competency Lifecycle (not yet fully configured)

The Education and Training module digitises the entire training lifecycle for all hospital staff — from session scheduling through attendance capture, assessment scoring, and competency evaluation — with real-time analytics for HR and Quality teams. All training data is linked to the Employee Master, ensuring every record is attributed to a specific, identifiable staff member.

4.6.1 Training Management — Four Integrated Tabs

- Dashboard tab: live overview of training activity — total sessions, total attendees, assessment completion rates, department-wise training coverage
- Schedule tab: create and manage training sessions with title, date, trainer name (resolved from Employee Master), department, topic, and session status (Draft / Approved / Completed / Cancelled)
- Attendance tab: digital attendance marking per session — staff selected from Employee Master, preventing free-text name entry and duplicate records; bulk mark all present with one click
- Assessment tab: post-training assessment scores captured per participant — enables competency gap analysis and targeted retraining decisions

4.6.2 Analytics

- Session frequency analysis: month-wise training volume, identifying periods of low training activity
- Department-wise coverage: which departments have received training recently and which are overdue
- Trainer-wise productivity: sessions conducted per trainer, total staff trained
- Assessment score distributions: pass/fail analysis, low-score identification for remedial training
- Attendance rate tracking: which staff are regularly attending versus missing training sessions
- NABH alignment: HRM 5 (staff orientation and training), HRM 6 (continuing education), HRM 11/12/13 (competency assessment and privileging evidence)

4.7 Committees and Meetings — AI-Assisted Full Lifecycle Digital Governance

The Committees module manages 15 hospital quality committees through a complete digital lifecycle. Every step — from scheduling through attendance, minutes drafting, distribution, and member acknowledgement — creates a timestamped, attributed, medicolegal-grade record suitable for NABH assessor review. Nothing is on paper. Nothing is on WhatsApp. Everything is in Q-ARM.

Lifecycle Stage	Q-ARM Capability — Verified from Codebase
Committee Constitution	Name, short code, category, meeting frequency, Terms of Reference document upload. Member roster with roles: Chairman, Convenor, Member, Secretary. Currently 15 committees, 216 memberships, 67 unique members.
Meeting Scheduling	Date, time, venue, agenda items. Status lifecycle: Scheduled → Conducted / Rescheduled / Cancelled. Calendar view across all committees showing the full year's meeting programme.
Digital Attendance	Per-member Present/Absent marking. "Mark All Present" toggle for efficiency. Evidence file upload: up to 2 files × 10MB per meeting (PDF, images). Files stored server-side in organised committee/meeting folder structure.
AI-Assisted Minutes Drafting	Structured minutes format with per-agenda-item fields: Discussion summary, Decision made, Action By (member name + target date). Any Other Business section. Next Meeting Date. Closing Remarks. AI suggestion support for drafting narrative from structured inputs.

Lifecycle Stage	Q-ARM Capability — Verified from Codebase
Digital Distribution	One-click distribution to all committee members. System records: distributed To (member names list), distributed Codes (employee ID list), distributed At (ISO timestamp), meeting Title. Distribution is permanent and irreversible.
Member Acknowledgement	Each member reads the full minutes content before any acknowledgement button is available — the "read before acknowledge" design is enforced by the interface. Four status options: ☒ Understood and Accepted / ☐ Understood and Objectionable / ☒ Understood and Rejected / ☒ Needs Further Clarification. Each acknowledgement stored with: canonical name, employee code, status, and ISO timestamp.
Permanent Reference	Acknowledged minutes never disappear. They remain permanently visible in the Meeting GIST tab and in the member's dashboard "Minutes — Pending and Acknowledged" widget, showing status label, acknowledgement date, and full minutes content on demand.
Action Points	Each committee decision can generate an action point with: action description, responsible member, target date, and status (Pending / Completed / Overdue). Action points tracked across all committees on the dashboard with overdue alerts.
Workflow Trail	Every action — minutes creation, editing, approval, distribution, and each individual acknowledgement — is recorded in a timestamped workflow trail embedded in the minutes object. Full chain of custody for every governance decision.
My Membership View	Each committee member logs in and sees only their own committee memberships: their role, attendance record, and pending acknowledgements. They cannot see other members' data or other committees they do not belong to.

4.8 Incident Reporting — Structured 4-Stage Workflow with 5M Fishbone RCA (not yet fully configured)

The Incident Reporting module captures all patient safety incidents through a structured 4-stage workflow: Reporter → Department Head → Quality → Top Management. Each stage has defined fields, responsibilities, and escalation triggers. The module uses the 5M Fishbone (Ishikawa) Root Cause Analysis framework — the international standard for healthcare incident analysis — rather than free text.

4.8.1 Incident Classification

- Near Miss: an unplanned event that did not result in harm but had the potential to do so — captured and analysed to prevent actual harm
- Adverse Event: an incident that resulted in unintended harm to the patient — requires Department Head review
- Sentinel Event: an unexpected event resulting in death or serious physical or psychological injury — triggers an immediate red alert on screen: " SENTINEL EVENT — Report Immediately to Top Management!" and automatically advances to full 4-stage review

4.8.2 4-Stage Structured Workflow

Stage	Who Acts / What Fields Are Completed
Stage 1 — Reporter (Sections 1–4)	Patient details (name, UMR, age, sex, IP/OP number). Incident location (ward, ICU, OPD, other). Witness name. Type of incident (Near Miss / Adverse Event / Sentinel Event). Brief description: What, When, Where, Who, and Why. Immediate notification: who was informed and their designation. Immediate action taken with responsible officer. Reporter submits to Department Head.
Stage 2 — Department Head (Sections 5–7)	Department Head sign-off with name and designation. Department-level review and comments. Severity classification using a 3x3 visual matrix: Near Miss / Adverse Event / Sentinel Event crossed with probability of recurrence. Forwarded to Quality dept.
Stage 3 — Quality Dept (RCA and CAPA)	5M Fishbone Root Cause Analysis: Man (human factors), Machine (equipment factors), Method (process factors), Material (supply and consumable factors), Environment (workspace

Stage	Who Acts / What Fields Are Completed
	and structural factors). Corrective Action (what was done immediately). Preventive Action (what systemic change will prevent recurrence). Evaluating officer with department and designation. Forwarded to Management.
Stage 4 — Top Management	Management review and final closure. CAPA satisfactory evaluation: confirmed that corrective and preventive actions are adequate and implemented. Incident formally closed with management signature.

4.8.3 5M Fishbone Root Cause Analysis — Why This Matters

Most hospitals document incident root causes in free text — producing inconsistent, often superficial, and non-comparable records. Q-ARM enforces the internationally recognised 5M Fishbone (Ishikawa) framework, with a dedicated structured text field for each of the five causal categories:

- Man: human factors — staff knowledge gaps, communication failures, fatigue, skill mismatch
- Machine: equipment factors — device malfunction, calibration failure, equipment unavailability
- Method: process factors — protocol gaps, unclear SOPs, workflow design failures, documentation failures
- Material: supply factors — medication mix-ups, wrong concentration available, labelling errors, consumable unavailability
- Environment: environmental factors — workspace layout, noise, lighting, extreme staffing pressures, infrastructure gaps

Every incident analysis is complete, structured, comparable across incidents, and defensible to NABH assessors. The structured format also enables trend analysis: repeated "Method" causes across multiple incidents signal a process design problem; repeated "Man" causes signal a training gap.

4.8.4 Additional Features

- Evidence upload: up to 10 attachments (images and PDFs) per incident — photographs, investigation documents, monitoring records, relevant charts
- Incident history with filtering by department, incident type, severity, and date range
- NABH alignment: PSQ 7a (incident management system with identification, reporting, review, and action), PSQ 7b (sentinel event identification), PSQ 7c (RCA analysis within 7 working days), PSQ 7d (corrective and preventive actions), PSQ 7e (risk incorporation), PSQ 7f (stakeholder communication)

4.9 Admin Panel — Complete Platform Control with Full Audit Log

The Admin Panel is restricted to Super Administrators and provides complete visibility and control over all aspects of Q-ARM — user management, role configuration, module permissions, and a comprehensive log of every action taken by every user in the system.

4.9.1 User Management

- Create, edit, and deactivate users with username, password, role, department, and employee code assignment
- Zero hardcoded credentials: no default passwords are embedded in the application code — all credentials are stored exclusively in the server KV store, making the system credentials-safe even if the HTML file is inspected
- Password security: passwords hashed using SHA-256 on HTTPS connections; protocol-aware switching with a custom `qarmHashPassword()` function that prevents the `crypto.subtle` undefined error on plain HTTP
- 5-attempt logout: 5 failed login attempts triggers a 15-minute automatic logout — prevents brute-force attacks on shared hospital networks
- First-Run Setup: on cold start with zero users, Q-ARM shows a self-initialising setup screen — no pre-configuration or manual database seeding required
- Tombstone system: deleted users receive a permanent tombstone record — they cannot be reactivated, and all historical audit records remain attributed to their original author even after account deletion
- Session timeout: idle sessions expire automatically to prevent unauthorised access from unattended terminals

4.9.2 Role and Permission System

Role	Module Access
Super Admin	All modules: CareVoice, Employees, KPI, NABH, Policies, Training, Committees, Incidents, Audit, Admin, Utility
Quality Manager	All quality modules: CareVoice, Employees, KPI, NABH, Policies, Training, Committees, Incidents, Audit, Utility (no Admin)
IPC Auditor (HH)	Audit module only — restricted to Hand Hygiene audit. Cannot access other audit types. Cannot delete others' records. Auto-directed to HH form on login.
Pharmacy Auditor	Audit module only — restricted to Medication Chart Audit. Cannot access HH, MRA, or PPE audit data.
MRA Auditor	Audit module, NABH Guidelines, Policies, Committees. Name auto-resolved from Employee Master on login.
PPE Auditor	Audit module, NABH Guidelines, Policies, Committees. Department auto-populated from Employee Master.
Committee Member	Committees module, NABH Guidelines, Policies. Sees only their own memberships and pending acknowledgements.
Pharmacy Head	Audit and Committees modules.
Dept. Head / Viewer	Configurable view-only or department-specific access.

4.9.3 Full Audit Log

- Every login and logout event: timestamp, username, success or failure
- Every data entry, edit, and deletion across all modules: attributed to the specific user with timestamp
- Every role change: who changed, what was changed, when, by whom
- Every user creation and deactivation: full record with administrator responsible
- Backup log: every backup execution recorded with timestamp, files backed up, success or failure status

4.10 Audit Management — WHO 5-Moment HH, MCA, MRA, PPE, RPA

The Audit Management module houses all structured clinical compliance audits — the operational measurement core of NABH quality. Each audit type has its own role-restricted access, dedicated analytics, and print report capability.

4.10.1 Hand Hygiene Compliance Audit (WHO 5-Moment Protocol)

Aligned with NABH IPC 3b and IPC 6d — monthly monitoring of all staff categories using the WHO Observation Form methodology. The most frequently used audit module in Q-ARM, capturing real-time compliance data that feeds directly into the IPC-related KPIs in the KPI Manager.

- Auditee capture: name (auto-resolved from employee code via Employee Master), department, staff category (Doctor / Nurse / Technician / Support Staff), observation area
- WHO 5 moments: Before Patient Contact, Before Aseptic Procedure, After Body Fluid Exposure, After Patient Contact, After Patient Surroundings
- Outcome per moment: Compliant — with technique sub-type (HR: Handrub / HW: Handwash / ABHR / ABHR+HW) — or Non-Compliant, or Missed
- Session reference: auto-generated unique reference number (e.g. HH-2026-001234) for each audit record

- Analytics: WHO moment-wise compliance breakdown, staff category-wise rates, department-wise heatmap (showing which departments need focused IPC intervention), non-compliance technique analysis, auditor-wise productivity, monthly trend
- Dashboard 6-card summary: Staff Audited, Moments Observed, Compliant count, Compliance %, Non-Compliant count, Non-Compliance % — colour-coded by performance level (green above 80%, amber 60–80%, red below 60%)
- Print reports: formatted with hospital letterhead, WHO moment table, compliance percentage, department breakdown — ready for NABH submission

4.10.2 Medication Chart Audit (NABH 6th Edition Aligned)

- NABH MOM 4g aligned: the audit methodology directly follows NABH's guidance on prescription audit for medication errors
- Multi-section checklist across 4 sections: Section 1 (Doctor parameters — prescription completeness, rational prescription, allergy documentation), Section 2 (Nurse parameters — medication administration records, timing, route), Section 3 (Pharmacist parameters — dispensing, labelling, LASA compliance), Section 4 (Combined parameters)
- Per session: multiple patient records, each with up to 10 configurable drug columns assigned from the hospital formulary — drug names pre-mapped to columns before session begins
- Cell-level error tracking: each cell in the audit matrix (patient × drug column × parameter) is marked Compliant / Error — enabling drug-name-wise error rate calculation
- Analytics: section-wise compliance, doctor-wise compliance trend, drug-name-wise error rates (identifies the specific drugs where prescribing or administration errors cluster), session history, monthly trend
- Print reports: formatted session-wise reports with drug legend, error summary, compliance percentage

4.10.3 Medical Records Audit (NABH IMS Chapter Aligned)

- 48 structured NABH-aligned parameters across 8 sections of the patient medical record
- Sections: Patient Identification and Admission Documentation, Initial Assessments, Clinical Charts, Daily Progress Notes, Surgical and Procedural Records, Special Clinical Records, Consent Management, Discharge Documentation and Patient and Family Education
- Per parameter: Compliant / Non-Compliant / Not Applicable — with NA option to exclude parameters not relevant to a specific patient type
- Session-wise history with analytics and print reports; suitable for audit submission to NABH
- NABH reference captured per session: the specific NABH OE codes being audited can be documented against the session

4.10.4 PPE Compliance Audit

- Department-configurable PPE item codes: each department can have its own PPE checklist (e.g. Gloves, Shoes, Aprons, Masks, Caps, Goggles) configured from the Admin panel
- Auditor department auto-populated from Employee Master based on the auditor's employee code — no manual selection
- Bidirectional sync: recent audit sessions synchronised to the portal without page reload
- NABH alignment: IPC 2b (adequate and appropriate PPE available and used correctly), IPC 8a (occupational health and safety practices for reducing microorganism transmission)

4.11 Utility Management — 5 Utilities, Monthly Consumption Tracking with Trend Analytics

The Utility Management module tracks hospital resource consumption across five utility streams on a monthly basis, providing trend charts, year-on-year comparison, and department-wise attribution for facility management compliance under NABH FMS chapter requirements.

Utility Stream	Unit / Clinical Significance
Drinking Water RO	Kilolitres (KL) — tracks RO-treated drinking water consumption; monitors purification system demand and identifies overconsumption
RO Water Dialysis	Kilolitres (KL) — separately tracks ultra-pure RO-grade water used specifically for haemodialysis units; critical for patient safety monitoring in nephrology
DG Units	Units — diesel generator electricity units consumed; tracks generator dependency and fuel management, identifies unusual power outage patterns
Electricity Units	Units — total hospital electricity consumption across all areas; enables cost monitoring and energy conservation analysis
[Additional utilities]	Configurable — additional utility types (water tanker, borewell, RO reject) can be added as needed without code changes

- Monthly data entry by authorised staff: consumption figures entered for each utility for each calendar month
- Trend charts: line chart showing month-on-month consumption across up to 12 months — identifies seasonal patterns, wastage spikes, and the impact of conservation measures
- Year-on-year comparison: current year consumption versus previous year for any utility — supports NABH FMS data reporting
- Consumption analytics tab: comparative charts across all utility types in one view
- Department-wise attribution: consumption assigned to the department responsible — enabling chargeback analysis and identifying high-consumption areas
- NABH alignment: FMS 3 (utilities management), FMS 5 (facility and equipment monitoring), supporting the Green Hospital initiatives increasingly valued by NABH assessors

5. Key Innovations That Make Q-ARM Unique

The following ten innovations distinguish Q-ARM from every commercial quality management system available in India. Each was identified from a real clinical quality gap, designed to solve a specific problem, and verified in daily use.

Innovation 1 — Single Platform, 11 Modules, Zero Fragmentation

No commercial hospital quality system in India combines KPI monitoring, audit management, committee governance, patient experience, incident reporting, NABH reference, policy management, training, utility tracking, and employee data in one unified platform. Q-ARM eliminates fragmentation entirely. One login. One data source. One audit trail. Every module feeds from the same Employee Master. Every number on the KPI dashboard traces back to the same audit records. Every committee acknowledgement references the same minutes stored in the same system. The platform is a single organism, not a collection of connected tools.

Innovation 2 — Live Presentation Mode with Benchmark Spotter Lines

The Quality Review Meeting problem: someone must prepare a PowerPoint before every meeting, manually copying KPI values, creating charts, and updating trend lines. The slide is always one month behind. The data is always one step away from the source. Q-ARM eliminates this entirely. Click "►Start Presentation" and the system launches a full-screen, live, darkened presentation generating one slide per KPI — with the trend chart, the benchmark spotter line, the danger zone shading, the supporting monthly data table, the attached evidence, the RCA, and the CAPA — all from live data, all on one slide. The ← Prev and Next → buttons move through all 57 KPIs in sequence. No preparation. No stale data. No separate file to maintain. The benchmark spotter line is the most visually powerful element: a thick horizontal reference drawn at the target level, with the performance trend line moving above and below it over time — the story of whether the hospital is improving toward its target is told instantly, visually, without any explanation needed.

Innovation 3 — Watermarked Policy Viewer — Confidentiality Without Physical Lock-and-Key

Hospital SOPs and clinical policies must be accessible to all staff but protected from unauthorised distribution. Physical binders are either locked (defeating accessibility) or open (defeating confidentiality). Digital PDFs emailed to staff are immediately shareable. Q-ARM solves this with a browser-based PDF viewer that renders every document with the viewing staff member's name, the current date, and the current time watermarked diagonally across every page — applied as a canvas overlay on each rendered page. Print is disabled. The download button does not exist. The file URL is never exposed to the user's browser. If a staff member photographs the screen and distributes the policy, the watermark identifies exactly who accessed it and exactly when. This is the only approach that simultaneously enables hospital-wide access and enforces individual accountability without any hardware or additional software.

Innovation 4 — Complete NABH 6th Edition Embedded Inside the Platform

The entire NABH 6th Edition — all 639 Objective Elements with their full interpretation text, HIS data capture guidance, and category classifications — is embedded natively inside Q-ARM. Staff do not need the physical book, a PDF viewer, or access to the NABH website. Any staff member on any device on the hospital network can search for any keyword and instantly see every OE that mentions it, with chapter and standard context. A nurse looking for the standard on pressure ulcer prevention types "pressure ulcer" and sees COP 16c, its full interpretation, and its category (Core) in seconds. This transforms NABH compliance from an annual preparation exercise — where the quality team scrambles to answer staff questions before an assessment — into a permanent, self-service daily reference embedded in the same tool where quality work happens.

Innovation 5 — 4-Stage Incident Workflow with 5M Fishbone RCA

Incident reporting in most hospitals is a paper form that reaches the Quality department days after the event, with a free-text "root cause" field that contains entries like "staff negligence" or "system error" — too vague to act on. Q-ARM's incident module enforces a 4-stage digital workflow (Reporter → Department Head → Quality dept → Top Management) with distinct fields, responsibilities, and sign-offs at each stage. The root cause analysis uses the 5M Fishbone framework — Man, Machine, Method, Material, Environment — with a structured text field for each factor. Every incident analysis is complete, comparable to other incidents, and traceable to a specific human decision or process failure. Sentinel events trigger an immediate visual alert: " SENTINEL EVENT — Report Immediately to Top Management!" — a digital escalation that cannot be ignored or lost in a paper chain.

Innovation 6 — Digital Committee Minutes with Medicolegal Acknowledgement Trail

Committee governance in hospitals is one of the most important NABH requirements and one of the most poorly documented. Minutes distributed by WhatsApp are theoretically acknowledged by anyone who reads the message — which is legally and clinically meaningless. Q-ARM's acknowledgement system requires each member to open the full minutes content, read through every agenda item with its discussion, decision, and action points, and then select a status: Understood and Accepted, Understood and Objectable, Understood and Rejected, or Needs Further Clarification. The system stores this acknowledgement with the member's canonical name (resolved from the Employee Master), their employee code, their chosen status, and an ISO 8601 timestamp. The result is a medicolegal-grade record of who read which minutes, when they read them, and whether they agreed with the decisions made. For every meeting. For all 15 committees. For all 67 unique members. Permanently.

Innovation 7 — Employee Master as the Universal Single Source of Truth

In most hospital quality systems, each module maintains its own staff list. The HH audit form has a name field where the auditor types the auditee's name — creating spelling variations ("Dr CR Setty" vs "DR C R SETTY" vs "Dr. C.R. Setty") that make analytics unreliable and acknowledgement matching impossible. Q-ARM has exactly one staff list: the Employee Master. Every module that needs staff information reads from it. The HH audit auto-populates the auditee's name from their employee code. The committee acknowledgement system resolves each member's canonical name using normalised matching against the Employee Master. The training module selects attendees from the master. The incident module assigns responsible officers from the master. One record. Zero inconsistency. Reliable analytics everywhere.

Innovation 8 — LAN-First, Zero Internet Dependency

Q-ARM runs at 192.168.1.86:3000 on the hospital's private LAN. This is not a limitation — it is a deliberate design choice with significant advantages. The system works during internet outages, router failures, or any cloud service disruption. Patient and staff data never leaves the hospital premises — no transmission to any cloud provider, no data sharing agreement required, no DPDP compliance complexity for the quality data. The entire platform — all 11 modules, all analytics, all committee records — survives on two files: one HTML portal and one Node.js server. If the server hardware fails, replacing it and copying the backup from the external drive restores the complete system in under an hour.

Innovation 9 — Automated Daily Backup with 90-Day Rotation

Healthcare data loss is irreversible. NABH audit records, committee minutes, incident reports, and KPI trends cannot be recreated if lost. Q-ARM includes a built-in automated backup system triggered every day at 5:45 PM IST. The backup copies all audit data, committee records, evidence files (PDFs and images), and the application files themselves to a dedicated 4TB external drive (E:\QARM_BACKUP\), with each backup in a date-stamped folder. The system automatically deletes backups older than 90 days, maintaining a rolling 90-day recovery window without manual intervention. If a record was entered two months ago and deleted in error, it can be recovered. If the server hard drive fails on a Tuesday, Monday's 5:45 PM backup is on the external drive and the data loss is at most one working day.

Innovation 10 — Built by the Senior Quality Manager, AI Architect & Digital Strategist for the Quality Team

The tenth innovation is not a feature. It is a fact about how Q-ARM was created. Every single capability in Q-ARM was identified as a need by the Quality Manager who uses it. The WHO 5-moment HH audit form was designed by someone who has conducted hundreds of HH audits. The KPI presentation mode was designed by someone who has sat through dozens of quality review meetings with outdated PowerPoint slides. The watermarked policy viewer was designed by someone who has tried and failed to prevent unauthorised policy document distribution. The 4-stage incident workflow was designed by someone who has seen incidents die in paper chains. Commercial software vendors design for a generic hospital. Q-ARM was designed for this hospital, by the person who knows exactly where quality governance fails in practice. That is the difference between a tool that ticks boxes and a tool that actually changes how quality is managed.

6. NABH 6th Edition Standards Alignment

Q-ARM is designed from the ground up with NABH accreditation as its primary reference. The following mapping shows how each Q-ARM module addresses specific NABH chapter requirements — creating a comprehensive digital evidence base across all 10 chapters.

Q-ARM Module	NABH 6th Edition Standards Addressed
KPI Manager	PSQ 3a/b/c/d — Key indicators for clinical, infection control, managerial, and patient safety outcomes. PSQ 2h — Audits at regular intervals. PSQ 3g — Improvements implemented and evaluated. PSQ 3h — Feedback communicated to staff. PSQ 6e — Management identifies performance improvement targets.
NABH Guidelines Browser	All 10 chapters — permanent staff reference tool eliminating reliance on physical book. PSQ 2 — Quality improvement programme requires standard knowledge by all levels. HRM 5 — Staff orientation to applicable standards and guidelines.
CareVoice (PREM and PROM)	PRE 7a — Patient feedback and satisfaction capture mechanism. PRE 7b — Patient experience capture (PREMs). PSQ 4d — Patient reported outcome measures (PROMs). PSQ 3h — Feedback communicated to staff. AAC 12 — Discharge process monitoring through post-discharge follow-up.
Employee Master	HRM 1 — Human resource planning and staffing. HRM 2 — Staff qualification and credential records. HRM 3 — Job descriptions available for all categories. All modules requiring staff attribution and accountability.
Policies and Manuals	All 10 chapters require "written guidance" — this module is the single repository. IPC 1a (IPC programme documentation), MOM 1a (medication management manual), COP 1a (written guidance for uniform care), PRE 1a (patient rights display and documentation), FMS 1 (facility management written guidance).
Education and Training	HRM 5a/b — Orientation and training for all staff. HRM 6 — Continuing education programme. HRM 11d/12d/13c — Privileging based on qualification, training, and competency assessment. PSQ 1a — Patient safety training for all staff.
Committees and Meetings	ROM 1 — Governance structure, meeting minutes and frequency. PSQ 1a — Patient safety committee (monthly meetings, corrective/preventive actions). IPC 1e — IPC committee (monthly meetings, risk reduction goals). MOM 1b — Pharmaco-therapeutic committee. All 15 NABH-mandated hospital committees.
Incident Reporting	PSQ 7a — Incident management system (identification, reporting, review, action). PSQ 7b — Sentinel event identification and definition. PSQ 7c — Analysis using RCA, completion within 7 working days. PSQ 7d — Corrective and preventive actions documented. PSQ 7e — Risks from incidents incorporated into risk management. PSQ 7f — Stakeholder communication after incidents.
Audit Management — HH	IPC 3b — Hand hygiene guidelines adherence. IPC 6d — Surveillance includes monthly HH compliance monitoring of all staff categories using WHO Observation Form methodology. IPC 6a — Surveillance tracking infection risks and trends.
Audit Management — MCA	MOM 4g — Audit of medication orders/prescriptions for safe and rational prescription using representative sample, at least monthly. MOM 7 — Medication verification before administration (prescription audit supports this). MOM 8c — Near misses and medication errors captured.
Audit Management — MRA	IMS 3 — Medical record documentation completeness, authentication, dating, and signing. IMS 4 — Medical records available for authorised personnel. AAC 13 — Discharge summary content and standards. COP 7g — Procedures documented in patient records.
Audit Management — PPE	IPC 2b — Adequate and appropriate PPE available and used correctly. IPC 8a — Occupational health and safety practices to reduce risk of microorganism transmission among healthcare providers. IPC 8d — Measures for blood and body fluid exposure prevention.
Utility Management & Admin panel	FMS 3a/b/c — Utility systems management, monitoring, and maintenance. FMS 5 — Medical equipment and facility monitoring. Supporting green hospital and environmental sustainability commitments increasingly valued under NABH assessments. Admin panel for administrative tasks

7. Demonstrated Impact

7.1 Operational Impact

- 100% paperless committee meetings across all 15 hospital quality committees — zero paper, zero WhatsApp distribution, zero physical signature rounds
- 57 NABH KPIs tracked monthly across 12 departments — zero manual Excel compilation, zero data lag
- Quality review meetings held without any preparation time — Presentation Mode launches live data, live trends, and live RCA/CAPA at the click of a single button
- Committee minutes acknowledged digitally by 67 unique members across 216 memberships — with permanent medicolegal-grade records
- Hand Hygiene, MCA, and MRA compliance data available to the Quality dept on any device at any time — no waiting for end-of-month reports
- Incident RCA documented in structured 5M Fishbone format — no incomplete or free-text-only submissions
- Policy documents accessible hospital-wide without distribution risk — watermark makes every access attributable
- NABH Guidelines available to all staff without the physical book — any OE, any keyword, any chapter, in seconds

7.2 NABH Assessment Readiness Impact

- Every HH audit record: time stamped, attributed, WHO moment-wise — exactly what IPC 6d requires for assessor demonstration
- Every MCA session: structured, doctor-wise, drug-wise — directly defensible for MOM 4g evidence
- Every committee meeting: scheduled, conducted, attended, minutised, distributed, and acknowledged — full PSQ and ROM chapter compliance demonstrated digitally
- 57 KPI trend charts with benchmark lines: PSQ 3 evidence for all indicators, including graphical demonstration of improvement trends
- Policy repository with watermarked access: IMS documentation evidence with access accountability
- Training records with assessment scores: HRM chapter evidence for all staff categories
- Incident RCA with 5M framework and 4-stage workflow: PSQ 7 evidence in structured, complete, comparable format
- NABH 6th Edition browsable inside the portal: demonstrates that the organisation uses standards as a daily operational reference, not only during assessment preparation

7.3 Cost and Ownership Impact

Commercial QMS — Market Rate	Q-ARM — Actual Cost
₹5–8 Lakhs setup cost	₹0 setup cost
₹1–1.5 Lakhs per year licensing	₹0 per year — forever
Annual support contract	No contract, no renewal, no expiry
Vendor dependency for every change	Hospital owns every line of code
Data on cloud — shared infrastructure	Data on hospital server — never leaves premises

8. Scalability — Future Roadmap

Q-ARM's modular architecture supports progressive expansion without disrupting existing modules. Planned enhancements include:

- HTTPS upgrade using hospital hostname certificate (qarm.aayush.local) for encrypted in-transit data — planned once certificate infrastructure is established
- Rational Prescription Audit (RPA) module — structured audit of outpatient prescriptions against NABH MOM 4 requirements
- KPI benchmark library — pre-loaded with published national and international benchmarks for each of the 57 indicators, updated annually
- CareVoice QR code integration — physical QR codes displayed in wards and at discharge counters for patients to access PREM surveys directly on their phones
- Advanced incident analytics — trend analysis of RCA categories across incidents (e.g. repeated "Method" failures signalling a specific SOP gap)
- Competency assessment module — structured online assessments for staff, linked to training records and HRM privileging requirements
- Replication model — Q-ARM's architecture makes it deployable at any hospital by copying two files. The platform is a potential shared resource for the Indian hospital quality community, particularly for smaller hospitals that cannot afford commercial QMS solutions

9. The Person Behind Q-ARM

Q-ARM was designed, coded, tested, and deployed entirely by Karri Nageswara Rao, Senior Manager – Quality & HIM, AI Architect and Digital Strategist, Aayush Hospitals, Vijayawada, Amaravati, Andhra Pradesh. He is a quality professional, not a software engineer. He is a certified Digital Health from Administrative Staff College of India, Hyderabad and AI in Healthcare by National Board of Examinations in Medical Sciences (NBEMS), New Delhi, Govt. of India. He learned Vibe Coding, AI tools to build because the tools his hospital needed did not exist in any affordable, integrated, NABH-aligned form.

Every feature in Q-ARM was born from a gap he identified in his own daily quality work. The benchmark spotter line was designed because he sat through meetings where no one could immediately see whether a KPI was above or below target. The watermarked policy viewer was designed because he could not prevent staff from sharing policy documents after they had been distributed. The 5M Fishbone RCA was designed because he had reviewed hundreds of incident reports with "root cause: human error" — an analysis so vague it could never drive improvement. The 4-stage committee acknowledgement was designed because he knew that a WhatsApp "Read" receipt is legally meaningless in a clinical governance context.

The Q-ARM codebase has gone through over 1,792 builds — each one addressing a real observation, a clinical feedback, or a quality requirement identified in live hospital use. This is not a prototype. It is a production system, used every day, improved every week, and owned permanently by the institution that built it.

Development philosophy, recorded in the Q-ARM codebase: "Don't trust my words, trust the verification. No stones unturned — this is healthcare. Fast never wins the race." — Operating principle, Q-ARM v6.7.2 Build-1792801574, Aayush NRI LEPL Healthcare

10. Conclusion

Q-ARM answers the question every hospital quality team in India asks: how do we manage everything — KPIs, audits, committees, incidents, policies, training, patient experience — document everything for NABH, and demonstrate improvement over time — without a budget for enterprise software, without an IT department, and without losing clinical focus in the process?

The answer Q-ARM gives is not a technology answer. It is a quality leadership answer. When the person who knows the problem most deeply is also the person who solves it — building from genuine daily need, verifying every feature against NABH standards, and refusing to accept fragmentation as inevitable — the result is something no vendor can replicate: a platform that works because it was built by someone who understands exactly what "not working" looks like in a hospital quality context.

Q-ARM is not a technology story.

It is a quality leadership story enabled by technology. A story about what happens when the person who knows the problem most deeply is also the person who builds the solution — without waiting for a vendor, a budget approval, or a product roadmap.

11 modules. 57 KPIs. 639 OEs. 15 committees. 216 memberships. ₹0 cost. Live and running.

[Hospital Name] · [City, State] · Submitted to NABH APEX Digital Health Excellence 2026

Developer: Karri Nageswara Rao · Q-ARM v6.7.2 · Category 2

Special thanks to:

Dr Y Ramesh Babu MD DA, Chairman – Management Committee, Head of Anaesthesia & Critical Care,

Dr K Gopala Krishna MD DM, Managing Director, Chief Cardiologist

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Category 2 — Digital Dashboards and Analytics for Clinical and Quality Decision-Making ·

Thank You! TEAM NABH

Nageswara Rao Karri, CMT, MBA (HM)

Senior Manager – Quality & HIM, AI Architect & Digital Strategist

Aayush NRI LEPL Healthcare Pvt. Ltd, Vijayawada, Amaravati, AP, INDIA

+91 9912369111, nrkari999@gmail.com

