Umeå University teacher’s day, Nov 5, 2020

DEVELOPING AI CAPABILITIES AT HELSINKI UNIVERSITY HOSPITAL

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HUS OPERATES IN 23 SITES

Southern Finland special catchment area for tertiary care together with districts of Southern-Karelia (Eksote), Kymenlaakso (Carea) and Päijät-Häme (PHHYKY)
Healthcare in 2019

- 92,000 surgeries
- 16,000 childbirths
- 453 organ transplants

2,900,000 patient visits

- 680,000 patients treated
- 330,000 elective referrals
- 82,000 emergency referrals

- 24.5 million laboratory tests
- 1.8 million imaging examinations
- 860,000 treatment days
- 2,800 hospital beds
GETTING STARTED WITH AI – KEY QUESTIONS FROM HOSPITAL’S PERSPECTIVE

• How to make health data available for AI research and algorithm development?

• How to develop needed competences and engage with partners in co-development?

• How to get meaningful and validated AI tools to clinicians’ use in patient care?
Unique patient IDs > 3 500 000
Clinical documents > 35 000 000
Clinical notes > 80 000 000
Lab & pathology > 780 000 000
Radiology examinations > 20 000 000
Go for "Low hanging fruits" e.g. automation of routine tasks with RPA / Chatbots / AI

Improve understanding through pilots – accept that many pilots will fail

Build strategic understanding of required competences, tools and partners
CLASSIFYING REFERRALS TO CLINICS

1st pilot in urology ~12 000 referrals/year -> saving 2 FTE
Detecting subarachnoid hemorrhage

- shortage of radiologists
- repeated misdiagnoses
- misdiagnose - 75% dies from a re-bleed in 1 year
RARE DISEASES AND FAILURE DEMAND

- Rare Diseases prevalence ~6%
- Total expenditure of (only) specialist care: 18% of yearly budget
- Excess expenditure ~ 270 million €/year
- 99 diseases with significant failure demand due to delayed dg

Typically
- Complicated, expensive pre-dg patient paths with **circular referral signatures**
- Prediagnostic **comorbidity networks** (2-19 typical diagnoses before definite RD dg)
- Opportunity: Expenditure ↓↓ due to effective therapy (up to 46,24-fold)
Septic infection in a small preterm baby

- life-threatening
- the baby gets very sick very fast
- severe complications
- difficult to predict
MASTERING THE REGULATORY ENVIRONMENT

Clinical research
- Involves patients
- Act on medical research
- Ethical committee & institutional review
- Good clinical practice guidelines

Biobank research
- Biobank act
- Wide consent from sample-donating participants
- Ethical review
- FinBB collaboration and shared services

Registry research
- Secondary use of social and health data - the new act
- Division of tasks between individual data controllers and Findata
- Collaboration and shared services

Feasibility studies, control groups

Possibility to re-contact donors / patients

Attaching clinical data from EHR
HUS DIGITAL HEALTH ECOSYSTEM

The world’s fastest track to commercialization for digital health and wellbeing innovations

Ecosystem Partners & Output
• Innovative development models
• New services & products addressing real-time needs
• Agile, standardised collaboration platform

• Patient data
• Clinical activities
• Understanding patient needs
• Patient reported outcomes
• Product / service needs

PROJECTS
• New global solutions
• Improved patient care
• Provider satisfaction
• Mydata – secure and safe

SPIN OFF PROJECTS

Rare diseases
Acute leukemia
Home dialysis

HUS
eMOM GDM
AI Head Analysis
Child with diabetes / IHAN
eCare for Me
Health Village

nn project

Fujitsu

Planmea Group

CGI

Tieto

Myntra

Productivity leap

Microsoft

Takeda

BC Platforms

BCB medical

HUS

CleverHealth Network
Applications and systems for social and healthcare that utilize algorithms, artificial intelligence, machine learning and data analytics.
IMPLICATIONS TO PHYSICIAN SKILLS AND EDUCATION

• AI will be part of routine tools for physicians -> basic understanding of AI for all

• Physician role is needed in every stage of AI development
  • **Problem identification and definition**
  • Information architecture and data management
  • Analytics and IT
  • Development and validation processes
  • Governance and ethics

AI in healthcare needs
• Relevant challenge
• Enough high quality data
• Verification & Validation

Collaboration is the key
• Top clinical scientists
• Top data scientists
• Top IT technicians