European Surveillance of Congenital Anomalies

Supported by the EU Public Health Programme

WHO Collaborating Centre for the Epidemiological Surveillance of Congenital Anomalies
What is EUROCAT?

• European network of population-based registries for the epidemiologic surveillance of congenital anomalies.
• Started in 1979
• More than 1.4 million births surveyed per year in Europe
• 39 registries in 20 countries
• 26% of European birth population covered
• High quality multiple source registries, ascertaining terminations of pregnancy as well as births.
EUROCAT Objectives

• Provide essential epidemiologic information on congenital anomalies in Europe

• Co-ordinate the establishment of new registries throughout Europe collecting comparable, standardised data

• Co-ordinate the detection and response to clusters and early warning of teratogenic exposures
EUROCAT Objectives cont.

- evaluate the effectiveness of primary prevention
- assess the impact of developments in prenatal screening
- provide an information and resource centre and ready collaborative research network to address the causes and prevention of congenital anomalies and the treatment, care and outcome of affected individuals
Methods

• Livebirths, fetal deaths with $GA \geq 20$ weeks and terminations of pregnancy (TOP) after prenatal diagnosis of malformation

• Follow-up during first year of life for late diagnosed cases in most registries

• Multiple sources of ascertainment

• Central database at University of Ulster
Distribution of type of malformation

All full member registries 2000-2005
All Anomalies, Full Member Registries, 1992-2004

Prevalence per 10,000 births

Years

- All Anomalies LB Prevalence
- All Anomalies TOPFA Prevalence
- All Anomalies Total Prevalence
- Cardiac Anomalies Total Prevalence
Selection Criteria

Click here for standard table

A1 - Congenital Anomaly Subgroups (12 Organ system subgroups with all major subgroups and specific subgroups): Total number of cases, number of cases by type of birth (liveborn, fetal death, termination of pregnancy), and total prevalence rate per 10,000 births of congenital anomaly subgroups in selected registries (registries combined), selected time period (available for all members registered)

A5 - Selected congenital anomaly: Total number of cases, number of cases by type of birth (liveborn, fetal death, termination of pregnancy), population (all births), and total prevalence rate per 10,000 births per year and per registry in selected registries, selected time period (available for registries)

A6 - Selected registry: Total number of cases, number of cases by type of birth (liveborn, fetal death, termination of pregnancy), population (all births), and total prevalence rate per 10,000 births per year and per congenital anomaly subgroup for a selected time period (available for all registries)

B3 - Selected congenital anomaly: Total number of cases, number of cases by type of birth (liveborn, fetal death, termination of pregnancy), fetal, birth and livebirth prevalence rates per 10,000 births per year, per registry in selected registries, selected time period (available for registries)

E3 - Selected congenital anomaly: Line graph showing liveborn and livebirth prevalence rates per 10,000 births per year, in selected registries, selected time period

Date From: 2003 (eg. 2003)
Date To: 2005

Continue

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**Eurocat Home Page**

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**Registries:**

<table>
<thead>
<tr>
<th>Full Member Registries</th>
<th>Associate Members Registries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albania</td>
<td>Finland</td>
</tr>
<tr>
<td>Austria</td>
<td>Control Centre France</td>
</tr>
<tr>
<td>Antwerp (Belgium)</td>
<td>France</td>
</tr>
<tr>
<td>Sofia (Bulgaria)</td>
<td>île de la Réunion (France)</td>
</tr>
<tr>
<td>Zagreb (Croatia)</td>
<td>Poland</td>
</tr>
<tr>
<td>Galicia (Spain)</td>
<td>Madrid (Spain)</td>
</tr>
<tr>
<td>Auvergne (France)</td>
<td></td>
</tr>
</tbody>
</table>

**Anomaly:** Hypospadias

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Display Results

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(B3) - Hypospadias (prevalence per 10,000 births) for the following registries: Styria, Antwerp, Odense, Tuscany From 2000 - 2005

<table>
<thead>
<tr>
<th>Registry</th>
<th>Year Range</th>
<th>LB N</th>
<th>FD N</th>
<th>TOP N</th>
<th>LB+FD+TOP N</th>
<th>LB Rate</th>
<th>LB+FD Rate</th>
<th>LB+FD+TOP Rate</th>
<th>Excluding Chromosomal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Styria (Austria)</td>
<td>2000 - 2005</td>
<td>139</td>
<td>0</td>
<td>1</td>
<td>140</td>
<td>22.35</td>
<td>22.18</td>
<td>22.34</td>
<td>136</td>
</tr>
<tr>
<td>Antwerp (Belgium)</td>
<td>2000 - 2005</td>
<td>156</td>
<td>0</td>
<td>0</td>
<td>156</td>
<td>14.40</td>
<td>14.40</td>
<td>14.40</td>
<td>153</td>
</tr>
<tr>
<td>Odense (Denmark)</td>
<td>2000 - 2004</td>
<td>52</td>
<td>0</td>
<td>0</td>
<td>52</td>
<td>18.54</td>
<td>18.44</td>
<td>18.44</td>
<td>52</td>
</tr>
<tr>
<td>Tuscany (Italy)</td>
<td>2000 - 2005</td>
<td>168</td>
<td>0</td>
<td>2</td>
<td>170</td>
<td>10.18</td>
<td>10.14</td>
<td>10.26</td>
<td>166</td>
</tr>
<tr>
<td><strong>Total (full member registries)</strong></td>
<td><strong>2000 - 2005</strong></td>
<td><strong>515</strong></td>
<td><strong>0</strong></td>
<td><strong>3</strong></td>
<td><strong>518</strong></td>
<td><strong>14.21</strong></td>
<td><strong>14.17</strong></td>
<td><strong>14.25</strong></td>
<td><strong>589</strong></td>
</tr>
</tbody>
</table>

LB = Live Births  
FD = Fetal Deaths / Still Births from 20 weeks gestation (see the Technical Notes for further details)  
TOP = Termination of pregnancy following prenatal diagnosis.

<table>
<thead>
<tr>
<th>Description Of Anomaly</th>
<th>ICD9</th>
<th>ICD10</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agenesis of the distal urethra and opening of the urethra on the ventral side of the penis behind the coronary sulcus</td>
<td>75200</td>
<td>C64</td>
<td></td>
</tr>
</tbody>
</table>

Source:  
EUROCAT Website Database: http://www.bio-medical.co.uk/eurocatlive (data uploaded 22/08/2007)  
Copyright:  
University Of Ulster, 2003
For most malformations there is no clear limit between the normal situation and the malformation.

Therefore strict definitions and inclusion or exclusion criteria are needed before comparison of data.
Why European collaboration?

- Sharing of expertise and resources
- Pooling of data
- Comparison of data
- Common response to public health questions

www.eurocat.ulster.ac.uk
Sharing of expertise and resources
Detection of clusters and trends

- Annual statistical surveillance done at central registry after February deadline for sending data
- Results send to local registries one month before the annual meeting
- Session at the annual meeting to discuss local clusters and trends
- Statistical monitoring report published 3-6 months after the meeting
Local registry investigations of clusters
(15 registries out of 27)

- 30% explained by data quality issues (e.g., duplicate cases, cases missing in the Central Registry database, incorrect date of birth)
- 22% associated with changes in diagnosis (e.g., inexperienced staff making diagnosis), aetiologic heterogeneity, familial or twin recurrence
- 22% confirmed an excess of cases, but no explanation found and no further investigation proposed
- 15% increase in cases due to improved prenatal detection
- 11% were apparent clusters with cause for concern - investigations ongoing

56 clusters in 2003-2004
The opportunity for pooling of data
Risk of congenital anomalies near hazardous-waste landfill sites in Europe: the EUROHAZCON study.

Multicentre case-control study in seven regions, 1089 cases of non-chromosomal anomaly and 2366 controls.

Prevalence of gastroschisis in Europe, by maternal age

## Down Syndrome: Total Prevalence per 10,000 births by Maternal Age 1980-99: EUROCAT regions

<table>
<thead>
<tr>
<th>Age</th>
<th>No. DS</th>
<th>Prev/10,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20</td>
<td>114</td>
<td>7.2</td>
</tr>
<tr>
<td>20-24</td>
<td>527</td>
<td>7.0</td>
</tr>
<tr>
<td>25-29</td>
<td>1230</td>
<td>8.4</td>
</tr>
<tr>
<td>30-34</td>
<td>1803</td>
<td>14.1</td>
</tr>
<tr>
<td>35+</td>
<td>3508</td>
<td>59.2</td>
</tr>
</tbody>
</table>
Total and Livebirth prevalence per 10,000 births of Down syndrome, 1990-2004
Proportion of births to mothers 35+ years in Europe 1990-2004
Transposition of great arteries - follow-up study

- TGA is a rare malformation: 2.0 per 10,000 births
- 91 liveborn infants in seven small registries.
- Additional data from medical records - high mortality before surgery
- Studies from tertiary centers only include infants that survive until surgery
- Important finding in relation to counselling of parents after prenatal diagnosis

- Status at one year: 51 of 57 infants with normal health. Two with delayed development, none with cerebral palsy

- Follow-up studies possible using the population based data from EUROCAT, but time consuming for local registries

Garne et al. Congenital Heart Disease 2007
The opportunity for comparison of data
Neural tube defects in Europe
Common response to public health questions
Evaluation of the impact of Chernobyl on the prevalence of congenital anomalies in 16 regions of Europe.

Observed and expected cases among pregnancies exposed in the first month following Chernobyl

<table>
<thead>
<tr>
<th>Condition</th>
<th>O</th>
<th>O/E</th>
<th>95%CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Down Syndrome</td>
<td>24</td>
<td>0.94</td>
<td>0.60 - 1.40</td>
</tr>
<tr>
<td>Neural Tube Defects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>British isles (5 regs)</td>
<td>29</td>
<td>0.61</td>
<td>0.41 - 0.88</td>
</tr>
<tr>
<td>Cont Europe (11 regs)</td>
<td>25</td>
<td>1.21</td>
<td>0.78 - 1.79</td>
</tr>
<tr>
<td>Hydrocephaly</td>
<td>36</td>
<td>0.83</td>
<td>0.58 - 1.14</td>
</tr>
<tr>
<td>Microcephaly</td>
<td>26</td>
<td>0.87</td>
<td>0.57 - 1.28</td>
</tr>
<tr>
<td>An/Micophthalmia</td>
<td>11</td>
<td>1.03</td>
<td>0.51 - 1.85</td>
</tr>
<tr>
<td>Congenital cataract</td>
<td>7</td>
<td>0.72</td>
<td>0.29 - 1.49</td>
</tr>
</tbody>
</table>

Pharmacovigilance

- The lamotrigine study has shown that the EUROCAT database can be used to answer questions of public concern on drug exposure during pregnancy

- The largest existing database in the world for studying exposure to anti-epileptic drugs
- Studies on drugs for other chronic maternal diseases possible
- Controls inside the EUROCAT database

- Answer possible in less than one year

- Our method can answer questions on increased risk of a specific malformation but cannot give the exact risk of malformations in exposed pregnancies

- We hope to expand the network by getting information on non-malformed controls - if we can find funding
Ethical problems
Terminations of pregnancy

- Different laws on termination of pregnancy (TOP)
- TOP after prenatal detection of malformation is a major burden for the couple
- The future goal should be primary prevention of malformations - not to diagnose prenatally and terminate (secondary prevention)

- 2000 late TOP (GA ≥ 24 weeks) in the EUROCAT database for the latest 5 year period

- If primary prevention is not possible: early prenatal diagnosis of severe malformations very important to avoid the very difficult situation with a late TOP

EUROCAT paper submitted on European policies on prenatal diagnosis and termination of pregnancy
Collaboration creates a whole that is greater than the sum of its parts.

Epidemiology 1997

Therefore we need EUROCAT collaboration

www.eurocat.ulster.ac.uk
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