

Harnessing AI to Transform Hospital Finance In Resource-Constrained Settings



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Artificial Intelligence (AI) is reshaping the financial landscape of healthcare systems, particularly in hospitals across low- and middle-income countries (LMICs). These institutions often grapple with chronic budget constraints, inefficient resource allocation, and burdensome administrative processes. By introducing AI-driven financial systems, hospitals can streamline operations, boost transparency, and ultimately expand access to essential health services.

Automated Financial Management - One of the most impactful applications of AI is in automating financial administration. AI-powered platforms now manage bookkeeping, payroll, and financial reporting with minimal human oversight—reducing errors, speeding up processes, and allowing scarce human resources to refocus on patient

care. Real-time financial dashboards further empower hospital leaders to make swift, data-informed decisions. For instance, AI-led forecasting and budget optimization have helped hospitals manage expenses more effectively, particularly in resource-strained environments¹.

Fraud Detection and Risk Mitigation - In regions with limited regulatory oversight, financial fraud can undermine the viability of health services. AI excels at pattern recognition; machine learning models can detect anomalies and flag suspicious transactions early. Notably, AI tools enhance financial governance and facilitate inclusive access to care by enabling needs-based financial



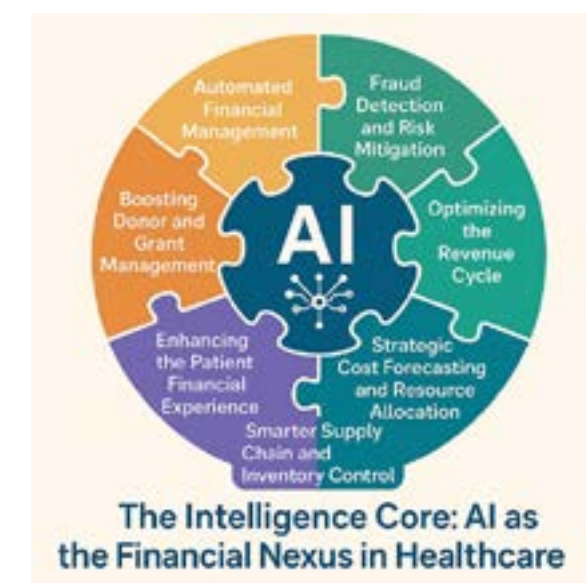
planning for vulnerable populations². These systems strengthen compliance and ensure financial integrity across healthcare networks.

Optimizing the Revenue Cycle - Billing inaccuracies, insurance claim denials, and fragmented payment processes contribute significantly to revenue leakage. AI mitigates these losses by automating claims processing, verifying insurance eligibility in real time, and predicting delays. This results in faster reimbursements and more sustainable financial operations. Furthermore, hospitals in LMICs often rely on donor support. AI facilitates donor targeting, campaign optimization, and automated grant application tracking. These tools enhance the institution's ability to secure sustainable funding and manage contributions effectively.

Strategic Cost Forecasting and Resource Allocation - AI's predictive analytics unlock the ability to analyze historical financial data and project future expenditure trends. Hospitals can identify inefficiencies, optimize procurement, and balance staffing decisions based on long-term scenarios. For institutions operating under fiscal pressure, this insight enables more deliberate, forward-looking planning³.

Enhancing the Patient Financial Experience - Navigating hospital payment systems can be complex for patients. AI-powered chatbots and virtual assistants support patients with billing inquiries, payment plans, and aid applications—improving the user experience while reducing front-desk workload (Hamzah and Rahman, 2023).

Smarter Supply Chain and Inventory Control - Effective inventory management is vital in low-resource environments where supply chain disruptions can be life-threatening. AI helps hospitals forecast demand for medicines and equipment, reduce wastage, and prevent stockouts without overstocking—striking a critical



balance between cost and availability. For instance, in large-scale purchases such as imaging equipment, AI can model patient utilization, estimate ROI, and assess long-term financial viability—equipping hospital leaders with actionable investment insights⁵.

Conclusion

AI holds transformative potential for hospital finance in low- to middle-income countries.

Despite AI's promise, systemic barriers remain. Outdated IT infrastructure, inconsistent internet connectivity, and concerns over data privacy pose significant implementation hurdles. Moreover, a shortage of technically trained personnel calls for long-term investments in digital literacy, upskilling, and capacity building within hospital finance teams. By enabling automation, bolstering revenue integrity, and delivering strategic intelligence, AI can help hospitals operate more sustainably while centering their mission on patient care.

¹ Alami, H., Rivard, L., Lehoux, P. et al. Artificial intelligence in health care: laying the Foundation for Responsible, sustainable, and inclusive innovation in low- and middle-income countries. *Global Health* 16, 52 (2020).

² Ramezani, M., Takian, A., Bakhtiari, A. et al. The application of artificial intelligence in health financing: a scoping review. *Cost Eff Resour Alloc* 21, 83 (2023).

³ Ahmed, T., Mosaddeque, A., Hossain, A., Twaha, U., Rowshon, M., & Babu, B. (2022). The Dynamics of AI and Automation in Financial Forecasting, Human Resources Planning, and Resources Optimization for Designing an Effective National Healthcare Policy. *Journal of Business Insight and Innovation*, 1(2), 78-88.

⁴ Hamzah, F. B., & Rahman, N. I. B. (2023). Patient Billing and Collections Optimization Through Behavioral Segmentation and Data-Driven Outreach Strategies. *Transactions on Machine Learning, Artificial Intelligence, and Advanced Intelligent Systems*, 13(12), 1-16.

⁵ Khan, F. S., Masum, A. A., Adam, J., Karim, M. R., & Afrin, S. (2024). AI in Healthcare Supply Chain Management: Enhancing Efficiency and Reducing Costs with Predictive Analytics.