Technical Supplement:

Measures of emergency department performance and activity

Hospital Quarterly: April to June 2010

Bureau of Health Information

Summary

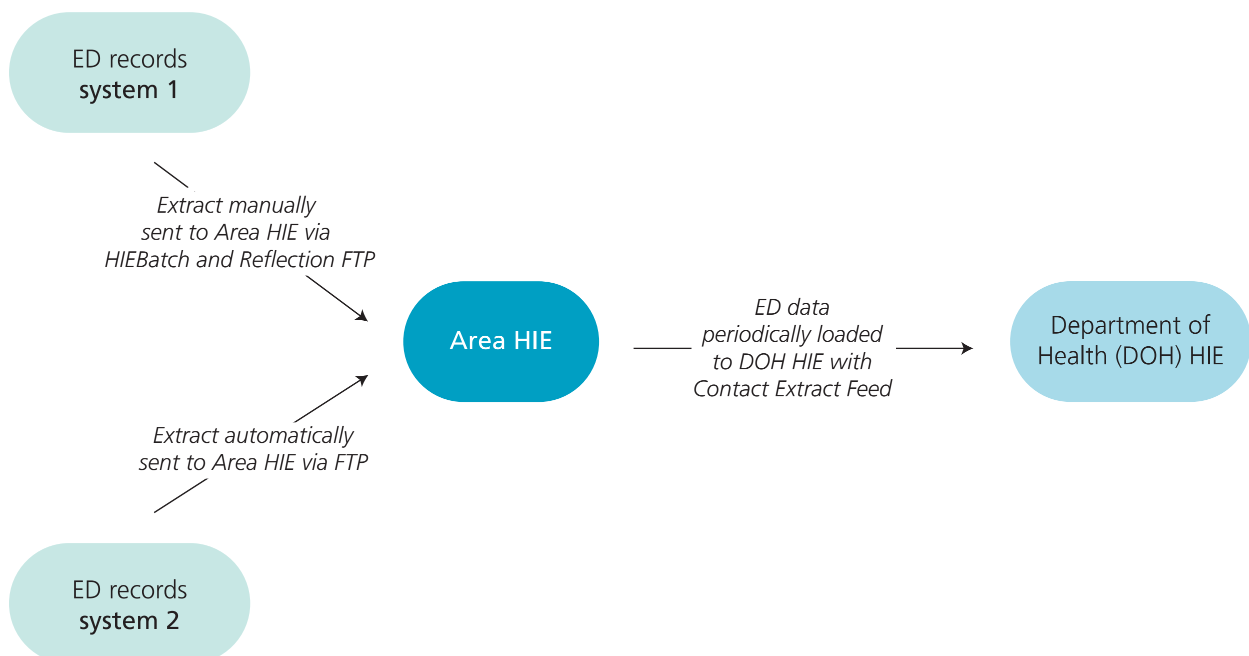
This supplement to the Bureau of Health Information's recurrent public hospital performance reports describes the methods and technical terms used to compute descriptive statistics and performance indicators reported in *Hospital Quarterly*. Due to the technical nature of this narrative, it is intended for audiences interested in the creation of health information.

Emergency department attendance data is extracted from a centralised data warehouse administered by the NSW Department of Health called the Health Information Exchange (HIE). Public hospitals with emergency departments upload records of emergency department presentations to this data warehouse regularly, via centralised area health service information systems (Figure 1). Public hospitals in the greater metropolitan area submit emergency department records on a weekly basis while most other hospitals submit records monthly.

NSW Health* requires that data quality checks are conducted at local, area and state levels. Emergency department performance and activity measures rely on patient-level information. The performance measures in this report are based on 85 hospital emergency departments which currently have computerised information systems which contain patient-level information for two or more years. From April to June 2010, these 85 emergency departments accounted for 83 per cent of all emergency department attendances in NSW.

A staggered rollout of a new electronic information system in NSW public hospital emergency departments has affected completeness of data extracts from the source systems, starting from the first quarter of 2007. The records uploaded may be unrepresentative of the true performance and activity in the hospitals implementing the new system, due to the length of time staff need to learn to use it.

Figure 1: Populating HIE emergency department data from hospital emergency department record systems



* New South Wales Health. *Emergency Department Collection (EDC) – Reporting requirements* [Internet] [cited 2010 Aug 19]. Available from www.health.nsw.gov.au/policies/PD/2005/pdf/PD2005_198.pdf

In *Hospital Quarterly,* records from such hospitals have been excluded from the calculation of state level, hospital peer group level and area health service level performance statistics. The calculation of counts at both the state and at area health service level include records from all hospital emergency departments with electronic information systems. At a facility level, only the fields of all attendances and off stretcher time performance are presented for hospitals undergoing a system update in the current quarter. For the quarter following implementation a cautionary note is displayed next to potentially affected results.

Prior to June 2010, the NSW Department of Health reported on the performance of NSW public hospital emergency departments with a selection of performance indicators. The Bureau is now tasked with reporting these indicators for NSW public hospitals, which include:

- All attendances
- Emergency admissions
- Triage performance (for each triage category)
- Emergency admission performance
- Off stretcher time.

The Bureau has expanded the scope of the emergency care performance indicators. A descriptive analysis of emergency attendances by triage category is included as a special feature of *Hospital Quarterly: April to June 2010.*

Emergency attendances are a subset of all attendances and include those with visit types classified as emergency, re-presentation for a continuing condition or pre-arranged admission for a medical reason. Emergency attendances comprise the bulk of all attendances to NSW public hospital emergency departments. The Bureau's *Hospital Quarterly* reports information about:

- How long patients wait to receive treatment after being triaged
- How long those patients who were admitted waited in the emergency department, starting from the beginning of treatment and ending with arrival on a ward, at an operating suite or at a critical care area
- How long non-admitted patients spent in the emergency department (from the start of treatment) before being discharged or transferred to another hospital
- How patients conclude their emergency department journey before, during or after completing treatment.

The Bureau of Health Information used SAS* V9.1.3™ for the statistical analysis of data for the *Hospital Quarterly: April to June 2010*.

A data quality assessment of information systems in NSW emergency departments is available at www.bhi.nsw.gov.au

* SAS Institute. *The SAS System for Windows version 9.1.3.* Cary (NC): SAS Institute; 2005.

Activity and performance indicators

Numbers in brackets in the following definitions indicate the HIE database field code used to identify records by emergency department visit type or mode of separation (as appropriate).

This section contains details about the definitions used for the calculations of measures of emergency department activity and performance reported in the *Hospital Quarterly: April to June 2010.*

Attendances / all attendances

All attendances is a count of all records in the emergency department visit database of the HIE. This count includes all records of attendances regardless of emergency department visit type and includes planned return visits, pre-arranged admissions, outpatient clinic visits, private referrals, persons pronounced dead on arrival and patients in transit in addition to emergency presentations. Records are not excluded based on missing or invalid fields.

Admissions from the emergency department

Admissions from the emergency department is a count of all records in the emergency department visit database of the HIE with a mode of separation recorded as admitted to a ward (1), admitted to a critical care ward (10), or admitted via an operating theatre (11). No records are excluded on the basis of any other fields with missing or invalid data.

Emergency attendances by triage category

Emergency attendances are the count of all records from the emergency department visit database of the HIE with an emergency department visit type of emergency (1), re-presentation for a continuing condition (3) or pre-arranged medical admission (8). Emergency attendances in the *Hospital Quarterly: April to June 2010* are reported by triage category. Records with missing or invalid information for emergency department visit type or triage category are excluded from this count.

Triage to treatment performance indicator

Triage performance is computed as the percentage of patients in a triage category that were treated within the recommended waiting time for that triage category. The denominator is defined as all emergency attendances in a triage category. The numerator is the number of emergency attendances in a triage category with a waiting time less than or equal to the recommended waiting time for that triage category. Records with missing or invalid information for triage category, triage time, or treatment time fields are excluded from both the numerator and denominator.

Emergency admission performance

Emergency Admission Performance (EAP) is computed as the percentage of all emergency attendances who were admitted to hospital within eight hours. The denominator is the count of all records that were an emergency admission. The numerator is a count of emergency admission records with a difference between treatment time and actual departure time of less than or equal to eight hours. Records with missing or invalid information in triage category, mode of separation, treatment time or actual departure time are excluded from both the numerator and denominator. The target for NSW is 80% of patients admitted within eight hours.

Off stretcher time performance indicator

Off Stretcher Time (OST) is the time in minutes between the time of arrival of an emergency patient by ambulance and the time they are transferred to the care of the emergency department. The denominator is all off stretcher cases, which include all emergency and priority medical patients transported by ambulance and delivered to an emergency department. The numerator is all off stretcher cases transferred to the care of an emergency department within 30 minutes of arrival. The target for NSW is 90 per cent of patients arriving by ambulance to be transferred within 30 minutes.

Emergency attendances by triage category and mode of separation

Counts of emergency department attendances are reported by triage category for three cohorts, defined by how they leave the emergency department. The reported total count is the sum of these three cohorts (listed below). The reported percentages are the count of records in a cohort in a triage category divided by the total count for that cohort. Records with missing information for triage category or mode of separation are excluded for all cohorts.

- The **treated and admitted to hospital cohort** includes emergency department records with a mode of separation of admission to acute inpatient ward (1), a critical care unit (10) or an operating theatre (11)
- The **treated and discharged or transferred cohort** includes emergency attendances with modes of separation of departed with treatment complete (4), admitted and discharged as inpatient within emergency department (2), treated then transferred to another hospital without admission (5) and treated and transferred for admission at another facility (12)
- Patients who **left without, or before completing treatment** (cohort 3) include attendances with modes of separation of departed, did not wait (6) and departed, left at their own risk (7). Attendances that ‘did not wait’ were triaged but left the emergency department before treatment was commenced. Attendances that ‘left at their own risk’ were triaged and treatment was begun by a clinician, but the patient left prior to completion of their treatment.

Cumulative distribution: time from triage to treatment

This graph presents the percentage of patients who received treatment by time and triage category. It shows a cumulative distribution of triaged emergency attendances by the number of minutes that elapse between triage time and the start of treatment by a nurse or clinician. The cumulative percentage is computed by taking the number of patients treated by each minute since triage to a triage category and dividing by the total number of patients triaged into that triage category. This cohort only includes patients who had a recorded triage category, triage time and treatment time.

A cumulative distribution that does not reach 100 per cent by 180 minutes indicates that there were some patients in a triage category that waited longer than 180 minutes for treatment.

Cumulative distribution: time from treatment to admission

This graph presents the percentage of patients who were treated and admitted by time and triage category. It shows a cumulative distribution of emergency admissions by the number of hours that elapse between the start of treatment by a clinician and actual departure time. The cumulative percentage is computed by taking the number of patients admitted from a triage category in six minute intervals of time elapsed since treatment began and dividing by the total number of patients admitted from that triage category. This cohort only includes patients who had a recorded triage category, treatment time and actual departure time.

A cumulative distribution that does not reach 100 per cent by 12 hours indicates that there were some patients in a triage category that waited longer than 12 hours to be admitted.

Cumulative distribution: time from treatment to discharge or transfer

This graph presents the percentage of patients who were treated and discharged or treated and transferred by time and triage category. It shows a cumulative distribution of non-admitted emergency attendances with completed treatment by the number of hours that elapse between the start of treatment by a clinician and actual departure time. The cumulative percentage is computed by taking the number of patients admitted from a triage category in six minute intervals of time elapsed since treatment began and dividing by the total number of patients admitted from that triage category. This cohort only includes patients who had a recorded triage category, treatment time and actual departure time.

A cumulative distribution that does not reach 100 per cent by 12 hours indicates that some patients in a triage category waited longer than 12 hours for their treatment to be completed and to leave the emergency department.

Glossary

Actual departure time – actual departure time for an admitted patient is the time the patient is transferred to a ward, operating theatre/suite or intensive care unit in that hospital. Actual departure time for a non-admitted patient or a patient transferred to another hospital is the time at which the assessment and initial treatment of the patient is recorded as having been completed.

Admission(s) – refers to the process, using registration procedures, under which a person is accepted by a hospital or an area or district health service facility as an inpatient. In the context of admission from the emergency department, the person is transferred to a hospital ward, an intensive care unit or an operating theatre.

Admission from the Emergency department – an admission from the emergency department is identified by the mode of separation and is defined as admitted to a hospital ward (1), admitted to a critical care unit (10) or admitted to an operating theatre (11) in the same hospital as the emergency department the patient visited for care.

Attendance – an 'attendance' is the presentation of a patient to the emergency department and is the earliest occasion of the patient being registered clerically or being triaged. An 'attendance' is also referred to as a 'visit' or 'presentation' at the emergency department.

Emergency Admission Performance (EAP) – in the context of care in emergency departments, this is a measure of the time from when the patient begins receiving treatment until the time they arrive on a ward, operating theatre/suite or intensive care unit in that hospital. The target for NSW is 80% admitted within eight hours.

Health Information Exchange (HIE) – better known by the abbreviation HIE, this is a store of health records and information. Data from the Area HIE are used to populate the Waiting List Collection On-line System (WLCOS), which provides the data for the Bureau's reports.

Mode of separation – the mode of separation is the status of the patient when they depart from the emergency department and, in some cases, the location to which patient is released. The thirteen possible modes of separation, as defined in HIE, are:

1. Admitted to ward / inpatient unit, not a critical care ward
2. Admitted and discharged as inpatient within emergency department
3. Admitted: died in emergency department
4. Departed: treatment completed
5. Departed: transferred to another hospital without first being admitted to hospital transferred from
6. Departed: did not wait
7. Departed: left at own risk
8. Dead on arrival
9. Departed: for other clinical service location
10. Admitted: to critical care ward or unit
11. Admitted: via operating suite
12. Admitted: transferred to another hospital
13. Admitted: left at own risk

Non-emergency attendance – these are non-emergency attendances to the emergency department. The two largest groups are planned returns to the emergency department for further treatment and private referral for treatment in the emergency department by a private medical officer.

Off Stretcher Time (OST) – the time between when a patient arrives at an emergency department by ambulance and when they are transferred into the care of the emergency department. In NSW the target for this is 90% of patients arriving by ambulance transferred within 30 minutes.

Pre-arranged admission – in the context of care in emergency departments, this is a planned visit to the emergency department that results in the patient being admitted to hospital and allocated a bed on a ward.

Start of treatment time – in the context of care in emergency departments, the recorded time of when treatment begins, i.e. typically when the patient was first seen by a healthcare professional after being triaged.

Triage – from the French verb *'trier'*, meaning *'to sort'*. Australian emergency departments classify, or triage, patients based on the urgency of their condition or how soon they need to receive care. Emergency departments use a five-point scale where '1' is most urgent and '5' is least urgent. Triage is usually carried out by a registered nurse when the patient arrives in the emergency department. Examples of conditions categorised in each triage group can be found at: www.wacebnm.curtin.edu.au/workshops/Triage.pdf

Triage categories – there are two main triage scales:

- The first Australian five-point triage scale originated at Ipswich Hospital, Queensland during the 1980s and was found to be "a valid and reliable measure of medical urgency". The Ipswich Triage Scale was the basis for the National Triage Scale (NTS) produced by the Australasian College for Emergency Medicine (ACEM) in 1993.

- The ACEM released a revised scale in 2001 (renamed as the Australasian Triage Scale) which was endorsed by the Commonwealth Department of Health and Aging in 2002 for use in all Australian emergency departments.

Triage level	National Triage Scale	Australasian Triage Scale	Recommended maximum waiting time (Target time)
Triage **1**	Resuscitation	Immediately life-threatening	2 minutes
Triage **2**	Emergency	Imminently life-threatening	10 minutes
Triage **3**	Urgent	Potentially life-threatening	30 minutes
Triage **4**	Semi-urgent	Potentially serious	60 minutes
Triage **5**	Non-Urgent	Less urgent	120 minutes

Triage time – this is the time recorded for when the patient is triaged.

Visit type – the reason the patient presents to an emergency department. The possible visit types, as defined in HIE, are:

1. Emergency presentation
2. Return visit - planned
3. Unplanned return visit for continuing condition
4. Outpatient clinic
5. Privately referred, non-admitted person
6. Pre-arranged admission: without emergency department workup
8. Pre-arranged admission: with emergency department workup
9. Person in transit
10. Dead on arrival
11. Disaster

About the Bureau

The Bureau of Health Information was established in 2009 as an independent, board-governed organisation established by the NSW Government to be the leading source of information on the performance of the public health system in NSW.

Our Mission

The Bureau provides the community, healthcare professionals and the NSW Parliament with timely, accurate and comparable information about the performance of the NSW public health system in ways that enhance the system's accountability and inform efforts to increase its beneficial impact on the health and well being of people in NSW.

The Bureau of Health Information is a statutory health corporation. The conclusions in this report are those of the Bureau of Health Information and no official endorsement by the NSW Minister for Health, the NSW Department of Health or any other NSW statutory health corporation is intended or should be inferred.

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