



# e-Oncology

A bi-lateral Italy-UK Workshop

Monday 27 October 2008

*Italian Cultural Institute*

*39 Belgrave Square London SW1X 8NX*

POLITECNICO DI MILANO



## Cases of UML Process Modelling in Oncology

Professor Francesco Pinciroli  
eHealth LAB – Bioengineering  
Politecnico di Milano





# BioMedical Informatics and e-Health Laboratory

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## *Serving Patients by Serving Doctors and Institutions*

EDUCATION

The Laboratory offers courses for undergraduate, graduate, and post-graduate students in the areas of BioMedical Engineering, Computer Engineering, and general clinical technologies.

The philosophy of the Laboratory is "learning by doing". To this end there are a variety of environments that students will engage in learning.

RESEARCH

The Laboratory promotes the application of advances in computer science, artificial intelligence, mathematics, and database theory to novel research approaches in electronic health records, patient data security, genomic and proteomic data analysis, and biomedical ontologies.

PRODUCTS

Recent Publications

- He@lthCo-op: a web-based system to support distributed healthcare co-operative work
- The unexpected high practical value of medical ontologies
- Using Gene Ontology and genomic controlled vocabularies to analyze high-throughput gene lists: three tool comparison
- Intelligent Web Services for Querying Heterogeneous Bioinformatics Databanks
- A Speaking Medical Record for the Patient at Risk of Emergency
- Service Monitoring in the Field of Emergencies

Recent Prototypes

GFINDER, MyWest, GAAS, DHV (see SanitàDigitale Home Page - Prototypes)



# e-Health LAB Home Page



MEDINFOPOLI Home Page - Windows Internet Explorer  
 http://www.sanitadigitale.polimi.it/

File Edit View Favorites Tools Help  
 Favorites Customize Links Personalizza collegamenti  
 MEDINFOPOLI Home Page Emulate IE7

POLITECNICO DI MILANO  
 \* Informatica BioMedica \* BioMedical Informatics \* Informatique BioMedicale \* BioMedizinische Informatik \* Informática Biomédica \*  
 \* Sanità Digitale \* e-health \* Telemedicina \* Telemedicina \*

## Informatica BioMedica + Sanità Digitale

Dipartimento di Bioingegneria

**rew** "e-Oncology tech-Experiences"- Initiatives **rew**  
**rew** "e-Oncology" - a bi-lateral Italy-UK Workshop - October 27, 2008 - London, UK **rew**  
 "Personalized Health Informatics" - Focus Group  
 "pHealth": An EU-US pHealth Conference - September 18-19, 2008 - Norfolk, VA, USA

*Evento - "Quale Fascicolo Sanitario Elettronico Personale?" - 16 Ottobre 2008*  
*Evento - "La Sanità Digitale per la famiglia verticale e per il paziente" - 1-2 Aprile 2008*  
*Evento - "Barriere all'adozione della cartella clinica informatizzata" - 20 Settembre 2007*  
*Evento - "Protezione sostenibile dei dati della Sanità Digitale" - 22 Marzo 2007*  
*Corso Breve - "Fondamenti e Applicazioni di Sanità Digitale" - 21 Marzo 2007*  
*Libro - "Elementi di Informatica BioMedica"*

*"Incontro Progetto SINCERE" - 1 Aprile 2008*

### 2004-2008 BioMedical Informatics OnLine Newsletter

- The London Seminars
  - Opening
  - Educational Offer
- The Bethesda Seminar at NIH
  - Exploiting Gene Annotations
  - At Med-Ed 2004 in San Francisco

**Informatica BioMedica**  
www.sanitadigitale.polimi.it

**e-health Lab**

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 Stefano Bonacina  
 Sara Marceglla  
 Luca Mazzola  
 Silvia Navino

Internet | Protected Mode: On 100%



# e-Health LAB Excerpta of Activities



<p><i>Serving patients by serving doctors and institutions</i></p> 	<h2>EXCERPTA 2004-2007</h2>
	<p><b>BioMedical Informatics and e-Health Laboratory</b></p>
 <p><b>Informatica BioMedica</b> <a href="http://www.sanitadigitale.polimi.it">www.sanitadigitale.polimi.it</a></p> <p><b>e-health Lab</b></p>	<p>Francesco PINCIROLI Marco MASSEROLI Stefano BONACINA Sara MARCEGLIA Luca MAZZOLA</p>
<p><b>Friends of the Laboratory</b></p> <p>Gruppo Lombardia Informatica IBM NoemaLife NRG - Document Consulting SUN Microsystems</p>	<p>POLITECNICO DI MILANO</p>  <p><b>Dipartimento di Bioingegneria</b></p>

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# UML

## *The Unified Modeling Language*



“The Unified Modeling Language (UML)

is a language for

- \* **specifying,**
- \* **visualizing,**
- \* **constructing, and**
- \* **documenting**

the artifacts of software systems, as well as for business modeling and other non-software systems”.

[UML specification given by the Object Management Group (OMG),  
<http://www.uml.org/> ]



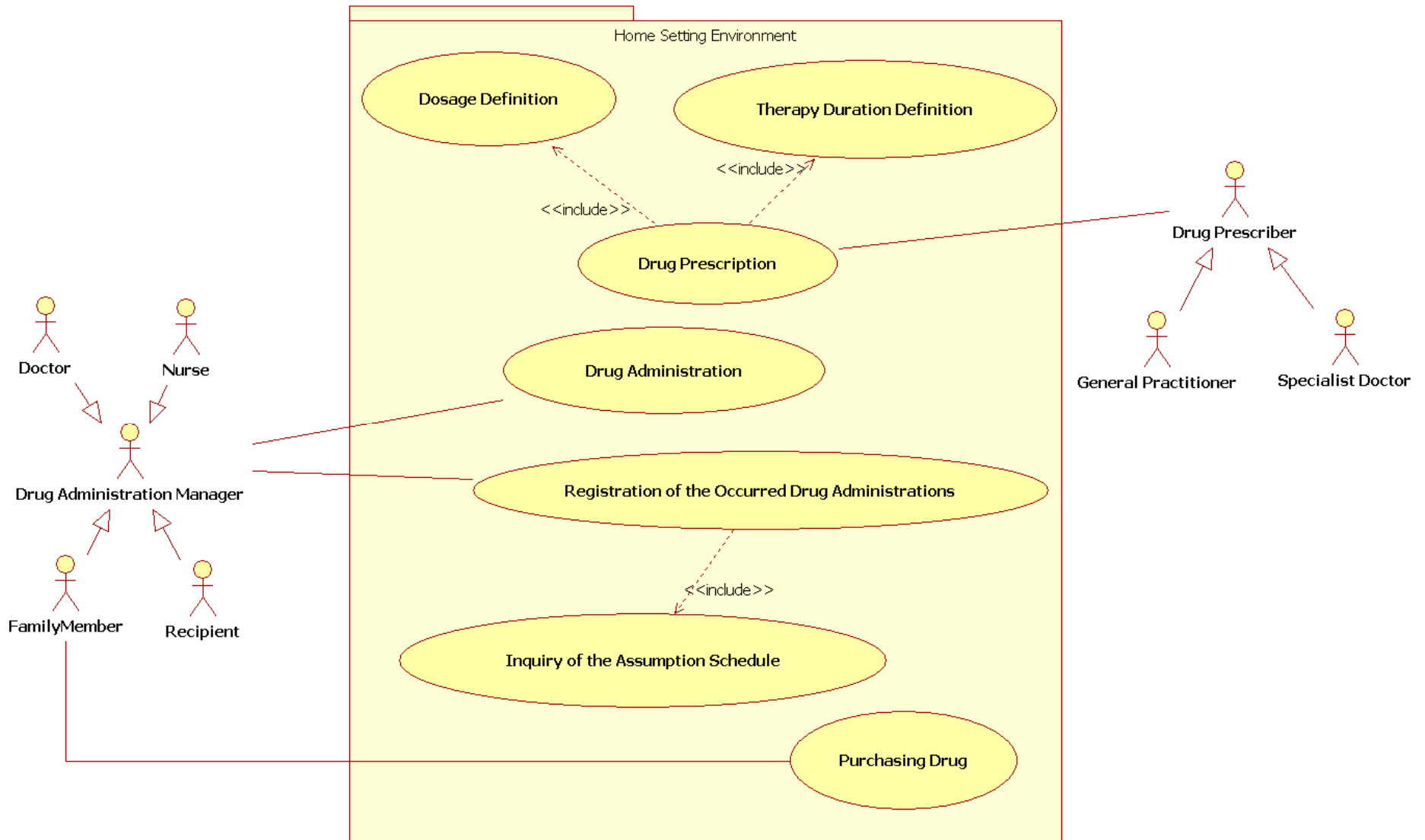
The UML graphical language, which is based on graphical semantic and syntax, allows to visualize the **actors**, the **relationships** between them, the **activities** to be done, the **sequences** to be respected, the **triggers** to be considered, for doing proper activities in the correct order.

Modeling with such a graphical language **makes the implementation tuned to different deployment environments.**



# What is UML for Medicine? Modeling Home Settings Environment

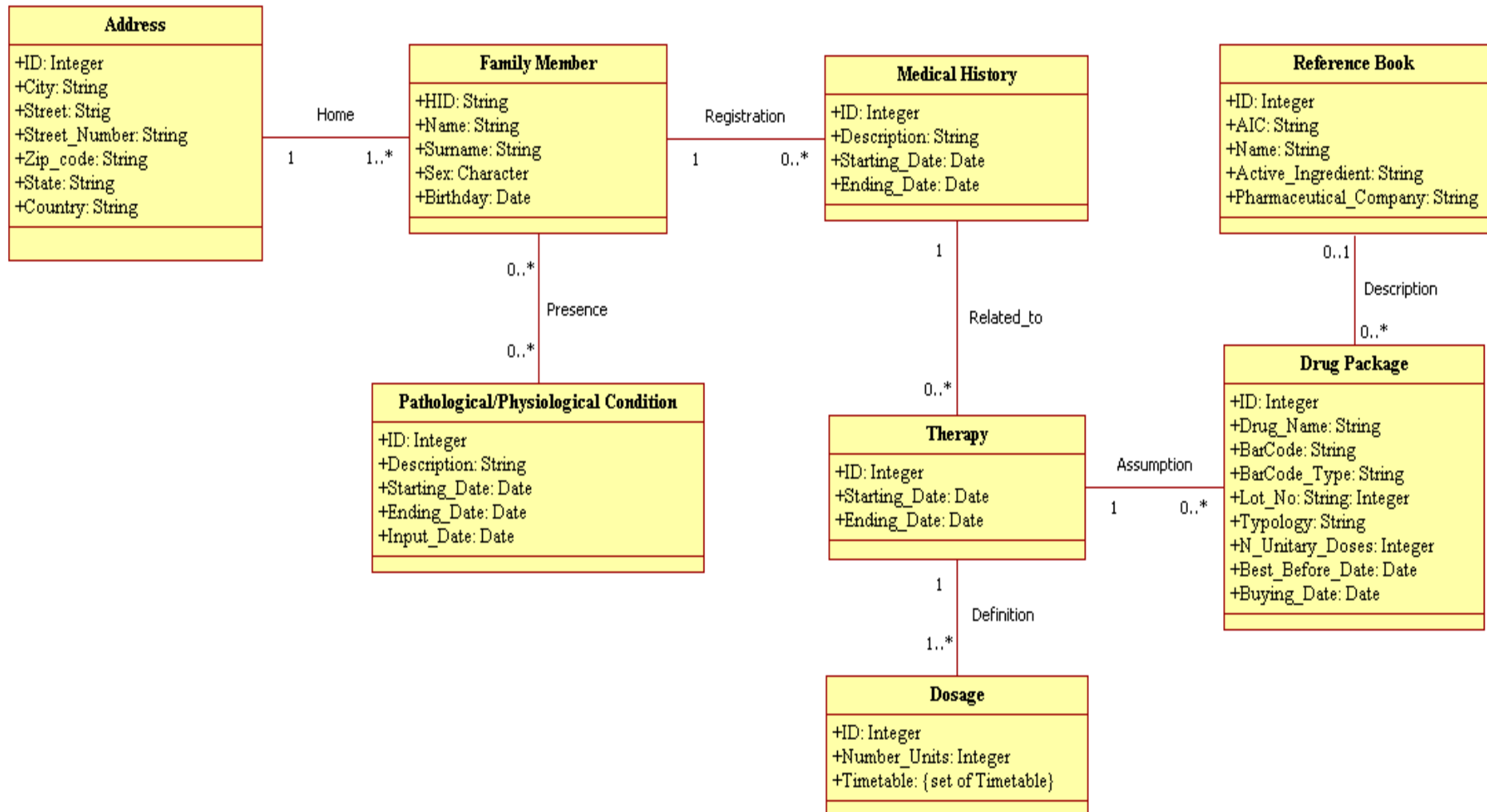
(1/6)





# What is UML for Medicine? Data Modeling

(2/6)

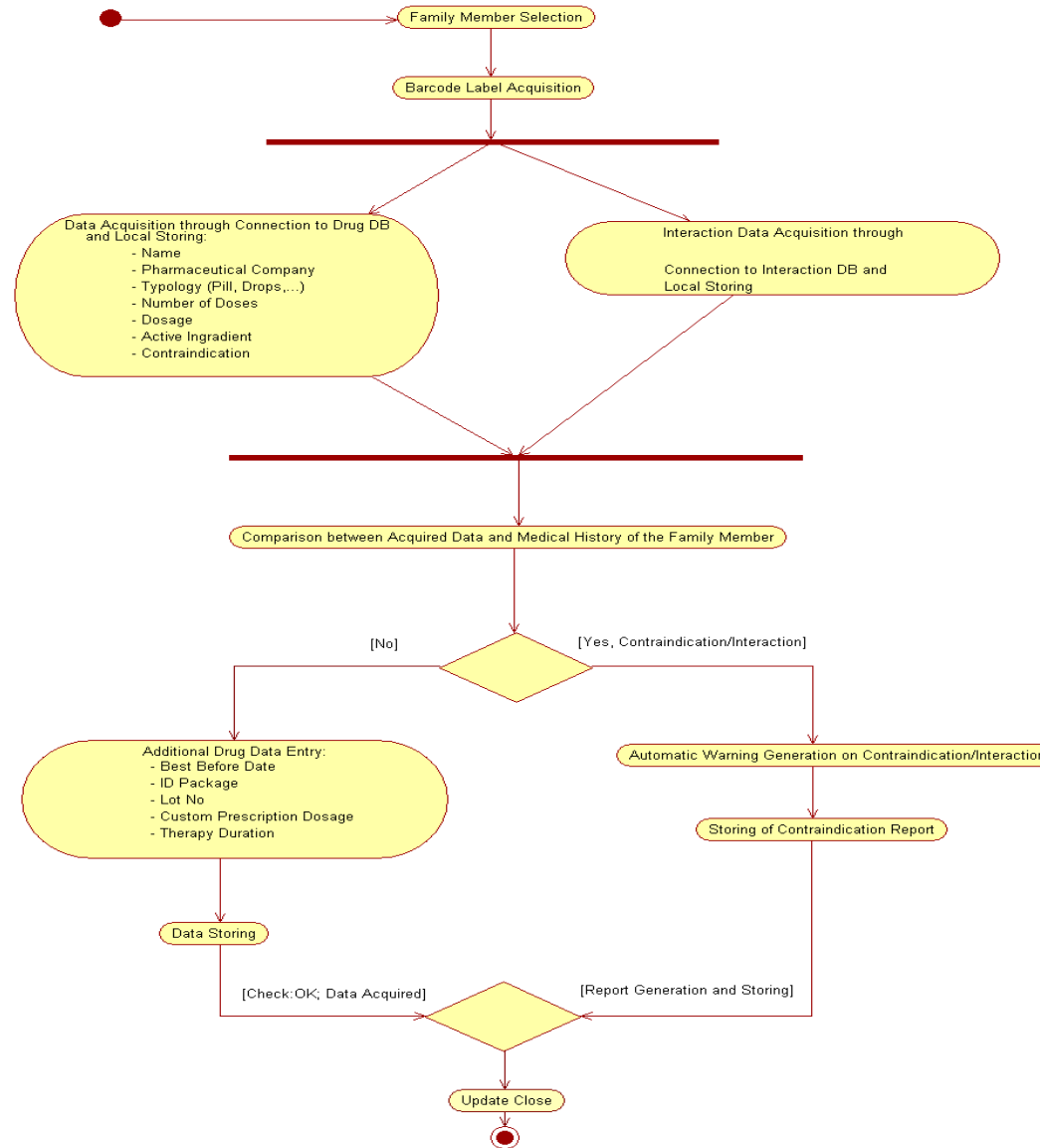




# What is UML for Medicine?

## Check of drug-drug interactions, ADEs

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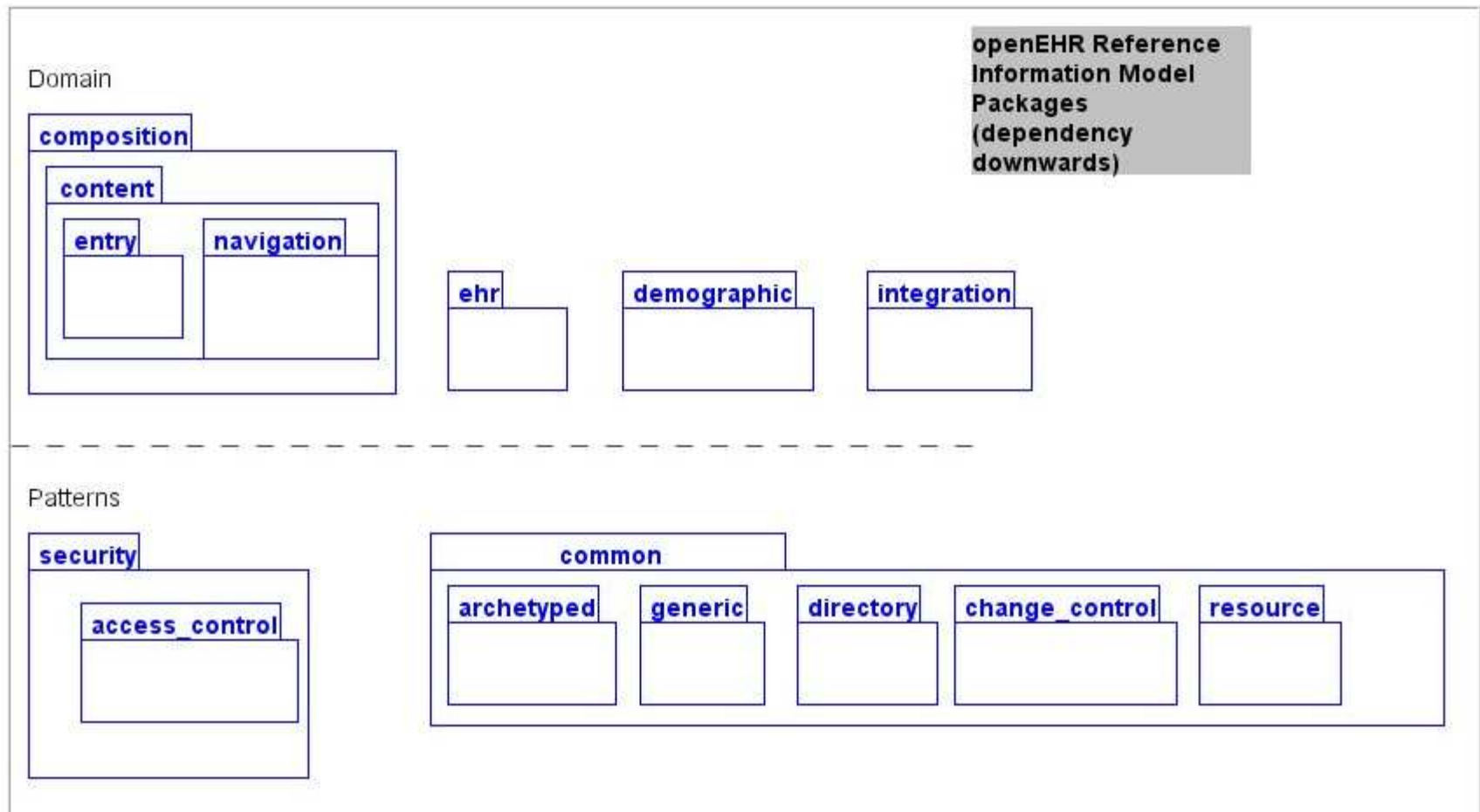
# What is UML for Medicine?

(4/6)

OpenEHR - <http://www.openehr.org/> rm.packages



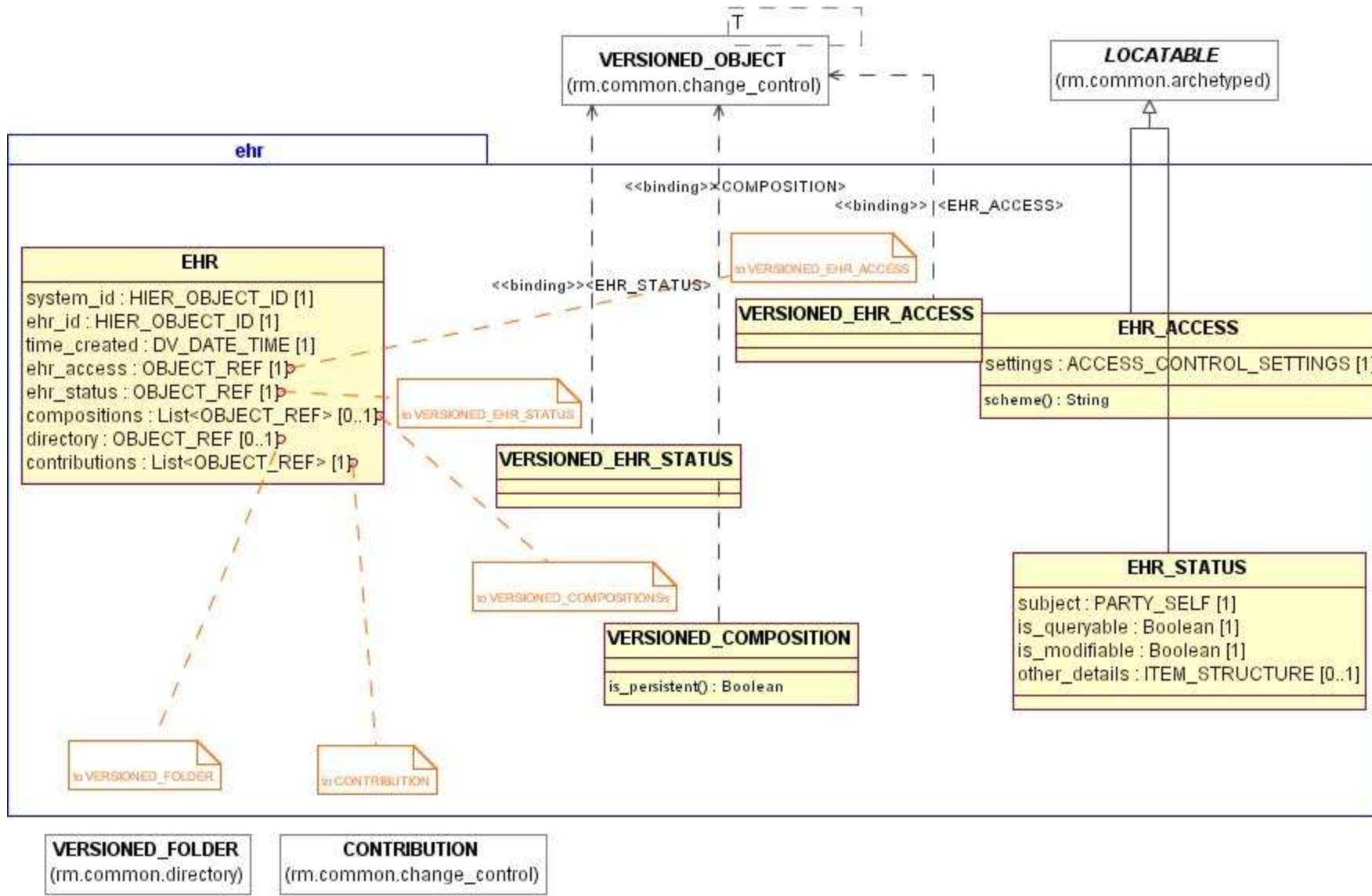
## Class Diagram **rm.packages**





# What is UML for Medicine? OpenEHR - Package EHR

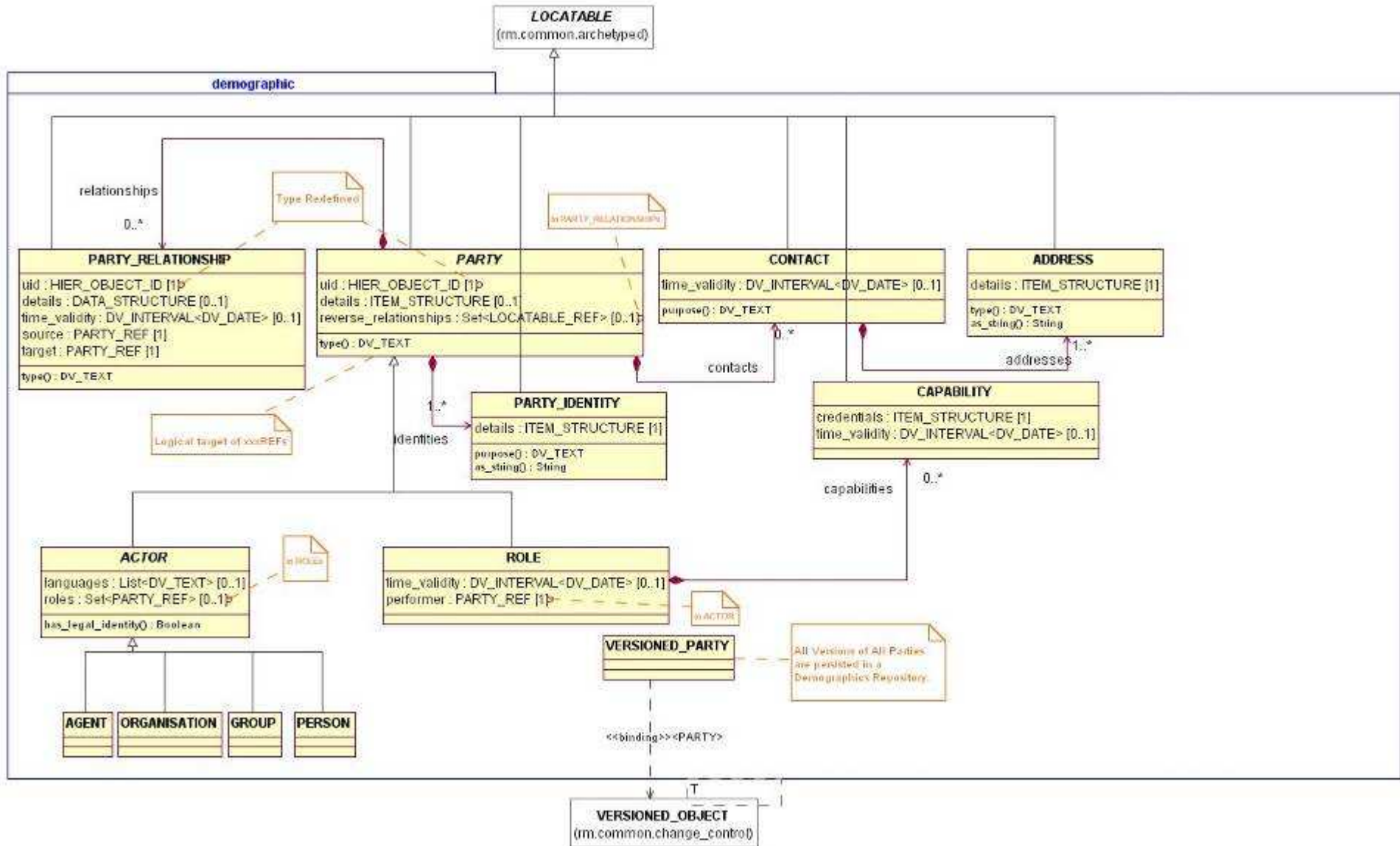
(5/6)





# What is UML for Medicine? OpenEHR - Package Demographic

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## e-Oncology tech-Experiences

starting a segment of the **e-health LAB** website  
for speeding up the sharing of experiences and results

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