Challenges of the Electronic Medical Record

Robert Day
Director Emergency Department
Royal North Shore Hospital
A Brief History of eMR in NSW Hospitals

- Early 2000’s - EDIS - computerised patient tracking system, paper based records, not connected to rest of the hospital
- 2006/7 - initial NSW Treasury funding for eMR
- 2008 Cerner Firstnet roll out to NSW EDs began
- 2010 Business case approved to extend eMR throughout NSW hospitals
Aims of the eMR

• Integrated system of patent records, pathology, radiology
• Immediate access to past records
• Access to patient records across sites
• Better quality, safety, efficiency of patient care
• Management data
2011 – negative reviews of Firstnet

- Independent review by Deloittes
  - Reported 98% users dissatisfied
    - Slow
    - Unreliable
    - Decreased clinical productivity
    - Non-intuitive
    - Irrelevant steps performing basic functions
“As with all major IT projects, there have been implementation issues,” the spokesman said.

NSW Health to act on FirstNet issues

Deloitte review sparks 'comprehensive program'.

NSW Health has identified issues with configuration, training and support of its FirstNet clinical information system (CIS) following a government-commissioned independent review.

Implementation of the CIS had been delayed and was expected to improve the care of more than 200 emergency patients when it was rolled out across the state's public hospitals.

Related Articles

FirstNet Remediation Program Update

New program to improve FirstNet

The FirstNet Remediation Program has been established to improve the operation and effectiveness of FirstNet in hospital emergency departments.

The FirstNet Remediation Program with ED clinicians input will develop and implement hospital specific plans to improve:

- Immediate usability
- Access, performance and work processes
- Functionality
- Training and support.
• 2013 – eMR2
• 2014, 2015 - further major upgrades
• Introduction of eMR to all NSW hospitals
• Implementation across hospital system:
  – Inpatient – PowerChart
  – operating theatres - SurgiNet
  – ambulatory care/ OP care
Where are we now in ED?

- Firstnet
  - Much better
  - More reliable
  - Universal acceptance
  - All documentation
  - Pathology, radiology ordering and results
  - eMeds
  - Electronic observation charts
  - Access to previous and other health records
  - Most paper gone
Multiple other facets to eMR

- PowerChart - inpatients

SurgiNet – operating theatres
Imaging RIS-PACS

NSW HealtheNet

eRIC – ICU

HealtheNet: Better healthcare

In NSW, a patient’s health information is often spread across a vast number of different locations and incompatible computer systems. HealtheNet is an e-Health NSW program that connects these disjointed systems. It provides NSW Health clinicians with secure and immediate access to a patient’s recent medical history from across all NSW Local Health Districts and a patient’s My Health Record. This means that irrespective of which NSW Health service a patient attends, their treating doctors, nurses and allied health providers will have the information they need to deliver the best care.

Watch a short introductory video below.
Current eMR status

- Broad and highly complex medical record
- Held on multiple systems / variable integration
- Some paper remnants
- Increasing amounts of patient information available
- “Source of Truth”

Issue for doctors and the legal system
Doctors

- Vital information “hidden” in many areas
- Often no pointers
- Time constraints to access all available information
- Is it factual?
- Documentation time constraints – use of shortcuts
- eMeds
Medical Reviewers

- Are all relevant documents there?
- Preformatted notes/ templates
- “cut and paste”
- Loss of flow – modified notes, non contemporaneous notes
- Loss of diagnostic thought process
Legal / Coronial system

Subpoena to hospital to produce evidence

Record transferred to paper by hospital clerical staff

• Not all available electronic records are produced

• Transience of some documents - Maybe impossible to retrieve all
Triage RNS

Triage Presenting Information: presents from cancer suite background of lymphoma
unwell today
fevers and sore throat
lachy @ 140bpm
paracetamol on board - afebrile at time of triage
lachrymal and looks unwell
last chemo 13/7 ago

Triage Information: **Total ED PRESENTS Last week(0) month(1) year(3)

DCP GENERIC CODE

Triage Visit Reason: Fever
Triage Date/Time: 12/03/2019 15:21
Triage Specialty: Sepsis Pathway
Triage Category: 2
Triage Group: Emergency RNS

Type of Visit: Emergency Presentation
Respiratory Rate: 26 (H)
Oxygen Saturation: 99 (H)
Peripheral Pulse Rate: 140 (H)
Systolic Blood Pressure: 152 mmHg
<table>
<thead>
<tr>
<th>Last Name</th>
<th>First Name</th>
<th>Location</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>PreArrival (4)</td>
<td></td>
</tr>
</tbody>
</table>

**Other Information**

manic, coming from gp
phx depression and anxiety.
fax coming to main arena
**Patient Information**

- **Allergies (2)**
  - aspirin
  - penicillin

**Vital Signs and Observations**

<table>
<thead>
<tr>
<th>Vital Sign</th>
<th>Current</th>
<th>Previous</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP</td>
<td>108/68</td>
<td>106/65</td>
<td>2/3</td>
</tr>
<tr>
<td>HR</td>
<td>83</td>
<td>82</td>
<td>1</td>
</tr>
<tr>
<td>Temp</td>
<td>36.2</td>
<td>36.5</td>
<td>-0.3</td>
</tr>
<tr>
<td>Oxygen Saturation</td>
<td>98</td>
<td>98</td>
<td>0</td>
</tr>
<tr>
<td>Peripheral Pulse Rate</td>
<td>83</td>
<td>83</td>
<td>0</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td>16</td>
<td>17</td>
<td>+1</td>
</tr>
</tbody>
</table>

**Diagnoses**

- No results found

**Problems**

- No results found

**Social History**

- No results found

**Emergency Department Timeline**

**Triage Information**

- **Triage Category**: 4
- **Triage Date/Time**: 12/03/19 13:36
- **Triage Presenting Information**: presents today with sebaceous for last 3/52 denies chest pains seen own cardiologist today - advised ed attendance nil lower limb swelling o/a obs stable talks in full sentences

**Outstanding Orders**

- No results found

**Document Launcher**

- No results found

**Assessment Scores**

- No results found
NSCCAHS AUID

Patient Summary

Images (EIR)  Pathology  Linked EHR  Medication

Male  (72 years)

Ryde MRN  0268294

Alerts (Discharge Summary History)
No Alerts found

Allergies & Adverse Reactions (Discharge Summary History)
No Allergies or Adverse Reactions found

Last 5 NSW Health Pathology Results - (for all Pathology results: see Pathology Tab)
No Results Found

Encounter History - Inpatient & Emergency

<table>
<thead>
<tr>
<th>Admission Date</th>
<th>Discharge Date</th>
<th>Admission Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-Mar-2019</td>
<td></td>
<td>Respiratory - shortness of breath</td>
</tr>
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</table>

Other sections:
- My Health Record - Access Code
- My Health Record - Emergency Access

There are no items to display.
SAGO Adult
Observation Frequency: Not specified. Follow local protocols.

RR (Bpm)

SpO2

SpO2 (%)

Oxygen

ECG Rhythm

Blood Pressure (SBP is the trigger)

BP (mmHg)
Risk of pressure area
Diabetic (Diabetes) T2DM on insulin

Triage Information

Triage Category :  2
Triage Date/Time :  12/03/19 15:21
Triage Presenting Information :  presents from cancer suite background of
<table>
<thead>
<tr>
<th>Procedure/Order</th>
<th>Status</th>
<th>Ordered</th>
</tr>
</thead>
<tbody>
<tr>
<td>paracetamol</td>
<td>Ordered</td>
<td>12/03/19 17:18</td>
</tr>
<tr>
<td>allopurinol</td>
<td>Ordered</td>
<td>12/03/19 17:17</td>
</tr>
<tr>
<td>metoclopramide</td>
<td>Ordered</td>
<td>12/03/19 17:17</td>
</tr>
<tr>
<td>sulfamethoxazole-trimethoprim</td>
<td>Ordered</td>
<td>12/03/19 17:17</td>
</tr>
<tr>
<td>valaciclovir</td>
<td>Ordered</td>
<td>12/03/19 17:17</td>
</tr>
<tr>
<td>pantoprazole</td>
<td>Ordered</td>
<td>12/03/19 17:17</td>
</tr>
<tr>
<td>insulin aspart-insulin aspart protamine</td>
<td>Ordered</td>
<td>12/03/19 17:16</td>
</tr>
<tr>
<td>metformin</td>
<td>Ordered</td>
<td>12/03/19 17:16</td>
</tr>
<tr>
<td>Respiratory Virus Multiplex PCR</td>
<td>Ordered</td>
<td>12/03/19 17:08</td>
</tr>
<tr>
<td>Baseline Vital Signs</td>
<td>Ordered</td>
<td>12/03/19 17:04</td>
</tr>
<tr>
<td>Height and Weight Form</td>
<td>Ordered</td>
<td>12/03/19 17:04</td>
</tr>
<tr>
<td>Adult Admission Assessment</td>
<td>Ordered</td>
<td>12/03/19 17:04</td>
</tr>
<tr>
<td>Blood Culture</td>
<td>Ordered</td>
<td>12/03/19 17:03</td>
</tr>
<tr>
<td>oxycodone</td>
<td>Ordered</td>
<td>12/03/19 15:59</td>
</tr>
<tr>
<td>gentamicin</td>
<td>Ordered</td>
<td>12/03/19 15:50</td>
</tr>
<tr>
<td>piperacillin-tazobactam</td>
<td>Ordered</td>
<td>12/03/19 15:50</td>
</tr>
<tr>
<td>Blood Culture</td>
<td>Ordered</td>
<td>12/03/19 15:45</td>
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<tr>
<td>Consult Pharm Clinical Review</td>
<td>Ordered</td>
<td></td>
</tr>
<tr>
<td>Diabetes Patient Review</td>
<td>Ordered</td>
<td></td>
</tr>
<tr>
<td>Peripheral insertion central catheter line</td>
<td>Canceled</td>
<td></td>
</tr>
</tbody>
</table>

### Patient Care

- **Adult Admission Assessment**: Ordered 12/03/19 15:04
- **Baseline Vital Signs**: Ordered 12/03/19 15:04, Completed Baseline Vital Signs

### Medications

- **paracetamol (paracetamol)**: Ordered 1,000 mg = 2.5 mL, Oral, Tablet, C/R, PO 4 times daily, Start Date: 12/03/19 17:18, Emergency RNS: ASB
- **metoclopramide (metoclopramide)**: Ordered 10 mg = 1 tab, Oral, Tablet, TID, PO 3 times a day, Start Date: 12/03/19 17:17, Emergency RNS: ASB
- **allopurinol**: Ordered 100 mg, Oral, Tablet, morning, 60-min. before food, Start Date: 12/03/19 17:16, Emergency RNS: ASB
- **insulin aspart-insulin aspart protamine (Insulin) (Insulin)**: Ordered 30 U, Sub-Q, Suspension, SQ, (with or without food), Indications: Diabetes, Insulin Therapy (RNS)
- **gentamicin**: Ordered 120 mg, IV Push, Intravenously, QC/IC, Start Date: 12/03/19 17:16, Emergency RNS: ASB
- **piperacillin-tazobactam (Pipe. Tazo. Bact)**: Ordered 40 mg, I.V, Intravenous, QC/IC, Start Date: 12/03/19 17:16, Emergency RNS: ASB
- **oxycodone**: Ordered 5 mg, Oral, Tablet, TID, Start Date: 12/03/19 17:16, Emergency RNS: ASB
- **metformin (metformin)**: Ordered 500 mg, Oral, Tablet, morning, 60-min. before food, Start Date: 12/03/19 17:16, Emergency RNS: ASB
- **valaciclovir (Valaciclovir)**: Ordered 1,000 mg, Oral, Tablet, TID, Start Date: 12/03/19 17:16, Emergency RNS: ASB

### Pathology Tests

- **Blood Culture**: Ordered, Completed 12/03/19 17:16, 12/03/19 17:16, 12/03/19 17:16, 12/03/19 17:16, 12/03/19 17:16
- **Respiratory Viral Panel**: Completed 12/03/19 17:16
- **Calcium, Magnesium**: Completed 12/03/19 17:16
- **Electrolytes**: Completed 12/03/19 17:16
- **Liver Functions**: Completed 12/03/19 17:16
- **C reactive protein (CRP)**: Completed 12/03/19 17:16
- **Computation Profile**: Completed 12/03/19 17:16, 12/03/19 17:16
<table>
<thead>
<tr>
<th>Medication</th>
<th>Dose/Route</th>
<th>Timing</th>
<th>Notes</th>
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<tbody>
<tr>
<td>gentamicin</td>
<td>320 mg, IV infusion, Solution-inj, ONCE, First Dose: 12/03/2019 16:00, ...</td>
<td>@1600</td>
<td></td>
</tr>
<tr>
<td>insulin aspart-insulin</td>
<td></td>
<td>@1930</td>
<td></td>
</tr>
<tr>
<td>aspart protamine (NovoMix 30 FlexPen)</td>
<td>16 units, Subcut, Suspe...</td>
<td>@0730</td>
<td></td>
</tr>
<tr>
<td>metformin (metformin 500 mg oral modified release tablet)</td>
<td>500 mg = 1 tab(s), Oral, T...</td>
<td>@1930</td>
<td></td>
</tr>
<tr>
<td>oxycodone (Endone)</td>
<td>5 mg, Oral, Tablet, ONCE, STAT, First Dose: 12/03/2019 15:59, Stop D...</td>
<td>@0800</td>
<td></td>
</tr>
<tr>
<td>pantoprazole</td>
<td>40 mg, Oral, Tab-EC, morning, First Dose: 13/03/2019 08:00, Emerg...</td>
<td>@1600</td>
<td></td>
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<tr>
<td>piperacillin-tazobactam</td>
<td>4.5 g, IV infusion, Vial, 8 hourly, indication: Febrile neutropenia - 1st line th...</td>
<td>@0000</td>
<td></td>
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<tr>
<td>sulfamethoxazole-trimethoprim (Bactrim DS 800 mg 160 mg oral tablet)</td>
<td>800/160mg, Oral, Tablet, ...</td>
<td>@0800</td>
<td></td>
</tr>
<tr>
<td>valaciclovir (Valtrex)</td>
<td></td>
<td>@0800</td>
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**CURRENT INFORMATION**

<table>
<thead>
<tr>
<th>Age</th>
<th>33 Years</th>
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<tbody>
<tr>
<td>Language</td>
<td>English</td>
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<tr>
<td>Visit Id</td>
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<table>
<thead>
<tr>
<th>Sex</th>
<th>Male</th>
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<tbody>
<tr>
<td>Mental Status</td>
<td>Never Married</td>
</tr>
<tr>
<td>Ethnicity</td>
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</table>

**COUNTER INFORMATION**

- Date: 12/03/19 15:20:00
- Reason: 1: Fever
- Charge Date: 12/03/19 15:20:00
- Order To Loc: Emergency Department
- Encounter Type: Inpatient
- Level: M

**ACKING INFORMATION**

- Taxi Group: Emergency RNS
- Taxi Id: Check In Date
- Check Out Date: LOS
- Acuity: 2
- Specialty: Surgery Pathway

**DIVIDER ASSIGNMENTS**

- Role: Assigned to
- Assigned to: Assigned to

**RENT INFORMATION**

<table>
<thead>
<tr>
<th>Nurse Name</th>
<th>Event Status</th>
<th>Request Date</th>
<th>Start Date</th>
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<tbody>
<tr>
<td>Nurse</td>
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<td>12/03/19 15:20:00</td>
<td>12/03/19 15:20:00</td>
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<tr>
<td>Nurse</td>
<td>Complete</td>
<td>12/03/19 15:20:00</td>
<td>12/03/19 15:20:00</td>
</tr>
<tr>
<td>Nurse</td>
<td>Complete</td>
<td>12/03/19 15:20:00</td>
<td>12/03/19 15:20:00</td>
</tr>
<tr>
<td>Nurse</td>
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<td>12/03/19 15:20:00</td>
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<tr>
<td>Nurse</td>
<td>Complete</td>
<td>12/03/19 15:20:00</td>
<td>12/03/19 15:20:00</td>
</tr>
</tbody>
</table>

**LOCATION INFORMATION**

- Room: AA1
- Unit: Emergency RNS ASB

**OF ALL LOCATIONS**

- Nurse Unit: Emergency RNS ASB
- Room: AA1
- Bed: 16
- Updated By: Steenbergen, Karen

**ORDERS INFORMATION**

- Order: Diabetic Patient Orders
- Catalog Type: Ordered
- Status: Ordered
- Diabetic Patient Orders
- Consults
- Laboratory
- Laboratory
- Laboratory
- Laboratory
- Laboratory
- Laboratory
- Laboratory
- Radiology
- Pharmacy
- Pharmacy
- Pharmacy
- Pharmacy
- Laboratory
- Pharmacy
- Patient Care
- Ordered
- Ordered
- Completed
- Completed
- Completed
- Completed
- Completed
- Completed
- Completed
- Completed
- Completed
- Completed
- Completed
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<thead>
<tr>
<th>Event</th>
<th>Type</th>
<th>Status</th>
<th>User</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bed Requested</td>
<td>Admit/Depart</td>
<td>Request</td>
<td>Fielding, Bronwyn</td>
</tr>
<tr>
<td>Admit</td>
<td>Admit/Depart</td>
<td>Start</td>
<td>Fielding, Bronwyn</td>
</tr>
</tbody>
</table>
Review of Recent ED Medicolegal Cases

- Little evidence of improved documentation with eMR
  - Preformatted notes with irrelevant history/exam
  - Reviews by senior staff poorly documented
  - Cut and paste into discharge summaries
  - Preformatted discharge instructions
  - Advice sought but details not written down
  - Often no differential diagnosis
  - Poor synthesis of thought processes - eg consideration of other diagnoses
Where to for eMR?

- System complexity will continue to increase
- Integration of systems will improve
- Volume of patient information available will rise
Implications

- Clear benefits for patients and clinicians
- Potential privacy issues
- Vital to have correct information in record
- Information overload
Legal system

• Accessing all the available relevant material
• How is the record accessed?
• What is the patient’s “health record”?
• Interpreting ever larger volumes of information
• What is reasonable to have accessed during an episode of care?