

Rigshospitalet North Wing, Copenhagen Photography: Adam Mørk.

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INTRODUCTION TO
DENMARK AND THE DANISH
HEALTH SYSTEM

*01 New North Zealand Hospital, Hillerc Architects: Herzog & de Meuron Basand Vilhelm Lauritzen Architects.

INTRODUCTION TO THE SUPER HOSPITAL PROGRAMME

The patient landscape of the future will be different from the patient landscape of today. More citizens will be living with often multiple chronic diseases that will require treatment and management. Managing diseases means disruption and distress in the daily life of these citizens, having a negative effect on quality of life. Modern technology allows treatment of patients much closer to home or even in their home - instead of in a hospital environment. Modern technology also enables the citizens to be active partners in their own disease management or treatment. This has positive effects on quality of life - and very often also on the quality of care and treatment.

Denmark is investing in a major structural and organisational reform of the Danish healthcare sector to establish a sustainable healthcare sector, where the hospitals are an integral part of a coherent health care system that supports patients as active partners in their treatment and at the same time meets the health care requirements of the future. This is called the Super Hospital Programme, cf. Figure 1. The programme consists of 16 new hospital projects and is allocated EUR 6.6 billion (2019 prices).

The focal point of the transformation of Danish healthcare sector is that patients, whether somatic or psychiatric, should spend as little time as possible at the hospital. Hospitals are for highly specialised treatment. Non-specialised treatment should take place outside the hospital, and Denmark is therefore aiming at replacing a significant share of admissions with outpatient treatment. Treatment outside the hospital is less intrusive for patients and more cost-efficient than hospitalisation, and with a greater share of patients treated outside the hospital, hospitals will be able to focus their resources on the critically ill or injured, who need highly specialised care. This will raise the quality of care, while at the same time pushing for patients to become active partners in their treatment.

The investment therefore facilitates a new hospital infrastructure with larger, but fewer hospitals that in turn have stronger, highly specialised professional environments with the capacity – both in terms of staff and equipment – to handle even the most critical and complex cases. This means closing hospitals, and the goal is to limit the number of hospitals with emergency departments from 40 to 21.

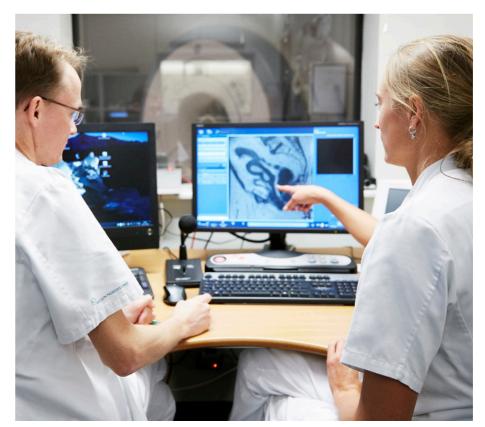
Through the investment, recommendations made by the Danish Health Authority are implemented as part of an overall effort to restructure the Danish health care system in order to ensure better and more coherent patient flows while improving efficiency, quality of care and patient safety. To achieve this, the government and the Danish regions in 2007 agreed on establishing:

- A new hospital infrastructure
- A new organisation in the hospitals
- Better coordination between the primary and secondary healthcare sectors





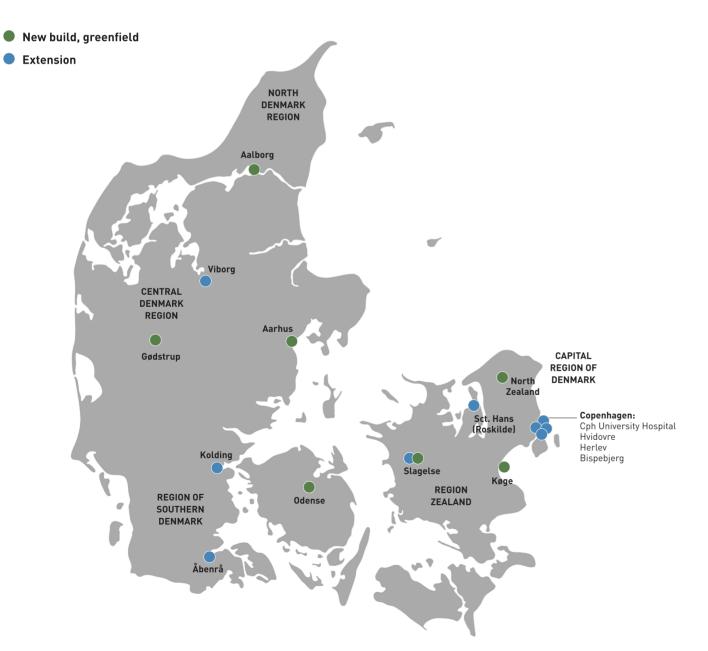




THE STRUCTURAL REFORM — the beginning of the Super Hospital Programme

In 2007, Denmark implemented a public sector structural reform that included an administrative and political reorganisation of the health sector. Prior to the reform, 13 counties managed the hospitals and were responsi ble for a number of other policy areas. The structural reform replaced the counties with five regions that took over the politi cal and administrative responsi bility for the health sector. This provided an opportunity for a large-scale modernisation of the Danish hospital infrastructure to ensure access to state-of-theart health services and improve quality across the entire health system. A cornerstone in this modernisation is the Super Hospital Programme. Thus, the programme is more than just building new facilities - it is a driver of a new structure for the health system.

THE 16 CONSTRUCTION PROJECTS IN THE SUPER HOSPITAL PROGRAMME













AIMS OF THE SUPER HOSPITAL PROGRAMME



WHY MERGE?

THE DANISH SUPER HOSPITAL PROGRAMME

WHY MERGE? AIMS OF THE SUPER HOSPITAL PROGRAMME

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A core idea of the new hospital infrastructure is the principle of treating patients at the lowest effective cost level while increasing the quality of highly specialised care. Merging hospitals into fewer units with large population bases of over 300,000 inhabitants supports the development of highly specialised professional environments for medical research and training. In the trade-off between proximity and quality of hospitals, Denmark has chosen the latter - even if it entails closing down local hospitals as it is believed that the positives outweigh the negatives.

AIM 1: HIGHER QUALITY

Higher quality is a constant target in any healthcare system. In Denmark, the Super Hospital Programme supports this pursuit in various ways as described in the following.

Putting the specialist in front

Emergency healthcare services play a crucial role in modernising the organisational structure at the hospitals. In order to guarantee that all patients receive appropriate treatment in case of sudden injury or illness, the reformation of the hospital infrastructure includes the establishment of 21 joint emergency departments staffed with specialists on a 24-hour basis.

The objective of the new emergency departments is to improve quality and provide full treatment for a larger share of patients without the need for further hospitalisation. The joint emergency departments will be able to draw upon medical specialists from all relevant fields 24/7 and the appropriate specialist will see the patient immediately. In many cases, this will result in faster and more accurate diagnosis and will make it possible to provide full treatment within the emergency department without referring patients to the specialised hospital departments. In addition to the restructuring of emergency departments from 40 to 21 larger units, a number of smaller emergency clinics have been established in areas remote to the nearest hospital. These clinics make it possible to treat patients with less complicated illnesses or injuries locally.

REQUIREMENTS TO EMERGENCY CARE FACILITIES

The Danish Health Authority recommends that the following medical specialties are part of the emergency departments:

- Internal medicine
- Orthopaedic surgery
- Surgery
- Anaesthesiolog
- Diagnostic radiolog
- Clinical biochemistry

Another recommendation is that the new hospitals should cover a geographic area consisting of at least 300,000 inhabitants.



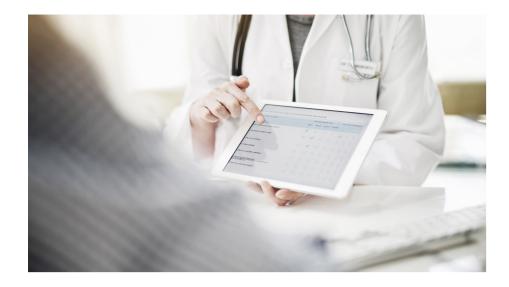
FROM MANY TO FEWER — HIGHER QUALITY

gency services has been steadily decreasing over the years. But before the structural reform still approximately 40 different hospitals provided emergency services, each with a number of separate departments for receiving emergency patients depending on the primary cause of referral. In the new organisational structure, the emergency facilities are merged into one multidisciplinary joint emergency department per hospital providing a single point of entry for all emergency patients. The emergency departments will only receive patients referred by a doctor. Thus, GPs and doctors in out-of-hours or emergency services serve as gatekeepers for the emergency departments





THE DANISH SUPER HOSPITAL PROGRAMME
WHY MERGE? AIMS OF THE SUPER HOSPITAL PROGRAMME



Digital transformation of health care

Creating a new digital infrastructure is a very important part of building a high quality healthcare sector in Denmark. The Danish healthcare sector is already highly digitised. This provides a solid foundation for further digital transformation as well as use of data for continuous development of quality and research.

Building new hospitals gives opportunities to incorporate digital solutions from the beginning, and the Super Hospital Programme is intended to drive further digitalisation. Of the total budget for new hospitals, approximately 20 percent have been earmarked for the procurement of medical equipment and information technology. Earmarking funds for equipment and technology means that it is not possible to cover construction expenses with funding intended for equipment, which thereby helps to ensure that the new hospitals are fully functional when completed.

Concentrating specialist care and enhanced research facilities at the new hospitals brings opportunities for more wide-ranging collaboration with other research environments, including academia and industry. Investments in information technology will strengthen the collection of health data and con

tribute to the quality of research and development as well as documentation of new products.

Besides the investments in digital infrastructure, state of the art technology and logistics systems within the Super Hospital Program, Denmark is investing heavily in a digital infrastructure connecting hospitals with other sectors such as the General Practitioners (GPs) and the municipalities giving the patient a coherent effort across the whole healthcare sector. This also aims at making the patient an active partner in the patient's treatment in order to improve the outcomes of the treatment.

DENMARK IS A DIGITAL FRONTRUNNER

Denmark is a front-runner in

IT systems at hospitals and GP clinics and digital communication between the segments of the health sector. A prime example of the digitalisation of health care in Denmark is the Shared Medication Record (SMR). SMR is a national database containing updated medicine for all patients in Denmark. It is an internationally well-reputed solution. All doctors, nurses, dentists, and other healthcare workers can access the database ensuring a better communication between the quality of treatment. In the app "Medicinkortet", patients medical prescriptions and they can via the app ask for renewed prescriptions.

Capacity in the new hospitals

The Super Hospital Programme is a long-term investment in a new infrastructure for the future healthcare sector. The future needs and capacities in the health sector is difficult to foresee, but when planning the hospitals, great emphasis was put on identifying trends in healthcare sector development and ensuring flexibility and adjustability in the planned structures. Both to ensure the best possible patient experience, modern working environments for employees, and the best possible care at a cost effective level.

Therefore, an expert panel was established in 2007 to highlight emerging trends in the health care sector and to ensure that this aspect was incorporated into the development of the hospitals.

The regions are continuously revising their projections for treatment needs with corresponding adjustments in the number of beds, operating rooms, outpatient clinics etc. All hospitals in the programme will have single bedrooms, which is expected to decrease the possibility of hospital-acquired infections (leading to shorter hospital admissions) and improve quality of care and comfort while hospitalised.

THE EXPERT PANEL

The expert panel consisted of five recognised experts in the fields of health economics, medicine, hospital planning, and hospital design. The expert panel had the task to evaluate the regions' applications for funds for building new hospital based on some selected criteria. The expert panel highlighted some emerging trends in the health system that the economic frame for the projects had to be based on. The most important trend is a shift from hospitalisation to outpatient treatment with an expected 20 percent reduction of bed days and an increase of 50 percent in outpatient treatment from 2007 to 2020. Already, the increase in outpatient treatment has exceeded projections and similarly, yet to a lesser extent, bed days have been reduced more than anticipated, cf. Figure 2.

CAPACITY AT THE EMERGENCY FACILITIES

The number of people covered by each emergency department varies according to location and population density; 13 of the 21 new emergency departments will serve 200,000-400,000 people each, while four departments will serve more than 400,000 people and four will serve less than 200,000 people.

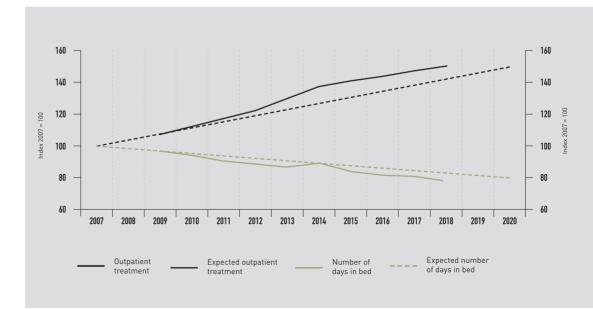


Figure: Development in outpatient treatment and number of days in bed

Note: The figure is based on the methods currently used by the Danish Health Data Authority's to assess the development of outpatient treatment and number of days in bed. These methods differ from the methods used by the Danish Government's expert panel for hospital investments. The methods are valid throughout the whole period. Source: The Danish National Patient Register, the Danish Health Data Authority.

THE DANISH SUPER HOSPITAL PROGRAMME

WHY MERGE? AIMS OF THE SUPER HOSPITAL PROGRAMME

AIM 2: EFFICIENCY GAINS

To ensure that the potential for efficiency is met, approval of each project application was conditioned on specific targets for future efficiency gains. The expert panel set a specific target for each project based on the type of project, the regions suggestions to initiatives to increase efficiency at new hospitals, and previous initiatives undertaken in the region to increase efficiency at existing hospitals.

The new hospitals provide a

the organisation of clinical

unique opportunity to optimise

work and to support knowledge

sharing. Previously, the reno-

vation of Danish hospitals has

occurred incrementally, which

has made it difficult to reap the

full potential of modernisations,

as the renovation had to fit

within the existing structure.

is not an incremental change

hospital structure of the whole

country, making it possible to

reorganise patient treatment,

logistics and management to a

much greater extent than ever

before.

but a restructuring of the

The Super Hospital Programme

The planning of how to realise efficiency gains and construction of the hospital are simultaneous processes. Solutions are designed in collaboration with clinicians to meet both the actual needs of the patients and the health system in general.

Some examples of how the regions plan to achieve efficiency gains are:

- Reducing the number of beds,
- Merging and/or restructuring departments, e.g. radiology and blood testing in proximity to operating rooms,
- Building joint emergency departments allowing for faster treatment and more structured work flows for handling emergency patients,
- Optimising patient flows through better IT-infrastructure, logistics, AGVs, automated systems for goods reception, and infrastructure for traceability.
- Constructing energy efficient buildings.

Building new hospitals creates a great opportunity for integrating new logistics solutions. The aim of installing hightech logistics is primarily to optimise the use of resources. Danish solutions for just-in-time logistics include systems for locating and tracking staff and equipment, solutions for automating basic and repetitive tasks, as well as solutions for guiding patients around the hospital, all of which help avoid delays and peak times in the hospital process.

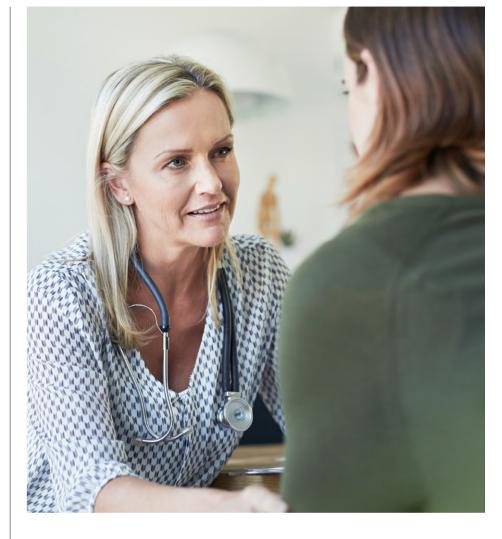
Intelligent solutions for handling samples help hospitals reduce their sample turnaround-time and subsequently speed up patient diagnostics. Fully automated laboratories improve sample flow by handling and sorting all blood samples without any manual handling, thereby minimizing the risk of errors and freeing up time for valueadding tasks such as patient related work. At Hospital of Southern Jutland in Aabenraa, the number of patients has increased but introducing a new sample logistics solution has helped reduce the average length of stay.

If the projects succeed in meeting their efficiency targets, approx. EUR 330 M per year will be freed up for re-investment in the healthcare sector, providing a financial boost for the entire sector. This will substantially contribute to create a future-proof and sustainable heath care system with world class quality of treatment.



GENERAL PRACTITIONERS ARE VITAL IN THE HEALTH CARE SYSTEM

General Practitioners (GPs), or "Family Doctors", fill a key position in the Danish healthcare system. Nearly all GPs in Denmark are independent tradition of working as family doctors providing effective first-line health care to their local communities. GPs are patients' primary contact point to the healthcare system and are gatekeepers between the primary level and the specialised to the specialised health care 2016, GPs took up only 8 percent of regional spending on health, yet 87 percent of the population was in contact with a GP. In comparison, hospitals took up 78 percent of regional health spending while the shares of the population receiving outpatient



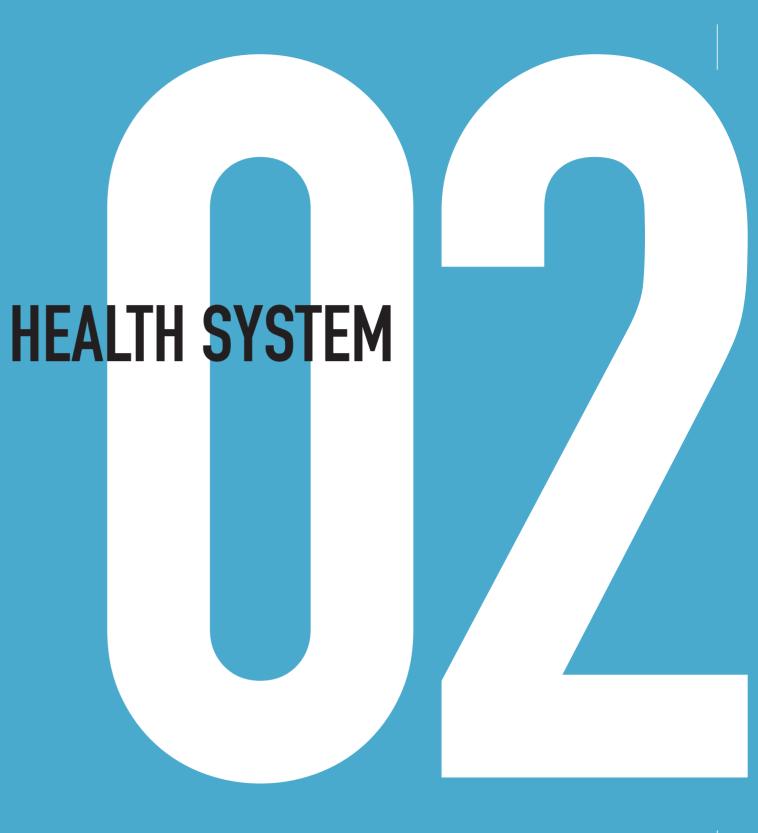
Better coordination of patient-flow

When aiming for a goal where hospitals only are for special treatment, more people will be treated closer to their home by GPs and the municipalities. A central part of achieving better performing hospitals is therefore also to focus on a better utilisation of the capacity and resources of GPs.

GPs will play a bigger part in the treatment of chronically ill patients, and only in severe cases the patients will go to the hospital. The GPs play an important role, as access to hospitals are by referral by GPs only. This is will ensure a more cost effective treatment and will also benefit the patient as treatment takes place in the immediate environment.

For GPs this means more patients as patients that previously were treated at hospitals now will be treated at GPs. This enhances the need for strong coordination between sectors in health care (GPs, hospitals, municipalities, etc.). Therefore, a range of initiatives have been launched to strengthen coordination between sectors through better sharing of high quality data across sectors, for instance projects aiming to improve standards of digital messages from the hospital to GPs or use of telehealth in cross-sector collaboration. This also supports the effort to make the patients active partners in the treatment courses.

CHANGE IN THE DANISH



MANAGING A STRATEGIC CHANGE IN THE DANISH HEALTH SYSTEM

The Super Hospital Programme differs from ordinary Danish hospital construction as the government is involved in planning and managing the programme and as the programme has been supported by an Expert Panel established in 2007.

Normally, the regions are responsible for the construction of public hospitals in Denmark. However, in the Super Hospital Programme the overall strategic decisions of establishing a new hospital infrastructure and 60 percent of the financing of the programme were made by the government. The programme is about much more than 16 new hospitals – it is the physical base of a profound structural reform of the Danish healthcare sector. Therefore, it has been necessary to have both the regions and central government involved in planning the hospitals to ensure that both local and national priorities were addressed.

A key element in the new hospital infrastructure is the merging of hospitals into fewer, larger facilities. This has meant closing a number of existing hospitals, requiring difficult decisions at the local level. The government involvement in the planning process has helped facilitate these decisions, not least because the allocation of government funds was contingent upon regional commitment to the overall structural reform including closing down small units.

The new hospitals are partly funded by the government. The distribution of funding for the new hospitals was based on applications from the regions.

The expert panel reviewed the applications with their recommendations serving as the basis for government allocation of funding for projects. The panel's screening of applications was based on a number of criteria such as; projected future capacity need, occupancy, degree of utilisation, spatial needs and standards, as well as an evaluation of the projects' fit within the envisioned future hospital structure.

The process of screening and evaluating the construction proposals from the regions consisted of two phases; the first phase was aimed at deciding which projects would be eligible for government support and specifying overall budgets for each projects. Each of the pre-approved projects then received a request for adjustments according to a set of specific recommendations from the expert panel, which were to be met in order to get the final approval for the government support. In the second phase, the government granted final approval for 16 regional projects totalling more than EUR 6.5 billion (2018 prices).

The regions own the buildings and are responsible for managing the construction projects. However, due to the shared financing, the government is involved to a greater degree in the supervision of the programme than in ordinary regional construction projects.

The Ministry of Health supervises the projects and disburses the funds. The Ministry of Health has established a specific framework for the programme that also outlines the regions' reporting obligation to the Ministry. The framework requires that the regions report on a quarterly basis on the progress of each individual project and gives the Ministry the possibility to intensify project audits in case of unexpected complications.

The main focus in The Ministry of Health's supervision is the regions' ability to keep the projects within the budget and accomplish the promised efficiency gains.

SINCE THE STRUCTURAL REFORM IN 2007,

18 HOSPITALS HAVE BEEN CLOSED DOWN.

As a part of the existing hospital plans, the regions are expecting to close down an additional nine hospitals in the coming years, as the quality funded hospitals are being taken into use.





 ${\bf 8}$



TIMELINE AND FINANCING

At present, six projects are fully complete and in operation, while several other hospitals are in partial operation, cf. Table 1. The last project in the programme is expected to be completed in 2025.

The budget for each project is based on an estimated square meter price of construction calculated by the expert panel. The budget is fixed and cannot be exceeded by adding additional regional funding. However, assumptions on the hospital capacity are not binding and can change.

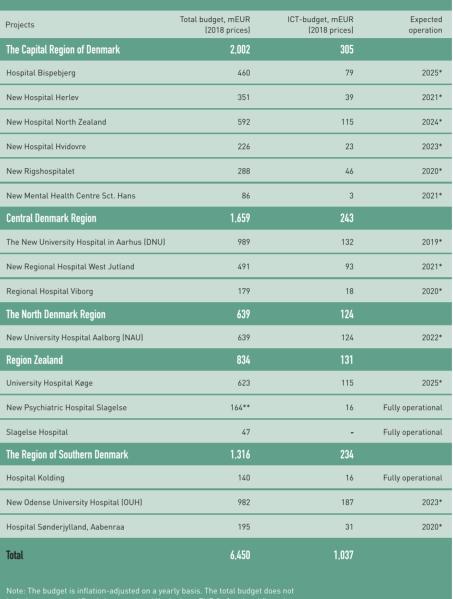
Budget constraints guarantee that the projects in the programme do not expand at the expense of the regions' other construction and maintenance projects. The budget limit is also intended to drive innovation, as problems must be solved within the allocated budget.

The government finances 59.7 percent of the programme with the remaining 40.3 percent financed by the regions. The grant from the government, known as the "Quality Fund", is administered and disbursed by the Ministry of Health. The regional portion of the programme is financed with a loan option (12.5 percent) and an annual deposit (27.8 percent), cf. Figure 3. Revenue from the sale of hospital buildings no longer in use are reserved for repayment of the loan.

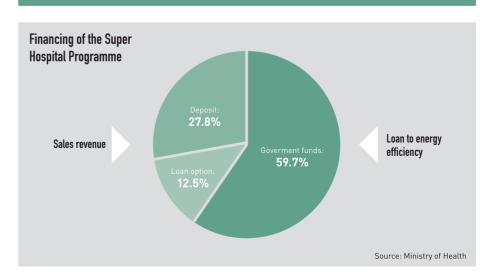
In addition, the regions can apply for a loan to invest in energy efficient solutions. These loans are supplemental to the original budget and can at most be 2.3 percent of the original budget.

The budget is adjusted for inflation on a yearly basis.

projects in the Super Hospital Programme			
Projects	Total budget, mEUR (2018 prices)	ICT-budget, mEUR (2018 prices)	Expected operation
The Capital Region of Denmark	2,002	305	
Hospital Bispebjerg	460	79	2025*
New Hospital Herlev	351	39	2021*
New Hospital North Zealand	592	115	2024*
New Hospital Hvidovre	226	23	2023*
New Rigshospitalet	288	46	2020*
New Mental Health Centre Sct. Hans	86	3	2021*
Central Denmark Region	1,659	243	
The New University Hospital in Aarhus (DNU)	989	132	2019*
New Regional Hospital West Jutland	491	93	2021*
Regional Hospital Viborg	179	18	2020*
The North Denmark Region	639	124	
New University Hospital Aalborg (NAU)	639	124	2022*
Region Zealand	834	131	
Hebrarda Harrista III.	(00	115	2025*



Source: Ministry of Health







SELECTED SUCCESS

OLDING
SYCHIATRY IN SLAGELSE



THE DANISH SUPER HOSPITAL PROGRAMME SELECTED SUCCESS STORIES

SELECTED SUCCESS **STORIES**

The programme is still ongoing, but the investment starts paying off already and success stories are emerging. A few worth mentioning are described in the following.

GERIATRIX IN AARHUS

Aarhus, a study shows that allomarkedly increased patient satisfaction, reduced the risk of delirium and the number of bed the patients as compared to admitted to shared rooms).









in building the new hospital is means that focus has been put on light, space and access to efficient and optimal patient treatment. The building has according to current needs, where long-term patient stays in expected to decrease.







KOLDING

PSYCHIATRY IN SLAGELSE

Internal surveys show a significant rise in patient satisfaction with the hospital facilities. Fur thermore, relatives to patients have noticed that the common facilities for waiting and resting are spacious and allow for privacy even in the presence of other patients or relatives.

The Psychiatric Hospital in Slagelse is using its design to support the treatment courses of its patients. Light, trans parency and openness, access and specially designed furni ture has been at the centre in lighting recreates the natural color change of daylight inside the building making lighting conditions optimal for patients and staff. At the same time, the planning of the hospital ensures peace and security in the most private parts of the hospital. creating a coherent health campus with shared use of infrastructure and surrounding

yr, "02, "03 & "04, sychiatric Hospital, Slagelse. "chitects: Karlsson Arkitekter, lhelm Lauritzen Architects ens Lindhel









COPENHAGEN, RIGSHOSPITALET - NORTH WING

Rigshospitalet officially inau gurated the new North Wing in construction. The building is shaped around five recreational atriums for patients. The build V-shaped structures, which are tied together by a transversal link and a vertical link in order to provide optimal logistics. This also reduces walking distances for the health care professionals and patients, just as it makes it possible to locate rooms so they can be used by different depart ments if necessary. Further more, the rooms are flexible, so that a bedroom can be changed to a treatment room.

*05, *06 & *07 Rigshospitalet North Win Copenhagen.





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APPENDIX

INTRODUCTION TO DENMARK AND THE DANISH HEALTH SYSTEM

Denmark

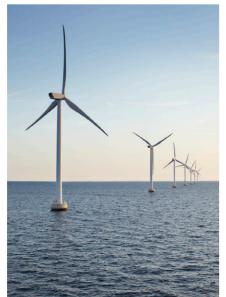
Denmark is located in Northern Europe and is a part of Scandinavia. The official language is Danish. Greenland and the Faeroe Islands are part of Denmark but have autonomous self-rule.

Denmark has an area of 43,094 km² and a population of 5.7 million people. Copenhagen is the capital of Denmark and the most populated city with an urban population of 1.3 million people.

The political system is a multi-party structure where several parties are represented in Parliament (Folketinget) at any one time. Danish governments are often characterised by minority administrations with one or more supporting parties. Since 1909, no single party has held the majority in Parliament.

The basic principle of the Danish welfare system, often referred to as a Scandinavian welfare model, is that all citizens have equal rights to social security. In the Danish welfare system, a number of services including healthcare are available to all citizens, free of charge.







The Danish health system

The Danish health system is universal and based on the principles of free and equal access to healthcare for all citizens.

The health system offers high-quality services, the majority of which are financed by general taxes. All costs of services provided by general practitioners and specialists, hospital treatment as well as pharmaceuticals and aides provided while hospitalised are covered by taxes. A minor part of health expenditures are out-of-pocket payments, primarily dental care and prescription drugs.

The regions run the health care system, while the government is in charge of structural planning, national guidelines etc. The municipalities provide elder care and are responsible for care provided to patients in their homes.

Overall planning and distribution of specialised hospital services is handled by the national Danish Health Authority, which defines and allocates specialist functions among hospitals in close cooperation with medical associations and the regions. The purpose of this centralised planning process is to improve and ensure quality and continuity of care, while at the same time ensuring efficient use of resources.







DO YOU WANT TO KNOW MORE?

Information on the Super Hospital Programme

Danish Ministry of Health

- www.sum.dk or the page about the Super Hospital Program:
 www.sum.dk/Sundhed/Sundhedsvaesnet/Sygehusvaesenet/Sygehusinvesteringer.aspx
- Danish Regions: www.regioner.dk
- Danish Regions page about the Super Hospital Program: www.godtsygehusbyggeri.dk

Information on Digital Health in Denmark Information on Digital Health in Denmark

Strategy for Digital Health 2018-2022

https://tinyurl.com/StrategyDigitalhealth

Danish Health Data Initiative

https://tinvurl.com/Healthinitiative

Strategy for cyber and information security in the healthcare sector

https://tinyurl.com/Strategycyber

Health Care in Denmark

https://tinyurl.com/HealthcareDK2016

More information about Denmark can be found here:

www.denmark.dk





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