Hospital Information System (HIS)
Finland Sypply – China Service

1. Background and objectives of the Export HIS project
2. Background about China
3. Healthcare system in China
4. Current situation of HIS in China
5. HIS development plans in China
6. Standardisation situation and activities in China
7. Healthcare IT market in China
8. Continuation after Export HIS
Export HIS Objectives
Software export / acquisition service chain

- Study recent developments in China’s healthcare system and analyse Hospital Information Systems needs in China
- Evaluate the applicability of Finnish healthcare systems know-how and software to the Chinese market and establish contacts with local authorities and companies
- Produce a plan for an actual export / acquisition project, if feasible

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2. China: Beijing & Shanghai
China, Shanghai, Pudong in figures

P.R. China
1,300 million inhabitants, urban 41%
9.6 mill. km², 3rd largest country
GDP 1,365 billion € 2004, 2nd largest economy
Health care 5.8%
GDP per capita 910 € 2003

Shanghai municipality
13 million inhabitants + 3.5 million floating (2002)
6,200 km²
Highest building rate, top economic development in China

Pudong New Area district
2.4 million inhabitants, 556 km²
5,600 regular foreign residents
The center of economic development in Shanghai
3. Healthcare System in Beijing and Shanghai
Healthcare delivery system with examples

P.R. China

18,396 hospitals, 42,471 health centers

Hospitals:
- 934 level 3
- 5,173 level 2
- 2,675 level 1
- 9,614 others

Hospitals:
- 2,000 priv.
- Rest govt.

Shanghai municipality

505 hospitals:
- 49 level 3
- 180 level 2
- 225 level 1
- 51 others

Pudong New Area district

49 hospitals:
- 5 level 3
- 17 level 2
- 24 level 1
- 3 others

Communities, townships

Weifang community
- 150,000 population
- 4 health stations
- 140 staffs
- 110 beds

Level 3 hosp. (teaching)

Yue Yang TC+WM hosp
Radiology
Pharmacy
Laboratory
Inp. wards
Outp. clinics

Level 2 hosp. (general)

Oriental (East) hosp.
Radiology
Pharmacy
Laboratory
Inp. wards
Outp. clinics

Level 1 hosp. (primary), community health centers

Weifang comm. HC
Pharmacy
Laboratory
Inp. wards
Outp. clinics

Clinic Prevention

Citizens
Healthcare management system
Healthcare funding system (urban)

P.R. China

Provinces, metropoles/municipalities, autonomous regions

DistRICTS, CountIES

Communities, townships

Citizens

Enterprises

Drug sales & diagnostic tests ~ 90%

Min. of Labour and Social Sec.

Min. of Health

Taxation

National government

Provincial/municipal govt.

Social Dev. Bur.

Health Bureau

District/county govt.

Urban Health Insurance

Social risk-pooling fund

Individual medical savings accounts

Radiology Pharmacy Laboratory Inp. wards Outp. clinics

Radiology Pharmacy Laboratory Inp. wards Outp. clinics

Pharmacy Laboratory Inp. wards Outp. clinics

Clinic Prevention

Govt. subsidy ~ 10%

6+2% of employees' wages

http://ase.tufts.edu/econ/papers/papers.html

From plan to market in the health sector?
4. Current situation of HIS in China
Health information management system

History of hospital IS in China

Before 1990
Single user applications with PC

1990 to 2000
PC + FOXBASE + LAN + departmental applications

After 2000
Client/Server, Browser/Server HIS
Clinical IS with PACS, laboratory IS and telemedicine

Regional difference
Eastern China: 80% hospitals have HIS
Western China: 20% have HIS

From: Hospital Information application in China
Chinese Computer Magazine 2003-12-5
5. HIS development plans in China
National health information development plan (2003-2010)

- All the hospitals at level III and level II have MIS, and 60% of county level hospitals have MIS by 2008
- Ten model digital hospitals with clinical IS such as EPR, PACS/RIS, LIS, doctor/nurse workstations by 2010
- 5-8 regional informatization models by 2006
- Network between health administration and preventive healthcare system by 2008

Hospital information system development (macro)

- Developing rapidly for HIS functional regulations and standards, compatible closely with international standards (ICD 10, HL7, DICOM, ICPM, SNOMED...)
- Restructuring hospital management model and workflow
- Promoting the CIS, study the Integrated HIS and Digital HIS
- Practicing 10 Digital Hospitals as examples (in 2005)
- Strengthening the training & education and technical cooperation
Hospital information system development (micro)

- General Plan for Digital Hospital
  - Doctor's workstation
  - Mobile equipment and bar code
  - PACS, RIS, LIS applications
- Implementation step by step
- First easy parts, then difficult ones
- System integrated, based on the unified standards

To develop a digital hospital is a long procedure. Structure, technology and standards are needed.

The main tasks for HIS in China

- Research for Digital Hospitals (Know How)
- Physician Workstation management information system, and Electronic Patient Records (EPRs)
- Security of information system (safety strategy)
- Public Health Management Information System
  → Functional norms, interface and integration standards, industry standards, data set standards, code standards

Meet the requirements of professional work
Digital Hospital Connotation and China’s Development Strategy Research project

Team members: Information Center of SHB, adm. departments of SHB, Hospital Management Department of University of Medicine, hospital representatives, medical information institutions, related enterprises

Purpose:
- To analysis the requirement of hospital development depended on informatization
- To study current situation of abroad digital hospital development,
- To design the frameworks, plans, demands, targets and stages of digital hospital’s development in Shanghai
- To set up a model of informatization construction of digital hospital
- Clarify the concept, connotation and measured standards of digital hospital
- Clarify the development stage and recent target of digital hospital
- Discuss the strategies of digital hospital’s development in Shanghai

6. Standardization situation and activities in China

Doctor’s Work Station

- Diagnosis and Treatment Assistant Module
- Medical Record Module
- Medical Prescription Module
- Warning Module
- Statistics Module
- Printing Module

Medical Safety Supervision Module

Performance Assessment Module Of Real-time Case-type
Rules and regulations in China

- Basic norm of hospital information system function (HIS)
  - issued by MOH (Ministry of Health), May 2002
  - partial unofficial translation into English done within Export HIS

- Outline of national health information development planning (2003-2010)
  - issued by MOH, April 2003

- Evaluation method of hospital information systems software
  - issued by MOH, 1997

- Internet’s health care information service management method
  - issued by MOH, 2000

- Electronic Signatures Law
  - past in April 2005

National standardization activities

China Health Information Management Association (CHIMA) established in April 2004 medical information standards committee which is responsible for establishing information standards.

- **The frame structure of national medical health information standard:**
  - Almost complete

- National medical health information basic data set standard: Started

- Hospital information basic data set standard (BDSS): Almost complete

- Public health basic data set standard: Completed by 2005

- Community health care basic data set standard: Just started by CHSI

- Chinese PACS standard: Almost completed by CHSI

- Chinese LIS standard: Started

- Chinese medical terminology standard: Started

- Structure and standard of Electronic Patient Record (EPR): Plan by CHSI

- Structure and standard of Electronic Health Record (EHR): Plan by CHSI
Organization of the HIBDSS project

<table>
<thead>
<tr>
<th>Group</th>
<th>Task</th>
<th>Data elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>WG1</td>
<td>ADT and Register</td>
<td>131</td>
</tr>
<tr>
<td>WG2</td>
<td>Outpatient, inpatient</td>
<td>250</td>
</tr>
<tr>
<td>WG3</td>
<td>Financial</td>
<td>134</td>
</tr>
<tr>
<td>WG4</td>
<td>Pharmacy</td>
<td>305</td>
</tr>
<tr>
<td>WG5</td>
<td>Operation and anesthesia</td>
<td>196</td>
</tr>
<tr>
<td>WG6</td>
<td>Laboratory</td>
<td>35</td>
</tr>
<tr>
<td>WG7</td>
<td>Medical image</td>
<td>118</td>
</tr>
<tr>
<td>WG8</td>
<td>Logistic</td>
<td>120</td>
</tr>
<tr>
<td>WG9</td>
<td>Medical record and EMR</td>
<td>174</td>
</tr>
<tr>
<td>WG10</td>
<td>Human resource and office management</td>
<td>267</td>
</tr>
<tr>
<td>WG11</td>
<td>Medical insurance</td>
<td>37</td>
</tr>
</tbody>
</table>

Rules and regulations in China

Three important documents guiding the application of electronic medical records, controlling the quality and functionality of software:

- Function norm of software in doctor working station of China's hospitals
- Module-interfacing standards in doctor working station
- Management for Shanghai electronic medical records (Draft)
7. Healthcare IT market in China

- China has a big potential health care market
- Under strong government control the competition is not sufficient
- IT expenditure relatively small (budget is limited), but it grows annually by 20-25%
- Expenditure in healthcare IT: 310 M€ in 2003 (13% packaged software), 700 M€ in 2008 (20% packaged software)
- IT manpower shortage in health organizations
- Standards and regulations are urgently needed
- After SARS, regional information system and patient information sharing are emphasized
- After WTO, new medical equipment, technology and management modal from abroad are welcome
- 500 suppliers, local IT vendors, at low price level
- Developing market at a turning point
## Market inhibitors

- Lacking competition between hospitals
- Financial position, ROI major concern
- Lacking knowledge of IT in hospitals
- Lack of talents combining IT with hospital business
- Lacking standardization
- Underdeveloped infrastructure
- Operation systems of hospitals
- Security concerns

## Local IT vendors in China

500 IT companies for the health domain  
Most IT suppliers are domestic  
300 for HIS development:

- Large 15% more than 50 staff
- Middle 60% 20-50 staff
- Small 25% less than 20 staff

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*From: Hospital information application in China  
ASEM Conference on eCommerce, London, 21-22 Feb 2005*
8. Continuation after Export HIS

Deliverables from Export HIS

- Working papers, theses, conference paper, manuscript
  - General description of the healthcare system in China (Palmén)
  - Business environment of healthcare information system in China (Sipilä)
  - The basic functional norm of HIS in China (partial translation, Ruonamaa)
  - Software localization into Chinese (Ruonamaa)
  - Healthcare Standardization in China (Jiang)
  - Quality improvement of laboratory service by IT, The problem and challenge of regional laboratory service in China (MSc, Jiang)
  - Kliinisen päätöksentuen ja potilastietojärjestelmien integraation rajapinnat kansainvälisesti (MSc, Suhonen)
  - Software architectures for digital healthcare (CHINC’2005, Korpela et al.)
  - Depicting the ‘healthcare system landscape’ for information systems developers (manuscript, Korpela et al.)
- 5 travel reports, linkages with authorities and companies
- Seminar in Shanghai & Guangzhou, workshop in ~Feb’06
Possibilities for collaboration

- What Chinese want from Finland-China eHealth Partnership:
  - Standardization and interoperability experience (Ydintiedot, SerAPI, HL7)
  - Digital hospital architecture, EPR and EHR
  - Regional information management, public health information management
  - Evaluation methods of health information systems
  - Workflow management and development ("ZipIT", clinical decision support)

- Further project proposals prepared within Export HIS:
  - Tekes/FinnWell: eHealth Partners Finland (Univ. of Tampere, UKu, et al.)
  - EU/6FP/IST: Building Collaborative Networks of Networks: Extending BEANISH to Asia (Univ. of Oslo, UKu, CHSI/MoH China, et al.)
  - Academy of Finland: Monitoring of antenatal care services at the primary health care level in three developing country contexts (UKu Public Health)

- Government-to-government agreements and World Bank type of funding is also needed

Possibilities for Finnish companies

- Look at model hospitals moving to "digital hospital" generation
- Required: Innovative niche product not found elsewhere
- Required: Internationalized product that can be localized
- Required: "Template" (aihio) rather than a rigid package
- Local solution provider should localize and provide support
- Government relations are very important
- Have a long term strategy but start before too late
- Consultation, eg. workflow analysis and development
- Training for trainers, eg. Health Information Management