



# Technical Supplement

Measures of emergency department  
activity and performance

Hospital Quarterly: July to September 2011

# 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.

The emergency department (ED) component of the *Hospital Quarterly* report is based on analyses of emergency department attendance data extracted from a centralised data warehouse administered by the NSW Ministry of Health called the Health Information Exchange (HIE).

There are more than 180 EDs in NSW. The activity and performance measures reported in the *Hospital Quarterly* reports are currently based on 88 hospital EDs which have had computerised patient information systems in place for two or more years. These 88 EDs comprise the NSW totals reported in *Hospital Quarterly* and account for approximately 85% of all ED attendances in NSW.

Progressively, EDs are replacing historic information systems with more contemporary systems. During the changeover there may be an impact on the completeness and reliability of data input or extraction from local systems to the HIE and more than one quarter may be affected.

At a facility level during a changeover period, the only information from the HIE reported by the Bureau is for total attendances. For aggregated reporting (e.g. for NSW, LHDs, and peer groups), data from affected hospitals are included in total counts but are excluded from calculation of all other performance measures. Data received from the NSW Ambulance Service are not affected and are reported as usual.

The Bureau provides individual performance profiles for 66 of the 88 EDs that have had an electronic records system in place for two or more years. These 66 EDs are those in the principal referral, major acute and district peer group hospitals in NSW.

The Bureau has made a number of changes to the reported measures of ED activity and performance in the *Hospital Quarterly, July-September 2011*. Further information on the rationale for the changes can be found in the *Background Paper: Approaches to reporting time measures of emergency department performance* at [www.bhi.nsw.gov.au](http://www.bhi.nsw.gov.au)

The Bureau will:

- Report times that patients spend in EDs starting from presentation time, which is defined as the earliest time recorded for the patient
- Report the time within which treatment begins for half of patients (50% or the median) and most patients (95%)
- Report the time within which admitted patients depart from the ED for half of patients (50% or the median) and most patients (95%)
- For triage 1 patients, continue to report the number of cases and the total time in ED, but not time to treatment.

The Bureau has modified the definition of the admission cohorts in *Hospital Quarterly* that are based on mode of separation to reflect whether a treated patient was admitted to the hospital from or within the ED, or departed the ED without being admitted and used the cohort consistently when reporting statistics about patients who were admitted. The definition is described in detail below, in the section 'Emergency attendances by triage category and mode of separation'.

# Activity and performance indicators

This section contains details about the definitions used for calculation of measures of ED activity and performance reported in the *Hospital Quarterly* reports.

In the following definitions, numbers in brackets indicate the HIE database field code used to identify records by ED visit type or mode of separation (as appropriate). Unless explicitly stated, records with incomplete information in the fields required for a calculation are excluded.

## Attendances / all attendances

All attendances is the count of every record in the ED visit database of the HIE. This count includes attendances of all ED visit types including emergency presentations, planned return visits, pre-arranged admissions, outpatient clinic visits, private referrals, persons pronounced dead on arrival and patients in transit. Records are assigned to quarters of the year using the arrival date field.

## Emergency attendances

Emergency attendances are records in the ED visit database of the HIE with an ED visit type of emergency (1) or an unplanned return visit for a continuing condition (3). Emergency attendances in the *Hospital Quarterly* reports are reported by triage category and records with missing or invalid information for triage category are excluded from reported counts of emergency attendances.

## Emergency attendances by triage category and mode of separation

Emergency attendances are reported by triage category for three cohorts, based on the mode of separation field: treated and admitted, treated and discharged or transferred, and left without or before completing treatment. The reported total count is the sum of these three cohorts. 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 cohorts are:

- The **'treated and admitted to hospital cohort'** comprises patients who have emergency attendances with modes of separation: admitted to a ward / inpatient unit (1), admitted and discharged as an inpatient within ED (2), admitted and died in ED (3), admitted to a critical care ward (10), admitted via an operating theatre (11) or admitted: left at own risk (13)
- The **'treated and discharged or transferred cohort'** comprises patients who have emergency attendances with modes of separation: departed with treatment complete (4), 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’ comprise those who have emergency attendances with modes of separation: departed, did not wait (6) and departed, left at their own risk (7). Patients who ‘did not wait’ were triaged but left the ED before treatment was commenced. Patients who ‘left at their own risk’ were triaged and treatment was begun by a clinician or nurse, but the patient left prior to completion of their treatment.

## All admissions from the emergency department

All admissions from the ED is a count of attendances in the ED visit database of the HIE with a mode of separation recorded that identifies the person as an admission. These patients may be recorded as admitted to a ward / inpatient unit (1), admitted and discharged as an inpatient within ED (2), admitted and died in ED (3), admitted to a critical care ward (10), admitted via an operating theatre (11) or admitted: left at own risk (13).

## All emergency admissions

All emergency admissions is the count of all emergency attendances that were an admission from the ED.

## Admitted patients used to calculate time to departure

‘Admitted patients used to calculate time to departure’ is the count of emergency admissions that excludes records with departure times that are not valid or more than 31 days after presentation time.

## Emergency attendances by quarter

The time series graphs in *Hospital Quarterly* present the number of emergency attendances to an ED during each quarter for the past 21 quarters.

## Presentation time

Presentation time is the earliest of the following fields in the emergency visit database of the HIE:

- Arrival time: the date and time on which the person presents for the service
- Triage time: the date and time on which the person is assessed by a triage nurse
- First seen by clinician time: the date and time on which the person is first seen by a medical officer and has a physical examination / treatment performed that is relevant to their presenting problem(s)
- First seen by nurse time: the date and time at which the person is first seen by a nurse and has an assessment / treatment performed that is relevant to their presenting problem(s)

If either ‘first seen by clinician time’ or ‘first seen by nurse time’ is more than 12 hours before the earlier of arrival and triage time, then that treatment time field is not considered for presentation time.

## Treatment time

Treatment time is the earliest of the following fields in the ED visit database of the HIE:

- First seen by clinician time: the date and time on which the person is first seen by a medical officer and has a physical examination / treatment performed that is relevant to their presenting problem(s)
- First seen by nurse time: the date and time at which the person is first seen by a nurse and has an assessment / treatment performed that is relevant to their presenting problem(s)

If either 'first seen by clinician time' or 'first seen by nurse time' is more than 12 hours before the earlier of arrival and triage time, then that treatment time field is not considered for treatment time.

## Departure time

Departure time is the date and time at which the person leaves the ED as recorded in the actual departure time field in the emergency visit database in the HIE.

## Performance indicators: Time until treatment and time until leaving the ED

### Time from presentation until treatment

Time from presentation until treatment is the difference between presentation time and treatment time. Time from presentation is reported by triage category for emergency attendances. Records with treatment times that are more than 31 days after presentation time are excluded.

### Time from presentation until leaving

Time from presentation until leaving the ED is the difference between presentation time and departure time. Records that do not have a valid value for visit type, or departure time are excluded. Departure times that are earlier than presentation time or more than 31 days after presentation time are excluded. Statistics based on time from presentation until departure are reported for treated and admitted, and treated and discharged or transferred cohorts.

### Half of patients (50%)

This measure is the median time and is used to describe time from presentation until treatment, and time from presentation until leaving the ED. For half of the patients (50%) in the cohort, the time from presentation until they were treated or admitted was equal to or less than the time reported. The Bureau uses the empirical distribution function with averaging to compute the median and rounds up to the nearest whole minute for reporting.

## Most patients (95%)

This measure is the 95th percentile and is used to describe time from presentation until treatment, and time from presentation until leaving the ED. For 19 out of 20 patients (95%) in the cohort, the time from presentation until they were treated or admitted was less than or equal to the time reported. For one out of 20 patients (5%) in the cohort, the time from presentation until they were treated or admitted was equal to or more than the time reported. The Bureau uses the empirical distribution function with averaging to compute the 95th percentile and rounds up to the nearest whole minute for reporting.

## Patients arriving by ambulance: attendances and off stretcher time

'Patients arriving by ambulance' is the count of all cases used for calculation of the off stretcher performance measure. It includes all emergency and priority medical patients transported by ambulance and delivered to an ED, sometimes collectively termed 'off stretcher cases'.

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 ED. The OST performance measure is reported as a percentage of all patients arriving by ambulance that are transferred within 30 minutes. The denominator is all off stretcher cases. The numerator is all off stretcher cases transferred to the care of an ED within 30 minutes of arrival at the ED.

Data for these measures is provided by the NSW Ambulance Service, which records the time of transfer as entered by ambulance officers using a dashboard console.

## Percentage of patients who were treated and admitted by time and triage category

The distribution curves used in *Hospital Quarterly* show the cumulative percentage of emergency admissions by the number of hours from presentation until leaving the ED by triage category. The cumulative percentage is computed by taking the number of patients admitted from a triage category in six minute intervals of time elapsed since presentation and dividing by the total number of patients admitted from that triage category. Emergency admissions are patients with a visit type = 1 or 3 and mode of separation = 1, 2, 3, 10, 11 or 13. This cohort only includes patients who had a valid triage category and valid actual departure time. Departure times which are earlier than presentation time or more than 31 days after presentation time are excluded.

If the cumulative distribution does not reach 100%, it indicates that some patients in that triage category waited longer than the longest time shown for their treatment to be completed and to leave the ED.

## Percentage of patients who were treated and discharged or transferred by time and triage category

The distribution curves in *Hospital Quarterly* show the cumulative percentage of non-admitted emergency attendances with completed treatment by the number of hours from presentation until leaving the ED by triage category. The cumulative percentage is computed by summing the proportions of patients discharged / transferred in six minute intervals of time elapsed since presentation within each triage category. Emergency patients who were discharged or transferred are patients with visit type = 1 or 3 and mode of separation = 4, 5 or 12.

This cohort only includes patients who had a valid triage category and valid actual departure time. Departure times which are earlier than or equal to presentation time or more than 31 days after presentation time are excluded.

If the cumulative distribution does not reach 100%, it indicates that some patients in that triage category waited longer than the longest time shown for their treatment to be completed and to leave the ED.

### Percentage of patients who received treatment by time

The distribution curve in *Hospital Quarterly* shows the cumulative percentage of emergency admissions by the number of minutes from presentation until leaving the ED by triage category. The cumulative percentage is computed by summing the proportions of patients whose treatment started in one minute intervals of time elapsed since presentation within each triage category. Emergency patients who received treatment are patients with visit type = 1 or 3 and mode of separation = 1, 2, 3, 4, 5, 7, 10, 11, 12 and 13. This cohort only includes patients who had a valid triage category and treatment time. Treatment times which are more than 31 days after presentation time are excluded.

If the cumulative distribution does not reach 100%, it indicates that some patients in that triage category waited longer than the longest time shown for their treatment to be commenced.

### Time from presentation until treatment by quarter

The time series graphs in *Hospital Quarterly* show the median and 95th percentile of minutes from presentation until treatment for emergency patients who received treatment by triage category and quarter. Emergency patients who received treatment are patients with a visit type = 1 or 3 and mode of separation = 1, 2, 3, 4, 5, 7, 10, 11, 12 and 13. Treatment times which are more than 31 days after presentation time are excluded. Mode of separation 'Admitted: left at own risk' (13) was included as a code in this field in the HIE from July 2009. The code 13 was used to indicate a different separation mode prior to July 2009. All records with mode of separation of 13 have been excluded from calculations on attendances with a recorded arrival date earlier than 1st July 2009.

### Time from presentation until admission by quarter

The time series graphs in *Hospital Quarterly* show the median and 95th percentile of hours from presentation until leaving the ED for emergency patients who were admitted, by quarter. Departure times which are earlier than or equal to presentation time or more than 31 days after presentation time are excluded. Mode of separation 'Admitted: left at own risk' (13) was included as a code in this field in the HIE from July 2009. The code 13 was used to indicate a different separation mode prior to July 2009. All records with mode of separation of 13 have been excluded from calculations on attendances with a recorded arrival date earlier than 1st July 2009.



## Download the report

The report, *Hospital Quarterly: Performance of NSW public hospitals, July to September 2011* and related reports are available at [www.bhi.nsw.gov.au](http://www.bhi.nsw.gov.au)

The suite of products includes:

- Three core modules on Admitted Patients, Elective Surgery and Emergency Departments

*Performance Profiles: Elective surgery* (activity and performance reports for more than 80 hospitals and NSW as a whole)

- *Performance Profiles: Emergency department care* (activity and performance reports for EDs in more than 60 hospitals and NSW as a whole)

*Data Quality Assessments*

*Technical Supplements*



## About the Bureau

The Bureau of Health Information provides the community, healthcare professionals and the NSW Parliament with timely, accurate and comparable information on 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 wellbeing of the people of NSW.

The Bureau is an independent, board-governed statutory health corporation. The conclusions in this report are those of the Bureau and no official endorsement by the NSW Minister for Health, the NSW Ministry of Health or any other NSW public health organisation is intended or should be inferred.

### To contact the Bureau

**Telephone:** +61 2 8644 2100

**Fax:** +61 2 8644 2119

**Email:** [enquiries@bhi.nsw.gov.au](mailto:enquiries@bhi.nsw.gov.au)

**Postal address:**

PO Box 1770

Chatswood

New South Wales 2057

Australia

**Web:** [www.bhi.nsw.gov.au](http://www.bhi.nsw.gov.au)

Copyright Bureau of Health Information 2011

State Health Publication Number: (BHI) 110253  
ISSN 1838-3238

Suggested citation: Bureau of Health Information.  
*Hospital Quarterly Technical Supplement: Measures of emergency department activity and performance, July to September 2011.* Sydney (NSW); 2011.

Published December 2011

Please note that there is the potential for minor revisions of data in this report. Please check the online version at [www.bhi.nsw.gov.au](http://www.bhi.nsw.gov.au) for any amendments.