

Digital Diabetes in the Digital Hospital

Dr Clair Sullivan MBBS (Hons) MD FRACP CHIA

Endocrinologist and Medical Informatician

Medical Lead for Digital Health Improvement for Queensland

CoChair Digital Health Improvement Network

Director of HITEC

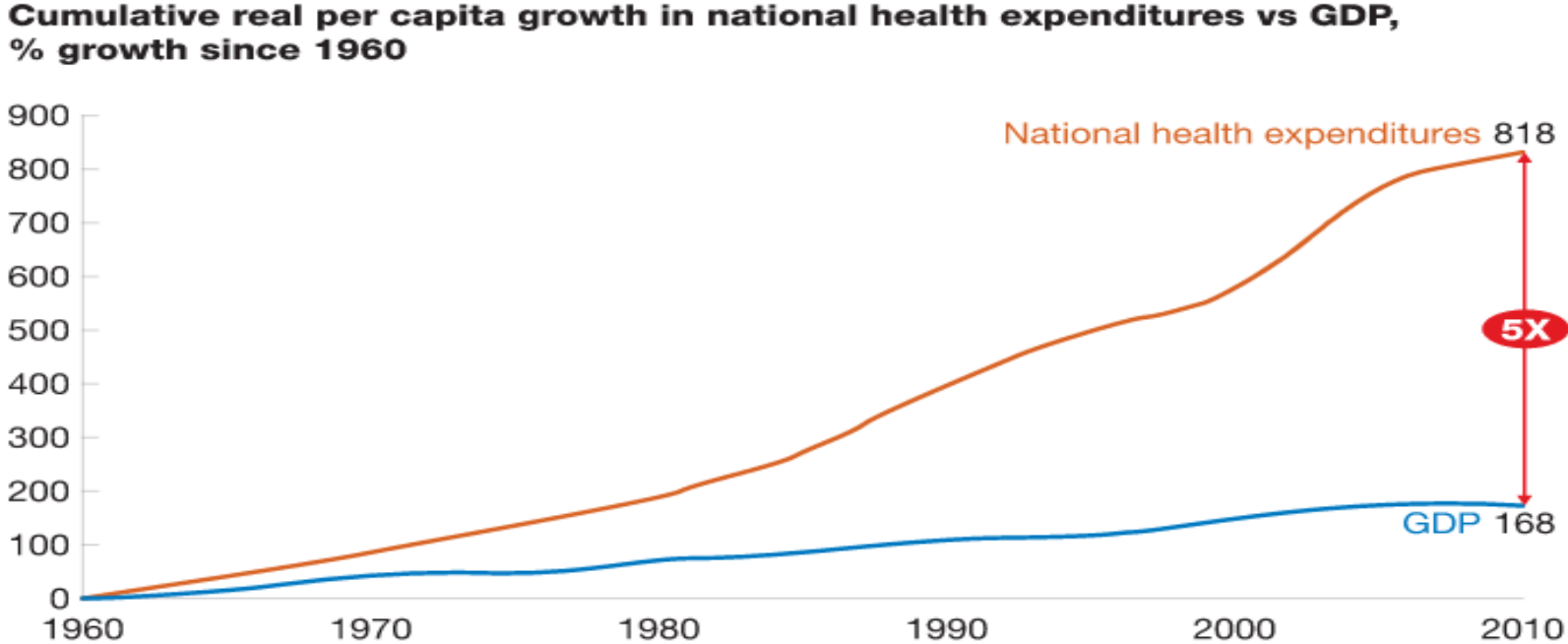
CoChair Queensland Diabetes Network



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Demand for Healthcare vs Available Resources



McKinsey







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"All this talk about EMRs and EHRs is just a fad - like the Internet thing."



Going digital: a narrative overview of the clinical and organisational impacts of eHealth technologies in hospital practice

*Justin Keasberry*¹ MBBS, Advanced Trainee in General and Acute Medicine

Ian A. Scott^{1,2,4} MBBS, FRACP, MHA, MEd, Director of Internal Medicine and Clinical Epidemiology

*Clair Sullivan*¹ MBBS, FRACP, Endocrinologist, Deputy Chair of Medicine

*Andrew Staib*¹ MBBS, FACEM, Deputy Director of Emergency Medicine

*Richard Ashby*³ MBBS, FACEM, FRACMA, Chief Executive Officer

¹Princess Alexandra Hospital, 199 Ipswich Road, Brisbane, Qld 4102, Australia.
Email: justin.keasberry@health.qld.gov.au; clair.sullivan@health.qld.gov.au;
andrew.staib@health.qld.gov.au

²Southern School of Medicine, University of Queensland, Translational Research Institute, 199 Ipswich Road, Brisbane, Qld 4102, Australia.

³Metro South Hospital and Health Service, Garden City Park, 2404 Logan Road, Brisbane, Qld 4113, Australia. Email: richard.ashby@health.qld.gov.au

⁴Corresponding author. Email: ian.scott@health.qld.gov.au

Abstract

Objective. The aim of the present study was to determine the effects of hospital-based eHealth technologies on quality, safety and efficiency of care and clinical outcomes.

Methods. Systematic reviews and reviews of systematic reviews of eHealth technologies published in PubMed/Medline/Cochrane Library between January 2010 and October 2015 were evaluated. Reviews of implementation issues, non-hospital settings or remote care or patient-focused technologies were excluded from analysis. Methodological quality was assessed using a validated appraisal tool. Outcome measures were benefits and harms relating to electronic medical records (EMRs), computerised physician order entry (CPOE), electronic prescribing (ePrescribing) and computerised decision support systems (CDSS). Results are presented as a narrative overview given marked study heterogeneity.

Results. Nineteen systematic reviews and two reviews of systematic reviews were included from 1197 abstracts, nine rated as high quality. For EMR functions, there was moderate-quality evidence of reduced hospitalisations and length of stay and low-quality evidence of improved organisational efficiency, greater accuracy of information and reduced documentation and process turnaround times. For CPOE functions, there was moderate-quality evidence of reductions in turnaround times and resource utilisation. For ePrescribing, there was moderate-quality evidence of substantially fewer medications errors and adverse drug events, greater guideline adherence, improved disease control and decreased dispensing turnaround times. For CDSS, there was moderate-quality evidence of increased use of preventive care and drug interaction reminders and alerts, increased use of diagnostic aids, more appropriate test ordering with fewer tests per patient, greater guideline adherence, improved processes of care and less disease morbidity. There was conflicting evidence regarding effects on in-patient mortality and overall costs. Reported harms were alert fatigue, increased technology interaction time, creation of disruptive workarounds and new prescribing errors.

Conclusion. eHealth technologies in hospital settings appear to improve efficiency and appropriateness of care,


Perspectives

Pioneering digital disruption: Australia's first integrated digital tertiary hospital

Clair Sullivan, Andrew Staib, Stephen Ayre, Michael Daly, Renea Collins, Michael Draheim and Richard Ashby

Med J Aust 2016; 205 (9): 386-389.

doi: 10.5694/mja16.00476

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Article

Authors

References

Responses

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Digital transformation has started in Australian hospitals

Digital technology now underpins most industries; however, the health care sector (particularly in hospitals) has been slow to transform from traditional paper-based systems of care. In the United States, for example, federal legislation and financial incentives have facilitated the implementation of electronic medical records (EMRs);¹ but there are only a handful of advanced EMRs in hospitals outside the US.² The roll-out of a digital hospital includes an EMR system and other technical components, such as integrated digital vital sign monitoring and digital electrocardiogram (ECG) records. This transformation prompts revolutionary change in the way health care is delivered and monitored.

Related content

- [MJA InSight: Digital revolution rolling out in hospitals](#)

Title The impacts of eHealth upon hospital practice: synthesis of the current literature

Authors

Dr Rebekah Eden
Postdoctoral Researcher
UQ Business School,
The University of Queensland
Email: r.eden@business.uq.edu.au

Professor Andrew Burton-Jones
UQ Business School and Centre for Business and Economics of Health,
The University of Queensland
Email: abj@business.uq.edu.au

Associate Professor Ian Scott
Department of Internal Medicine and Clinical Epidemiology
Princess Alexandra Hospital
Email: Ian.Scott@health.qld.gov.au

Dr Andrew Staib
Health improvement Unit
Clinical Excellence Division
Princess Alexandra Hospital
Email: Andrew.Staib@health.qld.gov.au

Dr Clair Sullivan
Health improvement Unit
Clinical Excellence Division
Princess Alexandra Hospital
Email: Clair.Sullivan@health.qld.gov.au

Digital disruption ‘syndromes’ in a hospital: important considerations for the quality and safety of patient care during rapid digital transformation

Clair Sullivan^{1,2,3,4} MBBS(Hons), MD, FRACP, CHIA, Consultant Endocrinologist and Medical Lead, Digital Health Improvement

Andrew Staib^{1,2,3,4} MBBS, FACEM, CHIA, Deputy Director of Emergency Medicine and Medical Lead, Digital Health Improvement

¹Princess Alexandra Hospital, Metro South Health, Ipswich Road, Woolloongabba, Qld 4102, Australia.

²Health Improvement Unit, Clinical Excellence Division, Butterfield Street, Herston, Qld 4066, Australia.

³MMRI, Translational Research Institute, 199 Ipswich Road, Woolloongabba, Qld 4102, Australia.

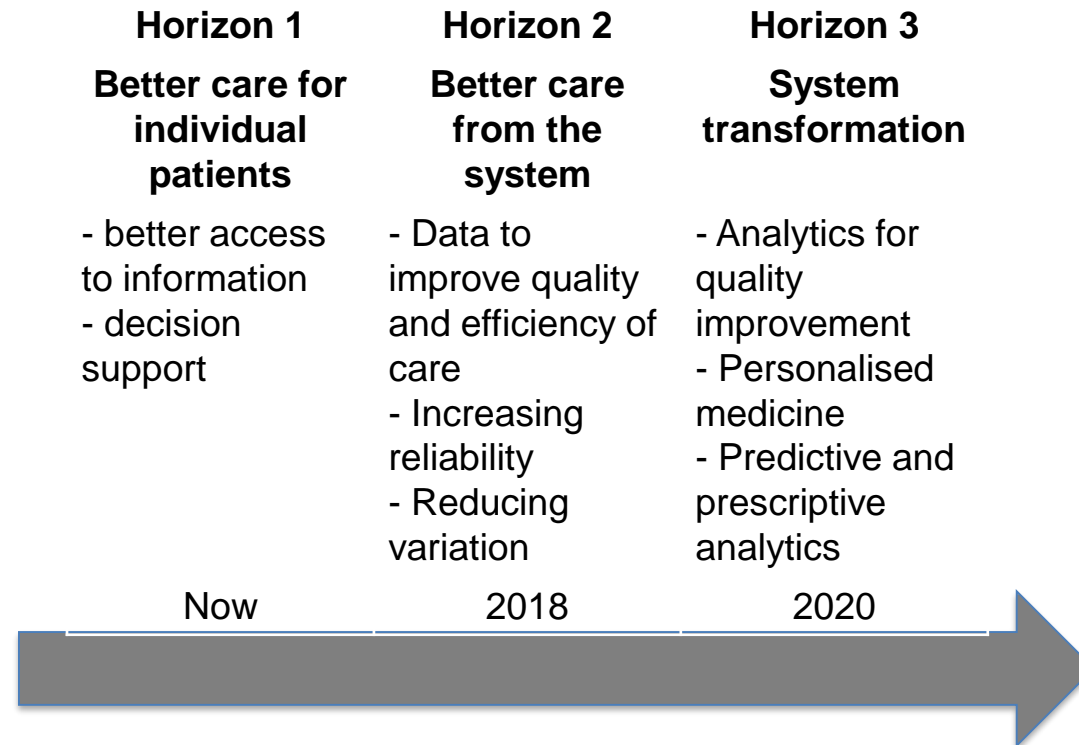
⁴Corresponding authors. Email: Clair.Sullivan@health.qld.gov.au; Andrew.Staib@health.qld.gov.au

Abstract. The digital transformation of hospitals in Australia is occurring rapidly in order to facilitate innovation and improve efficiency. Rapid transformation can cause temporary disruption of hospital workflows and staff as processes are adapted to the new digital workflows. The aim of this paper is to outline various types of digital disruption and some strategies for effective management. A large tertiary university hospital recently underwent a rapid, successful roll-out of an integrated electronic medical record (EMR). We observed this transformation and propose several digital disruption “syndromes” to assist with understanding and management during digital transformation: digital deceleration, digital transparency, digital hypervigilance, data discordance, digital chum and post-digital ‘depression’. These ‘syndromes’ are defined and discussed in detail. Successful management of this temporary digital disruption is important to ensure a successful transition to a digital platform.

What is the point of the digital hospital?

- Not to just put in an IT system
- Not to replace paper with electronic paper
- It's to give us a integrated digital platform for
 - transformation of care
 - innovation
 - better quality and efficiency of patient care

Towards a learning healthcare system with data and analytics



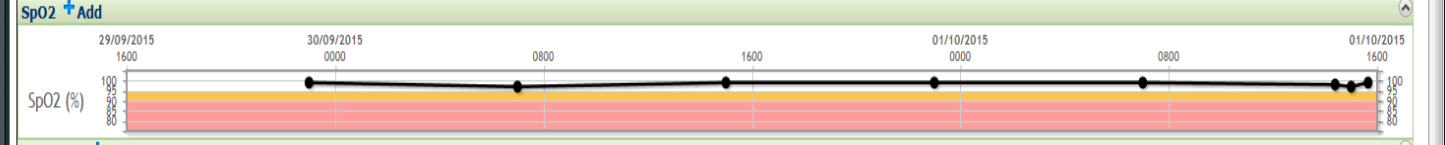
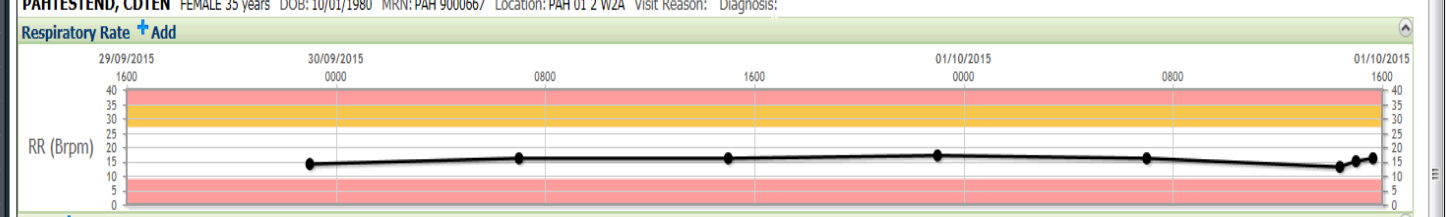
Horizon One

Better care for individual patients

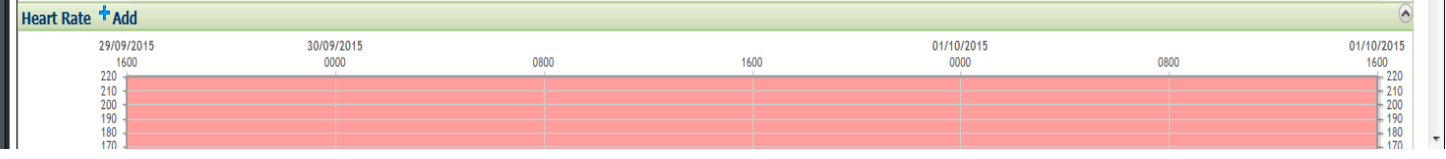
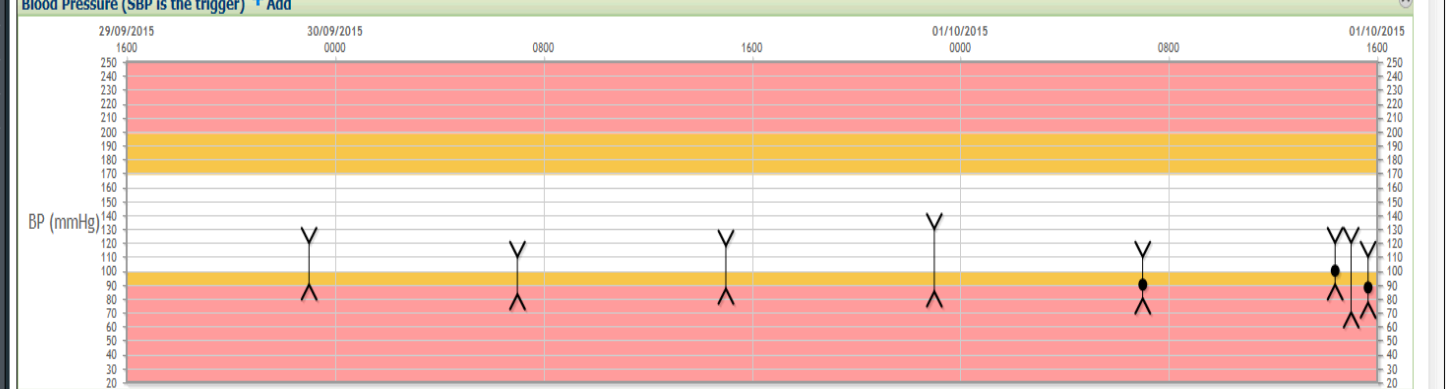
- Menu
- Patient Summary
- Managing Deterioration**
- Interactive View
- Activities and Interventions
- Orders + Add
- Forms
- Lines/Tubes/Drains Summary
- Clinical Notes View
- Plan of Care Summary
- Alerts and Problems
- Results
- Allergies + Add
- Histories
- Contiguous Note
- Documentation + Add
- Appointment Summary
- Advanced Growth Chart
- Patient Information
- The Viewer
- LearningLIVE

Managing Deterioration 100% SAGO Adult RR SpO2 BP HR I | Flyout | Print | Reset Zoom | Additional Criteria << 01/10/2015 15:53 >> | Alert Summary | ACC/Vary Freq. | Next Review: 02/10/15 14:50

Timeframe: 48 hours
 PAHTESTEND, CDTEN FEMALE 35 years DOB:10/01/1980 MRN:PAH 9000667 Location:PAH 01 2 W2A Visit Reason: Diagnosis:

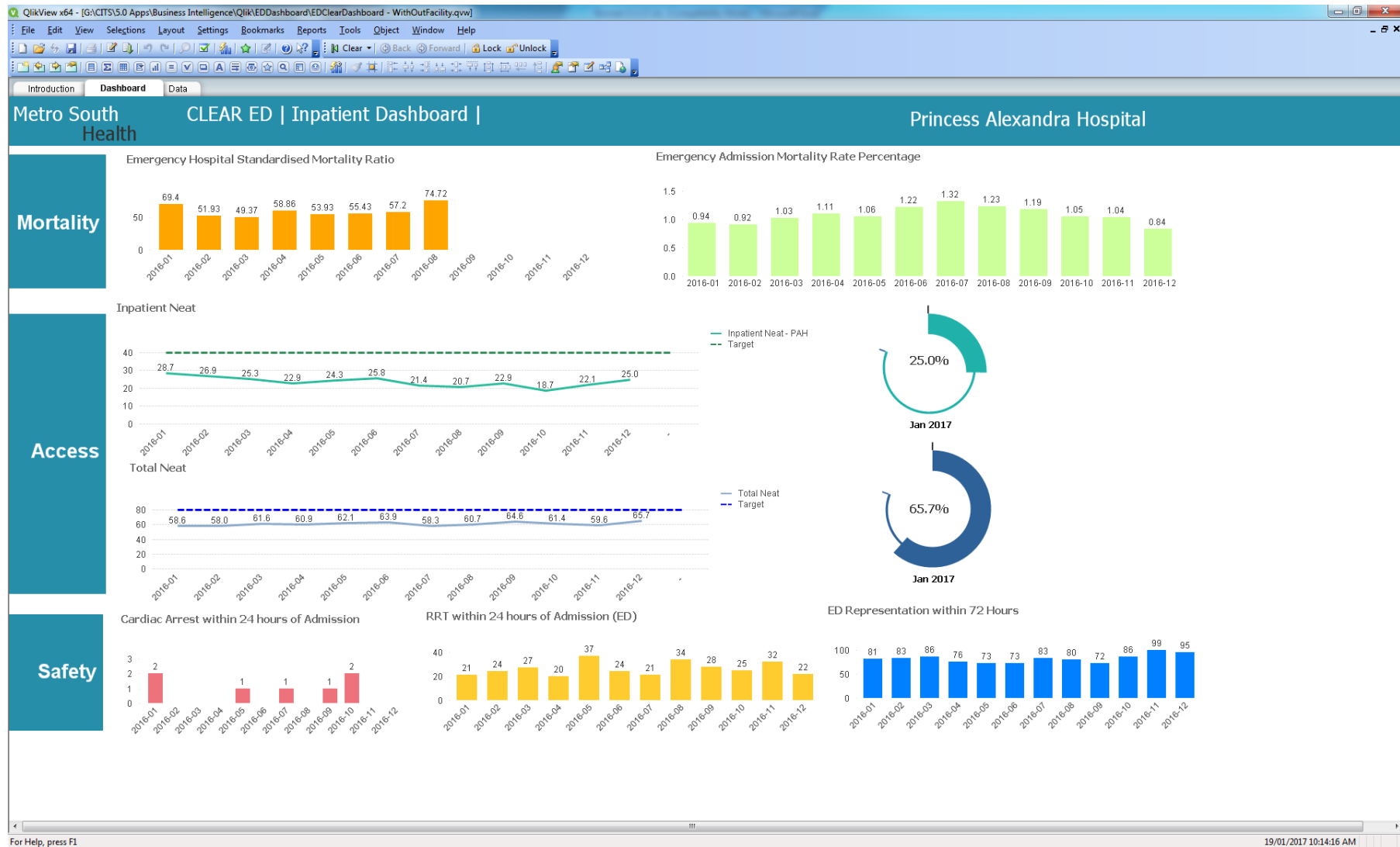


Oxygen (l) + Add
 No results found



Horizon Two

Better care from the system



Horizon Three

System transformation for more efficient and higher quality care

AUSTRALIAN COMMISSION
ON SAFETY AND QUALITY IN HEALTH CARE

**National Subcutaneous Insulin
Form Pilot Project**

Audit Tool User Guide

AUDIT TOOL : SNAPSHOT

DATE.....

Patient Information:

1. Patient Study ID No (to be added at data entry):	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2. UR No:	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
3. DOB:	___ / ___ / ___
4. Age (years):	<input type="checkbox"/> <input type="checkbox"/>
5. Gender:	M <input type="checkbox"/> F <input type="checkbox"/>
6. ATSI:	Yes <input type="checkbox"/> No <input type="checkbox"/>
7. Ward Name (eg. 5C,BT):
8. Ward Type (Tick one):	Medical <input type="checkbox"/> Surgical <input type="checkbox"/> Psychiatry <input type="checkbox"/> GARU/BIRU <input type="checkbox"/> CCU <input type="checkbox"/> ICU <input type="checkbox"/> HDU <input type="checkbox"/>

9. Specialty of Treating Consultant (one only):

Medical		Non-Medical	
General Medicine <input type="checkbox"/>	Haematology <input type="checkbox"/>	General surgical <input type="checkbox"/>	Breast Endocrine <input type="checkbox"/>
Cardiology <input type="checkbox"/>	Gastroenterology <input type="checkbox"/>	Orthopaedic <input type="checkbox"/>	Neurosurgery <input type="checkbox"/>
Stroke <input type="checkbox"/>	Diabetes/ endocrinology <input type="checkbox"/>	Vascular Surgery <input type="checkbox"/>	Transplant <input type="checkbox"/>
Geriatrician <input type="checkbox"/>	Neurology <input type="checkbox"/>	Hepato-biliary <input type="checkbox"/>	Psychiatry <input type="checkbox"/>
Renal <input type="checkbox"/>	Other: _____ <input type="checkbox"/>	Colorectal <input type="checkbox"/>	Rehabilitation <input type="checkbox"/>
Respiratory <input type="checkbox"/>		Cardiac Surgery <input type="checkbox"/>	Other: _____ <input type="checkbox"/>
Oncology <input type="checkbox"/>		ENT <input type="checkbox"/>	

10. No. of whole days i.e. midnight to midnight in hospital to date:

11. Type of Admission : Elective Emergency

12. Main Reason for admission (One option only)

DKA (Diabetic ketotacidosis)	<input type="checkbox"/>
HHS (Hyperosmolar hyperglycaemic)	<input type="checkbox"/>
Active Diabetic Foot Disease	<input type="checkbox"/>
Hyperglycaemia	<input type="checkbox"/>
Hypoglycaemia	<input type="checkbox"/>
Other medical(gastro, resp. etc.)	<input type="checkbox"/>
Non-medical (surgical)	<input type="checkbox"/>
Psychiatric	<input type="checkbox"/>

Diabetes and Endocrine Unit Involved in Care

13. Endocrinology (Reg/Consultant)	Yes <input type="checkbox"/>	No <input type="checkbox"/>
14. Diabetes Nurse Educator	Yes <input type="checkbox"/>	No <input type="checkbox"/>

15. Diabetes Type, On admission to the hospital

Type 1	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Type 2 diet only	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Type 2 OHA only or Byetta	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Type 2 insulin +/- OHA	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Other:	Yes <input type="checkbox"/>	No <input type="checkbox"/>

16. How long has the patient had diabetes years

17. Diagnosed this admission Yes No

18. Last HbA1c in notes or on AUSLAB (within 3 months): % Not available:

MAR

SBAR
 Interactive View / I&O
 Activities / Interventions

MAR

MAR Summary
 Orders + Add
 Allergies + Add
 Diagnosis & Problems
 Discharge Summary
 Document Viewing + Add
 Form Browser
 Growth Chart
 Histories
 Immunization Schedule
 Medication List + Add
 Notes + Add
 Patient Information
 Plan of Care Summary
 Reference
 Results Review

Time View

Medications

	6/29/2012 8:42 M	6/29/2012 8:00 M	6/28/2012 21:00	6/28/2012 17:48	6/28/2012 14:43	6/28/2012 14:40	6/28/2012 14:18	6/28/2012 14:10	6/28/2012 14:09	6/28/2012 13:52	6/28/2012 13:42	6/28/2012 13:35	6/28/2012 13:33	6/28/2012 13:31
Scheduled														
Unscheduled														
PRN														
Continuous Infusions														
Future														
Discontinued Scheduled														
Discontinued Unscheduled														
Discontinued PRN														
Discontinued Continuous Infusions														
prednisONE 6 mg = 6 tabs, Oral, form: Tab, Daily, order duration: 5 days, first dose 07/08/12 8:00:00 MDT, stop date 07/13/12 7:59:00 MDT														
prednisONE 4 mg = 4 tabs, Oral, form: Tab, Daily, order duration: 5 days, first dose 07/13/12 7:59:00 MDT, stop date 07/18/12 7:59:00 MDT														
prednisONE 2 mg = 2 tabs, Oral, form: Tab, Daily, order duration: 5 days, first dose 07/18/12 8:00:00 MDT, stop date 07/23/12 7:59:00 MDT														
PRN acetaminophen 650 mg = 2 tabs, Oral, form: Tab, q6hr PRN fever, first dose 06/28/12 13:01:00 MDT														
PRN acetaminophen Primary Pain Intensity														
PRN fentanyl 25 mcg = 0.5 mL, IV Push, form: Soln, q2hr PRN pain, first dose 06/28/12 13:01:00 MDT														
PRN fentanyl Primary Pain Intensity														
PRN hydRALAZINE 10 mg = 0.5 mL, IV Push, form: Soln, q2hr PRN hypertension, first dose 06/28/12 13:04:00 MDT, For Systolic BP greater than 140														
PRN hydRALAZINE Systolic Blood Pressure														
PRN morphine (morphine 4 mg/mL injection) 4 mg = 1 mL, IV Push, form: Soln, q2hr PRN pain, first dose 06/28/12 14:14:00 MDT														
PRN morphine Primary Pain Intensity														
Continuous Infusions DSNS 1,000 mL 1,000 mL, 1,000 mL, IV, 75 mL/hr, start date 06/28/12 13:00:00 MDT														
Administration Information Dextrose 5% with 0.9% NaCl 100 mL, 100 mL, IV, 0.04 units/min, start date 06/28/12 13:01:00 MDT														

28 June 2012 8:37 MDT - 30 June 2012 8:37 MDT (Clinical Range)

650 mg
Last given: 6/28/2012 14:10 MDT

25 mcg
Last given: 6/28/2012 13:42 MDT

10 mg
Last given: 6/28/2012 14:09 MDT

4 mg
Last given: 6/28/2012 14:18 MDT

Intervention Followed

* 650 mg Auth IV

* 25 mcg Auth IV
8 Auth (Verified)

* 10 mg Auth IV
158 Auth (Verified)
92 Auth (Verified)

* 4 mg Auth Verif
8 Auth (Verified)

* In Error
* In Error

Begin Bag 1,000 r

Performed by: Test, RN (Cerner)

Result Comment:

Last Given Information VANESSA, LPN SRG - WM...

medication: morphine

Dose: 4 mg

Route: IV Push

Site: Right Intern Jugular

Given: 6/28/2012 14:18 MDT

Result Comment:

Start Date: 7/05/2017
 End Date: 8/05/2017

Scheduled Ordered All

- Ward**
- PAH 01 1 W1C
 - PAH 01 1 W1D
 - PAH 01 1 WAA
 - PAH 01 1 WMAPU
 - PAH 01 2 W2A
 - PAH 01 2 W2C
 - PAH 01 2 W2D
 - PAH 01 2 W2DHD
 - PAH 01 2 W2E
 - PAH 01 3 W3C
 - PAH 01 3 WCARD
 - PAH 01 3 WCCU
 - PAH 01 4 W4BR

Risk
High

Complexity
Complex

- Ordered As**
- **Medication Level Required**
 - acidovir
 - Actrapid additive 50 unit(s) + sodium chlo...
 - Actrapid SC
 - allopurinol
 - Alu-Tab
 - aluminium hydroxide
 - amiODAROne
 - amiTRIPTYLine
 - amiLODIPine

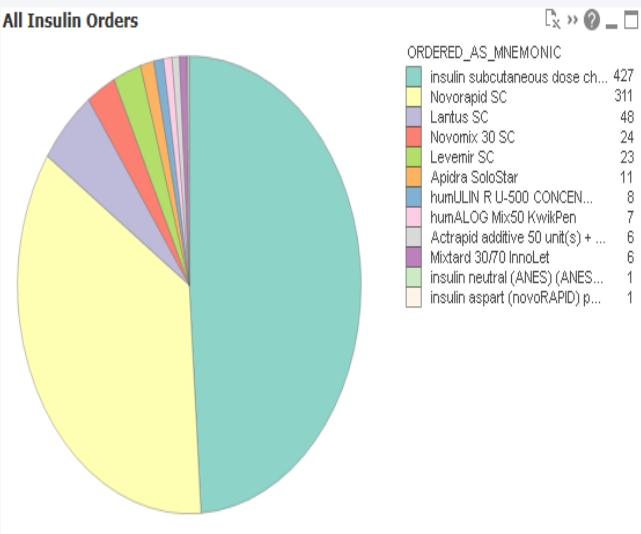
- Select Patients With:**
- BGL > 16
 - BGL < 4
 - All BGL Results
 - Glucose IV Administration
 - Glucagon Administration
 - Own Pump PowerPlan
 - Dka PowerPlan
 - Clear Filters

Current Selections

- Result_Val > 16
- DateMedium > =42862 < =42863
- BGLDateMedium > =42862 < =42863

All Insulin Orders

Insulin Order	Patients	Ordered	Completed	Discontinued	Cancelled	Deleted	Pending	Voided	Total	%
Total	35	304	453	5	111	0	0	0	873	100.0%
Actrapid additive 50 unit(s) + sodium chloride...	5	2	0	4	0	0	0	0	6	0.7%
Apidra SoloStar	1	2	7	0	2	0	0	0	11	1.3%
humALOG Mix50 KwikPen	1	2	4	0	1	0	0	0	7	0.8%
humULIN R U-500 CONCENTRATED 500 unit/...	1	2	4	0	2	0	0	0	8	0.9%
insulin aspart (novoRAPID) patient's own pump	1	0	0	1	0	0	0	0	1	0.1%
insulin neutral (ANES) (ANES) + Sodium Chlor...	1	0	1	0	0	0	0	0	1	0.1%
insulin subcutaneous dose check	27	183	233	0	11	0	0	0	427	48.9%
Lantus SC	16	8	32	0	8	0	0	0	48	5.5%
Levemir SC	5	7	11	0	5	0	0	0	23	2.6%
Mixtard 30/70 InnoLet	2	2	4	0	0	0	0	0	6	0.7%
Novomix 30 SC	5	9	10	0	5	0	0	0	24	2.7%
Novorapid SC	28	87	147	0	77	0	0	0	311	35.6%



Patients with Insulin Administered

34

Patients with IV Insulin Administered

1

Patients with Glucagon Administered

3

Patients with 50% Glucose Administered

7

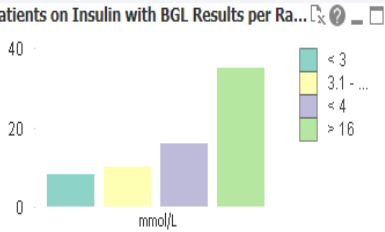
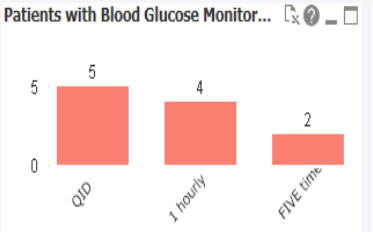
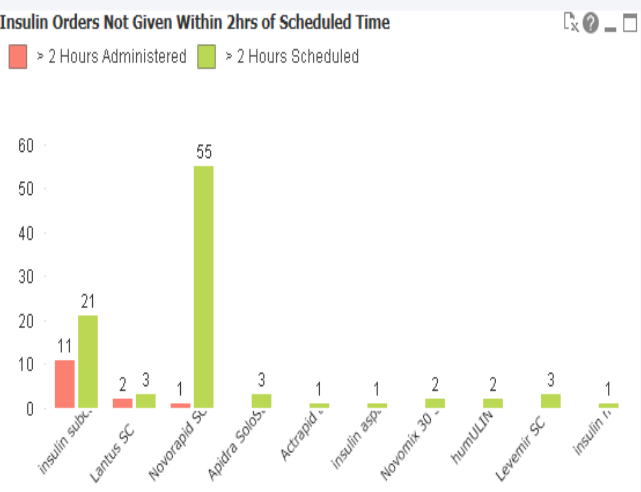
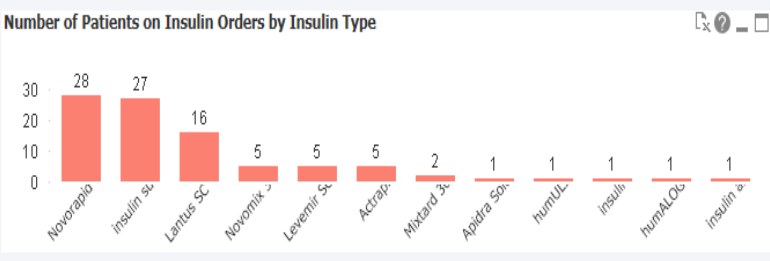
Patients with Initiated Diabetic Ketoacidosis PP

0

Patients with Initiated Patients Own Pump PP

1

Patients with insulin



Patients with Insulin Orders

MDN	Ward	Ordered As	Scheduled Date/Time	Administered Date/Time	Ordered Dose	Ordered Units	All Orders	
117691	1 WAA	Novorapid SC	7/05/2017 8:00:00 PM	-	-	-	1	
			7/05/2017 4:00:00 PM	-	-	-	1	
			8/05/2017 4:00:00 AM	-	-	-	1	
			7/05/2017 12:00:00 PM	-	-	-	3	
			7/05/2017 6:00:00 PM	-	-	-	2	
			8/05/2017 12:00:00 AM	-	-	-	1	
			7/05/2017 7:08:00 PM	7/05/2017 8:02:00 PM	-	-	1	
			7/05/2017 6:15:00 PM	-	-	-	1	
			Actrapid additive 50 unit(s) + s	-	-	-	-	-
			insulin neutral (ANES) (ANES) +	-	-	-	-	-

Digital disruption

- I am not really interested in technology for its own sake
- I am interested in using the patient-centred data and insights from the digital hospital in real time to improve the quality and efficiency of care at scale
- This requires new ways of working and a close partnership between eHealth and practising clinicians