Using EHR data for research purposes – Experiences with a Clinical Data Warehouse platform at Hannover Medical School

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Hannover Medical School
Outline

• Hannover Medical School (MHH)

• Clinical Research Center Hannover (CRC)

• IT Department for Educational and Scientific IT Systems

• MHH Clinical Data Warehouse
  – Motivation
  – Clinical Data Warehouse today
  – Central Use Cases

• Examples

• Vision
Hannover Medical School (MHH)

- Top 5 university medical centers in Germany
- 10,000 employees
- 3,400 students (79 nations)

Focus I
Infection Immunity

Focus II
Transplantation Regeneration

Focus III
Biomedical technology Implants
Clinical Research Center (CRC) Hannover

- Partner in EHR4CR Champion Program
- Early phase and proof-of-concept trials
- Three partners/research organizations
  - Hannover Medical School (MHH)
  - Fraunhofer Institute for Toxicology and Experimental Medicine (ITEM)
  - Helmholtz Centre for Infection Research (HZI)
Department for Educational and Scientific IT Systems at Center for Information Management
Department for Educational and Scientific IT Systems (Tasks and Services)

• Founded in 7/2013 at the Center for Information Management

• 10 employees

• Focuses:
  • Supporting research IT projects (on local, national and international level)
  • Development, Maintaining and Customizing of Educational and Scientific IT applications
  • Development and Maintaining of the Clinical Data Warehouse
Motivation

How do I access those datasets to find fitting patients for my research?

- Demographics
- Diagnoses
- Lab values
- Risk factors
- CT/MRI/Ultra sound images
- Biosamples

- age >50
- had kidney transplant
- low kidney function at last visit
- had a M8000/1 tumor formation
- with biosamples available

How do I access those data-sets to find fitting patients for my research?
MHH Clinical Data Warehouse

Core

- 2 million patients
- 10 million diagnosis
- 6 million visit data
- 500 million data points (medical records, lab values, etc.)

Analysis & Reporting

- SharePoint
- SQL Server Analysis Services
- SQL Server Reporting Services
- Power BI

Interfaces:

- HIS
- LIS
- RIS
- Biobank
- Register
MHH Clinical Data Warehouse today

Developing since 2010, established in 2013 at MHH

5 team members (ca. 2 full-time equivalents)
Roles: team leader, DBA, data integration specialist, analyst

Local projects and consulting of researchers from >12 clinical departments at MHH

National and international projects
• National: HiGHmed, German Biobank Alliance
• International: EHR4CR Champion Program
MHH Clinical Data Warehouse
Central Use Cases

Platform for interdisciplinary healthcare research and strategic decision making with central use cases:

- Patient screening / cohorting for clinical trails
- Epidemiological trials
- Improvement of the data quality
- Enrichment of research databases (registers)
Example 1: Business Intelligence (BI) / Reports

- Dashboards
- Strategic decision support
- Data visualization
- Knowledge discovery
Example 2: Self Services

- Provide local coding systems to researchers
- Support understanding of terminologies
Example 3: EHR4CR Champion program (InSite enrichment)

Hannover Medical School

©InSite Platform

study protocol

cohort size

©InSite
Local install

InSite
DWH

procedures

SNOMED

LOINC

ICD

MHH DWH
Vision

Complete MHH clinical data set
• Integration of further clinical systems

Gain information from unstructured data
• Use Natural Language Processing (NLP) and Machine Learning (ML)

Strengthen semantic interoperability to exchange patient data
• Implementation of medical terminologies

Easy data access
• Build additional self services for researchers
Thank you for your attention!

MH
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