EUBIROD

EUropean Best Information through Regional Outcomes in Diabetes

Materials, Methods and National Results

The Diabetes Register of Umbria, Italy

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Special BIRO Academy Meeting
"Coordinated Information Delivery from Diabetes Registers to improve quality and outcomes in Europe"
Rome 4-5th June 2010

Directorate-General for Health & Consumers

Executive Agency for Health and Consumers

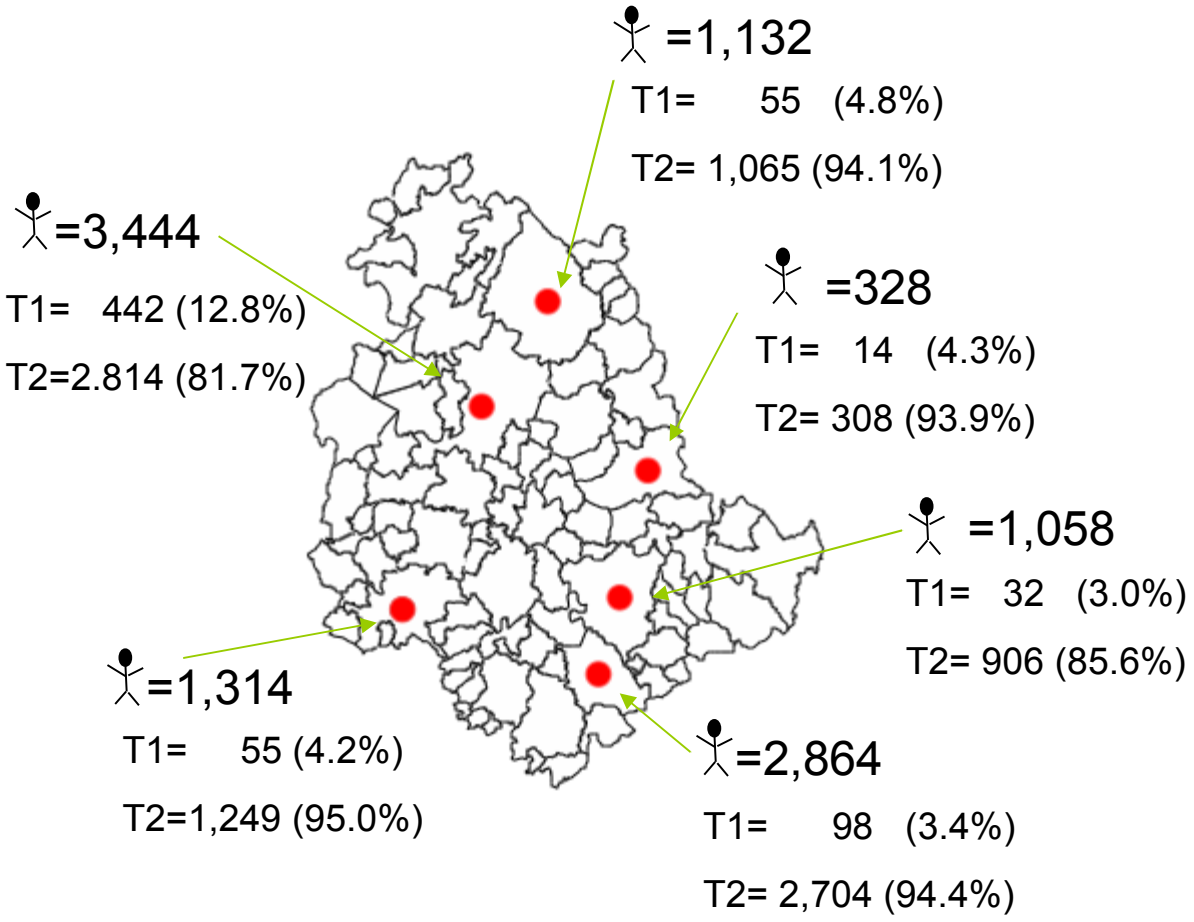
Umbria, Italy
Reference Population

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**

Umbria, Italy
Reference Diabetes Data



Year: **2008**
Region: **Umbria**
Total N. Subjects: **10,140**
Total N.Episodes: **23,244**
T1: **606 (5.6%)**
•T2: **9,046 N (89.2%)**

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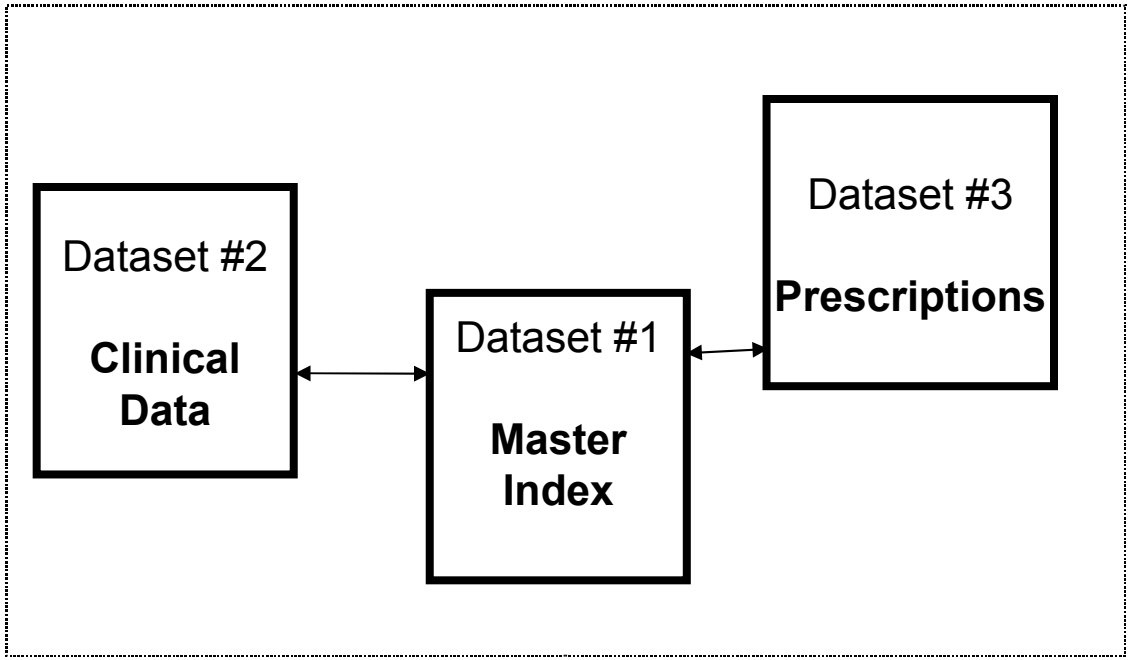
Local Database Structure



Diabetic Clinics

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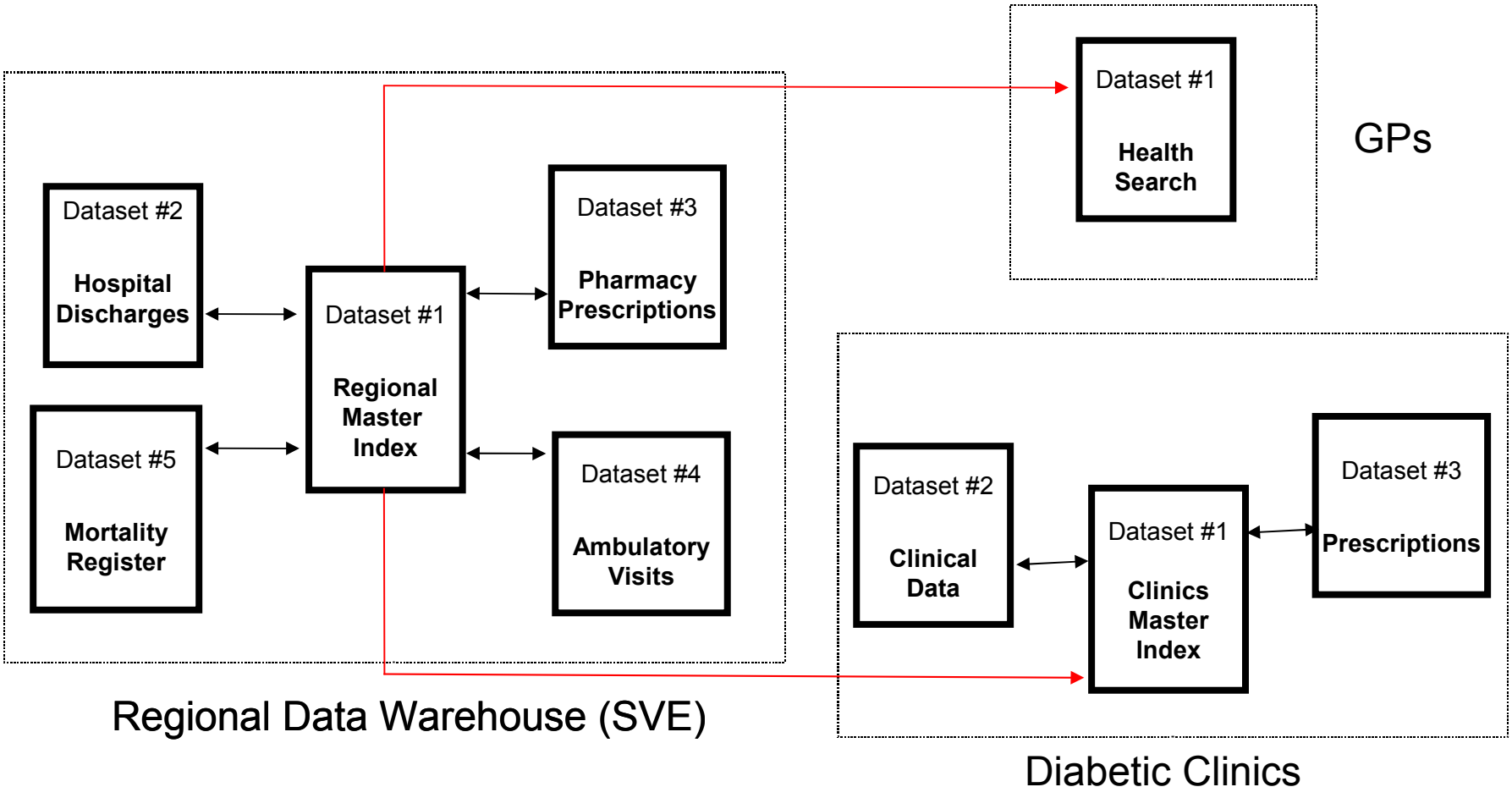
Local Database Structure: possible developments



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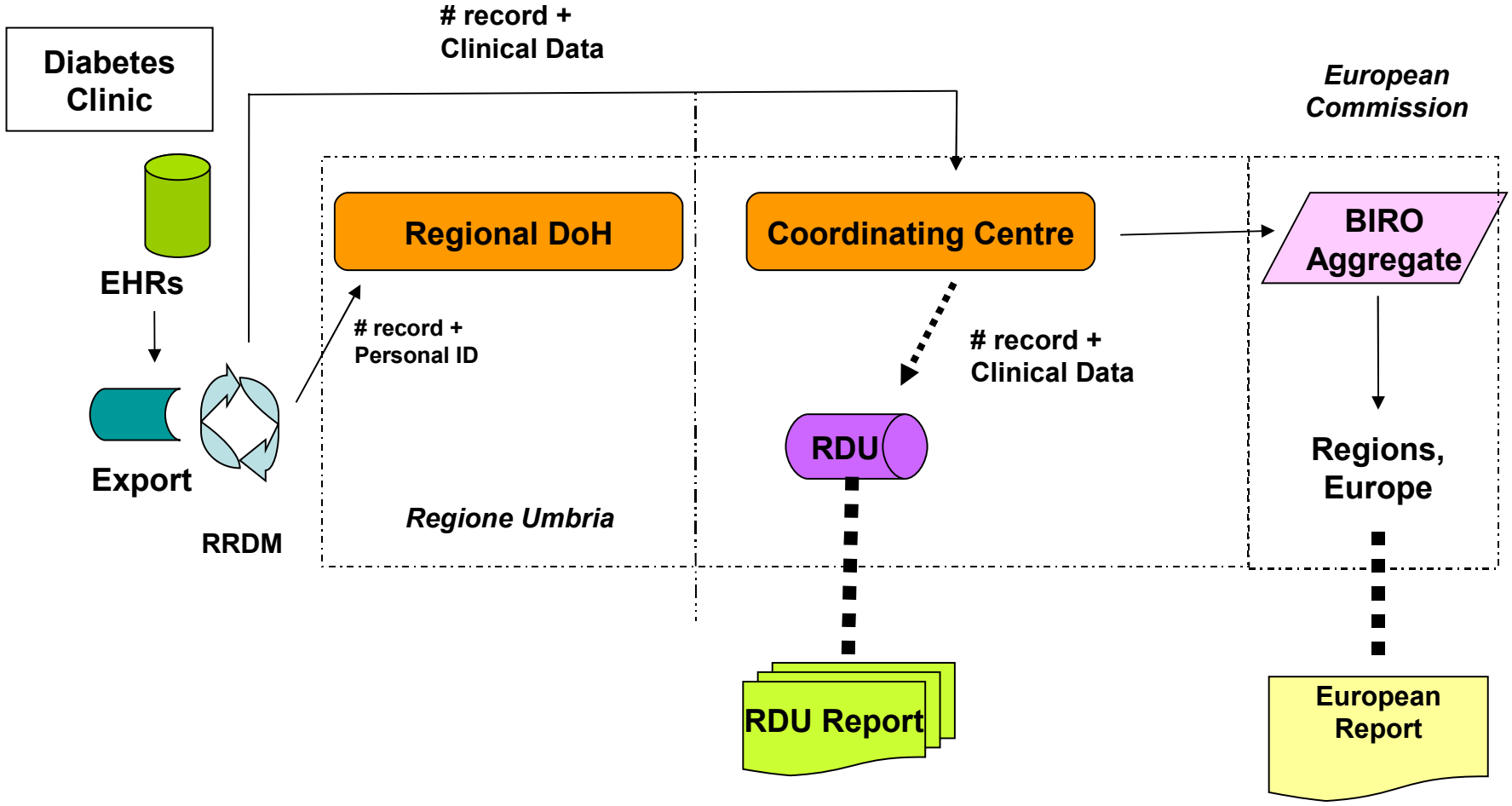
Local Database Structure: IT



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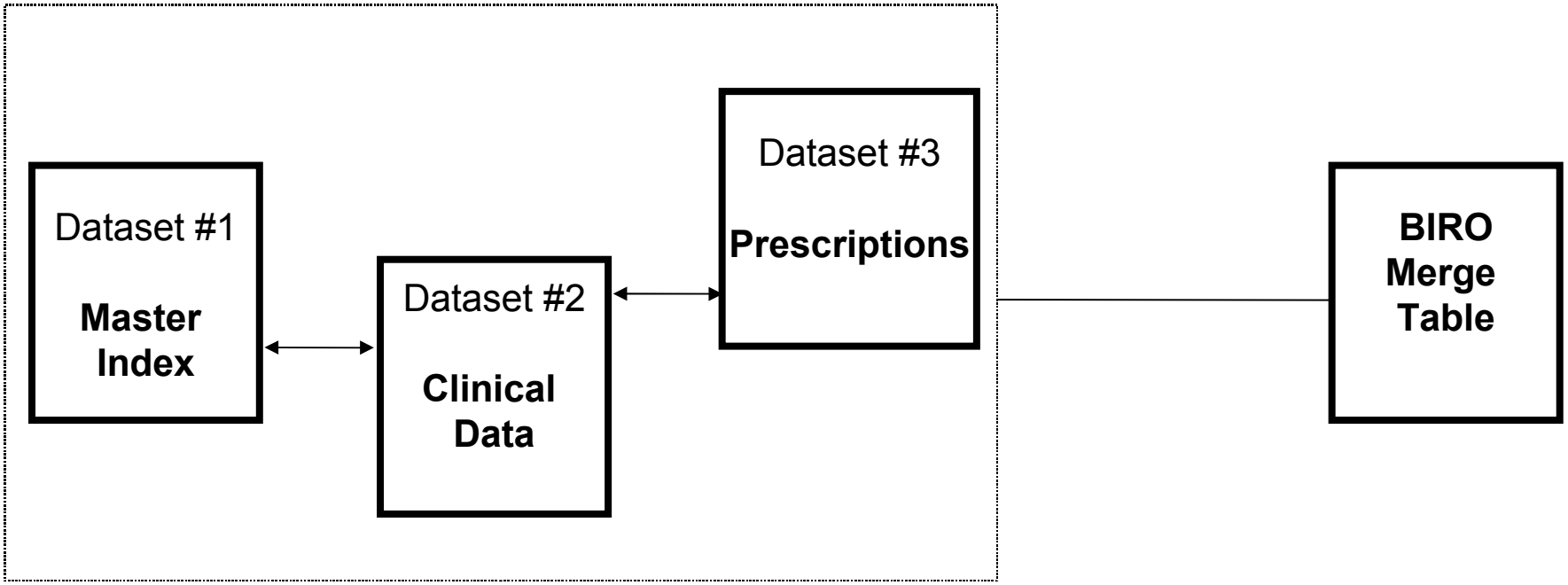
Local Database Structure and the BIRO Merge Table



Diabetic Clinics

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Using BIRO

- 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

Umbria, Italy
Mapping to BIRO European Standard

- 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

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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

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Additional Data

Activity Table:

created from Merge Table

Population Table:

Umbria File National Statistics (ISTAT)

Diabetic Population Table:

created from Merge Table

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Running BIRO: Data Quality Results

Merge Table Quality Log FileTotal 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%)

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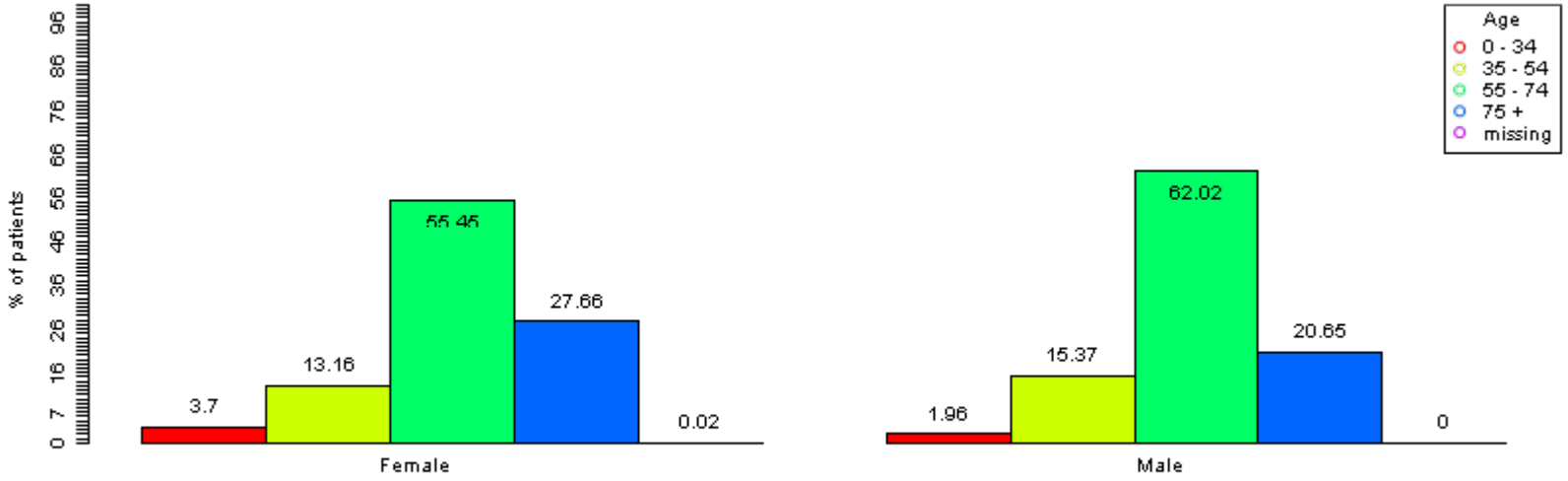
Statistical Report: General Characteristics (1)



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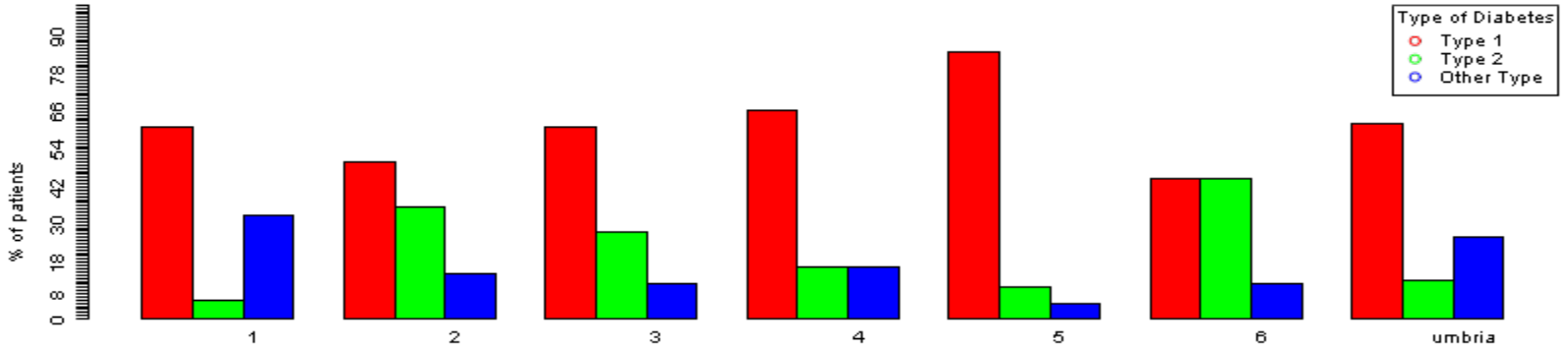
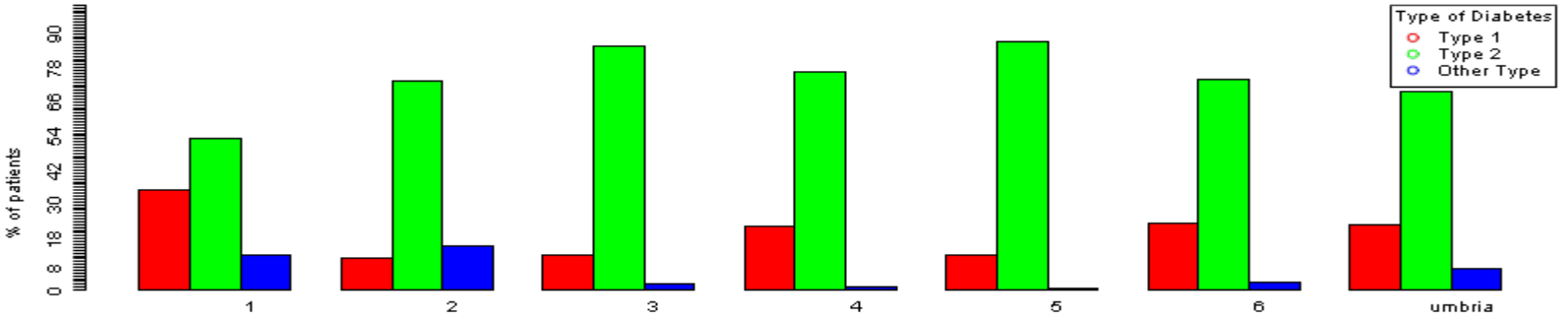
Statistical Report: General Characteristics (2)

AGE

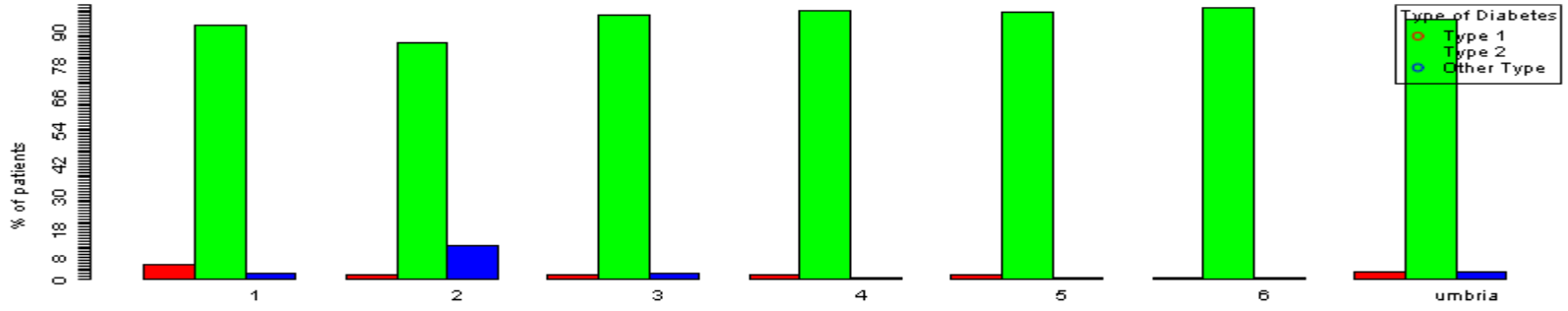
0-35



35-54



54-75



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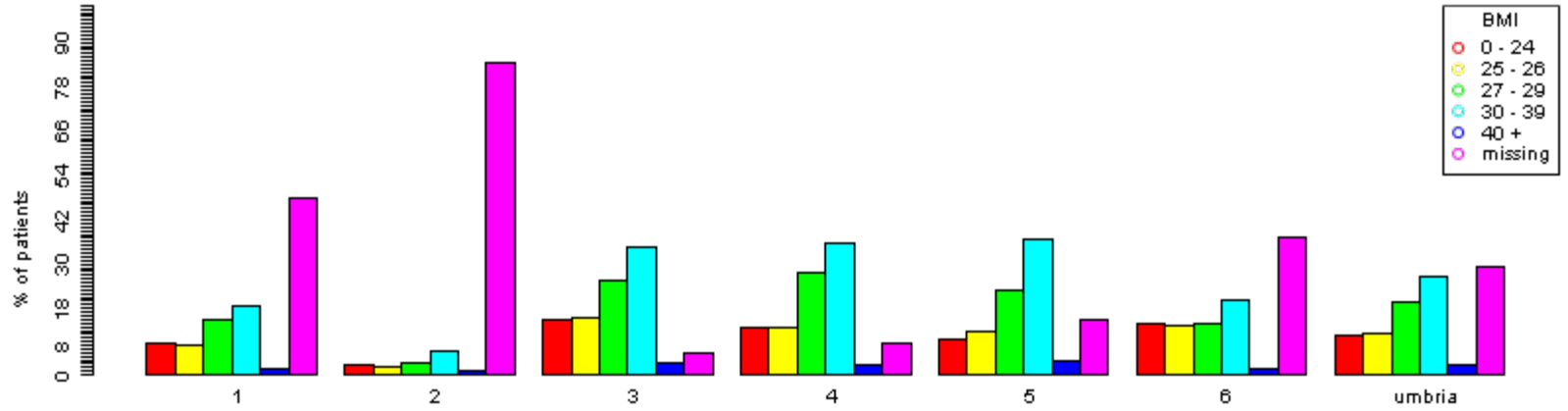
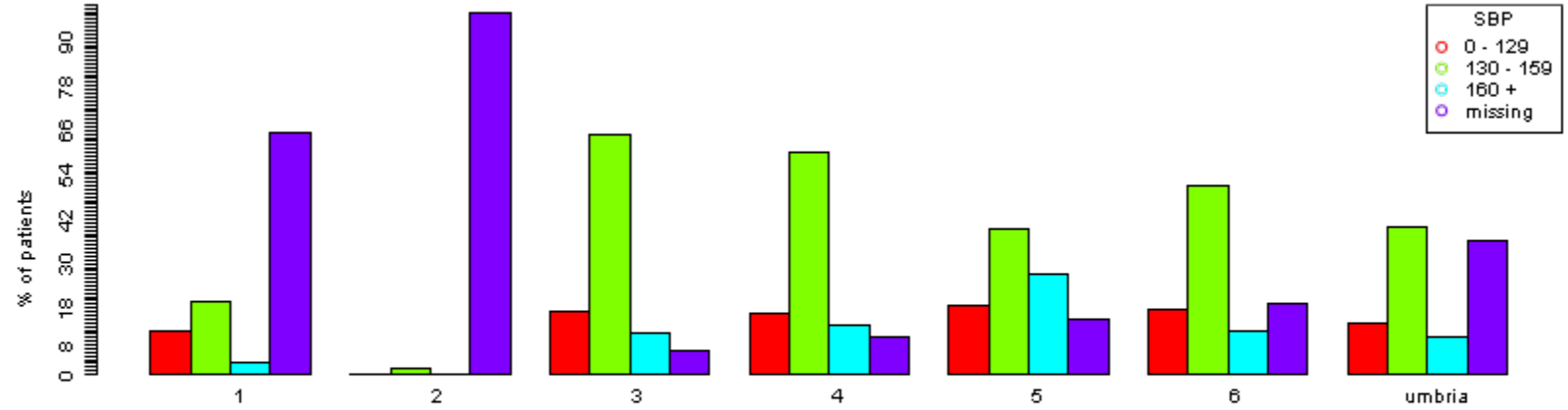
Statistical Report: General Characteristics (TYPE 2)





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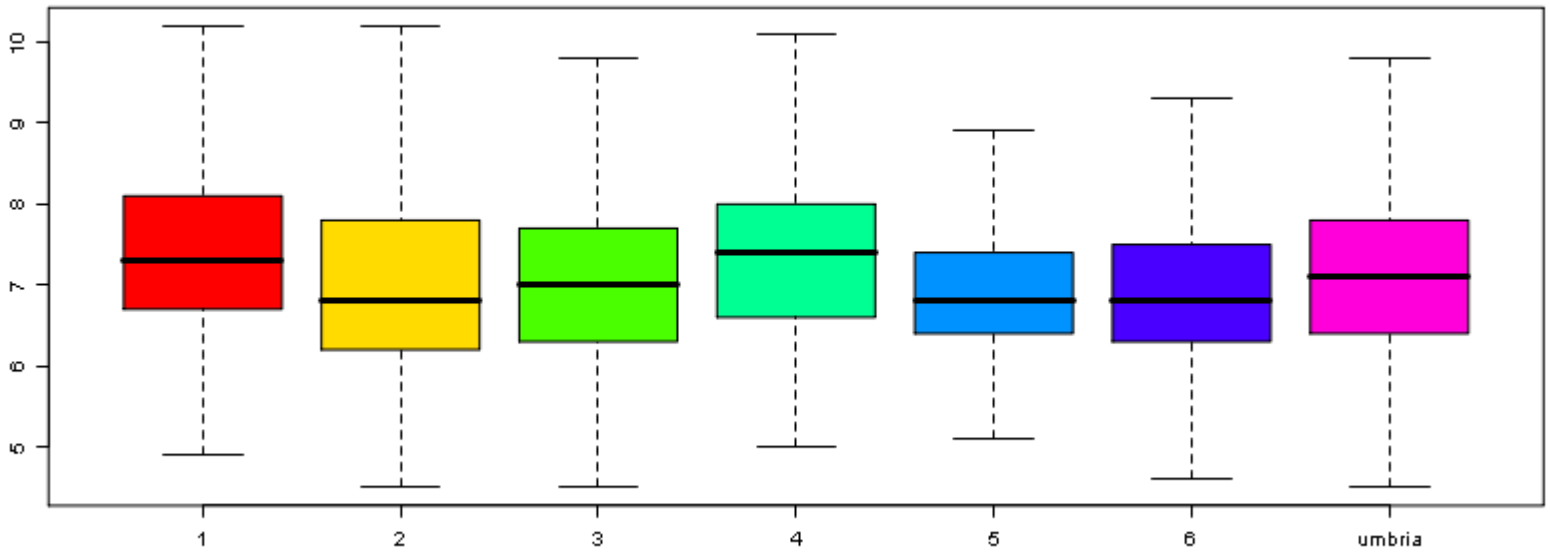
Statistical Report: General Characteristics (TYPE 2)

HbA1c by centre



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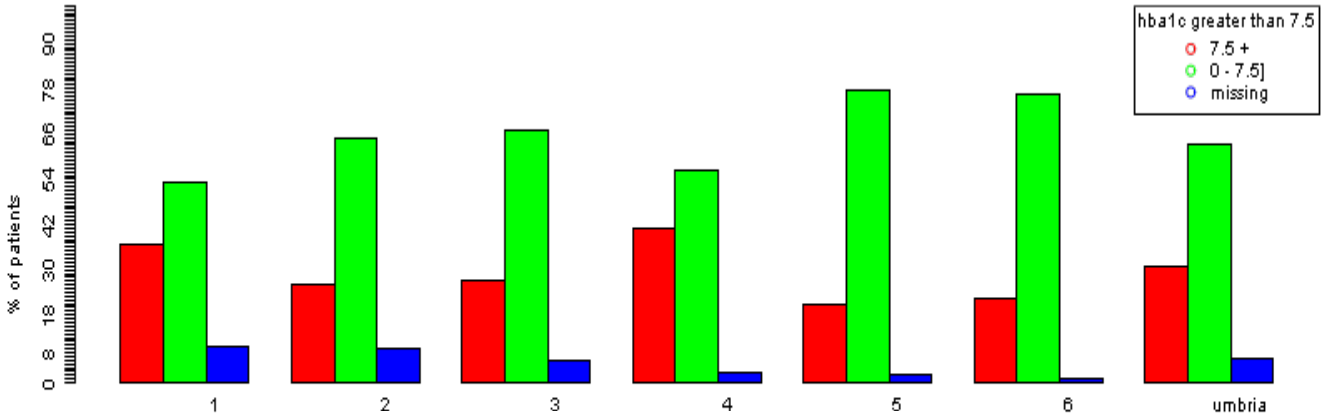
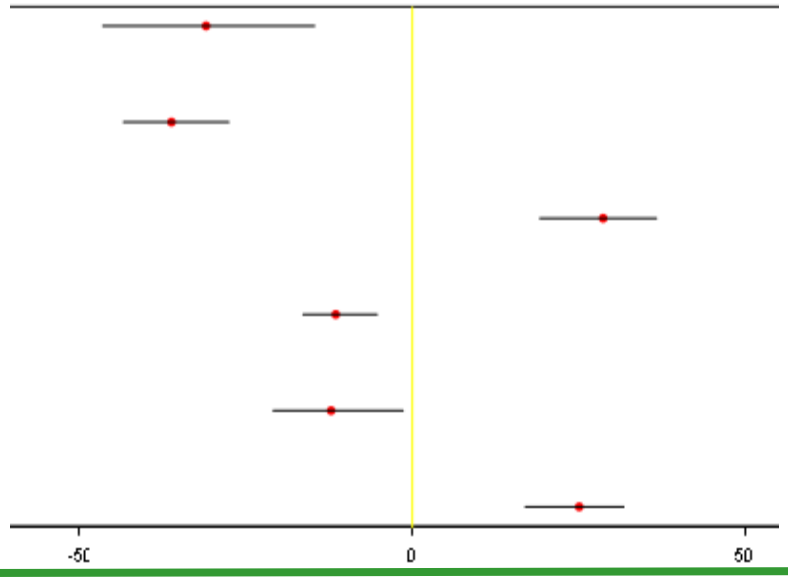
Statistical Results: BIRO Indicators





(O-E)/E%
95% CI

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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.

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Conclusions (2): Diabetes Care

- 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

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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.

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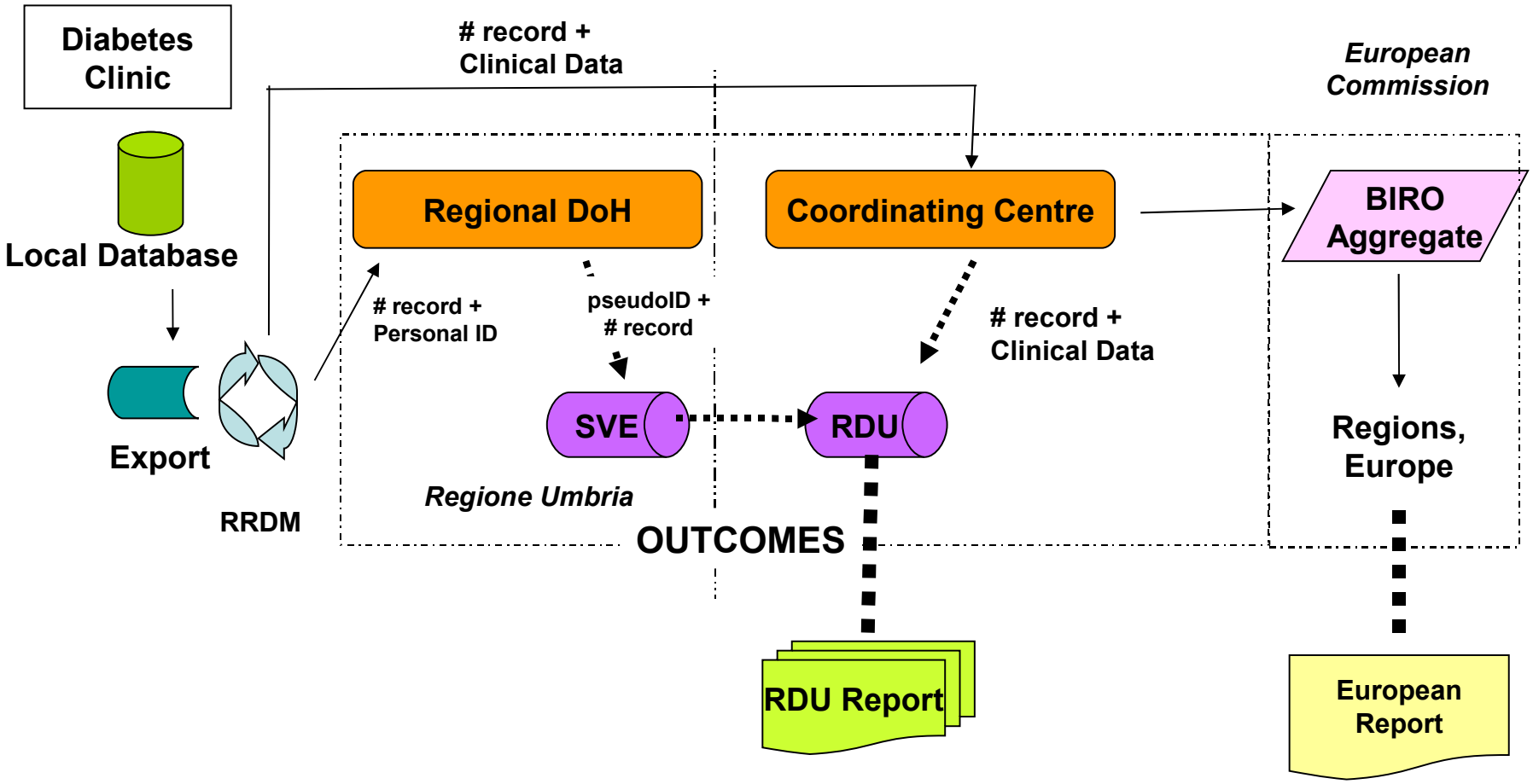
Future LOCAL Perspectives (1)



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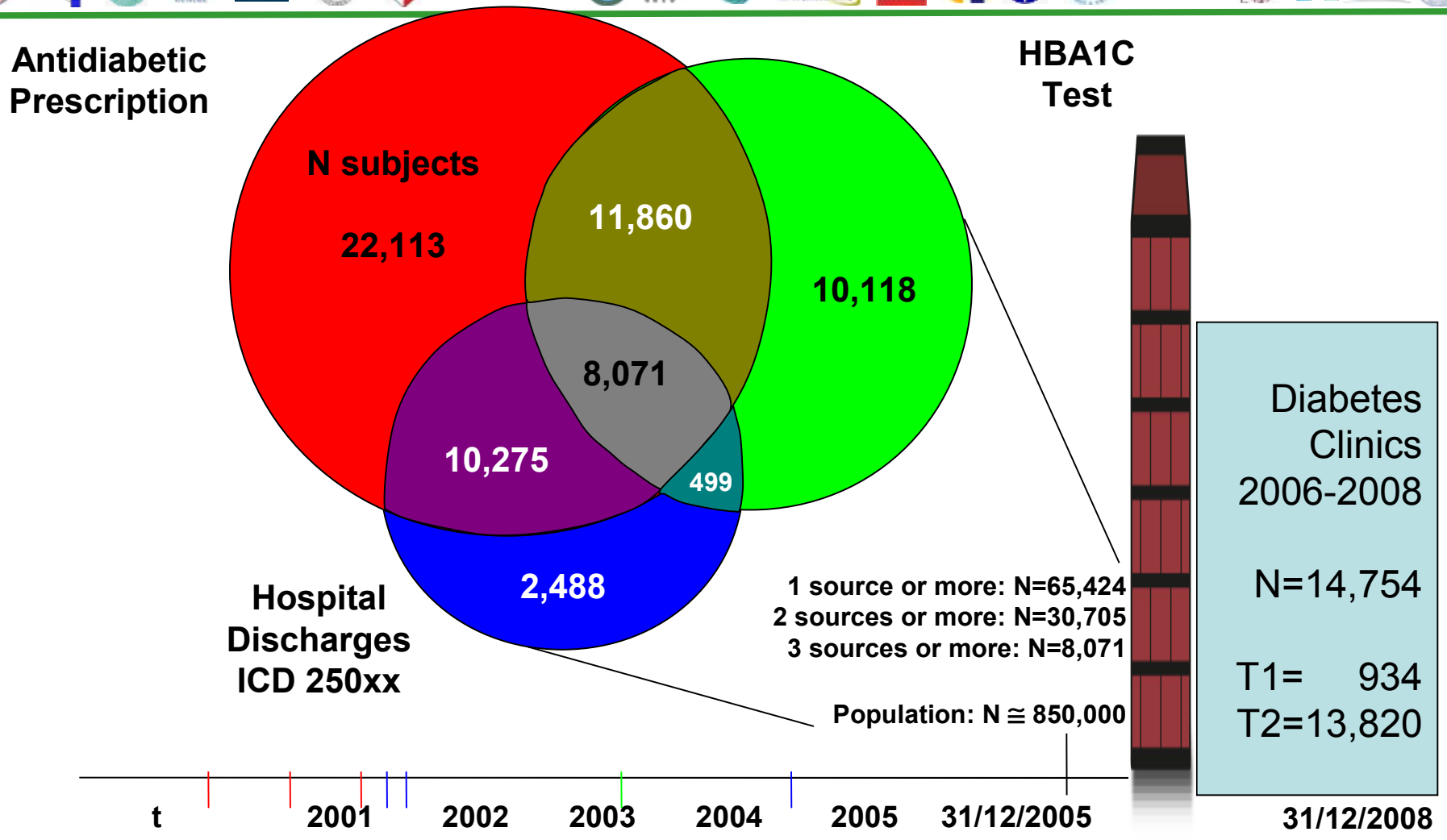
Future LOCAL Perspectives (2)



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Future BIRO Perspectives

- 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!