HITWA 2013
The Road to Reform: Challenges, Innovations and Success

State-wide perspectives and developments in eHealth and the digital hospital

Dr Andrew Robertson
WA Health – some unique challenges

- WA – approx. one-third of the Australian continent
- Land Area – 2.5 million square kilometres
- Population – 2.3 million Western Australians
- 97% of total area of WA has less than one person per sq km
- 30% of population lives outside of Perth
- Some remote areas are over 3000kms from Perth

WA Health (2011)

- Approx. 40,000 staff
- Handled just under 1 million ED visits
- Completed 81,000 elective surgery cases
- Carried out over 98,000 breast cancer screenings


Delivering a Healthy WA
Technology as an enabler

- Technology is a key enabler for WA Health.
- Current ICT strategies are focussed on enabling better health outcomes.
- Continue to review our business priorities aiming for bigger bang for our ICT spend.
- WA’s new hospitals and deployment of digital technologies.
Challenges

- Competitive process for budgetary funds across government.
- Our response is to focus efforts.
- We need to respond to:
  - the changing expectations of government to move towards a more collaborative approach to health care through a facilitation role; and
  - the increased need to share information between public and private providers
Current processes

- Non-electronic information
- Limited information sharing
- Paper intensive environments
- Manual scheduling

‘Analogue’ Journey Board
Information sources are expanding

More data was produced in the 3 years leading to 2005 than in the previous 40,000 years combined.


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Digital Healthcare – a shift in thinking

- More connected than ever before
  - The ability to share information electronically amongst all providers caring for a patient (and the patients themselves)

- Shared knowledge
  - Removing duplication of patient information, particularly within WA Health through record aggregation and smarter systems.
  - Workflow connections between providers to ensure patient information is communicated, received, acknowledged and acted on by providers in a secure and safe manner.
  - Better coordination and utilisation of primary, community and allied health services.
  - A stronger emphasis on the patient’s own responsibility in self-management, prevention and maintenance of their health.
  - Shared body of clinical knowledge that is evidence-based and consistently applied by clinicians.
  - Shared information between devices and/or robots (device collaboration)
  - Extended collaboration through Telemedicine and Hospital in the home.

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Digital healthcare and the digital hospital

- Comprehensive, pervasive IT infrastructure
- Expanded digital footprint
  - Extend process improvements to the community
  - Stronger collaboration between all healthcare providers, metropolitan and remote locations
  - Extended reach into patient homes and emergency medical services
- Everything and everyone is “connected”
Shift to electronic records

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<tr>
<th>STAGE</th>
<th>CAPABILITY</th>
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<td>7</td>
<td>Medical record fully electronic; Sharing clinical records externally, Data mining, advanced analytics and clinical decision support; use of a Shared Electronic Health Record (SEHR)</td>
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<tr>
<td>6</td>
<td>Physician documentation (structured templates), full decision support (variance &amp; compliance), full use of Picture Archiving and Communication System (PACS)</td>
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<tr>
<td>5</td>
<td>Closed loop medication administration</td>
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<tr>
<td>4</td>
<td>Computerized Physician Order Entry (CPOE), Clinical protocols</td>
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<tr>
<td>3</td>
<td>Clinical documentation (flow sheets), Order error checking, PACS available outside Radiology</td>
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<tr>
<td>2</td>
<td>Result viewing, simple decision support, may have document imaging</td>
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<tr>
<td>1</td>
<td>Ancillaries – Laboratory, Radiology, Pharmacy, ... etc.</td>
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<td>The 3 Ancillaries information systems above not installed</td>
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Highly leveraged networks including ipTV:
- Digital Signage – live data, dashboard
- Patient Entertainment System
- Way finding
- Patient and Public Educational Information systems
- Queue Manager, targets outpatient queuing processes, the validation of patient data and visibility of patient movement

Campus Wide Wireless LAN with high density of access points (FSH 1,532) Supporting:
- Roaming wireless data servers and roaming voice over WLAN
- Wireless biomedical monitoring systems

Significant LAN infrastructure (FSH 13,446 LAN ports in the primary building)
What is a digital hospital?

Real Time Location Services (RTLS) supports location tracking

- Mobile control
- Management engine
- Wireless switch
- Mobile controllers
- Tag access
- Wireless access
- Person and equipment tags
- Wireless devices

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What is a digital hospital?

- **Access terminal on a flexible arm by the bedside**

**Used by patients:**
- Order meals
- Telephone
- TV and video-on-demand
- Education of medical procedures/condition
- Internet
- Contact clinical staff

**Used by staff to:**
- Access the clinical workbench functionality
- Order services (cleaning, dressing change etc.)
- Track bed/room readiness (cleaners)
- Contact other staff
- Track the patient
What is a Digital Hospital?

- **Integrated Management (example - Integrated Extra Low Voltage Systems – IELVS)**
  - Building and Car Park Management
  - Intelligent Parking systems – directions to available parking bays
  - Integrated security and access control with automated security policies for a safer patient environment
  - Fire Alarm System
  - Closed Circuit TV
  - People Flow Counting System
  - Guest Room Management System
  - Lighting Control
  - IP Telephony …

- **Integrated Management (benefits)**
  - Reduced operating costs
  - Improved maintainability, less administration
  - Better control of critical systems
  - Improved facility value
  - Less “components” and complexity
  - Limit (possibly eliminate) Vendor lock-in

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What problem is being solved?

- Healthcare delivery represents some of the most complicated business processes known to humans, including those to support:
  - Triage
  - Clinical assessment
  - Clinical Orders
  - Results assessment
  - Surgery flows
  - Medical treatment flows
  - Transport
  - Billing
  - Large numbers of Ambulatory flows

- A standard patient value chain will potentially activate a large number of services and ICT related functions

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Improved patient outcomes

Documents and Notes
- Electronic Medical Records
- Clinical notes
- Document linking

Telemedicine
- More experts in more places
- Remote monitoring
- Remote consultation

Research
- Medical science
- Longitude studies
- Disease management

Pathology
- Disease diagnosis
- Pathology imaging

Collaboration
- Coordinated decisions
- Audited discussion
- Immediate action

Financials
- Enterprise billing
- Insurance

Biotechnology
- Gene science
- Bacteria science
- Diseases science

Medications Management
- Patient history
- Monitoring
- Regimen

Performance Measurement
- KPIs
- Data analysis
- Data mining

Online Access to Information
- to any location
- on any device

Delivering a Healthy WA
Fiona Stanley Hospital

Delivering a Healthy WA
Fiona Stanley Hospital –
Project Overview

- Major tertiary hospital in Perth south metropolitan area
- Named after Professor Fiona Stanley – 2003 Australian of the Year and specialist in paediatric health
- Project budget $2 billion, including $255.7 million of Australian Government funding for the State Rehabilitation Service
Fiona Stanley Hospital – ICT Project Overview

- **Scope:**
  - 783 beds, including 140-bed State rehabilitation service
  - 83% single patient rooms in main hospital
  - 6,300 rooms in the main hospital
  - 16 wards (of 24 beds each)
  - 29 imaging rooms
  - 16 theatres plus 2 shelled
  - 135,000m2 gross area (excluding car parks)
Operational Expectations:

- 300,000 people to walk through the main entrance in the first year
- 1,500 outpatients - average stay a few hours
- 650 inpatients in main hospital - average stay a few days to a few weeks
- 3,500 staff over 24 hours
- 2,000 visitors a day
- 80,000 presentations at the Emergency Department in the first year

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A complex environment

- HR
- Payroll
- Rostering
- Financials
- Procurement
- Pathology Systems
- PACS/RIS
- Information Management & Reporting
- Personnel Administration System (PAS)
- Clinical Workbench
- EMR
- Pharmacy
- Clinical Specialities
- Helpdesk
- Identity Management
- Data Centres
- Scanned Records
- Site Wide Scheduling
- Patient Entertainment
- Equipment Tracking
- Audio Visual Services
- Helpdesk
- Server Rooms
- Security
- IELVS
- Nurse Call
- Structured Cabling
- Equipment Racks

WAN → Hospital LAN/WAN → IELVS LAN

Managing Contractor
Other WA Health
FM Contractor

Delivering a Healthy WA
Fiona Stanley Hospital Application Delivery Method

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<th>Core Clinical Applications</th>
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<tr>
<td>Agilo IMPAX Enterprise</td>
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<td>jPharmacy</td>
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<th>Clinical Support Applications</th>
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<tr>
<td>Allied Health System</td>
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<td>Cataract Tracking Database</td>
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<td>Finesse Pro</td>
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<td>MedPal</td>
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<td>Perinatal Loss</td>
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<td>RENINS</td>
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<th>Hospital Operation Applications</th>
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<td>Accident Incident Management System</td>
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<td>Clinical Information Coding Unit Database</td>
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<td>FOI Track</td>
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<td>SMASH Library and Web Services</td>
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<th>Corporate Applications</th>
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<td>Activity Based Funding System</td>
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<th>ICT Applications</th>
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<tr>
<td>Access Request System</td>
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<td>Lexmark Document Solutions Suite</td>
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<th>FM (External) Applications - Integration</th>
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**KEY:**
- Windows 7 Compatible
- Windows XP Virtualised
- Application Not Procured
- Non-Desktop Application
- To Be Confirmed
Fiona Stanley Hospital – ICT Project Overview

How one of Australia’s most technologically advanced hospitals is showcasing how our hospitals will operate into the future

Secure and seamless interoperability

Pervasive wireless technology at point of care

Telehealth services for clinical, consultative

Integration of new medical equipment with information systems

RTLS – locating people and equipment; monitoring and duress

Enabling electronic medical records

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Key Criteria

- Deployment strategy for each application will be constantly monitored/managed against the following:
  - Patient safety - paramount;
  - Functionality – no less than current;
  - Fit with clinical commissioning timetable - must be met;
  - Contractual obligation to FM – every effort to meet/minimise variation to current agreement; and
  - Cost/value for money.
- In particular, if there is an indication that delivery time is becoming impractical, a decision will be made to adopt an approach that will not impact on clinical commissioning.
- A different approach for a given application may result in a less "digital solution", in the short term, however, full digitisation can be achieved over time, given that the facility is “hard wired” to accommodate envisaged and emerging systems.
Deployment Strategy

A. Deploy New Systems
B. Modify Existing Applications
C. Virtualise Existing Applications
D. Standalone Application
E. Defer and revert to manual process

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Fiona Stanley Hospital – ICT Project Overview

- An improved patient experience
  - Electronic health records system, less time spent providing the same information to different clinicians
  - Bedside patient entertainment systems
    - provides TV, Internet, games, movies and meal ordering
    - enables clinicians to access patient information at bedside
  - Site-wide WiFi for patients, visitors and staff and wireless patient monitoring
  - State-of-the-art building management system controls lighting, heating, security and air conditioning

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Albany Health Campus – Update
Albany Health Campus - Overview

- Commenced July 2010 as a Early Contractor Involvement (ECI) Design and Construct Project
- Practical Completion in April 2013
- Hospital is 132 bed. Constructed on the same site as the old hospital and old hospital will be demolished, some buildings will be retained such as hydrotherapy etc.
- Opened in May 2013
- Considerable new technology and clinical applications being deployed
Albany Health Campus – Clinical Applications

- WebPAS deployed in all of Great Southern from November 2012
- WebPAS ED deployed at same time but usability issues hindered uptake, feedback collected and remediation undertaken
- Clinical Information System (iCM) deployed March 2013
- E-Forms and Scanning current timeline has deployment to Albany in early 2014
- Albany has outsourced radiology to great Southern Radiology (GSR) and HIN is finalising a solution that will allow image viewing and storage between Health and GSR
- Windows 7 Desktop has been deployed to Great Southern as well along with a pilot of Mobility using Windows 8 tablets
The entire hospital has wireless coverage

- Wireless paging system being installed
- Duress installed and operational
- Mother Baby Tagging installed for hospital opening
- Identity and access management means each staff will have new access cards that will enable them to be readily identified as they move through the hospital
- Patient entertainment system that plays shows free to air television accesses internet
PCH ICT Project

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ICT Project Principles

The PCH ICT project will provide the Perth Children’s Hospital with the best ICT that the State can afford in achieving the desired patient outcomes as well as a modern ICT environment for patients, parents, clinicians and other hospital workers. In achieving this, the project will:

- Leverage what is being done for ICT at FSH and state-wide by HIN.
- Commission proven applications only into NCH (i.e. All new and upgraded applications will have been proven at PMH (or another tertiary hospital).
- Exploit the physical design attributes of the new facility.
- Replace the compensatory (i.e. legacy) ICT environment that has evolved at PMH over time with effective and efficient applications, workflow and business processes.
- Reduce / eliminate fragmentation of clinical information.
- Embed supply chain management and logistics into patient care activities.
- Provide current and forecast demand for resources (human, equipment, facility).
PCH ICT Design Parameters

- **Wireless**
  - Absolute requirement – mandated by the approved business case in respect of point of care information and the need for a fully integrated and seamless service.

- **Paperless/ Paperlight**
  - Not expected to achieve 100%
  - Building design anticipates 90% reduction in stored paper volumes for medical records

- **Mobile**
  - As for wireless: the overarching principal is providing information where needed

- **Automated (eg pharmacy robots, AMUs)**
  - For example, the recently completed SG2 report identifies opportunities to deploy ICT to improve medications management at NCH.

- **Self-serving (eg digital way-finding)**
  - Digital way-finding needs to be physically introduced on opening to avoid duplication of cost and enable efficient operation of clinic receptions etc. Level of sophistication of data displayed and integration with other management systems could be progressively upgraded after opening.
  - Advanced patient/visitor interfaces such as use of smart-phone technology to book clinics, provide access management, and potentially interact with hospital systems is not Day 1 mission critical as long as CAHS are staffed to cover less efficient processes
PCH ICT Design Parameters

- **Event-driven (eg. duress alarms, real-time location services)**
  - Very accurate location capability is required to provide the required level of duress alarm – this is an absolute.
  - The hospital design is based on centralised control and management of some mobile equipment, and electronic recording and management of supplies. This will need to be supported on Day 1

- **Role-specific (Identity Access Mgr)**
  - Will be required Day 1 to enable MC to provide security and access management system to operate.
  - Extent of required functionality to be finalised – integration with HR and rostering

- **Device agnostic (tablets, PES systems)**
  - PES is mandatory from the approved business case
  - iPads are a possible solution to the mandatory provision of mobility.
  - Policy re personal devices will need to be resolved
  - Data security and privacy issues will need to be addressed

- **Personalised (Portal, Clinical Workbench replacement)**
  - Mandatory from business case

- **Green**
  - Best endeavours – Ecologically Sustainable Development (ESD) provided for in other areas

- **Integrated**
  - ICT solutions will be integrated within the hospital environment to the greatest practicable extent to achieve efficiency (eg double handling reduction) and effectiveness improvements (eg reduced error rates).
PCH ICT Progress

- Recruitment of NCH ICT Project Director and team
- Business Case
- Budget Submission
Issues in going forward?
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<tbody>
<tr>
<td>4</td>
<td>Smart Building technologies including ubiquitous WiFi, RFID</td>
<td></td>
<td></td>
<td>Fiona Stanley Hospital</td>
<td>New Children's Hospital</td>
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<tr>
<td>3</td>
<td>Full eMR</td>
<td></td>
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<td>Fiona Stanley Hospital, New Children's Hospital</td>
</tr>
<tr>
<td>2</td>
<td>Connect to EMR</td>
<td></td>
<td></td>
<td>Albany Health Campus</td>
<td>All metropolitan Hospitals</td>
<td>All WA Hospitals</td>
</tr>
<tr>
<td>1</td>
<td>Maintain Current Systems</td>
<td>All WA Hospitals</td>
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Challenges ahead

- Building on the building stones
- Retiring legacy systems
- Consolidating multiple systems
- Rolling out to the remainder of the system
- Competing financial budgets
eHealth snapshot

What are the benefits?

- **More accurate information**
  - Doctors can access health records instantaneously and make more informed decisions about diagnoses and treatment, it will save time, money and, most importantly, lives.
  - Emergency department dashboards can give doctors and nurses at-a-glance updates about how many patients are arriving at any time.

- **Consolidated view of patient information**
  - Doctors and nurses will have immediate access to high-resolution digital images, laboratory results and medication histories.

- **Patients more informed**
  - Doctors and patient can collaborate over digital health records, radiology images, prescriptions and other health records at the bedside or via online services and video links.
  - Patients can stay in touch with their families or education services via online services or video links.

- **Clinicians more mobile**
  - Medical records and digital radiology images as well as document patients’ progress electronically whilst they are at the patients’ bedside or from anywhere in the network.

- **Streamlined and cost effective operation**
  - Hospitals, like any other organisation need to manage vast amounts of non-clinical information for day-to-day 24x7 operation; connecting real-time and operational information can lead to significant time and cost savings.
  - Reduce diagnostic test duplication.

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eHealth change and impact

What changes are required?

- **Strategic view**
  - Consideration of all aspects of transformation in clinical and non-clinical environments to ensure the realisation of the benefits eHealth.

- **Informatics education**
  - Improved education for healthcare professionals providing tools and knowledge in areas such as information and computer science.
  - Understanding of tools required for the acquisition, storage, retrieval, and use of the information to improve patient outcomes.

- **Involvement of all health professionals**
  - eHealth typically spans across all areas of healthcare including clinical care, nursing, pharmacy, pathology, imaging, public health, occupational health biomedicine, … etc.; collaboration across disciplines is essential to achieving the benefits digital healthcare.

- **Work practice of all health professionals**
  - Improvements in work practice through streamlining and automation are generally driven by the full commitment of all professionals through the use of information rich environments.

- **Process harmonisation and change**
  - Continuous empowerment of professionals requires the ongoing harmonisation (or change) of existing processes with new and improved approaches to healthcare and improved patient outcomes.
  - Adopting advanced clinical information systems such as computer-based provider order entry (CPOE) and clinical decision support systems (CDSS).

Delivering a Healthy WA
National e-health agenda

- Established to strengthen Australia’s ability to share healthcare information in the most effective way.
- Improving the sharing of healthcare information, within an appropriate privacy framework.
- Targeted objectives:
  - Improved quality of healthcare
  - Greater active participation by individuals in their healthcare
  - Improved efficiency by reducing the time to locate relevant information and reducing unnecessary duplication of services
  - Reduction of preventable errors, adverse events and inappropriate treatments
Personally Controlled Electronic Health Record (PCEHR) system

- Based on national standards with rigorous governance, regulation and oversight
- Privacy focused
- Secure access for patients and providers
- Streamlined access to e-health records
- A range of conformant repositories
- Health summary information, clinical documents and discharge summaries
- GP event summaries and other reports
Consumer Journey

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Summary

- WA Health continues to work towards:
  - Information driven healthcare in Western Australia
  - Information shared electronically amongst the patients and all providers involved in healthcare
  - Shared bank of clinical knowledge
  - Removing duplication of patient information
  - Secure workflow connections between providers
  - Coordinated used of resources
  - Patients actively involved in their own healthcare