

Applications of More Personalized Medicine in 2019



Healthcare Data Flow



Use Cases



Personalized medicine in Cardiology in 2019



Optimal targeted approach

Cancer

Tissue biopsy
Imaging
Phenotypic analysis
• Tumor size, extent
• Histologic analysis
Gene expression

Targeted therapy

Sub-optimal one-size-fits-all approach

HF

Imaging, ECG, PEX
Phenotypic analysis
• Quantify LVEF
• Functional class
• Fluid status
• QRS duration

Non-targeted therapy



FOUNDATION FACTS

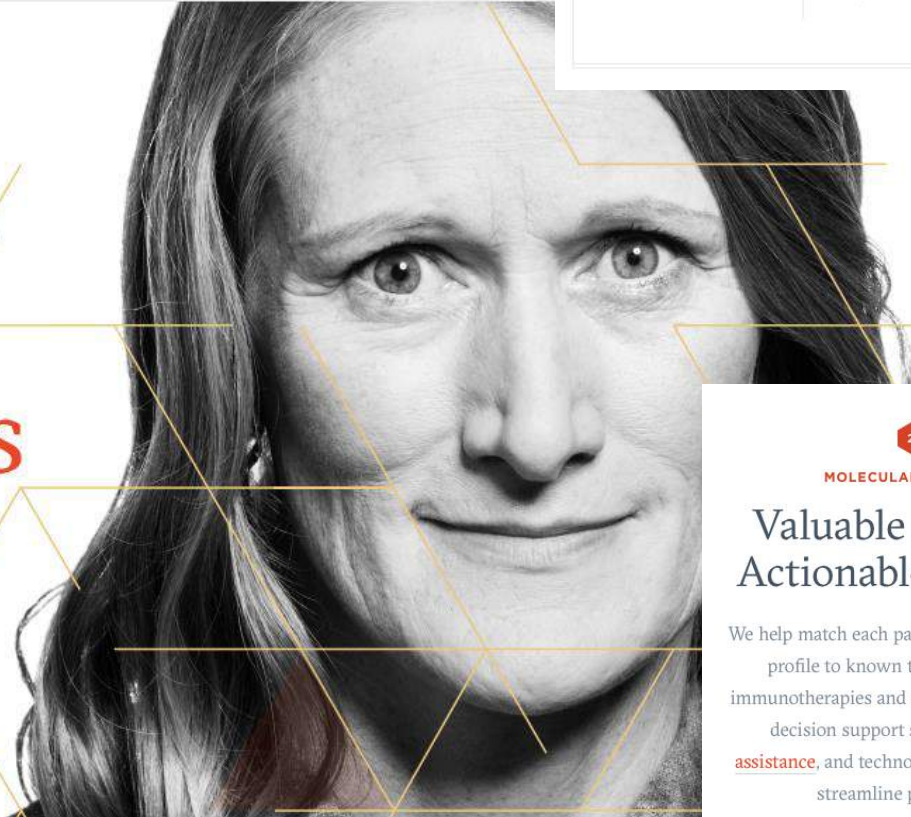
>300k
patients profiled

>30
biopharma
partners

>300
publications

The Relentless Pursuit of Better **Insights**

WE NEVER GIVE UP. We strive to do more for cancer patients - through richer science, deeper insights, and stronger partnerships - providing better cancer care today, and fueling better cancer care tomorrow.



MOLECULAR INSIGHTS

Valuable Insights, Actionable Options

We help match each patient's unique genomic profile to known targeted therapies, immunotherapies and clinical trials and offer decision support services, **financial assistance**, and technology solutions to help streamline patient care.

A collaboration with the FDA: new insights using real-world evidence

This latest study estimates real-world survival rates of immunotherapy-treated patients in the first year following regulatory approval in lung cancer, illustrating real-world performance of a new therapy class...

U.S. FDA APPROVES IBRANCE® (PALBOCICLIB) FOR THE TREATMENT OF MEN WITH HR+, HER2-METASTATIC BREAST CANCER

Approval of expanded indication based predominately on real-world data

IQVIA'S UNPARALLELED DATA ASSETS

600 Million

NON-IDENTIFIED PATIENT RECORDS.

Bringing precision medicine to patients more efficiently

You can now more efficiently research and develop precision medicines targeted to smaller populations. Innovative study designs use real world evidence to supplement primary data

TriNetX Live™

Apply a Data-Driven Approach for Clinical Trial Optimization

- Real-time scenario modeling for protocol feasibility
- Directly connect with sites on trial opportunities
- Self-service access to fresh patient data

HCO	Patients
Anonymous Site	169,460
Anonymous Site	110,480
Anonymous Site	103,870
Anonymous Site	3,...

What is the Phenotype KnowledgeBase?



Health Data increasing in clinical and Researcher: refine algorithm and unstructured identify cohort the health c

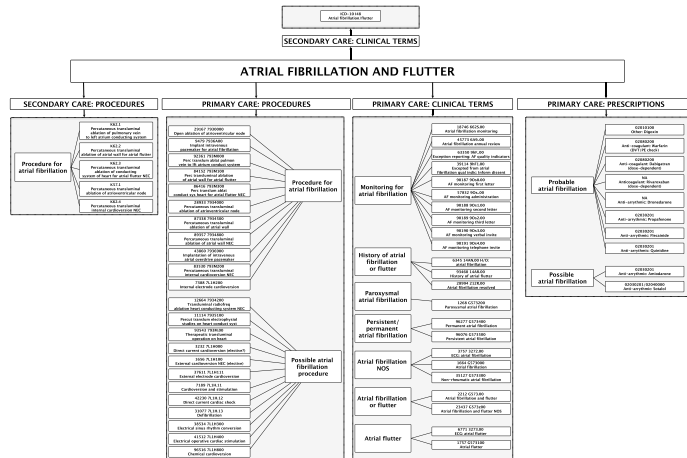
The Phenot website, Ph environment validating e identify cha within health functionally

Welcome to CALIBER!

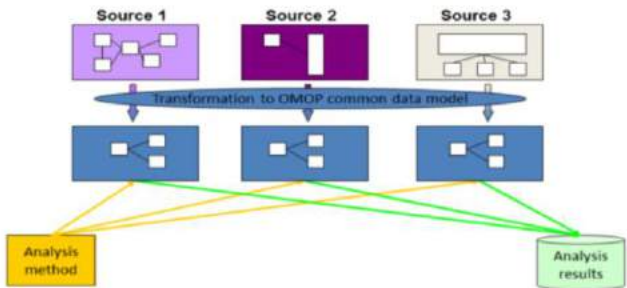
A comprehensive, open-access resource providing the research community with information, tools and phenotyping algorithms for UK electronic health records data.

EHR Phenotypes

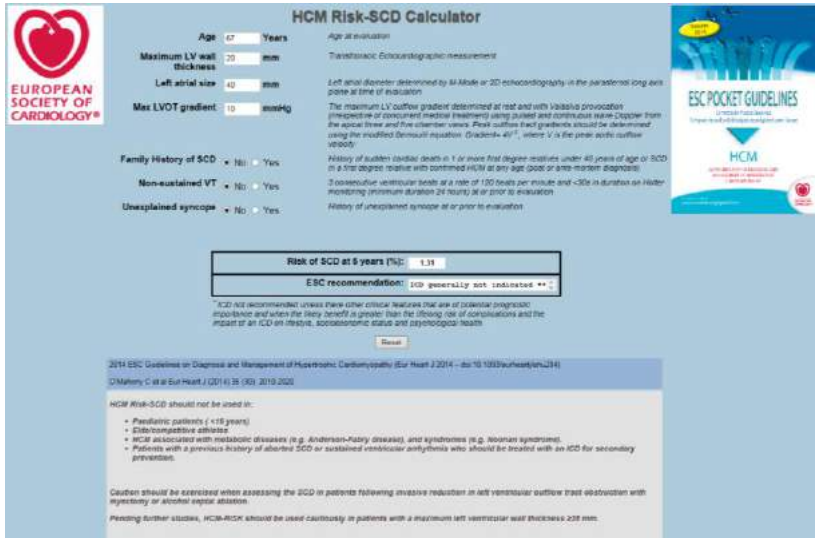
Rule-based **phenotyping algorithms** using four national structured UK EHR data sources: primary care (CPRD), hospitalizations (HES) and mortality (ONS). Phenotypes have been extensively validated by generating six layers of evidence: aetiological, prognostic, case-note review, genetic, cross-EHR and cross-country replication.



OMOP Common Data Model



Precision medicine in cardiology today



EUROPEAN SOCIETY OF CARDIOLOGY

HCM Risk-SCD Calculator

Age at evaluation: 27 Years
Maximum LV wall thickness: 20 mm
Left atrial size: 40 mm
Max LVOT gradient: 10 mmHg

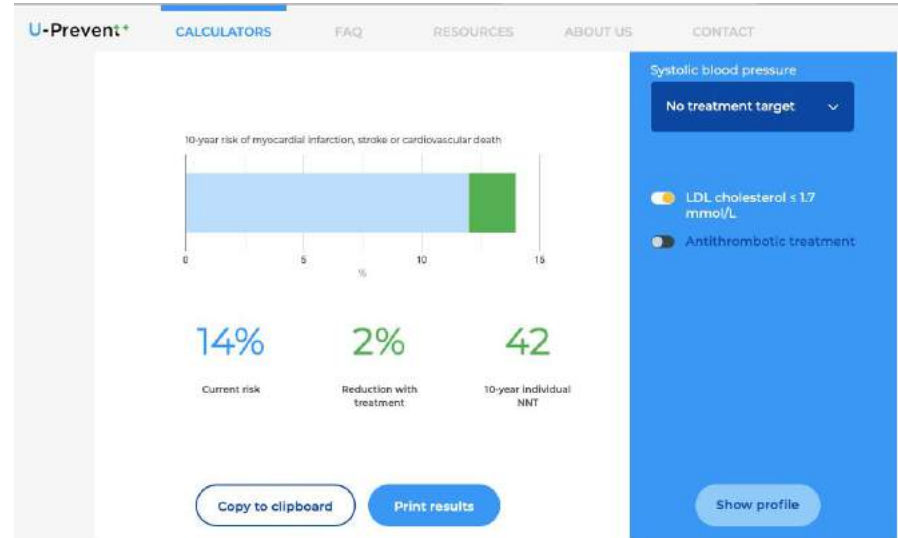

Family History of SCD: No
Non-explained VT: No
Unexplained syncope: No

Risk of SCD at 6 years (%): 1.31
ESC recommendation: ICD generally not indicated **

2014 ESC Guidelines on Diagnosis and Management of Hypertrophic Cardiomyopathy (Eur Heart J 2014 - doi:10.1093/eurheartj/ehu234)
Mahoney C et al. Eur Heart J (2014) 35 (16): 2010-2020

HCM Risk-SCD should not be used in:
• Paediatric patients (<18 years)
• Discompetitive athletes
• HCM associated with metabolic disorders (e.g. Anderson-Fabry disease), and syndromes (e.g. Noonan syndrome).
• Patients with a previous history of aborted SCD or sustained ventricular arrhythmias who should be treated with an ICD for secondary prevention.

Caution should be exercised when assessing the SCD in patients following invasive reduction in left ventricular outflow tract obstruction with septal or alcohol septal ablation.
Pending further studies, HCM-Risk should be used cautiously in patients with a maximum left ventricular wall thickness >20 mm.



U-Prevent+ CALCULATORS FAQ RESOURCES ABOUT US CONTACT

Systolic blood pressure: No treatment target

LDL cholesterol ≤ 1.7 mmol/L
Antithrombotic treatment

10-year risk of myocardial infarction, stroke or cardiovascular death



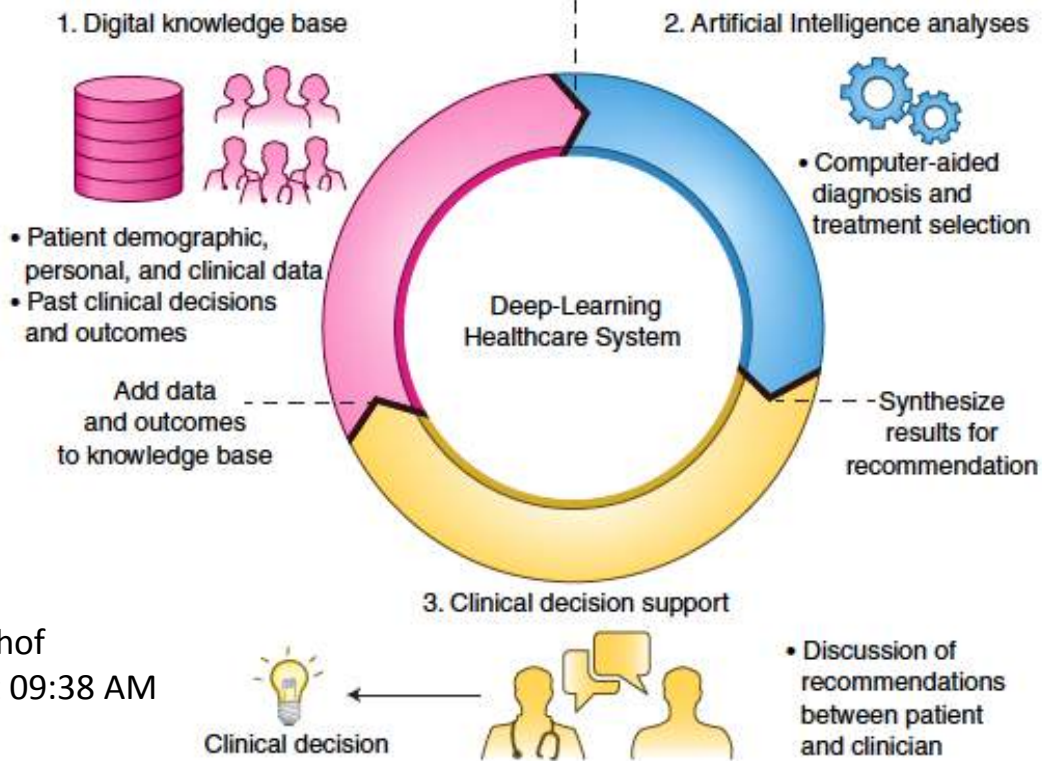
Metric	Value
Current risk	14%
Reduction with treatment	2%
10-year individual NNT	42

Copy to clipboard Print results Show profile

Probably past as considered medical device..



Harmonization and preprocessing

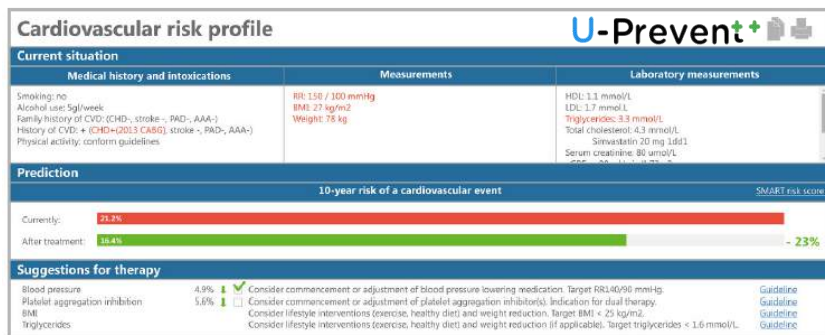


Katrien Groenhof
Sunday 06 Oct 09:38 AM
Digital Arena

Clinical decision support

Uniform data collection in routine clinical practice in cardiovascular patients for optimal care, quality control and research: The Utrecht Cardiovascular Cohort

Eur J Prev Cardiol. 2017 May;24(8):840-847



Neth Heart J (2019) 27:435–442



ESC
European Society
of Cardiology

European Heart Journal (2019) 0, 1–11
doi:10.1093/eurheartj/ehz385

CLINICAL RESEARCH
Vascular medicine

Alert-based computerized decision support for high-risk hospitalized patients with atrial fibrillation not prescribed anticoagulation: a randomized, controlled trial (AF-ALERT)

BestPractice Advisory

Important (1 Advisory)

1 Your atrial fibrillation patient is at increased risk for stroke!

The patient has a **CHA₂DS₂-VASc** score of 8. Patients with a score of 8 have an **annual stroke risk of 6.7%**.

What to do:

- 1) Click **Accept** to open the order set and select an anticoagulation order.
- 2) If you are unsure of how to proceed, please review the [evidence-based clinical practice guidelines](#).
- 3) If you do not wish to proceed with an anticoagulation order, please provide an **Acknowledge Reason** below.

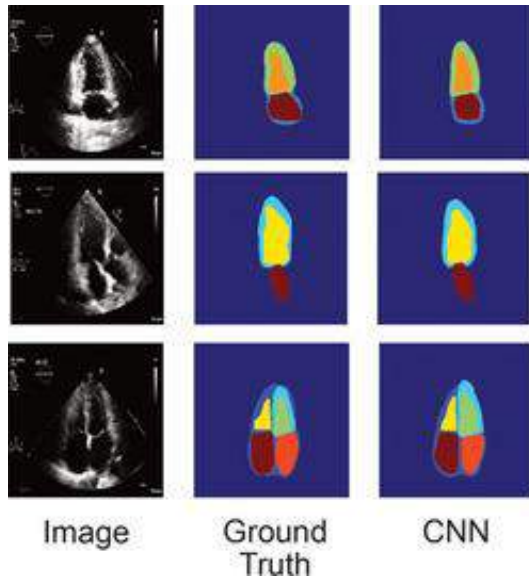
Acknowledge reason:

Bleeding risk is too high | Stroke risk is not high | Patient is high-risk for falls
Patient refuses anticoagulation | Other (Leave Comment)

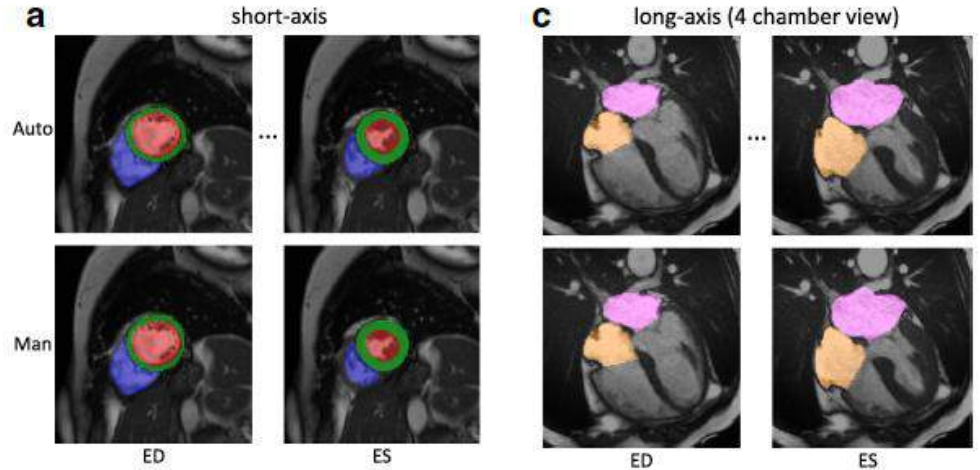
Open Order Set: **Stroke Prevention in Patients with Non-Valvular AF** preview
(Last done by: [redacted] on 2/22/2019 at 10:42 AM)

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Big data in cardiology today



94% accuracy echoview
91% accuracy LVH
93% accuracy HCM
87% accuracy cardiac amyloidosis

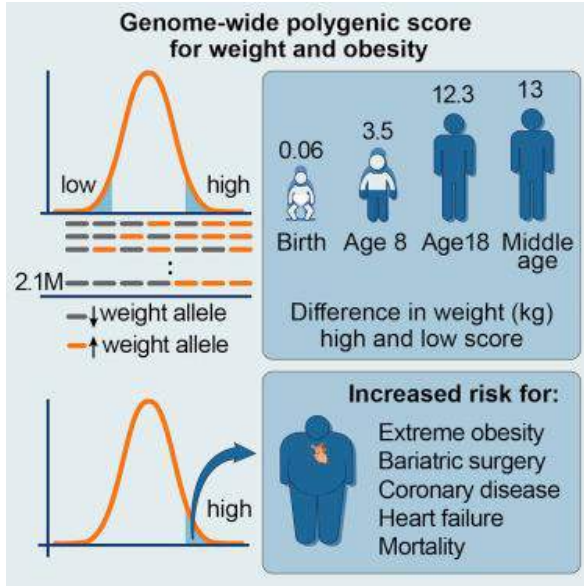


npj Digital Medicine (2018) 1:59
Circulation. 2018;138:1623

Predictive modelling

Cell

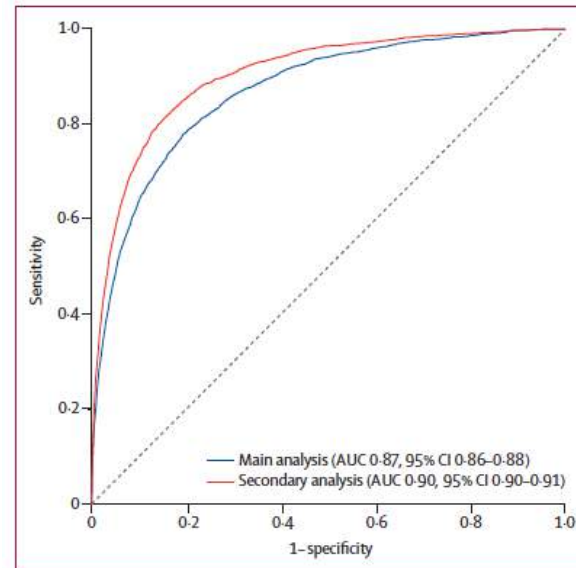
Polygenic Prediction of Weight and Obesity Trajectories from Birth to Adulthood



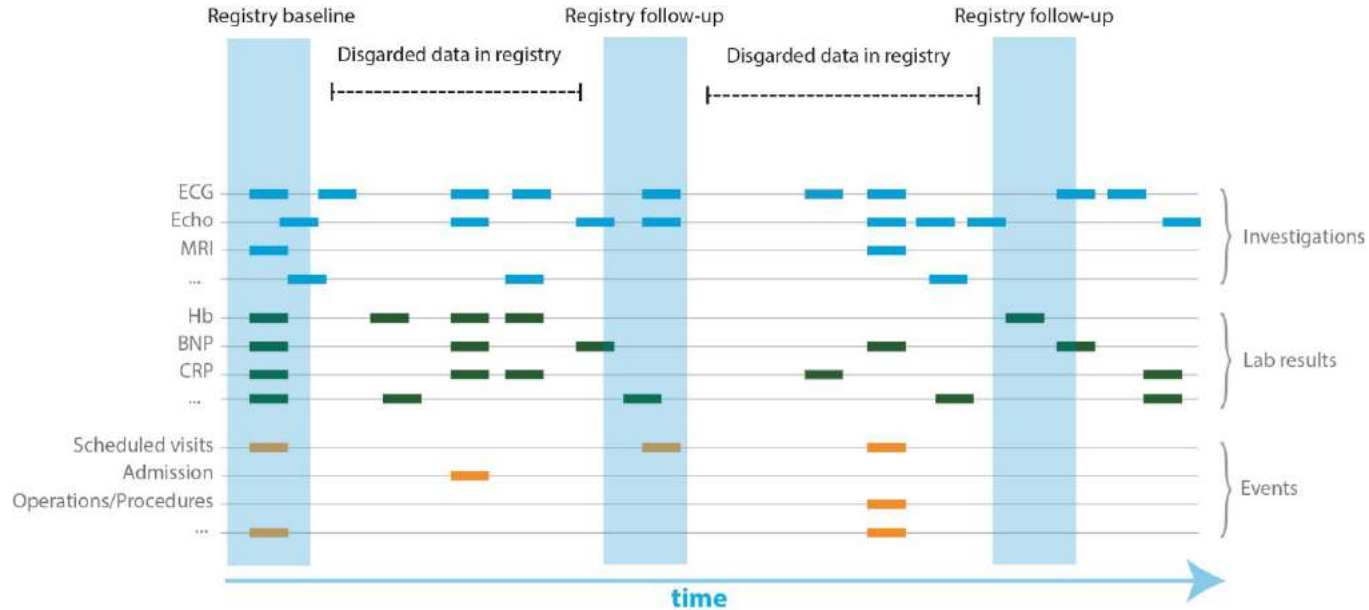
Khera et al., 2019, Cell 177, 587–596

An artificial intelligence-enabled ECG algorithm for the identification of patients with atrial fibrillation during sinus rhythm: a retrospective analysis of outcome prediction

Zachil Attia*, Peter A Noseworthy*, Francisco Lopez-Jimenez, Samuel J Asirvatham, Abhishek J Deshmukh, Bernard J Gersh, Rickey E Carter, Xiaoxi Yao, Alejandro A Rabinstein, Brad J Erickson, Suraj Kapa, Paul A Friedman Lancet. 2019 Aug 1

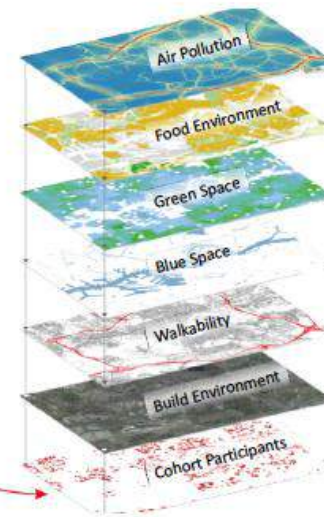
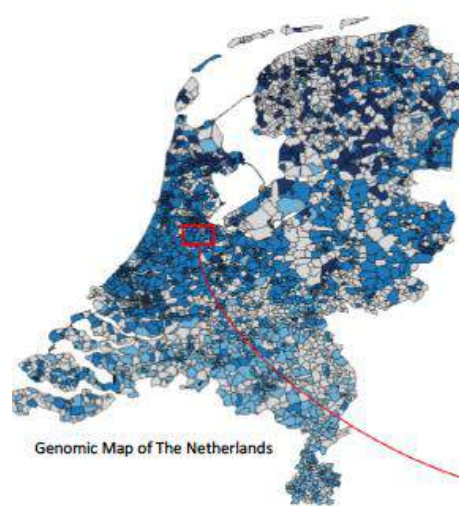
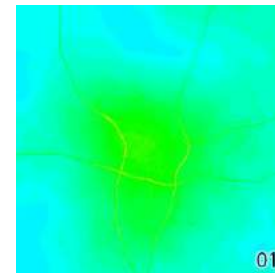


Real-time Predictive modelling within routine care

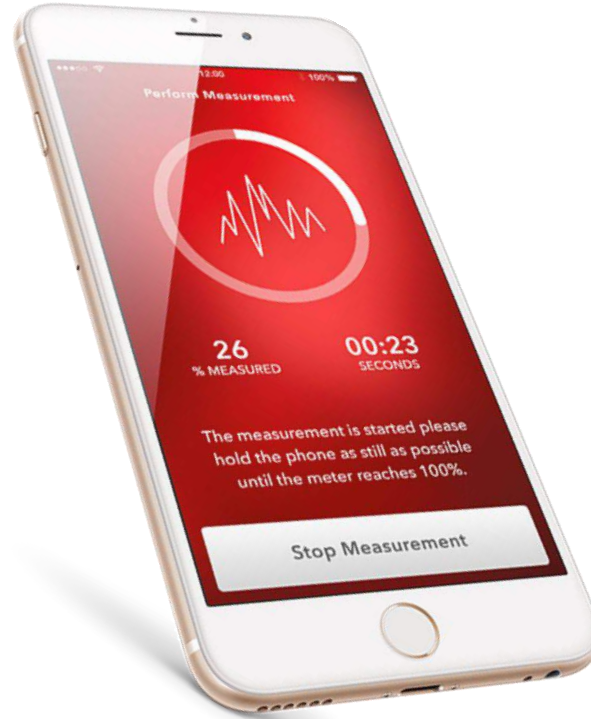
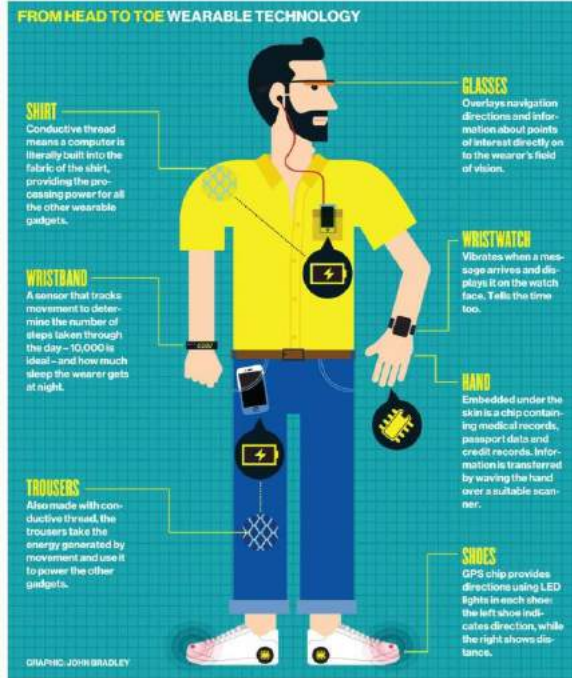


Digital Arena Saturday 14:06
Arjan Sammani
Unravelrdp.nl

Exposome



Sensors



But what then? Where is the evidence?

Big Data for Personalized medicine: challenges today

Routine care data

Registration



Uniformisation (OMOP)



Data analytics

Extractability

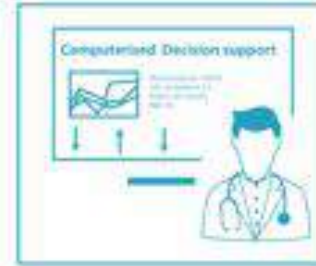


Missing data



Actionable insights

Uptake in care



Big data for personalized medicine: big possibilities

- Molecular diagnosis to design future trials to provide targeted therapy
- AI analytics of real-world data for prediction and diagnostic yield will lead to actionable insights
- However, it is all about phenotype, phenotype, phenotype (new and old)
- Harmonization of clinical care pathways, data models, coding key for success (external validation)
- Multi-disciplinary collaboration essential



Klaske Siegersma
Sunday – October, 6th
Artificial Intelligence 2 – 8:45-9:25
Digital Arena



This work has received support from the EU/EFPIA Innovative Medicines Initiative [2] Joint Undertaking BigData@Heart grant n° 116074