Adult Critical Care in England
April 2011 to March 2012
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Executive Summary

This publication, Adult Critical Care in England – April 2011 to March 2012, is the fourth in an annual series of reports published by the Health and Social Care Information Centre analysing data in English hospital admission records for periods of care in Intensive Care and High Dependency Units.

Key findings

In 2011-12:

Critical Care Periods
- There were 238,248 records of adult critical care periods usable for analysis, an increase on the 215,728 records usable for analysis in 2010-11.
- Nearly twice as many critical care periods were recorded as starting on each weekday (between 15% and 17% per day) as on a Saturday (8.8%) or Sunday (8.2%).
- More critical care periods were recorded as starting between 18:00-18:59 than any other hour in the day (8.1% of all recorded start times).

Critical Care Patients
- The majority of critical care records were for male patients (58% (137,225) of records where gender was recorded).
- Nearly all records where the information is available – 95% (173,623 records) – recorded the patient as having been admitted to the critical care unit from the same NHS hospital site as the critical care unit.
- A large majority of records identify that patients went elsewhere in the same NHS hospital site upon the end of their critical care period (84% (149,703) of records with the information recorded).
- In around 9% of cases, the patient died in the critical care unit.

Clinical Analysis
- ‘Cardiac surgery and primary cardiac conditions’ was the Healthcare Resource Group chapter identified in more records than any other, accounting for 27% of male and 17% of female records.
- On average, the equivalent of 9 days’-worth of organ support was recorded per critical care period.
- More critical care records had 2 types of organ support recorded than any other number of support types (31% of the records).

Critical Care Units
- 60% (141,842) of adult critical care records were for care units for non-specific general adult care, and 18% (43,226 records) were for units where cardiac surgical patients predominate.
Introduction

Background
An Intensive Care Unit (ICU) or High Dependency Unit (HDU) ward in a hospital – known as a critical care unit – provides support, monitoring and treatment for critically ill patients requiring constant support and monitoring to maintain function in at least one organ, and often in multiple organs; medical equipment is used to take the place of patients’ organs during their recovery.

Some critical care units are attached to condition-specific treatment units, such as heart, kidney, liver, breathing, circulation or nervous disorders. Others specialise in neonatal care (babies), paediatric care (children) or for patients with severe injury or trauma.

This publication is the fourth in an annual series of statistical reports on adult critical care data published by the Health and Social Care Information Centre.

Coverage
Data for paediatric and neonatal critical care is collected principally through separate datasets which are not comparable to the adult critical care dataset; therefore this report is limited to analysis of data for adult critical care units, although some of the patients treated in these units will have been babies or children. Data is for activity in NHS hospitals in England and activity commissioned by the English NHS carried out in the independent sector in England.

Analysis in this report covers periods of critical care and episodes of inpatient hospital care which ended between 01 April 2011 and 31 March 2012.

Note that figures shown, except where stated otherwise, are numbers of records of adult critical care and not numbers of patients; any particular patient could have had more than one critical care stay, whether in the same or different time periods and for the same or different conditions.

Unless stated otherwise, figures relate to records of critical care periods which were the ‘best match’ with a hospital inpatient episode and are thus usable for analysis – for further details, please refer to the accompanying Technical Guide.

Further information
The following documents and files are published alongside this statistical report:

- Data Quality Note – more detailed information about the quality and coverage of the data analysed in this report.
- Technical Guide – background to the data and some of the processing issues.
- Data file – the data in the accompanying tables in an easily reusable format.

Bespoke tabulations and extracts of critical care HES data are available on request (terms and conditions apply). For more information and details of any applicable charges, please visit http://www.ic.nhs.uk/data-extracts.
Critical Care Periods

Overview
There were 238,248 critical care records usable for analysis. This is more than the 215,728 records usable for analysis in 2010-11 but the increase may in part reflect improvements in data quality and coverage as well as any underlying increase in the number of critical care periods.

Seasonality
The number of critical care records which ended in each month was not uniform, with variation from month to month being greater than would be expected randomly, although this variation may at least in part be a result of incomplete reporting by hospitals.

Chart 1: Percentage of critical care records by month of discharge from critical care.

![Chart 1: Percentage of critical care records by month of discharge from critical care.](chart1)

Note: March figures are artificially depressed owing to systemic non-reporting of unfinished care periods

In 2010-11 the number of finished critical care records showed a clearly apparent peak in the late autumn / early winter months, but any pattern for 2011-12 is less apparent (Chart 1 and accompanying Table 1). It is not known whether this might in part have resulted from a milder winter than the previous year. Figures for March each year are artificially depressed as any critical care period associated with a hospital inpatient episode which is still on-going at the end of March will not be reported into the system until the following financial year, when it has finished.

The greatest number of discharges was in June, compared to a peak in October in the 2010-11 year, although in both years the 3rd quarter (October to December) had the greatest aggregate number (accompanying Table 2).

A full breakdown of the number of finished critical care periods in each month for each hospital provider is presented in Table 3 in the accompanying data tables file.

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1 Statistical hypothesis that number of discharges is independent of discharge month rejected at $p \approx 0$
Day of the week
There were nearly twice as many critical care periods recorded as starting on each weekday (between 15% and 17% per day) as on a Saturday (8.8%) or Sunday (8.2%) (Chart 2 and accompanying Table 4). By contrast, discharges from critical care (Chart 3) were recorded with less clear a pattern, although there were fewer recorded for Saturday to Monday (between 9.0% and 13% per day) than the midweek days of Tuesday to Friday (between 15% and 17% per day). The distribution through the week was similar to that seen in 2010-11 data.

Chart 2: Recorded critical care period start day

Chart 3: Recorded critical care period discharge day
Critical care periods mostly started during the working day, with 51% of those with a start time recorded starting between 8:00 and 17:59 (Chart 4) with the peak hour being 18:00-18:59, having 8.1% of the recorded start times. The recorded critical care period end times followed a similar pattern to start times, with few during each of the overnight hours and the bulk during the daytime, but there were clear peaks around 10:00-10:59am and 17:00-17:59 with a marked dip around the hour 13:00-13:59. These patterns in start and end times, which are similar to those for 2010-11 records, may reflect in part hospital practices and discharge planning.

A considerable fraction of critical care records have the first or, to a lesser extent, the last hour of the day recorded for start or end time: 5.5% of recorded start times were in the post-midnight hour compared to just 2.3% in the 1:00-1:59 hour. This may be largely a result of some hospital providers recording default times of midnight or 23:59 rather than reflecting a genuine peak in critical care admissions or discharges in the middle of the night.

**Chart 4: Distribution of recorded critical care period start and end hour**

![Chart](chart.png)

Note: Figures for the first and last hours of the day are artificially high owing to poor data recording by some hospital providers

**Length of stay**

Critical care period start time is recorded in far fewer cases than end time and the times have substantial data quality issues, so analysis of length of stay has been based on period start and end dates. By convention in analyses of data from Hospital Episode Statistics, the length of stay is expressed as the difference in whole days between the start and end date: for example, a period starting and finishing on the same calendar day would be reported as having a duration of 0 days, even if it was very nearly 24 hours long, whilst a period starting on one calendar day and finishing on the next would be reported as having a duration of 1 day, whether it was nearly 48 hours long (started very early on day 1 and ended very late on day 2) or as short as 1 minute (started just before midnight and ended just after).

About half of critical care records – 53% (126,967) – finished one or two calendar days after they started, similar to the 52% of 2010-11 records. More records – 36% (86,959) – ended one day after they started than any other duration (Chart 5), with there being generally fewer periods recorded the greater the number of calendar days covered.
Chart 5: Recorded critical care period duration in days

Note: duration is the difference in whole days between the start and end date; see text above for description.
Critical Care Patients

Patient demographics

Age and gender

The majority of the critical care records where gender was recorded – 58% (137,225 records) – were for male patients, similar to 2010-11. Older patients generally accounted for greater numbers of critical care periods than younger patients (Chart 6), with 70 to 74 year-old men and 75 to 79 year-old women being recorded more than any other age groups; individual patients can, however, have been admitted for more than one critical care period during the year.

Chart 6: Number of critical care records by gender and age group

Note: Excludes records where gender was not recorded

Deprivation

Generally, more critical care periods were recorded for patients the more deprived their area according to the Index of Multiple Deprivation (IMD), although the average number of days covered by critical care periods was similar across the IMD groups. There were 27,737 records for patients in the most deprived decile compared to 18,869 for the least deprived decile, although it is not known whether this difference is a result of IMD or of some other factor. A full breakdown is presented in Table 5 in the accompanying data tables file.

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2 Analysis based on deciles of the Index of Multiple Deprivation, a measure which “combines a number of indicators, chosen to cover a range of economic, social and housing issues, into a single deprivation score for each small area in England” (Department of Communities and Local Government: http://www.gov.uk/government/organisations/department-for-communities-and-local-government/series/english-indices-of-deprivation)
Admission type

Of those records where the information was recorded, more than half – 51% (86,734) – were for patients admitted to a critical care unit as an unplanned local admission, i.e., a patient in the local area who had been referred to the unit as an emergency or urgent case only as a result of an unexpected acute illness. A further 37% (63,616) were planned local surgical admissions, i.e., pre-arranged surgical admission from the local area which had been accepted by the critical care unit prior to the start of the surgical procedure (which will typically have been elective or scheduled surgery). Both fractions are almost unchanged on 2010-11 data.

Note that these figures refer specifically to the admission to the critical care unit and not to the overarching hospital admission.

A full breakdown of admission type is shown in Table 6 in the accompanying data tables file.

Source of admission to critical care

Nearly all critical care records – 95% (173,623) – which recorded the source of the patient’s admission to critical care had the source as the same NHS hospital site as the critical care unit, similar to the 94% recorded for 2010-11. Other sources capable of being recorded were: other NHS hospital site, independent hospital provider in the UK, a non-hospital source in the UK (such as the home) and non-UK sources.

Considering the more specific source location of the patient immediately before the start of the critical care period, the most common single source was theatre and recovery (following surgical and / or anaesthetic procedure) which was the case for 45% (79,217) of those records which had the information recorded, similar to the 43% recorded for 2010-11. A further 24% (42,344) were for patients admitted from another ward (25% in 2010-11).

A full breakdown is shown in Table 7 (admission source) and Table 8 (specific source location) in the accompanying data tables file.

Discharge status and destination

Information is recorded in most records for patients’ destination upon discharge from the critical care unit as is further information about their status at discharge.

84% (149,703) of records with the information recorded identify that patients went elsewhere in the same NHS hospital site upon the end of their critical care period (Table 9), little different from 2010-11. In nearly two-thirds – 64% (113,201 records) – of cases with the information recorded, patients were identified as fully ready for discharge at the end of their critical care period (Table 10 in the accompanying data tables file), similar to the 66% identified for 2010-11; about 8% (13,973) showed the patient having the current level of care continuing in another location, slightly higher than the 7% in 2010-11.

These tables show that – based on the incomplete information recorded – in around 9% of cases, the patient died in the critical care unit.
### Table 9: Destination of patients at the end of their critical care period

<table>
<thead>
<tr>
<th>Critical care unit discharge destination</th>
<th>2011-12</th>
<th>2010-11</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of critical care records</td>
<td>Percentage of critical care records</td>
</tr>
<tr>
<td>Same NHS hospital site</td>
<td>149,703</td>
<td>84.0%</td>
</tr>
<tr>
<td>No discharge destination, patient died in unit</td>
<td>15,152</td>
<td>8.5%</td>
</tr>
<tr>
<td>Non-hospital destination within the UK (e.g. home as coded in location)</td>
<td>7,047</td>
<td>4.0%</td>
</tr>
<tr>
<td>Other NHS hospital site (can be same trust or a different NHS trust)</td>
<td>5,901</td>
<td>3.3%</td>
</tr>
<tr>
<td>Independent hospital provider in the UK</td>
<td>276</td>
<td>0.2%</td>
</tr>
<tr>
<td>Non-United Kingdom destination (e.g. repatriation)</td>
<td>65</td>
<td>0.0%</td>
</tr>
<tr>
<td><strong>Sub total</strong></td>
<td><strong>178,144</strong></td>
<td><strong>100.0%</strong></td>
</tr>
<tr>
<td>Unknown / not recorded</td>
<td>60,104</td>
<td>25.2%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>238,248</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

More specific information on the destination of patients following the end of their critical care period is laid out in Table 11 in the accompanying data tables file.
Clinical Analysis

Type of inpatient treatment

Hospital inpatient episode records associated with critical care periods include an allocation to a Healthcare Resource Group (HRG), a grouping of clinically similar treatments for administrative purposes. Analysis of these groupings gives an indication of the main areas of clinical care for which patients are admitted to critical care units (Table 12).

As in 2010-11, the HRG chapter with the greatest number of critical care records was chapter E ("Cardiac surgery and primary cardiac conditions") with 27% (37,159) of male and 17% (16,817) of female patient records which had HRG recorded, a total of 23% (53,976).

Chart 7: Percentage split of critical care records by Healthcare Resource Group by gender, in descending order of recorded male:female ratio

Most HRG chapters had more critical care records for men than women, with chapter E having the greatest recorded male-to-female ratio (37,159 male records – 69% of the total – and 16,817 female records – 31% of the total). Chapters M ("Female reproductive system") and N ("Obstetrics and neonatal care") are largely specific to female patients.

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3 For further information on HRGs, please see [http://www.ic.nhs.uk/hrg](http://www.ic.nhs.uk/hrg)

4 Excludes records where gender was not recorded.
Table 12: Critical care records by gender and Healthcare Resource Group (HRG)\(^5\)

<table>
<thead>
<tr>
<th>HRG 3.5 chapter</th>
<th>2011-12</th>
<th></th>
<th>2010-11</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Total</td>
<td>Male</td>
</tr>
<tr>
<td>A The nervous system</td>
<td>9,534</td>
<td>7,535</td>
<td>17,069</td>
<td>8,570</td>
</tr>
<tr>
<td>B Eyes and periorbita</td>
<td>181</td>
<td>99</td>
<td>280</td>
<td>159</td>
</tr>
<tr>
<td>C Mouth, head, neck and ears</td>
<td>6,074</td>
<td>3,755</td>
<td>9,829</td>
<td>5,962</td>
</tr>
<tr>
<td>D Respiratory system</td>
<td>15,819</td>
<td>13,128</td>
<td>28,947</td>
<td>15,221</td>
</tr>
<tr>
<td>E Cardiac surgery and primary cardiac conditions</td>
<td>37,159</td>
<td>16,817</td>
<td>53,976</td>
<td>32,844</td>
</tr>
<tr>
<td>F Digestive system</td>
<td>19,472</td>
<td>16,839</td>
<td>36,311</td>
<td>17,902</td>
</tr>
<tr>
<td>G Hepato-biliary and pancreatic system</td>
<td>6,769</td>
<td>5,276</td>
<td>12,045</td>
<td>5,807</td>
</tr>
<tr>
<td>H Musculoskeletal system</td>
<td>6,735</td>
<td>6,020</td>
<td>12,755</td>
<td>6,201</td>
</tr>
<tr>
<td>J Skin, breast and burns</td>
<td>2,444</td>
<td>2,394</td>
<td>4,838</td>
<td>2,239</td>
</tr>
<tr>
<td>K Endocrine and metabolic system</td>
<td>1,402</td>
<td>1,823</td>
<td>3,225</td>
<td>1,344</td>
</tr>
<tr>
<td>L Urinary tract and male reproductive system</td>
<td>9,748</td>
<td>6,219</td>
<td>15,967</td>
<td>8,220</td>
</tr>
<tr>
<td>M Female reproductive system</td>
<td>26</td>
<td>2,304</td>
<td>2,330</td>
<td>9</td>
</tr>
<tr>
<td>N Obstetrics and neonatal care</td>
<td>88</td>
<td>4,094</td>
<td>4,182</td>
<td>137</td>
</tr>
<tr>
<td>P Diseases of childhood</td>
<td>747</td>
<td>664</td>
<td>1,411</td>
<td>827</td>
</tr>
<tr>
<td>Q Vascular system</td>
<td>10,863</td>
<td>5,215</td>
<td>16,078</td>
<td>9,533</td>
</tr>
<tr>
<td>R Spinal surgery and primary spinal conditions</td>
<td>2,205</td>
<td>2,069</td>
<td>4,274</td>
<td>2,039</td>
</tr>
<tr>
<td>S Haematology, infectious diseases, poisoning and non-specific groupings</td>
<td>5,347</td>
<td>4,800</td>
<td>10,147</td>
<td>5,226</td>
</tr>
<tr>
<td>T Mental health</td>
<td>318</td>
<td>153</td>
<td>471</td>
<td>318</td>
</tr>
<tr>
<td>U Unidentified groups</td>
<td>2,140</td>
<td>1,688</td>
<td>3,828</td>
<td>1,442</td>
</tr>
<tr>
<td>Blank Unknown / not recorded</td>
<td>154</td>
<td>125</td>
<td>279</td>
<td>143</td>
</tr>
<tr>
<td>Total</td>
<td>137,225</td>
<td>101,017</td>
<td>238,242</td>
<td>124,143</td>
</tr>
</tbody>
</table>

5 HRG (version 3.5) chapter recorded in linked hospital inpatient episode record. Excludes records where gender is not recorded.
Organ support

For the 238,248 critical care records, there were in total the equivalent of 2,093,099 days'-worth of organ support recorded, an average of nearly 9 support days'-worth per critical care period. Patients in a critical care unit can have support for more than one organ system for some or all of their critical care stay; there were a total of 517,664 organ support records, indicating an average of 2.2 organ support types per critical care period.

The greatest number of support records was for basic cardiovascular support, with 178,318 records for a total of 688,885 support days'-worth, an average of 3.9 support days'-worth per critical care period. The support type with the greatest average number of recorded support days per critical care period was gastrointestinal support, with 44,513 records for a total of 336,332 support days'-worth, an average of 7.6 support days'-worth per critical care period.

Chart 8: Number of critical care records by number of recorded support types

Overall, 93% (220,516) of critical care records had 1 or more of the 9 support types recorded (Chart 8); most commonly critical care periods had 2 support types recorded, which was the case for 31% (74,519) of critical care records. A similar pattern was observed in 2010-11.

Generally, the greater the number of support types recorded for a critical care period, the longer the length of stay in critical care: for critical care records with between 0 and 3 types of support recorded, average days covered by the critical care period was between 2.3 and 4.0. For records with more than 3 types of organ support, the average number of critical care days was higher the more types of support were recorded.

A full breakdown of support is presented in in Table 13 in the accompanying data tables file.
Critical Care Units

Principal clinical service
Whilst some critical care wards principally provide non-specific general adult care services, others specialise in particular categories of patients. 60% (141,842) of adult critical care records were for care units for non-specific general adult care, and 18% (43,226 records) were for units where cardiac surgical patients predominate, similar to 2010-11 (61% and 17% respectively). A full breakdown of the care units’ principal clinical service is in Table 14 in the accompanying data tables file.

Bed configuration
Of the 238,248 critical care records, 175,402 recorded the unit’s bed configuration based on maximum funded and intended use as:

- Level 2 beds only – patients requiring more detailed observation or intervention, including support for a single failing organ or post-operative care and those ‘stepping down’ from higher levels of care
- Level 3 beds only – patients needing advanced respiratory support alone or two or more organs’ system support, including beds for complex patients requiring support for multi-organ failure
- Mix of level 2 and level 3 beds
- Temporary use of non-critical care beds

Of those where the configuration was recorded, 67% (118,210) were for mixed bed wards whilst 3.2% (5,533) were for temporary use of non-critical care beds; both fractions were similar in 2010-11. A full breakdown of the recorded unit bed configuration is in Table 15 in the accompanying data tables file.