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RESEARCH PAPER

Patient characteristics and institutional factors associated with those who ‘‘did not wait’’ at a South East Queensland Emergency Department

Who are those who ‘‘did not wait’’ in ED?

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Summary

Background: Patients who do not wait in Emergency Departments (ED) are a key concern for healthcare consumers, providers and policymakers.

Methods: A six month descriptive retrospective cross-sectional designed study was undertaken at a public, metropolitan, adult tertiary referral ED in South East Queensland (SEQ). Using hospital administrative data, all patient presentations were examined over the timeframe with the aim of identifying and describing patient, institution and economic factors for individuals who attend the ED with the focus on patients who did not wait for medical treatment.

Results: A total of 1088 (4.2%) of 25,580 ED patient presentations did not wait (DNW). When compared to patients who waited those who DNW differed significantly regarding age ($p < 0.001$),

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triage category ($p < 0.001$), mode ($p < 0.001$) and shift of arrival ($p < 0.001$). Patients who DNW were younger, assigned less urgent triage categories and presented in higher proportions by private transport, during evenings and overnight. Some ($n = 550$) were incorrectly coded as DNW when they actually waited, but left after treatment commenced. The crude cost of incorrectly coding these patients amounted to >\$160,000.

Conclusions: Understanding the characteristics of patients who DNW enables strategies to be considered and implemented to manage and mitigate both the potential clinical risk to patients and the financial implications for health care institutions.

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What is known

- The subgroup of ED patients who DNW can represent ED access (and performance) issues. National and international literature spanning more than 20 years on patients who DNW reflect the persistence of the issue.
- The general demographic and clinical profile of patients who DNW includes: younger, assigned less urgent triage categories, have an overseas or no address, identify a language other than English and present to the ED in higher proportions by private transport, and during evening and night time hours.

What this paper adds

- This study offers an initial insight into the characteristics of patients who DNW in a busy, academic, tertiary teaching hospital ED in Queensland, Australia.
- Unique to this study is a crude cost analysis indicating potential hospital cost implications of patients who DNW amounting to >AU\$160,000 in expenses due to incorrect coding. Highlighting room for improvement in critical data discrepancies requiring attention and possible rectification through staff education.

Introduction

The Emergency Department (ED) is commonly recognised as the interface between the community and the hospital providing over 6.2 million accident and emergency services during 2010–2011 in Australia.¹ With an annual growth rate of approximately 4.0% over the past five years¹ the impact on access to emergency health care services, effecting patients' experiences. Escalating growth in ED demand is multifactorial and has been attributed to changes in demographics, expectations, morbidity such as: rise of chronic diseases, and impacts of improved population health campaigns.² The inability to meet expectations may contribute to dissatisfaction causing patients to leave the ED before being assessed and treated by a medical officer. Globally, patients who "did not wait" (DNW) are viewed as an indicator of poor ED performance, and these individuals pose a key concern for healthcare, providers and policymakers.

Research on the phenomenon of patients who DNW for ED medical assessment has been conducted internationally with studies in Hong Kong, United States of America (USA), Canada, United Kingdom (UK) and Ireland reporting DNW rates from as low as 0.36% (Hong Kong)^{3,4} up to 15% (USA).⁴ Australian studies report rates between 4.1%⁵ and 11.2%.⁶ Inconsistent results could be attributed to variations in study designs, study periods, sample sizes and patient populations.

Demographic profiles of patients who DNW vary within the literature. Australian and international studies report higher percentages of young adult patients^{5,7–9} as more likely not to wait compared to older patients. Patients reported as 'non-white' or 'black' are frequently mentioned in the USA literature as socially disadvantaged and more likely not to wait.^{9–11} Australian studies indicate that patients of Aboriginal descent (often a socially disadvantaged group) are also less likely to wait.^{6,12,13}

Clinical profiles of patients who DNW are relatively consistent. Despite variation in triage categorisation processes between countries, the majority of studies reported that the least sick or non-urgent were most likely not to wait.^{6–11,14–20} Service profiles of EDs (including factors such as day of week and month of year) revealed conflicting findings in relation to patients who DNW. Some studies identified weekdays^{14,21} while others found weekends to have higher rates.^{5,8} Evenings and overnight were unanimously reported as having high rates of DNW.^{5,7,16}

Queensland's population differs somewhat to those studied internationally and in other Australian states. As such, the aforementioned findings may not be generalisable. In ten years to 2011, Queensland's population grew by 23%, the second fastest growth of all Australian states and territories, behind Western Australia at 24%.²² This rapid population growth in Queensland may result in the inability of health services to meet demand. Patients may be presenting to EDs as their only alternative and might therefore be considerably unwell. Supporting this are Queensland rates of hospitalisation which are 5% higher than the national rate and double the rate in Canada.²³

Aim

The aim of this study was to understand the scope of the problem of individuals who attended a public, adult tertiary referral ED within South East Queensland (SEQ) and who DNW for medical assessment and treatment.

Method

Design

This study used a descriptive retrospective cross-sectional design of prospectively collected administrative health data.

Study setting and population

The study was conducted in one of three public, teaching tertiary level facilities in SEQ that provides care in all major adult specialties, with the exception of obstetrics. As a Level 1 trauma facility this hospital services the local metropolitan catchment area and is also a major referral hospital for a large surrounding zone.

Inclusion criteria

The population for this study consisted of all adult patients (≥ 18 years) who presented to the ED during the six month period: 1 January–30 June, 2011 and DNW. DNW was defined as patients who (i) presented to the ED, (ii) were assessed by a nurse and recorded on the ED specific tracking database (Emergency Department Information system, EDIS, isoft ED module: version 10), and (iii) left prior to being medically assessed and treated. These patients were documented as 'DNW' in the discharge status field on the EDIS and did not have a time recorded in the field labelled 'treating clinician time seen'.

Data collection

Data were extracted from the hospital Clinical Costing System (also known as Transition II). This system integrates large volumes of patient-level demographic, clinical, resource utilisation and financial information into a single database. It is a data warehouse that receives data from various 'feeder systems' or hospital databases and contains resource tracking and clinical costing tools.

Data were received from the EDIS, Enterprise pathology results information system (Auslab) and Radiology Information System (RIS) into the Transition II system to calculate patient costing. The Transition II system is based on patient-centric costing which is referred to as a 'bottom up' approach.²⁴ Costs are based on actual consumption of human and material resources at a 'product' level.²⁴

Variables of interest as identified from within the literature included: gender, age, day and time of presentation, mode of arrival, acuity, socioeconomic status, ethnicity, language spoken and health insurance. In addition, ED wait times for all patients, re-attendance or re-presentation of patients who DNW during their initial visit to ED, and cost of DNW are also reported.

Socioeconomic status was derived indirectly based on individual residential postcodes and the Australian Bureau of Statistics (ABS) Socio-Economic Indexes for Areas (SEIFA), in particular, the index of relative socioeconomic disadvantage (IRSD). IRSD focuses on low income earners, relatively low educational attainment and high unemployment²⁵ and was

used to examine relationships between neighbourhood disadvantage and ED attendances. Each patient postcode was assigned the corresponding decile score from 1 (the lowest 10%) to 10 (the highest 10%), where the lowest decile represents those postcodes with the highest proportion of people living in households of greatest disadvantage.

The Australasian Triage Scale (ATS) is a measure of clinical urgency and is used as an indicator of patient acuity when limited other information is available or accessible such as is the case with patients who DNW. Each of the five categories of the ATS has an assigned maximum time a patient should wait for assessment and treatment: that is, ≤ 2 min for ATS one; ≤ 10 min for ATS two; ≤ 30 min for ATS three; ≤ 60 min for ATS four; and, ≤ 120 min for ATS 5.²⁶ Wait times are often used as a measure of ED performance and efficiency and are generally presented as the percentage of patients seen in less than or equal to the maximum time recommendations set by the Australasian College for Emergency Medicine (ACEM).²⁶

A quality indicator used in emergency health care and applied to patients who DNW is re-attendance or re-presentation rate. It is suggested that unplanned return visits to ED may be a consequence of requiring further treatment of the same condition or a condition related to the initial presentation. The timeframe used for this measure varies throughout the literature from 24h²⁷ to seven days.^{18,19,28} The seven day timeframe was selected for this study and the discharge disposition of the subsequent visit was examined. The mode of arrival was used as a surrogate marker of acuity, with patients arriving by ambulance more unwell than those presenting by private transport.²⁹

Ethical considerations

Ethical approval for this study was obtained from the Queensland Health Central Office Human Research Ethics Committee (HREC) and from the Griffith University HREC.

Data analysis

Descriptive statistics were used to analyse the study's findings using the statistical package for social sciences (SPSS, version 19). Continuous variables were analysed using non-parametric statistical testing as the basic assumptions for parametric testing (normal distribution) were not met. The Mann–Whitney *U*-test was used to determine differences between those patients who DNW and those that waited in regards to age and ED LOS. The level of significance (α) of 0.05 was adopted.

Results

There were 1088 patients who DNW and were not seen by a medical officer, representing 4.2% of the total 25,580 patient presentations, or an average of six patients per day. These were defined, in this study, as 'True DNW'. The other 24,492 patient presentation records were those patients who waited to see a medical officer. This group included a number of patient presentations ($n=550$, 2.1%) coded as DNW but had a documented time of medical officer review.

Fig. 1 Sample inclusion process.

These were defined as 'False DNW' because they were actually seen by a medical officer but (incorrectly) coded as DNW. Fig. 1 displays the sample inclusion process.

The median age of patients who DNW was 33.0 years (IQR 25.0–47.0). This was 12 years younger than those patients who waited to be seen (median = 45.0 years; IQR 30.0–63.0) and was significant ($p < 0.001$). Furthermore, 75% of patients who DNW were aged 47.0 years or younger. Males who DNW comprised 4.2% of all male presentations and females who DNW comprised 4.3% of all females presentations.

Patients who presented to the ED were examined for differences regarding ethnicity; language spoken; and, health insurance (see Table 1). Around 3% of presentations identified as Aboriginal and/or Torres Strait Islander (ATSI). English was the predominant language spoken.

DNW patients were designated less urgent triage categories in higher proportions than those that waited, with nearly 60% of patients who DNW triaged as categories four (44.1%) or five (14.7%) (see Table 2). Over three quarters ($n = 819$, 75.3%) of patients who did not wait arrived by private transport, whereas patients who waited had a higher percentage ($n = 11285$, 46.1%) of ambulance arrivals, with half ($n = 12,375$, 50.5%) of those arriving by private transport [χ^2 (3, $N = 25,580$) = 255.701; $p < 0.001$]. The Socio-Economic Indexes for Areas (SEIFA) index of disadvantage was used to examine the relationship between neighbourhood disadvantage and ED attendances. A similar pattern between both groups of patients was observed (see Fig. 2).

Patients returning to the ED within seven days of their index presentation may be considered a surrogate measure of their degree of illness. Of 1088 patients who DNW, 155 (14.2%) returned to the study site ED within seven days. Fig. 3 shows the majority ($n = 99$, 63.9%) were discharged home from their second visit however 12.9% ($n = 20$) again DNW and 5.8% ($n = 9$) left after medical treatment commenced. There were 27 (16.8%) patients that were admitted from their second visit.

The most common time to present to ED was during the day shift ($n = 11,352$, 44.4%) between 07:00 and 14:59 h, however it was patients who presented during the afternoon shift between 15:00 and 22:59 h that DNW in higher percentages ($n = 586$, 53.9) [χ^2 (2, $N = 25,580$) = 329.91; $p < 0.001$].

Fig. 2 Number of patients who DNW and who waited, by SEIFA IRSD. Note. Only those individuals with an Australian post-code listed in the SEIFA were included, 44 (4.0%) were missing from the DNW group and 592 (2.4%) were missing from the waited group. DNW = did not wait. SEIFA = socio-economic index for areas. IRSD = index of relative socio-economic disadvantage. IRSD score of 1 reflects the lowest 10% and represents those postcodes with the highest proportion of people living in households of greatest disadvantage.

Fig. 3 Discharge disposition of patients who re-attended within seven days of DNW episode (%) ($n = 155$, 14.2%). Note. DNW = did not wait. LAMA = left against medical advice. ICU = intensive care unit

Table 1 Ethnicity, language and insurance status of ED patient presentations (*N* = 25,580).

Patient characteristic	True DNW (<i>n</i> = 1088)		Waited (<i>n</i> = 24,492)		DNW rate	χ^2	<i>p</i> -Value
	<i>n</i> (%)		<i>n</i> (%)		(%)		
Ethnicity						1.323	0.250
Non-ATSI	1047	(96.2%)	23,722	(96.9%)	4.2%		
ATSI	41	(3.8%)	770	(3.1%)	5.1%		
Language spoken						15.131	<0.001
English	1010	(92.8%)	22,084	(90.2%)	4.4%		
Other than English	72	(6.6%)	1882	(7.7%)	3.7%		
Unknown/not stated	6	(0.6%)	526	(2.1%)	1.1%		
Insurance status						7.512	0.023
Medicare	1000	(91.9%)	22,711	(92.7%)	4.2%		
Private insurance	54	(5.0%)	857	(3.5%)	5.9%		
Other/unknown	34	(3.1%)	924	(3.8%)	3.5%		

Note. DNW rate presented as within group %.

DNW = did not wait. ATSI = Aboriginal and/or Torres Strait Islander.

The earlier part of the week, namely, Monday and Tuesday both had higher numbers of total presentations (*n* = 4077, 15.9%, *n* = 3808, 14.9%) and higher numbers of patients who DNW (*n* = 206, 18.9%, *n* = 163, 15.0%). The overall DNW rate was 4.2%; on Mondays the DNW rate was highest (5.1%) and lowest Fridays (3.7%). Percentages of presentations for both patients who waited and those who DNW, were highest on weekdays (72.0% and 73.4%, respectively). The DNW rate was also slightly higher on weekdays (4.3%) than weekends (4.0%).

For those who waited, the median wait time to see a medical officer was 45.0 min (IQR 9.0–115.0). Triage categories one, two and five had median wait times to see a medical officer within the recommended ATS maximum wait time whilst categories three and four both exceeded the recommended times, having median wait times of 64.0 and 95.0 min, respectively. For each ATS category, the proportion of patients who did not meet the performance indicator target was higher (i.e. worse than) than both the Queensland and national averages.

For patients who DNW, the ED LOS exceeded the recommended ATS maximum wait time and the performance indicator targets for ATS categories two through five.

Transition II total cost is the sum of each patient's costs whilst in the ED. Of the 1088 patients who DNW, 67 (6.16%) cost more than the standard DNW allocated amount of \$55.92. The sum of the additional extra costs over and above the standard allocated amount was \$6390. These extra costs comprised \$1665 allied health costs, \$1909 pathology costs, \$1332 radiology costs, \$895 miscellaneous cost and \$590 pharmacy costs and indicate that some patients who DNW were receiving health care resources. Some (*n* = 550) were incorrectly coded as DNW when they actually waited, but left after treatment commenced. Table 3 presents the number of 'False DNW' in each ATS category and the calculations between the actual amount they were cost at and the amount they should have been cost at using Table 2 to result in a deficit amount.

Table 2 Australasian Triage Scale and mode of arrival of ED presentations (*N* = 25,580).

Patient characteristic	True DNW (<i>n</i> = 1088)		Waited (<i>n</i> = 24,492)		DNW rate	χ^2	<i>p</i> -Value
	<i>n</i> (%)		<i>n</i> (%)		(%)		
ATS						667.801	<0.001
1 – resuscitation	0	(0.0%)	1153	(4.7%)	0.0%		
2 – emergency	6	(0.6%)	5028	(20.5%)	0.1%		
3 – urgent	442	(40.6%)	11,730	(47.9%)	3.6%		
4 – semi-urgent	480	(44.1%)	5258	(21.5%)	8.4%		
5 – non-urgent	160	(14.7%)	1323	(5.4%)	10.8%		
Mode of arrival						255.701	<0.001
Walk-in	819	(75.3%)	12,375	(50.5%)	6.2%		
Ambulance	252	(23.2%)	11,285	(46.1%)	2.2%		
Police	14	(1.3%)	724	(3.0%)	1.9%		
Other	3	(0.3%)	108	(0.4%)	2.7%		

Note. DNW rate presented as within group %.

DNW = did not wait. ATS = Australasian Triage Scale.

Table 3 The costing of patients incorrectly coded or false DNW (*n* = 550).

Triage code	False DNW (<i>n</i> = 550)	Actual ED cost (\$)	Correct ED cost (\$)	Deficit (\$)
ATS				
1	0	0	0	0
2	23	1288	14,145	−12,857
3	216	12,096	97,848	−85,752
4	234	13,104	66,690	−53,586
5	77	4312	12,936	−8624
Total	550	30,800	19,1619	−160,819

Calculation of deficit = actual costed amount (number of false DNW × TII cost assigned to DNW (\$56)) − (number of false DNW (23) × TII cost assigned to non-admitted by triage category (Table 2)).

i.e. Category 2 deficit = $(23 \times 56) - (23 \times 615) = -12,857$.

DNW = did not wait. False DNW: patients coded as 'DNW' who were actually seen by a medical officer.

Discussion

This research was motivated by the need to further understand the group of patients who present to the ED and DNW in terms of patient demographics, socioeconomic status, living circumstance, temporal, organisational and financial factors.

The DNW rate published in Australian hospital statistics 2010–2011 report was 5.5%.¹ This rate was somewhat higher than the rate of 4.2% revealed in the current study however, also revealed was the presence of data inaccuracies resulting in patients being coded as DNW when in fact they may have actually been assessed by a medical officer. Using only discharge status to identify patients who DNW, the rate in this study was 6.4% (*n* = 1638) which may suggest that published rates could also be overestimated if based on discharge status alone. Additionally variations may also be due to heterogeneity of study approaches in regard to particular methods used to calculate rates. Tropea et al.⁶ for example, only included patients who were discharged home and based their DNW rate calculation on that sample (i.e. with a subsequent smaller denominator) which would explain their considerably higher rate (11.2%) than other Australian research.

Patients presenting to the site ED had a similar distribution of adult males and females by five year age group as the AIHW Australian sample of ED presentations.³⁰ The patients who DNW were, however, approximately 12 years younger than the general ED population. These findings are consistent with Australian and international literature.^{6–8,10,12,20,28} There are a number of reasons young people may visit EDs over a primary care practitioner including anonymity from family practitioner, inflexible systems, opening hours, financial and transport barriers.³¹ In addition, the relatively centrally located hospital with a free service and 24 hour care may prove more accessible.³¹ This, however, presents a potentially critical gap in services as young people transition through physical, social, emotional and neural developmental changes into adulthood.³² This development stage is a crucial time to positively influence health and social behaviours which pose major threats to the health of Australia's young people.³¹ Major threats include drug and alcohol experimentation/abuse, suicide/self-harm, sexually transmissible infections, unplanned pregnancy and injury

from risk-taking behaviours.³¹ The health of young people is influenced by the interaction of many health determinants such as human biology, behaviours, socioeconomic and environmental factors but most importantly health service interactions and interventions.³¹ Given that young people comprise the bulk of the cohort of patients who DNW, a better understanding of this group is required.

Tropea et al.⁶ reported almost half (47.4%) of DNW episodes occurred during evenings as was the case in this current study (53.5%). More specifically, peak attendance times for patients who DNW were between 18:00 and 24:00 h. This was despite total patient attendances being higher (51%) during day shift (07:00–14:59), specifically highest between 09:00 and 13:00 h, or, as Wright¹³ found, during business hours (09:00–17:00 h) (44.4%). The increase in DNW rates during evenings implies this may be a consequence of ED overcrowding.³³

The main barriers to accessing services identified in an Australian Patient Experience Survey³⁴ were cost, unacceptable waiting times and lack of available services. Wait times have been universally cited by almost all research on the topic of DNW and have been implicated as the most common associated factor.^{20,27,33,35,36} Wait times before patients decided not to wait were similar to the two to three hours reported by other studies^{10,28,36} with half of those who DNW in this current study leaving within two and a half hours. Those who were seen and discharged remained in the department for almost four and a half hours.

Cross et al.³⁶ reported an association between longer ED LOS and patients who DNW, however in this current study this trend only appears to be the case for shift of arrival and triage category. Patients triaged category four had both the highest percentage of DNW and waited the longest (147 min) before they DNW, followed by category three (142 min) then five (132 min) and two (106 min); there were no category one patients who DNW. The other trend in ED LOS was shift of arrival which appeared to be the longest in the afternoon (161 min) and shortest (94 min) in the mornings, which also mirrors the times of highest and lowest percentages of patients who DNW. So it would seem that despite waiting to be seen for the longest amount of time in the afternoons more patients still eventually decided to not wait. These findings suggest that in this study site ED patients were more tolerant of waiting overnight by almost an hour longer than

they were during the day shift. This curious result may also suggest that times recorded during day shifts may possibly be more accurate as the staffing ratios are better and patients who did not wait are noticed sooner.

The Australian Government's National Health Reform Agreement included the recent introduction of activity based funding and changes to hospital financial incentives. Rather than historically based negotiated budgets, individual patients are the source of revenue in an attempt to motivate better understanding and accountability of costs, examination of inputs used in episodes of care and identification of innovative, cost efficient models of care.³⁷ The evaluation of additional presumed un-costed interventions (i.e. radiology and pathology) received by patients prior to medical assessment who subsequently DNW totalled almost \$6500 and included pathology and radiology costs of more than \$2000. Additionally, a number of patients in the dataset were noted to be coded as DNW yet had a time to medical officer recorded, indicating they may have, in fact, been reviewed. This seemingly simple error may have considerable economic implications as costs are based on patient discharge disposition.

Limitations

This single site descriptive study's results cannot be extrapolated to other sites. Results regarding re-presentation and hospital admission are likely to be underestimated as we did not account for attendance to other hospitals or health care facilities (such as GP, pharmacy, or dental hospital) as this was beyond the scope of our study. Also beyond the study scope was the examination of morbidity and mortality outcomes of patients who DNW. These aspects are recommended for future research. Causal or associative inferences cannot be drawn about the relationship between patients who DNW and factors analysed.

Conclusions

The main purpose of this study was to investigate characteristics of the institution and attending patients, to develop a demographic and clinical profile of those who DNW for medical assessment at a large public, tertiary referral ED in SEQ. Results from this study revealed some findings consistent with those reported in Australian and international literature whilst others were contradictory which may be a consequence of differing study populations and health-care environments. Similar to other studies, this study found patients who DNW tended to be younger, assigned less urgent triage categories and present to the ED in higher proportions by private transport, and during evenings and overnight.

Wait times remain the crux of the DNW debate and interestingly this study found variability in the trend between wait times and patients who DNW, indicating this may not necessarily be the principal influencing factor as previously assumed. Rather, as suggested by Handel et al.³⁸ it may be a consequence of the unknown or perception of an infinite wait. Further investigation into this may explain incongruencies and provide a guide for effective intervention strategies. Firstly though, an important next step would be to profile DNW patient and hospital characteristics across

the state of Queensland to understand how they compare and differ. In addition to this, an understanding of subsequent morbidity and mortality associated with patients who do not wait is crucial to guide prioritisation of this cohort within the emergency research agenda.

Author contributions

NM, MM, JC, MC conceived and designed the study. NM, MM, JC, MC developed the study protocol. NM, MM, JC, MC supervised data collection. NM, MM, JC, MC analysed the data. NM, MM, JC, MC prepared and approved the manuscript.

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Provenance and conflict of interest

None of the authors are associated with provenance or conflicts of interests in regards to the manuscript. This paper was not commissioned.

References

1. Australian Institute of Health and Welfare. *Australian hospital statistics 2010–11: emergency department care and elective surgery waiting times*. Canberra: AIHW; 2011. Health services series no. 41. Cat. no. HSE 115.
2. Booz Allen, Hamilton. *Key drivers of demand in the emergency department: a hypothesis driven approach to analyse demand and supply*. North Sydney: NSW Department of Health; 2007.
3. Lee KM, Wong TW, Chan R, Lau CC. A study of patients who leave without notice in an A&E department. *Acc Emerg Nurs* 1998;6(2):118–21.
4. Bindman AB, Grumbach K, Keane D, Rauch L, Luce JM. Consequences of queuing for care at a public hospital Emergency Department. *J Am Med Assoc* 1991;266(8):1091–6.
5. Hall J, Jelinek G. Characteristics and outcomes of patients who did not wait after attending Perth public hospital Emergency Departments, 2000–2003. *Med J Aust* 2007;187(11/12):626–9.
6. Tropea J, Sundararajan V, Gorelik A, Kennedy M, Cameron P, Brand C. Patients who leave without being seen in Emergency Departments: an analysis of predictive factors and outcomes. *Acad Emerg Med* 2012;19(4):439–47.
7. Gilligan P, Joseph D, Winder S, Keefe FO, Oladipo O, Ayodele T, et al. DNW—did not wait or demographic needing work: a study of the profile of patients who did not wait to be seen in an Irish Emergency Department. *Emerg Med J* 2009;26(11):780–2.
8. Goodacre S, Webster A. Who waits longest in the Emergency Department and who leaves without being seen? *Emerg Med J* 2005;22(2):93–6.
9. Ding R, McCarthy ML, Li G, Kirsch TD, Jung JJ, Kelen GD. Patients who leave without being seen: their characteristics and history of emergency department use. *Ann Emerg Med* 2006;48(6):686–93.
10. Pham JC, Ho GK, Hill PM, McCarthy ML, Pronovost PJ. National study of patient, visit, and hospital characteristics associated with leaving an Emergency Department without being seen: predicting LWBS. *Acad Emerg Med* 2009;16(10):949–55.

11. Sun BC, Binstadt ES, Pelletier A, Camargo CA. Characteristics and temporal trends of left before being seen visits in US Emergency Departments, 1995–2002. *J Emerg Med* 2007;**32**(2):211–5.
12. Mohsin M, Young L, Ieraci S, Bauman AE. Factors associated with walkout of patients from New South Wales hospital Emergency Departments, Australia. *Emerg Med Austral* 2005;**17**(5/6):434–42.
13. Wright L. They just don't like to wait—a comparative study of Aboriginal and non-Aboriginal people who did not wait for treatment, or discharged themselves against medical advice from rural Emergency Departments: part 2. *Austral Emerg Nurs J* 2009;**12**(3):93–103.
14. Asaro PV, Lewis LM, Boxerman SB. Emergency Department overcrowding: analysis of the factors of renege rate. *Acad Emerg Med* 2007;**14**(2):157–62.
15. Bambi S, Scarlini D, Becattini G, Alocci P, Ruggeri M. Characteristics of patients who leave the ED triage area without being seen by a doctor: a descriptive study in an urban level II Italian University Hospital. *J Emerg Nurs* 2011;**37**(4):334–40.
16. Bourgeois FT, Shannon MW, Stack AM. Left without being seen: a national profile of children who leave the Emergency Department before evaluation. *Ann Emerg Med* 2008;**52**(6):599–605.
17. Browne GJ, McCaskill ME, Giles H, Lam LT, Fasher BJ, Exley B. Paediatric walk-out patients: characteristics and outcomes. *J Paediatr Child Health* 2001;**37**(3):235–9.
18. Guttmann A, Schull MJ, Vermeulen MJ, Stukel TA. Association between waiting times and short term mortality and hospital admission after departure from Emergency Department: population based cohort study from Ontario, Canada. *BMJ* 2011;**342**(7809):1250–7.
19. Mohsin M, Forero R, Ieraci S, Bauman AE, Young L, Santiano N. A population follow-up study of patients who left an Emergency Department without being seen by a medical officer. *Emerg Med J* 2007;**24**(3):175–9.
20. Rowe BH, Channan P, Bullard M, Blitz S, Saunders LD, Rosychuk RJ, et al. Characteristics of patients who leave Emergency Departments without being seen. *Acad Emerg Med* 2006;**13**(8):848–52.
21. Hobbs D, Kunzman SC, Tandberg D, Sklar D. Hospital factors associated with emergency center patients leaving without being seen. *Am J Emerg Med* 2000;**18**(7):767–72.
22. Australian Bureau of Statistics. 3218.0—regional population growth, Australia, 2011. Canberra: ABS; 2012.
23. Queensland Health The health of Queenslanders 2010. *Third report of the Chief Health Officer Queensland*. Brisbane: Queensland Health; 2010.
24. McCrow C. Clinical analysis of coded data and the effect on quality of care. *HIM-Interchange* 2011;**1**(1):10–6.
25. Australian Bureau of Statistics. 2039. 0—Information Paper: An Introduction to Socio-Economic Indexes for Areas (SEIFA). Canberra: ABS; 2006.
26. Australasian College for Emergency Medicine. *Policy on the Australasian Triage Scale*. Melbourne: ACEM; 2006.
27. Fry M, Thompson J, Chan A. Patients regularly leave Emergency Departments before medical assessment: a study of did not wait patients, medical profile and outcome characteristics. *Austral Emerg Nurs J* 2003;**6**(2):21–6.
28. Ibanez G, Guerin L, Simon N. Which improvements could prevent the departure of the left-without-being-seen patients? *Emerg Med J* 2011;**28**(11):945–7.
29. Marinovich A, Afilalo J, Colacone A, Unger B, Giguere C, Leger R, et al. Impact of ambulance transportation on resource use in the emergency department. *Acad Emerg Med* 2004;**11**(3):312–5.
30. Australian Institute of Health and Welfare. *Australian hospital statistics 2010–11*. Canberra: AIHW; 2012. Health Services Series no.43. Cat. no. HSE 117.
31. Australian Institute of Health and Welfare. *Young Australians: their health and wellbeing 2011*. Canberra: AIHW; 2011. Cat. no. PHE 140.
32. Ragin DF, Hwang U, Cydulka RK, Holson D, Haley LL, Richards Jr CF, et al. Reasons for using the Emergency Department: results of the EMPATH Study. *Acad Emerg Med* 2005;**12**(12):1158–66.
33. Ng Y, Lewena S. Leaving the paediatric Emergency Department without being seen: understanding the patient and the risks. *J Paediatr Child Health* 2012;**48**(1):10–5.
34. Australian Bureau of Statistics. 4102.0—Australian Social Trends, Mar 2011. *Health services: use and patient experience*. Canberra: ABS; 2011. Available at <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4102.0Main+Features20Mar+2011>.
35. Arendt KW, Sadosty AT, Weaver AL, Brent CR, Boie ET. The left-without-being-seen patients: What would keep them from leaving? *Ann Emerg Med* 2003;**42**(3):317–23.
36. Cross KP, Cammack VH, Calhoun AW, Gracely EJ, Kim IK, Stevenson MD, et al. Premature departure from the pediatric Emergency Department: a cohort analysis of process- and patient-related factors. *Pediatr Emerg Care* 2010;**26**(5):349–56.
37. Health Policy Solutions. *Activity based funding for Australian public hospitals: towards a pricing framework..* Melbourne: Health Policy Solutions; 2011.
38. Handel DA, Fu R, Daya M, York J, Larson E, John McConnell K. The use of scripting at triage and its impact on elopements. *Acad Emerg Med* 2010;**17**(5):495–500.