The Norwegian Human Environmental Biobank - MoBaEtox

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The Norwegian Human Environmental biobank - MoBaEtox

- Established by the Norwegian Institute of Public Health
- Will be used to monitor exposure to
  - Diet components
  - Environmental contaminants
MoBaEtox - possibilities

– Assess known contaminants
– Assess, till now, unknown contaminants
– Follow changes over time
– Identify possible geographical differences
– Identify population groups at higher risk
– Assess exposure pathways
– ++
MoBaEtox

- **Part I**
  Retrieval and analysis of existing biobank-material from 3000 pregnant women in the Norwegian Mother and Child Cohort Study

- **Part II**
  New collection where the same 3000 women was invited to participate together with their child and their child’s father.
The Norwegian Mother and Child Cohort Study (MoBa)

Aim: To find causes of disease and factors involved in health related issues in a lifespan

• A large population based pregnancy cohort
• A family cohort (mother + father + child)
• Long term follow-up
Collaboration with 50 hospitals

- Hospitals with < 1000 births/year
- Hospitals with >1000 births/year

Recruiting pregnant women and their partners midpregnancy

Inclusion period
1999 - 2008
Norway
~60,000 births/year

Participation rate: 41%
## The MoBa cohort

<table>
<thead>
<tr>
<th>#</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mothers</td>
<td>95 000</td>
</tr>
<tr>
<td>Fathers</td>
<td>75 500</td>
</tr>
<tr>
<td>Children</td>
<td>114 500</td>
</tr>
<tr>
<td>Pregnancies</td>
<td>113 000</td>
</tr>
<tr>
<td>Twins</td>
<td>1950</td>
</tr>
<tr>
<td>Triplets</td>
<td>21</td>
</tr>
</tbody>
</table>
MoBa data collection

- **Child**
  - Ultrasound: 18 W, 22, 30 W
  - Birth: Cord blood
  - ½, 1½, 3, 5 Y
  - 7 Y: Teeth
  - 8 Y
  - 13, 14 Y

- **Mother**
  - Blood

- **Father**
  - Blood
MoBaEtox – part I

AIM

• Obtain knowledge about nutritional and heavy metal status during pregnancy

• Investigate the importance of this status for mother and child health later in life

• Focus on whether nutritional status can protect against negative effects of harmful metals
Inclusion

The Norwegian Mother and Child Cohort Study (MoBa)  
n = 108 000 pregnancies

HARVEST  
n = 11 000

MoBa - Etox  
n = 5000

Blood  
Plasma  
Urin

Ultrasound  
18 W  
22, 30 W

Birth  
½, 1½, 3,

Child

Mother

Father

Blood

Blood

Blood
Volumes and substances

- 930 µL urine
- 1100 µL blood
- 400 µL plasma

**Metals (b)**
- Mercury
- Cadmium
- Lead
- Manganese
- Zink
- Arsenic
- Thallium
- Cobalt
- Cobber
- Molybdenum
- Selenium
- Jod, Na, K (u)

**Blood sugar (b)**
- HbA1c

**Inflammation (p)**
- CRP

**Hormons (p)**
- TSH
- fT3, fT4
- TPOAb

**Iron status (p)**
- Ferritin
- Transferrin

**Vitamins (p)**
- Vit A (retinol)
- Carotenoids
- 25OHVitD
- Vit E
  - (Tokopheroler)

**Stress marker (u)**
- Cortisol

**Corestation factors**
- Cholesterol (p)
- Creatinine (u)
- Albumin (u)
- Uric acid (u)
Status part I

- Biobank retrieval: ✓
- Biomarker analysis: ✓
- Data analysis: In progress
MoBaEtox part II

- Participants in part I invited to participate in part II – together with father and child
- Informed consent
- Recruitment and sample collection: 2016
- Questionnaire – diet and lifestyle (adults)
- Biological material
  - Shortly after collection: Biomarker analysis (diet and environmental contaminants)
  - Long term storage: Future studies, study trends in exposure
MoBaEtox part II

- Biological samples were collected at the participants local health center

- Processed at the biobank, NIPH

- Participation
  - 668 children
  - 658 mothers
  - 500 fathers
# Biological material stored

<table>
<thead>
<tr>
<th>Material stored</th>
<th>Mother, father</th>
<th>Child</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole blood (EDTA)</td>
<td>9 mL</td>
<td>4 mL</td>
</tr>
<tr>
<td>Plasma (EDTA)</td>
<td>4.5 mL</td>
<td>1.8 mL</td>
</tr>
<tr>
<td>Serum</td>
<td>4.5 mL</td>
<td>1.8 mL</td>
</tr>
<tr>
<td>Urine</td>
<td>18 mL</td>
<td>18 mL</td>
</tr>
<tr>
<td>Whole blood for RNA (in Tempus tubes)</td>
<td>3 ml</td>
<td>3 ml</td>
</tr>
</tbody>
</table>
Status part II

- Recruitment: ✓
- Storage of biomaterial: ✓
- Biomarker analysis: Not started.
Thank you!

- Helle M. Meltzer (PI)
- Line Småstuen Haug
- Cathrine Thomsen
- Nina Stensrud
- Anne Kari Tveter
- The Biobank Team