THE WENNBERG INTERNATIONAL COLLABORATIVE
SPRING POLICY MEETING
PISA 2016

Session II
Reducing Unwarranted Geographical Variation
11:00-13:00, 15th April 2016

Best Information through Regional Outcomes (BIRO): a decentralised approach for the secure integration of performance indicators and the automated analysis of practice variation

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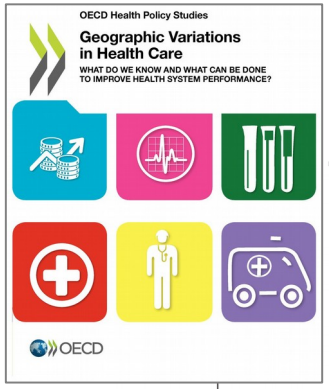
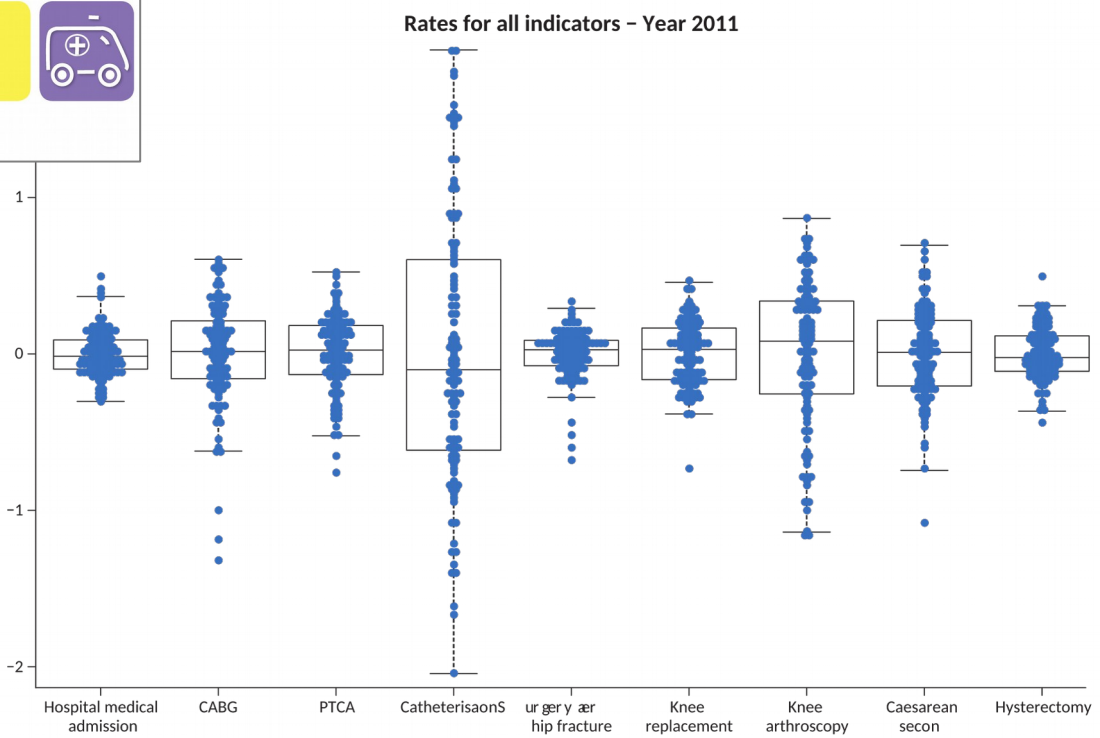
Reporting on medical practice variation



Turnip charts of log-standardised rates for all health care procedures and activities, by province, Italy, 2011



Source: Authors' estimates based on National Hospital Discharges Database, Ufficio VI, DG Programmazione sanitaria, Ministero della Salute, Italy.

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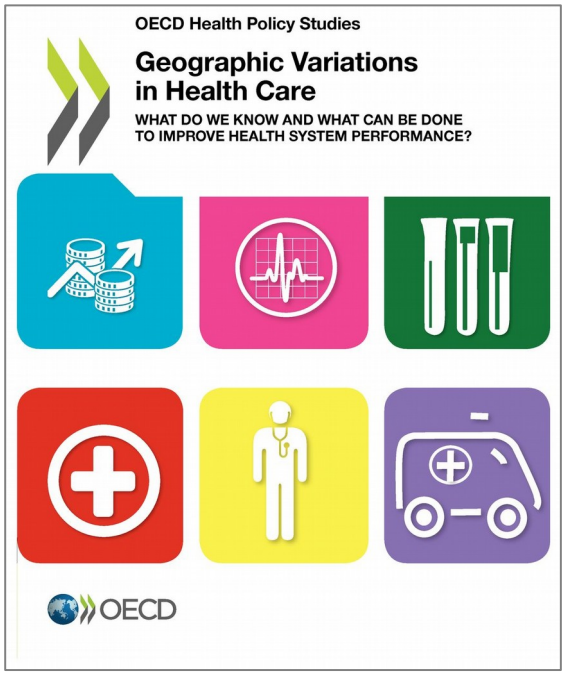
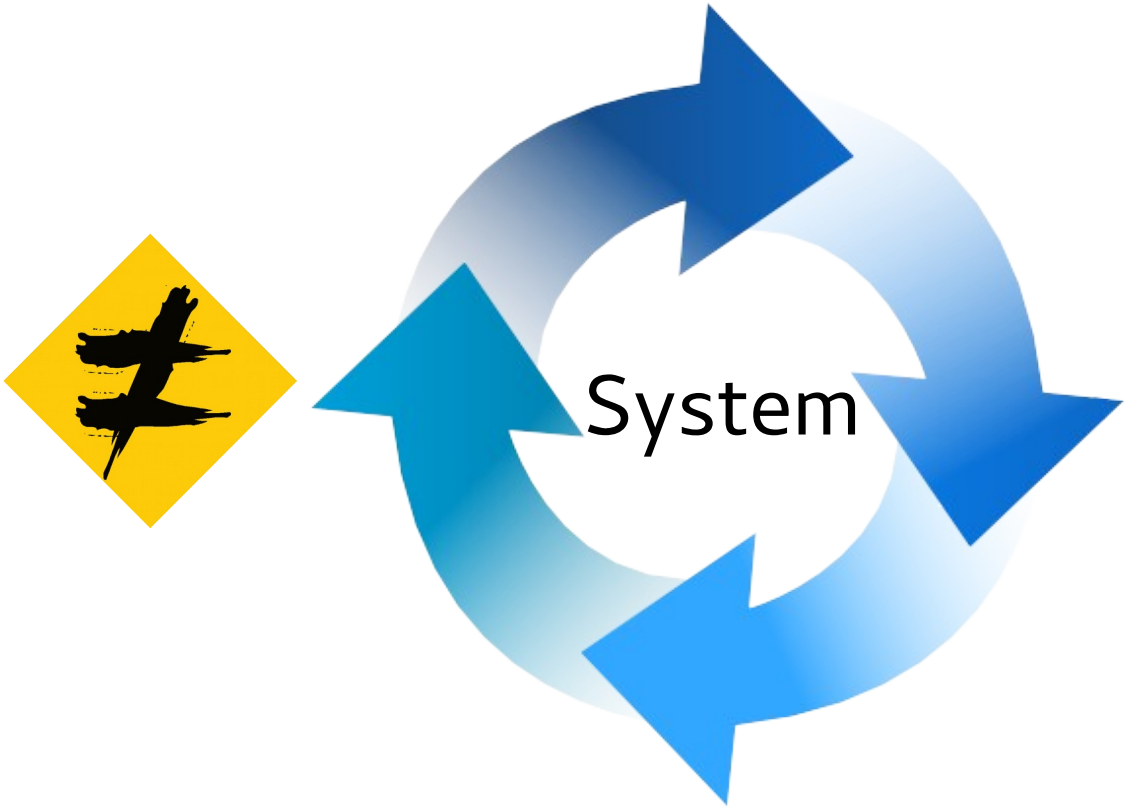
Measurement vs Routine Monitoring



Project



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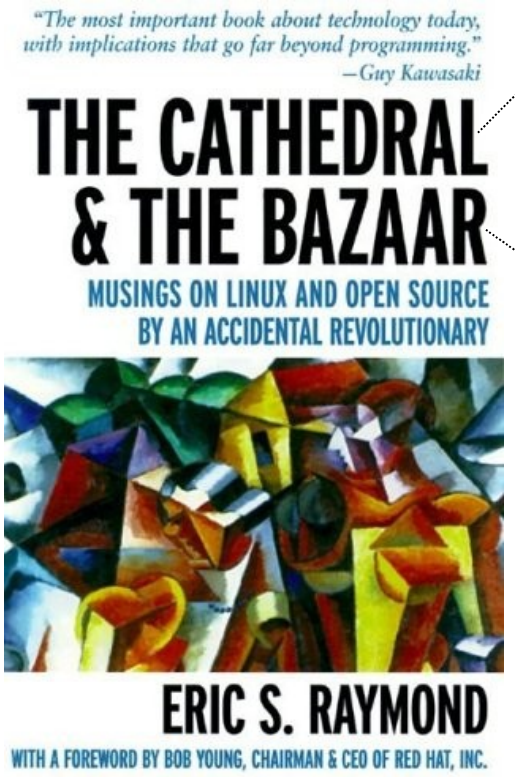
Choosing the reference model



An inspiring statistical reflection

Complete Sample

Box 3.4.2. Output Logistic Model on all observations

The LOGISTIC Procedure
Model Information

Data Set	WORK._MODEL_
Response Variable	HI_HBA
Number of Response Levels	2
Number of Observations	17102
Model	binary logit
Optimization Technique	Fisher's scoring

Response Profile

Ordered Value	HI_HBA	Total Frequency
1	1	4856
2	0	12246

Probability modeled is HI_HBA=1.

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-0.6862	0.1028	44.5243	<.0001
GENDER	1	-0.2297	0.0343	44.7555	<.0001
CL_AGE2	1	0.0916	0.1092	0.7027	0.4019
CL_AGE3	1	-0.1465	0.1040	1.9842	0.1589
CL_AGE4	1	-0.2491	0.1086	5.2637	0.0218

Box 3.4.3. Output Logistic Model on aggregate data

The LOGISTIC Procedure
Model Information

Data Set	WORK.IN_SEDIS
Response Variable	HI_HBA
Number of Response Levels	2
Number of Observations	16
Weight Variable	COUNT
Sum of Weights	17102
Model	binary logit
Optimization Technique	Fisher's scoring

Response Profile

Ordered Value	HI_HBA	Total Weight	Total Frequency
1	1	8	4856.000
2	0	8	12246.000

Probability modeled is HI_HBA=1.

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-0.6862	0.1028	44.5243	<.0001
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Combinations of Levels of Covariates

Same results !

Box 3.4.4. Observed/expected rates by centre using logistic regression

Centre	Den.	Num.	%Observed	% Expected	95% Lower	95% Upper
1	7699	2189	28.4	28.5	27.5	29.5
2	2360	1000	42.4	28.0	26.1	29.8
3	3422	916	26.8	28.4	26.9	29.9
4	1239	222	17.9	28.3	25.8	30.8
5	2382	529	22.2	28.4	26.6	30.2

EU BIRO and EUBIROD projects

BIRO project (2005–2009)
EU DG–SANCO co–funded public health project in diabetes

"to provide European health systems with an ad hoc, evidence and population-based diabetes information system"

EUBIROD project (2008–2012)
EU DG–SANCO co–funded public health project in diabetes

"to implement a sustainable European Diabetes Register through the coordination of existing national/regional frameworks and the systematic use of the BIRO system in 20 European countries"

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BIRO fundamental principles

System. *Federation of networks sharing a common distributed health information infrastructure*

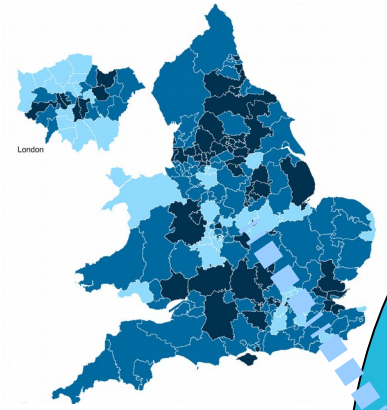
Region. *A network in the system sharing a homogeneous set of standardized definitions for the collection of health information*

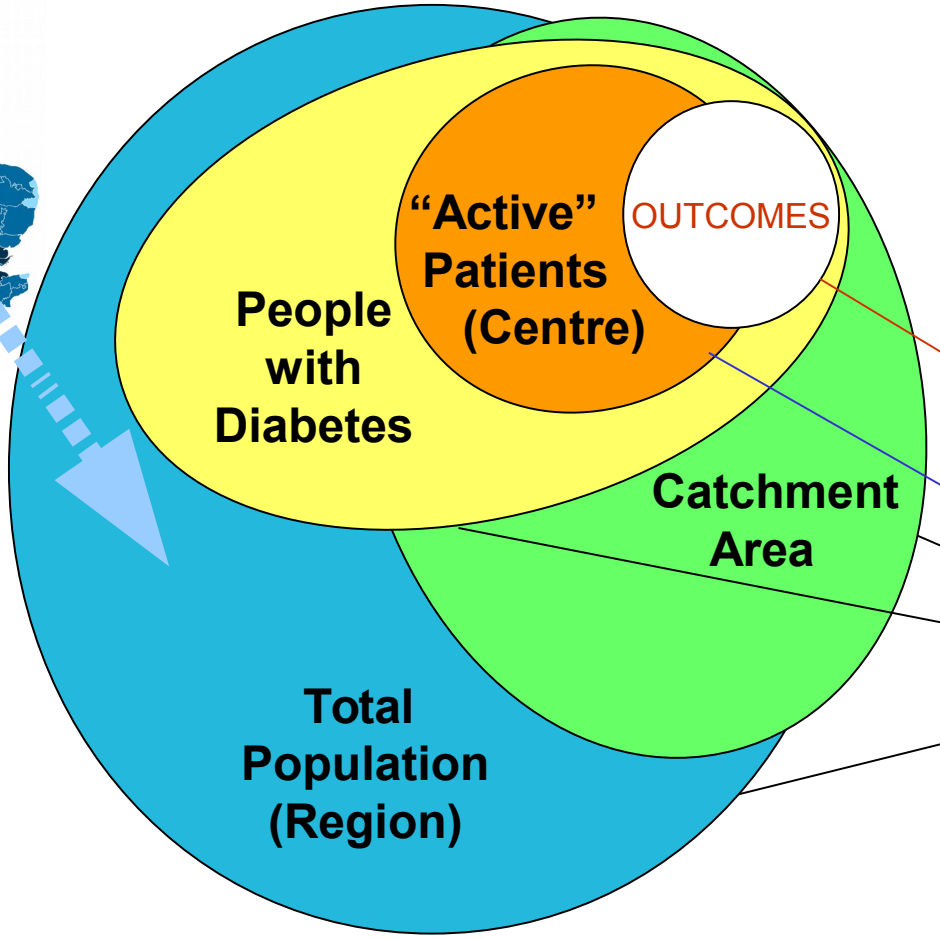
Statistical Object. *Element of a distributed information system carrying essential data in the form of one or more embedded aggregate components, specifically designed to produce a summary output for a population of interest*

Data source. *Unit within a region contributing to the system through the transmission of statistical objects to the higher level*

Box. *Standardized software installed in each data source to generate statistical objects from local data*

Data sources vs population-based analysis





INDICATORS

Numerator

Denominator

DATA

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The BIRO approach

1. Review your problem: construct an evidence-based framework
2. Describe the data structure of your network
3. Agree on reporting targets: specify report templates
4. Conduct a Privacy Impact Assessment
5. Identify the best information system architecture
6. Specify your data dictionary
7. Design and implement all software
8. Analyse data and disseminate results
9. Transfer technology
10. Evaluate, improve and update

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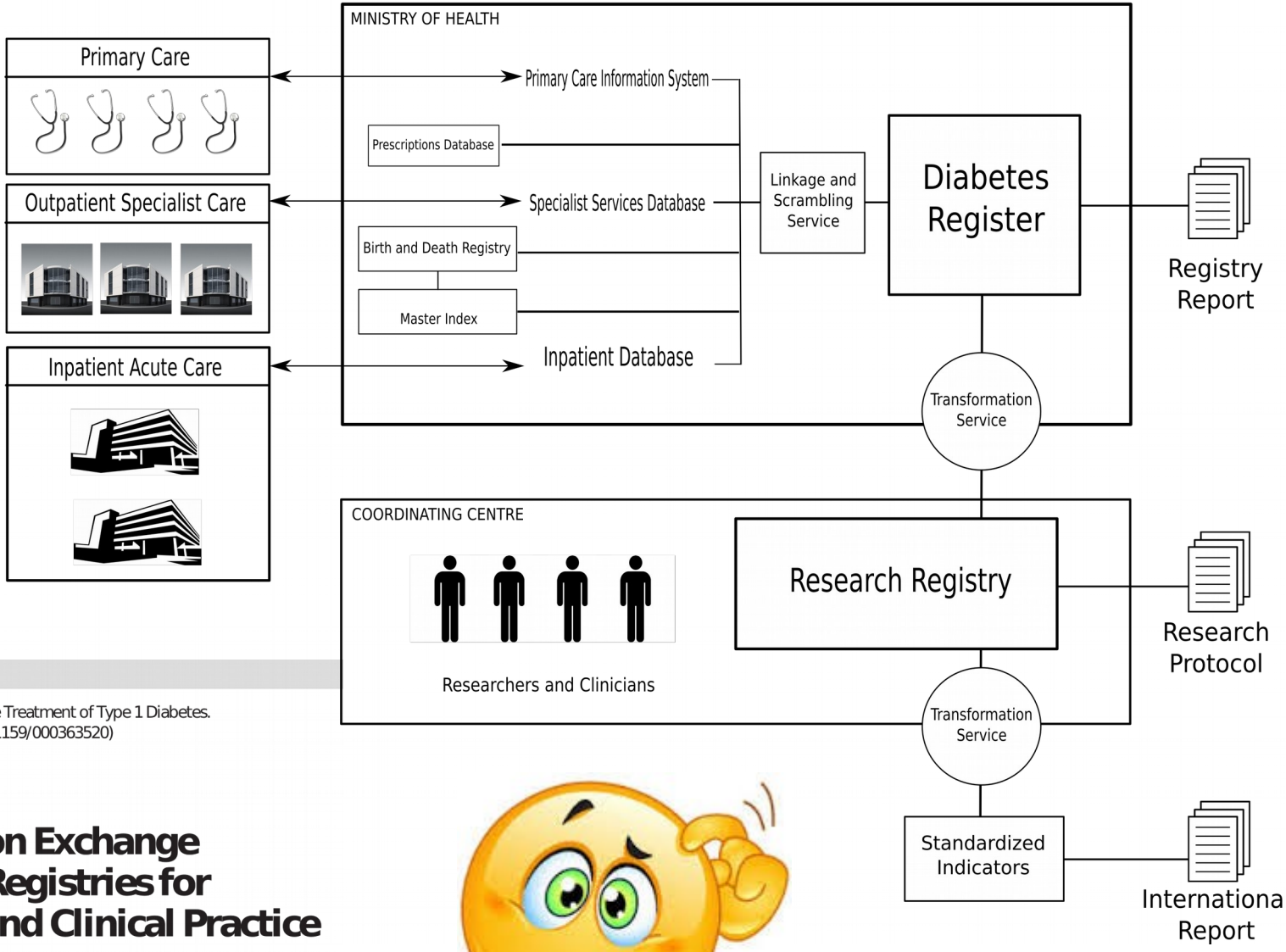
The structure of disease registers: ideal vs real



Bruttomesso D, Grassi G (eds): Technological Advances in the Treatment of Type 1 Diabetes. Front Diabetes. Basel, Karger, 2014, vol 24, pp 1–14 (DOI: 10.1159/000363520)

Standardized Information Exchange in Diabetes: Integrated Registries for Governance, Research, and Clinical Practice

F. Carinci[a] ▪ C.T. Di Iorio[a] ▪ M. Massi Benedetti[b]

[a]Serectrix snc, Pescara, [b]Hub for International Health Research, Perugia, Italy

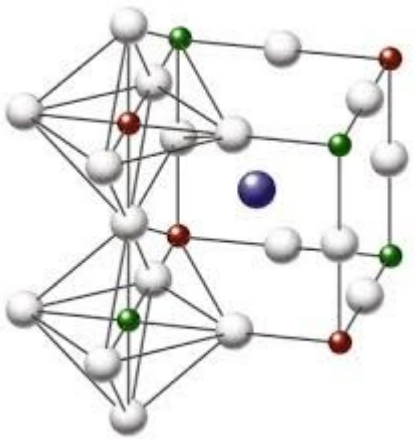
Original Articles

Core Standards of the EUBIROD Project*

Defining a European Diabetes Data Dictionary for Clinical Audit and Healthcare Delivery

S. G. Cunningham[1]; F. Carinci[2,3]; M. Brillante[1]; G. P. Leese1; R. R. McAlpine1; J. Azzopardi[4]; P. Beck[5]; N. Bratina[6]; V. Boucquet[7]; K. Doggen[8]; P. K. Jarosz-Chobot[9]; M. Jecht[10]; U. Lindblad[11]; T. Moulton[12]; Ž. Metelko[13]; A. Nagy[14]; G. Olympios[15]; S. Pruna[16]; S. Skeie[17]; F. Storms[18]; C. T. Di Iorio[19]; M. Massi Benedetti[2]

[1]University of Dundee, Scotland; [2]Hub for International Health Research, Italy; [3]University of Surrey, United Kingdom; [4]University of Malta, Malta; [5]Joanneum Research, Austria; [6]University Children's Hospital Ljubljana, Slovenia; [7]Centre Hospitalier de Luxembourg, Luxembourg; [8]Scientific Institute of Public Health, Belgium; [9]Medical University of Silesia, Poland; [10]Havelhöhe Hospital, Germany; [11]Department of Primary Care, University of Gothenburg, Sweden; [12]Adelaide and Meath Hospital, Ireland; [13]Vuk Vrhovac University Clinic for Diabetes, Croatia; [14]University of Debrecen, Hungary; [15]Ministry of Health, Cyprus; [16]Telemedica Consulting, Romania; [17]NOKLUS, Norway; [18]Dutch Institute for Healthcare Improvement (CBO), The Netherlands; [19]Serectrix snc, Italy



1 DEMOGRAPHIC CHARACTERISTICS	1.1 Basic demographics		
2 CLINICAL CHARACTERISTICS	2.1 Diabetes status		
	2.2 Risk factors for diabetes complicat ons	2.2.1 Obesity and Growth (most recent value in the last 12 months)	
		2.2.2 Lifestyle	
		2.2.3 Clinical measurements (most recent value in the last 12 months)	
	2.3 Diabetes complicat ons		
3 HEALTH SYSTEM	3.1 Structure (provider level)		
	3.2 Structural quality		
	3.3 Processes	3.3.1 Foot examinat on	
		3.3.2 Eye examinat on	
		3.3.3 Measurement done (in the last 12 months)	
		3.3.4 Treatment (at least one prescript on in the last 12 months)	
		3.3.5 Management	
4 POPULATION	4.1 Area level		
5 RISK ADJUSTED INDICATORS	5.1 Epidemiology		
	5.2 Process quality (in adults with diabetes in the last 12 months)		
	5.3 Outcome Quality: Intermediate outcomes (in adults with diabetes in the last 12 months)		
	5.4 Outcome Quality: Terminal outcomes (in the last 12 months)		

Core Standards of the EUBIROD Project*

Defining a European Diabetes Data Dictionary for Clinical Audit and Healthcare Delivery

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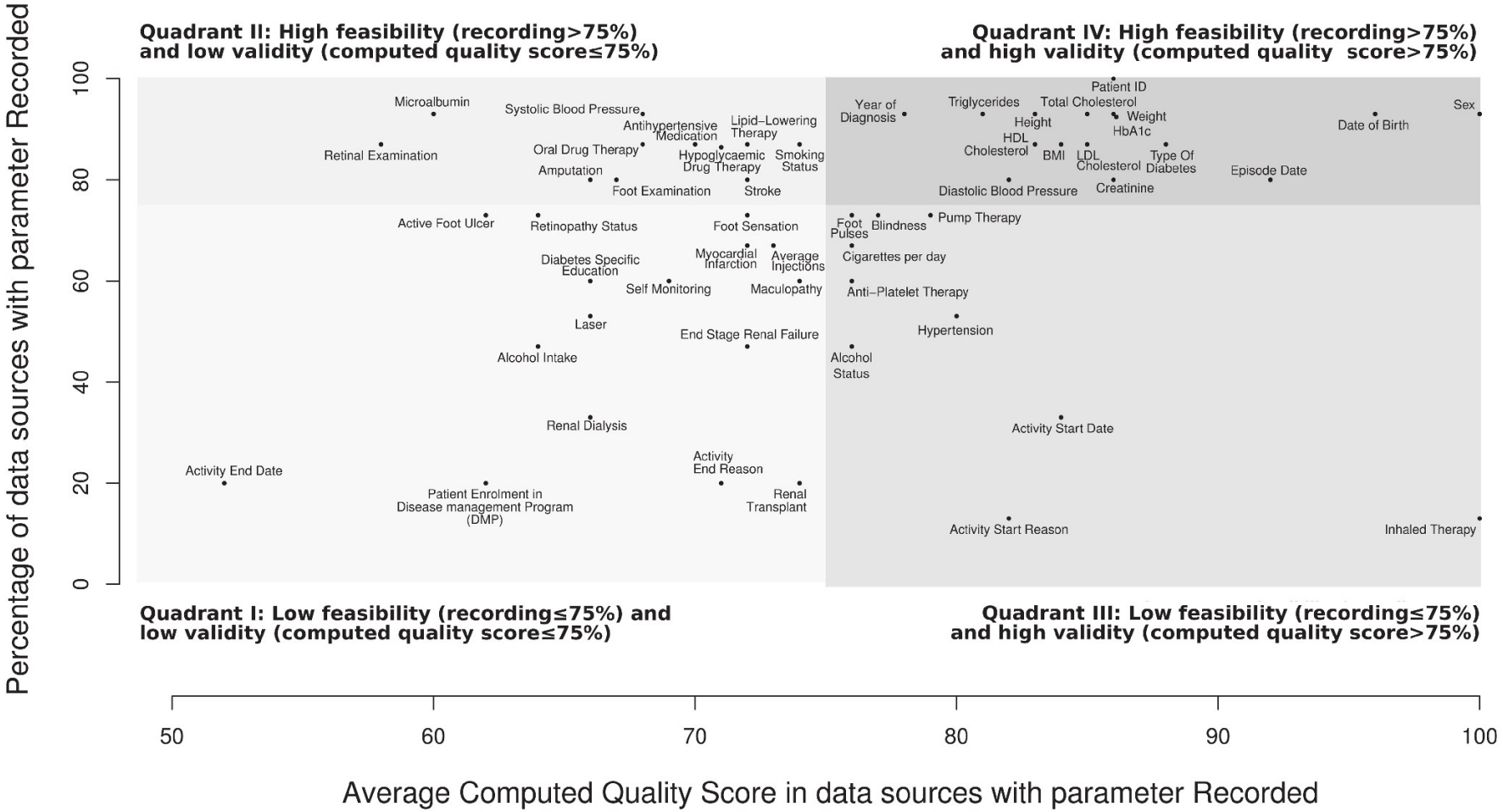

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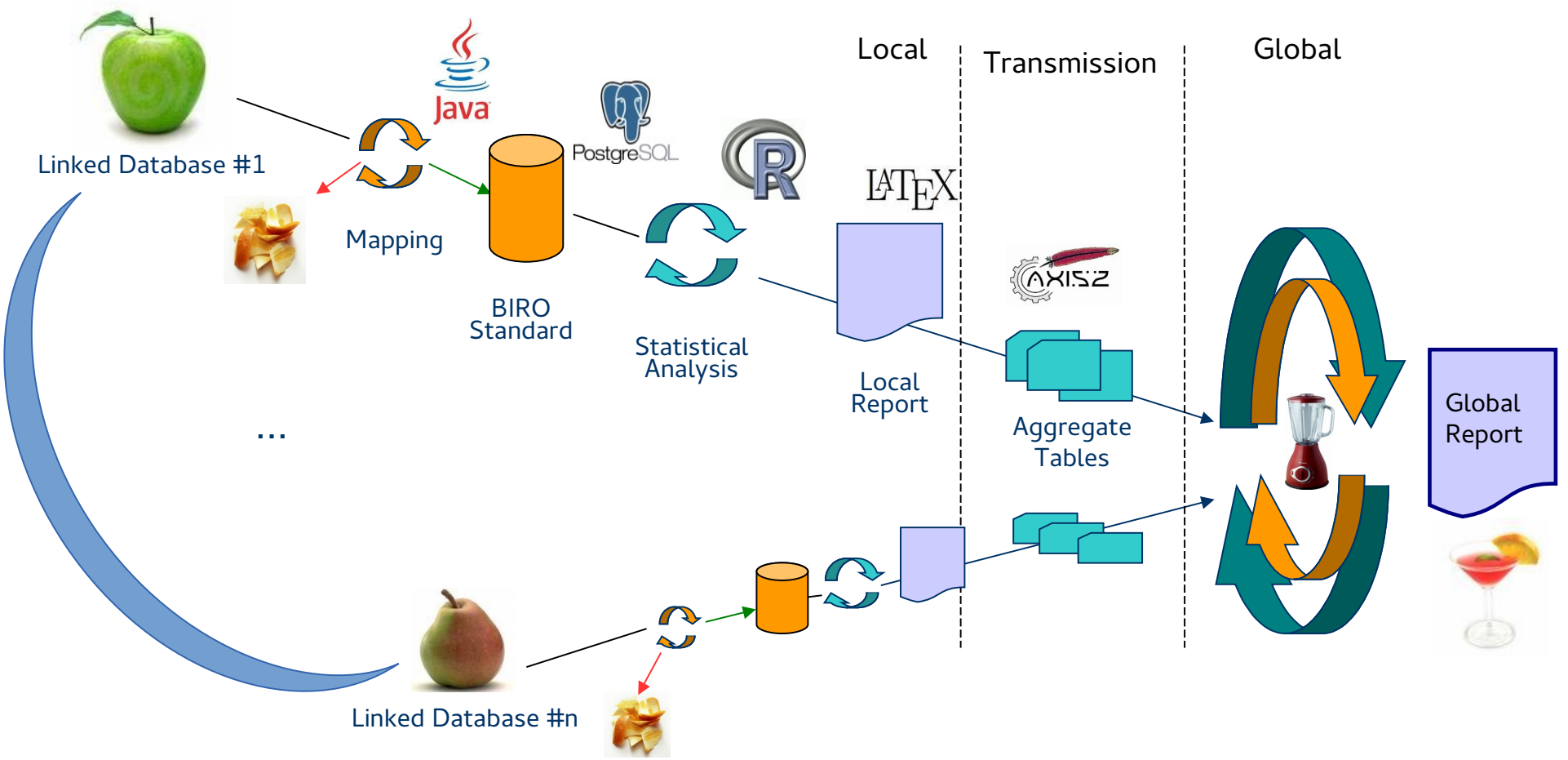
The BIRO system

http://www.eubirod.eu



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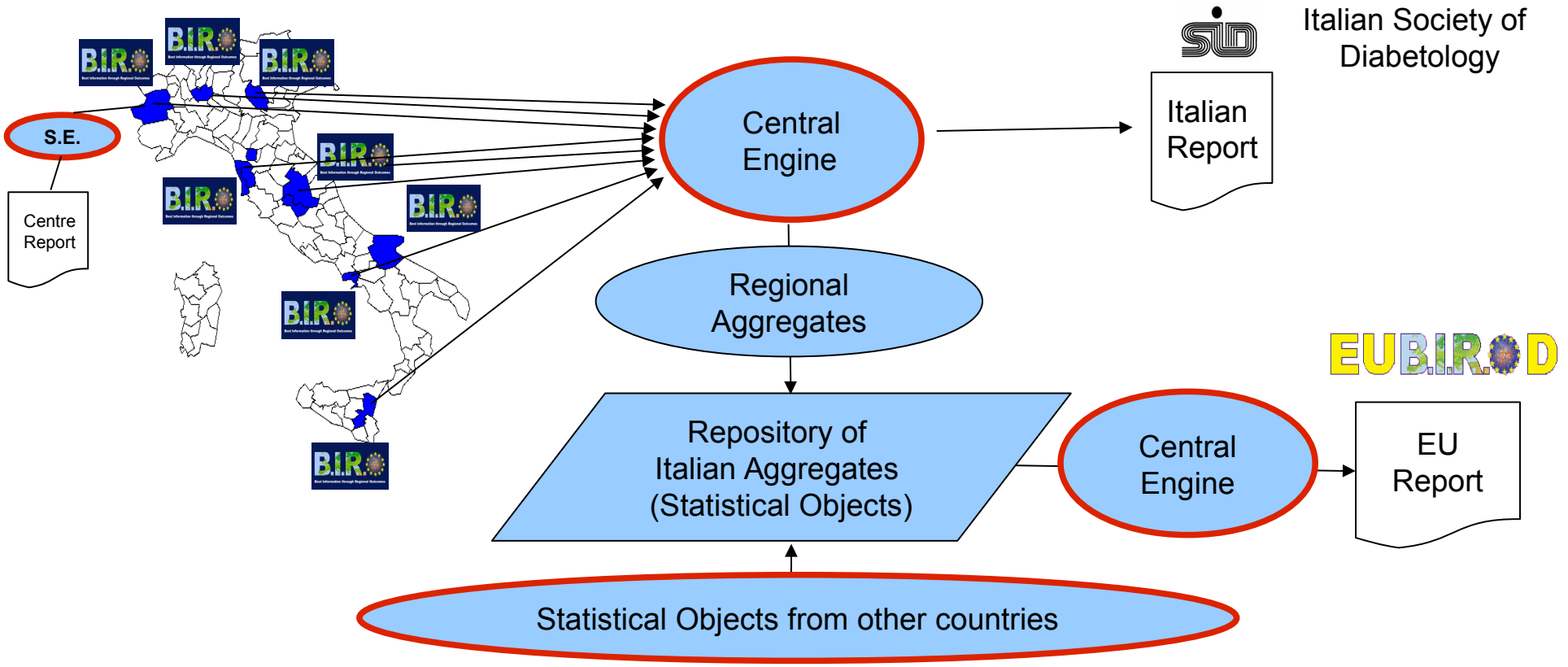
Applying BIRO in the EUBIROD project: National decentralised automated reporting

ITALY: BIRO installed in N=8 centres; S.E.=Statistical Engine

DATABASES OF INDIVIDUAL RECORDS STAY WITH THE ORIGINAL DATA CUSTODIAN



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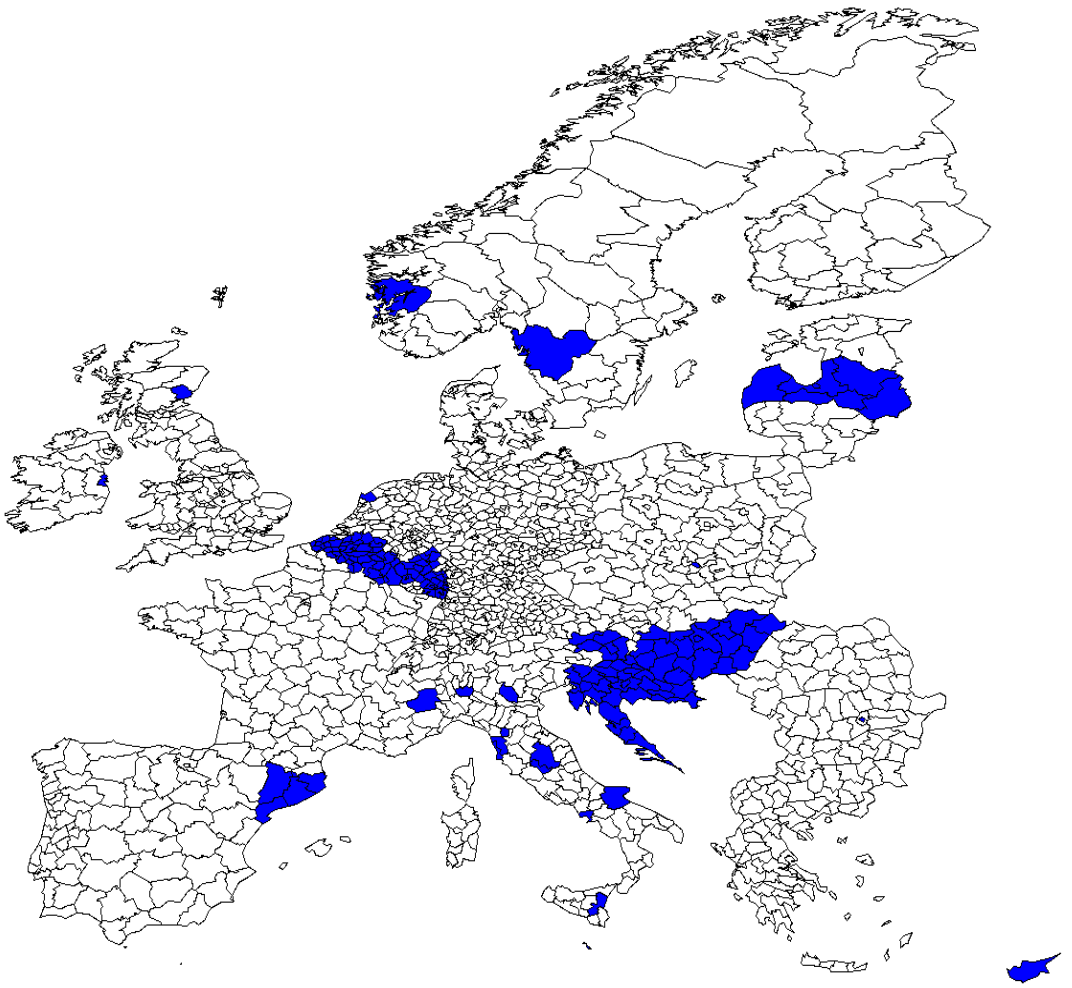
EUBIROD Report (2012)

8/2/2012: New BIRO Release 2.1.12

15/2/2012: Collection of statistical objects closed

21/2/2012: EU Report available (N=79 indicators)



13 Days from Software Release to Online Publication of the results !

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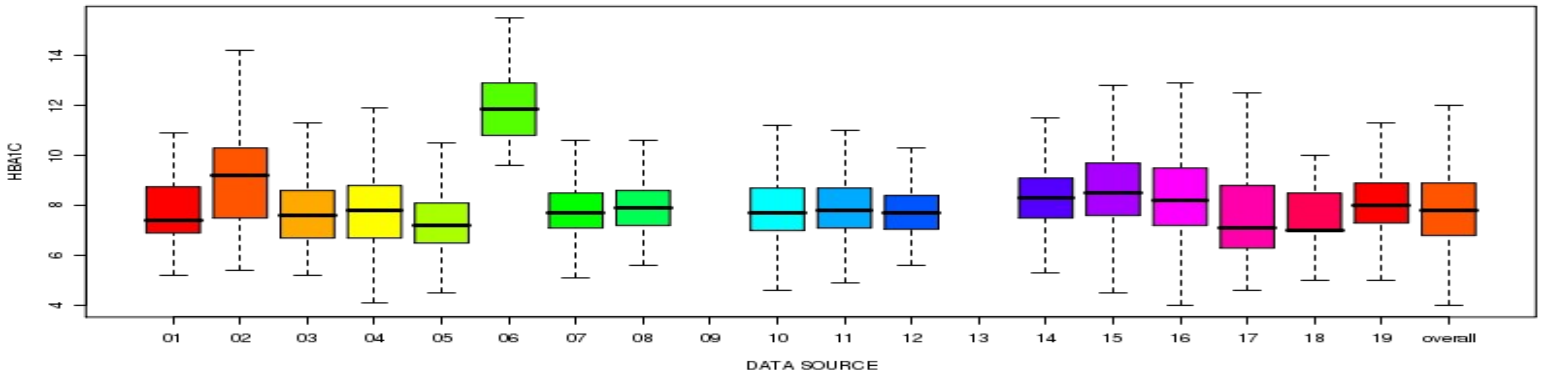
Glycated Haemoglobin (HbA1c)

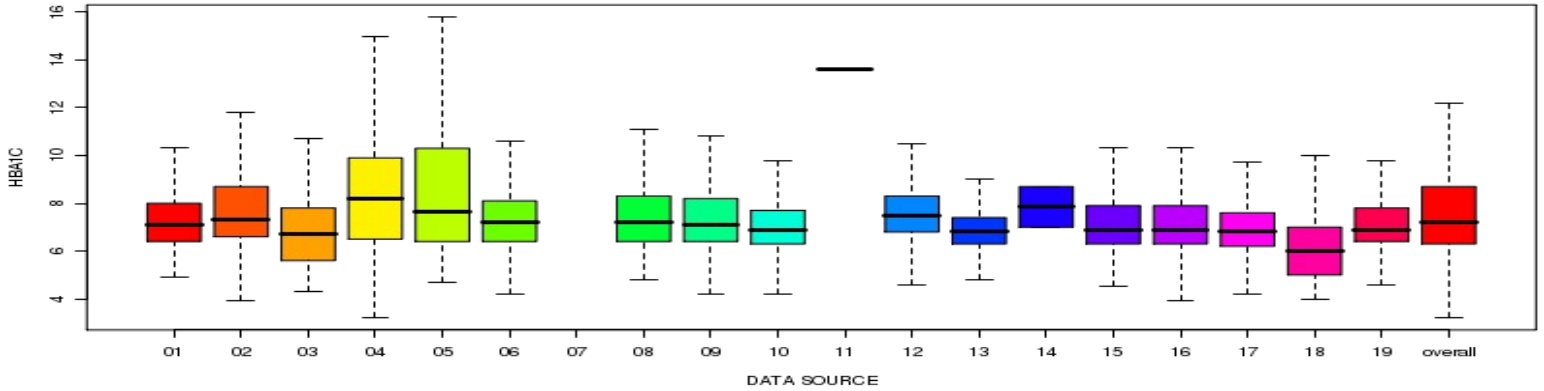
N=168,948

EUBIROD Diabetes Report 2012

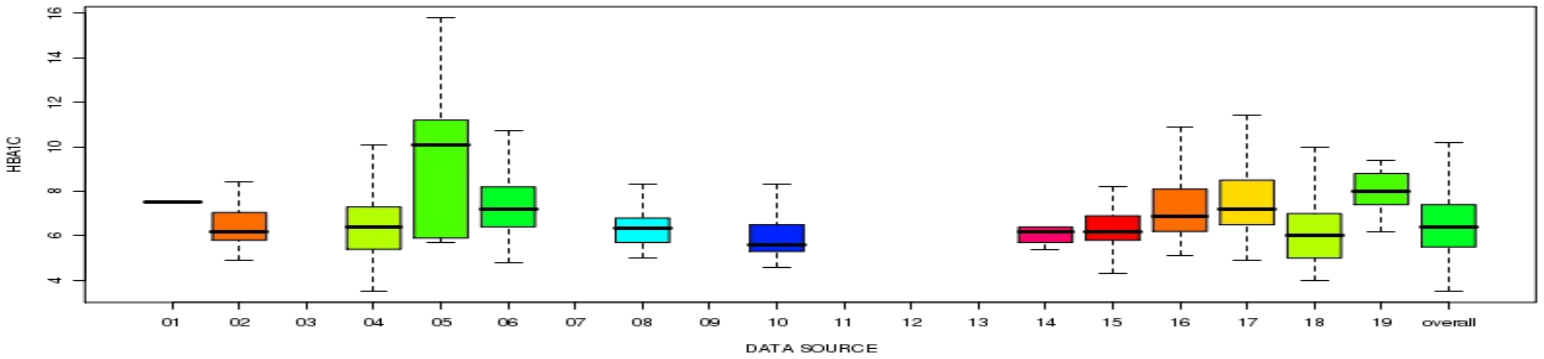
Type 1



Type 2



Other Type



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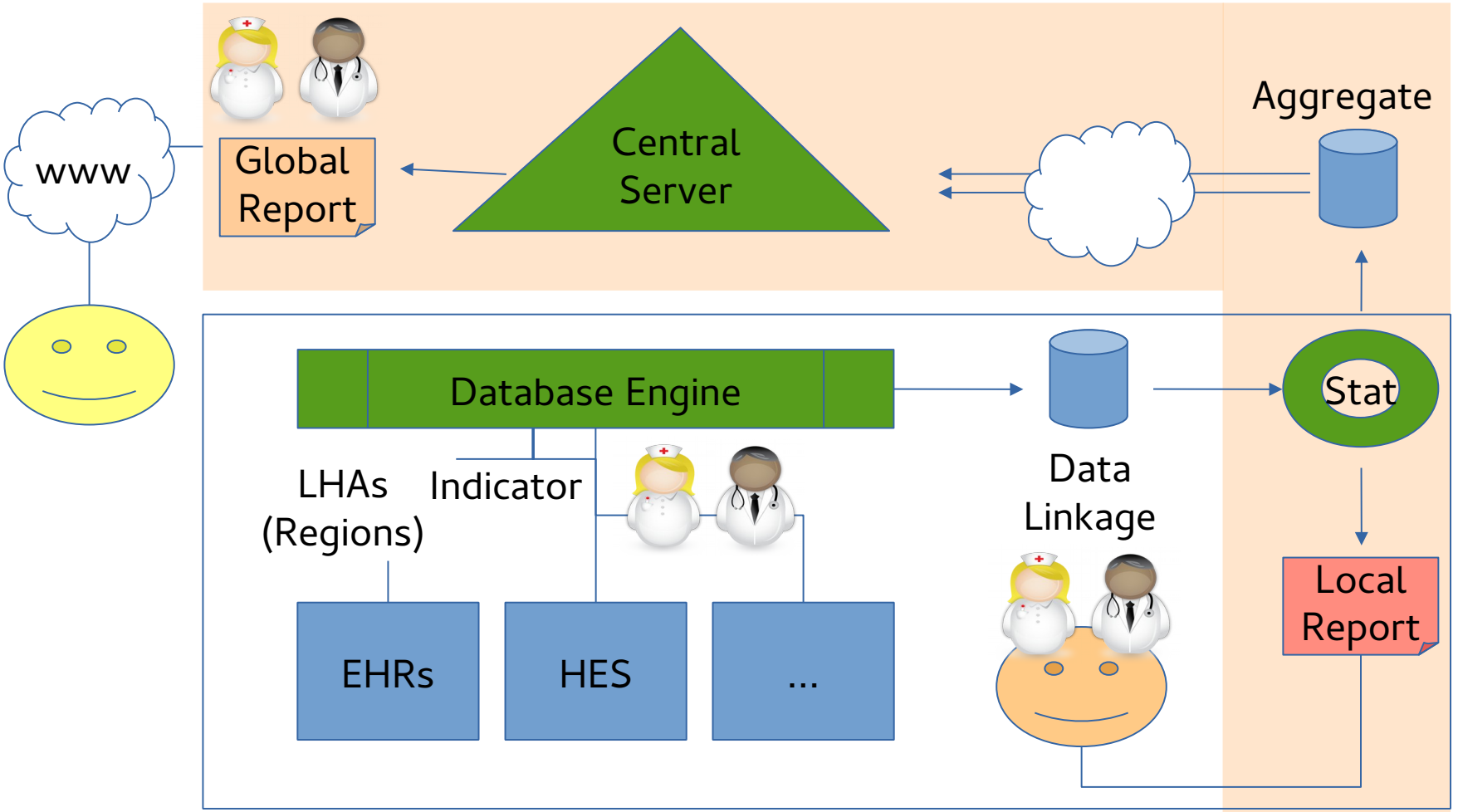
Application of the BIRO approach to the NEO system in the Matrice project (Agenas 2011-2014)

https://github.com/agenas/neo



The shaded data architecture is based on the BIRO system (2005-2012, see www.biro-project.eu, www.eubirod.eu)

Open Source Tools adopted

H2

R

DocBook

Groovy

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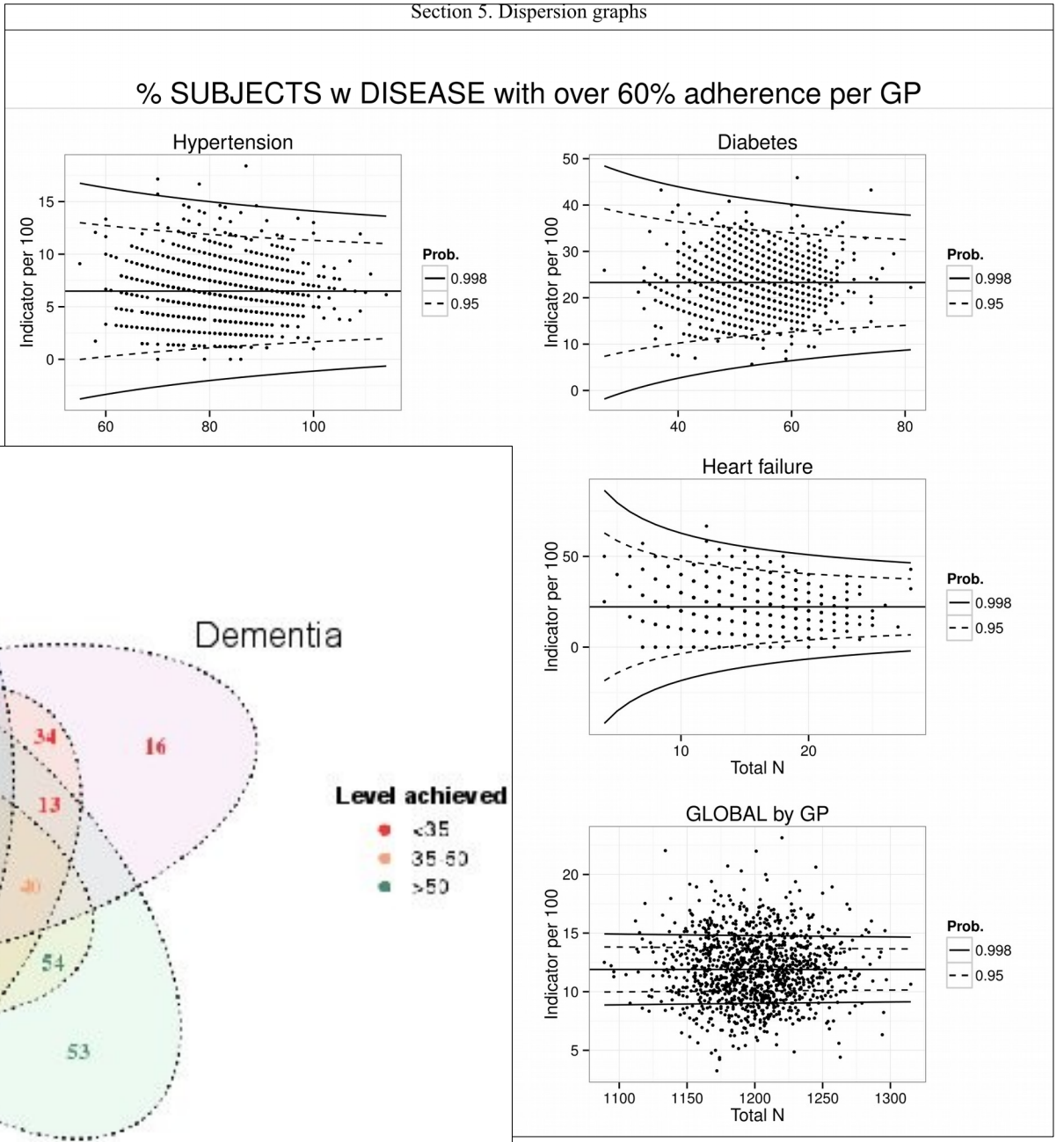
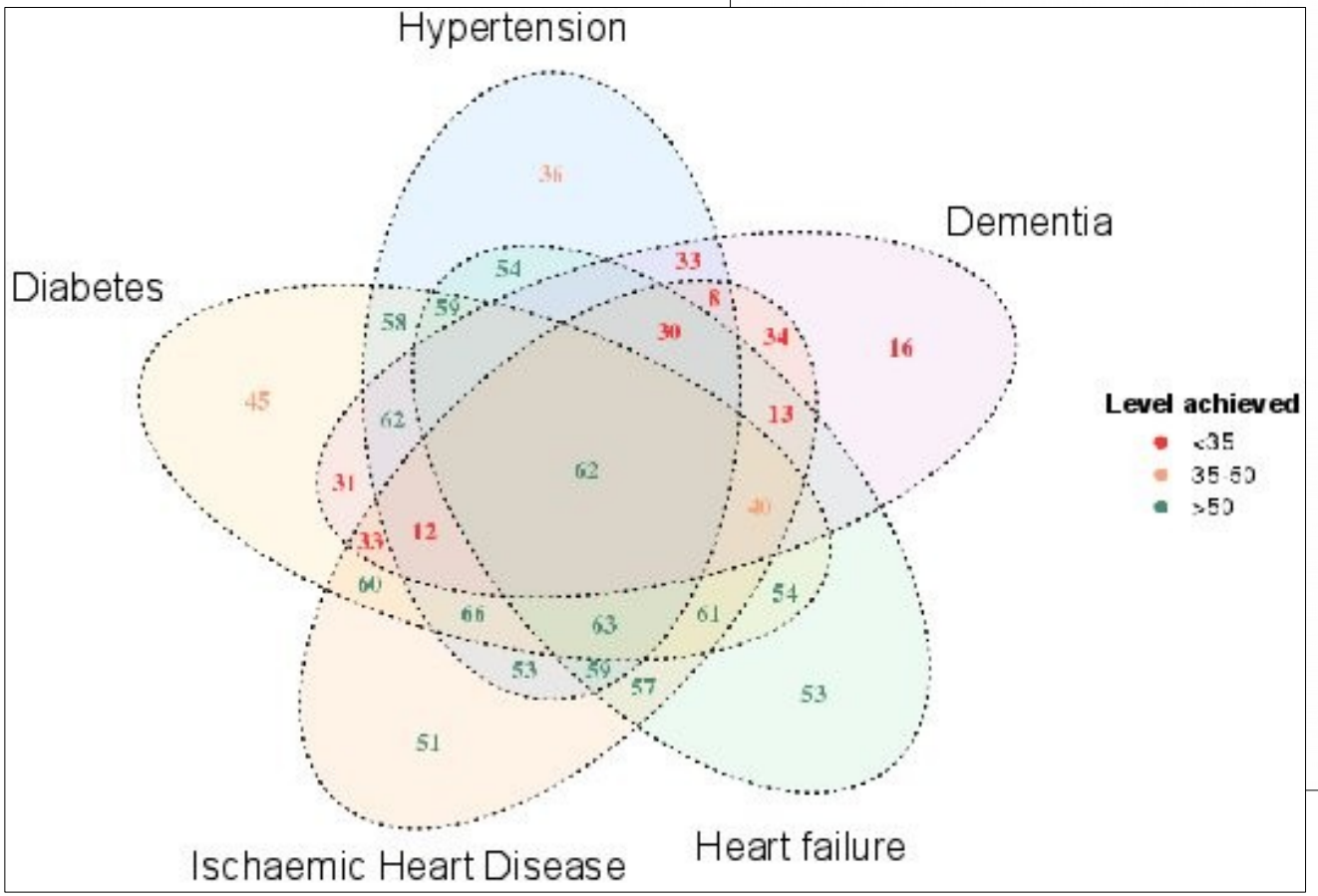
Neo outputs

https://github.com/agenas/neo





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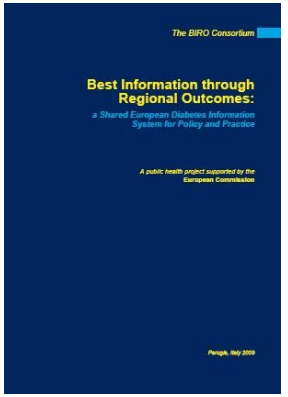
B.I.R.

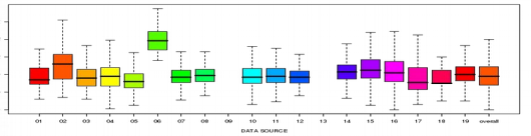
Best Information through Regional Outcomes

www.biro-project.eu



2005-2009

→ EUBIROD Diabetes Report

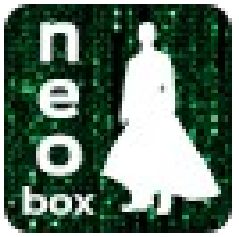


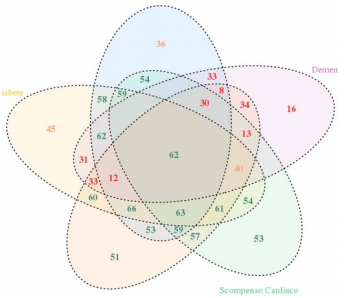
EUBIROD

www.eubirod.eu

Diabetes

2012



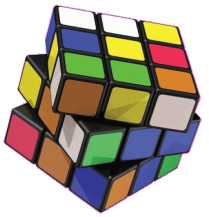


PARENT cross-border PAtient REgistries iNiTiative

CHRODIS ADDRESSING CHRONIC DISEASES AND HEALTHY AGEING ACROSS THE LIFE CYCLE

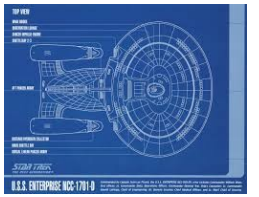
OECD Health Information Infrastructure, Hospital Performance Benchmarking

2014



User

Technical



2016

BRIDGEHEALTH

BRidging Information and Data Generation for Evidence-based Health Policy and Research

www.bridge-health.eu

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Watch this space!

BIRO http://www.biro-project.eu

EUBIROD http://www.eubirod.eu

NEO https://github.com/agenas/neo

EUBIROD NETWORK http://www.hirs-research.eu/eubirod.html

Guildhall clock, Guildford, Surrey, UK

Thanks for your attention

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