



# Danish Health Data Authority harnesses big data to improve patient care

Client name: Danish Health Data Authority

Location: Copenhagen, Denmark

Industry: Healthcare

### Challenge

- Healthcare data is fragmented and not accessible outside of application silos
- Clinical decision making is often based on incomplete data
- Innovation cycles are long, expensive and ineffective due to legacy technology

### Solution

- All healthcare data aggregated into a single cloud-based repository
- An open API connector enables staff to build their own applications
- The managed platform helps the agency focus on healthcare innovation

### Results

- Web portal enables healthcare professionals and patients to access medical data anytime, anywhere
- Application development time reduced to 4 to 6 weeks
- More than 30 applications are currently in the development pipeline

With a treasure trove of 40-plus years of comprehensive healthcare information about its 7 million citizens, Denmark would seem like a perfect candidate for a massive big data project aimed at improving the quality of clinical care through the use of advanced analytics.

But despite the fact that Denmark's health records and clinical databases are considered among the most detailed in the world, a study conducted by the Danish government in 2013 concluded Denmark was failing to take full advantage of that information because it was fragmented and compartmentalized.

Denmark's National Board of Health moved quickly to rectify the situation, creating a health data agency in 2015 charged with developing a new system that would aggregate healthcare data, make it open and available to the appropriate parties — hospitals, researchers, physicians and patients — and provide a platform that encourages data analysis and the creation of new applications based on that data.

The Danish Health Data Authority put the project out to bid, and DXC Technology won the contract to meet the needs by building and maintaining a private cloud. DXC's proposal was more price competitive than that of other bidders because it was based extensively on automation. In addition, DXC stood out for its extensive experience handling healthcare data and its hands-on familiarity with all of the requested software packages and technologies. That included legacy database applications such as IBM Db2 and Microsoft SQL Server, as well as next-generation apps like the Hadoop open source big data platform and the Qlik data visualization program.

Within 6 weeks of signing the contract, DXC delivered the first phase of the project, which included Db2, SQL Server and Cloudera Hadoop, as well as integration services and the tools needed to secure the data. The next stage, which required the purchase of new hardware from HP and NetApp, was completed in 12 weeks.

The new platform is already paying dividends. For example, there's a new application that aggregates data on the number of preventable admissions and the associated costs, and slices that data by diagnoses, municipalities, regions and citizens. Another app tracks the administration of antibiotics by region, municipality, age and gender for use in comparisons and benchmarking across the country. Aggregated cancer surgery data in six selected diagnostic areas is being presented via a user-friendly interface. This makes it possible to access all data by region and hospital, based on these categories: patient pathways, average admission time, 30-day mortality rate and number of complications.

Further, there are additional applications in the pipeline, which are expected to deliver value to providers, patients, researchers and healthcare executives.

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## How the health data system works

DXC handles the management and operations of the platform, including support, security and privacy. Hospitals, municipalities and general practitioners generate the data, and the Danish Health Data Authority is responsible for building applications and services on top of the platform.

Other key details:

- The data comes from visits to primary care physicians, dentists, physiotherapists and other specialists, and includes information about medicines, prescriptions, lab results, procedures, diagnoses, examinations, birth data and data from clinical databases maintained by specialists. Additional data comes from patients' and citizens' wearable devices, clinical quality databases, and other public sources, and it all gets integrated, aggregated and stored in the DXC system.
- Participants include 69 hospitals organized into five regional authorities, 98 municipalities and 3,653 general practitioners. All data is labeled with a unique person ID.
- The platform storage capabilities include a 250TB SSD SAN, 400TB of Hadoop storage, and a 400TB SAN for log data and backup. Other core technologies include VMware virtualization and a Splunk security information and event management (SIEM) solution for auditing user access to data.
- There are two web portals: a secure VPN for healthcare professionals, plus one for public access based on aggregated and anonymized statistical information. The portals, based on the Sitecore content management system (CMS) and Qlik, were developed by the Danish Health Data Authority and are maintained and monitored by DXC.

## Opportunities for future improvements

Karin Glindtvad, DXC's project manager, says the health data platform provides technical solutions in a highly secure environment. “This means that opportunities are opened for researchers to access data in an environment that complies with all requirements regarding handling of patient data.”

DXC is also charged with making sure that emerging analytics technologies such as AI and machine learning are integrated with the existing, more traditional business intelligence technologies, so they feed on the same data and do not create isolated data lakes.

Nielsen is confident the health data program is well on its way to improving the quality of life for Denmark's citizens. “Accessible and aggregated data across the care continuum is a unique capability that will position the Danish healthcare system as a global leader in data-driven healthcare,” she says.

Learn more at  
[www.dxc.technology/  
healthcare](http://www.dxc.technology/healthcare)

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