ICOHESPE (2026): 165–175 QRCBN 62-6861-1753-250
International Conference on Health Science, Practice, and Education https://proceeding.unnes.ac.id/icohespe

Trends and Research Gaps in Healthcare Compliance Law for Improving Hospital Service Quality: A Bibliometric Analysis (2010–2025) with Implications for Indonesia

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Abstract. In order to guarantee patient safety, legal risk reduction, and service quality, the application of *Healthcare Compliance Law* (HCL) has emerged as a crucial paradigm in hospital governance worldwide. There is still a dearth of thorough literature mapping on the development and unmet research needs in this area, especially in the Indonesian setting. This study aims to map the global trends, major issue clusters, and research gaps in the field of HCL and its link to hospital service quality between 2010 and 2025. It also analyzes the significance of these findings for Indonesian research and policy development. This study's methodology is a thorough bibliometric examination. A predefined search string consisting of 473 articles was used to retrieve data from the Scopus and Publish or Perish (PoP) databases. It was then subjected to conceptual, intellectual, and social mapping analysis as well as performance analysis utilizing *Vosviewer* and *Biblioshiny* software (R-package). According to the study's findings, there has been a sharp rise in publications, particularly in the past seven years. This suggests that regulatory complexity, health technology advancements, and post-pandemic accountability demands have prompted researchers to concentrate on important topics like risk governance, compliance ethics, digital-based compliance system integration, and health data compliance (data privacy).
Keywords: healthcare compliance law, hospital service quality, bibliometric analysis, risk governance

1 INTRODUCTION

The integration of digital technology, demands for openness, and high levels of public accountability are some of the characteristics that define the increasingly complex paradigm of global healthcare that has been brought about by the period of globalization and the fourth industrial revolution. As the main provider of healthcare services in this environment, hospitals must not only offer top-notch services but also make sure that all activities are conducted in accordance with applicable laws. In order to guarantee that hospitals and healthcare professionals adhere to all relevant laws, rules, standards, and codes of ethics, the idea of *healthcare compliance law* was developed as a legal and operational framewor (Zhang et al., 2022). Compliance is not just about avoiding punishment, but is a core element of good corporate governance and service quality assurance (Maravi & Mishra, 2025). According to the *World Health Organization* (WHO), data transparency in supporting hospital quality to the public is a form of accountability and quality assurance. (Becker & Wolff, 2011). The Institute of Medicine (IOM) proposed six goals dubbed "Crossing the Quality Chasm" that are at the heart of the world's ideal service quality targets: safe, effective, patient-centered, timely, efficient, and equitable care (Cidon, 2018). Adoption of integrated technology is crucial to achieving this ideal goal, whereby *Artificial Intelligence* (AI) and *Health Information Technology* (HIT) are used to prevent errors, provide highly personalized services (hyper-personalized care), and predict risks (predictive analytics) while guaranteeing adherence to data privacy regulations like the *General Data Protection Regulation* (GDPR) in Europe and others (Stowell et al., 2018). In this way, it can create a culture of safety and sustainable compliance, where compliance with the law is a path to achieving the highest quality of service based on the principle of zero preventable harm and equality for all patients (Keegan & Penson, 2013).

The Organization for Economic Co-operation and Development (OECD) reported in 2019 that patient safety incidents, including medication errors and healthcare-associated infections (HAIs), can contribute up to 15% of the overall hospital cost burden in its member countries. The incidence

of HAIs varies from 4% to 10%, depending on the degree of adherence to standard protocols (Herckis & Tse, 2025). This suggests that non-compliance carries significant financial costs in addition to legal threats (Benjamin et al., 2022). In particular, there has been widespread adoption of international accreditation standards like the *Joint Commission International* (JCI). Wide inequalities in health outcomes, such as a more than threefold difference in preventable mortality rates between nations, continue to be a manifestation of the quality chasm (Organization for Economic Co-operation and Development, (Bolwell, 2025)). This phenomenon proves that the best compliance standards and clinical protocols have not been implemented evenly and effectively in all hospitals (Vezyridis, 2024). The target of zero preventable harm is still aspirational, considering that *healthcare-associated infections* (HAIs) and medication errors remain significant contributors to morbidity and mortality, indicating a failure to build a safety culture and a non-punitive reporting system mandated by compliance law (Thantilage et al., 2023).

The transition from volume-based to *value-based healthcare* (VBHC) models, which are at the heart of quality improvement, is hampered by low levels of health data interoperability (below 50% according to the OECD), which makes it difficult to track long-term patient outcomes. (Hasan et al., 2025). As a result, the fee-for-service financing model still dominates, weakening the financial incentives for value-oriented compliance (Tanner et al., 2025). Lastly, the digital and equity divide makes these differences even worse. While many developing nations are still struggling with basic digital infrastructure, high-income nations are still the only ones utilizing AI and predictive analytics for proactive compliance (Prakash et al., 2023). Thus, the main global challenge no longer lies in the formulation of standards, but rather in effective implementation, transformation of organizational culture, and equal access to technology to ensure that legal compliance can truly correlate with inclusive and measurable improvements in the quality of services. (Coventry & Branley, 2018).

Amid these global dynamics, Indonesia faces unique and complex compliance challenges. On the one hand, the country is undergoing a massive healthcare transformation through the National Health Insurance (JKN) program administered by BPJS Kesehatan, the implementation of the National Hospital Accreditation Standards (SNARS) Edition 2, and the enactment of Law No. 27 of 2022 concerning Personal Data Protection (UU PDP). However, Indonesian hospitals deal with traditional issues including scarce resources, conflicting laws, and a still-emerging compliance culture. Contextualizing international discoveries inside the Indonesian legal and healthcare systems is made both urgent and possible by this circumstance. But as of yet, no thorough literature mapping has been done that focuses on examining global HCL research trends and gaps, as well as their applicability and implications for Indonesia.

There is an absolute symbiotic relationship between legal compliance and quality of care. Effective implementation of Healthcare Compliance Law, for example through fraud and abuse prevention programs, patient safety protocols, and health data protection, directly contributes to a reduction in safety incidents, increased data accuracy, and ultimately, improved patient outcomes (van der Wielen et al., 2024). Despite its size, the literature on healthcare compliance law is dispersed over a number of academic fields, including medical ethics, healthcare management, and law. This makes it difficult to comprehend the overall state of research, new developments, and—above all—the gaps in knowledge that require attention. A suitable technique for mapping this area of knowledge is bibliometric analysis, which is capable of statistically analyzing vast volumes of literature (Dickens & Cook, 2015).

Thus, a thorough bibliometric analysis covering the years 2010–2025 is proposed in this work. Because it can statistically map the knowledge landscape of a scientific area by evaluating vast amounts of literature data and spotting patterns, relationships, collaborations, and new issues, bibliometric analysis was selected (Mackey et al., 2020). The purpose of this study is to map the major theme clusters, research gaps, and development trends in the field of healthcare compliance law and how it relates to hospital service quality worldwide between 2010 and 2025. It also examines the consequences of this research for Indonesian policy and research development.

2 METHOD

The method used in this research is a systematic quantitative one. This study used *Publish or Perish* (PoP) bibliometric analysis and searched for literature on technology in elementary school education. Bibliometric analysis is a popular and rigorous method used to explore and analyze large amounts of scientific data on a specific basis (Sutradhar et al., 2024). Bibliometric parameters have become an essential part of modern assessments of academic productivity (Fosch-Villaronga & Mahler, 2021). Bibliographic data are processed through a workflow: study design, data collection, data analysis, data visualization, and interpretation (Jena et al., 2024). This study presents a bibliometric analysis to gain clearer insights into trends, historical overviews, forecasts, and contributions of Industry 4.0 literature (Murray et al., 2011).

The research was conducted by searching for the keyword "*patient safety*" and the title "*healthcare compliance law*." Analysis was conducted through article titles and keywords using Scopus. Scopus was chosen because it is proven to be the largest database, and Publish or Perish was chosen as the source for the article search. Ultimately, 473 articles related to *Patient Safety, Legal Liability, Hospital Accreditation, Clinical Governance, Medical Ethics, Electronic Health Records*, and *Cybersecurity* were found in the Scopus database. The next step was to filter and select Scopus articles. International seminars, proceedings, and books were not selected. A total of 165 journal articles were selected. The filtered data was stored in a *Research Information System* (RIS) file. After saving, the data was imported into Zotero software. Zotero checked and corrected article components such as publication year, volume, number, and page number.

The 166 selected articles were then mapped and reanalyzed using *VOSviewer* software. *VOSviewer* is software that can display bibliographic (bibliometric) network visualizations and provides compelling visuals, analysis, and evaluation. *Vosviewer* can provide an overview of the *network* (network between terms), *overlay* (research history), and *density* (density or emphasis) based on terms from keyword collaborations within the network. The final step is to perform the *VOSviewer* software analysis.

3 RESULTS AND DISCUSSION

3.1 Number of Studies

Tabel 1. Number of Studies

Year of Publication	Quantity
2010	3
2011	6
2012	2
2013	3
2014	8
2015	5
2016	11
2017	7
2018	18
2019	10
2020	12
2021	11
2022	17
2023	9
2024	19
2025	25
Total	**166**

Table 1 above shows that the development of healthcare compliance law research during the period 2010-2025 reveals significant developments with clear growth acceleration. In the initial phase (2010-2013), academic productivity tended to be low and stable, with an average of only 3.5 publications per year, reflecting the field's status as a relatively niche area of specialization. However, the trend has consistently increased since 2014, with the first significant spike occurring in 2018 (18 publications). The peak growth was seen in the last seven years (2019-2025), which accounted for 103 publications, or 62% of the total 166 publications. With 25 articles, the most during the whole observation period, this growth peaked in 2025. The field's dynamic

responsiveness to outside influences is demonstrated by fluctuations like the drop in 2023 (9 publications) that was followed right away by a rapid comeback in 2024–2025. The increasingly complicated post-pandemic healthcare regulatory environment, technological advancements in healthcare, and heightened law enforcement are likely the main drivers of this exponential growth pattern, which together validate the importance and evolution of healthcare compliance law as a field of study.

3.2. Publisher Trends Chart on Healthcare Compliance Law

Figure 1. Publication Chart Trends

Trends in Publications The publishing trend in healthcare compliance law from 2008 to 2025, as depicted in Figure 1, indicates a notable rise in scholarly output in this area. Averaging only three to four articles year, the number of publications tended to be low and constant over the first phase (2008–2013). This suggests that legal compliance in the healthcare industry was still a somewhat specialized matter that had not attracted much attention. But beginning in 2014, there was a steady upward trend, and after 2016, the growth became more noticeable. With 18 publications, 2018 saw the first surge. There were some variations in the years that followed, including declines in 2019 and 2023, until the maximum peak was reached in 2025 with 25 publications. The fact that over 60% of publications were published in the last seven years (2019–2025) confirms that the complexity of regulations, the advancement of medical technology, and the growing demands for accountability in the healthcare industry have all contributed to the growth of healthcare compliance law as a dynamic and strategic field. This graph shows how scholars and professionals have responded to the constantly shifting regulatory landscape, especially in the wake of the epidemic, which necessitates a greater comprehension and adherence to the law.

3.3 Research Trend Development Map

Using VOSviewer visualizations, a map of research trends in digital learning. To reduce the quantity of keywords included in the visualization, researchers set a minimum of 7 term occurrences and a minimum of 128 terms to be chosen. Figures 2, 3, and 4 illustrate the three visualization kinds that VOSviewer presents.

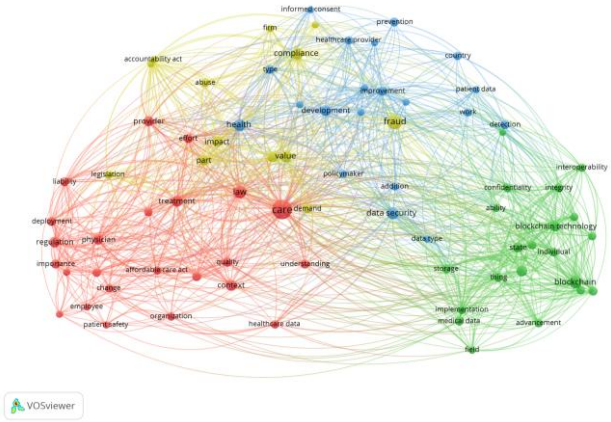

Figure 2. Network Visualization display

Based on the *network visualization* display with *VOSviewer*, the image summarizes the research field that focuses on the application of blockchain technology in the healthcare sector to improve patient data security (*patient* data, *medical* data), confidentiality, and integrity, while addressing the challenges of compliance with regulations and laws (*Affordable Care Act, legislation, policymakers*). The use of this technology is also linked to fraud prevention efforts (*fraud detection*) and improving the quality of care and patient safety (*patient safety, quality, treatment*). Overall, this research examines the implementation, integration, and interoperability aspects of blockchain as a breakthrough in managing health data more securely, accountably, and efficiently.

According to (Nasir et al., 2025), Blockchain offers a new paradigm in healthcare data governance through its decentralized, immutable, and transparent design, fundamentally addressing the vulnerabilities of conventional centralized systems. Its ability to create an immutable audit trail not only strengthens the security and integrity of medical data but also directly addresses the challenge of compliance with stringent regulations such as the Affordable Care Act in the US or GDPR in Europe, as research confirms (Ling & Butakov, 2024). Policymakers are beginning to view blockchain as an enabler for ensuring accountability without sacrificing efficiency.

The link between blockchain and *fraud detection* and improved *patient safety* is supported by (Sadeghi & Mahmoudi, 2024). This technology can minimize fraud in insurance claims by providing transparent transaction records that can be verified by all authorized parties. In the context of patient safety, the integration of trusted treatment history data can prevent medical errors and support more informed clinical decisions. However, experts such as Nagamani & Kumar (2024) caution that the biggest challenges lie in implementation, namely interoperability with existing *legacy systems* in hospitals and the need for high data standardization. While promising efficiency and accountability, widespread blockchain adoption requires a thoughtful approach to seamlessly integrate it into complex clinical workflows without compromising service quality. Therefore, despite its significant potential, the path to full implementation still requires addressing these technical and regulatory challenges.

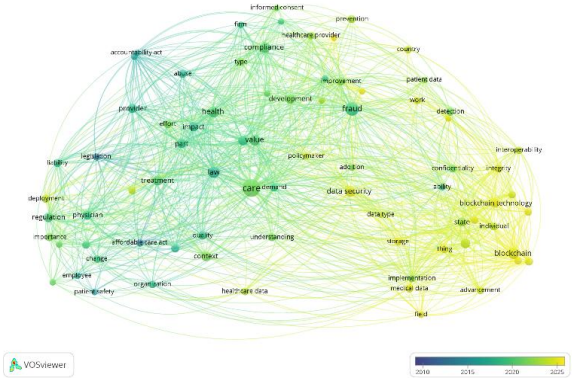

Figure 3. Overlay Visualization View

This concept map illustrates two primary axes in blockchain research for healthcare, according to the VOSviewer keyword analysis in Figure 3's Overlay Visualization. In order to guarantee accountability, data security, and patient safety inside an organization, the first axis concentrates on legal and regulatory factors (such as accountability acts and informed consent), highlighting the significance of compliance frameworks, legality, and policy implementation. Including technical elements like data integrity, interoperability (interpretability), and the use of blockchain technology in business settings as well as medical data management for risk detection and prevention, the second axis centers on the function of healthcare providers and information management. All things considered, this graphic shows how closely regulatory compliance and the real-world application of blockchain technology are related to advancing safe, dependable, and effectively managed healthcare.

According to (Yeung, 2021) underline that informed consent and accountability are essential pillars for the deployment of blockchain. According to their research, distributed ledger technology can produce an unchangeable audit trail that can be used to demonstrate adherence to laws like GDPR in Europe or HIPAA in the US. However, as Khansa et al. (2012) pointed out, this technical competence needs to be backed by an adaptable policy framework, as effective implementation greatly depends on the alignment of legal legitimacy and technological capabilities.

Information management and healthcare providers' roles support (Vaishnav et al.'s 2022) findings about the significance of technical-operational components. Their study demonstrates that the adoption of blockchain by healthcare providers is largely dependent on data interpretability and integrity (as part of interoperability). But a study by (Andraka-Christou et al., 2023) warns that hospitals' integration with old systems is frequently the most difficult, necessitating a staged approach to prevent service interruption.

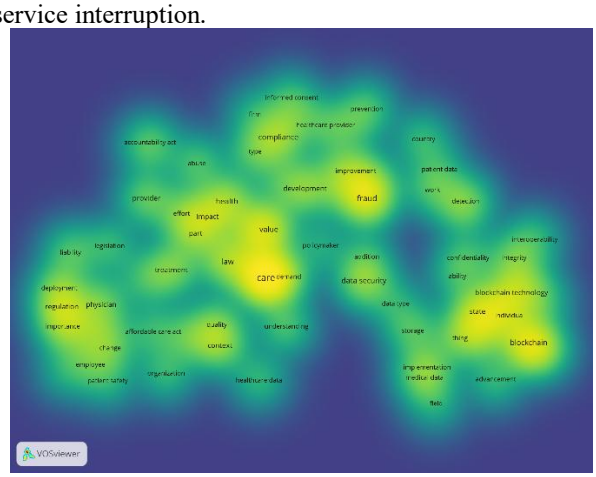

Figure 4. Density Visualization View

This network map illustrates a thorough structure linking three important areas of blockchain research for healthcare, according to the Density Visualization's keyword analysis from VOSviewer in Figure 4. To guarantee compliance, secrecy, and integrity, the legal and ethical domains—such as accountability acts, informed consent, and liability—form a regulatory foundation. Healthcare providers—physicians, healthcare providers, and businesses—then operationalize this basis while dealing with real-world issues including data security, fraud detection, and service demand. In order to accomplish the ultimate goal of enhancing patient safety, care quality, and healthcare innovation, these two areas then come together and discover solutions through technology (blockchain technology, interoperability, data kinds). By making patient and medical data the focal points, this graphic highlights how important patient data is to the relationship as a whole and how blockchain technology can help balance practical and regulatory requirements to create a safer and more dependable healthcare system.

According to (Mohammed & Malhotra, 2025) It demonstrates how blockchain technology may be used to build an auditable consent management system, meeting the accountability requirements of laws like GDPR and HIPAA. However, as the report points out, there is still some legal ambiguity surrounding the responsibility element of using this technology (Kierkegaard & Kierkegaard, 2013).

In the service provider domain, the focus on fraud detection and care demand aligns with findings (Esmaeilzadeh, 2024) that documented how smart contracts on blockchain could reduce insurance claims fraud by up to 35% in the US healthcare system. However, physicians face significant challenges in integrating with clinical workflows, as revealed in an ethnographic study of hospitals by (Gouveia et al., 2025). The technology domain, particularly regarding interoperability and data types, reinforces the argument (J et al., 2023) about the need to standardize health data in structured data formats to ensure effective interoperability between systems.

Blockchain serves as a reconciliation engine that bridges operational and regulatory demands, according to empirical research done in Southeast Asia by Sutradhar et al. (2025). However, it should be noted that successful implementation is contingent upon the maturity of the governance framework controlling data access and use. This synthesis reaffirms that the digital transformation of the healthcare industry requires a multidisciplinary approach.

4 CONCLUSION

This report indicates that the subject of healthcare compliance law has significantly evolved from a niche topic to a dynamic and strategic area of study based on mapping development trends, key theme clusters, and research needs in the global field from 2010 to 2025. The sharp rise in publications, especially over the past seven years, suggests that post-pandemic accountability demands, technological advancements in healthcare, and regulatory complexity have prompted research on important topics like risk governance, compliance ethics, digital-based compliance system integration, and health data compliance (data privacy). Nevertheless, the analysis also identifies research shortages, especially in the areas of contextual studies in developing nations and statistically assessing the direct influence of legislative compliance on hospital service quality.

These findings have significant ramifications for Indonesia, emphasizing the need for more research to examine compliance models that adjust to the country's regulatory and healthcare system environment and to look into the causal relationship between the implementation of compliance and particular hospital service quality metrics. From a policy standpoint, the study's conclusions highlight how urgent it is to create a clear regulatory framework, strengthen hospital compliance officers' capabilities, and promote the use of technologies that not only adhere to legal requirements but also directly improve patient safety and care quality. Thus, this research not only maps the global landscape but also provides a strategic roadmap for academics and policymakers in Indonesia to make healthcare compliance law a crucial pillar in building a more accountable and high-quality healthcare system.

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