Nortal

nortal.com

WHITE PAPER

# The Hospital of the Future

DIGITAL HEALTHCARE

Healthcare is at the crossroads of major challenges brought on by aging population and increased prevalence of chronic disease globally. However, the sector's digitalization is still lagging behind even though it could benefit largely from the digital revolution that enables higher efficiency, better services, new solutions and more patient engagement.

# Healthcare benefits from the digital revolution

The application of high-tech innovation is commonplace in diagnostics and advanced treatments. While delivering remarkable results for patients, these innovations have for the most part failed to either substantially update the overall healthcare delivery process to increase efficiency, or lower the cost of healthcare. The introduction of most modern treatments and diagnostics tools is often characterized by increased costs. This is a symptom of applying isolated instances of innovation in a highly complex environment, resulting in isolated advances that increase the complexity of the process, and end up increasing the overall cost for the society.

SUCCESS STORY

## Healthcare in a digital environment in Estonia

As a care provider in all medical fields, Tartu University Hospital operates a near fully digital process both inside the hospital and also in interacting with its environment.

Nearly all exchanges of data, be they medical, financial or operational with administrators, other care providers and patients is digital.

Inside the hospital, a central process-driven solution unifies and simplifies the complex diagnostics processes for hospital's staff in order to help them provide patients with high-quality medical services even more efficiently.

The Hospital Information System created by Nortal significantly reduced the administrative workload of hospital staff, enabling the clinical personnel to focus more on the actual diagnosis and treatment. This improved the quality of the hospital's medical care. Thanks to the Patient Portal, part of the new e-service, patients can now access their medical data more conveniently and are therefore engaged in the process early on. All crucial data are also accessible securely on mobile devices.

# Digital healthcare brings benefits for doctors and patients

The healthcare sector is able to benefit from the digital revolution, which offers opportunities for greater efficiency, better services and new solutions. The German healthcare sector is an enormous opportunity in Digital Health and has started to move by introducing the E-Health Act. With rapid advancements taking place around the world, collecting international best practices and implementing those within the framework of a German reference model could lead to the practical implementation of better healthcare in Germany for patients, for clinical services/procedures, for doctors, for clinical research and for health insurance providers. In other words, improvements for all stakeholders!

With Digital Health, patients are better informed about their diagnoses and have an overview on the prescribed treatment. Doctors can obtain data directly from fitness trackers or wearables used by the patient. However, today it is already a question of which applications will be linked in the future. This digitization process has already reached German clinics and hospitals today.

Nortal is putting together a consortium of innovation change agents and stakeholders to collect international best practices for the German reference model, to develop and deliver a model of the future hospital. A model where technological advances coupled with innovative processes deliver actual change and better, more efficient solutions for the ecosystem. We see the project incorporating one or several clinical partners to provide operational input and be the testing ground for novel solutions, a research institution to provide scientific input and validation of solutions, and a collection of innovative technology solution providers.

In addition to the roles outlined above, we are introducing change agents across all stakeholders. We believe organizational change coupled with technological solutions is the only way to really harness the potential arising from rapidly evolving technological innovation.

In short, the Nortal approach is to combine technological innovation with organizational change in order to deliver meaningful impact for the future sustainability of healthcare in Germany.

With the "Gesetz für sichere digitale Kommunikation und Anwendungen im Gesundheitswesen" (E-Health Act), the nationwide introduction of a telematics infrastructure has started this year, which interconnects hospitals and medical practices nationwide and provides conditions for the medical care of the future Germany. The e-Health law prescribes a concrete roadmap for the introduction of beneficial applications and a secure digital highway for healthcare.

## + TIME

**99%**

**OF PRESCRIPTIONS**

are issued digitally in Estonia, without wasting any paper.

## + COUNTDOWN

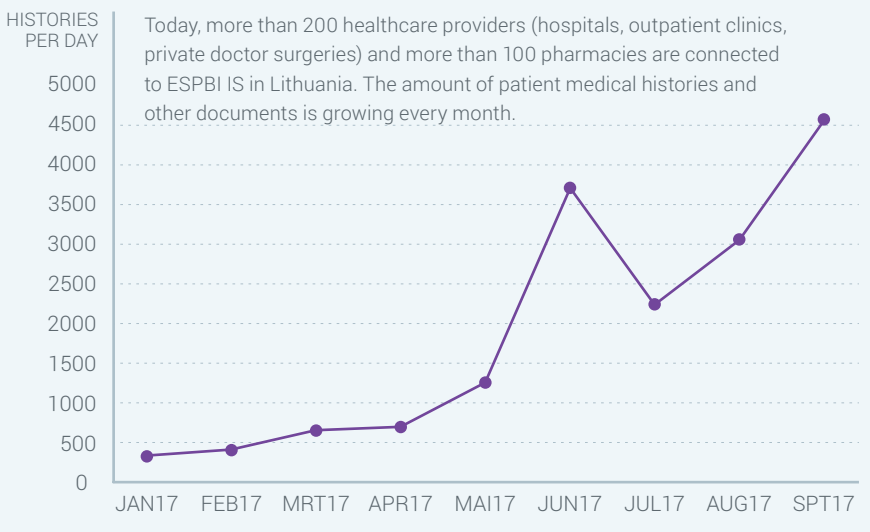
**3 YEARS**

**LEFT**

to implement cross-border digital prescription in EU.

## HOW OUTPATIENT HISTORIES GROW PER DAY

Today, more than 200 healthcare providers (hospitals, outpatient clinics, private doctor surgeries) and more than 100 pharmacies are connected to ESPBI IS in Lithuania. The amount of patient medical histories and other documents is growing every month.



# Features of the hospital of the future

## On-demand Data Access - Innovative Data Security Model

1

Technological innovation often fails to deliver the expected impact due to issues with data access rights. We propose to using a Dynamic On-Demand Data Security model. The basic concept is to enable patient empowerment through a 2-way process for data rights.

All actors who have data access rights according to the current operational model would retain their rights. In addition, we provide a tool for stakeholders to request data access from the patient dynamically, as well as dynamic break-the-glass data access options with patient notifications. Patient benefits and self-determination is the main focus: the patient decides who has access to his or her medical records. Such access would be granted for a limited time, and patients have the opportunity to request more information about why the access is needed and to specify the data available.

Stakeholders and beneficiaries for On-Demand data access should, in addition to medical specialists, include other public servants and pension and potentially insurance providers among others.

## Big Data and IoT enabled hybrid storage to enable a new generation of analytics

2

Increased use of telemedicine and personal healthcare devices is resulting in a flood of information being available from patients. In addition to traditional structured data, there will be streams of unstructured data from devices such as heart rate monitors, motion sensors and others.

For example, sleep pattern data from a personal wearable device can amount to gigabytes of data and does not suit conventional database structures. This data should also be available for medical specialists for analysis, when they consider it important. The new data is also made available for machine learning solutions to deliver insights into the care process.

## Patient portal – positioning patients at the center of the healthcare delivery

3

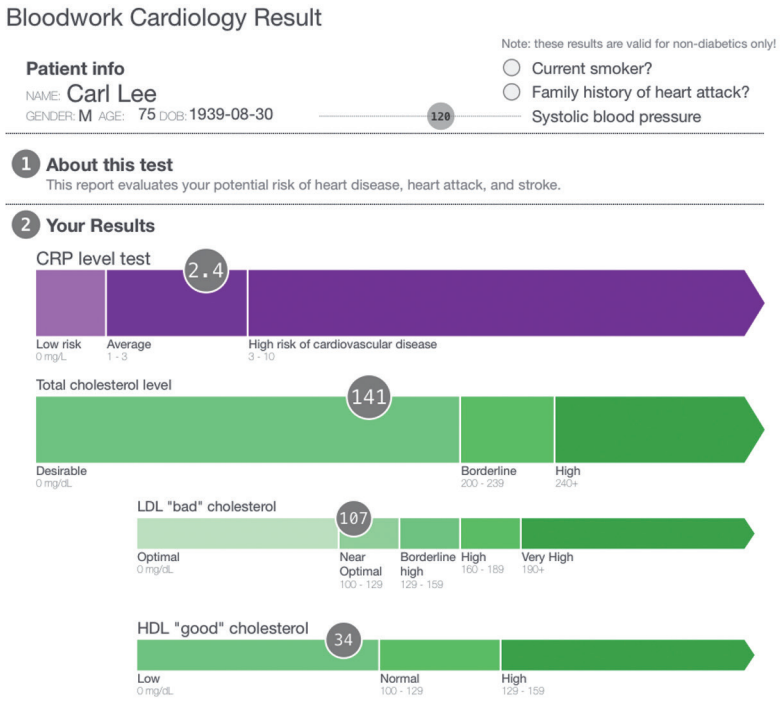
The patient's portal opens up medical data, which is an enormous game changer by empowering patients and giving them control over their own data. Through the digital portal, the patient not only owns the data in a form of a patient diary (e.g. on blood glucose measurements), but can also store data from wearables such as fitness bracelets is stored.

These applications are successful and tested by Nortal. Combining data access with additional value added services such as online appointment management, administration of personal data and communication with medical professionals will further position the patient at the center of the healthcare delivery process.

## Patient centric presentation of medical information

4

In order to facilitate effective communication between patients and medical specialists, Nortal aims to implement and test novel ways of presenting clinical information for patients and specialists. Increased focus on visual design supports comprehension and adherence to recommendations.




## Interconnectivity and automation to deliver process efficiency and care quality

5

Major inefficiencies are present in all healthcare environments due a lack of data integration models. The same lack of data interconnectivity is also a qualitative risk in healthcare.

We propose to implement and test HL7 FHIR as the next generation medical data exchange standard, enabling atomic data exchange between traditional clinical systems, but also modern mobile applications and other services.

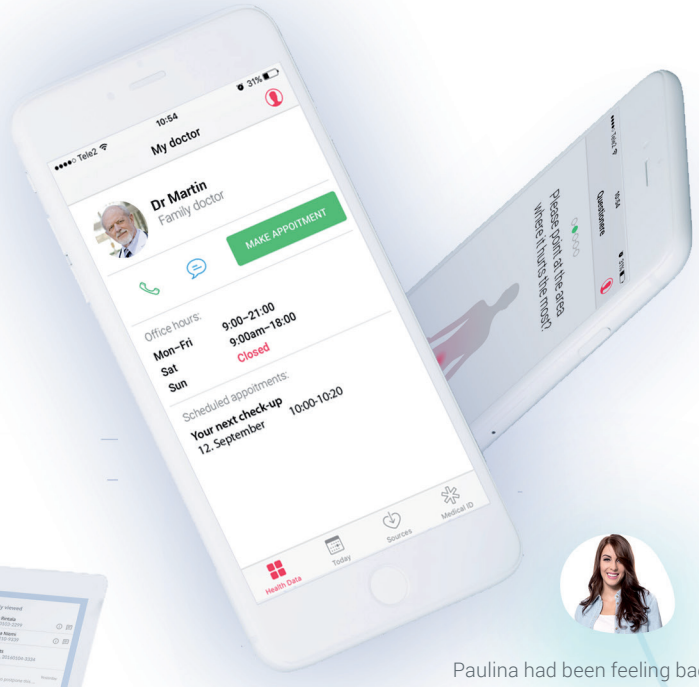
## Transparency through technology

6

A key element for innovation to enable efficiency increases is systematic trust. We propose to achieve this via transparency – provide tools for patients to be able to monitor data access history and evaluate the use of their data by different stakeholders.

# Seamless healthcare experience

Taking a user experience driven approach to healthcare creates substantial benefits in an industry that is facing serious challenges from rising costs and limited resources. Here's Nortal's version of how this could work in one scenario.






Paulina had been feeling bad for a long time and opened e-Health inside Apples Health app to book an appointment with her healthcare provider.

Paulina takes prescription medication, keeps in contact with her doctors via the e-Health app. She can see lab results and AI can guide her treatment.

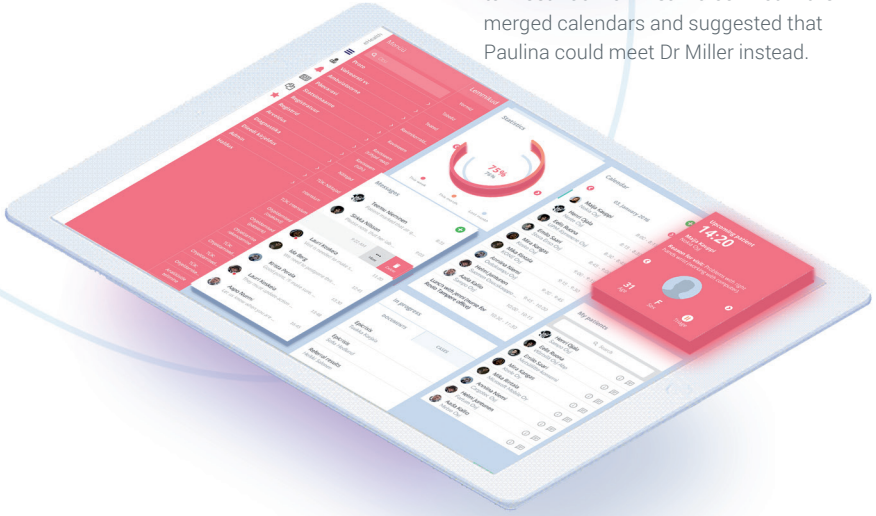
Dr Martin can be up to date with her progress via the Journal. He knows that she is being taken care of.

Paulina met Dr Miller. All the data – history, questionnaire results, and Dr Martin notes – were now available for Dr Miller to see.

Dr Miller reviewed Paulina's data, met her, understood she is pregnant and arranged new appointments for her to see specialists. All memos were saved in the Journal.


eHealth's AI recommended she meet her family doctor. It sent an appointment request to Dr Martin together with the questionnaire results.

Dr Martin received the request and agreed to meet Paulina. AI saw a conflict in their merged calendars and suggested that Paulina could meet Dr Miller instead.



# Summary

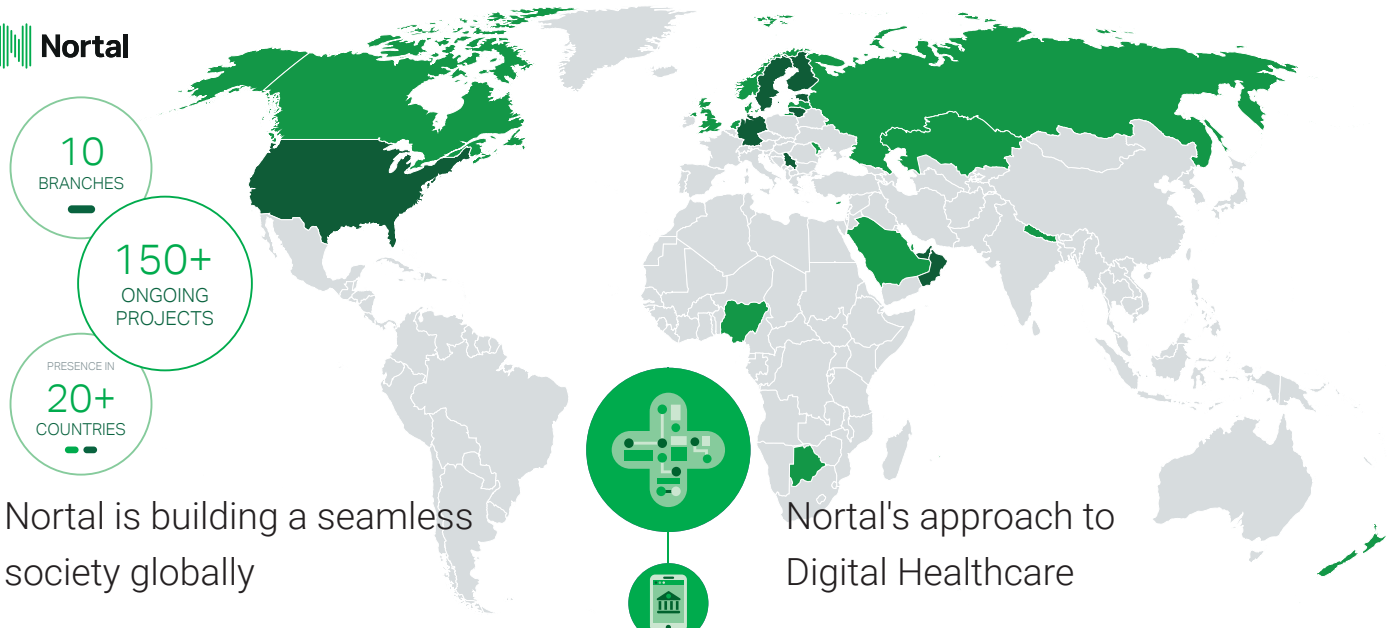
Germany is taking steps to become a leader in the global eHealth revolution. This is both a necessity to ensure the sustainability of the healthcare system domestically, as well as an enormous export opportunity for German industry.

Nortal is heading a consortium with German stakeholders in healthcare such as hospitals, scientific institutions and digital healthcare solution providers. The aim is to establish an international best practice center of excellence in Germany to form a reference case of meaningful impact delivered from technological innovation in the future of digital health and the future hospital.

Particular attention will be provided for models of organizational change. Training, expectation management, stakeholder mapping and service design will be covered as tools to enable maximum impact from the innovative technology solutions to be delivered.

In order to support future dissemination of project results, Nortal will publish the source code of its technical solutions for anyone to use.

Nortal




## Nortal is building a seamless society globally

Nortal is a multinational strategic change and technology company. Combining the unique experience of transforming Estonia into a digital leader and creating change in businesses with a strategic approach and data-driven technology, our vision is to build a seamless society.

Nortal works to build a seamless society that stands on three pillars — enterprise, e-health, and e-government. In each of these three areas, Nortal has helped very influential customers achieve strategic change and build better experiences.

Operating in Europe, the Middle East, Africa, and North America, Nortal doesn't just provide IT services, but actual structural reforms, focusing on the underlying impact on the target organization, whether it be governments, hospitals or private enterprises.

## Nortal's approach to Digital Healthcare

The importance of data is increasing in all the sectors, and healthcare is no exception. Healthcare organizations are under pressure to offer consumer engagement to people who want seamless experiences and expect their medical data be available in real-time across different platforms.

Combine this with constant cost containment goals, and you have a serious challenge on your hands. Nortal can help healthcare institutions and policy makers in forging successful strategies, managing the change and creating the right technology to transform healthcare.

Nortal can create secure platforms and digital healthcare systems where privacy is absolute. The data we can help healthcare organizations collect can facilitate the next leap in medicine, precision medicine.

# Get in touch with our expert

Taavi Einaste, Head of Digital Healthcare in Nortal, is among the world's top experts in digital healthcare transformation and analytics. During his more than seven years at Nortal, he has worked on numerous large-scale projects and reforms, including national level transformation projects targeting the efficiency of healthcare providers.

Taavi Einaste
Nortal's Head of Digital Healthcare
taavi.einaste@nortal.com

Learn more about Digital Healthcare on Nortal's website:
https://nortal.com/ehealth/digital-healthcare/