



The ED-inpatient Interface: A User's Guide

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What are we trying to achieve?

A made-up number or better care for our patients?





Our day jobs

- We work at one of Australia's leading hospitals
- Over 700 beds, over 60 000 ED presentations/year
- 90 000 admissions to ward/year
- Over 750 000 outpatient appointments/year
- Nearly 1000 doctors, 6000 staff
- Massive basic science and clinical research facility
- Like most Australian hospitals, no health systems research
- We are not managers/administrators but systems physicians















Outline

- 1. What is the ED-inpatient interface?
- 2. Why is it important?
- 3. What do we know about it?
- 4. Should we care about it?
- 5. How can we improve it? Tools for change.
- 6. The future of the ED-inpatient interface





What is the ED-inpatient interface (EDii)?

- Transfer of patient care from ED clinicians to inpatient clinicians
- Not a place, but a process
- Often a complicated period of shared care





ED – Inpatient Interface







ED – Inpatient Interface







The ED-inpatient interface (EDii)

- Sickest, most complex patients
- At their most vulnerable
- Patients are harmed with EDii dysfunction

Fatovich, D.M., Y. Nagree, and P. Sprivulis, Access block causes emergency department overcrowding and ambulance diversion in Perth, Western Australia. Emerg Med J, 2005. 22(5): p. 351-4.





EDii is important

- scale
- -8 million ED attendances/ year
- -2.5 million of these patients admitted/year

Australian Institute of Health and Welfare, Australian Hospital Statistics 2013-2014, Emergency department care. Commonwealth Government Canberra. p19.





EDii is important

• Cost

Average cost of ED admission \$8 280 30 000 ED admissions/year \$248 400 000/year at PAH is spent on Edii

HIMS data PAH accessed September 2015





EDii is important

Politics

It's the only area of practice where politicians have imposed time targets for clinical care...without a robust system for monitoring patient outcomes

Stokes, B., *Four Hour Rule Program Progress and Issues Review*, in *Delivering a Healthy WA*, D.o. Health, Editor 2011, Government of Western Australia. p. 1-84.





EDii is hard

- 1. Complex negotiation between clinical services (each team has different priorities)
- 2. Incomplete available clinical information and diagnostic uncertainty
- 3. Rapid changes in patient condition

Sullivan C and Staib A The Health Advocate IN PRESS





What do we know about EDii?

- Not much (remarkable given the NEAT!)
- Because traditionally siloed
- Lots of ED research
- Lots of inpatient research
- Nothing much on the interface
- -care delivered by separate tribes
- -data across the interface not linked





EDii dysfunction

- Access Block:
- -Proportion of patients waiting >8 hours to get to an inpatient bed
- -Is a symptom of EDii dysfunction

-Lack of inpatient beds is just one cause of Edii dysfunction...

Richardson, D.B., Access block point prevalence study 2014: 4-hour target still out of reach, in Australian College of Emergency Medicine Conference -2014, ACEM, Editor 2014: Melbourne





How do we know if the EDii is functioning well?

- Process measures in part
- Need to look at outcomes for patients who are subject to the interface
- Mid Staffordshire- process measures OK but outcomes were not...

Wood, H., Fontain, P., Harvey, D., Catford, G., Hills, A., Holland, B., *Investigation into Mid Staffordshire NHS Foundation Trust*, Commission for Healthcare Audit and Inspection, Editor 2009.





ED – Inpatient Interface

Emergency Medicine

Inpatient Medicine





ED – Inpatient Interface







News

Brisbane's Princess Alexandra hospital has worst national figures for emergency department admission and discharge Janelle Miles The Courier-Mail December 14, 2012 1:00AM



The emergency department at Brisbane's Princess Alexandra Hospital has recorded the worst patient admission and discharge rates in the country, PIC: David Kelly

THE Princess Alexandra Hospital has recorded the nation's worst emergency department figures, in terms of the percentage of patients discharged or admitted to a ward within four hours.

A National Health Performance Authority report shows just 33 per cent of patients left the PA's ED within four hours last financial year, compared with the 54 per cent average among all major metropolitan hospitals.

The report, to be released today, also reveals 10 per cent of ED patients requiring admission to a ward at the Princess Alexandra waited more than 18 hours in 2011/12.

It shows the hospital on Brisbane's southside must improve a lot to make the national target of 90 per cent of patients leaving the ED within four hours.

But it is not alone.

The only Queensland nublic hospital to reach the 90 per cent target last financial year was Gumpie -



Queensland | Princess Alexandra



A Brisbane hospital improved after having the slowest emergency department in Australia last year.

A QUEENSLAND hospital has bounced back from the shame of having the slowest emergency department in Australia.

Princess Alexandra Hospital's emergency department was singled out in 2012 for its tardiness, meeting time targets for only 33 per cent of patients.

On Thursday it was named as the most improved based on 2013 figures, with 62 per cent of patients making it out of the department within the targeted four hours.

"We have gone from from being far and away the worst to at least being in the middle of the pack," said Dr Andrew Staib, the deputy director of emergency department.

It was a multi-faceted effort, he said. "But there is still a lot of work to do."

Queensland was the best performed state in Australia for the March 2013 quarter, with 11 of its 24 major hospitals meeting its 77 per cent target, according to National Health Performance Authority figures published on the MyHospitals website.













Why should I care about EDii?

 Overcrowding is an ED problem: don't care about NEAT



- Because we were so bad at NEAT< forced to collaborate and work on Edii
- Didn't do that until we went to the library and really started to look



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Journal of the Australian Healthcare & Hospitals Association

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| This Journal \$ GO Advanced Search | Report on the 4-h rule and National Emerge in Australia: time to review | ency Access Target (NEAT) | HTM | Full Text |
| Journal Home About the Journal | Andrew Staib ^{A D E} , Clair Sullivan ^{A B D} , Bronwyn Gri Scott ^A | ffin ^A , Anthony Bell ^C and Ian | PDF | PDF (180 KB) Supplementary Material |
| Editorial Structure Contacts For Advertisers | A Princess Alexandra Hospital, Metro South Health, 199 Ipswich Roa | ad, Woolloongabba, Qld 4102, Australia. | Ţ. Ţ | Export Citation |
| Content Online Early Current Issue Just Accepted All Issues Research Fronts Sample Issue | Email: clair.sullivan@health.qld.gov.au; Bronwyn.Griffin2@health.qld ^B Mater Research Institute, University of Queensland, Translational F Woolloongabba, Qld 4102, Australia. ^C Royal Brisbane and Women's Hospital, Metro North Health, Bower Australia. Email: Anthony.Bell@health.qld.gov.au ^D These authors contributed equally to this paper. | l.gov.au Research Institute (TRI), 199 Ipswich Road, n Bridge Road, Herston, Qld 4129, | | ShareThis Comments |
| For Authors General Information Author Instructions Submit Article Scope Open Access | Corresponding author. Email: Andrew.Staib@health.qld.gov.au Australian Health Review - http://dx.doi.org/10.1071/AH15071 Submitted: 9 April 2015 Accepted: 17 July 2015 Published online: 4 | 5 October 2015 | | |
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PAH NEAT Safety Dashboard

| NEAT Dashboard Princess Alexandra Hospital | | Pre Implementation | | | | Post Implementation | | | | | | |
|--|-----------|--------------------|-----------|-----------|------------------|---------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| | | 201 | 1 | | 2012 2012 / 2013 | | 013 | | | | | |
| Quality and Clinical Outcome Measures | Jan - Mar | Apr - Jun | Jul - Sep | Oct - Dec | Jan - Mar | Apr - Jun | Jul - Sep | Oct - Dec | Jan - Mar | Apr - Jun | Jul - Sep | Oct – Dec |
| Re-presentation to PAH ED < 48 hrs of discharge from ED | 3.4 | 2.8 | 2.6 | 2.8 | 3.1 | 3.1 | 3 | 3.8 | 3.8 | 3.4 | 3.1 | 3.2 |
| Inpatient mortality for patients admitted from PAH ED (%) | 2 | 2.4 | 2.5 | 2.6 | 2.3 | 2.3 | 2 | 1.6 | 1.7 | 1.2 | 1.1 | 1 |
| PAH Standardised Hospital Mortality Ratio | 8 | 0 | 8 | 5 | 8 | 5 | 74 | | 74 61 | | | |
| RRT calls to PAH inpatients admitted < 24 hrs from PAH (rate per 1000 admissions) | 4.9 | 8.1 | 7.3 | 6.7 | 9.4 | 8.3 | 10 | 8.9 | 9.9 | 14 | 13 | 13 |
| Cardiac Arrest calls to PAH inpatients admitted < 24 hrs from PAH (rate per 1000 admissions) | 1.4 | 0.9 | 0.9 | 1 | 1.1 | 0.4 | 1.1 | 1.4 | 1 | 0.8 | 1.1 | 0.5 |







Sullivan, Clair M., Staib, Andrew, Flores, Judy, Aggarwal, Leena, Scanlon, Alan, Martin, Jennifer H., and Scott, Ian A. (2014). Aiming to be NEAT: safely improving and sustaining access to emergency care in a tertiary referral hospital. *Aust. Health Review* **38**, 564–574









EDii is important

Clinical risk
 -eHSMR vs elective HSMR
 -EDii is where errors occur



Richardson, D.B., Increase in patient mortality at 10 days associated with emergency department

overcrowding. Med J Aust, 2006. 184(5): p. 213-6.





Why should we care about EDii?

- Halving our ED LOS been associated with a halving of ED-inpatient mortality
- Reduction in cardiac arrests within 24hrs admission
- Improved patient satisfaction
- Improved morale and collaboration across the EDinpatient interface
- Very low cost (work smarter): we halved LOS without a CDU or MAU





CSIRO PUBLISHING

Australian Health Review http://dx.doi.org/10.1071/AH14083

Aiming to be NEAT: safely improving and sustaining access to emergency care in a tertiary referral hospital

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Abstract

Objective. To implement and evaluate strategies for improving access to emergency department (ED) care in a tertiary hospital.

Methods. A retrospective pre-post intervention study using routinely collected data involving all patients presenting acutely to the ED of a major tertiary hospital over a 2-year period. Main outcome measures were changes in: the percentage of patients exiting the ED (all patients, patients discharged directly from the ED, patients admitted to inpatient wards); mean patient transit times in the ED; inpatient mortality rates; rates of ED 'did not wait' and re-presentations within 48 h of ED discharge; and selected safety indicators. Qualitative data on staff perceptions of interventions were also gathered.

Results. Working groups focused on ED internal processes, ED-inpatient unit interface, hospital-wide discharge processes and performance monitoring and feedback. Twenty-five different reforms ere nacted over a 9-month period (January–March 2012) with the post-reform period (January–March 2013), the percentage of patients exiting the ED within 4h rose for all patients presenting to the ED (from 32% to 62%), for patients discharged directly from the ED (from 4/% to 75%) and for admitted patients (from 12% to 32%; P < 0.001 for all comparisons). The mean (±s.d.) time all patients spent in the ED was reduced from 7.2 ± 5.8 to $(2 + 4.2 \pm 3.5 h) (P < 0.001)$ and, for admitted patients, was associated with reduced in-hospital mortality (from 2.3% to 1.7%; P = 0.045). The 'did not wait' rates in ED fell from 6.9% to 1.9% (P < 0.001), whereas ED re-presentations within 48h among patients discharged from the ED orse slightly (from 3.1% to 3.8%; P = 0.023). Improvements in outcome measures were maintained over the subsequent 12 months.

Conclusions. Multiple reforms targeting processes both within the ED and its interface with inpatient units greatly improved access to ED care over 12 months and were associated with decreased in-hospital mortality.







Sullivan C, Staib, A., Eley, R., Scanlon, A., Flores, J., Scott, I. NEAT metrics of the ED-inpatient interface: measures of patient flow and mortality for emergency admissions to hospital. Australian Health Review. 2015 May 18. doi: 10.1071/AH14162. [Epub ahead of print]





Queensland Government

Just Accepted

This article has been peer reviewed and accepted for publication. It is in production and has not been edited, so may differ from the final published form.

Who is less likely to die in association with improved National Emergency Access Target (NEAT) compliance for emergency admissions in a tertiary referral hospital?

Clair Sullivan, Andrew Staib, Robert Eley, Bronwyn Griffin, Rohan Cattell, Judy Flores, Ian Scott

Abstract

Objective: We aimed to identify factors associated with reduced mortality among patients admitted from the emergency department (ED) to inpatient wards in a major tertiary hospital which had previously reported a near halving in mortality in association with a doubling in National Emergency Access Target (NEAT) compliance over two years (2012a2014). Methods: We retrospectively analysed ED Information System (EDIS) and hospital discharge abstracts on all emergency admissions during 2011 (pre-NEAT) and 2013 (post-NEAT). Patients admitted to short stay wards and then discharged home, and patients dying in ED were excluded. Patients were categorised according to age, time of arrival, mode of transport to ED, triage category, clinical presentation and major diagnostic codes. Results: In-patient mortality rate (MR) for emergency admissions decreased from 2011 (1.9%, 320/17022) to 2013 (1.2%, 202/17162) (p<0.001). Deaths in ED (0.19% vs 0.17%) or coded as in-patient palliative care (17.9% vs 22.2%) did not change between years. The (MR) of older patients admitted to medical wards decreased significantly from 3.5% to 1.7% (p=0.011). Higher MR was seen among patients presenting to ED between midnight and 12 noon than at other times in 2011 (2.5% vs 1.5%, p<0.001) but not in 2013 (p=0.150). A similar pattern was seen among patients presenting on week-ends versus week-days; 2,2% vs 1,7% (p=0.038) in 2011 compared to 1,3% vs 1.1% (p=0.150) in 2013. Fewer deaths were noted among patients with acute cardiovascular or respiratory disease in 2013 than in 2011: 1.7% vs 3.6% and 1.5% vs 3.4% respectively (p<0.001 for both comparisons). Mode of transport or triage category was not associated with MR changes. Conclusion: Improved NEAT compliance is associated with improved in-patient mortality among particular subgroups of emergency admissions, namely older patients with complex medical conditions, those presenting afterhours and on week-ends, and those presenting with time-sensitive acute cardiorespiratory conditions.





Which patients are more sensitive to the quality of the ED-inpatient interface?



Sullivan C, Staib, A., Eley, R., Scanlon, A., Flores, J., Scott, I Who is less likely to die in association with improved National Emergency Access Target compliance for emergency admissions in a tertiary referral hospital?. Australian Health Review. 2015 May 18. doi: 10.1071/AH14242 [Epub ahead of print]





Which diseases are more sensitive to the quality of the ED-inpatient interface?



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How can we improve our EDii?

- Culture change: the end of "The Wall"
- Prioritising unscheduled care (after all they have the highest risk of dying..)
- -always having a med reg available
- -direct to ward admissions
- -clinicians managing patient flow
- -traditional markers of patient flow pretty useless





Process Measures that matter

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| Clair Sullivan ^A , Andrew Staib ^A , Rob Eley ^A , Alan Sca | nlon ^A , Judy Flores ^A and Ian | < | ShareThis |
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Australian Health Review - http://dx.doi.org/10.1071/AH14162 Submitted: 19 September 2014 Accepted: 22 March 2015 Published online: 18 May 2015

Abstract

Background Movement of emergency patients across the emergency department (ED)-inpatient ward interface influences compliance with National Emergency Access Targets (NEAT). Uncertainty exists as to how best measure patient flow, NEAT compliance and patient mortality across this interface.

Objective To compare the association of NEAT with new and traditional markers of patient flow across the ED-inpatient interface and to investigate new markers of mortality and NEAT compliance across this interface.

Methods Retrospective study of consecutive emergency admissions to a tertiary hospital (January 2012 to June 2014) using routinely collected hospital data. The practical access number for emergency (PANE) and inpatient cubicles in emergency (ICE) are new measures reflecting boarding of inpatients in ED; traditional markers were hospital bed occupancy and ED attendance numbers. The Hospital Standardised Mortality Ratio (HSMR) for patients admitted via ED (eHSMR) was correlated with inpatient NEAT compliance rates. Linear regression analyses assessed for statistically significant associations (expressed as Pearson R coefficient) between all measures and inpatient NEAT compliance rates.

Results PANE and ICE were inversely related to inpatient NEAT compliance rates (r = 0.698 and 0.734 respectively, P < 0.003 for both); no significant relation was seen with traditional patient flow markers. Inpatient NEAT compliance rates were inversely related to both eHSMR (r = 0.914, P = 0.0006) and all-patient HSMR (r = 0.943, P = 0.0001).

Conclusions Traditional markers of patient flow do not correlate with inpatient NEAT compliance in contrast to two new markers of inpatient boarding in ED (PANE and ICE). Standardised mortality rates for both emergency and all patients show a strong inverse relation with inpatient NEAT compliance.



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Midnight Hospital Occupancy and NE

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Emergency and NEAT







Inpatient Cubicles in Emergency







Linking Process Measures and Outcomes

The EDii Patient Safety Dashboard

0 C CLEAR ED | Inpatient Dashboard

☆ Dashboard Settings



Inpatient NEAT



Emergency Hospital Standardised Mortality Ratio



(1)







 (\pm)

RRT within 24 hours of Admission (ED)





53

Ľ,

Last 12 Months 🗸

(f) (f)

=



ED Re-presentation within 24 Hours 5

Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug

Access









Merit Award: CLEAR ED - Inpatient Dashboard PA Hospital













Princess Alexandra Hospital

• AUSTRALI

THAW

- T- Target your efforts
- H- Heads of units model the way
- A- Access data
- W-Work at it







Breaking down the ED-inpatient interface using the THAW model at PAH has:

- has improved admitted NEAT from 10 to 50%
- been associated with a halving of ED-inpatient mortality
- Reduction in cardiac arrests within 24hrs admission
- Improved patient satisfaction
- Improved morale and collaboration across the ED-inpatient interface
- Very low cost (work smarter)









- Culture change takes
- 1. Trust
- 2. Data
- 3.Patients must be the focus

Every decision based on these three principles....the rest is easy...





Princess Alexandra Hospital brisbane + Australia







- This service does provide a single point of entry for patients referred from the PAH ED for general cardiology admission.
- The aim is to provide streamlined high level referral for quick definitive care for our patients.







- Cardiology Process: cardiology advanced trainee (CASPER) discusses case. CASPER reg contacts the relevant cardiology registrar for admission on ward.
- In the unlikely event that the patient is not appropriate for cardiology admission, CASPER reg refers back to ED.





Adverse Outcomes

- One <u>cardiac arrest</u> in CASPER cohort, not enough numbers pre or post to show significant difference.
- Zero **<u>RRT activations</u>** within 24hours (pre or post)
- Inpatient Transfers (exc cath lab):
 4 pre, 3 post





Cardiology NEAT compliance

- Increased significantly for the 80 CASPER patients (92 pre-intervention patients arriving over business hours) from 64.1 to 85.0% (z=3.106, p=0.0018).
- Out of hours NEAT was not different for the pre and post periods at 41.1 and 45.9 percent, respectively (z=.8558, p=0.3897).





ED Length of Stay pre and post CASPER intervention

| | | N= | ED LOS (mins) | SD | F | P value |
|------------------|-----------------|-----|---------------------|--------|--------|---------|
| Pre- | In hours | 92 | 265.9 | 124.7 | 4.243 | 0.04 # |
| interventio n | Out of hours | 151 | 306.70 | 163.05 | 14.287 | <.001 * |
| | | | | | | |
| Post- | CASPER | 80 | 199.40 | 101.84 | 27.090 | <.001 † |
| Interventio n | Out of hours | 162 | 327.69 | 208.33 | .694 | >.05 ‡ |

Pre intervention in hours compared to pre-intervention out of hours
* Pre intervention in hours compared to Post intervention in hours (CASPER time)
* Post intervention in hours (CASPER) compared to Post intervention out of hours
* Pre intervention out of hours compared to Post intervention out of hours





Ward Length of Stay pre and post CASPER intervention

| | | N= | WARD LOS (Days) | SD | F | þ |
|-------------------|--------------|-----|-----------------------|------|-------|---------|
| Pre-intervention | In hours | 92 | 2.44 | 2.95 | 0.191 | 0.662 # |
| | Out of hours | 151 | 2.61 | 3.02 | 0.506 | 0.478 * |
| | | | | | | |
| Post-Intervention | CASPER | 80 | 2.15 | 2.21 | 2.995 | 0.085 † |
| | Out of hours | 162 | 2.88 | 3.43 | 2.58 | 0.662 ‡ |

Pre intervention in hours compared to pre-intervention out of hours
* Pre intervention in hours compared to Post intervention in hours (CASPER time)
†Post intervention in hours (CASPER) compared to Post intervention out of hours
‡Pre intervention out of hours compared to Post intervention out of hours





Adverse Outcomes

- One <u>cardiac arrest</u> in CASPER cohort, not enough numbers pre or post to show significant difference.
- Zero **<u>RRT activations</u>** within 24hours (pre or post)
- Inpatient Transfers (exc cath lab):
 4 pre, 3 post





EDii is hard

4. The unscheduled nature of the care competing with scheduled events for inpatient teams

 Limited resources including ED pressures (overcrowding) and inpatient pressures (limited bed availability)

6. Time pressures

Sullivan C and Staib A The Health Advocate IN PRESS





Future of EDII

- Maturity...patient focus nearly normal now
- Digital especially at PAH
- Chance for data driven systems physicians to optimise patient outcomes and efficiency







- EDII really important
- Quality of EDII in your hospital likely to affect mortality
- Data driven low cost clinical redesign can improve mortality





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Should we be thinking about Edii differently?

- The quality of EDii affects patient outcomes
- Systems view rather than individual patient view
- When does a patient requiring emergency admission become our patient?

















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What are we Trying to Achieve?

A number or better care for our patients?





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