The White Paper on China’s Hospital Information System
1. White Paper Overview (10 mins)
2. China HIT Overview (10 mins)
3. Challenges and Recommendations (10 mins)
4. China Hot Topics (10 mins)
   • RHIN
   • Clinical Systems
5. Chinese HIT Development Roadmap (10 mins)
6. Q & A (10 mins)
CHIMA

• CHIMA - “China Hospital Information Management Association”
• A non-profit academic organization
• Mission to promote information development in the healthcare industry
• Individual member: ~1,000

Key Areas:

• Academic research
• Exchange activities
• Training and consulting
• Standards development
White Paper Project Background

• The Informatization Steering Committee office from the Ministry of Health commissioned CHIMA to produce a White Paper on China’s Hospital Information System.

• The project was conducted over one year, with the active support and cooperation of Accenture.

• The White Paper was officially launched in May 2008.

• CHIMA experts involved had extensive experience in China’s healthcare environment having led, organized, designed and implemented many hospital information systems (HIS).

• Accenture provided expert healthcare knowledge, a sound methodology, comprehensive local and international expertise.

• The White Paper was written after a significant amount of research and analysis.

• The White Paper reflects the present status and developing trends of Hospital Information Systems in China.
White Paper Chapters

1. Healthcare Information in Hospital - Current Situation and Problems
2. Clinical Information System
3. Electronic Medical Record
4. Regional Health Information Networks
5. New Information Technology (IT) and Hospital Information Systems
6. Medical System Reform and Information Systems
7. Development of Healthcare Information Technology Industry and Market Development
8. Return on Investment (ROI) and Compensation Mechanism for Hospital Computerization
9. Human Resources and Establishment Academic Disciplines
10. Healthcare Information Standards
11. Conclusions and Recommendations
Intended Audience

• Health authorities and related government departments
• IT departments of health institutions
• Leaders, experts, enterprises, universities and research institutes that specialize in hospital management, information management and digital technology.
• Those interested in the HIT industry
Agenda

1. White Paper Overview

2. **China HIT Overview (10 mins)**

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4. China Hot Topics
   - RHIN
   - Clinical Systems

5. Chinese HIT Development Roadmap

6. Q & A
Cumulative Investment of Hospitals Computerization (2005)

- above 50,000,000: 0.94%
- 20,010,000-50,000,000: 4.22%
- 10,010,000-20,000,000: 9.84%
- 5,010,000-10,000,000: 13.82%
- 2,010,000-5,000,000: 18.74%
- 1,010,000-2,000,000: 17.33%
- 500,000-1,000,000: 14.75%
- below 500,000: 20.37%
Growth of Chinese HIT market Investment

Hundred Million Yuan

- Public Health
- Hospitals

<table>
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<tr>
<th>Year</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007 (E)</th>
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<td>52.9</td>
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<td>73.4%</td>
<td>73.2%</td>
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</table>
China's unique HIT environment

- The government controls most of the healthcare resources and pricing, hospitals are financially independent and make their own HIT choices.
- A significant imbalance in HIT development between highly developed regions versus those at the county level hospitals or in rural settings.
- A late HIT development advantage has resulted in Chinese technical infrastructure to be more current with advanced hardware infrastructure and modern approaches to software development, such as service-oriented-architecture and the latest application development platforms.
- Since overall hospital HIT investment is small, much of the current software is of low quality and low cost. The low-cost software is a barrier to entry for vendors wishing to enter the Chinese market.
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Current Situation

• Significant progress over the last 10 years

• Some advanced systems - generally big difference between large hospitals and medium/small hospitals and primary care

• Enviable position with doctors use of systems, but:
  – Billing / administration focused
  – Not realizing potential benefits

• Critical period going forward
China HIT Industry

- China > 500 vendors – not sophisticated (core systems)
- Consolidation urgently required
- Lack of standards /standardization (comes at a cost)
- Realistic funding necessary
- New wave of systems more complex (e.g. clinical information systems)
- Implementation services critical
- Vendors need scale and focus (HIS, LIS, CIS)
- Encourage international vendors in new complex areas – strategic partnerships
Current Issues

- Levels of funding and continuity
- Competing for funds – track record – lack of confidence
- Poor investment decisions
- Little focus on clinical benefits (patient safety & quality)
- Limited performance measurement
- Lack of standards
- Lack of planning, unrealistic timeframes, etc.
- Skills development program required
- Immature software industry
Funding

- Low investments - not alone
- UK has “raised the bar” – progress slow
- Learn from overseas mistakes:
  - Standards – introduce NOW!
  - Planning
  - Realistic timeframes
- Current funding complex – national, province, city, district, hospital
Software Selection

• China – emphasis on hardware / infrastructure

• Overseas expenditure:
  – 20 – 25 years ago:
    • 65% hardware, 20% software, 15% implementation services
  – Now:
    • 30% hardware, 15% software, 65% implementation services

• Implementation planning essential

• Require more user engagement in process
Skilled Workforce

- Some large hospitals impressive – as size decrease, skills reduce
- Too much emphasis on technology – need business focus (especially at CIO level)
- Extensive training programs must be introduced (government)
- Current and future leadership group require international experience
- Health informatics - professional development
Set Realistic Goals & Timelines

• Next areas of focus (clinical, RHIN’s) are large and complex implementations
• Programs not isolated projects
• Planning essential
• Urgent need for professional project management
• Link programs to Health Reform initiatives
**Actions Required**

- Increased investment
- Mandate standards – HL7, LOINC, SNOMED, etc (interoperability)
- Regulatory changes e.g. electronic signatures for prescribing
- Develop guidelines for selection process (based on standard criteria)
- Software certification organization – will force consolidation
- Encourage overseas involvement – learn from mistakes of others
- Utilize existing professional organizations e.g. CHIMA
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Regional Health Information Network

CHIMA and Accenture provided the following definition of RHIN in China:

“Is a business and technical platform that provides institutions including medical caregivers, health administration authorities, patients, payers and medication suppliers with health industry data that is collected, transmitted, stored and processed in digital form in order to support working processes of medical care services, public health and health administration.”

• RHIN is a hot topic in China HIT industry at present.
• More than 30 cities / districts have RHIN plans, conducting research, planning, conducting pilots.
• Shenzhen, Guangzhou, Shanghai, Beijing…
• Made some progress, but have experienced significant problems.
RHIN Recommendations

• Acknowledge the difficulties embedded in Regional Health Information Networks, need to plan and implement scientifically.

• Ensure adequate government investment to ensure continuous development.

• Innovative organizational models and reformed management process are required for Regional Health Information Networks.

• Accelerating the development of Primary Health Institution Information Systems and providing support for Regional Health Information Networks.

• Urgent need to establish standards and specifications for Regional Health Information Networks.
Clinical Information Systems (1)

Definition: A clinical information system (CIS) collects, processes, stores and communicates patient information to help improve the quality and efficiency of care service.

- Physician Order Management System
- Intensive Care Unit System
- Surgery Anaesthesia System
- Physician Workstation System
- Laboratory Information System (LIS)
- PACS and Radiology Information System (RIS)
- Cardiology (ECG) Information System

### Survey of CIS Applications

<table>
<thead>
<tr>
<th>System Name</th>
<th>CHIMA Survey 2005 (%)</th>
<th>Center for Health Statistics &amp; Information, MOH Survey (%)</th>
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<tbody>
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<td>Laboratory Information System</td>
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<td>26.43</td>
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<td>Ancillary Department Information System</td>
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<td>Inpatient Physicians Workstation</td>
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<td>Outpatient Physicians Workstation</td>
<td>32.99</td>
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<td>Radiology Information System</td>
<td>33.40</td>
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<tr>
<td>PACS System</td>
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<tr>
<td>Clinical Decision Support System</td>
<td>12.30</td>
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### Clinical Information Systems (2)

#### Existing issues
- Limited system integration
- No focus on the reduction of medical errors
- Little evaluation of the CIS applications
- Lack of medical knowledge bases
- Limited standardization
- Regulations are not in place e.g., electronic prescriptions

#### Recommendations
- Gradual introduction to clinical applications
- Overall plan and avoid ‘islands of information’
- Strengthen use of knowledge bases
- Strengthen control over CIS products
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Health Reforms

Vision: To establish a basic healthcare service for all, with minimal quality disparity that will ensure timely access to prevention, treatment and care with safe drug use at a reasonable cost. The core is to deliver a basic healthcare system that covers both the rural and urban population.

Four basic contents of the new system:

• basic healthcare that covers both the rural and urban population.

• multi-level healthcare guarantee system

• National essential drug system

• scientific and standard management systems in public hospitals.
Challenge and Opportunities

• Patient referrals in communities and hospitals:
  – Information flow with patient referral.
  – Regional EHR.
  – Portable PHR.

• Public hospitals management system
  – Operational information sharing
  – Data mining and decision-support

• Multi-level healthcare guarantee system
  – On-line claim system
  – Data mining and decision-support
HIT Development Roadmap for China

• China’s HIT development is at a critical crossroad:
  – Health Reforms raise complex requirements for HIT
  – Investment components are changing - government should provide more funding
  – MIS needs to urgently transform to provide management decision support with advanced applications
    • Executive Information System (EIS)
    • Cost Analysis, Performance Management System (PMS)
    • Supply Chain Management System (SMS)
    • Customer Relationship Management (CRM)
    • Enterprise Resource Planning (ERP)
  – Patient-centered and clinical-oriented EMR being deployed
  – RHIN based EHR are being planning in highly developed regions
HIT Development Roadmap for China

Is it feasible to implement a uniform system across the country? Answer: No!

- Big market determines government does not have enough power
- Imbalance of HIT applications across the whole country
- Requirements are too complex
- Impossible to replace all existing HIS with a uniform HIS
HIT Development Roadmap for China

Is it possible to develop high-quality, low-cost software systems?
Answer: Yes!

- The defined system quality means support of interoperable communities and EMR/EHR applications
- China’s IT human resources are abundant and cheap in terms of coding and services
- Using late-development advantage, avoiding overseas country’s mistakes
- Government need to form a team of professionals with high potential
- Government must invest in Research and Development of high-end and reusable artefacts
- HIT companies design applications through functional design, coding, testing and provide applications and services to their clients
Is it possible to bypass interoperability?
Answer: No!

• Some people believe that interoperability exists only because HIT in the US has been developed with the lack of data element standards

• Interoperability is the ability to communicate and cooperate with two or more systems, including

• Data element standards -- Semantic

• Data communication standards -- Syntactic

• Roles/transaction and harmonization work flow

• We will make the same mistakes made by overseas countries and end up with more silos, without interoperability
If it possible to implement POS applications (EMR, EHR, Community Healthcare Service CHS) and resolve interoperability at the same time?

Answer: Difficult but possible.

- Define a set of information exchange standards to support interoperability. These standards include information content, information exchange format and information exchange processes
- Define policies and procedures to assess, test and certify whether software applications comply with interoperability requirements
- Stimulate and promote software vendors to comply with the standards
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