Materials, Methods and Data Analysis of Diabetes Registers

The Diabetes Register of Upper Silesia, Poland

Przemysława Jarosz-Chobot, Joanna Polańska, Grażyna Deja
Upper Silesian Center of Child’s Health

Special BIRO Academy Meeting
“Coordinated Information Delivery from Diabetes Registers to improve quality and outcomes in Europe”
Rome 4-5th June 2010
Country: Poland
Region: Upper Silesia
Total Population: 4,645,665
Diabetes Prevalence: 0.09%
Type of Data Sources: Hospital Clinic (Diabetes)

N. Participating Centres: 1

Upper Silesian Register for children below 15 years old
Upper Silesia, Poland
Reference Diabetes Data

Year: **2010**
Region: Upper Silesia
Total N. Subjects: 839
Total N. Episodes: 1,174

N subjects:
- T1: 837 (99.8%)
- T2: 0 (0%)
- MODY: 2 (0.2%)
Upper Silesia, Poland
Local Database Structure

- Local Hospital Register
- Based on Microsoft SQL Server Express
- Relational 20-table database
- Gathering over 150 parameters
- Multiterminal application working on a intranet network
- Personel involved in data acquisition:
  - Statisticians
  - Diabetes Nurses
  - Doctors
  - Trainees
- Customisable reports performed by IT specialists from Silesian University of Technology
Upper Silesia, Poland
Local Database Structure

Arterial Blood Gas
- id_gazometria int <pk>
- leczenie_id int <fk1>

Electrolytes
- id_jonogram int <pk>
- leczenie_id int <fk1>

Morphology
- id_morfolgia int <pk>
- leczenie_id int <fk1>

Laboratory
- id_lab int <pk>
- pacjent_id int <fk>

Biochemical analysis
- id_biochemia int <pk>
- leczenie_id int <fk1>

Urine
- id_mocz int <pk>
- leczenie_id int <fk1>
Upper Silesia, Poland
Local Database Structure: IT

Server
Backup
Database

Statisticians
Guidance service
Hospital ward

Electronic reports
Paper reports
Upper Silesia, Poland
Local Database Structure and the BIRO Merge Table

20 database tables

Database Merge Table

<table>
<thead>
<tr>
<th>Export</th>
</tr>
</thead>
<tbody>
<tr>
<td>pat_id</td>
</tr>
<tr>
<td>epi_date</td>
</tr>
</tbody>
</table>

Filtering

BIRO Merge Table

Dataset.CSV
• Problems/Weaknesses in Local Register
  – Gathering unusual data for clinic profile
  – Rotation of hospital ward trainees
  – Hospital ward and statisticians acquisition only
Upper Silesia, Poland
Using BIRO

• Problems/Weaknesses in using BIRO:
  – Not fully detailed User Manual – absence of:
    • Reasons of Quality and Validation Report errors
    • Solutions for specific errors
  – Messages with lack of information ex.:
    „Something went wrong connecting to database”
    „Something wrong with SQL Access for: org.postgresql.util.PSQLException:”
    „It is not possible to save the configuration”
• Problems/Weaknesses in using BIRO:
  - Not understandable messages in Statistical Engine
    "ERROR: relation "episode_wide" does not exist"
  - No R Exception handling:
    "Error in `<-.data.frame`(`*tmp*`, , pmatch("Age in class", names(data4_1_1)), : replacement has 9 rows, data has 0"
Upper Silesia, Poland

Using BIRO

- Problems/Weaknesses in using BIRO:
  - Too many steps and adjustments needed
  - Unfriendly application environment
  - Need of IT consultant
  - JAVA technology causes Processor Consumption-
    sometimes javaw process stays active after
    closing BiroBox
  - After succesfull analyse program reported only
    98% completion
Upper Silesia, Poland
Using BIRO

• Strengths
  – Detailed Quality report
  – Many report features PDF HTML JPG
  – Local Postgres Database allowing IT consultants to view Imported data
• Problems/Weaknesses in Local Register

- Still a lot of data in paper registers: Diagnosis dates, HBA1C
Upper Silesia, Poland
Mapping to BIRO European Standard

- Problems/Weaknesses of BIRO Standard:
  - Lost of individual patient data by averaging
  - Not taking into consideration other indicators

- Strengths
  - Linkage of many Diabetic Centers
  - Standardization
Patient ID
Data Source ID
Type Of Diabetes
Sex
Date of Birth
Date of Diagnosis
Episode Date
Smoking Status
Cigarettes per day
Alcohol Intake
Weight
Height
Body Mass Index
Systolic Blood Pressure
Diastolic Blood Pressure
HbA1c
Creatinine
Microalbumin

Put in bold/grey (your/not your) fields!

Patient Enrolment in DMP

End Stage Renal Therapy
Renal Dialysis
Renal Transplant
Stroke
Active Foot Ulcer
Myocardial Infarction
Laser
Hypertension
Blindness
Amputation

Total Cholesterol
HDL
Triglycerides
Eye Examination
Retinopathy Status
Maculopathy Status
Foot Examination
Foot Pulses
Foot Sensation
Nasal Therapy
Average Injections
Self Monitoring
Diabetes Specific Education
Lipid Lowering Therapy
Anti-platelet Therapy

Directorate-General for Health & Consumers
Executive Agency for Health and Consumers
Activity Table:
- We are not able to collect data about other Diabetic Centers and activity of adult patients

Population Table:
- Data only for 0-14 age band

Diabetic Population Table:
- No such data collected in Poland
Upper Silesia, Poland
Running BIRO: Data Quality Results

Distribution of missing values:
- bmi: 280 (23.85%)
- chol: 358 (30.49%)
- cigs_day: 1173 (99.91%)
- dbp: 950 (80.92%)
- dt_diag: 985 (83.90%)
- hdl: 361 (30.75%)
- height: 278 (23.68%)
- sbp: 950 (80.92%)
- tg: 359 (30.58%)
- weight: 254 (21.64%)

Distribution of not parsable values:

Distribution of out of range values:
- chol: 816 (69.51%)
- hdl: 813 (69.25%)
- height: 4 (0.34%)
- tg: 815 (69.42%)
- weight: 186 (15.84%)

List of out of range values:
- record_id: 1; field_name: hdl
- record_id: 1; field_name: chol
- record_id: 1; field_name: tg
- record_id: 2; field_name: hdl
- record_id: 2; field_name: chol
- record_id: 2; field_name: tg
- record_id: 3; field_name: hdl
...
### Upper Silesia, Poland

**Statistical Report: General Characteristics (Tables)**

<table>
<thead>
<tr>
<th>Parameter: 1.1. Age (Classes)</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 - 34</td>
<td>147 (100.00 %)</td>
<td>137 (100.00 %)</td>
</tr>
<tr>
<td></td>
<td>147 (51.76 %)</td>
<td>137 (48.24 %)</td>
</tr>
<tr>
<td></td>
<td>284 (100 %)</td>
<td>284 (100 %)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter: 2.1.1. Type of diabetes</th>
<th>Type of Diabetes</th>
<th>0 - 34</th>
<th>35 - 54</th>
<th>55 - 74</th>
<th>75 +</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>284 (100.00 %)</td>
<td>0 (0.00 %)</td>
<td>0 (0.00 %)</td>
<td>0 (0.00 %)</td>
<td>284 (100 %)</td>
</tr>
<tr>
<td></td>
<td>284 (100 %)</td>
<td>0 (0 %)</td>
<td>0 (0 %)</td>
<td>0 (0 %)</td>
<td>284 (100 %)</td>
</tr>
</tbody>
</table>
Upper Silesia, Poland
Statistical Report: General Characteristics (Tables)

<table>
<thead>
<tr>
<th>Weight</th>
<th>0 - 34</th>
<th>35 - 54</th>
<th>55 - 74</th>
<th>75+</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>0 - 49</td>
<td>45 (30.61%)</td>
<td>44 (32.12%)</td>
<td>0 (0.00%)</td>
<td>0 (0.00%)</td>
</tr>
<tr>
<td>50 - 69</td>
<td>33 (22.45%)</td>
<td>38 (27.74%)</td>
<td>0 (0.00%)</td>
<td>0 (0.00%)</td>
</tr>
<tr>
<td>70 - 89</td>
<td>19 (12.93%)</td>
<td>6 (4.38%)</td>
<td>0 (0.00%)</td>
<td>0 (0.00%)</td>
</tr>
<tr>
<td>90 - 109</td>
<td>2 (1.36%)</td>
<td>0 (0.00%)</td>
<td>0 (0.00%)</td>
<td>0 (0.00%)</td>
</tr>
<tr>
<td>missing</td>
<td>48 (32.65%)</td>
<td>49 (35.77%)</td>
<td>0 (0.00%)</td>
<td>0 (0.00%)</td>
</tr>
<tr>
<td></td>
<td>147 (51.76%)</td>
<td>137 (48.24%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

C-M-H Chi-Squared Test
One or more cells have less than 2 obs
### Upper Silesia, Poland
Statistical Report: General Characteristics (Tables)

---

**B.I.R.**

Best Information through Regional Outcomes

**BIRO Report site:** 17.03 czerwiec 2010

**Reference date:** 31/12/08

**Parameter:** 2.2.1.2. BMI (the most recent episode in 12 months)

<table>
<thead>
<tr>
<th>BMI</th>
<th>Type 1</th>
<th>0 - 34</th>
<th>35 - 54</th>
<th>55 - 74</th>
<th>75 +</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>0 - 24</td>
<td></td>
<td>108 (73.47 %)</td>
<td>98 (71.53 %)</td>
<td>0 (0.00 %)</td>
<td>0 (0.00 %)</td>
</tr>
<tr>
<td>25 - 26</td>
<td></td>
<td>5 (3.40 %)</td>
<td>7 (5.11 %)</td>
<td>0 (0.00 %)</td>
<td>0 (0.00 %)</td>
</tr>
<tr>
<td>27 - 29</td>
<td></td>
<td>4 (2.72 %)</td>
<td>2 (1.46 %)</td>
<td>0 (0.00 %)</td>
<td>0 (0.00 %)</td>
</tr>
<tr>
<td>40 +</td>
<td></td>
<td>1 (0.68 %)</td>
<td>0 (0.00 %)</td>
<td>0 (0.00 %)</td>
<td>0 (0.00 %)</td>
</tr>
<tr>
<td>missing</td>
<td></td>
<td>29 (19.73 %)</td>
<td>30 (21.90 %)</td>
<td>0 (0.00 %)</td>
<td>0 (0.00 %)</td>
</tr>
</tbody>
</table>

|       |               | 147 (51.76 %) | 137 (48.24 %) | 0 (0 %) | 0 (0 %) | 0 (0 %) | 0 (0 %) |

**C-M-H Chi-Squared Test**

One or more cells have less than 2 obs
### B.I.R. - Best Information through Regional Outcomes

**BIRO Report site:** 17, 03 czerwiec 2010  
**Reference date:** 31/12/08  
**Parameter:** 2.2.3.1. Systolic BP (the most recent episode in 12 months)

<table>
<thead>
<tr>
<th>SBP</th>
<th>Type 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 - 34</td>
</tr>
<tr>
<td></td>
<td>Male</td>
</tr>
<tr>
<td>0 - 129</td>
<td>54 (36.73%)</td>
</tr>
<tr>
<td>missing</td>
<td>93 (63.27%)</td>
</tr>
<tr>
<td>147 (51.76%)</td>
<td>137 (48.24%)</td>
</tr>
</tbody>
</table>

**C-M-H Chi-Squared Test**  
One or more cells have less than 2 obs
**Upper Silesia, Poland**  
**Statistical Report: General Characteristics (Tables)**

---

**B.I.R.O.**  
*Best Information through Regional Outcomes*

**BIRO Report site:** 17, 03 czerwiec 2010  
**Reference date:** 31/12/08

**Parameter:** 2.2.3.2. Diastolic BP (the most recent episode in 12 months)

<table>
<thead>
<tr>
<th>DBP</th>
<th>Type 1</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 - 34</td>
<td>Male</td>
<td>Female</td>
<td>35 - 54</td>
<td>Male</td>
<td>Female</td>
<td>55 - 74</td>
<td>Male</td>
<td>Female</td>
<td>75 +</td>
<td>Male</td>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 - 69</td>
<td>38 (25.85 %)</td>
<td>48 (35.04 %)</td>
<td>0 (0.00 %)</td>
<td>0 (0.00 %)</td>
<td>0 (0.00 %)</td>
<td>0 (0.00 %)</td>
<td>86 (30.28 %)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>70 - 99</td>
<td>16 (10.88 %)</td>
<td>15 (10.95 %)</td>
<td>0 (0.00 %)</td>
<td>0 (0.00 %)</td>
<td>0 (0.00 %)</td>
<td>0 (0.00 %)</td>
<td>31 (10.92 %)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>missing</td>
<td>93 (63.27 %)</td>
<td>74 (54.01 %)</td>
<td>0 (0.00 %)</td>
<td>0 (0.00 %)</td>
<td>0 (0.00 %)</td>
<td>0 (0.00 %)</td>
<td>167 (58.8 %)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>147 (51.76 %)</td>
<td>137 (48.24 %)</td>
<td>0 (0 %)</td>
<td>0 (0 %)</td>
<td>0 (0 %)</td>
<td>0 (0 %)</td>
<td>284 (100 %)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**C-M-H Chi-Squared Test**

One or more cells have less than 2 obs
### Upper Silesia, Poland

**Statistical Report: General Characteristics (Tables)**

#### Parameter: 2.3.1. Retinopathy (the most recent episode in 12 months)

<table>
<thead>
<tr>
<th>Retinopathy</th>
<th>0 - 9</th>
<th>10 - 19</th>
<th>20 +</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Retinopathy</td>
<td>35 (100.00 %)</td>
<td>1 (100.00 %)</td>
<td>0 (0 %)</td>
</tr>
<tr>
<td></td>
<td>35 (97.22 %)</td>
<td>1 (2.78 %)</td>
<td>0 (0 %)</td>
</tr>
</tbody>
</table>

#### Parameter: 2.3.2. End stage renal failure

<table>
<thead>
<tr>
<th>E.S.R.F.</th>
<th>0 - 9</th>
<th>10 - 19</th>
<th>20 +</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>35 (100.00 %)</td>
<td>1 (100.00 %)</td>
<td>0 (0 %)</td>
</tr>
<tr>
<td></td>
<td>35 (97.22 %)</td>
<td>1 (2.78 %)</td>
<td>0 (0 %)</td>
</tr>
</tbody>
</table>

#### Parameter: 2.3.3. Foot ulcer

<table>
<thead>
<tr>
<th>Foot Ulcer</th>
<th>0 - 9</th>
<th>10 - 19</th>
<th>20 +</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>35 (100.00 %)</td>
<td>1 (100.00 %)</td>
<td>0 (0 %)</td>
</tr>
<tr>
<td></td>
<td>35 (97.22 %)</td>
<td>1 (2.78 %)</td>
<td>0 (0 %)</td>
</tr>
</tbody>
</table>

#### Parameter: 2.3.4. Amputation

<table>
<thead>
<tr>
<th>Amputation</th>
<th>0 - 9</th>
<th>10 - 19</th>
<th>20 +</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>35 (100.00 %)</td>
<td>1 (100.00 %)</td>
<td>0 (0 %)</td>
</tr>
<tr>
<td></td>
<td>35 (97.22 %)</td>
<td>1 (2.78 %)</td>
<td>0 (0 %)</td>
</tr>
</tbody>
</table>
Upper Silesia, Poland
Statistical Report: General Characteristics (Tables)

B.I.R.O.
Best Information through Regional Outcomes

BIRO Report site: 17, 03 czerwiec 2010
Reference date: 31/12/08
Parameter: 2.3.5. Stroke

<table>
<thead>
<tr>
<th>Stroke</th>
<th>0 - 9</th>
<th>10 - 19</th>
<th>20 +</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>35 (100.00 %)</td>
<td>1 (100.00 %)</td>
<td>36 (100 %)</td>
</tr>
<tr>
<td></td>
<td>35 (97.22 %)</td>
<td>1 (2.78 %)</td>
<td></td>
</tr>
</tbody>
</table>
Upper Silesia, Poland
Statistical Report: General Characteristics (Figures)

Age class

Type of diabetes
Upper Silesia, Poland

Statistical Report: General Characteristics (Figures)

Barplot: Weight (by Gender)

Barplot: Weight (by Age)
Upper Silesia, Poland
Statistical Report: General Characteristics (Figures)
Upper Silesia, Poland
Statistical Report: General Characteristics (Figures)
Upper Silesia, Poland
Statistical Report: General Characteristics (Figures)
Upper Silesia, Poland
Statistical Report: General Characteristics (Figures)
Upper Silesia, Poland

Statistical Report: General Characteristics (Figures)
Upper Silesia, Poland

Statistical Report: General Characteristics (Figures)
Upper Silesia, Poland

Statistical Report: General Characteristics (Figures)
Upper Silesia, Poland

Statistical Report: General Characteristics (Figures)
Upper Silesia, Poland

Statistical Report: General Characteristics (Figures)
Upper Silesia, Poland

Statistical Report: General Characteristics (Figures)

Barplot: Stroke (by Duration)
Upper Silesia, Poland
Statistical Report: Health System

**B.I.R.*

Best information through Regional Outcomes

**BIRO Report** site: 17.03 czerwiec 2010
Reference date: 31/12/08

Parameter: 3.1.2 Average diabetes population

<table>
<thead>
<tr>
<th>Age</th>
<th>Type 1 Male</th>
<th>Type 1 Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 9</td>
<td>47 (31.97%)</td>
<td>46 (33.58%)</td>
</tr>
<tr>
<td>10 - 19</td>
<td>99 (67.35%)</td>
<td>90 (65.69%)</td>
</tr>
<tr>
<td>20 - 29</td>
<td>1 (0.68%)</td>
<td>1 (0.73%)</td>
</tr>
<tr>
<td></td>
<td>147 (51.76%)</td>
<td>137 (48.24%)</td>
</tr>
</tbody>
</table>

---

**Chart:**

- **Age Groups:** 0 - 9, 10 - 19, 20 - 29
- **Colors:**
  - Red: Male
  - Green: Female
  - Blue: Other

**Legend:**

- 0 - 9
- 10 - 19
- 20 - 29
Upper Silesia, Poland
Statistical Report: Health System

B.I.R.
Best Information through Regional Outcomes

BIRO Report date: 17.03 czerwiec 2010
Reference date: 31/12/08
Parameter: 3.3.5.2 Visit Frequency

<table>
<thead>
<tr>
<th>Visit Frequency</th>
<th>Type 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 - 34</td>
</tr>
<tr>
<td>Only one</td>
<td>262 (92.25%)</td>
</tr>
<tr>
<td>More than one</td>
<td>22 (7.75%)</td>
</tr>
<tr>
<td></td>
<td>284 (100%)</td>
</tr>
</tbody>
</table>

Visit Frequency:
- **Only one**
- **More than one**

% of patients

- 92.25%
- 7.75%
BIRO Report site: 17.03 czerwiec 2010
Reference date: 31/12/08
Parameter: 3.3.5.1 Self-monitoring

<table>
<thead>
<tr>
<th>Self Monitoring</th>
<th>Type 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 - 34</td>
</tr>
<tr>
<td>Both</td>
<td>284 (100.00 %)</td>
</tr>
<tr>
<td></td>
<td>284 (100 %)</td>
</tr>
</tbody>
</table>

Barplot: Self Monitoring (by Age)
Upper Silesia, Poland
Statistical Results: BIRO Indicators (Tables)

**BIRO Report** site: 17, 03 czerwiec 2010
Reference date: 31/12/08

Parameter: 5.1.1 Prevalence of diabetes mellitus per 1,000

<table>
<thead>
<tr>
<th>Obs</th>
<th>Denom</th>
<th>typedm</th>
<th>Ratex1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>284</td>
<td>649030</td>
<td>Type 1</td>
<td>0.44</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>Type 2</td>
<td>NaN</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>Type 1</th>
<th>Type 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 9</td>
<td>20 (7.04%)</td>
<td>0 (0.00%)</td>
</tr>
<tr>
<td>10 - 19</td>
<td>19 (6.69%)</td>
<td>0 (0.00%)</td>
</tr>
<tr>
<td>20 - 29</td>
<td>1 (0.35%)</td>
<td>0 (0.00%)</td>
</tr>
<tr>
<td>missing</td>
<td>244 (85.92%)</td>
<td>0 (0.00%)</td>
</tr>
<tr>
<td>284 (100%)</td>
<td>0 (0 %)</td>
<td>284 (100 %)</td>
</tr>
</tbody>
</table>
Upper Silesia, Poland
Statistical Results: BIRO Indicators (Tables)

**BIRO Report**

*Best Information through Regional Outcomes*

**Parameter:** 5.2.7 Percentage of patients with diabetes and one or more blood pressure measurements within the last 12 months

<table>
<thead>
<tr>
<th>N</th>
<th>Obs</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>284</td>
<td>117</td>
<td>41.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of Diabetes 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP measurements</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>54 (36.73%)</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>93 (63.27%)</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
Upper Silesia, Poland
Statistical Results: BIRO Indicators (Tables)

**BIRO Report** site: 17, 03 czerwiec 2010
Reference date: 31/12/08

Parameter: 5.2.14 Portion of diabetes patients with lipid lowering treatment

<table>
<thead>
<tr>
<th>N</th>
<th>Obs</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>284</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Type of Diabetes 1

<table>
<thead>
<tr>
<th>Lipid lowering treatment</th>
<th>Male</th>
<th>Type 1</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 - 34</td>
<td>35 - 54</td>
<td>55 - 74</td>
</tr>
<tr>
<td>No</td>
<td>147 (100.00%)</td>
<td>0 (0.00%)</td>
<td>0 (0.00%)</td>
</tr>
<tr>
<td></td>
<td>147 (51.76%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>
Upper Silesia, Poland
Statistical Results: BIRO Indicators (Tables)

**BIRO Report** site: 17, 03 czerwiec 2010
Reference date: 31/12/08
Parameter: 5.2.15 Portion of diabetes patients with ASA treatment

<table>
<thead>
<tr>
<th></th>
<th>Obs</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>284</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of Diabetes 1</th>
<th>MALE</th>
<th></th>
<th>FEMALE</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ASA treatment</td>
<td></td>
<td>---</td>
<td></td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>0 - 34</td>
<td>35 - 54</td>
<td>55 - 74</td>
<td>75+</td>
</tr>
<tr>
<td>No</td>
<td>147 (100.00 %)</td>
<td>0 (0.00 %)</td>
<td>0 (0.00 %)</td>
<td>0 (0.00 %)</td>
</tr>
<tr>
<td>147 (51.76 %)</td>
<td>0 (0 %)</td>
<td>0 (0 %)</td>
<td>0 (0 %)</td>
<td>137 (48.24 %)</td>
</tr>
</tbody>
</table>
## Upper Silesia, Poland

### Statistical Results: BIRO Indicators (Tables)

**BIRO Report** site: 17, 03 czerwiec 2010

Reference date: 31/12/08

Parameter: 5.2.16 Percent of patients with diabetes performing self-monitoring of blood glucose/urine testing

<table>
<thead>
<tr>
<th>N</th>
<th>Obs</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>284</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of Diabetes</th>
<th>Male</th>
<th>Type 1</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 - 34</td>
<td>35 - 54</td>
<td>55 - 74</td>
</tr>
<tr>
<td>Urine</td>
<td>147 (100.00 %)</td>
<td>0 (0.00 %)</td>
<td>0 (0.00 %)</td>
</tr>
<tr>
<td>Blood Glucose</td>
<td>0 (0.00 %)</td>
<td>0 (0.00 %)</td>
<td>0 (0.00 %)</td>
</tr>
<tr>
<td>Both</td>
<td>0 (0.00 %)</td>
<td>0 (0.00 %)</td>
<td>0 (0.00 %)</td>
</tr>
<tr>
<td></td>
<td>147 (51.76 %)</td>
<td>0 (0 %)</td>
<td>0 (0 %)</td>
</tr>
</tbody>
</table>

---

**BIRO** Best Information through Regional Outcomes
Upper Silesia, Poland
Statistical Results: BIRO Indicators (Tables)

**BIRO Report** site: 17, 03 czerwiec 2010
Reference date: 31/12/08
Parameter: 5.3.3 Percentage of patients with most recent blood pressure less than 140/90 mmHg

<table>
<thead>
<tr>
<th>N</th>
<th>Obs</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>284</td>
<td>117</td>
<td>41.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of Diabetes 1</th>
<th>sbp less than 140/90 mmHg</th>
<th>0 - 34</th>
<th>35 - 54</th>
<th>55 - 74</th>
<th>75 +</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>0 - 140]</td>
<td></td>
<td>54 (36.73 %)</td>
<td>63 (45.99 %)</td>
<td>0 (0.00 %)</td>
<td>0 (0.00 %)</td>
</tr>
<tr>
<td>missing</td>
<td></td>
<td>93 (63.27 %)</td>
<td>74 (54.01 %)</td>
<td>0 (0.00 %)</td>
<td>0 (0.00 %)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>147 (51.76 %)</td>
<td>137 (48.24 %)</td>
<td>0 (0 %)</td>
<td>0 (0 %)</td>
</tr>
</tbody>
</table>
### Upper Silesia, Poland

**Statistical Results: BIRO Indicators (Tables)**

**BIRO Report** site: 17, 03 czerwiec 2010

**Reference date:** 31/12/08

**Parameter:** 5.3.4 Percentage of patients with BMI greater than 30

<table>
<thead>
<tr>
<th>N</th>
<th>Obs</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>284</td>
<td>1</td>
<td>0.35</td>
</tr>
</tbody>
</table>

**Type of Diabetes 1**

<table>
<thead>
<tr>
<th>BMI greater than 30</th>
<th>0 - 34</th>
<th>35 - 54</th>
<th>55 - 74</th>
<th>75 +</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>30 +</td>
<td>1 (0.68%)</td>
<td>0 (0.00%)</td>
<td>0 (0.00%)</td>
<td>0 (0.00%)</td>
</tr>
<tr>
<td>0 - 30]</td>
<td>117 (79.59%)</td>
<td>107 (78.10%)</td>
<td>0 (0.00%)</td>
<td>0 (0.00%)</td>
</tr>
<tr>
<td>missing</td>
<td>29 (19.73%)</td>
<td>30 (21.90%)</td>
<td>0 (0.00%)</td>
<td>0 (0.00%)</td>
</tr>
</tbody>
</table>

Total: 284 (100%)
### Upper Silesia, Poland

#### Statistical Results: BIRO Indicators (Tables)

**BIRO Report site:** 17, 03 czerwiec 2010  
**Reference date:** 31/12/08  
**Parameter:** 5.3.7 Former or current foot ulceration

<table>
<thead>
<tr>
<th>N</th>
<th>Obs</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>284</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Type of Diabetes 1**

<table>
<thead>
<tr>
<th>foot ulceration</th>
<th>Type 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 - 34</td>
</tr>
<tr>
<td></td>
<td>Male</td>
</tr>
<tr>
<td>No</td>
<td>147 (100.00%)</td>
</tr>
<tr>
<td></td>
<td>147 (51.76%)</td>
</tr>
</tbody>
</table>
Upper Silesia, Poland
Statistical Report: BIRO Indicators (Figures)

BIRO Report site: 17, 03 czerwiec 2010
Reference date: 31/12/08

Parameter: 5.4.1 Annual incidence of dialysis and/or transplantation (renal replacement therapy in patients with diabetes)

<table>
<thead>
<tr>
<th>N</th>
<th>Obs</th>
<th>Rate x 100000</th>
</tr>
</thead>
<tbody>
<tr>
<td>284</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of Diabetes 1</th>
<th>Type 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 - 34</td>
</tr>
<tr>
<td>dialysis and/or transplantation</td>
<td>Male</td>
</tr>
<tr>
<td>No</td>
<td>147 (100.00 %)</td>
</tr>
<tr>
<td></td>
<td>147 (51.76 %)</td>
</tr>
</tbody>
</table>
Upper Silesia, Poland
Statistical Report: BIRO Indicators (Figures)

**BIRO Report**
- **site:** 17, 03 czerwiec 2010
- **Reference date:** 31/12/08
- **Parameter:** 5.4.2 ESRF in Persons with Diabetes

<table>
<thead>
<tr>
<th>N</th>
<th>Obs</th>
<th>Rate x 100000</th>
</tr>
</thead>
<tbody>
<tr>
<td>284</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Type of Diabetes 1**

<table>
<thead>
<tr>
<th>esrf</th>
<th>0 - 34</th>
<th>35 - 54</th>
<th>55 - 74</th>
<th>75 +</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>147</td>
<td>(100.00%)</td>
<td>(100.00%)</td>
<td>0 (0.00%)</td>
<td>0 (0.00%)</td>
</tr>
<tr>
<td>(51.76%)</td>
<td>(48.24%)</td>
<td>(0%)</td>
<td>(0%)</td>
<td>(0%)</td>
</tr>
</tbody>
</table>

**ESRF**
- ESRF: Estimated Severe Renal Failure

**B.I.R.O.**
- Best Information through Regional Outcomes
Upper Silesia, Poland

Statistical Report: BIRO Indicators (Figures)
Upper Silesia, Poland
Statistical Report: BIRO Indicators (Figures)
Upper Silesia, Poland

Statistical Report: BIRO Indicators (Figures)
Upper Silesia, Poland
Statistical Report: BIRO Indicators (Figures)
Upper Silesia, Poland
Statistical Report: BIRO Indicators (Figures)

Barplot: Lipid lowering treatment (by Type of Diabetes)
Upper Silesia, Poland
Statistical Report: BIRO Indicators (Figures)
Upper Silesia, Poland
Statistical Report: BIRO Indicators (Figures)

Barplot: ASA treatment (by Type of Diabetes)
Upper Silesia, Poland
Statistical Report: BIRO Indicators (Figures)
Upper Silesia, Poland

Statistical Report: BIRO Indicators (Figures)
Upper Silesia, Poland

Statistical Report: BIRO Indicators (Figures)
Upper Silesia, Poland

Statistical Report: BIRO Indicators (Figures)
Upper Silesia, Poland

Statistical Report: BIRO Indicators (Figures)
Upper Silesia, Poland

Statistical Report: BIRO Indicators (Figures)
Upper Silesia, Poland

Statistical Report: BIRO Indicators (Figures)
Upper Silesia, Poland
Statistical Report: BIRO Indicators (Figures)
Upper Silesia, Poland
Statistical Report: BIRO Indicators (Figures)
Upper Silesia, Poland
Statistical Report: BIRO Indicators (Figures)
Conclusions (1): Statistical Results

- Reports do not include some indicators that are important for paediatric treatment
- Important indicators Creatinine, cholesterol and triglycerides were rejected by statistical engine as “Out of Range Values”
- Our Merge Table didn’t contain HBA1C’s which are still in paper registers
- It’s interesting to see the BMI distribution
Upper Silesia, Poland

Conclusions (2): Diabetes Care

• It’s hard to conclude on results taken from BIRO reports because most of the parameters are not well suited for our type of patients – children type 1 diabetes
Conclusions (3): BIRO usage

• The BIRO system is a promising instrument in comparative study between Diabetic Centers
• There should be a more friendly interface
• It should gather more parameters
• It’s very unfortunate that privacy policy in many countries forces the system to aggregate data
Upper Silesia, Poland
Future LOCAL Perspectives

• Gather historical informations
• Transfer paper data to Local Register
• Force personel to more accurate acquisition of data
• Invite other Health Centers into the project
Upper Silesia, Poland
Future BIRO Perspectives

• Add some more parameters into BIRO system which are already included in our Local Register – have a bigger focus on Children
• Divide Age band 0-14
• Improve the prior data analysis in BIROBOX which would allow Centers to correct/adjust their data if there is such a need – and so avoid rejecting them in statistical analysis
Upper Silesia, Poland

Thanks for the attention!