The Danish Healthcare System

Hans Erik Henriksen

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Healthcare DENMARK is a public-private partnership

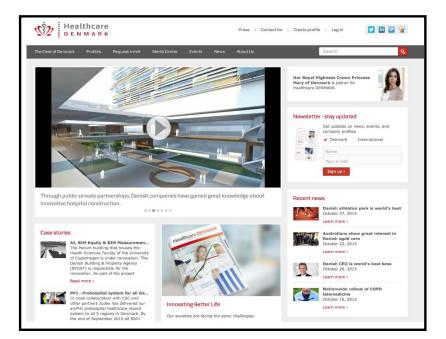# Her Royal Highness Crown Princess Mary is patron for Healthcare Denmark

"In Denmark, our focus on putting the patient first – combined with constant efforts to improve efficiency and quality – has resulted in a wide array of innovative healthcare solutions.
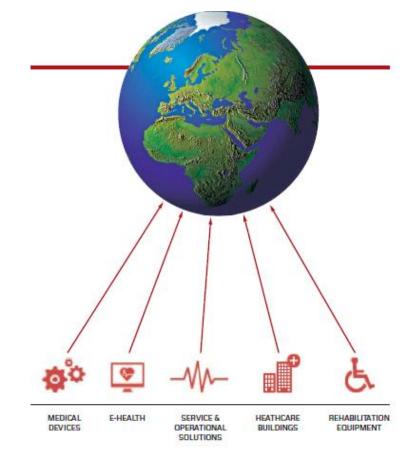I sincerely believe Danish technologies, products and expertise can have a positive impact on global health."

Healthcare DENMARK

- Danish healthcare visitor programs

- Conferences

- Danish delegation visit to other countries

- Communication and press activities

- The Healthcare DENMARK homepage

Agenda

- The Danish Healthcare System
- Danish Healthcare strategies and initiatives
- E-health and Healthcare IT
- Telehealth
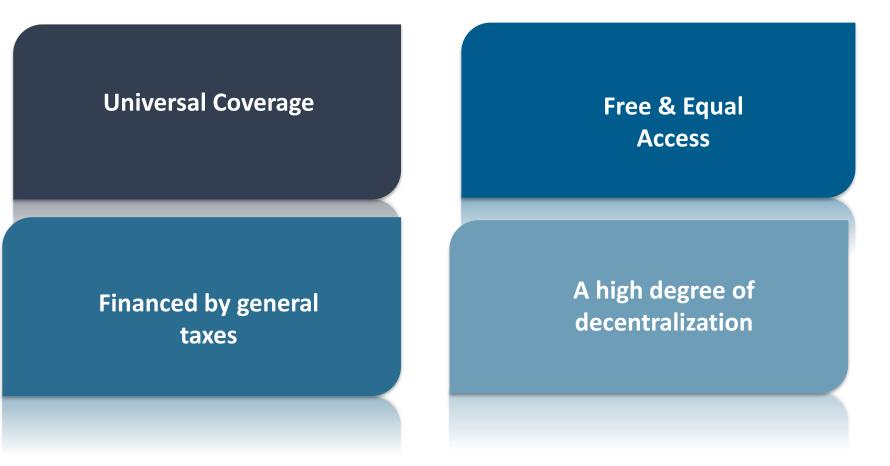- EHR platform at Central Region

Denmark

- **Capital**: Copenhagen
- **Population**: 5.7 million.
- **Area:** 43,094 km^2
- **GDP**$_{per capita}$: 59,831$
- **Language:** Danish

The Danish Healthcare System

Basic Features

Universal Coverage

Free & Equal Access

Financed by general taxes

A high degree of decentralization

Organization of the Healthcare System

National Level

Regional Level

Local   Level

Ministry of Health
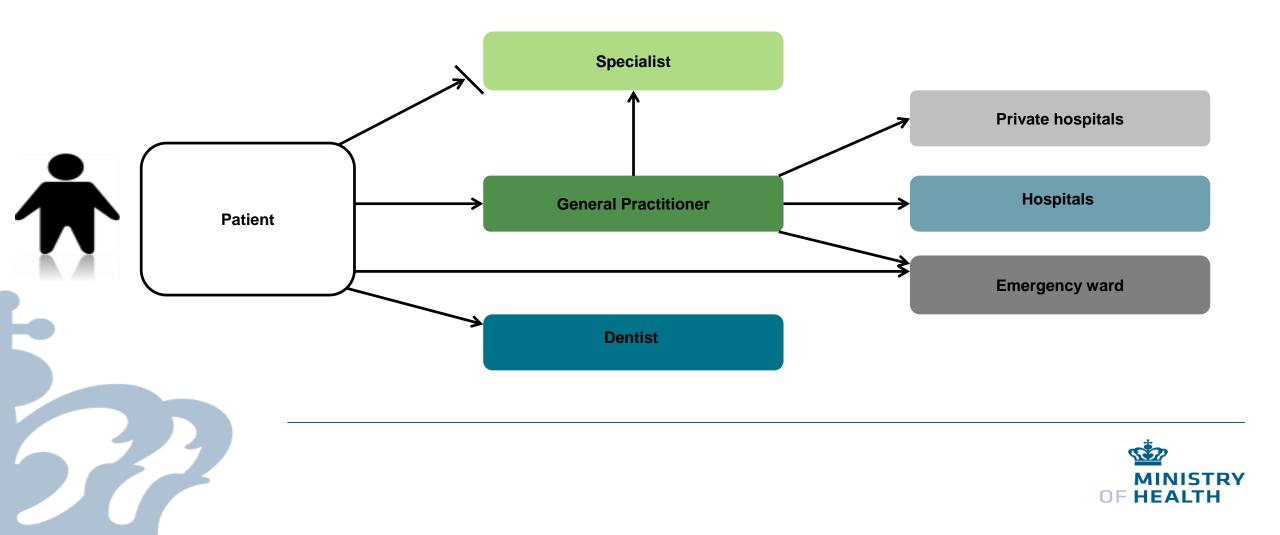
5 Regions
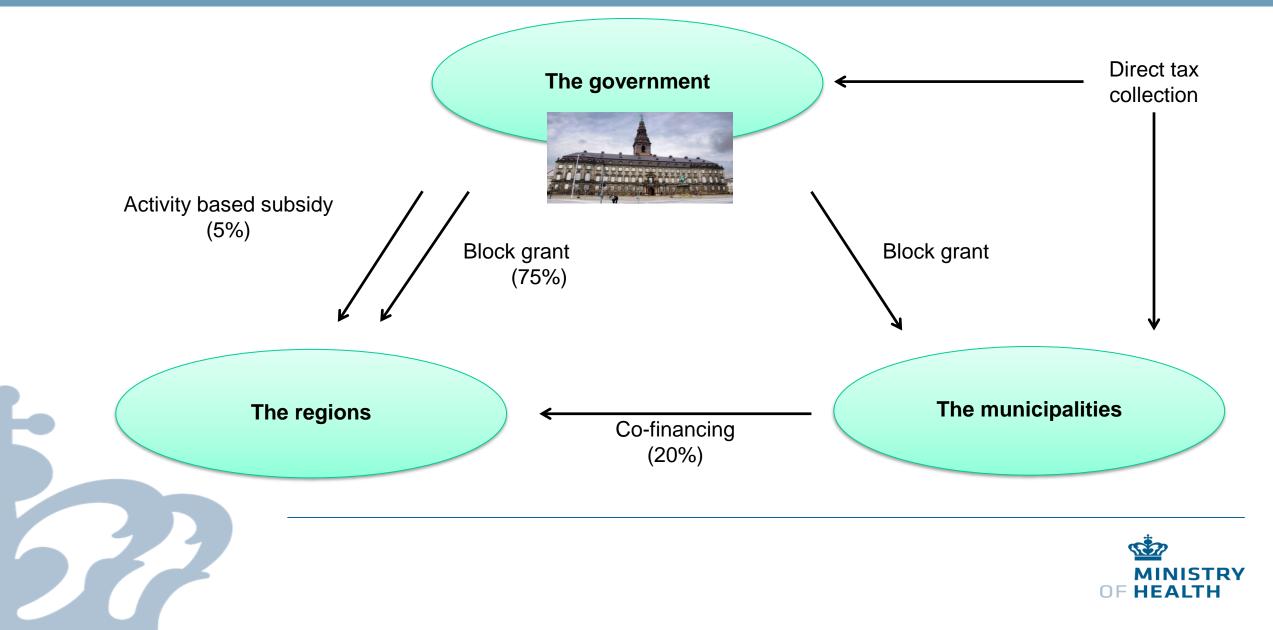
98 Municipalities

Where to go to if you get ill?

The government

Direct tax collection

Activity based subsidy (5%)

Block grant (75%)

Block grant

The regions

Co-financing (20%)

The municipalities

MINISTRY OF HEALTH
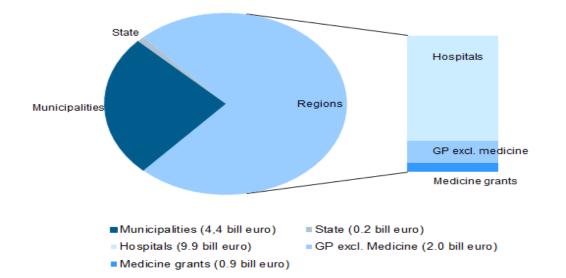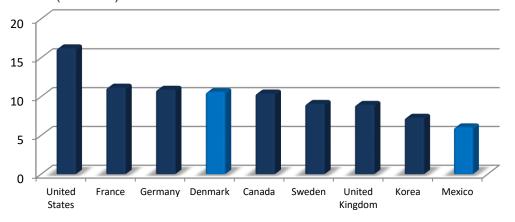
Financing Healthcare

Public expenditures on health in general

Total expenditure on health as a share of GDP, 2012 (OECD)
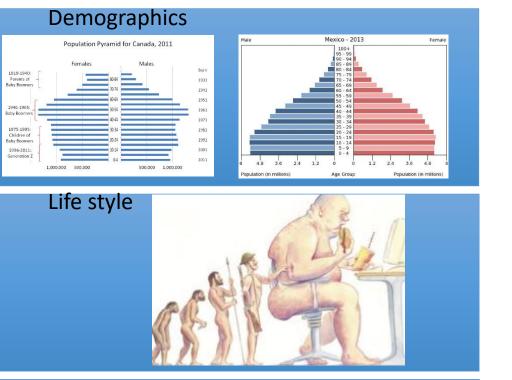

MINISTRY OF HEALTH

Agenda

- The Danish Healthcare System
- **Danish Healthcare strategies and initiatives**
- E-health and Healthcare IT
- Telehealth
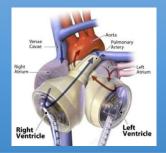- EHR platform at Central Region

All countries face the same healthcare challenges

Healthcare challenges

Demographics

Life style

New treatments
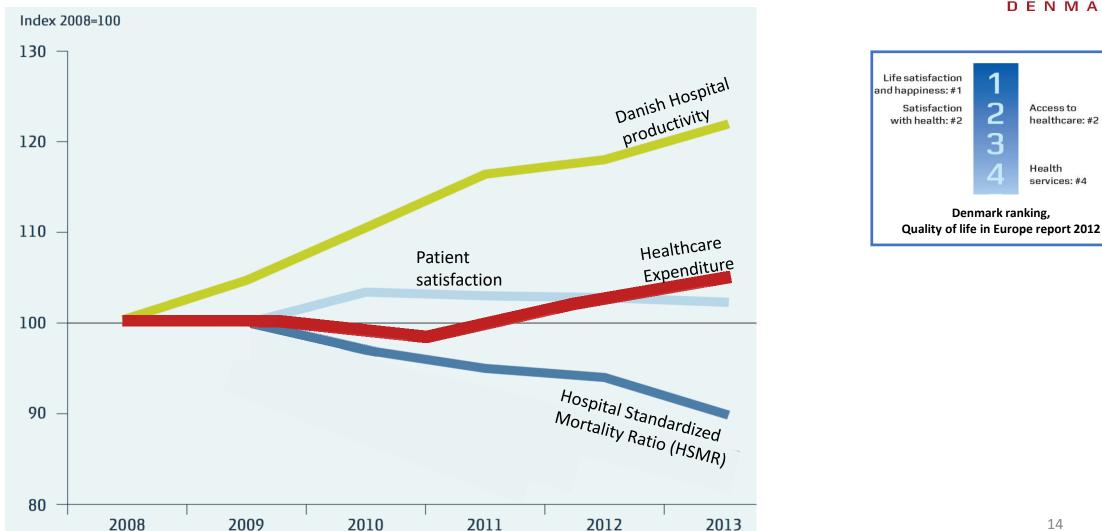
Denmarks initiatives

- **Early detection of critical diseases, population health initiatives and patient empowerment**
  - Early detection of diseases and immediate start of treatment
    - Nationwide screening
    - Fast access to diagnostics
  - Population health and prevention initiatives
  - Primary healthcare clinics
  - E-health, telehealth and patient empowerment
  - Ambient Assisted Living
  - Personalized Medicine

- **High quality and effective hospital treatment**
  - High quality treatment
  - More outpatient treatment
  - "Just-in-time" coordination and logistics

Danish citizens are happy with their lives and with healthcare services

Index 2008=100

- Danish Hospital productivity
- Patient satisfaction
- Healthcare Expenditure
- Hospital Standardized Mortality Ratio (HSMR)

Life satisfaction and happiness: #1
Satisfaction with health: #2
Access to healthcare: #2
Health services: #4
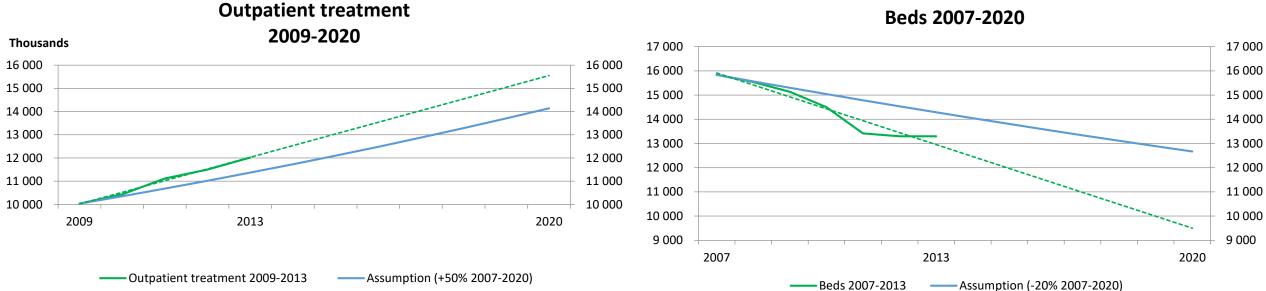
**Denmark ranking,
Quality of life in Europe report 2012**

Outpatient treatment vs. inpatient treatment

Outpatient treatment 2009-2020

Thousands

— Outpatient treatment 2009-2013   — Assumption (+50% 2007-2020)

Beds 2007-2020

— Beds 2007-2013   — Assumption (-20% 2007-2020)
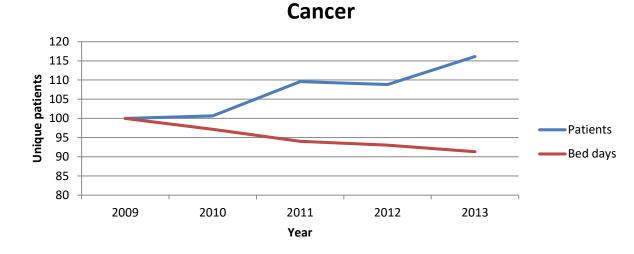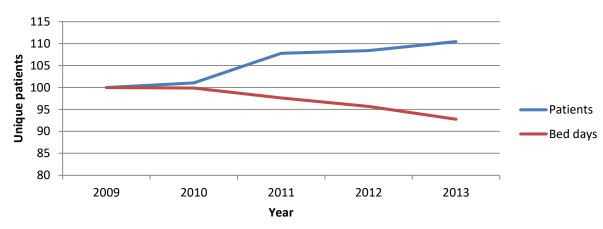
Unique patients vs. bed days (2009 = index 100)
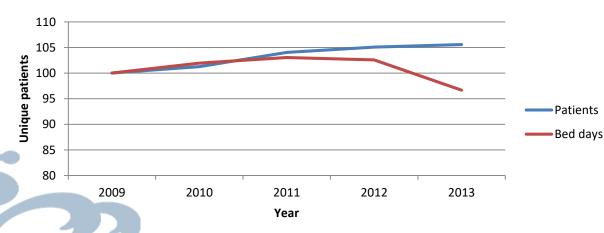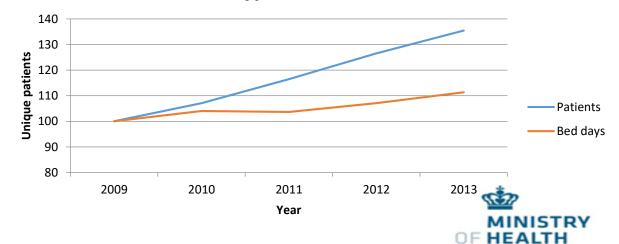
Municipalities and chronic care

- Principle: Keep activity at lowest efficient cost level

- Extensive home care and home nursing

- Prevent acute admissions and take care of patients

- Citizens goal: Returning to and keeping a job

- Empowerment and living an active everyday life

- Rehabilitation
  - Patient education
  - Physical training
  - Diets
  - Tobacco

What does the Government want?

- Better treatment in the primary sector (GP's) and a 20 pct. reduction in emergency admissions for patients with COPD and diabetes.

Initiatives

- A clear treatment plan (diabetes, COPD, arthritis) and more quality of care – more data and more transparency at individual level – GPs and patients

- National initiative for people with lung diseases including early detection and care and treatment via telemedicine for all relevant COPD patients before 2019

- Case management with special trained nurses - offered to vulnerable patients with complex course of treatment in risk of many acute contacts (1 pct. Of patients take up 30 pct. of expenditures).

Ongoing work in the Ministry of Health

The right to fast diagnose and treatment

- Maximum waiting of 30 days

Cancer Strategy IV

- Holistic and coherent approach to cancer treatment

Targeted effort for the elderly medical patients

- New action plan.
- Focus among other on prevention, treatment and follow-up at home.

Action plan for dementia

- Denmark as a dementia-friendly country. Individual tailored solutions. Focus on relatives.

Personalised Medicine

National Telehealth by 2019

The Danish eHealth and Telehealth plan

- National EHR and E-health architecture
- International standards
  - HL7
  - Continua Health Allicance
- First fully regional telehealth implementations
- Coordinated strategy:
  - Ministry of Health
  - Danish Regions
  - Danish Municipalities

THE DANISH
GOVERNMENT
LOCAL GOVERNMENT
DENMARK
DANISH REGIONS

**MAKING
eHEALTH WORK**

NATIONAL STRATEGY FOR DIGITALISATION
OF THE DANISH HEALTHCARE SECTOR 2013-2017

The eHealth and telehealth strategy will align with the 2013 – 2020 Assisted Living strategy

- Full scale implementation of proven solutions
  - Ceiling lifts
  - Digital rehabilitation
  - Selected robot technology
- Full scale Smart Home implementation
- Smart Home technology for disabled citizens
- Coordinated strategy:
  - Ministry of Health and Prevention
  - Danish Regions
  - Danish Municipalities

COMMON PUBLIC-SECTOR
STRATEGY FOR DIGITAL WELFARE
2013-2020

THE DANISH GOVERNMENT
LOCAL GOVERNMENT DENMARK
DANISH REGIONS
SEPTEMBER 2013

DIGITAL WELFARE
EMPOWERMENT,
FLEXIBILITY AND EFFICIENCY
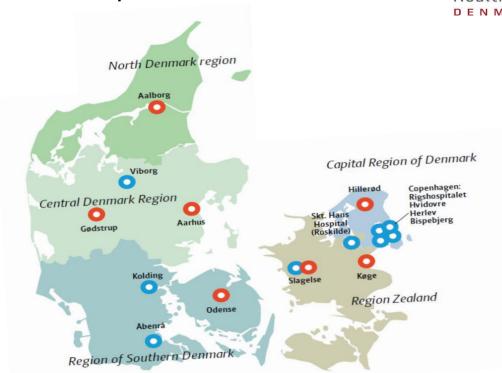
16 new hospitals will be the backbone of patient centric healthcare
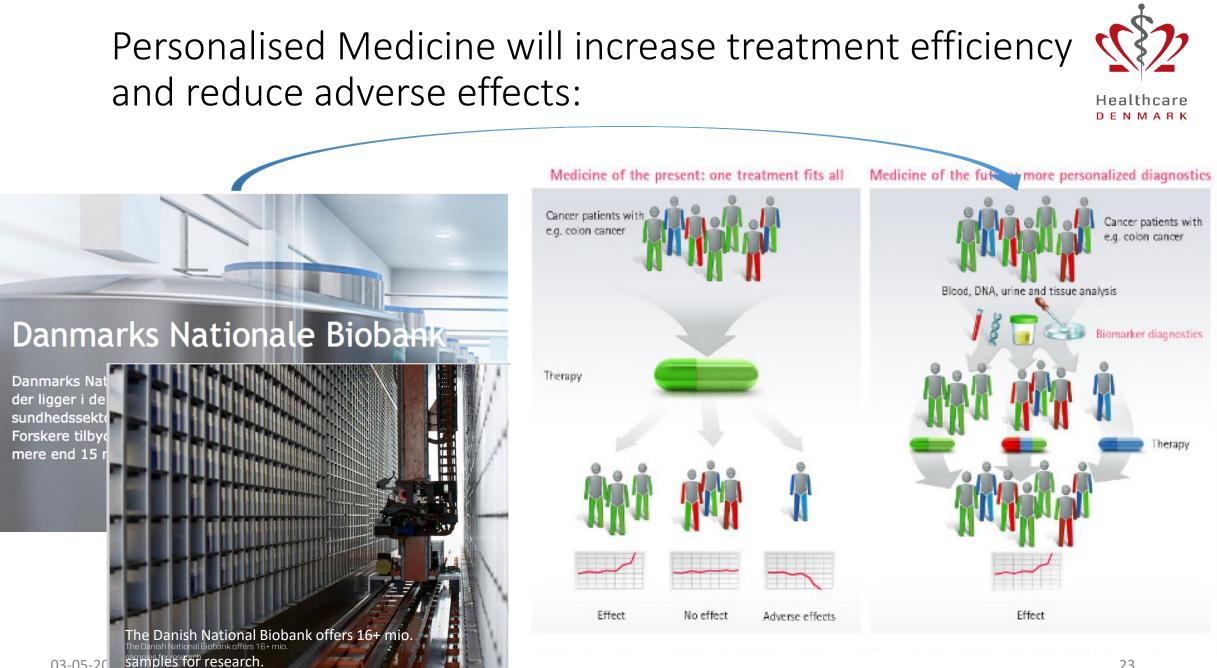
- **Public-private partnerships**
- **New innovations**
- **Danish design**
- **Green technology**

Personalised Medicine will increase treatment efficiency and reduce adverse effects:

Danmarks Nationale Biobank

Danmarks Nat...
der ligger i de...
sundhedssekt...
Forskere tilby...
mere end 15 ...

The Danish National Biobank offers 16+ mio. samples for research.

Medicine of the present: one treatment fits all

Cancer patients with e.g. colon cancer

Therapy

Effect | No effect | Adverse effects

Medicine of the future: more personalized diagnostics

Cancer patients with e.g. colon cancer

Blood, DNA, urine and tissue analysis

Biomarker diagnostics

Therapy

Effect

Agenda

- The Danish Healthcare System
- Danish Healthcare strategies and initiatives
- **E-health and Healthcare IT**
- Telehealth
- EHR platform at Central Region

A long term focus on health data networks and on e-health provide efficient access to healthcare information

Sundhed.dk
E-health Portal
2003 -

MedCom
Health Data Network
1994 -

Who is behind?
Ministry of Health, Danish Regions, Ministry of Interior, National Association of Local Authorities, National Board of Health, Copenhagen Hospital Corporation, Danish Pharmaceutical Association

SERVICES FOR CITIZENS

- **Access to personal health data on treatment**
  - **E.g. e-Record from hospitals and GPs and Shared Medication Card**
- **Communication with health care providers**
  - **E.g. Contact information and e-services like booking, prescription renewals and electronic communication**
- **General information on health service**
  - **E.g. quality in health care, patient rights**
- **Accurate and updated information on health, disease and treatment**
  - **E.g. medical handbook**
- **Personal home care/hospital solutions**
  - **E.g. diabetes and anticoagulant therapy**
- **Patient to patient dialogue**
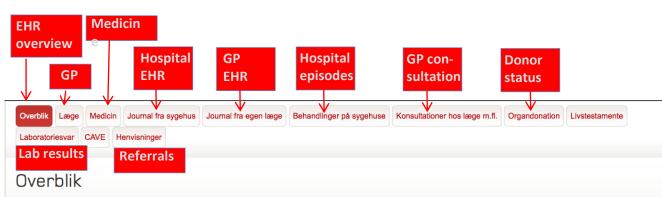
SERVICES FOR HEALTH CARE PROFESSIONALS

- **Access to personal health data on patients**
  - **E.g. e-Record, laboratory data and Shared Medication Card**
- **Contact and service information on other health care providers**
- **General information on health service**
  - **E.g. waiting lists, quality in health care, health and prevention programs, visitation**
- **Accurate and updated information on health, disease and treatment**
  - **E.g. medical handbook, treatment feedback and benchmarking**
- **Personal home care/hospital solutions**
  - **E.g. diabetes and anticoagulant therapy**

sundhed.dk

The national EHR today (e-journal)

Healthcare
DENMARK

EHR overview · **Medicine** · **GP** · **Hospital EHR** · **GP EHR** · **Hospital episodes** · **GP con-sultation** · **Donor status**

Overblik	Læge	Medicin	Journal fra sygehus	Journal fra egen læge	Behandlinger på sygehuse	Konsultationer hos læge m.fl.	Organdonation	Livstestamente
Laboratoriesvar	CAVE	Henvisninger						

Lab results · **Referrals**

Overblik

I din sundhedsjournal kan du finde de seneste oplysninger registreret om dig vedrørende behandlinger, medicin, lægemiddelallergier m.m.

Læge — **GP**

GP name and address

Seneste medicin ordineret af læge — **Medicine**

Dato	Medicin	Behandling
04.03.2014	Porto	
03.03.2014	Crestor	mod forhøjet kolesterol
27.05.2013	Restlevering	

› Se al ordineret medicin
› Se dit medicinkort

Seneste journaloplysninger fra sygehus (e-journal) — **Hospital EHR**

Dato	Sygehus	Afdeling	Diagnose
11.12.2000	KOLDING SYGEHUS	SKADESTUEN	Distorsio reg malleolorum

› Se alle journaloplysninger fra sygehus (e-journal)

Seneste journaloplysninger fra læger (p-journal) — **GP EHR**

Dato	Hos	Speciale	Fagligt område
20.06.2011	**GP name**	Alment praktiserende læge	HOVEDOVERSIGT

› Se alle journaloplysninger fra egen læge og speciallæger (p-journal)

Behandlinger på sygehuse — **Hospital episodes**

Se oplysninger om:
- Behandlinger på sygehus efter 1977
- Ambulant behandling og skadestuebesøg efter 1995

› Se oversigt over behandlinger på sygehuse

Konsultationer hos læge, tandlæge, fysioterap — **Specialists**

Se de behandlinger, du har fået tilskud til fra sygesikringen. På oversigten kan du se:
- Hvornår du sidst var hos tandlæge, fysioterapeut o.lign.
- Hvor meget tilskud, du har fået fra sygesikringen

› Se behandlinger hos læge, tandlæge, fysioterapeut m.fl.
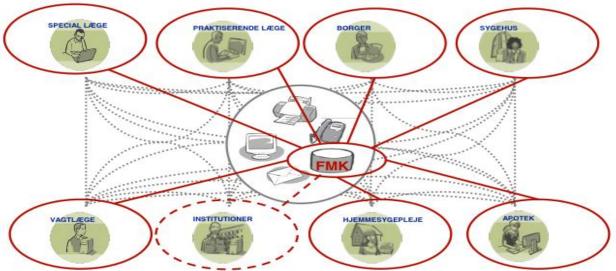
The Shared Medication Record

Description

- One national database containing updated information about prescription medicine for all patients in Denmark
- Access for all doctors, nurses, dentists, pharmacists at hospitals.
- Viewing access for citizens (own data)

Background

- Reducing number of medication errors
- Better communication regarding medicine between all involved parties
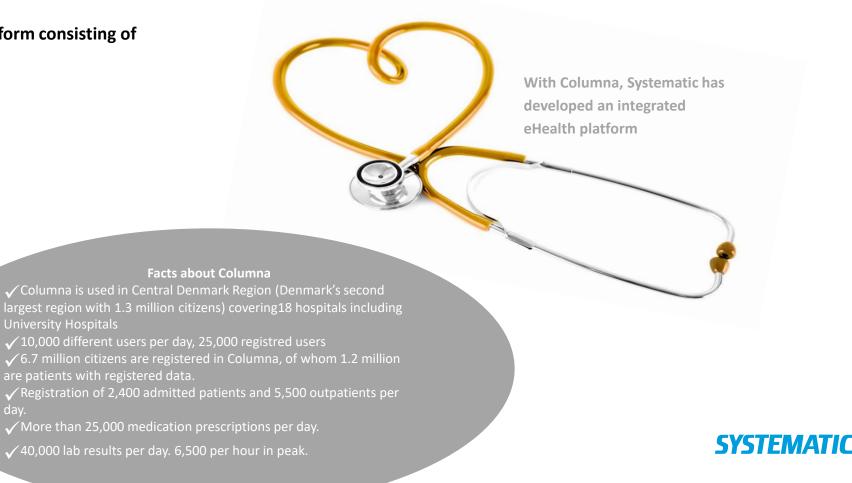- Improving the quality of the treatment

MINISTRY OF HEALTH

Data for the National E-health platform is delivered by the regional E-health solutions – e.g. the Systematic eHealth platform

Columna is a full blown eHealth platform consisting of

- The Patient Record

- Patient Administration (ADT)

- Booking

- Order/Result

- Medication Management

- Logistics

With Columna, Systematic has developed an integrated eHealth platform

Facts about Columna

✓ Columna is used in Central Denmark Region (Denmark's second largest region with 1.3 million citizens) covering18 hospitals including University Hospitals

✓ 10,000 different users per day, 25,000 registred users

✓ 6.7 million citizens are registered in Columna, of whom 1.2 million are patients with registered data.

✓ Registration of 2,400 admitted patients and 5,500 outpatients per day.

✓ More than 25,000 medication prescriptions per day.

✓ 40,000 lab results per day. 6,500 per hour in peak.

SYSTEMATIC

The National Service Platform

Service users
- Regions
- Municipalities
- Medical practices
- Government

REGISTER SERVICES
- Medical Authorisation
- Civil registration no. (CPR)
- Provider
- Client

DATA COLLECTION

Central data collection and distribution unit

BUSINESS SERVICES
- Shared Medication Record (FMK)
- Treatment relationship
- Follow-up
- Consent
- My log
- Notification
- Notification of birth
- Danish Vaccination Register (DDV)
- Authorisation

NSP SERVICES
- Security Token Service (STS)
- Token exchange

NSP

National Service Platform

Ministry of Health
- FMK
- DDV
- Authority
- Registers

Ministry of Economic Affairs and the Interior
- CPR

Ministry of Ecclesiastical Affairs
- Register of birth

Healthcare DENMARK

The National Service Platform – and new services

2014: National Image Index
- Radiology
- Ultrasound
- Telehealth

2015- : National Telehealth
- Device data
  - General (e.g. weight)
  - Diagnostic (e.g. ECG)

Government
National
Databases

FÆLLES
MEDICINKORT

National Healthportal

Municipal IT

X 98

5 Regions

IT Infrastructure & Network

Services   Support

IT Infrastructure & Network

Services   Support

IT Infrastructure & Network

Services   Support

IT Infrastructure & Network

Services   Support

IT Infrastructure & Network

Services   Support

OpenTele

Healthcare Network

Continua/XDS/HL7

epsos
EUROPEAN PATIENTS
SMART OPEN SERVICES

EU systems

NSP

National
Service
Platform

NSP Master

3600 GP's

Agenda

- The Danish Healthcare System

- Danish Healthcare strategies and initiatives

- E-health and Healthcare IT

- **Telehealth**

- EHR platform at Central Region

Telemedical ulcer assessment: The method
- The nurse photographs the ulcer with her cell phone and mails the image to the doctor.
- The doctor prescribes new treatment or new medication.
- Communication between nurse and doctor is based on a shared web based patient record.

The benefits:
- reduce the number of hospital admissions
- minimise the patients' transport time
- reduce doctor and nurse time at the hospitals
- improve the skills of the municipal nurses increase patient satisfaction.

National roll-out: 70 % of all relevant patients to be included by 2017

Are elderly people able to use Telehealth solutions ?

- The Danish Digitalization strategy – electronic mailbox by Nov. 2014

- Patient Empowerment and quality of life

- Integrated Care

Personalised Healthcare – and Telehealth

TeleCare Nord

- All COPD patients in Region North
- Highest number of research projects
- Evidence
- OpenTelehealth – open source platform

The EPITAL project

Citizen - Summer 2014

Medical box – rescue medication
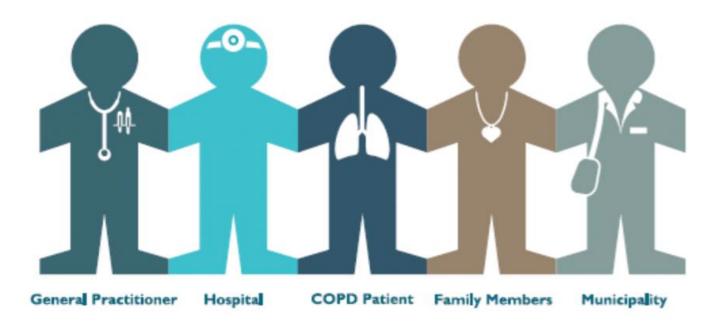
e-health navigator

KOL Medicinkasse

e-health monitoring devices

- Personalised Healthcare
- Call center and new support organisation
- Patient Empowerment
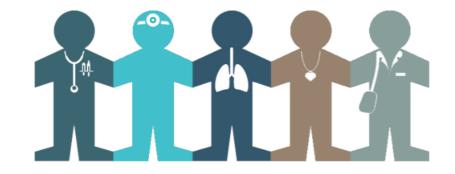
TeleCare North
Home monitoring of COPD patients

General Practitioner   Hospital   COPD Patient   Family Members   Municipality
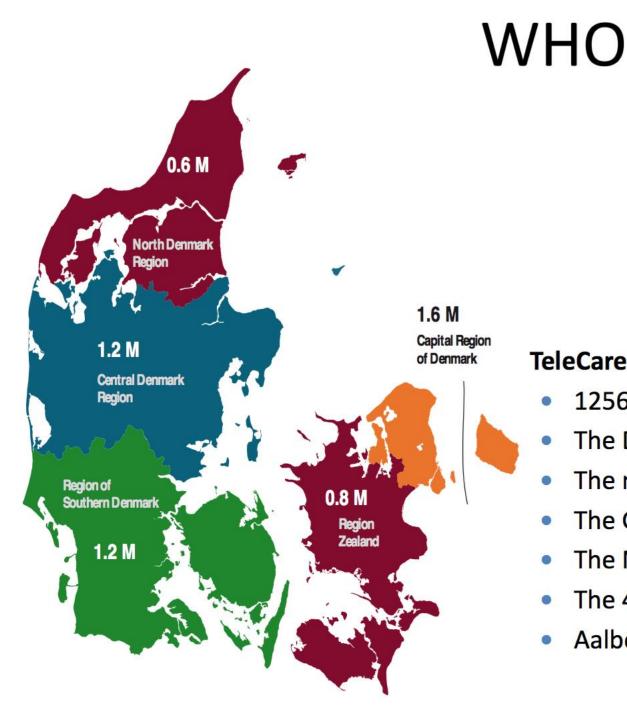
TeleCare North

- From a R&D/ pilot program to a full scale demonstration project. First example in Europe.

- Collaboration across sectors, not only around the patient but also with the patient in relation to finding and implementing solutions that meet technical, organizational, legal and economic challenges of deploying full-scale operation.

- Evaluation- and research design, including randomized block design, geared towards gathering evidence of effect.

WHO

TeleCare Nord participants

- 1256 Patients
- The Danish Lung Association
- The municipalities in North Jutland
- The GPs in North Jutland
- The North Denmark Region
- The 4 hospitals in North Jutland
- Aalborg University

Healthcare
DENMARK

0.6 M

North Denmark
Region

1.2 M

Central Denmark
Region

Region of
Southern Denmark

1.2 M

1.6 M

Capital Region
of Denmark

0.8 M

Region
Zealand

Hjørring

Frederikshavn

Læsø

Brønderslev

Jammerbugt

Aalborg

Thisted

Vesthimmerland

Rebild

Morsø

Mariagerfjord

HOW

Asynchrony

National infrastruktur

National database

Internationale standards
HL7   XDS

sundhed.dk

OpenTele   Servers

Mobil broadband

Support

New Services

Logistic

As simple as possible – based on Open Source

Towards Integrated Care

Local patient related services

Regional operating services

PhD results
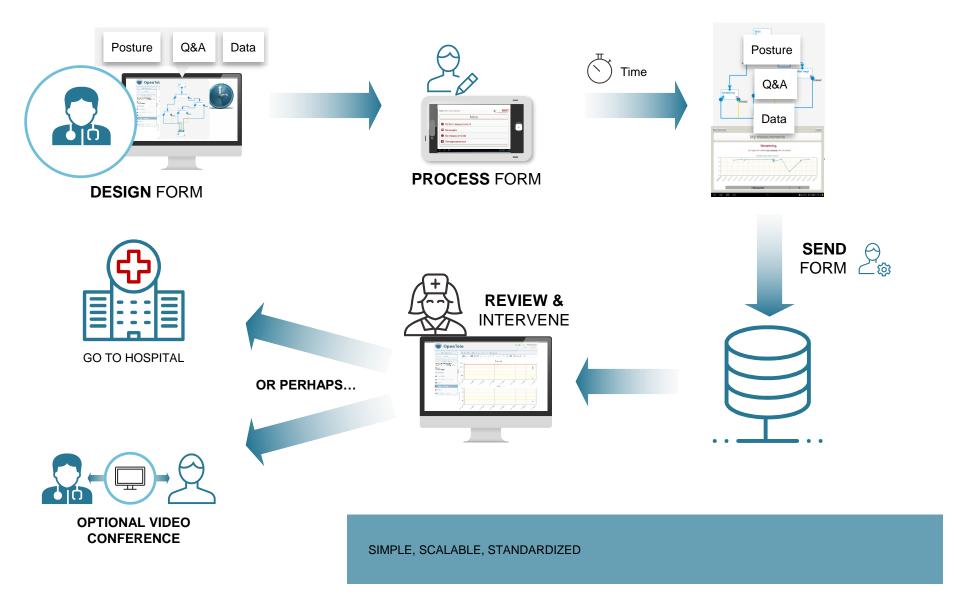
Health economic

- Home monitoring offers an health effect measured in qualy-ajusted life year (QALY).

- Home monitoring is more expensive - if offered to all COPD patients

- Home monitoring of patients with server COPD / GOLD 3 offers an effect measured in QALY **and** a reduces healthcost app. 7000 Dkr. /year.

- Home monitoring of patients who receives municipal nursing and care services offers an effect measured in QALY **and** reduces cost app. 9000 Dkr. /year
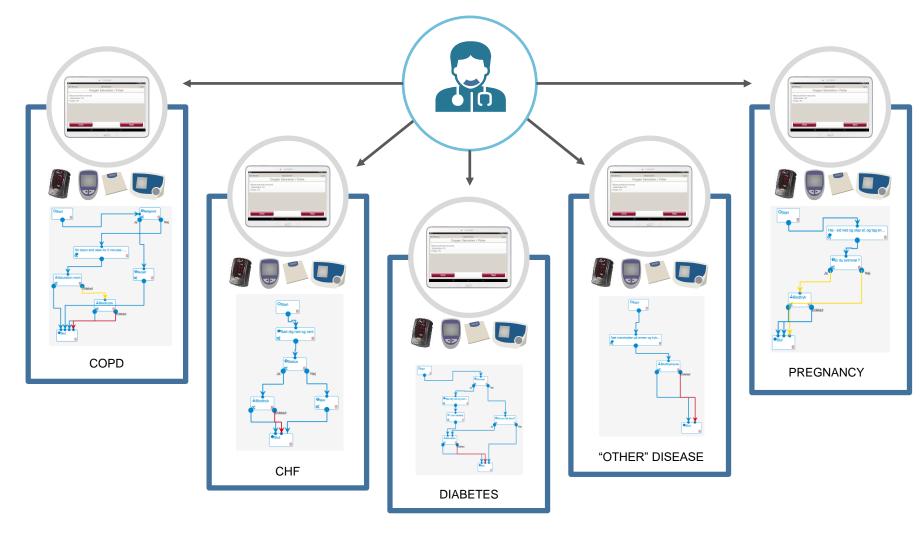
OPEN TELE SIMULATED CONSULTATION

DESIGN FORM

Posture Q&A Data

PROCESS FORM

Time

Posture Q&A Data

SEND FORM

GO TO HOSPITAL

REVIEW & INTERVENE

OR PERHAPS…

OPTIONAL VIDEO CONFERENCE

SIMPLE, SCALABLE, STANDARDIZED

Healthcare
DENMARK

46
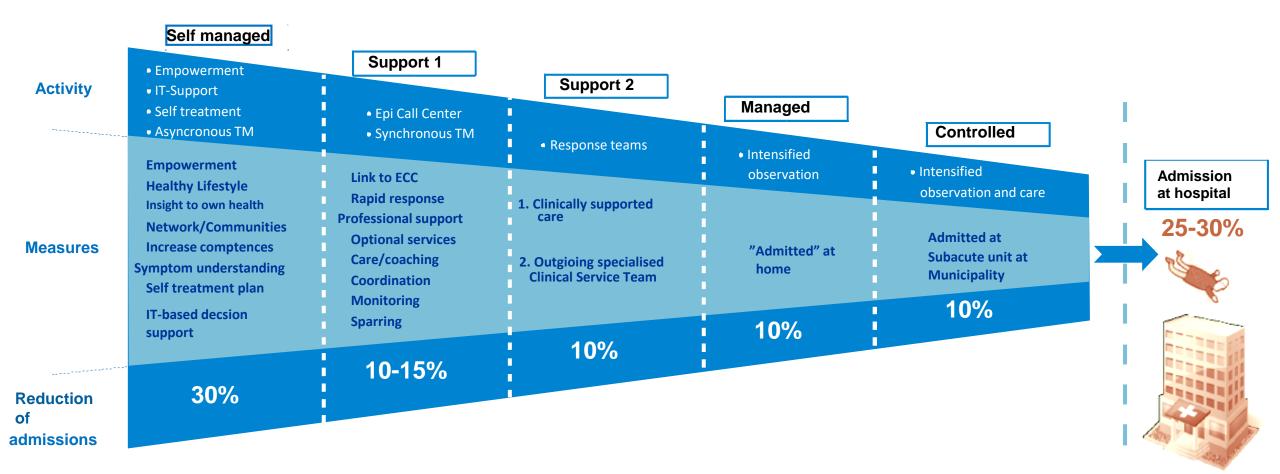
OpenTelehealth REMOTE PATIENT MONITORING - solution

COPD

CHF

DIABETES

"OTHER" DISEASE

PREGNANCY

Medical device class 2

Generic platform with flexibility to adapt

47

"The Funnel"

Healthcare DENMARK

Activity

Self managed
- Empowerment
- IT-Support
- Self treatment
- Asyncronous TM

Support 1
- Epi Call Center
- Synchronous TM

Support 2
- Response teams

Managed
- Intensified observation

Controlled
- Intensified observation and care

Measures

Self managed	Support 1	Support 2	Managed	Controlled
Empowerment	Link to ECC	1. Clinically supported care		
Healthy Lifestyle	Rapid response			
Insight to own health	Professional support		"Admitted" at home	Admitted at Subacute unit at Municipality
Network/Communities	Optional services	2. Outgoing specialised Clinical Service Team		
Increase comptences	Care/coaching			
Symptom understanding	Coordination			
Self treatment plan	Monitoring			
IT-based decsion support	Sparring			

Admission at hospital

25-30%

Reduction of admissions

30%	10-15%	10%	10%	10%

1 2 **3** 4 5 6

CallCenter, Lyngby-Taarbæk, – Summer 2014

CallCenter in Lyngby-Taarbæk

Doctor at Bornholm

Citizen in Florida

Agenda

- The Danish Healthcare System
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- Telehealth
- **EHR platform at Central Region**

Columna eHealth Platform

Solution Portfolio

Columna
Clinical
Information
System

Columna
Clinical
Logistics

Columna
Service
Logistics

Columna
Patient
Logistics

Columna
Cura
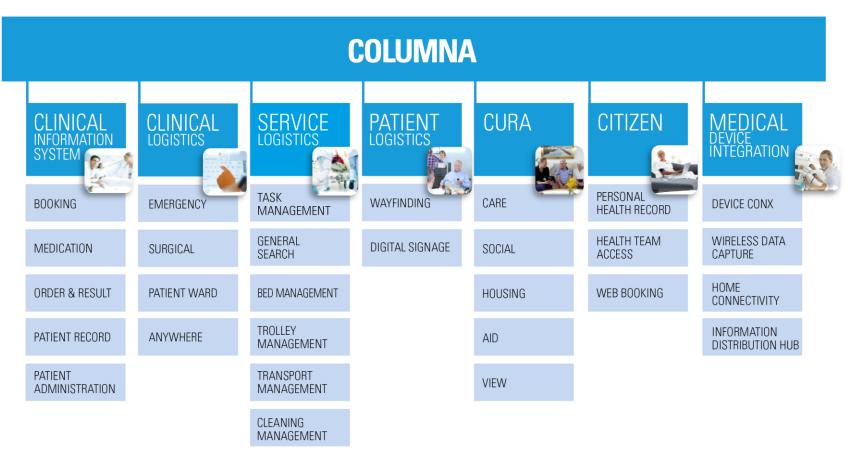
Columna
Citizen

Columna
Medical
Device
Integration

SYSTEMATIC

Columna eHealth platform
Modularity & Integration

COLUMNA

CLINICAL INFORMATION SYSTEM	CLINICAL LOGISTICS	SERVICE LOGISTICS	PATIENT LOGISTICS	CURA	CITIZEN	MEDICAL DEVICE INTEGRATION
BOOKING	EMERGENCY	TASK MANAGEMENT	WAYFINDING	CARE	PERSONAL HEALTH RECORD	DEVICE CONX
MEDICATION	SURGICAL	GENERAL SEARCH	DIGITAL SIGNAGE	SOCIAL	HEALTH TEAM ACCESS	WIRELESS DATA CAPTURE
ORDER & RESULT	PATIENT WARD	BED MANAGEMENT		HOUSING	WEB BOOKING	HOME CONNECTIVITY
PATIENT RECORD	ANYWHERE	TROLLEY MANAGEMENT		AID		INFORMATION DISTRIBUTION HUB
PATIENT ADMINISTRATION		TRANSPORT MANAGEMENT		VIEW		
		CLEANING MANAGEMENT				

SYSTEMATIC

Columna in Central Denmark Region

Fully implemented solution and in 24/7 use

1 Joint solution for somatic and psychiatric patients

10 hospitals in Central Denmark Region

3400+ beds in somatic and psychiatric hospitals

20.000+ different users per day

6.7 million citizens are registered
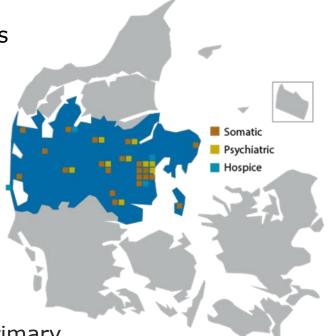   (1.7 million are patients with registered data)

2.500+ admitted patients per day

>25.000 medication prescriptions per day

>40.000 lab results per day

6.500 lab results per hour in peak

> 80,000 information exchanges per. month with primary health service and citizens to support the continuum of care
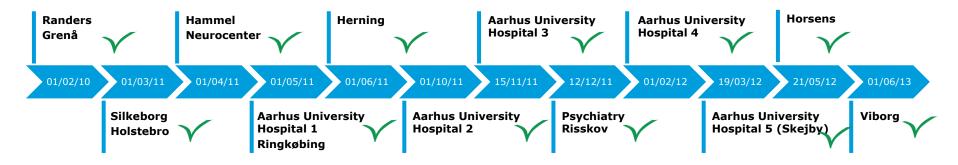
HIMMS Level 6

■ Somatic
■ Psychiatric
■ Hospice

SYSTEMATIC

Columna roll-out in the Region

Ambitious plan 10 hospitals in 40 months

Randers Grenå ✓

Hammel Neurocenter ✓

Herning ✓

Aarhus University Hospital 3 ✓

Aarhus University Hospital 4 ✓

Horsens ✓

| 01/02/10 | 01/03/11 | 01/04/11 | 01/05/11 | 01/06/11 | 01/10/11 | 15/11/11 | 12/12/11 | 01/02/12 | 19/03/12 | 21/05/12 | 01/06/13 |

Silkeborg Holstebro ✓

Aarhus University Hospital 1 Ringkøbing ✓

Aarhus University Hospital 2 ✓

Psychiatry Risskov ✓

Aarhus University Hospital 5 (Skejby) ✓

Viborg ✓

Roll-out strategy:
- One standard configuration
- Reuse and small adjustments of clinical content
- Smaller hospitals - full roll-out
- Large hospital stepwise roll-out based on specialties
- Psychiatric and somatic hospital on simultaneous roll-out

■ Somatic
■ Psychiatric
■ Hospice

SYSTEMATIC

Outcomes

Aarhus University Hospital – most efficient in Denmark

Easy overview of patient information including mobile access

Increased efficiency

Higher quality of care

Tools for effective planning of daily tasks

Standardized plans of treatment

Structured clinical documentation, reusable

Focal point of the interdisciplinary and inter-sectorial cooperation

Optimized patient flows, logistics and communication

Optimization of hospital service logistics

Enhanced patient safety

High satisfaction among clinicians

WHY **COLUMNA**

→ Simplifies healthcare delivery
→ Simplifies patient-centric care
→ Simplifies critical decision making

SYSTEMATIC

The New University Hospital

SYSTEMATIC

Involvement in the New University Hospital Skejby (DNU)

Systematic is involved in the development of Healthcare IT solutions to DNU; the main areas are:

- Logistics Optimization in the hospital service areas
- Future Patient in hospital of the future
- The patient dialogue with the hospital

DNU - commissioning

2015 - the first departments

2016 - Emergency Department

2019 - full operation

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Facts about the New University Hospital

- Aarhus University Hospital in Skejby today: approx 160.000 sqm
- New buildings: app. 300.000 sqm
- Approx 1,2 million sqm soil
- Plant investment (gross) 1.25bn EURO (2010-level)
- Operating budget (gross) app. 1.25bn EURO
- App. 11.000 employees
- App. 1.000 students
- Annual activity:
- 100,000 admissions (inpatients)
- 950,000 outpatient visits
- 40-50% of the regional hospital activity
- Up to 38,000 daily transportations

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