Past, Present & Future
Clinical Management System (CMS)
for Hospital Authority in Hong Kong
- a Journey of 20+ years

HA Convention 2016
Hong Kong Healthcare System - Dual System

Private
Self-financed by patients

2.6% GDP
12% inpatients
69% outpatients

Public
Highly subsidized by govt

2.5% GDP
88% inpatients
31% outpatients

Public Health

Source: 1. Hong Kong's Domestic Health Accounts (HKDHA) 2010/11 from Food & Health Bureau
2. Inpatient (secondary & tertiary care): "Public-private share by in-patient bed day occupied in 2012" from HA and Department of Health
Total Expenditure on Health as Percentage of GDP

Source: 1. Food and Health Bureau – Hong Kong’s Domestic Health Accounts (HKDHA). Estimate of Domestic Health Expenditure, 1989/90 – 2010/11
2. OECD Health Data June 2013

5.1% = 2.5% + 2.6%

GDP
Public
Private

Hong Kong
Government Expenditure on Health – 2014/15 Estimate

- Community and External Affairs: 3.4%
- Economic: 3.3%
- Environment and Food: 4.2%
- Infrastructure: 6.0%
- Security: 11.2%
- Social Welfare: 18.5%
- Housing: 0.1%
- Education: 21.8%
- Support: 14.5%
- Health: 17.0%

Established in 1991

- 162 sites
- 42 Public Hospitals
- 47 Specialist Outpatient Clinics (SOPD)
- 73 General Outpatient Clinics (GOPC)
- Around 28,000 Beds

Annual Workload
- 6,300,000 GOPC Attendances
- 7,300,000 SOPD Attendances
- 2,200,000 A&E Attendances
- 1,700,000 Inpatient and Day Patient

Source:
1. HA Statistical Report 2012/13
2. HA Information Fact Sheet Jun 2014
3. www.ha.org.hk
IT Service Delivery & Technology
Scope of IT Service Delivery

Electronic Transactions

<table>
<thead>
<tr>
<th>Electronic Transactions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CMS transactions</td>
<td>11.0M per day</td>
</tr>
<tr>
<td>ePR transactions</td>
<td>1.8M per day</td>
</tr>
<tr>
<td>OPAS/IPAS transactions</td>
<td>0.86M per day</td>
</tr>
<tr>
<td>Laboratory requests per annum</td>
<td>23.7M</td>
</tr>
<tr>
<td>Dispensing transactions per annum</td>
<td>65.8M</td>
</tr>
<tr>
<td>Radiology examinations per annum</td>
<td>4.6M</td>
</tr>
<tr>
<td>Financial transactions per annum</td>
<td>156.9M</td>
</tr>
<tr>
<td>HR/Payroll transactions per annum</td>
<td>9.4M</td>
</tr>
<tr>
<td>Procurement/SCM transactions per annum</td>
<td>22.2M</td>
</tr>
</tbody>
</table>

Network Infrastructure

<table>
<thead>
<tr>
<th>Network Infrastructure</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Desktop PCs</td>
<td>45,000</td>
</tr>
<tr>
<td>LANs / Wireless LAN Access Points</td>
<td>2,474 / 3,750</td>
</tr>
<tr>
<td>WAN Lines</td>
<td>250</td>
</tr>
<tr>
<td>Servers (Processors)</td>
<td>1,650 (7,100)</td>
</tr>
<tr>
<td>Data stored on the network</td>
<td>2,450 Terabytes</td>
</tr>
</tbody>
</table>

Messaging

<table>
<thead>
<tr>
<th>Messaging</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Intranet / Internet mailboxes</td>
<td>60,600 / 47,200</td>
</tr>
<tr>
<td>Intranet messages per month</td>
<td>28M</td>
</tr>
<tr>
<td>IN / OUT Internet messages per month</td>
<td>834K / 899K</td>
</tr>
<tr>
<td>Spam messages blocked per month</td>
<td>1.1M</td>
</tr>
<tr>
<td>Viruses / Attacks blocked per month</td>
<td>291 / 183K</td>
</tr>
</tbody>
</table>

Who Do We Support

- 7+ mil HK Residents
- 70,293 HA Employees
- 42 Hospital/Institutions
- 120 HA Clinics in 200 Buildings
- 18,091 Suppliers to HA

* 2 for Development and Testing
** Expenditure include e-HR. Employees refer to HA staff only

• HA IT Services 2014/15
  • Employees: 852 (63%)
  • Contractors: 511 (37%)
  • 5 Corporate Data Centers*
  • 16 Hospital Data Centers

• IT OPEX: $1,088M (83%), 2.2% of Total HA OPEX**
• IT CAPEX: $226M (17%), 28.3% of Total HA CAPEX**
• IT Expenditure is 2.6% of Total HA Expenditure**
• IT Employees is 1.2% of Total HA Employees**
Clinical Systems – Patient Care Delivery Journey

Problems

- History taking
- Physical examination

Outcomes

- Coding of discharge diagnosis & procedures
- Drug prescription
- Discharge summary
- Referrals or replies to other clinicians
- Follow-up appointment booking
- Medical reports

"One" Set of Integrated Applications

- Laboratory (LIS)
- Radiology (RIS)
- Radiology Imaging (RID)
- Operating Theatre (OTMS)

"One" Set of Integrated Databases

- Pharmacy Dispensing (PMS)
- Medical Record Tracing System (MRTS)
- Electronic Patient Record
- Organ Transplant (ORTS)

"One" Set of Integrated Platform

- Appointment Booking (OPAS)
- Hong Kong Patient Master Index – Patient Administration (IPAS)
- Patient Deceased
- Patient Discharged

23/5/2016
Unique Patient Identifier

- Using Hong Kong Identity Number (HKID #)
- PMI, Admissions/Discharges and Appointments Booking implemented across all HA hospitals and clinics
- HA PMI contains 10 million people’s records

Uniquely identify all patients and facilitate linking together episodes of care
Standards & Medical Terminology

Diagram showing various terminologies and their relationships:
- Diagnosis/Procedure
- GCD
- CDF
- HACVT
- CDARS
- DW
- ePR

Terminologies:
- ICD9CM
- ICD 10
- ICPC
- ICF
- SNOMED
- LOINC

Date: 23/5/2016
CMS Governance & Roadmap
CMS Development In HA (20+ years)

- **1990** – “Green fields”
- **1991** – Patient Administration
- **1992** – Pharmacy system
- **1993** – Pathology system
- **1994** – Radiology information system
- **1995** – CMS I
- **2002** – CMS II – incl. Electronic Patient Record (ePR)
- **2003** – eSARS
- **2004** – Image Distribution
- **2006** – ePR sharing with private sector
- **2009** – CMS III Ph 1
- **2010** – Filmless Hospital
- **2011** – InPatient Medication Order Entry
- **2012** – Web-based CMS
- **2013** – CMS III Ph 2
- **2014** – Filmless OT
- **2016** – Launch of eHR


CMS III (2009 – 2017) [SOA Web-based]

CMS IV (under planning)
CMS: Integrated clinical workstation for direct use by all 40,000+ clinical users in HA

- Phase II (2002-2008) – The Documenter
- Phase III (2009-2017) – The Helper
- Phase IV – The Colleague
- Phase V – The Mentor
Evolution of CMS I & II

CMS I (Year 1995 – 2001)
- Discharge summary
- Clinician coding of diagnosis & procedure codes
- Ordering of medications & laboratory tests
- Retrieving laboratory & radiology results
- Medication history
- E-booking of appointments
- Referral / reply letters and reports
- Cross hospital information enquiry

CMS II (Year 2002 – 2008)
- Generic Clinical Requests (Order Entry)
- Generic Results Reporting (Clinical Forms)
- Clinical Data Framework
- Outcome Documentation
- Medication Decision Support
- Clinical Data Analysis and Reporting
- Electronic Patient Record (ePR)
Evolution of CMS III

CMS III (Year 2009 - 2017)

• Full Web Based, Service Oriented Architecture (SOA)
  – Access anywhere
• Imaging Solution
  – Radiology & Others
• Filmless Hospital
  – Nursing Wards (Wifi)
• Mobile Solution
  – Apps (Patient Assessment, Nursing outreach service, Care Model, ….)
• Nursing & Allied Health
  – More electronics
• Closed Loop Inpatient Medication Order Entry
  – Prescription, Dispensing & Administration
  – eCert, Mobile Tablets, Wifi
• Support for electronic Health Record (Government program)
  – Launched in Mar 2016
CMS is essential in HA

Each Day...

- 100,000+ patients treated with CMS
- 11,000,000+ Clinical online trans
  - Peak: 600 Tran / sec

To Date...

- 22,000+ Clinical workstations
- 40,000+ Clinical users
- 10,000,000+ patient records
- 700,000,000 Lab records
- 1,000,000,000,000 MB clinical data & rad images

Overall System Availability: 99.99%
Key Benefits
System Efficiency from Speeding up Process

1st Benefit:

Average time with doctor per specialist outpatient attendance: 7 Minutes
Average wait time for dispensed drugs: 15 Minutes

23/5/2016
## Contribution to Patient Safety

### Drug Allergy Checking

<table>
<thead>
<tr>
<th>Drug Allergy Alerts Raised</th>
<th>69,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alert Accepted</td>
<td>32,000 (47%)</td>
</tr>
<tr>
<td>Alert Overridden</td>
<td>37,000 (53%)</td>
</tr>
</tbody>
</table>

### Drug Drug Interaction Checking

<table>
<thead>
<tr>
<th>DDI Alerts Raised</th>
<th>11,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alert Accepted</td>
<td>4,000 (35%)</td>
</tr>
<tr>
<td>Alert Overridden</td>
<td>7,000 (65%)</td>
</tr>
</tbody>
</table>

### Incidents of Misidentifications in Laboratory Tests

<table>
<thead>
<tr>
<th></th>
<th>Hospital A</th>
<th>Hospital B</th>
<th>Hospital C</th>
<th>Hospital D</th>
<th>All hospitals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Before introduction of 2D barcode system</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of cases</td>
<td>132</td>
<td>4</td>
<td>59</td>
<td>42</td>
<td>697</td>
</tr>
<tr>
<td><strong>23/5/2016</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>After introduction of 2D barcode system</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Manage Emergencies
(e.g. eSARS > eFLU > eMILK)

Fatality Rate by Age

<table>
<thead>
<tr>
<th>Age</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-29</td>
<td>7.0</td>
</tr>
<tr>
<td>30-34</td>
<td>11.6</td>
</tr>
<tr>
<td>35-44</td>
<td>14.7</td>
</tr>
<tr>
<td>45-59</td>
<td>28.0</td>
</tr>
<tr>
<td>60-74</td>
<td>44.1</td>
</tr>
<tr>
<td>75+</td>
<td>73.3</td>
</tr>
</tbody>
</table>

The Hong Kong epidemic

eSARS Architecture

Video Conferencing
Enterprise Wide Analytics…
leveraging Corporate Clinical Data Warehouse and Clinical Data Analysis and Reporting System (CDARS)

Clinicians run **56,000** queries per month
New Business Models - PPI
Sharing ePR with Private Sector Clinicians
Clinicians like IT and use IT

**SO WHAT IS CMS IN HA?**

- One of the most important investments supporting our core business of clinical care
- One of the largest CIS in the world with the highest penetration and clinician buy-in
- Facilitates clinical operations, making it more efficient and safer
- For the doctors, it is arguably the single most important tool in our daily practice
- A goldmine of largely unexplored data for clinical research and management reviews
- We need to move on to the next stage – exciting!

**WHY WE ARE SPECIAL**

- Clinician designed system for clinicians
- We did it in our own way, in-house, perhaps ignorant of what others are doing outside HK in the early days
- We use it, and use it a lot, and it is everywhere, almost 24/7
- We depend on it, and addicted to it
- Our core business is so dependent on it that system availability, data integrity and security is becoming a major risk management issue

Dr CC Yau
MBBS FRCP FRCR FHKAM FHKCR
Department of Oncology, Princess Margaret Hospital
Cluster Clinical Systems Coordinator
CISPG & CIPEG Member

23/5/2016
CMS IV - New Clinical Technology for year 2017 to 2022 & beyond
New Pathology Technology

- **Emerging laboratory investigation technologies**
  - Enhancing reporting structure, analyzer interfacing, data analysis etc. for new technologies,
    - E.g. 1 Next Generation Sequencing (NGS)
    - E.g. 2 genomic medicine…

- **Digital Pathology**
  - Developing pathology slide-less infrastructure
  - Integrating with Digital Pathology for analysis & reporting

- **Laboratory Management System**
  - Supporting laboratory operations and workflow management, e.g. sample tracking, real-time operations monitoring, reagent management…
• Pharmacy Operation Modernization
  • Pharmacy automation
  • Cross institution service
  • Flexible pharmacy operation

• Workflow Re-engineering for Pharmacy Dispensing
  • Triage of priority dispensing
  • Pharmacy dashboard
  • Management of waiting time

• Drug Information Mobile Platform
  • Mobile Apps
  • Drug administration schedule
  • Patient empowerment
#3
- New Imaging Technology

- **Enterprise Image Archive**
  - Multi-ology, cloud-based image repository
  - Zero-footprint universal viewer for delivering anytime, anywhere image viewing
  - Extend image sharing across enterprise
    - E.g.1: Image Navigation Assisted Surgery
    - E.g.2: Image interface with robotic surgery
  - Enable support to eHR (Imaging)

- **Enterprise Imaging Workflow Engine**
  - Enterprise work list and workflow engine to support multi-ology imaging workflows
  - Enable to launch appropriate reporting and visualization tool based on pre-defined criteria
  - Interoperate with enterprise universal viewer for sharing
  - Enable central reporting system for radiology images

---

- **ePR-ID**
  - DICOM Image Archive for Filmless
  - Enterprise DICOM Archive
  - Centralized Radiology PACS
  - Enterprise Multi-specialty Archive
  - Centralized multi-ology image repository
  - Enterprise Multi-specialty Archive with eHR enabling
  - Support eHR Stage II interface

---

23/5/2016
• Modern Clinical Technology
  – 3D Bio-printing systems for organ transplant
    • E.g.1 : 3DP Hip/Knee Implants
    • E.g.2 : 3D visualization
  – Track & Trace Technology
    • RFID / Blue Tooth / iBeacon
  – Healthcare Robotics Device
  – Biomedical
#5

**Smart Consultation Technology**

- **Clinical Protocol Driven Care**
  - Patient Care Plan
  - Assessment, Intervention & Outcome
  - Pre-op risk assessment

- **Smart Clinical Documentation**

- **Precision Medicine**
  - Emerging approach for disease diagnosis, treatment and prevention
  - Context of genes, physiology, anatomy, environment & lifestyle

23/5/2016
#6

Patient Management Technology

- **Patient Registration Technology**
  - New generation of smart HK ID Card

- **User Log-in Technology**
  - Biomedical identification

- **New Bed Management Technology**
  - Exploration of use: RFID/iBeacon on bed and patient

- **Location & Condition Sensing Technology**
  - Sensor Devices and Wireless Network
Mobile Medicine Technology

• **Mobile Medicine / Telemedicine**
  – Support Community Care

• **Bed-side setting**
  – Vital Sign automatic capture / alert

• **Patient Self-monitoring at home**
  – Vital Sign capture / alert
## Acknowledgement

### Clinicians
- Dr. FUNG Hong
- Dr. S F LUI
- Dr. C C YAU
- Dr. John KWOK
- Dr. K C WONG
- Dr. Y C CHU
- Dr. Lilian LEUNG
- Dr. Chris TSE
- Dr. C B LAW
- Dr. I T LAU
- Dr. W L NG
- Dr. John CHAN
- Dr. S Y WONG
- Dr. C B LEUNG
- Dr. Damon CHOY
- Dr. Y Y CHOW
- Dr. Jimmy CHAN
- Dr. C P WONG
- Dr. Betty YOUNG
- Dr. K C LI
- Dr. Susan CHAN
- Dr. C Y WONG
- Dr. C Y TAM
- Dr. Ashley CHENG
- Dr. H B CHAN
- Dr. W Y SHEN

and hundreds of clinicians / nursing teams / allied health teams .................. & HI teams (led by Dr. N T CHEUNG) and IT teams (led by Kevin CAI)
Thank You
Key Learning Points - Achieving Healthcare IT in HA

1. Innovation
2. Proper Governance Structure
3. Risk Management
4. Team work among clusters & HAHO
5. Driven, Designed & Used by Clinicians
6. Infrastructure ready – wifi / device

Project Success

23/5/2016
Key IT Issues/Challenges

1. Inherent IT Risks
2. Ongoing Technology Refreshment
3. Rising Internal Demand for IT
4. Significant External Demands on HA IT Services
5. Growth in Facilities: Data Centers & WiFi
6. Developing IT Organisation
7. Developing Health Informatics/IT capability in HK
8. Safeguarding Data Security and Privacy
Recognition & Validation

Awards

China Top 5 CIO Award in 2008
Gold Award in HK ICT Award in 2007
APICTA Gold Award in 2006
HA Outstanding Staff & Team Award in 2006
Asian Hospital Management Merit Award in 2006
HKCS IT Excellence Bronze Award in 2005
Winner Asian Hospital Management Award 2005
Stockholm Challenge Award in 2004
Informatics Insight Award in 2004
Best presented paper in APAMI in 2003
Special invited presentation in AMIA in 2003

Benchmarking

HA total annual IT expenditure was only 10% of the comparable NHS London Region in UK

HA total IT investment of HK$2.4B since 1991 against HK$32.6B for Clinical Systems at comparable Kaiser Permanente in USA

HK$1B project in Singapore to share all public hospitals electronic patient records by 2012 (that HA has been doing since 2001)
# 15 Areas of Architecture, Technology and Infrastructure

|---|---|---|

23/5/2016
Clinical Applications Strategy 2012-17

Planning framework
• Build on Clinical System Strategy 2007-12
• Make Reference to
  – HA Strategic Service Plan 2009-12
  – Forthcoming HA SSP 2012-17
• Align / enable HAVMV
  – Healthy People
  – Happy Staff
  – Trusted by the community

Development
Engagement
• CMS III Advanced Strategic Planning Workshop (Oct 2010)
• CIPSG & CIPEG forums
• Briefing to senior executives

Working
• Multiple CIPO & other internal forums

Internal control & QA
• CMT / CET meetings
• Briefing to D’s meeting
• ITGC comment & input (June ’11)
1. Adopt the Computerized Patient Record (CPR) Architecture for future clinical systems
2. Evaluate and acquire, (if risk and cost-justified), commercially available tools, components and applications before developing in-house
3. Redevelop legacy PAS & CMS Systems to facilitate Workflow and Decision Support (Gartner CPR Level 3/4)
4. Progress Corporate Imaging Solution
5. Progress Sharing HA ePR with the Private Sector
Future CMS Phase III - Objectives

1. Develop the content
   – Standards-based, comprehensive, multimedia patient-based ePR

2. Facilitate the process
   – Support for operational care processes
   – Workflow management and communication tools

3. Improve the outcome
   – Clinical decision support at point of care
   – Support for QA activities

4. Extend to the Community

23/5/2016
## Clinical Informatics Program Steering Group

**Dr H W LUI & Dr C P WONG**

### Functional Groups

**Requirements**
- Dr Henery Huang
- Dr TC Pun
- Dr KC Lee
- Dr John Kwok
- Dr LF Fung
- Dr Eric Chan
- Dr Daniel Chu
- Dr Joseph Lui
- Dr YY Chow

**Implementation**
- Dr SF Lui
- Dr TF Chan
- Dr TY Wong
- Dr HF Ng
- Dr TM Choy
- Dr Matthew Ng
- Dr PW Ko
- Dr SK Au
- Dr YY Chow

**Development**
- Dr Betty Young
- Dr Andrew Young
- Dr CC Yau
- Dr CY Tam
- Dr NT Young

**Standards/Policies**
- Dr CB Law
- Dr LC Chong
- Dr Betty Young
- Dr CC Yau
- Dr CB Leung

**Technology**
- Dr CB Law
- Dr LC Chong
- Dr Betty Young

### Groups
- 44 groups
- 160 doctors
- 100 others

### Dates
- 23/5/2016
Important Notes

1. All patient information is strictly confidential.
2. Staff may only use the CMS for authorised purposes.
3. All access to CMS is logged.
4. Please log off immediately after use.
5. Please ensure you have verified the content before you sign the computer printouts.
The HK Patient Master Index

• Using Hong Kong Identity Number (HKID #)
• HKPMI, Admissions/Discharges and Appointments Booking implemented across all HA hospitals and clinics
• HA HKPMI contains 8 million records

Uniquely identify all patients and can facilitate linking together episodes of care
2.2 Clinical Systems Strategy (5-year plan)
IT Strategic Plan for 5 years

IT Program

1. Clinical
   - CMS3- Modernising CMS2 + Closed Loop Meds Mgt.
   - Supporting Government’s CDIS & eHR

2. Non-Clinical
   - ERP- Enterprise Resources Planning System
   - PBRC – Patient Billing & Revenue Collection

3. Infrastructure
   - RAS- Improve Reliability, Availability & Serviceability
   - CRS- Consolidation, Rationalization & Standardization

4. Organization
   - IT/IS Organization as a Shared Service

Currently developing the next 5 year IT Strategic Plan!

23/5/2016
ePR Image Distribution

- **Reference quality images**
  - Images acquired from Radiology PACSs
  - Selected key images
  - Compressed → reference quality images kept in Central Archive
  - Share with clinical depts via CMS / ePR platform
  - As at March 2007, 11 Radiology PACSs connected
  - 22 millions of 5 Terabytes lossy images archived

- **Limited lossless image distribution**
  - Leverage the same architecture
  - Add local server to keep lossless images
  - Facilitate filmless operation
Image Distribution Project - Architecture

Continuous IT upgrades to support front-line upgrades to the IT's Information Technology infrastructure and capabilities during 2016 included enhancements to the Clinical Management System (CMS) and the electronic Patient Record (ePR).

The CMS, with its six million patient records, supports front-line practice with ready access to information at each patient and also enables the way to improve treatment and management regimes.

Radiology Dept. mini PACS

Limited lossless Option

DICOM via WAN

Central Archive

Central Web Servers

Local Gateway

Clinical quality images (life long)

ePR (with RIS / Images link)

existing workstations)
Enterprise-wide Electronic Patient Record (ePR)

Patient Summary

Radiology Images

23/5/2016

Laboratory Results
ePR Contents

- Patient demographics
- Admissions & outpatient visits
- Allergies & Alerts
- Laboratory results
- Radiology results
- Diagnoses
- Discharge summaries

- Medications
- Operation & procedures
- Rehabilitation & therapy
- Obstetric history
- Other specialty data
- Scanned documents
- Diagnostic images
### Image Distribution via ePR

#### Patient Information
- **HKID:** K1001000
- **Name:** PATIENT, 305997 (病人)
- **DOB:** 01/12/1965 (Exact? Y)
- **Age:** 39
- **Sex:** F
- **Death:** N

#### Search by Request Date

<table>
<thead>
<tr>
<th>Request Date Period</th>
<th>Request Date Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>--- All ---</td>
<td>OR From Date:</td>
</tr>
<tr>
<td></td>
<td>To Date:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reference</th>
<th>Date</th>
<th>Time</th>
<th>Procedure</th>
<th>Facility</th>
</tr>
</thead>
<tbody>
<tr>
<td>HN0500000002</td>
<td>10/01/2005</td>
<td>14:02</td>
<td>XRAY</td>
<td>AHN</td>
</tr>
<tr>
<td>HN0500000001</td>
<td>10/01/2005</td>
<td>12:39</td>
<td>XRAY</td>
<td>AHN</td>
</tr>
<tr>
<td>No case no</td>
<td>07/01/2005</td>
<td>14:50</td>
<td>CT</td>
<td>Shoulder +con.</td>
</tr>
<tr>
<td>No case no</td>
<td>07/01/2005</td>
<td>14:55</td>
<td>CT</td>
<td>AC joint</td>
</tr>
<tr>
<td>No case no</td>
<td>07/01/2005</td>
<td>14:53</td>
<td>XRAY</td>
<td></td>
</tr>
<tr>
<td>No case no</td>
<td>07/01/2005</td>
<td>14:52</td>
<td>XRAY</td>
<td>Chest</td>
</tr>
<tr>
<td>No case no</td>
<td>07/01/2005</td>
<td>14:52</td>
<td>XRAY</td>
<td>Chest + Ba</td>
</tr>
</tbody>
</table>

#### URGENT PLAIN CT BRAIN

**Clinical History:**
Head injury with LOC and vomiting. (history from ePR: patient has history of NPC and Ca lung).

**Technique:**
- 5mm non-contrast axial CT scans of the posterior cranial fossa.
- 10mm non-contrast axial CT scans of the rest of the brain.

**Findings:**
There is a hyperdense subdural haematoma in the left frontoparietotemporal region. It measures 9mm in thickness. There is mild mass effect with ipsilateral sulcal, ventricular effacement and mild midline shift.

**1st Endorsed By:** RIS User for DEMO
**1st Endorsed Date:** 10/01/2005 17:19

---

23/5/2016
Electronic Patient Record - ePR

- Web-based lifelong longitudinal record of all healthcare transactions for all Hong Kong citizens
- Many data formats (textual, numerical and digital images)
- Patient privacy protected with access controls and full audit logs
- Available at all 162 facilities in HA
Hong Kong Public Healthcare

The Government of the Hong Kong Special Administrative Region of the People’s Republic of China

Food and Health Bureau

Department of Health

Centre for Health Protection

Hospitals, Specialist Outpatient Clinics, and General Outpatient Clinics

Public Health and Screening Services
Healthcare Structure in Hong Kong

**Primary Care** (distribution of consultations)

- Chinese Medicine Practitioners: 12.8%
- Public Doctors: 29.7%
- Private Doctors: 56.8%
- Others: 0.7%

**Secondary and Tertiary Care** (distribution of in-patient bed days)

- Hospital Authority: 88%
- Private Hospitals/Doctors: 12%

Source:
2. Public/private share by in-patient bed day occupied in 2012 (HA & Department of Health)

23/5/2016
1. Doctors prescribe via IPMOE

2. Nurses login and view MAR via IPMOE

3. Nurses scan Barcode on drug bag to verify Right drug & Right time

   System auto-assign schedule & sort out drugs due for administration

   Patient Identity & Drug data are transmitted to scanner via Bluetooth

4. Nurses scan Barcode on patient wristband to verify Right patient

   Drug administration details are clearly documented in the system

Pharmacists receive the order, vet and dispense drugs to ward

Administration record can be seen in pharmacy to facilitate drug refill

Drug administration details are clearly documented in the system

A “closed loop” Inpatient Medication Order Entry project among Doctors, Nurses & Pharmacist using E-Cert, Wifi, Mobile Devices, Tablet, Drug Trolley,…..
Filmless Hospital – New Technology

Film Saving: 5.3million per year

$$ Saving: $53m per year

Basic viewing technology

Image processing system

23/5/2016