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Original Article

Electronic prescription as an instrument for qualifying pharmaceutical assistance in Brazil

Prescrição eletrônica como instrumento de qualificação da assistência farmacêutica no Brasil

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ABSTRACT
Electronic prescription is a technological innovation that aims to improve the quality of Pharmaceutical Assistance. It allows healthcare professionals to prescribe medications in an electronic record, containing structured and interoperable data, replacing paper prescriptions. This type of prescription brings several benefits to patients, promotes greater patient safety and adherence to treatment, reduces fraud, improves the quality of the medication prescription and dispensing processes and access to information. This study describes the development of the electronic prescription record in the SUS, through the National Health Data Network (RNDS) and its dissemination to patients and health professionals within SUS Digital platforms. As a result, more than 1.8 million records have already been received at RNDS and are therefore available on SUS Digital Profissional platforms. The presentation of such results is another step towards improving patient protagonism, democratizing access and guaranteeing rights, prevention and more effective pharmacotherapeutic monitoring. Electronic prescription is a pharmaceutical assistance qualification instrument, providing greater security, efficiency and control in the medication prescription and dispensing processes. By integrating technology into healthcare, it is possible to improve the quality of care, optimize resources and promote safer and more personalized assistance.
Keywords: Electronic Prescribing; Pharmaceutical Services; Health Information Interoperability; Digital Health; Continuity of Patient Care

RESUMO
A prescrição eletrônica é uma inovação tecnológica que visa aprimorar a qualidade da Assistência Farmacêutica. Permite que profissionais de saúde prescrevam medicamentos em um registro eletrônico, contendo campos e dados estruturados e interoperáveis, substituindo as tradicionais receitas em papel. Essa modalidade de prescrição traz diversos benefícios para o cidadão, promovendo a maior segurança no uso dos medicamentos, redução de fraudes, aprimoramento da qualidade nos processos de prescrição e dispensação de medicamentos e acesso às informações e promoção da adesão ao tratamento. Este estudo descreve o desenvolvimento do registro de prescrição eletrônica no SUS, por meio da Rede Nacional de Dados em Saúde (RNDS) e a disseminação dos registros ao cidadão e profissional de saúde por meio das plataformas SUS Digital. Como resultado, mais de 1.8 milhões de registros já foram recebidos na RNDS, e por conseguinte, disponíveis nas plataformas SUS Digital Profissional. A apresentação desses dados é mais um passo para aprimorar o protagonismo do cidadão, democratizando o acesso e garantindo direitos, propiciando acesso, prevenção e monitoramento farmacoterapêutico mais efetivo. A prescrição eletrônica é um instrumento de qualificação da Assistência Farmacêutica, proporcionando maior segurança, eficiência e controle no processo de prescrição e dispensação de medicamentos. Ao integrar a tecnologia aos cuidados de saúde, é possível melhorar a qualidade do atendimento, otimizar recursos e promover uma assistência mais segura e personalizada.
Palavras-chave: Prescrição Eletrônica; Assistência Farmacêutica; Interoperabilidade da Informação em Saúde; Saúde Digital; Continuidade da Assistência ao Paciente

Introduction

Electronic prescribing is a technological innovation aimed at enhancing the quality of Pharmaceutical Care. It allows healthcare professionals to prescribe medications through an electronic record containing structured and interoperable fields and data, replacing traditional paper prescriptions. This form of prescribing offers several benefits for pharmaceutical care, promoting greater patient safety, reducing fraud, improving the flow of health data, and enhancing the quality of the prescribing and dispensing processes.[1-5]

With the advancements in the implementation of Electronic Health Record (EHR) systems, the quality of patient care has improved, along with greater safety in the processes of prescribing and dispensing medications. Driven by guidelines within the scope of Health Information Technology, there is an increasing demand for healthcare professionals to document and record patient care in a structured and reportable manner.[6]

Among the main medication errors, events related to the prescribing process stand out, highlighting the need to improve the mechanisms currently in use. In addition, investments in the education of healthcare professionals regarding the understanding of the risks associated with operational errors are identified as a key strategy to enhance procedures and patient care protocols.[7-10]

It is worth highlighting the importance of using the electronic medical record for documenting patient care, as it serves as a structural component for the implementation of electronic prescribing. The electronic medical record is also seen as a facilitator for improving communication among healthcare professionals, contributing to clinical decision-making, treatment adherence, and patient safety. However, on its own, this tool does not solve all existing problems.[8]

For the efficient implementation of electronic prescribing, challenges such as data interoperability, the existence of multiple distinct information systems, and the difficulty in establishing standardized terminologies need to be overcome.[11]

In Brazil, with the recognition of the National Health Data Network (RNDS) as an interoperability platform, an information model capable of accommodating the necessary data for electronic prescription records has been published.[7,8,12]

Regarding the terminological standard for medications, Brazil adopts the Brazilian Drug Ontology (OBM), which promotes interoperability by integrating data from different information systems and standardizing the records of prescriptions and medication dispensing through the RNDS. Thus, with the digitalization of healthcare, especially regarding medication-related information, the OBM will provide a unified terminological database, enabling the unequivocal identification of products and strengthening health surveillance, as well as promoting safety, quality, and effectiveness in medication use and enhancing pharmaceutical care in Brazil.[13,14]

With the OBM, Brazil will adopt a robust standard for the interoperability of medication prescriptions. Considering the context and the benefits demonstrated by the strategies adopted in several countries to improve healthcare quality and ensure continuity of care, combined with the lack of studies that analyze the process of adopting and implementing models like the one addressed in this study, the execution of this research is justified.[15-18] Thus, the objective of this study is to describe the development and dissemination of electronic prescription records within the Brazilian Unified Health System (SUS) through the National Health Data Network (RNDS) and to present its benefits for Pharmaceutical Care, continuity of care, and patient safety.

Methods

This is a Brazilian case study that details the decisions and agreements regarding the implementation and interoperability of Medication Prescription Records in Brazil.

Brazil is characterized by its 5,568 municipalities and two districts, covering a territorial area of 8,510,000 km^2 and a population of 203,080,756 inhabitants. The country faces significant social inequality and difficulties in accessing education and healthcare, with social programs playing an important role in mitigating these challenges.[19-23] In addition, Brazil has a unique and decentralized public healthcare system, the Unified Health System

(SUS), which ensures comprehensive, universal, and free access to healthcare for the entire population.[24]

The governance of informational models for interoperability follows a highly robust structure, as outlined below:

Approval and deliberation of informational models by the Digital Health Management Committee (CGSD) of the Ministry of Health, with the definition of priorities for the implementation of the electronic prescription information model within the SUS.

Agreement reached during meetings of the Tripartite Intermanagement Commission (CIT) and the publication of a specific ministerial ordinance establishing the regulations for receiving data through the RNDS and disseminating it via the SUS Digital platforms.

Thus, for the present study, in addition to the analyses carried out on the agreements and prioritizations within the governance bodies, a documentary analysis was conducted regarding the regulations governing the implementation of electronic prescribing through the National Health Data Network (RNDS), including its definitions, agreements, and implementation stages. To support this analysis, the official portals of the National Health Data Network and the Digital Health Management Committee were consulted. These repositories compile technical updates, agreements, and the continuous monitoring of the overall digital health strategy.

For data analysis, a request for access to the quantitative records in the RNDS was made. The request was submitted via email to the General Coordination of Innovation and Health Informatics, part of the Department of Information and Informatics of the Unified Health System (DATASUS), under the Secretariat of Information and Digital Health (SEIDIGI) of the Ministry of Health. The purpose of this request was to obtain information on the number of records available and to assess the benefits provided by the platform.

As this is a case report, and the data used were public and anonymized, with no possibility of identifying individuals, there was no need for review by the Ethics Committee. Nevertheless, ethical principles were observed throughout the entire study.

Results

The informational model for electronic prescribing within the RNDS (RPM – Medication Prescription Record) was agreed upon in technical meetings with members of the Digital Health Management Committee (CGSD) and subject-matter experts. It was approved during the 1st Ordinary Meeting of the Tripartite Intermanagement Commission (CIT) in 2022 and published through Consolidation Ordinance SAES/MS No. 1, dated February 22, 2022 (Chapter IX).

Following the establishment of a new message format for the RNDS, the General Coordination of Innovation and Health Informatics of the Department of Information and Informatics of the Unified Health System (CGIIS/DATASUS), under the Ministry of Health, initiated the development of a specific computational model and the preparation of the RNDS architecture to enable the exchange of electronic prescription messages.

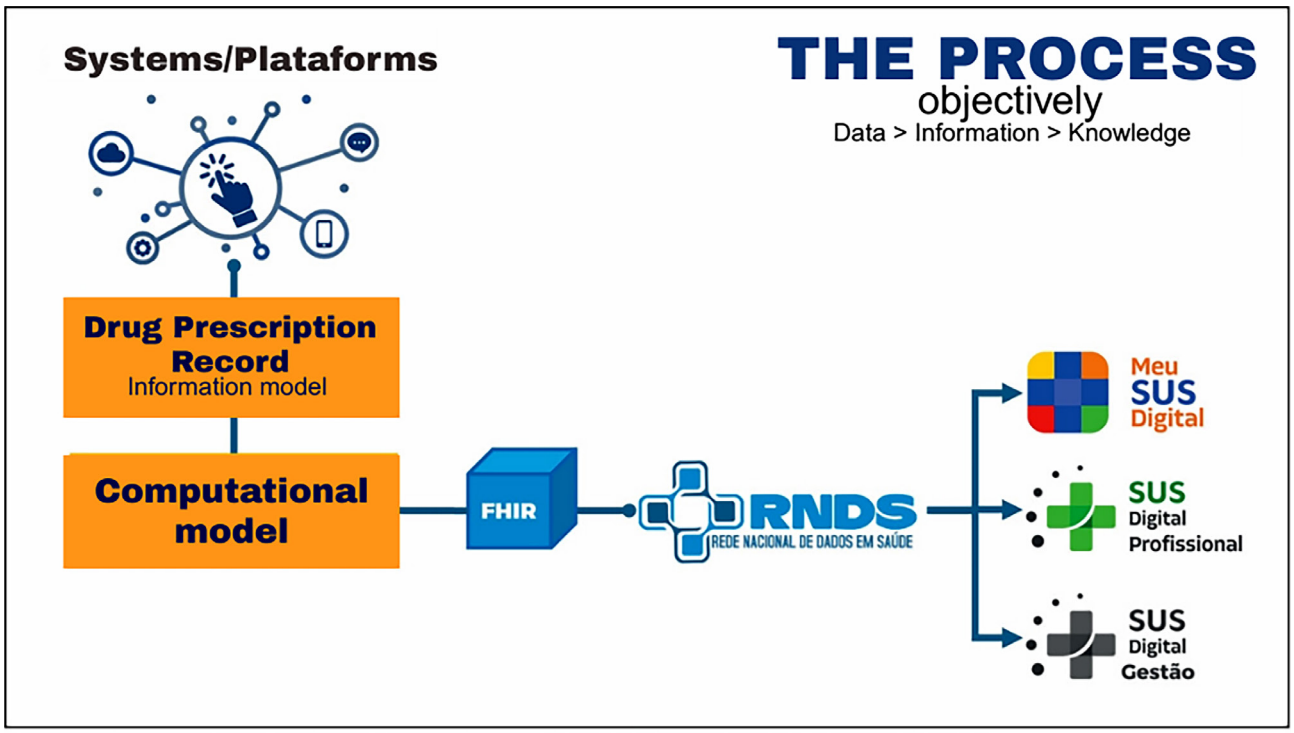
The development of the computational model for the RPM involved the selection of Fast Healthcare Interoperability Resources (FHIR), which correspond to the specific data contained in the message. Regarding the preparation of the RNDS architecture, this process included the development of endpoints and services for receiving messages, as well as the creation of mechanisms for system integration.

With the computational component developed, the next steps involved the creation of dissemination tables and the development, within the SUS Digital platforms, of an interface for disseminating prescriptions to both citizens and healthcare professionals.

In December 2023, the Ministry of Health began receiving electronic prescription records in the RNDS. The pilot project aimed to collect data from municipalities selected by the Secretariat of Primary Health Care (SAPS), which were submitted through patient encounters recorded in the citizen's electronic health record within Primary Health Care (PEC e-SUS APS).

The following table presents the data received from the six municipalities that use the new version of the Citizen's Electronic Health Record for Primary Health Care (PEC e-SUS APS). As this functionality is expanded nationwide, it is expected that more than 4 million prescriptions will be received monthly, thereby highlighting the value and relevance of the RNDS and the SUS Digital platforms.

Figure 1. Stages of Development of the Electronic Prescription Record



Source: General Coordination of Innovation and Health Informatics | Ministry of Health

Table 1. Number of municipalities, healthcare facilities, and prescriptions available in the National Health Data Network, by Federative Unit, Brazil, 2023.

Federative Unit	N.º of Municipalities	N.º of Estab.	N.º of Prescriptions
Ceará	1	3+68	484
Distrito Federal	1	2	2
Espírito Santo	1	23	1,013
Minas Gerais	1	9	2,574
Paraná	1	33	376
Rio Grande do Norte	1	3	400
TOTAL	**6**	**108**	**4,849**

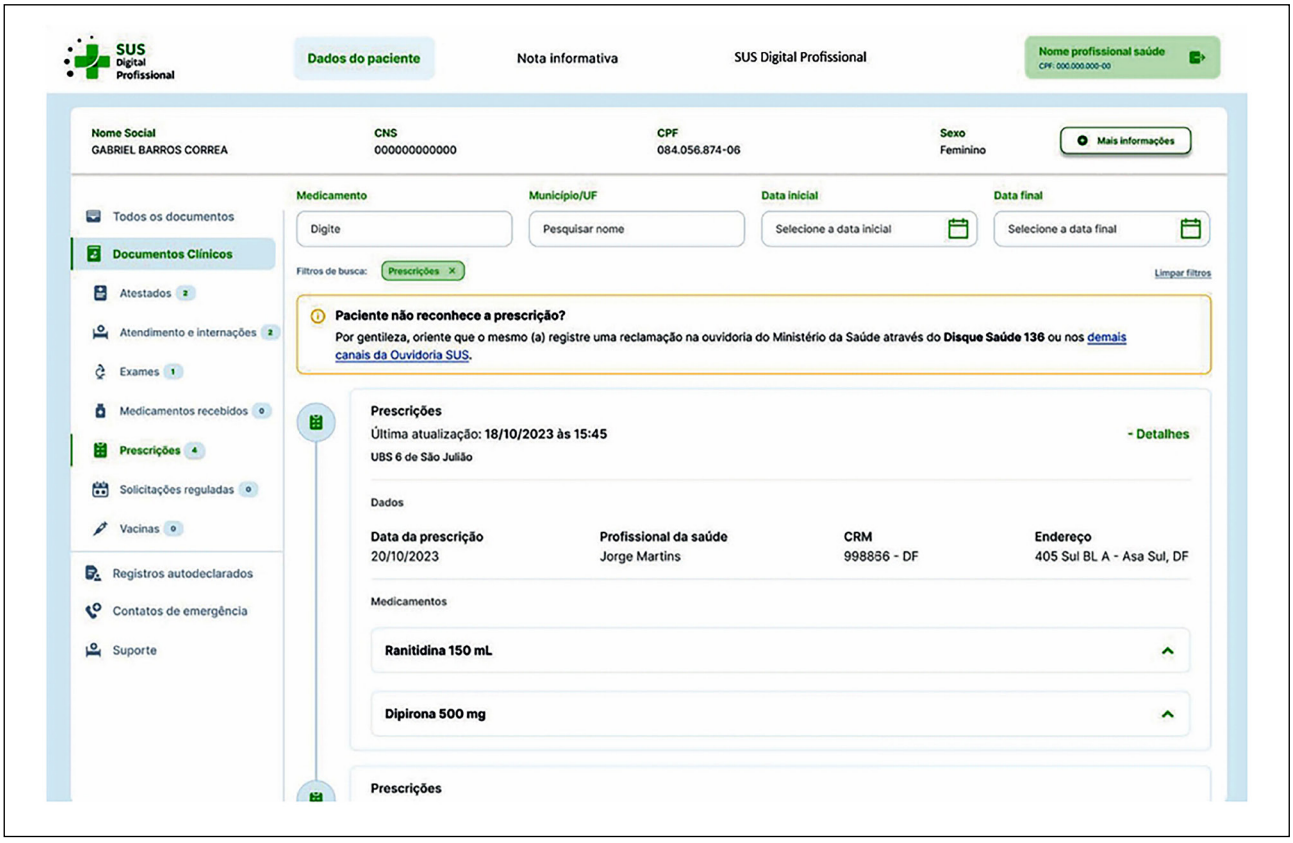
Observation: Data from december 22, 2023. N.º of Estab.: Number of establishments
Source: BRASIL; MINISTRY OF HEALTH, 2023

Discussion

The ability to prescribe medications electronically represents a significant contribution to pharmaceutical care, offering benefits that range from enhancing patient safety to optimizing the flow of health data and improving the quality of the prescribing and dispensing processes. This advancement has the potential to provide greater safety, reduce fraud, and minimize errors in prescribing and dispensing, as evidenced by recently published studies that highlight electronic prescribing as a fundamental tool for ensuring greater patient safety.[1]

In line with the present study, other research highlights the importance of terminological standardization prior to the implementation of electronic prescribing systems.[18] Similarly to Brazil, several countries have adopted interoperability strategies to enable the provision of this service.[15,16]

Figure 2. SUS Digital Professional interface displaying the electronic prescribing functionality.

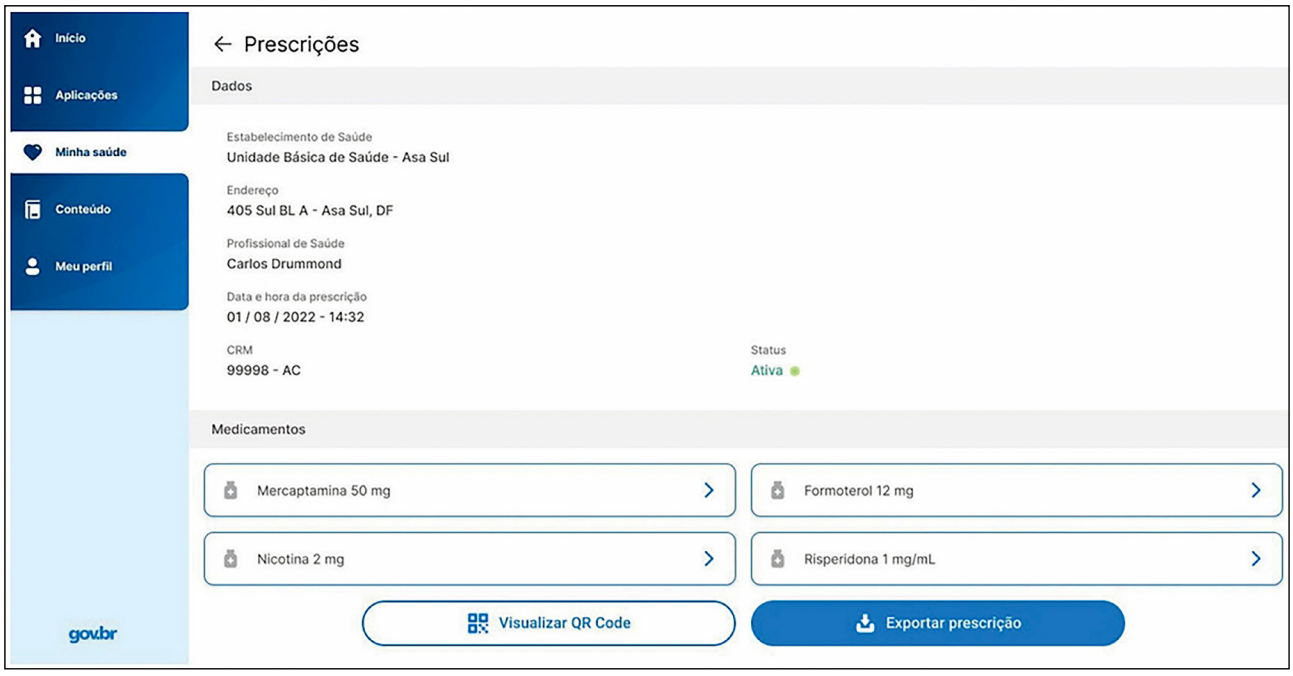


Source: SUS Digital Professional – Ministry of Health

Figure 3. Screen detailing the electronic prescribing functionality in Meu SUS Digital

Source: Meu SUS Digital – Ministry of Health

Figure 4. It has the functionality of electronic prescription with the possibility of issuing the document.



Source: Meu SUS Digital – Ministry of Health

Additionally, studies have been identified that emphasize the imperative need for the development and use of electronic prescribing systems to be aligned with quality standards. A poorly designed system can lead to negative impacts on the quality of patient care.[25]

In general, scientific evidence indicates that the implementation of electronic prescribing provides substantial benefits for healthcare professionals, managers, and patients across various dimensions. Among these benefits are the significant reduction of medication errors, support for monitoring and improving patient adherence to treatments, and assistance in clinical decision-making.[2,9,26,27]

As a limitation of this study, it is important to highlight the inability to analyze the direct impacts of implementing electronic prescription of medications within the RNDS. This is therefore recommended for future studies in order to evaluate the benefits, challenges, and digital health transformation in these contexts. As a strength, this study presents the entire process of implementing electronic prescribing in Brazil, from its initial conception to its first uses and data reception, marking a fundamental step in the country's digital transformation. Furthermore, the expertise of the authors is noteworthy, as they are responsible for coordinating the implementation of electronic prescribing nationwide, thus providing valuable insights for countries that are in the process of implementation or planning to adopt similar strategies.

Conclusion

The establishment of electronic prescribing within the RNDS represents another step toward enhancing the citizen's role in their own healthcare. Through the SUS Digital platform, individuals will be able to quickly and transparently access their clinical history, allowing patients to view their own health information, better understand their clinical conditions, improve treatment adherence, reduce errors, and actively participate in the care process. Furthermore, through the RNDS, it has been possible to foster an interoperable environment in Brazil, providing standardized information to healthcare professionals and offering a more effective tool for pharmacotherapeutic monitoring compared to paper-based prescriptions.

In addition, the implementation of the OBM will enable the establishment of a unified termino-

logical standard, built upon rigorous international standards for the categorization and description of medications. It will be made available openly and free of charge to any information system, thereby strengthening the interoperability environment in the country.

Brazil has initiated the implementation of electronic prescribing within the RNDS and the dissemination of health records through the SUS Digital platforms. In this context, through data standardization and interoperability, access to health records by both citizens and healthcare professionals provides error reduction, improved efficiency, cost savings, and patient empowerment as key benefits. Moreover, as more data is transmitted to the RNDS, a greater volume of information will become available to healthcare professionals, enabling them to enhance and strengthen continuity of care.

Thus, with the widespread adoption of electronic prescribing, an accelerated evolution of Digital Health in Brazil is envisioned, enabling the availability and exchange of health information with increasing speed and quality, bringing significant benefits to citizens, healthcare professionals, and SUS managers.

Contributions of the Authors

JEAQ: Research coordination, definition of research objectives and hypotheses, manuscript writing, formatting according to journal guidelines, and manuscript review. RWMM: Research coordination, manuscript writing, data collection and analysis, and manuscript review. ESS: Statistical analyses, interpretation of results, creation of tables and figures, methodology development and implementation, and manuscript review. GNN: Manuscript review, grammatical revision, and formatting according to journal guidelines. PXS: Research coordination, interpretation of results, and manuscript review. PLM: Manuscript writing, data collection and analysis, and manuscript review. RSS: Definition of research objectives and hypotheses and final manuscript review.

Responsible Reviewers

Lindemberg Assunção Costa, Juliana Ferreira Fernandes Machado

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