High-quality health-research benefits from sustainable biobanking

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Nordic Biobank Conference 2022

Conflict of interest

No conflict of interest.

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How sustainable biobanking benefits high-quality health research?

- Biobanks store high-quality **samples and data** in a controlled manner
- High-quality **infrastructure** to sustain sample and data quality
- Sustainable to use **already available collections**
  - No need to always collect new cohorts to access samples/data
  - New collections to be stored in biobanks to ensure usability after initial research

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THL Biobank is based on legacy collections

Established	2014
Research collections	30
Sample donors	230 000

Representative population cohorts

- FINRISK Study 1992–2012
- Health 2000/2011 Surveys
- FinHealth 2017 Survey
- Finnish Mobile Clinic 1965-1980

Disease-specific collections

- Type 1 and 2 diabetes
- Migraine
- Coronary heart disease
- Psychiatric Family Collections
- Psychosis
- Idiopathic pulmonary fibrosis

Other collections

- GeneRISK Study
- Twin Study
- Surveys to assess the risk factors of chronic diseases in healthy adults
- FinHIT

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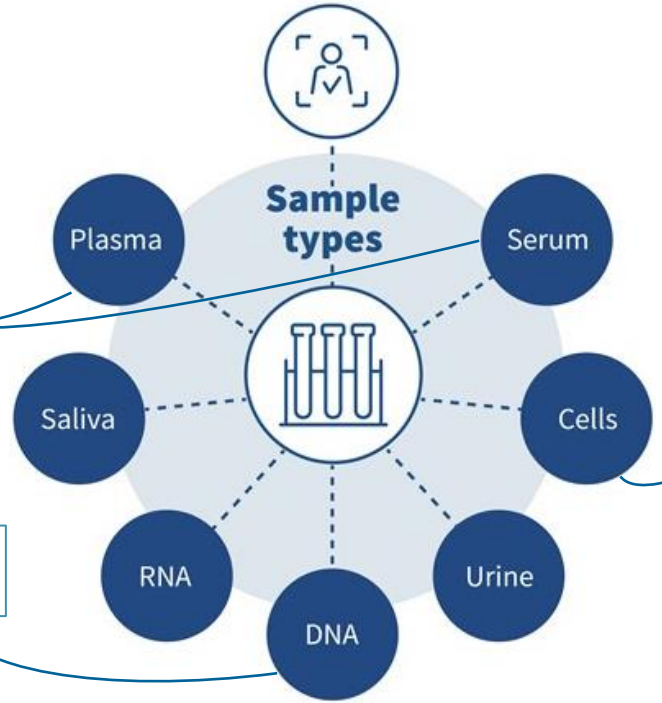
Sample types in THL Biobank



In most collections samples collected in a standardized way

Different cell types available
- B-lymphocytes
- PBMC
- Fibroblasts
- iPS cell lines

In most cohorts DNA already used to produce GWAS

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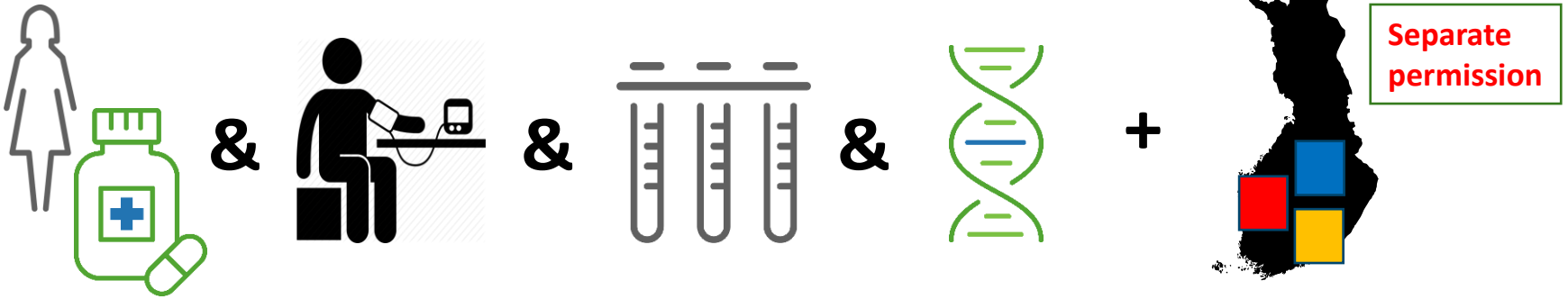
High-quality data

- Data stored in dedicated databases
  - scripts and IT tools for processing
- Data is well-documented, annotated and structured
- Linkage to registers and long follow-up times



Omics in THL Biobank

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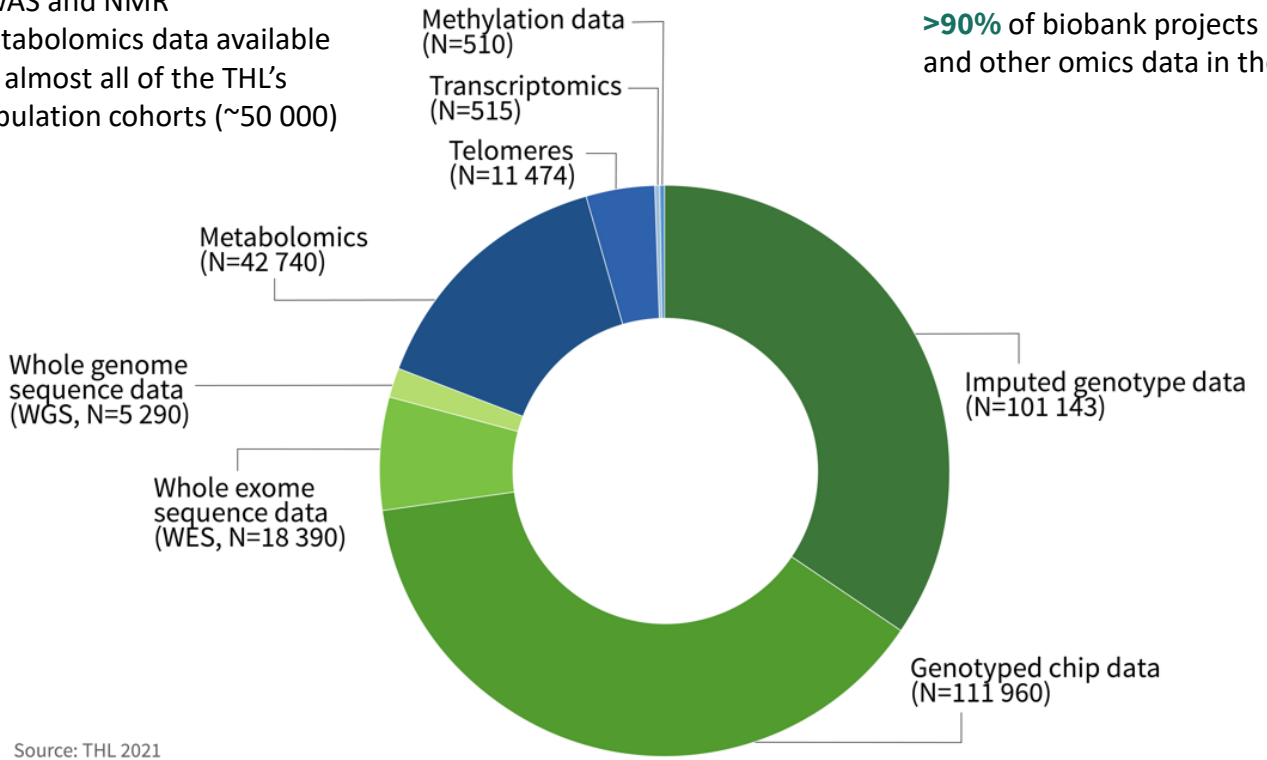
GWAS and NMR metabolomics data available for almost all of the THL's population cohorts (~50 000)



Source: THL 2021

>90% of biobank projects use genomics and other omics data in their research

NEW: Metagenome data
N=7 214

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How to do sustainable biobanking?

- Samples and data must be **collected, stored and documented properly**
- The **infrastructure** to host sample and data collections must be in place
- **Services and expertise** to facilitate research projects
- **Collaboration** to achieve more
- **Quality** to ensure reliability of operations
- **FAIR** principles
- **Communication** to distribute information to the community

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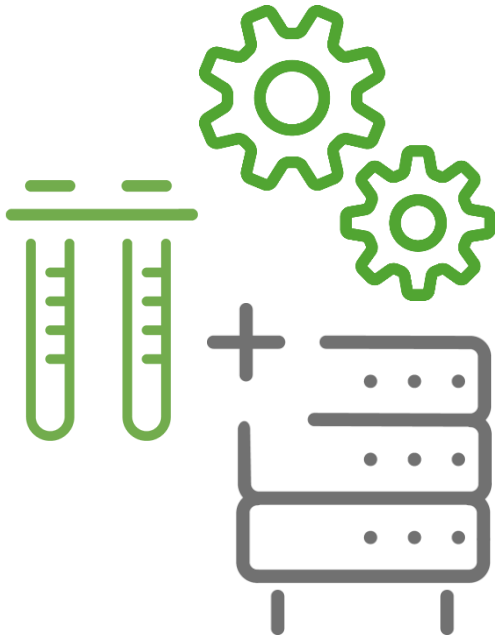
Infrastructure

- Infrastructure
  - Lab equipment and sample storage, softwares, servers, databases
  - Hosts comprehensive lifestyle & multi-omics data
  - Longitudinal sample/data collections
- IT solutions for operations and services
  - Flexible and constantly evolved to accommodate new requirements
  - Current needs: Data storing and processing
    - Server space to store data
    - Computing power to process big data



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Services

- Service-oriented attitude
  - Researchers
  - Other biobanks
  - Collaborators

- Service development based on customer needs
  - Consultation & expertise (sample collection set-up, genetics etc.)
  - Sample management & processing services
  - Data analysis services, i.e. PRS, GWAS-pipeline

- Utilize expert network
  - THL's wide network of experts & researchers

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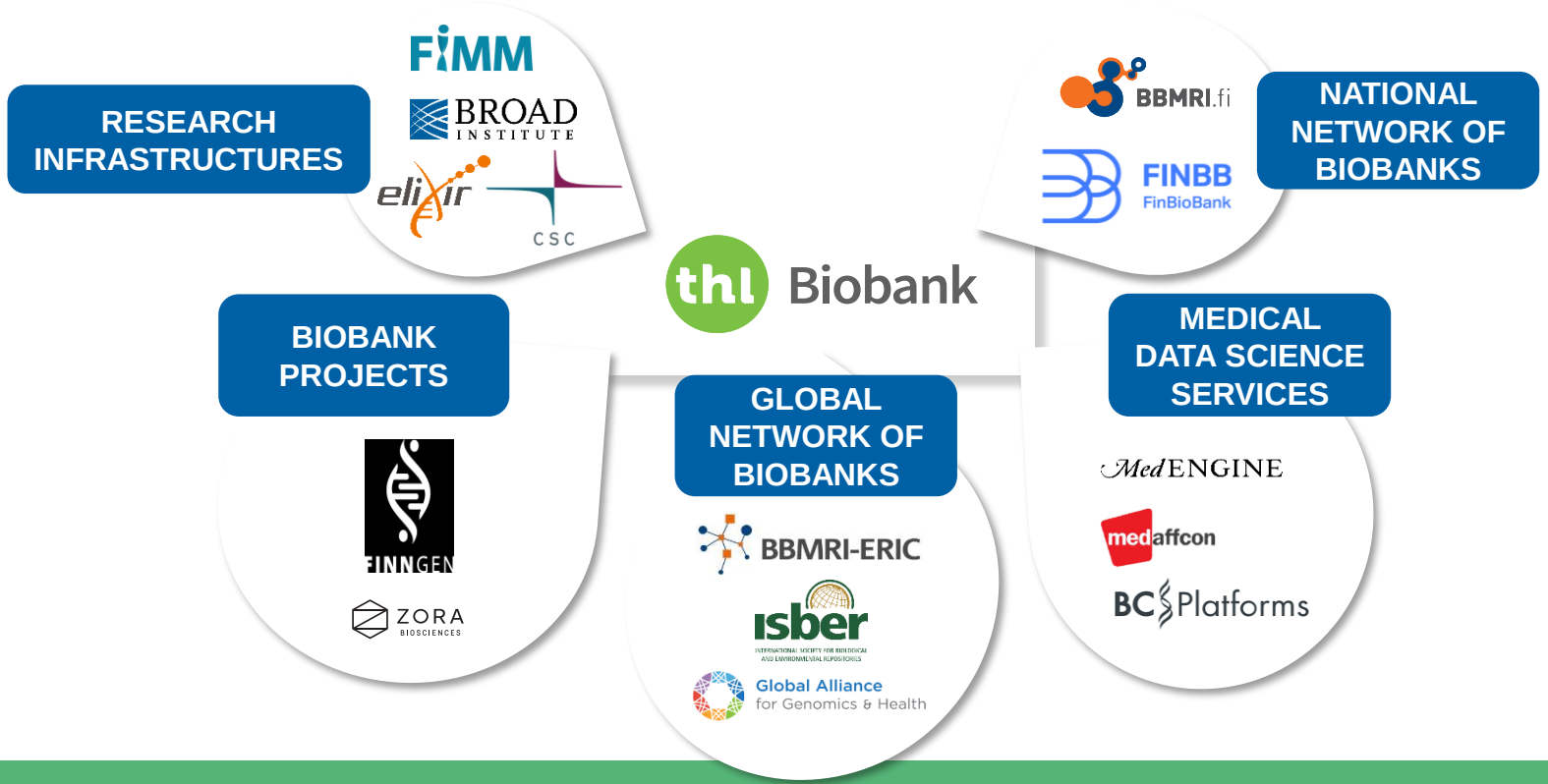
Collaboration to ensure sustainability



Sustain expertise and quality all the way

- Quality is embedded in every aspect of biobanking
  - THL Biobank quality management system in place
  - Aiming for: Better complience to operational standards, guidelines
- Quality in infrastructure
  - Occupational safety regulations
  - Data protection and data safety regulations
- Sample and data quality checks
  - **Use of quality data and quality metrics in developing modes of operation**
  - Sample purity, concentration, sample mix-up, data completeness and data integrity
- Sufficent amount of capable personnel
  - Orientation, additional training
  - Possibility to gain expertise on specific field

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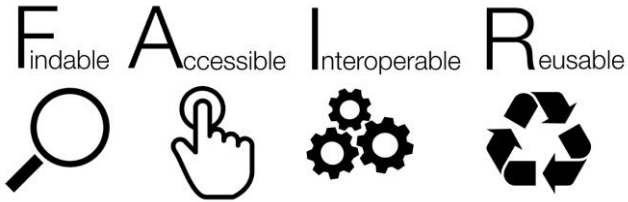
Achieving sustainability by making it FAIR

- **F**indable: new solutions to provide better availability services
  - Catalogues: Fingenious Cohorts, BBMRI-ERIC Directory
  - Availability services: BC Platforms Rquest, BBMRI-ERIC Finder, Beacon, Fingenious Requests
- **A**ccessible: combining data with other biobanks and national registries
  - Streamlining permission process to enable one-stop-shop access
- **I**nteroperable
  - Harmonization of data to established standards
  - Harmonization to operational standards
- **R**eusable: Returning data to the biobank
  - Storage and access of large datasets
  - Quality checks & documentation



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Costs of sustainability

- Agile development vs. reliability of operations
- Where to get resources to maintain and develop of biobanks?
  - From customers?
  - From home institute budget?
  - From elsewhere
- Biobank research project costs usually cover only the direct work expenses related to the project
- How public biobanks assess the value of samples and data into project pricing schemes?

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Thank you!

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