

**Data properly managed and properly used is  
our "new gold"**

**«Clinical Data Warehouse» is a good start**

# An average day at OUS

## Some important numbers

- 25 newborns
- 3455 patient treatments
- 2100 dinners
- 26.000 employees, 15.000 at work each day
- NOK 73 mill. in daily budget

## Locations

- More than 1 million square meters in more than 325 buildings.
- Patient treatment at over 40 locations

## Technology

- Approx. 18.000 workstations and 3.500 laptops
- More than 20.000 telephones (fixed/mobile)
- More than 40.000 MTDs
- More than 10.000 other IOT units



# An average day at OUS



## Has generated

- More than 2,1 Petabyte (PB) ( $10^{15}$ ) of data

## The hospital generates

- About 1 to 3 terabytes (TB) every day
- Anticipated growth is about 1 PB/year
- Growth will increase over time

## Example - Electronic Medication and Electronic Medical Chart (EMMC)

- 6 billion rows (as of March 2022)
- Increases with 3 million each day

### Some important

- 25 newborns
- 3455 patients
- 2100 diagnoses
- 26.000 electronic medical records
- NOK 73 million

### Locations

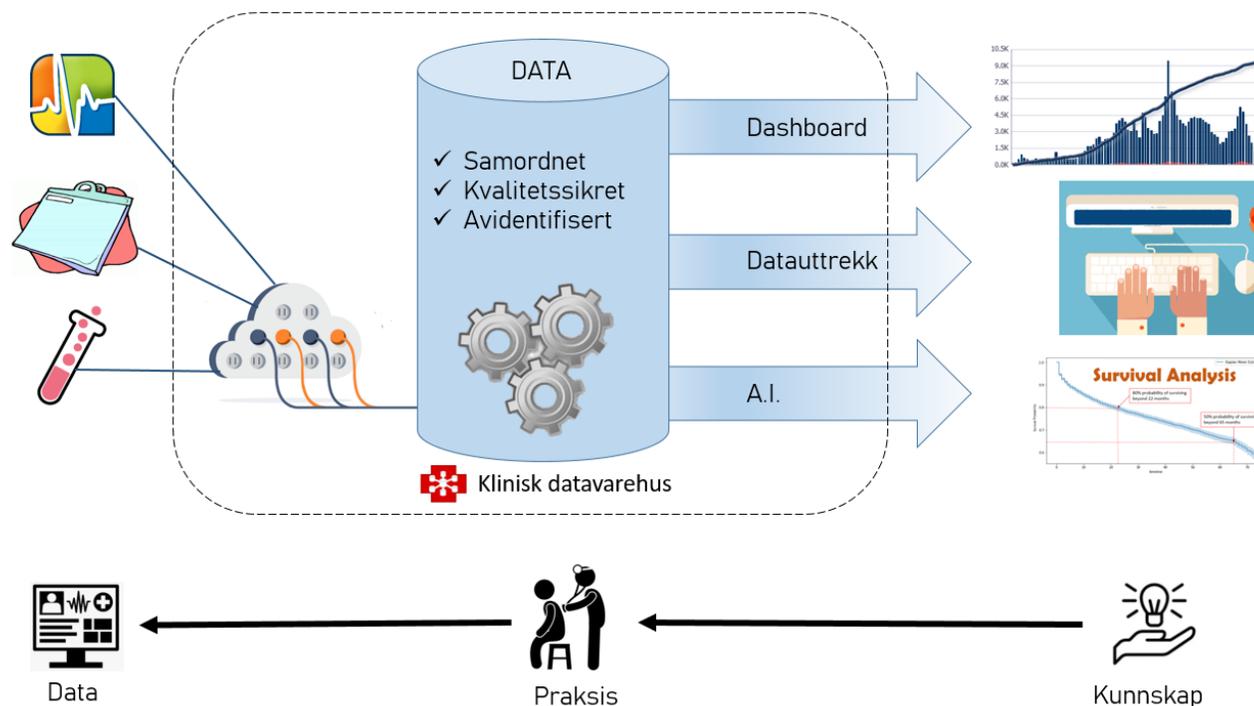
- More than 100 locations
- Patient treatment

### Technology

- Approx. 100 servers
- More than 20.000 sensors (medical, nursing)
- More than 40.000 MTDs
- More than 10.000 other IOT units

# WHAT IS KDVBH?

- Clinical Data Warehouse (KDVBH) is a quality register and warehouse for secondary use of data collected from several different sources
- Data in KDVBH must be consolidated, harmonized, quality assured, de-identified and ready for secondary use such as reporting, analysis, extraction and modeling



# The main purpose of Clinical Data Warehouse (KDVH) is to improve diagnostics and treatment

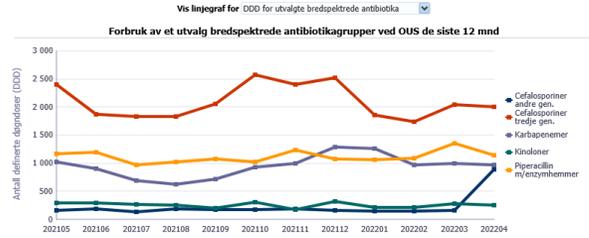
## KDVH

- allows for the consolidation and analysis of data from EHR, EMR, test results etc.
- provides the potential for following up quality over time
- contributes to improvements in data entry in the hospital
- makes clinical data accessible in a way that protects the patient privacy
- provides management with a tool for discussions on quality of treatment and comparison to national and international guidelines
- relieves the source systems by reducing the need for integrations, thus contributing to better performance in core applications
- can extract data to internal quality registers and research studies

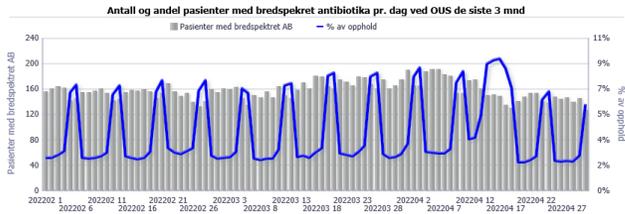


# Examples

## OUS Klinisk datavarehus



Gå til Antibiotika - bredspektr



01 - Generell

Forside Diagnose/behandling Medisiner Laboratoriemedisin Kurve Om KD/VH Hjelp Corona Kraft

Forside kreft Behandling Pakkeforløp Hjelp

Søkekriterier

År: 2021

Pasientforløp (Alle kolonneverdier)

Diagnosekategori (Alle kolonneverdier)

Tilbakespill

**Pasienter**

32 052 kreftpasienter

12 111 nye kreftpasienter

**Medikamentell behandling**

1 356 innlagte kreftpasienter

3 595 polikliniske kreftpasienter

4 461 kreftpasienter

**Rehabilitering**

564 kreftpasienter

Det finnes ingen data for brukerundersøkelser for de valgte kriterier. Opphøst

**Stråleterapi**

4 762 kreftpasienter

Andel kreftpasienter i stråleterapi

**Relativ overlevelse**

2016-2020. Alle C-diagnoser. Kilde: Kreftregisteret

77,3% 3 år

73,0% 5 år

**Metastaser**

4 601 kreftpasienter

2 016 nye kreftpasienter

14% kreftpasienter

17% nye kreftpasienter

**Kirurgi**

5 828 tumorreseksjoner

5 291 kreftpasienter

Andel kreftpasienter med tumorreseksjoner

**Kliniske studier**

Alle C-diagnoser

Inkludert i kliniske studier

Inkludert i kliniske studier

**Opphold**

8 605 innlagte kreftpasienter

29 632 polikliniske kreftpasienter

16 059 innleggelses

123 574 polikliniske konsultasjoner

**Palliativ behandling**

661 kreftpasienter

Antall kreftpasienter i palliativ behandling

**Multidiplinære teammøter (MDT-møter)**

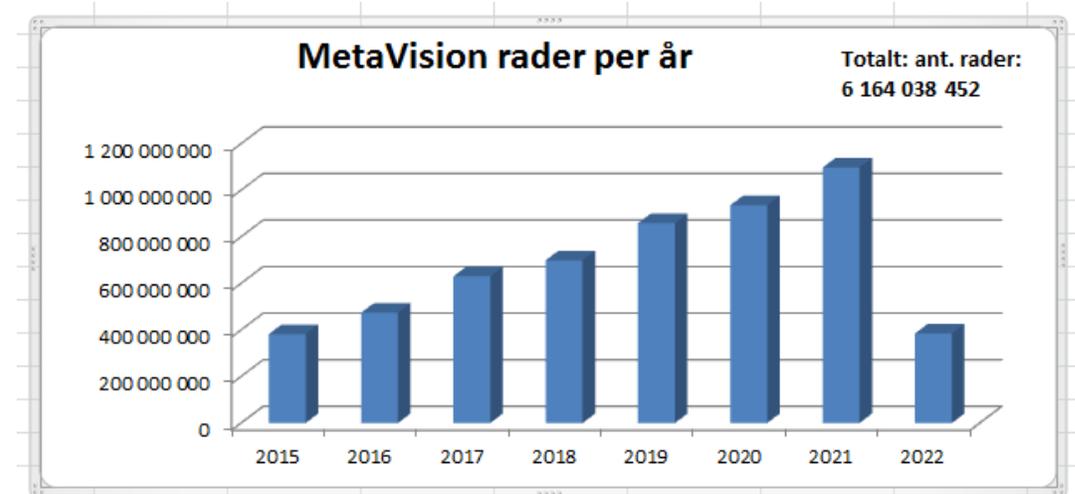
5 201 kreftpasienter

3 469 nye kreftpasienter

# The value of health data

- The value of health data is in its use, data in itself has no value
- Data must be connected, processed, made available and utilized
- Better utilization of health data can lead to better patient care and savings \*
- KDVB has contributed to new knowledge by compiling data across sources and across multiple tables
  - Safe surgery
  - Antibiotics use indications
  - News - early warning score
  - Corona datamart
  - Key data for cancer

\* Menon Economics (eHelse 2019)



- A total of over 6 billion rows in KDVB from MetaVision
- The number increases by 3 million rows per day

# «The Value of Data»



Realising the value of health care data: a framework for the future

EY  
Building a better working world

Typical estimated values (£) per patient record based on recent data transactions

EHR or EMR data has an estimated value of **greater than £100 per patient record.**

Genomic data aggregators have raised capital from private equity and pharmaceutical companies at estimated valuations of **over £1,500 per DNA sample.**

Deals combining genomic and phenotypic data from patient records have been valued between **£1,000 and £5,000 per patient record.**

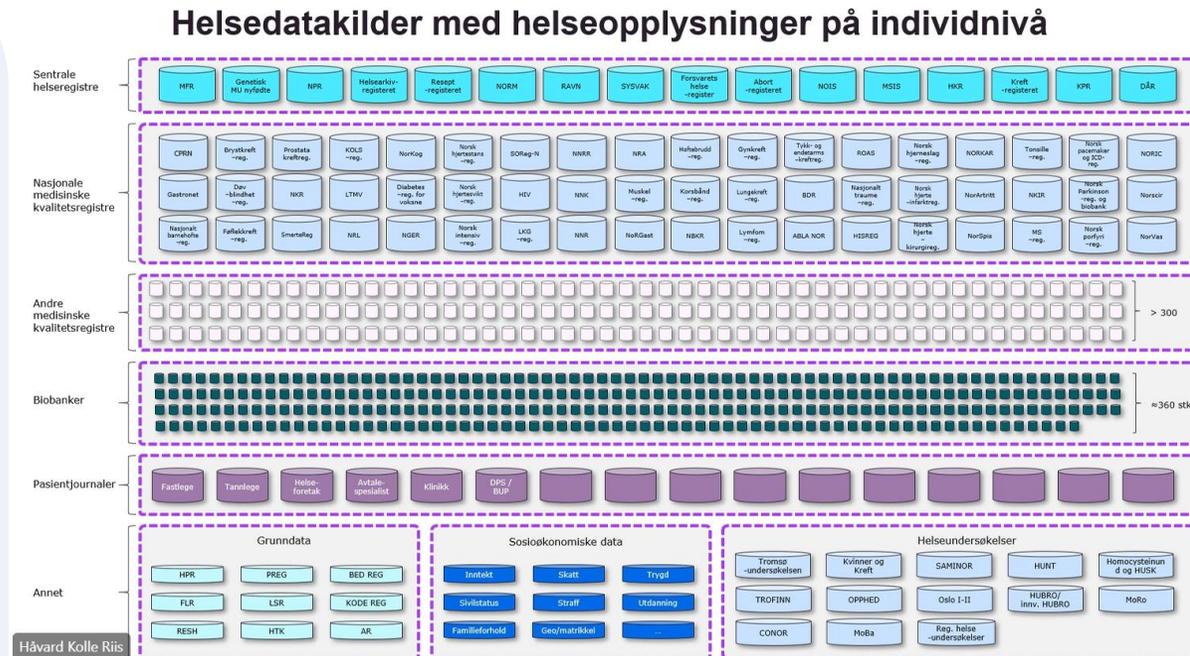
Partnerships combining genomic and phenotypic data from patient records have been valued between **£1,000 and £5,000 per patient record.**

Applying these approaches, we estimate that the 55 million patient records held by the NHS today may have an indicative market value of several billion pounds to a commercial organisation.



# A lot of data requires good management - Data Governance

- OUS has a lot of data in administrative and clinical systems as well as in a large number of registers
- There is a need for OUS to have a long-term perspective on data management
- There is still a lot to do and a lot to learn

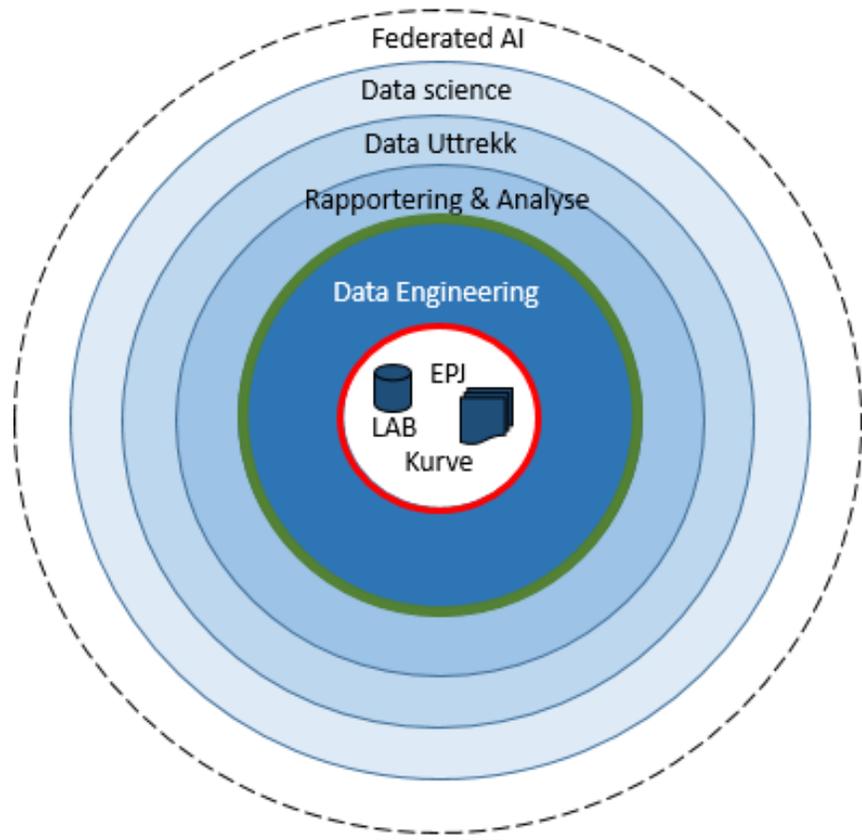


Kilde: Direktoratet for eHelse: Antall ulike registre

# Competence is necessary and desired

- The best features in KDVBH have emerged through a collaboration with **clinicians**, who need answers to their questions and know the data, **medical coders**, who understand the use and can assist in how things are registered, and information architects/developers who wash / **facilitate data** for secondary use.
- There is a great need for guidance and assistance in reusing data either in KDVBH or in separate registers
- We need to develop our own expertise but also to acquire expertise from external sources

# Data management for the future - distributed machine learning



- We build layer upon layer and reuse quality assurance and knowledge
- We can facilitate machine learning and artificial intelligence in our environment, in order to allow industry and research to validate their model on data where they are, rather than copying huge data sets out of the safe zone.

# Key points

1. KDVBH provides new clinical knowledge based on the data we currently generate, manage and refine
2. Ensuring good data quality in the source systems is resource-intensive but a prerequisite for good knowledge
3. There is a need for OUS to have a long-term perspective on data management where the sources we are currently using are seen together (both clinical and administrative)
4. OUS must prioritize recruiting more expertise that enables us to take responsibility for good management, processing and making the data we own available for good use