Clinical Informatics Challenges in Precision Medicine

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Conflict of Interest Disclosure

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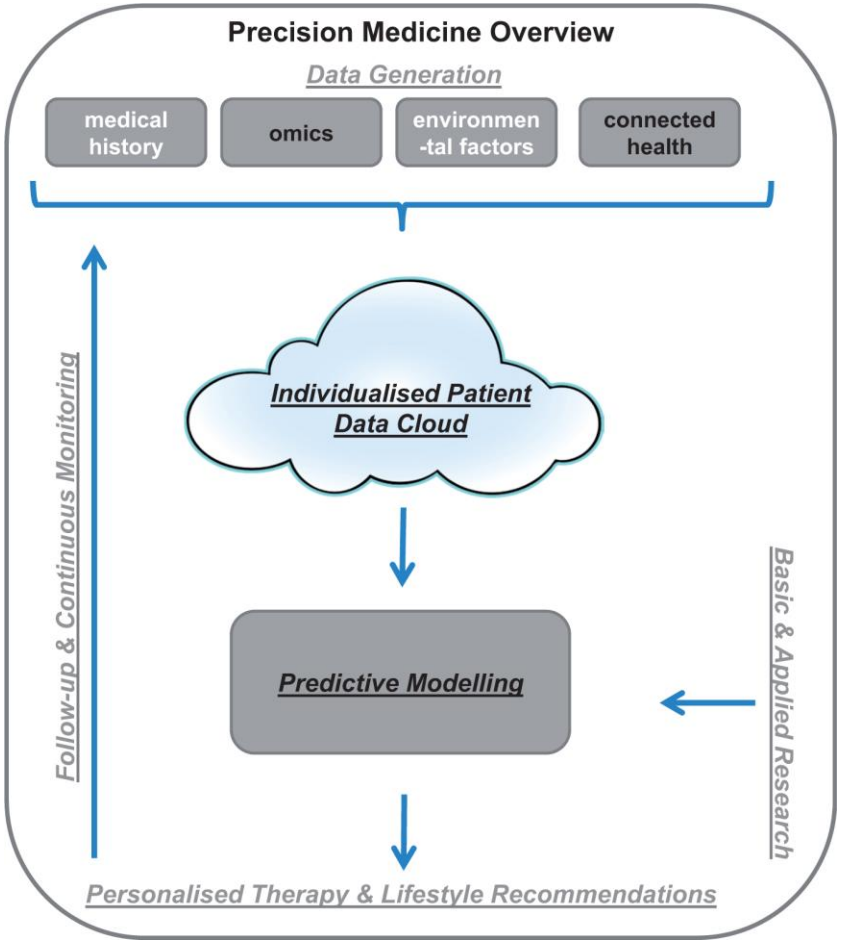
Medizinische Universität Graz

CBmed BIOMARKER RESEARCH

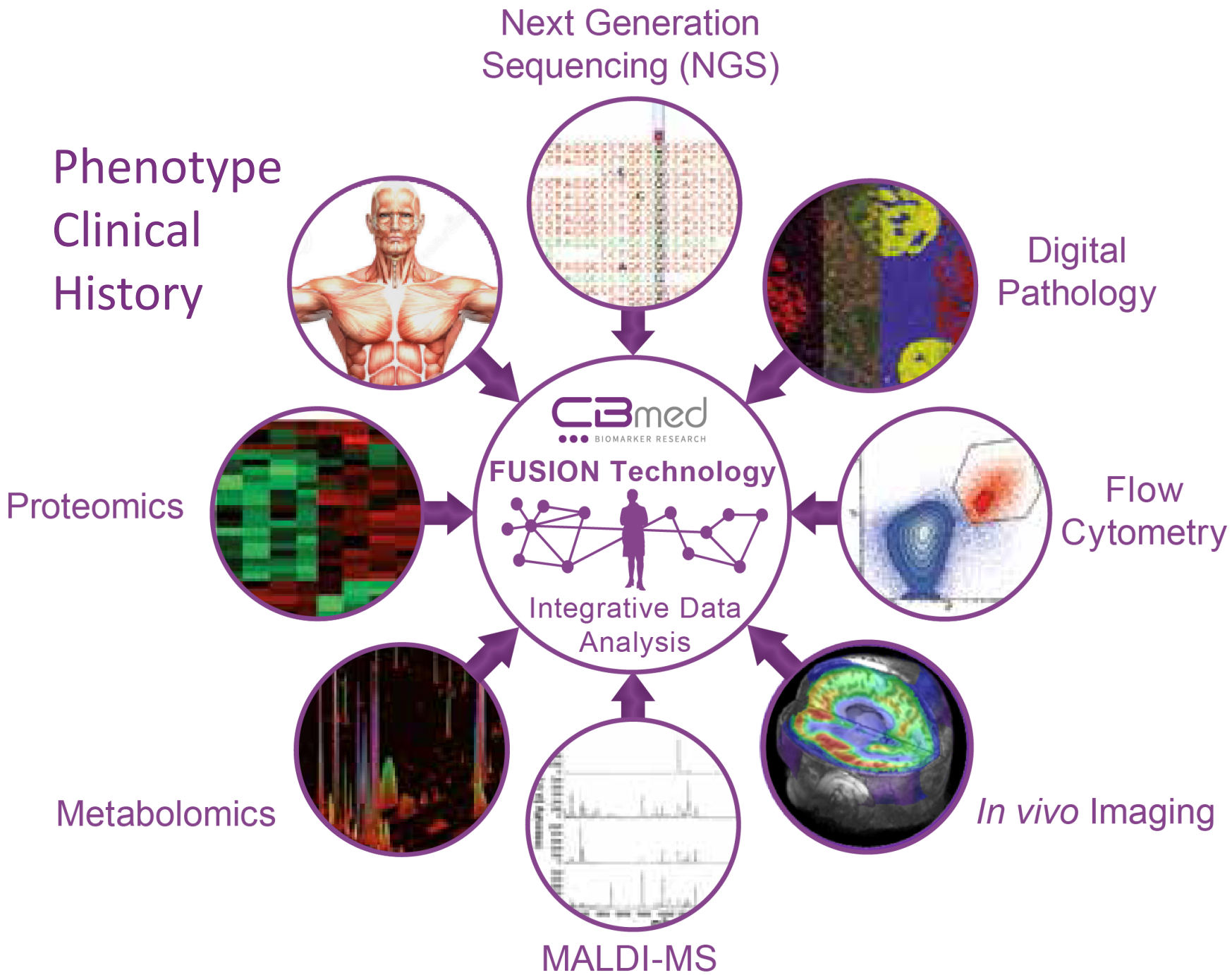
averbis text analytics

What is Precision Medicine?

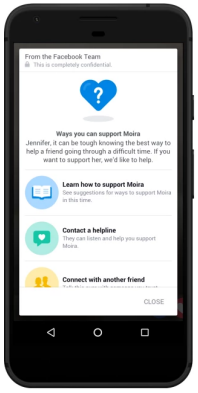


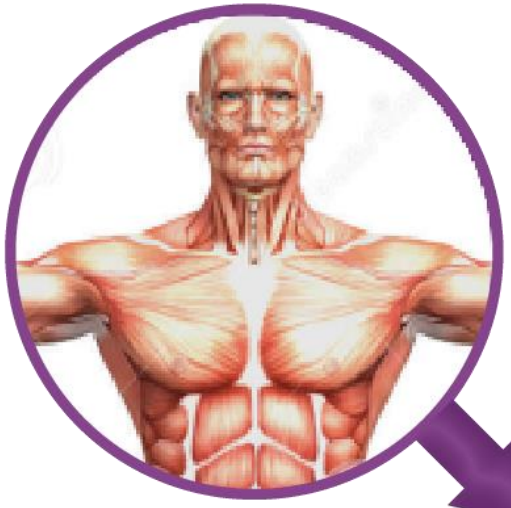
"'Precision medicine' has emerged as a computational approach to functionally interpret **omics** and **big data**, and facilitate their application to healthcare provision. In this new era, patients are not segregated by disease, or disease subtype. Instead, the aim is to treat every patient as an individual case, incorporating a range of personalized **data** including **genomic**, **epigenetic**, **environmental**, **lifestyle** and **medical history**"

David J. Duffy. Problems, challenges and promises: perspectives on precision medicine. Briefings in Bioinformatics, Volume 17, Issue 3, May 2016, Pages 494–504, https://doi.org/10.1093/bib/bbv060

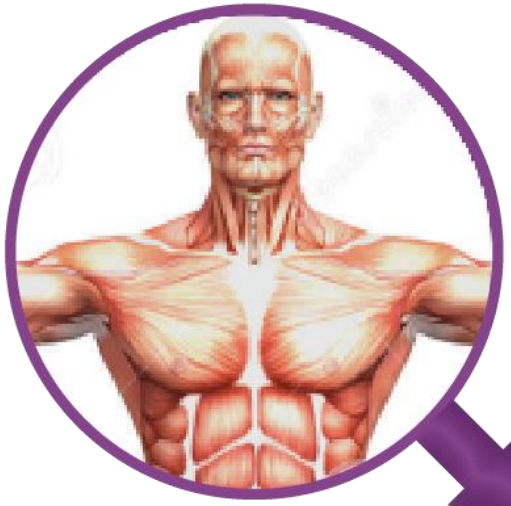

Next Generation Sequencing (NGS)
Phenotype
Clinical
History
Digital Pathology
CBmed
BIOMARKER RESEARCH
FUSION Technology
Integrative Data Analysis
Proteomics
Flow Cytometry
Metabolomics
In vivo Imaging
MALDI-MS


NOV 23
1258
96 BPM
fitbit

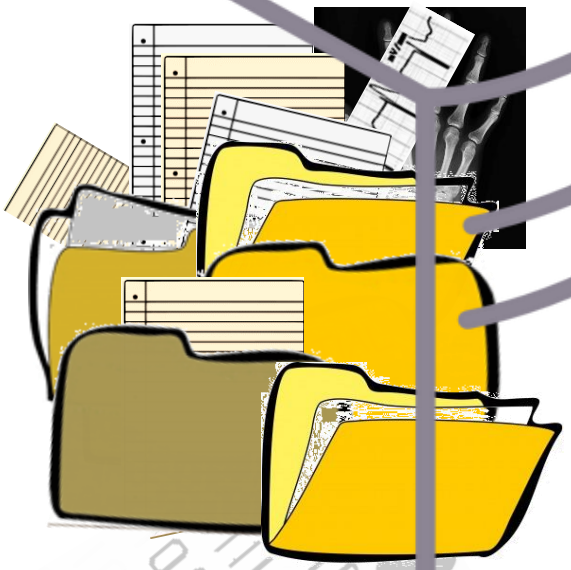

From the Facebook Team
This is completely confidential.
Ways you can support Moira
Jennifer, it can be tough knowing the best way to help a friend going through a difficult time. If you want to support her, we'd like to help.
Learn how to support Moira
See suggestions for ways to support Moira in this time.
Contact a helpline
They can listen and help you support Moira.
Connect with another friend
CLOSE

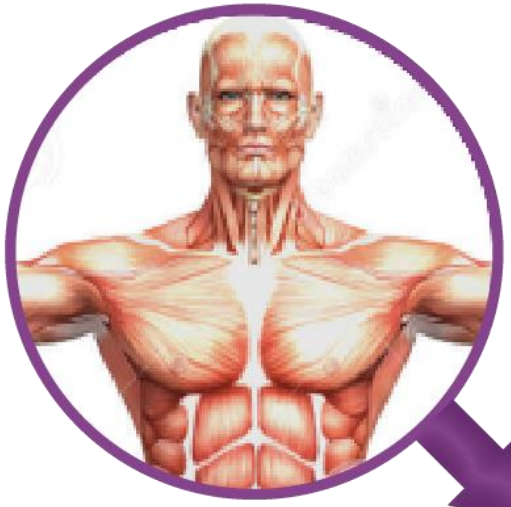


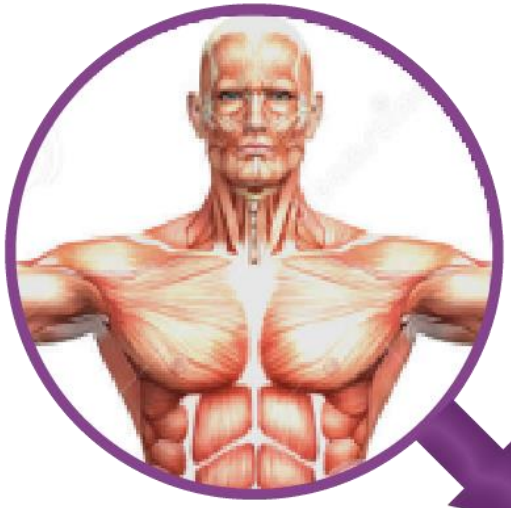
Health Records

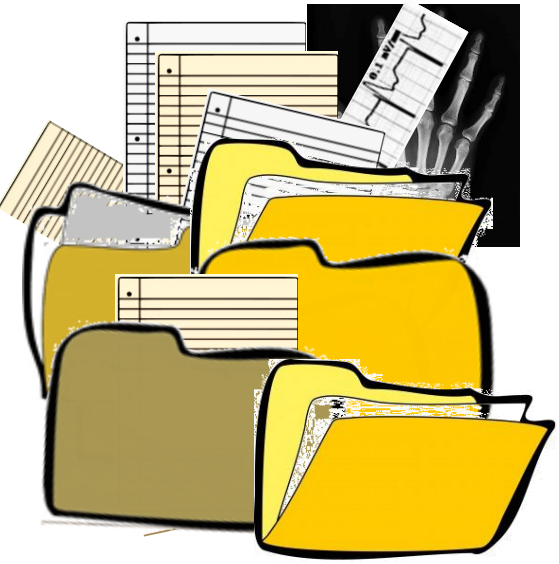


Electronic
Health Records

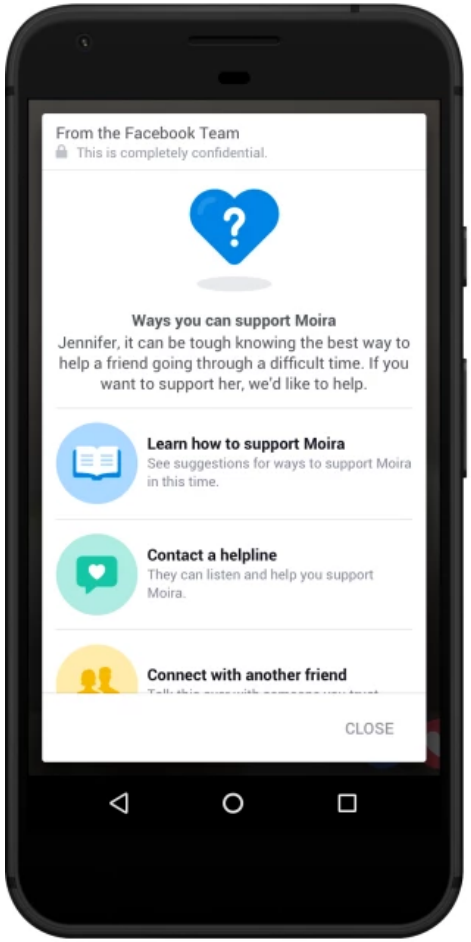








New from the *Weekly Spark*



Can Facebook's Machine-Learning Algorithms Accurately Predict Suicide?

March 10, 2017

News Type: Weekly Spark, Weekly Spark News

Scientific American

Facebook has just expanded the array of tools it provides to reach users at risk for suicide and connect them with mental health resources. The menu of options that allows Facebook users to report posts with content indicating potential thoughts of suicide or self-harm will now be available for Facebook live streams as well. The social media company is also piloting a pattern recognition algorithm that it hopes will automatically identify posts of concern even if they have not yet been reported by users. According to Facebook spokesperson William Nevius, the algorithm will use words or phrases related to suicide or self-harm in a user's post, and in comments added by friends, to determine if the person may be at risk. The system will automatically alert Facebook's Community Operations team about posts of concern so that the team can quickly review them. If the team determines that support is warranted, they will ensure that information about helping resources will appear in the user's news feed.

Spark Extra! Check out a community guide for Facebook users.

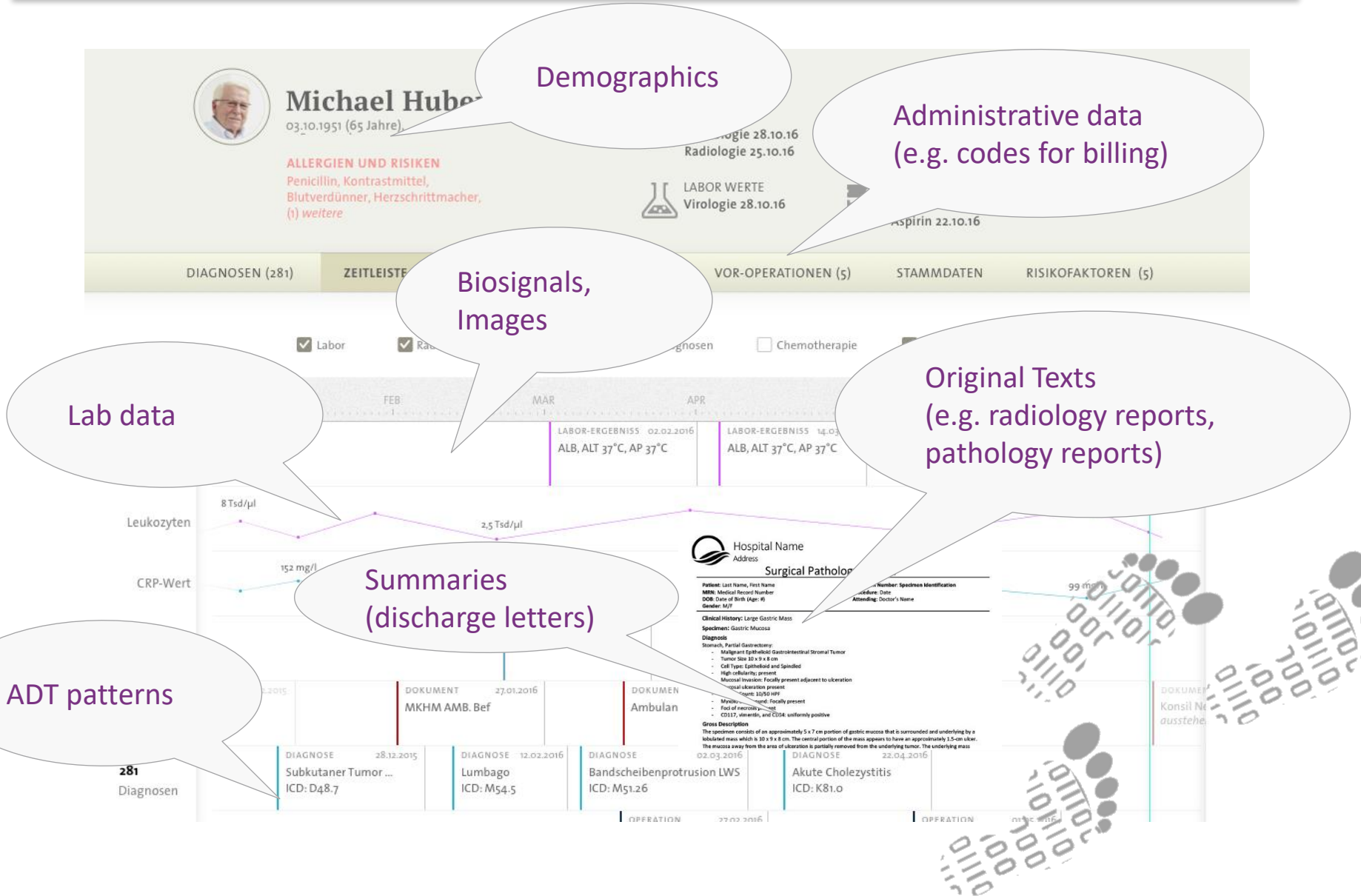
Planning and Implementing: New and Social Media

Digital Footprints

Search engines
Social networks
Mobile applications
IoT Sensors

Relevance for Health and Biomedical Research?
Routine data?

Mining Electronic Health Records (EHRs)



Problems with EHR content

- **Structured content, but not coded**
  - Lab parameters
  - Administrative data
  - Local data collections
  - (Drug prescription data, vital signs, etc.)

Querying ☺
Quality ☺
Granularity ☺
Standards 😐

- **Structured and coded content**
  - Diagnoses (ICD-10)
  - Procedures (MEL, ICPM)

Querying ☺
Quality 🙂
Granularity 🙂
Standards 😐

- **Textual content**
  - Reports (pathology, radiology, surgery)
  - Summaries (discharge letters)
  - Nursing documentation

Querying 🙂
Quality 🙂
Granularity ☺
Standards 😐


Completeness
Correctness
Granularity
Structure
Volume
PM Relevance
Admission / Discharge/ Transfer
Administrative Codes (ICD…)
Clinical Lab
Prescriptions
Problem List
Registries
Findings Reports
Discharge Summaries

Information extraction from texts

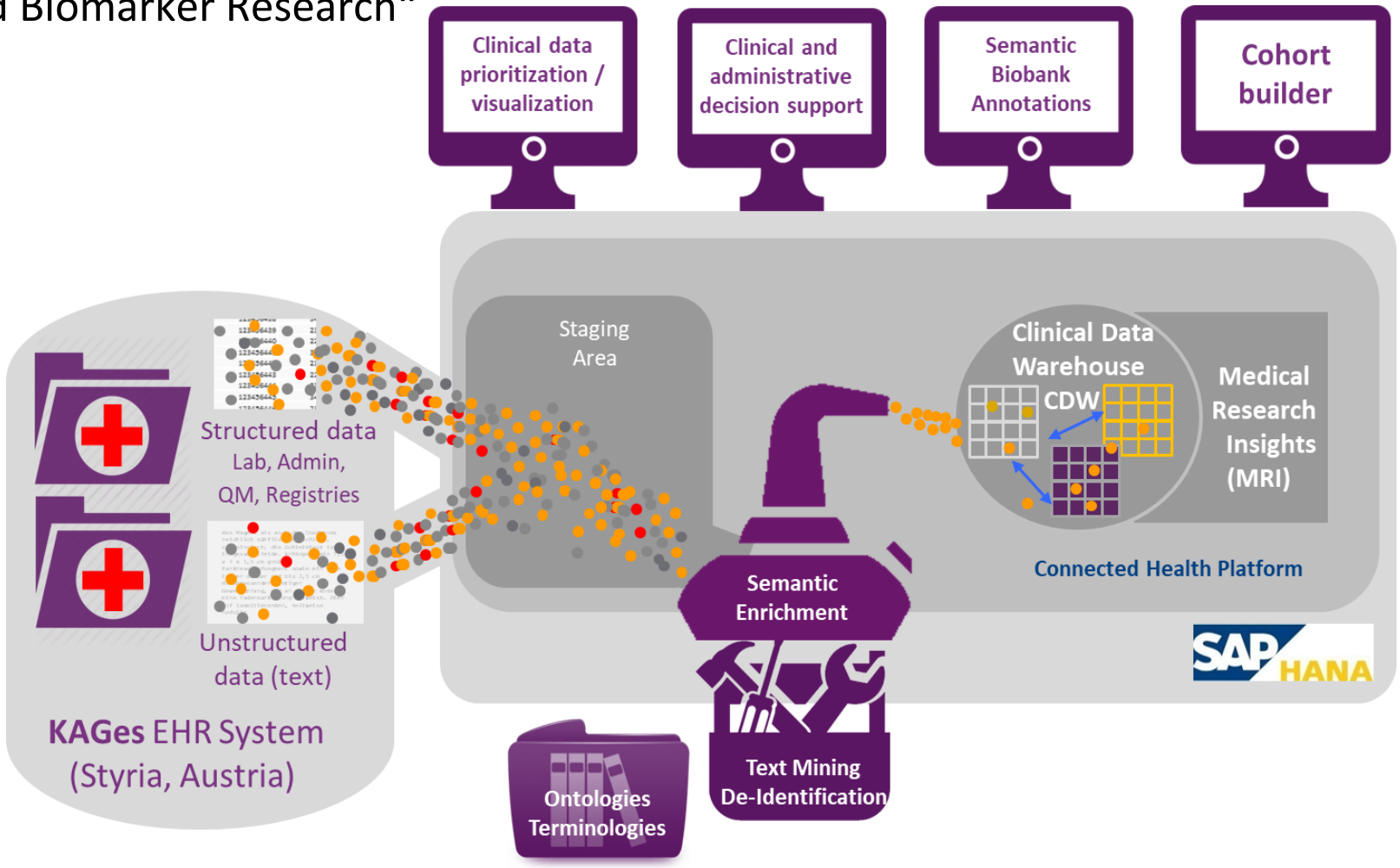
Clinical Routine data

St. p. TE eines exulc. sek.knot.SSM li US dors. 5/11 Level IV 2,4 mm Tumordurchm. Sentinnel LK ing. li. tumorfr.

Code (SNOMED CT, LOINC)	Value	Context
254730000 |Superficial spreading malignant melanoma of skin		392521001 |History of
301889008 |Excision of malignant skin tumour		392521001 |History of
47224004 |Skin of posterior surface of lower leg **7771000** |Left		
81827009 |Diameter **258673006** |Millimetre	2.41	
94339008 |Secondary malignant neoplasm of inguinal lymph nodes		15240007 |Current 2667000 |Absent

Project 1.2 "DBM4PM Digital biomarkers for precision medicine"

- **Continuation of "IICCAB –** Innovative Use of Information for Clinical Care and Biomarker Research"



Mining "Digital Biomarkers" from Electronic Health Records