

Medical Ontologies and Momis

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Spin-off presso Università di Modena e Reggio Emilia

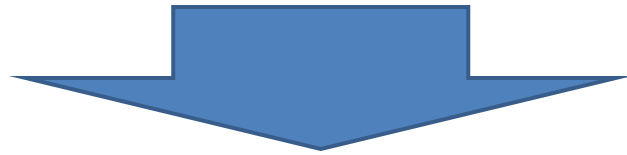


DataRiver
open source data integration

- ▶ An ontology is an engineering artifact consisting of:
 - ▶ A vocabulary used to describe (a particular view of) some domain
 - ▶ An explicit specification of the intended meaning of the vocabulary
- ▶ Ideally, an ontology should:
 - ▶ Capture the knowledge of a domain of interest
 - ▶ Provide a formal and machine manipulable model of the domain

Why we need to extend the WordNet Ontology?

- ▶ Many standard and nomenclatures in medical domain
 - ▶ Not all are internationally recognized
 - ▶ Each organization can choose which to use
- ▶ WordNet Ontology contains only very general concepts



Using MOMIS in medical domain makes critical the extension of WN with technical terms

Systematized Nomenclature of Medicine--Clinical Terms

SNOMED CT is the best positioned terminology to semantically annotate archetypes because it is an international standard which provides a consistent terminology across all health care domains
[J.Allones, D.Penas, M.Taboada, D.Martinez . A study of semantic proximity between archetype terms based on SNOMED CT relationships]

- ▶ **311,000** concepts
- ▶ Connected by some **1,360,000** links or relationships
- ▶ Project began in 1979
- ▶ Developed and standardized by **IHTSDO** (The International Health Terminology Standards Development Organization
[<http://www.ihtsdo.org/>])



- Started at National Library of Medicine, 1986
- Long-term R&D project
- Over 120 source vocabularies and over 1 million concepts

Is not an Ontology but a set of tool that allow to produce a customized Knowledge Source starting from a set of vocabularies (CPT[®], ICD-10-CM, LOINC[®], MeSH[®], RxNorm, and SNOMED CT[®])



Produce a database containing an Ontology in Rich Release Format (RRF) that include only concepts and vocabularies chosen by the User

The Goal is

- ▶ to merge the information available in WordNet with the technical information provided by the two medical ontologies

The main Issues are:

- ▶ identifying the entities that represent the same concept in the real world
- ▶ finding the relations that have the same meaning
- ▶ maintaining the semantics the two medical ontologies

Existing MOMIS projects about eHealth

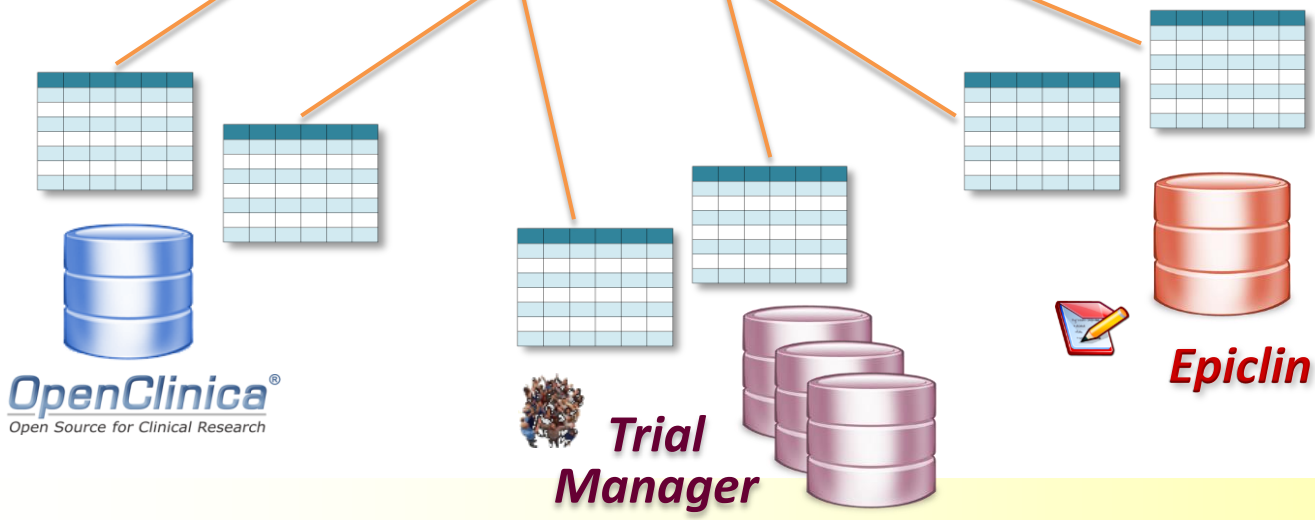
The system MOMIS has been used in

- **Olive Tree project** to integrate clinical data of patients from 10 different countries of the Mediterranean Area.
- **FIL project** (Fondazione Italiana Linfomi) to create a platform that allows users to perform customized searches on the different sources of clinical trial data: a new tool that allows an aggregated view of data easier has been developed, called *MOMIS dashboard*





MOMIS and MOMIS Dashboard have been adopted by FIL to integrate and monitor on a single platform over 30 clinical trials currently available on 5 different data sources



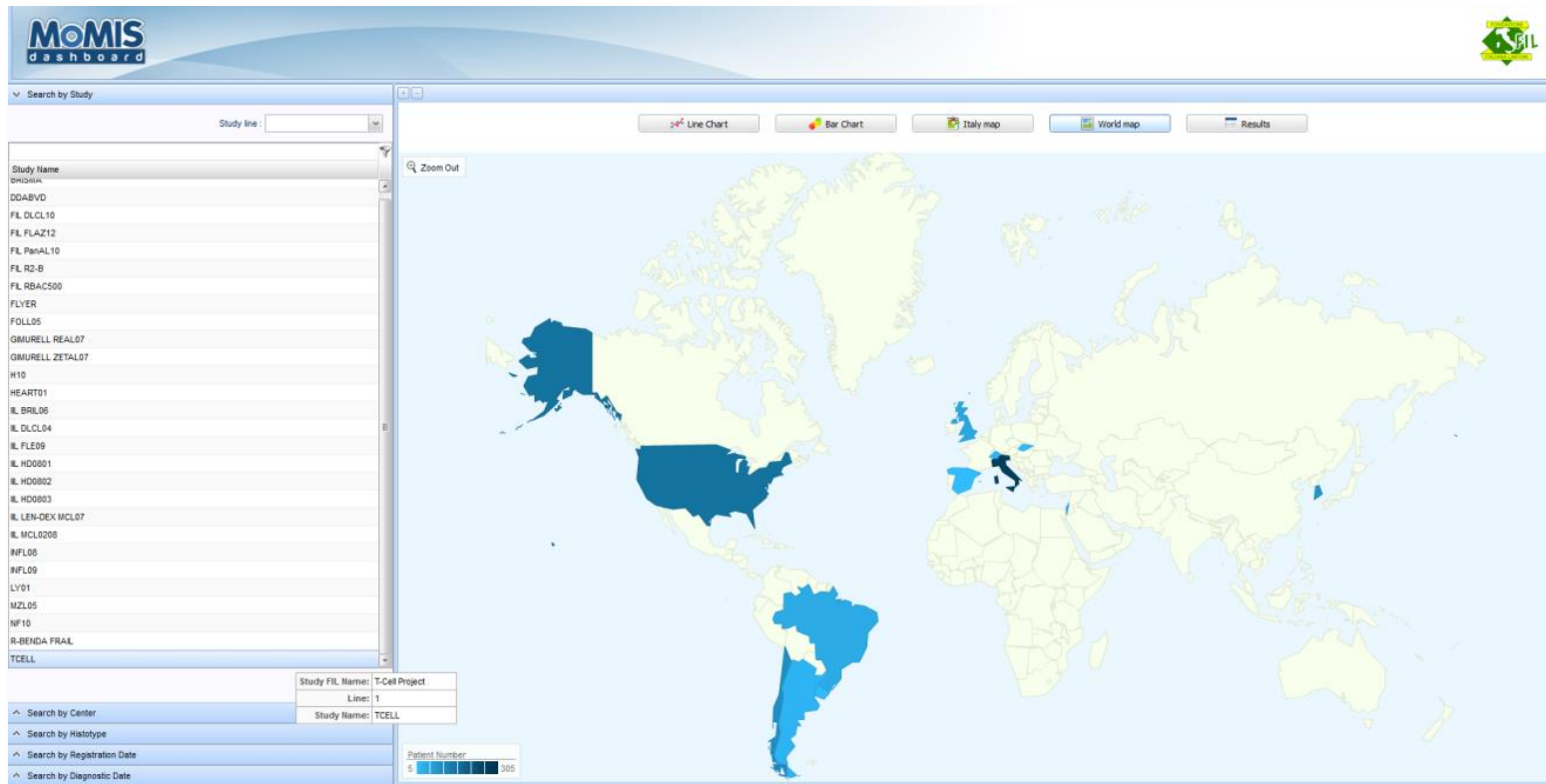
OpenClinica
Open Source for Clinical Research

Trial Manager

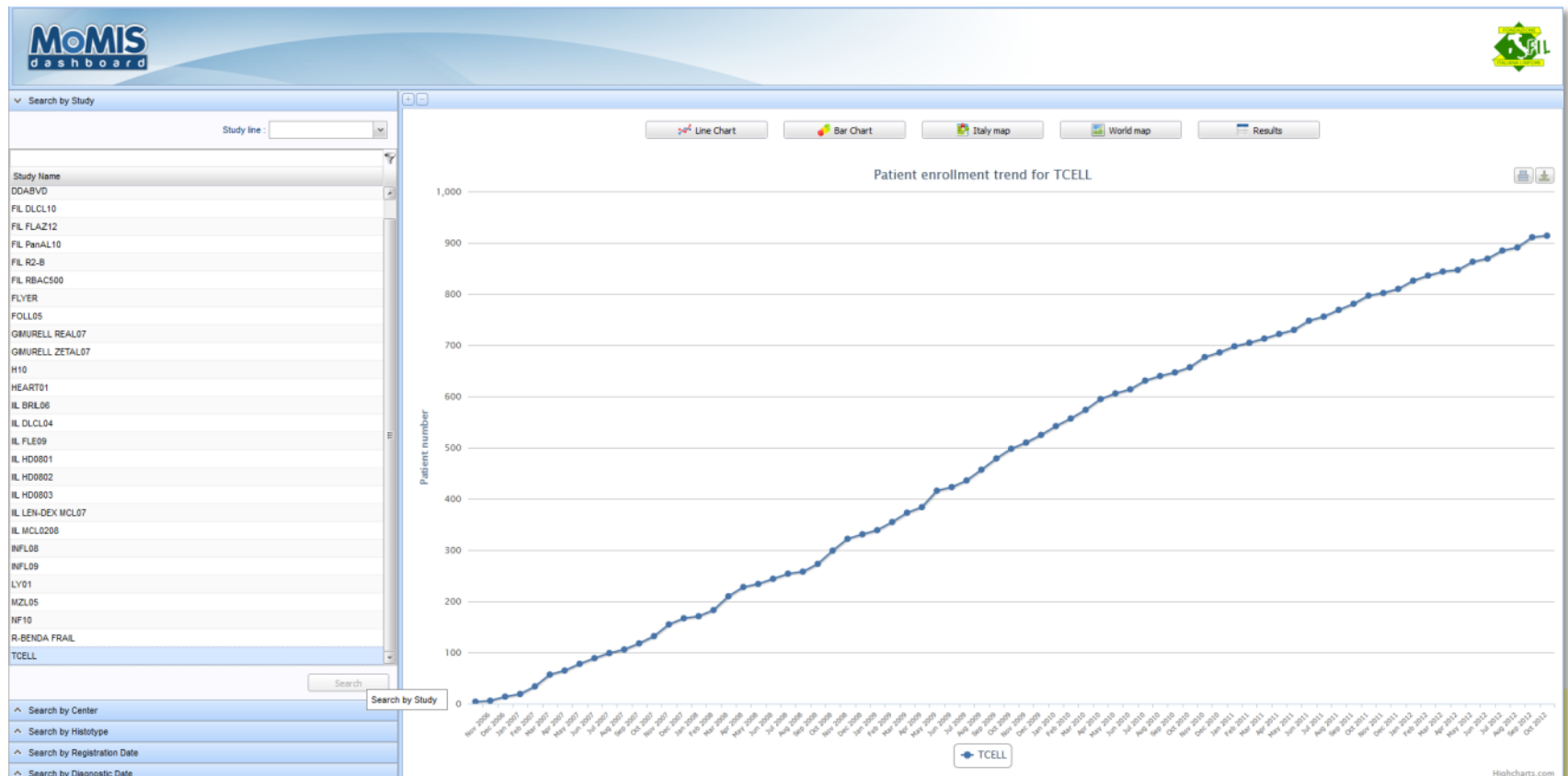
Epiclin

MOMIS dashboard

MOMIS Dashboard is a web application that shows users charts, tables or density maps over the global schema generated by **MOMIS**.



All operations take place without affecting data on local sources and keeping the constraints of visibility depending on the user's role.



MOMIS dashboard



Search by Study

Study line:

Line Chart Bar Chart Italy map World map Results

Export Result in Excel

- Study Name
 - PROGMA
 - DOABVD
 - FL DLCL10
 - FL FLAZ12
 - FL PanAL10
 - FL R2-B
 - FL RBAC500
 - FLYER
 - FOLL05
 - GMURELL REAL07
 - GMURELL ZETAL07
 - H10
 - HEART01
 - IL BRIL06
 - IL DLCL04
 - IL FLE09
 - IL HD0801
 - IL HD0802
 - IL HD0803
 - IL LEN-DEX MCL07
 - IL MCL0208
 - INFL08
 - INFL09
 - LY01
 - MZL05
 - NF10
 - R-BENDA FRAL
 - TCELL
- Search
- Search by Center
 - Search by Histotype
 - Search by Registration Date
 - Search by Diagnostic Date

Number of patients: 914

Study Name	Center Name	Sex	Date of birth	Diagnosis date	Registration date	Registration age	ICD-O-3 Morphology Code	Morphology description	ICD-O-3 Description
1	TCELL	ROMA-LA SAPENZA	M	29/06/1963	12/09/2006	12/10/2006	43	9702 Peripheral T-cell lymphoma, NOS	Peripheral T-cell lymphoma, NOS
2	TCELL	ROMA-LA SAPENZA	M	30/06/1940	19/09/2006	12/10/2006	66	9702 Peripheral T-cell lymphoma, NOS	Peripheral T-cell lymphoma, NOS
3	TCELL	ROMA-LA SAPENZA	M	29/06/1932	05/09/2006	12/10/2006	74	9702 Peripheral T-cell lymphoma, NOS	Peripheral T-cell lymphoma, NOS
4	TCELL	ROMA-LA SAPENZA	F	30/06/1984	02/10/2006	12/10/2006	22	9705 Angioimmunoblastic T-cell lymphc	Angioimmunoblastic T-cell lymphc
5	TCELL	Bratislava - NOU	M	29/06/1958	22/11/2006	28/11/2006	48	9705 Angioimmunoblastic T-cell lymphc	Angioimmunoblastic T-cell lymphc
6	TCELL	MESSINA PAPPARDO	F	29/06/1937	29/10/2006	04/12/2006	69	9716 Hepatosplenic T-cell lymphoma	Other peripheral T-cell lymphoma
7	TCELL	PESCARA EMATOLOGIA	F	29/06/1931	11/10/2006	04/12/2006	75	9702 Peripheral T-cell lymphoma, NOS	Peripheral T-cell lymphoma, NOS
8	TCELL	PESCARA EMATOLOGIA	F	29/06/1937	03/10/2006	04/12/2006	69	9702 Peripheral T-cell lymphoma, NOS	Peripheral T-cell lymphoma, NOS
9	TCELL	REGGIO EMILIA	M	29/06/1978	09/11/2006	05/12/2006	28	9714 Anaplastic large cell lymphoma, T	Anaplastic large cell lymphoma, T
10	TCELL	LECCE EMATOLOGIA	M	30/06/1940	09/11/2006	11/12/2006	66	9705 Angioimmunoblastic T-cell lymphc	Angioimmunoblastic T-cell lymphc
11	TCELL	MODENA MEDICINA DIAGNOSTIC	M	29/06/1956	13/09/2006	19/12/2006	50	9702 Peripheral T-cell lymphoma, NOS	Peripheral T-cell lymphoma, NOS
12	TCELL	ROMA-LA SAPENZA	M	30/06/1942	03/12/2006	27/12/2006	64	9702 Peripheral T-cell lymphoma, NOS	Peripheral T-cell lymphoma, NOS
13	TCELL	ROMA-LA SAPENZA	M	30/06/1948	16/10/2006	27/12/2006	58	9702 Peripheral T-cell lymphoma, NOS	Peripheral T-cell lymphoma, NOS
14	TCELL	LECCE EMATOLOGIA	M	30/06/1940	09/11/2006	03/01/2007	66	9705 Angioimmunoblastic T-cell lymphc	Angioimmunoblastic T-cell lymphc
15	TCELL	Bratislava - NOU	M	29/06/1950	01/09/2006	06/01/2007	56	9705 Angioimmunoblastic T-cell lymphc	Angioimmunoblastic T-cell lymphc
16	TCELL	MILANO HUMANITAS	F	29/06/1950	14/12/2006	14/01/2007	56	9708 Subcutaneous panniculitis-like T- T lymphoma cutaneous	
17	TCELL	MODENA MEDICINA DIAGNOSTIC	M	29/06/1935	27/11/2006	23/01/2007	71	9702 Peripheral T-cell lymphoma, NOS	Peripheral T-cell lymphoma, NOS
18	TCELL	PALERMO - LA MADDALENA	M	29/06/1935	22/01/2007	3/01/2007	71	9705 Angioimmunoblastic T-cell lymphc	Angioimmunoblastic T-cell lymphc
19	TCELL	Santiago de Chile	M	29/06/1953	06/12/2006	01/02/2007	53	9702 Peripheral T-cell lymphoma, NOS	Peripheral T-cell lymphoma, NOS
20	TCELL	MESSINA PAPPARDO	F	30/06/1940	12/01/2007	10/02/2007	66	9705 Angioimmunoblastic T-cell lymphc	Angioimmunoblastic T-cell lymphc
21	TCELL	NOCERA INFERIORE	M	29/06/1938	18/12/2006	11/02/2007	68	9714 Anaplastic large cell lymphoma, T	Anaplastic large cell lymphoma, T
22	TCELL	Bratislava - NOU	M	29/06/1935	20/10/2006	11/02/2007	71	9702 Peripheral T-cell lymphoma, NOS	Peripheral T-cell lymphoma, NOS
23	TCELL	BOLZANO EMATOLOGIA	M	30/06/1980	29/11/2006	14/02/2007	26	9714 Anaplastic large cell lymphoma, T	Anaplastic large cell lymphoma, T
24	TCELL	BOLZANO EMATOLOGIA	M	30/06/1947	01/08/2006	14/02/2007	59	9719 NK/T cell lymphoma, nasal type	Other peripheral T-cell lymphoma
25	TCELL	Santiago de Chile	M	29/06/1938	22/01/2007	15/02/2007	68	9702 Peripheral T-cell lymphoma, NOS	Peripheral T-cell lymphoma, NOS
26	TCELL	Santiago de Chile	M	30/06/1941	27/12/2006	24/02/2007	65	9702 Peripheral T-cell lymphoma, NOS	Peripheral T-cell lymphoma, NOS
27	TCELL	Santiago de Chile	M	29/06/1965	06/02/2007	24/02/2007	41	9714 Anaplastic large cell lymphoma, T	Anaplastic large cell lymphoma, T
28	TCELL	REGGIO EMILIA	M	30/06/1948	19/12/2006	25/02/2007	58	9705 Angioimmunoblastic T-cell lymphc	Angioimmunoblastic T-cell lymphc
29	TCELL	CATANZARO EMATOLOGIA	M	29/06/1932	14/09/2006	25/02/2007	74	9717 Intestinal T-cell lymphoma	Other peripheral T-cell lymphoma
30	TCELL	Hono Kona - QMH	F	29/06/1960	03/01/2007	26/02/2007	46	9719 NK/T cell lymphoma, nasal type	Other peripheral T-cell lymphoma