FinnGen ecosystem projects: PreMed

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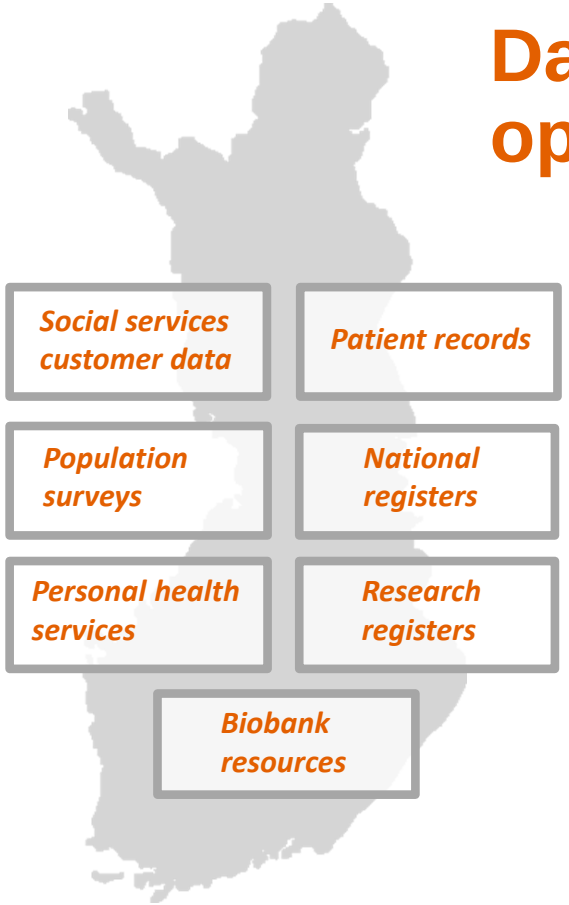
www.vtt.fi/premed

Data-driven precision medicine opportunity



Data exploitation

Pharma & diagnostics

Healthcare

Food and nutrition

Personal devices & apps

PreMed – data-driven precision medicine ecosystem

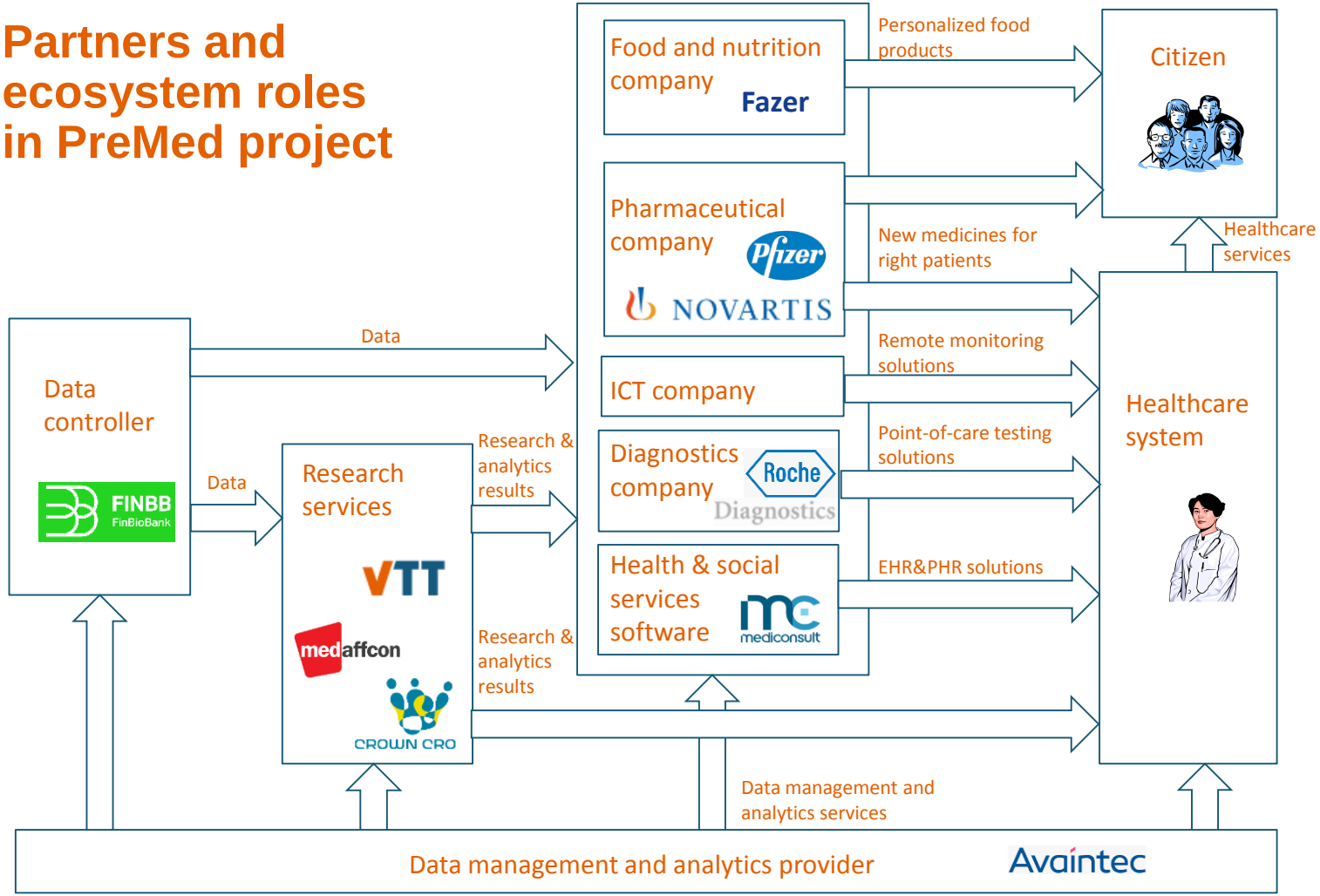
- Time span: May 2017 - December 2020
- Budget: 1166 k€
- Funding: Business Finland, VTT, Companies
- Overall objective:
  - promote the development of a data-driven precision medicine ecosystem in Finland
- Detailed objectives:
  - collect and **disseminate information** of on-going national and international activities
  - assess precision medicine ecosystem **needs and bottlenecks**
  - identify **new business strategies and models**
  - provide **recommendations to public bodies**
  - carry out a **biobank study** to assess the relevance of exploiting pharmacogenomics in a clinical use case

Exploit data from FinnGen project!

- interviews
- system simulation

http://www.vtt.fi/premed

Partners and ecosystem roles in PreMed project

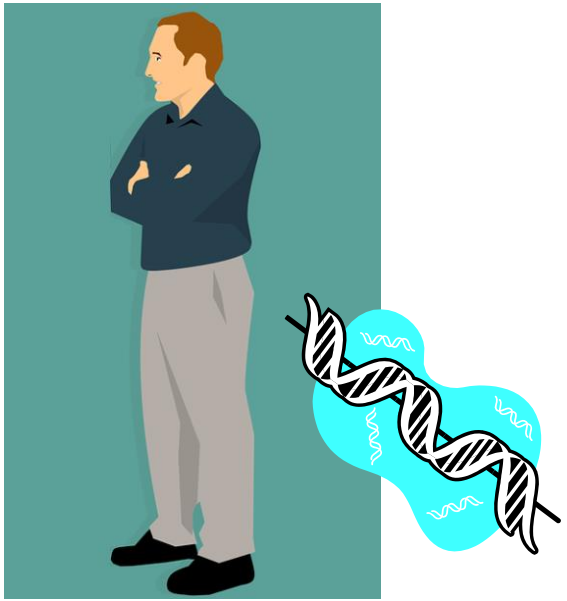


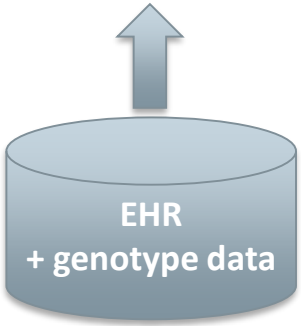
Active tasks and contributors in 2019-2020

Peter Ylén Tomi Sorasalmi	Task 3: System analysis	
	Task 6: Biobank study – organisation	
Jaakko Lähteenmäki Juha Pajula Anna-Leena Vuorinen Richard Fagerström	Task 7: Biobank study - research	External advisors Kari Harno, UEF Mika Lehto, HUS Mikko Niemi, UoH and HUS Tanja Nieminen, Medaffcon Oy
	Task 8: Networking & Dissemination	
Mark van Gils Jari Ahola	Task 9: Management	

PreMed – biobank study use case: pharmacogenomics

Decision on
best drug and
drug dose
for the patient
using all available
data
(incl. genotype)





Pharmacogenomics example:
CYP2C9 gene variant association with warfarin

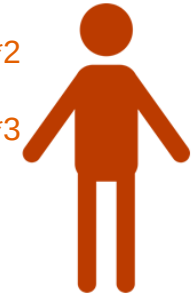
chromosome #10

CYP2C9 gene

CYP2C9*1 wild type (normal)

CYP2C9*2 or CYP2C9*3 allele

~35% of Finnish population



- Slower metabolism of warfarin
- Increased anticoagulation effect
- Increased risk of bleeding with normal warfarin dose

Research questions

- How much the risk for bleeding is increased in the Finnish population?
- Is it clinically and economically relevant to do a genome test to adjust the medication dose?

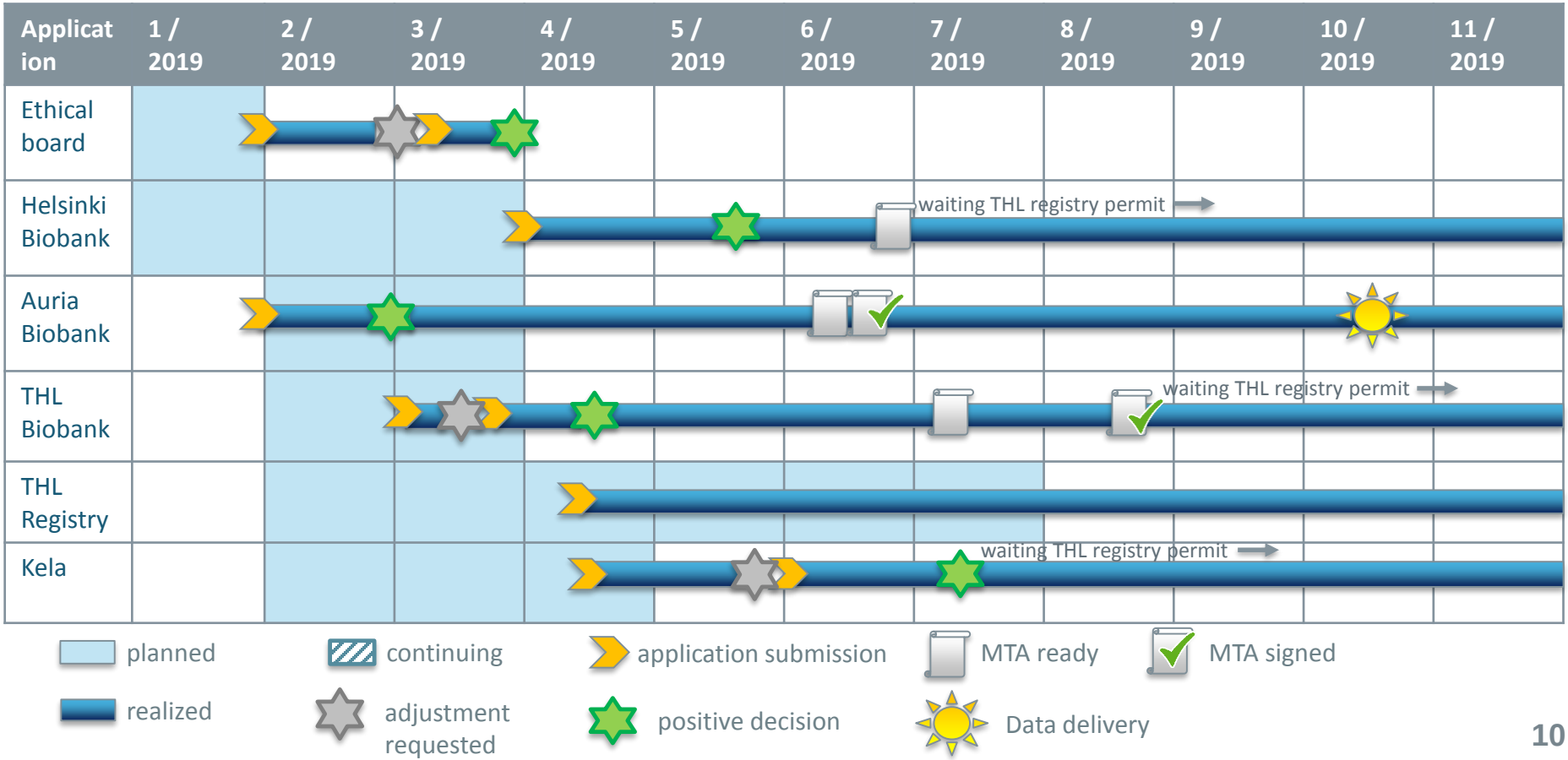
PreMed PGx study: Pharmacogenomics of antithrombotic drugs

- Overall goal: investigate the feasibility of using genome data in the context of antithrombotic therapy
  - Gain evidence on the association between gene variants and anticoagulation control of **warfarin therapy**.
  - Assess the **clinical and economic impact** of using genotype data in guiding warfarin therapy.
  - **Explore potential genotype-phenotype associations** in the context of antithrombotic therapy in general
  - To **assess the current usage of pharmacogenetic information** in the context of antithrombotic therapy.

Needed data resources for the PreMed PGx study

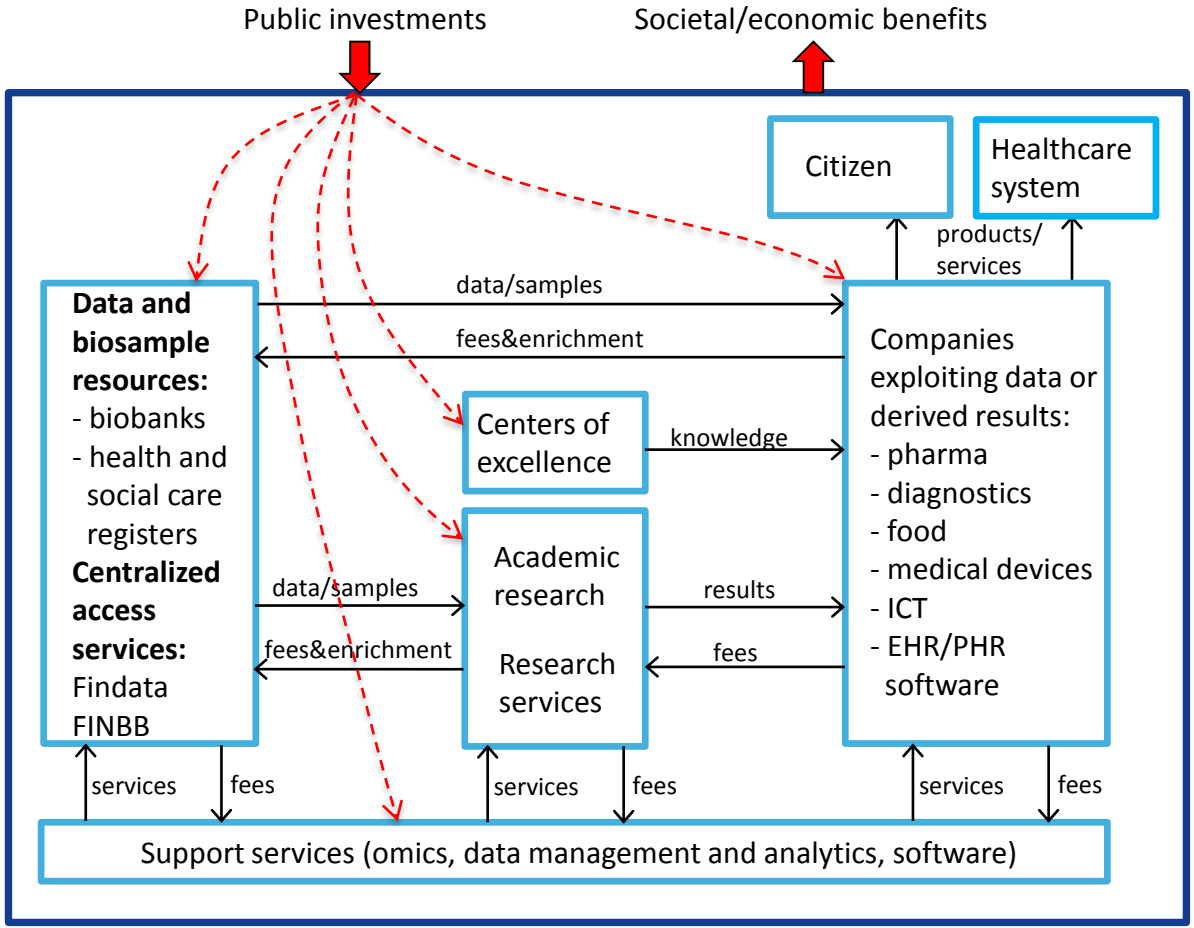
- Genome data from biobanks
- EHR data from hospital data lakes (via biobanks)
- Laboratory data
- THL register data (Hilmo&Avohilmo)
- Kela register data (drug purchases)

Progress of data collection

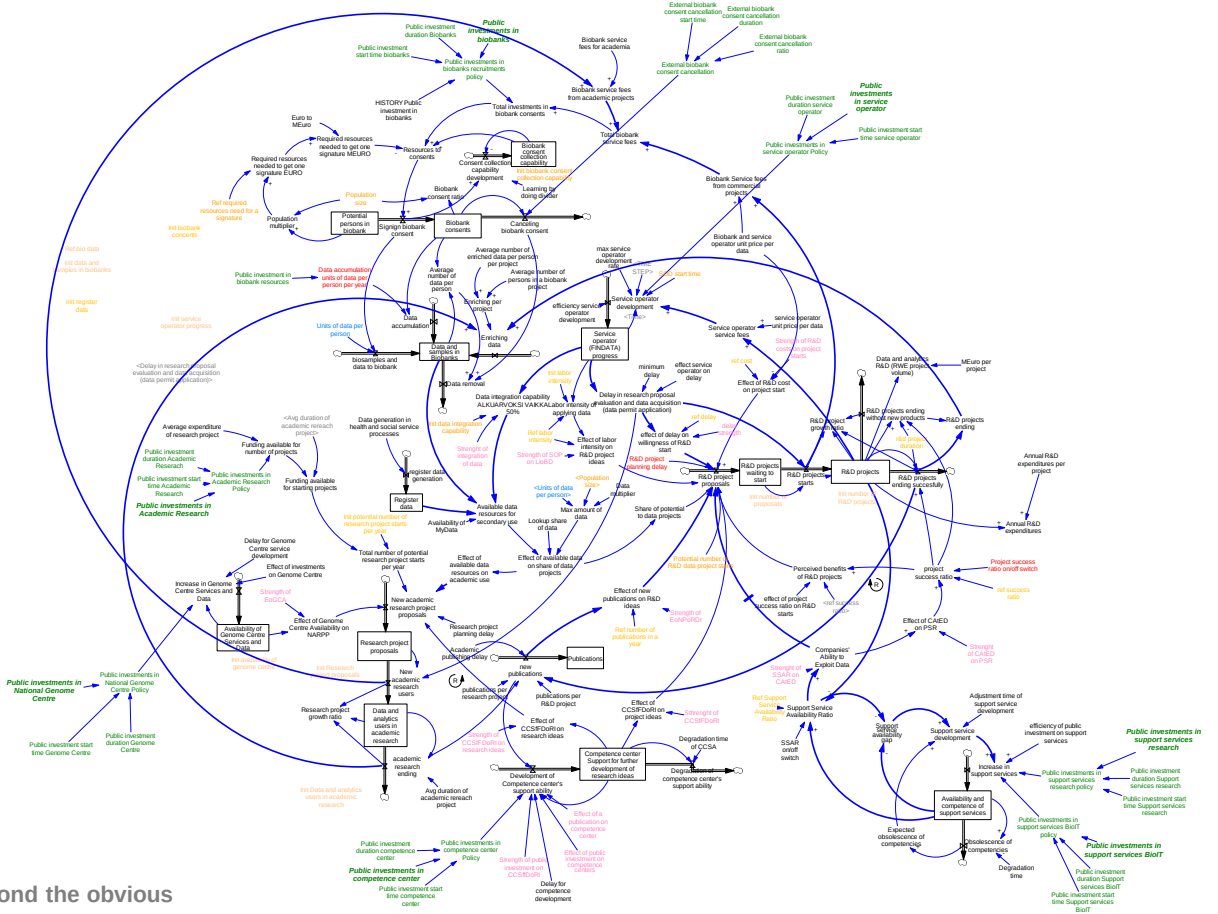


Ecosystem simulation approach

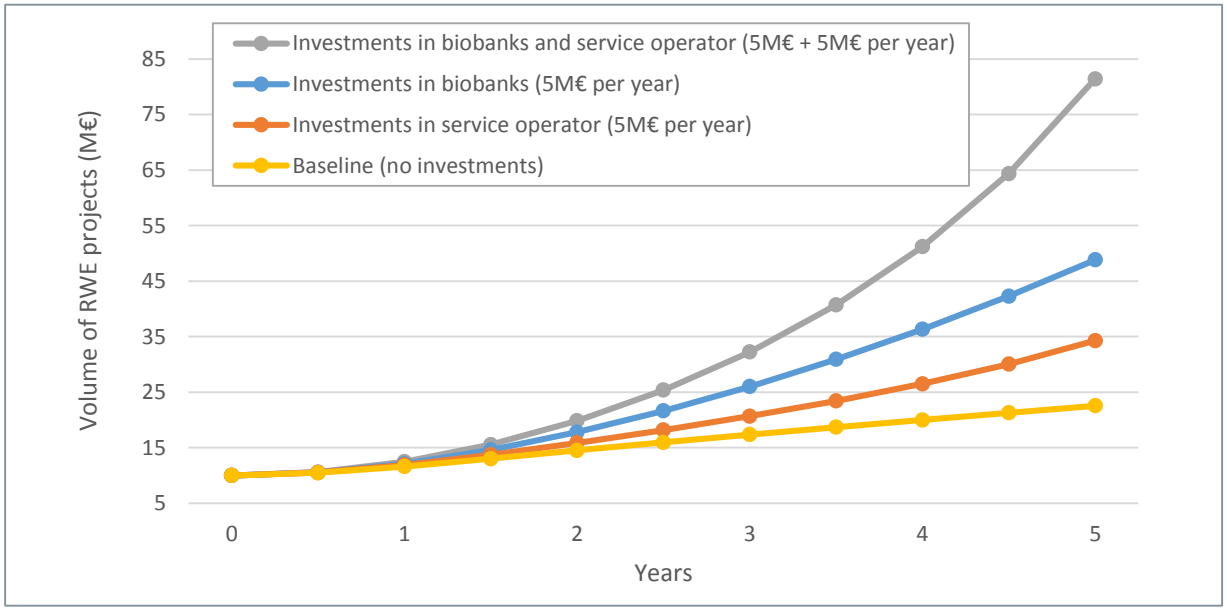
Data-driven precision medicine ecosystem



Model implementaion in Vensim™ tool



Example of initial simulation results with limited model functionality



Conclusions and observations

- Support of **joint biobank projects** needed
  - joint services
  - harmonization of processes and practices
  - project organization and leadership
- Improvement of **registry data access** needed
  - high expectations towards Findata – attention needed for:
    - sufficiency of resources
    - relation with biobanking
    - data anonymization process
- Support for **impact analysis** needed
    - ecosystem simulation model being developed

beyond
the obvious

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