‘

Private Sector National Hospital Cost Data Collection

Cost Report

Round 16 (2011-2012)

for Overnight Private Hospitals

27 September 2013

DRG Version: AR-DRG 6.0x

List of abbreviations

1. Abbreviation Description
2. AHPCS Australian Hospital Patient Costing Standards
3. AIHW Australian Institute of Health and Welfare
4. ALOS Average length of stay
5. AR-DRG Australian refined diagnosis related group
6. CM Cost modelled
7. DoHA Department of Health and Ageing
8. DRG Diagnosis related group
9. IHPA Independent Hospital Pricing Authority
10. LOS Length of stay
11. MDC Major diagnostic category
12. NHCDC National hospital cost data collection
13. NHDD National Health Data Dictionary
14. PC Patient costed
15. PHDB Private Hospital Data Bureau
16. PwC PricewaterhouseCoopers
17. SPS Specialist procedure suites

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Executive Summary

## Purpose of this report

1. The private sector National Hospital Cost Data Collection (NHCDC) is a voluntary collection that produces a range of hospital cost and activity information by Australian Refined Diagnosis Related Groups. (AR-DRG or DRG) PricewaterhouseCoopers (PwC) have been engaged by the Independent Hospital Pricing Authority (IHPA) to provide collection, processing and reporting services in relation to Round 16 (12 months ending 30 June 2012) of the NHCDC for acute admitted care provided by overnight private hospitals.
2. This report documents the data, processes, methodology and results for acute admitted care[[1]](#footnote-2) provided by overnight private hospitals. The scope of the collection is in relation to those hospitals with at least 200 acute admitted separations in the 2011-12 financial year. No collection has been performed for Private Stand-Alone Day Hospital facilities for Round 16.

## Background to the Private Sector NHCDC

1. The first Australian national private sector cost study was conducted as part of the 1991-92 National Cost Study. 29 private sector facilities were involved in this initial study which evolved to become the National Hospital Cost Data Collection (NHCDC). Its objective is to provide Australian governments and the health care industry with a nationally consistent method of costing all types of hospital activity and publishing meaningful results which are used for benchmarking, funding and planning hospital based services.
2. Round 1 commenced in 1996-97 with voluntary participation for both the private and public sector. The private sector collection has grown steadily in representation from the initial 23 hospitals and 240,000 episodes in Round 1. Since the first round, there have been a number of years where no publication was released due to the Commonwealth deciding that the low participation rates in these rounds created an unacceptable risk of invalid or unreliable results or bypassed as agreed with the sector. The last publication was for Round 13 (2008-09), with a 3 year gap until the current publication for Round 16 (2011-12).
3. While there are a variety of additional data sets on private hospital sector activity, such as Hospital Casemix Protocol (HCP), Private Hospital Data Bureau (PHDB), National Admitted Patient Collection (APC), and Private Health Establishments Collection (PHE) – the Private Sector NHCDC is unique insofar as it reports on the costs of service by classified activity.

## Current year report

1. The format of the Round 16 publication has been changed from prior years, with there being a substantial reduction in the level of detail provided. The Round 16 publication will only including DRG information, cost weights and other cost relativities and will not contain direct or overhead cost breakdowns, the 17 cost components or the total average cost of the DRG.

## Key findings and features of the Round 16 Sample

1. The sample comprised 105 hospitals representing 66% of the population separations.
2. The total sample separations were 1,775,059, an increase of 8% in the three years from Round 13. This is equivalent to a growth rate of 2.5% p.a.
3. The average length of stay decreased from 2.57 days in Round 13 to 2.52 days in Round 16, a decrease of 2.0% over the 3 year period. This decrease continues a long-term observed trend for private hospitals.
4. The twenty DRGs with the highest cost per episode include a number of DRGs relating to cardiac procedures. This is consistent with the results of the Round 13 collection.
5. Rankings for the twenty highest volume DRGs have remained fairly consistent since Round 13.
6. A measure of total relative resource consumption by hospitals is the number of “cost weighted” separations, calculated as the number of separations, multiplied by the DRG cost weight. The ranking of the top 20 DRGs that are estimated to consume the most resources by private hospitals (defined as the top 20 cost-weighted separation DRGs) have remained fairly consistent since Round 13.
7. The table below illustrates the top five AR-DRGs in regards to average cost, volume and level of consumption.

Table 1 AR-DRG Rankings

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Rank** | **DRG** | **Description** | **Cost Weight (a)** | **Number of Seps (b)** | **Cost Weighted Seps (c)** | **ALOS (d)** |
| ***DRGs with the highest cost-weight*** | | | | | | |
| 1 | A06A | Tracheostomy W Ventilation >95 Hours W Catastrophic Cc | 54.94 | 292 | 16,036 | 47.4 |
| 2 | A40Z | Ecmo | 36.10 | 23 | 841 | 21.3 |
| 3 | A06C | Ventilation >95 Hours W/O Catastrophic Cc | 25.58 | 42 | 1,085 | 23.1 |
| 4 | A06B | Trach W Vent >95 Hours W/O Cat Cc Or Trach/Vent >95 Hours W Cat Cc | 23.34 | 929 | 21,684 | 29.4 |
| 5 | F01A | Implantation Or Replacement Of Aicd, Total System W Catastrophic Cc | 19.78 | 323 | 6,390 | 11.6 |
| ***DRGs with the highest number of separations*** | | | | | | |
| 1 | R63Z | Chemotherapy | 0.20 | 192,612 | 37,713 | 1.0 |
| 2 | G48C | Colonoscopy, Sameday | 0.18 | 112,418 | 20,521 | 1.0 |
| 3 | L61Z | Haemodialysis | 0.18 | 89,758 | 16,093 | 1.0 |
| 4 | Z40Z | Endoscopy W Diagnoses Of Other Contacts W Health Services, Sameday | 0.18 | 76,071 | 13,527 | 1.0 |
| 5 | G46C | Complex Gastroscopy, Sameday | 0.26 | 69,784 | 17,848 | 1.0 |
| ***DRGs with the highest number of cost-weighted separations\**** | | | | | | |
| 1 | I04B | Knee Replacement W/O Catastrophic Or Severe Cc | 5.70 | 25,079 | 142,893 | 6.1 |
| 2 | I03B | Hip Replacement W/O Catastrophic Cc | 5.29 | 19,918 | 105,453 | 6.5 |
| 3 | I09B | Spinal Fusion W/O Catastrophic Cc | 8.85 | 10,871 | 96,234 | 6.5 |
| 4 | O01C | Caesarean Delivery W/O Catastrophic Or Severe Cc | 1.89 | 33,837 | 63,904 | 5.0 |
| 5 | I16Z | Other Shoulder Procedures | 1.37 | 36,362 | 49,859 | 1.3 |

1. **Notes**
2. a) See the Glossary in Appendix A
3. b) “Number of seps” means the number of separations in 2011/12.
4. c) See the Glossary in Appendix A
5. d) ALOS means “Average length of stay”.

Introduction

## Purpose of this report

1. The NHCDC is a voluntary collection that produces a range of hospital cost and activity information by AR-DRG. The AR-DRG code 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[[2]](#footnote-3). An individual AR-DRG represents a class of patients with similar clinical conditions that require similar hospital services. The results of the collection are expressed in this report as national cost weights by AR-DRG version 6.0x, and associated analytical tables.

## Format of the report

1. In 2012 IHPA engaged PwC to conduct a series of consultations to determine the views of the private sector around publication options for the NHCDC. These views were obtained through a series of consultations and workshops undertaken with key informants from the private hospital sector and peak bodies.
2. The consultations identified that the key concern of the sector in regards to participation in the collection was the commercial sensitivity of the published data and the perceived negative impact this published data had on negotiations with private health insurers. These concerns had created resistance to participation in the past and it was recommended that the publication be amended from Round 16 (2011-12) onwards to address these concerns.
3. Following these consultations, IHPA communicated to the private sector that there would be a substantial reduction in the level of detail provided in the private NHCDC results from Round 16 and onwards, with the publication only including DRG information, cost weights and other cost relativities. The report would not contain direct or overhead cost breakdowns, the 17 cost components or the total average cost of the DRG.
4. Consequently, this report contains the Round 16 private sector national cost weights by AR-DRG 6.0x. A “cost weight” for a selected DRG is calculated as the average cost for that DRG, expressed as a weight relative to the overall average cost across all DRGs. The national cost weight across all DRGs is equal to 1.00, with higher cost DRGs having a cost weight higher than 1.00 (e.g. A40Z: ECMO with a cost weight of 36.10), and lower cost DRGs having a cost weight lower than 1.00 (e.g. J67B Minor Skin Disorders, Same day with a cost weight of 0.12).
5. The cost components for which cost weights are produced are:

* Total cost per AR-DRG;
* The combined costs of Operating Room and Specialist Procedure Suites (“SPS”);
* Critical Care, which covers costs incurred in both intensive and coronary care units;
* Miscellaneous, which combines the costs of Ward Medical, Pathology, Imaging, Emergency Department and Prostheses.
* Scope of this collection

1. For this report, only the costs and separations associated with care type 1.0 (acute admitted care) are included with the exception that the costs associated with the unqualified neonate separations[[3]](#footnote-4) have also been included in the costs of care. Where this adjustment has been made, the costs of care have been allocated back to the delivery DRGs of the birth-giving mothers and the counts of care type 7.0 removed. A further discussion of this is provided in Section 3.6.
2. The scope of the collection to which this report relates is defined as follows:
3. **Separations in-scope**: admitted episodes of care in hospitals are classified according to a data element called “Care Type” and is defined in the AIHW National Health Data Dictionary. [[4]](#footnote-5) Care types are:

* 1.0 - Acute care (admitted care)
* 2.0 - Rehabilitation care (admitted care)
* 3.0 - Palliative care
* 4.0 - Geriatric evaluation and management
* 5.0 - Psychogeriatric care
* 6.0 - Maintenance care
* 7.0 - Newborn care
* 8.0 - Other admitted patient care
* 9.0 - Organ procurement - posthumous (other care)
* 10.0 - Hospital boarder (other care)

1. Acute admitted care consume the vast majority of hospital resources. In 2010/11, 92**%** of separations and 86% of patient days relate to care type 1.0 in the private sector, and 93% of separations and 80% of patient days in the public sector.[[5]](#footnote-6) **Hospitals in-scope**: private overnight hospitals with at least 200 acute admitted separations in 2011-12 define the population from which the voluntary sample is drawn.
2. **Costs in-scope**: the costs in-scope associated with patient care are specified in the Australian Hospital Patient Costing Standards v2.0 – 1 March 2011 (“AHPCS v2.0”).[[6]](#footnote-7) These costs are defined as “all expenditure incurred by or on behalf of the hospital related to day to day delivery of services”[[7]](#footnote-8). This includes an allocation of costs that could be incurred outside the hospital but relate to the delivery of services (e.g. shared service functions). The standards also discuss the types of costs that are excluded from patient costing, such as commercial business entities that might include activities such as operating a retail florist business, commercial parking, and child care centres. Hospitals were requested to submit costs that comply with the AHPCS v2.0 to support consistency in the input data used to calculate the cost weights.

## History of the Private Sector NHCDC

1. Round 1 of the 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 round 8, 9, or Rounds 14 due to low participation rates. No collection was carried out for Round 10 or Round 15 (2010-11) as the sector elected to bypass that year and move directly to the following round. The table below shows the participation rate for Round 16 and the last four published rounds.

Table 2 Summary of private hospital participation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 1. **Round 7** 2. **(2003-04)** | 1. **Round 11** 2. **(2006-07)** | 1. **Round 12** 2. **(2006-07)** | 1. **Round 13** 2. **(2008-09)** | 1. **Round 16 (2011-12)** |
| 1. Number of hospitals | 1. 113 | 1. 82 | 1. 109 | 1. 110 | 1. 105 |
| 1. Sample separations | 1. 1,240,388 | 1. 1,297,147 | 1. 1,607,678 | 1. 1,648,989 | 1. 1,775,059 |
| 1. Percentage of separations | 1. 65% | 1. 59% | 1. 72% | 1. 71% | 1. 66% |
| 1. AR-DRG version | 1. 4.2 | 1. 4.2 | 1. 4.2 | 1. 5.1 | 1. 6.0x |

## Public and private sector differences

1. This report does not seek to compare the average cost per separation between the public and private sectors, as the range of costs between the two sectors is different. Many of the cost items present in the public sector such as Medical Salaries, Pathology, Pharmacy, Imaging or Allied Health are not equally represented in Private Hospital general ledgers. For example, imaging and pathology costs are generally not reported for the private sector because the majority of hospitals are outsourcing these services and patients pay for these services directly. Many patients make private arrangements and they are charged on a fee-for-service basis. As a result, these costs are not reported in a hospital’s general ledger. Medical costs are also generally charged direct to patients by providers on a fee-for-service basis. Training of medical officers is generally not a feature of the private sector, and accordingly salaried medical officers are not represented within the cost files unless there is an intensive care unit or emergency department, where an around-the-clock medical practitioner is required.

## Confidentiality of data

1. Due to the commercial nature of the sector, all participating hospitals in Round 16 are assured that hospital level data will not be released in any form without the prior, written permission of the organisation from which the data originated. Where a cost weight reported for a DRG is based on less than five 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 (-----).

## Reliances and limitations

1. PwC have performed data checks and reasonableness tests at several stages of the costing process: at data submission, during the costing process, and on the aggregated data at the end of the process. However, this information has not been audited. The collection also required signoffs from hospitals during the costing process. A description of the checks is provided throughout this report.

The following areas can have a material impact on the reported costs and cost weights. PwC have relied upon information supplied by hospitals in the following areas:

1. Hospitals were requested to report costs that comply with the AHPCS v2.0. A review of the extent to which the costs reported by hospitals comply with the AHPCS v2.0 was out of scope of this project, and we have assumed that the costs reported by hospitals comply with those standards;
2. The mapping of cost general ledger accounts to cost areas was performed by the participant hospitals. PwC have relied upon these mappings in the production of the cost dataset but training was provided;
3. Inpatient fractions: this fraction is assigned to each cost centre by participant hospitals and denotes the proportion of costs related to inpatient care. These fractions have a significant effect on the reported results as the fractions determine the cost base that is to be allocated to patients.
4. This Report has been prepared by PricewaterhouseCoopers Australia (PwC) at the request of IHPA in our capacity as advisors in accordance with the Terms of Reference and Terms and Conditions contained in the contract between IHPA and PwC.
5. This document is not intended to be used or relied upon by any persons other than IHPA, nor to be used for any purpose other than that articulated in the Terms of Reference. Accordingly, PwC accept no responsibility in any way whatsoever for the use of this report by any other persons or for any other purpose.
6. 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.

Methodology

## Identifying the minimum sample size

1. PwC undertook calculations based on data received from the Independent Hospital Pricing Authority (IHPA), the Department of Health and Ageing (DoHA) and Private Health Data Bureau dataset (PHDB) to determine the number of separations, number of hospitals and number of hospital groups required to participate.

### Data analysis

1. In determining the minimum participation level, the following datasets were received and reviewed:
2. The published cost weight tables for Round 13;
3. A summary of the NHCDC sample for Round 13 and Round 14, by hospital and DRG, for the overnight sector;
4. From the Private Hospital Data Bureau dataset(PHDB): 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;
5. From the PHDB dataset: a summary of the population levels of activity, average length of stay, and standard deviation of the length of stay, by hospital and DRG, for all private hospitals, i.e. for private overnight hospitals and private day hospitals.
6. Item 1 above was obtained from the Department of Health and Ageing (DoHA) website[[8]](#footnote-9). Items 2 and 3 above were provided by IHPA. Item 4 above was provided by DoHA.
7. 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:
8. 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:
   1. Standard deviation of costs per DRG;
   2. Margin of error in the estimated average cost per DRG; and
   3. Statistical confidence that the estimates fall within the specified margin of error.
9. 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.
10. 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
11. 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

1. 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[[9]](#footnote-10) 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%* confidence, the required sample size for DRG(k) is:
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:
3. Number of separations by DRG;
4. Total cost by DRG (number of separations per DRG multiplied by the average cost per DRG).
5. The two approaches resulted in similar minimum samples sizes for overnight and day-only hospitals. For overnight hospitals, a weighting by number of separations resulted in a slightly higher aggregate minimum sample size than weighting the results by total cost.

### Results

1. For overnight hospitals, the summary findings of this exercise were that:

* approximately 60% of all separations would be required in order to achieve a robust sample;[[10]](#footnote-11)
* the collection should include at least 90 hospitals and 10 hospital ‘groups’ (of 2 or more hospitals) to be representative.

1. These minimum targets were used as the condition on which the collection would go ahead. Hospitals were requested whether they had an intention to participate. The indicative participation rate exceeded the 60% and 90 hospital threshold requirements, and IHPA and the hospital sector agreed for the collection to proceed.

## Costing methodologies

1. In the NHCDC, the cost of an episode of acute admitted care is built up by allocating categories of hospital expenditure to “cost buckets”, which are estimated at the patient level. 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. Emergency Departments

11. Supplies

12. Specialist Procedure Suites

13. On-costs

14. Prostheses

15. Hotel

16. Depreciation

1. Once each of the cost buckets are estimated for an individual patient, the patient’s total cost of care is derived as the sum of each of the above components. The definition of cost buckets are included in the Australian Hospital Reference Manual previously released by Department of Health and Ageing (DoHA), and now by IHPA. A description of the cost buckets is provided in Appendix C - Costs included in the cost buckets.
2. There are two main methodologies adopted for hospital cost allocations: cost modelled or patient costed:

### Patient costing (PC)

1. Patient costed sites are hospitals that provide a calculated cost of care at the patient level for each episode of care. This is done using actual patient level consumption data if practical. For example, Direct Pathology costs may be based on the actual number of pathology tests performed for each patient. If actual patient consumption is impractical, allocation methods are required. The PC method of costing is often referred to as a ‘bottom up’ method of costing because cost aggregates are devised from individual items of patient consumption[[11]](#footnote-12). For this collection, eight hospitals performed their own costing, representing 9% of the sample separations.

### Cost modelling (CM)

1. Cost modelling makes minimal use of measures of resource consumption by individual patients, and aims to estimate mean costs for classes of patients (e.g. by DRG). Cost modelled sites are hospitals that ‘model’ their cost centres using pre-determined statistics and service consumption weights in order to apportion their costs to patient groups defined by their DRG (in the case of acute admitted care). This is also known as ‘top down’ costing because the hospital starts with an aggregate cost and apportions it across cost centres based on assumptions about relative resource utilisation which are set at the DRG level.
2. Most private hospitals do not undertake consumption costing at the patient level. For this collection, 97 hospitals, representing 91% of the sample separations, have been cost modelled by the PwC costing team using Power Health Solutions’ modelling software “PPM2”, which is specialist hospital costing software. IHPA advised PwC to use the AR-DRGv6.0x service weights, which are derived from patient-costed sites in public sector hospitals. The proportion of cost modelled separations in the previous Round 13 was similar, at 90%.
3. The PwC costing team have performed costing in compliance with AHPCS v2.0.

## Stages and Phases of the private sector NHCDC

1. This section describes the methodology adopted to produce the private sector NHCDC dataset and the cost weights published in this report. The three stages of the collection were:
2. **Stage 1 - Data collection:** comprising a data specification phase, and data submission phase by hospital participants. Participants electing to be cost modelled were required to submit patient activity data, and general ledger data. Participants electing to perform their own costing provided data at the separation level with the allocated costs.
3. **Stage 2 - Costing:** As noted above, the majority of hospitals were cost-modelled by PwC’s costing team. This phase comprised detailed hospital-level quality review checks. The approach to resolve issues identified during the checks were agreed with both hospitals and IHPA.
4. **Stage 3 - Analysis and reporting:** The analysis dataset is compiled from all participating hospitals, with further checks and comparisons performed against the Round 13 NHCDC. The dataset was then adjusted via a strata weighting process to produce cost weight estimates for the population of in-scope hospitals and separations.

## Steps in the data collection phase for cost modelled sites

1. Steps of the data collection phase for the Round16 private sector collection include:
2. Hospital mapping of cost centres to cost buckets: Hospitals performed their own mapping of cost centres to cost buckets.
3. We understand that in previous collections, the mapping of cost centres to cost buckets was performed by the previous contractor rather than by hospitals. This represents a change in approach relative to previous years. Guidelines for performing the mapping were provided by PwC to participants as part of the data specifications document, with further support provided through a helpdesk.
4. Website portal for data submissions: hospitals were provided access to a secure website to submit data which enabled them to upload each of the data inputs.
5. Real-time quality checking during the submission process: a real-time summary of hospitals’ data during the data submission process meant that hospitals could correct data anomalies at the time of submission. The checks performed during the submission included data integrity and validation checks, as well as reasonableness tests for average cost per separation, average cost per day, average length of stay, Error DRG proportion, and Overhead allocation proportion. Ranges were developed from analysis of the Round 13 cost data at the hospital level. A confirmation/override was required by the user if the results fell outside of the range.

Election to use the Private Hospital Data Bureau (PHDB) activity data: PwC was granted access to the data submitted by private hospitals to the Private Hospital Data Bureau. Hospitals were given the option to use their PHDB submissions for the purpose of the Round 16 NHCDC submission. A number of hospitals elected to submit their own activity data, rather than to use the submitted PHDB data, to ensure that the most recent and up to date patient records were used in the costing.

## Steps in the costing phase for cost modelled sites

### Changes in methodology compared to the Round 13 (2008/09) collection

1. The cost modelling approach in Round 16 allocated costs in wards to separations on the basis of fractional bed days, while all other cost centres were allocated to encounters based on service weights.
2. While the majority of hospitals in Round 16 and Round 13 used cost modelling to allocate costs, some inputs and assumptions have changed between the rounds. Some identified differences in processes and assumptions are detailed below:
3. Round 16 was reported in DRG version 6.0x and used 6.0x service weights. Round 13 was reported in version 5.2 and used service weights from version 5.0. Changes in the service weights will lead to different allocations between the versions;
4. After the release of the draft Round 16 Cost report, it was raised by the hospital representatives that the service weights used for cost allocation had caused a flipping issue in the resultant cost weight table, compromising the AR-DRG classification hierarchy. Following on from the Private Sector Review Group meeting in June 2013, IHPA released a new set of DRG version 6.0x service weights to the PwC costing team to reprocess the Round 16 submissions. The new service weights were derived using the 2013 National Efficient Price dataset for public sector patient costed sites (excluding outlier data and weighted for the sample to the population);
5. At the Private Sector Review Group meeting, it was discussed and recommended that prosthesis revenue should be considered as an alternative source to develop prosthesis service weights to allocate costs at an episode level. This allocation methodology was reviewed by IHPA but not considered to be feasible for Round 16 due to timing and data availability in the current round. This recommendation will be adopted in future rounds;
6. Hospitals in Round 16 submitted data that was already mapped to NHCDC cost outputs and areas. In Round 13, this was performed centrally by the previous coordinator;
7. Payroll tax has been included (where applicable) and mapped to ‘on-costs’ for Round 16 as per AHPCS v2.0 . These costs were reported separately in Round 13;
8. Overhead costs were allocated to each patient care area based on that area’s share of the total expenses;
9. DRG Version: a number of hospitals were only able to provide activity data using DRG versions earlier than 6.0x. Where this occurred, PwC re-grouped the DRGs for these hospitals to produce a version 6.0x DRG.

### Hospital-level quality review checks

During the costing process, checks were performed at the hospital level, for the following:

1. Consistency between encounter data and ward transfer data;
2. All DRGs are valid DRGs based on DRGv6.0x;
3. Identification and removal of duplicate encounter and transfer records;
4. Reconciliation of allocated costs to the general ledger;
5. Overhead allocation by cost centre and cost bucket;
6. Identification of separations with negative costs;
7. Identification of separations costs lower than $20;
8. Reporting and investigation of the top and bottom 50 separations for episode cost, average cost per day, and length of stay;
9. DRG consistency, identification of surgical DRGs with very low costs or zero costs in operating room and/or specialist procedure suite costs;
10. Inconsistent cost weight relativity at the DRG-level for each hospital, e.g. the average costs per DRG do not follow the classification’s hierarchical order;
11. Statistical outliers by DRG, based on analysis of percentile bands from the Round 13 collection;
12. If a hospital participated in Round 13, a comparison of costs to the previous collection by cost bucket for DRGs that are consistent between v5.1 and v6.0x;
13. A comparison of the hospital’s costs by cost bucket, compared what would be expected from the Round 13 collection, for DRGs that are consistent between v5.1 and v6.0x.

### Issues encountered during the data collection and costing phases

Below is a list of issues associated with the Round 16 collection:

#### Activity information

* Not all of the patient records were submitted to the Private Hospital Data Bureau (PHDB) collection;
* Inability to link all ward transfer records to encounter records;
* Inaccurate or non-existent ward transfer data (i.e. either transfer time is set to midnight or transfer data was created from the encounter data)

#### General ledger data

* Non-expenditure accounts and negative expense accounts were initially submitted by hospitals. Any edits to the data submitted were agreed and discussed with the hospital;
* Inconsistent General Ledger structures and the impact on account and cost centre mapping, e.g. some hospitals allocated costs into patient care cost centres directly, whereas some have distinct overhead cost centres. Similarly, there is variation in the level of detail in General Ledger data, e.g. some hospitals only have one cost centre for both a ward and operating theatre, or one cost centre for operating rooms and specialist procedure suites. This is a feature of the variation in hospital structures and must be borne in mind when interpreting the cost weight results;

#### Costing assumptions and process

* Version 6.0x service weights for the public sector (derived from the 2013 National Efficient Pricing dataset for patient costed sites) were used. These weights did not have a weight for Specialist Procedure Suites and Emergency Departments. As agreed with IHPA, the service weights for Operating Rooms were used for Specialist Procedure Suites and Emergency Department costs were allocated across all DRGs at a patient episode level.

1. The majority of these issues have been raised in previous rounds and our approach to resolve these issues was agreed with each hospital and with IHPA.

### Feedback provided to hospitals

1. After going through the quality review checks, results from the costing process were sent back to hospitals for review and comment. This reporting included:

* The cost of each encounter, split by cost bucket;
* A profile of the hospital’s activity and cost data, including:
  + Captured occupancy levels per day and month for overnight patients;
  + The number of same-day patients per day and month;
  + The top 10 DRGs by frequency, and their average costs;
  + The top 10 DRGs by average cost; and
  + The direct and overhead split by cost bucket.

1. These reports provided hospitals with overall data to enable a review of the reasonableness of the draft results and to provide comments or queries before the results were finalised.

## Analysis and reporting

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

### Neonate adjustment

1. The costs for newborn infants with zero qualified days, in respect of care type 7 (newborn care), and neonate DRGs were allocated to the delivery DRGs of mothers at the same hospital. The definition of unqualified days is provided in the National Health Data Dictionary[[12]](#footnote-13): “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 the methodology adopted by IHPA and applied to the public sector collection for Rounds 14 and 15 as inputs to the National Efficient Price weights.[[13]](#footnote-14)

### Population adjustment process

1. Analysis performed by PwC prior to the commencement of the collection identified that there are statistically significant differences in costs between various hospital groups. To ensure the results reflect the full range of Australia’s private hospitals, an estimation process was 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.
2. A change in methodology has been adopted for this Round. In previous Rounds, the variables used to re-weight the profile of the sample to that of the population were:

* Hospital type (for-profit or not-for-profit); and
* Size classification of the hospital, based on the number of acute admitted separations.

1. A concern raised by the sector is that such an approach could inadvertently over-represent the costs and separations of the larger hospitals in the weighted sample relative to their actual market shares. Therefore, a market-based approach was adopted to weight the sample so that the weighted separations and costs of the larger participants did not exceed their actual markets shares. Upon further investigation, we found that this method of weighting better accounted for differences in hospital characteristics than using broader groupings such as Hospital Type and Size.
2. In order to compile a study and strata file that is required for the population estimation process, the number of acute hospital separations for 2011-12 for each hospital was 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 are included in the population file. An issue with the PHDB file was that a number of hospitals missed a monthly PHDB submission. This means that the PHDB was not complete and unsuitable for estimating the population without some form of adjustment for the missing data. Our approach to adjust for missing data was as follows:
3. If a hospital submitted data to the NHCDC but it missed a monthly PHDB submission, then the revised separation count was adopted from the hospital’s NHCDC data;
4. If a hospital missed a monthly PHDB submission but did not participate in the NHCDC, then an annualised estimate at hospital level was taken based on analysis of the average number of separations from the other monthly submissions;
5. For all other hospitals, i.e. with no missing submission, the PHDB count of separations was adopted.
6. The number of hospitals in the population file for Round 16 is 248 which is an increase of 22 sites from Round 13.
7. The population separations have increased by 7.0% from Round 13 to Round 16 (see Table 3 for more detail.)

Summary of results

## Summary of Round 16 Sample to Population

1. The number of hospitals participating in Round 16 was 105. The sample separations represent 66% of the acute private hospital separations in scope which represents a significant proportion of private hospital activity.

Table 3 Comparison of separations and hospitals, Round 7 (2002/03) to Round 16 (2011/12)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | **Round 7 2002/03** | **Round 11 2006/07** | **Round 12 2007/08** | **Round 13 2008/09** | **Round 16 2011/12** |
| Sample separations | | 1,240,388 | 1,297,147 | 1,607,678 | 1,648,989 | 1,775,059 |
| % increase | | 28% | 5% | 24% | 3% | 8% |
| Population separations | | 1,903,975 | 2,192,314 | 2,248,324 | 2,328,814 | 2,703,792 |
| % sample to population | | 65% | 59% | 72% | 71% | 66% |
| Sample hospitals | | 113 | 82 | 109 | 110 | 105 |
| % increase | | 36% | -27% | 33% | 1% | -5% |
| Population hospitals | | 221 | 229 | 229 | 226 | 248 |
| % sample to population | | 51% | 36% | 48% | 49% | 42% |

1. The table below displays the average length of stay of sample separations in Round 16 compared to previous rounds. The average length of stay in Round 16 was 2.51 days, which is 2% lower than Round 13 (2008-09) when the average length of stay was 2.57. There has been a steady reduction in the average length of stay over the analysis period.

Table 4 Average length of stay (ALOS), Round 7 (2002/03) to Round 16 (2011/12)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | **Round 7 2002/03** | **Round 11 2006/07** | **Round 12 2007/08** | **Round 13 2008/09** | **Round 16 2011/12** |
| Average length of stay | | 2.97 | 2.88 | 2.62 | 2.57 | 2.52 |
| % decrease | |  | 3% | 9% | 2% | 2% |

## DRG Analysis – all cost buckets

### The twenty DRGs with the highest cost weights

1. The twenty DRGs with the highest costs weights are those that are likely to consume the highest resource for an individual episode of care, as measured by the cost weight. DRGs with fewer than 5 separations or 3 participating hospitals are excluded from the analysis in this sub-section. “Cost weighted separations” is calculated as the DRG cost weight, multiplied by the number of separations for a given DRG. The list of DRGs is provided in the following table:

Table 5 DRGs with twenty highest cost weights, AR-DRG 6.0x, Round 16 (2011/12)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DRG** |  | **Description** | **Cost Weight** (a) | **Separations** (b) | **Cost Weighted Separations** (c)=(a)x(b) | **Number of Days** (d) | **ALOS (days)** (e)=(d)/(b) | **Std Error** |
| 1 | A06A | Tracheostomy W Ventilation >95 Hours W Catastrophic Cc | 54.94 | 292 | 16,036 | 13,842 | 47.4 | 1.56 |
| 2 | A40Z | Ecmo | 36.10 | 23 | 841 | 497 | 21.3 | 5.52 |
| 3 | A06C | Ventilation >95 Hours W/O Catastrophic Cc | 25.58 | 42 | 1,085 | 978 | 23.1 | 1.57 |
| 4 | A06B | Trach W Vent >95 Hours W/O Cat Cc Or Trach/Vent >95 Hours W Cat Cc | 23.34 | 929 | 21,684 | 27,277 | 29.4 | 0.41 |
| 5 | F01A | Implantation Or Replacement Of Aicd, Total System W Catastrophic Cc | 19.78 | 323 | 6,390 | 3,733 | 11.6 | 0.42 |
| 6 | I06Z | Spinal Fusion W Deformity | 17.77 | 843 | 14,975 | 8,606 | 10.2 | 0.33 |
| 7 | A11A | Insertion Of Implantable Spinal Infusion Device W Catastrophic Cc | 15.30 | 13 | 198 | 226 | 17.4 | 2.02 |
| 8 | F03A | Cardiac Valve Proc W Cpb Pump W Invasive Cardiac Investigation W Cat Cc | 14.90 | 596 | 8,878 | 10,740 | 18.0 | 0.14 |
| 9 | I09A | Spinal Fusion W Catastrophic Cc | 14.15 | 689 | 9,754 | 11,598 | 16.8 | 0.21 |
| 10 | P06B | Neonate, Admwt >2499 G W Significant Or Procedure W/O Multi Major Problems | 13.45 | 148 | 1,989 | 3,745 | 25.3 | 1.56 |
| 11 | F01B | Implantation Or Replacement Of Aicd, Total System W/O Catastrophic Cc | 12.76 | 2,437 | 31,106 | 6,308 | 2.6 | 0.10 |
| 12 | I01A | Bilateral/Multiple Major Joint Proc Of Lower Extremity W Revision Or W Cat Cc | 12.56 | 333 | 4,184 | 5,077 | 15.2 | 0.31 |
| 13 | F04A | Cardiac Valve Proc W Cpb Pump W/O Invasive Cardiac Inves W Cat Cc | 11.50 | 2,253 | 25,907 | 30,859 | 13.7 | 0.06 |
| 14 | W04A | Other Or Procs For Multiple Significant Trauma W Catastrophic Or Severe Cc | 11.35 | 13 | 147 | 487 | 37.7 | 1.62 |
| 15 | A07Z | Allogeneic Bone Marrow Transplant | 10.97 | 15 | 160 | 261 | 17.9 | 2.20 |
| 16 | F07A | Other Cardiothoracic/Vascular Procedures W Cpb Pump W Catastrophic Cc | 10.96 | 235 | 2,578 | 3,210 | 13.7 | 0.36 |
| 17 | W02A | Hip, Femur & Limb Pr For Mult Signif Trauma, Incl Implantation W Cat/Sev Cc | 10.96 | 50 | 543 | 1,348 | 27.2 | 1.26 |
| 18 | D01Z | Cochlear Implant | 10.89 | 733 | 7,982 | 1,068 | 1.5 | 0.35 |
| 19 | I31A | Hip Revision W Catastrophic Cc | 10.68 | 340 | 3,630 | 6,920 | 20.4 | 0.33 |
| 20 | I32A | Knee Revision W Catastrophic Cc | 10.19 | 178 | 1,812 | 3,439 | 19.3 | 0.38 |
|  | **Sub-total, top 20 highest cost weight** | | **15.25** | **10,484** | **159,878** | **140,219** | **13.4** |  |
|  | **All DRGs** |  | **1.00** | **2,703,792** | **2,703,792** | **6,820,000** | **2.5** |  |
|  | Top 20, % of all DRGs | |  | 0.4% | 5.9% | 2.1% |  |  |

1. **Notes :**
2. (b) Separations shown are strata weighted
3. (e) ALOS means average length of stay
4. Figure 1 below shows that the top 20 cost-weight DRGs are very low in volume, representing only 0.4% of separations in 2011/12, however they represent 5.9% of hospital resources, as measured by the statistic “cost-weighted separations”.

Figure 1 Twenty highest cost-weight AR-DRGs

1. Figure 1 highlights that the top 20 cost-weight DRGs are very low in volume, representing only 0.4% of separations in 2011/12, however they represent 5.9% of hospital resources, as measured by the statistic cost-weighted separations.
2. Figure 2 on the following page highlights the cost-weights of these twenty DRGs and plots them relative to the cost weight of all other DRGs, illustrating the significant difference in cost-weight for these DRGs:

Figure 2 Twenty highest cost-weight AR-DRGs – plot of cost weight versus number of separations

Figure 2 highlights the cost-weights of the top twenty DRGs and plots them relative to the cost weight of all other DRGs, illustrating the significant difference in cost-weight for these DRGs:  The cost-weights of these DRGs ranges from 10.19 to 54.94, relative to a baseline of 1.0. 

The DRG with the highest cost-weight is Tracheostomy with Ventilation >95 Hours with Catastrophic Cc. Other top twenty DRGs which are highlighted are, in cost order, Ecmo, Ventilation >95 Hours without Catastrophic Cc, Implantation Or Replacement of Aicd, Total System without Catastrophic Cc, and Cardiac Valve Proc W Cpb Pump without Invasive Cardiac Inves with Catastrophic Cc.



### The twenty DRGs with the highest number of separations in 2011/12

1. This table shows the 20 DRGs that had the highest number of separations in 2011/12. The top 20 frequency DRGs represent 44% of separations in 2011/12. The list of DRGs is provided on the following table:

Table 6 Twenty highest volume (number of separations) DRGs, AR-DRG 6.0x, Round 16 (2011/12)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DRG** |  | **Description** | **Cost Weight** (a) | **Separations** (b) | **Cost Weighted Separations** (c)=(a)x(b) | **Number of Days** (d) | **ALOS (days)** (e)=(d)/(b) | **Std Error** | **Comments** |
| 1 | R63Z | Chemotherapy | 0.20 | 192,612 | 37,713 | 192,650 | 1.0 | 0.00 | i) These DRGs have a lower cost weight, which means that for an individual episode of care, they consume lower resources than the average across all DRGs. The average cost weight for this group is 0.40. |
| 2 | G48C | Colonoscopy, Sameday | 0.18 | 112,418 | 20,521 | 112,356 | 1.0 | 0.00 |
| 3 | L61Z | Haemodialysis | 0.18 | 89,758 | 16,093 | 89,766 | 1.0 | 0.00 |
| 4 | Z40Z | Endoscopy W Diagnoses Of Other Contacts W Health Services, Sameday | 0.18 | 76,071 | 13,527 | 76,039 | 1.0 | 0.00 |
| 5 | G46C | Complex Gastroscopy, Sameday | 0.26 | 69,784 | 17,848 | 69,736 | 1.0 | 0.00 |
| 6 | G47C | Other Gastroscopy, Sameday | 0.19 | 66,092 | 12,426 | 66,059 | 1.0 | 0.00 |  |
| 7 | Z64B | Other Factors Influencing Health Status, Sameday | 0.15 | 65,766 | 9,817 | 65,761 | 1.0 | 0.00 |  |
| 8 | I18Z | Other Knee Procedures | 0.58 | 62,946 | 36,427 | 70,002 | 1.1 | 0.00 | ii)These DRGs have a lower average length of stay than the overall average across all DRGs. |
| 9 | D40Z | Dental Extractions And Restorations | 0.38 | 60,903 | 23,332 | 61,197 | 1.0 | 0.00 |
| 10 | C16Z | Lens Procedures | 0.45 | 49,440 | 22,274 | 49,789 | 1.0 | 0.00 |  |
| 11 | J11Z | Other Skin, Subcutaneous Tissue And Breast Procedures | 0.35 | 42,357 | 14,658 | 46,436 | 1.1 | 0.00 |  |
| 12 | G10B | Hernia Procedures W/O Cc | 0.83 | 38,188 | 31,535 | 49,845 | 1.3 | 0.00 | iii)The ranking of the highest volume DRGs has remained relatively stable between Round 13 and Round 16. |
| 13 | E63Z | Sleep Apnoea | 0.27 | 36,790 | 9,871 | 37,051 | 1.0 | 0.00 |
| 14 | O60B | Vaginal Delivery W/O Catastrophic Or Severe Cc | 1.34 | 36,425 | 48,819 | 150,076 | 4.1 | 0.01 |
| 15 | I16Z | Other Shoulder Procedures | 1.37 | 36,362 | 49,859 | 47,047 | 1.3 | 0.00 |  |
| 16 | U60Z | Mental Health Treatment, Sameday, W/O Ect | 0.22 | 34,504 | 7,616 | 34,555 | 1.0 | 0.00 |  |
| 17 | O01C | Caesarean Delivery W/O Catastrophic Or Severe Cc | 1.89 | 33,837 | 63,904 | 168,411 | 5.0 | 0.00 |  |
| 18 | N07Z | Other Uterine And Adnexa Procedures For Non-Malignancy | 0.57 | 32,386 | 18,493 | 36,797 | 1.1 | 0.00 |  |
| 19 | L41Z | Cystourethroscopy, Sameday | 0.20 | 32,125 | 6,278 | 32,124 | 1.0 | 0.00 |  |
| 20 | G11Z | Anal And Stomal Procedures | 0.49 | 31,328 | 15,506 | 40,863 | 1.3 | 0.00 |  |
|  | **Sub-total, 20 highest separation count** | | **0.40** | **1,200,090** | **476,516** | **1,496,560** | **1.2** |  |  |
|  | **All DRGs** | | **1.00** | **2,703,792** | **2,703,792** | **6,820,000** | **2.5** |  |  |
|  | Top 20 separation count, % of all DRGs | |  | 44% | 18% | 22% | 0.4 |  |  |

1. **Notes :**
2. (b) Separations shown are strata weighted

(e) ALOS means average length of stay

1. Figure 3 shows that the highest volume DRGs usually have a lower cost weight. Consequently, despite representing 44% of all separations, it is estimated that they consume 18% of private hospital resources (measured using the number of cost-weighted separations) in 2011/12:

Figure 3 Twenty DRGs with the highest number of separations in 2011/12:

Figure 3 shows that the highest volume DRGs usually have a lower cost weight. Consequently, despite representing 44% of all separations, it is estimated that they consume 18% of private hospital resources (measured using the number of cost-weighted separations) in 2011/12:

1. Figure 4 below highlights the groups of the twenty highest volume DRGs which illustrates that most of them have relatively low cost-weights:

Figure 4 Twenty highest volume DRGs – plot of cost weight versus number of separations

Figure 4 highlights the groups of the twenty highest volume DRGs, which illustrates that most of them have relatively low cost-weights.

The DRG with the highest volume is Caesarean Delivery without Catastrophic or Severe Cc. Other top twenty DRGs which are highlighted are, in volume order, Vaginal Delivery without Catastrophic or Severe Cc, Other Knee Procedures, Complex Gastoscopy Sameday, and Chemotherapy.



### The twenty DRGs with the highest volume x cost-weight (“cost-weighted separations”) in 2011/12

1. This group of DRGs are those that are estimated to consume the highest share of resources in a year, taking into account the volume of separations, and the average resource utilisation (cost weight) for an individual episode of care. These are identified by selecting the DRGs with the highest number of **cost-weighted** separations. DRGs with fewer than 5 separations or 3 participating hospitals are excluded from the analysis in this sub-section. The list of DRGs is provided on the following table:

Table 7 DRGs with the twenty highest number of cost-weighted separations, AR-DRG 6.0x, Round 16 (2011/12)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DRG** |  | **Description** | **Cost Weight** (a) | **Separations** (b) | **Cost Weighted Separations** (c)=(a)x(b) | **Number of Days** (d) | **ALOS (days)** (e)=(d)/(b) | **Std Error** | **Comments** |
| 1 | I04B | Knee Replacement W/O Catastrophic Or Severe Cc | 5.70 | 25,079 | 142,893 | 153,629 | 6.1 | 0.01 | i) These twenty DRGs represent 24% of total separations in 2011/12, and are estimated to consume 34% of total resources as measured by the number of cost-weighted separations. | |
| 2 | I03B | Hip Replacement W/O Catastrophic Cc | 5.29 | 19,918 | 105,453 | 129,880 | 6.5 | 0.01 |
| 3 | I09B | Spinal Fusion W/O Catastrophic Cc | 8.85 | 10,871 | 96,234 | 70,280 | 6.5 | 0.03 |
| 4 | O01C | Caesarean Delivery W/O Catastrophic Or Severe Cc | 1.89 | 33,837 | 63,904 | 168,411 | 5.0 | 0.00 |
| 5 | I16Z | Other Shoulder Procedures | 1.37 | 36,362 | 49,859 | 47,047 | 1.3 | 0.00 |
| 6 | O60B | Vaginal Delivery W/O Catastrophic Or Severe Cc | 1.34 | 36,425 | 48,819 | 150,076 | 4.1 | 0.01 |
| 7 | R63Z | Chemotherapy | 0.20 | 192,612 | 37,713 | 192,650 | 1.0 | 0.00 |
| 8 | I18Z | Other Knee Procedures | 0.58 | 62,946 | 36,427 | 70,002 | 1.1 | 0.00 |
| 9 | F42B | Circulatory Disorders W/O Ami W Invasive Cardiac Inves Proc W/O Cat Or Sev Cc | 1.20 | 26,873 | 32,161 | 55,517 | 2.1 | 0.01 | ii) The rankings are broadly consistent with the Round 13 rankings, where available. | |
| 10 | F12B | Implantation Or Replacement Of Pacemaker, Total System W/O Catastrophic Cc | 4.48 | 7,168 | 32,113 | 22,913 | 3.2 | 0.02 |
| 11 | G10B | Hernia Procedures W/O Cc | 0.83 | 38,188 | 31,535 | 49,845 | 1.3 | 0.00 |
| 12 | F01B | Implantation Or Replacement Of Aicd, Total System W/O Catastrophic Cc | 12.76 | 2,437 | 31,106 | 6,308 | 2.6 | 0.10 |
| 13 | I10B | Other Back And Neck Procedures W/O Catastrophic Or Severe Cc | 1.72 | 15,914 | 27,396 | 60,540 | 3.8 | 0.01 |
| 14 | F15B | Interventional Coronary Procs W/O Ami W Stent Implantation W/O Cat Or Sev Cc | 2.36 | 10,971 | 25,918 | 20,604 | 1.9 | 0.01 |
| 15 | F04A | Cardiac Valve Proc W Cpb Pump W/O Invasive Cardiac Inves W Cat Cc | 11.50 | 2,253 | 25,907 | 30,859 | 13.7 | 0.06 |  | |
| 16 | I04A | Knee Replacement W Catastrophic Or Severe Cc | 6.65 | 3,800 | 25,259 | 32,685 | 8.6 | 0.05 |  | |
| 17 | I13B | Humerus, Tibia, Fibula And Ankle Procedures W/O Cc | 1.74 | 14,297 | 24,897 | 34,269 | 2.4 | 0.01 |  | |
| 18 | D40Z | Dental Extractions And Restorations | 0.38 | 60,903 | 23,332 | 61,197 | 1.0 | 0.00 |  | |
| 19 | K04B | Major Procedures For Obesity W/O Cc | 2.51 | 9,103 | 22,862 | 17,103 | 1.9 | 0.01 |  | |
| 20 | C16Z | Lens Procedures | 0.45 | 49,440 | 22,274 | 49,789 | 1.0 | 0.00 |  | |
|  | **Sub-total, top 20 highest cost-weighted separations** | | **1.37** | **659,395** | **906,062** | **1,423,604** | **2.2** |  |  | |
|  | **All DRGs** | |  | **2,703,792** | **2,703,792** | **6,820,000** | **2.5** |  |  | |
|  | Top 20 cost-weighted separations, % of all DRGs | |  | 24% | 34% | 21% | 0.4 |  |  | |

1. **Notes :**
2. (b) Separations shown are strata weighted

(e) ALOS means average length of stay

1. Figure 5 show this group of DRGs represent 24% of separations, but they consume 34% of hospital resources, as measured by the proportion of cost-weighted separations.

Figure 5 Twenty DRGs with the highest number of cost-weighted separations

Figure 5 show this group of DRGs represent 24% of separations, but they consume 34% of hospital resources, as measured by the proportion of cost-weighted separations. 

1. The DRGs in this group consist of a mixture of high / medium / low cost weight DRGs, as highlighted by the range of dark red areas in below, e.g.

* DRGs with low cost weight, but a high volume of separations, e.g. Chemotherapy (R63Z);
* DRGs with moderate to high cost weight, and a moderate number of separations, egg. Spinal fusion without complications (I09B).

1. Figure 6 below highlights the cost-weight of these DRGs (dark red) and plots them relative to the cost weight of all other DRGs.

Figure 6 Twenty DRGs with the highest number of cost-weighted separations – plot of cost weight versus number of separations

Figure 6 highlights the cost-weight of DRGs with the highest number of cost-weighted separations and plots them relative to the cost weight of all other DRGs. 

It contains a mix of high volume, low cost weight separations (for example chemotherapy) and moderate volume, moderate-to-high cost weight separations (for example spinal fusion without complications).

Some of these highest cost-weight are labelled.  In descending order of cost-weight, these are Spinal Fusion without Catastrophic Cc, Knee Replacement without Catastrophic or Severe Cc, Caesarean Delivert without Catastrophic or Severe Cc, Other Knee Procedures and Chemotherapy.


### DRG Analysis – other cost buckets

Table 8 Twenty DRGs with the highest cost weight for Miscellaneous costs (Ward Medical, Pathology, Imaging, Emergency Department and Prostheses)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DRG** |  | **Description** | **Miscellaneous Cost Weight** (a) | **Separations** (b) | **Overall Cost Weight** (c) | **Number of Days** (d) | **ALOS (days)** (e)=(d)/(b) | **Std Error** | **Comment** |  |
| 1 | F01A | Implantation Or Replacement Of Aicd, Total System W Catastrophic Cc | 12.73 | 323 | 19.78 | 3,733 | 11.6 | 0.42 | i) This table shows the DRGs that are likely to consume the highest resources for a combined mix of cost buckets. Most of these DRGs also have a high overall cost weight.   1. DRGs with fewer than 5 separations or 3 participating hospitals are excluded from the table. |
| 2 | I06Z | Spinal Fusion W Deformity | 11.77 | 843 | 17.77 | 8,606 | 10.2 | 0.33 |
| 3 | F01B | Implantation Or Replacement Of Aicd, Total System W/O Catastrophic Cc | 9.95 | 2,437 | 12.76 | 6,308 | 2.6 | 0.10 |
| 4 | A11A | Insertion Of Implantable Spinal Infusion Device W Catastrophic Cc | 9.26 | 13 | 15.30 | 226 | 17.4 | 2.02 |
| 5 | D01Z | Cochlear Implant | 8.51 | 733 | 10.89 | 1,068 | 1.5 | 0.35 |
| 6 | I09A | Spinal Fusion W Catastrophic Cc | 7.49 | 689 | 14.15 | 11,598 | 16.8 | 0.21 |
| 7 | I01A | Bilateral/Multiple Major Joint Proc Of Lower Extremity W Revision Or W Cat Cc | 6.19 | 333 | 12.56 | 5,077 | 15.2 | 0.31 |
| 8 | A12Z | Insertion Of Neurostimulator Device | 5.76 | 1,666 | 7.96 | 6,416 | 3.9 | 0.08 |
| 9 | I09B | Spinal Fusion W/O Catastrophic Cc | 5.60 | 10,871 | 8.85 | 70,280 | 6.5 | 0.03 |
| 10 | A11B | Insertion Of Implantable Spinal Infusion Device W/O Catastrophic Cc | 5.44 | 62 | 7.48 | 382 | 6.2 | 0.42 |
| 11 | A40Z | Ecmo | 5.02 | 23 | 36.10 | 497 | 21.3 | 5.52 |
| 12 | I01B | Bilateral/Multiple Major Joint Pr Of Lower Extremity W/O Revision W/O Cat Cc | 4.98 | 2,229 | 8.26 | 16,415 | 7.4 | 0.07 |
| 13 | F03A | Cardiac Valve Proc W Cpb Pump W Invasive Cardiac Investigation W Cat Cc | 4.79 | 596 | 14.90 | 10,740 | 18.0 | 0.14 |
| 14 | I32A | Knee Revision W Catastrophic Cc | 4.28 | 178 | 10.19 | 3,439 | 19.3 | 0.38 |
| 15 | I32B | Knee Revision W Severe Cc | 4.16 | 273 | 8.18 | 3,094 | 11.3 | 0.22 |
| 16 | F03B | Cardiac Valve Proc W Cpb Pump W Invasive Cardiac Investigation W/O Cat Cc | 4.14 | 210 | 10.00 | 2,507 | 11.9 | 0.13 |
| 17 | I15Z | Cranio-Facial Surgery | 4.04 | 200 | 7.36 | 1,035 | 5.2 | 0.85 |
| 18 | I05A | Other Joint Replacement W Catastrophic Or Severe Cc | 3.98 | 282 | 7.44 | 2,602 | 9.2 | 0.18 |
| 19 | I31A | Hip Revision W Catastrophic Cc | 3.90 | 340 | 10.68 | 6,920 | 20.4 | 0.33 |
| 20 | I32C | Knee Revision W/O Catastrophic Or Severe Cc | 3.89 | 1,830 | 6.79 | 13,652 | 7.5 | 0.06 |
|  | **Sub-total, top 20 highest cost-weighted separations** | | **6.21** | **24,131** |  | **174,595** | **7.2** |  |  |
|  | **All DRGs** | | **0.27** | **2,703,792** |  | **6,820,000** | **2.5** |  |  |
|  | Top 20 Miscellaneous cost-weight DRGs, % of all seps | |  | 0.9% |  | 3% | 0.4 |  |  |

1. **Notes :**
2. (a) Miscellaneous is the sum of Ward Medical, Pathology, Imaging, Emergency Departments, and Prostheses.
3. For cost weight (cost bucket specific) calculations please refer to the "Appendix A: Glossary of NHCDC terms"
4. (b) Separations shown are strata weighted
5. (c) DRG-rank for cost weight across all cost buckets. A rank of 1 means that the DRG has the highest cost weight.

(e) ALOS means average length of stay

Table 9 Twenty DRGs with the highest cost weight for Operating rooms and Specialist Procedure Suites

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DRG** |  | **Description** | **OR and SPS Cost Weight** (a) | **Separations** (b) | **Overall Cost Weight** (c) | **Number of Days** (d) | **ALOS (days)** (e)=(d)/(b) | **Std Error** | **Comment** |
| 1 | J01A | Microvas Tiss Transf For Skin, Subcutaneous Tiss & Breast Disd W Cat/Sev Cc | 2.56 | 145 | 7.27 | 1,533 | 10.6 | 0.25 | i) This table shows the DRGs that are likely to consume the highest Operating Room and Specialist Procedure Suite resources for an individual episode of care, as measured by the Operating Room and Specialist Procedure cost weight. Most of these DRGs also have a high overall cost weight.  DRGs with fewer than 5 separations or 3 participating hospitals are excluded from the table. |
| 2 | J01B | Microvas Tiss Transf For Skin, Subcutaneous Tiss & Breast Disd W/O Cat/Sev Cc | 2.18 | 408 | 5.29 | 2,985 | 7.3 | 0.09 |
| 3 | I02A | Microvascular Tissue Transfer Or (Skin Graft W Cat Or Sev Cc), Excluding Hand | 2.00 | 349 | 8.94 | 6,987 | 20.0 | 0.27 |
| 4 | F07A | Other Cardiothoracic/Vascular Procedures W Cpb Pump W Catastrophic Cc | 1.84 | 235 | 10.96 | 3,210 | 13.7 | 0.36 |
| 5 | A06A | Tracheostomy W Ventilation >95 Hours W Catastrophic Cc | 1.77 | 292 | 54.94 | 13,842 | 47.4 | 1.56 |
| 6 | F07B | Other Cardiothoracic/Vascular Procedures W Cpb Pump W Severe Or Moderate Cc | 1.68 | 160 | 7.88 | 1,457 | 9.1 | 0.25 |
| 7 | F03A | Cardiac Valve Proc W Cpb Pump W Invasive Cardiac Investigation W Cat Cc | 1.56 | 596 | 14.90 | 10,740 | 18.0 | 0.14 |
| 8 | F05A | Coronary Bypass W Invasive Cardiac Investigation W Reoperation Or W Cat Cc | 1.50 | 758 | 10.04 | 12,718 | 16.8 | 0.08 |
| 9 | F04A | Cardiac Valve Proc W Cpb Pump W/O Invasive Cardiac Inves W Cat Cc | 1.49 | 2,253 | 11.50 | 30,859 | 13.7 | 0.06 |
| 10 | I06Z | Spinal Fusion W Deformity | 1.48 | 843 | 17.77 | 8,606 | 10.2 | 0.33 |
| 11 | W04A | Other Or Procs For Multiple Significant Trauma W Catastrophic Or Severe Cc | 1.47 | 13 | 11.35 | 487 | 37.7 | 1.62 |
| 12 | F04B | Cardiac Valve Proc W Cpb Pump W/O Invasive Cardiac Inves W/O Cat Cc | 1.39 | 1,440 | 8.58 | 13,615 | 9.5 | 0.04 |
| 13 | F07C | Other Cardiothoracic/Vascular Procedures W Cpb Pump W/O Cc | 1.34 | 123 | 6.02 | 836 | 6.8 | 0.20 |
| 14 | I15Z | Cranio-Facial Surgery | 1.31 | 200 | 7.36 | 1,035 | 5.2 | 0.85 |
| 15 | F05B | Coronary Bypass W Invasive Cardiac Investigation W/O Reoperation W/O Cat Cc | 1.28 | 665 | 6.75 | 8,001 | 12.0 | 0.06 |
| 16 | F06A | Coronary Bypass W/O Invasive Cardiac Inves W Reoperation Or W Cat Or Sev Cc | 1.27 | 2,397 | 6.76 | 26,890 | 11.2 | 0.03 |
| 17 | I09A | Spinal Fusion W Catastrophic Cc | 1.24 | 689 | 14.15 | 11,598 | 16.8 | 0.21 |
| 18 | A40Z | Ecmo | 1.23 | 23 | 36.10 | 497 | 21.3 | 5.52 |
| 19 | L03A | Kidney, Ureter And Major Bladder Procedures For Neoplasm W Catastrophic Cc | 1.20 | 421 | 6.50 | 6,676 | 15.8 | 0.17 |
| 20 | H01A | Pancreas, Liver And Shunt Procedures W Catastrophic Cc | 1.20 | 541 | 7.52 | 9,379 | 17.3 | 0.20 |
|  | **Sub-total, top 20 highest cost-weighted separations** | | **1.45** | **12,552** | **10.87** | **171,951** | **13.7** |  |  |
|  | **All DRGs** | | **0.18** | **2,703,792** | **1.00** | **6,820,000** | **2.5** |  |  |
|  | Top 20 OR and SPS cost-weight DRGs, % of all seps | |  | 0.5% |  | 3% | 0.4 |  |  |

1. **Notes :**
2. (a) OR and SPS means "Operating Room" and "Specialist Procedure Suites" for the DRG shown
3. For cost weight (cost bucket specific) calculations please refer to the "Appendix A: Glossary of NHCDC terms"
4. (b) Separations shown are strata weighted
5. (c) DRG-rank for cost weight across all cost buckets. A rank of 1 means that the DRG has the highest cost weight.

(e) ALOS means average length of stay

Table 10 Twenty DRGs with the highest cost weight for Critical Care costs

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DRG** |  | **Description** | **Critical Care Cost Weight** (a) | **Separations** (b) | **Overall Cost Weight** (c) | **Number of Days** (d) | **ALOS (days)** (e)=(d)/(b) | **Std Error** | **Comment** |
| 1 | A06A | Tracheostomy W Ventilation >95 Hours W Catastrophic Cc | 36.73 | 292 | 54.94 | 13,842 | 47.4 | 1.56 | i) This table shows the DRGs that are likely to consume the highest Critical Care resources for an individual episode of care, as measured by the Critical Care cost weight. Most of these DRGs also have a high overall cost weight. DRGs with fewer than 5 separations or 3 participating hospitals are excluded from the table. |
| 2 | A06C | Ventilation >95 Hours W/O Catastrophic Cc | 18.76 | 42 | 25.58 | 978 | 23.1 | 1.57 |
| 3 | A40Z | Ecmo | 16.64 | 23 | 36.10 | 497 | 21.3 | 5.52 |
| 4 | A06B | Trach W Vent >95 Hours W/O Cat Cc Or Trach/Vent >95 Hours W Cat Cc | 13.48 | 929 | 23.34 | 27,277 | 29.4 | 0.41 |
| 5 | P06B | Neonate, Admwt >2499 G W Significant Or Procedure W/O Multi Major Problems | 8.68 | 148 | 13.45 | 3,745 | 25.3 | 1.56 |
| 6 | P03Z | Neonate, Admwt 1000-1499 G W Significant Or Procedure | 8.10 | 6 | 9.49 | 6 | 1.0 | 4.60 |
| 7 | F40B | Circulatory System Diagnosis W Ventilator Support W/O Catastrophic Cc | 5.59 | 7 | 7.04 | 34 | 5.0 | 1.32 |
| 8 | P67A | Neonate, Admwt >2499 G W/O Significant Or Procedure W Multi Major Problems | 5.39 | 89 | 9.16 | 1,532 | 17.3 | 1.65 |
| 9 | E40B | Respiratory System Diagnosis W Ventilator Support W/O Catastrophic Cc | 5.35 | 20 | 7.20 | 143 | 7.2 | 1.11 |
| 10 | E40A | Respiratory System Diagnosis W Ventilator Support W Catastrophic Cc | 5.06 | 84 | 9.25 | 1,069 | 12.7 | 0.61 |
| 11 | F40A | Circulatory System Diagnosis W Ventilator Support W Catastrophic Cc | 5.03 | 50 | 8.80 | 683 | 13.7 | 0.66 |
| 12 | X40Z | Injuries, Poisoning And Toxic Effects Of Drugs W Ventilator Support | 4.84 | 11 | 7.48 | 58 | 5.3 | 1.04 |
| 13 | B42B | Nervous System Diagnosis W Ventilator Support W/O Catastrophic Cc | 3.14 | 23 | 6.14 | 183 | 7.8 | 0.54 |
| 14 | B42A | Nervous System Diagnosis W Ventilator Support W Catastrophic Cc | 3.13 | 23 | 5.81 | 224 | 9.8 | 0.57 |
| 15 | F03A | Cardiac Valve Proc W Cpb Pump W Invasive Cardiac Investigation W Cat Cc | 3.06 | 596 | 14.90 | 10,740 | 18.0 | 0.14 |
| 16 | F07A | Other Cardiothoracic/Vascular Procedures W Cpb Pump W Catastrophic Cc | 2.88 | 235 | 10.96 | 3,210 | 13.7 | 0.36 |
| 17 | E41Z | Respiratory System Diagnosis W Non-Invasive Ventilation | 2.85 | 312 | 5.65 | 4,403 | 14.1 | 0.15 |
| 18 | F05A | Coronary Bypass W Invasive Cardiac Investigation W Reoperation Or W Cat Cc | 2.84 | 758 | 10.04 | 12,718 | 16.8 | 0.08 |
| 19 | P65B | Neonate, Admwt 1500-1999 G W/O Significant Or Procedure W Major Problem | 2.74 | 21 | 6.67 | 516 | 24.4 | 0.87 |
| 20 | T40Z | Infectious And Parasitic Diseases W Ventilator Support | 2.64 | 33 | 10.11 | 379 | 11.5 | 0.75 |
|  | **Sub-total, top 20 highest cost-weighted separations** | | **8.90** | **3,703** |  | **82,237** | **22.2** |  |  |
|  | **All DRGs** | | **0.05** | **2,703,792v** |  | **6,820,000** | **2.5** |  |  |
|  | Top 20 Critical Care cost-weight DRGs, % of all seps | |  | 0.1% |  | 1% | 0.4 |  |  |

1. **Notes :**
2. (a) For cost weight (cost bucket specific) calculations please refer to the "Appendix A: Glossary of NHCDC terms"
3. (b) Separations shown are strata weighted
4. (c) DRG-rank for cost weight across all cost buckets. A rank of 1 means that the DRG has the highest cost weight.

(e) ALOS means average length of stay

Appendix A Glossary of NHCDC terms

1. **Actual data:** The hospital data received by the NHCDC that is used as the sample data to produce national average costs. Actual data (or sample data) is used in the estimation process as defined by the NHCDC (see Estimated).
2. Note: As actual data is a sample only; caution should be taken when comparing this data as it is not necessarily representative of the population.
3. **Acute inpatient:** An admitted patient whose illness is acute, and has one or more problems which require short–term health care in an admitted patient setting.
4. In the Casemix context, episodes of care which can appropriately be classified by AR–DRG, and which do not meet the definitions for rehabilitation, palliation, or non–acute admitted patient.
5. **Admitted patient**: A patient who has been formally admitted to a hospital.
6. Further, admitted patients are categorised by care type into acute, rehabilitation, palliation, and non-acute.
7. **Adjacent DRGs**: Adjacent DRGs consist of one or more DRGs generally defined by the same diagnosis or procedure code list. DRGs within adjacent DRGs have differing levels of resource consumption and are partitioned on the basis of several factors, including complicating diagnoses/procedures, age and/or the patient clinical complexity level (PCCL).
8. The fourth character of a DRG code represents the severity of a DRG. A severity code of "A" indicates the highest consumption of resources; a severity code of "B" indicates the next highest consumption of resources; code "C" indicates the next highest consumption of resources; and severity code "D" indicates the least consumption of resources within a DRG.
9. A severity code of "Z" indicates that there is no split for the DRG. Therefore the adjacent DRG data for DRG with a severity code of "Z" has no change to the cost by volume.
10. **ALOS**: See average length of stay.
11. **AR–DRG**: See Australian Refined Diagnosis Related Groups.
12. **Australian Refined Diagnosis Related Groups (AR–DRGs):** A variant of the DRG system designed specifically for use in Australia. The national standard. The current version in use is Version 6.0x, which recognises 702 categories of DRG.
13. **Average cost**: In the costing context, the total cost of production divided by the number of products in a period. Also known as full average cost.
14. **Average Length of Stay (ALOS):** The ALOS is calculated by dividing the number of days by the number of separations for each DRG. The calculation of ALOS includes all days and separations. That is, no trimming is applied when calculating this statistic. In other national reporting, length of stay is adjusted to remove leave days, however this adjustment was not applied in this report because most hospitals did not supply leave days.
15. **Care type**: The overall nature of a clinical service provided to an admitted patient during an episode of admitted care (e.g. acute, rehabilitation, palliative, psychogeriatric, maintenance, newborn and other admitted patient care).
16. **Cost buckets:** Also known as ‘cost components’, cost buckets determine the detail of the reporting framework for NHCDC products. For a complete list of the cost buckets and what they include and exclude, see the Definitions chapter in the Hospital Reference Manual.
17. **Cost centre (CC):** An accounting entity where all costs associated with a particular type of activity can be recorded. Sometimes abbreviated to CC.
18. **Cost modelling (CM):** A popular for a type of product costing which makes minimal use of measures of resource consumption by individual patients, and aims only to estimate mean costs for classes of patients. CM sites are hospitals that ‘model’ their cost centres using pre-determined statistics and ‘weights’ in order to apportion their costs across product groups and types. This is also known as ‘top down’ costing because you start with an aggregate cost and apportion it across cost centres.
19. **Cost weight (total)**: The average cost across all AR–DRGs for the total cost is chosen as the reference value, and given a weight of 1. A cost weight of an AR-DRG is calculated as the average total cost for that AR-DRG divided by the reference value. The formula to calculate the cost weight is:
20. *Example for AR-DRG = "XXX"*
    1. Reference Cost = $80   
       Total Average Cost for DRG:XXX = $100  
       "XXX" Total Cost Weight = $100/$80 = 1.25
21. **Cost weight (specific cost bucket)**: A cost weight for an AR-DRG for a specific cost bucket is calculated as the average cost for that AR-DRG and relevant cost bucket, divided by the reference value. The reference value equals the total average cost across all AR-DRGs, as per that used in the Cost Weight (Total Costs).The formula to calculate the cost weight is:
22. Where:

*c* is the specific cost bucket or combination of cost buckets

1. *Example for AR-DRG = "XXX*

Reference Cost = $80   
Total Average Cost for DRG:XXX = $100  
Critical Care Average Cost for DRG: XXX = $40  
"XXX" Critical Care Cost Weight = $40/$80 = 0.5

1. **Cost-weighted separations:** This is calculated as the DRG cost weight (total costs), multiplied by the number of separations for a given DRG, and aggregated across a set of DRGs. It is an indicator of the relative resource consumption of acute care hospitals. The formula to calculate cost-weighted separations is:
2. Where:

*ni* is the number of separations in the *ith* DRG

*k* is the number of DRGs (in AR-DRGv6.0x it is 702)

*CWi* is the cost weight (total cost) for the *ith* DRG

1. **Critical Care Unit:** A patient care area in a hospital which is staffed and equipped to handle patients at particular risk due to high severity of illness. Includes intensive care units, neonatal intensive care units and coronary care units.
2. **Direct cost centre**: In the product costing context, cost centres are generally classified as either overhead or direct product. The latter type is also known as ‘Direct Cost Centres’.
3. Direct products are those able to be delivered directly to the customer. The main types of direct products are patient episodes of care. Direct product cost centres therefore include all those which provide their services to patients rather than to other cost centres (as is the case for overhead cost centres). Examples are nursing, emergency department, and imaging.
4. **Estimated data:** The total costs are estimated by, increasing within each stratum, the sample of hospitals data to the estimated volumes for the total population. The aim is to minimise bias in the collection caused by the sample of the participating hospitals, by weighting the sample results according to the known characteristics of the population.
5. **Grouper**: An analytical tool (usually a computer program) which supports the assignment of patient care episodes to Casemix classes.
6. **ICU**: Intensive Care Unit. See Critical Care Unit.
7. **Indirect costs:** Used in several ways to designate costs which are not easily able to be related to specific products. In the standard product costing method, costs which are passed to cost centres from overhead cost centres.
8. **Inpatient:** See admitted patient.
9. **Intensive Care Unit (ICU):** See Critical Care Unit.
10. **Length of stay (LOS):** The number of days an inpatient spends in hospital. It is calculated in different ways for different purposes. The most common involves subtracting the admission date from the discharge date. In other national reporting, length of stay is adjusted to remove leave days, however this adjustment was not applied in this report because most hospitals did not supply leave days.
11. **Overhead costs:** In the product costing context, cost centres are generally classified as either overhead or direct products (patient care). An overhead cost centre provides its services to other cost centres rather than directly to patients (as is the case for patient care cost centres). Examples are building costs and linen services.
12. **Patient costing (PC):** A generic term for a type of product costing which makes use of
13. measures of resource consumption by individual patients, and aims to estimate costs for each individual patient care episode. PC sites are hospitals that are able to calculate the cost of care at the patient level. Generally, this is done using actual patient level consumption data.
14. The PC method of costing is also known as a ‘bottom up’ method of costing because cost aggregates are devised from individual items of patient consumption.
15. **Service weights:** The relative costs of a service for each type of patient care product. For example, the relative costs of imaging or nursing across all ARDRGs. Also known as service weights.
16. **Separations:** The NHDD version 15.0 defines a separation as “the process by which an episode of care for an admitted patient ceases”.
17. **Standard error:** Standard errors, reported against DRG cost weights in tables across the Cost Weights Report, indicate the reliability of cost weights in terms of variation in costs and variation from the sample design.
18. **Weighted separation:** see cost-weighted separation.

Appendix B Standard error range, Round 16 Private sector

1. Standard errors, reported against DRG cost weights in tables across the Cost Weights Report, indicate the reliability of cost weights in terms of variation in costs and variation from the sample design. The following tables summarise the reliability of DRG cost weights by grouping the standard errors into a number of ranges.
2. Numbers of DRGs and separations falling into standard error ranges in column 2 provide insight into the global impact of estimation error on cost weights.

Table 11 Number of DRGs by Standard Error range, AR-DRG 6.0x, Private Sector, Round 16

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Number of DRGs** | **Separations** | **Percentage of DRGs (%)** | **Percentage of Total Separations (%)** |
| 0.000 - 0.039 | 284 | 2,513,162 | 41% | 93% |
| 0.040 - 0.099 | 165 | 129,464 | 24% | 5% |
| 0.100 - 0.149 | 81 | 34,815 | 12% | 1% |
| 0.150 - 0.199 | 33 | 8,043 | 5% | 0% |
| 0.200 - 0.399 | 81 | 14,634 | 12% | 1% |
| 0.400 + | 51 | 3,674 | 7% | 0% |
| **Total\*** | **695** | **2,703,792** | **100%** | **100%** |

1. \* The standard error for some DRGs cannot be estimated due to low separation counts in the sample.
2. The results above show that 65% (41% + 24%) of v6.0x DRGs have cost weight estimates with a standard error range of less than 0.1. Almost 98% of separations are within the subset of DRGs that have a small standard error.
3. These results are very similar to the range of standard errors published in Appendix D of the Round 13 NHCDC cost Report[[14]](#footnote-15).

Appendix C Costs included in the cost buckets

1. **1. Ward Medical**: This is also known as Medical Clinical Services, includes the salaries and wages of all medical officers including sessional payments. Note that medical costs may also be found in other buckets that have a medical salary and wages component e.g. Imaging, Pathology, Critical Care, Operating Rooms, Emergency Department, Specialist Procedure Suites, Allied Health and Pharmacy.
2. **2. Ward Nursing**: This bucket includes Nursing salaries and wages reported in Clinical Service areas.
3. **3. Non-clinical Salaries**: This cost bucket includes all other costs of service provision for each inpatient separation.
4. **4. Pathology**: Pathology cost bucket includes costs of diagnostic clinical laboratory testing for the diagnosis and treatment of patients and associated salaries.
5. **5. Imaging**: The Imaging cost bucket covers the area of diagnostic and therapeutic imaging produced under the direction of a qualified technician and reported by a medical practitioner and associated salaries.
6. **6. Allied Health**: The Allied Health cost bucket includes clinical services which are delivered by qualified Allied Health professionals who have direct patient contact in areas like audiology, physiotherapy, podiatry etc.
7. **7. Pharmacy**: The Pharmacy cost bucket covers the area of the hospital responsible for the provision of pharmaceuticals. This includes the purchase, production, distribution, supply and storage of drug products and clinical pharmacy services.
8. **8. Critical Care**: The Critical Care cost bucket covers the Intensive Care Unit and Coronary Care Units.
9. **9. Operating Rooms**: The Operating Rooms cost bucket covers the area of a hospital where significant surgical procedures are carried out under surgical conditions under the supervision of qualified medical practitioners. The operating room must be equipped to deliver general anaesthesia and conform to the College of Anaesthetists and the Faculty of Intensive Care standards.
10. **10. Emergency Department (ED)**: The ED cost bucket covers the area of the hospital where patients who present in an unscheduled manner can be triaged, assessed and treated. The ED must conform to the requirements of the Australian Council on Healthcare Standards trauma guidelines, with the capacity to provide complex, multi-system life support (including mechanical ventilation and invasive cardiovascular monitoring) for a limited period of time.
11. **11. Supplies**: ‘Supplies’ is an abbreviation for the Supplies and Ward Overheads cost bucket. It includes costs for goods and services, medical and surgical supplies, ward overheads and clinical department overheads. In other words, it includes all costs attributed to a ward that are not included in any other cost buckets.
12. **12. Specialist Procedures Suites (SPS):** The SPS includes costs equipped specifically to provide an environment where diagnostic and therapeutic procedures can be performed under the direction of suitably qualified medical practitioners. Does not include Operating Room costs.
13. **13. On-costs:** The On-costs cost bucket includes superannuation, termination payments, workers compensation, long service leave etc.
14. **14. Prostheses:** The Prostheses cost bucket includes the costs of all prostheses appearing on hospital accounts and costs incurred by the hospital but have not been included in their accounts.
15. **15. Hotel:** The Hotel Services cost bucket includes such items as food service, linen, grocery supplies and recorded as overheads.
16. **16. Depreciation:** The Depreciation cost bucket includes depreciation for items that are durable, able to support production for an appreciable period of time and purchased outright or donated.
17. More details on these costs are available in the Hospital Reference Manual on the [Casemix website](http://www.health.gov.au/casemix).

Appendix D Cost weight tables by DRG

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Private Sector Estimated Round 16 (2011-12) National consolidated Cost weights by DRG.Private Sector Estimated Round 16 (2011-12) National consolidated Cost weights by DRG.Private Sector Estimated Round 16 (2011-12) National consolidated Cost weights by DRG.Private Sector Estimated Round 16 (2011-12) National consolidated Cost weights by DRG.Private Sector Estimated Round 16 (2011-12) National consolidated Cost weights by DRG.Private Sector Estimated Round 16 (2011-12) National consolidated Cost weights by DRG.Private Sector Estimated Round 16 (2011-12) National consolidated Cost weights by DRG.Private Sector Estimated Round 16 (2011-12) National consolidated Cost weights by DRG.Private Sector Estimated Round 16 (2011-12) National consolidated Cost weights by DRG.Private Sector Estimated Round 16 (2011-12) National consolidated Cost weights by DRG.Private Sector Estimated Round 16 (2011-12) National consolidated Cost weights by DRG.Private Sector Estimated Round 16 (2011-12) National consolidated Cost weights by DRG.Private Sector Estimated Round 16 (2011-12) National consolidated Cost weights by DRG.Private Sector Estimated Round 16 (2011-12) National consolidated Cost weights by DRG.Private Sector Estimated Round 16 (2011-12) National consolidated Cost weights by DRG.Private Sector Estimated Round 16 (2011-12) National consolidated Cost weights by DRG.

1. Acute admitted care separations are those identified in national data collections as “Care Type 1.0” (AIHW National Data Dictionary 15th edition). Costs associated with newborn babies (“Care Type 7.0”) in relation to the number of unqualified days have been allocated to the delivery AR-DRGs of the associated mothers. This is further described in Section 3.6. [↑](#footnote-ref-2)
2. DOHA (Department of Health and Ageing) 2011, Data Definitions Manual [↑](#footnote-ref-3)
3. These are separations with care type 7.0 (new born care), with zero qualified days in the delivery DRGs (Major Diagnostic Category 15 newborns and other neonates) [↑](#footnote-ref-4)
4. e.g. refer to the 15th edition [↑](#footnote-ref-5)
5. Australian Institute of Health and Welfare (AIHW), Australian Hospital Statistics 2010-11, Cat No, HSE117. [↑](#footnote-ref-6)
6. <http://www.health.gov.au/internet/main/publishing.nsf/Content/Australia-Hospital-Patient-Costing-Standards>, accessed 15 April 2013 [↑](#footnote-ref-7)
7. Page 19 of Australian Hospital Patient Costing Standards v2.0 – 1 March 2011 [↑](#footnote-ref-8)
8. <http://www.health.gov.au/internet/main/publishing.nsf/Content/Round_13-cost-reports>, accessed 3 April 2012 [↑](#footnote-ref-9)
9. In this context: the probability that an estimate falls within the margin of error of the true mean. [↑](#footnote-ref-10)
10. Defined as 95% confidence level and 4% acceptable margin of error for the overall average cost. The 95% confidence level and 4% margin of error parameters were informed by considering participation levels in historic publications that were considered acceptable for publication. [↑](#footnote-ref-11)
11. DoHA, Hospital Reference Manual for Round 11 (2006-07) [↑](#footnote-ref-12)
12. AIHW National Health Data Dictionary, 15th edition [↑](#footnote-ref-13)
13. Advice from IHPA [↑](#footnote-ref-14)
14. Department of Health and Ageing, NHCDC Cost Report Round 13 (2008-2009), November 2010 [↑](#footnote-ref-15)