# E-PRESCRIPTION SUCCESS IN ESTONIA: THE JOURNEY FROM PAPER TO PHARMACOGENOMICS

By: Karin Kõnd and Anett Lilleväli

**Summary:** Estonia has introduced the world's most innovative solutions for prescribing medicines and the future possibilities are incredibly promising. A move from paper to digital prescriptions and additional features that will help both the doctor and patient are already present in the health system.

***Keywords:*** *E-Prescription, Cross Border Health Care, Estonia*

## Introduction

Estonia's health care system is one of a kind with innovative e-solutions available for both patients and doctors. One of the key innovations in Estonia's cutting-edge e-health system is e-prescription.

The Estonian e-prescription system was launched in 2010 by the Estonian Health Insurance Fund. E-prescription is a country-wide, centralised and paperless system used by all doctors, patients and pharmacies. A year after launching, 84% of prescriptions were issued digitally. The preparation of the system took five years and involved a number of partners including: governmental bodies responsible for different data registries, hospitals, pharmacies and software providers among others. E-prescription has enhanced openness and transparency in the field of prescribing medicines and more importantly opened a whole new method for future developments which aim to share information and statistics, and improve medical care and the quality of decision-making. In 2019, 99.9% of prescriptions are issued digitally, about 10 million prescriptions each year, which translates to a significant amount of time saved for all parties.[1,2]

## The primary benefits of e-prescription

E-solutions are expected to enhance the efficiency of public services. E-prescription aims to benefit the patient, pharmacist, state and physician. From patient perspective, the main benefit is convenience. From the state point of view, the main benefit is big data collection that enables the updating of policies based on thorough data analysis.

All health care service providers and pharmacies are connected to the central e-prescription system, which helps the physicians and pharmacists monitor and manage the issuing of prescriptions. After prescribing a medicine, the e-prescription system stores the incoming prescription and it becomes accessible immediately in every pharmacy's information system on request. The pharmacist identifies the person using his/her ID card and retrieves the prescription from the central database.

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It is thought that doctors spend less time issuing prescriptions and make less mistakes. They have access to a patient's full medicine history and will get feedback if the medicine has been over- or misused. The e-prescription system also enables the automatic calculation of the correct rate of reimbursement on medications covered by the Health Insurance Fund.

Another major advantage is that physician visits are no longer needed for routine, repeat prescriptions. Patients can contact the doctor by e-mail or by phone and then collect the medicine from the pharmacy. Another advantage is that patients don't need to worry about carrying a paper prescription or losing it. Through the patient portal they can have a complete overview of their medicines and also a data log for every prescription.

> drug-drug interaction alert service integrated in the prescription centre

Pharmacies spend significantly less time entering less data into the system and can pay more attention to serving clients. The vast majority of necessary prescription data is already entered into the e-prescription system by the doctor; the pharmacist only has to add that the medication was actually dispensed to the patient.

## Improving the quality of pharmaceutical care – drug-drug interaction alert

The e-prescription system provides an overview of all prescriptions issued for a patient and with this information it is possible to evaluate any interactions between pharmaceuticals prescribed by different doctors. Since June 2016, all Estonian physicians are using the drug-drug interaction (DDI) alert service integrated in the prescription centre. The service is based on the INXBASE database[4] which provides checks for interactions and displays respective notifications.

The alerts for different DDIs are divided according to clinical significance and generated automatically for the user. Automatic information is also displayed when there are no interactions.[5]

In addition to DDI alerts, e-prescription data are used in monitoring and enhancing the quality of pharmacotherapy. For example, various indicators are embedded into the family physicians' quality bonus system, which monitors a doctor's adherence to treatment guidelines (e.g. type-2 diabetes, post myocardial infarction management, etc.) For every family physician, tailored specific feedback about his/her prescribing pattern in comparison with peers is also available.

## Crossing borders

Due to people becoming more mobile, the need for e-services to be available outside the country's borders is growing. As a result of the active cooperation in e-governance, Estonia and Finland were the first countries in the European Union to launch a cross-border e-prescription service. It is based on the European eHealth Digital Service Infrastructure (eHDSI).

So far, it has been possible to buy prescription medicines abroad using paper prescriptions. Since 21 January 2019, e-prescriptions issued in Finland can be retrieved in Estonian pharmacies.

The opportunity to use e-prescriptions abroad will benefit citizens by making the management of medications treatment easier, while pharmacies benefit from the improved data quality for their activities because digital prescriptions issued in another country will become available in a standardised form and in the local language.

The launch of a cross-border e-prescription service is the first step on a long road to facilitate the transmission of health data across borders so that, in case of a health problem in a foreign country, the physician would also have access to a summary of the medical history for the provision of better quality treatment.

> 99.9% of prescriptions are issued digitally

## The future of e-prescription – pharmacogenomics

In medical sciences, Estonia is leading in the research field with the Estonian Biobank located at the University of Tartu. The biobank holds more than 152,000 people's DNA, which is about 12% of the adult population of Estonia. Collecting genetic data is an important step towards preventive medicine, transforming to personalised health care and enabling people to receive better and timely treatment in the future.

The field of pharmacogenomics (PGx) is gradually shifting from the reactive testing of single genes towards the proactive testing of multiple genes to improve treatment outcomes, reduce adverse events and decrease the burden of unnecessary costs for health care systems. Despite the progress in the field of PGx science, its implementation into routine medical care is difficult. Nevertheless, the number of studies on the implementation of PGx has increased in recent years and scientists are working on genetic association studies looking for new practical medical benefits from genetic information.

Estonia is leading the way towards developing practical solutions for health care from genomic data, and the Government of Estonia is supporting projects to find new practical ways to implement personalised medicine into action.

The project is divided into different steps and the next step forward is to integrate genetic data into the e-prescription system as a part of routine medical care,

taking into account the personal genetic information when prescribing drugs. The first developments will be ready by 2022, when a patient-specific drug-gene interaction alert system is integrated into e-prescriptions.

## Conclusion

Next year, 2020, will be the 10th anniversary of the e-prescription service. In a decade Estonia has gone from paper prescriptions to e-prescriptions with additional features such as DDI-alerts and the cross-border exchange of prescription data. By 2022, the e-prescription is envisioned to involve PGx recommendations based on patients' genetic data, which will offer enhanced opportunities for personalised care.

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# ACHIEVING BETTER HEALTH AND WELL-BEING VIA THE **DANISH E-HEALTH PORTAL** SUNDHED.DK

By: Morten Elbæk Petersen

**Summary:** An overview of prescription medications, laboratory test results, vaccination data, a historical overview of treatments, Electronic Health Records from hospitals, and large volumes of highly qualified information about health, prevention and disease provide examples of the data and digital services available 24–7 to citizens and health care professionals via the Danish e-Health portal, www.sundhed.dk. Sundhed.dk was launched in 2003 and is an integrated part of national economic negotiations and national eHealth strategies.

***Keywords:*** *eHealth Portal, Personal Health Data, Patient Empowerment, Public Information, Denmark*

## Introduction

A multitude of data and digital services are available to citizens and health care professionals in Denmark via the national, publicly-owned, Danish eHealth portal, sundhed.dk.[1]

As part of the Danish health care sector, sundhed.dk plays a crucial role in supporting transparency and patient empowerment and providing health professionals with the possibility to access patient health data residing outside of local systems and *across* sectors and boundaries. This contributes greatly to the delivery of more coherent and effective health care for Danish citizens.

Launched in 2003 as a collaboration between the state, the regions and the municipalities, sundhed.dk is an integrated part of national eHealth strategies.

The most recent Danish national Digital Health Strategy 2018–2022 – *A Coherent and Trustworthy Health Network for All*,[2] highlights that sundhed.dk will continue to serve as "a single point of national entry where patients can access their health data provided by the hospital, General Practitioner (GP) and municipal health service." This "one trusted source" approach contributes directly to the national strategic goal for strengthening