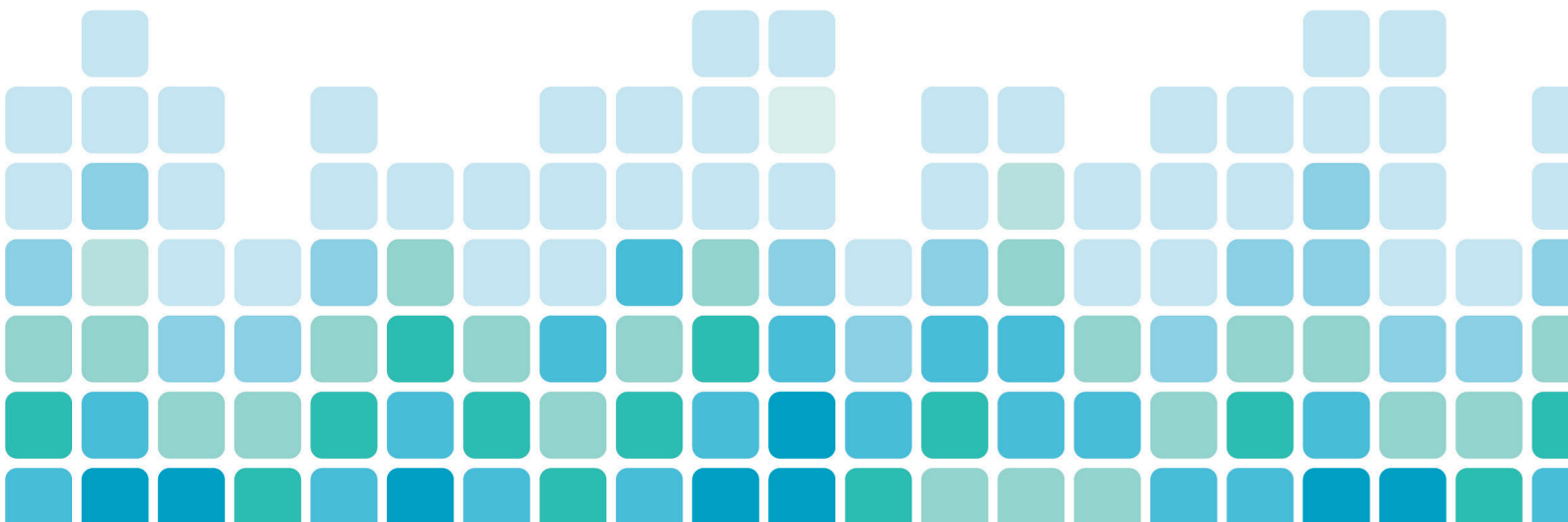


# Spotlight on measurement

Measuring transfer of care from the  
ambulance to the emergency department

September 2013



# Summary

The timely transfer of ambulance patients into hospital emergency departments (EDs) is widely seen as an important measure in the delivery of high quality healthcare services.

It is important both from a patient and a healthcare system perspective.

For patients, particularly those who are acutely unwell, efficient transitions can make a real difference to their health outcomes.

For the healthcare system, the timeliness of patient transfers from the ambulance crew to the ED team is an important access issue. Although transfers occur in the ED, they are affected by a wide range of system factors both within the hospital (such as ED capacity or delays in admitting patients from the ED); and outside it (such as effective community care to minimise the need for ambulance transfer to the ED). Measuring the timeliness of patient transfers can therefore provide significant insight into wider access issues.

Given the importance of this transition point, reporting of comparative performance is essential. Such information can be used to inform decision-makers; to catalyse improvement, and to provide accountability to the public about the performance of the system and its hospitals.

Delay, either in the transfer of patients from the ambulance to the ED; or in the process of ensuring the ambulance available for the next call, is important and should be measured and reported upon.

This report explores the implications of including a new measure of hospital performance called transfer of care time, in the Bureau of Health Information's *Hospital Quarterly* Emergency Department module alongside the previously reported measure off-stretcher time.

It highlights differences between the two measures and potential insights to be gained from their joint reporting.

The report's main findings are:

- Both transfer of care time and off-stretcher time are measures related to ED patient transitions. Both measures start at the time the ambulance arrives at the ED. However transfer of care time covers the time elapsed until the patient is moved to the ED treatment space and responsibility for care is transferred from paramedics to ED staff; while off-stretcher time continues until the ambulance crew returns to the ambulance.
- Off-stretcher time is calculated by the Ambulance Service of NSW and is available for all patient transfers to hospital, regardless of whether those patients visited the ED. In contrast, transfer of care times are only available for those patients transported to the ED by ambulance.
- Compared with off-stretcher time, the transfer of care measure is more closely aligned to the patient experience – how long people wait to have their care transferred from the ambulance crew to the ED staff. Off-stretcher time includes time when the patient is no longer with the ambulance crew and is more closely aligned to ambulance availability.

- Transfer of care time should provide a more accurate picture of hospital performance, reflecting the extent to which the capacity of the ED - and its ability to respond to patients in a timely way - is managed. As a newly introduced measure, there remains some variation across the state about when transfer of care is considered to be complete.<sup>+</sup>
- While it may be important from an ambulance performance perspective to measure off-stretcher time, it is not a measure that precisely captures patient transitions between ambulance and ED. It is influenced by the timeliness of the transfer process but also reflects some factors that are only under the control of the ambulance crew.
- For NSW as a whole, the median transfer of care time in the quarter April – June 2013 was 13 minutes; the median off-stretcher time was 27 minutes.
- Large hospitals have median transfer of care times in line with those of most smaller hospitals.
- In comparison to off-stretcher time, transfer of care time provides a better reflection of responsiveness to case urgency, with the most urgent cases (Triage 1) transferred in the shortest period of time.

- Transfer of care time and off-stretcher time are different measures of the transition between ambulance and ED. Comparisons between the two do not reflect performance improvement or deterioration.

The Bureau of Health Information (the Bureau) will add transfer of care measures for the state and for individual hospitals on a quarterly basis to its *Hospital Quarterly* series, beginning with volume 13.

The measures to be reported on at a NSW level are:

- Number of ambulance arrivals with a transfer of care time
- Percentage of arrivals with transfer of care within 30 minutes
- Median transfer of care time
- Median off-stretcher time for patients transported to the ED by ambulance.

At a hospital level, individual performance profiles will include median transfer of care time and median off-stretcher time for patients transported to the ED by ambulance.

Transfer of care time and off-stretcher time are overlapping but distinct measures - differing in purpose, definition and interpretation.

(+) The NSW Ministry of Health has accepted the recommendations made by the Auditor-General that by December 2013, those tasks that should occur before transfer of care is complete are clarified. NSW Auditor-General's Report. *Reducing ambulance turnaround time at hospitals*. Sydney: Audit Office, 2013.

# From the Ambulance to the ED

## Defining off-stretcher times and transfer of care times

### From the Ambulance to the ED: why measure?

The Ambulance Service of NSW responds to more than a million calls and carries out over 800,000 transports per year. In 2012–13 there were nearly 550,000 emergency cases transported to NSW hospitals.

Transferring patients from the ambulance to the ED is an important process and is a key performance indicator for the healthcare system. The transfer of patients from the ambulance to the ED is vital for two reasons.

First, from a clinical perspective, there are a number of acute conditions (such as cardiac arrest, trauma, asthma attack) where minutes are crucial. Efficient and effective transfers can make a difference to patient outcomes.

For the healthcare system, the timeliness of patient transfers from the ambulance crew to the ED team is an important access issue. Although transfers occur in the ED, they are affected by a wide range of system factors both within the hospital (such as ED capacity or delays in admitting patients from the ED); and outside it (such as effective community care to minimise the need for ambulance transfer to the ED). Measuring the timeliness of patient transfers can therefore provide significant insight into wider access issues.

Like all patient transitions in the healthcare system, transferring from the ambulance to the ED is a process that is shaped by a range of factors such as:

- Timely transfer of relevant and accurate information regarding the patient and their condition
- Clear and well-practised coordination between ambulance and ED staff
- Teamwork among different healthcare disciplines, specialties and roles
- Patient-centred care that is both responsive and seamless
- Physical capacity and availability of resources to receive patients and deal with them in a timely way.

Historically in NSW, the transition has been measured and reported on using off-stretcher time. Recently, another measure of the transition process – transfer of care time – has been developed. This document examines these two measures and explores the implications of reporting transfer of care time in NSW within the suite of indicators focused on hospital and ED performance.

Delay, either in the transfer of patients from the ambulance to the ED; or in the process of ensuring the ambulance available for the next call, is important and should be measured and reported upon.

## From the Ambulance to the ED: off-stretcher time

Off-stretcher time is drawn from ambulance data with a:

- **start time:** the ambulance arrival time at the hospital (generated by the ambulance information system)
- **end time:** the time point at which the ambulance crew has returned to their vehicle\* (generated by the ambulance information system)

Off-stretcher times have been reported by the Bureau of Health Information as part of its *Hospital Quarterly Emergency Department* module since 2010 (and before then by the NSW Ministry of Health). However, off-stretcher time as a measure of performance in the timely transfer of patient care between ambulance and ED has some limitations. It captures information on all ambulance journeys to hospital, regardless of whether the ED is the destination. Further, as data are recorded via a mobile data terminal located in an ambulance, the measure includes the time it takes for an ambulance crew to return to their vehicle following patient transfer.

While it may be important from an ambulance performance perspective to measure off-stretcher time, it is not a measure that precisely captures patient transitions between ambulance and ED.

## From the Ambulance to the ED: transfer of care time

Transfer of care time is drawn from two data sources with a:

- **start time:** the ambulance arrival time at the hospital (generated by the ambulance information system)
- **end time:** the arrival of the patient at the treatment location (generated by the ED information system)<sup>†</sup>

Compared with off-stretcher time, the transfer of care measure as defined is more closely aligned to the patient experience – how long people wait to have their care transferred from the ambulance crew to the ED staff.

As a newly introduced measure however, there remains some variation across the state about when transfer of care is considered to be complete.<sup>‡</sup>

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(\*) The point at which the ambulance crew has returned to their vehicle following transfer of the patient to the ED is known as '*delayed available time*'. The crew subsequently undertakes necessary cleaning and resetting tasks to prepare for their next call. Once ready, they change their status to '*clear*'.

(†) Treatment location arrival time is captured electronically by the hospital when a patient is moved from an ambulance treatment zone (ambulance bay, ambulance stretcher, etc) to an ED treatment zone (bed / chair inside the ED or chair in the waiting room).

(‡) NSW Auditor-General's Report. *Reducing ambulance turnaround time at hospitals*. Sydney; Audit Office, 2013.

## From the Ambulance to the ED: aim of this document

This document explores the relative strengths of off-stretcher time and transfer of care time for the purposes of hospital and ED performance reporting.

It examines how off-stretcher time and transfer of care time can demonstrate variation in different aspects of performance over time and between organisations. It covers seven main themes:

- 1) Methods and analytic approach
- 2) Comparison of median off-stretcher times and transfer of care times at a NSW and hospital level of analysis
- 3) Profile of the differences between median off-stretcher time and median transfer of care time, and the extent to which they vary across peer groups and Local Health Districts (LHDs).
- 4) Exploration of the relationship between off-stretcher time, transfer of care time and volume of ambulance-ED transfers
- 5) Analysis of the relationship between off-stretcher time, transfer of care time and triage category
- 6) Examination of target achievement and performance reporting for off-stretcher time and transfer of care time
- 7) Review of the report's main findings and outline of the Bureau's proposed approach to measuring and reporting on ambulance-ED transfers.



# 1) Methods and analytic approach

## How we explored the off-stretcher time and transfer of care times

This document examines the discriminatory power of two measures of hospital performance: off-stretcher time and transfer of care time. While both measures focus on the transfer of patients from ambulance to the ED, and have identical start times, they differ in their end points. Transfer of care time refers to a shorter period than off-stretcher time. This is represented in [Figure 1](#) which depicts the transition process in a stepwise way.

In order to understand the relative information contribution of the two measures, only matched records have been included in the analysis and the report ([see Box](#)). Keeping the dataset constant allows us to examine the properties of the measures for use in performance reporting; and removes potential confounders.

The difference between off-stretcher time and transfer of care time ([Figure 1](#)) is the interval between the moment patient care is transferred to the ED staff and the moment the ambulance crew returns to their vehicle. This difference can be affected by a range of issues including delays in moving patients from ambulance trolleys onto an ED bed and delays in the ambulance crew returning to their vehicle following patient transfer. The reasons for the difference may vary across hospitals and over time. Current data do not allow us to identify the reasons driving the differences.

Data were downloaded from the Transfer of Care Reporting System (TCRS) portal. Around 2% of records had missing data elements that required imputation of the missing time points ([see Appendix 2](#)).

### Matched and unmatched records

This report is based on data referred to as matched records. Matched records are those where the ambulance incident number and date can be identified in both the Ambulance Service of NSW data and the ED data. Matched records can be used to calculate corresponding transfer of care times and off-stretcher times for each patient transfer.

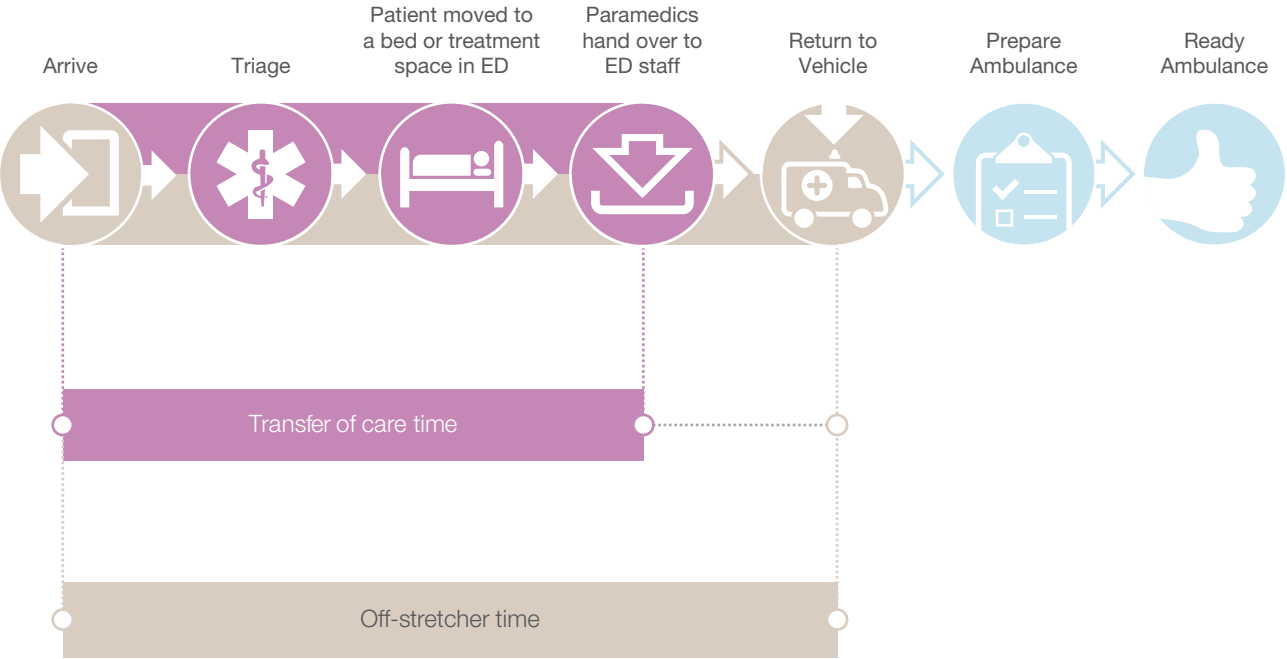
Ambulance data also includes ‘*unmatched*’ records which are: cases where patients have gone directly to another part of the hospital, for example to a ward or to the operating theatre; or have missing data fields or clerical issues that preclude matching of patient records that were actually ED attendances. In most cases, it is possible to measure off-stretcher times for unmatched records. However, a transfer of care time cannot be produced for unmatched records. Ambulance priority data are available for unmatched records and are described in [Appendix 1](#).

The underlying cause of unmatched records – non-ED transportation or a hospital clerical issue – cannot be ascertained from the data.

The proportion of records that were ‘*unmatched*’ in NSW public hospitals over five quarters (April – June 2012 to April – June 2013) was analysed. The proportion of unmatched records remained relatively stable (13-15%). For the latest quarter, the proportion of unmatched records in individual hospitals ranged from 3% to 71%. Most hospitals had fewer than 25% unmatched records.

In hospitals with high levels of unmatched records, further investigation revealed that off-stretcher times were similar for matched and unmatched records. The results are outlined in [Appendix 1](#).

Figure 1: Schematic showing the difference between off-stretcher time and transfer of care time.





## 2) Median waiting times

### Median transfer of care times are lower than median off-stretcher times

Median time for transfer of care refers to the length of time (in minutes) it took for half of patient transfers to be made from the ambulance to the ED.

Median off-stretcher time refers to the length of time (in minutes) it took for half of the ambulance crews to return to their vehicles following patient transfer to ED.

In the latest quarter (April – June 2013), the median off-stretcher time across NSW was 27 minutes. The median transfer of care time for NSW was 13 minutes. Over the five quarters for which there are comparable data available, statewide median off-stretcher times have remained stable and median transfer of care times initially decreased before stabilising in the last three quarters (Table 1).

Differences between individual hospital median times for off-stretcher time and transfer of care time vary across the state. For example, in peer group A, *hospital x* had a median off-stretcher time of 30 minutes and a corresponding median transfer of care time of 7 minutes; while in peer group C2, *hospital y* had a median off-stretcher time of 22 minutes and a corresponding median transfer of care time of 15 minutes (Figure 2).

Quantifying the difference between median transfer of care times and median off-stretcher times provides insight into variability in the interval between the point where responsibility for patient care is deemed to have been transferred, and the ambulance crew's return to their vehicle - an important component in ambulance turnaround time and performance.

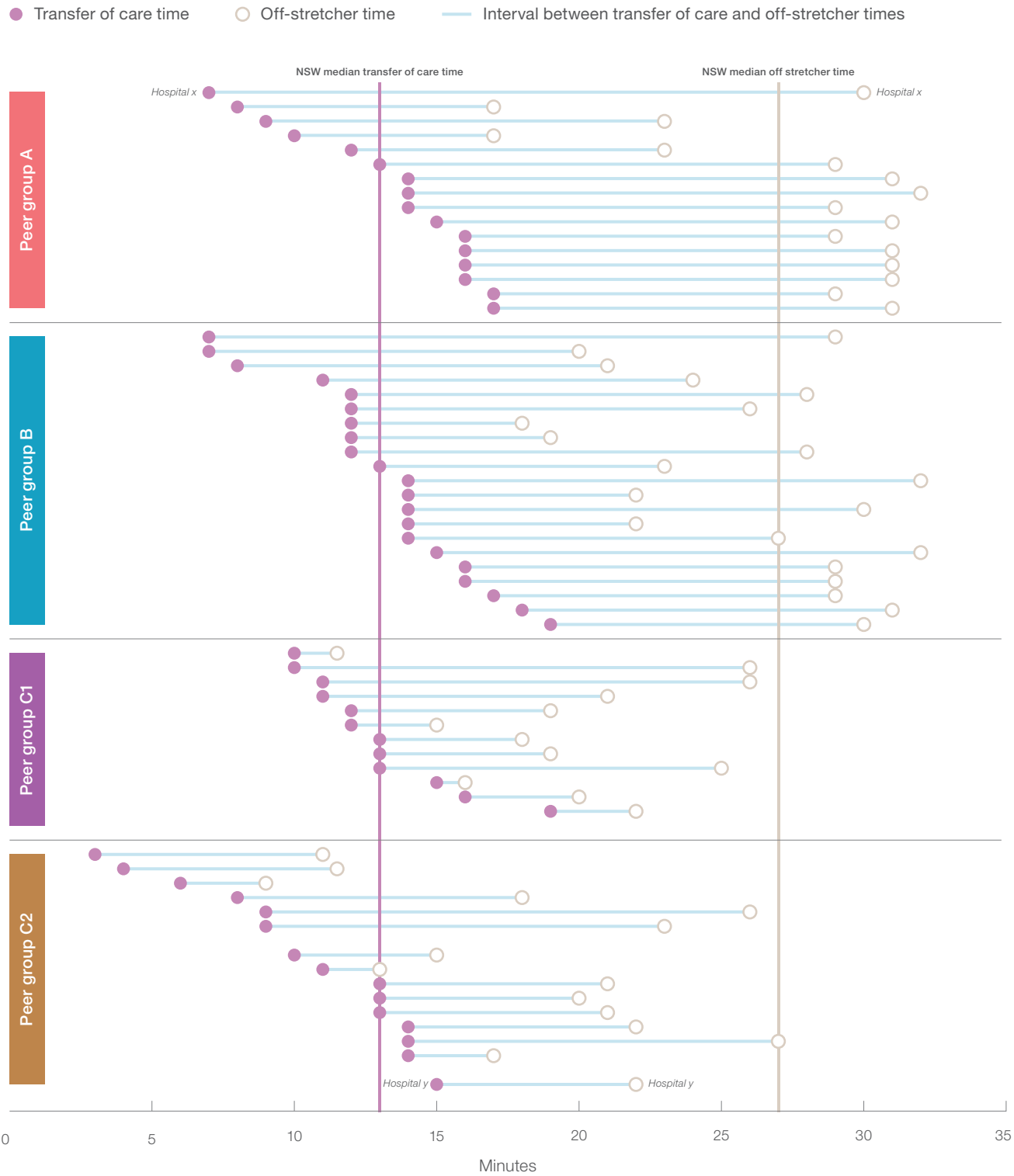
Table 1: Off-stretcher time and transfer of care time, NSW, matched records, April - June 2012 to April - June 2013.

	Apr-Jun 2012	Jul-Sep 2012	Oct-Dec 2012	Jan-Mar 2013	Apr-Jun 2013
Number of matched records	118,315	124,413	122,689	119,049	120,630
Transfer of care median (minutes)	16	16	13	13	13
Off-stretcher time, median (minutes)	26	28	26	26	27
Interval or difference	10	12	13	13	14

**Note:** No data are available for 1 January 2013. Data exclude hospitals with < 5 quarters of data and hospitals that are not reported in *Hospital Quarterly, Emergency Department* module ([www.bhi.nsw.gov.au](http://www.bhi.nsw.gov.au)). There were three small hospitals that had a negative interval (excluded from figure).

**Source:** Transfer of Care Reporting System.

Figure 2: Hospital-level median times for off-stretcher time and transfer of care time, April – June 2013 (sorted by transfer of care time, within hospital peer groups)



### 3) Off-stretcher time and transfer of care time

#### The two measures across peer groups and LHDs

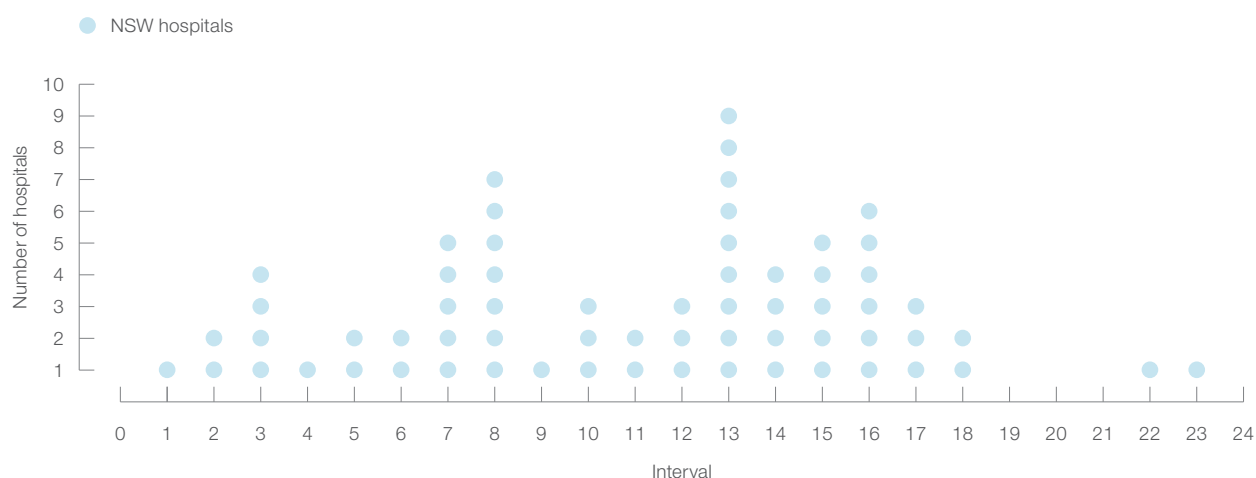
Transfer of care times should be shorter than off-stretcher times. The actual difference varies across hospitals and over time and, when using matched cases only, can be quantified in terms of the interval between median transfer of care time and median off-stretcher time.

Across NSW as a whole, this interval was 10 minutes in Quarter 2 (Apr – Jun) 2012, increasing to 14 minutes in Quarter 2 (Apr – Jun) 2013, reflecting an overall decrease in transfer of care times (last line of Table 1).

The interval between median transfer of care time and median off-stretcher time varies across NSW hospitals. In the most recent quarter (April – June 2013), the difference between median transfer of care and median off-stretcher time ranged from 1 to 23 minutes (Figure 3) with many hospitals recording intervals between 7 and 16 minutes.

In April – June 2013, one LHD (Group 12) contained the four hospitals with the longest interval. The same LHD's hospitals also showed the most variation, with interval ranging from 2 minutes to 23 minutes (Figure 4).

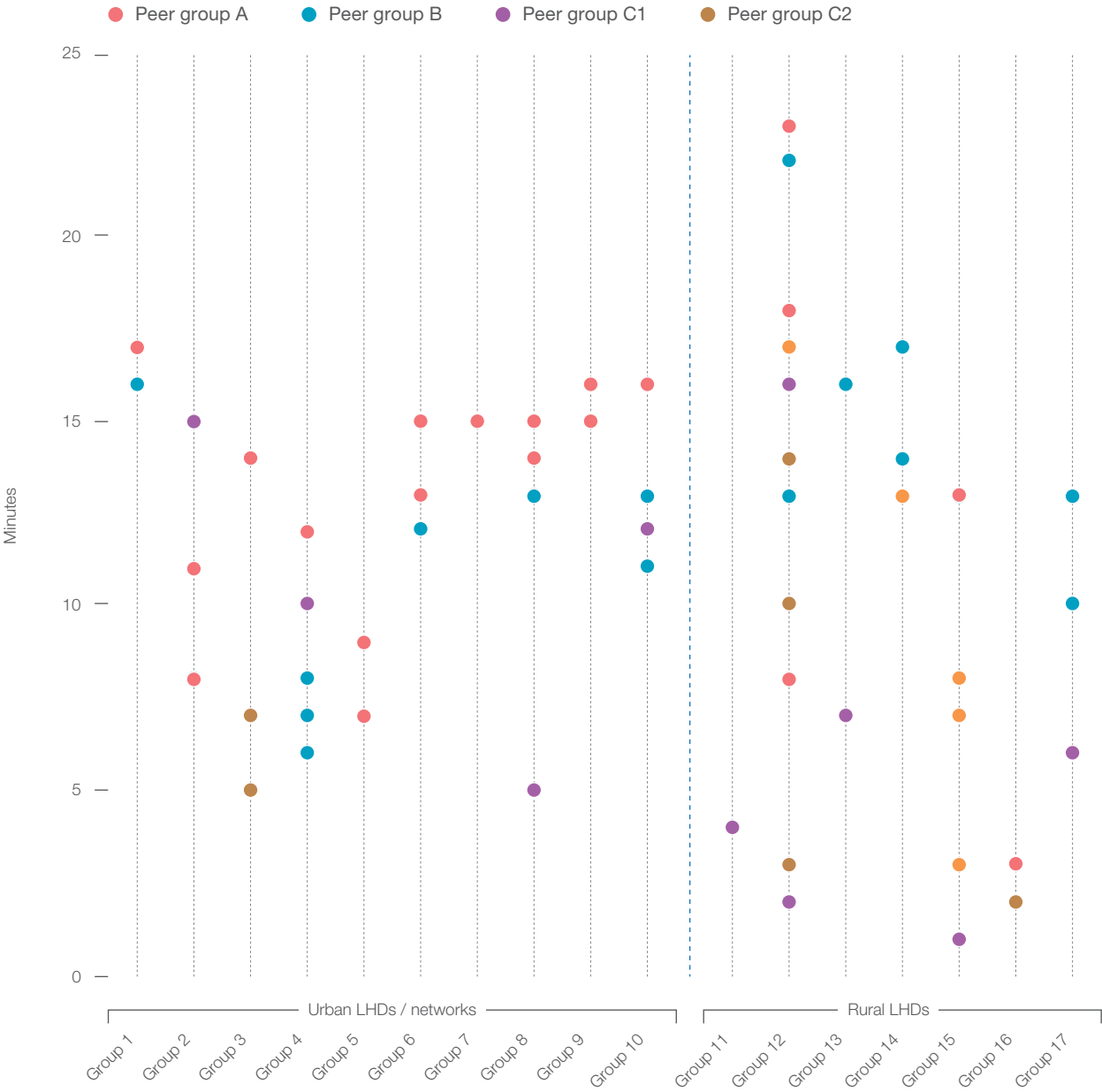
Figure 3: Distribution of the hospital-level intervals between median transfer of care and median off-stretcher time (minutes), April – June 2013



**Note:** No data are available for 1 January 2013. Data exclude hospitals with < 5 quarters of data and hospitals that are not reported in *Hospital Quarterly, Emergency Department* module ([www.bhi.nsw.gov.au](http://www.bhi.nsw.gov.au)). There were three small hospitals that had a negative interval (excluded from figure).

**Source:** Transfer of Care Reporting System.

Figure 4: Hospital-level intervals between median off-stretcher times and median transfer of care times, by organisational groups (LHD / network) and peer group, April – June 2013



## 4) Peer group, volume and performance

### Greater volume of patients is not associated with longer median transfer of care times

There is less variability within peer groups for median transfer of care times than for median off-stretcher times.

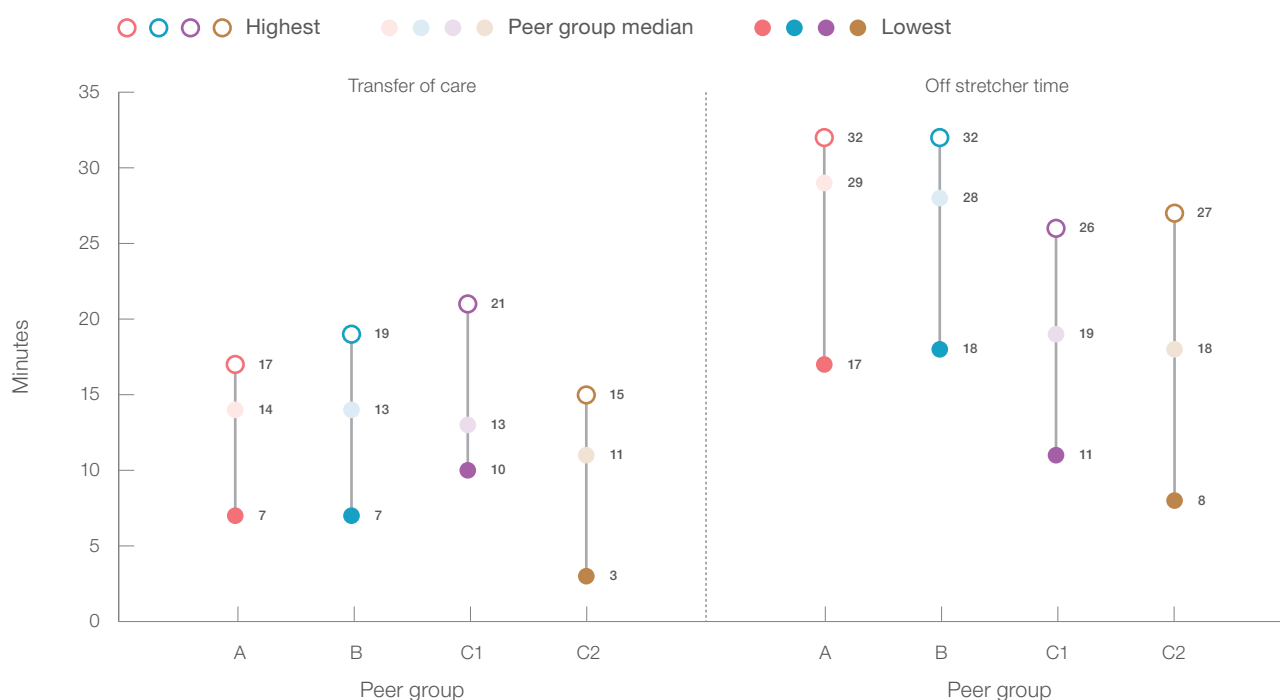
Across peer groups, in the quarter April – June 2013, median transfer of care times were least variable in peer group A hospitals (ranging from 7 to 17 minutes) and most variable in peer group B hospitals (7 - 19 minutes) and C2 hospitals (3 - 15 minutes) (Figure 5).

In the same quarter (April – June 2013), median off-stretcher times were least variable in peer group B hospitals (median times 18 – 32 minutes) and most variable in peer group C2 hospitals (8 – 27 minutes).

The impact of the number of patients delivered to an ED by ambulance on median transfer of care times is modest. Large hospital EDs that see a high volume of patients have median transfer of care times that are in line with many smaller EDs (Figure 6).

The corresponding median off-stretcher time versus volume reveals a similar picture. In all but the smallest hospitals, there is little correlation between volume of patients delivered by ambulance and off-stretcher time (Figure 7).

Figure 5: Dispersion of median transfer of care times and off-stretcher times, by peer group, April – June 2013



Note: No data are available for 1 January 2013. Data exclude hospitals with < 5 quarters of data and hospitals that are not reported in *Hospital Quarterly, Emergency Department* module ([www.bhi.nsw.gov.au](http://www.bhi.nsw.gov.au)). There were three small hospitals that had a negative interval.

Source: Transfer of Care Reporting System.

Figure 6: Median transfer of care time vs number of patient transfers, NSW hospitals, April – June 2013

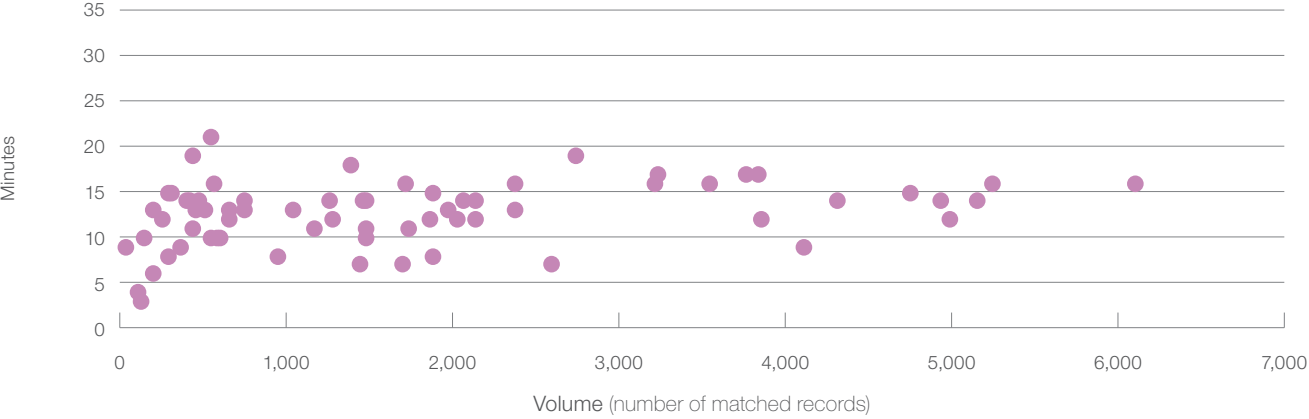
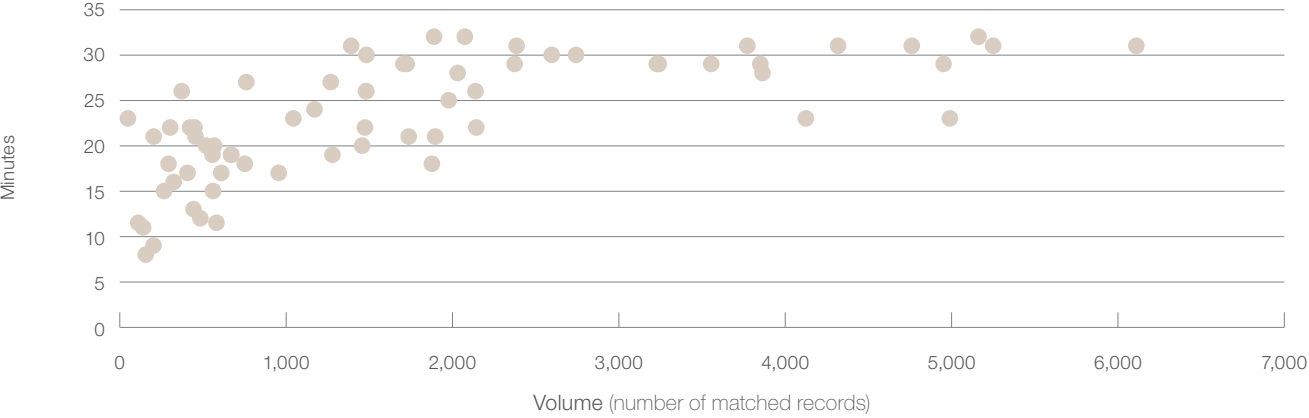


Figure 7: Median off-stretcher time vs number of patient transfers, ambulance transports to NSW hospitals, April – June 2013



## 5) Triage category and performance

### Transfer of care time better reflects responsiveness to urgency

Plotting NSW median times against triage categories (see Box for definition), reveal that in comparison to off-stretcher time, transfer of care time measures provide a better reflection of responsiveness to case urgency, with the most urgent cases (Triage 1) transferred in the shortest period of time (Figures 8 and 9).

There is also evidence of a seasonal effect in both transfer of care times and off-stretcher time, with slightly longer median times in the winter quarter (Figures 8 and 9).

Figure 10 provides a minute by minute account of transfer of care times in the state for the quarter April – June 2013, stratified by triage category. It clearly shows that most patients are transferred within 30 minutes of arrival at hospital, regardless of triage category. The peak interval to receive transfer of care is around 10 minutes.

The corresponding graph for off-stretcher times shows a flatter distribution of times and a higher proportion of patients (particularly in triage categories 2, 3 and 4) that waited longer than

30 minutes (Figure 11). There does not seem to be a clear peak time for off-stretcher time – a sustained high number of cases are found between 15 and 35 minutes.

Upon arrival at the ED, patients are allocated to one of five urgency (or triage) categories. Each category has a nationally defined maximum recommended time by which the patient should receive care:

- Resuscitation / Immediately life threatening (within seconds)
- Emergency / Imminently life threatening (within 10 minutes)
- Urgent / Potentially life threatening (within 30 minutes)
- Semi-urgent / Potentially serious (within 60 minutes)
- Non-urgent (within 120 minutes).

Figure 8: Median transfer of care times by triage category, NSW, April – June 2012 to April – June 2013

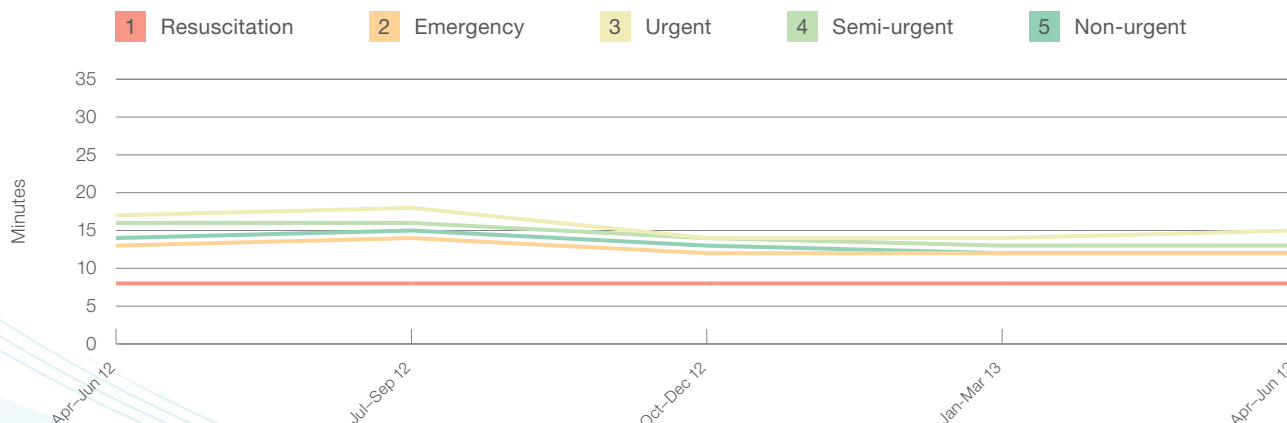




Figure 9: Median off-stretcher times, by triage category, NSW, April – June 2012 to April – June 2013

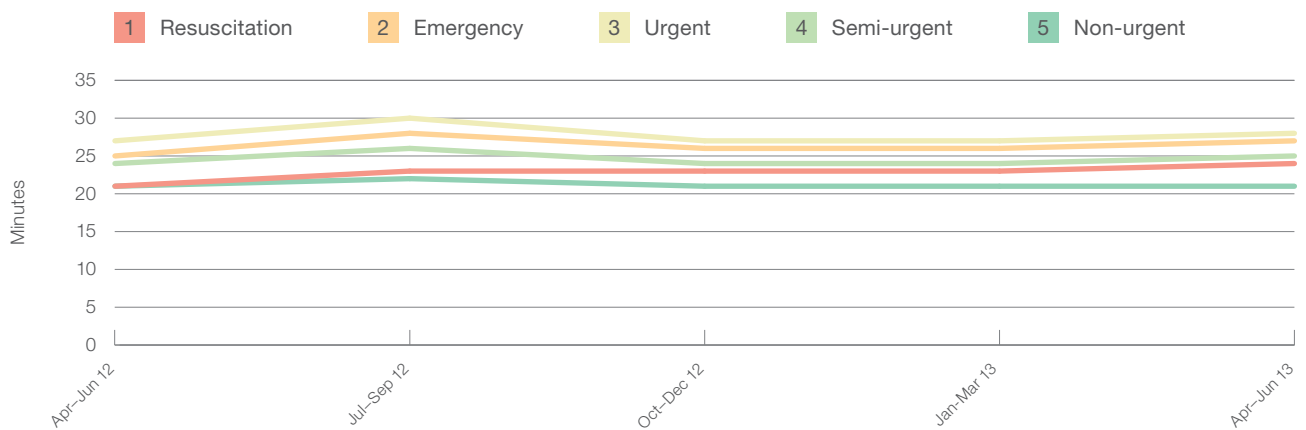


Figure 10: Transfer of care times, by triage category, stacked chart, NSW, April – June 2013

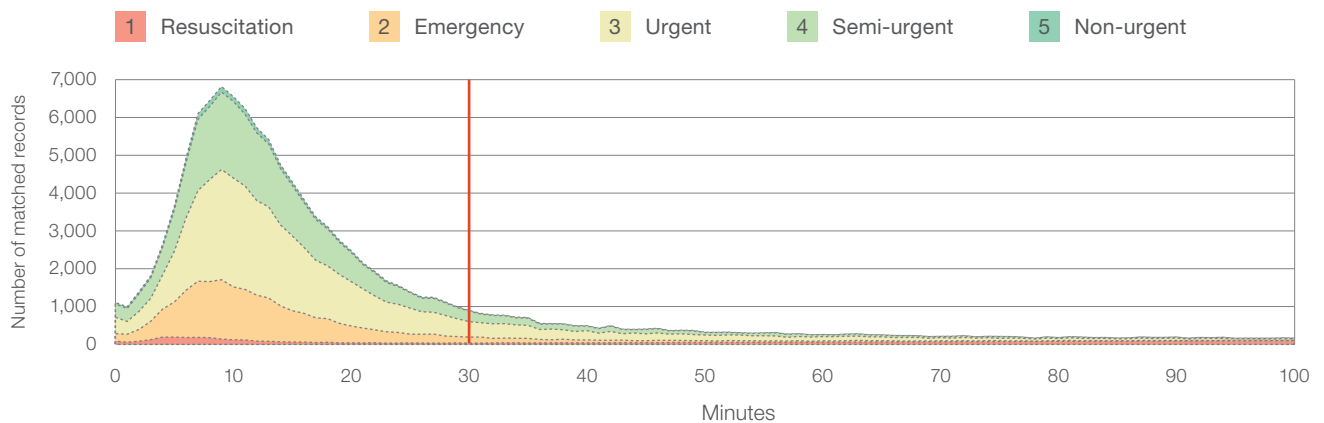
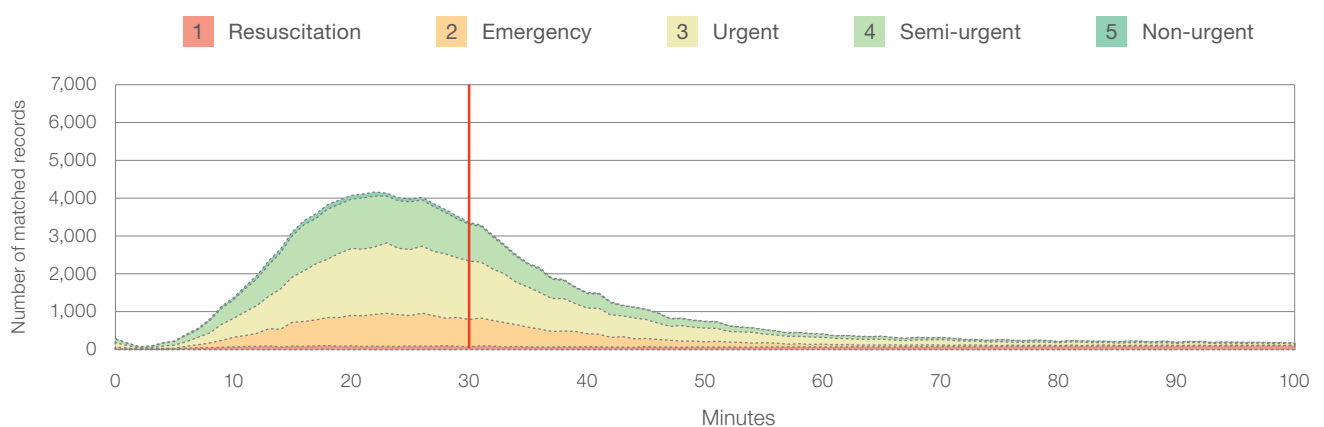


Figure 11: Off-stretcher times, by triage category, stacked chart, NSW, April – June 2013



**Note:** Truncated at 100 minutes. No data are available for 1 January 2013. Only includes records that include information on triage category.

**Source:** Transfer of Care Reporting System.

## 6) Target achievement on patient transitions from the ambulance to the ED

There is a target time of 30 minutes for transfer of care and for each hospital, 90% of transfers should occur within that timeframe. From the accompanying edition of *Hospital Quarterly* onwards, performance will be reported as the percentage of transfers within target time.

The target for off-stretcher time, when it was in use as a performance measure, was also 30 minutes.

Transfer of care time and off-stretcher time are distinct measures of different aspects of patient transitions and cannot be directly compared.

It is useful however to compare performance over time within each measure. There has been improvement in statewide transfer of care

performance over the five quarters for which data are available. In the quarter April – June 2013, 81% of transfers were within the 30 minute target, compared with 74% in the same quarter last year (Table 2).

In the latest quarter (April – June 2013) the proportion of hospitals achieving the transfer of care target time of 30 minutes for 90% of their patients ranged from 29% in peer group A to 38% in peer group C1 (Table 3).

As expected, hospital-level target achievement is higher in transfer of care as compared to off-stretcher time. Data for the most recent quarter show considerable variation within peer groups for both measures, with the widest variation in peer group A (Figure 12).

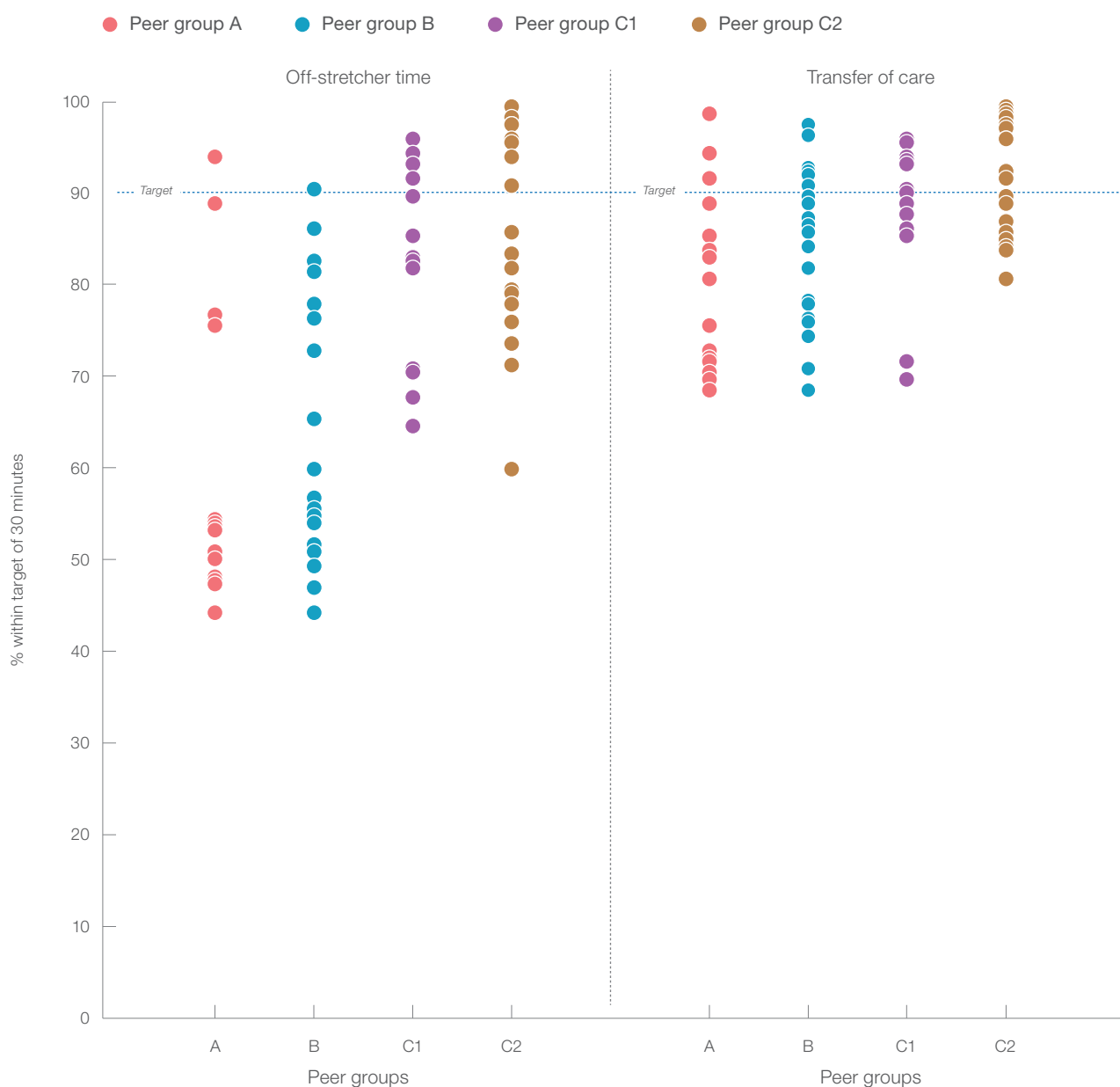
Table 2: Percentage of patient transfers within 30 minute target for off-stretcher time and transfer of care time, NSW, April - June 2012 to April - June 2013

	Apr-Jun 2012	Jul-Sep 2012	Oct-Dec 2012	Jan-Mar 2013	Apr-Jun 2013
Off-stretcher time	63%	56%	64%	64%	61%
Transfer of care time	74%	71%	82%	83%	81%

Table 3: Proportion of hospitals achieving 30 minute target for 90% of patient transfers, by peer group, April - June 2013

	Peer group A	Peer group B	Peer group C1†	Peer Group C2†
% meeting off-stretcher time target for 90% of patients	6%	5%	31%	47%
% meeting transfer of care target for 90% of patients	29%	14%	38%	47%

Figure 12: Percentage of patients transferred within 30 minute target for off-stretcher time and transfer of care time, by hospital peer groups, April – June 2013



(‡) There were two C1 hospitals and three C2 hospitals which achieved the off-stretcher time target but did not achieve the transfer of care target.

**Note:** No data are available for 1 January 2013. Data exclude hospitals with < 5 quarters of data and hospitals that are not reported in *Hospital Quarterly, Emergency Department* module [www.bhi.nsw.gov.au](http://www.bhi.nsw.gov.au)

**Source:** Transfer of Care Reporting System.

## 7) Moving forward

### From Spotlight on Measurement to *Hospital Quarterly*

This report has explored the implications of including a new measure of hospital and ED performance, transfer of care, alongside the previously reported off-stretcher time.

#### What we found

The report's main findings are:

- Transfer of care time and off-stretcher time measure different components of ED patient transitions. Both measures start at the time the ambulance arrives at the ED. However transfer of care time covers the time elapsed until the patient is moved to the ED treatment space and responsibility for care is transferred from paramedics to ED staff; while off-stretcher time continues until the ambulance crew returns to the ambulance.
- Compared with off-stretcher time, the transfer of care measure is more closely aligned to the patient experience – how long people wait to have their care transferred from the ambulance crew to the ED staff. Off-stretcher time includes time when the patient is no longer with the ambulance crew.
- There may be continuing interest in measuring off-stretcher time, or the difference between off-stretcher time and transfer of care to quantify the time interval between the patient transfer of care and the ambulance crew's return to their vehicle.

- Transfer of care time should provide a more accurate picture of hospital performance, reflecting the extent to which the capacity of the ED - and its ability to respond to patients in a timely way - is managed.
- Transfer of care time and off-stretcher time include different elements of the transition between ambulance and ED. Comparisons between the two measures do not reflect performance improvement or deterioration.

As a performance measure, transfer of care time provides new and valuable information that supplements the information provided by off-stretcher time.

#### Reflecting on data quality

A recent report by the NSW Auditor-General<sup>17</sup> found variation in hospital staff views regarding when transfer of care has occurred: *"Some thought it occurred when paramedics handed over patients to hospital staff at the bedside. Others thought it occurred when a patient was allocated a bed by the triage nurse. In the later scenario, paramedics said that although a bed had been allocated, they were sometimes unable to offload patients."*

The NSW Ministry of Health has accepted the recommendation made by the Auditor-General that by December 2013, those tasks that should occur before transfer of care is complete are clarified.<sup>(7)</sup>

In light of the Auditor-General's findings, the Bureau undertook further data analysis. This revealed that in the latest quarter (April – June 2013), there were 14 hospitals for which the median transfer of care time was shorter than the median time to triage – suggesting some systematic variation in the way the transfer of care time is being measured in hospitals. When stratified into triage categories, there were between 11 and 16 hospitals with shorter median transfer of care times than median triage times across triage groups. There is no indication therefore that the variation seen is a result of case mix or acuity.

Further, across the state 13% of matched records had off-stretcher times that were shorter than their transfer of care times. At a hospital level, the proportion of matched records that had shorter off-stretcher times than transfer of care times ranged from 4% to 69%.

Going forward, there are mechanisms in place to ensure data quality. Although there is some imprecision in the data as the new Transfer of Care Reporting System is established, measures remain valid for performance comparisons.

The Bureau's assessment is that while there is room for improvement in data quality, transfer of care time and off-stretcher time are valuable measures of overlapping but discrete areas of performance.

## What we will report

The Bureau of Health Information will report transfer of care measures for the state and for individual hospitals on a quarterly basis as part of its *Hospital Quarterly* series, beginning with volume 13. It will also report on off-stretcher times (for matched records only – see [Appendix 1](#) for an explanation of matched and unmatched records).

The measures to be reported at a NSW level are:

- Ambulance arrivals with transfer of care time
- Percentage of arrivals with transfer of care within 30 minutes
- Median transfer of care time
- Median off-stretcher time for patients transported to the ED by ambulance.

At a hospital level, individual performance profiles will include median transfer of care time and for patients transported to the ED by ambulance, median off-stretcher time.

Hospitals with small numbers of ambulance arrivals in a quarter (< 50) are not reported upon.

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(7) NSW Auditor-General's Report. *Reducing ambulance turnaround time at hospitals*. Sydney; Audit Office, 2013.

## Appendix 1: Matched and unmatched records

Not all patients transported to the hospital by ambulance are delivered to the emergency department. Some go directly to another part of the hospital, for example to a ward or to theatre or to the intensive care unit. As these patients do not enter the ED, there is no emergency department incident number or date / time recorded in the ED system. In these cases a transfer of care time cannot be calculated and the data are ‘*unmatched*’ records in the dataset. However, the ambulance journey information is available and can be used to generate an off-stretcher time.

This report has focused on the implications of reporting transfer of care, alongside off-stretcher time. In order to make meaningful comparisons between these two measures, only matched records have been included in the analysis and report.

To provide context for the report, the relative proportions of matched and unmatched records were calculated. For the state as a whole, the percentage of records that were unmatched was 15% in April – June 2012, falling to 13% in April – June 2013 ([Appendix table 1](#)).

Across NSW hospitals, the proportion of unmatched records for the five quarters with available data varied ([Appendix figure 1](#)).

Those hospitals with > 30% unmatched records were further investigated, comparing off-stretcher times for unmatched and matched records.

Ambulance priority data are available for unmatched records and analysis of these data for June 2013 revealed that 36% of unmatched records were for priority P3 incidents (which are transported to hospital locations other than the ED); while 42% were for priority 1C (which are high priority cases where clerical accuracy may be compromised in order to focus appropriately, on clinical care delivery). The remaining 22% were distributed fairly evenly across the other priority categories.

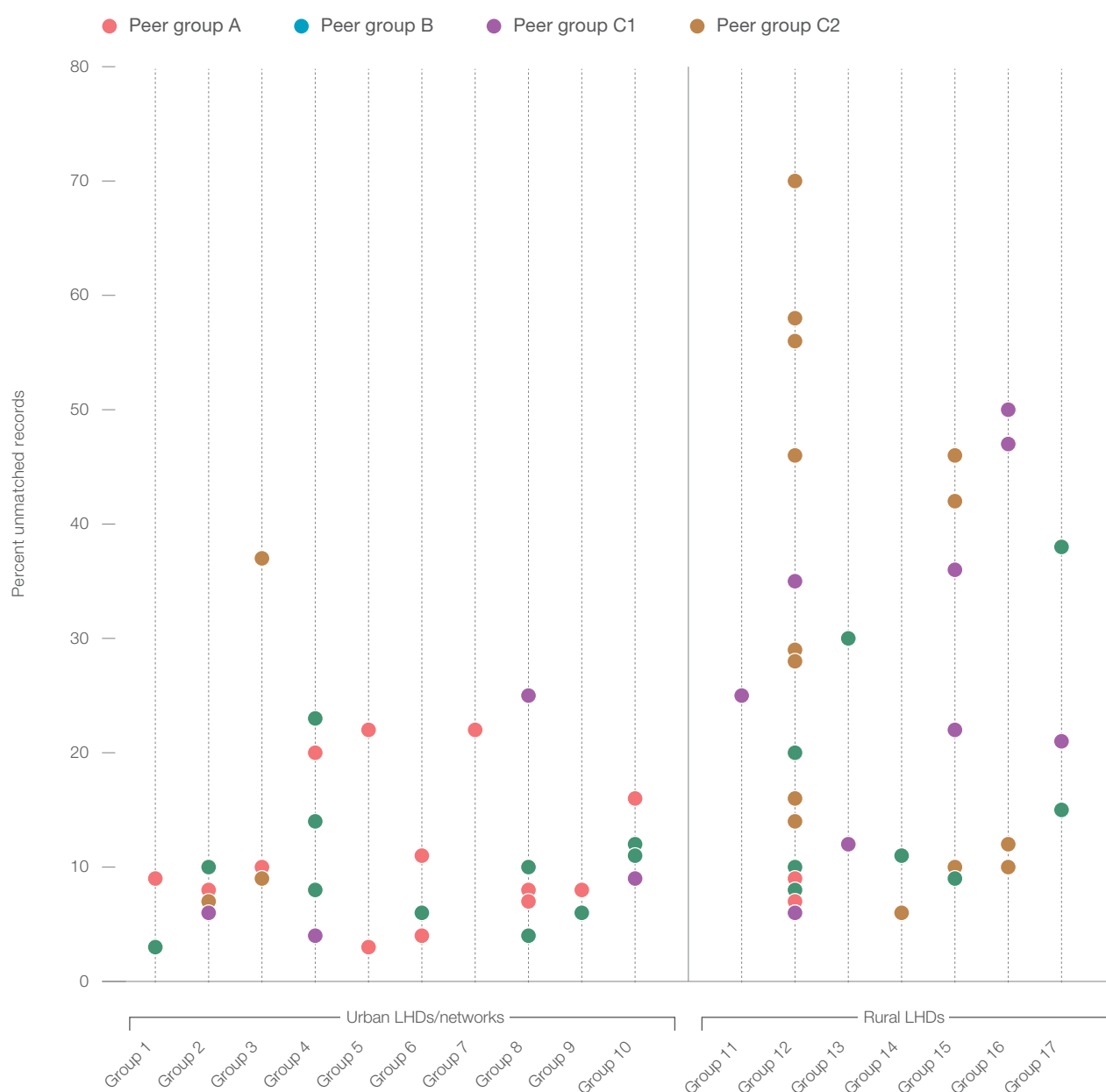
Appendix table 1: Matched and unmatched ambulance records, NSW, April – June 2012 to April – June 2013

	Apr-Jun 2012	Jul-Sep 2012	Oct-Dec 2012	Jan-Mar 2013	Apr-Jun 2013
Unmatched records	21,349	20,038	18,613	19,553	18,464
Matched records	118,315	124,413	122,689	119,049	120,630
Percent unmatched	15%	14%	13%	14%	13%

Note: Data exclude hospitals with < 5 quarters of data. Tabulated data exclude facilities not reported in ED module of *Hospital Quarterly*.

Source: Transfer of Care Reporting System.

Appendix figure 1: Proportion of ambulance records that were unmatched, NSW hospitals by LHD, April – June 2012 to April – June 2013





## Appendix 2

Records where transfer of care was unable to be calculated (triage missing and negative time (11); transfer > 24h after arrival (185); transfer before arrival and triage (1831); transfer is missing (6036).

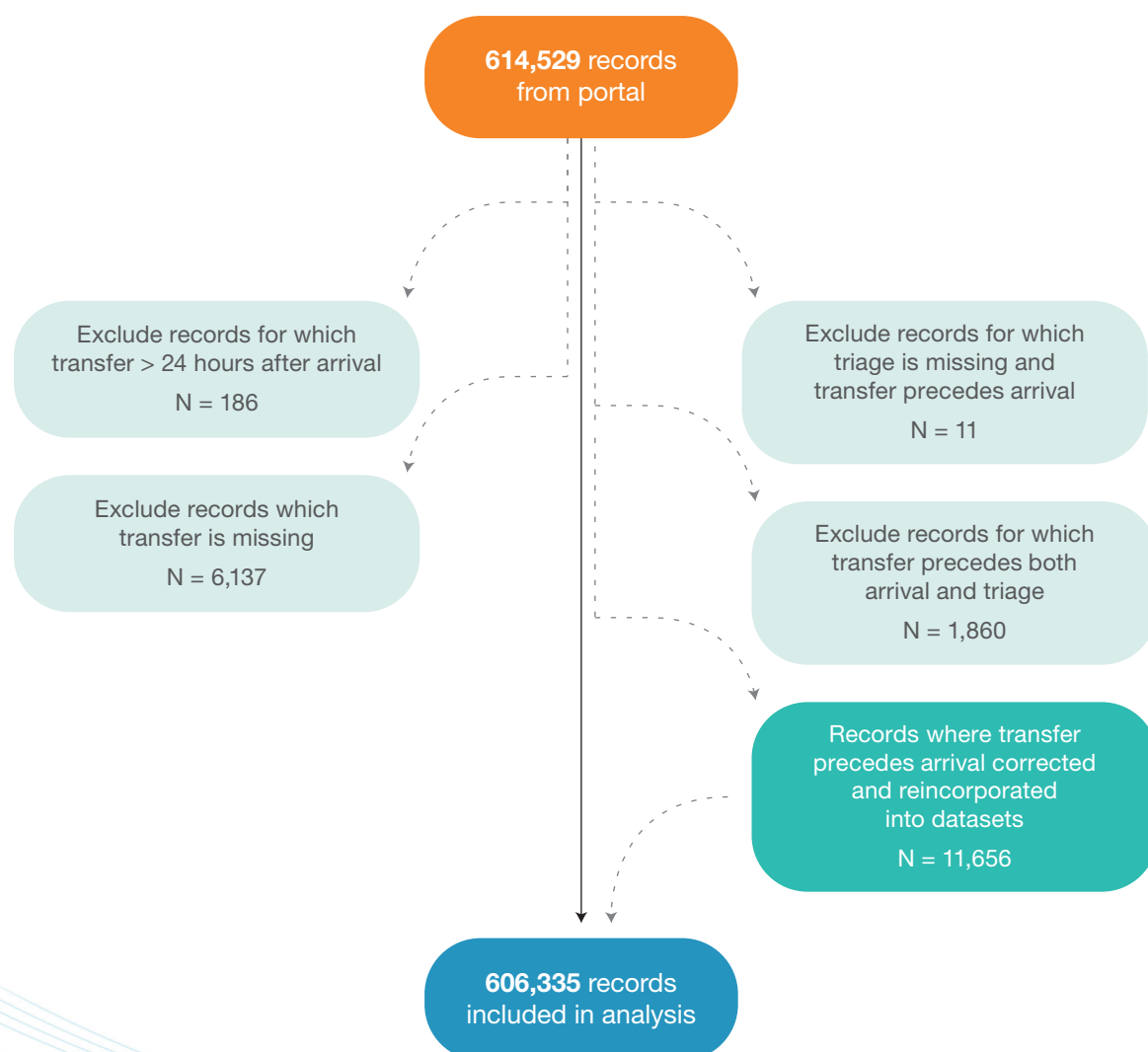
The number of records that were unable to be calculated decreased over the five quarters measured (from 1,645 in April – June 2012 to 1,390 in April – June 2013). The distribution of these records was evenly spread across hospitals in the state.

Over the five quarters included in this report, there were 11,656 records where the time recorded for transfer preceded the hospital ED arrival time. The following steps were used to impute a transfer of care time for these records:

Records where the arrival time is after the triage time,

- If transfer time is less than arrival time and triage time not missing and triage time is less than or equal to transfer time then:
- Use the triage time as the arrival time.

Appendix figure 2: Composition of the dataset used in this report



# 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 statutory health corporation is intended or should be inferred.

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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.