Increased burden on metropolitan urological services: The era of the Australian National Emergency Access Targets (NEAT or the “4-h target”)

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Abstract

Background: The National Emergency Access Targets (NEAT) was introduced in Australia in 2011 and guides the clearance of presentations within 4-h of initial presentation from the Emergency Department (ED). We aim to assess the impact of the introduction of NEAT on acute urological services at a large metropolitan center.

Methods: A retrospective cohort study was performed and data were collected from electronic patient management systems. The control group was represented by ED presentations between June and September 2011, 1 year prior to the introduction of NEAT. The two study groups consisted of ED presentations between June and September 2012 and 2013, respectively. Outcome measures included time to the ureteric stent and scrotal exploration, inpatient length of stay (IPLOS), out-of-hours operating, and hospital mortality rates.

Results: Across the three study periods, a total of 76,935 patients were assessed by the EDs of the health service. 225 urological inpatient episodes were included across all periods with a trend showing increasing numbers of admissions ($P = 0.003$). For patients admitted under the urological service: Waiting room time and ED length of stay decreased significantly ($P < 0.001$). Proportion of operative cases decreased insignificantly ($P = 0.275$). Time from emergency presentation to emergency ureteric stent remained unchanged, however, proportions of procedures performed out-of-hours showed an increasing trend ($P < 0.001$). A significant increase in inter-unit transfer was observed, however, median IPLOS and mortality for operative and nonoperative cases remain unchanged.

Conclusions: Concerning urological admissions, the implementation of NEAT has been associated with improvement in ED key performance indicators. Such changes have been correlated with reductions in operative cases and increases in out-of-hours emergency operating. Further research is required to evaluate the direct effect of NEAT on urological patient care.

Keywords: Emergencies, inpatients, length of stay, urology, quality of health care
INTRODUCTION

Inefficient patient clearance leading to overcrowding in Emergency Departments (EDs) has been reported to be associated with poorer patient outcomes and increased mortality.[1] The National Emergency Access Targets (NEAT) were introduced across Australia in 2011. This initiative suggests the clearance of emergency presentations within 4 h of initial presentation in order to reduce ED waiting times and improve the quality of patient care. NEAT was based on a similar system implemented throughout the United Kingdom.[2] The downstream impact of these care models on acute urological services is unclear with no previous reports available.

EXPERIENCE WITH NATIONAL EMERGENCY ACCESS TARGETS

To investigate the impact of NEAT on a metropolitan health service we performed a retrospective review at Western Health, Melbourne, from which we report the impact on acute urological services. Western Health represents a large peripheral health network, servicing a culturally diverse population of almost 1,000,000 people. It has two primary facilities with large EDs encountering over 110,000 emergency presentations per year. Following ethical approval, data were collected from electronic patient management systems for data over the same 3 month period for three consecutive years.[3] The control group represented ED presentations between June and September 2011, 1 year prior to the introduction of NEAT. The two separate study groups consisted of ED presentations between June and September 2012 and 2013, following the introduction of NEAT. In addition to demographic information, outcome measures included: Time to emergency operating theater access, inpatient length of stay (IPLOS) (for operative and nonoperative cases), inter-unit transfers, and out-of-hours operating. Emergency urologic surgery including: Time to ureteric stent or scrotal exploration was used as arbitrary surrogate markers for emergency theater access. Inter-unit transfer was defined as transfer-of-care between treating teams during admission, for example, transfer from general surgery to urology teams. Out-of-hours operating was defined as: An operative procedure starting prior to 0800 h or after 1700 h. No other major administrative changes were made during this period. Statistical analysis was completed on SPSS version 20 (SPSS Inc., Chicago, Ill, USA). All data were expressed in medians and interquartile range unless otherwise specified. The Mann–Whitney U-test was used for comparing continuous variables, relative risk (RR) calculated for estimates of proportions. Cochran-Armitage (CA) $\chi^2$ regression was used to examine the trends. Kaplan–Meier regression was used to compare time to the ureteric stent and scrotal exploration. Across the three study periods, a total of 76,935 patients were assessed by the EDs of the health service. Resultant emergency urological inpatient episodes across all periods numbered 225 (0.3% of ED presentations, 1.2% of all admitted patients). Of all ED presentations, an increasing proportion of patients requiring urological admission was observed throughout the study periods ($P = 0.003$, CA trend). For admitted urology patients, ED key performance indicators reduced, including: Waiting room time ($P < 0.001$) and ED length of stay ($P = 0.091$). Inter-unit transfers within 48 h of presentation increased across the study periods from 3.4% to 16.9% and 15.8%, respectively (RR: 4.67, 95% confidence interval [CI]: 1.11–19.61, $P = 0.04$). Proportion of operative cases insignificantly decreased from 40.0% to 29.1% ($P = 0.275$, CA trend). Median IPLOS for operative and nonoperative cases remained consistent across study periods. Time from ED presentation to emergency ureteric stent ($P = 0.121$) or scrotal exploration ($P = 0.142$) was comparable across all study periods [Figure 1]. However, proportions of procedures performed out-of-hours showed an increasing trend from 27.1% to 51.5% (RR: 2.10, 95% CI: 1.05–4.77, $P = 0.035$). Outcomes on ED and inpatient, key performance indicators, are summarized in Table 1.

DISCUSSION

In this center, the implementation of NEAT has been associated with improvement in ED key performance indicators including: Waiting room times (time between presentation and ED physician review) and time to surgical review, consistent with other reports.[4] Despite these changes, only a mild reduction in ED length of stay was observed, suggesting limitation from other factors including theater availability and hospital occupancy. Adverse patient outcomes and increased mortality have been

Figure 1: Kaplan–Meier regression comparing time to emergency stent between study groups ($P = 0.121$)
Table 1: Summary table of emergency presentations and emergency urological admissions variables

|                       | Control group (2011) | Study group 1 (2012) | Study group 2 (2013) | P      |
|-----------------------|----------------------|----------------------|----------------------|--------|
| **Emergency department data** |                      |                      |                      |        |
| ED presentations (total) | 25,070               | 25,025               | 26,840               | 0.462  |
| Campus 1               | 16,055               | 16,106               | 17,606               | 65.6%  |
| Campus 2               | 9015                 | 8919                 | 9234                 | 34.4%  |
| Mean age (range)       | 40.0 (range 0–104)   | 41.1 (range 0–103)   | 40.1 (range 0–103)   | 0.07   |
| Gender                 |                      |                      |                      |        |
| Female                 | 12,451               | 12,540               | 13,304               | 49.6%  |
| Male                   | 12,611               | 12,477               | 13,536               | 50.4%  |
| **ED triage category** |                      |                      |                      |        |
| Resuscitation          | 85                   | 105                  | 110                  | 0.4%   |
| Emergency              | 2358                 | 2504                 | 2529                 | 9.4%   |
| Urgent                 | 8557                 | 8486                 | 8780                 | 32.7%  |
| Semi-urgent            | 12,359               | 12,148               | 13,427               | 50.0%  |
| Nonurgent              | 1655                 | 1728                 | 1947                 | 7.3%   |
| DOA                    | 56                   | 54                   | 46                   | 0.2%   |
| **Emergency separation** |                      |                      |                      |        |
| Direct admit           | 5993                 | 5651                 | 5958                 | 22.2%  |
| Admit via SSU          | 496                  | 743                  | 618                  | 2.3%   |
| SSU                    | 1638                 | 2334                 | 3608                 | 13.4%  |
| Direct DC              | 14,136               | 13,380               | 14,138               | 52.7%  |
| LOR                    | 2787                 | 2823                 | 2483                 | 9.3%   |
| Death                  | 20                   | 32                   | 35                   | 0.1304|
| **Emergency urological admissions data** |                      |                      |                      |        |
| ED urological admissions | 59                   | 65                   | 101                  | 0.003  |
| Operative              | 23                   | 18                   | 30                   | 29.7%  |
| Nonoperative           | 36                   | 47                   | 71                   | 61.3%  |
| Mean age (range)       | 59.6 (range 17–98)   | 54.6 (range 19–87)   | 59.7 (range 20–89)   | 0.234  |
| Time to urological review (h) | 4.17 (IQR 2.15–5.48) | 3.48 (IQR 2.22–5.30) | 3.17 (IQR 2.00–4.77) | 0.001  |
| EDLOS (h)              | 8.23 (IQR 0.47–6.07) | 7.07 (IQR 0.35–4.42) | 6.96 (IQR 0.25–4.52) | 0.091  |
| IPLOS (days)           | 2.14 (IQR 0.96–4.88) | 2.28 (IQR 0.96–4.73) | 2.06 (IQR 1.09–3.82) | 0.944  |

IQR: Interquartile range, ED: Emergency Department, IPLOS: Inpatient length of stay, EDLOS: Emergency department length of stay

reported to result from ED overcrowding, potentially from inappropriate patient treatment in nontreatment areas. Further, ED overcrowding has been correlated with increased cancellations of elective surgical cases. The initiation of NEAT by the Australian government to reduce these poor outcomes has been met with controversy, particularly following the rescindment of the similar NHS-based scheme in the United Kingdom.

However, these improvements in ED key performance indicators have resulted in reduced overall emergency operative cases, which were more likely to be performed out-of-hours. Our findings reflect the detrimental “downstream” effects of the NEAT scheme encountered by other departments across hospitals. It is likely that the reduced proportion of operative cases is a result of increased lower-acuity admissions. Further, such admissions are potentially reflective of the increase in inter-unit transfer of undifferentiated patients who would not have “traditionally” been admitted under a urology service. Such findings support previous suggestions that decreased time for relevant investigations and early or inappropriate referrals may be a consequence of a target-based approach. The Royal Australasian College of Surgeons, the body governing surgical practice in Australia, released a public statement regarding NEAT suggesting that “emphasis may be placed on EDs rather than patient care.” While there was no change in the time from presentation to theater access (for ureteric stent and scrotal exploration), these cases were more likely to be performed out-of-hours. The significance of out-of-hours urological operating and its impact on patient care is not clear and has not been previously reported. However, in general, out-of-hours operating increases staff-related costs and may compromise care due to poor supervision and restricted services and facilities.

Our study has several limitations, including the inherent flaws related to the retrospective and observational nature of the review. Data assessing the complexity of admitted patients and hospital occupancy were not available for analysis, and thus their respective financial impact on the outcome measures and health system could not be assessed. Our results suggest that further, more comprehensive assessment is warranted.

CONCLUSIONS

The NEAT initiative was introduced in Australia with a lack of supportive evidence. To the authors’ knowledge, the current study represents the only available data concerning urological admissions. Despite a modest improvement in ED key performance indicators, NEAT has resulted in downstream effects including increased admissions and out-of-hours operating for acute urological services.
Further, despite the extensive administrative changes made, no change in time to the emergency theater was observed. Future research assessing the cost-benefit of NEAT implementation for acute urological and wider health services is required.

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Conflicts of interest
There are no conflicts of interest.

REFERENCES

1. Langhan TS. Do elective surgical and medical admissions impact emergency department length of stay measurements? Clin Invest Med 2007;30:E177-82.
2. National Emergency Access Targets. Emergency Care Institute of New South Wales; 2012. Available from: http://www.ecinsw.com.au/ neat. [Last accessed on 2012 Aug 31].
3. Perera ML, Davies AW, Gnaneswaran N, Giles M, Liew D, Ritchie P, et al. Clearing emergency departments and clogging wards: National emergency access target and the law of unintended consequences. Emerg Med Australas 2014;26:549-55.
4. Geelhoed GC, de Klerk NH. Emergency department overcrowding, mortality and the 4-hour rule in Western Australia. Med J Aust 2012;196:122-6.
5. Submission to the Council of Australian Governments Expert Panel – Four Hour National Access Targets in Emergency Departments Royal Australasian College of Surgeons; 2011. Available from: http://www.surgeons.org/media/307099/sbm_2011-05-24_four_hour_rule. pdf. 3. [Last accessed on 2014 Sep 10].
6. Good Practice in Management of Emergency Surgery: A Literature Review. Department of Health, Victorian Government; 2010. p. 1-86.