



# Technical Supplement

Emergency department measures

Hospital Quarterly: January to March 2012

# 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) components of *Hospital Quarterly* are based on analyses of ED 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 *Hospital Quarterly* are currently based on 89 hospital EDs which have had an electronic records system in place for five or more quarters. These 89 EDs comprise the '*NSW totals*' reported in *Hospital Quarterly* and account for approximately 85% of all ED attendances in NSW.

The Bureau provides individual performance profiles for 67 of these EDs. All of the 67 EDs are part of hospitals in the principal referral, major and district peer groups in NSW.

Progressively, EDs in NSW are replacing historic information systems with more contemporary electronic records systems. During the changeover to a new system, 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 NSW reporting (for example, for NSW, local health district and peer group), data from affected hospitals are included in total counts but are excluded from calculation of all other performance measures. Data received from the Ambulance Service of NSW are not affected and are reported as usual.

The Bureau has made a number of changes to the measures of ED activity and performance reported in *Hospital Quarterly, January to March 2012*. Further information on the rationale for the changes can be found in the *Hospital Quarterly Background Paper: Approaches to reporting time measures of emergency department performance, Addendum June 2012* at [www.bhi.nsw.gov.au](http://www.bhi.nsw.gov.au)

These are the changes introduced in *Hospital Quarterly, January to March 2012*:

- The time that patients spend in EDs is measured starting from presentation time. Presentation time is defined as the earlier of arrival or triage time. Previously, presentation time was defined as the earlier of arrival, triage or treatment time. This change is introduced to be consistent with definitions being used for national and interstate reporting. The change has a minimal effect on results based on presentation time, since only a small number of records have a treatment time recorded which is earlier than the times recorded for arrival and triage. In the January to March 2012 quarter, 0.1% of records were affected for NSW,

and the highest per cent for a single hospital was 1%. Bureau measures of time to treatment are not affected by the change of definition. For time to leaving the ED, the change has no effect on the median or 95th percentile times. For individual hospitals, the median time to leaving the ED did not change for most hospitals, and all differences were less than 1 minute. Similarly, the 95th percentile time to leaving the ED did not change for most hospitals, and all differences were two minutes or less.

- The labelling of the median and 95th percentile times (to start treatment or to leaving the ED) has changed, however the methods of calculation have not changed. *Hospital Quarterly* will now refer to the '*median time*', replacing '*half of patients (50%)*'; and the '*95th percentile time*', replacing '*most patients (95%)*'.
- The median time to leaving the ED and the 95th percentile time to leaving the ED are now reported for all patients. Previously, the cohort for leaving the ED only included admitted patients. This change is consistent with the definition of the cohort for the new national performance benchmark, the National Emergency Access Target (NEAT).<sup>2</sup> Broadening the cohort to include all patients has a substantial effect on the results. Therefore, times for leaving the ED in previous reports cannot be compared to times for leaving the ED from *Hospital Quarterly*, *January to March 2012* onwards. Individual performance profiles include

results for this new cohort for the current quarter, over the past five years and as a cumulative graph and table together with results for other mode of separation cohorts.

- The percentage of patients who leave the ED within four hours of presentation is now reported in *Hospital Quarterly*. This is the new national performance benchmark (NEAT) that NSW will be assessed against under the National Health Reform Agreement.<sup>2</sup>

# Activity and performance indicators

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

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.

## 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, some outpatient 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 *Hospital Quarterly* 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 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.

## All attendances by mode of separation

Emergency attendances are reported based on the mode of separation field: treated and discharged, treated and admitted to hospital, patients left without or before completing treatment, patients transferred to another hospital and other modes. Records with missing mode of separation are included in the 'other' cohort.

The cohorts are:

- **'Treated and discharged'** comprises attendances with mode of separation: departed with treatment complete (4)
- **'Treated and admitted to hospital'** comprises 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)
- **'Left without, or before completing, treatment'** comprises those 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 the completion of their treatment

- **‘Transferred to another hospital’** comprises those patients who transferred to another hospital (5) or were admitted and then transferred to another hospital (12)
- **‘Other’** includes patients who were dead on arrival (8) or patients who departed for another clinical service location (9). Attendances with missing mode of separation are also included in this cohort.

## Presentation time

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

- **Arrival time:** the date and time on which the person is recorded in the system as presenting for the service
- **Triage time:** the date and time on which the person is recorded in the system as being assessed by a triage nurse.

## Treatment time

Treatment time is the earlier 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 presentation time or more than 31 days after presentation time, then that treatment time field is considered an error and is excluded from calculations. If treatment time is earlier than presentation time, but 12 hours or less before presentation time, then it is set to zero.

## 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. If departure time is more than 12 hours before presentation time or more than 31 days after presentation time, then that departure time field is considered an error and is excluded from calculation.

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

### 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 an ED visit type of emergency (1) or an unplanned return visit for a continuing condition (3) are included. Treatment times which are more than 12 hours after presentation time are considered errors and excluded from calculation.

### 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 departure time are excluded from calculation. Departure times that are earlier than presentation time or more than 31 days after presentation time are considered errors and are excluded from calculation.

## Median

The median is the midpoint of the waiting times distribution. This measure is used in *Hospital Quarterly* to describe time from presentation until treatment and time from presentation until leaving the ED. The median is the time by which half of patients started treatment or left the ED. The other half of patients took equal to or longer than this time. The Bureau uses the data for each patient and the empirical distribution function with averaging to compute the median in SAS<sup>®3</sup>. Results are rounded to the nearest whole minute for reporting.

## 95th percentile

The 95th percentile is a statistical measure of the waiting time distribution. It is used in *Hospital Quarterly* to describe time from presentation until treatment, and time from presentation until leaving the ED. The 95th percentile is the time by which 95% of patients started treatment or left the ED. The final 5% of patients took equal to or longer than this time. The Bureau uses the data for each patient and the empirical distribution function with averaging to compute the 95th percentile in SAS<sup>®3</sup>. Results are rounded to the nearest whole minute for reporting.

## Percentage of patients who left the ED within four hours of presentation by quarter

The time series graph in *Hospital Quarterly* shows the percentage of patients who left the ED within 4 hours of presentation by quarter. Records that do not have a valid departure time are excluded from calculation.

Departure times that are earlier than presentation time or more than 31 days after presentation time are considered as errors and are excluded from calculation.

## Arrivals by ambulance and Off Stretcher Time

Ambulance arrivals 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.

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 patients arriving by ambulance who were transferred to the care of an ED within 30 minutes of arrival at the ED.

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

The NSW target requires 90% of patients arriving by ambulance to be transferred to the care of the ED within 30 minutes of arrival.

### Percentage of patients who received treatment by time

The distribution curve in *Hospital Quarterly* shows the cumulative percentage of emergency attendances by minutes from presentation until treatment 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 12 hours before presentation time or more than 31 days after presentation time are considered as errors and are excluded from calculation.

If the cumulative distribution does not reach 100%, it indicates that some patients in that triage category waited longer than the maximum time shown on the horizontal axis for their treatment to start.

### Percentage of patients who left the ED by time

The distribution curve in *Hospital Quarterly* shows the cumulative percentage of attendances by the number of hours from presentation until leaving the ED. The cumulative percentage is computed by summing the proportions of patients left the ED in one minute intervals of time elapsed since presentation. Records that do not have a valid departure time are excluded from calculation. Departure times which are before presentation time or more than 31 days after presentation time are considered as errors and are excluded from calculation.

If the cumulative distribution does not reach 100%, it indicates that some patients waited longer than the maximum time shown on the horizontal axis to leave the ED.

### Percentage of patients who left ED by time and mode of separation

The distribution curve in *Hospital Quarterly* shows the cumulative percentage of attendances by the number of hours from presentation until leaving the ED by mode of separation. The cumulative percentage is computed by summing the proportions of patients who left the ED in one minute intervals of time elapsed since presentation for each mode of separation. Records that do not have a valid departure time are excluded from calculation. Departure times which are before presentation time or more than 31 days after presentation time are considered as errors and are excluded from calculation.

If the cumulative distribution does not reach 100%, it indicates that some patients in that mode of separation waited longer than the maximum time shown on the horizontal axis of the graph to leave the ED.

## Time from presentation until treatment by quarter

The time series graph in *Hospital Quarterly* shows the median and 95th percentile of minutes from presentation until treatment for emergency patients who received treatment by quarter for 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 12 hours before presentation or more than 31 days after presentation are considered as errors and are excluded from calculation.

## Time from presentation until leaving the ED by quarter

The time series graph in *Hospital Quarterly* shows the median and 95th percentile of hours from presentation until leaving the ED by quarter. Records that do not have a valid departure time are excluded from calculation. Departure times which are before presentation time or more than 31 days after presentation time are considered as errors and are excluded from calculation.

# References

1. Australian Institute of Health and Welfare. METeOR Metadata Online Registry. [Emergency department stay – presentation time, hhmm](#). [online] [cited 28 May 2012]. Available from [www.meteor.aihw.gov.au/content/index.phtml/itemId/471889](http://www.meteor.aihw.gov.au/content/index.phtml/itemId/471889)
2. Australian Government Department of Health and Ageing. National Health Reform. [National Partnership Agreement on Improving Public Hospital Services](#). [online] [cited 28 May 2012]. Available from [www.yourhealth.gov.au/internet/yourhealth/publishing.nsf/Content/npa-improvingpublichospitals-agreement-toc](http://www.yourhealth.gov.au/internet/yourhealth/publishing.nsf/Content/npa-improvingpublichospitals-agreement-toc)
3. SAS Institute. [The SAS System for Windows, version 9.2](#) Cary (NC): SAS Institute 2005.

## Download our reports

The report, *Hospital Quarterly: Performance of NSW public hospitals, January to March 2012* and related reports are available at [www.bhi.nsw.gov.au](http://www.bhi.nsw.gov.au)

The suite of products includes:

- *At a Glance* summarising the three core modules
- Three core modules titled Admitted Patients, Elective Surgery and Emergency Departments
- Activity and performance reports about emergency department care and elective surgery for 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.

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