Finnish Birth Cohort 1987 – new data sources linked to health data

Mika Gissler and Reija Paananen
The 1987 Finnish Birth Cohort

• All children born in Finland in 1987 (n=60,069)
• Focus on mental health, behaviour and wellbeing from uterus to childhood and adulthood
• What are the fragments for later wellbeing?
• Follow-up from fetal period until early adulthood using register data only:
Registers in Finland

• Traditions: population statistics have been collected more than 250 years and health statistics more than 150 years.

• First real health registers were started in the 1940-1950s, when improved computers were available: health care personnel, cancer register.

• Personal identification number for all citizens and permanent residents in 1964-1968.

• Several data quality studies have shown the high quality of routinely collected registers.

• Data protection allows research use of register data.
Finnish health registers

- Cancers 1953
- Health care personnel 1955
- Tuberculosis and STIs 1958
- Congenital anomalies 1963
- Occupational diseases 1964
- Special medication 1964
- Adverse drug reactions 1966
- Hospital discharges 1967
- Cancer screenings 1968
- Causes-of-death 1969
- Abortions and sterilisations 1977
- Exposure to cancer-hazardous material 1979
- Endoprostheses 1980
- Drugs (surveillance) 1982
- Visual impairments 1983
- Births 1987
- Infectious diseases 1989
- Dental implants 1994
- Prescribed drugs 1994
- Outpatient visits in public hospitals 1998
- Outpatient visits in health care centres 2011

All these registers include personal identification number
## Health registers: 1987 Finnish Birth Cohort

<table>
<thead>
<tr>
<th>Register</th>
<th>Data</th>
<th>Period covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finnish Medical Birth Register</td>
<td>Pregnancy and birth outcomes</td>
<td>1987</td>
</tr>
<tr>
<td>Finnish Hospital Discharge Register</td>
<td>Hospitalisation data (discharge diagnosis, date, duration, etc.)</td>
<td>1987-2008, outpatient visits since 1998</td>
</tr>
<tr>
<td>Cause of Death Register</td>
<td>Dates and causes of death</td>
<td>1987-2008</td>
</tr>
<tr>
<td>Register on Prescribed Medicine and Special Refunded Medicine</td>
<td>Redeemed prescriptions of psychotropic medication (ATC codes, date)</td>
<td>1994-2008</td>
</tr>
<tr>
<td>Infectious Disease Register</td>
<td>Sexually transmitted infections</td>
<td>2004-2008</td>
</tr>
<tr>
<td>Register on Induced Abortions</td>
<td>Induced abortions</td>
<td>2000-2008</td>
</tr>
<tr>
<td>Finnish Medical Birth Register</td>
<td>Pregnancy and birth outcomes</td>
<td>2000-2008</td>
</tr>
</tbody>
</table>

NEW

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### Other registers: 1987 Finnish Birth Cohort

<table>
<thead>
<tr>
<th>Register</th>
<th>Data</th>
<th>Period covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistics Finland &amp; Central Population Register</td>
<td>Births and deaths, parents’ marriages and divorces, migration, education, occupations</td>
<td>1987-2009</td>
</tr>
<tr>
<td>Register on Social Assistance</td>
<td>Social assistance for parents and cohort members</td>
<td>2002-2008 for cohort members</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1987-2008 for parents</td>
</tr>
<tr>
<td>Register on Child Welfare</td>
<td>Information on children taken into custody</td>
<td>1991-2008 (partly from 1987)</td>
</tr>
<tr>
<td>Finnish Defence Forces Registers</td>
<td>Data on service and results of aptitude tests</td>
<td>2005-2009</td>
</tr>
<tr>
<td>Finnish Legal Register Centre</td>
<td>Information on criminality, offences and court decisions</td>
<td>2002-2009</td>
</tr>
</tbody>
</table>
Novelties in the 1987 Finnish Birth Cohort

- Socio-demographics linked to health and social registers
  - Child welfare actions
  - Social assistance
  - Mental health care: inpatient care, outpatient care and use of psychopharmaceuticals

- Over-generational aspects
  - Parental social assistance
  - Parental education
  - Parental mental health
The 1987 Finnish Birth Cohort at age 21

[Bar chart showing percentages for various categories: Comprehensive school only, Mental health care, Psycho-pharmaceuticals, Social assistance, Delinquency, Child welfare actions]
Problems accumulate for cohort members with short education
Parental education buffers from problems in youth and adolescence

Parental education
- university
- upper secondary
- lower secondary
- comprehensive school only

- Child has comprehensive school only
- Child has mental health care
- Child has social assistance
- Child has delinquencies
- Child welfare actions

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Childhood financial distress increases children’s problems
Risk factors for chlamydia infections

Girls

<table>
<thead>
<tr>
<th>Factor</th>
<th>%</th>
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<tbody>
<tr>
<td>Chlamydia Infections</td>
<td>10</td>
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<tr>
<td>Mother &lt; 20 y</td>
<td>15</td>
</tr>
<tr>
<td>Father &lt; 20 y</td>
<td>20</td>
</tr>
<tr>
<td>Mother has previous abortion</td>
<td>15</td>
</tr>
<tr>
<td>Child has psychiatric care</td>
<td>10</td>
</tr>
<tr>
<td>Abortion</td>
<td>25</td>
</tr>
<tr>
<td>Birth</td>
<td>15</td>
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</tbody>
</table>

Boys

<table>
<thead>
<tr>
<th>Factor</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlamydia Infections</td>
<td>5</td>
</tr>
<tr>
<td>Mother &lt; 20 y</td>
<td>5</td>
</tr>
<tr>
<td>Father &lt; 20 y</td>
<td>5</td>
</tr>
<tr>
<td>Mother has previous abortion</td>
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<tr>
<td>Child has psychiatric care</td>
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Between Disadvantage and Dysfunction:
Family Social Class as an Antecedent of Serious Criminal Offending

Model 1: Family social class
• Low SES and education are predictive of serious criminal offending

Model 2: Family stability & distress
• Public assistance: duration of means-tested income support (social assistance)
• Family instability (weighted variety score):
  – Maternal smoking, unmarried at birth, teen mother, parents divorced, custodial placement in child protective services

Dynamic measures of family stress prevail over social class
• Three-fold Improvement in model fit
• Major reductions in coefficients associated with SES and education
  – Manual labor and low education remain significant

Personal characteristics of parents seem to matter more than their position in the social structure:
Dysfunction → Disadvantage
Strengths

• Complete census of all infants born in a single year in Finland.
• Data on 60 000 people allows studies on rare outcomes.
• Data is of high quality.
• Data can be widely utilised in various research fields including social and health services.
• Follow-up can be continued for as long as needed.
• The data can be further extended, if applying for additional study permission.
Permissions and data

• 8 separate requests for permission to receive individual-based register data for scientific research
  – The process took 7 months.
  – It took another 18 months to collect all the material from the different register authorities and complete the linkages.

• Costs
  – The data from THL were given free of charge.
  – Other authorities charged for their services and the cost for the complete cohort was 10 940 € (18.4 cents per cohort member).
Feasible, but...

- Time-consuming process
- Costs before anything is done:
  - Data costs are sometimes high and may be unexpected high.
- Data handling and interpretation needs expertise.
- Data overload syndrome & risk for fishing
- Data protection limits
  - Total data vs. data protection regulation (at Statistics Finland)
- Long-term funding for research is needed
Solutions for the future

• Collaboration is needed with expertise in different fields:
  – Perinatal health, longitudinal epidemiology, mental health, infectious diseases, reproductive health, social services, child welfare actions, criminality etc.

• Compilation and analyses of ad hoc data from distance – no data given for the researchers
  – MIDRAS project for faster compilation and for increased data security
It is feasible – just do it!