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SCHOOL OF BUSINESS AND SOCIAL SCIENCES

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# Rehabilitation strategies for Patients with Cardiovascular disease

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# Abstract

# Acronyms and Abbreviations

ICT Information Communications Technology

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# 1 | Introduction

## 1.1 Background

### 1.1.1 Technology

### 1.1.2 The Danish Healthcare System

The establishment of the Danish Healthcare System started in the eighteenth century. The first hospital was placed in Copenhagen and it opened in 1757. This hospital is still functioning and is today known as Rigshospitalet. Outside the capital small hospitals were build during the late eighteenth century. Even then the hospital was partly financed by taxes, patient payment and charity. In the late nineteenth century every thirteenth Dane was a member in a sick-benefit association which the Danish Government co-funded. The Danish Welfare State has its root in 1933 where the Social reform was founded. With this reform Danes with a low income it became a demand that they were members of a sick.benefit association. During the thirties taxes gradually became the dominant finance source to the Danish Healthcare System.

The sick-benefit associations was shut down in 1973 and replaced by public health insurance. The Danish public health insurance is paid by the Danes themselves within taxes. But the insurance provides free care for everyone regardless of income and residence. This public health insurance includes hospital stays, surgery, visits to a GP and specialist'. Furthermore it provides partly funding for dentist, physiotherapist, chiropractor, podiatrist and contributes to medicin.

### structure....

Every healthcare system consist of users, healthcare institutions and the financial third part, besides the fundamental financial mechanism user fee, tax and budgets/rates. This is described with the tripartite model in figure 1.1. The A, B and C is the financial mechanism and 1, 2 and 3 is the consistence of the healthcare system. The model shows how a third part is pushed in between the users and the healthcare institutions. This third part creates equality between users as much as possible. The constellation of finances differs from country to country. Denmark is mostly funded by the Government through taxes whereas US citizen needs health insurance to pay the for these services.

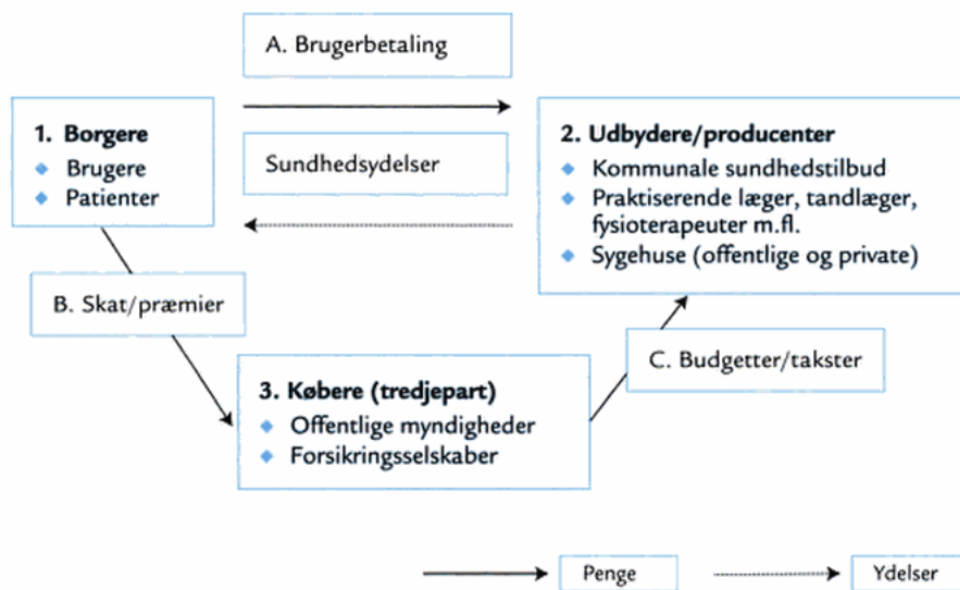


Figure 1.1: Tripartite model [1]

In 2007 Denmark made big structural changes throughout the healthcare organisation. Municipalities was combined which meant a change from 275 municipalities to 98. The 14 counties was replaced by 5 regions. The Danish Healthcare System is thereby organized in three levels: State(National level), region(regional level) and municipalities(local level)[2, 3].

The municipalities have multiple tasks but in the health area they administrate home nursing, public healthcare, school health service, child dental treatment, prevention and rehabilitation[4]. The five regions are responsible for the secondary sector which is mainly the hospital sector. Each region are able to organize their services accordingly to their regional wishes. They may adjust within the national legal limits, but the region will be responsible of procurement of staff and equipment. The states task is to initiate, coordinate, and advise. Furthermore the job is to establish goals for the national health policy[4]. In Denmark a ministry takes care os this job. The ministry changes over time but in 2015 the name of the ministry became Ministry of health [5]. This ministry is responsible for establishing the overall framework for the provision of health and elderly care.

"As a result of the modernisation process, the number of bed days is expected to be reduced by 20 per cent, and outpatient treatment to be expanded by 50 per cent from 2007 to 2020." [3]

[1, 4]

## **Finances**

The region is financed by four subsidies: Block grant from the state(75%), state activity-related subsidy(5%), local contribution(10%) and local activity-related contribution(10%). The block grant from the state is distributed with the consideration of differences inside the regions which will give the regions equal prospect of providing healthcare services. The rest of the subsidies are divided in three different types of distribution, this is partly to encourage the regions and municipalities to increase activity and efficiency[4].

The municipalities is financed with a block grant from the state as well but also council taxes which differs in municipalities. The regions receives activity-based subsidy from the municipality which means that the municipality pays the region money depended on the number of hospitalisations and treatments performs by the hospital on the municipalities citizens. Due to this constellation the municipality have incitament to reduce demands for hospitalization and other regional healthcare services[3].

## **Preventive healthcare**

As a part of the local government reform in 2007 preventive healthcare became an important part of the health care system. The vision was to improve quality of life and impact the lifestyle related diseases like cancer and cardiovascular diseases which are the dominating cause of death today in Denmark. Furthermore it included a focus on risk factor as tobacco, alcohol and lack of exercise. The municipalities was given the primary responsibility for preventive health[4].

## **Rehabilitation**

Rehabilitation, including physical and mental training, programmes is offered for all citizens by the municipalities. The training and the rehabilitation of a patient may be initiated at the hospital and carried on within the municipality when the patient is discharges. Which means that the municipality will be responsible for the rehabilitation after discharge. The training is to help the patient ti regain functional abilities and help them become self sufficient. Some will receive training free of charge whilst others may pay partly from their own pocket. This depends on the type illness [3].

## **Digitization in the healthcare system**

Denmark is known for extensive digitization and electronic communication in the system and use of health data. Denmark made standards for electronic communication years ago and the result of this is an almost digitalized communication within the healthcare sector. Health records, laboratory test results and hospital referrals are all nearly collected as electronic data. Multiple ICT and digital workflow are completely integrated, this marks Denmark as a frontrunner in deployment of e-health.

Telemedicine is a big part of the digitalization plan in Denmark where five initiatives is to

be the foundation of future telemedicine infrastructure in Denmark. "The goal is to have a digital infrastructure and IT architecture in place within the foreseeable future, so that relevant information can be exchanged across the healthcare system and other sectors" [3].

### **1.1.3 Target Group and Market Segment**

The need for cardiac rehabilitation should be evaluated for all patients with heart disease. This includes patients who have had a balloon dilation or by-pass surgery and patients with stable ischemic heart disease. Patients with heart failure, pacemaker or who have had heart-valve surgery or cardiac transplantation should also be evaluated for the purpose of cardiac rehabilitation [6]. By this statement it is seen, that this invention will involve a large target group.

To teach cardiac patients about their illness and how they are able to influence the course of the disease, means that the risk of dying is reduced. Furthermore research shows, that rehabilitation programs with physical exercise reduce cardiac mortality [7].

## **1.2 Problemstatement**

More than half of the danish citizens over the age of 55 suffer from a cardiovascular disease. Furthermore, cardiovascular diseases are one of the most common causes to death in Denmark. The total cost of treating cardiovascular patients at the Danish Healthcare System was 5.5 billion DKK in 2015. Every year approximately 55.700 Danes is diagnosed with cardiovascular disease.

Nearly 107.100 Danes are hospitalized every year for cardiovascular disease and almost 73.100 Danes are yearly at one or more consultations at the hospital. Approximately 23 percent of the cardiovascular patients are readmitted into the hospital within 30 days after being discharged. It has been proven, that cardiac rehabilitation results in a reduction in deaths caused by cardiovascular diseases and the need for readmissions [7].

All this indicates that cardiovascular patients constitute a large part of the Danish states economy. This leads to our problem statement which is:

- What impact would an ICT solution for rehabilitation have on both cardiovascular patients and the Danish Healthcare System?
- How can ICT be used to shorten hospital stay for cardiovascular patients?
- Which barriers/challenges can such system meet in implementation?

### **1.2.1 Delimitation**

This project is limited only to be focusing on healthcare in Denmark and how the technology within rehabilitation will have an essential impact on the Danish Healthcare



System. However, the project will be compared to related ICT solutions in EU as scientific articles based on The Danish Healthcare System is limited in this research area.

Relevant data on how the Danish Healthcare System is establish will mainly be based on literature found in books and on websides were guidelines, statistics and the historical development is being published.

## 2 | Method

## 3 | Theory

## 4 | Empirical process

## 5 | Analysis and discussion

## 6 | Conclusion

# Appendix

# References

- [1] Bjarne Rose Hjortbak et al. Sundhedsvæsenet på tværs - opgaver, organisation og regulering. 2nd ed. munksgaard, 2013.
- [2] . The local government reform. The Ministry of the Interior and Health. 2005. : .
- [3] . Health Care in Denmark - an overview. Healthcare Denmark and Ministry of health. 2017. : .
- [4] . Health Care in Denmark. Ministry of Health and prevention. 2008. : .
- [5] 2016. URL: <http://www.sum.dk/Om-ministeriet/Ministeriets-historie.aspx>.
- [6] Sundhedsstyrelsen. Vejledning om hjerterehabilitering på sygehuse. Center for Forebyggelse og Enhed for Planlægning. 2004. : .
- [7] URL: <https://hjertereforeningen.dk/alt-om-dit-hjerte/noegletal/>.



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