Materials, Methods and National Results

The Diabetes Register of Umbria, Italy

Fabrizio Carinci
Technical Coordinator

Special BIRO Academy Meeting
“Coordinated Information Delivery from Diabetes Registers to improve quality and outcomes in Europe”
Rome 4-5th June 2010
Country: **Italy**
Region: **Umbria**
Total Population: **872,964**
Diabetes Prevalence: **8.2% (DVSS)**
Diabetes Prevalence captured by clinics: **1.1%**

Type of Data Sources:
- **Regional Network of Diabetes Clinics**

N. Participating Centres: **6**
Year: 2008
Region: Umbria
Total N. Subjects: 10,140
Total N. Episodes: 23,244
• T1: 606 (5.6%)
• T2: 9,046 N (89.2%)
Umbria, Italy
Local Database Structure: possible developments

Dataset #1: Health Search

Dataset #2:
- Hospital Discharges
- Ambulatory Visits

Dataset #3:
- Pharmacy Prescriptions
- Clinical Data
- Clinics Master Index

Dataset #4:
- Regional Master Index
- Diabetic Clinics

Dataset #5:
- Mortality Register

Regional Data Warehouse (SVE)
Umbria, Italy
Local Database Structure: IT

Diabetes Clinic

- EHRs
- Export
- RRDM

Regional DoH

Coordinating Centre

- # record + Clinical Data
- # record + Personal ID
- RDU
- RDU Report

European Commission

BIRO Aggregate

Regions, Europe

European Report
Umbria, Italy
Local Database Structure and the BIRO Merge Table

Dataset #1
Master Index

Dataset #2
Clinical Data

Dataset #3
Prescriptions

BIRO Merge Table

Diabetic Clinics
• Problems/Weaknesses
  – speed of execution depends from OS
  – packages/environment must be installed properly: reconfiguration maybe complex and eventually conflict with other applications => BIROX (to be heavily tested on field)
  – data connection between R and Postgres should be tested in advance

• Strengths
  – easy to use, comprehensive, many options available
  – data quality check essential
• Problems/Weaknesses
  – may not cover all cases and cannot avoid ability in preparing and merging original data => customized toolbox (but: lots of work + direct assistance)
  – shall include links to all definitions with exhaustive, quick reference/user guide

• Strengths
  – starting from a merge table that is not too distant from standard, it does the job very easily and efficiently
Umbria, Italy
Merge Table Contents

- 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

- 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
- Patient Enrolment in DMP

- End Stage Renal Therapy
- Renal Dialysis
- Renal Transplant
- Stroke
- Active Foot Ulcer
- Myocardial Infarction
- Laser
- Hypertension
- Blindness
- Amputation
- Antihypertensive Medication
- Hypoglycemic Drug Therapy
- Oral Drug Therapy
- Pump Therapy
Activity Table:
created from Merge Table

Population Table:
Umbria File National Statistics (ISTAT)

Diabetic Population Table:
created from Merge Table
Merge Table Quality Log File
Total number of missing values: 130212 (28.010%)

Total number of not parsable values: 0 (0.000%)
Total number of out of range values: 149 (0.032%)
Total number of non admissible values: 571 (0.123%)
Total number of duplicates: 0 (0.641%)

Distribution of missing values:
- bmi: 11346 (48.81%)
- hba1c: 7136 (30.70%)
- creat: 13863 (59.64%)
- ldl: 18909 (81.35%)
- weight: 11067 (47.61%)
- chol: 12567 (54.07%)
- height: 2678 (11.52%)
- tg: 12792 (55.03%)
- sbp: 13440 (57.82%)
- dbp: 13439 (57.82%)
-hdl: 12975 (55.82%)
Umbria, Italy
Statistical Report: General Characteristics (1)
Umbria, Italy
Statistical Report: General Characteristics (2)
Umbria, Italy
Statistical Report: General Characteristics (TYPE 2)
HbA1c by centre
Umbria, Italy
Statistical Results: BIRO Indicators

(O-E)/E%  
95% CI
Conclusions (1): Statistical Results

- Data quality check shows that accurate recording is performed on variables perceived to be relevant for everyday operational management.
- Variables required to operate the data entry software, e.g. demographic characteristics (age, sex, date of diagnosis) are quite complete.
- Among clinical variables, **HbA1c** is fairly complete. However, this measure is not standardized and cannot be precisely assessed (under revision). Other measurements are more scarcely present.
- We have used the statistical engine at centre level, identifying clusters of incomplete data and variability of measures for specific centres.
- Specific analysis and on field activities are necessary to assess the existence of barriers to accurate registration. Appropriate quality check rules at data entry must be reinforced.
- The potential influence of data "missing/invalid NOT at random" suggests great caution in the interpretation of the results.
Blood pressure and glycated haemoglobin levels vary across centres.

Indicators show significant differences between observed/expected outcomes across the region.

However, data quality does not allow to draw conclusions except for few variables (HbA1c).

Standardization affects results, albeit only slightly when adjusting by Age, Sex.

More data are required to control for potential selection bias in our population.
Umbria, Italy
Conclusions (3): BIRO usage

- The BIRO system runs without problems on Umbria data
- Outputs are very informative in terms of standardized diabetes indicators expressed as rates of successes/failures in the overall population
- The variability of average levels across centres is also very interesting. The European report template should include these comparisons across regions.
- Specific tools to explore bias and confounding are required. Statistical models adjustable by the user (ex: standardization by age, sex, diabetes duration, comorbidities, etc) should be embedded in the system, without requiring extra efforts e.g. further mapping, etc.
Umbria, Italy
Future LOCAL Perspectives (2)

Antidiabetic Prescription

- N subjects: 22,113
- 1 source or more: N=65,424
- 2 sources or more: N=30,705
- 3 sources or more: N=8,071

HBA1C Test

- 10,118

Hospital Discharges ICD 250xx

- 10,275
- 2,488
- 499

Population: N ≅ 850,000

Diabetes Clinics 2006-2008

- N=14,754
- T1= 934
- T2=13,820

Dates:
- 31/12/2005
- 31/12/2008
• EUBIROD should expand its range of users with an epidemic progression
• Scientific paper and automated European Diabetes Report should be immediately delivered
• Improvement are possible on three different pathways:
  – epidemiological analysis of bias/confounding
  – fostered data management and refined report template
  – enhanced documentation and activities to foster data completeness and quality of information
Umbria, Italy
Lake Trasimeno: yes, there are beaches in Umbria!

Thanks for the attention!