

 Norwegian Institute of Public Health

Biobanks -infrastructure for research

Gun Peggy Knudsen, PhD
Head of Biobank and Infrastructure

Biobanks – different levels

- Storage facilities and laboratories
 - infrastructure
- Collections of biological material
 - use
- Analytical results from biological material in biobanks
 - re-use



Regional Biobanks

- HUNT, Levanger



- NIPH, Oslo



Biobanking

- Receive samples
- Process samples
- Analysis
- Storage
- Tracking system
- Retrieval and shipment



ISO 9001 Quality Management System



Biobanks – high tech storage

- Automated storage systems
 - 20 °C
 - 80 °C
- Automated Liquid handling systems



Biobanks – collections of biological material

- Biobanks established with different aims
 - Research
 - Treatment
 - Diagnostic
 - Forensic
- Clinical biobanks versus population based biobanks



Biological material

- Different sources
 - Tissue, blood, nails, teeth, hair, saliva, urine
- Different types of processed material
 - Serum, plasma
 - DNA, RNA
 - Cell lines

Biobank Norway

- ***A national infrastructure for biobanks and biobank related activity in Norway***
 - www.biobanknorge.no
- Now 11 partners (universities, regional health authorities, NIPH)
- Population biobanks and clinical biobanks
- Collaborate – best practice biobanking
- Funding for large infrastructure

Health data

- Health records
- Clinical data collected for research project/biobank
- Health registries
- Health surveys and cohorts

Health Registers

- Norsk pasientregister (NPR)
 - Hjerne/Kar registeret
- Kreftregisteret
- Reseptregisteret (NorPD)
- FD-Trygd/NAV
 - Uførediagnoser
 - Sykefravær-diagnoser
- KUHR
- Dødsårsaksregisteret

Health surveys and cohorts

- Mother and Child cohort (MoBa)
 - 270.000 individuals!
- Cohort of Norway (CONOR)
 - 200.000 individuals!
- HUNT 2 og 3, Tromsø IV og V, HUBRO, innvandrere-HUBRO, HUSK, OPPHED, TROFINN, MoRo II, Oslo II

Tromsø undersøkelsen – biologic material

- 40.000 participants Tromsøundersøkelsen(1-6)
- Tromsø 6:
 - 12.882 blood samples
 - 7.218 urine samples
 - 8.617 hair samples
- DNA stored at HUNT biobank

CONOR – biological material

- More than 200.000 participants
- DNA from 200.000 participants
- Stored at HUNT biobank (backup at NIPH)

HUNT – biological material

- Over 120.000 participants
- More than 80.000 DNA samples
 - Plasma, serum, blood
- Stored at HUNT biobank

HUNT – results genetics

- APOC3, triglycerides, coronary disease
 - *N Eng J Med* 2014
- Myocardial infection
 - *Hum Mol Genet* 2014
- TM6SF2 Cholesterol, myocardial infarction
 - *Nat Genet* 2014
- Type 2 diabetes
 - *Nat Genet* 2014
- LDL cholesterol
 - *Am J Hum Genet* 2014

MoBa – biological material

Pregnancy cohort, recruited from 1999 to 2008, more than 270.000 participants, children, mothers and fathers

Sample	Time of collection	Sample type	Number of participants	% received from total participants
Maternal pregnancy sample	Wk 17-20	EDTA blood, urine*	94 576	88,1%
Paternal sample	Wk 17-20	EDTA blood	68 962	83,3%
Maternal birth sample	0-3 days after birth	EDTA blood	85 150	79,3%
Child umbilical cord sample	Day of birth	EDTA blood, **RNA Tempus whole blood	90 781	83,3%
Child milk teeth sample	6-7 y	Milk teeth	12 920	25,0%

*Urine taken from a sub-group of 75 624 mothers
**RNA taken from 45.309 children

MoBas uniqueness - trio design



- Controlling for genetic background
- Identify de novo genetic variants
- Study effect of maternal and paternal transmission

Genotype data – infrastructure for research

- Better health by Harvesting Biobanks (HARVEST)
- Funded by RCN, 20 mill NOK, PI Per Magnus, NIPH
- Partners: NTNU, UiT, UiB
- Aim:
 - Large scale genotyping
 - Make data available for the Norwegian research community

HARVEST

- Genotyping of:
 - 6000 Tromsø samples
 - 1800 HUNT triads
 - 4000 MoBa triads
- Harvest is coordinated with an ERC project at UiB (Njølstad) in collaboration with NIPH
 - 7000 triader
- Genotype data will be available for researchers!
 - **45.000 individuals**



Summary – Biobanks as infrastructure for research

- Collect, process, store and manage samples
- Use the existing biobanks
 - Clinical biobanks
 - Population biobanks: MoBa, CONOR, HUNT
- Use analytical data derived from biobanks
 - HARVEST



Thanks!

Gun.Peggy.Knudsen@fhi.no

