

ANALYSIS OF DEVELOPMENT AND USER ASPECTS OF ePRESCRIPTION IN SLOVENIA

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Slovenia has well-developed eHealth solutions. One of these is ePrescription, which enables the electronic prescription of medicines and their dispensing in pharmacies. With few exceptions, the everyday functioning of the healthcare system ground to a halt during the COVID-19 pandemic. New treatment protocols and the risk of infection meant that health professionals faced major challenges in their work. Patients tried to reduce the number of personal visits to healthcare institutions as much as possible, both out of fear of infection and in response to the changes introduced in healthcare provision and the various restrictions put in place. Because of the exceptional circumstances, other inherent factors and pressure from patients, health professionals began to make more intensive use of eHealth solutions. The ePrescription solution was already in general use at this time and proved extremely important in ensuring the prescription of medicines. The paper will describe the ePrescription solution in detail, illustrate its development and, with the help of data from statistics and business intelligence modules, analyse its use.

Keywords:

ePrescription,
electronic
prescription,
eHealth,
health
informatics



University of Maribor Press

DOI <https://doi.org/10.18690/um.fov.4.2024.14>
ISBN 978-961-286-871-0

1 Introduction

Slovenia has well-developed eHealth solutions. One of these is ePrescription, a national IT solution for the electronic prescription of medicines by healthcare providers and the dispensing of medicines in pharmacies. Despite the solution has been in use since 2015, there is very little written about it, especially in English. Our aim is to describe and analyse the ePrescription solution, provide data on its use over the years, and discuss this.

Today ePrescription is one of the most recognised, effective and widely used solutions to have been developed in the context of Slovenian eHealth. Its effects have been evaluated by the Ministry of Public Administration in 2020 in the document "Evalvacija ukrepov iz enotne zbirke ukrepov, Vrednotenje učinkov implementacije projekta eZdravje: eRecept, eNaročanje" (Ministry of Public Administration, 2020).

The DESI Report 2019 (European Commission, 2019) ranked Slovenia third in the EU in terms of the use of electric prescriptions. The ePrescription solution also won the "Informacijska jagoda" award for the best information society achievement in 2017.

The aims of the ePrescription solution were the following (Stanimirović & Matetić, 2018; National Institute of Public Health, 2020):

- To increase patient safety and reduce errors due to the incorrect use of medicines through improved legibility of prescriptions and a smaller number of administrative errors.
- To simplify procedures for patients in cases where, taking into account medical guidelines, a prescription may be issued in the absence of the patient, since in such cases the patient does not need to visit the prescriber in order to collect the prescription.
- To ensure more efficient prescription and use of medicines, taking into account information on previously prescribed and dispensed medicines.
- To increase the efficiency of the process of dispensing medicines within individual operators and between operators in healthcare, above all by reducing unnecessary contacts and journeys.

- To reduce administrative costs by eliminating the use of paper forms (purchase of forms, printing in doctor's surgeries, filing systems in pharmacies).
- To provide the data necessary for various analyses, including various types of studies.

ePrescription use found an even bigger role during the COVID-19 pandemic. With few exceptions, the everyday functioning of the healthcare system ground to a halt during the COVID-19 pandemic. New treatment protocols and the risk of infection meant that health professionals faced major challenges in their work. Patients tried to reduce the number of personal visits to healthcare institutions as much as possible, both out of fear of infection and in response to the changes introduced in healthcare provision and the various restrictions put in place. Because of the exceptional circumstances, other inherent factors and pressure from patients, health professionals began to make more intensive use of eHealth solutions. During this period, prescribing medicines remotely without the patient being present made it possible for many patients to obtain medicines without interruption and greatly eased access to medicines during the pandemic.

In this paper we describe and analyse the ePrescription solution, provide data on its use over the years, and discuss this.

2 Methodology

The paper presents an analysis of the functionality and use of the ePrescription solution as part of Slovenian eHealth. The solution was introduced at the national level in 2015. During the COVID-19 pandemic it made it possible for large numbers of patients to access the medicines they needed, which indicates that this solution is important for Slovenian health system. Our research aimed to answer the question of what the ePrescription solution actually consists of and to explore its development and use over the years. It was based on the case study research methodology (Kljajić Borštnar, 2021; Yin, 2018), which included an in-depth study of the field and its analysis. For data we used statistics from the administrative and business intelligence modules.

The selection of this research methodology was driven by the distinct characteristics of the research topic, with the chosen method regarded as the most efficient for the study. Due to the exploratory nature of this research, quantitative empirical methods were found insufficient for producing satisfactory results or offering a credible evaluation of the field. The intricate landscape of healthcare digitalization in Slovenia is still evolving, posing challenges in ensuring the representativeness of the research sample. Thus, the case study framework, including exhaustive literature review and statistical data, was considered the most favourable methodological approach to enable a comprehensive exploration of the of the functionality and use of the ePrescription in Slovenia.

Accordingly, the analysis was conducted on the one hand based on a review of the literature in this field (Rant et al., 2017; Rant et al., 2019; Stanimirović & Matetić, 2018; Stanimirović et al., 2022, Yang et al., 2022; Zidarn et al., 2018; Matetić et al., 2024) as well as on the examination of project documentation, user instructions and the technical specifications of the solution. On the other hand, it based on observations and statistical usage data. We used statistics from the administrative and business intelligence modules in the analysis to compare the number of electronic prescriptions issued by year, their share comparing all prescriptions issued and compare number of electronic prescriptions issued by months in different years. We also compared data number of healthcare providers using this solution on the both side of it – prescribing prescriptions and dispensing medicines. We use data from the years 2016 to 2023.

Analysis of the functionality and use of the ePrescription solution was carried out in December 2023 and January 2024. Statistical data were obtained from the business and administrative modules in January 2024.

3 Results

3.1 Description of the solution and analysis

ePrescription is a national IT solution for the secure electronic prescribing and electronic dispensing of medicines. Electronic prescriptions are generated in the local IT systems of healthcare providers and stored in a central register of electronic prescriptions (Fig. 1). The latter serves as a source of information for pharmacies,

where medicines are dispensed to patients on the basis of ePrescriptions issued (Ministry of Health, 2013).

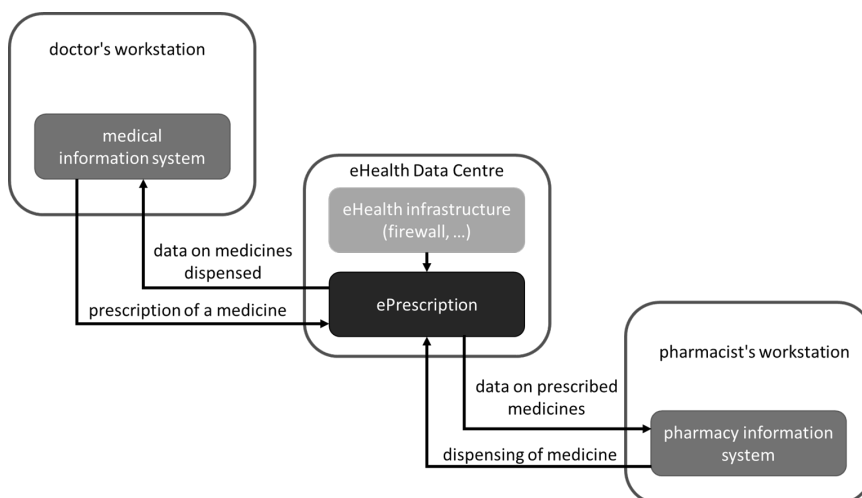


Figure 1: Diagram of the ePrescription solution

Source: (Stanimirović & Matetić, 2018; National Institute of Public Health, 2020)

Even the development of the solution is an example of good practice, since seven software providers cooperated on its development as a consortium. The solution was introduced in November 2015 at the primary level throughout Slovenia, and then at the secondary and tertiary levels in February 2016. It is used on a daily basis by healthcare providers and in pharmacies.

The solution consists of two components, namely the electronic prescribing and dispensing of medicinal products (Matetić et al., 2024).

When prescribing a medicine, the doctor identifies themselves using their professional card and the patient's health insurance card or health insurance number. The doctor examines the list of medication taken by the patient. Then doctor then chooses the medicine they wish to prescribe from the list of previously prescribed medicines or the Central Medicinal Products Database. They may also prescribe a magistral formula. At this stage they have the opportunity to check interactions and contraindications. The solution also allows doctors to check the suitability of a medicinal product for athletes (in the case of it having been placed on a list of banned

substances). The doctor thus prepares the prescription data and checks appropriateness. They then sign the bundle digitally and send it to the central register of electronic prescriptions (Matetić et al., 2024).

At the pharmacy, the pharmacist uses the patient's health insurance card and their own professional card to obtain patient data, select the prescription and select the medicine for dispensing. They then prepare and dispense the medicine and confirm dispensing in the central register of electronic prescriptions (Matetić et al., 2024).

The patient can monitor all this information via the zVEM patient portal (National Institute of Public Health, 2024). Patients can see what medicines they have been prescribed, who prescribed them and when, medicines already dispensed and how many more times medicines may be dispensed in the case of repeat prescriptions. A patient can collect medicines dispensed under the same repeat prescription from different pharmacies in Slovenia. The zVEM portal (National Institute of Public Health, 2024) also allows patients to see who has consulted their prescription data and when.

The ePrescription solution allows the doctor to view a patient's electronic prescriptions, electronically issue green and white prescriptions, issue structured prescriptions, prescribe a medicine from the Central Medicinal Products Database or a magistral formula, check for interactions and contraindications and the presence of substances that are banned in sport, sign the prescription bundle electronically and send it to the central national register of electronic prescriptions. Meanwhile, in pharmacies it enables dispensing pharmacists to view electronic prescriptions in the central register, check for interactions and contraindications and the presence of substances that are banned in sport, and electronically sign and forward dispensing data to the central register.

ePrescription is an IT solution that has been in use since 2015. Despite this, we are constantly working to develop it. In 2023 we added the production and updating of the personal medication card (National Institute of Public Health, 2020b), which is done by specially trained pharmacists. These activities are actually out in another eHealth IT solution – called zVEM plus – where, however, data on electronic prescriptions are used as a basis.

We are currently preparing a link to the Slovenian Anti-Doping Organisation (SLOADO). Checking medicines against the list of banned substances in sport will be incorporated into the solution.

We are also adding functionality that enables nurses to view electronic prescriptions.

3.2 Usage data

Our research also looked at the use of the ePrescription solution.

Data from the administrative module of the ePrescription solution show that the total number of electronic prescriptions issued did not change significantly between 2018 and 2020. Increases in numbers can be seen in 2021, 2022 and 2023. More than 15 million electronic prescriptions were issued in 2022, while in 2023 the total number of electronic prescriptions exceeded 15.6 million (Fig. 2). This is equivalent to every inhabitant of Slovenia receiving just under eight prescriptions per year.

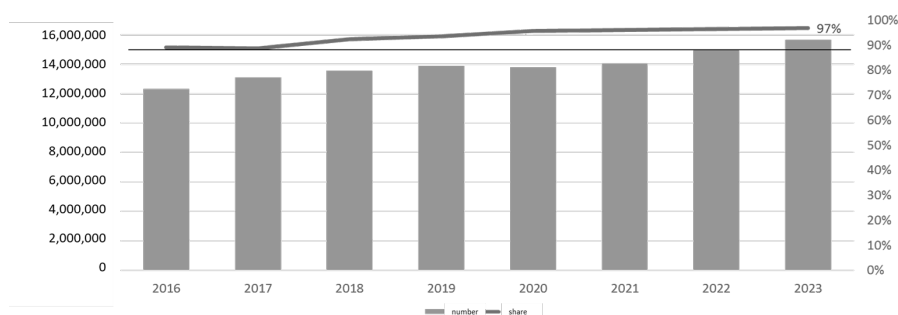


Figure 2: Number and share of electronic prescriptions issued by year

Source: Own

The ePrescription solution has been used by 1,500 healthcare providers. Electronic prescriptions have been issued in 1,100 organisations and medicines have been dispensed by 360 pharmacies.

A review of the share of electronic prescriptions among all prescriptions shows that from 2020 onwards more than 96% of prescriptions issued were electronic. In 2023 this figure reached 97%. Our aim when launching ePrescription was to achieve a

share of 90%, a target we have significantly exceeded (Fig. 2). Existing rules mean that we will never reach 100%. Some urgent prescriptions will continue to be issued on paper, as will prescriptions issued during home visits and personal prescriptions issued by doctors for their own use.

It is also interesting to look at how the number of electronic prescriptions varies from month to month. There is a visible drop in the number of prescriptions in the summer months, while more prescriptions are issued in winter (Fig. 3).

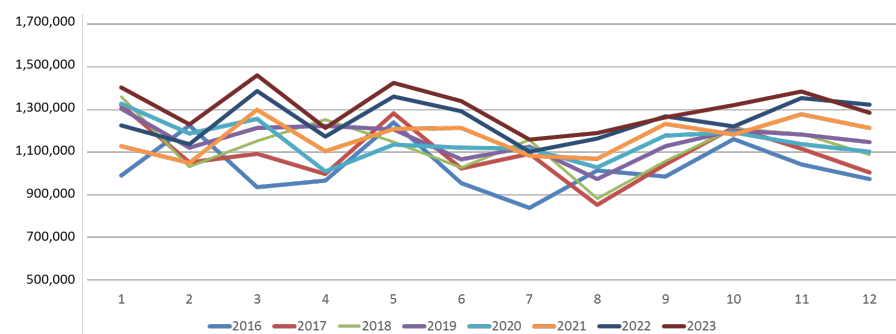


Figure 3: Number of electronic prescriptions issued by months in different years

Source: Own

4 Discussion

The independent report “Evalvacija ukrepov iz enotne zbirke ukrepov, Vrednotenje učinkov implementacije projekta eZdravje: eRecept, eNaročanje” (Ministry of Public Administration, 2020) lists the key positive changes for individual stakeholders. Key positive changes are understood as impacts of ePrescription, which have beneficial effects on stakeholders in the healthcare system, business dimensions, and other organizational, process and management aspects of the healthcare system.

For doctors, the report emphasises better control and oversight of already issued prescriptions, more structured prescriptions, easier and faster checking of drug interactions as a result of additional functionalities, more effective control for individual risk groups, less administrative work and more accessible and faster data analysis. Positive changes for pharmacists include the possibility of checking drug interactions, elimination of the possibility of issuing the wrong medicine because of

a doctor's illegible handwriting, less administrative work, better safety and more accessible and faster data analysis. The key positive changes for patients include streamlined prescribing and dispensing processes, a reduced chance of unwanted side effects from taking medicines, safe storage of data on prescribed medication, the ability to view prescription statuses, and options allowing the dispensing of medicines for ongoing treatment or remote prescribing. What's more, the report also cites significant systemic benefits from the ePrescription. Among the most important are certainly the financial savings, which range between €2 million and €3 million a year for 2016, 2017 and 2018.

The solution also has other advantages: the option to issue prescriptions remotely without the physical presence of the patient in the doctor's surgery; the elimination of errors resulting from incorrect notes or illegible handwriting and a consequent increase in patient safety; in the case of repeated prescriptions, the fact that patients no longer have to go the same pharmacy each time; the possibility of checking medicines for the presence of substances from the list of substances that are banned for athletes. Monitoring the consumption of medicines is also more simple and data reliability is improved.

5 Conclusions

The ePrescription solution is an example of good practice in the digitalisation of healthcare in Slovenia. The solution was the first eHealth solution in Slovenia to be introduced at the national level. During the COVID-19 pandemic it made it possible for large numbers of patients to access the medicines they needed, by allowing doctors to issue prescriptions remotely and enabling patients to collect their prescriptions at any pharmacy in Slovenia using their health insurance card. More than 96% of prescriptions are issued electronically. These place Slovenia among the leading countries in the world in this sphere. The link to the zVEM patient portal, which allows patients to monitor their own use of medicines, is also important. Although the ePrescription solution was developed and introduced in 2015, it still serves on a daily basis its purpose extremely well and is constantly being upgraded in the light of new requirements and needs. Today it would be difficult to imagine Slovenia's healthcare system without electronic prescribing. Both human resources and financial resources need to be provided to ensure the maintenance of the ePrescription solution and enable the necessary upgrades and enhancements.

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