BIGMED PROSJEKTET: UTVIKLING AV KLINISK BESLUTNINGSVERKTØY

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TECHNOLOGY CHANGES MEDICINE

Imaging

Fluoroscopic guidance

Ultrasound

Videoscopic surgery

Computerisation

Automated procedures

Robots

Communication

Digital information

Telemedicine

Patient information

Miniaturization

Imaging fMRI, Pet, Optical

Micro technology

Nanotechnology

Biomolecular science

Cell engineering

Genomics

INTERVENSJONSSENTERET 2016
BILDEDANNENDE UTSTYR INN PÅ OPERASJONSSTUENE

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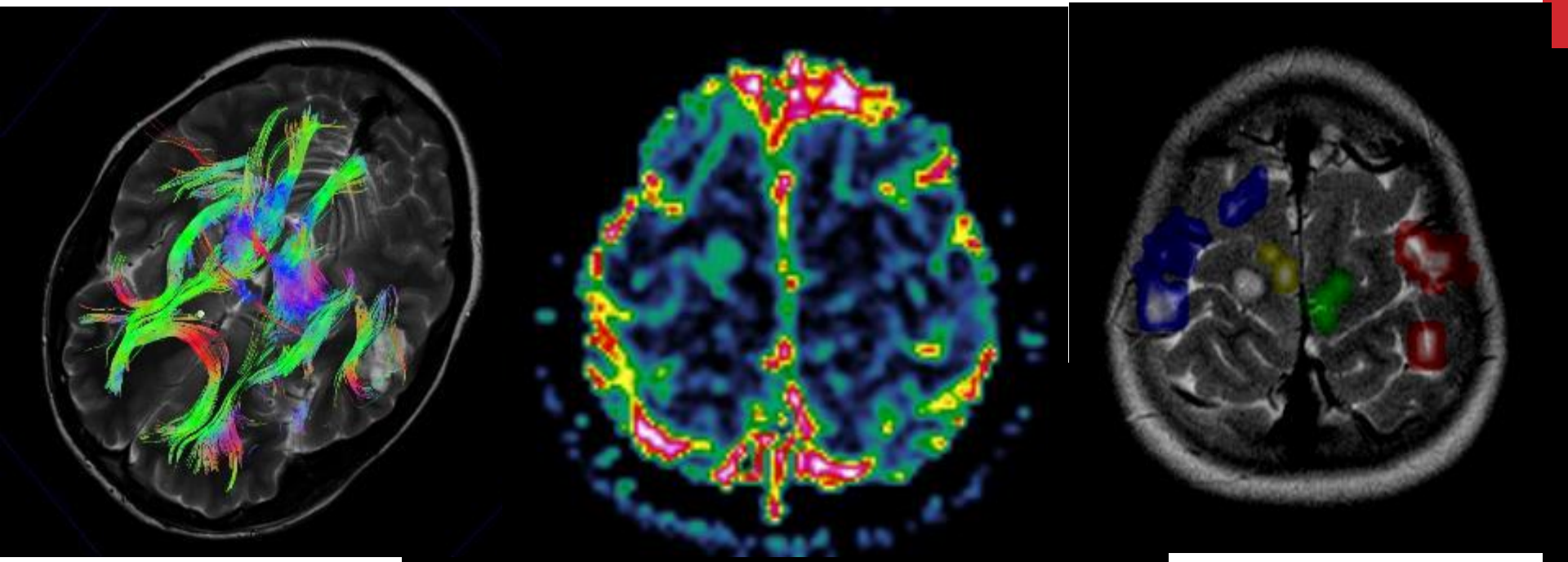
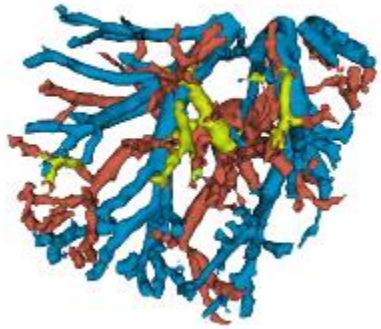
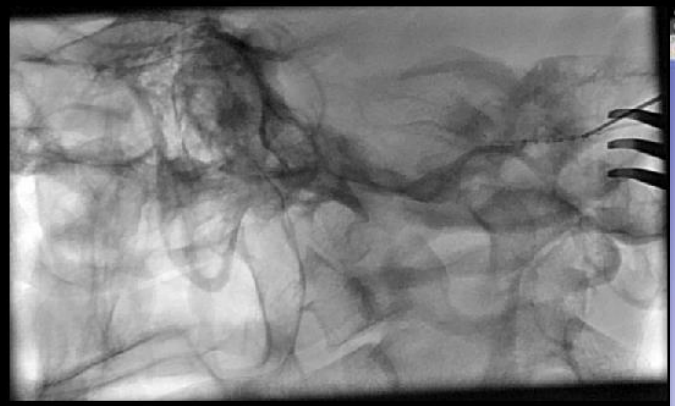
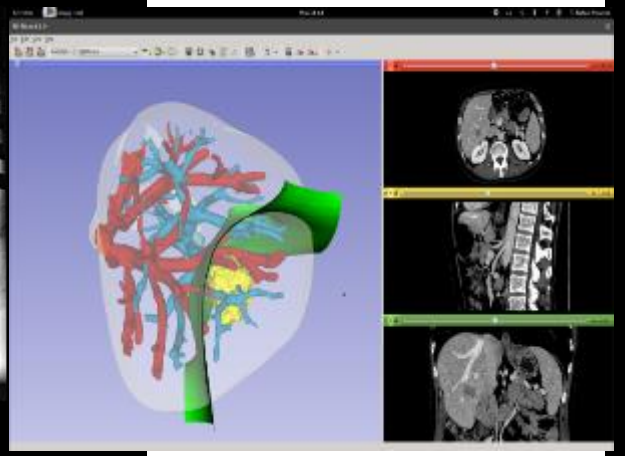
Advanced imaging for precise decisions and treatment









BIG DATA OG COGNITIVE COMPUTING

Digital radiologi – Alle bildedata er en digital kode som kan analyseres av datamaskinnen

Digital patologi – mikroskopet knyttet til et digitalt kamera som kan analysere bildene ved mønstergjengjenning the computer analyses the slides through pattern recognition

Full genom sekvensiering-knytte den enkeltes informasjon til alle andre pasienters genom

Gjenkjenne ustrukturerte data i pasientjournalen

Datamaskinen kan lese nye vitenskapelige artikler og holde seg oppdatert

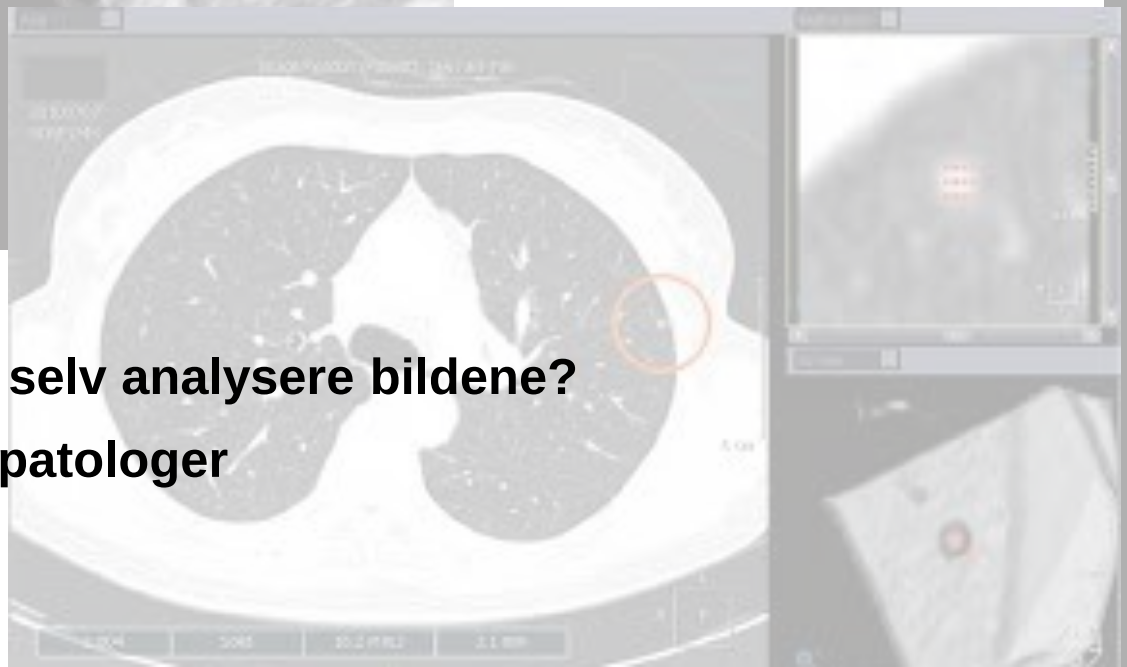
COMPUTER AIDED DIAGNOSIS (CAD) I RADIOLOGISKE UNDERSØKELSER OG PATOLOGI

Automatisk analyse av mamografi

Automatisk analyse av CT thorax

Automatisk analyse av CT tykktarm

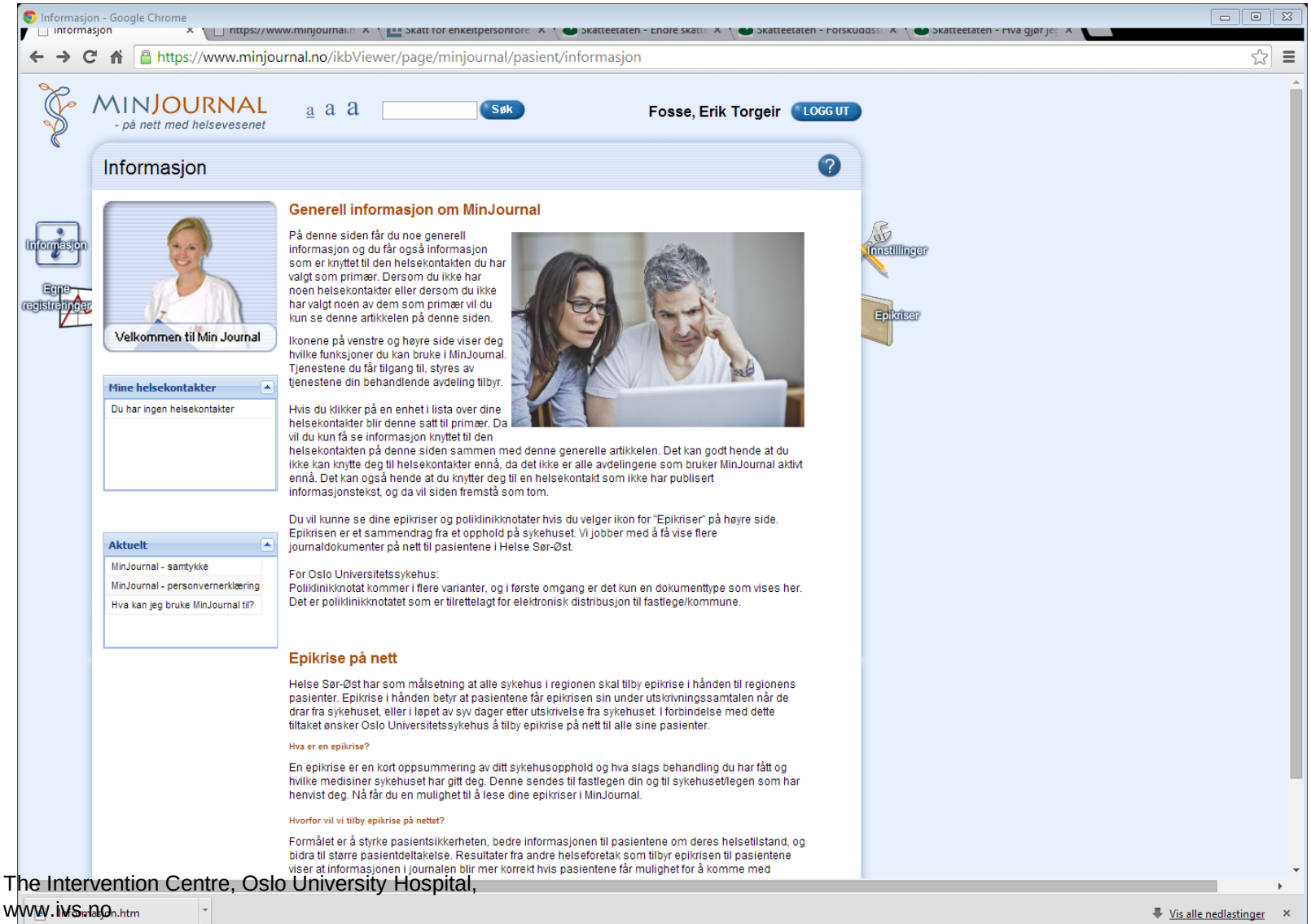
Automatisk analyse av patologisnitt



Vil det radiologiske utstyret selv analysere bildene?

Nye roller for radiologer og patologer

SYKEHUSETS INFORMASJON OM PASIENTEN TILGJENGELIG PÅ NETT -MIN JOURNAL



BEHOV FOR OVERSETTELSE OG KORREKTUR?

Okuli: Runde og egale pupiler.

Cavum oris: Rene, bleke slimhiner uten tegn til iritasjon. Let rubor i bakre svelg.

Ingen beleg.

Cor: Fjerne toner uten siker bilyd, regelmesig aksjon uten perifer puls deficit.

Columna: Ike bankeøm.

Thoraks: Kyfotisk.

Pulmones: Normale lungefysikalia uten fremmedlyder. Perkutorisk sonort uten patologiske dempningslyder.

Abdomen: Bløt og uøm over det hele. Ingen palpabel organomegali eler tumores.

Normale tarmlyder iale 4 kvadranter. Ike bankeøm over

PÅGÅENDE PROSJEKT: TESAURUS

Utvikle ordliste basert på journaler

Benytte etablerte medisinske ordbøker

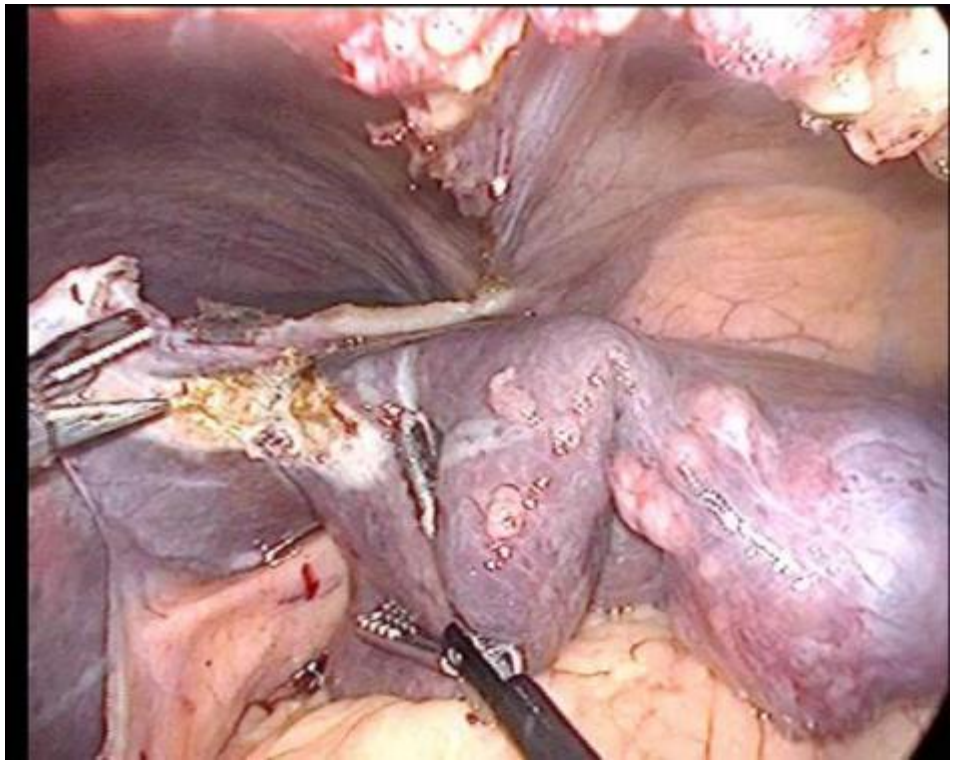
Benytte vanlig norsk ordliste

Oversette alle fremmedord når pasienten trekker musa over ordet

Ved å klikke på ordet får man en forklaring fra mediwsinsk leksikon

CLINICAL CHALLENGES TODAY

Choosing precise pathway based on patient history, clinical data, imaging data, patient genetics and tumour characteristics



14% of hospital stays in Norway lead to some kind of patient injury (0,6% death)

Complicated decision process

- Lack of Precision
- No standardisation
- Resource demanding
- Often wrong decisions

New technology-new possibilities

- Large amount of data
- Advanced IT solutions
- New workflow and practice

BIGMED

The vision behind the BIG data MEDical solution (BIGMED) is to lay the foundation for an ICT platform that addresses the analytic bottlenecks for the implementation of precision medicine and paves the way for novel big data analytics.

The solutions will provide the patients with an optimized care which takes their unique individual characteristics into proper consideration.

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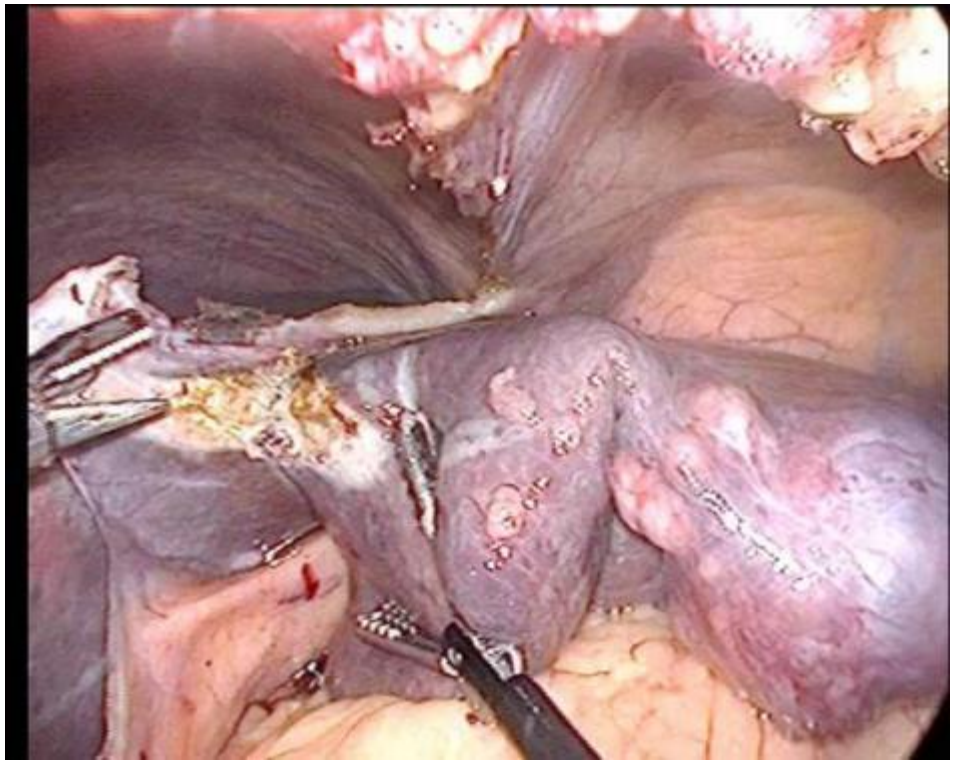

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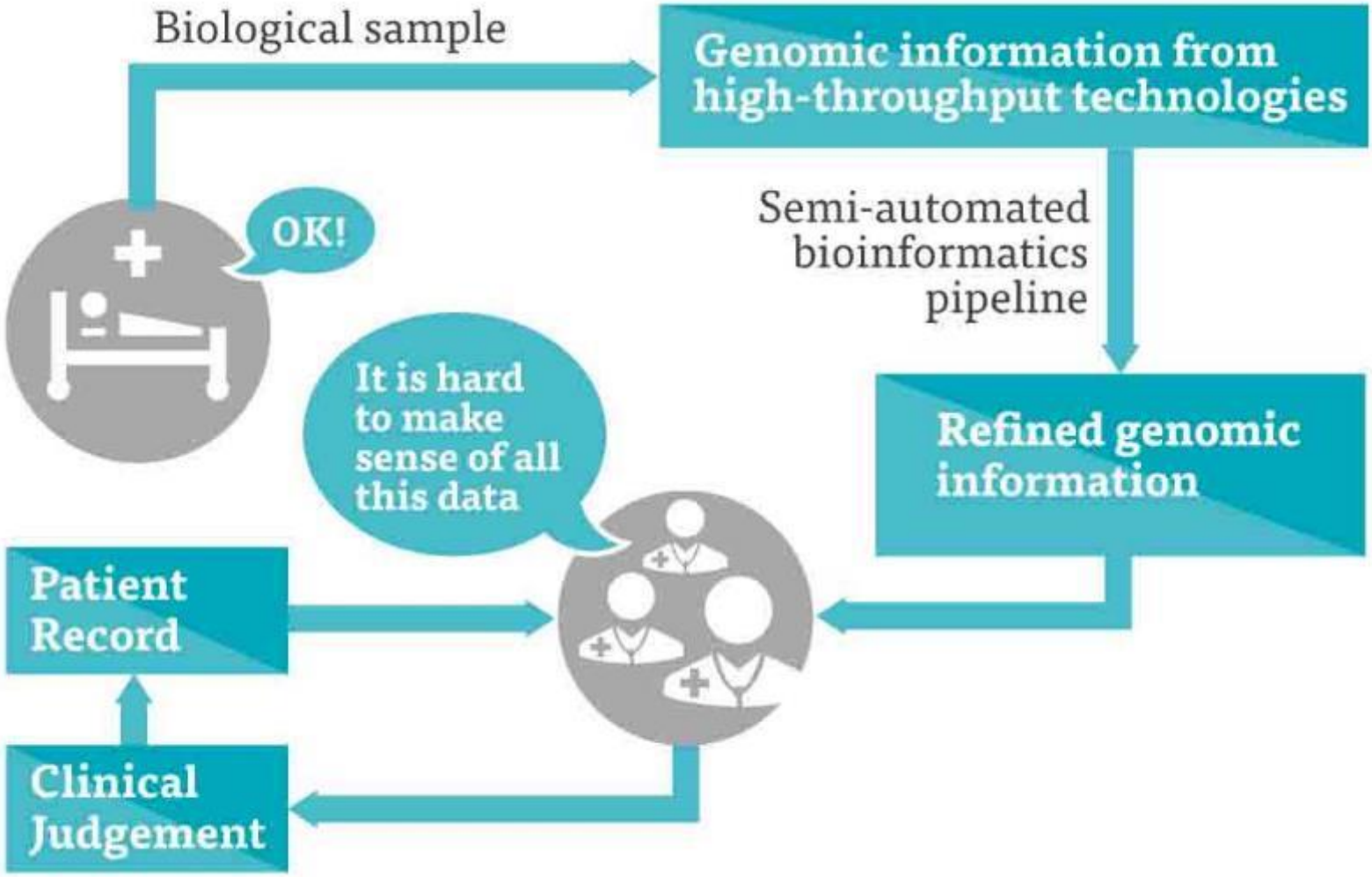
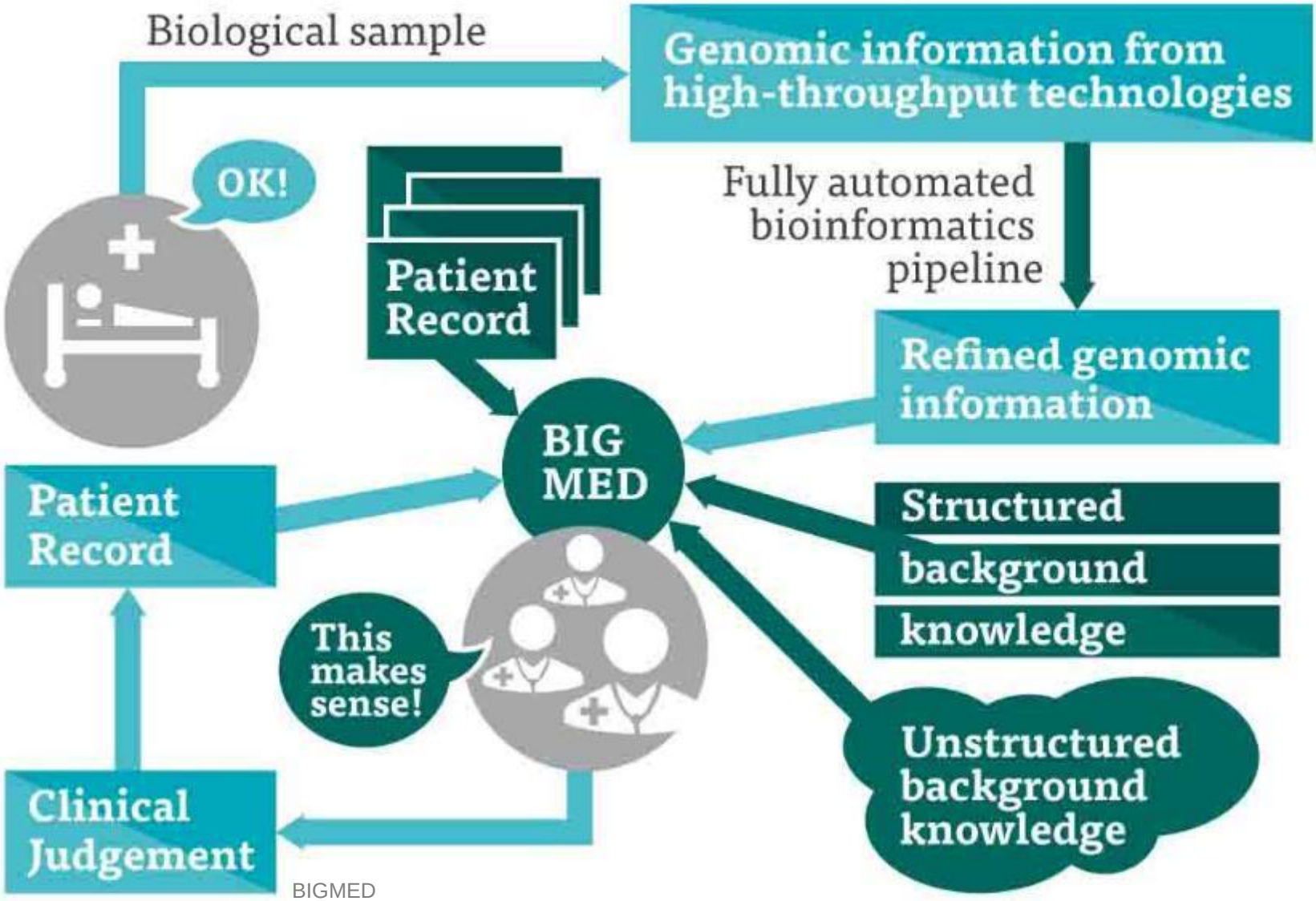
SITUATION TODAY



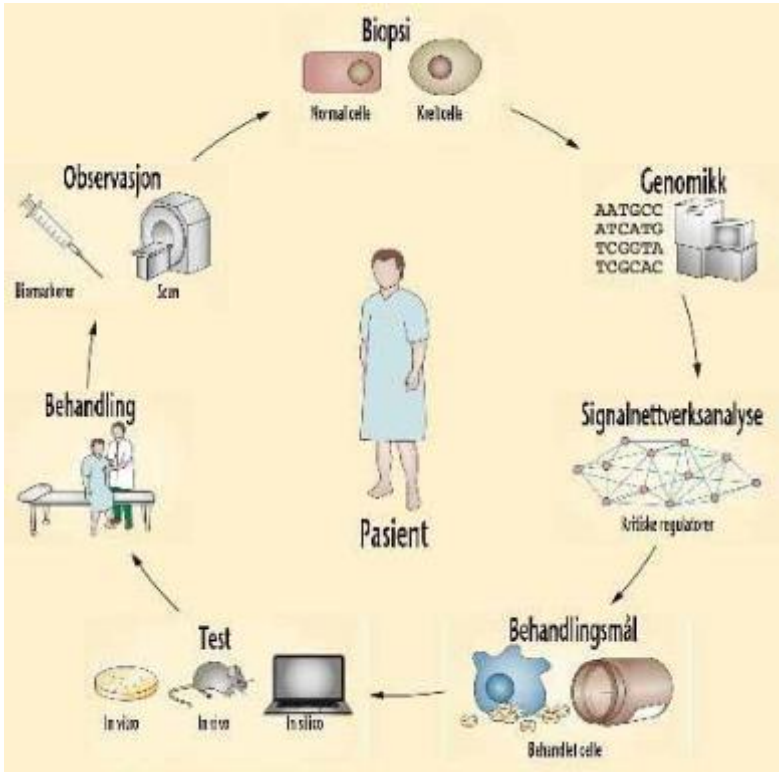
SITUATION WITH BIGMED



FUTURE SOLUTION

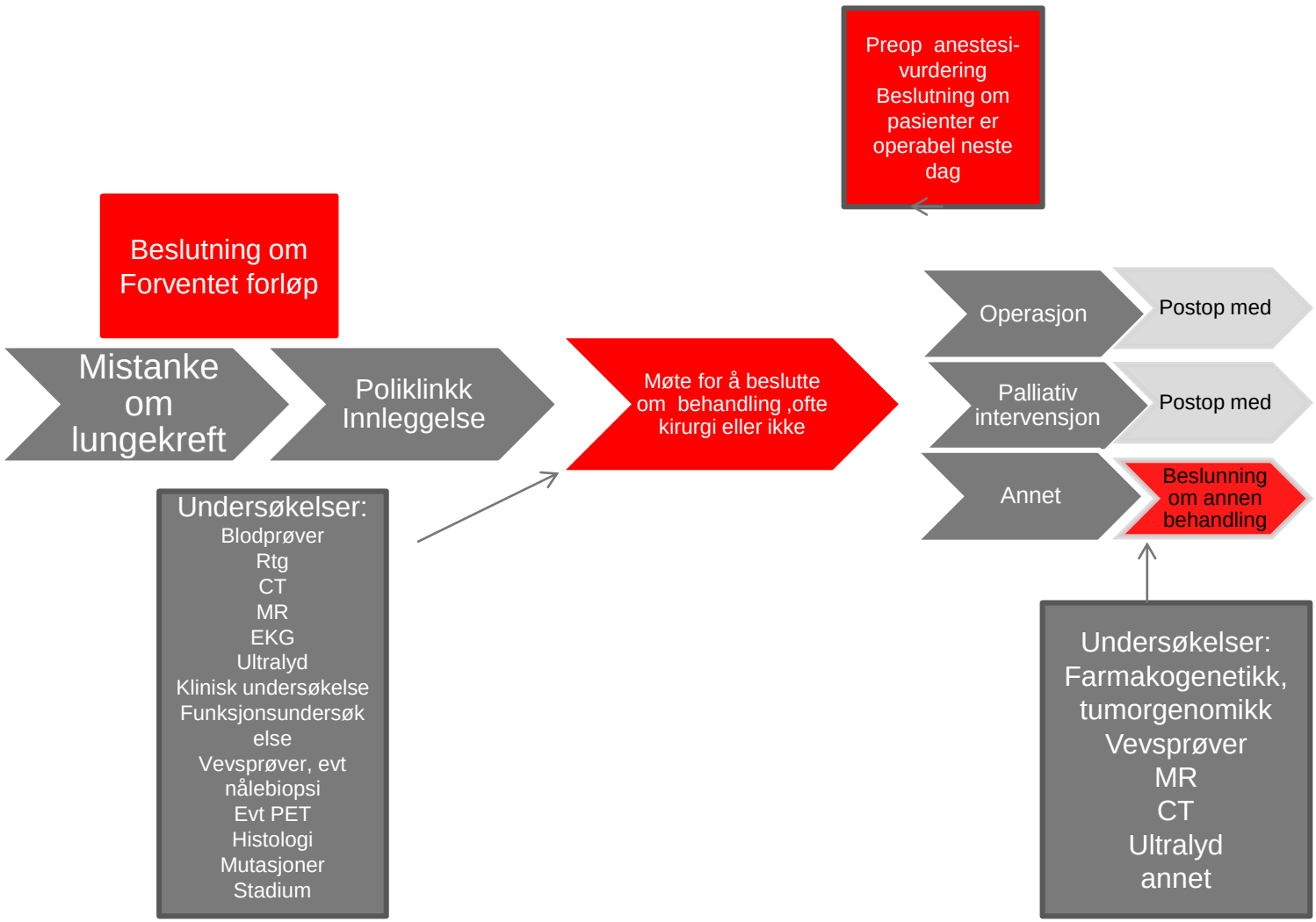
Knowledge repository

The Patient



Will lead to changes in organization and in patient and doctores roles

BESLUTNINGSPROSESSER I PASIENTFORLØP (GENERISK)



CONTENT OF THE BIGMED PLATFORM

All patient records

The patient's genetic information

Tumour genomics

All other patient data

Image descriptions

Journal articles

FUNCTIONALITY

Recognize words and meaning in all written text

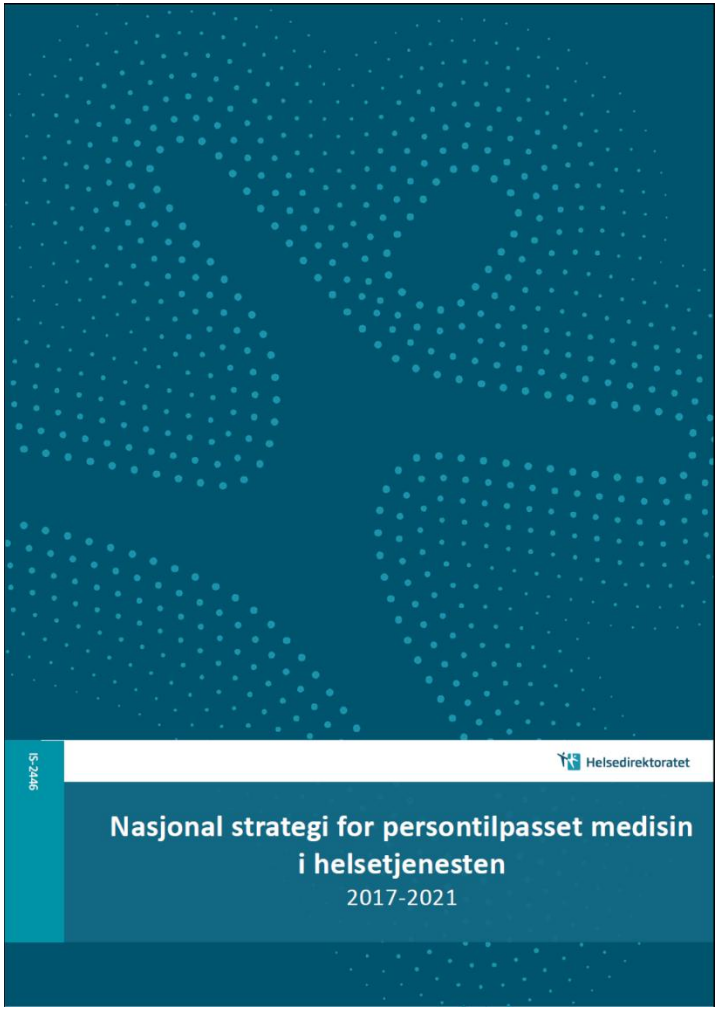
Recognize genetic sequences

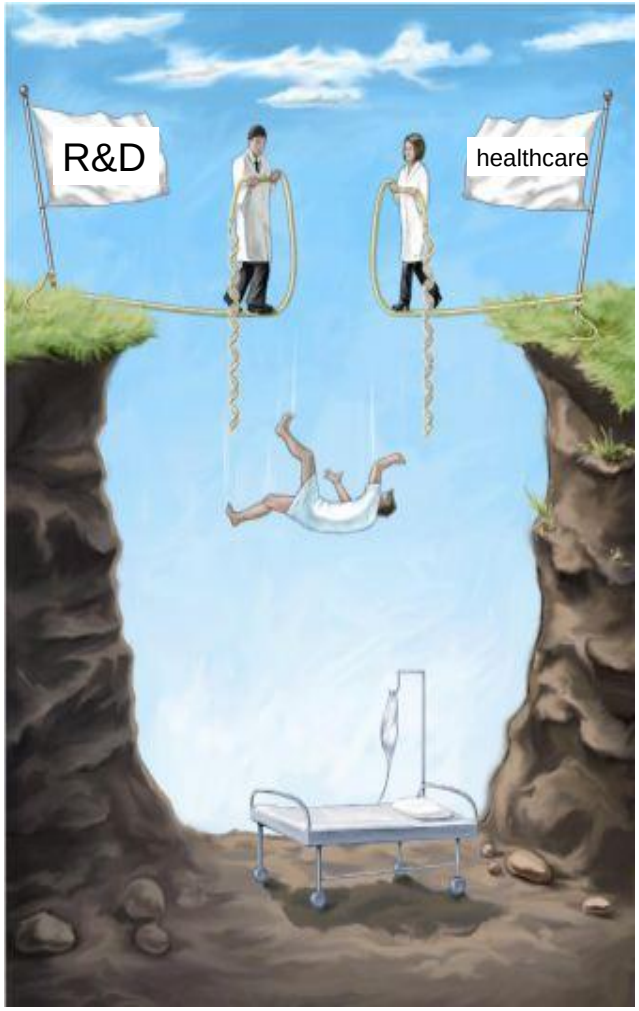
Recognize all blood samples

Recognize image descriptions

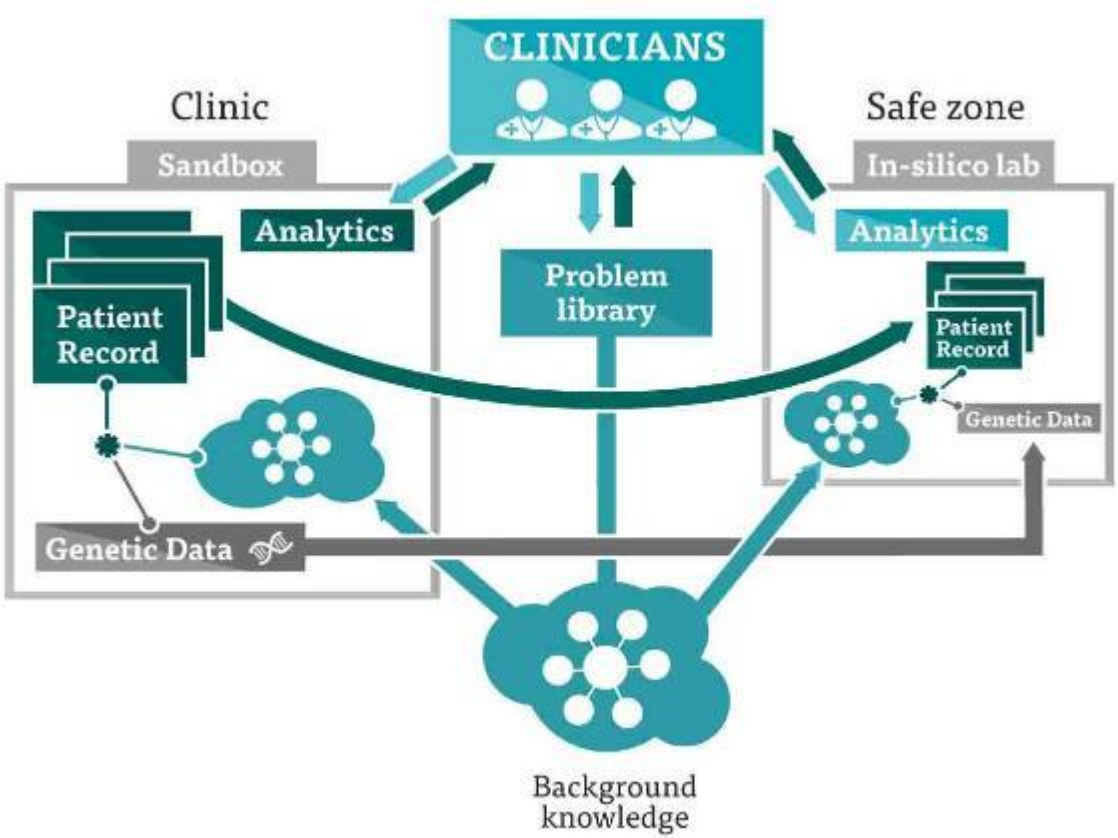
Analyse relations between different information and suggest pathway for diagnostics and treatment

Bridging the gap

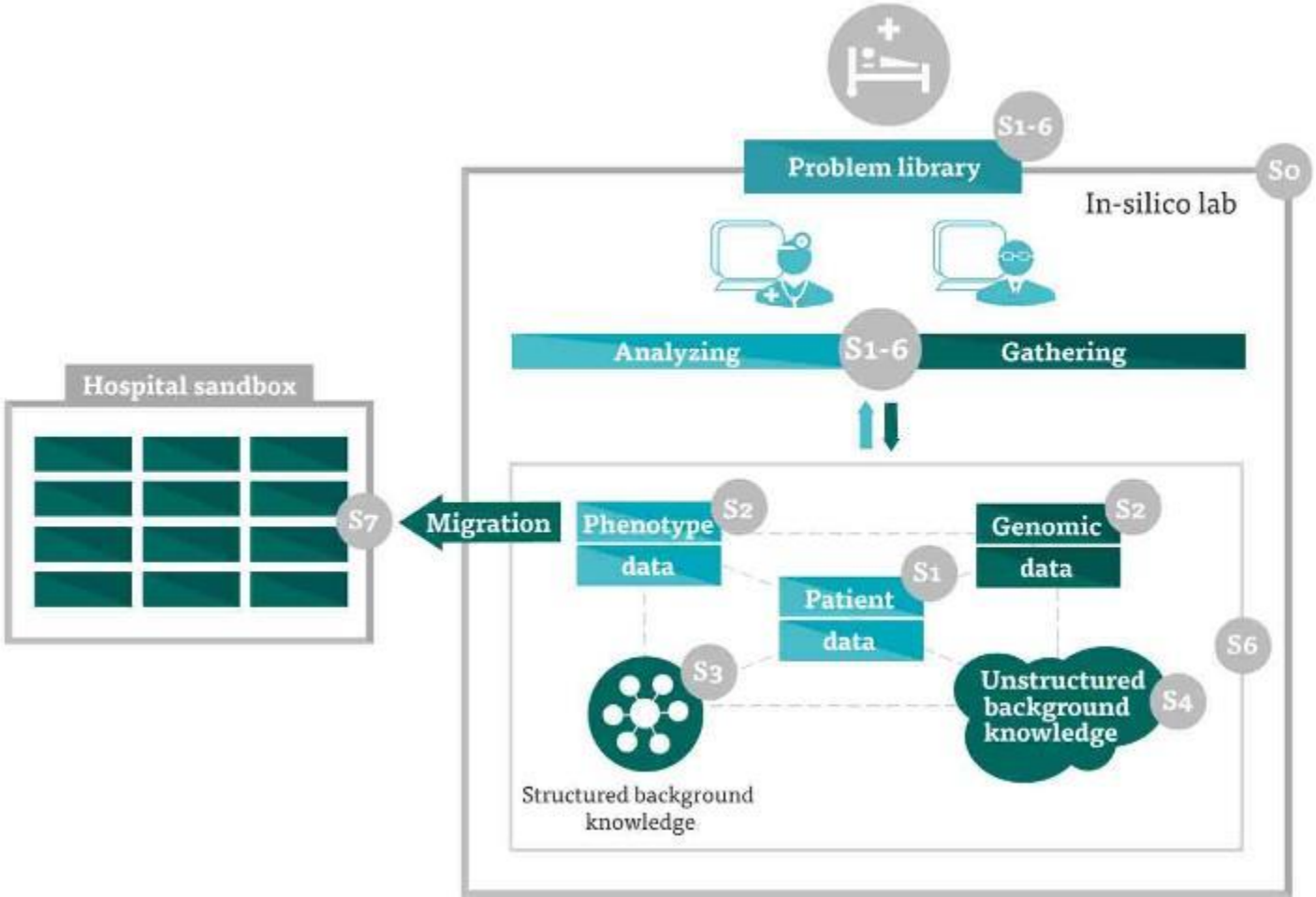




DEVELOPMENT IN AN *IN SILICO LAB* AND TESTING IN A CLINICAL SAND BOX



RESULTS FROM THE *SILICO LAB* TRANSFERRED TO THE CLINICAL SAND BOX



BIGMED IN IT-DEVELOPMENT

Digitalization → Communication → Automatization

Electronic patient record

PACS

Laboratory data

Surveillance data

One patient record

Health net

Data recognition

Analysis

EXTERNAL CONDITIONS

Possibilities

- One inhabitant – one patient record
- Good biobanks and registries
- Short way hospital- authority
- Research prone population
- Roadmap for precision medicine
- Allowed storage of genome data (Norvariom)
- Digitalization in all parts of society

Challenges

- Legal restraints
- National demands
- Strong personal protection
- Laws under revision
- Fragmented and inadequate IT-solutions
- BIGDATA solutions at other levels of society
- Sharing of health data

RETT LAG FOR OPPGAVEN

Juridisk rammeverk

UiO : Universitetet i Oslo

Kravstillere

Oslo universitetssykehus

Forsvarets sanitet

Pasienter

LHL

Kreftforeningen

FORENINGEN FOR HJERTESYKE BARN

IKT-forskning

Optique

Access to Big Data

IBM Watson

NTNU

UiO : Universitetet i Oslo

Industri og næringsliv

DNV·GL

IBM

OSLO MED TECH

SYKEHUSPARTNER

Kunnskapsforlaget
Aschehoug og Gyldendal

PubGene

DIPS

DELTAKERE OUS

- **KLM**
  - AMG
  - Intervensjonssenteret

- **Klinikk for kirurgi, inflammasjonsmedisin og transplantasjon**
  - Avd for Gastro- og barnekirurgi

- **Kreftklinikken**
  - Kreftforskningsinst
  - Onkologisk avd

- **Hjerte-lunge-kar klinikken**
  - Hjertemedisinsk avd

- **OUS stab**
  - IKT seksjon
  - Jus seksjon

DELTAKERE UIO

- **Medisinsk fakultet**
  - Inst klinisk medisin
- **Mat Nat fakultet**
  - Inst informatikk
  - USIT
- **Juridisk fakultet**
  - Inst offentlig rett

BIGMED TECHNOLOGIC OUTCOMES

1. Identify the requirements for precision medicine from the needs defined by the selected patient groups.
2. Develop and demonstrate bioinformatics tools that will speed up the robust and scalable inclusion of genomic diagnostics into mainstream healthcare.
3. Develop and demonstrate novel, beyond state of the art tools to extract actionable medical information from multiple unstructured and structured sources of medical data.
4. Develop and demonstrate novel analytical ICT tools for integrative analysis of patient data from electronic health records, genomic datasets and phenotype data to inform clinical decisions.
5. Demonstrate the feasibility of sharing curated genomic data from clinical labs in two different countries, identify potential legal barriers and suggest potential solutions.

BIGMED IMPLEMENTATION OUTCOMES

1. **Establish the basis for commercialization of the project innovations and potential new commercial spin offs through our industrial partners**
2. **Conduct studies on the effect of the BIGMED solutions on patients' health and quality of life as well as for health care costs.**
3. **Validate the generic value of the tools developed on the four clinical use cases. They will also be tested on other diseases including the ability to identify soldiers at risk for specific injuries based on soldiers' medical cards and on a cohort of patients diagnosed with sarcoma.**
4. **Reinforce a shared vision among the BIGMED partners and establish the consortium as an internationally recognized enabler of precision medicine.**

Rollene endres

- Skillet mellom indremedisin og kirurgi viskes ut
- Klinikerens skjønn blir mindre dominerende – beslutningsprosesser automatiseres
- Informatikere og ingeniører får en viktig rolle i beslutningsprosessen
- Radiologens skjønn mindre dominerende – diagnostikk automatiseres
- Fysikere får en viktig rolle i analysen av radiologiske bilder
- Pasientene kan kommunisere direkte med sykehusets datasystemer