



Digital innovations and healthcare partnerships at Karolinska University Hospital

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Swedish healthcare

Healthcare challenges

Demographics; an aging population

Increasing healthcare costs (80% chronic diseases)

Healthcare inequality; lack of focus on prevention

Slowness implementing new treatments and technology

Changed prerequisites

Patient involvement and connectivity

Automation and decision support

Healthcare delivery models

Opportunities

High research ranking & top innovation ranking

Healthcare data and national quality registers

Emerging technologies

Personalized medicine

Patient Centric Healthcare

Karolinska University Hospital

Next to Karolinska Institutet and Stockholm's new life science cluster

THREE ASSIGNMENTS

Healthcare – Clinical research – Education

HERITAGE

Research and innovation

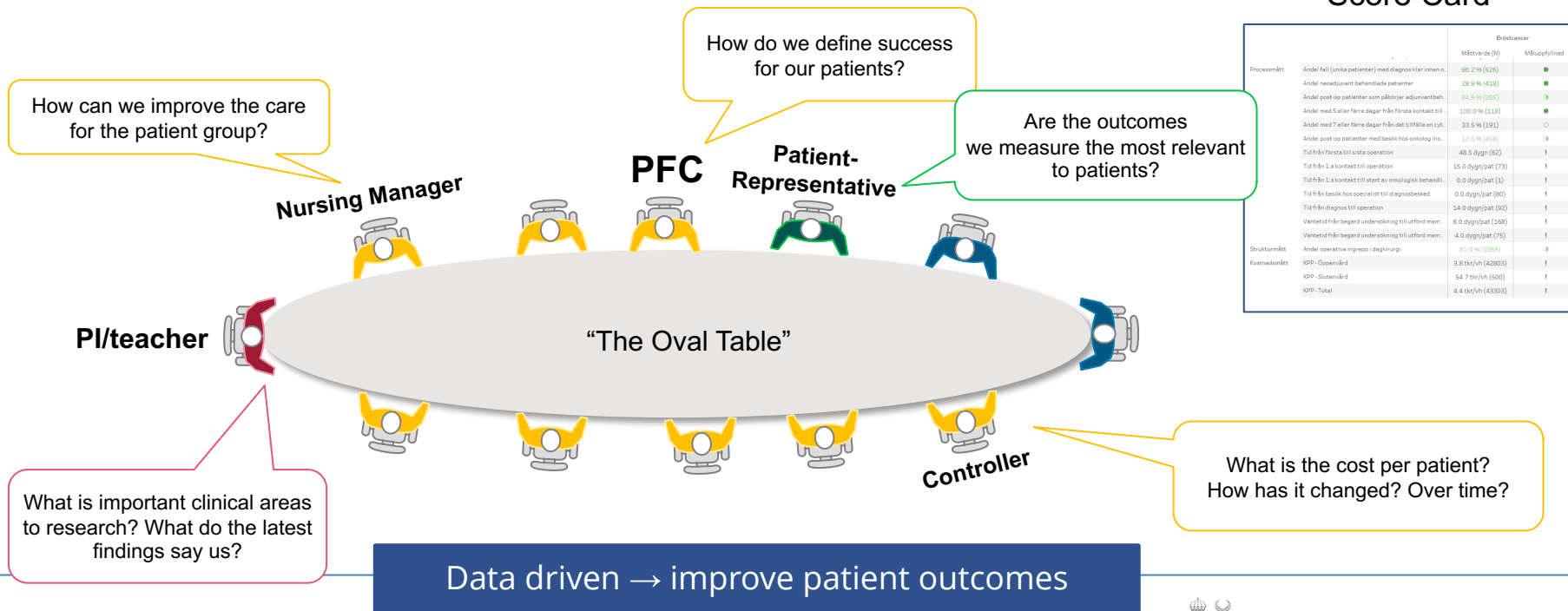


Some Key facts

- 1,35 million patient visits /year
- > 57,000 national/international
- 1000 beds
- 1,8 billion EUR in yearly budget
- 15 700 staff
- 2000+ active in research

Pathway management

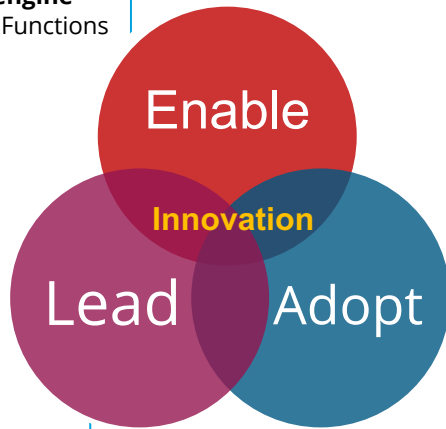
with broad interdisciplinary representation



Innovation management at Karolinska University Hospital

Approach

Innovation engine
in Themes & Functions



Generate, lead and scale
world class multi-disciplinary
innovation projects

Embrace, import and adopt
high impact external innovation

Center for Innovation



- Multi-disciplinary team
- Tools for systematic innovation

Areas

Technologies & digitalization

Innovation infrastructure

Pathways & care levels

Co-creation

Prevention

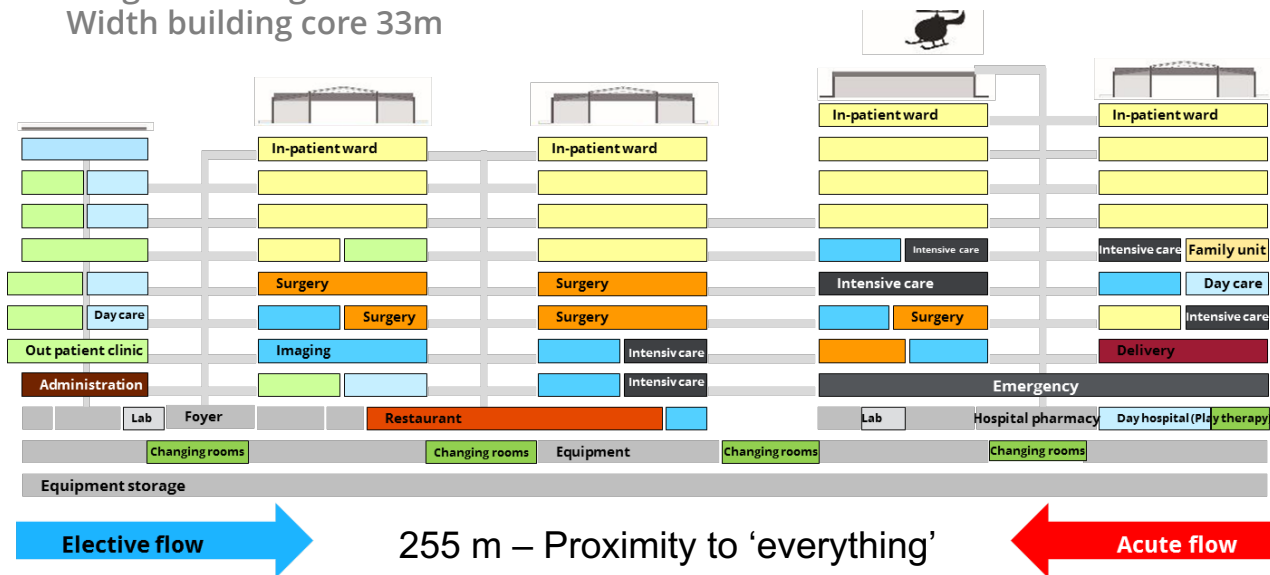
Innovation procurement

New hospital building designed for highly specialized care

Distance from side to side 82m

Length building core 57m

Width building core 33m



A catalyst for digitalization, innovation and transformation

Single rooms:
integrity & safety

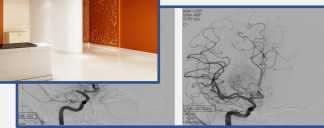


Examples



Restricted (adult)
acute admittance

Integrated cancer care



Acute neuro intervention

Innovative logistic system



Medical technology program in the new hospital building



**20,000 medical device
products in 13 projects**

New approaches

New procurement approach

New commissioning approach

Innovation partnerships

Innovation Partnerships

Examples

Stroke
Prostate cancer
Surgical navigation

Medical imaging

OR integration

Patient monitoring

Automation

Cyclotron and radio pharmacy

ICT (information and communication)

Flexible endoscopy

Sterilization

Care flow optimization

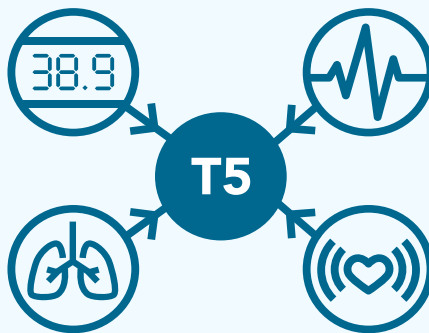
Case 1

Infrastructure to monitor vital parameters

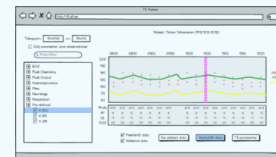
Wearable patient monitoring



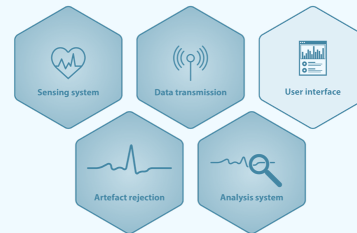
Interoperability



Clinical decision support and AI



Gamma



Nightingale 
Smart monitoring, safer care

Case 2

Integrated (hybrid) surgery theatres

New opportunities in the surgery theaters

- Equipment integration and control
- Highly accessible digital imaging
- Large flexible monitors; patient monitoring, endoscopy, ultrasound, wound cameras, electronic journals
- Video recording & documentation
- Communication; Video transmission in real-time (experts, auditorium, education)



Case 3

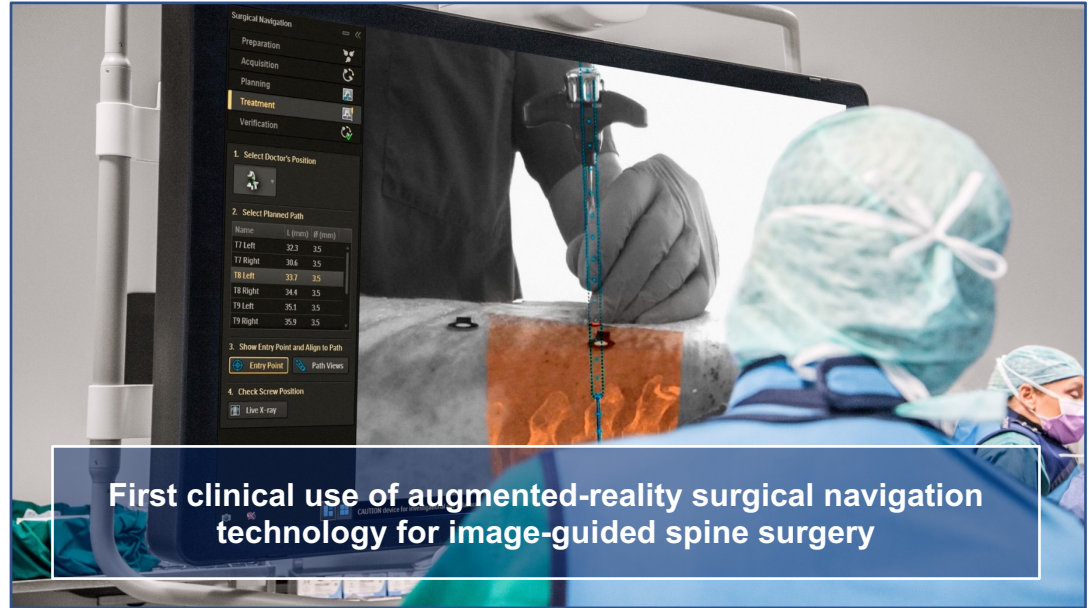
Surgical navigation with AR and 3D

Augmented reality in image-guided surgery

94% accuracy – increased quality, precision and safety through

- Integrated workflow
- Augmented reality
- Patient tracking
- 1st clinical use in the world
- 1st and leading center for this technology

Developed within one of Karolinska's strategic innovation partnerships (Philips)



Case 4

Automation and robotics

Minimizing dirty, dull and dangerous activities

How can automation and robotics address the challenges in highly specialized care?

One initiative with three horizons:

- Development center for flexible robot automation
- Mobile manipulation
- UX project in hospital robotics

Karolinska University Hospital in collaboration with ABB.



Case 5

Challenge the market to meet our needs

Supporting life style changes – improving care

The pilot solution aims to

- **empower patients and support lifestyle changes** in order to improve outcomes of surgical procedures as well as cost effectiveness.
- **explore how to challenge the market** to develop new solutions through pre-commercial procurement.

A collaboration with university hospitals in Spain and Denmark, Karolinska Institutet and the Swedish Reumatism Organization.



Case 6

Childhood Cancer App

Co-creation between parents and staff

The importance of a simple mobile app should not be underestimated. The app was the start of a collaboration between patients, parents and staff – and led to a continuous innovation work.

Result

- 5 languages – 20% of the families do not speak Swedish
- Downloaded all over the country
- Led to a platform for information apps
- New innovations keep coming...



Case 7

Algorithms preventing infections

HAI Proactive – early and individualized prediction

Aims to develop and implement a fully automated HAI surveillance system based on electronic health records data and screening algorithms for prediction of HAI at the individual patient level.

Results: A rule-based surveillance algorithm for sepsis that continuously monitor patients admitted to hospital.

A national collaboration: Academic, health and industry partners with support from Sweden's Innovation Agency.

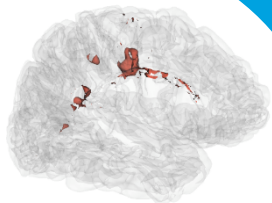


Case 8

Reality lab for AI development and implementation

Pioneering implementation of AI in healthcare

Learning by doing – based on clinical needs
AI-tools are developed by healthcare, industry and academia.



Eg MS Pilot
T Granberg 2017

Policies, ethics
& regulatory
issues

IT infrastructure
& security

Communication and
rootedness

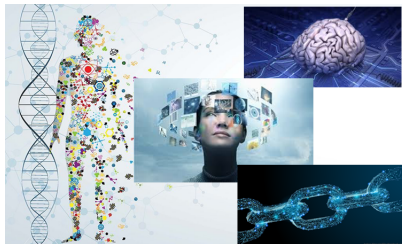
Procurement,
agreements
& business
cases

Implementation
in healthcare

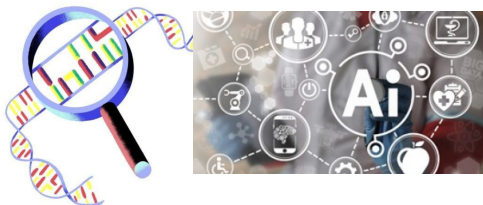
Partnerships success factors

Enablers

Digitalization & Emerging Technologies

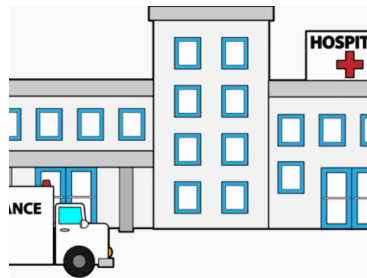


Research



Driver

Care Providers & Needs



Scalable wholistic solutions

IT architecture

Innovation management

Partners

Pharma

Medtech

IT

Automation

Strategic alliances ?



Thank you!

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