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ICT Management Models for Improving Hospital Service Quality: A Systematic Review

Modelos de gestión de las Tecnologías de la Información y la Comunicación para mejorar la calidad de los servicios hospitalarios: una revisión sistemática

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ABSTRACT

This systematic review analyzes the application of ICT management models, intelligent systems, data analytics, and process mining in hospital settings, with the aim of identifying dominant approaches, evaluation metrics, and research gaps. The study was conducted following PRISMA guidelines, based on the analysis of 76 peer-reviewed articles indexed in Scopus. The results reveal a predominance of models oriented toward hospital digital transformation and strategic ICT management, complemented by the increasing use of artificial intelligence and data analytics to support clinical and administrative decision-making. Process mining emerges as a relevant technique for analyzing real hospital processes, although its adoption remains limited. Regarding performance evaluation, most studies rely on traditional technical metrics such as accuracy and precision, with limited incorporation of organizational and service quality indicators. The review highlights the need for more integrated ICT management models that articulate technology, processes, and human factors, as well as more robust evaluation frameworks to enhance applicability and sustainability in real hospital environments.

Keywords: data analytics; digital governance; intelligent systems; process mining; decision making; healthcare digital transformation

RESUMEN

La presente revisión sistemática analiza la aplicación de modelos de gestión de tecnologías de la información y la comunicación (TIC), sistemas inteligentes, analítica de datos y process mining en el ámbito hospitalario, con el objetivo de identificar enfoques predominantes, métricas utilizadas y vacíos de investigación. El estudio se desarrolló siguiendo las directrices PRISMA, a partir del análisis de 76 artículos científicos indexados en Scopus. Los resultados evidencian una predominancia de modelos orientados a la transformación digital hospitalaria y a la gestión estratégica de las TIC, complementados por el uso creciente de inteligencia artificial y analítica de datos para apoyar la toma de decisiones clínicas y administrativas. El process mining emerge como una técnica relevante para el análisis de procesos reales, aunque su adopción aún es limitada. En cuanto a la evaluación del desempeño, la mayoría de los estudios utiliza métricas técnicas tradicionales, como accuracy y precision, observándose una escasa incorporación de indicadores organizacionales y de calidad del servicio. La revisión identifica la necesidad de modelos de gestión de TIC más integrales, que articulen tecnología, procesos y factor humano, así como marcos de evaluación más robustos que favorezcan la aplicabilidad y sostenibilidad de estas soluciones en contextos hospitalarios reales.

Palabras clave: analítica de datos; gobernanza digital; minería de procesos; sistemas inteligentes; toma de decisiones; transformación digital en salud

1. INTRODUCTION

Hospital digital transformation has become a strategic axis for improving the quality and efficiency of healthcare services (Elbatanouny et al., 2025). The increasing demand for healthcare services has driven the use of information and communication technologies (ICT) as a key support for hospital management; however, in many contexts, particularly in developing countries, their adoption remains fragmented. This situation highlights the need to analyze the contribution of ICT management models to improving hospital service quality (Saavedra Grandez, 2021).

ICT management in hospital environments plays a strategic role by enabling the integration of information systems, the automation of processes, and support for clinical and administrative decision-making. From a theoretical perspective, this management approach is associated with digital transformation and intelligent systems frameworks, where information becomes a key asset for continuous improvement (Alves et al., 2024; Franceschi et al., 2025). Tools such as data analytics and process mining allow a deeper understanding of how healthcare processes are actually executed, enabling the identification of inefficiencies and supporting organizational optimization. In practice, their impact is reflected in improved clinical coordination, reduction of errors, and enhancement of the patient experience. Furthermore, the human component plays a critical role, as technological adoption largely depends on factors such as training, perceived usefulness, and organizational culture (Balzer et al., 2023; Vural et al., 2025).

Studies such as those conducted by Akinwale and AboAlsamh (2023), Alòs et al. (2025), and Navarro Martínez and Leyva (2024) show a sustained increase in research focused on the digitalization of hospital services and the use of intelligent systems to support decision-making. These studies can generally be categorized into approaches centered on technological infrastructure, user experience, and process optimization through advanced analytics. Although the findings indicate improvements in efficiency, traceability, and healthcare quality, they also reveal limitations associated with partial or poorly integrated implementations. In many cases, technology is adopted without a comprehensive management framework, which reduces its real impact (Alawadhi et al., 2025; Miriam Janet et al., 2024). Moreover, a significant portion of the existing research is concentrated in highly developed contexts, leaving important gaps in environments characterized by structural constraints.

In response to these limitations, the present study adopts an approach focused on ICT management as a key element for articulating hospital service quality, integrating intelligent systems and process mining techniques (Özdağoğlu et al., 2025). This approach enables the analysis of real clinical process flows, the identification of operational deviations, and the generation of evidence to support continuous improvement. In particular, process mining facilitates the understanding of the internal dynamics of hospital services through the analysis of real event logs, providing an objective and data-driven perspective. This approach is especially relevant in contexts with organizational constraints, where resource optimization and informed decision-making are essential for improving healthcare delivery.

Previous studies (Hügle & Grek, 2023; Petzold & Steidle, 2023; Pilares et al., 2022) have demonstrated a growing interest in hospital digitalization, artificial intelligence, and process analytics. Nevertheless, a significant gap remains between technological development and its

effective integration into management models. Most studies focus on specific technological solutions without addressing the interaction between technology, organizational processes, and decision-making in an integrated manner. Furthermore, there is limited representation of developing countries, where structural challenges significantly influence the adoption of digital technologies. This gap highlights the need for systematic reviews that provide a holistic and contextualized understanding of ICT management in hospital environments.

The objective of this study is to conduct a systematic review of the literature on ICT management models aimed at improving hospital service quality, with a particular focus on the use of intelligent systems, data analytics, and process mining. Unlike previous reviews, this study integrates both technical and organizational perspectives, allowing the identification of patterns, emerging approaches, and research gaps. The main contribution lies in providing an analytical framework that supports decision-making and the design of more efficient, adaptable, and sustainable ICT management models, particularly relevant in contexts characterized by structural limitations and increasing healthcare demand.

2. METHODOLOGY

This systematic review aims to identify, analyze, and synthesize the scientific evidence related to Information and Communication Technology (ICT) management models aimed at improving the quality of hospital services, with particular emphasis on the use of intelligent systems, data analytics, and process mining. The study was conducted following a structured methodological approach aligned with the PRISMA guidelines (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) and supported by a reproducible and transparent systematic review strategy (Page et al., 2021; PRISMA, 2025).

The methodological process was organized into three main phases: planning, execution, and reporting. These phases ensured methodological coherence, traceability of results, and scientific rigor. Mendeley was used as a bibliographic reference manager, while the stages of study selection and screening were documented through spreadsheets and flow diagrams downloaded from the PRISMA website.

2.1 Review planning

In order to properly structure the search strategy and clearly define the scope of the study, the PICO framework (Population, Intervention, Comparison, Outcome) was employed and adapted to the context of ICT management in hospital services. This strategy allowed the delimitation of key concepts and guided the formulation of the research questions.

Table 1. Application of the PICO model

Criterion	Description
P (Population)	Hospital services and healthcare organizations
I (Intervention)	ICT management models, intelligent systems, data analytics, and process mining
C (Comparison)	Comparison between traditional approaches and digital, intelligent, or hybrid management models
O (Outcome)	Improvement of hospital service quality, operational efficiency, decision-making, and organizational performance

Based on this conceptual framework, the research questions guiding the search, selection, and analysis of the scientific literature were defined.

2.2 Research questions

The research questions (RQ) were formulated in order to systematically explore the state of the art regarding ICT management applied to hospital environments:

RQ1: What ICT management models have been applied in hospital services and what are their main conceptual and technological approaches?

RQ2: What types of intelligent systems, data analytics, or process mining techniques have been used to improve the quality of hospital services?

RQ3: What performance metrics and outcomes are reported in hospital management based on intelligent systems?

2.3 Search strategy and selection criteria

The search strategy was designed independently for each research question, using combinations of key terms and synonyms related to ICT management, hospital quality, and intelligent systems. Searches were conducted in the Scopus database using the advanced search mode on titles, abstracts, and keywords.

Table 2. Search strings used

Criterion	Description
RQ1	TITLE-ABS-KEY ("ICT management" OR "information technology management" OR "digital transformation" OR "health information systems") AND TITLE-ABS-KEY ("hospital" OR "healthcare services") AND TITLE-ABS-KEY ("service quality" OR "healthcare quality" OR "quality of care")
RQ2	TITLE-ABS-KEY (“artificial intelligence” OR “data analytics” OR “process mining” OR “intelligent systems”) AND TITLE-ABS-KEY (“hospital” OR “healthcare”)
RQ3	TITLE-ABS-KEY (“service quality” OR “healthcare quality” OR “decision making”) AND TITLE-ABS-KEY (“ICT” OR “digital systems”)

Inclusion criteria

- Peer-reviewed scientific articles
- Publications between 2022 and 2025
- Studies written in English or Spanish
- Research related to ICT management, hospital service quality, or intelligent systems
- Full-text availability.

Exclusion criteria

- Purely clinical studies without a technological or management component
- Conceptual articles without empirical evidence
- Narrative reviews without explicit methodology
- Documents without full-text access.

2.4 Keywords and relationship with the research questions

Table 3. Keywords and relation with the RQ

Keyword	Related terms / synonyms	Associated RQ
ICT Management	Digital management, IT governance	RQ1, RQ4
Healthcare Quality	Service quality, care quality	RQ3
Process Mining	Process analysis, workflow mining	RQ2
Artificial Intelligence	AI, machine learning, data analytics	RQ2
Digital Transformation	Digital health, e-health	RQ1
Decision Support	Clinical decision support systems	RQ3
Hospital Management	Healthcare management	RQ1, RQ4

2.5 Data extraction and analysis

During the data extraction phase, structured fields were defined to systematize the relevant information from each selected study. These fields enabled consistent comparative analysis and facilitated the identification of patterns, trends, and research gaps.

Table 4. Data extraction fields

Field	Description
Reference	Title, authors, and publication year
Type of publication	Journal article, conference paper, review
Geographic context	Country or region of the study
Study approach	Management, analytics, intelligent systems
Model used	Type of model or architecture employed
Technologies applied	ICT, AI, analytics, process mining
Main results	Relevant findings of the study
Impact on quality	Reported improvement indicators
Limitations	Methodological or contextual constraints
Contributions	Theoretical or practical contributions

2.6 Sources of information

The bibliographic search was conducted exclusively in the Scopus database, selected due to its broad coverage of peer-reviewed scientific literature. Searches were performed during 2025, applying filters for document type (journal articles), time range, and access type (Gold Open Access and Hybrid Gold).

The retrieved records were exported in RIS format for subsequent analysis. Duplicate removal and verification of inclusion criteria were conducted manually and systematically, ensuring process traceability and methodological consistency throughout the review.

3. RESULTS AND DISCUSSIONS

3.1 Selected articles and general characteristics

Following the search strategies defined for each research question, a total of 258 records for RQ1, 395 for RQ2, and 201 for RQ3 were initially identified in the Scopus database. Subsequently, filters related to publication year (2022–2025), document type (peer-reviewed scientific articles), and access type (Gold Open Access and Hybrid Gold) were applied, reducing the results to 50 articles for RQ1, 58 for RQ2, and 22 for RQ3.

Next, a screening process was conducted to identify and remove duplicate records among the three research questions. At this stage, 18 duplicates were identified between RQ1 and RQ2, 14 between RQ2 and RQ3, and 17 between RQ3 and RQ1. Additionally, 11 articles were found to be common to

all three searches. After removing duplicates, a consolidated set of 92 unique articles was obtained for eligibility assessment.

Subsequently, full-text reading of the selected studies was conducted in order to verify their thematic and methodological relevance with respect to the objectives of the study. As a result of this evaluation, 16 articles were excluded, mainly because they presented a predominantly clinical focus without a connection to ICT management, relied exclusively on diagnostic techniques without organizational implications, or did not provide evidence related to improving service quality or supporting hospital decision-making. Finally, 76 articles were included in the systematic review analysis.

Table 5 presents the final distribution of the articles according to each research question and the stages of the filtering process.

Table 5. Distribution of articles by research question

Research question	Identified (unfiltered)	From 2022	Journal articles	Gold + Hybrid Gold
RQ1	258	105	73	50
RQ2	395	216	91	58
RQ3	201	43	28	22

Note: *The column "Journal articles" corresponds to peer-reviewed publications. "Gold + Hybrid Gold" indicates articles with full access according to Scopus criteria.*

The complete process of identification, screening, eligibility, and inclusion of the studies is summarized in Figure 1, prepared according to the PRISMA guidelines.

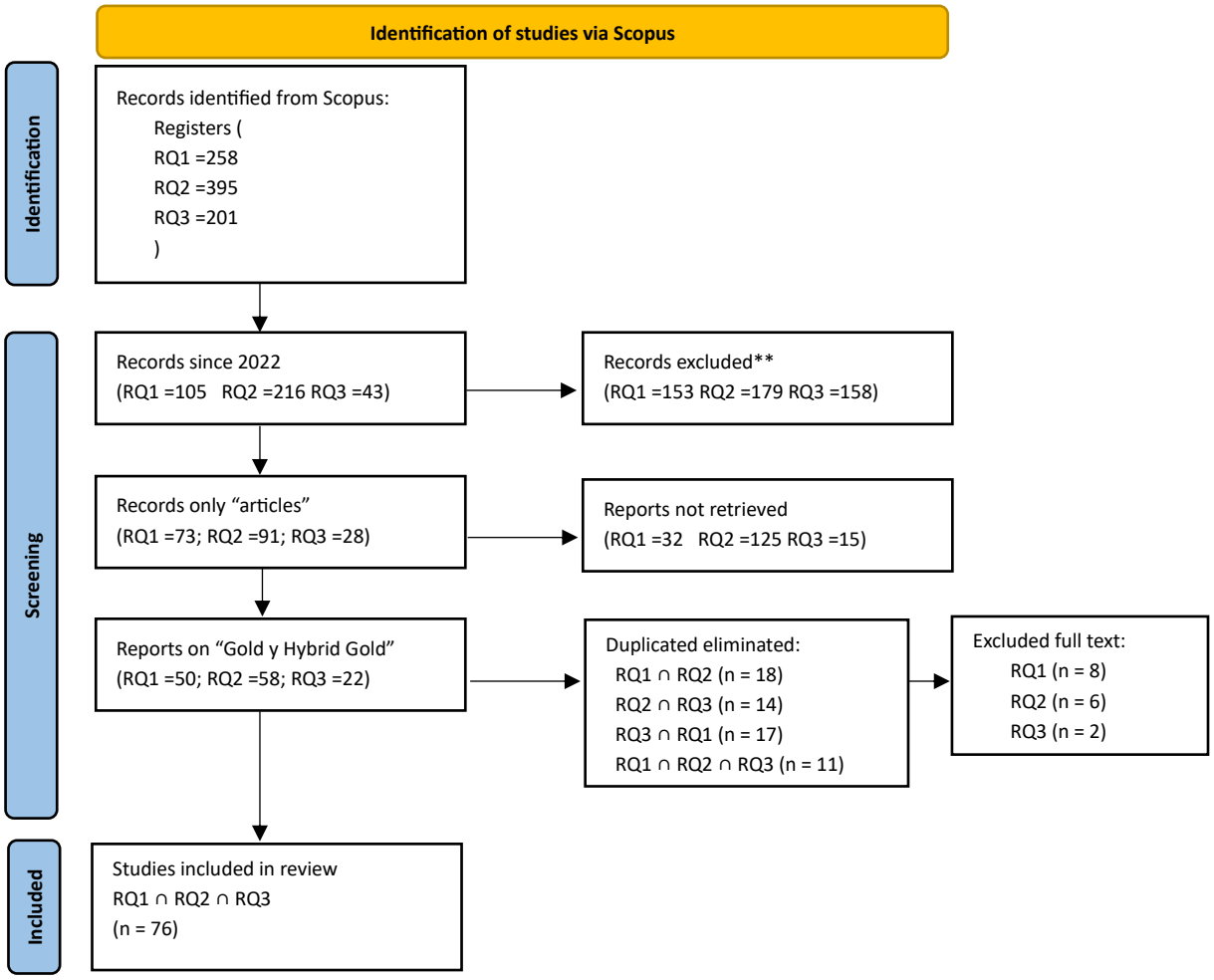

Figure 1. PRISMA flowchart of the item selection process

3.2 Temporal distribution of the selected studies

Table 6 presents the distribution of the selected articles according to their year of publication. The results show an increasing trend in scientific production during the analyzed period, with a notable rise starting in 2023, reflecting a growing interest in the study of ICT management, intelligent systems, and decision-making in the hospital context.

Table 6. Distribution of selected articles by year and research question

Year	RQ1	RQ2	RQ3
2022	12	7	3
2023	14	10	5
2024	9	12	5
2025	15	29	9
Total	50	58	22

This temporal pattern indicates a sustained increase in academic interest in the application of digital technologies, data analytics, and management models aimed at improving organizational performance in hospital services. It also reflects the consolidation of data-driven and process-oriented approaches as key tools for addressing current challenges in healthcare systems.

3.3 General observations derived from the analyzed studies

The analysis of the selected studies made it possible to identify common patterns that provide a comprehensive view of the role of ICT management in improving the quality of hospital services. First, a significant proportion of the studies emphasizes information management as a critical factor for strengthening operational efficiency, interdepartmental coordination, and strategic decision-making.

Furthermore, the results reveal a growing interest in the use of intelligent systems, data analytics, and process mining techniques as tools to understand the actual behavior of hospital processes, identify bottlenecks, and optimize resource utilization. These approaches enable a transition from reactive management toward evidence-based management supported by real and updated data.

However, the studies also reveal persistent limitations related to the digital maturity of organizations, system interoperability, and the alignment between technology, processes, and human capabilities. Taken together, these findings confirm the need for comprehensive and contextualized ICT management models capable of integrating technology, people, and processes in order to achieve sustainable improvements in hospital service quality.

3.4 RQ1: ICT management models in hospital services

The analysis of the studies selected for RQ1 allowed the identification of structural and conceptual patterns in the way ICT management models have been conceived and implemented in hospital environments. In general terms, the reviewed studies show a progressive transition from approaches focused exclusively on technological infrastructure toward more comprehensive models oriented to the integration of organizational processes, decision-making, and human capabilities.

Based on the qualitative–quantitative analysis of the included articles, four major categories of ICT management models were identified, reflecting different levels of organizational maturity and intervention approaches. These categories are presented in Table 7, together with their frequency of occurrence and the corresponding article code.

Table 7. Classification of ICT management models identified in the literature

Model category	Functional description	Freq (n)	Perc (%)	Articles
Strategic ICT management models	Integrate institutional planning, digital governance, and alignment between organizational objectives and technological capabilities.	14	28%	(Alòs et al., 2025; Colais et al., 2022; Holl et al., 2024; Karumbi et al., 2023; Lin, Lin, et al., 2025; Mash, 2022; Meshcheryakova et al., 2023; Okwaraji et al., 2024; Schneider et al., 2023; Steyn et al., 2022; Tiangco et al., 2024; Utami et al., 2025; Westheimer et al., 2023; Zhou et al., 2025)
Hospital digital transformation models	Focused on organizational modernization, interoperability, process automation, and improvement of operational performance.	11	22%	(Belardi et al., 2023; Ching-Lin & A/p Sukirthanandan, 2025; Eleyyan et al., 2025; Gäbler et al., 2022; Innotata et al., 2023; Kuck et al., 2022; Molenaar et al., 2024; Mussi et al., 2023; Oladoyin et al., 2025; Păcuraru et al., 2025; Pilares et al., 2022)
Health information systems models (HIS, EHR, ERP)	Focused on clinical data management, interoperability, traceability, and support for clinical and administrative decision-making.	13	26%	(Akinwale & AboAlsamh, 2023; Althumairi et al., 2022; Amiri Ara et al., 2025; Basile et al., 2024; Brand et al., 2025; Dadi et al., 2023; Jaber et al., 2025; Manu et al., 2022; Marceau et al., 2025; Muzigaba et al., 2022; Navarro Martínez & Leyva, 2024; Szczepura et al., 2024; Wood et al., 2022)
Sociotechnical models centered on the human factor	Address technological adoption, digital competencies, organizational culture, and acceptance of change.	12	24%	(Asadi et al., 2023; Chimbo & Motsi, 2024; Cho et al., 2024; Dinh et al., 2022; Hügle & Grek, 2023; Koebe & Bohnet-Joschko, 2023; Migamba et al., 2023; Petzold & Steidle, 2023; Pradhan et al., 2022)

From an analytical perspective, hospital digital transformation models constitute one of the relevant categories identified in the literature, representing approximately 22% of the analyzed studies. These models are characterized by integrating digital technologies with clinical and administrative processes in order to improve operational efficiency, continuity of care, and service quality. The literature indicates that this approach has been particularly consolidated in contexts where healthcare systems face increasing pressure associated with rising demand, resource scarcity, and the need to optimize service delivery times.

Secondly, strategic ICT management models, representing around 28%, aim to align technology with long-term institutional objectives. These studies highlight the role of digital governance, strategic planning, and information-based decision-making as key determinants of organizational performance. In this group, technology is conceived as a strategic enabler rather than an end in itself.

In turn, models centered on health information systems represent approximately 26% of the total. These studies prioritize the analysis of platforms such as HIS, EHR, or integrated hospital management systems, with emphasis on data quality, interoperability, and support for clinical processes. Although they present significant technical advances, several studies highlight limitations associated with system fragmentation and dependence on robust technological infrastructures.

Finally, sociotechnical models, although less frequent (24%), acquire particular conceptual relevance. These studies recognize that the effectiveness of ICT largely depends on human factors, such as staff training, technological acceptance, organizational culture, and leadership styles. From this perspective, failures in the implementation of technologies are not explained solely by

technical limitations but also by weaknesses in change management and in the integration between organizational actors.

Table 8. Relationship between ICT management model type and predominant organizational approach

Model type	Main focus	Predominant organizational level	Expected outcomes
Strategic ICT management	Strategic alignment and governance	Executive and managerial level	Improved decision-making and institutional planning
Hospital digital transformation	Process and service optimization	Cross-organizational level	Increased efficiency and continuity of care
Health information systems	Clinical and operational data management	Technical-operational level	Improved traceability, interoperability, and clinical support
Sociotechnical models	Human and cultural factors	Individual and group level	Greater technological adoption and sustainability of change

From an integrated perspective, the results show that ICT management in hospital environments is configured as a multidimensional phenomenon, where technology acts as a catalyst but not as the sole determinant of organizational change. The predominance of models oriented toward digital transformation reflects a growing concern to respond to complex and dynamic contexts. However, the lower presence of sociotechnical approaches suggests that a gap still exists between technological development and the management of the human factor.

Overall, the findings of RQ1 indicate that ICT management models have evolved toward more integrated schemes, although challenges remain related to interoperability, organizational sustainability, and technological appropriation. These results reinforce the need to design models that balance infrastructure, processes, and people, particularly in hospital environments in developing countries where structural limitations condition the real impact of digital transformation.

3.5 RQ2: Application of intelligent systems, data analytics, and process mining in hospital management

3.5.1 General analysis of the selected studies

The analysis corresponding to RQ2 was conducted on a total of 58 scientific articles identified after applying the previously defined inclusion criteria. These studies address the application of intelligent systems, data analytics, and process mining techniques as mechanisms to support decision-making and improve organizational performance in hospital contexts.

From a temporal perspective, scientific production shows a growing trend starting in 2023, with a particularly notable increase between 2024 and 2025, reflecting the sustained interest in integrating advanced analytical capabilities into healthcare management systems. This growth is closely associated with the consolidation of digital infrastructures, the availability of large volumes of clinical and administrative data, and the need to optimize processes in highly demanding hospital environments.

The analyzed studies address decision-making from multiple organizational levels, including clinical management, operational planning, resource allocation, and institutional performance evaluation. Overall, the findings indicate a transition from descriptive approaches toward predictive and prescriptive models, supported by artificial intelligence (AI), advanced analytics, and process mining techniques.

3.5.2 Classification of technological approaches applied

Based on the content analysis of the articles, four major technological categories were identified according to the predominant approach used to support decision-making in hospital environments. Table 9 presents this classification together with its frequency and reference codes.

Table 9. Classification of technological approaches applied in hospital management

Technological approach	Functional description	Freq (n)	Perc (%)	Articles (codes)
Artificial intelligence (AI)-based systems	Use of predictive models, machine learning, and intelligent systems to support clinical and administrative decision-making	16	27.6 %	(Alawadhi et al., 2025; Bellini et al., 2025; Elbatanouny et al., 2025; Fan et al., 2025; Galety et al., 2025; García, 2025; Hur & Rushakoff, 2025; Kaczmarek & Wibbeling, 2025; Laverty et al., 2025; Li et al., 2025; Özdağoğlu et al., 2025; Pasquadibisceglie et al., 2025; Rahmati et al., 2025; Scala et al., 2025; Tuan et al., 2025; Ydenius et al., 2025)
Data analytics and business analytics	Descriptive, diagnostic, and predictive analysis to support organizational decision-making	20	34.5 %	(Albrecht et al., 2024; Alimiri Dehbaghi et al., 2024; Alves et al., 2024; Angelina et al., 2025; Bienefeld et al., 2025; Franceschi et al., 2025; Hibi et al., 2024; Johnson et al., 2024; Krämer et al., 2025; Kumar et al., 2025; Kwon et al., 2024; Lam et al., 2024; Lin, Hoyt, et al., 2025; Lotfi et al., 2025; Miriam Janet et al., 2024; Parrales-Bravo et al., 2025; Pramesh et al., 2025; Vural et al., 2025; Wells & Reilly, 2025; Wu et al., 2025)
Process mining and process analysis	Evaluation of clinical and administrative workflows using event log data	14	24.1 %	(Albarrak, 2023; Alhakami et al., 2023; Anita Christaline et al., 2024; Balzer et al., 2023; Chalmeta et al., 2023; Free et al., 2023; Huang et al., 2024; Katirai et al., 2023; Kaur & Garg, 2023; Maduekwe, 2024; Mi et al., 2023; Parrales-Bravo et al., 2024; Samaras et al., 2023; W. Zhang et al., 2023)
Hybrid approaches (AI + analytics + process mining)	Integration of multiple techniques for advanced decision support	8	13.8 %	(Arnaud et al., 2022; Hadid et al., 2022; Kc et al., 2022; Vahedi et al., 2022; C. Yu et al., 2022; X. Yu et al., 2022; Z. Zhang et al., 2022)

3.5.3 Descriptive analysis of the identified approaches

The results show that data analytics represents the predominant approach, accounting for approximately 34.5% of the analyzed studies. These studies mainly focus on the analysis of large volumes of hospital data to support organizational decision-making, monitor institutional performance, and evaluate key performance indicators.

Secondly, artificial intelligence-based systems appear in approximately 27.6% of the studies, standing out for their application in predictive models, recommendation systems, and decision-support tools in highly complex contexts such as bed management, patient prioritization, and healthcare workflow optimization.

In turn, process mining represents an emerging but highly relevant line of research, accounting for approximately 24.1% of the studies. This technique is used to reconstruct and analyze real processes from event logs, enabling the identification of bottlenecks, deviations from clinical

protocols, and opportunities for improving hospital care. Its application is particularly valuable in environments where processes are complex, non-linear, and highly dependent on human behavior.

Finally, hybrid approaches, which combine artificial intelligence, advanced analytics, and process mining, represent approximately 13.8% of the total. These models stand out for their ability to integrate multiple data sources, improve analytical accuracy, and provide advanced decision support for both clinical and managerial contexts.

3.5.4 Relationship between analytical techniques and decision-making levels

The cross-analysis made it possible to identify a clear correspondence between the type of analytical technique employed and the organizational level at which it is applied. Table 10 summarizes this relationship.

Table 9. Relationship between analytical techniques and decision-making level

Type of technique	Operational level	Tactical level	Strategic level
Artificial intelligence	High	Medium	Low
Data analytics	Medium	High	Medium
Process mining	High	High	Low
Hybrid approaches	Medium	High	High

The results indicate that AI-based and process mining approaches are primarily used to support operational and tactical decisions, such as resource allocation, inefficiency detection, and workflow improvement. In contrast, hybrid models demonstrate a greater capacity to support strategic decision-making, as they integrate structural, operational, and contextual information.

3.5.5 Interpretative synthesis of RQ2

Overall, the results of RQ2 reveal a clear evolution toward the use of intelligent systems as a fundamental support for hospital management. The literature shows that the combination of artificial intelligence, data analytics, and process mining enables the transition from reactive models to predictive and prescriptive approaches, strengthening organizational responsiveness.

However, relevant limitations are also identified, such as the dependence on data quality, the lack of standardization among systems, and the limited integration between operational and strategic levels. These challenges restrict the transformative potential of the analyzed technologies, particularly in contexts characterized by structural constraints or low levels of digital maturity.

In this regard, the findings suggest that the real value of intelligent systems does not lie solely in technological sophistication but in their integration with organizational processes, human capabilities, and appropriate governance frameworks. This perspective reinforces the need for comprehensive models capable of transforming data into actionable knowledge and sustainable strategic decisions within hospital services.

3.6 RQ3: Performance metrics and reported outcomes in hospital management based on intelligent systems

3.6.1 General analysis of the performance metrics used

The analysis corresponding to RQ3 was conducted on a final set of 22 scientific articles, which explicitly report performance metrics to evaluate the application of intelligent systems, data analytics, and process mining in hospital management. These studies employ a heterogeneous set

of quantitative metrics aimed at measuring the effectiveness, accuracy, and reliability of the proposed models in both clinical and administrative contexts.

In general, it is observed that most studies prioritize traditional metrics originating from the field of machine learning and predictive analytics, such as accuracy, precision, recall, and AUC, even when the models are applied to organizational or process optimization problems. In contrast, metrics oriented toward organizational reliability, process stability, or impact on decision-making appear less frequently and in a less standardized manner.

This pattern suggests that performance evaluation in hospital management remains strongly influenced by technical approaches, with only partial adoption of metrics specifically related to the organizational and managerial domain.

3.6.2 Frecuencia y distribución de métricas reportadas

Based on the content analysis of the articles, three main types of performance metrics were identified and grouped according to their evaluative function. Table 11 presents the frequency of the most commonly reported metrics together with the article codes in which they are used as primary indicators.

Table 10. Frequency of performance metrics reported in the analyzed studies

Performance metric	Type of evaluation	Freq (n)	Perc (%)	Articles (codes)
Accuracy	Overall performance	4	18.2 %	(Akik et al., 2024; Al-Qerem et al., 2025; Chu, 2023; Kayumba et al., 2025)
	Prediction accuracy			
	Effective event detection			
Processing time / throughput	Balance of accuracy and recall	9	40.9 %	(Alimbetova et al., 2025; Birru et al., 2024; Demir & Guzel, 2024; Ismatullah, 2023; Lovemore et al., 2023; Nabot & Al-Qerem, 2025; Rahmaddian et al., 2025; Rifial et al., 2025; Sylqa, 2025)
	Discriminative capability			
Organizational indicators (KPI)	Operational efficiency	9	40.9 %	(Balić et al., 2022; Chu, 2023; Dal Moro et al., 2024; Gyebo et al., 2022; Jones et al., 2022; Laverty et al., 2025; Ningsih & Kurniawan, 2023; Scala et al., 2025; Windari et al., 2025)
	Institutional performance			

The results show that metrics related to operational efficiency and organizational indicators (KPI) constitute the most frequent evaluation approaches, each representing approximately 40.9% of the analyzed studies. These metrics mainly focus on evaluating process optimization, reduction of operational times, and improvement of institutional performance in hospital environments. In contrast, accuracy, used as an indicator of the overall performance of predictive models, appears in approximately 18.2% of the studies.

This pattern indicates that, although machine-learning-based approaches continue to employ traditional classification metrics, there is a growing interest in incorporating organizational indicators that allow the evaluation of the real impact of analytical technologies on the efficiency and quality of hospital services.

3.6.3 Critical analysis of metric reliability and limitations

Despite the favorable quantitative results reported in most studies, the analysis reveals several recurrent methodological limitations. First, there is a high heterogeneity in the selection and reporting of metrics, which complicates direct comparisons between studies. Second, only a limited number of articles report confidence intervals, external validation, or sensitivity analyses—key aspects for evaluating the actual reliability of the proposed models.

Furthermore, most studies evaluate performance in controlled or retrospective environments, with limited evidence of prospective validation in real hospital settings. This limitation is particularly relevant for models reporting high levels of accuracy but whose transferability to complex operational contexts has not been fully demonstrated.

3.6.4 Interpretative synthesis of RQ3

Overall, the results of RQ3 show that the evaluation of intelligent systems applied to hospital management relies predominantly on traditional technical metrics, with still limited incorporation of organizational indicators and decision-impact measures. Although the reported values suggest a high potential for these technologies to improve hospital efficiency and effectiveness, a gap persists between algorithmic performance and organizational reliability.

These findings highlight the need to advance toward more comprehensive evaluation frameworks that combine technical, organizational, and human-centered metrics. Such frameworks would allow the assessment not only of model accuracy but also of their real impact on service quality, operational sustainability, and strategic decision-making within healthcare systems.

CONCLUSIONS

This systematic review provides an integrative and structured overview of the application of ICT management models, intelligent systems, data analytics, and process mining techniques in hospital environments, with particular emphasis on their contribution to decision-making and organizational performance. Based on the analysis of 76 peer-reviewed scientific articles published mainly between 2022 and 2025, the findings reveal a clear evolution from isolated technological approaches toward more complex and integrated models that combine digital infrastructure, organizational processes, and human capabilities.

Regarding ICT management models (RQ1), the results show a predominance of approaches oriented toward hospital digital transformation and strategic ICT management, followed by models centered on health information systems and, to a lesser extent, sociotechnical approaches. This distribution indicates that although technology is recognized as a key enabler of hospital quality and efficiency, a gap still exists in the systematic integration of human and organizational factors within technological management models. The reviewed studies consistently highlight that the absence of digital governance, institutional leadership, and change management limits the real impact of ICT in hospital services.

Concerning the application of intelligent systems, data analytics, and process mining (RQ2), the evidence shows a sustained increase in the use of artificial intelligence and advanced analytics techniques to support operational and tactical decision-making, such as resource allocation, optimization of clinical workflows, and monitoring of institutional performance. Process mining emerges as a particularly relevant line of research for analyzing real processes, enabling the

identification of bottlenecks, deviations, and opportunities for improvement based on event logs. However, hybrid approaches combining AI, analytics, and process mining—although less frequent—stand out for their greater capacity to support strategic decisions and provide a holistic view of hospital operations.

Regarding the performance metrics used (RQ3), the review reveals a strong dependence on traditional technical indicators such as accuracy, precision, recall, and AUC, even when models are applied to organizational management problems. Although the reported values are generally high, recurring methodological limitations were identified, including heterogeneity in metric reporting, limited external validation, and insufficient incorporation of organizational indicators related to decision-making impact. This suggests that algorithmic performance alone does not guarantee the reliability or sustainability of solutions implemented in real hospital environments.

Overall, this review demonstrates that the value of ICT and intelligent systems in hospital management does not lie solely in technological sophistication but in their coherent integration with organizational processes, governance structures, and human capabilities. To the best of our knowledge, this study represents one of the first systematic reviews that jointly analyzes ICT management models, analytical techniques, and reported performance metrics, offering a transversal perspective that contributes to a deeper understanding of current practices, their limitations, and the remaining challenges.

Finally, the findings suggest the need to advance toward more comprehensive and contextualized ICT management models, particularly in healthcare systems of developing countries, where structural and organizational constraints strongly influence the impact of digital transformation. Likewise, future research should promote more robust evaluation frameworks that combine technical, organizational, and human-centered metrics to ensure that intelligent systems effectively contribute to improving the quality, efficiency, and sustainability of hospital services.

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CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest related to the development of the study.

AUTHORSHIP CONTRIBUTION

Conceptualization; Data Curation; Formal Analysis; Research; Methodology; Visualization; Validation; Writing - original draft; Writing - revision and editing: García-Angulo, J. L.

REFERENCES

Akik, C., El-Dirani, Z., Willis, R., Truppa, C., Zmeter, C., Aebischer-Perone, S., Roswall, J., Hamadeh, R., Blanchet, K., Roberts, B., Fouad, M. F., Perel, P., & Ansbro, É. (2024). Providing continuity of care for people living with noncommunicable diseases in humanitarian settings: A qualitative study of health actors' experiences in Lebanon. *Journal of Migration and Health*, *10*. https://doi.org/10.1016/j.jmh.2024.100269

Akinwale, Y. O., & AboAlsamh, H. M. (2023). Technology Innovation and Healthcare Performance among

Healthcare Organizations in Saudi Arabia: A Structural Equation Model Analysis. *Sustainability (Switzerland)*, *15*(5). https://doi.org/10.3390/su15053962

Al-Qerem, A., Ali, A. M., Nabot, A., Jebreen, I., Alauthman, M., Alangari, S., Aburub, F., & Aldweesh, A. (2025). Enhancing Organizational Performance: Synergy of Cyber-Physical Systems, Cloud Services, and Crowdsensing. *International Journal of Crowd Science*, *9*(1), 44–55. https://doi.org/10.26599/IJCS.2023.9100033

Alawadhi, A., Jenkins, D., Palin, V., & van Staa, T. (2025). Development and evaluation of prediction models to improve the hospital appointments overbooking strategy at a large tertiary care hospital in the Sultanate of Oman: a retrospective analysis. *BMJ Open*, *15*(4). https://doi.org/10.1136/bmjopen-2024-093562

Albarrak, A. M. (2023). Improving the Trustworthiness of Interactive Visualization Tools for Healthcare Data through a Medical Fuzzy Expert System. *Diagnostics*, *13*(10). https://doi.org/10.3390/diagnostics13101733

Albrecht, S., Broderick, D., Dost, K., Velev, I., Nghiem, N., Wu, M., Zhu, J., Poonawala-Lohani, N., Jamison, S., Rasanathan, D., Huang, S., Trenholme, A., Stanley, A., Lawrence, S., Marsh, S., Castelino, L., Paynter, J., Turner, N., McIntyre, P., … Wicker, J. S. (2024). Forecasting severe respiratory disease hospitalizations using machine learning algorithms. *BMC Medical Informatics and Decision Making*, *24*(1). https://doi.org/10.1186/s12911-024-02702-0

Alhakami, H., Baz, A., Al-Shareef, M., Kumar, R., Agrawal, A., & Khan, R. A. (2023). A Framework for Securing Saudi Arabian Hospital Industry: Vision-2030 Perspective. *Intelligent Automation and Soft Computing*, *36*(3), 2773–2786. https://doi.org/10.32604/iasc.2023.021560

Alimbetova, M. S., Kurakbaeyev, K. K., Ismailov, Z. K., & Baimuratova, M. A. (2025). VALIDATION AND ADAPTATION½ OF THE HEALTHQUAL-KZ QUESTIONNAIRE FOR COMPREHENSIVE HEALTHCARE QUALITY ASSESSMENT IN PUBLIC–PRIVATE PARTNERSHIPS. *Calitatea Vietii*, *36*(2). https://doi.org/10.46841/RCV.2025.02.01

Alimiri Dehbaghi, H., Khoshgard, K., Sharini, H., Jafari, S., & Naaleini, F. (2024). Radiomics-based machine learning for automated detection of Pneumothorax in CT scans. *PLOS ONE*, *19*(12). https://doi.org/10.1371/journal.pone.0314988

Alòs, F., Aldón Mínguez, D., Goussens, A., & Paredes Costa, E. J. (2025). The digital toolkit as a key resource in Primary Care. *Atencion Primaria*, *57*(11). https://doi.org/10.1016/j.aprim.2025.103275

Althumairi, A., Alabib, A. F., Alumran, A., & Alakrawi, Z. (2022). Healthcare Providers' Satisfaction with Implementation of Telemedicine in Ambulatory Care during COVID-19. *Healthcare (Switzerland)*, *10*(7). https://doi.org/10.3390/healthcare10071169

Alves, M., Seringa, J., Silvestre, T., & Magalhães, T. (2024). Use of Artificial Intelligence tools in supporting decision-making in hospital management. *BMC Health Services Research*, *24*(1). https://doi.org/10.1186/s12913-024-11602-y

Amiri Ara, M., Shokri, N., Aliyari, S., Bahadori, M., & Hosseini-Shokouh, S.-M. (2025). Strategies to reduce costs and increase revenue in hospitals: a mixed methods investigation in Iran. *BMC Health Services Research*, *25*(1). https://doi.org/10.1186/s12913-025-12295-7

Angelina, Q., Begum, K., Kim, H.-C., Tripathy, S., Singhal, D., & Singh, S. (2025). A Structural Analysis of AI Implementation Challenges in Healthcare. *Algorithms*, *18*(4). https://doi.org/10.3390/a18040189

Anita Christaline, A. C., Mariappan, M., Prem Sankar, N. P., & Thinesh, V. S. (2024). TinyML-Based Lightweight AI Healthcare Mobile Chatbot Deployment. *Journal of Multidisciplinary Healthcare*, *17*, 5091–5104. https://doi.org/10.2147/JMDH.S483247

Arnaud, E., Elbattah, M., Ammirati, C., Dequen, G., & Ghazali, D. A. (2022). Use of Artificial Intelligence to Manage Patient Flow in Emergency Department during the COVID-19 Pandemic: A Prospective, Single-Center Study. *International Journal of Environmental Research and Public Health*, *19*(15). https://doi.org/10.3390/ijerph19159667

Asadi, F., Sabahi, A., Ramezanghorbani, N., & Emami, H. (2023). Challenges of implementing diagnostic-related groups and healthcare promotion in Iran: A strategic applied research. *Health Science Reports*, *6*(2). https://doi.org/10.1002/hsr2.1115

Balić, A., Turulja, L., Kuloglija, E., & Pejić Bach, M. (2022). ERP Quality and the Organizational Performance: Technical Characteristics vs. Information and Service. *Information (Switzerland)*, *13*(10). https://doi.org/10.3390/info13100474

Balzer, F., Agha-Mir-Salim, L., Ziemert, N., Schmieding, M., Mosch, L., Prendke, M., Wunderlich, M. M., Memmert, B., Spies, C., & Poncette, A.-S. (2023). Staff perspectives on the influence of patient characteristics on alarm management in the intensive care unit: a cross-sectional survey study. *BMC Health Services Research*, *23*(1). https://doi.org/10.1186/s12913-023-09688-x

Basile, L. J., Carbonara, N., Panniello, U., & Pellegrino, R. (2024). The role of big data analytics in improving the quality of healthcare services in the Italian context: The mediating role of risk management. *Technovation*, *133*. https://doi.org/10.1016/j.technovation.2024.103010

Belardi, P., Corazza, I., Bonciani, M., Manenti, F., & Vainieri, M. (2023). Evaluating Healthcare Performance in Low- and Middle-Income Countries: A Pilot Study on Selected Settings in Ethiopia, Tanzania, and Uganda. *International Journal of Environmental Research and Public Health*, *20*(1). https://doi.org/10.3390/ijerph20010041

Bellini, V., Calabrò, F., Bignami, E., Haja, T. M., Fasterholdt, I., Rasmussen, B. S. B., & Cecchi, R. (2025). Applying the Model for Assessing the Value of AI (MAS-AI) Framework To Organizational AI: A Case Study of Surgical Scheduling Assessment in Italy. *Journal of Medical Systems*, *49*(1). https://doi.org/10.1007/s10916-025-02235-7

Bienefeld, N., Keller, E., & Grote, G. (2025). AI Interventions to Alleviate Healthcare Shortages and Enhance Work Conditions in Critical Care: Qualitative Analysis. *Journal of Medical Internet Research*, *27*. https://doi.org/10.2196/50852

Birru, E., Ndayizigiye, M., Wanje, G., Marole, T., Smith, P. D., Koto, M., McBain, R., Hirschhorn, L. R., Mokoena, M., Michaelis, A., Curtain, J., Dally, E., Andom, A. T., & Mukherjee, J. (2024). Healthcare workers' views on decentralized primary health care management in Lesotho: a qualitative study. *BMC Health Services Research*, *24*(1). https://doi.org/10.1186/s12913-024-11279-3

Brand, M., Böhm, F., Kaisers, U. X., Fehling, P., Hoffmann, T. K., Rotter, N., Ludwig, S., & Theodoraki, M.-N. (2025). Bicentric evaluation of employee satisfaction, patient safety and treatment quality: comparing different Health Information System (HIS) solutions. *BMC Health Services Research*, *25*(1). https://doi.org/10.1186/s12913-025-13559-y

Chalmeta, R., Navarro-Ruiz, A., & Soriano-Irigaray, L. (2023). A computer architecture based on disruptive information technologies for drug management in hospitals. *PeerJ Computer Science*, *9*, 1–28. https://doi.org/10.7717/peerj-cs.1455

Chimbo, B., & Motsi, L. (2024). The Effects of Electronic Health Records on Medical Error Reduction: Extension of the DeLone and McLean Information System Success Model. *JMIR Medical Informatics*, *12*. https://doi.org/10.2196/54572

Ching-Lin, M., & A/p Sukirthanandan, P. (2025). Impact of telemedicine service quality on patient satisfaction: an empirical study using Servqual model and expectation confirmation theory. *Journal of Public Health and Development*, *23*(3), 97–112. https://doi.org/10.55131/jphd/2025/230308

Cho, J., Yoo, S., Lee, E. E., & Lee, H.-Y. (2024). Impact of a Nationwide Medication History Sharing Program on the Care Process and End-User Experience in a Tertiary Teaching Hospital: Cohort Study and Cross-Sectional Study. *JMIR Medical Informatics*, *12*. https://doi.org/10.2196/53079

Chu, M.-N. (2023). Assessing the Benefits of ChatGPT for Business: An Empirical Study on Organizational Performance. *IEEE Access*, *11*, 76427–76436. https://doi.org/10.1109/ACCESS.2023.3297447

Colais, P., Pinnarelli, L., Mataloni, F., Giordani, B., Duranti, G., D'Errigo, P., Rosato, S., Seccareccia, F., Baglìo, G., & Davoli, M. (2022). The National Outcomes Evaluation Programme in Italy: The Impact of Publication of Health Indicators. *International Journal of Environmental Research and Public Health*, *19*(18). https://doi.org/10.3390/ijerph191811685

Dadi, T. L., Abebo, T. A., Yeshitla, A., Abera Ergu, Y., Tadesse, D., Tsegaye, S., Gerbaba, M. J., Worke, M. D., Tadesse, D., & Medhin, G. (2023). Impact of quality improvement interventions on facility readiness, quality and uptake of maternal and child health services in developing regions of Ethiopia: A secondary analysis of programme data. *BMJ Open Quality*, *12*(4). https://doi.org/10.1136/bmjoq-2022-002140

Dal Moro, R., Helal, L., Almeida, L., Osório, J., Schmidt, M. I., Mengue, S., & Duncan, B. B. (2024). The Development of the Municipal Registry of People with Diabetes in Porto Alegre, Brazil. *Journal of Clinical Medicine*, *13*(10). https://doi.org/10.3390/jcm13102783

Demir, İ. K., & Guzel, D. (2024). Attitudes of 3PL Providers of the Companies towards the Activities of Organizational Performance. *Tehnicki Glasnik*, *18*(2), 163–171. https://doi.org/10.31803/tg-20230404232057

Dinh, N., Agarwal, S., Avery, L., Ponnappan, P., Chelangat, J., Amendola, P., Labrique, A., & Bartlett, L. (2022). Implementation Outcomes Assessment of a Digital Clinical Support Tool for Intrapartum Care in Rural Kenya: Observational Analysis. *JMIR Formative Research*, *6*(6). https://doi.org/10.2196/34741

Elbatanouny, H., Tawfik, H., Khater, T., & Gorbenko, A. (2025). An interpretable machine learning model to predict hospitalizations. *Clinical EHealth*, *8*, 53–65. https://doi.org/10.1016/j.ceh.2025.03.004

Eleyyan, S. Y., ELssyed Etewa, B. B., Al'Haj Ahmad, F., & El Bilbeisi, A. H. (2025). Healthcare providers' insights on pediatric care quality in Gaza hospitals: integrating evidence-based practices and illness management, health information systems, and referral efficiency. *Frontiers in Pediatrics*, *13*. https://doi.org/10.3389/fped.2025.1587984

Fan, X., Chen, L., Tang, W., Sun, L., Wang, J., Liu, S., Wang, S., Li, K., Wang, M., Cheng, Y., & Dai, L. (2025). Prediction of outpatient visits for allergic rhinitis using an artificial intelligence LSTM model - a study in Eastern China. *BMC Public Health*, *25*(1). https://doi.org/10.1186/s12889-025-22430-y

Franceschi, F., Vaittinada Ayar, P. V, Hassan, T., & Gries, A. (2025). Artificial intelligence to improve patient care in emergency medicine: a workflow-based analysis. *Internal and Emergency Medicine*. https://doi.org/10.1007/s11739-025-04155-3

Free, R. C., Lozano-Rojas, D., Richardson, M., Skeemer, J., Small, L., Haldar, P., & Woltmann, G. (2023). A data-driven framework for clinical decision support applied to pneumonia management. *Frontiers in Digital Health*, *5*. https://doi.org/10.3389/fdgth.2023.1237146

Gäbler, G., Lycett, D., & Gall, W. (2022). Integrating a New Dietetic Care Process in a Health Information System: A System and Process Analysis and Assessment. *International Journal of Environmental Research and Public Health*, *19*(5). https://doi.org/10.3390/ijerph19052491

Galety, M. G., Tan, K. T., Kshirsagar, P. R., & Polamuri, S. R. (2025). Medical data security and effective organization using integrated Blockchain principles in AI-based healthcare 6.0 infrastructures. *Discover Computing*, *28*(1). https://doi.org/10.1007/s10791-025-09588-0

García, R. E. G. (2025). Thematic evolution of research on hospital management: A longitudinal study based on Scopus. *Iberoamerican Journal of Science Measurement and Communication*, *5*(4). https://doi.org/10.47909/ijsmc.183

Gyebo, A. V. S., Ahamat, A., & Yahaya, S. N. (2022). A review on information communication technology adoption in the Nigerian healthcare sector. *International Journal of Electronic Healthcare*, *12*(3), 279–298. https://doi.org/10.1504/IJEH.2022.124488

Hadid, M., Elomri, A., Padmanabhan, R., Kerbache, L., Jouini, O., EL Omri, A., Nounou, A., & Hamad, A. (2022). Clustering and Stochastic Simulation Optimization for Outpatient Chemotherapy Appointment Planning and Scheduling. *International Journal of Environmental Research and Public Health*, *19*(23). https://doi.org/10.3390/ijerph192315539

Hibi, A., Cusimano, M. D., Bilbily, A., Krishnan, R. G., & Tyrrell, P. N. (2024). Impact of Automated Prognostication on Traumatic Brain Injury Care: A Focus Group Study. *Canadian Journal of Neurological Sciences*, *51*(6), 819–827. https://doi.org/10.1017/cjn.2024.24

Holl, F., Clarke, L., Raffort, T., Serres, E., Archer, L., & Saaristo, P. (2024). The Red Cross Red Crescent Health Information System (RCHIS): an electronic medical records and health information management system for the red cross red crescent emergency response units. *Conflict and Health*, *18*(1). https://doi.org/10.1186/s13031-024-00585-6

Huang, X., Wang, Y., Yang, X., Jiang, R., Liu, Y., & Wang, H. (2024). Patient-Centric Mobile Medical Services Accessed Through Smartphones in the Top 100 Chinese Public Hospitals: Cross-Sectional Survey Study. *JMIR Formative Research*, *8*. https://doi.org/10.2196/45763

Hügle, T., & Grek, V. (2023). Digital transformation of an academic hospital department: A case study on strategic planning using the balanced scorecard. *PLOS Digital Health*, *2*(11). https://doi.org/10.1371/journal.pdig.0000385

Hur, R., & Rushakoff, R. (2025). Machine Learning for Causal Inference in Hospital Diabetes Care: TMLE Analysis of Selection Bias in Diabetic Foot Infection Treatment—A Cautionary Tale. *Diabetology*, *6*(11). https://doi.org/10.3390/diabetology6110122

Innotata, T., Bachtiar, A., Oktamianti, P., & Joung, O. W. (2023). Do Quality Of Service, Work Culture, And Digital Transformation Affect Competitive Advantage? Empirical Study At Santo Antonio Hospital. *Media Publikasi Promosi Kesehatan Indonesia*, *6*(7), 1393–1400. https://doi.org/10.56338/mppki.v6i8.3551

Ismatullah, N. K. (2023). User Satisfaction of SIMRS at X Hospital Mataram Using the EUCS Method. *Media Publikasi Promosi Kesehatan Indonesia*, *6*(8), 1687–1694. https://doi.org/10.56338/mppki.v6i8.4012

Jaber, M. J., Al-Bashaireh, A. M., Kouri, O., Aldiqs, M. A., Alqudah, O. M., Khraisat, O. M., Bindahmsh, A. A., Alshodukhi, A. M., Almutairi, A. O., & Hakeem, N. A. (2025). Development and Validation of a Workflow Instrument to Evaluate the Success of Electronic Health Records Implementation from a Nursing Perspective: An Exploratory and Descriptive Study. *Global Journal on Quality and Safety in Healthcare*, *8*(1), 15–22. https://doi.org/10.36401/JQSH-24-16

Johnson, O. A., McCrorie, C., McInerney, C., Mebrahtu, T. F., Granger, J., Sheikh, N., Lawton, T., Habli, I., Randell, R., & Benn, J. (2024). Implementing an artificial intelligence command centre in the NHS: a mixed-methods study. *Health and Social Care Delivery Research*, *12*(41), 1–108. https://doi.org/10.3310/TATM3277

Jones, K., Lennon, E., McCathie, K., Millar, A., Isles, C., McFadyen, A., & Shearer, H. (2022). Teledermatology to reduce face-to-face appointments in general practice during the COVID-19 pandemic: A quality improvement project. *BMJ Open Quality*, *11*(2). https://doi.org/10.1136/bmjoq-2021-001789

Kaczmarek, S., & Wibbeling, S. (2025). Artificial intelligence in hospital logistics and operational processes. *Bundesgesundheitsblatt - Gesundheitsforschung - Gesundheitsschutz*, *68*(8), 898–906. https://doi.org/10.1007/s00103-025-04094-6

Karumbi, J., Gathara, D., Young, B., & Williamson, P. (2023). To adopt or adapt an existing neonatal core outcome set in Kenya: a study protocol. *Trials*, *24*(1). https://doi.org/10.1186/s13063-023-07821-z

Katirai, A., Yamamoto, B. A., Kogetsu, A., & Kato, K. (2023). Perspectives on artificial intelligence in healthcare from a Patient and Public Involvement Panel in Japan: an exploratory study. *Frontiers in Digital Health*, *5*. https://doi.org/10.3389/fdgth.2023.1229308

Kaur, T., & Garg, R. (2023). Digital healthcare: A topical and futuristic review of technological and robotic revolution. *Paladyn*, *14*(1). https://doi.org/10.1515/pjbr-2022-0108

Kayumba, K., Ntihabose, C., Musange Furere, S., Ngabo, B., Irakiza, P., Rubuga, F. K., Umutoni, N., Kalisa, I. R., Birindabagabo, P., Rwamasirabo, E., Kayibanda, E., Mukundirukuri, P., Absolomon, G., Dhanani, S., & Condo, J. (2025). Dual Clinical Practice (DCP) policy to improve the retention of human resources for health in Rwanda: a mid-term review using a cross-sectional and retrospective study design. *BMC Health Services Research*, *25*(1). https://doi.org/10.1186/s12913-025-12313-8

Kc, A., Kong, S. Y. J., Basnet, O., Haaland, S. H., Bhattarai, P., Gomo, O., Gurung, R., Ahlsson, F., Meinich-Bache, Ø., Axelin, A., Malla, H., Basula, Y. N., Pathak, O. K., Pokharel, S. M., Subedi, H., & Myklebust, H. (2022). Usability, acceptability and feasibility of a novel technology with visual guidance with video and audio recording during newborn resuscitation: a pilot study. *BMJ Health and Care Informatics*, *29*(1). https://doi.org/10.1136/bmjhci-2022-100667

Koebe, P., & Bohnet-Joschko, S. (2023). The Impact of Digital Transformation on Inpatient Care: Mixed Methods Study. *JMIR Public Health and Surveillance*, *9*. https://doi.org/10.2196/40622

Krämer, S., Flöge, A., Handt, S., Juzek-Küpper, F., Vogt, K., Ullmann, J., & Rauen, T. (2025). Prioritized appointment allocation in new patients, what is really decisive?: Comparative analysis of manual appointment allocation with automated and AI-assisted approaches. *Zeitschrift fur Rheumatologie*, *84*(3), 169–178. https://doi.org/10.1007/s00393-024-01550-7

Kuck, A., Kinscher, K., Fehring, L., Hildebrandt, H., Doerner, J., Lange, J., Truebel, H., Boehme, P., Bade, C., & Mondritzki, T. (2022). Healthcare Providers' Knowledge of Value-Based Care in Germany: An Adapted, Mixed-Methods Approach. *International Journal of Environmental Research and Public Health*, *19*(14). https://doi.org/10.3390/ijerph19148466

Kumar, A., Masud, M., Alsharif, M. H., Gaur, N., & Nanthaamornphong, A. (2025). Integrating 6G technology in smart hospitals: challenges and opportunities for enhanced healthcare services. *Frontiers in Medicine*, *12*. https://doi.org/10.3389/fmed.2025.1534551

Kwon, D. H., Trihy, L., Darvish, N., Hearst, E., Sumra, S., Borno, H. T., Bose, R., Chou, J., de Kouchkovsky, I., Desai, A., Ekstrand, B., Friedlander, T., Kaur, G., Koshkin, V. S., Nesheiwat, S., Sepucha, K., Small, E. J., Aggarwal, R. R., & Belkora, J. (2024). Patients Can Administer Mobile Audio Recordings to Increase Knowledge in Advanced Prostate Cancer. *Cancer Medicine*, *13*(22). https://doi.org/10.1002/cam4.70433

Lam, K., Simister, C., Yiu, A., & Kinross, J. M. (2024). Barriers to the adoption of routine surgical video recording: a mixed-methods qualitative study of a real-world implementation of a video recording platform. *Surgical Endoscopy*, *38*(10), 5793–5802. https://doi.org/10.1007/s00464-024-11174-2

Laverty, L., Gasteiger, N., Wilson, A., Jenkins, D., & Dowding, D. (2025). Mixed-methods evaluation of how a predictive model pilot intervention addresses patient non-attendance at outpatient services in an NHS Foundation Trust in England. *BMJ Open*, *15*(12), e102154. https://doi.org/10.1136/bmjopen-2025-102154

Li, M., Li, X.-H., Min, K.-Y., & Juntao, J.-T. (2025). Artificial Intelligence Applications in Fangcang Shelter Hospitals: Opportunities and Challenges. *Chinese Medical Sciences Journal*, *40*(3), 197–202. https://doi.org/10.24920/004510

Lin, Y., Hoyt, A. C., Manuel, V. G., Inkelas, M., Ayvaci, M. U. S., Ahsen, M. E., & Hsu, W. (2025). Risk-Stratified Screening: A Simulation Study of Scheduling Templates on Daily Mammography Recalls. *Journal of the American College of Radiology*, *22*(3), 297–306. https://doi.org/10.1016/j.jacr.2024.12.010

Lin, Y., Lin, H., Tang, N., Hu, M., Dai, Q., & Shi, X. (2025). Digital innovation in ophthalmic admissions: Impact on hospital quality in China. *Digital Health*, *11*. https://doi.org/10.1177/20552076251341149

Lotfi, M., Abolpour, N., Ghasemi, M., Heydari, H., & Pourghayumi, R. (2025). Potential of Artificial Intelligence for Bone Age Assessment in Iranian Children and Adolescents: An Exploratory Study. *Archives of Iranian Medicine*, *28*(4), 198–206. https://doi.org/10.34172/aim.32070

Lovemore, C., Chavunduka, D., Chinofunga, S., Marere, R. P., Chifamba, O., & Kaviya, M. (2023). Promoting perceived service quality and organisational performance through customer retention strategies: the moderating role of ICT. *European Journal of Management Studies*, *28*(3), 193–211. https://doi.org/10.1108/EJMS-01-2023-0003

Maduekwe, N. C. (2024). PROTECTING THE PATIENT'S DATA IN THE 21ST CENTURY HEALTHCARE INDUSTRY: IS THE AFRICAN CONTINENT READY FOR THE DIGITAL SPACE? *Journal of Sustainable Development Law and Policy*, *15*(1), 206–237. https://doi.org/10.4314/jsdlp.v15i1.7

Manu, A., Billah, S. M., Williams, J., Kilima, S., Yeji, F., Matin, Z., Hussein, A., Gohar, F., Wobil, P., Baffoe, P., Karim, F., Muganyizi, P., Mogela, D., El-Arifeen, S., Vandenent, M., Aung, K., Shetye, M., Dickson, K. E., Zaka, N., … Hailegebriel, T. D. (2022). Institutionalising maternal and newborn quality-of-care standards in Bangladesh, Ghana and Tanzania: a quasi-experimental study. *BMJ Global Health*, *7*(9). https://doi.org/10.1136/bmjgh-2022-009471

Marceau, M., Dulgarian, S., Cambre, J., Garabedian, P. M., Amato, M. G., Seger, D. L., Volk, L. A., Jackson, G. P., Bates, D. W., Rozenblum, R., & Syrowatka, A. (2025). Clinician Attitudes and Perceptions of Point-of-Care Information Resources and Their Integration Into Electronic Health Records: Qualitative Interview Study. *JMIR Medical Informatics*, *13*. https://doi.org/10.2196/60191

Mash, R. (2022). The contribution of family physicians to African health systems. *African Journal of Primary Health Care and Family Medicine*, *14*(1). https://doi.org/10.4102/PHCFM.V14I1.3651

Meshcheryakova, N., Udin, V., Demchenko, Y., & Galitskaya, V. (2023). POPUL ATION INCLUSION IN THE DIGITALIZ ATION OF HEALTHCARE. *Zhurnal Issledovanii Sotsial'noi Politiki*, *21*(4), 661–676. https://doi.org/10.17323/727-0634-2023-21-4-661-676

Mi, D., Li, Y., Zhang, K., Huang, C., Shan, W., & Zhang, J. (2023). Exploring intelligent hospital management mode based on artificial intelligence. *Frontiers in Public Health*, *11*. https://doi.org/10.3389/fpubh.2023.1182329

Migamba, S. M., Kisaakye, E., Komakech, A., Nakanwagi, M., Nakamya, P., Mutumba, R., Migadde, D., Kwesiga, B., Bulage, L., Kadobera, D., & Ario, A. R. (2023). Trends and spatial distribution of neonatal sepsis, Uganda, 2016–2020. *BMC Pregnancy and Childbirth*, *23*(1). https://doi.org/10.1186/s12884-023-06037-y

Miriam Janet, C. L., Jaime, C. C., & Laura Nelly, C. C. (2024). Artificial intelligence in medical management: advances and challenges. *Revista Venezolana de Gerencia*, *29*(108), 1817–1835. https://doi.org/10.52080/rvgluz.29.108.21

Molenaar, J., Kikula, A., Kionga, Y., Berenge, H. T., Benová, L., van Olmen, J., Hanson, C., Abeid, M., & Pembe,

A. B. (2024). Data for whom? Experiences and perceptions of a perinatal eRegistry in two hospitals in Mtwara region, Tanzania. *BMJ Global Health*, *9*(11). https://doi.org/10.1136/bmjgh-2024-016765

Mussi, C. C., Luz, R., Damázio, D. D. R., Santos, E. M. D., Sun, V., Porto, B. S. D. S., Parma, G. O. C., Cordioli, L. A., Birch, R. S., & Guerra, J. B. S. O. (2023). The Large-Scale Implementation of a Health Information System in Brazilian University Hospitals: Process and Outcomes. *International Journal of Environmental Research and Public Health*, *20*(21). https://doi.org/10.3390/ijerph20216971

Muzigaba, M., Chitashvili, T., Choudhury, A., Were, W. M., Diaz, T., Strong, K. L., Jackson, D., Requejo, J., Detjen, A., & Sacks, E. (2022). Global core indicators for measuring WHO's paediatric quality-of-care standards in health facilities: development and expert consensus. *BMC Health Services Research*, *22*(1). https://doi.org/10.1186/s12913-022-08234-5

Nabot, A., & Al-Qerem, A. (2025). Impact of software quality on organizational performance. *Array*, *27*. https://doi.org/10.1016/j.array.2025.100476

Navarro Martínez, O., & Leyva, J. M. (2024). Digital Transformation Led by Nurses and Nursing Managers' Priorities: A Qualitative Study. *Journal of Nursing Management*, *2024*. https://doi.org/10.1155/2024/8873127

Ningsih, A. K., & Kurniawan, Y. (2023). Evaluating Successful Implementation of Fleet Management System. *Journal of System and Management Sciences*, *13*(6), 322–335. https://doi.org/10.33168/JSMS.2023.0619

Okwaraji, Y. B., Bradley, E., Ohuma, E. O., Yargawa, J., Suárez-Idueta, L., Requejo, J., Blencowe, H., & Lawn, J. E. (2024). National routine data for low birthweight and preterm births: Systematic data quality assessment for United Nations member states (2000–2020). *BJOG: An International Journal of Obstetrics and Gynaecology*, *131*(7), 917–928. https://doi.org/10.1111/1471-0528.17699

Oladoyin, V., Adedini, S., Ijadunola, K., Ogunwemimo, H., Folorunso, O., Chukwu, E., Okoli, U., Adoghe, A., Oyeniyi, S., Adetiloye, O., & Fatusi, A. (2025). The assessment of routine health information system performance towards improvement of quality of reproductive, maternal, newborn, child and adolescent health services in Ondo and Ekiti States, Nigeria. *PLOS ONE*, *20*(1 January). https://doi.org/10.1371/journal.pone.0318010

Özdağoğlu, G., Damar, M., Safa Erenay, F. S., Turhan Damar, H., Himmetoğlu, O., & Pinto, A. D. (2025). Monitoring patient pathways at a secondary healthcare services through process mining via Fuzzy Miner. *BMC Medical Informatics and Decision Making*, *25*(1). https://doi.org/10.1186/s12911-025-03016-5

Păcuraru, I.-M., Năstac, A., Zamfir, A., Busnatu, Ș S., Andronic, O., & Artamonov, A.-R. (2025). Digital Transformation of Medical Services in Romania: Does the Healthcare System Meet the Current Needs of Patients? *Healthcare (Switzerland)*, *13*(20). https://doi.org/10.3390/healthcare13202549

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., … Alonso-Fernández, S. (2021). Declaración PRISMA 2020: una guía actualizada para la publicación de revisiones sistemáticas. *Revista Española de Cardiología*, *74*(9), 790–799. https://doi.org/10.1016/j.recesp.2021.06.016

Parrales-Bravo, F., Caicedo-Quiroz, R., Tolozano-Benites, E., Vasquez-Cevallos, L., & Cevallos-Torres, L. (2025). STOP: Studying Time-Series of Preeclamptic Emergencies. *IEEE Access*, *13*, 65672–65689. https://doi.org/10.1109/ACCESS.2025.3558888

Parrales-Bravo, F., Gómez-Rodríguez, V., Barzola-Monteses, J., Caicedo-Quiroz, R., Tolozano-Benites, E., & Vasquez-Cevallos, L. (2024). From Descriptive to Prescriptive Analytics on Time Series of the Number of Preeclampsia Inpatient Beds. *IEEE Access*, *12*, 131576–131590.

https://doi.org/10.1109/ACCESS.2024.3458073

Pasquadibisceglie, V., Appice, A., Malerba, D., & Fiameni, G. (2025). Leveraging a large language model (LLM) to predict hospital admissions of emergency department patients. *Expert Systems with Applications*, *287*. https://doi.org/10.1016/j.eswa.2025.128224

Petzold, T., & Steidle, O. (2023). Digital transformation of German healthcare organizations: Current status and existing challenges from the perspective of quality management. *Bundesgesundheitsblatt - Gesundheitsforschung - Gesundheitsschutz*, *66*(9), 972–981. https://doi.org/10.1007/s00103-023-03743-y

Pilares, I. C. A., Azam, S., Akbulut, S., Jonkman, M., & Shanmugam, B. (2022). Addressing the Challenges of Electronic Health Records Using Blockchain and IPFS. *Sensors*, *22*(11). https://doi.org/10.3390/s22114032

Pradhan, N. A., Ali, S. A., Roujani, S., Ali, A., Hussain, S. S., Rizwan, S., Koya, S., Saleem, S., & Siddiqi, S. (2022). Quality of care assessment for small and sick newborns and young infants in Pakistan: findings from a cross-sectional study. *BMC Pediatrics*, *22*(1). https://doi.org/10.1186/s12887-022-03108-5

Pramesh, C. S., Koita, R., Sengar, M., Shah, N., Das, A. V, Nayak, P., Anandampillai, K., Pai, P., Kadam, A., Mallick, I., Bhargava, P., Penumadu, P., Nair, C. K., Borthakur, B., Aarish, M., Bagri, G., Ghosh-Laskar, S., Tibdewal, A., Balasubramani, L., … Bansal, M. (2025). National Cancer Grid initiative for electronic medical records, India. *Bulletin of the World Health Organization*, *103*(5), 337–342. https://doi.org/10.2471/BLT.24.292230

Prisma. (2025). *PRISMA*. https://www.prisma-statement.org/

Rahmaddian, T., Hanum, N. Z., Aisyiah, I. K., Adhyka, N., Rusti, S., & Faaghna, L. (2025). Assessing the Impact of Human and Technological Factors on Hospital Management Information System Utilization: A Case Study at Hospital X In Padang City Indonesia. *International Journal of Statistics in Medical Research*, *14*, 28–37. https://doi.org/10.6000/1929-6029.2025.14.03

Rahmati, M., Smith, L., Piyasena, M. P., Bowen, M., Boyer, L., Fond, G., Kazemi, A., Yon, D. K., Lee, H., Sehmbi, T., Ahluwalia, S., & Pardhan, S. (2025). Artificial Intelligence improves follow-up appointment uptake for diabetic retinal assessment: a systematic review and meta-analysis. *Eye (Basingstoke)*, *39*(12), 2398–2406. https://doi.org/10.1038/s41433-025-03849-4

Rifial, M., Razak, A., Darmawansyah, D., Indar, I., & Rahman, A. (2025). Evaluation of the Utilization of the Hospital Management Information System (SIMRS) at Madani Regional General Hospital, Palu. *Journal of Public Health and Pharmacy*, *5*(2), 274–286. https://doi.org/10.56338/jphp.v5i2.6169

Saavedra Grandez, S. G. (2021). Intervención de las TICs en redefinición de atención externa en Hospital II-2 Tarapoto en épocas de pandemia Covid 19. *Revista Científica de Sistemas e Informática*, *1*(1). https://doi.org/10.51252/rcsi.v1i1.120

Samaras, A., Bekiaridou, A., Papazoglou, A. S., Moysidis, D. V, Tsoumakas, G., Bamidis, P., Tsigkas, G., Lazaros, G., Kassimis, G., Fragakis, N., Vassilikos, V., Zarifis, I., Tziakas, D. N., Tsioufis, K., Davlouros, P., & Giannakoulas, G. (2023). Artificial intelligence-based mining of electronic health record data to accelerate the digital transformation of the national cardiovascular ecosystem: Design protocol of the CardioMining study. *BMJ Open*, *13*(4). https://doi.org/10.1136/bmjopen-2022-068698

Scala, A., Bifulco, G., Borrelli, A., Egidio, R., Triassi, M., & Improta, G. (2025). Use of artificial intelligence to study the hospitalization of women undergoing caesarean section. *BMC Public Health*, *25*(1). https://doi.org/10.1186/s12889-025-21530-z

Schneider, H., Mukinda, F., Cupido, J., Wessels, J., Kupa, P., Leboho, P., Nkoana, N., Bosch, N., & Pillay, Y.

(2023). Improving health outcomes and quality at the subdistrict level: Evaluation of the '3 feet model' in Waterberg District, Limpopo Province, South Africa. *South African Medical Journal*, *113*(11), 1459–1465. https://doi.org/10.7196/SAMJ.2023.v113i11.1558

Steyn, L., Mash, R., & Hendricks, G. (2022). Use of the Vula App to refer patients in the West Coast District: A descriptive exploratory qualitative study. *South African Family Practice*, *64*(1). https://doi.org/10.4102/safp.v64i1.5491

Sylqa, D. A. (2025). Enhancing Organizational Performance through Quality Information Systems in Internationally Engaged Enterprises. *Journal of Risk Analysis and Crisis Response*, *15*(1), 68–78. https://doi.org/10.54560/jracr.v15i1.568

Szczepura, A., Khan, A. J., Wild, D., Nelson, S., Woodhouse, S., & Collinson, M. (2024). Digital Adoption by an Organization Supporting Informal Caregivers During COVID-19 Pandemic Showing Impact on Service Use, Organizational Performance, and Carers' Well-Being: Retrospective Population-Based Database Study With Embedded User Survey. *JMIR Aging*, *7*. https://doi.org/10.2196/46414

Tiangco, B., Daguit, S. E. J., Astrologo, N. C., Flores, L., Parma, R. N., & Celi, L. A. (2024). Challenges in the maintenance of an open hospital-based cancer registry system in a low-to-middle-income country (LMIC): 2017–2022 experience. *PLOS Digital Health*, *3*(1). https://doi.org/10.1371/journal.pdig.0000328

Tuan, W.-J., Yan, Y., Abou Al Ardat, B., Felix, T., & Chen, Q. (2025). Predicting Missed Appointments in Primary Care: A Personalized Machine Learning Approach. *Annals of Family Medicine*, *23*(4), 294–301. https://doi.org/10.1370/afm.240316

Utami, E. W., Shaleh, C., & Setyowati, E. (2025). Strengthening Digital Governance in the Transformation of Inpatient Services: A Case Study of Ngudi Waluyo Wlingi Regional General Hospital in the SATUSEHAT Interoperability Era. *Journal of Cultural Analysis and Social Change*, *10*(3), 1596–1604. https://doi.org/10.64753/jcasc.v10i3.2633

Vahedi, A., Moghaddasi, H., Asadi, F., Hosseini, A. S., & Nazemi, E. (2022). Applications, features and key indicators for the development of Covid-19 dashboards: A systematic review study. *Informatics in Medicine Unlocked*, *30*. https://doi.org/10.1016/j.imu.2022.100910

Vural, O., Ozaydin, B., Aram, K. Y., Booth, J., Lindsey, B. F., & Ahmed, A. (2025). An Artificial Intelligence–Based Framework for Predicting Emergency Department Overcrowding: Development and Evaluation Study. *JMIR Medical Informatics*, *13*. https://doi.org/10.2196/73960

Wells, A. J., & Reilly, P. L. (2025). 50 Years of the Glasgow Coma Scale: A historical perspective. *Journal of Clinical Neuroscience*, *133*. https://doi.org/10.1016/j.jocn.2024.110994

Westheimer, J. L., Moukaddam, N., Lindsay, J. A., Sabharwal, A., Najafi, B., Iacobelli, P. A., Boland, R. J., & Patriquin, M. A. (2023). Technology Implementation for Mental Health End Users: A Model to Guide Digital Transformation for Inpatient Mental Health Professionals. *JMIR Mental Health*, *10*. https://doi.org/10.2196/40429

Windari, A., Kismartini, K., Luqman, Y., & Wijanarko, B. (2025). E-Government for improving healthcare service quality in hospitals around Central Java. *Journal of Public Health and Development*, *23*(2), 119–132. https://doi.org/10.55131/jphd/2025/230209

Wood, T., Chatfield, M., Gray, L., Peel, N., Freeman, S., & Martin-Khan, M. (2022). Examining the adaptability and validity of interRAI acute care quality indicators in a surgical context. *SAGE Open Medicine*, *10*. https://doi.org/10.1177/20503121221103221

Wu, M., Huang, X., Liang, C., Wang, P., Zhang, Y., & Zhang, Y. (2025). Pharmacist-led remote follow-up service for non-metastatic breast cancer patients: a prospective randomised controlled trial of

pharmaceutical intervention. *Frontiers in Pharmacology*, *16*. https://doi.org/10.3389/fphar.2025.1640727

Ydenius, V., Djerf, S., Fredrikson, M., Larsen, R., Sjöberg, F., & Frigyesi, A. (2025). Higher hospital level does not improve 30-day survival after road traffic accidents. *Scientific Reports*, *15*(1). https://doi.org/10.1038/s41598-025-26519-7

Yu, C., Che, Y., Sun, G., Zhao, X., & Liu, B. (2022). Research on Diagnosis Architecture of Cardiovascular Diseases Based on Multimedical Images. *Computational and Mathematical Methods in Medicine*, *2022*. https://doi.org/10.1155/2022/9123332

Yu, X., Zhang, C., & Wang, C. (2022). Construction of Hospital Human Resource Information Management System under the Background of Artificial Intelligence. *Computational and Mathematical Methods in Medicine*, *2022*. https://doi.org/10.1155/2022/8377674

Zhang, W., Chen, X., Zhang, Y., & Hua, H. (2023). Intelligent Construction of Hospital Management Organization Based on Communication Technology and Information Fusion. *Wireless Communications and Mobile Computing*, *2023*. https://doi.org/10.1155/2023/4758451

Zhang, Z., Zheng, X., An, K., He, Y., Wang, T., Zhou, R., Zheng, Q., Nuo, M., Liang, J., & Lei, J. (2022). Current Status of the Health Information Technology Industry in China from the China Hospital Information Network Conference: Cross-sectional Study of Participating Companies. *JMIR Medical Informatics*, *10*(1). https://doi.org/10.2196/33600

Zhou, G.-S., Shi, S.-H., Qian, Q.-R., & Zheng, Q.-Y. (2025). Improving patients' satisfaction through service digitalization: a cross-sectional study based on the theory of psychological empowerment. *BMC Health Services Research*, *25*(1). https://doi.org/10.1186/s12913-025-13641-5