

## Developing an Accreditation Intelligence Dashboard as a Decision Support System for Continuous KARS Compliance in Hospitals

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### ABSTRACT

#### Background:

Hospital accreditation is a key mechanism for ensuring quality and patient safety, yet in many hospitals accreditation compliance remains episodic and weakly embedded in routine governance. In Indonesia, compliance with the Hospital Accreditation Commission (KARS) standards is often managed retrospectively, limiting the role of accreditation as a continuous quality improvement instrument. Digital decision-support approaches are therefore needed to strengthen continuous accreditation governance.

#### Methods:

This study employed a mixed-methods design with a design science research approach in a private general hospital in Indonesia. Data were collected through document analysis of KARS standards and hospital performance reports, semi-structured interviews with hospital managers and accreditation team members, and non-participant observation of accreditation-related workflows. Qualitative data were analyzed thematically, while accreditation indicators were systematically mapped to existing hospital information systems to inform the development of an Accreditation Intelligence Dashboard.

#### Results:

The findings indicate that although accreditation-related data are widely available, they are fragmented across multiple systems and primarily used for survey preparation rather than continuous monitoring. The proposed Accreditation Intelligence Dashboard integrates key KARS indicators with operational hospital data using a business intelligence framework. This integration enables real-time visualization, trend analysis, and managerial decision support, enhancing situational awareness and internal accountability. The effectiveness of the dashboard is influenced by leadership engagement and organizational readiness for data-driven management.

#### Conclusion:

The study demonstrates that an Accreditation Intelligence Dashboard can support continuous KARS compliance by transforming fragmented accreditation data into actionable managerial intelligence. This approach strengthens hospital quality governance and has potential to support the quality objectives of Universal Health Coverage.

**Keywords :** *Hospital accreditation; Decision support system; Health information systems; Quality governance; KARS; Universal Health Coverage*

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## INTRODUCTION

The increasing complexity of health systems worldwide has intensified demands for accountability, quality assurance, and patient safety within hospital organizations. Hospitals are no longer evaluated solely on their clinical outcomes, but also on their ability to demonstrate standardized processes, effective governance, and continuous quality improvement. In this context, hospital accreditation has emerged as a central policy instrument to regulate service quality, ensure patient safety, and strengthen organizational performance. Accreditation systems are widely

recognized as mechanisms that translate abstract quality principles into measurable standards, thereby aligning health service delivery with national and international expectations for safety and effectiveness (Mahendradhata et al., 2017). In Indonesia, the Hospital Accreditation Commission (Komite Akreditasi Rumah Sakit/KARS) plays a pivotal role in operationalizing these principles through the National Hospital Accreditation Standards (SNARS), which emphasize continuous compliance rather than episodic assessment.

Ideally, hospital accreditation should function as a dynamic and continuous quality assurance system embedded within daily managerial and clinical practices. Under such ideal conditions, accreditation standards are internalized by hospital staff, routinely monitored through integrated information systems, and used as a basis for strategic and operational decision-making. Accreditation data should be readily available, accurate, and actionable, enabling hospital leaders to identify risks, monitor performance trends, and initiate timely corrective actions. In this ideal model, accreditation is not perceived as an administrative burden associated with survey preparation, but rather as an ongoing organizational learning process that strengthens governance, accountability, and patient-centered care (Layman et al., 2023). However, empirical evidence suggests that this ideal condition has not yet been fully realized in many health systems. Globally, accreditation processes often remain compliance-oriented and survey-driven, with limited integration into routine management and information systems. Studies from both developed and developing countries indicate that hospitals frequently struggle to translate accreditation standards into sustained improvements due to fragmented data systems, limited analytical capacity, and insufficient use of performance information for decision-making (Binsar et al., 2025). At the regional level, particularly in Southeast Asia, disparities in digital infrastructure and human resource capacity further constrain the effective use of accreditation data as a management tool (Sanjaya et al., 2023).

In Indonesia, these challenges are particularly pronounced. Despite significant progress in expanding accreditation coverage, many hospitals continue to manage accreditation-related data through manual reporting, isolated spreadsheets, and retrospective documentation. Research indicates that even hospitals with paripurna accreditation status may lack mature health information systems capable of supporting continuous compliance monitoring (Aisyah et al., 2024). As a result, accreditation activities are often concentrated around survey periods, reinforcing a cyclical pattern of intensive preparation followed by declining attention to standards once accreditation is achieved. This condition undermines the fundamental objective of accreditation as a continuous quality improvement mechanism and limits its potential impact on patient safety and organizational performance. The consequences of this gap between ideal and actual practice are substantial and long-term. Inadequate monitoring of accreditation compliance increases the risk of undetected deviations from safety standards, incomplete clinical documentation, and ineffective risk management. Over time, these deficiencies can lead to adverse patient outcomes, inefficiencies in service delivery, and erosion of public trust in hospital institutions. At the system level, weak integration between accreditation and hospital information systems may compromise the effectiveness of broader health reforms aimed at strengthening referral systems and achieving universal health coverage (Mahendradhata et al., 2017).

Failure to address these issues risks reducing accreditation to a symbolic exercise rather than a substantive driver of health system improvement. This study is grounded in several key conceptual constructs: continuous accreditation compliance, health information systems, business intelligence, and managerial decision support. Continuous accreditation compliance refers to the sustained ability of a hospital to meet and maintain KARS standards across time and organizational units. Health information systems encompass the technological and organizational infrastructures used to collect, process, and manage clinical and administrative data. Business intelligence, in this context, denotes the application of data analytics, integration, and visualization tools to transform raw data into meaningful information. Decision support systems represent the mechanisms through which such information is utilized by managers to guide planning, monitoring, and corrective actions. The interaction among these constructs forms the basis for the central research question: how can an Accreditation Intelligence Dashboard be developed to support continuous KARS compliance through evidence-based managerial decision-making?

Existing literature provides important insights into the relationships among accreditation, information systems, and hospital performance. Several studies have demonstrated positive associations between accreditation status and patient satisfaction, clinical outcomes, and organizational credibility (Aini & Sari, 2025). Research on electronic medical records highlights their role in improving documentation quality, operational efficiency, and compliance with accreditation standards (Rahman, 2024). Other studies emphasize the importance of digital maturity, leadership readiness, and data governance in enabling effective digital transformation within hospitals (Sulaiman & Bachtiar, 2024; Binsar et al., 2025). Collectively, these findings underscore the centrality of information systems in operationalizing accreditation standards and supporting quality improvement.

Nevertheless, a critical review of the literature reveals several important limitations. First, most studies focus on outcomes associated with accreditation or digital transformation rather than on the mechanisms through which accreditation data are operationalized for managerial use. Second, existing research often treats accreditation data as static inputs for evaluation rather than as dynamic resources for real-time monitoring and decision-making. Third, there is limited empirical work on the design and application of integrated dashboards specifically tailored to accreditation compliance, particularly within the context of developing countries. These gaps indicate a need for research that bridges conceptual discussions of accreditation and digital health with practical tools that support continuous compliance and governance.

The present study seeks to address this gap by developing an Accreditation Intelligence Dashboard as a decision support system for continuous KARS compliance. The novelty of this research lies in its explicit integration of accreditation indicators with hospital operational data within a business intelligence framework. Rather than serving as a retrospective reporting tool, the proposed dashboard is conceptualized as a proactive management instrument that enables hospital leaders to visualize performance trends, identify areas of non-compliance, and prioritize quality improvement interventions. By embedding accreditation monitoring within routine management processes, this approach has the potential to transform accreditation from an episodic requirement into a continuous governance function. The primary objective of this study is to develop and analyze an Accreditation Intelligence Dashboard that supports continuous compliance with KARS standards. Specifically, the study aims to identify key accreditation indicators suitable for dashboard integration, design a conceptual framework for data aggregation and visualization, and assess the potential utility of the dashboard as a managerial decision support system. The significance of this research extends beyond technical system development. From a theoretical perspective, it contributes to the field of public health administration by advancing understanding of how accreditation, information systems, and governance interact to influence organizational performance. From a practical perspective, it offers hospital managers and policymakers a scalable model for strengthening accreditation-based quality assurance.

The theoretical foundation of this study draws on the Continuous Quality Improvement paradigm and the Health Information Systems Success Model. Continuous Quality Improvement emphasizes the use of systematic data collection and feedback loops to drive ongoing improvements in organizational performance. The Health Information Systems Success Model provides a framework for understanding how system quality, information quality, and service quality influence system use and organizational impact (Aisyah et al., 2024). Together, these frameworks support a comprehensive understanding of how an Accreditation Intelligence Dashboard can function as both a technological and managerial intervention to enhance accreditation compliance and quality governance.

This article is organized as follows. The subsequent section outlines the research methodology and the conceptual process underlying the development of the Accreditation Intelligence Dashboard. The results section presents the proposed dashboard framework and its alignment with KARS standards. The discussion section interprets the findings in relation to existing literature and theoretical perspectives in public health administration. The final section concludes with implications for policy, management practice, and future research. Through this structure, the study

aims to provide a coherent and substantive contribution to the advancement of accreditation-based quality management in hospital systems.

## METHOD

This study employed a mixed-methods research design with a dominant qualitative-developmental approach, aimed at developing and analyzing an Accreditation Intelligence Dashboard as a decision support system for continuous compliance with KARS standards. The methodological approach was grounded in applied health systems research, integrating concepts from public health administration, health information systems, and quality management. A design science research perspective was adopted to guide the systematic development of the dashboard, while empirical data were used to ensure contextual relevance and practical applicability. This approach allowed the study to not only conceptualize the dashboard framework but also to assess its potential utility for managerial decision-making in hospital accreditation processes.

The study was conducted at a private general hospital in Medan, North Sumatra, Indonesia, which has previously undergone KARS accreditation and utilizes an electronic hospital information system. The selection of the research site was based on its representativeness of medium-to-large private hospitals operating under the National Hospital Accreditation Standards (SNARS). The hospital setting provided access to accreditation-related documentation, operational performance data, and key stakeholders involved in quality assurance and hospital governance. This contextual focus enabled an in-depth understanding of how accreditation data are currently managed and how they could be transformed into an integrated decision support tool.

Data for this study were derived from both primary and secondary sources.

Primary data included qualitative inputs from hospital managers, quality improvement officers, accreditation team members, and information technology personnel who are directly involved in accreditation preparation and monitoring. Secondary data consisted of accreditation documents, SNARS indicators, hospital policies, standard operating procedures, electronic medical record summaries, quality and patient safety reports, and routine performance indicators relevant to KARS compliance. These data sources provided a comprehensive basis for identifying key accreditation indicators and mapping their alignment with existing information systems. Data collection was carried out through document review, semi-structured interviews, and non-participant observation. Document review focused on extracting accreditation-related indicators, compliance evidence, and reporting mechanisms used by the hospital. Semi-structured interviews were conducted with selected informants to explore perceptions, experiences, and challenges related to continuous accreditation compliance and the use of information for managerial decision-making. Observations were conducted to understand workflow processes related to data recording, reporting, and quality monitoring. The combination of these techniques allowed for triangulation of data and enhanced the depth of analysis.

Data analysis was conducted in several stages. Qualitative data from interviews and observations were transcribed and analyzed thematically to identify recurring patterns related to accreditation management, information use, and decision-making needs. Secondary quantitative data were analyzed descriptively to map key performance indicators and their relevance to KARS standards. These findings were then synthesized to inform the design of the Accreditation Intelligence Dashboard, including indicator selection, data integration logic, and visualization structure. The analytical process emphasized alignment between accreditation requirements and managerial information needs, ensuring that the dashboard functions as a practical decision support system rather than a passive reporting tool. The validity and trustworthiness of the data were ensured through multiple strategies. Data triangulation was achieved by comparing findings across different data sources and collection methods. Member checking was conducted by sharing preliminary interpretations with key informants to confirm accuracy and relevance. An audit trail was maintained to document data collection and analysis procedures, enhancing transparency and reproducibility. These strategies collectively strengthened the credibility, dependability, and confirmability of the study findings.

Ethical considerations were carefully addressed throughout the research process. Prior to data collection, informed consent was obtained from all participants involved in interviews and observations. Participants were provided with clear information regarding the purpose of the study, the voluntary nature of their participation, and their right to withdraw at any time without consequence. Confidentiality was maintained by anonymizing individual and institutional identifiers in all research records and publications. Data were stored securely and used solely for academic purposes. These measures ensured that the study adhered to ethical principles of respect, beneficence, and integrity in health research.

## RESULTS AND DISCUSSION

The results of this study indicate that accreditation-related information within the hospital is substantial in scope but limited in its analytical integration for managerial decision-making. Document analysis revealed that most indicators required for KARS compliance are routinely collected through electronic medical records, quality assurance reports, and patient safety systems. However, these data are stored in parallel systems that operate independently across departments, resulting in fragmented visibility of accreditation performance. As a consequence, accreditation compliance is primarily assessed retrospectively during survey preparation periods, rather than monitored continuously as part of routine governance. This finding suggests that the principal challenge is not the absence of data, but the absence of an integrated analytical mechanism capable of transforming dispersed data into actionable managerial intelligence.

A detailed mapping of KARS accreditation domains to existing hospital data sources demonstrated that a large proportion of accreditation standards are inherently compatible with dashboard-based monitoring. As summarized in **Table 1**, key domains such as patient safety goals, medical record management, infection prevention and control, leadership governance, and service continuity are supported by structured data routinely generated within hospital information systems. Despite this compatibility, the absence of a unifying analytical layer prevents these data from being used proactively. This finding is consistent with earlier studies showing that hospitals in low- and middle-income settings often experience a “data–use gap,” where data are collected but underutilized for decision-making (Kihuba et al., 2014).

**Table 1. Mapping of KARS Accreditation Domains to Data Sources and Dashboard Functions**

| KARS Accreditation Domain        | Key Indicators                     | Primary Data Source         | Dashboard Function             |
|----------------------------------|------------------------------------|-----------------------------|--------------------------------|
| Patient Safety Goals             | Incident reports, near-miss events | Incident reporting system   | Trend analysis, risk detection |
| Medical Record Management        | Record completeness, timeliness    | Electronic medical records  | Compliance monitoring          |
| Infection Prevention and Control | HAI rates, antibiotic use          | IPC surveillance system     | Longitudinal monitoring        |
| Leadership and Governance        | Corrective action follow-up        | Quality assurance reports   | Accountability tracking        |
| Clinical Service Continuity      | Length of stay, referral delays    | Hospital information system | Performance correlation        |

Interviews with hospital managers and accreditation team members further clarified how this fragmentation affects decision-making processes. Informants reported that existing accreditation reports are static, delayed, and difficult to interpret, limiting their usefulness for operational planning. Decision-making related to quality and patient safety was therefore often reactive, driven by immediate problems or external survey requirements. In contrast, respondents perceived the Accreditation Intelligence Dashboard as enabling a more proactive governance approach by consolidating multiple indicators into a single, continuously updated interface. This perception aligns with evidence from dashboard usability studies, which demonstrate that visual analytics can

enhance situational awareness and reduce cognitive burden among healthcare managers (Schall et al., 2017).

The Accreditation Intelligence Dashboard developed in this study integrates accreditation indicators with operational data through a business intelligence architecture. The analytical results show that this integration enables multidimensional visualization of compliance status across time, organizational units, and accreditation domains. **Table 2** summarizes the core components of the dashboard and their intended managerial functions. Importantly, the dashboard is not designed as a reporting tool alone, but as a decision support system that allows managers to explore relationships between indicators, identify emerging risks, and prioritize corrective actions. This design responds directly to KARS standards that emphasize systems-based evaluation rather than isolated compliance checks.

**Table 2. Core Components of the Accreditation Intelligence Dashboard**

| Dashboard Component  | Description                              | Managerial Use        |
|----------------------|------------------------------------------|-----------------------|
| Compliance Overview  | Real-time status by accreditation domain | Strategic monitoring  |
| Unit-Level View      | Comparison across departments            | Targeted intervention |
| Trend Analysis       | Longitudinal indicator tracking          | Early warning         |
| Drill-Down Analytics | Access to underlying data                | Root cause analysis   |
| Decision Alerts      | Automated compliance flags               | Proactive management  |

From an organizational governance perspective, the results suggest that the dashboard strengthens internal accountability by increasing transparency of accreditation performance. Managers are able to compare compliance across units and track follow-up actions over time, reducing reliance on informal communication and ad hoc monitoring. This finding is consistent with Continuous Quality Improvement theory, which emphasizes timely feedback and visibility of performance as prerequisites for sustained improvement. By embedding accreditation monitoring into routine managerial processes, the dashboard shifts accreditation from a specialized activity conducted by accreditation teams to a shared organizational responsibility. The findings also extend existing literature on hospital accreditation by clarifying the mechanisms through which accreditation data can support continuous compliance. Prior studies have documented positive associations between accreditation status and outcomes such as patient satisfaction and organizational legitimacy (Aini & Sari, 2025), as well as the role of digital maturity in health system performance (Aisyah et al., 2024). However, few studies have examined how accreditation data are operationalized at the managerial level. The present results address this gap by demonstrating how accreditation intelligence dashboards translate regulatory standards into actionable decision-support tools.

An important contextual finding relates to the role of leadership and organizational culture. While respondents expressed strong support for the dashboard concept, they emphasized that its effectiveness depends on leadership engagement and routine use in management forums. In organizational settings where data are not systematically used for decision-making, dashboards risk becoming underutilized. This reinforces international evidence that health information technologies must be accompanied by organizational and behavioral change to generate sustained impact (Hysong et al., 2023). Accordingly, the dashboard should be viewed as an enabling infrastructure that supports, but does not replace, effective leadership and governance. The study also highlights how the dashboard alters the temporal orientation of accreditation compliance. Traditional accreditation processes are structured around fixed survey cycles, which may encourage short-term compliance behavior. The dashboard mitigates this tendency by enabling continuous visibility of compliance indicators, thereby supporting incremental improvement rather than episodic preparation. This temporal shift strengthens alignment between accreditation and continuous quality improvement, a relationship that has been widely advocated but insufficiently operationalized in practice. From a theoretical perspective, the results support the relevance of the Health Information Systems Success Model in explaining the value of accreditation intelligence systems. As summarized

in **Table 3**, the findings demonstrate that information quality, interpretability, and relevance to managerial tasks are critical determinants of system impact. The dashboard enhances these dimensions by aligning accreditation indicators with decision-making contexts, thereby increasing the likelihood of sustained use and organizational benefit.

**Table 3. Relationship Between Empirical Findings and Theoretical Frameworks**

| Key Empirical Finding                                         | Theoretical Framework                    | Interpretation for Accreditation Governance                                                            |
|---------------------------------------------------------------|------------------------------------------|--------------------------------------------------------------------------------------------------------|
| Fragmented accreditation data limits continuous compliance    | Health Information Systems Success Model | Low system and information integration reduces organizational impact and decision support value        |
| Dashboard improves managerial awareness                       | Continuous Quality Improvement Theory    | Timely feedback and visualization strengthen learning cycles and corrective action                     |
| Leadership engagement conditions dashboard effectiveness      | Governance and Stewardship Theory        | Technology effectiveness depends on alignment with leadership commitment and accountability structures |
| Continuous monitoring reduces episodic accreditation behavior | Quality Governance and Regulatory Theory | Shifting accreditation from inspection-based to performance-based governance                           |

At the policy level, the findings have implications for the national KARS accreditation system and its alignment with Universal Health Coverage. Continuous accreditation monitoring supports the quality dimension of UHC by ensuring that expanded access to hospital services is accompanied by sustained safety and performance standards. Accreditation intelligence dashboards could also support performance-based contracting and regulatory oversight if implemented at scale. However, system-level challenges related to interoperability, data governance, and digital capacity must be addressed to ensure equitable adoption across hospitals. **Results validation** was undertaken through methodological triangulation, member checking, and analytical transparency. Findings derived from document analysis were cross-validated with interview data and observational evidence to ensure consistency. Preliminary dashboard constructs and interpretations were reviewed with key informants to confirm relevance and accuracy. An audit trail documenting indicator selection, data mapping, and analytical decisions was maintained throughout the study. These validation strategies enhance the credibility and dependability of the results and align with qualitative rigor expectations in Scopus-indexed health services research. Several limitations should be acknowledged. The study was conducted in a single hospital setting, which may limit transferability to other organizational contexts with different levels of digital maturity or governance structures. In addition, the study focused on conceptual development and perceived utility rather than longitudinal outcome evaluation. Future research should examine the impact of accreditation intelligence dashboards on patient safety indicators, accreditation outcomes, and organizational performance over time.

## CONCLUSIONS AND SUGGESTION

This study concludes that the development of an Accreditation Intelligence Dashboard represents a viable and theoretically grounded approach to strengthening continuous compliance with KARS standards within hospital settings. The findings demonstrate that while accreditation-related data are widely available across hospital information systems, their fragmented structure significantly limits their value for managerial decision-making. By integrating accreditation indicators with operational data through a business intelligence framework, the proposed dashboard transforms dispersed documentation into actionable managerial intelligence. This integration

enables continuous monitoring, enhances situational awareness, and supports evidence-informed decision-making, thereby addressing a fundamental weakness in traditional accreditation practices that rely on episodic assessment and retrospective reporting.

Based on these conclusions, several suggestions can be proposed. Hospitals are encouraged to adopt accreditation intelligence dashboards as part of their internal quality governance systems, ensuring that accreditation indicators are routinely reviewed in managerial forums and linked to corrective actions. Investment in leadership development and data literacy is essential to maximize the value of such systems. Accreditation bodies and health authorities should explore the development of standardized accreditation indicator frameworks that facilitate dashboard integration and reduce reporting burden. Future research should extend this work through longitudinal and multi-site studies to evaluate the impact of accreditation intelligence dashboards on patient safety outcomes, accreditation performance, and organizational efficiency. Further investigation into the integration of accreditation intelligence with national digital health platforms and health financing mechanisms would also provide valuable insights for health system strengthening.

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