







## DIFFUSION OF THE ELECTRONIC CITIZEN'S RECORD IN FAMILY HEALTH TEAMS

### DIFUSÃO DO PRONTUÁRIO ELETRÔNICO DO CIDADÃO EM EQUIPES DE SAÚDE DA FAMÍLIA

### DIFUSIÓN DEL REGISTRO ELECTRÓNICO DEL CIUDADANO EN EQUIPOS DE SALUD FAMILIAR

 Grazielly Soares Avila<sup>1</sup>  
 Ricardo Bezerra Cavalcante<sup>2</sup>  
 Natalia Gherardi Almeida<sup>1</sup>  
 Tarcisio Laerte Gontijo<sup>3</sup>  
 Suellen de Souza Barbosa<sup>4</sup>  
 Maria José Menezes Brito<sup>1</sup>

<sup>1</sup>Universidade Federal de Minas Gerais - UFMG, Escola de Enfermagem. Belo Horizonte, MG - Brazil.

<sup>2</sup>Universidade Federal de Juiz de Fora - UFJF, Faculdade de Enfermagem, Departamento de Enfermagem Aplicada. Juiz de Fora, MG - Brazil.

<sup>3</sup>Universidade Federal de São João del Rei - UFSJ, Departamento de Enfermagem. Divinópolis, MG - Brazil.

<sup>4</sup>UFJF, Faculdade de Enfermagem, Curso de Graduação em Enfermagem. Juiz de Fora, MG - Brazil.

Corresponding Author: Grazielly Soares Avila  
E-mail: grazisavila@gmail.com

#### Authors' Contributions:


Conceptualization: Grazielly S. Avila, Ricardo B. Cavalcante, Natalia G. Almeida, Tarcisio L. Gontijo, Maria J. M. Brito; Data Collection: Grazielly S. Avila; Funding Acquisition: Ricardo B. Cavalcante, Tarcisio L. Gontijo; Investigation: Grazielly S. Avila, Ricardo B. Cavalcante, Maria J. M. Brito; Methodology: Grazielly S. Avila, Ricardo B. Cavalcante, Tarcisio L. Gontijo, Maria J. M. Brito; Project Management: Ricardo B. Cavalcante, Maria J. M. Brito; Resources Management: Grazielly S. Avila, Ricardo B. Cavalcante, Maria J. M. Brito; Supervision: Ricardo B. Cavalcante, Maria J. M. Brito; Validation: Grazielly S. Avila, Ricardo B. Cavalcante, Maria J. M. Brito; Visualization: Grazielly S. Avila, Ricardo B. Cavalcante, Tarcisio L. Gontijo, Maria J. M. Brito; Writing - Original Draft Preparation: Grazielly S. Avila, Ricardo B. Cavalcante, Natalia G. Almeida, Tarcisio L. Gontijo, Suellen S. Barbosa, Maria J. M. Brito; Writing - Review and Editing: Grazielly S. Avila, Ricardo B. Cavalcante, Natalia G. Almeida, Tarcisio L. Gontijo, Suellen S. Barbosa, Maria J. M. Brito.

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 Kênia Lara Silva  
 Luciana Regina Ferreira da Mata

#### ABSTRACT

**Objective:** to analyze the diffusion of the citizen's electronic record in family health teams. **Method:** case study with a qualitative approach based on the theory of diffusion of innovation. Data collection included interviews with 39 professionals and direct observation in two basic health units in the eastern region of Minas Gerais. Data were analyzed through content analysis and systematized using software. Results: the analysis resulted in two categories - "innovation electronic citizen record and its attributes" and "communication channels, time and social system: influences on the diffusion of electronic citizen record". In the first, the attributes of innovation were identified, which are: relative advantage, compatibility, trialability, observability, and complexity. In the second category, it was identified how the communication channels, time and the social system have influenced the diffusion of the citizen's electronic medical record. Through this analysis, it was possible to identify situations that enhance acceptance, such as: saving resources, integrating information between professionals, optimizing time, speeding up access to data; and others that increase rejection, such as: disappearance of records, risk to the integrity of information, failures in the internet network, poor quality of equipment, insufficient training, among others. Final considerations: the acceptance of the Electronic Citizen's Record is a great challenge for professionals and for management spheres, as the challenges permeate phases that range from the implementation of infrastructure to training for use and subsequent monitoring.

**Keywords:** Electronic Health Records; Family Health Strategy; Diffusion of Innovation; Primary Health Care; Health Planning; Health Information Systems.

#### RESUMO

**Objetivo:** analisar a difusão do prontuário eletrônico do cidadão em equipes de saúde da família. **Método:** estudo de caso de abordagem qualitativa fundamentado na teoria da difusão da inovação. A coleta de dados compreendeu entrevistas com 39 profissionais e observação direta em duas unidades básicas de saúde na região leste de Minas Gerais. Os dados foram analisados por meio da análise de conteúdo e sistematizados com o uso de um software. Resultados: a análise resultou em duas categorias - "a inovação prontuário eletrônico do cidadão e seus atributos" e "canais de comunicação, tempo e sistema social: influências na difusão do prontuário eletrônico do cidadão". Na primeira foram identificados os atributos da inovação, que são: vantagem relativa, compatibilidade, experimentação, observabilidade e complexidade. Na segunda categoria foram identificados como os canais de comunicação, o tempo e o sistema social têm influenciado a difusão do prontuário eletrônico do cidadão. Mediante esta análise, foi possível identificar situações que potencializam a adoção, como: a economia de recursos, integração das informações entre os profissionais, otimização do tempo, agilidade no acesso aos dados; e outras que potencializam a rejeição, como: desaparecimento de cadastros, risco à integridade das informações, falhas na rede de internet, baixa qualidade de equipamentos, treinamento insuficiente, entre outros. Considerações finais: a adoção do Prontuário Eletrônico do Cidadão se constitui em um grande desafio para os profissionais e para as esferas de gestão, pois os desafios perpassam por fases que vão desde a implantação de infraestrutura à capacitação do uso e ao posterior monitoramento.

**Palavras-chave:** Registros Eletrônicos de Saúde; Estratégia Saúde da Família; Difusão de Inovações; Atenção Primária à Saúde; Planejamento em Saúde; Sistemas de Informação em Saúde.

#### RESUMEN

**Objetivo:** analizar la difusión del registro electrónico del ciudadano en los equipos de salud de la familia. **Método:** estudio de caso con enfoque cualitativo basado en la teoría de la difusión de la innovación. La recolección de datos incluyó entrevistas a 39 profesionales y observación directa en dos unidades básicas de salud en la región este de Minas Gerais. Los datos fueron analizados mediante análisis de contenido y sistematizados mediante software. Resultados: el análisis resultó en dos categorías - "innovación del registro ciudadano electrónico y sus atributos" y "canales de comunicación, tiempo y sistema social: influencias en la difusión del registro ciudadano electrónico". En el primero, se identificaron los atributos de la innovación, que son: ventaja relativa, compatibilidad, experimentación, posibilidad de observación y complejidad. En la segunda categoría, se identificó cómo los canales de comunicación, el tiempo y el sistema social han influido en la difusión del registro electrónico del ciudadano.

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A través de este análisis, fue posible identificar situaciones que potencian la adopción, tales como: ahorro de recursos, integración de información entre profesionales, optimización del tiempo, agilización del acceso a los datos; y otros que aumentan el rechazo, tales como: desaparición de registros, riesgo a la integridad de la información, fallas en la red de internet, mala calidad de los equipos, capacitación insuficiente, entre otros. Consideraciones finales: la adopción del Registro Ciudadano Electrónico es un gran desafío para los profesionales y para los ámbitos de gestión, ya que los desafíos permean fases que van desde la implementación de la infraestructura hasta la capacitación para su uso y posterior seguimiento.

Palabras clave: Registros Electrónicos de Salud; Estrategia de Salud Familiar; Difusión de Innovaciones; Atención Primaria de Salud; Planificación em Salud; Sistemas de Información en Salud.

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## INTRODUCTION

In 2013, the Brazilian Ministry of Health (MoH) instituted the e-SUS Primary Care (e-SUS PC) strategy, which consists of a set of actions aimed at the informatization of basic health units (BHU), the integration of information and the systematization of data collection. For this, it has two software systems, the simplified data collection (SDC) and the electronic citizen record (ECR).<sup>1</sup> Regarding the ECR system, the MoH highlights its potential for improving the care provided to the population, expanding the clinical capacity of professionals, optimization of expenditure on information management, systematization of the registration of health information and integration of decision support tools in the provision of health services.<sup>1</sup>

In fact, the ECR represents possibilities for advances and qualification in the use of health information, but also challenges to be overcome. Some studies have shown several weaknesses in implementation, which compromise its legitimacy and generate effects on the work process of health professionals.<sup>2-5</sup>

The implementation of the ECR implies structural changes, in the technologies used in the work processes, in the organizational culture of the teams and in the management as a whole, constituting an innovation.<sup>2,5</sup> An innovation represents something new and its diffusion comprises the process by through which information about innovation circulates between communication channels, for a certain period, among members of a social system.<sup>6</sup>

The diffusion process of an innovation is crucial and determinant for its acceptance or rejection by individuals/acceptor, and the acceptance depends directly on the way it is presented to its future adopters.<sup>6</sup> In Brazil, the ECR diffusion process is new, and several municipalities are still at the beginning of the process.

Therefore, there is still little information available on how this process has taken place.

Therefore, knowing how this innovation is being diffused and how professionals, who are at the cutting edge, are experiencing this process is of fundamental importance, and can contribute to the production of knowledge that support strategies to improve the process of implementing and using the ECR. In this sense, there is the following guiding question: how has the diffusion of the citizen's electronic medical record been in family health teams? In order to answer this question, the general objective was to analyze the diffusion of the citizen's electronic medical record in family health teams (FHT).

## METHOD

This is a research with a qualitative approach, in which the methodological framework of the single case study was used, which is an adequate strategy when it comes to issues related to contemporary phenomena inserted in their real context, especially when the boundaries between the phenomenon and the context are not clear.<sup>7</sup>

Everett Rogers' Theory of Innovation Diffusion (TID) was adopted as a theoretical framework, which reinforces that the diffusion process can be influenced by four elements: innovation itself, communication channels, time, and a social system. Still, the theory highlights as attributes capable of influencing the process of diffusion of innovations in any segment: relative advantage, compatibility, complexity, trialability, and observability. Thus, the decision-making process about the innovation can culminate in its acceptance or rejection, depending on how these elements and attributes are perceived by acceptors.<sup>6</sup>

The study setting included two municipalities in a health micro-region in the eastern region of Minas Gerais. As an inclusion criterion, it was established that the municipalities already had the ECR implemented and in use by health professionals in at least one BHU. From the universe of 24 municipalities belonging to this micro-region, eight met the established inclusion criteria. Afterwards, by means of a draw, two of these municipalities were included in the study. Also randomly, one BHU from each municipality was selected.

The participants in this research were health professionals belonging to the family health teams of the selected BHU. All professionals who used the ECR in their daily work and who were present at the time of data collection

were included. Professionals who were on vacation, day off or leave on the days established for collection were excluded. From a total of 42 professionals, 39 were included in the study: three nurses, seven Nursing technicians, three physicians, 19 community health agents, two dentists, two oral health technicians, one oral health assistant and two receptionists. Three participants were excluded due to absence on the days of data collection.

As sources of evidence, interviews and direct observation were used, in addition to a structured questionnaire to identify the profile of the participants. Before data collection, the researcher who performed it was trained by two other researchers experienced in the methods used. Data collection took place from March to June 2019, being carried out during a typical working week (Monday to Friday). The interviews took place in the physical space of each BHU through individual meetings, in a reserved place and after signing the Informed Consent Form (ICF). The interviews were audio-recorded, conducted using a semi-structured script (Table 1) and lasted an average of 30 minutes. Furthermore, they were transcribed in full and filed in word processing software (Microsoft Word 2019). After transcribing, the interviews were returned to the respondents for comments and/or corrections and

were read by a second researcher comparing them with the audios, for validation.

To ensure confidentiality, participants were identified by the acronym corresponding to their professional category followed by the number corresponding to the order of the interviews. The acronyms used were ENF- nurse, TENF- Nursing technician, MED- doctor, DEN- dentist, ACS- community health agent, TSB- oral health technician, ASB- oral health assistant and REC- receptionist.

The observation was direct, guided by a script (Figure 1) and took place during the field visit and at the time of the interviews. The participants' work routine during the use of the ERC was observed, in addition to situations that emerged in the field, such as discussions, questions, agreements or disagreements about the ERC. The information collected in the observation was registered in a field diary as observation notes. In the results, they were identified by the acronym NO, followed by the number corresponding to the order presented (NO1, NO2...).

For the analysis of the collected data, the technique of content analysis was used, in the thematic-category modality.<sup>8</sup> To assist in the systematization of the analysis, the MaxQDA software version 2018 was used, which was used in all stages of content analysis.

Figure 1 - Questions from the research script and aspects observed in data collection, according to the Diffusion of Innovation Theory, small municipalities, eastern health region, Minas Gerais, Brazil, 2021

Elements and attributes of innovation	Research script questions	Items observed
Innovation Observability Complexity	Talk about your perception about the use of ECR in Primary Care. How has the process of implementing the ECR been in your unit from the beginning to the present moment?	Observable influences on work; Difficulties or facilities for professionals to use ECR, computers and printers; Physical structure of the units, as well as internet connection, computers, and printers;
Relative advantage	Did you use the previous information system? If yes, talk about the ECR compared to the previous system.	Use of other forms of records in addition to ECR;
Compatibility	Considering the possibilities of the ECR, what stands out most in your daily work?	Use of ECR in FHT work processes;
Communication channels Social system	Are you informed and oriented about updates that occur on the ECR C routinely? In which way? Assuming you have the power to decide whether or not to use the ECR. What choice would you make? Why?	Communication channels used to circulate information about the ECR; Formation of groups and interaction between professionals, based on the ECR.
Time Trialability	Have you been prepared to use ECR? How was this preparation done? Do you consider yourself prepared to use ECR?	

Source: Research data.

With regard to the chronological poles of the analysis process proposed by Bardin,<sup>8</sup> the material was organized in the pre-analysis phase. The transcribed interviews and observation notes were imported into MaxQDA, followed by a floating reading of the material. In the next phase, of exploration of the material, the text was broken down into registration units and then the categorization resulted in two categories: "the ECR innovation and its attributes" and "communication channels, time and social system: influences in the diffusion of the ECR".

The last stage of analysis consisted of processing the results, making it possible to make inferences and interpretations by capturing the manifest and latent contents contained in all the collected material (interviews and observation).<sup>8</sup> For this, deduction and reasoning were used to check meanings to the data. Also at this stage, it was identified in each of the categories which situations can enhance the acceptance, and which can enhance the rejection of the ECR, in light of the TID. A second researcher performed a second analysis of the data, for its validation.

To ensure the accuracy in the study, the list of consolidated criteria for qualitative research reports (COREQ) was used as a support tool, which consists of 32 verification items that concern the research team, the study design, and the data analysis.<sup>9</sup> The project was submitted and approved by the Research Ethics Committee with human beings under Opinion No. 3.297.521, CAAE: 53159316.5.0000.5545. All precepts governed by Resolution 466/2012 of the National Health Council in relation to research involving human beings were followed, as well as the nature of anonymity and voluntary participation in the research, in addition to the guarantee of exclusive use of data for scientific purposes.

## RESULTS

Analyzing the profile of the participants, it was observed that the majority is female (79.5%) and that the predominant age group corresponds to individuals aged 31 to 40 years (53.8%), followed by individuals aged 20 to 30 years (23.0%). Most had completed high school as education (64.1%), 28.2% completed higher education, 15.4% graduated and 7.7% primary education. As for the time of first contact with the ECR, most had contact for two years (38.5%) and three years (35.9%). Only one respondent reported having contact for four years and two had contact for less than a year.

### ECR innovation and its attributes

In this category, the attributes of innovation were identified: relative advantage, compatibility, trialability, observability, and complexity. In the first attribute, relative advantage, the advantages, and disadvantages of the ECR identified by the participants will be presented. One of the advantages highlighted by the participants was the practicality of the ECR in closing production.

SIAB was more laborious, actually, because you took your monthly production. Not here, you release it daily, so I think the data is more correct here (ENF2).

Saving resources and integrating information among professionals were also identified as advantages.

And I also think that it is a way, like the pharmacy, to save money, because sometimes a doctor gives a medicine here, another gives it there, then he just consumes more from the municipality [...] (ASB1).

I can see the test request, we do not keep repeating it anymore, because when I ask, I place everything in there, then there is the date, and everything is saved and there is not so much expense [...] (MED2).

In addition to saving on medications and tests, saving paper was also mentioned as an advantage.

[...] it eliminates paper, I think even for nature it is good [...] (ACS10).

I think it has improved a lot, it saves paper, it does not need this much paperwork [...] (ACS15).

Some participants highlighted as an advantage the fact of having a second chance in relation to writing errors, as the ECR, as well as other electronic health records, allows eventual typing errors to be corrected.

[...] we do not make mistakes, if we make mistakes, it is corrected, so it is much better, because if it is on paper and we do not pay attention, it passes [...] (ACS3).

Despite offering professionals the possibility of correcting errors, it is clear that the ECR is not capable of signaling to the professional the occurrence of the error.

Another thing, the program had to have a self-denial system, for example, when I took the tablet and everything was done, I came across a pregnant man on my file, when I saw that I was shocked, because as a software allowed a pregnant man, how so? It is another failure (ACS4).

Another identified disadvantage concerns the fact that the ECR does not allow the editing of some data.

[...] the child has an outdated CPF, RG or SUS card, if you register that child with that card and then it has an update, there is no way to change it (ACS9).

As seen in the situations mentioned, the ECR does not have the ability to signal the occurrence of some typing errors and does not allow the editing of some data, therefore, it is common for typing errors to be found.

Sometimes they [ACS] type wrongly and we keep trying to guess, if we do not get a part for the paper record, I think it is the care they must have, they are the entrance door, they type first [...] because the typing error is enormous (ACS10).

The disappearance of records was another disadvantage, mentioned by the ACS, a fact that seems to be commonplace.

There is a family that I have registered 6 times and every time I enter their visit, I have to register [...] (ACS10).

Such situations, experienced by the ACS, in which recorded data disappear, have generated a feeling of insecurity in relation to the data.

I like the electronic medical record, but in terms of our protection, I think the sheet, the paper helps more, because there we have the patient's signature, so much so that I do both, I take the sheet and I take the tablet, because in electronic medical record I can press a button there and erase that (ACS7).

Some professionals, faced with perceived flaws in the ECR, have developed strategies to try to overcome them.

I created an imaginary street, the "error" street and I send everyone there, the person who is registered 3, 4 times in the same house, I take it and throw it to the "error" street, and I only have one in my system [...] he [ECR] does not understand that "error" does not exist, everything I do he accepts (ACS10).

Another disadvantage identified was that there was no individualization of access to micro-areas in the ECR territory module, accessed by ACSs through tablets, which can be used as a means of harming a co-worker in cases of disagreement.

Let's suppose that there is a situation where someone in the sector will sabotage any agent's micro-area, he can, one agent sabotages the other's micro-area (ACS4).

For example, if I had a quarrel with you, I do not like you and we are ACS, I can negatively influence your work [...] (ACS12).

The second attribute analyzed was compatibility, which presents the compatibilities and incompatibilities with the professionals' needs and demands. One of the compatibilities found was the agility that the ECR provides to the professional in accessing the patient's data and history, in addition to expanding access and providing more up-to-date information.

The electronic medical record is a thousand times better, in addition to being faster, you have access to the medicines that the person is using whenever you want, everything that has been done before, if she consulted with another doctor and he uses the right system (MED2).

In addition, some professionals recognized that with the use of ECR they can do more activities in less time, production is faster and there is time for other activities, such as planning.

[...] I spent days to fill out the papers, more time to do the service, the practice there and then some time to put it in the system, so [...] it gives greater agility, more time to think, to design, to work, so it's wonderful (TSB1).

One of the incompatibilities identified concerns the lack of some information in the ECR, considered important by professionals, in the daily work of primary health care.

We report there that we visited, looked at the blood pressure, but there is no other specific data on the patient, such as who he is on that day exactly, a specified report. At least in our technical part of Nursing, the data are superficial (TENF4).

Some procedures that, like I told you, do not have in the system [...] and some exams, too, that we end up not finding in the system (ENF3).

In addition, professionals have found it difficult to visualize health situations in the territory based on information stored in the ECR.

[...] for example, on São José Street that I do, it shows me that there are 30 people, but who these 30 people are and where they are, it does not show, at least not in what I have access [...] (ACS10).

Faced with this situation, some professionals chose to use a notebook, where they make lists and records of important information, which they need in their daily lives for decision-making.

I am more oriented by the notebook [...] here there is the date of birth, SUS card, if one has diabetes or not, here is my safety [...] on the tablet it [ECR] does not give me what that person have in the form of a report (ACS10).

Observation note NO1 reinforces this result of the concomitant use of manual and electronic records.

I am in the room used by the ACS at BHU, when one of the ACS arrives carrying a tablet and a notebook with a blue cover. She sits in a chair beside me and opens the notebook. I ask her what information she records there. Then, she shows me that she registers the addresses of her micro-area, with the respective families of each address and some personal data such as date of birth, SUS card number and the health problems reported by each individual (NO1).

Two other problems mentioned, not related to the ECR itself, but interfering with its use, are the failures in the internet network and the low quality of the tablet.

Another thing that also interferes, sometimes the internet is very slow, there are days when we start to do the medical records on the computer, and we have to stop because the internet is off [...] (MED1).

The tablet I have in my hands today, I think it is weak for us to use. I think it cannot stand very long, that is why there was a problem [...] (ACS7).

Moving on to the trialability attribute, it was noticeable in both municipalities that professionals did not have time

allocated for trialability before the ECR was put into practice. As it is something new and “unknown” to professionals, the introduction of the ECR ended up generating some reactions such as fear, resistance, and feelings of incapacity.

[...] I despaired, I dreamed day and night with this electronic citizen's record, I even felt sick. I said, “people do not tell me about this electronic medical record”, because due to my age I thought I would not be able to adapt [...] (ACS7).

In the beginning it was a seven-headed beast, everyone thought it was difficult (TENF5).

In the observability attribute, the participants highlighted some results observed with the use of the ECR. One of the results identified was the reduction of problems with understanding the medical prescription, because through the ECR, the medical prescription and exam orders can be printed, making them legible.

[...] if the printed prescription is given to the person, then there is no problem with the doctor's handwriting, of not understanding the prescription (MED1).

Other results, observed by a small number of participants, were the loss of time with filling in data and an increase in the time of patient care.

[...] so it is like that, a little laborious, in addition to having the service, for example, in addition to making the dressing, you still have to come here and launch it (ENF1).

Many do not like it either, because they think it takes a long time, there are patients who complain, exactly because of the excess of information [...] (MED1).

Considering the perception of an increase in the time spent filling out information in the ECR, some professionals expressed concern with the care offered to the patient, and for this reason they have developed strategies to prevent attention diversion.

[...] for me to give better care to the patient, I write it down on a sheet of paper, I give the patient the assistance he needs and when it is over, I come to the ECR and launch it, then I do not have that rush to launch it (TENF3).

[...] step by step, we are acquiring tactics so that we are not just stuck in typing, in the evolution here on the computer and forgetting about the patient (MED3).

Once again, we see the paper record being used concurrently with the ECR. This fact is confirmed by the following observation note:

One of the Nursing technicians is screening patients who come in search of medical care. When a patient arrives, the technician listens to the complaint, measures the vital signs, writes down the results on a piece of paper, instructs the patient to wait at the reception and then goes to the doctor's office to inform the patient's condition. When she comes back from the office, she opens the ECR on the computer, enters the patient's data and clicks on the option "discharge the citizen" (NO3).

### Communication channels, time, and social system: influences on ECR diffusion

This category discusses how the elements of communication channels, time and social system have influenced the diffusion of the ECR in the cities surveyed. In the present study, it was identified that interpersonal communication has been the main communication channel used in the ECR diffusion process. Among the actors involved in interpersonal communication, two key-informants stand out, called IF1 and IF2.

She [IF1] stayed with us for a long time, she sat down with each professional at a time [...] I think she stayed here with us for more than two months (ENF2).

There is a guy [IF2] who prepared himself, there is always something for him to pass on to us... he came and gave instructions, helped those who did not know how to use the computer, taught them to use the ECR [...] (ACS12).

In addition to key-informants, other professionals have also been a source of information.

Sometimes whoever arrived last, who explains it is the nurse or the IF2 himself/herself (ENF3).

My sister is studying Medicine, so they taught her, and she gave it to me. When I arrived, it was the paper record, and I was the one who taught my team how to use it (MED2).

Training was identified as one of the crucial moments of interpersonal transmission of information about the ECR to professionals, but some professionals considered that the training for the use of the ECR was insufficient.

[...] it was all in groups, we had to open up this field. It was not proper preparation, it was the basics... on, off, how you enter the password. Now, one thing we all realize is that no one has this preparation, not even at the regional level (ACS10).

In addition, professionals consider that the ECR implementation manual does not provide all the necessary information, leaving doubts.

[...] there are things that are still a mystery, it may be that there is some functionality there that I don't even know exists [...] there is a handout [ECR Implementation Manual] that was printed, but it is also pretty vague (ACS10).

In view of the lack of adequate preparation for the use of ECR, some professionals feel unprepared and, as a result, inconsistencies multiply.

Being prepared gives an idea of being ready, so I consider myself less unprepared than at the beginning... there is a lot we cannot do... with these conditions here I feel unprepared... what do I do when a family disappears? I do not know, I register again, I register and then the inconsistencies in the computer multiply [...] (ACS10).

In addition to interpersonal communication, the telephone and the internet are also means of communication used to resolve doubts or communicate about the ECR, through calls and the WhatsApp.

[...] so we have assistance pretty close, the IF1 monitors us closely, any questions, sometimes by phone, by WhatsApp, then she comes here and explains (TSB1).

[...] we also have a working group [WhatsApp] that is suitable for this, sometimes it [IF1] will do some update, if the system is off, she already talks to us and, also, when she comes back, she puts it in the group (ENF2).

Time is another important dimension when assessing the spread of an innovation. As seen before, after the training, the ECR was put into practice immediately, with no time allocated for trialability.

In the beginning everything was like that, something of a surprise, we thought we would not like it (TENF5).

[...] when it was launched, he said... we did a training, from today on you will use it (ENF3).

However, even faced with a sudden implementation, some professionals considered that the learning process was fast.

I think that in a short time everyone caught it, even those who were afraid, who were starting (ACS8).

One of the facilitators of using the ECR was the previous use of the SDC.

[...] this ECR has already been worked on, not on the computer, but the form itself (SDC) I already had an idea, when the ECR came in it was easier (ACS12).

The social system is the last element in the diffusion process. In this study, we identified the proximity and greater articulation between local actors, city hall, municipal health department (MHD), key-informants and ESF professionals, making up a local social system. This proximity happens not only because of the physical proximity between them, but also because of the ease of communication and the interpersonal communication

that takes place, especially between the ESF professionals and between professionals and key-informants.

Still, it was identified that the decision to implement the ECR came from higher levels, so the professionals, individually, did not hold decision-making power on the adoption of the ECR. However, it was decided to question them in this regard, asking the following question during the interview: "assuming you have the power to decide on the use or not of ECR, what choice would you make? Why?". Most responded that they would choose to use the ECR.

Definitely the use, because, as I said, it is major because you have better access to patient information (TENF1).

In my point of view, I do use the medical record. Because it is a way for work to become faster, more practical (ACS4).

Figure 2 summarizes the results of the two categories presented in this study and reports the situations that enhance the acceptance and rejection of the ECR, according to the elements and attributes of innovation, in the light of TID.

Figure 2 - Perception of primary care professionals on elements that enhance the acceptance and rejection of ECR innovation, small municipalities, eastern health region, Minas Gerais, Brazil, 2021

		Enhancing situations of the acceptance of the ECR	Enhancing situations of the rejection of the ECR
Innovation	Relative advantage	- Convenience in closing production; - Resource saving; - Integration of information between professionals; - Possibility of correcting typos;	- Does not flag typos; - Does not allow editing of some data; - Occurrence of typos; - Disappearance of records; - General access to micro areas; - Information integrity risk;
	Compatibility	- Fast access to patient data and history; - Availability of real-time information; - Optimization of professionals' time;	- Important information is missing; - Difficulty in viewing health situations in the territory; - Concomitant use of non-paper records; - Internet network failures; - Low quality of equipment;
	Trialability		Trialability in everyday life after implementation;
	Observability	- Problem reduction with understanding prescriptions;	- Waste of time with filling in; - Increased patient care time;
	Complexity	- Ease of use;	- Volume of information; - Repetitive information;
Communication channels	- Interpersonal communication; - Telephone; - Internet; - Whatsapp; - Key-Informants; - Ongoing Support from Key-Informants;	- Insufficient training; - Manual with insufficient information; - Some professionals consider themselves unprepared to use the ECR;	
Time	- Learning after trialability; - Previous experience with the use of SDC helped in learning to use the ECR;	- Sudden implantation; - There are still doubts;	
Social system	- Local articulated social system (City Hall, SMS, Key-Informants and ESF professionals); - Proximity between Key-Informants and ESF professionals;	- Regulated imposition, without the participation of all members;	

Source: Research data.



## DISCUSSÃO

In this study, it was identified that the diffusion of the EMC has faced situations that can enhance its acceptance, such as the integration of information between professionals, the agility in accessing patient data, the optimization of professionals' time, the availability of information in real time, among others.

There is a consensus among several authors that the availability of records in the electronic medical record and broader access to updated health information are some of the main gains in care practice, when compared to paper records, as the professional has individual access to a computer with internet at your workplace, being able to access the medical record and the reports that the system provides, at any time, resulting in an increase in the performance of the handling of information by professionals, which is more up-to-date and legible.<sup>10-12</sup>

Another important advantage identified is the saving of resources. It is estimated that the introduction of electronic records will lead to savings of about 22 billion reais a year with the greater efficiency of this resource.<sup>13</sup> In addition to the savings from the end of the use of paper records, there is a forecast of reduction in expenses with medicines and tests, due to the integration of information between health professionals, with the consequence of the availability of information in real time and the possibility of being accessed at different points in the health care network (HCN). In this way, information is no longer restricted to one place, allowing professionals to have access to the entire patient history, avoiding repetitive prescriptions and, consequently, reducing unnecessary expenses.<sup>14</sup>

On the other hand, several situations were identified that could enhance the rejection of innovation, such as the disappearance of records, lack of information, difficulty in visualizing health situations in the territory, failures in the internet network and poor quality of equipment. Some of these occurrences have generated a feeling of insecurity in relation to the data and led to the concomitant use of paper records.

One of the premises of health information systems is to facilitate work processes, so when having to record the same information in different places or having to record the same information more than once, instead of facilitating, the technology can end up making the daily routine of professionals difficult, as it can generate the perception that the technology is less advantageous, leading to its underuse or even rejection.<sup>5</sup>

Another observed result concerns the perception of some professionals with the increase of time in filling out information in the ECR and the decrease in time with the patient and, consequently, the diversion of their attention. Studies reveal that reduced time with patients and increased workload in electronic medical record tasks have contributed to dissatisfaction among professionals.<sup>15,16</sup>

Thus, the incompatibility and complexity attributed to innovation end up developing in professionals the perception that the technology being implemented is an instrument of the work process that, added to the others, represents an overload with negative repercussions on care.<sup>5</sup>

It is common for the implementation of technological innovations to generate resistance and discomfort to acceptors, especially when they represent an innovation that breaks with previously accepted processes and paradigms.<sup>6</sup> These feelings are considered human factors influencing the success of an information system, so they should be considered and mitigated with a view to the acceptance of innovation.<sup>17</sup> Therefore, it is essential that there is technical support for solving the problems faced by professionals, so that the innovation, in fact, is recognized as more advantageous in relation to the previous technology, contributing to its acceptance by the professionals.<sup>18</sup>

In addition, it is expected that the ECR instrumentalize the planning and local decision-making process, however, this process can be hampered due to incompatibilities that make it impossible to meet the needs of professionals. When acceptors identify incompatibilities, the diffusion process tends to be compromised. The more an innovation can integrate or coexist with existing values, past experiences, and the needs of potential adopters, the greater its prospects for acceptance and adoption.<sup>6</sup>

Rogers<sup>6</sup> highlights that the decision for innovation can be optional, collective, or authoritarian/normative. Given the context observed and reported throughout this work, it is clear that the decision was of a normative type, as it was taken by a small number of members of the social system (MoH, City Hall and MHS) who have status that gives them certain power over the too much. In addition, the implementation took place suddenly, with no time allocated for trialability and with deficiencies in the technological infrastructure offered.

This situation was also found in studies that analyzed the implementation of the e-SUS PC strategy in other Brazilian cities.<sup>2,5</sup> This form of sudden implementation, without

the effective participation of professionals in decision-making processes and without time for trialability, weakens the innovation diffusion process, as it makes its acceptance difficult, making the diffusion process slower.<sup>2,19</sup>

Some professionals considered that the training for using the ECR was insufficient, leaving doubts and generating in them the perception of unpreparedness, even after some years of using the ECR. For Costa and Portela<sup>20</sup>, the ability of an individual to use an innovation is directly associated with prior knowledge of how to use it properly. Therefore, in addition to operationalizing the structuring of BHU, to receive this technology, it is necessary to invest in training professionals, teaching them how to use it, and involving them in the implementation process, as this reinforces the desire to adopt the innovation.

The essence of the diffusion process is the exchange of information between members of the social system, through which the individual is motivated to reduce uncertainty about the advantages and disadvantages of innovation.<sup>6</sup> Therefore, people play a fundamental role in this process, for they are able to advise, teach and influence others.

As it represents a sudden change in the work process of primary care (PC) professionals, it is essential that elements such as time and trialability are considered, as they are essential to the diffusion process.<sup>6</sup> For this, it is necessary to change this scenario that we have seen in public health Brazilian, whose health technologies are implemented suddenly, with no opportunity for prior trialability and no open dialogue with professionals.

In this scenario, despite the ECR diffusion process representing an important advance in the dynamics of health services, it is still anchored in traditional methods and strategies, similar to other information systems, being spread vertically and without the participation of professionals da Ponta.<sup>21</sup> The challenge of overcoming this form of diffusion is therefore highlighted, basing it on the active participation of all members of the social system.

## FINAL CONSIDERATIONS

In this study, we sought to analyze how the ECR has been diffused in family health teams. It was identified that professionals recognize some advantages, compatibilities, and positive results from the implementation of the ECR, which can enhance its adoption. On the other hand, it was found that the implementation took place suddenly, without the effective participation of professionals in decision-making processes, without time for trialability and without adequate training.

Such situations weaken the innovation diffusion process, hinder its acceptance, and slow down the diffusion process, increasing its rejection.

It was concluded that the adoption of the ECR constitutes a great challenge for the professionals of the ESF and for the spheres of management, as the challenges run through phases that range from the implementation of infrastructure to the training for use and subsequent monitoring, being essential during this process, communication between members of the social system, understanding that only together, professionals and management, it is possible to guarantee the success of this innovation.

The present study is limited by its generalizability, as it is a case study carried out in two municipalities in the eastern region of Minas Gerais. Considering the different realities of Brazilian cities and the specificities of health care in Primary Care (PC), it is pertinent that further studies on this topic are carried out in other cities and other regions of Brazil. In this way, the findings of this study may guide and support further investigations that deepen the understanding of the diffusion process, implementation strategies, as well as the use of the ECR for health planning in ESF teams, and also contribute to the production of knowledge that can direct strategies to improve the process of implementing and using the ECR.

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