InterSystems®
DACH SYMPOSIUM 2023

HEALTHCARE FORUM

Personalized Medicine with InterSystems

Dr. Erion Dasho | InterSystems

I am late

I am late

IoMT

Raising costs

Research

AI/ML

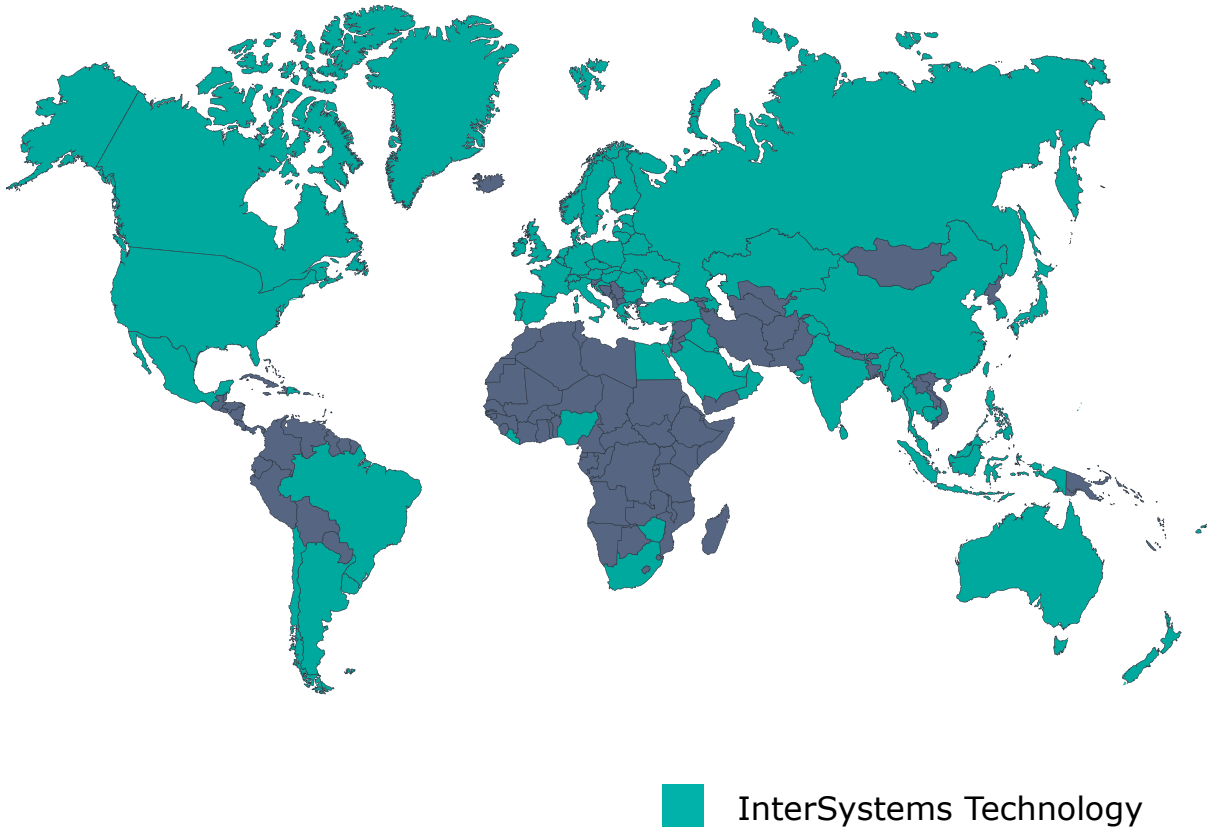
Access and Quality

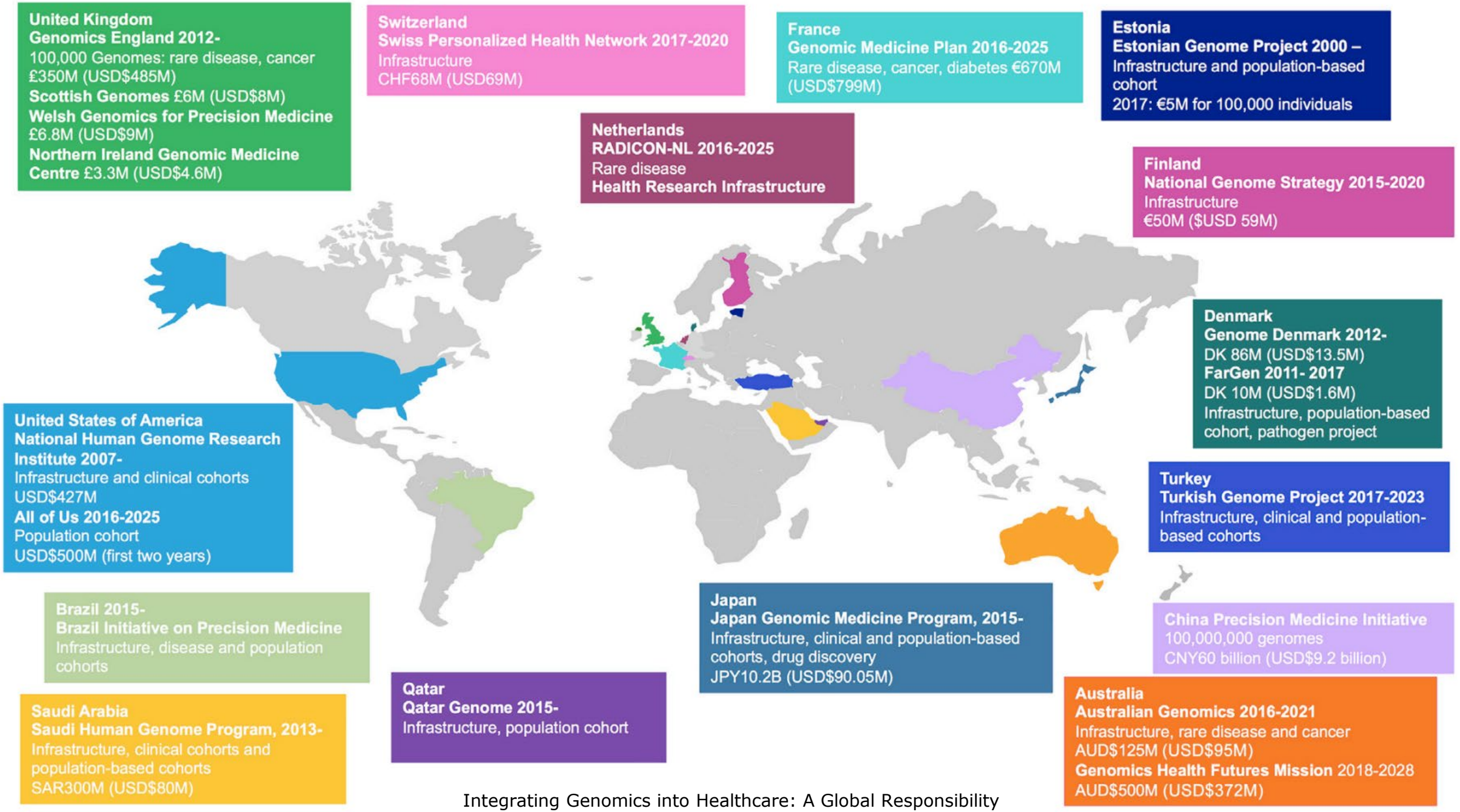
Personalized Medicine

Estimated doubling time of medical knowledge

Imagine “only” the data that we generate…

- **1 Billion+** Health records built on InterSystems:
  - **2/3** of US Population
  - **58%** of US Hospital Beds
- **400 Million patients** served by TrakCare
- **90 Million citizens** in HealthShare powered information networks

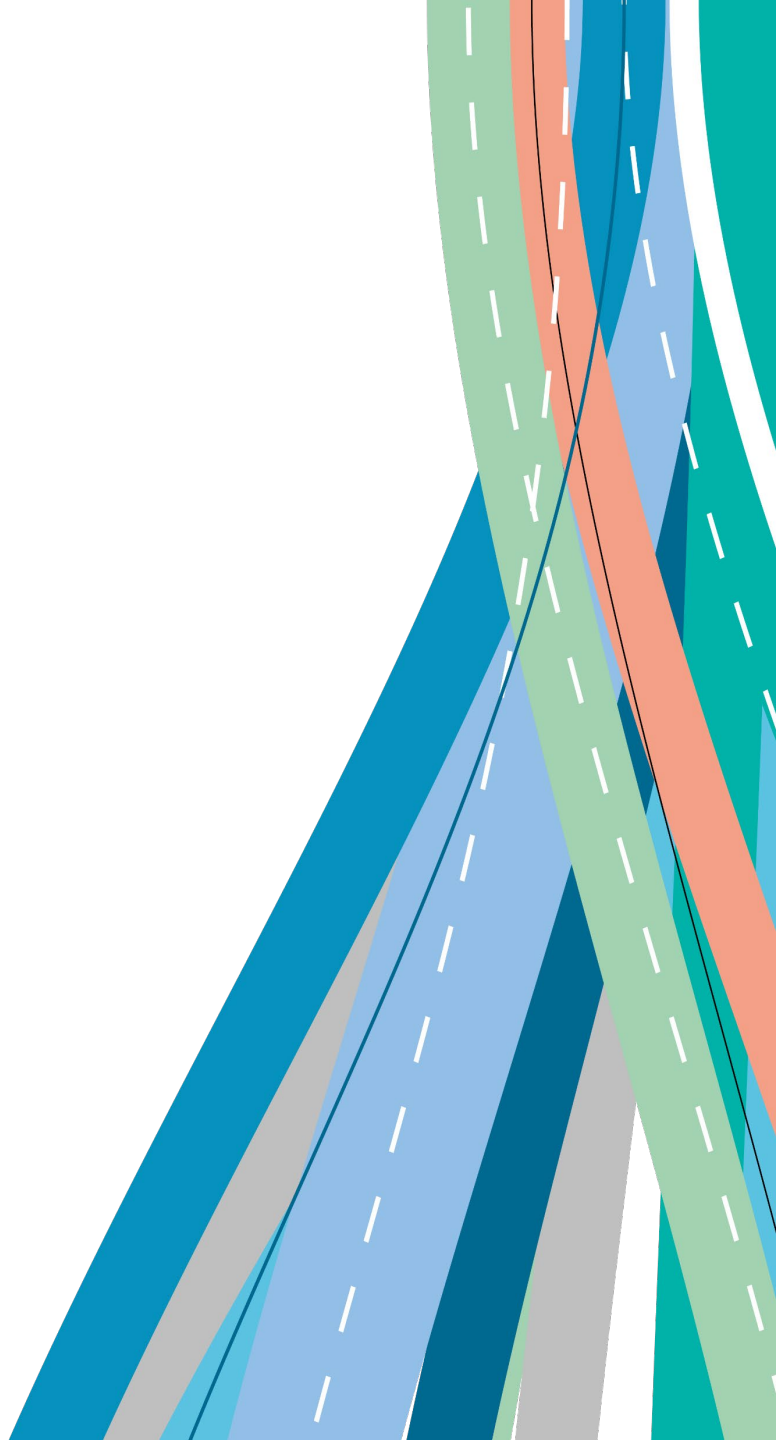



United Kingdom
Genomics England 2012-
100,000 Genomes: rare disease, cancer
£350M (USD$485M)
Scottish Genomes £6M (USD$8M)
Welsh Genomics for Precision Medicine
£6.8M (USD$9M)
Northern Ireland Genomic Medicine Centre £3.3M (USD$4.6M)
Switzerland
Swiss Personalized Health Network 2017-2020
Infrastructure
CHF68M (USD69M)
France
Genomic Medicine Plan 2016-2025
Rare disease, cancer, diabetes €670M (USD$799M)
Estonia
Estonian Genome Project 2000 –
Infrastructure and population-based cohort
2017: €5M for 100,000 individuals
Netherlands
RADICON-NL 2016-2025
Rare disease
Health Research Infrastructure
Finland
National Genome Strategy 2015-2020
Infrastructure
€50M ($USD 59M)
Denmark
Genome Denmark 2012-
DK 86M (USD$13.5M)
FarGen 2011- 2017
DK 10M (USD$1.6M)
Infrastructure, population-based cohort, pathogen project
United States of America
National Human Genome Research Institute 2007-
Infrastructure and clinical cohorts
USD$427M
All of Us 2016-2025
Population cohort
USD$500M (first two years)
Turkey
Turkish Genome Project 2017-2023
Infrastructure, clinical and population-based cohorts
Brazil 2015-
Brazil Initiative on Precision Medicine
Infrastructure, disease and population cohorts
Japan
Japan Genomic Medicine Program, 2015-
Infrastructure, clinical and population-based cohorts, drug discovery
JPY10.2B (USD$90.05M)
China Precision Medicine Initiative
100,000,000 genomes
CNY60 billion (USD$9.2 billion)
Saudi Arabia
Saudi Human Genome Program, 2013-
Infrastructure, clinical cohorts and population-based cohorts
SAR300M (USD$80M)
Qatar
Qatar Genome 2015-
Infrastructure, population cohort
Australia
Australian Genomics 2016-2021
Infrastructure, rare disease and cancer
AUD$125M (USD$95M)
Genomics Health Futures Mission 2018-2028
AUD$500M (USD$372M)

Within 2024, the genome of 60 million patients is expected to be generated.

Within 2030, China aims to sequence 100 million genomes through a $9.2 billion project (China Precision Medicine Initiative).

- How will be the medicine of the future?
- Are we already “killing” the medicine of the future?
- How will personalized medicine (likely) work?
- What is happening in the DACH Region?
- Can InterSystems contribute?



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Medicine of the future

Precise?

Personalized?

Patient-centered?

?

Digital twin?

Why is it not happening right now?!

Uniformity

CPGs and DRGs

VS.

Kymriah

(FDA Approved, 2017)

CAR T Cell Therapy:

Patient's genetically reengineered T-cells attack acute lymphoblastic leukemia cells.

475,000 USD

https://www.onclive.com/view/novartis-sets-a-price-of-475000-for-car-tcell-therapy

The personalization approach

Search for the personalization

within uniformity

Uniformity guides the decision,

while personalization makes the last mile

Healthcare Data

Present Data
Historic Data
Laboratory
Imaging
Wearables
Sensors

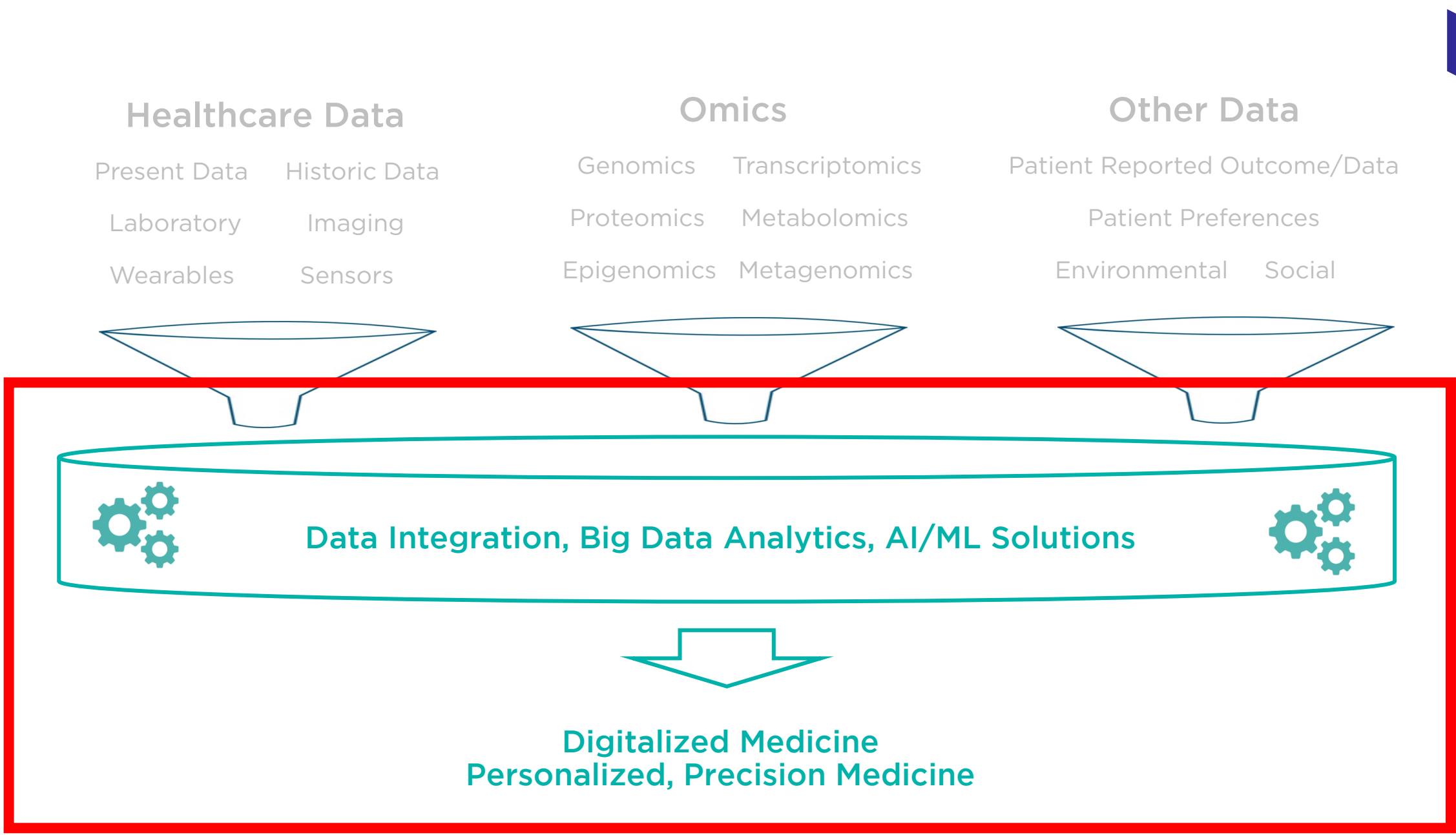
Omics

Genomics
Transcriptomics
Proteomics
Metabolomics
Epigenomics
Metagenomics

Other Data

Patient Reported Outcome/Data
Patient Preferences
Environmental
Social

Digitalized Medicine
Personalized, Precision Medicine

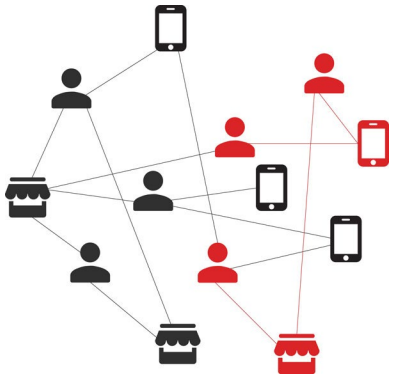

Healthcare Data
Present Data
Historic Data
Laboratory
Imaging
Wearables
Sensors
Omics
Genomics
Transcriptomics
Proteomics
Metabolomics
Epigenomics
Metagenomics
Other Data
Patient Reported Outcome/Data
Patient Preferences
Environmental
Social
Data Integration, Big Data Analytics, AI/ML Solutions
Digitalized Medicine
Personalized, Precision Medicine

InterSystems®

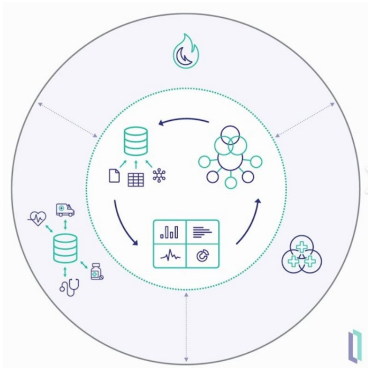
Creative data technology

Oncodesign Precision Medicine, Dijon, France

Improve care for patients with treatment-resistant cancers.



Heterogeneous data



InterSystems IRIS for Health

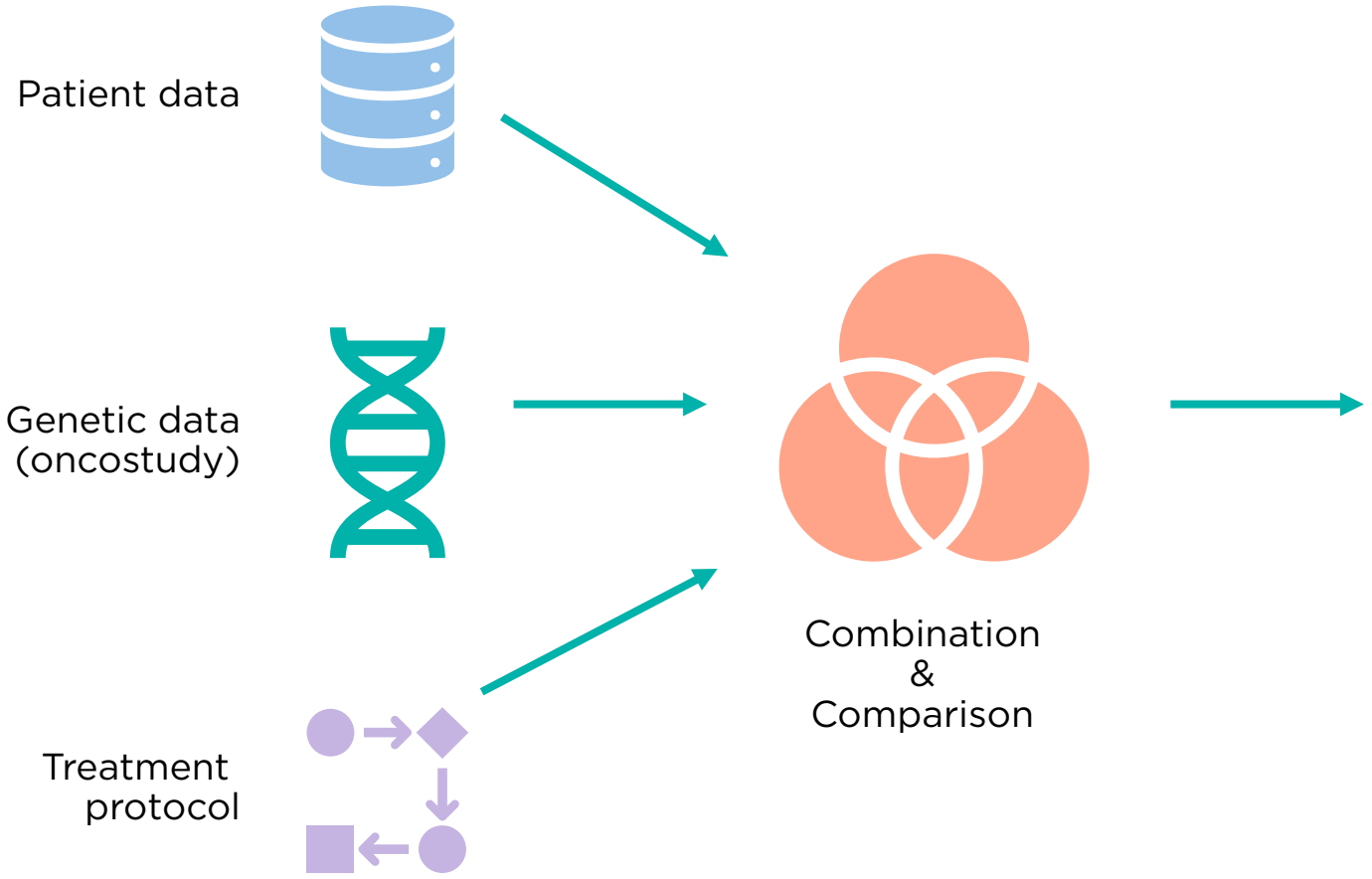
OncoSNIPER

Identify patient sub-population with treatment-resistant cancers

Propose treatment regimens that overcome resistance

https://www.oncodesign.com/our-innovation-technologies/oncosniper/

Genomics integration: Mediclinic Middle East



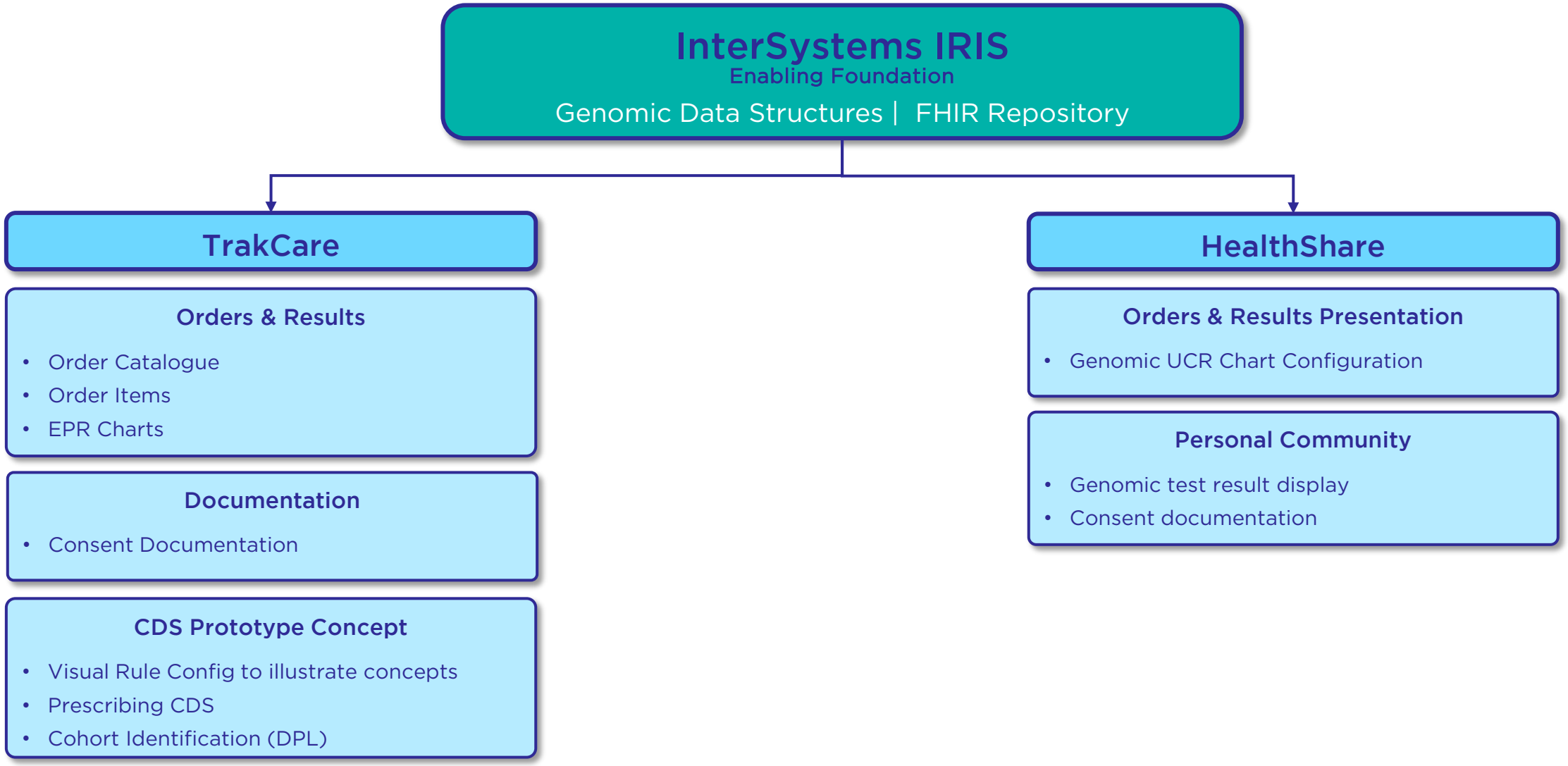
Optional answer:

"Based on the genetic setup of the patient, the chosen protocol might not be suitable for this patient"

Integrated into TrakCare

Solution integration

Genomic Orders / Results / Clinical Decision Support



Potential Use Case Scenarios – Genomic Orders / Results

InterSystems IRIS
data platform readiness
Genomic Data Structures for Orders and Results
FHIR Repository

TrakCare Order Communications
genomic test ordering and results viewing

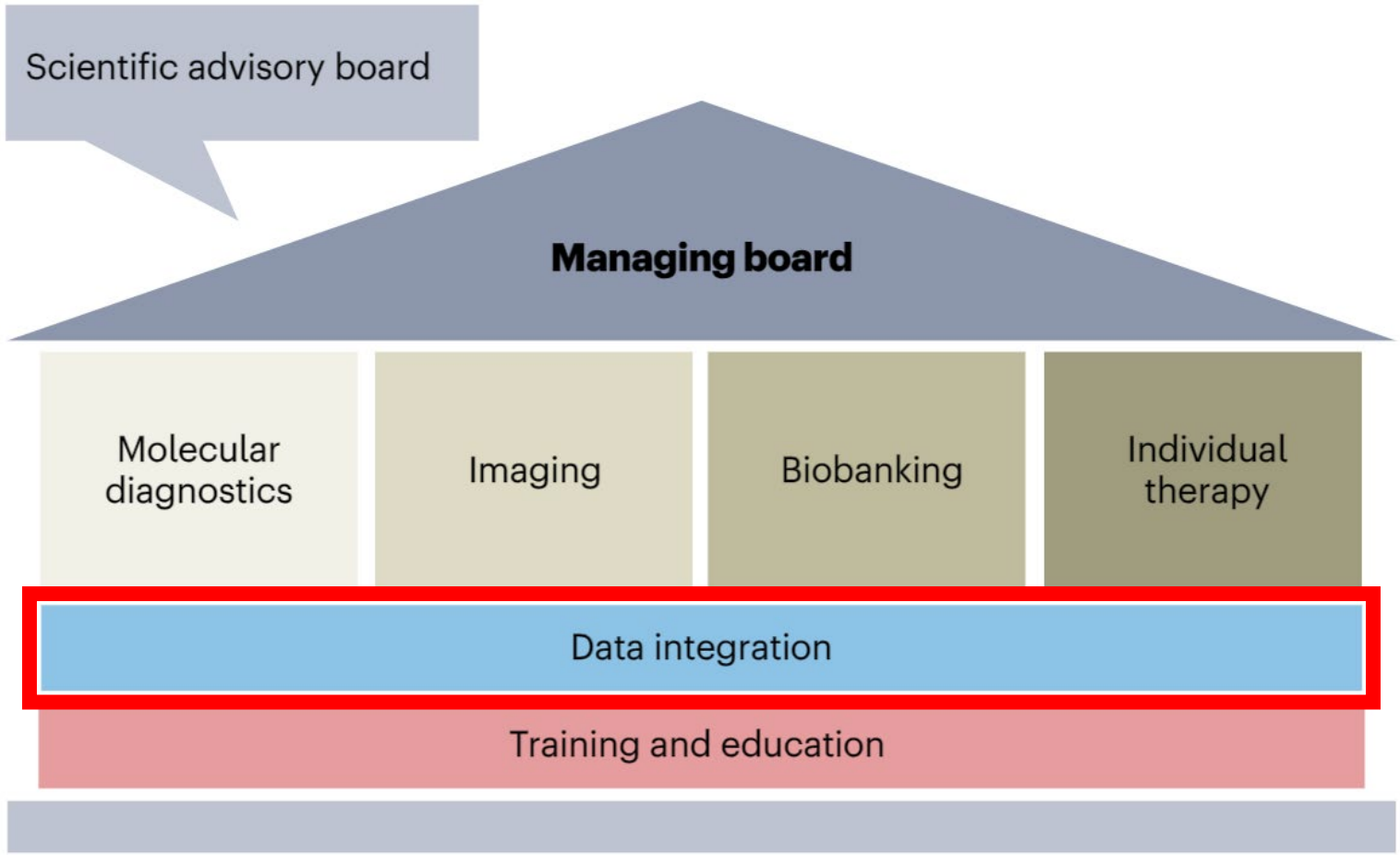
Configuration or Order Items
Configuration of EPR Charts to display Genomic test orders and results
Upload of Published Genomic Order Item Directory (UK national directory)

TrakCare Decision Support
alerting and cohort identification
Proof of Concept CDS – TrakCare Visual Rules to illustrate pharmacogenomic decision support
3rd Party API Integration – with a third-party decision support engine (e.g., FDB)
Cohort Analysis – manual configuration of TrakCare Dynamic Patient Lists

HealthShare
providing visibility of patient genomic profiles
Genomic Charts in UCR / Clinical Viewer
Health Insight Population Health Management – cohort identification reflecting patient characteristics and genomic profile to determine appropriate management of disease

What about Germany?

Zentren für Personalisierte Medizin (ZPM)



https://dnpm.de/ (Das Deutsche Netzwerk für Personalisierte Medizin)

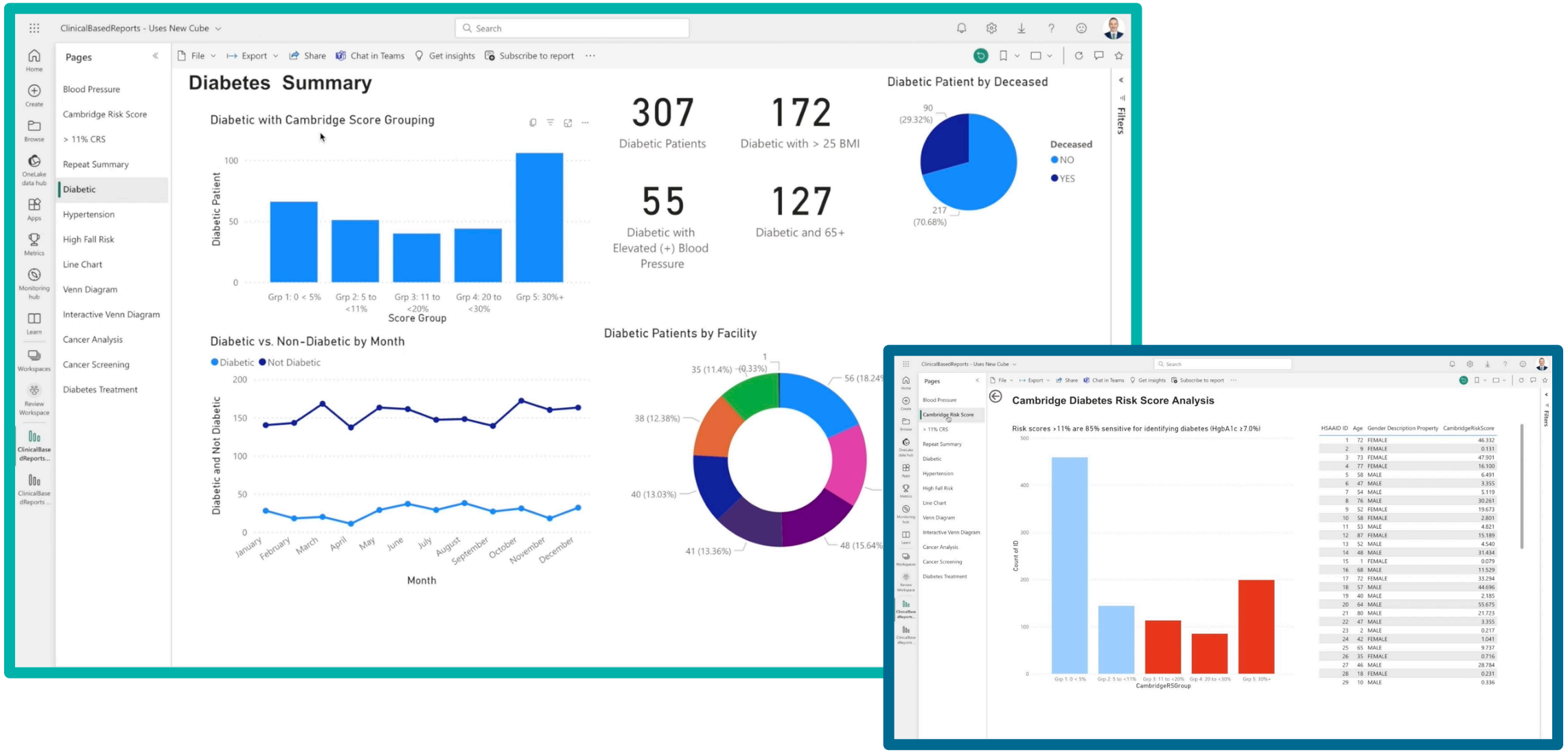
genomDE: Goal and objectives

Implement genomic medicine in standard care.

- Establish standards for the clinical use of genome diagnostics, quality-assured sequencing and the interdisciplinary evaluation of sequence data.
- Design and establish a nationwide platform for diagnostically collected genetic data, linking healthcare and research.
- Resolve technical (safety), ethical, regulatory and social challenges.

https://www.bundesgesundheitsministerium.de/themen/gesundheitswesen/personalisierte-medizin/genomde-de.html

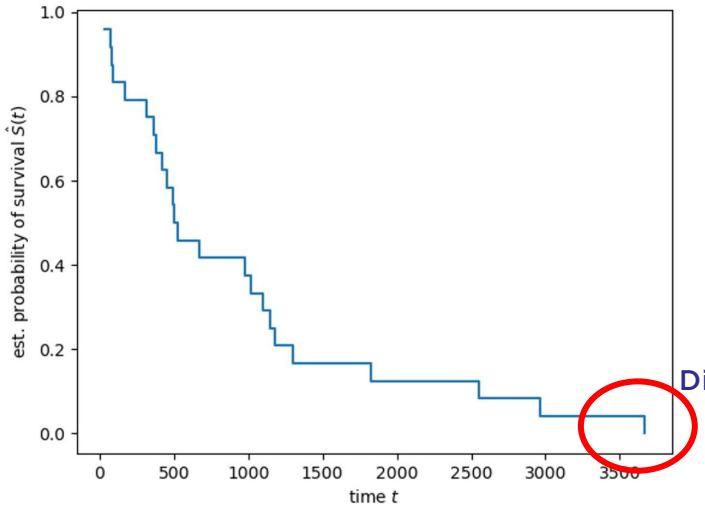
Building upon eDA: Dashboards



Beyond eDA: Diabetes Prediction

- **Objective:** Identify the probability that patients will develop a diabetes diagnosis in a specific time interval (survival time).
- **Implementation:** Survival Analysis -> analyzing the expected duration of time until the diabetes diagnosis occurs. Survival analysis involves the modelling of time-to-event data.
- **Solution:** an indication through an alert of when the patient will likely develop a diabetes diagnosis.

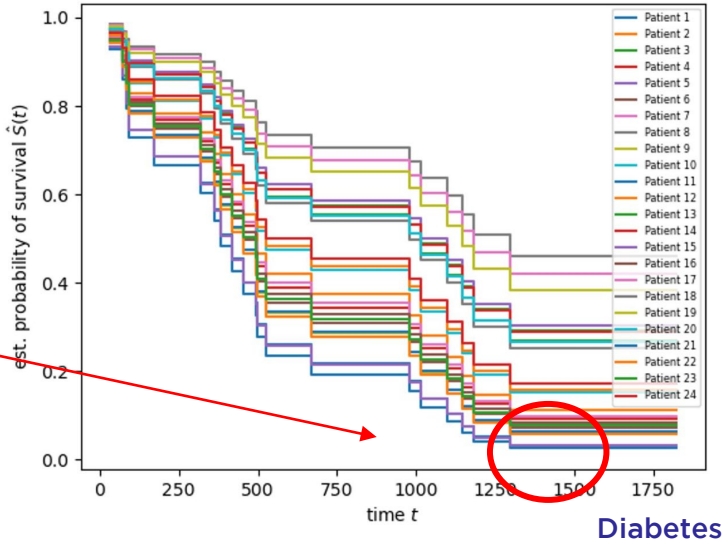
Survival Analysis by entire population



Diabetes diagnosis when the curve reaches 0 on y-axis.

Diabetes diagnosis

Survival Analysis by single patient



Diabetes diagnosis

Key takeaways

- “The future of surgery is not about blood and guts; it is bytes and bits” [1]
- The future (present) of medicine will undoubtedly be Personalized and Precise (to add more: Personalized, Precise, Proactive, Preventive, Prescriptive…)
- Digitalization is one of the few hopes towards high quality, accessible, affordable and sustainable healthcare and data is the mean to achieve that
- Several interesting initiatives and projects ongoing in DACH Region
- InterSystems has predicted on time these tendences and has taken proactive measures to shape the future
- We are happy to support our partners’ network through sharing technology advancements and jointly implementing use cases

[1] Dr. Richard Satava, University of Washington Medical Center

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Vielen Dank