

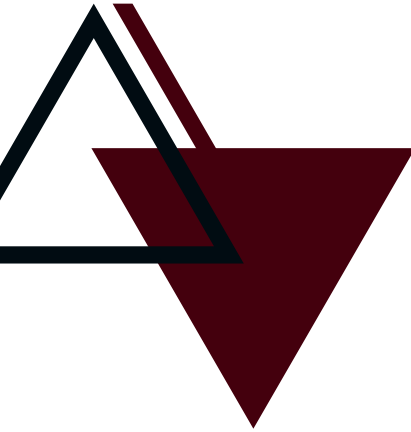
The Impact of Hospital Management Information Systems (HMIS) on Quality of Care and Patient Outcomes

16 June 2025

Presented by: Nitish Gupta

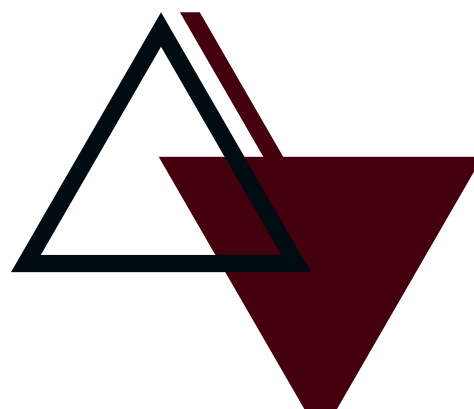
Guided by : Dr. Sandesh Kumar Sharma





OVERVIEW

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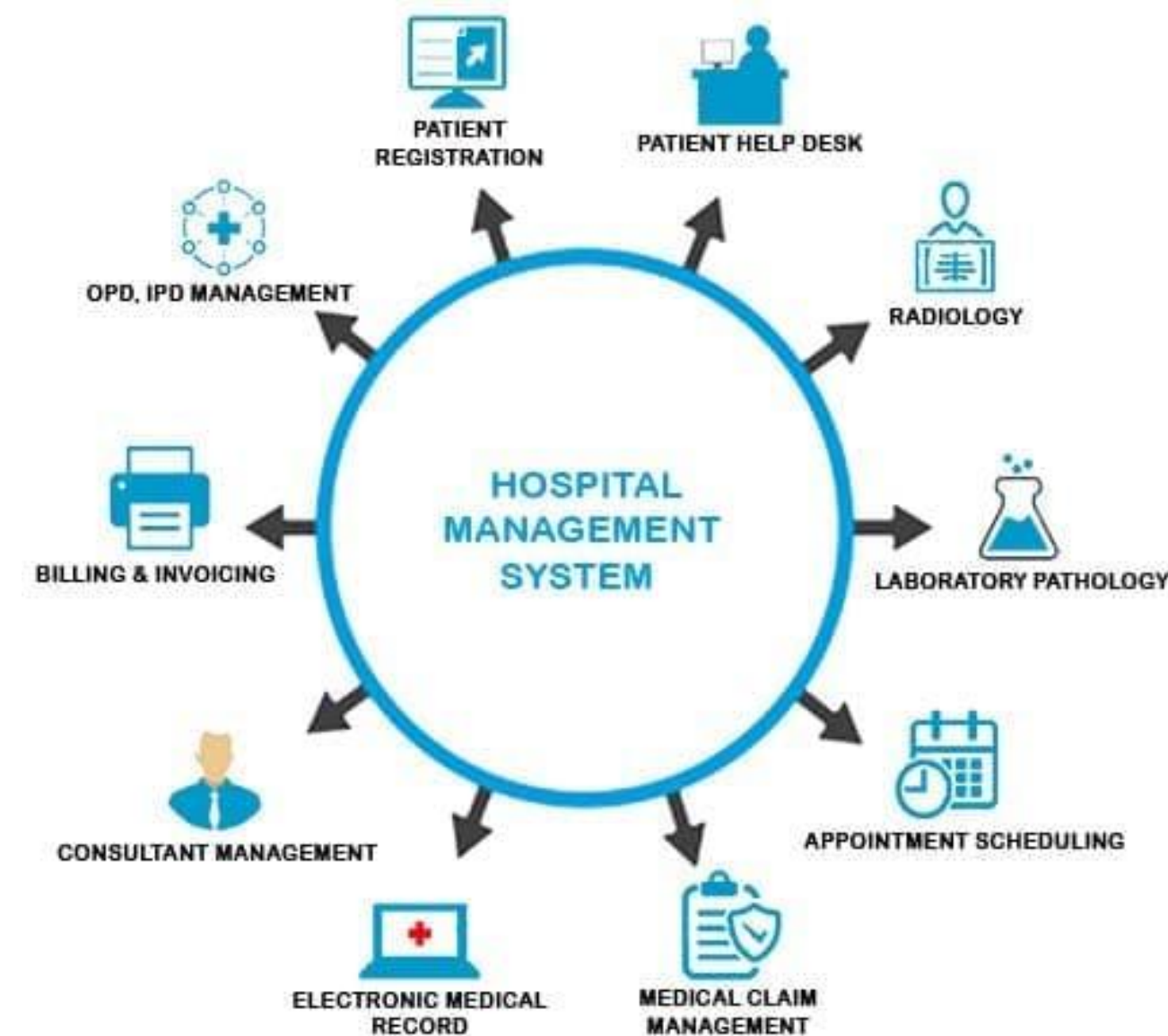


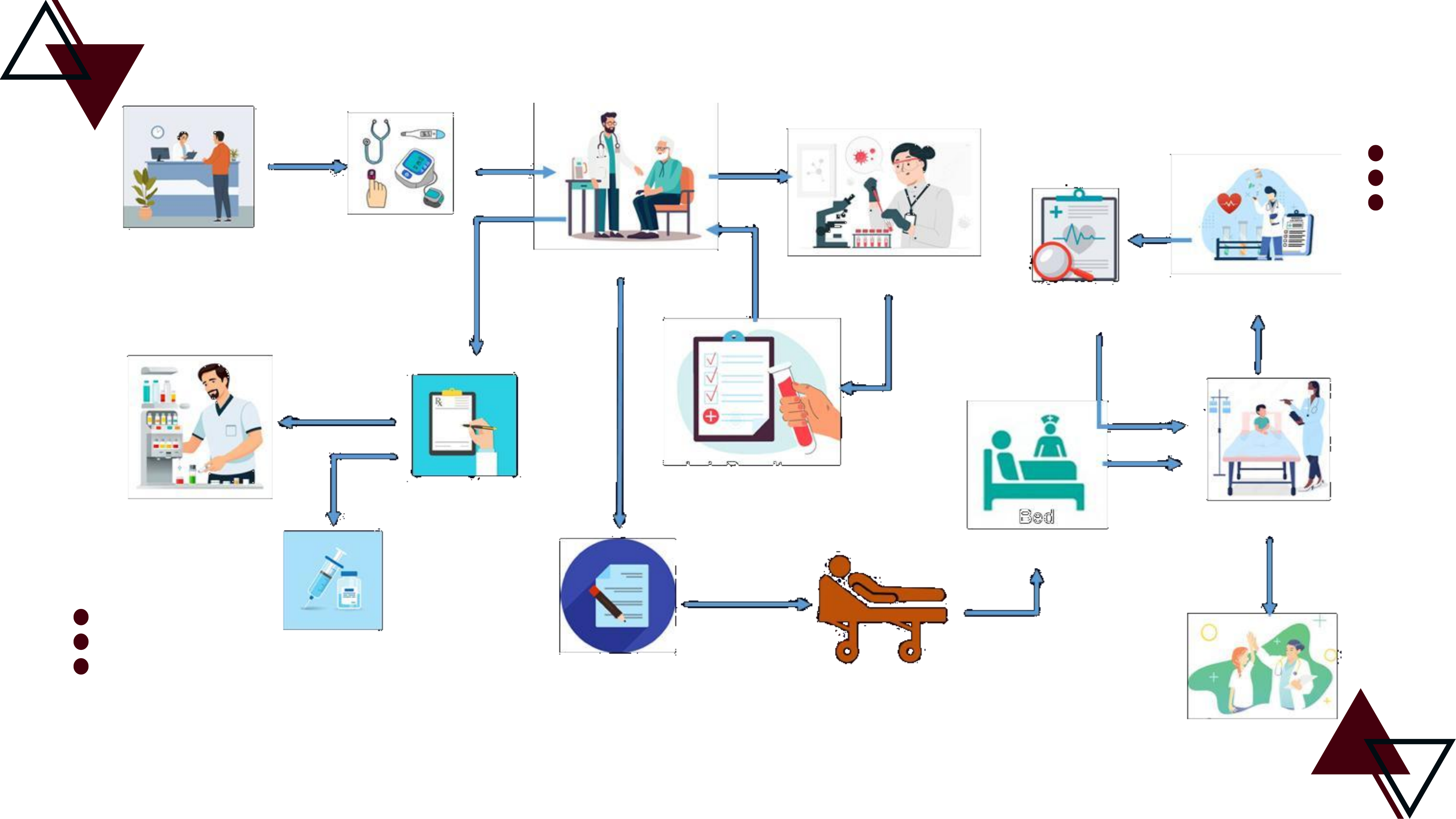


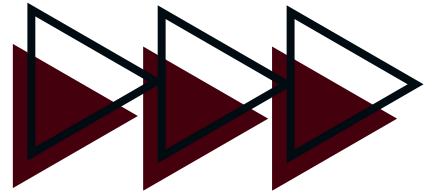
INTRODUCTION :

Background

Hospital Management Information Systems (HMIS) are transforming healthcare by streamlining both clinical and administrative tasks. They help reduce errors, improve efficiency, and enhance patient satisfaction through tools like electronic medical records, billing, and diagnostics. While developed countries have widely adopted HMIS, developing nations like India face challenges such as limited resources and infrastructure. Government initiatives like Ayushman Bharat aim to bridge this gap. This study explores how HMIS at Flores Hospital supports better healthcare delivery, patient safety, and outcomes.







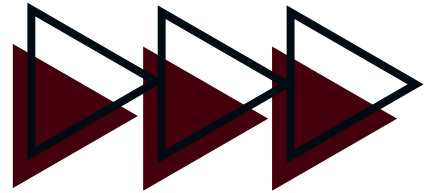
1. To Explore HMIS facilitates improved clinical decision-making and continuity of patient care.
- 2.To Evaluate the contribution of HMIS towards enhancing patient experiences and satisfaction..



Objectives of the Study

3. To Assess the impact of HMIS on patient safety and the reduction of clinical errors.
4. To Identify and characterize key barriers and facilitators affecting HMIS implementation, adoption, and sustained utilization





Research Questions :

01

How does the implementation and use of HMIS affect operational efficiency in healthcare institutions?

02

What is the impact of HMIS on patient safety and clinical error reduction?

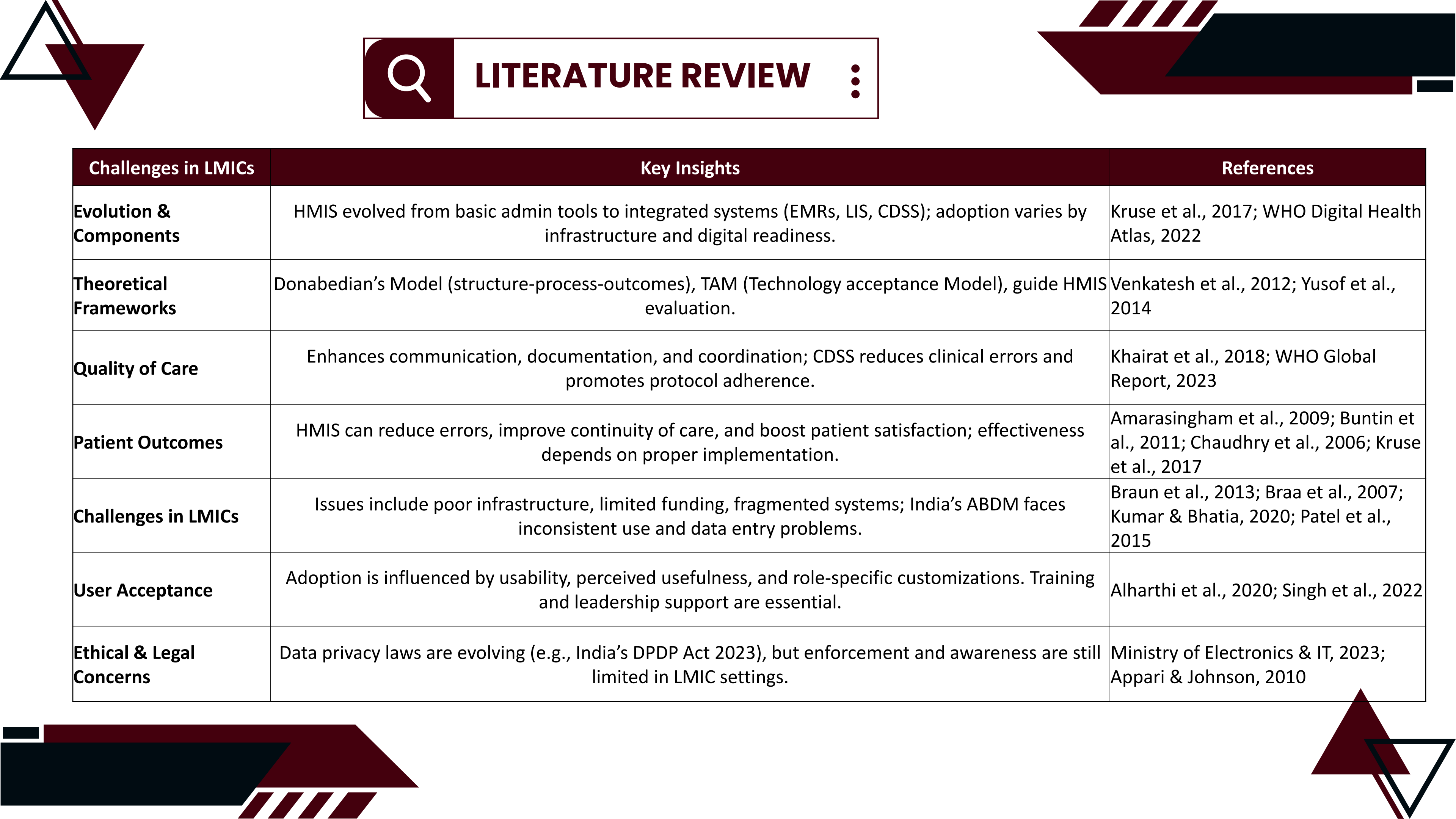
03

In what ways does HMIS enhance the quality and timeliness of clinical decision-making?

04

How does HMIS affect patient satisfaction and experiences with healthcare services?





LITERATURE REVIEW

Challenges in LMICs	Key Insights	References
Evolution & Components	HMIS evolved from basic admin tools to integrated systems (EMRs, LIS, CDSS); adoption varies by infrastructure and digital readiness.	Kruse et al., 2017; WHO Digital Health Atlas, 2022
Theoretical Frameworks	Donabedian’s Model (structure-process-outcomes), TAM (Technology acceptance Model), guide HMIS evaluation.	Venkatesh et al., 2012; Yusof et al., 2014
Quality of Care	Enhances communication, documentation, and coordination; CDSS reduces clinical errors and promotes protocol adherence.	Khairat et al., 2018; WHO Global Report, 2023
Patient Outcomes	HMIS can reduce errors, improve continuity of care, and boost patient satisfaction; effectiveness depends on proper implementation.	Amarasingham et al., 2009; Buntin et al., 2011; Chaudhry et al., 2006; Kruse et al., 2017
Challenges in LMICs	Issues include poor infrastructure, limited funding, fragmented systems; India’s ABDM faces inconsistent use and data entry problems.	Braun et al., 2013; Braa et al., 2007; Kumar & Bhatia, 2020; Patel et al., 2015
User Acceptance	Adoption is influenced by usability, perceived usefulness, and role-specific customizations. Training and leadership support are essential.	Alharthi et al., 2020; Singh et al., 2022
Ethical & Legal Concerns	Data privacy laws are evolving (e.g., India’s DPDP Act 2023), but enforcement and awareness are still limited in LMIC settings.	Ministry of Electronics & IT, 2023; Appari & Johnson, 2010

HMIS Impact on Clinical and Operational Efficiency

Administrative Efficiency:

- **Patient registration and billing:**
Digitization reduced registration time by 30–40%
Automated billing minimized financial errors and manual work
- **Resource allocation:**
Real-time dashboards improved bed management, equipment tracking, and staff scheduling

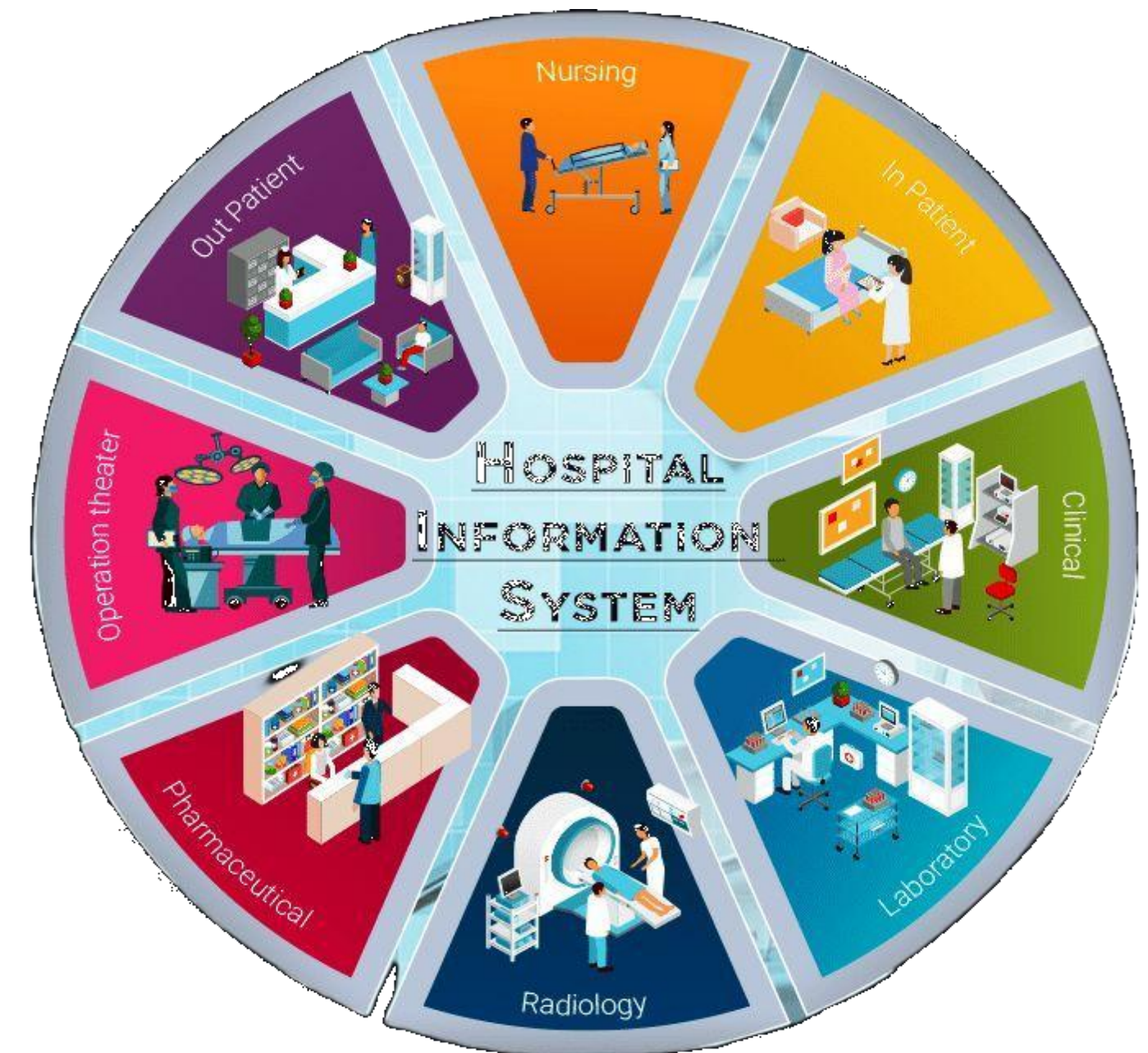
Clinical Efficiency:

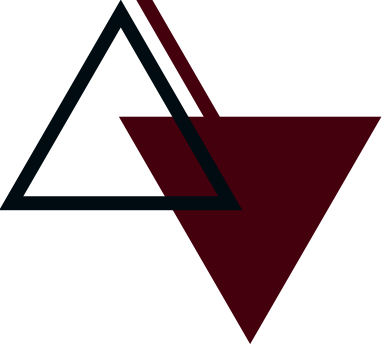
- **Instant access to EMRs:**
Reduced delays in diagnosis and treatment
Facilitated continuity across OPD, IPD, and diagnostics
- **Faster communication:**
Interdepartmental data sharing improved coordination between lab, pharmacy, and wards

Evidence from India:

Urban hospitals using HMIS showed:

- Reduced outpatient wait times
- Faster lab turnaround
- Higher throughput in OPD/IPD





HMIS implementation challenges

Despite its benefits, HMIS adoption is hindered by significant systemic and operational barriers, especially in LMICs:

🔌 Infrastructure Gaps:

- Poor internet connectivity and unstable electricity
- Limited access to devices and backup systems

👩 Human Resource Issues:

- Insufficient training of clinical and support staff
- Resistance to change due to perceived complexity or workload increase

System Fragmentation:

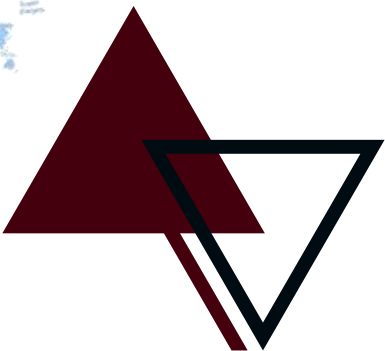
- Lack of interoperability across departments and institutions
- Use of isolated software modules without integration

📉 Data Quality Concerns:

- Inconsistent or incorrect data entry
- Incomplete patient records limit decision-making potential

⚖️ Governance and Policy Gaps:

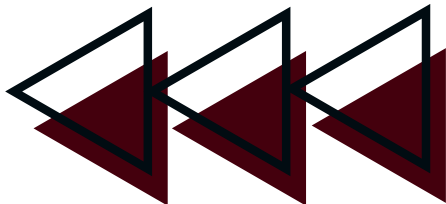
- Weak data protection laws
- No standardized national HMIS protocols
- Limited funding for implementation and maintenance





Study Objective: How do Hospital Management Information Systems (HMIS) influence the quality of care and patient outcomes, particularly in low- and middle-income healthcare settings?

Aspect	Details
Design	Qualitative, cross –sectional Descriptive Study
Primary Method	Literature Review (LR)
Data Sources	Secondary data from PubMed, Scopus, Web of Science, WHO reports, MoHFW documents, NHA data
Analysis Technique	Thematic coding (deductive and inductive); frameworks: Donabedian, TAM
Inclusion Criteria	Studies on HMIS in hospitals (2005–2024), English language,, outcome-related findings
Exclusion Criteria	Non-hospital settings, technical-only papers, non-peer-reviewed content



This research provides critical insights into how HMIS contributes to modern healthcare goals beyond just digitalization.

1. For Hospital Administrators

Offers a roadmap for improving institutional performance, transparency, and resource utilization.

2. For Clinicians and Staff

Highlights how HMIS supports safer, more efficient care workflows and reduces documentation burdens when properly integrated.

3. For Patients

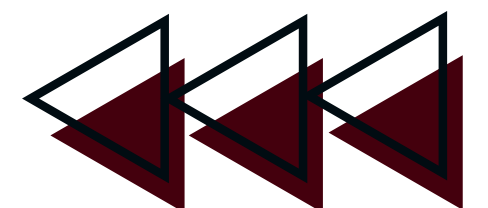
Evaluates how digital systems influence patient trust, satisfaction, access to information, and continuity of care.

4. For Policymakers and Public Health Authorities

Informs national digital health strategies (e.g., ABDM, eHospital) with ground-level evidence from hospital systems.

5. For Developers and Vendors

Provides user feedback and practical challenges to improve HMIS design and usability.



HMIS at Flores Hospital – Arogya System Overview



Hospital: Flores Hospital, Ghaziabad

HMIS Used: Arogya HMIS

Key Modules Implemented:

OPD/IPD Registration: Enables patient demographic capture and visit scheduling.

Billing: Basic billing functionality for outpatient and inpatient services; lacks integration with clinical workflows.

TPA Management: Handles limited insurance coordination and third-party claims, but without auto-validation features.

Pharmacy: Inventory and dispensing system integrated with patient billing.

Limitations:

No EMR: Absence of electronic medical records and clinical documentation restricts decision support and patient safety tracking.

No Lab/Radiology Integration: Manual coordination required between diagnostic and treatment units.

Lacks CDSS & Dashboards: No alerts, audit tools, or analytics for quality tracking or process improvement.

Conclusion:

Arogya at Flores Hospital is focused on basic **administrative digitization**, but lacks **clinical depth and integration**, limiting its overall impact on quality of care and patient outcomes.



Comparative HMIS Overview – 5 Major Private Hospitals



Hospital Name	Location	HMIS Software/System Used	Scope of Implementation	EMR Integration
Apollo Hospitals	Pan-India	Apollo Prism + MedMantra	Full (Clinical + Admin)	Yes
Fortis Healthcare	Pan-India	MedTech Global (HospiLogix)	Full (Clinical + Finance)	Yes
Max Healthcare	Delhi NCR	Lifeline + In-house Modules	Full (Admin + Clinical)	Yes
BLK-Max Super Speciality	Delhi	In-House Custom System	Clinical & Operational Modules	Yes
Narayana Health	Bengaluru + India	NH-Connect (Custom Cloud)	Clinical-focused	Yes



HMIS Functional Capabilities Comparison

Feature	Apollo (Prism+MedMantra)	Fortis (HospiLogix)	Max (Lifeline)	BLK-Max (Custom)	Narayana (NH-Connect)
Patient Registration Automation	✓	✓	✓	✓	✓
Billing & TPA Integration	✓	✓	✓	⚠	✓
CDSS (Decision Support)	✓	✓	⚠	⚠	✓
Lab & Radiology Linkage	✓	✓	✓	✓	✓
HR & Asset Management	✓	✓	⚠	⚠	✗

Legend: ✓ = Fully Functional, ⚠ = Partially Functional, ✗ = Not Implemented

HMIS Functional Capabilities Comparison

Hospital	HMIS Software Used	Strengths	Weaknesses
Apollo	Apollo Prism + MedMantra	Deep integration, excellent analytics	Complex system, high training demand
Fortis	HospiLogix (MedTech Global)	Seamless finance-clinical integration	Vendor lock-in, slower UI in legacy setups
Max Healthcare	Lifeline + In-house modules	Balanced approach, strong EMR & documentation	Moderate CDSS capability
BLK-Max	In-House Custom System	Tailored to hospital workflows	CDSS and HR modules underdeveloped
Narayana Health	NH-Connect (Cloud-based)	Efficient, doctor-friendly, great uptime	Weak administrative & HR coverage

Key Takeaways – Private Hospital HMIS Comparison

- **Apollo & Fortis** lead with comprehensive digital ecosystems and CDSS support.
- **Max & BLK-Max** offer Delhi-based models with modular, real-world workflow alignment.
- **Narayana Health's** cloud-first approach prioritizes speed, clinical access, and scalability
- **Flores Hospital's** HMIS is basic and non-clinical, focused on finance and registration workflows.
- Compared to major hospitals, it lacks core quality-enhancing tools like EMRs, lab integration, and CDSS.
- For future improvement, Flores should consider upgrading Arogya or integrating clinical modules to support patient safety, efficiency, and decision-making.

Gaps Identified:

- CDSS adoption uneven across hospitals.
- Staff training and user-friendliness remain challenges in multi-platform setups.

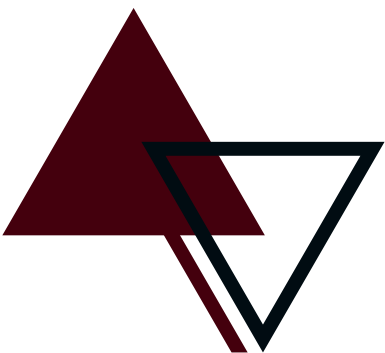
Recommendation:

- Hospitals should strengthen **clinical decision support** and **user training**.
- Nationwide collaboration could encourage **standardization** without compromising flexibility.
- Administrative modules (HR, asset tracking) under-prioritized in some setups



Conclusion

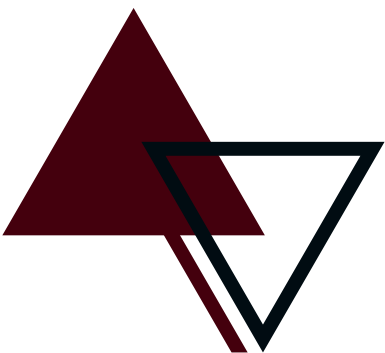
- **HMIS significantly enhances care quality and patient outcomes when properly implemented—improving efficiency, safety, coordination, and satisfaction.**
- **Major challenges in LMICs include poor infrastructure, low digital literacy, lack of interoperability, and limited policy enforcement.**
- **Arogya at Flores Hospital is focused on basic administrative digitization, but lacks clinical depth and integration, limiting its overall impact on quality of care and patient outcomes.**
- **The comparative analysis of HMIS in leading private hospitals reveals that while digital adoption is widespread, system effectiveness hinges on seamless integration, user-centric design, and strong clinical decision support—not just the presence of technology. Prioritizing interoperability, customization, and staff training will be key to unlocking the full potential of HMIS in India’s private healthcare sector.**

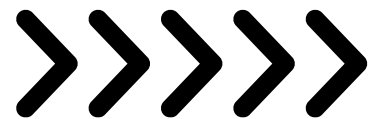




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THANK YOU!

