

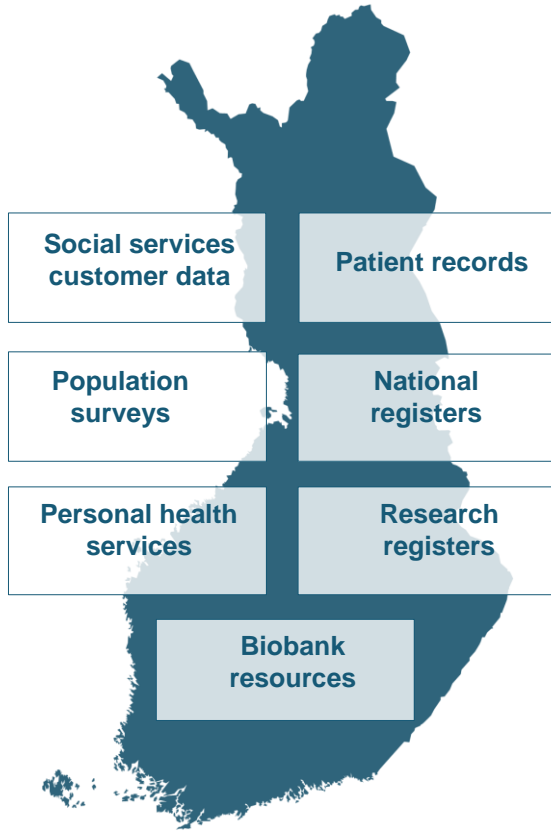
# **PreMed project**

**– a practical example of  
secondary use of data**

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# Data-driven precision medicine opportunity



## Pharma & diagnostics



## Healthcare












## Food and nutrition



## Personal devices & apps

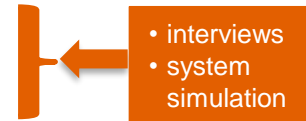


# Examples of major initiatives in precision medicine

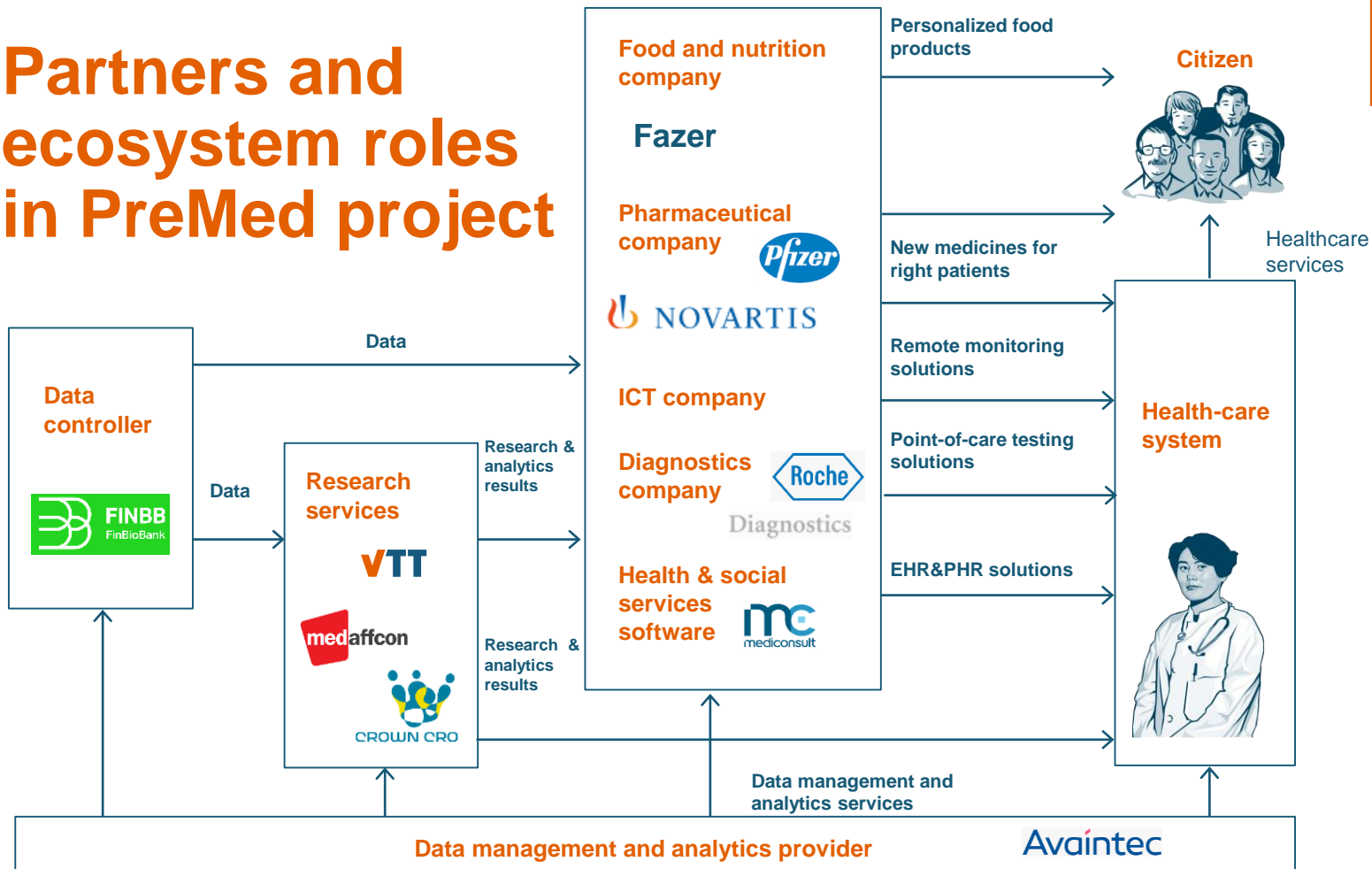
Initiative		Approach	Clinical focus	N (thousands / % of inhabitants)	Yearly funding total (M€)*	Yearly funding per population (€)
All of Us / NIH (USA)		Prospective cohort	All diseases	1000 / 0.30%	258 <sup>(1)</sup>	0,8
UK Biobank		Prospective cohort	All diseases	500 / 0.75%	15 <sup>(2)</sup>	0,2
Kadoorie biobank (China / UK)		Prospective cohort	Chronic diseases	500 / 0.04%	n/a	n/a
Estonian Genome Centre		Prospective cohort	All diseases	100 / 7.7%	5 <sup>(3)</sup>	3,8
EPIC study / IARC-WHO (multinational)		Prospective cohort	Chronic diseases	520 / 0.14%	n/a	n/a
100k Genomes Project (UK)		Research project	Rare diseases, cancer	85 / 0.13%	41 <sup>(4)</sup>	0,6
FinnGen (Finland)		Research project	All diseases	500 / 9.1%	10 <sup>(5)</sup>	1,8
NHGRI / NIH (USA)		Research/collaboration/funding programme	Genetic diseases, cancer	n/a	325 <sup>(6)</sup>	1,0
Australian Genomics		Research/collaboration/funding programme	Rare diseases, cancer	n/a	32 <sup>(7)</sup>	1,3
Japan Genomic Medicine Program		Research/collaboration/funding programme	Rare diseases, cancer	100 / 0,08%	80 <sup>(8)</sup>	0,6

# PreMed – data-driven precision medicine ecosystem

- **Time span:** May 2017 - April 2020
- **Budget:** 1166 k€
- **Funding:**
  - Business Finland and VTT (phase 1 - 3)
  - Companies (phases 2 - 3)
- **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
  - assessment of precision medicine ecosystem **needs and bottlenecks**
  - identification of **new business strategies and models**
  - provide **recommendations to public bodies**
  - carrying out a **biobank study** to assess the relevance of exploiting pharmacogenomics in a clinical use case



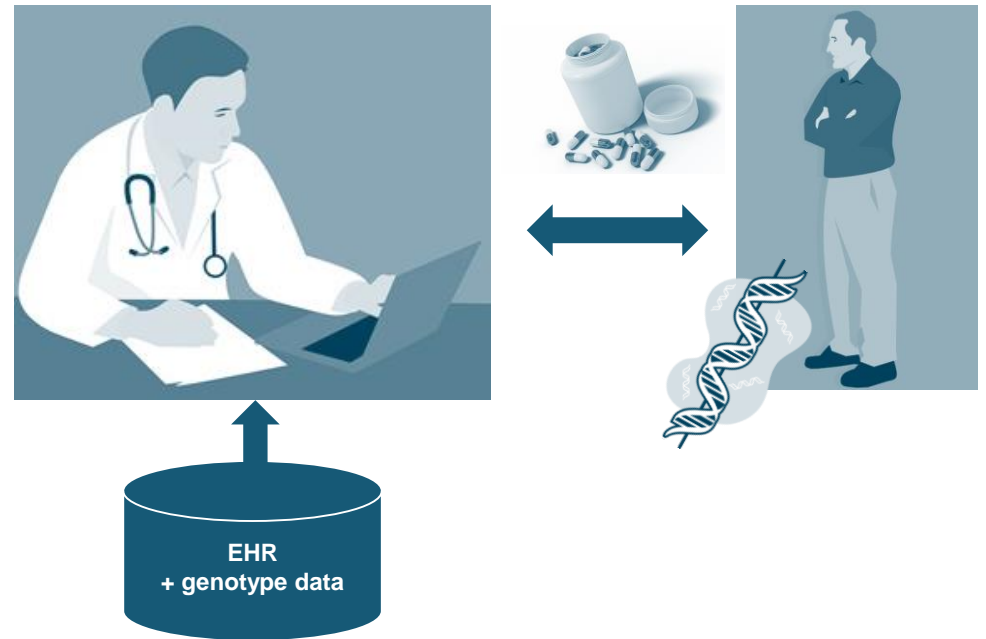
# Partners and ecosystem roles in PreMed project



# 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

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## 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<sup>1</sup>: 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 particular, **direct oral anticoagulants** will be investigated as their pharmacogenetic properties are not yet well known and their use is rapidly increasing
- To **assess the current usage of pharmacogenetic information** in the context of antithrombotic therapy

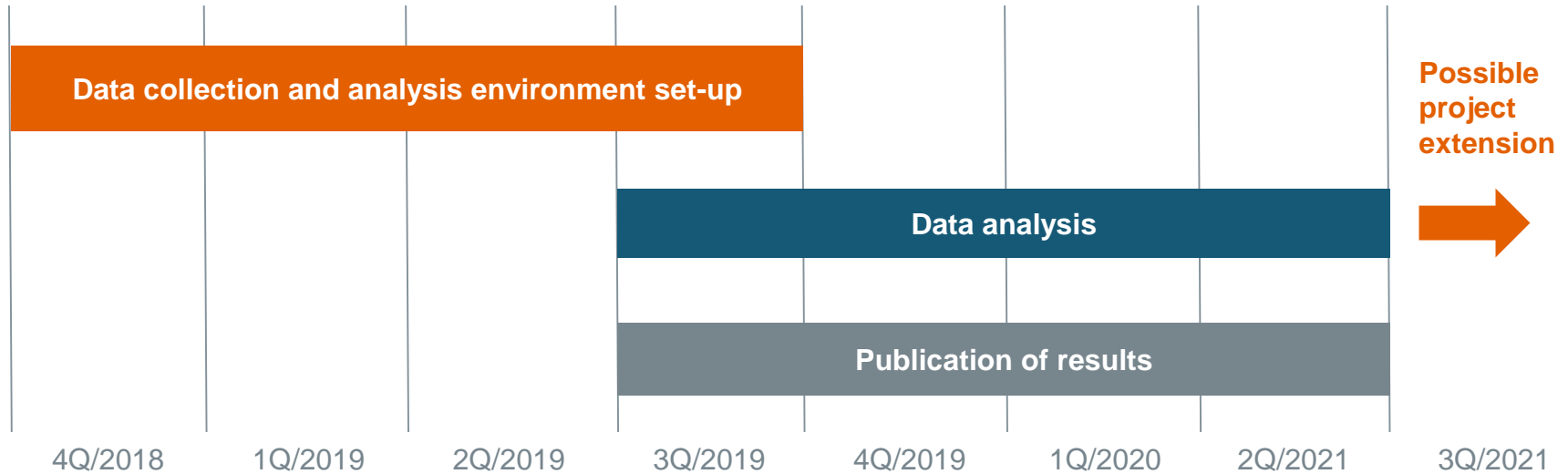


# Needed data resources for the PreMed PGx study

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

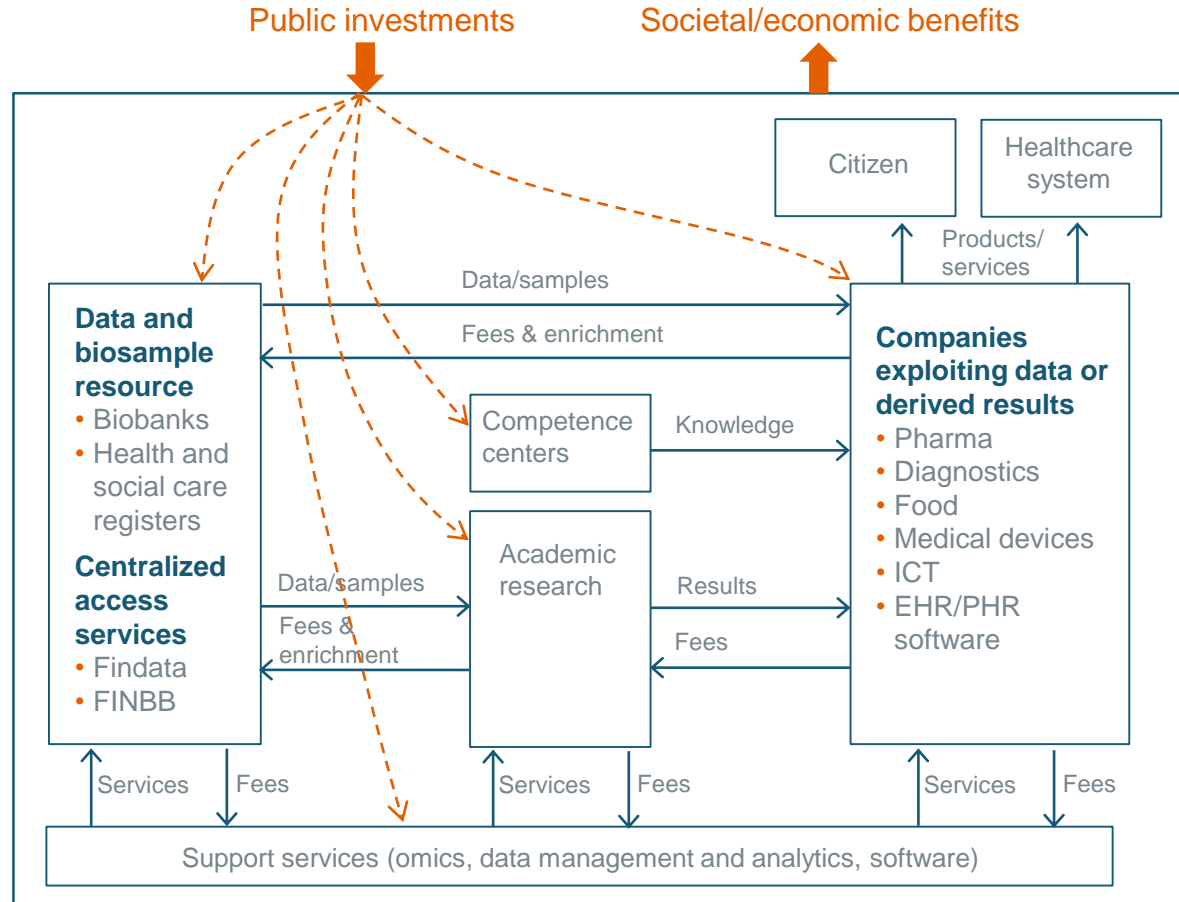


# Biobank study time schedule



# Ecosystem for secondary use of health data – Simulation approach

Data-driven precision medicine ecosystem



# Conclusions

- The PreMed project performs a biobank study on pharmacogenomics
- **Clinical objective:** assessing feasibility of using genotype data in the context of antithrombotic drugs
- **”Ecosystem objective”:** collect experience and identify bottlenecks in the current processes related to secondary use of health data

# Budget information references (for slide 3)

- 1) US congress approval for year 2018
- 2) Based on MRC and Wellcome Trust funding of £244.3M for period 2004 - 2022
- 3) Invested by the Estonia government in 2018
- 4) Based on UK government funding of £300M for period 2013 - 2021
- 5) Based on budgeted funding of 59 M€ for 2017 - 2022
- 6) US government funding budgeted for 2019
- 7) Based on funding budgeted for Genomics Health Futures Mission in 2019 - 2028
- 8) Japan government investment in 2017

# Get in touch with us:

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## More information

PreMed project:

[www.vtt.fi/premed](http://www.vtt.fi/premed)

VTT activities in Digital Health:

[www.vttresearch.com/services/health-and-wellbeing/digital-health](http://www.vttresearch.com/services/health-and-wellbeing/digital-health)



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