Independent Hospital Pricing Authority

**National Hospital Cost Data Collection:
Private Hospital Cost Report**

Round 20 (Financial year 2015-16)

February 2018

National Hospital Cost Data Collection, Private Hospital Cost Report, Round 20 (Financial year 2015-16) – February 2018

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Contents

[Tables and figures 3](#_Toc497750206)

[Acronyms/Abbreviations 4](#_Toc497750207)

[Disclaimer 5](#_Toc497750208)

[1 Executive summary 6](#_Toc497750209)

[2 Introduction 8](#_Toc497750210)

[3 Scope and Methodology 12](#_Toc497750211)

[4 Results 15](#_Toc497750212)

[Appendix A: Analysis performed to determine the minimum sample size 41](#_Toc497750213)

[Appendix B: Detailed methodology 45](#_Toc497750214)

[Appendix C: Standard error range for the Round 20 private sector NHCDC 50](#_Toc497750215)

[Appendix D: Cost weight tables by AR-DRG Version 8.0 51](#_Toc497750216)

[Appendix E: Cost weight tables by AR-DRG Version 7.0 52](#_Toc497750217)

[Appendix F: Cost weight tables by AR-DRG Version 6.0x 53](#_Toc497750218)

# Tables and figures

## List of Tables

[Table 1. Summary of private hospital participation 6](#_Toc497750015)

[Table 2. Summary of private hospital participation 9](#_Toc497750016)

[Table 3. Round 20 participation rate confidence level and margin of error 13](#_Toc497750017)

[Table 4. Comparison of separations and hospitals, Round 11 (2006-07) to Round 20 (2015-16) 15](#_Toc497750018)

[Table 5. Top 20 DRG ranked by highest cost weight 18](#_Toc497750019)

[Table 6. Top 20 DRGs ranked by highest volume of population adjusted separations 21](#_Toc497750020)

[Table 7. Top 20 DRGs ranked by highest cost weighted separations 24](#_Toc497750021)

[Table 8. Top 20 DRGs ranked by ALoS 27](#_Toc497750022)

[Table 9. Breakdown of cost by cost-bucket group, Round 20 versus Round 18 28](#_Toc497750023)

[Table 10. Top 20 DRG for critical care cost bucket 31](#_Toc497750024)

[Table 11. Top 20 DRGs for operating room/specialised procedure suite cost bucket 34](#_Toc497750025)

[Table 12. Top 20 DRGs for prostheses cost bucket 37](#_Toc497750026)

[Table 13. Top 20 DRGs for miscellaneous (Misc.) cost bucket 40](#_Toc497750027)

[Table 14 Round 20 participation rate confidence level and margin of error. 43](#_Toc497750028)

[Table 15. Number of DRGs by standard error range 50](#_Toc497750029)

[Table 16. Round 20 (2015-16) national consolidation cost weight tables – V8.0 51](#_Toc497750030)

[Table 17. Round 20 (2015-16) national consolidation cost weight tables – V7.0 52](#_Toc497750031)

[Table 18. Round 20 (2015-16) national consolidation cost weight tables – V6.0x 53](#_Toc497750032)

## List of Figures

[Figure 1. Top 20 DRGs ranked by highest cost weight 17](#_Toc497750033)

[Figure 2. Comparison of top 20 DRGs by highest volume of population adjusted separations 20](#_Toc497750034)

[Figure 3. Comparison of top 20 DRGs by highest cost weighted separations 23](#_Toc497750035)

[Figure 4 Comparison of top 20 DRGs by ALoS 26](#_Toc497750036)

[Figure 5. Breakdown of cost by cost-bucket group, Round 20 versus Round 18 28](#_Toc497750037)

[Figure 6. Top 20 DRG for critical care cost bucket 30](#_Toc497750038)

[Figure 7. Top 20 DRGs for operating room/specialised procedure suite cost bucket 33](#_Toc497750039)

[Figure 8. Top 20 DRGs for prostheses cost bucket 36](#_Toc497750040)

[Figure 9. Top 20 DRGs for miscellaneous cost bucket 39](#_Toc497750041)

# Acronyms/Abbreviations

| **Acronym/Abbreviation** | **Description** |
| --- | --- |
| ABS | Australian Bureau of Statistics |
| AHPCS | Australian Hospital Patient Costing Standards |
| AIHW | Australian Institute of Health and Welfare |
| ALoS  | Average length of stay |
| AR-DRG | Australian Refined Diagnosis Related Group |
| DoH | Department of Health |
| DRG | Diagnosis Related Group |
| EDW | Enterprise Data Warehouse |
| HCP | Hospital Casemix Protocol |
| ICD-10-AM | International statistical classification of diseases and related health problems, Tenth Revision, Australian modification |
| IHPA | Independent Hospital Pricing Authority |
| LoS | Length of stay |
| NHCDC | National hospital cost data collection |
| OR | Operating room (theatres) |
| PHDB | Private Hospital Data Bureau |
| PwC | PricewaterhouseCoopers Australia |
| QA | Quality Assurance |
| SPS | Specialist procedure suites |
| WIP | Work in progress |

# Disclaimer

Reliance on this report

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Accordingly, whilst the statements made in this report are given in good faith, PwC accept no responsibility for any errors in the information provided to us nor the effect of any such errors on our analysis, suggestions or report.

Comparison to Round 18 report

The Round 20 ranking analysis cannot be compared to the published Round 18 National Hospital Cost Data Collection (NHCDC) report due to moving from Australian Refined Diagnosis Related Groups (AR-DRG) version 6.0x to version 8.0 which caused a loss of 10 per cent of the separations which could not be re-grouped. Therefore the Round 18 data has been re‑ranked based on the revised dataset.

Public and private sector differences

This report does not seek to compare the average cost per separation between the public and private sectors, as the scope of costs between the two sectors is different. Many of the cost items present in the public sector such as Pathology or Imaging are not equally represented in Private Hospital general ledgers. In addition, the costs of medical specialists are usually not captured in private hospital general ledgers. For example, these costs are generally not reported for the private sector because the majority of hospitals do not provide these services directly and patients pay for these services separately.

Confidentiality of data

Due to the commercial nature of the sector, all participating hospitals in Round 20 are requested to sign a confidentiality agreement before any final reports are released.

Where a cost weight reported for a Diagnosis Related Group (DRG) is based on less than five population-adjusted separations, the Figures for this cost weight have been replaced by asterisks (\*\*\*\*\*). If the number of contributing hospitals for a particular DRG is less than three, the Figures for this cost weight have been replaced by dashes (-----).

For the cost weight table appendices we have removed the column that showed the number of hospitals associated with a DRG. This decision was based on feedback received from the sector in relation to hospitals being identifiable.

# Executive summary

The private sector NHCDC is a voluntary collection that produces a range of hospital cost and activity information by AR-DRG. This report includes the findings from the Round 20 (2015-16) private sector NHCDC for acute admitted care provided by overnight private hospitals.

## Changes in Round 20

There have been some key changes from Round 18 to Round 20, which are summarised below:

* All participants were required to undertake their own costing. The primary reason being that by increasing hospital involvement, the quality of the private sector NHCDC would improve and result in building long-term capacity in the sector to undertake patient level costing.
* Specific hospital groups were targeted to participate. This was done to achieve the target participation rate.
* IHPA facilitated the data collection process, which involved stakeholder engagement, validation, quality assurance and data set consolidation. Consultants were engaged to undertake data analysis and reporting.
* The analysis in this report was updated to AR‑DRG version 8.0. This was done to reflect changes in clinical practice and to ensure the classifications remain clinically relevant and robust.
* The market share adjustment counts only hospital groups that submitted data. This was done to better reflect the population of participants and ensure each group is appropriately represented.

These changes are detailed further in section 2.5.

## Participation

The high level statistics for the Round 20 private sector NHCDC compared to previously reported Rounds (since 2006‑07) are provided in Table 1. In Round 20, the data set represents 91 hospitals and 1,781,699 separations representing 58 per cent of the population.

The number of participating hospitals has declined by five hospitals or 5.0 per cent. The number of sample separations has increased by 84,388 or 5.0 per cent. The participation rate reduced marginally by 2.0 percentage points compared to Round 18.

Table 1. Summary of private hospital participation

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Summary | Round 11 2006-07 | Round 12 2007-08 | Round 13 2008-09 | Round 16 2011-12 | Round 17 2012-13 | Round 18 2013-14 | Round 20 2015-16 |
| Number of hospitals | 82 | 109 | 110 | 105 | 95 | 96 | 91 |
| Sample Separations | 1,297,147 | 1,607,678 | 1,648,989 | 1,775,059 | 1,650,816 | 1,697,311 | 1,781,699 |
| Participation rate\* (%) | 59 | 72 | 71 | 66 | 60 | 60 | 58 |
| AR-DRG version | 4.2 | 4.2 | 5.1 | 6.0x | 6.0x | 6.0x | 8.0 |

\* Participation rate refers to the percentage of sample separations compared to the population separations.

## Key findings

The data from the Round 20 private sector NHCDC was analysed to identify top 20 DRGs by various comparators between Round 18 and Round 20. The key findings are provided below:

* Highest cost weight: The analysis showed 80 per cent consistency in the top 20 between Round 18 and 20, with the top three being ranked in the top three for both Rounds. Four DRGs have entered the top 20, which is potentially due to the change in sample size and increase in volume of weighted separations for these DRGs.
* Highest volume of population adjusted separations: This analysis showed 90 per cent consistency in the top 20 between Round 18 and 20, with the top two being ranked the same for both Rounds.
* Highest cost‑weighted separations: The analysis showed 80 per cent consistency in the top 20 between Round 18 and 20, with the top two being ranked the same for both Rounds. The changes in the top 20 are potentially due to different sample of participants and change in activity volume.
* Highest ALoS: The analysis showed 70 per cent consistency in the top 20 between Round 18 and 20, with the top two being ranked in the top two for both Rounds. Two DRGs have entered the top 20 which are neonatal DRGS. These were previously masked due to having less than 5 separations or having data from less than three hospitals.

The data was also analysed by the cost buckets OR and SPS combined, critical care, prostheses and miscellaneous. The key findings are provided below, when comparing between Round 18 and 20:

* OR/SPS cost bucket increased by 3.2 per cent. A potential reason for this is the increased use of participant’s own feeder data and allocation statistics providing more accurate cost allocations, changes in service weights between Rounds and increase in same day theatre related separations.
* Critical care cost bucket increased by 0.5 per cent. There was some movement in the top 20 DRGs by highest critical care cost which is potentially due to the participants using their own feeder systems to allocate costs
* Prostheses cost bucket decreased by 3.0 per cent. A potential reason for this is that participants used feeder systems rather than PHDB data to inform this allocation of cost.

## Key considerations

The following areas can have a material impact on the reported costs and cost weights. These should be considered, in addition to the changes in Round 20, when interpreting the information in this report:

* Application of the AHPCS v3.1.
* Mapping of general ledger to the appropriate and consistent cost buckets.
* Allocation of cost centres to care areas.
* Variability in allocating costs using feeder systems (patient level data) verses service weights.

# Introduction

## Purpose of this report

The purpose of this report is to provide an overview of costs reported to the Round 20 private sector NHCDC. The Round 20 private sector NHCDC is a voluntary collection that produces a range of hospital cost and activity information.

The information is grouped by AR-DRG, which is “a patient classification scheme which provides a means of relating the number and types of patients treated in a hospital to the resources required by the hospital, as represented by a code[[1]](#footnote-1)”. The AR-DRG is derived from a range of data collected on admitted patients, including diagnosis and procedure information, classified using ICD-10-AM [[2]](#footnote-2).

This report documents the data, processes, methodology and results for acute admitted care provided by overnight private hospitals. The results of the collection are expressed as national cost weights by AR-DRG version 8.0. Cost weight tables are provided in AR-DRG versions 8.0, 7.0 and 6.0x in the Appendices. In Round 20, participants were required to submit costed data to IHPA directly, unlike previous Rounds where data was submitted to IHPA and then PwC costed, (for more details please refer to section 2.5 Changes in Round 20).

## Format of this report

The format of this report is based on the Round 18 (2013-14) private sector NHCDC report which included DRG aggregated data, cost weights and other cost relativities.

The DRG information is displayed for the top 20 DRGs ranked as follows:

* Highest cost weight;
* Highest volume of population-adjusted separations;
* Highest cost-weighted separations;
* Highest ALoS;
* Highest OR and SPS cost bucket cost weight;
* Highest critical care cost bucket cost weight;
* Highest prostheses cost bucket cost weight; and
* Highest miscellaneous cost bucket cost weight.

For definitions of the cost buckets please refer to Appendix D: Cost weight tables by AR-DRG Version 8.0.

## History of the private sector NHCDC

Round 1 of the private sector NHCDC was conducted in 1996-97 with 23 hospitals and 240,000 episodes being represented. Since then, the collection has grown steadily although no publication was released for Rounds 8, 9, or 14 due to low participation rates or IHPA electing not to proceed for that year. No collection was carried out for Rounds 10, 15 and 19 as the sector elected to bypass that year and move directly to the following Round. Round 19 was bypassed due to the expectation that achieving the 60 per cent participation rate would not be met due competing priorities of the participants. Table 2 below shows the participation rate for Round 20 and the last seven published rounds.

Table 2. Summary of private hospital participation

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Summary | Round 7 2002-03 | Round 11 2006-07 | Round 12 2007-08 | Round 13 2008-09 | Round 16 2011-12 | Round 17 2012-13 | Round 18 2013-14 | Round 20 2015-16 |
| Number of hospitals | 113 | 82 | 109 | 110 | 105 | 95 | 96 | 91 |
| Sample Separations | 1,240,388 | 1,297,147 | 1,607,678 | 1,648,989 | 1,775,059 | 1,650,816 | 1,697,311 | 1,781,699 |
| Participation rate\* (%) | 65 | 59 | 72 | 71 | 66 | 60 | 60 | 58 |
| AR-DRG version | 4.2 | 4.2 | 4.2 | 5.1 | 6.0x | 6.0x | 6.0x | 8.0 |

\* Participation rate refers to the percentage of sample separations compared to the population separations.

## Private hospital statistics for Round 20 (2015-16)

ABS[[3]](#footnote-3) reported that there were 630 private hospitals operating in Australia in 2015-16, a net increase of 18 from Round 18 in 2013-14. There were three additional acute and psychiatric hospitals and 15 additional free-standing day hospitals in 2015-16 compared to Round 18.

There were 33,074 beds and chairs available in private hospitals in 2015-16. Acute and psychiatric hospitals accounted for 29,922 or 91 per cent of all beds and chairs, with the remaining 3,152 located in free-standing day hospital facilities.

There were over 4.7 million patient separations in 2015-16, with 75 per cent of those separations reported by acute and psychiatric hospitals. Total patient separations increased by 8.3 per cent from 2013-14 to 2015-16.

Private hospitals provided close to 10.7 million patient days of care in 2015-16. Acute and psychiatric hospitals provided 9.5 million, or 89 per cent of all patient days. Within acute and psychiatric hospitals, overnight-stay patients accounted for 7.4 million patient days and same‑day patients accounted for a further 2.2 million.

## Changes in Round 20

There have been some key changes from Round 18 to Round 20 which are described below.

### Participants self-costing

This was the first time that all participants were required to undertake their own costing. The primary reason being that by increasing hospital involvement, the quality of the private sector NHCDC would improve and result in building long-term capacity in the sector to undertake patient level costing. Participants advised IHPA of how they were going to cost, what software they would be using to cost and if they were going to contract the process out to a third party. IHPA assessed the participant’s processes to ensure the integrity and reliability of the data for the private sector NHCDC.

### Targeted participants

In previous Rounds, hospitals that wished to participate were required to submit an Expression of Interest (EOI) to participate in the Round. However, for Round 20, IHPA invited a targeted group of hospitals to participate. These hospitals represent up to 72 per cent of overnight private acute activity. Participants were required to submit data that represents at least 90 per cent of the submitting hospital establishment’s total in-scope activity, which is evaluated as a ratio of total in‑scope activity submitted for the Private Hospital Data Bureau (PHDB) collection in 2015-16.

### Complete linking of activity and cost

IHPA requested that all hospitals submit two files for each hospital containing activity and cost data and IHPA required 100 per cent linkage between files. There was less reliance on the HCP and PHDB data. In previous Rounds, the participants were provided the option to draw from the HCP and PHDB data sets as part of their submissions, however there are a number of historical issues with the PHDB and HCP datasets.

### Update to AR‑DRG version 8.0

IHPA and participants agreed that this report would be in AR‑DRG version 8.0, with additional cost weight tables included as appendices in AR‑DRG versions 6.0x and 7.0. The Round 18 dataset was re-grouped from AR‑DRG version 6.0x to 8.0, however 10 per cent of separations were unable to be re‑grouped as the required data fields were not available. The population adjustment was re-calculated to accommodate for this decrease in separations to reflect the Round 18 population.

### Data collection facilitated by IHPA

IHPA facilitated the data collection process, which involved stakeholder engagement, validation, quality assurance and data set consolidation. Consultants were engaged to undertake data analysis and reporting.

### Market share adjustment changes

The market share adjustment was changed given the change in participant population. The market share was calculated based on each hospital groups’ PHDB separations as a share of the participating groups’ PHDB separations. In previous Rounds, the PHDB separations for the entire private sector population were considered, regardless of participation. The Round 20 approach better reflects the population of participants and ensures each group is appropriately represented.

## Key considerations

The following areas can have a material impact on the reported costs and cost weights. These should be considered, in addition to the changes in Round 20, when interpreting the information in this report:

* Application of the AHPCS v3.1.
* Mapping of general ledger to the appropriate and consistent cost buckets.
* Allocation of cost centres to care areas.
* The variability of using feeder systems (patient level data) by participants verses service weights to allocate costs.

# Scope and Methodology

## Scope

The scope of the Round 20 private sector NHCDC includes acute patients admitted to overnight private hospitals in Australia, who were discharged in the financial year 2015-16. This included patients that were admitted to a hospital, were classified under the AR-DRG classification and had a care type of acute admitted or qualified newborn[[4]](#footnote-4) (see section 3.1.1). For this report the classification of an overnight private hospital is one that performed over 200 acute admitted separations.

For this report an acute admitted separation is considered in scope if the patient:

* has a care type of acute admitted or newborn (refer section 3.1.1);
* was discharged in the financial year 2015-16 (refer section 3.1.3); and
* was discharged from an overnight private hospital.

### In-scope Care types

The separations associated with acute admitted care and newborn care with qualified care days are in scope. Therefore these separations are included in the calculation of the AR-DRG cost weights. The costs associated with unqualified neonate separations[[5]](#footnote-5) have been included in the costs of care on an adjusted basis (as described below and in Appendix B: Detailed methodology for the neonatal adjustment).

Acute admitted care type 1.0 is “care in which the clinical intent or treatment goal is to: manage labour (obstetric); cure illness or provide definitive treatment of injury; perform surgery; relieve symptoms of illness or injury (excluding palliative care); reduce severity of an illness or injury; protect against exacerbation and/or complication of an illness and/or injury which could threaten life or normal function; perform diagnostic or therapeutic procedures.” [[6]](#footnote-6)

Newborn care type 7.0 is “initiated when the patient is born in hospital or is nine days old or less at the time of admission. Newborn care continues until the care type changes or the patient is separated:

* Patients who turn 10 days of age and do not require clinical care are separated and, if they remain in the hospital, are designated as boarders.
* Patients who turn 10 days of age and require clinical care continue in a newborn episode of care until separated.
* Patients aged less than 10 days and not admitted at birth (e.g. transferred from another hospital) are admitted with newborn care type.
* Patients aged greater than 9 days not previously admitted (e.g. transferred from another hospital) are either boarders or admitted with an acute care type.
* Within a newborn episode of care, until the baby turns 10 days of age, each day is either a qualified or unqualified day.
* A newborn is qualified when it meets at least one of the criteria detailed in Newborn qualification status.

Within a newborn episode of care, each day after the baby turns 10 days of age is counted as a qualified patient day. Newborn qualified days are equivalent to acute days and may be denoted as such.” [[7]](#footnote-7)

### In-scope costs

Participants were requested to submit their costed data in compliance with the AHPCS version 3.1[[8]](#footnote-8) to support consistency in output.

The AHPCS v3.1 defines product costs in scope as “all costs incurred by, or on behalf of the hospital, that are necessarily incurred in the production of patient and non-patient products, subject to the specific exclusion that the costs of time provided by medical specialists to treat private patients that are not directly met by the hospital, are not to be imputed.”[[9]](#footnote-9) This includes non-cash expenditure items such as depreciation.

### Work in Progress Patients

The AHPCS v3.1 requires that all patient activity during the year be costed according to its set of guidelines. For the purposes of the NHCDC, all patients discharged within the reference period are considered in scope. A WIP patient is defined as a patient that is not admitted and discharged within the financial year 2015-16.

## Identifying the minimum sample size

IHPA targeted specific hospital groups to participate in Round 20 in order to meet target participation as detailed in Appendix A: Analysis performed to determine the minimum sample size. It should be noted that these criteria are based on 2012 data and no adjustments have been made to account for any significant sector or market changes for this Round 20 collection and associated reports.

For Round 20, the participation rate achieved was 58 per cent, 91 hospitals and 9 hospital groups. IHPA agreed that this drop in participation rate means that the confidence level and margin of error has moved from 95 per cent confidence and 4.0 per cent margin of error to 85 per cent confidence and 3.0 per cent margin of error as per Table 3 below. This marginal decrease in participation rate is not expected to significantly impact the validity of the results.

Table 3. Round 20 participation rate confidence level and margin of error

|  |   | Confidence level |
| --- | --- | --- |
|   |  | 85% | 90% | 95% | 99% |
|   | 1% | 87% | 88% | 90% | 92% |
| Margin of error per DRG class (%) | 2% | 72% | 75% | 80% | 85% |
| 3% | 59% | 63% | 69% | 77% |
| 4% | 49% | 53% | 60% | 69% |
| 5% | 40% | 45% | 52% | 61% |
| 6% | 34% | 39% | 45% | 55% |
| 7% | 29% | 33% | 39% | 49% |
| 8% | 25% | 29% | 35% | 44% |
| 9% | 21% | 25% | 31% | 40% |
|   | 10% | 19% | 22% | 27% | 36% |

## Stages of the Collection

While the stages of the collection for Round 20 are similar to that of Round 18, the methodology adopted in Round 20 was different to previous Rounds. There were eight stages of the private sector NHCDC, which are:

Stage 1: Stakeholder engagement

Stage 2: Data collection

Stage 3: Data preparation

Stage 4: Costing

Stage 5: Data submission

Stage 6: Data validation and Quality Assurance (QA)

Stage 7: Data analysis (including adjustments)

Stage 8: Reporting

For more details please refer to Appendix B: Detailed methodology.

# Results

## Participation

The population of separations in Round 20 is defined as all acute admitted separations performed at 246 in scope overnight private hospitals in 2015-16, which is 3,051,681 separations.

The number of sample separations in Round 20 was 1,781,699 which represents a 5.0 per cent increase in the sample separations compared to Round 18 (shown in Table 4). In Round 20 the participation rate is 58 per cent of separations, which is a small decrease of 2.0 per cent compared to Round 18.

The average number of sample separations submitted per participant increased by 1,899 separations (from 17,680 to 19,579) between Round 18 and Round 20. The average number of separations per population hospital increased by 371 separations (from 12,034 to 12,405) between Round 18 and Round 20.

Table 4. Comparison of separations and hospitals, Round 11 (2006-07) to Round 20 (2015-16)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Key Statistic** | **Round 11 2006-07** | **Round 12 2007-08** | **Round 13 2008-09** | **Round 16 2011-12** | **Round 17 2012-13** | **Round 18 2013-14** | **Round 20 2015-16** |
|
| Sample separations | 1,297,147 | 1,607,678 | 1,648,989 | 1,775,059 | 1,650,816 | 1,697,311 | 1,781,699 |
| Change in separations (%) | 5 | 24 | 3 | 8 | -7 | 3 | 5 |
| Population separations | 2,192,314 | 2,248,324 | 2,328,814 | 2,703,667 | 2,753,670 | 2,827,996 | 3,051,681 |
| Participation rate (%) | 59 | 72 | 71 | 66 | 60 | 60 | 58 |
| Sample hospitals | 82 | 109 | 110 | 105 | 95 | 96 | 91 |
| Change in sample hospitals (%) | -27 | 33 | 1 | -5 | -10 | 1 | -5 |
| Population hospitals | 229 | 229 | 226 | 248 | 244 | 235 | 246 |
| Sample hospitals to population hospitals (%) | 36 | 48 | 49 | 42 | 39 | 41 | 37 |
| Average separations per participant | 15,819 | 14,749 | 14,991 | 16,905 | 17,377 | 17,680 | 19,579 |
| Average separations per population hospital | 9,573 | 9,818 | 10,304 | 10,902 | 11,286 | 12,034 | 12,405 |
| ALoS | 2.88 | 2.62 | 2.57 | 2.51 | 2.53 | 2.45 | 2.34 |
| change (%) | -3.0 | -9.0 | -1.9 | -2.2 | 0.5 | -3.1 | -4.6 |
| Overnight ALoS | unknown | unknown | unknown | unknown | 4.42 | 4.38 | 4.18 |

The ALoS decreased from 2.45 days in Round 18 to 2.34 days in Round 20 which is a reduction of 4.6 per cent (see Table 4). A reason for this movement was Round 20 had a different sample population compared to Round 18. Contributing to this decline in ALoS is the overnight ALoS has reduced from 4.38 to 4.18 (4.6 per cent; 0.20 days reduction).

Table 4 shows the ALoS over the past six years, with the trend showing a decrease since 2006‑07. Literature in the public domain supports a reduction in ALoS to hospitals focusing on efficiency strategies, for example patient pathways/discharging planning; DRG changing from overnight to same day classifications; and new technologies and medical advancements enabling certain procedures to be performed quicker or with shorter recovery times.

## Analysis of Top 20 DRGs

This section analyses the top 20 DRGs by the following categories, which are the same as presented in the Round 18 private sector NHCDC report.

* Highest cost weight;
* Highest number of population-adjusted separations;
* Highest cost weighted separations; and
* Highest ALOS including minimum and maximum range.

An additional analysis of the cost buckets (critical care, OR/SPS, prostheses and miscellaneous) is undertaken showing the Top 20 for each of these buckets.

Please note: The Round 20 ranking analysis cannot be compared to the published Round 18 NHCDC report due to moving from AR-DRG version 6.0x to version 8.0 which caused a loss of 10 per cent of the separations which could not be re-grouped. Therefore the Round 18 data has been re-ranked based on the revised dataset.

### Top 20 DRGs ranked by highest cost weight

Key findings

As shown in Figure 1 the highest cost weight DRG is A06A – Tracheostomy with ventilation > 95 hours with catastrophic CC. As illustrated in Table 5, this was ranked number one in Round 18 and is anticipated to be ranked as the top one or two DRGs given it is a highly complex and resource intensive patient pathway. This DRG has reduced by 9.25 cost weights between rounds. This is due to a different sample of hospital groups changing and the reduction in ALoS between rounds.

The DRGs listed in Table 5 are all predicted to be within this top 20 ranking given that 80 per cent (16 out of 20) are with catastrophic CCs, require ventilation, or have high cost prostheses. The only DRG that does not have a DRG description that including the wording complex is I09Z Spinal Fusion for Deformity however this is procedure which has high theatre time and prostheses costs so is expected to be included in the top 20.

As demonstrated in Table 5, these highly complex patients only represent 0.3 per cent (8,241 population-adjusted separations) of the total population-adjusted separations (3.05m). These DRGs represent 4.3 per cent of the total estimated cost of the total population cost. This indicates that these are high cost low volume DRGs.

Consistencies between Round 18 and Round 20

80 per cent (16 out of 20) of the top 20 DRGs for Round 20 were included in the Round 18 results with the top three being ranked in the top three in Round 18. With A06B Tracheostomy and/or Ventilation >=96hours, Intermediate Complexity ranking number two, compared to Round 18, ranking number three. And F01A Implantation and Replacement of AICD, Total System, Major Complexity ranking number three, compared to Round 18, ranking number two.

Overall these top 20 DRGs are anticipated to be represented in the top 20 list given their clinical nature, high complexity and resource utilisation.

Differences between Round 18 and Round 20

New to the top 20 is P03B Neonate, AdmWt 1000-1499g W Significant OR Proc/Vent>=96hrs, Minor Complexity ranked 11 (see Table 5 and Figure 1), cost weight of 14.32 and 45 weighted separations, compared to Round 18 which was masked due to having less than 5 separations.

P64A Neonate, AdmWt 1250-1499g W/O Significant OR Proc/Vent>=96hrs, Major Complexity has moved from being ranked 92 in Round 18 to a ranking of eight (see Figure 1). The potential reasons for change are the change in sampling size and the increase in volume of weighted separations increasing from 22 to 28.

Figure 1. Top 20 DRGs ranked by highest cost weight

**Note:** when a Round 18 bar is missing from the chart, this is because that DRG was masked in Round 18 due to having less than 5 separations or having less than 3 hospitals with that DRG.

Table 5. Top 20 DRG ranked by highest cost weight

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Top 20 Round 18** | **Rank Round 20** | **DRG** | **DRG Description** | **Cost weight(a)** | **No. of weighted seps(b)** | **Cost weighted seps(c)=(a)x(b)** | **Number of days(d)** | **ALoS (days)(e)=(d)/(b)** | **Std error** | **% of total seps** | **% of CW seps** | **Round 18 cost weight** | **Rank Round 18** | **Round 18 weighted seps** |
|
|
| Yes | 1 | A06A | Tracheostomy and/or Ventilation >=96hours, Major Complexity | **35.15** | 199 | 6,995 | 9,912 | 49.8 | 1.82 | 0.0% | 0.2% | 44.41 | 1  | 161  |
| Yes | 2 | A06B | Tracheostomy and/or Ventilation >=96hours, Intermediate Complexity | **24.44** | 532 | 13,002 | 16,718 | 31.4 | 0.79 | 0.0% | 0.4% | 27.48 | 3  | 403  |
| Yes | 3 | F01A | Implantation and Replacement of AICD, Total System, Major Complexity | **20.46** | 297 | 6,077 | 3,116 | 10.5 | 0.47 | 0.0% | 0.2% | 28.93 | 2  | 239  |
| Yes | 4 | I02A | Microvascular Tissue Transfers or Skin Grafts, Excluding Hand, Major Complexity | **16.66** | 103 | 1,716 | 5,215 | 50.6 | 1.72 | 0.0% | 0.1% | 14.38 | 13  | 58  |
| Yes | 5 | F04A | Cardiac Valve Procedures W CPB Pump W/O Invasive Cardiac Invest, Major Comp | **16.52** | 291 | 4,807 | 7,096 | 24.4 | 0.69 | 0.0% | 0.2% | 19.47 | 6  | 252  |
| Yes | 6 | F01B | Implantation and Replacement of AICD, Total System, Minor Complexity | **16.31** | 2,363 | 38,541 | 5,460 | 2.3 | 0.12 | 0.1% | 1.3% | 22.34 | 5  | 2,448  |
| Yes | 7 | A06C | Tracheostomy and/or Ventilation >=96hours, Minor Complexity | **16.24** | 480 | 7,795 | 9,612 | 20.0 | 0.63 | 0.0% | 0.3% | 17.37 | 9  | 450  |
| No | 8 | P64A | Neonate, AdmWt 1250-1499g W/O Significant OR Proc/Vent>=96hrs, Major Complexity | **16.00** | 28 | 448 | 1,177 | 42.6 | 1.82 | 0.0% | 0.0% | 5.89 | 92  | 22  |
| Yes | 9 | B60A | Acute Paraplegia and Quadriplegia W or W/O OR Procedures, Major Complexity | **15.55** | 10 | 156 | 472 | 49.5 | 1.86 | 0.0% | 0.0% | 18.97 | 7  | 11  |
| Yes | 10 | I09A | Spinal Fusion, Major Complexity | **14.72** | 425 | 6,256 | 8,477 | 20.0 | 0.50 | 0.0% | 0.2% | 16.24 | 10  | 562  |
| No | 11 | P03B | Neonate, AdmWt 1000-1499g W Significant OR Proc/Vent>=96hrs, Minor Complexity | **14.32** | 45 | 644 | 1,430 | 31.9 | 2.76 | 0.0% | 0.0% | \*\*\*\*\*\* | \*\*\*\*\*\* | \*\*\*\*\*\* |
| Yes | 12 | I06Z | Spinal Fusion for Deformity | **14.11** | 1,209 | 17,059 | 11,867 | 9.8 | 0.31 | 0.0% | 0.6% | 15.41 | 11  | 820  |
| Yes | 13 | F03A | Cardiac Valve Procedures W CPB Pump W Invasive Cardiac Investigation, Major Comp | **13.83** | 336 | 4,647 | 6,721 | 20.0 | 0.38 | 0.0% | 0.2% | 17.48 | 8  | 288  |
| Yes | 14 | F07A | Other Cardiothoracic/Vascular Procedures W CPB Pump, Major Complexity | **13.20** | 25 | 330 | 442 | 17.7 | 1.11 | 0.0% | 0.0% | 13.74 | 14  | 21  |
| Yes | 15 | K01A | OR Procedures for Diabetic Complications, Major Complexity | **12.44** | 63 | 784 | 2,824 | 44.6 | 1.36 | 0.0% | 0.0% | 12.01 | 20  | 80  |
| Yes | 16 | F05A | Coronary Bypass W Invasive Cardiac Investigation, Major Complexity | **12.03** | 433 | 5,209 | 7,439 | 17.2 | 0.39 | 0.0% | 0.2% | 14.47 | 12  | 358  |
| No | 17 | F08A | Major Reconstructive Vascular Procedures W/O CPB Pump, Major Complexity | **11.95** | 275 | 3,286 | 6,419 | 23.3 | 0.58 | 0.0% | 0.1% | 10.61 | 29  | 208  |
| Yes | 18 | I31A | Revision of Hip Replacement, Major Complexity | **11.91** | 283 | 3,371 | 6,707 | 23.7 | 0.49 | 0.0% | 0.1% | 12.21 | 19  | 251  |
| No | 19 | G01A | Rectal Resection, Major Complexity | **11.45** | 300 | 3,435 | 8,013 | 26.7 | 0.47 | 0.0% | 0.1% | 11.69 | 22  | 266  |
| Yes | 20 | F06A | Coronary Bypass W/O Invasive Cardiac Investigation, Major Complexity | **11.16** | 546 | 6,093 | 8,659 | 15.9 | 0.33 | 0.0% | 0.2% | 12.47 | 17  | 370  |
| 16 | **Sub-total, top 20 highest cost weight** | **15.85** | **8,241** | **130,650** | **127,776** | **15.5** |   | 0.3% | 4.3% |  |  |  |
| in  | **All DRG’s** | **1.00** | **3,051,681** | **3,051,681** | **7,153,742** | **2.3** |  | 100% | 100% |  |  |  |
| Top 20 | **Top 20 % of all DRGs** |  | **0.3%** | **4.3%** | **1.8%** |   |   |   |   |   |   |   |

Notes

(a) For cost weight (cost bucket specific) calculations please refer to Appendix D: Cost weight tables by AR-DRG Version 8.0

(b) Separations shown are strata weighted

(e) ALoS means average length of stay

### Top 20 DRGs ranked by highest volume of population-adjusted separations

Key findings

Table 6 and Figure 2 shows the highest population-adjusted separations DRG for Round 20; which is a measure of the volume of separations in the whole population (i.e. the number of separations in the Round 20 sample, adjusted using the weights to reflect the whole population).

Table 6 shows for Round 20 R63Z Chemotherapy is ranked number one as per Round 18’s ranking, and is anticipated to be ranked number one considering the frequency required of this treatment.

As presented in Table 6 the DRGs listed in the top 20 are likely to be within this ranking given that 90 per cent (18 out of 20) are either high frequency treatments or classified as same day treatments.

As illustrated in Table 6 these DRGs represent 43 per cent (1,322,903population-adjusted separations) of the total population-adjusted separations (3.05m population-adjusted separations). In Table 6 these DRGs represent 18 per cent (549,177) of the total population cost weighted separations. This indicates that these are high volume low cost DRGs.

The ALoS for these top 20 DRGs is 1.2 days compared to the population of 2.3 days. The reason for this is that the majority of these DRGs are sameday procedures given their large volumes.

Consistencies between Round 18 and Round 20

90 per cent (18 out of 20) of the current rounds top 20 DRGs were included in Round 18’s results (see Table 6) with the top two being ranked in the same order as Round 18 which were Chemotherapy and Colonoscopy (Minor Complexity). This is expected given the high frequency of treatments required for chemotherapy patient’s pathways and the colonoscopy’s demand as a day procedure.

Differences between Round 18 and Round 20

As seen in Figure 2, L61Z Haemodialysis has dropped in ranking from Round 18 ranking 3 to ranking 5 for Round 20. A factor affecting this rank reduction is a reduction of 16,129 weighted separations compared to Round 18.

Two new DRGs have come into the top 20 for Round 20 these are N07B Other Uterus and Adnexa Procedures for Non-Malignancy, Minor Complexity ranked 18 compared to ranking 28 in Round 18 and D11Z Tonsillectomy and Adenoidectomy ranked 19 compared to ranking 22 in Round 18 (see Figure 2).

Figure 2. Comparison of top 20 DRGs by highest volume of population adjusted separations

**Note:** when a Round 18 bar is missing from the chart, this is because that DRG was masked in Round 18 due to having less than 5 separations or having less than 3 hospitals with that DRG.

Table 6. Top 20 DRGs ranked by highest volume of population adjusted separations

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Top 20 Round 18** | **Rank Round 20** | **DRG** | **DRG Description** | **Cost weight(a)** | **No. of weighted seps(b)** | **Cost weighted seps(c)=(a)x(b)** | **Number of days(d)** | **ALoS (days)(e)=(d)/(b)** | **Std error** | **% of total seps** | **% of CW seps** | **Round 18 weighted seps** | **Rank Round 18** | **Round 18 cost weight** |
|
|
| Yes | 1 | R63Z | Chemotherapy | 0.15 | **268,018** | 40,203 | 268,072 | 1.0 | 0.000 | 8.8% | 1.3% | 246,050  | 1  | 0.19  |
| Yes | 2 | G48B | Colonoscopy, Minor Complexity | 0.26 | **145,423** | 37,810 | 150,085 | 1.0 | 0.001 | 4.8% | 1.2% | 124,227  | 2  | 0.26  |
| Yes | 3 | G46B | Complex Endoscopy, Minor Complexity | 0.30 | **93,597** | 28,079 | 98,121 | 1.0 | 0.001 | 3.1% | 0.9% | 87,934  | 4  | 0.33  |
| Yes | 4 | Z40Z | Other Contacts W Health Services W Endoscopy, Sameday | 0.20 | **85,896** | 17,179 | 85,896 | 1.0 | 0.001 | 2.8% | 0.6% | 80,600  | 5  | 0.20  |
| Yes | 5 | L61Z | Hemodialysis | 0.11 | **83,214** | 9,154 | 83,217 | 1.0 | 0.000 | 2.7% | 0.3% | 99,343  | 3  | 0.06  |
| Yes | 6 | Z64B | Other Factors Influencing Health Status, Minor Complexity | 0.18 | **68,869** | 12,396 | 70,245 | 1.0 | 0.002 | 2.3% | 0.4% | 72,735  | 6  | 0.17  |
| Yes | 7 | G47C | Gastroscopy, Minor Complexity | 0.20 | **67,272** | 13,454 | 70,317 | 1.0 | 0.001 | 2.2% | 0.4% | 63,202  | 8  | 0.19  |
| Yes | 8 | D40Z | Dental Extractions and Restorations | 0.38 | **61,614** | 23,413 | 61,890 | 1.0 | 0.001 | 2.0% | 0.8% | 63,966  | 7  | 0.40  |
| Yes | 9 | C16Z | Lens Procedures | 0.47 | **52,814** | 24,823 | 53,093 | 1.0 | 0.001 | 1.7% | 0.8% | 52,845  | 9  | 0.54  |
| Yes | 10 | I18B | Other Knee Procedures, Minor Complexity | 0.48 | **47,425** | 22,764 | 49,262 | 1.0 | 0.002 | 1.6% | 0.7% | 50,000  | 10  | 0.46  |
| Yes | 11 | E63B | Sleep Apnea, Minor Complexity | 0.18 | **44,050** | 7,929 | 44,125 | 1.0 | 0.001 | 1.4% | 0.3% | 42,072  | 11  | 0.17  |
| Yes | 12 | F42B | Circulatory Dsrds, Not Adm for AMI W Invasive Cardiac Inves Proc, Minor Comp | 1.05 | **42,020** | 44,121 | 58,117 | 1.4 | 0.006 | 1.4% | 1.5% | 41,023  | 12  | 0.86  |
| Yes | 13 | L41Z | Cystourethroscopy for Urinary Disorder, Sameday | 0.20 | **40,511** | 8,102 | 40,511 | 1.0 | 0.001 | 1.3% | 0.3% | 33,817  | 15  | 0.20  |
| Yes | 14 | G10B | Hernia Procedures, Minor Complexity | 0.86 | **36,311** | 31,227 | 44,514 | 1.2 | 0.003 | 1.2% | 1.0% | 34,317  | 14  | 0.95  |
| Yes | 15 | I16Z | Other Shoulder Procedures | 1.26 | **34,252** | 43,158 | 41,879 | 1.2 | 0.004 | 1.1% | 1.4% | 35,578  | 13  | 1.29  |
| Yes | 16 | I04B | Knee Replacement, Minor Complexity | 4.25 | **33,469** | 142,243 | 177,475 | 5.3 | 0.006 | 1.1% | 4.7% | 25,912  | 18  | 5.34  |
| Yes | 17 | J11B | Other Skin, Subcutaneous Tissue and Breast Procedures, Minor Complexity | 0.36 | **32,840** | 11,822 | 33,794 | 1.0 | 0.002 | 1.1% | 0.4% | 32,545  | 16  | 0.32  |
| No | 18 | N07B | Other Uterus and Adnexa Procedures for Non-Malignancy, Minor Complexity | 0.33 | **28,966** | 9,559 | 29,028 | 1.0 | 0.002 | 0.9% | 0.3% | 20,160  | 28  | 0.39  |
| No | 19 | D11Z | Tonsillectomy and Adenoidectomy | 0.50 | **28,384** | 14,192 | 29,061 | 1.0 | 0.002 | 0.9% | 0.5% | 22,603  | 22  | 0.46  |
| Yes | 20 | Q61B | Red Blood Cell Disorders, Intermediate Complexity | 0.27 | **27,957** | 7,548 | 32,951 | 1.2 | 0.003 | 0.9% | 0.2% | 23,580  | 20  | 0.27  |
| 18 | **Sub-total, 20 highest separation count** | **0.41** | **1,322,903** | **549,177** | **1,521,653** | **1.2** |   | 43% | 18% |  |  |  |
| in  | **All DRGs** |  |  | **1.00** | **3,051,681** | **3,051,681** | **7,153,742** | **2.3** |  | 100% | 100% |  |  |  |
| Top 20 | **Top 20 separation count, % of all DRGs** |  | **43%** | **18%** | **21%** |   |   |   |   |   |   |   |

Notes

(a) For cost weight (cost bucket specific) calculations please refer to Appendix D: Cost weight tables by AR-DRG Version 8.0

(b) Separations shown are strata weighted

(e) ALoS means average length of stay

### Top 20 DRGs ranked by highest cost-weighted separations

Key findings

Table 7 and Figure 3 present the top 20 DRGs ranked by highest cost-weight separations. A cost weighted separation refers to the number of population-adjusted separations multiplied by the cost weight for that DRG, and measures the total cost associated with that DRG.

Figure 3 presents that the highest cost weight DRG is I04B - Knee Replacement without Catastrophic or Severe CC. This procedure is a common procedure within the sector and therefore is customary to be number one. Noticeably as can be seen in Table 7, the number of cost weighted separations has increased by 3,831 (or 3.0 per cent) (142,243-138,412) between Rounds.

The DRGs listed in the top 20 (Table 7) are predicted to be within this ranking given that 80 per cent (16 out of 20) are either within orthopaedic, neurology or cardiac procedures which require high cost prostheses or high volume treatments like chemotherapy.

In Table 7 these DRGs represent 30 per cent (924,758 cost weighted separations) of the total population cost weighted separations of 3.05m. Additionally, these DRGs represent 28 per cent of the total population-adjusted separations. This indicates that these are a mixture of high volume/high cost DRGs.

Consistencies between Round 18 and Round 20

As shown in Table 7 the top two DRGs (I04B - Knee Replacement without Catastrophic or Severe CC and I03B - Hip Replacement without Catastrophic CC) were ranked in the same order as Round 18 which is influenced by the ALoS being above the average and high costs prostheses being used in these orthopaedic and neurology treatments.

Differences between Round 18 and Round 20

There are four new DRGs in the top 20 as seen in Figure 3. These are all from the obstetrics and maternity DRGs these are:

* O60B Vaginal Delivery, Intermediate Complexity ranked 11 compared to 25.
* O01B Caesarean Delivery, Intermediate Complexity ranked 17 compared to 26.
* N04B Hysterectomy for Non-Malignancy, Minor Complexity ranked 19 compared to 22.
* O60C Vaginal Delivery, Minor Complexity ranked 20 compared to 35.

A reason for these movements is all these DRGs have incurred significant increase in cost‑weighted separations ranging from 3,344 to 14,889 between Rounds.

Figure 3 highlights that F01B Implantation and Replacement of AICD, Total System, Minor Complexity has dropped to be ranked number 8 compared to ranking 3 in the prior Round due to a reduction in cost weighted separations of 16,141. Additionally R63Z Chemotherapy has declined in ranking from four in Round 18 to seven in Round 20 due a reduction in cost‑weighted separations of 7,506.

A reason for both these changes are the different sample of participants compared to Round 18 and changes in activity volumes.

Figure 3. Comparison of top 20 DRGs by highest cost weighted separations

**Note:** when a Round 18 bar is missing from the chart, this is because that DRG was masked in Round 18 due to having less than 5 separations or having less than 3 hospitals with that DRG.

Table 7. Top 20 DRGs ranked by highest cost weighted separations

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Top 20 Round 18** | **Rank Round 20** | **DRG** | **DRG Description** | **Cost weight(a)** | **No. of weighted seps(b)** | **Cost weighted seps(c)=(a)x(b)** | **Number of days(d)** | **ALoS (days)(e)=(d)/(b)** | **Std error** | **% of total seps** | **% of CW seps** | **Round 18 cost-weighted seps** | **Rank Round 18** | **Round 18 weighted seps** | **Round 18 cost weight** |
|
|
| Yes | 1 | I04B | Knee Replacement, Minor Complexity | 4.25 | 33,469 | **142,243** | 177,475 | 5.3 | 0.01 | 1.1% | 4.7% | 138,412 | 1  | 25,912  | 5.34 |
| Yes | 2 | I03B | Hip Replacement, Minor Complexity | 4.91 | 25,714 | **126,256** | 134,302 | 5.2 | 0.01 | 0.8% | 4.1% | 116,091 | 2  | 18,574  | 6.25 |
| Yes | 3 | I09C | Spinal Fusion, Minor Complexity | 6.31 | 8,853 | **55,862** | 46,502 | 5.3 | 0.05 | 0.3% | 1.8% | 47,128 | 5  | 6,555  | 7.19 |
| Yes | 4 | O01C | Caesarean Delivery, Minor Complexity | 1.82 | 27,301 | **49,688** | 126,647 | 4.6 | 0.00 | 0.9% | 1.6% | 35,117 | 10  | 20,756  | 1.69 |
| Yes | 5 | F42B | Circulatory Dsrds, Not Adm for AMI W Invasive Cardiac Inves Proc, Minor Comp | 1.05 | 42,020 | **44,121** | 58,117 | 1.4 | 0.01 | 1.4% | 1.5% | 35,374 | 9  | 41,023  | 0.86 |
| Yes | 6 | I16Z | Other Shoulder Procedures | 1.26 | 34,252 | **43,158** | 41,879 | 1.2 | 0.00 | 1.1% | 1.4% | 45,953 | 6  | 35,578  | 1.29 |
| Yes | 7 | R63Z | Chemotherapy | 0.15 | 268,018 | **40,203** | 268,072 | 1.0 | 0.00 | 8.8% | 1.3% | 47,709 | 4  | 246,050  | 0.19 |
| Yes | 8 | F01B | Implantation and Replacement of AICD, Total System, Minor Complexity | 16.31 | 2,363 | **38,541** | 5,460 | 2.3 | 0.12 | 0.1% | 1.3% | 54,681 | 3  | 2,448  | 22.34 |
| Yes | 9 | G48B | Colonoscopy, Minor Complexity | 0.26 | 145,423 | **37,810** | 150,085 | 1.0 | 0.00 | 4.8% | 1.2% | 32,001 | 13  | 124,227  | 0.26 |
| Yes | 10 | I09B | Spinal Fusion, Intermediate Complexity | 8.81 | 4,195 | **36,958** | 33,475 | 8.0 | 0.09 | 0.1% | 1.2% | 37,955 | 8  | 3,778  | 10.05 |
| No | 11 | O60B | Vaginal Delivery, Intermediate Complexity | 1.49 | 23,795 | **35,455** | 99,656 | 4.2 | 0.00 | 0.8% | 1.2% | 20,565 | 25  | 18,616  | 1.10 |
| Yes | 12 | J06B | Major Procedures for Breast Disorders, Minor Complexity | 1.45 | 24,061 | **34,888** | 48,875 | 2.0 | 0.01 | 0.8% | 1.1% | 29,363 | 15  | 20,442  | 1.44 |
| Yes | 13 | F12B | Implantation and Replacement of Pacemaker, Total System, Minor Complexity | 5.23 | 6,582 | **34,424** | 15,932 | 2.4 | 0.03 | 0.2% | 1.1% | 41,952 | 7  | 6,225  | 6.74 |
| Yes | 14 | I10B | Other Back and Neck Procedures, Minor Complexity | 1.79 | 18,981 | **33,976** | 62,600 | 3.3 | 0.01 | 0.6% | 1.1% | 30,475 | 14  | 15,808  | 1.93 |
| Yes | 15 | F15B | Interventional Coronary Procs, Not Adm for AMI, W Stent Implant, Minor Comp | 2.91 | 10,955 | **31,879** | 19,215 | 1.8 | 0.02 | 0.4% | 1.0% | 32,014 | 12  | 10,096  | 3.17 |
| Yes | 16 | G10B | Hernia Procedures, Minor Complexity | 0.86 | 36,311 | **31,227** | 44,514 | 1.2 | 0.00 | 1.2% | 1.0% | 32,725 | 11  | 34,317  | 0.95 |
| No | 17 | O01B | Caesarean Delivery, Intermediate Complexity | 2.12 | 13,582 | **28,794** | 75,787 | 5.6 | 0.01 | 0.4% | 0.9% | 19,922 | 26  | 9,983  | 2.00 |
| Yes | 18 | G46B | Complex Endoscopy, Minor Complexity | 0.30 | 93,597 | **28,079** | 98,121 | 1.0 | 0.00 | 3.1% | 0.9% | 28,693 | 16  | 87,934  | 0.33 |
| No | 19 | N04B | Hysterectomy for Non-Malignancy, Minor Complexity | 1.69 | 15,214 | **25,712** | 46,390 | 3.0 | 0.01 | 0.5% | 0.8% | 22,367 | 22  | 13,598  | 1.64 |
| No | 20 | O60C | Vaginal Delivery, Minor Complexity | 1.32 | 19,307 | **25,485** | 72,734 | 3.8 | 0.00 | 0.6% | 0.8% | 15,762 | 35  | 16,532  | 0.95 |
| 16 | **Sub-total, top 20 highest cost-weighted separations** | **1.08** | **853,994** | **924,758** | **1,625,838** | **1.9** |   | 28% | 30% |  |  |  |  |
| in  | **All DRGs** |  | **1.00** | **3,051,681** | **3,051,681** | **7,153,742** | **2.3** |  | 100% | 100% |  |  |  |  |
| Top 20 | **Top 20 cost-weighted separations, % of all DRGs** |  | **28%** | **30%** | **23%** |   |   |   |   |   |   |   |   |

Notes

(a) For cost weight (cost bucket specific) calculations please refer to Appendix D: Cost weight tables by AR-DRG Version 8.0

(b) Separations shown are strata weighted

(e) ALoS means average length of stay

### Top 20 DRGs ranked by ALoS

Key findings

Table 8 shows that the DRG with the highest ALoS is I02A Microvascular Tissue Transfers or Skin Grafts, Excluding Hand, Major Complexity with a ALoS of 50.6 days, which was ranked number two in Round 18 and is customary to be ranked number one or two given the fact these are highly complex and resource intense patients.

As demonstrated in Table 8 the DRGs listed in the top 20 are expected to be within this ranking given that they all are complex patients as they have been coded to DRGs ending in A or B which indicates complexity and comorbidities which typically leads to a long LoS.

In Table 8 these DRGs as we would anticipate represent the minority of separations given that they represent 0.1 per cent (3,816 population-adjusted separations) of the total population-adjusted separations (3.05m population-adjusted separations). In Table 8 these DRGs represent 1.5 per cent (46,808 cost weighted separations) of the total population cost weighted separations.

Consistencies between Round 18 and Round 20

70 per cent (14 out of 20) of this Rounds top 20 DRGs were included in Round 18’s. The top two DRGs in Round 20 were in the top two DRGs in Round 18, however they have switched ranking. A06A Tracheostomy and/or Ventilation >=96hours, Major Complexity was ranked number one in Round 18 the reduction in ranking is due to a significant reduction in ALoS of 10.8 days. The reason for this change is due to the loss in separations when regrouping the original Round 18 data from AR-DRG version 6.0x to AR-DRG version 8.0.

Differences between Round 18 and Round 20

There are two new neonatal DRGs entering the top 20 for Round 20. These were previously masked in Round 18 (see Table 8). P03B Neonate, AdmWt 1000-1499g W Significant OR Proc/Vent>=96hrs, Minor Complexity ranked seven compared to Round 18 where the data was masked due to having less than 5 separations. P04B Neonate, AdmWt 1500-1999g W Significant OR Proc/Vent>=96hrs, Minor Complexity ranked 11 compared to Round 18 where the data was masked due to there being less than three hospitals.

B60A Acute Paraplegia and Quadriplegia W or W/O OR Procedures, Major Complexity (see Figure 4) has moved between Rounds from ranking 9 (Round 18) to ranking 3 for this Round, driven by ALoS increasing by 17.2 days between Rounds as seen in Figure 4. This is due to the low number of weighted separations which appear in this DRG. The low number of separations leads to more volatile results.

I02A Microvascular Tissue Transfers or Skin Grafts, Excluding Hand, Major Complexity has the greatest range in LoS, from a minimum of 5 days to a maximum of 290 days (see Table 8).

Figure 4 Comparison of top 20 DRGs by ALoS

**Note:** when a Round 18 bar is missing from the chart, this is because that DRG was masked in Round 18 due to having less than 5 separations or having less than 3 hospitals with that DRG.

Table 8. Top 20 DRGs ranked by ALoS

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Top 20 Round 18** | **Rank Round 20** | **DRG** | **DRG Description** | **ALoS (days)(a)** | **Min LoS** | **Max LoS** | **Cost weight** | **No. of weighted seps (b)** | **Cost weighted seps** | **Std error** | **% of total seps** | **% of CW seps** | **Round 18 ALoS** | **Rank Round 18** | **Number of days** |
|
|
| Yes | 1 | I02A | Microvascular Tissue Transfers or Skin Grafts, Excluding Hand, Major Complexity | **50.6** | 5 | 290 | 16.66 | 103 | 1,716 | 1.72 | 0.0% | 0.1% | 47.8 | 2  | 5,215 |
| Yes | 2 | A06A | Tracheostomy and/or Ventilation >=96hours, Major Complexity | **49.8** | 6 | 155 | 35.15 | 199 | 6,995 | 1.82 | 0.0% | 0.2% | 60.6 | 1  | 9,912 |
| Yes | 3 | B60A | Acute Paraplegia and Quadriplegia W or W/O OR Procedures, Major Complexity | **49.5** | 17 | 69 | 15.55 | 10 | 156 | 1.86 | 0.0% | 0.0% | 32.3 | 9  | 472 |
| Yes | 4 | K01A | OR Procedures for Diabetic Complications, Major Complexity | **44.6** | 9 | 98 | 12.44 | 63 | 784 | 1.36 | 0.0% | 0.0% | 43.3 | 3  | 2,824 |
| Yes | 5 | P64A | Neonate, AdmWt 1250-1499g W/O Significant OR Proc/Vent>=96hrs, Major Complexity | **42.6** | 12 | 62 | 16.00 | 28 | 448 | 1.82 | 0.0% | 0.0% | 32.9 | 8  | 1,177 |
| Yes | 6 | F11A | Amputation, Except Upper Limb and Toe, for Circulatory Disorders, Major Comp | **33.3** | 2 | 164 | 10.23 | 65 | 665 | 1.54 | 0.0% | 0.0% | 38.3 | 5  | 2,146 |
| No | 7 | P03B | Neonate, AdmWt 1000-1499g W Significant OR Proc/Vent>=96hrs, Minor Complexity | **31.9** | 1 | 62 | 14.32 | 45 | 644 | 2.76 | 0.0% | 0.0% | \*\*\*\*\*\* | \*\*\*\*\*\* | 1,430 |
| Yes | 8 | A06B | Tracheostomy and/or Ventilation >=96hours, Intermediate Complexity | **31.4** | 4 | 108 | 24.44 | 532 | 13,002 | 0.79 | 0.0% | 0.4% | 35.6 | 6  | 16,718 |
| Yes | 9 | P65A | Neonate, AdmWt 1500-1999g W/O Significant OR Proc/Vent>=96hrs, Extreme Comp | **31.3** | 6 | 126 | 10.56 | 116 | 1,225 | 1.57 | 0.0% | 0.0% | 32.1 | 10  | 3,640 |
| Yes | 10 | U63A | Major Affective Disorders, Major Complexity | **30.2** | 1 | 231 | 4.94 | 816 | 4,031 | 0.16 | 0.0% | 0.1% | 27.5 | 13  | 24,612 |
| No | 11 | P04B | Neonate, AdmWt 1500-1999g W Significant OR Proc/Vent>=96hrs, Minor Complexity | **30.1** | 14 | 60 | 10.20 | 26 | 265 | 1.54 | 0.0% | 0.0% | ------ | ------ | 796 |
| No | 12 | B82A | Chronic & Unspec Para/Quadriplegia W or W/O OR Proc, Major Complexity | **29.7** | 1 | 123 | 9.11 | 96 | 875 | 1.14 | 0.0% | 0.0% | 25.2 | 23  | 2,850 |
| No | 13 | U61A | Schizophrenia Disorders, Major Complexity | **28.2** | 1 | 142 | 5.00 | 129 | 645 | 0.47 | 0.0% | 0.0% | 23.7 | 29  | 3,651 |
| Yes | 14 | R03A | Lymphoma and Leukaemia W Other OR Procedures, Major Complexity | **27.8** | 1 | 97 | 7.77 | 145 | 1,127 | 0.55 | 0.0% | 0.0% | 31.3 | 11  | 4,023 |
| Yes | 15 | U66A | Eating and Obsessive-Compulsive Disorders, Major Complexity | **26.7** | 1 | 132 | 4.27 | 109 | 465 | 0.31 | 0.0% | 0.0% | 33.0 | 7  | 2,915 |
| Yes | 16 | G01A | Rectal Resection, Major Complexity | **26.7** | 3 | 90 | 11.45 | 300 | 3,435 | 0.47 | 0.0% | 0.1% | 25.2 | 20  | 8,013 |
| Yes | 17 | P64B | Neonate, AdmWt 1250-1499g W/O Significant OR Proc/Vent>=96hrs, Minor Complexity | **26.5** | 1 | 60 | 6.79 | 69 | 469 | 0.74 | 0.0% | 0.0% | 27.1 | 15  | 1,824 |
| No | 18 | G02A | Major Small and Large Bowel Procedures, Major Complexity | **26.3** | 4 | 130 | 10.93 | 839 | 9,170 | 0.33 | 0.0% | 0.3% | 24.9 | 24  | 22,067 |
| Yes | 19 | F61A | Infective Endocarditis, Major Complexity | **26.2** | 1 | 100 | 6.02 | 86 | 518 | 0.71 | 0.0% | 0.0% | 27.3 | 14  | 2,264 |
| No | 20 | I61A | Distal Femoral Fractures, Major Complexity | **25.8** | 4 | 122 | 4.25 | 41 | 174 | 0.91 | 0.0% | 0.0% | 24.3 | 26  | 1,053 |
| 14 | **Sub-total, top 20 longest ALoS separations** | **30.8** |   |   | **12.27** | **3,816** | **46,808** |   | 0.1% | 1.5% |  |  | **117,602** |
| in  | **All DRGs** | **2.3** |  |  | **1.00** | **3,051,681** | **3,051,681** |  | 100% | 100% |  |  | **7,153,742** |
| Top 20 | **Top 20 longest ALoS separations, % of all DRGs** |  |  |  |  | **0.1%** | **1.5%** |   |   |   |   |   | **1.6%** |

Notes

(a) For cost weight (cost bucket specific) calculations please refer to Appendix D: Cost weight tables by AR-DRG Version 8.0

(b) Separations shown are strata weighted

(e) ALoS means average length of stay

## Analysis of cost buckets

The private sector NHCDC has analysed and reported on the following cost buckets since Round 17 (2012-13), as agreed by the private hospital sector. The same cost buckets have been reported in Round 20.

* Operating room/Specialised Procedure Suite (OR/SPS);
* Critical care;
* Prostheses; and
* Miscellaneous (representing the remainder of the cost buckets).

This section contains the analysis of the differences between cost buckets in Round 18 and Round 20 as well as the cost buckets by top 20 DRGs.

### Differences between Round 18 and Round 20

Table 9 and Figure 5 illustrate the differences between the Round18 and Round 20 for the cost buckets. These movements were expected as the participants undertook their own costing and 67 per cent of the participants used their own feeder systems as allocation statistics instead of relying on service weights.

Figure 5 visually shows that OR and SPS had the largest movement between Rounds with an increase of 3.2 per cent. A potential reason for this change is the increased use of participant’s own feeder data and allocation statistics providing more accurate cost allocations, changes in service weights between Rounds and increase in same day theatre related separations. Additionally there was a decrease of 3.0 per cent in prostheses. A potential reason for this is that participants used feeder systems rather than PHDB data to inform this allocation of cost. The Round 18 results have not been adjusted for CPI changes between the years.

Figure 5. Breakdown of cost by cost-bucket group, Round 20 versus Round 18

Table 9. Breakdown of cost by cost-bucket group, Round 20 versus Round 18

|  |  |  |  |
| --- | --- | --- | --- |
| **Cost Bucket** | **Round 18 2013-14** | **Round 20 2015-16** | **Movement** |
|
| Operating Rooms and Specialist Procedure Suites | 23.2% | **26.4%** | 3.2% |
| Critical Care | 5.9% | **6.4%** | 0.5% |
| Prostheses | 21.9% | **18.9%** | -3.0% |
| Miscellaneous | 49.0% | **48.3%** | -0.7% |
| Total | 100.0% | **100.0%** | 0.0% |

### Critical care cost bucket

Key findings

Table 10 demonstrates that the highest critical care cost weight DRG is A06A Tracheostomy and/or Ventilation >=96hours, Major Complexity. This was ranked number one in Round 18 and is predicted to be ranked number one or two given the fact this is a highly complex and resource intense DRG.

As seen in Table 10 the DRGs listed in the top 20 are expected to be within this ranking given that they are either mechanical ventilation or neonatal DRGs.

Consistencies between Round 18 and Round 20

DRGs ranked one and two (see Figure 6) were in the same ranking order as Round 18. Both of these DRGs increased their weights, by 2.45 and 1.93 respectively. A reason for this movement could be the participants using their own feeder systems to allocate costs compared to in Round 18.

The greatest reduction was Q01A Splenectomy, Major Complexity decreasing its cost weight by 6.18 hence ranking 18 this Round compared to a ranking of 3 in Round 18. The greatest increase was P64A Neonate, AdmWt 1250-1499g W/O Significant OR Proc/Vent>=96hrs, Major Complexity increasing its cost weight by 9.81 causing a significant shift in ranking from 167 in Round 18 to ranking 4 for Round 20. These both relate to increased feeder data being utilised to allocate costs and the service weight changes between rounds.

Differences between Round 18 and Round 20

There are six new DRGs entering the top 20 (see Table 10) this is due to an increase in separations and volume of hospitals submitting data against these specific DRGs for Round 20. These were:

* P03B Neonate, AdmWt 1000-1499g W Significant OR Proc/Vent>=96hrs, Minor Complexity,
* P64A Neonate, AdmWt 1250-1499g W/O Significant OR Proc/Vent>=96hrs, Major Complexity,
* P65A Neonate, AdmWt 1500-1999g W/O Significant OR Proc/Vent>=96hrs, Extreme Comp,
* P04B Neonate, AdmWt 1500-1999g W Significant OR Proc/Vent>=96hrs, Minor Complexity,
* P05B Neonate, AdmWt 2000-2499g W Significant OR Proc/Vent>=96hrs, Minor Complexity, and
* B42A Nervous System Disorders W Ventilator Support, Major Complexity.

The reason for these being ranked in this Round’s top 20 is predominately due to the changes in the sample of hospitals which submitted data and the activity volume for the masked DRGs.

Figure 6. Top 20 DRG for critical care cost bucket

**Note:** when a Round 18 bar is missing from the chart, this is because that DRG was masked in Round 18 due to having less than 5 separations or having less than 3 hospitals with that DRG.

Table 10. Top 20 DRG for critical care cost bucket

| **Top 20 Round 18** | **Rank Round 20** | **DRG** | **DRG Description** | **Critical care cost weight(a)** | **No. of weighted seps(b)** | **Overall cost weight(c)** | **ALoS (days)(d)** | **% of DRG total cost** | **Round 18 critical care cost weight** | **Rank Round 18** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **OR and SPS** | **Critical care** | **Prosth-esis** | **Miscell-aneous**  |
|
|
| Yes | 1 | A06A | Tracheostomy and/or Ventilation >=96hours, Major Complexity | **20.76** | 199 | 35.15 | 49.8 | 8% | 59% | 5% | 28% | 18.31 | 1  |
| Yes | 2 | A06B | Tracheostomy and/or Ventilation >=96hours, Intermediate Complexity | **13.94** | 532 | 24.44 | 31.4 | 8% | 57% | 6% | 29% | 12.01 | 2  |
| No | 3 | P03B | Neonate, AdmWt 1000-1499g W Significant OR Proc/Vent>=96hrs, Minor Complexity | **11.56** | 45 | 14.32 | 31.9 | 0% | 81% | 0% | 19% | \*\*\*\*\*\* | \*\*\*\*\*\* |
| No | 4 | P64A | Neonate, AdmWt 1250-1499g W/O Significant OR Proc/Vent>=96hrs, Major Complexity | **10.12** | 28 | 16.00 | 42.6 | 0% | 63% | 0% | 37% | 0.31 | 167  |
| Yes | 5 | A06C | Tracheostomy and/or Ventilation >=96hours, Minor Complexity | **8.83** | 480 | 16.24 | 20.0 | 10% | 54% | 6% | 29% | 7.75 | 4  |
| Yes | 6 | F40A | Circulatory Disorders W Ventilator Support, Major Complexity | **7.78** | 33 | 11.03 | 15.7 | 2% | 71% | 0% | 27% | 4.00 | 12  |
| No | 7 | P65A | Neonate, AdmWt 1500-1999g W/O Significant OR Proc/Vent>=96hrs, Extreme Comp | **7.61** | 116 | 10.56 | 31.3 | 0% | 72% | 0% | 27% | 0.41 | 140  |
| No | 8 | P04B | Neonate, AdmWt 1500-1999g W Significant OR Proc/Vent>=96hrs, Minor Complexity | **7.11** | 26 | 10.20 | 30.1 | 0% | 70% | 0% | 30% | ------ | ------ |
| No | 9 | P05B | Neonate, AdmWt 2000-2499g W Significant OR Proc/Vent>=96hrs, Minor Complexity | **6.62** | 25 | 8.81 | 18.7 | 0% | 75% | 0% | 25% | 0.00 | 738  |
| No | 10 | B42A | Nervous System Disorders W Ventilator Support, Major Complexity | **5.87** | 30 | 10.24 | 16.3 | 2% | 57% | 0% | 41% | \*\*\*\*\*\* | \*\*\*\*\*\* |
| Yes | 11 | F04A | Cardiac Valve Procedures W CPB Pump W/O Invasive Cardiac Invest, Major Comp | **5.78** | 291 | 16.52 | 24.4 | 14% | 35% | 19% | 32% | 4.53 | 7  |
| Yes | 12 | F43A | Circulatory Disorders W Non-Invasive Ventilation, Major Complexity | **5.63** | 46 | 9.48 | 20.5 | 2% | 59% | 0% | 38% | 3.61 | 13  |
| Yes | 13 | T40Z | Infectious and Parasitic Diseases W Ventilator Support | **5.37** | 24 | 8.86 | 13.7 | 2% | 61% | 0% | 38% | 4.04 | 11  |
| Yes | 14 | E41A | Respiratory System Disorders W Non-Invasive Ventilation, Major Complexity | **5.13** | 288 | 9.39 | 20.8 | 1% | 55% | 0% | 44% | 2.97 | 18  |
| Yes | 15 | F07A | Other Cardiothoracic/Vascular Procedures W CPB Pump, Major Complexity | **5.04** | 25 | 13.20 | 17.7 | 21% | 38% | 8% | 33% | 4.05 | 10  |
| Yes | 16 | F06A | Coronary Bypass W/O Invasive Cardiac Investigation, Major Complexity | **4.99** | 546 | 11.16 | 15.9 | 19% | 45% | 8% | 29% | 4.47 | 9  |
| Yes | 17 | F05A | Coronary Bypass W Invasive Cardiac Investigation, Major Complexity | **4.84** | 433 | 12.03 | 17.2 | 22% | 40% | 8% | 30% | 4.67 | 6  |
| Yes | 18 | Q01A | Splenectomy, Major Complexity | **4.63** | 13 | 9.45 | 15.4 | 10% | 49% | 8% | 34% | 10.81 | 3  |
| Yes | 19 | E40B | Respiratory System Disorders W Ventilator Support, Minor Complexity | **4.56** | 48 | 6.64 | 8.7 | 1% | 69% | 0% | 30% | 3.27 | 15  |
| No | 20 | P65B | Neonate, AdmWt 1500-1999g W/O Significant OR Proc/Vent>=96hrs, Major Complexity | **4.54** | 164 | 7.63 | 25.0 | 0% | 60% | 0% | 40% | 1.41 | 48  |
| 13 in Top 20  | **Sub-total, top 20 highest critical care cost-weight DRGs** | **8.19** | **3,389** | **15.56** | **23.7** | 10% | 53% | 7% | 30% |  |  |
|  |  | **All DRGs** | **0.06** | **3,051,681** | **1.00** | **2.3** | 26% | 6% | 19% | 48% |  |  |
|  |   | **Top 20 Critical Care cost-weight DRGs, % of all DRGs** |  | **0.1%** |   |   |   |   |   |   |   |   |

Notes

(a) For cost weight (cost bucket specific) calculations please refer to Appendix D: Cost weight tables by AR-DRG Version 8.0

(b) Separations shown are strata weighted

(c) DRG-rank for cost weight across all cost buckets. A rank of 1 means that the DRG has the highest cost weight.

(d) ALoS means average length of stay

### Operating room/specialised procedure suite cost bucket

Key findings

Figure 7 shows that the highest cost weight DRG is J01A Microvas Tiss Transf for Skin, Subcut Tiss & Breast Dsrds, Major Complexity. This was ranked number one in Round 18 and is accustomed to be ranked number one or two given the fact that this procedure utilises a large amount of theatre time.

As presented in Table 11 the DRGs listed in the top 20 are customary to be within this ranking given that the majority are coded to DRGs ending in A or B and are all known for consuming high levels of theatre time for example cardiac investigative procedures.

Consistencies between Round 18 and Round 20

DRGs ranked one and two were ranked in the same order as Round 18 with a minor change in weighting.

The greatest increase was F07A Other Cardiothoracic/Vascular Procedures W CPB Pump, Major Complexity increasing its cost weight by 0.96. This relates to increased feeder data and allocation statistics being utilised and service weight changes between rounds.

Differences between Round 18 and Round 20

A40B ECMO, Minor Complexity (see Table 11) was masked in Round 18 due to the sample containing less than 5 separations compared to Round 20 where there were 30 weighted separations and it is ranked three.

The top five rankings include a new entrant F07A Other Cardiothoracic/Vascular Procedures W CPB Pump, Major Complexity (see Figure 7) which was ranked 18 in Round 18 and is now ranked number five. A reason for this is the different sample size and increase in weighted separations for this DRG.

The other two new DRGs are I09A Spinal Fusion, Major Complexity and A06B Tracheostomy and/or Ventilation >=96hours, Intermediate Complexity (see Figure 7). The reason for these entering the top 20 is sample size changes, costing approach changes and increase in weighted separations between rounds.

Figure 7. Top 20 DRGs for operating room/specialised procedure suite cost bucket

**Note:** when a Round 18 bar is missing from the chart, this is because that DRG was masked in Round 18 due to having less than 5 separations or having less than 3 hospitals with that DRG.

Table 11. Top 20 DRGs for operating room/specialised procedure suite cost bucket

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Top 20 Round 18** | **Rank Round 20** | **DRG** | **DRG Description** | **OR and SPS cost weight(a)** | **No. of weighted seps(b)** | **Overall cost weight(c)** | **ALoS (days)(d)** | **% of DRG total cost** | **Round 18 OR and SPS cost weight** | **Rank Round 18** |
| **OR and SPS** | **Critical care** | **Prosth-esis** | **Miscell-aneous**  |
|
|
| Yes | 1 | J01A | Microvas Tiss Transf for Skin, Subcut Tiss & Breast Dsrds, Major Complexity | **3.20** | 64 | 8.19 | 11.8 | 39% | 15% | 7% | 39% | 3.39 | 1  |
| Yes | 2 | J01B | Microvas Tiss Transf for Skin, Subcut Tiss & Breast Dsrds, Minor Complexity | **2.84** | 617 | 5.86 | 7.3 | 48% | 5% | 9% | 37% | 2.61 | 2  |
| No | 3 | A40B | ECMO, Minor Complexity | **2.84** | 30 | 8.86 | 4.1 | 32% | 26% | 24% | 18% | \*\*\*\*\*\* | \*\*\*\*\*\* |
| Yes | 4 | A06A | Tracheostomy and/or Ventilation >=96hours, Major Complexity | **2.76** | 199 | 35.15 | 49.8 | 8% | 59% | 5% | 28% | 2.55 | 3  |
| Yes | 5 | F07A | Other Cardiothoracic/Vascular Procedures W CPB Pump, Major Complexity | **2.75** | 25 | 13.20 | 17.7 | 21% | 38% | 8% | 33% | 1.79 | 18  |
| Yes | 6 | F03A | Cardiac Valve Procedures W CPB Pump W Invasive Cardiac Investigation, Major Comp | **2.63** | 336 | 13.83 | 20.0 | 19% | 30% | 20% | 31% | 2.36 | 6  |
| Yes | 7 | F05A | Coronary Bypass W Invasive Cardiac Investigation, Major Complexity | **2.61** | 433 | 12.03 | 17.2 | 22% | 40% | 8% | 30% | 2.14 | 9  |
| Yes | 8 | F04A | Cardiac Valve Procedures W CPB Pump W/O Invasive Cardiac Invest, Major Comp | **2.34** | 291 | 16.52 | 24.4 | 14% | 35% | 19% | 32% | 2.41 | 4  |
| Yes | 9 | F03B | Cardiac Valve Procedures W CPB Pump W Invasive Cardiac Investigation, Minor Comp | **2.31** | 357 | 10.22 | 13.3 | 23% | 25% | 22% | 30% | 2.13 | 10  |
| Yes | 10 | F05B | Coronary Bypass W Invasive Cardiac Investigation, Minor Complexity | **2.20** | 1,157 | 8.69 | 12.2 | 25% | 37% | 4% | 33% | 1.90 | 13  |
| Yes | 11 | I02A | Microvascular Tissue Transfers or Skin Grafts, Excluding Hand, Major Complexity | **2.20** | 103 | 16.66 | 50.6 | 13% | 6% | 11% | 70% | 2.38 | 5  |
| Yes | 12 | F08A | Major Reconstructive Vascular Procedures W/O CPB Pump, Major Complexity | **2.19** | 275 | 11.95 | 23.3 | 18% | 24% | 16% | 42% | 1.77 | 19  |
| Yes | 13 | F06A | Coronary Bypass W/O Invasive Cardiac Investigation, Major Complexity | **2.07** | 546 | 11.16 | 15.9 | 19% | 45% | 8% | 29% | 1.75 | 20  |
| Yes | 14 | F04B | Cardiac Valve Procedures W CPB Pump W/O Invasive Cardiac Invest, Interm Comp | **2.04** | 1,591 | 10.76 | 12.0 | 19% | 33% | 22% | 26% | 1.87 | 15  |
| Yes | 15 | H01A | Pancreas, Liver and Shunt Procedures, Major Complexity | **2.03** | 355 | 10.73 | 19.9 | 19% | 30% | 9% | 42% | 1.93 | 12  |
| No | 16 | I09A | Spinal Fusion, Major Complexity | **2.02** | 425 | 14.72 | 20.0 | 14% | 13% | 43% | 31% | 1.73 | 22  |
| Yes | 17 | I06Z | Spinal Fusion for Deformity | **1.99** | 1,209 | 14.11 | 9.8 | 14% | 7% | 59% | 19% | 1.96 | 11  |
| Yes | 18 | F07B | Other Cardiothoracic/Vascular Procedures W CPB Pump, Intermediate Complexity | **1.95** | 104 | 9.60 | 11.8 | 20% | 37% | 14% | 29% | 2.16 | 8  |
| No | 19 | A06B | Tracheostomy and/or Ventilation >=96hours, Intermediate Complexity | **1.94** | 532 | 24.44 | 31.4 | 8% | 57% | 6% | 29% | 1.47 | 32  |
| Yes | 20 | G01A | Rectal Resection, Major Complexity | **1.88** | 300 | 11.45 | 26.7 | 16% | 28% | 5% | 51% | 1.83 | 16  |
| 17 | **Sub-total, top 20 highest ORSPS cost-weight DRGs** | **2.20** | **8,948** | **12.61** | **16.6** | 17% | 32% | 21% | 30% |  |  |
| in  | **All DRGs** |   | **0.26** | **3,051,681** | **1.00** | **2.3** | 26% | 6% | 19% | 48% |  |  |
| Top 20 | **Top 20 OR and SPS cost-weight DRGs, % of all DRGs** |  | **0.3%** |   |   |   |   |   |   |   |   |

Notes

(a) For cost weight (cost bucket specific) calculations please refer to Appendix D: Cost weight tables by AR-DRG Version 8.0

(b) Separations shown are strata weighted

(c) DRG-rank for cost weight across all cost buckets. A rank of 1 means that the DRG has the highest cost weight.

(d) ALoS means average length of stay

### Prostheses cost bucket

Key findings

The highest cost weight DRG is F01A Implantation or Replacement of AICD, Total System with Catastrophic CC as displayed in Table 12 and Figure 8. This was ranked number one in Round 18 due to the high cost of the defibrillator prosthesis and increased activity. This DRG has reduced by 4.30 cost weights between rounds due to the change in hospital groups.

As demonstrated in Table 12 the DRGs listed in the top 20 are expected to be within this ranking given that 80 per cent (16 out of 20) are known procedures to include an expensive prosthesis.

Additionally as anticipated these highly expensive prostheses procedures only represent 1.2 per cent (37,193 population-adjusted separations) of the total population-adjusted separations (3.05m population-adjusted separations) seen in Table 12.

Consistencies between Round 18 and Round 20

80 per cent (16 out of 20) of the top 20 DRGs were included in Round 18’s results with the top four being ranked in the same order which indicates that these DRGs are consuming similar amounts of prosthetic resources.

The greatest reduction, as in Round 18, was F01A Implantation or Replacement of AICD, Total System W Catastrophic CC reducing its cost weight by 4.30. The contributing factors for this movement is either that the sample of hospital groups is impacting this cost bucket, improvements in feeder data being used for this round, or potentially the costs of these implants used have reduced in cost to the sampled hospital groups.

The only increased weight was for I01B Bilateral and Multiple Major Joint Procedures of Lower Limb, Minor Complexity increasing its cost weight marginally by 0.25. This relates to the change in costing approach, increased feeder data and allocation statistics being utilised and service weight changes between rounds.

Differences between Round 18 and Round 20

The following DRGs are new to the top 20 these are (see Figure 8):

* I01B Bilateral and Multiple Major Joint Procedures of Lower Limb, Minor Complexity was ranked 21 now 9.
* I09C Spinal Fusion, Minor Complexity was ranked 22 now ranked 14.
* F17B Insertion and Replacement of Pacemaker Generator, Minor Complexity was ranked 23 now ranked 18.
* I31B Revision of Hip Replacement, Intermediate Complexity was ranked 26 now ranked 20.

The reason for these movements is that the participants have used improved feeder data for prostheses therefore this DRG is now reflecting a more accurate cost of delivery and activity has increased for these DRGs.

A11B Insertion of Implantable Spinal Infusion Device, Minor Complexity ranked has dropped from nine to 16 for this Round. This is due to the low number of weighted separations which appear in this DRG. The low number of separations leads to more volatile results.

Figure 8. Top 20 DRGs for prostheses cost bucket

**Note:** when a Round 18 bar is missing from the chart, this is because that DRG was masked in Round 18 due to having less than 5 separations or having less than 3 hospitals with that DRG.

Table 12. Top 20 DRGs for prostheses cost bucket

|  **20 Round 18** | **Rank Round 20** | **DRG** | **DRG Description** | **Prosth-esis cost weight(a)** | **No. of weighted seps(b)** | **Overall cost weight(c)** | **ALoS (days)(d)** | **% of DRG total cost** | **Round 18 prosthesis cost weight** | **Rank Round 18** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **OR and SPS** | **Critical care** | **Prosth-esis** | **Miscell-aneous**  |
|
|
| Yes | 1 | F01A | Implantation and Replacement of AICD, Total System, Major Complexity | **14.97** | 297 | 20.46 | 10.5 | 7% | 9% | 73% | 11% | 19.27 | 1  |
| Yes | 2 | F01B | Implantation and Replacement of AICD, Total System, Minor Complexity | **14.44** | 2,363 | 16.31 | 2.3 | 6% | 1% | 89% | 4% | 17.71 | 2  |
| Yes | 3 | I06Z | Spinal Fusion for Deformity | **8.38** | 1,209 | 14.11 | 9.8 | 14% | 7% | 59% | 19% | 8.90 | 3  |
| Yes | 4 | D01Z | Cochlear Implant | **6.94** | 728 | 8.39 | 1.6 | 10% | 0% | 83% | 7% | 8.53 | 4  |
| Yes | 5 | I09A | Spinal Fusion, Major Complexity | **6.29** | 425 | 14.72 | 20.0 | 14% | 13% | 43% | 31% | 7.34 | 7  |
| Yes | 6 | A12Z | Insertion of Neurostimulator Device | **6.12** | 3,166 | 7.59 | 2.7 | 9% | 1% | 81% | 9% | 8.01 | 6  |
| Yes | 7 | I09B | Spinal Fusion, Intermediate Complexity | **4.83** | 4,195 | 8.81 | 8.0 | 18% | 5% | 55% | 22% | 5.36 | 10  |
| Yes | 8 | I01A | Bilateral and Multiple Major Joint Procedures of Lower Limb, Major Complexity | **4.67** | 1,351 | 9.04 | 10.1 | 16% | 5% | 52% | 28% | 5.15 | 11  |
| No | 9 | I01B | Bilateral and Multiple Major Joint Procedures of Lower Limb, Minor Complexity | **4.30** | 2,118 | 7.49 | 6.5 | 16% | 4% | 57% | 23% | 4.05 | 21  |
| Yes | 10 | A11A | Insertion of Implantable Spinal Infusion Device, Major Complexity | **4.07** | 21 | 8.01 | 10.1 | 9% | 5% | 51% | 35% | 4.36 | 18  |
| Yes | 11 | F12A | Implantation and Replacement of Pacemaker, Total System, Major Complexity | **3.80** | 1,491 | 7.37 | 8.6 | 13% | 11% | 52% | 24% | 4.93 | 12  |
| Yes | 12 | F12B | Implantation and Replacement of Pacemaker, Total System, Minor Complexity | **3.66** | 6,582 | 5.23 | 2.4 | 14% | 4% | 70% | 11% | 4.53 | 16  |
| Yes | 13 | I32A | Revision of Knee Replacement, Major Complexity | **3.55** | 737 | 8.08 | 12.5 | 15% | 6% | 44% | 35% | 4.66 | 15  |
| No | 14 | I09C | Spinal Fusion, Minor Complexity | **3.52** | 8,853 | 6.31 | 5.3 | 19% | 3% | 56% | 22% | 3.98 | 22  |
| Yes | 15 | F17A | Insertion and Replacement of Pacemaker Generator, Major Complexity | **3.45** | 143 | 5.84 | 6.7 | 12% | 5% | 59% | 24% | 4.84 | 14  |
| Yes | 16 | A11B | Insertion of Implantable Spinal Infusion Device, Minor Complexity | **3.41** | 32 | 5.65 | 5.1 | 13% | 1% | 60% | 26% | 6.15 | 9  |
| Yes | 17 | I31A | Revision of Hip Replacement, Major Complexity | **3.29** | 283 | 11.91 | 23.7 | 13% | 15% | 28% | 44% | 4.13 | 20  |
| No | 18 | F17B | Insertion and Replacement of Pacemaker Generator, Minor Complexity | **3.25** | 1,918 | 4.08 | 1.2 | 12% | 1% | 80% | 7% | 3.94 | 23  |
| Yes | 19 | F04A | Cardiac Valve Procedures W CPB Pump W/O Invasive Cardiac Invest, Major Comp | **3.15** | 291 | 16.52 | 24.4 | 14% | 35% | 19% | 32% | 4.91 | 13  |
| No | 20 | I31B | Revision of Hip Replacement, Intermediate Complexity | **3.03** | 991 | 7.39 | 11.0 | 17% | 8% | 41% | 35% | 3.74 | 26  |
| 16 in top 20 |   | **Sub-total, top 20 highest prosthetic cost-weight DRGs** | **5.02** | **37,193** | **7.93** | **5.7** | 14% | 5% | 63% | 18% |  |  |
|  |  | **All DRGs** | **0.19** | **3,051,681** | **1.00** | **2.3** | 26% | 6% | 19% | 48% |  |  |
|  |  | **Top 20 Prosthesis cost-weight DRGs, % of all DRGs** |  | **1.2%** |   |   |   |   |   |   |   |   |

Notes

(a) For cost weight (cost bucket specific) calculations please refer to Appendix D: Cost weight tables by AR-DRG Version 8.0

(b) Separations shown are strata weighted

(c) DRG-rank for cost weight across all cost buckets. A rank of 1 means that the DRG has the highest cost weight.

(d) ALoS means average length of stay

### Miscellaneous cost bucket

Key findings

This cost bucket is the most volatile in rankings of all the buckets in Round 20 driven by the sample size, different hospitals participating and the different approach to costing. Table 13 illustrates that the highest cost weight DRG is I02A Microvascular Tissue Transfers or Skin Grafts, Excluding Hand, Major Complexity. This was ranked number five in Round 18 and the reason for the change is the doubling of activity between rounds and that the DRG is a complex treatment.

As presented in Table 13 the DRGs listed in the top 20 are anticipated to be within this ranking given that they have high cost weights and low volume separations which are resource intensive treatments and have appeared in the top 20 of previous tables throughout this section.

Additionally these highly complex patients only represent 0.2 per cent (5,034 population-adjusted separations) of the total population-adjusted separations (3.05m population-adjusted separations) in Table 13.

Similar to Round 18, participants were using allocation statistics and feeder data thus improving the quality and accuracy of cost allocation from the general ledger to these miscellaneous cost buckets.

Consistencies between Round 18 and Round 20

45 per cent (9 out of 20) of the top 20 DRGs were included in Round 18’s results, which was expected given the nature of these cost buckets included in this category.

The greatest reduction was A06A Tracheostomy and/or Ventilation >=96hours, Major Complexity decreasing its cost weight by 5.37 which ranked number one in Round 18. The greatest increase was I02A Microvascular Tissue Transfers or Skin Grafts, Excluding Hand, Major Complexity increasing its cost weight by 2.88 ranked number five in Round 18. These both relate to costing approach changes, sample size changes and service weight changes between rounds.

Differences between Round 18 and Round 20

The greatest swings, as illustrated by Figure 9, are the movements in costs weights for:

* A06A Tracheostomy and/or Ventilation >=96hours, Major Complexity which reduced by 5.37 cost weights.
* A06B Tracheostomy and/or Ventilation >=96hours, Intermediate Complexity which reduced by 2.92 cost weights.
* F04A Cardiac Valve Procedures W CPB Pump W/O Invasive Cardiac Invest, Major Comp which reduced by 2.38 cost weights.

A reason for these reductions and increases in cost weights is the change in sample size, the approach to costing and possibility the reduction in ALoS overall.

U62A Paranoia and Acute Psychotic Disorders, Major Complexity increased by 3.37 cost weights (see Figure 9). This is due to the low number of weighted separations which appear in this DRG. The low number of separations leads to more volatile results.

Figure 9. Top 20 DRGs for miscellaneous cost bucket

Table 13. Top 20 DRGs for miscellaneous (Misc.) cost bucket

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Top 20 Round 18** | **Rank Round 20** | **DRG** | **DRG Description** | **Miscell-aneous cost weight(a)** | **No. of weighted seps(b)** | **Overall cost weight(c)** | **ALoS (days)(d)** | **% of DRG total cost** | **Round 18 miscellan-eous cost weight** | **Rank Round 18** |
| **OR and SPS** | **Critical care** | **Prosth-esis** | **Miscell-aneous**  |
|
|
| Yes | 1 | I02A | Microvascular Tissue Transfers or Skin Grafts, Excluding Hand, Major Complexity | **11.62** | 103 | 16.66 | 50.6 | 13% | 6% | 11% | 70% | 8.74 | 5  |
| Yes | 2 | A06A | Tracheostomy and/or Ventilation >=96hours, Major Complexity | **9.81** | 199 | 35.15 | 49.8 | 8% | 59% | 5% | 28% | 15.18 | 1  |
| Yes | 3 | K01A | OR Procedures for Diabetic Complications, Major Complexity | **8.80** | 63 | 12.44 | 44.6 | 12% | 14% | 4% | 71% | 9.17 | 4  |
| Yes | 4 | B60A | Acute Paraplegia and Quadriplegia W or W/O OR Procedures, Major Complexity | **8.38** | 10 | 15.55 | 49.5 | 10% | 24% | 12% | 54% | 9.95 | 3  |
| Yes | 5 | A08A | Autologous Bone Marrow Transplant, Major Complexity | **7.27** | 184 | 7.67 | 21.6 | 1% | 4% | 0% | 95% | 7.29 | 11  |
| Yes | 6 | A06B | Tracheostomy and/or Ventilation >=96hours, Intermediate Complexity | **7.17** | 532 | 24.44 | 31.4 | 8% | 57% | 6% | 29% | 10.09 | 2  |
| Yes | 7 | F11A | Amputation, Except Upper Limb and Toe, for Circulatory Disorders, Major Comp | **6.83** | 65 | 10.23 | 33.3 | 15% | 15% | 3% | 67% | 6.55 | 15  |
| Yes | 8 | R03A | Lymphoma and Leukaemia W Other OR Procedures, Major Complexity | **6.56** | 145 | 7.77 | 27.8 | 6% | 5% | 5% | 84% | 7.34 | 10  |
| No | 9 | B82A | Chronic & Unspec Para/Quadriplegia W or W/O OR Proc, Major Complexity | **6.10** | 96 | 9.11 | 29.7 | 8% | 16% | 9% | 67% | 5.36 | 33  |
| No | 10 | P64A | Neonate, AdmWt 1250-1499g W/O Significant OR Proc/Vent>=96hrs, Major Complexity | **5.88** | 28 | 16.00 | 42.6 | 0% | 63% | 0% | 37% | 5.58 | 26  |
| No | 11 | G02A | Major Small and Large Bowel Procedures, Major Complexity | **5.87** | 839 | 10.93 | 26.3 | 14% | 28% | 4% | 54% | 5.75 | 22  |
| No | 12 | G01A | Rectal Resection, Major Complexity | **5.82** | 300 | 11.45 | 26.7 | 16% | 28% | 5% | 51% | 5.90 | 21  |
| No | 13 | R60A | Acute Leukaemia, Major Complexity | **5.75** | 392 | 6.20 | 20.0 | 1% | 6% | 0% | 93% | 4.08 | 59  |
| No | 14 | T01A | Infectious and Parasitic Diseases W OR Procedures, Major Complexity | **5.43** | 597 | 7.92 | 24.7 | 10% | 17% | 4% | 69% | 5.69 | 24  |
| No | 15 | U62A | Paranoia and Acute Psychotic Disorders, Major Complexity | **5.34** | 35 | 5.41 | 20.5 | 1% | 0% | 0% | 99% | 1.97 | 202  |
| Yes | 16 | F04A | Cardiac Valve Procedures W CPB Pump W/O Invasive Cardiac Invest, Major Comp | **5.25** | 291 | 16.52 | 24.4 | 14% | 35% | 19% | 32% | 7.63 | 8  |
| No | 17 | I31A | Revision of Hip Replacement, Major Complexity | **5.25** | 283 | 11.91 | 23.7 | 13% | 15% | 28% | 44% | 5.36 | 32  |
| No | 18 | K01B | OR Procedures for Diabetic Complications, Intermediate Complexity | **5.12** | 168 | 6.76 | 23.8 | 13% | 4% | 7% | 76% | 4.55 | 49  |
| No | 19 | L09A | Other Procedures for Kidney and Urinary Tract Disorders, Major Complexity | **5.05** | 105 | 8.26 | 23.1 | 10% | 26% | 3% | 61% | 5.24 | 35  |
| No | 20 | 801A | OR Procedures Unrelated to Principal Diagnosis, Major Complexity | **5.03** | 600 | 7.91 | 23.6 | 10% | 16% | 11% | 64% | 5.73 | 23  |
| 9 |   | **Sub-total, top 20 highest miscellaneous cost-weight DRGs** | **6.13** | **5,034** | **12.33** | **27.2** | 10% | 32% | 8% | 50% |  |  |
| in  |   | **All DRGs** | **0.48** | **3,051,681** | **1.00** | **2.3** | 26% | 6% | 19% | 48% |  |  |
| Top 20 |   | **Top 20 Miscellaneous cost-weight DRGs, % of all DRGs** |  | **0.2%** |   |   |   |   |   |   |   |   |

Notes

(a) For cost weight (cost bucket specific) calculations please refer Appendix D: Cost weight tables by AR-DRG Version 8.0

(b) Separations shown are strata weighted

(c) DRG-rank for cost weight across all cost buckets. A rank of 1 means that the DRG has the highest cost weight.

(d) ALoS means average length of stay

# Appendix A: Analysis performed to determine the minimum sample size

**Background**

In September 2012 IHPA engaged PwC to review the methodology for calculating the minimum sample size to have a valid and reliable private sector NHCDC collection. This review was requested by the Private sector to ensure the validity and reliability of the collection.

The calculations were based on data received from IHPA, the DoH and PHDB to determine the number of separations, number of hospitals and number of hospital groups required to participate.

**The outcome**

The conclusion of this re-evaluation based on 2012 data was:

* Approximately 60 per cent of all separations are required in order to achieve a 95 per cent confidence level and 4.0 per cent acceptable margin of error.
* The 95 per cent confidence level and 4.0 per cent margin of error parameters have been informed by considering participation levels in historic publications.
* The collection should include approximately 90 hospitals and 10 hospitals ‘groups’ (of 2 or more hospitals) to be representative.

These minimum targets were used as criteria for the Round 20 collection. It should be noted that these criteria are based on 2012 data and no adjustments have been made to account for any significant sector or market changes for this Round 20 collection and associated reports.

These minimum targets were used as the condition on which the previous rounds would go ahead. For Round 20, IHPA targeted a select group of participants to provide self-costed data, changing the expectation that the minimum participation rate of 60 per cent will be met.

**Minimum participation levels based on 2012 data**

*Historical data analysis used in determining the minimum participation levels*

The following datasets were received and reviewed:

1. The published cost weight tables for Round 13;
2. A summary of the NHCDC sample for Round 13 and Round 14, by hospital and DRG, for the overnight sector;
3. From the PHDB dataset: a summary of the population levels of activity, showing the total number of separations by hospital in-scope for the collection (at least 200 separations), for Round 13 and Round 14, for the overnight sector;
4. From the PHDB dataset: a summary of the population levels of activity, ALoS, and standard deviation of the LoS, by hospital and DRG, for all private hospitals, that is, for private overnight hospitals and private day hospitals.

Item 1 above was obtained from the DoH website[[10]](#footnote-10). Items 2 and 3 above were provided by IHPA. Item 4 above was provided by DoH.

In order for the NHCDC sample to be representative of the patient population and the population of private hospitals, minimum participation levels have been specified in terms of:

1. Separation sample size expressed as a percentage of the population levels of activity, where “population” is defined as the total number of separations for hospitals in-scope for the collection. The minimum separation sample size considered to provide sufficient reliability consistent with common statistical practice and historical publication practices was based on the following parameters:
2. Standard deviation of costs per DRG;
3. Margin of error in the estimated average cost per DRG; and
4. Statistical confidence that the estimates fall within the specified margin of error.

Parameters (b) and (c) above were informed by reviewing the minimum sample size considered robust enough for publication in the Round 7 to 13 collections and parameter (a) was derived from the Round 13 cost weights.

1. The minimum number of hospitals that are required to participate, in aggregate and by hospital characteristic, to ensure that the collection is representative of the population of private hospitals; and
2. The minimum number of hospital groups that are required to participate, to ensure that the results represent the population of private hospitals.

**Percentage of population separations**

A key objective of the collection is to produce estimated costs and cost-weights by classified activity. The percentage of population separations that is required in a sample depends upon the tolerable “margin of error”, statistical confidence[[11]](#footnote-11) required, and the standard deviation of costs. To obtain an estimate of the average episode cost of a given DRG, say “k”, within a margin of error *m* and with *x per cent* confidence, the required sample size for DRG(k) is:

$$sample size of AR-DRG\left(k\right)$$

$$=\left(\frac{\left(Z-score of x\right)×(standard deviation of episode cost for DRG(k))}{(margin of error m)}\right)^{2}$$

A dataset with a lower margin of error, higher statistical confidence, and higher standard deviation, will require a larger sample size. The standard deviation of each DRG varies, and so the sample size required for each DRG (given the same parameters for error and confidence) will vary. However, given that the NHCDC collection is a voluntary one, it will be impossible to achieve target samples for each DRG. Hence, the sample sizes across all DRGs were aggregated. In performing this aggregation, two weighting methods were investigated:

1. Number of separations by DRG;
2. Total cost by DRG (number of separations per DRG multiplied by the average cost per DRG).

**Outcome of analysis**

Based on the above analysis, historically IHPA agreed that for the private overnight NHCDC the minimum target participation rate would be 60 per cent in order to achieve a robust sample[[12]](#footnote-12). For Round 20, the participation rate achieved was 58 per cent, 91 hospitals and 9 groups. IHPA agreed that this drop in participation rate means that the confidence level and margin of error has moved from 95 per cent confidence and 4.0 per cent margin of error to 85 per cent confidence and 3.0 per cent margin of error as per Table 14 below. This marginal decrease in participation rate is not expected to significantly impact the validity of the results.

Table 14 Round 20 participation rate confidence level and margin of error.

|  |   | Confidence level |
| --- | --- | --- |
|   |  | 85% | 90% | 95% | 99% |
|   | 1% | 87% | 88% | 90% | 92% |
| Margin of error per DRG class (%) | 2% | 72% | 75% | 80% | 85% |
| 3% | 59% | 63% | 69% | 77% |
| 4% | 49% | 53% | 60% | 69% |
| 5% | 40% | 45% | 52% | 61% |
| 6% | 34% | 39% | 45% | 55% |
| 7% | 29% | 33% | 39% | 49% |
| 8% | 25% | 29% | 35% | 44% |
| 9% | 21% | 25% | 31% | 40% |
|   | 10% | 19% | 22% | 27% | 36% |

**Minimum number of hospitals required**

**Historical methodology to calculate minimum number of hospitals required**

The formula that is used to produce cost-weights is provided below:



Where the average costs are weighted by population levels of activity across all DRG classes and by other hospital characteristics (e.g. hospital size and for-profit / not-for-profit status).

The above formula shows that the cost-weight is influenced by both the average cost of an individual DRG, as well as the overall average cost across all DRGs. The average costs within a given DRG, and across all DRGs, are in turn influenced by the underlying distribution of separations by hospital attribute by which average costs can vary. Therefore, to ensure that the national cost-weights are representative of the Australian population of hospitals, it is important to have a sample that reflects the distribution of separations, and the average costs, across the hospital attributes by which costs can vary.

The study found that there are statistically significant variations in cost between the following hospital attributes:

* State variations in average costs;
* Status (for profit/non-profit);
* Hospital size (+8,000 separations or under 8,000 separations); and
* Region (metropolitan verses non-metropolitan).

To ensure that the average cost per DRG represents a national average, the attributes of the participating hospitals must be such that they represent the hospital attributes by which costs can vary.

Weighting factors can then be applied to re-balance the sample to the population by DRG and hospital attribute. Therefore, the attributes listed above can be used to formulate a sampling frame against which hospitals can be recruited to participate.

**Outcome of analysis**

Based on the above analysis and to achieve a separation sample size of 60 per cent IHPA agreed that for the previous rounds of the private overnight NHCDC the target minimum number of 10 hospitals will be required. With the caveat that the participants would submit at least 90 per cent of the submitting hospital establishment’s total in-scope activity, which is evaluated as a ratio of total in-scope activity data submitted for the PHDB collection in that reference period.

For Round 20 the participation rate was 58 per cent, 91 hospitals and 9 groups therefore, as this was satisfactory against the criteria, the collection proceeded.

# Appendix B: Detailed methodology

## Stages of the private sector NHCDC

The eight stages of the collection are:

Stage 1: Stakeholder engagement

Stage 2: Data collection

Stage 3: Data preparation

Stage 4: Costing

Stage 5: Data submission

Stage 6: Data validation and QA

Stage 7: Data analysis (including adjustments)

Stage 8: Reporting

These are detailed below.

**Stage 1: Stakeholder engagement**

In a change of approach for Round 20, IHPA sought costed data directly from private hospitals for the private sector NHCDC. This is expected to build capacity in the sector and improve data quality. Participants were requested by IHPA to provide a methodology that outlined how the hospital will undertake the costing and submit data. All participants have demonstrated that they have appropriate costing methodologies.

**Stage 2: Data collection**

At the commencement of the data collection phase a Data Request Specification (DRS) was prepared and distributed to all participants. Participants performed their own data collection.

**Stage 3: Data preparation**

Participants performed their own QA checks on their data to verify that the data was appropriate to be used in their costing process.

**Stage 4: Costing**

The costing phase comprised of participants performing episode level costing using specialised and well-known costing software. Programs used by hospitals in Round 20 include CostPro plus, PPM and C++.

**Stage 5: Data submission**

IHPA required that the participating overnight hospital or hospital groups submit quality data that is in accordance of the Round 20 private sector Data Requirements Specification (DRS) along with a data quality checklist, which provided IHPA the context of their costing process.Participants were informed of the costed data collection timeframes and provided access to the National Health Reform EDW drop box to upload and submit. The participating hospitals were provided a Data Transfer Guide to help navigate through the new process and to communicate processing timeframes.

**Stage 6: Data validation and Quality Assurance**

Participants were required to submit their costed data as csv files which pass data checks documented in the DRS. IHPA only accepted data with zero critical errors and which represented at least 90 per cent of the submitted hospital establishment’s total in-scope activity.

Where the costed data did not meet the DRS requirements, Participants were asked to review the files and make the necessary changes and then re-submit the data.

Once the data was validated, IHPA reviewed the data and produces QA reports to assist participants to confirm the accuracy and appropriateness of the data submission. This included checking for uncharacteristic traits in the data submission in areas that have potential to have a material impact on the data, such as zero or negative cost buckets, costs in prosthesis or operating rooms which are not expected to have costs (and vice versa) and DRG flipping[[13]](#footnote-13). If the QA reports identified uncharacteristic traits, the participant was asked to investigate and either adjust the data or justify the deviation. Once all uncharacteristic traits were justified, the participant confirmed their data was final

On finalisation of the valid costed data submission, IHPA required participants to submit a data quality statement. The data quality statements inform IHPA of the key matters that may impact each participant’s data submission and provide assurance that the data was fit for purpose.

IHPA then consolidated the data submission into a national costed data set.

**Stage 7: Data analysis (including adjustments)**

PwC reviewed the data set for DRG flipping. In Round 20 there were a small number of these instances which were analysed and which IHPA either accepted or requested agreement with the relevant participants to trim the data set for specific episodes that were considered outliers.

Based on the adjustments described above the cost weight tables were produced and checked for reasonableness and compared to the Round 18 results.

**Stage 8: Reporting**

PwC analysed the data and produced reports which outlined the results of the Round 20 private sector NHCDC.

## Round 20 approach

IHPA changed its approach to Round 20, where all participants were required to cost their own data. Each hospital group conducted their own costing processes which required to be performed in compliance with the AHPCS version 3.1. IHPA evaluated that the costing approaches submitted by the participants demonstrated their ability to submit quality costed data sets.

### Costing methodologies

Hospital costing is the process of identifying the resources and inputs used during an episode and applying the costs of those inputs to the different types of clinical procedures and treatments provided to each patient in a hospital. For Round 20, participating hospitals were requested to provide a methodology that outlined how the hospitals will undertake the costing process and submit costed data.

There are two main methodologies that were adopted by participants for hospital cost allocations: cost modelled or patient costed, which are outlined below.

**Cost modelling**

Cost modelling (also known as top down costing) takes the total admitted acute costs for patient areas (such as Wards) and allocates costs to encounters based on an assumed level of consumption using service weights. Service weights are the relative costs of a service for each type of patient care product. Service weights are applied to apportion costs to patient groups defined by their DRG (in the case of acute admitted care).

**Patient costing**

Patient costing (also known as bottom-up costing) uses some type of activity feeder system to provide actual resource consumption. For example, a prostheses system within a hospital will record what type of prosthesis has been implanted into a patient and the cost. This data is used to allocate costs to patients from the Prostheses patient care area.

Patient level costing yields results that are closer to the true cost of an encounter within a hospital, however due to the dependency on feeder systems, perfect patient level costing can be difficult to achieve.

### Data sources

In this Round, the following categories of patient level data components have been utilised during the costing process:

**Financial data:** This includes the general ledger cost centres and account codes, along with mapping of those cost centres to patient care areas and standardised line items. This data set excluded revenue cost centres and/or account codes.

**Activity data:** This includes the encounter level data (such as patient ID, encounter ID, date of birth etc.) and transfer information identifying the patient’s pathway through the hospital via transfers between areas such as operating rooms and wards.

**Feeder data:** This includes data that identifies patient consumption of hospital products or services within a patient care area. For example, a prosthesis feeder might list the prosthetic items received by a patient and the cost of each. This feeder data was used to allocate costs in the general ledger as it identified how much of the prosthesis products each encounter consumed. Where no feeder data was submitted, patient care area costs were allocated using service weights.

### Cost bucket or cost components

In the NHCDC, the cost of an episode of acute admitted care is reported by allocating patient level costs to a set of pre-defined cost buckets/cost components. The cost buckets are listed as follows:

1. Ward Medical
2. Ward Nursing
3. Non-clinical Salaries
4. Pathology
5. Imaging
6. Allied Health
7. Pharmacy
8. Critical Care
9. Operating Rooms
10. Supplies
11. Specialist Procedure Suites
12. On-costs
13. Prostheses
14. Hotel
15. Depreciation

Please note that Emergency Department cost bucket was excluded for the private sector NHCDC cost buckets as this collection is for acute admitted only.

Once each of the cost buckets were calculated for an individual patient, the patient’s total cost of care was derived as the sum of the above components. A description of the cost buckets are provided in Appendix D: Cost weight tables by AR-DRG Version 8.0

### AR-DRG grouping

All 91 hospitals submitted data costed in a prior version to AR-DRG version 8.0. The data was regrouped using grouping software to AR-DRG version 8.0.

### Service weights

The 2014-15 service weights were used in Round 20, which are derived from the Round 19 public sector NHCDC.

### Cost weights

A cost weight for a selected AR-DRG is calculated as the average cost for that DRG, expressed as a weight relative to the overall average cost across all AR-DRGs. The national cost weight across all AR-DRGs is equal to 1.00, with higher cost AR-DRGs having a cost weight higher than 1.00. The weight is an indicator of the complexity of the care of the patient and thus the resourcing intensity required. This is often referred to as the casemix of a patient or hospital.

### Costing standards

Costing was performed in compliance with AHPCS version 3.1.

**Analysis and reporting**

The costing dataset was constructed from the combined hospital costed outputs. The following adjustments were applied to the dataset:

### Neonate adjustment

The costs for newborn infants with zero qualified days, in respect of care type 7 (newborn care), and neonate AR-DRGs were allocated to the delivery AR-DRGs of mothers at the same hospital.

The definition of unqualified days is provided in the National Health Data Dictionary[[14]](#footnote-14): “unqualified days” relates to the first 9 days of a newborn’s life, unless the newborn is a second or subsequent live born infant or it requires intensive care. This adjustment has been performed consistent with Round 18 private NHCDC.

### Market share adjustment process

The market share was first determined for the hospital groups that requested it, to ensure they were appropriately represented. This was done by calculate the share of the PHDB separations that belonged to the relevant group, against those of the hospital groups which submitted to the NHCDC. The data was adjusted accordingly to exclude separations from hospital groups which submitted more separations than their market share.

### Population adjustment process

To ensure the results reflect the full range of Australia’s private hospitals, an estimation process is adopted to create representative national costing and activity Figures from sample data. The estimation process produces ‘population’ data by estimating weights, on the basis of acute admitted separations, that are applied to the sample data so that the acute admitted separations equal the total population Figures.

The total population was determined as the number of acute separations in 2015-16 obtained from the PHDB. All private acute hospitals in Australia (excluding private day hospital facilities) with more than 200 acute admitted separations during the financial year were included.

The number of hospitals in the population file for Round 20 is 246.

# Appendix C: Standard error range for the Round 20 private sector NHCDC

Standard errors, reported against DRG cost weights included in section 4.2 Top 20 and Appendix D: Cost weight tables by AR\_DRG, give an indication of the reliability of cost weights. A large standard error indicates a high level of variation in the underlying sample data for that particular DRG, and therefore the cost weight presented is a less reliable estimate of the true underlying cost of a separation in that DRG.

Table 15 summarises the reliability of DRG cost weights by grouping the standard errors into a number of ranges. Numbers of DRGs and separations falling into standard error ranges provide insight into the global impact of estimation error on cost weights.

Table 15. Number of DRGs by standard error range

| Standard error range | Number of DRGs | Separations | Percentage of DRGs (%) | Percentage of total separations (%) |
| --- | --- | --- | --- | --- |
| 0.000 - 0.039 | 258 | 2,726,916 | 34% | 89% |
| 0.040 - 0.099 | 183 | 222,412 | 24% | 7% |
| 0.100 - 0.149 | 79 | 49,975 | 10% | 2% |
| 0.150 - 0.199 | 51 | 18,420 | 7% | 1% |
| 0.200 - 0.399 | 84 | 22,391 | 11% | 1% |
| 0.400 +  | 105 | 11,461 | 14% | 0% |
| Total\* | **760** | **3,051,575\*** | **100%** | **100%** |

\* The standard error for some DRGs cannot be estimated due to low separation counts in the sample.

The results above show that 58 per cent (34 per cent + 24 per cent) of DRGs have cost weight estimates with a standard error range of less than 0.1. Around 96 per cent (89 per cent + 7.0 per cent) of separations are within the subset of DRGs that have standard error less than 0.1.

#

# Appendix D: Cost weight tables by AR-DRG Version 8.0

Table 16. Round 20 (2015-16) national consolidation cost weight tables – V8.0

**Please refer to excel file for details**

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# Appendix E: Cost weight tables by AR-DRG Version 7.0

Table 17. Round 20 (2015-16) national consolidation cost weight tables – V7.0

**Please refer to excel file for details**

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# Appendix F: Cost weight tables by AR-DRG Version 6.0x

Table 18. Round 20 (2015-16) national consolidation cost weight tables – V6.0x

**Please refer to excel file for details**

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11. In this context: the probability that an estimate falls within the margin of error of the true mean. [↑](#footnote-ref-11)
12. Defined as 95 per cent confidence level and 4.0 per cent acceptable margin of error for the overall average cost. The 95 per cent confidence level and 4.0 per cent margin of error parameters were informed by considering participation levels in historic publications that were considered acceptable for publication. [↑](#footnote-ref-12)
13. DRG flipping occurs when the average cost of a lower complexity DRG within the related adjacent DRG is higher than the one with more complexity. [↑](#footnote-ref-13)
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