

# Evaluation of Approaches to Adoption of LOINC used by Seven Hospitals in Taiwan

Liang-Wen Wang, Li-Li Wen,

Yu-Sheng Lo, Chien-Tsai Liu

Graduate Institute of Biomedical Informatics

Taipei Medical University

Date : May-09-2009

# Background



- Electronic medical records (EMRs)
  - Since 1998
  - Medical certificate administrative center
  - Laws related to promotion of EMRs
- E-hospitals
  - 90% of hospitals and clinics use computer
  - Local Code for physician order
- Previous Study
  - LOINC could use in Taiwan
  - NHI-LOINC knowledge base

# Introduction of National Health Insurance (NHI) codes

- National Health Insurance (NHI) codes for insurance reimbursement .
- CPT code in American
- For payment purpose.
  - Coxsackie virus antibody (type B1 to 6) used the same NHI code
  - Rheumatoid Factor Having 3 NHI Code because of different method
- Can't describe full content of a test
  - Lack sample type, result unit and etc.

# Introduction of Logical Observation Identifier Names and Codes (LOINC®)

- To create universal identifiers (names and codes) to be used in the existing ASTM E1238, HL7, CEN TC251, and DICOM
- A Standardization of Laboratory Information
- More than 42,000 observation terms.
- Six main Attributes
  - Analyte/component
  - Property
  - Time\_ASPECT
  - System
  - Scale
  - Method



# Examples OF LOINC

Code : Component : Property : Time : System : Scale : Method

5792-7 : GLUCOSE : MCNC : PT : UR : QN : TEST STRIP

2350-7 : GLUCOSE : MCNC : PT : UR : QN

1516-4 :GLUCOSE^2H POST 100 G GLUCOSE PO : MCNC : PT : UR : QN

# Mapping Method



- From local code to LOINC
- Available Mapping Tools
  - RELMA
    - Established by Regenstrief
  - NHI-LOINC
    - Correlation of laboratory name from NHI to LOINC.
    - Since 20024
    - More than 9,000 data
    - 2006 build other attributers correlation table



Aims

- Mapping tools in Taiwan

- RELMA + experts ( laboratory subject matter experts, laboratory Computer experts, LOINC experts, database expert )

- NHI-LOINC knowledge base + computer Programming



# Materials

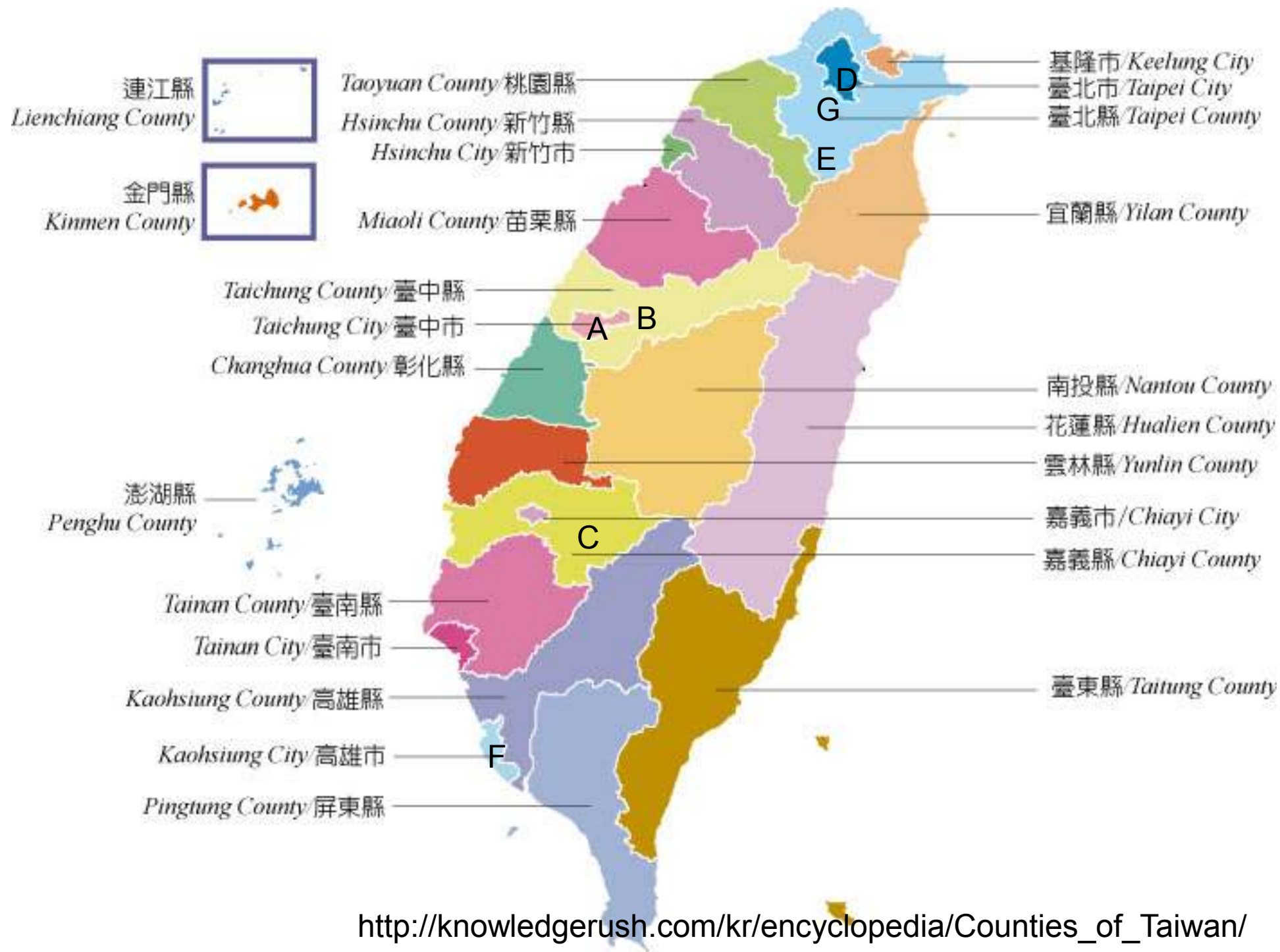
- Seven hospitals in this Study.
- Three hospitals used the RELMA system.
- Four hospitals used the NHI-LOINC mapping system.
- From May 2007 to November 2007
- Collect total volume of laboratory tests performed in two month (from October to November).




# Hospitals Information

Table 1 : The numbers of beds and location and methodology of seven hospitals.

Hospital	Beds	Location	Mapping Method
A	1723	Taichung City	NHI-LOINC
B	1215	Taichung County	RELMA
C	807	Chiayi County	NHI-LOINC
D	758	Taipei City	NHI-LOINC
E	502	Taipei County	NHI-LOINC
F	498	Kaohsiung City	RELMA
G	85	Taipei County	RELMA



# Result



Hospital	Volume in two months	Successful mapping rate	1:1 mapping	1: many mapping
A NHI-LOINC	455039	82.41%	78.26%	21.74%
B RELMA	108666	8%	3.39%	96.61%
C NHI-LOINC	14271	17.13%	100%	0
D NHI-LOINC	601391	85.07%	67.17%	32.83%
E NHI-LOINC	173257	85.6%	71.7%	28.3%
F RELMA	208194	14.36%	96.15%	3.85%
G RELMA	2639	66.67%	100%	0

1:1 mapping : one local code transfer to one LOINC

1: many mapping : one local code transfer to more than one LOINC



## Discussion : NHI-LOINC method

- Hospital A,D,E successful mapping rate more than 80%
- Hospital C poor mapping rate (17.13%)
  - An unfriendly user interface
  - Design by information vendor, lack LOINC knowledge
- Successful Rate depend on programming
- 1 to 1 mapping more than 67%
  - Automatic transfer
  - Time saving and experts saving



## Discussion : RELMA method

- Hospital B,F successful mapping rate less than 15 %
  - Lack some kinds of expert in their own hospital
  - Cost too much time to learn RELMA
- Hospital G successful mapping rate is 66.67%
  - Small volume of laboratory test
- 1 to 1 mapping rate almost 100% ,except hospital B
  - Mapping the laboratory finding, not the order
  - Microscopic test



# Conclusion

- Large volume of tests for mapping, the NHI-LOINC approach is better
  - A good computer programming
  - Successfully rate is better (80%:15%)
- Small volume of tests for mapping, RELMA is more appropriate.
  - Hospital G : successfully rate:66.67% ,1:1 mapping rate :100%

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**Thanks for your attention.**







# Introduction of Local codes

- Only using in a hospital (or cooperative hospitals)
- Different in each hospital
- Can't be understood by another hospital
- Hard to be a standard