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# Regulation of Ethical Aspects of Electronic Medical Records in Indonesia's Positive Law and Implementation in Hospitals

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## Abstract

The transformation of medical records into electronic form through Minister of Health Regulation Number 24 of 2022 aims to enhance healthcare service systems based on the principles of data security and confidentiality. However, the implementation of Electronic Medical Records (EMR) requires more than technical readiness; it must also adhere to core medical ethics principles, including autonomy, privacy or confidentiality, integrity, authentication, availability, access control, and non-repudiation. This study aims to analyze how these ethical principles are regulated and implemented in Indonesian hospitals. Using a normative legal research method with a statutory approach, this study examines relevant laws and regulations along with literature from scientific publications between 2020 and 2025. The findings reveal that although the regulation of EMR ethics is relatively comprehensive, its practical application remains limited. Key issues include the absence of specific SOPs, insufficient technological capacity, and limited attention to patient autonomy. While many hospitals share basic RME features such as login access, integration, and data backup, only some adopt advanced security measures like auto log-off or electronic signatures. This study concludes with recommendations to harmonize regulations with field practices, improve data protection, and ensure equitable technological infrastructure for sustainable EMR implementation in Indonesia.

## Keywords

Autonomy, Electronic Medical Record, Ethics, Health Regulation, Positive Law.

## 1. Introduction

Medical records are a crucial part of healthcare and are currently undergoing digital transformation. In Indonesia, this shift began with Permenkes Number 24 of 2022, which mandates the implementation of Electronic Medical Records (*Rekam Medis Elektronik/RME*) (Ardianto & Nurjanah, 2024). The RME system aims to ensure the security and confidentiality of patient information. According to Edward Shortliffe, RME serves as a centralized digital repository of a patient's health history, accessible to authorized parties (Basani, 2023). Article 3 Paragraph (1) of the regulation requires every health facility (*fasyankes*) to implement RME, while Article 7 Paragraph (3) mandates the development of standard operating procedures tailored to each facility's resources. As of November 2022, there were approximately 23,000 health facilities in Indonesia, with about 11,000 concentrated in five provinces on the island of Java. The remaining 12,000 are dispersed in areas with limited internet and electronic infrastructure (Larasati et al., 2024). Implementation has begun in many hospitals; however, progress remains limited. A survey by PERSI in March 2022 found that only 50% of approximately 3,000 hospitals had adopted RME, and just 16% operated it optimally (Christy et al., 2024; Julia & Aulianto, 2024). Additionally, data from the Directorate of Referral Health Services revealed that only 345 hospitals (11.23%) had successfully implemented the system (Amir, 2019; Rusdi & Ularan, 2023).

The implementation of Electronic Medical Records presents various challenges, particularly in ethical and legal aspects (Melyanti & Sewu, 2023; Rubiyanti, 2023). Ethical considerations are crucial as they relate to patient rights, as stated in Article 26 Paragraph (1) of Permenkes Number 24 of 2022: "The contents of the medical record belong to the patient". Medical ethics, as outlined by Tom Beauchamp and James Childress, consist of four key principles: autonomy, beneficence, non-maleficence, and justice. Autonomy ensures patients' decision-making rights; beneficence promotes their well-being; justice guarantees fair access to health services; and non-maleficence stresses the importance of avoiding harm. These principles uphold integrity, justice, and patient welfare in healthcare (Wikansari & Santoso, 2022; Nurdin et al., 2024).

In implementing Electronic Medical Records, the four basic health ethics expand to include privacy, integrity, authentication, availability, access control, and non-repudiation (Santoso et al., 2022; Janarthanan et al., 2024). Ethical principles like privacy and confidentiality ensure improved service quality and protect patient rights. Violations of these rights may lead to legal consequences for hospitals and doctors. Indonesian positive law regulates these aspects, serving as a guide for RME implementation. The principles of confidentiality, integrity, and availability also form part of the health worker's code of ethics. Deharja et al. (2023) and Izza and Lailiyah (2024) study focused on RME implementation challenges but did not address ethical aspects. Lestari et al. (2024) have examined the positive legal aspects of Electronic Medical Records (EMR) in Indonesia, including ethical issues, but without thoroughly discussing legal ethical arrangements. Budiyanti et al. (2019) addressed ethical and legal challenges of EMR in the Personalized Medicine Era, focusing on privacy and data security but not other ethical principles. Larasati (2024) discussed confidentiality, integrity, and availability but did not elaborate on the legal articles regulating them. These studies have yet to comprehensively address the ethical aspects, relevant legal provisions, and their practical implementation in the field.

Previous studies have discussed various aspects of Electronic Medical Records (EMR) in Indonesia, but few have provided a comprehensive analysis of the ethical principles and their legal regulation. Most focus on technical or infrastructural challenges, while ethical aspects, such as autonomy, beneficence, non-maleficence,

and justice, are only partially addressed or not explicitly linked to relevant legal provisions. As a result, a gap remains in understanding how these ethical principles are regulated within Indonesian positive law and how they are implemented in hospital settings. Therefore, this study aims to comprehensively examine the regulation of ethical aspects in the implementation of Electronic Medical Records (EMR) within the framework of Indonesia's positive law. Specifically, it focuses on analyzing the four fundamental principles of health ethics: autonomy, beneficence, non-maleficence, and justice, along with supporting ethical dimensions such as confidentiality, integrity, and availability. This journal also seeks to identify the relevant legal provisions governing these ethical principles and evaluate their implementation in hospital settings across Indonesia.

## **2. Literature Review**

Electronic Medical Records (EMR) or *Rekam Medis Elektronik* (RME), have become increasingly vital in modern healthcare systems. In Indonesia, the push toward digital transformation in health documentation was formalized with the issuance of Ministry of Health Regulation (*Permenkes*) Number 24 of 2022, which mandates the adoption of EMRs in all health service facilities (Agno & Guo, 2013; Pratama et al., 2023). This regulation serves as the foundation for integrating electronic-based patient records into the healthcare system. According to Asyfia et al. (2023), EMRs are centralised digital repositories of patients' lifetime health information that are accessible to authorised medical personnel. Article 3 Paragraph (1) of the regulation requires all health facilities (*fasyankes*) to implement EMRs, while Article 7 Paragraph (3) instructs them to develop Standard Operating Procedures (SOPs) based on their specific capabilities and resources. However, geographic disparities persist; nearly 11,000 of the 23,000 facilities are concentrated in Java, leaving the rest in regions with inadequate internet and IT infrastructure (Ati et al., 2024; Larasati et al., 2024). Despite these challenges, adoption is progressing. A 2022 survey by PERSI revealed that 50% of hospitals had begun using EMRs, although only 16% were deemed to be operating them effectively (Cahyaharnita, 2019). Government data from the Directorate of Referral Health Services further noted that only 11.23% of hospitals had successfully implemented the system (Wilson & Khansa, 2018; Almaghrabi & Bugis, 2022).

The shift to digital health records also introduces complex legal and ethical considerations. Ethical principles play a crucial role in protecting patient rights, particularly in safeguarding the confidentiality and control of medical information. Article 26 Paragraph (1) of *Permenkes* Number 24 of 2022 explicitly states that the contents of the medical record belong to the patient. As Nurdin et al. (2024) explain, the ethical framework in healthcare is rooted in four core principles: autonomy, beneficence, non-maleficence, and justice. Autonomy supports the patient's right to make informed decisions, beneficence seeks to improve well-being, non-maleficence focuses on avoiding harm, and justice demands fair distribution of healthcare resources (Devkota & Devkota, 2013; Almaghrabi & Bugis, 2022). These principles guide the ethical obligations of healthcare professionals and are essential in the context of EMR implementation.

As EMR technology advances, the scope of healthcare ethics broadens to incorporate digital specific concerns (Bates, 2000). Janarthanan et al. (2024) identify additional ethical dimensions that are increasingly relevant in the context of EMRs: privacy, integrity, authentication, access control, availability, and non-repudiation. The principles of privacy and confidentiality are especially critical in ensuring service quality and protecting patient rights. If these rights are breached such as through unauthorized access to medical records it may result in legal consequences for healthcare institutions and practitioners (Schumaker & Reganti, 2014; Jabali &

Jarrar, 2018). These ethical concerns are reflected in Indonesian legal standards and form part of the professional code of conduct for health workers.

While several studies have addressed EMR implementation in Indonesia, many remain limited in scope. Izza and Lailiyah (2024) focused primarily on technical and human resource barriers but did not engage with ethical concerns. Indira et al. (2023) examined legal frameworks governing EMRs but only touched briefly on ethical matters. Meanwhile, Budiayanti et al. (2019) explored ethical and legal challenges in the context of personalized medicine, particularly around privacy and data security, but did not elaborate on broader ethical principles. Similarly, Larasati (2024) discussed ethical concerns such as confidentiality, integrity, and availability but without detailed analysis of the related legal provisions. These studies highlight the fragmented nature of existing research on the ethical-legal dimension of EMR.

Therefore, a clear gap exists in the literature regarding the integration of ethical principles with legal regulation in the context of EMR implementation (Prabawati et al., 2025; Yunengsih, 2025). Many studies either focus on technological aspects or address ethics and law separately, without offering a cohesive analysis. This study seeks to fill that gap by providing a comprehensive review of how ethical principles such as autonomy, beneficence, non-maleficence, and justice and supporting elements like confidentiality and integrity are legally regulated and practically applied in Indonesian hospital settings.

### 3. Methods

This research employs a normative legal research method, which aims to uncover the truth through legal logic and normative reasoning within the framework of legal science. According to Ibrahim (2006), normative legal research focuses on analyzing legal norms and principles found in statutory regulations, court decisions, and legal doctrines. This method is suitable for studies that intend to evaluate how laws are structured and applied in practice, especially when assessing legal norms that govern ethical issues. In this study, the statutory approach is utilized as part of normative legal research. This approach entails a thorough examination of all laws and regulations pertaining to the ethical aspects of Electronic Medical Records (EMRs). The researchers identify and analyze legal instruments, including ministerial regulations and legal provisions on patient rights and health professional responsibilities, that are relevant to the implementation of EMR. Through this method, the research aims to critically assess the adequacy and consistency of existing legal frameworks governing ethical principles such as autonomy, beneficence, non-maleficence, justice, confidentiality, integrity, and availability in the context of EMR in Indonesian hospital settings.

The review of regulatory implementation was conducted by searching for journals and articles on the analysis of ethical aspects that have or have not been implemented in RME systems used in Indonesian hospitals. The inclusion criteria were journals and articles that discussed the application or implementation of RME in Indonesian hospitals, using qualitative, quantitative, or a combination of both research designs, and were fully accessible in either Indonesian or English, published between 2020 and 2025. The exclusion criteria applied were articles or cases that were not relevant to the topic discussed and cases that were similar to or had been discussed previously. After data collection, evaluation and review of applicable laws and regulations and their implementation in the field, the results will be summarized based on ethics in the format of title, author, and year of publication, applicable ethical aspects and obstacles obtained.

## **4. Results**

### **4.1. Ethical Aspects of Electronic Medical Records in Positive Law**

Autonomy is the first aspect of medical organization, it places the patient as a competent individual and entitles to decisions related to his/her health care. The principle of health autonomy is stipulated in the Law Number 17 of 2023 concerning Health, which affirms the patient's right to autonomy in receiving health services (Indonesia, 2023). Article 4, paragraph (1) letter (f) stipulates that every individual has the right to determine the type of health service they need independently and responsibly. However, this right is subject to exceptions in Article 4 paragraph (2), which applies in emergencies or during outbreaks. Additionally, Article 4 paragraph (1) letter (h) states that individuals may accept or refuse part or all of the medical assistance offered to them. This, too, is limited by exceptions in Article 4 paragraph (3), particularly in cases of outbreaks, communicable diseases, unconsciousness, emergencies, or severe mental disorders without a companion. In the context of electronic medical records, this ethical principle of autonomy is reflected in the patient's initial act of registration, which serves as consent to data collection. Nevertheless, this autonomy is often overlooked, as patients typically entrust health decisions to medical personnel. Patient data, regulated under Article 13 paragraph (1) of Permenkes Number 24, is crucial in administering medical records.

Patient data is detailed in Article 14 of Permenkes Number 24 of 2022 which states that patient registration involves patient identity data and social data. These data include the medical record number, the patient's name, and the patient's population number (*Nomor Induk Kependudukan/NIK*), as well as their religion, occupation, education, and marital status. These data are the patient's rights, so the hospital needs to provide sufficient information on the advantages and disadvantages of electronic medical records, such as easier access for health workers with the risk that the data can fall into the hands of unauthorized people. Article 13 paragraph (5) of Permenkes Number 24 of 2022 states that the responsibility for organizing medical records referred to in paragraph (1) is the responsibility of the doctor, dentist or other health worker. The next autonomy right related to medical records is the patient's consent. Every action needs to be informed to the patient, and then the patient's decision, whether consent or refusal, must be recorded in the medical record. This is regulated in Article 46, paragraph (2) of Law Number 29 of 2004, Article 4, paragraph (1), letters h and j of Law Number 17 of 2002. Consent is given after a prior explanation of the action to be performed or informed consent is regulated in Article 4 Paragraph (1) letter j of Law Number 17 of 2002, Article 45 of Law Number 29 of 2004, and Article 52 letter (a). Sanctions for violations of making medical records without consent should be regulated in Article 79, letter b, of Law Number 29 of 2004 (Indonesia, 2004).

### **4.2. Privacy and Confidentiality**

The principle of autonomy is closely related to the ethical principles of privacy and confidentiality, which ensure that the contents of medical records and patient information remain confidential and undisclosed to unauthorized parties. Budiyantri et al. (2019) highlight several ethical and legal challenges in implementing Electronic Medical Records (EMR) in the era of personalised medicine, including genomic discrimination, changing dynamics in doctor-patient relationships, data ownership, and legal accountability. The risk of cyberattacks and health information leakage can have a severe impact on patients, as confidentiality directly affects self-esteem, stigma, and insurance eligibility. Indonesian laws extensively regulate this issue, as the digitization of medical records involves multiple stakeholders, making data leakage a major concern. Article 29 paragraphs (1) and (2) of Permenkes Number 24 of 2022 mandate that RMEs uphold data security principles, including confidentiality, integrity, and availability, and ensure protection from unauthorized

internal and external access. This obligation is reinforced by Article 4 paragraph (1) letter i of Law Number 7 of 2023, which guarantees the confidentiality of personal health data, and Article 47 paragraph (2) of Law Number 29 of 2004, which obliges health professionals to safeguard medical records. Further support is found in Article 57 paragraph (1) of Law Number 36 of 2009 and Article 32 letter (l) of Law Number 36 of 2009 (Indonesia, 2009b). Exceptions are outlined in Permenkes Number 24 of 2022, including minors, emergencies, insurance, legal, and administrative needs, as well as when requested by the Ministry of Health, provided that legal procedures and identity protection are maintained.

The protection of personal data in electronic systems is regulated in Article 2 paragraph (1) of MOCI Regulation Number 20/2016, which governs all stages of data processing, including collection, storage, and deletion. In the context of Electronic Medical Records, Article 20 of Permenkes Number 24/2022 requires secure digital storage ensuring confidentiality, integrity, and availability, using certified servers or cloud services with backup systems in separate locations. If resources are limited, Article 22 allows collaboration with certified Electronic System Operators under a Non-Disclosure Agreement. RME data must be stored for at least 25 years. Security measures include access control, authentication, integrity, and non-repudiation.

#### **4.3. Access Control and Authentication**

Article 29 Paragraph (2) of Permenkes Number 24/2022 emphasizes that confidentiality ensures the security of data and information from unauthorized internal or external access. Access rights to medical records are further detailed in Article 30. Paragraph (2) states that the head of the health facility determines access rights, which include data input, correction, and viewing as outlined in Paragraph (3). Paragraph (4) specifies that health workers and administrative officers conduct clinical data entry according to their authority. Paragraph (5) allows data correction for input errors, while Paragraph (6) sets a maximum correction time of 2 x 24 hours after data input. Paragraph (7) states that corrections beyond this period require approval from the medical recorder or facility head. Lastly, Paragraph (9) asserts that access rights must uphold the principles of data and information security (Ministry of Health of the Republic of Indonesia, 2022).

Granting access rights can also be complemented by an electronic signature as a means of verifying and authenticating the contents of the RME and the identity of the signatory, as mentioned in Article 31. In the implementation of electronic medical records, electronic signatures can be in the form of fingerprints, which are a condition of access to the contents of medical records (Ati et al., 2024; Ametefe et al., 2024). Access rights must also be opened and can be owned by the Ministry of Health as stipulated in Article 28 Paragraph (1), and Paragraph (2), which states “Health facilities must open access to all contents of REM, The Ministry of Health is authorized to utilize and store the contents of RME in the context of health data processing.”

Granting access rights is related to the authentication process, confirming the data access to medical records. This process helps maintain the confidentiality of medical record data and restrict access to medical records to authorized parties only (Indira et al., 2023). This process can be done by installing an account login page that contains a username and password or Personal Identification Number (PIN) that is only known by the owner of the access account. An automatic log-off feature that logs users off after a specified period can further enhance access security.

#### **4.4. Integrity and Non-repudiation**

The principle of integrity guarantees that any data that arrives, original and intact, is not manipulated during transmission is regulated by Article 29 paragraph (3) of Permenkes Number 24 of 2022 which states that “The principle of integrity is

a guarantee of the accuracy of the data and information contained in the REM and changes to the data may only be made by people who are given access rights to change". Non-repudiation means that there is no denial regarding data changes as regulated by the Explanation of Article 46 paragraph (2) of Law Number 29 of 2022 "In the event of an error in recording data in medical records, files and records must not be eliminated or deleted in any way. Changes to records or errors in medical records can only be made by crossing out and affixing the initials of the officer concerned (Julia & Aulianto, 2024).

These two aspects ensure that individuals cannot deny their involvement in a transaction or communication and guarantee the internal quality of Electronic Medical Records (EMR), including data accuracy, consistency, and security. Data accuracy refers to the correctness and validity of input, with systems ideally equipped to detect and correct errors automatically. Consistency requires uniform patient data and precise documentation of updates. Only the original inputter may modify data (Widiyanti et al., 2024). Data security limits access and tracks changes, with personal identity numbers replacing signatures. Article 25 paragraph (2) of Permenkes Number 24/2022 states that health facilities are responsible for data loss, damage, forgery, or unauthorized use. Article 24, paragraph (2) requires data transfers to use platforms managed by the Ministry of Health. Article 17 paragraph (2) further mandates that clinical information be recorded in an integrated, time-sequenced manner.

Article 29 paragraph (4) Permenkes Number 24 of 2022 states that "Availability is a guarantee that data and information in the RME can be accessed and used by people and parties who have access rights determined by the head of the health facility." This means that RME information must be accessible quickly, easily, and available to provide effective and efficient health services. This principle also governs data backup, which was previously discussed in the privacy and confidentiality section. Article 20 paragraph (2) of Permenkes Number 24 Year 2022 states that "Electronic medical record storage must ensure the security, integrity, confidentiality, and availability of Electronic Medical Record data". Backup data ensures that the data and information remain accessible and usable for health services, facilitating the implementation of ethical aspects of electronic medical records in Indonesian hospitals (Izza & Lailiyah, 2024).

Six studies highlight ethical aspects and barriers to implementing Electronic Medical Records (EMR) in various hospitals in Indonesia. Gopi et al. (2024) study showed that patients could self-register, while privacy was maintained through a separate server and data backup. However, server disruptions led to system errors without any explanation for data protection. Chhor et al. (2025) noted a login system with access restrictions, but data was not maximized and the PACS system was unavailable. Augustine et al. (2024) found logins with password expiration systems, but no electronic signatures. Ardianto et al. (2024) reported restrictions on access rights and data editing time, despite the lack of security SOPs. Ametefe et al. (2024) noted efficiency through electronic signatures and fingerprints, although the system experienced disruptions during busy periods. Meanwhile, Nguyen et al. (2024) added the innovation of self-registration via an app, although facial recognition and automatic logout features were not yet available.

## **5. Discussion**

Several laws and regulations govern the ethical aspects of medical records in Indonesia, providing the legal foundation for the implementation and management of Electronic Medical Records (EMRs) (Prabawati et al., 2025; Yunengsih, 2025). These include Permenkes Number 24 of 2022 on Medical Records, Law Number 17 of 2023 on Health, Law Number 29 of 2004 on Medical Practices, Law Number 36 of 2009 on Health, and Law Number 44 of 2009 on Hospitals (Indonesia, 2009a).

Among these, Permenkes Number 24 of 2022 provides the most comprehensive and detailed regulation regarding medical record ethics. It outlines key ethical principles such as autonomy, privacy and confidentiality, access control and authentication, system integration and non-repudiation, as well as availability of information. Each of these elements plays a crucial role in ensuring that patient medical data is protected, accessible only by authorized personnel, and recorded accurately in a legally accountable manner (Cahyaharnita, 2019). These regulations help ensure ethical standards in both clinical practice and health information systems (Tamon et al., 2025).

The implementation of ethical aspects of electronic medical records in Indonesian hospitals has been quite good. The articles collected found some similarities in the basic systems of RME implementation, such as the login page that has been found in most RME systems in hospitals. Integrated systems with all parts of the hospital, data backup and UPS systems that ensure data availability in case of system problems have also been implemented (Agno & Guo, 2013; Pratama et al., 2023). Each health worker generally has their own account and access to features is limited according to their respective roles. Data availability is usually easier and faster to access with the implementation of electronic medical records. The privacy of patient data is quite guaranteed with access restrictions, and some hospitals only allow access to data when connected to the hospital's network connection (Melyanti & Sewu, 2023; Rubiyanti, 2023). The auto logout feature is already available in some hospitals after a certain period of time and password changes are encouraged to health workers every few months. The history of changes to data is set and can be seen, deletion of data is usually not done and only changes are made. Maintenance is carried out within a period determined by each hospital (Schumaker & Reganti, 2014; Jabali & Jarrar, 2018). Digital signatures and fingerprints are also available in some hospitals for further security and authentication.

In practice, several deficiencies are still encountered in the implementation of electronic medical records in hospitals. These shortcomings generally stem from system errors, human errors, the lack of adequate infrastructure, or the absence of specific standard operating procedures (SOPs) governing electronic medical records. Additionally, the ethical aspect of patient autonomy tends to be underexplored in existing academic literature. Nevertheless, the integration of digital registration applications has shown potential in strengthening autonomy. These applications allow patients to independently register, select their preferred doctor, determine treatment types, and schedule appointments based on their needs and convenience, thus enhancing patient-centered care.

## 6. Conclusion

This study finds that although ethical regulations regarding electronic medical records (*Rekam Medis Elektronik/RME*) in Indonesia particularly those outlined in Permenkes Number 24 of 2022 are relatively comprehensive, their practical implementation in hospitals remains suboptimal. Common obstacles include technical limitations, such as system instability and data security vulnerabilities, the absence of standardized operational procedures specific to electronic records, and a general lack of emphasis on patient autonomy in RME usage. Nonetheless, some hospitals have made progress by adopting measures such as restricted access systems, electronic signatures, and automated data backup protocols. The practical implication of these findings is the urgent need to harmonize legal and ethical standards with on-the-ground hospital practices. Hospitals must prioritize infrastructure readiness, improve staff competency in managing RME systems, and institutionalize SOPs that incorporate ethical safeguards, particularly with regard to privacy, authentication, and patient consent.

On a broader scale, uniform digitalization efforts are essential to ensure equitable RME implementation across healthcare facilities in Indonesia. From a theoretical perspective, the study contributes to the discourse on bioethics in digital health systems by highlighting the underexplored dimension of patient autonomy in Indonesian contexts. The study confirms that autonomy is not merely a technical issue but a core ethical principle that must be actively embedded in system design and usage policies. However, this study is limited by its descriptive and normative approach, without quantitative or empirical validation across different hospital types and regions. Future research should investigate how various levels of hospital accreditation and regional infrastructure affect RME ethics implementation. Comparative studies across provinces or between public and private institutions would also enrich understanding and support more targeted policymaking.

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***Data Disclosure Statement***

The data that support the findings of this study are available from the corresponding author upon reasonable request.



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