

# Implementing a PHR System for Knowledge Sharing based on IHE Cross-Enterprise Document Sharing and Ontology

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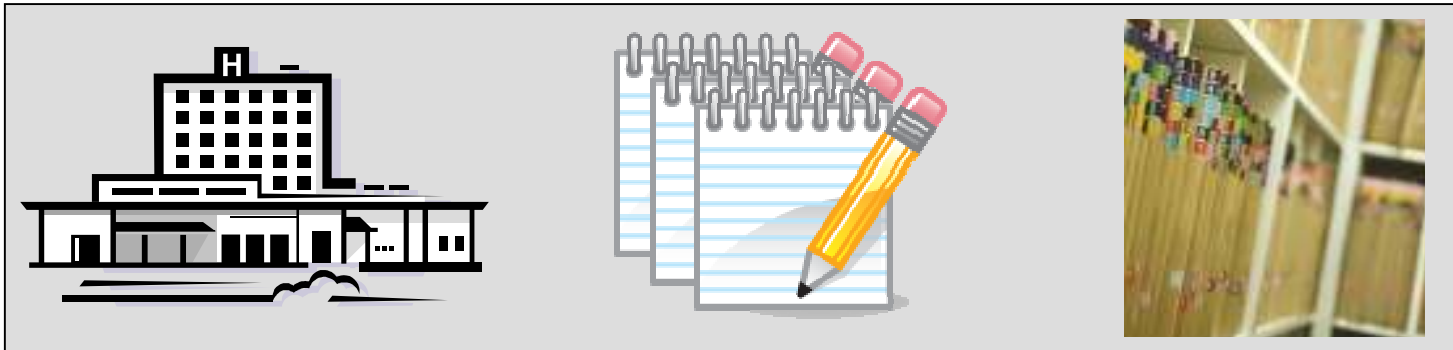
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Date: 2009/05/09

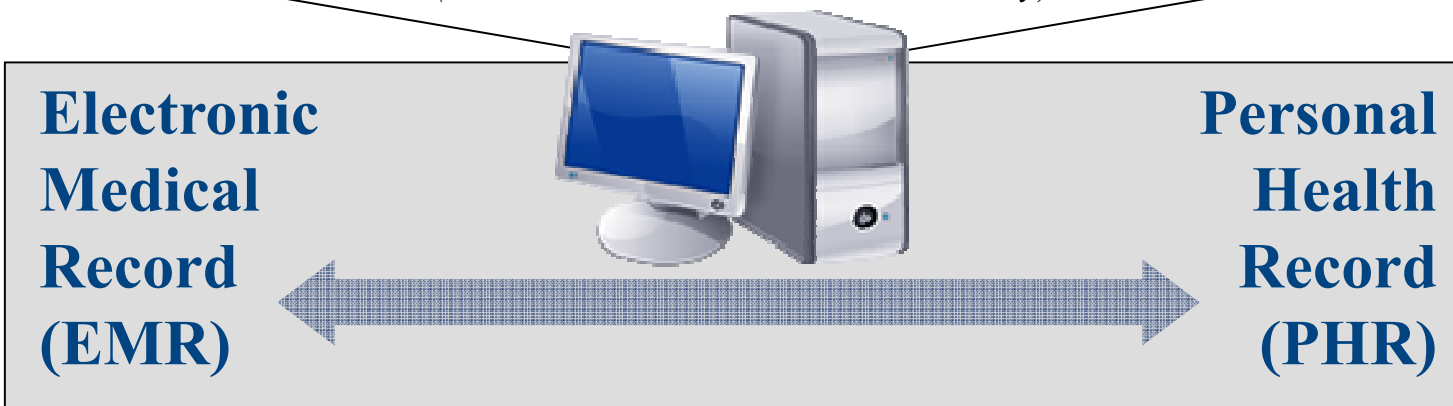
# Background



## Why EMRs are being implemented?

1. Improve workflow efficiency
2. Improve quality of care

*(Medical Records Institute's Survey)*



# Personal Health Record

## Definition:

*“An electronic application through which individuals can access, manage and share their health information, and that of others for whom they are authorized, in a private, secure, and confidential environment.”*

*Markle Foundation’s Connecting for Health collaborative*

## Six Common Types of PHR:



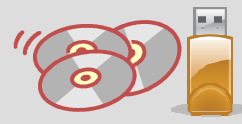
*Paper-based*



*PC-based*



*Web-based*



*Portable devices*



*Internet Portal*



*Health Bank*

3

# Challenges of Future PHR

1. Consolidate numerous data sources
2. Accept incoming data from outside entities
3. Online knowledge bases and decision support systems integrated with health records
4. Connect to communities of other with similar diagnostic
5. Participate in clinical trials, health surveillance, etc.

# Challenges of Future PHR

## 1. Consolidate numerous data sources

2. Accept

3. Online

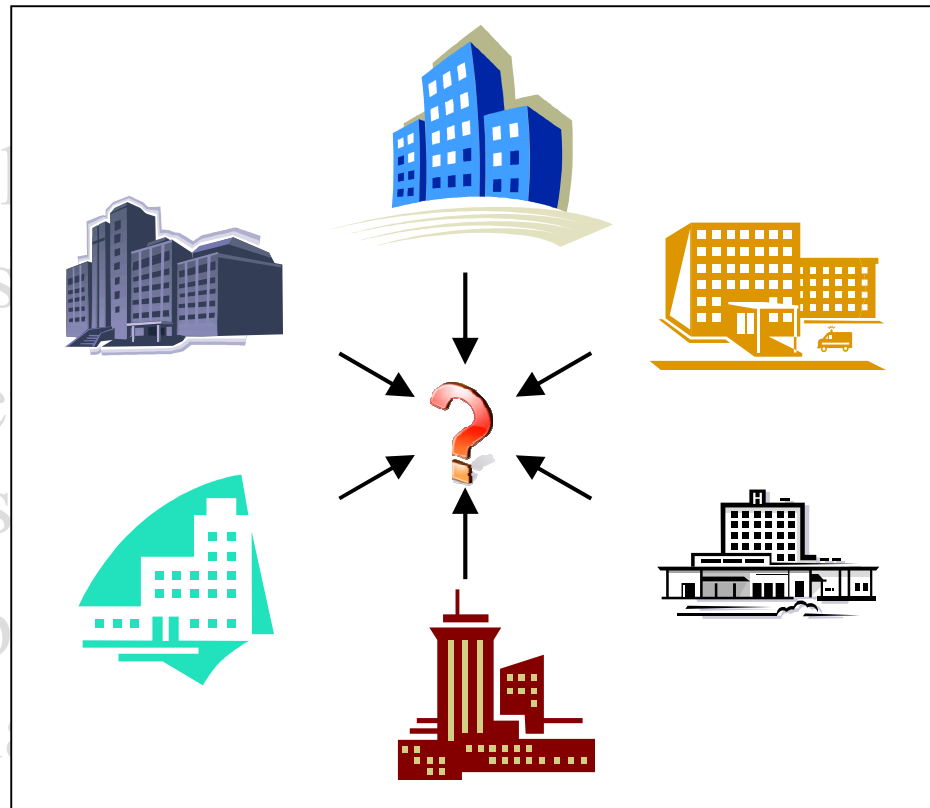
systems

4. Connec

diagnos

5. Particip

surveill



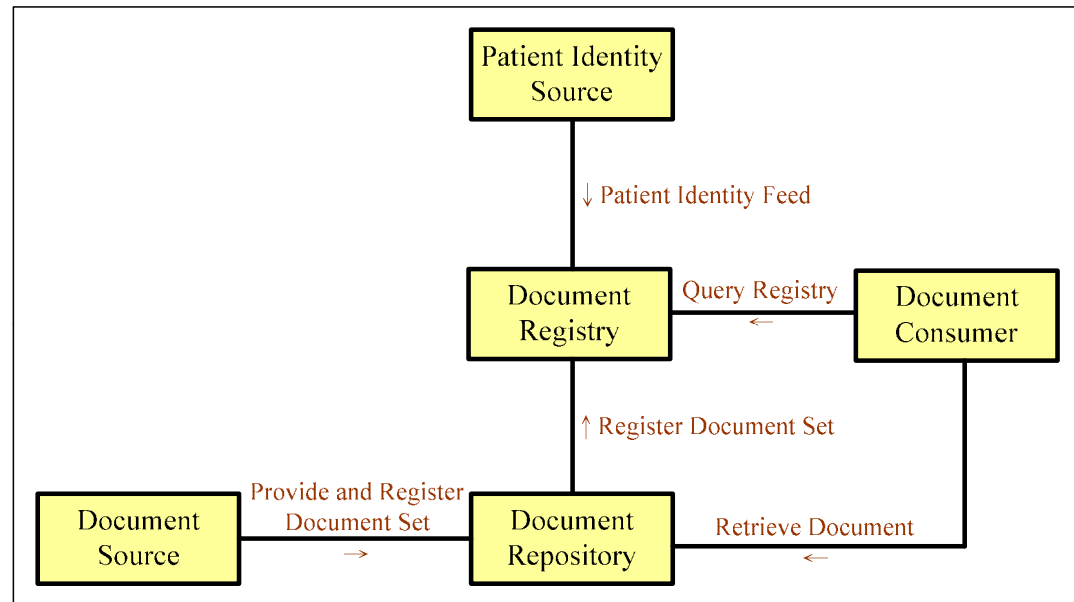
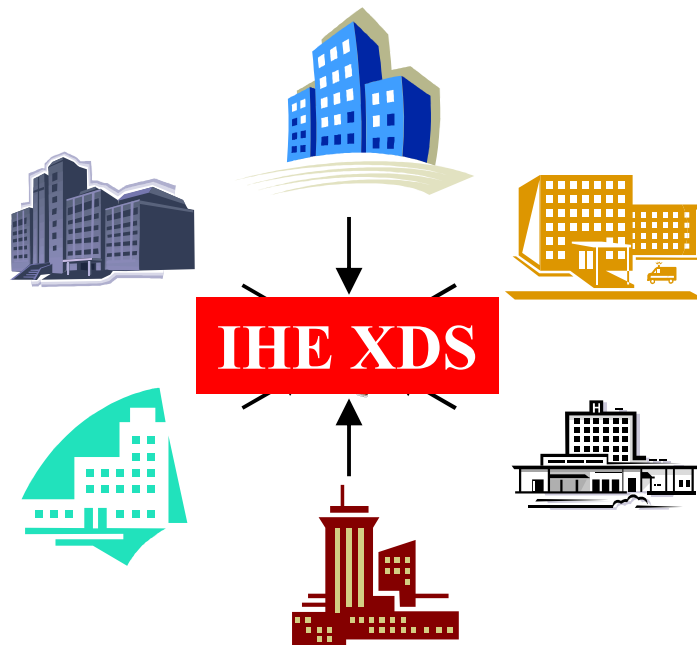
entities

on support

nds

ith similar

# How to consolidate PHRs from numerous data sources?



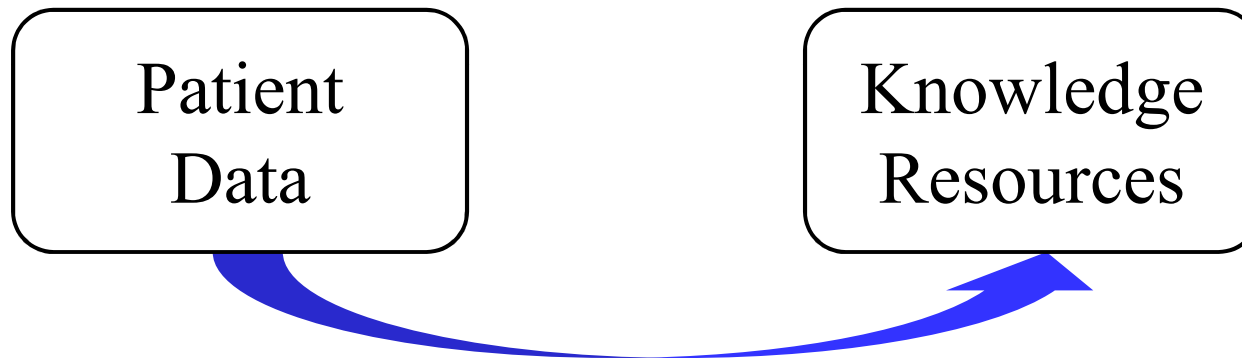
## Integrating the Healthcare Enterprise (IHE)

### Cross-Enterprise Document Sharing (XDS)

Provide a standards-based specification for managing the sharing documents between different healthcare enterprises

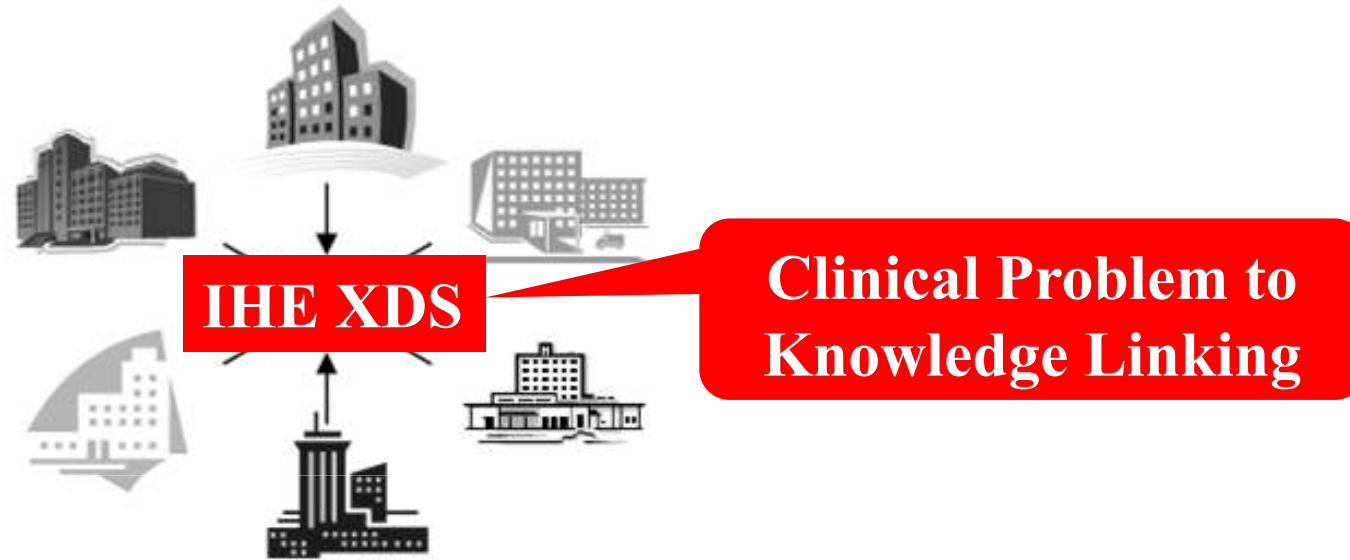
# PHR System

**More than just a static repository**



**Clinical Problem to Knowledge Linking**

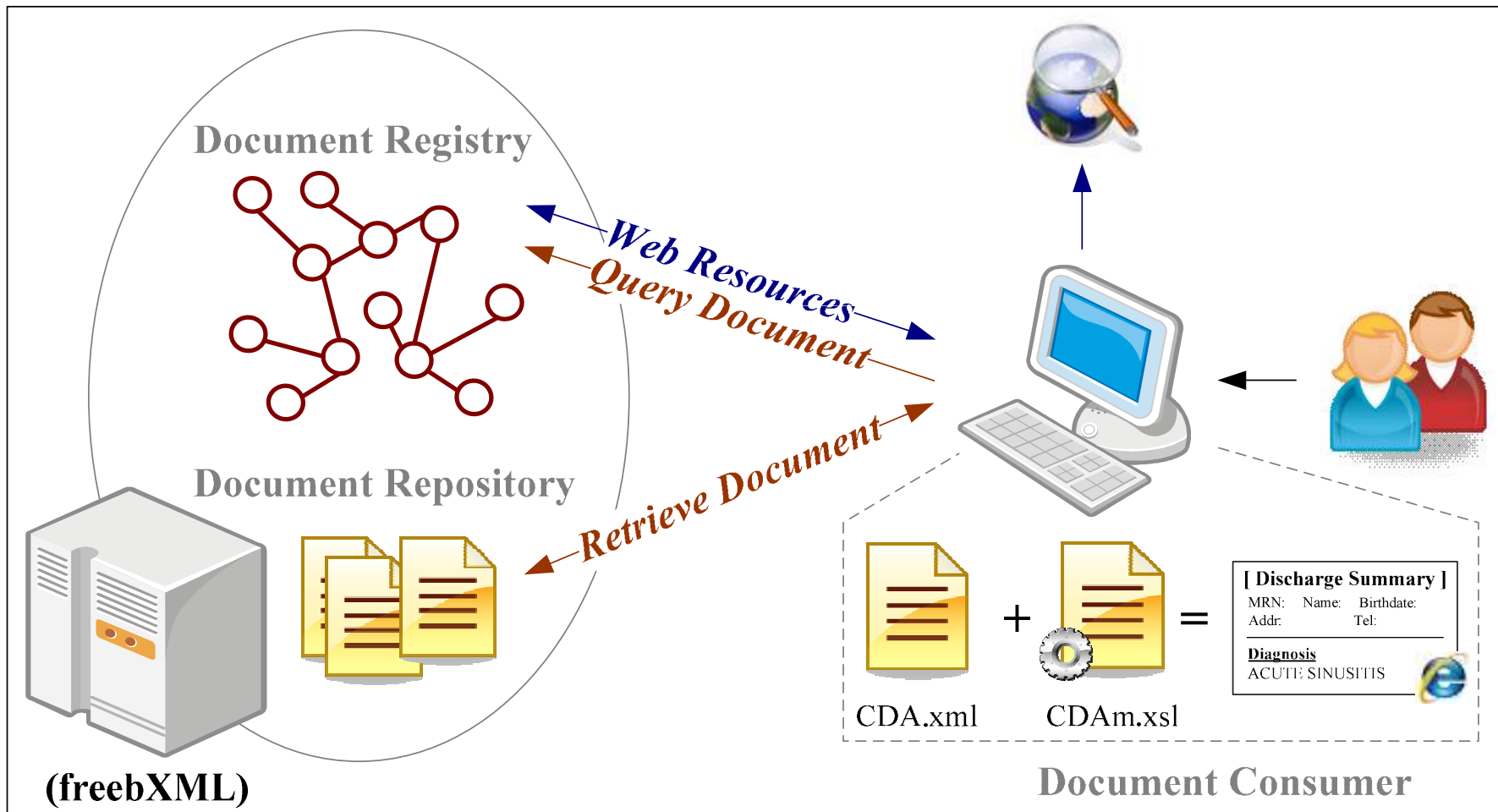
# Aims



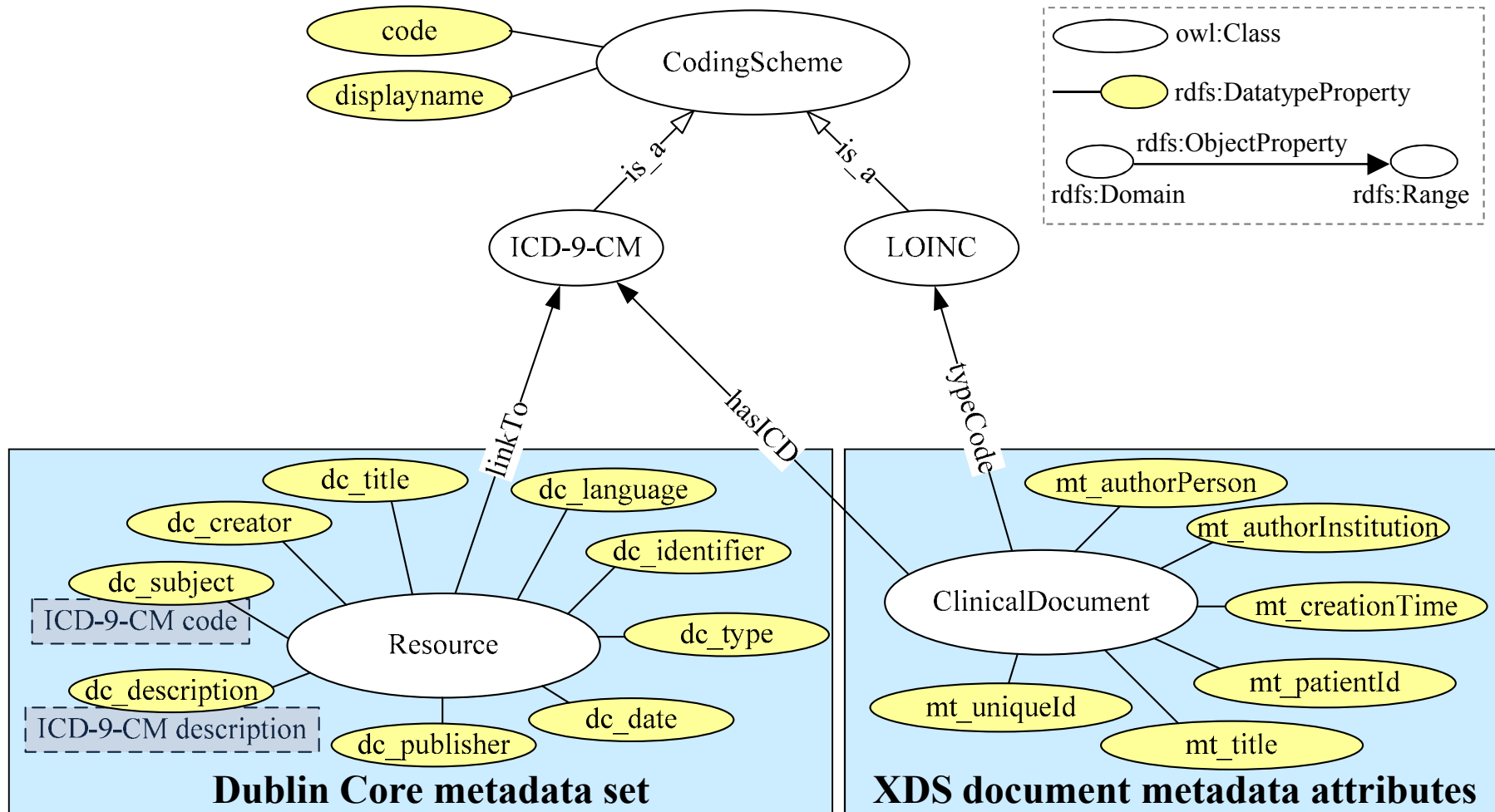
- Based on IHE XDS
  - Develop a PHR prototype system → Document Sharing
  - Patients can share the Web resources related to their diseases. → Knowledge Sharing



# System Architecture



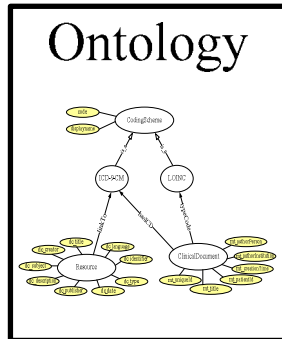
# Ontology Design



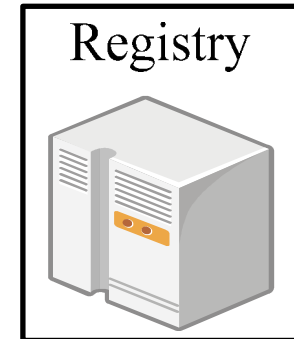
**Web resources**

**Documents**

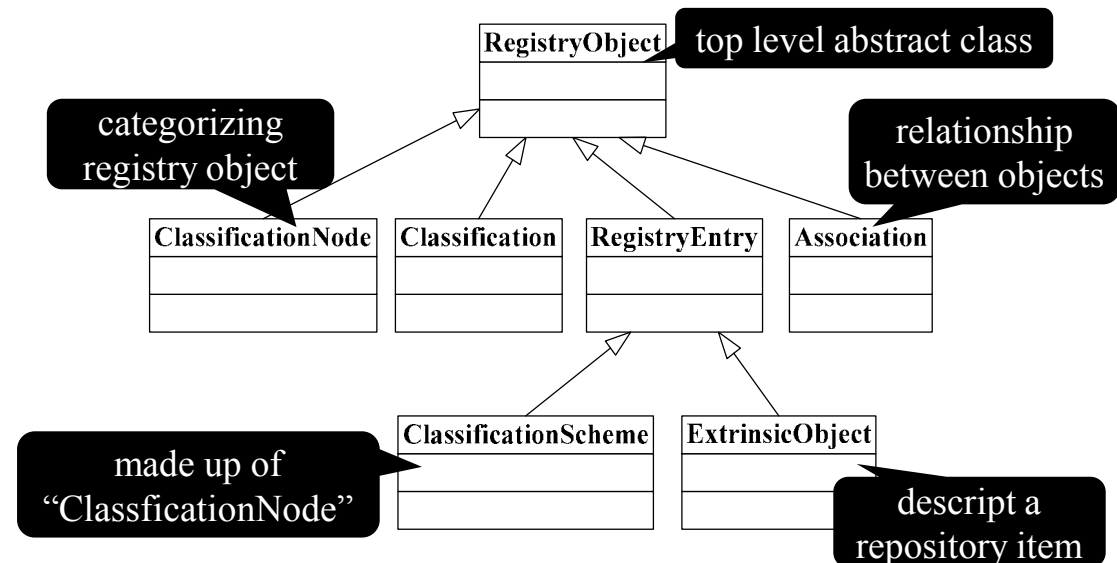
# Mapping Ontology to Registry



OWL	ebXML
owl:Class	rim:ClassificationNode
rdfs:DatatypeProperty	rim:Association Type "DatatypeProperty"
rdfs:ObjectProperty	rim:Association Type "ObjectProperty"
rdfs:Domain	rim:sourceObject
rdfs:Range	rim:targetObject



*ebXML Registry Profile for Web Ontology Language (OWL)*



**Simplified Core Object of ebXML Registry Information Model**

# Query/Retrieve Document

**Personal Health Record Prototype System**

- Submit Document -      - Query / Retrieve Document -

請輸入病歷號碼：

(1) 由 關渡醫院 於 20081121 建立      (2) 由 景美醫院 於 20090309 建立

**出院病歷摘要**

**Patient:** 陳小花      **MRN:** P002  
**Birthdate:** October 12, 1981      **Sex:** Female  
**Consultant:** 李四      **Created On:** April 25, 2009

**診斷**

- 急性鼻竇炎 |  |  |

**主訴**  
**病中**

 + 

CDA.xml      CDAm.xml

# Query/Retrieve Document

**Personal Health Record Prototype System**



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**Birthdate:** October 12, 1981  
**Consultant:** 李四

**診斷**

- 急性鼻竇炎  

**主訴**  
**病中**

```
<component>
  <section>
    <code code="42347-5" codeSystem="2.16.840.1.113883.6.1" codeSystemName="LOINC" displayName="Admission Diagnosis"/>
    <title>診斷</title>
    <text>
      <list>
        <item ID="a1">急性鼻竇炎</item>
      </list>
    </text>
    <entry>
      <observation classCode="OBS" moodCode="EVN">
        <code code="461.9" codeSystem="2.16.840.1.113883.6.103" codeSystemName="ICD-9-CM" displayName="Acute sinusitis">
          <originalText>
            <reference value="#a1"/>
          </originalText>
        </code>
      </observation>
    </entry>
  </section>
</component>
```

# Add Web Resource

(1) 由 關渡醫院 於 20081121 建立

(2) 由 景美醫院 於 20090309 建立

**Patient:** 陳小花  
**Birthdate:** October 12, 1981  
**Consultant:** 李四

診斷

- 急性鼻竇炎 | 🔍 | + |

主訴

病史

Add

## 鼻竇炎系列(一)：急性鼻竇炎

檢舉

分類：[常見耳鼻喉科疾病](#)

2008/02/15 01:10



鼻竇炎是民眾相當常見的疾病，冒。但我發現，一般民眾其實對鼻竇炎時，會看到他們相當驚駭要開刀？」

這一系列的文章就是希望讓大家會因為疏忽而延誤病情。

### 鼻竇在哪裡？

鼻竇在我們鼻子的周圍，骨頭的

ICD-9-CM Code : 461.9

ICD-9-CM Description : 急性鼻竇炎 Acute sinusitis

網址： Identifier

主題： Title

作者： Creator

出版者：

出版日期： Date

資源類型： Type

語言： Language

備註：

新增

# Search and Share Web Resources

## 出院病歷

**Patient:** 陳小花  
**Birthdate:** October 12, 1981  
**Consultant:** 李四

**診斷** **Diagn** **Search**

- 急性鼻竇炎 | 🔍 | +

## 出院病歷

**Patient:** 王小明  
**Birthdate:** January 3, 1972  
**Consultant:** 張三

**診斷** **Diagnostic** **Search**

- 感冒 | 🔍 | +
- 急性鼻竇炎 Acute sinusitis | 🔍 | +

**ICD-9-CM Code :** 461.9

**ICD-9-CM Description :** 急性鼻竇炎 Acute sinusitis

**網址 :** <http://tw.myblog.yahoo.com/excell-ent/article?mid=333&prev=374&next=327&l=f&fid=5>

**主題 :** 鼻竇炎系列(一) : 急性鼻竇炎

**作者 :** 黃威雄

**出版者 :** **出版日期 :** 2008/02/15

**資源類型 :** 一般網頁 **語言 :** 中文

**備註 :**

**網址 :** <http://www.kmu.edu.tw/~kmcj/data/9512/5.htm>

**主題 :** 急性鼻竇炎與併發症

**作者 :** 戴志峰

**出版者 :** 高醫醫訊 **出版日期 :** 2004/12

**資源類型 :** 雜誌 / 期刊 / 文章 **語言 :** 中文

**備註 :**



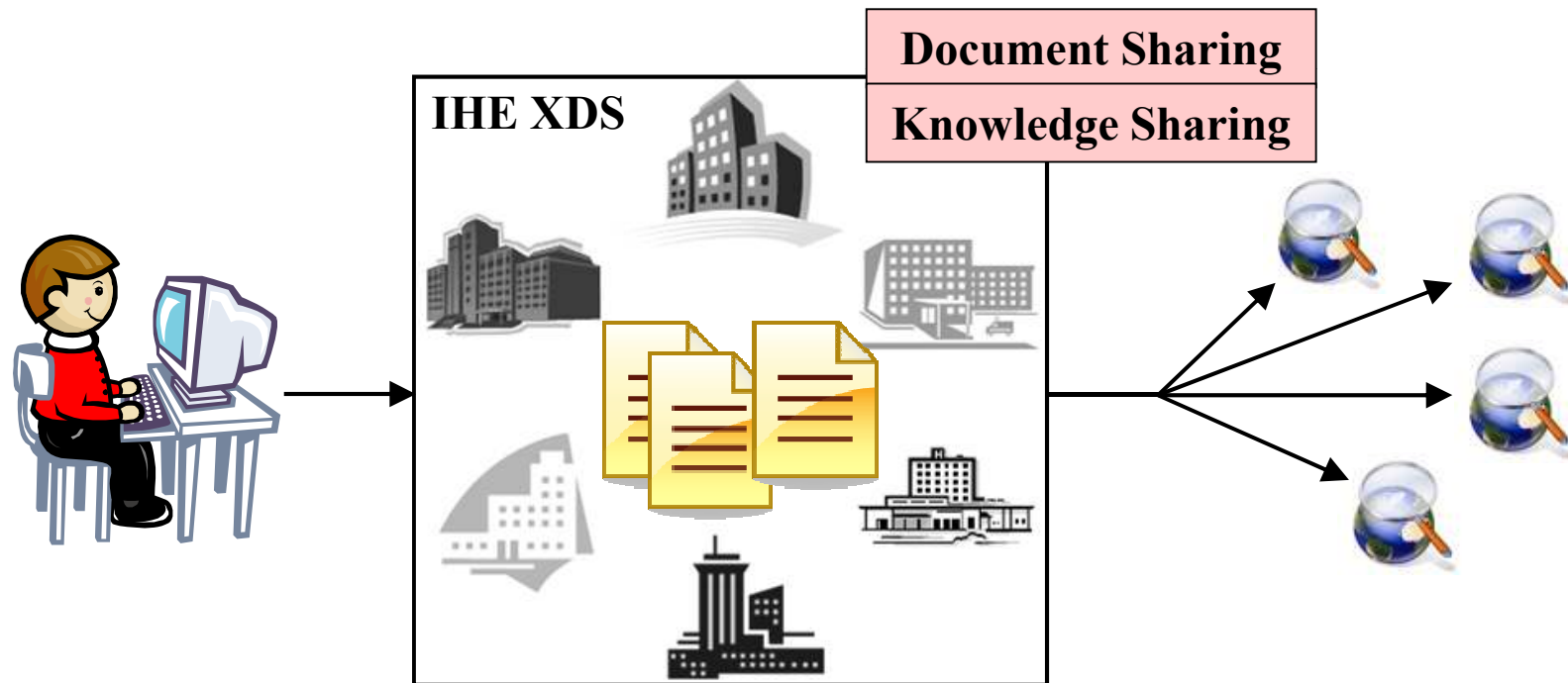
# Discussion

- Do not touch system security and control patient identification issue
- Document format - CDA R2
- Manual way to search resources by patients
  - Record resources in the central registry



# Conclusion

- Semantic extension function for the registry
  - Share medical web resources, but do not share the personal health information



**Thanks For Your Listening!**