Characteristics and outcomes of patients who "did not wait" after attending Perth public hospital emergency departments, 2000–2003

Jacqui Hall and George A Jelinek

ABSTRACT

Objective: To determine characteristics and outcomes of patients who did not wait to see a doctor in emergency departments (EDs).

Design and setting: Population-based outcome study using probabilistically linked ED and Western Australian death records, with ED records from all seven Perth public hospitals that have EDs from 1 July 2000 to 30 June 2003.

Main outcome measures: Rates of "did not wait" (DNW) presentations, overall and for individual hospitals; characteristics of DNW patients; mortality rates among DNW patients at 2, 7 and 30 days.

Results: DNW rates varied from 2.6% to 6.3% (average, 4.1%) and were generally lower in tertiary teaching hospitals. DNW patients had conditions of lower urgency, predominantly Australasian Triage Scale category 4 (67.1%) and 5 (23.4%). The DNW rates in these categories were 5.8% and 10.6%, respectively ($P < 0.001$). Patients referred by health care providers had lower DNW rates (0.5%; $P < 0.001$). DNW patients were more frequently male (4.4% v 3.8%; $P < 0.001$), and young to middle-aged adults (15–44 years; 5.8%; $P < 0.001$). Patients with a higher than average DNW rate were more likely to arrive by private transport (5.0%; $P < 0.001$) or with police (5.8%; $P < 0.001$), re-present for review (8.6%; $P < 0.001$) or have social or behavioural problems (7.7%; $P < 0.001$). Most patients (91.9%) did not wait on only one occasion. The 30-day mortality rate among DNW patients was significantly lower than for patients seen by a doctor and discharged (0.14 v 0.20%; $P = 0.026$), and for all patients seen in the ED (1.28%; $P < 0.001$).

Conclusions: Patients who did not wait for medical assessment in Perth EDs had conditions of lower acuity and had lower mortality rates than those who waited for assessment.

MJA 2007; 187: 626–629

In Australasia, the term "did not wait" (DNW) or equivalent is used to describe patients who leave before medical assessment. These patients have been triaged and may or may not have had initial nursing assessments and observations. DNW patients represent an important subset of the emergency department (ED) patient population. Demographic and clinical characteristics of this group of patients have been reported in previous studies, but there have been problems reporting their outcomes.

Because follow-up data are usually unavailable for these patients, there is the potential for unrecognised poor outcomes from lack of treatment. Limited outcome data for DNW patients suggest that they do not have worse outcomes than other ED patients. However, most published studies report small numbers of patients and use retrospective questionnaire-type data collection methods based within one hospital population. There is considerable selection bias because of high rates of non-responders, and data may be missed if patients subsequently present to different hospitals. A study of 419 DNW patients reported that 61% were seen by a doctor within 7 days of the visit, and that only 1.7% were hospitalised.[1] Another study found that 61% of DNW patients did not require any treatment after leaving.[2] A recent study reported that 12.7% of DNW patients revisited EDs within 7 days of departure, and that 5% were admitted.[3]

Perth is the most isolated capital city in Australia, and has a unique single medical record identifier for all patients attending hospitals. It therefore offers an opportunity to follow up mortality outcomes for DNW patients. We linked computerised data on ED attendances from Perth public hospital EDs to the Western Australian Mortality Database to determine mortality for these patients. Any deaths in Western Australia among patients who attended an ED at a Perth hospital were unlikely to be missed.

METHODS

The primary data for this study were collected using Emergency Department Information Systems (EDIS, version 10.0; Health Administration Solutions, Sydney, NSW). This is a real-time patient-tracking system that records computerised data from each of the seven metropolitan public hospital EDs in Perth (four teaching and three non-teaching hospitals). EDIS is widely used throughout Australasian EDs, and enables hospital staff to track a patient through the processes of the ED. The EDIS database contains extensive information pertaining to emergency presentations including patient demographics, arrival and discharge dates and times, presenting complaints, mode of arrival, Australasian Triage Scale (ATS) category, disposition and discharge diagnosis. The only two private hospital EDs in Perth were not included in the study as their ED data were not of sufficient quality at the time of the study.

Death records were obtained from the Western Australian Mortality Database, which contains all information detailed on death certificates issued by the Registrar General since 1969.

Data on the EDIS database from 1 July 2000 to 30 June 2003 were linked to the Mortality Database from 1 January 2000 to 31 March 2004 to ensure delayed entry of death was not missed. Two hospitals had incomplete information as they were the last to have data linked, with data available only from 22 May 2001, and 19 February 2002, to 30 June 2003.

Patients were recorded as DNW if they were assigned a triage category and registered by clerical staff, but did not wait for medical assessment. Descriptive data for DNW patients were extracted and compared with data for patients who did wait for medical assessment and were subsequently discharged, and with those for patients overall, including those admitted where applicable.

Data analysis

EDIS and the Mortality Database records were linked by the Western Australian Data Linkage Unit by probabilistic matching. This linkage has been described previously.[4] Data extraction and handling were performed with SPSS, version 12.0 (SPSS Inc, Chicago, Ill, USA). Univariate descriptive analyses were undertaken using Microsoft Excel (Microsoft, Redmond, Wash, USA), with χ^2 testing for significant differences between proportions with the level of significance set at 0.05. Cumulative mortality rates at 2, 7, and 30 days were calculated with reference to the last ED presentation of each patient in the dataset.

Ethical approval

Ethical and record-linkage approvals were obtained from the Human Research Ethics Committee at the University of Western Australia and the Confidentiality of Health Information Committee of Western Australia.

RESULTS

There were 24 988 patients accounting for 28 748 DNW presentations during the 3-year period. There were 368 442 patients who did wait for medical assessment, accounting for 673 025 ED visits; 447 043 (66.4%) of these presentations resulted in discharge after medical assessment. Overall, the DNW rate in metropolitan Perth was 4.1% of all presentations, ranging from 2.6% to 6.3% for the seven hospitals (Box 1A). With the exception of one tertiary hospital with a DNW rate of 6.1%, DNW rates were lower at inner-city tertiary referral hospitals than regional hospitals.

Demographic analysis (Box 1B) showed a higher than average DNW rate in the 15–44-years age group (5.8%; $P < 0.001$). Male patients were also more likely not to wait (4.4% v 3.8%; $P < 0.001$). Patients referred by other health care professionals were less likely not to wait (0.5%; $P < 0.001$). Patients arriving at EDs by private transport had a higher DNW rate (5.0%; $P < 0.001$), as did those arriving with police (5.8%; $P < 0.001$). Patients who arrived by ambulance had a lower DNW rate (1.4%; $P < 0.001$). Of note, two DNW patients had arrived with the Royal Flying Doctor Service, a rural air retrieval service.

Most DNW patients were in ATS categories 4 (67.1%) and 5 (23.4%). There was an inverse relationship between urgency of the need for treatment and DNW rate. The DNW rates in ATS categories 4 and 5 were 5.8% and 10.6%, respectively ($P < 0.001$; Box 1C). Only 156 patients did not have an ATS category recorded, of whom two did not wait.

The groups of patients with the highest DNW rates were those asked to return to the ED for review and those with social/behavioural problems (8.6% and 7.7%, respectively; $P < 0.001$). Other presentation groups likely not to wait, in decreasing order, were patients with the following complaints: ear, nose and throat/oral (6.3%); regional problems (in specific body parts such as the hand or foot; 5.8%); temperature/environmental (5.8%); paediatric (5.3%); alcohol and drug (4.9%); and eye (4.9%). Conversely, patients were more likely to wait if they presented with complaints that were more likely to be perceived as serious. We found low DNW rates in those with: cardiovascular (0.8%); haematology/oncology (1.3%); endocrine (1.3%); provisional diagnosis only (1.8%); and neurology (2.2%) disorders.

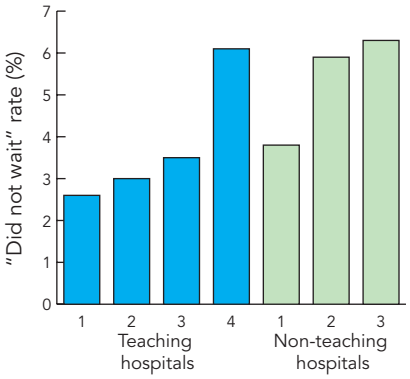
Of all DNW patients, 22 964 (91.9%) did not wait on only one occasion (Box 2). The 1483 patients (5.9%) who did not wait on two occasions accounted for most of the remaining DNW patients. There was one patient who did not wait on 75 separate occasions during the 3-year period studied.

The average overall DNW rate was 4.1%. When data were analysed by day and time, the average DNW rate ranged from 2.7% (Wednesday day shift) to 6.0% (Sunday evening shift). DNW rates were higher than average on all evening shifts (5.0%; $P < 0.001$) and also throughout the day on Sundays (4.9%; $P < 0.001$). Patients were least likely not to wait on weekday day shifts (3.2%; $P < 0.001$).

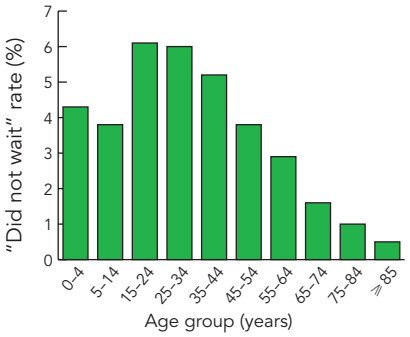
DNW patients had significantly lower mortality rates at 2, 7 and 30 days than patients who waited for medical assessment in the ED and were subsequently discharged, and than all patients presenting including those admitted. At 2 days, four DNW patients (0.01%) had died versus 123 (0.03%) of those seen and discharged and 2651 (0.39%) of those seen overall ($P = 0.001$). At 7 days, eight DNW patients (0.03%) had died, versus 294 (0.07%) of

1 "Did not wait" rate by hospital, patient age and triage category

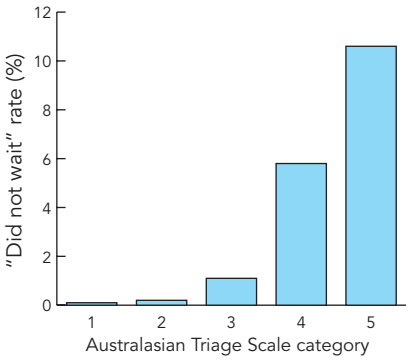
A: Rate by hospital



B: Rate by patient age group



C: Rate by triage category



2 Distribution of "did not wait" (DNW) presentations per patient

No. of DNW presentations	No. of patients
1	22 964 (91.9%)
2	1 483 (5.9%)
3	270 (1.0%)
4	105 (0.4%)
5	50 (0.2%)
6–10	71 (0.3%)
11–20	32 (0.1%)
21–30	11 (0)
31–40	1 (0)
> 40	1 (0)

those seen and discharged and 4729 (0.70%) of patients overall ($P < 0.001$). At 30 days, 40 DNW patients (0.14%) had died, versus 914 (0.20%) of those seen and discharged and 8586 (1.28%) overall ($P < 0.001$). Of the 40 DNW patients who died by 30 days, 29 (72%) were in ATS category 4, one was in category 1 and one in category 2. There were no statistically significant differences in mortality rates between DNW patients in different presentation groups.

DISCUSSION

There is significant variability in DNW rates across hospitals and countries. Previously published rates for EDs in south-western Sydney are 4.9%,[5] 5.7%[6] and 8.6%.[3] International rates range from 0.8% to 8.2%,[1,2,7-13] with an average of 4.0%. Higher DNW rates have been reported by major teaching hospitals[6,13] and in public versus private hospitals.[13] This raises concerns that patients with lesser means to find alternative health care are more likely not to wait.

Patients who did not wait for medical assessment in Perth EDs did so at lower rates than those reported in other major Australian studies from south-western Sydney. Three of the four tertiary teaching hospitals in our study had DNW rates of 3.5% or lower. One tertiary hospital had a rate of 6.1%. The reported New South Wales rates were more typical of the smaller Perth regional hospital EDs, which had DNW rates of 3.8%, 5.9% and 6.3%. This study is the first to report DNW rates that are lower in inner-city tertiary hospitals than in smaller metropolitan non-teaching hospitals. Our rate is also lower than the rate of 6.7% found in a small 4-month study at a single Victorian tertiary hospital ED.[14]

Not waiting for assessment is an episodic phenomenon for most patients, rather than a pattern of attendance. Over 90% of patients who did not wait did so only once during the 3-year study period. The strong association with evening shifts and Sundays supports the suggestion that not waiting is related to times when EDs are busiest and waiting times are at their peak, as well as when general practitioners' services are least available.

Characteristics of DNW patients previously identified in the published research include being a young male,[5,6,11,12,14] not being married,[2,9] having lower socioeconomic [5,6,9,15] and educational[15] status, with English not the primary language,[6] and not having private health insurance.[6,15] Of particular note and interest within Australia are Aboriginals, who are 37% more likely not to wait than other Australians.[6]

One study found that 73.3% of DNW patients reported that they were suffering from a psychosocial stressor at the time of presentation,[8] and another reported a propensity for alcohol–drug presentations and psychiatric presentations.[15] The most consistent finding in the literature on DNW presentations was the presence of long waiting times,[1,5-14,16] although there are methodological difficulties with reporting waiting times in this group of patients because the time the patient actually leaves is usually not recorded. There were other studies that reported an increase in the DNW rate during the night shift.[6,14,17] Furthermore, research suggests that DNW patients present with problems of lower acuity,[6,12,14,15] and have a shorter onset of presenting symptoms.[2,11]

Our findings confirm those from NSW that there is a preponderance of young adults and males in the DNW cohort. That the DNW rate was lower in patients referred from other health care services and higher in those arriving by private transport might be expected. However, the high rate in patients arriving under police escort (5.8%) raises concern as to whether these patients were competent at the time of the DNW episode. Most DNW patients were in ATS categories 4 and 5, and there was an inverse relationship between urgency and the DNW rate.

DNW patients were roughly twice as likely to have presented for review or with social/behavioural problems. The high rate in the social/behavioural problem group raises concerns because of the potential ramifications of not assessing people with serious underlying psychiatric illness and issues of competence when deciding not to wait for medical assessment. This suggests the need for targeting interventions towards this group of patients while waiting, such as expediting an interview by psychiatry liaison nurses, as now happens in some of the study hospitals.

The 30-day mortality rate for DNW patients of 0.14% compared favourably with that of 0.20% for all discharged patients. No reliable data have been previously published on mortality among patients who do not wait for medical assessment at EDs. This is because patients are often lost to follow-up after such attendances, may attend other hospitals, or leave the area. Our study is unique because there is little chance of such leakage. It confirms that these patients have low-acuity conditions and have significantly lower mortality than patients who wait for assessment and are discharged.

Our study has some limitations. We elected not to analyse waiting times despite these having been previously published and related to DNW rates. This was because of our experience that the times entered for how long a patient waits before leaving are highly unreliable. Typically, the triage nurse will notice that a patient is no longer waiting when a patient does not respond to being called, or will catch up at the end of the nursing shift, and input that time as the DNW time. This tends to inflate waiting times.

We did not include socioeconomic or educational background in our analysis as this information is not entered routinely in EDIS. Previous studies have used postcodes for this purpose, but we felt that this may be misleading in the Perth metropolitan region, as there is significant variation in socioeconomic and educational level within postcodes.

Clinical presentation characteristics are subjective, relying on triage nurses' initial diagnosis and assessment, and on the code options available. It was noted that some patients did not have a triage category recorded, and we recognise that discharge and triage diagnoses do not always concur.

Our study used mortality data to assess outcomes. Mortality is an infrequent outcome in ED patients, and other outcome measures may be more meaningful in determining the effects of not waiting for medical care. A vertical linkage could be done using the same database we used in this study to find rates of re-presentation to EDs or to outpatient clinics. This would provide further estimation of consequences of not waiting for medical assessment. Long-term health impact also requires study. Such parameters were outside the scope of this study.

Our study has significant strengths. The characteristics of DNW patients that we found in this study are highly reliable because of the large number of patients analysed, and the fact that the data were gathered from all public hospitals in Perth. EDIS records details of every presentation to EDs in metropolitan Perth in a consistent manner, so it is unlikely that any patients have been omitted from the study. Further, Perth's geographical isolation means that it is unlikely that many patient deaths were missed during the study period. It is unlikely that any other Australian region

could have provided such reliable linked data on outcomes.

DNW is an episodic phenomenon that occurs across all patient ages and problem categories, with a preponderance on Sundays and evening shifts. Although urgency and mortality overall were lower for DNW patients, there were groups of DNW patients of particular concern. Our findings suggest the need for competency assessment and documentation at the triage stage for any patient presenting with intoxication, a psychiatric condition or with police. Strategies should be considered to expedite formal assessment by a senior medical staff member for these patients. More research is needed to quantify re-presentation rates, subsequent resource consumption and longer-term outcomes of DNW patients to enable goal-directed interventions.

ACKNOWLEDGEMENTS

We acknowledge and appreciate the assistance of Nick Gibson in linking and extracting the data, and Associate Professor Peter Sprivulis, Dr Sandra Neate and Dr Tracey Weiland for comments on the manuscript. This study was presented at the Annual Scientific Meeting of the Australasian College for Emergency Medicine (South Australian Faculty) in May 2006.

COMPETING INTERESTS

None identified.

AUTHOR DETAILS

Jacqui Hall, MB ChB, FACEM, Formerly Registrar in Emergency Medicine[1]
George A Jelinek, MD, FACEM, DipDHM, Professor of Emergency Medicine[1,2]
1 Sir Charles Gairdner Hospital, Perth, WA.
2 Discipline of Emergency Medicine, University of Western Australia, Perth, WA.
Correspondence:
George.Jelinek@health.wa.gov.au

REFERENCES

1 Dos Santos LM, Stewart G, Rosenberg NM. Pediatric emergency department walk-outs. *Pediatr Emerg Care* 1994; 10: 76-78.
2 Gibson G, Maiman LA, Chase AM. Walk-out patients in the hospital emergency department. *JACEP* 1978; 7: 47-50.
3 Mohsin M, Forero R, Ieraci S, et al. A population follow-up study of patients who left an emergency department without being seen by a medical officer. *Emerg Med J* 2007; 24: 175-179.
4 Sprivulis P, Da Silva J-A, Jacobs I, et al. ECHO: the Western Australian emergency care hospitalisation and Outcome linked data project. *Aust N Z J Public Health* 2006; 30: 123-127.
5 Mohsin M, Bauman A, Ieraci S. Is there equity in emergency medical care? Waiting times and walkouts in South Western Sydney hospital emergency departments. *Aust Health Rev* 1998; 21: 133-149.
6 Mohsin M, Young L, Ieraci S, Bauman AE. Factors associated with walkouts of patients from New South Wales hospital emergency departments, Australia. *Emerg Med Australas* 2005; 176: 434-442.
7 Arendt KW, Sadosty AT, Weaver AL, et al. The left-without-being-seen patients: what would keep them from leaving? *Ann Emerg Med* 2003; 42: 317-323.
8 Fernandes CM, Daya MR, Barry S, Palmer N. Emergency department patients who leave without being seen by a physician: the Toronto hospital experience. *Ann Emerg Med* 1994; 24: 1092-1096.
9 Weissberg MP, Heitner M, Lowenstein SR, Keefer G. Patients who leave without being seen. *Ann Emerg Med* 1986; 15: 813-817.
10 Goldman RD, Macpherson A, Schuh S, et al. Patients who leave the paediatric emergency department without being seen: a case–control study. *CMAJ* 2005; 172: 39-43.
11 Khanna R, Chaudry MA, Prescott M. Emergency department patients who leave the department without being seen by a doctor. *Eur J Emerg Med* 1999; 6: 233-235.
12 Goodacre S, Webster A. Who waits longest in the emergency department and who leaves without being seen? *Emerg Med J* 2005; 22: 93-96.
13 Stock LM, Bradley GE, Lewis RJ, et al. Patients who leave emergency departments without being seen by a physician: magnitude of the problem in Los Angeles County. *Ann Emerg Med* 1994; 23: 294-298.
14 Lee G, Endacott R, Flett K, Bushnell R. Characteristics of patients who did not wait for treatment in an emergency department: a follow-up study. *Accid Emerg Nurs* 2006; 14: 56-62.
15 Wartman SA, Taggart MP, Palm E. Emergency room leavers: a demographic and interview profile. *J Community Health* 1984; 9: 261-268.
16 McNamara KJ. Patients leaving the ED without being seen by a physician: is same-day follow-up indicated? *Am J Emerg Med* 1995; 13: 136-141.
17 Bindman AB, Grumbach K, Keane D, et al. Consequences of queuing for care at a public hospital emergency department. *JAMA* 1991; 266: 1091-1096.

(Received 21 Sep 2007, accepted 7 Nov 2007) ❑