

INDIVIDUALIZED TREATMENT

The healthcare system is under pressure: better budgetary compliance, quicker treatment, more equitable patient rights, and higher expectations from patients and relatives.

These expectations have changed considerably in recent times as baby boomers born after World War Two are now around 70 years old and will soon be demanding to be involved with an active influence on their courses of treatment. Many of these patients, who are characterized by multiple morbidities and chronic

diseases, will present a challenge for specialists and geriatric care units.

An important factor is that we are living longer with our diseases than ever before. This also applies to the various types of cancer. Curative treatments do not exist for many chronic conditions and the overall effect of the treatments is often unknown.

If the healthcare sector is to adapt, significant cultural, organizational, and educational changes are required.

Access to SAS hospital solutions is simple, transparent, and straightforward for all types of users. Here you see the access page from a Danish hospital.

sas THE POWER TO KNOW. **Kvalitet og patientsikkerhed**

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 - ➔ Årsagsanalyse
- kodeanalyse**
 - ➔ Monitorering
 - ➔ Årsagsanalyse

Velkommen til portalen for kvalitet og patientsikkerhed

Kvalitet og patientsikkerhed er i fokus hos SAS Institute. Vores løsninger skaber grundlaget for datadrevet kvalitetsledelse. Vi giver jer nye muligheder for at anvende data og analyse til at sikre fakta baserede og proaktive tiltag i arbejdet med at øge kvalitet- og patientsikkerhed.

Key Performance Indicators



Article from "Data driven management in healthcare – inspiration for a change", published by SAS Institute, 2017. Read the entire report here: www.sas.com/nordic/healthcarereport





Equal and free access to the healthcare system has been a core principle of Nordic healthcare politics.

Nonetheless, this concept of equality has led to us treating everybody alike. We've developed care cycle programs and treatment plans. These have resulted in enhanced efficacy and better treatment results for some patients, but not all.

In the future, we should focus on developing individualized care plans based on individual patients' symptoms, diagnoses, expectations, and options. Patients need to be treated differently to ensure that the most patients possible get the best possible treatment. It's a challenge that the analytical organization can assist with if the use of data is accepted in a broader context.

Aggregate healthcare data in the healthcare system of the future

We live in a world where digitalization is on the rise. Nordic citizens are preoccupied with healthy living and many of them self-monitor their health. As a result, a lot of health data exists outside of public healthcare systems. This kind of data is also known as Real World

Evidence or RWE data – data that are generated and documented in the real world.

This type of data can provide a lot of information about an individual, but how can it be utilized in the healthcare sector?

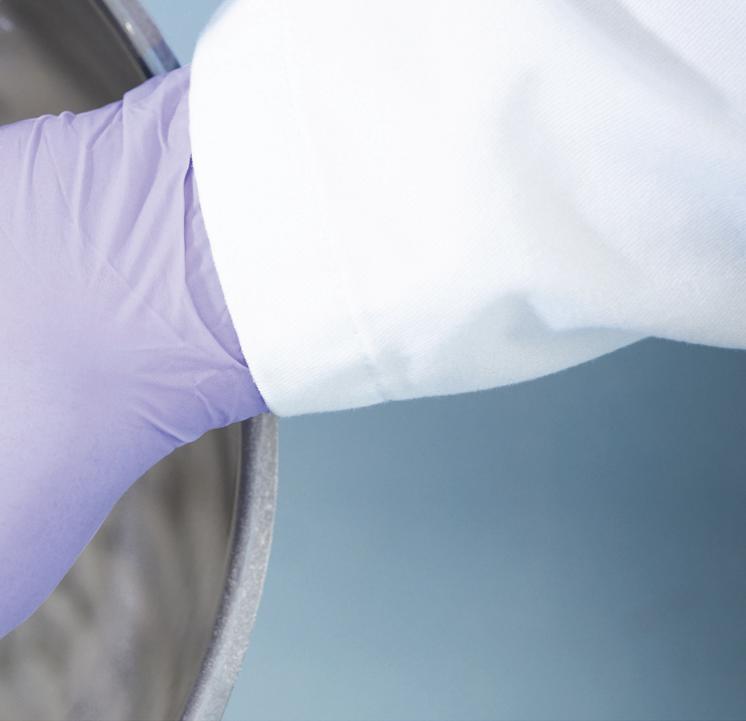
Going forward, we should find a way to use RWE data proactively. This is what the public and the politicians are expecting.

Information is everywhere and a modern healthcare system should not just limit itself to responding to data that comes from controlled clinical trials. We need to be able to do an about-face, undergo change, and, if needed, put an end to activities that aren't actually benefiting patients. We need to have solid documentation that our changes are in fact working, and has effect on the changes that are implemented. The changes should be monitored, to verify that it's actually happening.

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Personalized medicine is the future

Since no two people are exactly alike, we can react a little differently to the same medication. Today, many persons are treated with medications they don't get any benefit from. Some are even treated with medication they only experience side effects from. We need to be better at distinguishing between patients and accept the fact that the etiology of many serious illnesses can have a genetic explanation. Thus knowledge, technology, collaboration, and ethics can be combined in new and better ways¹.

In recent years, efforts have been made to develop methods for customizing patient treatment based on the genetic information of each patient's biological traits. Is the patient getting the right treatment from the get go? Are the effects taking place more rapidly? Is the patient getting healthy more quickly? And is the treatment leading to fewer adverse effects? This would all lead a reduction in medication usage.



Personalized medicine is about the use of genetic information to personalize treatment, i.e., a treatment that is adapted to the individual patient's biological traits and health situation. It enhances the efficacy and reduces the risk of adverse effects and the overall usage of medication

Personalized medicine requires establishing a genomic data bank and regulating medications in new ways. It calls for new methods of approval for novel medications, new legislation, and changes in the requirements and form of clinical research trials. In Denmark the Danish government and Danske regioner have already suggested a common path forward to these new opportunities in the report "Personlig Medicin til gavn for patienterne" [Personalized Medicine for the Benefit of Patients], National strategi for Personlig Medicin 2017-2020 [National Strategy for Personalized Medicine 2017-2020]².

The cost of medications at the hospitals is a focal point of these initiatives in Denmark³. Over the last nine years, hospital medication expenditures have doubled from around \$635 million in 2007 to an estimated \$1.4 billion in 2016. About half of this amount is used on cancer medications. If the medicines aren't working on many of the patients and just giving them severe side effects, then personalized medicine would be an advantage for both these patients and the community. In

¹ and ² National strategi for Personlig Medicin 2017-2020 [National Strategy for Personalized Medicine 2017-2020] published by SUM and Danske regioner, December 2016

³ <http://www.amgros.dk/media/45580/sygehusmedicin-2015.pdf>

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this way, patients get the best possible treatment with the fewest possible side effects and the community benefits by not spending money on medications that aren't working.

There is a trend toward self-administered outpatient treatment – a positive development for patients since it provides both increased patient satisfaction and more effective treatment while simultaneously lowering costs.

The patient is an important, integrated part of the treatment, but not all patients have the same resources or healthcare knowledge. Therefore, patients with limited or no resources require special attention. Otherwise, this development could contribute toward further social inequality in healthcare.

Individualized treatment will become a requirement for the healthcare system of tomorrow.

This concept encompasses more than just personalized medicine, which is nevertheless an essential part of individualized treatment in the future. For example, personalized medicine is part of the EU Commission's Horizon 2020 program⁴.

We need to steer clear of the “one size fits all” concept and accept that the healthcare treatments of tomorrow will also involve personalized medicine. Personalized medicine means less unnecessary, ineffectual treatment and fewer side effects for patients.

Today, we're unable to identify which patients will benefit from a medication and which will not, but the day will come when this is possible. There's a lot of talk about “imprecision medicine”, i.e., medicine where the main indication may be known for the overall population, but the indication for the individual patient is not. The standard-of-care treatment paradigm is being challenged and it's increasingly being recognized that the therapies can end up harming some patients more than helping them and thereby become a matter of life and death. Some investigations, studies, and treatments injure or kill instead of heal.

We've come to the important realization that we need to change our approach to the individual patient and the examinations and treatments we provide them with.

Special diagnostic methods are needed in order for the treatment to be customized to an individual patient's



⁴ <https://ec.europa.eu/programmes/horizon2020/en/h2020-section/health-demographic-change-and-wellbeing>

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biological traits and health situation. The following paragraph deals with this topic along with the use of data in diagnostics.

Advantages of a strong life sciences industry

The Nordics has strong internationally-oriented pharmaceutical and medical device industries, which develop diagnostics, medical equipment, and pharmaceutical products. This position of strength ought to be exploited better than it is today.

Specific diagnostic kits are usually a key ingredient in the development of personalized medicine. Today, genetic testing is still quite expensive, but the prices are falling and many people believe that genetic testing will become an everyday reality within a few decades. This can already be seen in the area of cancer.

While we're waiting on this, we can utilize data far better. Based on the wealth of data available, we can develop innovative predictive models that can help clinicians ensure that individual patients receive the best possible treatment at the lowest price. Perhaps we should also develop algorithms to select the best treatment option on the basis of mathematical models.

Access to data is a prerequisite

In order for personalized medicine to be a success, easy access to data and patient registries is needed and researchers need to map the genome of the local population and establish a biobank. Access needs to be provided for public sector as well as private sector researchers.

Personalized medicine raises new questions

Personalized medicine has brought about a paradigm shift in healthcare along with an opportunity to develop better diagnostic tests and more effective medicines. But it also raises a lot of new questions:

- Is personalized medicine too expensive in the short term?
- Can orphan medications for small patient groups be profitable?
- Should we be developing and using medications with very limited indications?
- How do we deal with these issues on an ethical basis?
- How should we be organized with respect to research, clinical trials, and effective authorization systems?

Not all of these questions can be answered and the cost of personalized medicine continues to be an obstacle.

Individualized treatment requires more patient input

Individualized treatment requires a lot of open communication with the patient.

Over the course of many years, we've worked on getting patients more involved in their own treatment plans. Along with globalization and easier access to

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information, this has led to many patients becoming more knowledgeable and critical of their treatment options than ever before.

Individualized treatment requires more ongoing dialogue with patients and real-time data that is available in centralized locations. With new technological opportunities, such as genetic sequencing, novel types of medication, and big data, personalized medicine has become a real option. At the same time, the systematic collection and analysis of data provides an opportunity to classify patient risks and calculate individualized risk assessment scores with the goal of providing optimized, safe, high-quality treatment options for each individual patient. The following paragraph discusses the advantages of real-time data.

Immediate feedback is also called real-time data.

This means that data is collected as soon as it's produced. There is no "delay" and the data is typically also processed in real-time. Caregivers therefore receive a response immediately and can react right away.

Current data describes the latest possible data that is available. In some situations, week-old data may be current, while in others, data will get updated in real-time.

Whether it's necessary to use current or real-time data depends on the specific situation.



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