INTERACT Webinar #9
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Clinical Management IT Systems (e-Health)

Presentation #1: Dr Richard Ashby FRACMA
Presentation #2: Dr Tony Sara FRACMA
eHealth and Clinical Informatics
“An Overview”

RACMA Webinar

Dr Richard Ashby
Dr Tony Sara
November 2011
eHealth and Clinical Informatics

• **Part 1**
  - International and National Perspectives
  - eHealth Strategy
  - Key Organisations
  - EMR, EHR, PCEHR

• **Part 2**
  - Clinical Informatics
  - An overview of key concepts

• **Part 3**
  - Q & A
eHealth and Clinical Informatics

eHealth – a global focus…..

• What is it?
• Why is it important?
• How is it being done?

….. And what will it cost?
What is eHealth?

“eHealth is the combined use of electronic communication and information technology in the health sector.”

World Health Organisation

• Electronic medical records: such as patient records, clinical administration systems, digital imaging and archiving systems, e-prescribing, e-bookings etc.
• Telemedicine and telecare
• Decision support tools
• Internet-based technologies and services
Why eHealth?
The eHealth revolution...

"eHealth is the single-most important revolution in healthcare since the advent of modern medicine, vaccines, or even public health measures like sanitation and clean water".

(European Institute of Public Administration, 2003)
Why eHealth?

- 35% of hospital referrals might be avoided with IEHR
- 10% of patients with a drug allergy are prescribed that drug during a hospital admission
- There are more people in hospital from preventable medication incidents than from asthma and breast cancer combined
- 30% of all radiology and pathology investigations are inappropriate or unnecessary
- Most Australian doctors can’t order a chest X-Ray electronically.

*and the list goes on...*
Benefits

- Decreased medication adverse events
- Decreased duplication
- Safer care – active / passive decision support
- Evidence based ordering; care paths
- Decreased service utilisation
- Improved efficiency
- Consumer, provider satisfaction
- Etc etc
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eHealth – a global focus......

Focus of international agendas

• 2003 – United Nations World Summit on the Information Society
• 2005 – World Health Assembly
• 2005 – WHO Global Observatory for eHealth (GOe) established
• 2005 – European Commission eEurope action plan released
• 2006 – World Summit on the Information Society
• 2009 – Obama Health Reform

National agendas

• Canada Infoway
• Scottish Care Information (SCI)
• NHS Connecting for Health
• Veterans Health Administration USA
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- The largest IT Project in the World is in eHealth
- eHealth will be the largest IT spend worldwide 2008 - 2012

= U.S. $26B =

Three Gorges Dam
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eHealth - How?

UK NHS Connecting For Health

“When this happens, it will be the healthcare marvel of the world”

Dr Simon Eccles
Clinical Head
Connecting for Health, 2006

Not quite……… (2010)
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In Australia

2003  – Victoria invests $323million in HealthSMART programme

2005  – NeHTA established

2005  – HealthConnect South Australia begins

2007  – Funding of $243million granted to QH for eHealth agenda

2008  – Australian eHealth Research Centre opened in Brisbane

2008  – National eHealth Strategy unveiled

2010  – $460m for PCEHR
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TYPICAL HISTORY
1980’s  - Greenscreen Patient Activity System (PAS)

1990’s  - Gen2 PAS
    - Emergency
    - O.R.
    - Outpatient & Scheduling
    - PACS / RIS

2000-2011  - Pathology Orders / results
    - Pharmacy Management
    - Structured Documents
    - Speciality Specific Systems (ICU, Cardiology, Mental Health, etc)
    - Knowledge Systems (eLibrary)

2011+  - i EHR
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In Australia

Related digital advances:
- wireless
- RFID / Advanced Sensors
- Biomedical
- Mobility
- Robotics
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Some Lessons from eHealth History

• 80:20 Rule applies always, everywhere
• 90%:100% Rule applies always, everywhere
• Clinicians have unlimited and highly variable “wants”, but reasonable needs: Buy “off-the-shelf” and minimise customisation
• Health services are lousy software developers
• Major systems need major players
• Consultancies burn cash
• Collaborate, don’t duplicate/triplicate…
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Typical Architecture

- Clinical applications
- Aligned with specific business purposes
- Common across health care institutions
- Reusable across health care institutions

- Alignment with initial eHealth 6 priorities

**Core Clinical Systems**

- Electronic Discharge Summary
- Scheduling
- Order Entry
- Results Reporting
- Medications Management
- Clinical Notes
- PACS / RIS
- PAS
- Others…

**Specialty Systems**

**Common Services Backplane**
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Other:

• NEHTA:
  – National eHealth Transition Authority
• Location:
  – Brisbane
• Funding:
  – $100M+pa (COAG)
• Tasks:
  – Build the foundation pillars for national eHealth program
  – Unique identifiers: providers, patients, places, products
  – National authentication service
  – Standardised vocabulary (SNOMED CT-AU)
  – Interoperability standards (messaging etc)
  – Privacy and security
Other:

Personally Controlled Electronic Health Record
Australia – next 5 years

• Good potential for PCEHR success
• Hosting / “Cloud”
• Convergence
• Digital Hospitals
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Now:

Clinical Informatics – the nitty gritty!
Dr Tony Sara
Information Management

“Clinical Informatics”
RACMA
Dr Tony Sara – December 2011
The Curriculum

11. Information management - Manager

1. Appropriate use of health information and health information systems
2. Uniformity and standards of data transmission across jurisdictions
3. Internet communication
4. Governance data
5. Balanced scorecard
6. Principles of Information Technology
7. Responsible use of information
8. Clinical management IT system/s
9. IT risk management
10. Systems design
11. E-health
12. Delivery of Information Technology
13. Principles of knowledge management
14. Medical records administration & Coding
15. Epidemiology and statistics
16. Privacy legislation
17. Multi cultural matters and the appropriate use of interpreters
What we hope to cover

• Plan to cover a mix of the above, based on “clinical informatics”
Agenda

• Electronic systems and the patient care process
• Component systems
  – Person identification
  – Past history
  – Test results – path, imaging
  – DDx
  – EBM Mx plans
  – “CIAP”
  – Ordering & rules engines, CDS
  – Observations, clinical notes
  – Linking these together
  – Transfer care
Agenda (2)

- Clinical governance
- Project management
- Risk management
- Privacy
- Security
- Monitoring:
  - Individual care
  - Analysis of alerts from rules fired
  - Patterns of care
    - By doctor, by team, by unit, by hospital, by region, by State...
Agenda (3)

• Outcomes of care
  – By doctor, by team, by unit, by facility, by region, by State...
• Applied research eg Vioxx
• But, doctor, why are we doing it this way?
• Results
- UI – make sure that the information is about the right patient

- “symptoms” – up to 80 to 90% of diagnoses can be made from Hx
- Past medical history
- Other relevant history

CIS – keep accurate long term history

Physical Examination

- “signs” – can confirm history, and may add new information
- observations

Investigations

- blood tests (chemical, haematological, biochemical, endocrine etc)
- imaging (X-ray, CT, U/sound, MRI, nuclear medicine, etc)
- invasive (surgery, various endoscopies)
- Results of all of these maintained by CIS

CIS – lists of diagnoses by symptoms, signs and test results

Differential diagnoses

CIS – most appropriate treatment (EBM) for the condition

- Clinical guidelines, Cochrane
- textbooks, Medline

Ordering Therapy
Perform surgery
Provide care
Monitor care
Assess results of care
Document care

CIS – “rules engines”

CIS – observations, clinical notes, tests, fluids

CIS – discharge referral

Transfer care
Component Systems

• **Person identification**
  – Right person! At the point of entry...else... until resolved
  – Deterministic PMIs inadequate – world wide average is 6 to 8% potential duplicates
  – Probabilistic matching required
  – Clerical staff must use proper search techniques
  – back-end quality processes essential
Component Systems

• “CIS”
  – Past history, cradle to the grave..
• Test results
• DD lists
• EBM – web, Cochrane, special interest groups, etc
• CIAP
• Rules engines – person, drug, dose, route, other drugs, disease, obs, weight, path
Component Systems

• Observations, pumps & devices, clinical notes, consultations, etc

• Linking these:
  – “Monolithic”/“Integrated” systems
  – Vs
  – “best-of-breed” Integrated using e-thingies eg HL7 messages – all vendors claim compliance with the standard, not many do so in practice
  – EMPI is the person master, all other systems must be slaves

• Transfer care – eDRS, input to PCeHR, whatever
Clinical Governance

• BSc 1983 – proj mgt – “persuade users to perceive that the system is theirs”
• Still doesn’t happen (Gartner – up to 75% health IT projects fail to meet all deliverables)
• Project life cycle:
  – From initial planning to transfer of data to next system
• If clinicians are to use any system they must be deeply involved from start to finish
• Messaging
• Business integration
Clinical Governance (2)

• If clinicians are to change clinical behaviour as a result of the use and analysis of an information system, they must “own” the system, the data and the analysis

• Role of medical managers:
  – To ensure all this happens – understand what it is like to be a clinician

• “It’s impossible to properly re-engineer a process using technology in an area without oversight of someone who can bridge [the different] teams.”

Bill Gates, Business @ the Speed of Thought
Project management

- Various methodologies: PMBOK, PRINCE2, ITIL
- Planning
- Planning
- Work practice
- Work practice
- Work practice
- 80% about the people and the processes, 20% about the technology – techies don’t get this, and probably don’t care
- Business sustainability & recovery eg MedOnc, downtime paper
Project management (2)

- Include the real users, the JMOs
- Pay VMOs if necessary
- By clinical departments if required
- Train, train, train
- UAT
- Go-live
- Support – enhancements, upgrades, patches
- Test/train/development/backup environments
IT project management

A formal process, includes:
• Planning & defining
• Management of scope
• Change management
• training
• Implementation
• Go-live
• Benefits realisation

The IT lifecycle:
• Development, implementation, maintenance, enhancement, devolution
Privacy, Security

• Roughly, use the rules of the paper world that you already know
• State specific legislation
• Authentication, non-repudiation, user specific accounts when ordering is in scope
• Seek advice from your HIMs/Privacy Officers
IT risk management

Formal process, with:
• Risk assessment
• Risk mitigation
• Risk communication
• Risk monitoring and review

Necessary to ensure:
• functionality is attained
• IT part of the system works
• At a minimum, a risk register must be kept and reviewed

http://en.wikipedia.org/wiki/IT_risk_management
Monitoring

• Individual care – what happened to that patient, by that doctor
• Alerts analysis
• Patterns of care – how has that doctor/team/etc performed, what does that doctor/etc usually do
• Outcomes of care – by doctor/team/etc
Why?

• **Driving forces:**
  • “desire to take better care of patients”
  • technology
    – processing power
    – internet
  • Safety/quality/accountability
  • cost containment
    – cost benefits from technology
    – increasing costs of care
      ▫ graying of population
      ▫ technology of medicine
      ▫ increased expectations
  • information explosion
  • Decreasing availability of staff (due to ageing of population)
Why?

• Essentially, the need to provide better care (and demonstrably better care) to more patients with constrained resources and proportionally fewer staff

• safety/quality/accountability
  – increasing need, and demand, for safety & quality
  – increasing litigation
  – increased need, and demand, for accountability - hence need to demonstrate quality...
  – errors becoming increasingly public
Why?

- **Cost containment**
  - reduce errors
  - reduce litigation
  - use consumables appropriately
  - possibilities of the technology...
Why?

• Information Explosion
  – too much, too often...
  – eg from Jeremy Wyatt ....
  – It is not possible for any practitioner to keep up
  – “JIT information”
  – it is believed that even the best mind can only keep 5 to 6 items in “foreground” memory
Increase in the number of biomedical journals, 1875-1990

Number of biomedical journals

Year

1860 1880 1900 1920 1940 1960 1980 2000
Results?

  - significant reductions in orders for drugs to which the patients had reported allergies (35, vs. 146 during the pre-intervention period; P<0.01)
  - significant reductions in orders for excess drug dosages (87 vs. 405, P<0.01)
  - significant reductions in orders for antibiotic-susceptibility mismatches (12 vs. 206, P<0.01)
  - marked reductions in the mean number of days of excessive drug dosage (2.7 vs. 5.9, P<0.002)
  - marked reductions in adverse events caused by anti-infective agents (4 vs. 28, P<0.02)
  - significant reductions in the cost of anti-infective agents (adjusted mean, $102 vs. $427 and $340, respectively; P<0.001)
  - significant reductions in total hospital costs (adjusted mean, $26,315 vs. $44,865 and $35,283; P<0.001)
  - significant reductions in the length of the hospital stay (adjusted mean, 10.0 vs. 16.7 and 12.9 days; P<0.001)
Results?

• Reduction in up to 81% of ADEs caused by prescribing (Bates D et al. The Impact of Computerized Physician Order Entry on Medication Error Prevention JAMIA 6:313-321 (1999))

• But, single units, specific software, specific cultures

• Generally, thought to be scalable
Discussion

• Clinical Informatics for Dummies – hand out

• Questions?

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