Independent Hospital Pricing Authority

IHPA

Technical Specifications 2014–15

National Pricing Model

Version 1.0

February 2014

National Pricing Model Technical Specifications 2014-15

Table of Contents

Table of acronyms and abbreviations

Acronym/ abbreviation	Description
ABF	Activity Based Funding
ALOS	Average length of stay
AN-SNAP	Australian National Subacute and Non Acute Patient Classification
APC	Admitted Patient Care
AR-DRG	Australian Refined Diagnosis Related Groups
ASGS	Australian Statistical Geography Standard
ASNC	Admitted Subacute and Non-acute Care
CSO	Community Service Obligation
DoH	Department of Health
DSS	Data Set Specification
DVA	Department of Veterans' Affairs
ED	Emergency Department
HCP	Hospital Casemix Protocol
ICU	Intensive Care Unit
IHPA	Independent Hospital Pricing Authority
LHN	Local Hospital Network
LOS	Length of Stay
MAPE	Mean Absolute Percentage Error
MBS	Medicare Benefits Schedule
MDB	Major Diagnostic Block, used in Urgency Related Groups
MDC	Major Diagnostic Category, used in AR-DRGs
MPS	Multipurpose Service
NAPED	Non Admitted Patients Emergency Department
NEC	National Efficient Cost
NEP	National Efficient Price
NHCDC	National Hospital Cost Data Collection
NHRA	National Health Reform Agreement
NMDS	National Minimum Data Set
NPHED	National Public Hospital Establishment Database
NWAU	National Weighted Activity Unit
PHI	Private Health Insurance
PICU	Paediatric Intensive Care Unit
SLA	Statistical Local Area
TAC	Technical Advisory Committee
TTR	Teaching, Training and Research
UDG	Urgency Disposition Groups
UoW	University of Wollongong
URG	Urgency Related Groups

1 Overview of process

The National Health Reform Agreement (NHRA) sets out the intention of the Australian Government and state and territory governments to work in partnership to improve health outcomes for all Australians. One of the ways in which the NHRA aims to achieve this is through the implementation of national Activity Based Funding (ABF). The NHRA specifies that the central component of ABF is an independently determined National Efficient Price (NEP) and National Efficient Cost (NEC), to be used as a reference for the Commonwealth to determine its funding contribution for Australian public hospital services.

The Independent Hospital Pricing Authority (IHPA) is a key element of the NHRA, responsible for the national implementation of an ABF system and in determining the annual NEP and NEC determinations. IHPA was established as an independent government agency under Commonwealth legislation on 15 December 2011. It has since issued two *NEP Determinations* for 2012-2013 (NEP12) and 2013-14 (NEP13 and NEC13).

IHPA has now published its third NEP and NEC, which sets out the determinations for 2014-15 in relation to each of its legislative functions, namely:

a. The 2014-15 NEP (NEP14) for health care services provided by public hospitals where the services are funded on an activity basis;

b. The 2014-15 NEC (NEC14) for health care services provided by public hospitals where the services are funded on a block funded basis;

c. Development and specification of classification systems for health care and other services provided by public hospitals;

d. Adjustments to the NEP to reflect legitimate and unavoidable variations in the costs of delivering health care services;

e. Except where otherwise agreed between the Commonwealth and a state or a territory – the public hospital functions that are to be funded in that state or territory by the Commonwealth; and

f. Publication of a report setting out the NEP and NEC for the coming year and any other information that would support the efficient funding of public hospitals.

This document has been produced as an accompaniment to the *NEP14* and *NEC14 Determinations*. It provides the technical specifications for how IHPA developed the ABF models for the service streams to be funded on this basis from 1 July 2014, and provides guidance to hospitals, Local Health Networks (LHN) and state and territory health authorities on how to apply these to hospital activity. It also shows how the NEC is determined for hospitals (such as small rural hospitals) funded on a block funded basis.

Separate documents titled, *IHPA Cost and Pricing Models Expert Guide – Acute Admitted 2013-14* (based on 2010-11 cost and activity data) and – *Acute Admitted 2014-15* (based on 2011-12 cost and activity data) are also available for those managers who wish to become more acquainted with the IHPA cost/price models.

Systems for classifying outputs have been applied separately to different ABF service streams. In addition, under the current national application of ABF, a common unit has been developed across all ABF service streams known as a National Weighted Activity Unit (NWAU). This is the unit to which NEP14 is applied as a reference for the Commonwealth to determine its share of funding for activity undertaken by hospitals (aggregated at a LHN level).

To develop NWAU and to determine the NEP14, IHPA has collated activity and cost data for each of the ABF service streams to be funded on an activity basis in 2014-15, as follows:

- acute admitted;
- emergency department;
- non-admitted;
- subacute and non-acute admitted; and
- mental health.

In consultation with jurisdictions, IHPA has identified 260 hospitals to make up the ABF price model and 436 hospitals designated for block funding, with 16 of the block funded hospitals being treated separately as specialist mental health establishments.[1] The 420 block funded hospitals have been grouped by size and locality in the NEC cost model for the specification of availability and service capacity elements to determine NEC14.

The activity and cost data is sourced by IHPA from various national data collections and is supplemented by additional data provided by the states and territories. Table 1 below references relevant sections in the *NEP14* and *NEC14 Determinations*. The classification systems for each service stream and the source of its cost and activity data, are shown in Table 2.

Table 1: Sections of the *NEP14 and NEC14 Determinations*

Component	**Section of *Determination***
National Efficient Price	Chapter 2
Acute admitted services - NEP14	
AR-DRG inlier bounds, flags for designated same-day payment AR-DRG and unbundled ICU AR-DRG, National Weighted Activity Unit (NWAU) weights for same-day payment AR-DRGs, short-stay outliers (base and per diem), inliers, long-stay outliers (per diem), Intensive Care Unit (ICU) rates per hour, paediatric adjustment, private patient service adjustment	Appendix F
Indigenous adjustment, outer regional, remote and very remote adjustments, and radiotherapy adjustments	Chapter 5
List of radiotherapy codes	Appendix B
Specified ICUs	Appendix C
Private patient accommodation adjustment	Appendix D
Specialised children's hospitals	Glossary
Definition of an eligible ICU or paediatric ICU (PICU)	Glossary
Emergency department services - NEP14	
Urgency Related Groups v1.4 classification and NWAU weights	Appendix J
Urgency Disposition Groups v1.3 classification and NWAU weights	Appendix K
Emergency departments in-scope for ABF	Glossary
Definitions of emergency department role levels	Glossary
Non-admitted services - NEP14	
Tier 2 non-admitted services classification v3.0 weights	Appendix I
Definition of Tier 2 list of non-admitted services classifications v3.0	Glossary
Subacute and non-acute services - NEP14	
AN-SNAP v3 weights	Appendix G
Care Type per diem rates for those subacute facilities yet to implement AN-SNAP	Appendix H
Definitions of AN-SNAP v3	Glossary
***Mental health services* - NEP14**	
AR-DRG-based inlier bounds, NWAU and adjustment weights	Appendix F
Definition of mental health patients	Chapter 5
Block funded hospital services - NEC14	
NEC weights, Efficient costs for each block funded hospital	Chapter 3

[1] For a list of Block-funded hospitals see Appendix A of the *NEC Determination 2014-15*

Table 2: Summary of classification systems and sources of cost

Service stream	Classification[2]	Cost data	Activity data
Acute admitted care	Australian Refined Diagnosis Related Groups (AR-DRG) version 7.0	National Hospital Cost Data Collection (NHCDC) Round 16 (2011-12).	Admitted Patient Care ABF DSS
Emergency department care	Urgency Related Group (URG) version 1.4 Urgency Disposition Groups (UDG) version 1.3	NHCDC Round 16 (2011-12)	*Level 3B to 6 emergency departments*: Emergency Department Care ABF DSS *Level 1 to 3A emergency departments*: Emergency Services ABF DSS
Non-admitted care (outpatients only)	Tier 2 Outpatient Clinic Definitions version 3.0	NHCDC Round 16 (2011-12)	Non-admitted Patient ABF DSS
Subacute care (and non-acute)	AN-SNAP version 3 Care type	NHCDC Round 16 (2011-12)	Admitted Patient Care ABF DSS and Admitted Subacute and Non acute Care ABF DSS
Mental health care	(AR-DRG) version 7.0 with modified inlier bounds	NHCDC Round 16 (2011-12)	Admitted Patient Care ABF DSS
Block funded services	IHPA-defined size and Australian Statistical Geography Standards (ASGS) location categorisation on total NWAU for hospital	Expenditure data from the National Public Hospital Establishments Data base (NPHED) (2011-12) NHCDC Round 16 (2011-12)	Admitted Patient Care (APC) NMDS, NAPED and NPHED

A summary of the National Hospital Cost Data (NHCDC) Round 16 cost data received for 2011-12 is at **Attachment A**.

An important part of the modelling process is the preliminary preparation of both the costing and activity data. The essential steps in the data preparation process are:

a. A substantial validation process undertaken as the data are received from jurisdictions;
b. Matching mothers with unqualified neonates[3] to ensure costs are properly attributed to the mothers;
c. Matching the NHCDC cost file with the APC activity file at the patient level (which has recorded a success rate of over 99 per cent);
d. Identifying any differences in patient characteristics or operational data recorded across the two datasets and reconciling this with APC data where appropriate; and
e. Where reported, removing blood costs and/or any identified amounts related to Commonwealth pharmaceutical payments.

Classification systems within each service stream are applied uniformly across all available data. Although these systems have been developed in part to explain variation in cost between different outputs within the stream, additional systematic variation still occurs. To account for this, various adjustments are modelled and where justified, implemented into the models.

Once agreement is reached on the cost profiles, adjustments and relative weights of various classes within each service stream, the data are projected to reflect 2014-15 prices and relativities. These data are then fed into the development of the NEP14, as explained in detail in **Attachment B**.

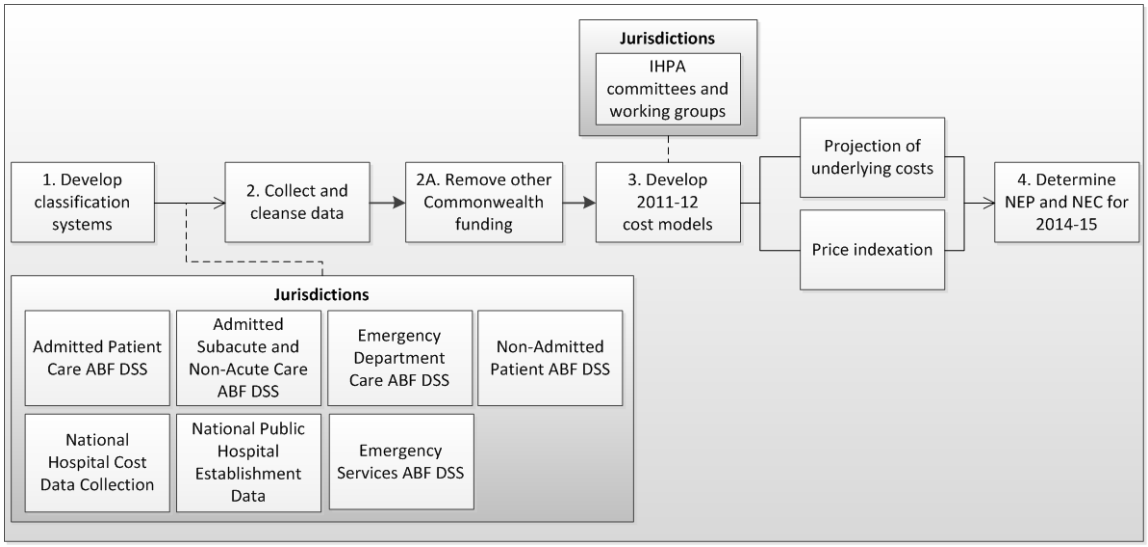
The overall process to determine NEP14 is shown in Figure 1.

[2] Details of each of the classifications are available from:

www.ihpa.gov.au/internet/ihpa/publishing.nsf/Content/ABF-Price-Model-Reference-Classifications-for-2013-14

[3] See Glossay Item *Newborn qualification status* [METeOR identifier: 327254]

Figure 1: Process to determine the National Efficient Price 2014-15



1.1 Backcasting

National Efficient Price Determination 2014-15 (NEP14)

In accordance with Clauses A34(b) and A40 of the NHRA, the Pricing Authority has applied the methodological changes to NEP13 and determined the back cast NEP13 for the purposes of determining Commonwealth growth funding between 2013-14 and 2014-15 is $4,819.

Backcasting Volume

IHPA has also estimated the volume impact of methodological changes between NEP13 and NEP14, which can be used for the purposed of estimating movements in volume between NEP13 and NEP14. This is useful for converting NWAU13 activity target to NWAU14 targets, and for estimating Commonwealth growth funding prior to actual 2013-14 activity data being available.

The volume multipliers (VM) are calculated for each jurisdiction for each particular ABF service category stream and made available on request. The backcast volume multipliers for each jurisdiction (for each ABF product category) are calculated simply as:

$$\mathrm{VM} = \frac{\text{NWAUs delivered by backcast model (NWAU14)}}{\text{NWAUs delivered by original cost model (NWAU13)}}$$

That is, where patient level activity is not available, an estimate of 2013-14 backcasted activity is obtained by multiplying the estimated volume of 2013-14 NWAUs by the relevant VM multiplier.

2 Acute admitted care cost model

2.1 General Issues

2.1.1 Cost unit

An 'episode of admitted patient care' is the cost unit for acute admitted patients. It is "[t]*he period of admitted patient care … characterised by only one care type*" [4], and covers the period of care from admission to discharge.

2.1.2 In-scope activity

Acute admitted care is that provided to patients who undergo a facility's formal admission processes, where the clinical intent or treatment goal is the provision of acute care, or the patient is a baby born in hospital, or is nine days old or younger at the time of admission[5] and has been qualified for one or more days[6].

2.1.3 In-scope patients

National arrangements for ABF apply to a subset of acute admitted episodes defined by the funding source for the patient and the type of hospital in which the episodes occur, as shown in Table 3. In public hospitals, ABF has been taken to apply to patients with a funding source[7] of 'Health Service Budget (Not covered elsewhere)', 'Health Service Budget (due to Reciprocal Health Care Agreement)', 'Health Service Budget (no charge raised due to hospital decision)' 'private health insurance', 'self-funded', or 'other hospital or public authority contracted care'.

All episodes from all funding sources are included in the calculation of the cost weights. This approach is taken to ensure the sample used for the development of NWAU is maximised and reflects the overall costs for the hospital. Only in-scope patients are included in the calculation of the mean cost used in the development of the NEP. All other episodes (e.g. those funded through the Department of Veterans' Affairs (DVA) and compensable patients) are excluded from the scope of funding.

In-scope hospitals

The *NEP14 Determination* sets down a definition of hospital services in-scope for the application of ABF for 2014-15.

[4] See object class *Episode of admitted patient care* [METeOR identifier: 268956].

[5] See data element *Care type* [METeOR Identifier: 270174], values: 1 Acute care; 7 Newborn care.

[6] See data element *Number of qualified days for newborns* [METeOR identifier: 270033].

[7] See data element *Principal source of funding (Funding source for hospital patient)* [METeOR identifier: 339080].

The lists of ABF hospitals and hospitals to be block funded are based on nominations from jurisdictions on the basis of draft eligibility criteria, currently being considered by the Council of Australian Governments (COAG). Based on the 2011-12 datasets and advice from jurisdictions, there are:

a. 260 ABF hospitals; and

b. 436 hospitals to be block funded.

In-scope costs

Factors impacting on scope of costs include:

- Where a patient is admitted through an emergency department that is within the scope of ABF for emergency care, this component of cost is removed from the episode and funded through the emergency care funding model;
- Depreciation and other capital related costs (where reported) are removed;
- Indirect costs for teaching, training and research (TTR) are included but any direct TTR costs are excluded and will be block funded; and
- Identified blood costs and Commonwealth pharmaceutical payments are also removed.

Table 3: Acute admitted episodes in scope for ABF

Variable	Episodes that meet the inclusion criteria		
Care type	1 Acute care 7 Newborn care and qualified days > 0		
Funding source/ Election status	**Funding Source (2014-15 codes)**	**Public hospitals**	**Private hospitals**
	01 Health Service Budget (Not covered elsewhere)	Included	Included
	02 Health Service Budget (due to eligibility for Reciprocal Health Care Agreement)	Included	Included
	03 Health Service Budget (no charge raised due to hospital decision)	Included	Included
	08 Other hospital or public authority (contracted care)	Included	Included where election status is public
	09 Private Health Insurance	Included	Excluded
	13 Self-funded	Included	Excluded
Hospital size & location	As per the *Determination.*		
Error AR-DRGs	Episodes with an 'error' AR-DRG are not assigned an NWAU. These include AR-DRGs v7.0 960Z, 961Z, and 963Z.		

2.1.4 Classification

Australian Refined Diagnosis Related Groups (AR-DRGs) are used to classify acute admitted care. The version applying for funding in 2014-15 is AR-DRG v7.0.

2.2 Analysis of costs to derive NWAU for acute admitted care

This section provides an overview of the steps involved in developing the NWAU for acute admitted care. Detailed information in relation to each of the components of the model is included below. In summary, the steps involved in developing the NWAU for acute admitted care are:

a. Prepare data.
b. Stratify and weight cost data to activity data.
c. Calculate inlier bounds from activity data.
d. Classify episodes into relevant categories including inliers, short-stay and long-stay outliers, designated same-day AR-DRGs, paediatric status, indigenous status and remoteness area status, and those reporting radiotherapy procedures.
e. Determine cost level for ICU adjustment and deduct associated costs.
f. Derive initial parameters for AR-DRG inlier/outlier model and ensure predicted costs align with actual costs by AR-DRG.
g. Derive paediatric adjustment, specialist psychiatric age adjustment (see Section 6), indigenous adjustment, remoteness adjustment, and radiotherapy adjustment.
h. Derive private patient service adjustment and private patient accommodation adjustment.
i. Incorporate aggregate-level cost data and data trimmed in data preparation process.

These steps are described in further detail below.

2.2.1 Data preparation

For the financial year 2011-12, an activity-level cost sample of 4,305,419 acute admitted records (with both the admission and separation dates within this period), was partitioned into two groups for modelling purposes. The first group was evaluated as fit for use to develop AR–DRG cost profiles for the 2011-12 cost model; and a second group identified as not fit for this purpose.

The second group was incorporated into the cost model along with establishment-level aggregate cost data to calibrate the overall level of costs within the model (see Section 2.2.9).

Patient level cost data from four establishments, totalling 27,245 episodes, was removed from the sample, based on jurisdictional advice.

A preliminary model with length of stay and DRG as explanatory variables of patient cost was derived and applied to the remaining sample. The 565 Hospital-DRG combinations with extremely high or low cost to funding ratios were also excluded from the patient level modelling.

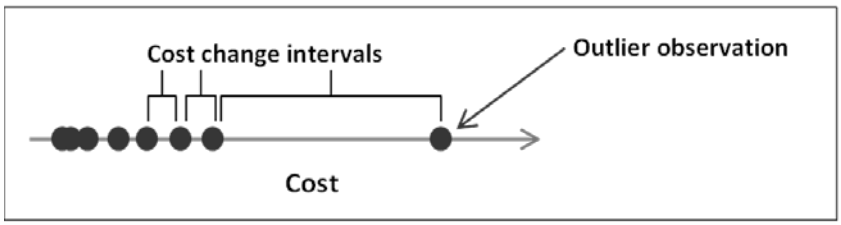
The sample of 4,270,538 records was further reduced by 11,568 by restricting the records with total in-scope costs (excluding depreciation and ED costs) greater than $23.

The remaining sample was then analysed by AR-DRG, and observations with extreme outlier costs were identified and removed. This was done by ranking observations by cost and identifying those values that recorded an extreme jump in cost over 300 per cent (or a decrease in cost of less than 25 per cent) from the previous observation, as illustrated in Figure 2. In total, 61 records were removed at this stage.

The final stage of extreme outlier identification was undertaken by first deriving a preliminary regression model using length of stay and DRG, and analysing the resulting cost ratios.

Following this, another 432 individual records with extremely high or low cost ratios were removed. The resulting sample of 4,258,477 separations was identified for use in creating AR-DRG cost profiles, and the other 46,942 separations were identified for incorporation into the cost model along with the sample of aggregate cost data.

Figure 2: Illustration of outlier identification



2.2.2 Stratification and weighting

Weighting of the entire sample of costed activity from ABF establishments up to the population of all in-scope acute admitted activity from ABF establishments occurred in two stages. The two-stage approach was required to account for the cost data sample not including any activity with an admission date prior to 1 July 2011.

The first stage of the weighting process stratified and weighted the ABF sample up to the population of all 2011-12 ABF acute admitted activity with an admission date on or after 1 July 2011. The stratification is based on establishment state/territory, size, location and paediatric specialty. Establishments are classified by size using 2013-14 acute admitted NWAU calculated on 2011-12 activity data.

Both patient-level and aggregate samples of cost data are used within the weighting process.

The second stage of the weighting process weighted the 2011-12 activity with admission date on or after 1 July 2011, up to all activity with separation dates within 2011-12. This weighting is done by length of stay quartiles within AR-DRG. Same-day activity received a weight of 1 in this process, as there are no 2011-12 same-day separations with admission dates prior to 1 July 2011.

Note that the resulting sample-to-population weights are used throughout all stages of the cost model development.

2.2.3 Inlier bounds

The L3H3 method (L1.5H1.5 for Mental Health MDCs 19 and 20) was applied to the population of in-scope activity from ABF establishments to identify inlier bounds outside of which are short-stay and long-stay outliers. The method excludes same-day episodes occurring in AR-DRGs designated for a separate same-day payment, and uses length of stay adjusted to remove ICU days for ICU-unbundled AR-DRGs. The steps are:

a. Calculate the national mean length of stay for each AR-DRG.
b. Calculate the inlier lower bound for each AR-DRG. This is based on the calculation: national mean length of stay divided by 3 (1.5 for Mental Health). The result was truncated. This means that it was rounded down to the next lowest integer (e.g. if the result was 3.6, the inlier lower bound was set to 3).
c. Calculate the inlier upper bound for each AR-DRG. This is based on the calculation: national mean length of stay multiplied by 3 (1.5 for Mental Health). The result was

rounded to the nearest integer (e.g. 10.2 would result in the upper bound being set to 10, whereas 10.7 would result in the upper bound being set to 11).

d. Episodes with an ICU-adjusted length of stay equal to or between the two inlier bounds of the AR-DRG to which they belong are considered inlier episodes.

Further to the above process, changes with respect to inlier bounds from the 2010-11 cost model were monitored to ensure they were the result of real change and were not due to statistical noise. Wherever an AR-DRG has not been significantly affected by a move to AR-DRG v7.0, or by a changed status on the Designated Same-Day Payment list or on the Bundled ICU list, 95 per cent confidence intervals around bounds are used to evaluate changes as significant or not. Changes are also evaluated in terms of their materiality (required to affect at least 1 per cent of an AR-DRG's separation and at least 10 separations).

2.2.4 Classification of patient-level cost data in relevant categories

Prior to analysing costs, episodes are assigned to categories reflecting the relevant adjustments to be made through the 2011-12 cost model. The steps involved include:

a. *Assigning one of the following categories to each episode:*
    - Same-day separation from an AR-DRG on the Designated Same-Day Payment list
    - Short stay outlier
    - Inlier
    - Long stay outlier
b. *Flagging episodes that are eligible for the paediatric adjustment.* These are episodes that:
    - Occur in establishments identified as delivering specialised paediatric services (listed in the Glossary);
    - Have an AR-DRG which is not within Major Diagnostic Category 15 (Newborns and other neonates); and
    - Have patient age at admission of 16 years or less.

c. *Flagging episodes that are eligible for the specialist psychiatric age adjustment.* These are episodes that have patient psychiatric care days and fall within the age categories specific to the adjustment (see Section 6). These episodes together with all the episodes in MDCs 19 and 20 (Mental Diseases and Disorders, and Alcohol/Drug Use and Alcohol/Drug Induced Organic Mental Disorders respectively) are considered part of the mental health model and are explained in Section 6.

d. *Flagging episodes that are eligible for the indigenous adjustment.* These are episodes with indigenous status[8] of Aboriginal and/or Torres Strait Islander origin.

e. *Flagging episodes that are eligible for the remoteness adjustment.* These are episodes where the patient's place of usual residence has been assigned to a remoteness area[9] of:

   - RA2 - Outer Regional Australia;
   - RA3 - Remote Australia; and
   - RA4 - Very Remote Australia.

   Three flags are used: one for outer regional Australia, one for remote Australia and one for very remote Australia. The remoteness area of the usual residence of a patient is determined using the following process:

   - The patient's postcode of usual residence is mapped to remoteness areas (see Supplementary Table 1).
   - If the postcode is missing or invalid, then the supplied SLA code is used (see Supplementary Table 2).
   - If the SLA code is also missing or invalid, then the remoteness area of the hospital is used. The remoteness code of the hospital is based on the remoteness area of the ABS collection district within which the hospital is located.

f. *Flagging episodes that are eligible for the radiotherapy adjustment.* These are episodes where the patient is eligible if they have recorded a radiotherapy-related procedure as defined in Appendix B of the *NEP14 Determination.*

g. *Flagging episodes eligible for ICU adjustment.* These are episodes that occur in hospitals identified by IHPA as eligible for ICU adjustment as defined in Appendix C of the *NEP14 Determination* and have an AR-DRG not on the Bundled ICU list.

h. *Flagging private episodes.* These are episodes with a funding source[10] of '02 Private health insurance' or '03 Self-funded'.

[8] See data element *Indigenous status* [METeOR identifier: 291036].

[9] Remoteness areas are defined in the *Australian Standard Geographic Standard (ASGS),* which is maintained by the Australian Bureau of Statistics (see: www.abs.gov.au). The 2011 ASGS Remoteness Area classification was used to classify patients' place of residence and locality of hospitals.

[10] See data element *Principal source of funding (Funding source for hospital patient)* [METeOR identifier: 339080], values: 01 Australian Health Care Agreements; 02 Private health insurance; 03 Self-funded; 10 Other hospital or public authority (contracted care); 11 Reciprocal health care agreements (with other countries); 12 other. See Table 3 for relevant codes in 2014-15.

2.2.5 Determine ICU adjustment level and deduct associated costs

Patient-level cost data for episodes in hospitals with an eligible ICU or PICU with ICU hours reported are analysed to estimate an average cost per ICU hour. The eligible ICUs and PICUs are those belonging to hospitals that report more than 24,000 ICU hours and have more than 20 per cent of those hours reported with the use of mechanical ventilation. The specified hospitals with eligible ICUs and/or PICUs are listed at Appendix C of the *NEP14 Determination.* A total sample of 56,835 separations with ICU hours and costs from establishments with eligible ICUs/PICUs was used.

Linear regression by state/territory was used to derive state/territory hourly ICU costs. DFFITS statistics are used to exclude overly influential observations. The weighted mean of the hourly ICU costs taken across states was used to derive a national ICU rate of $190.

For ICU-eligible episodes, an ICU adjustment is calculated using the estimated ICU cost per hour and the reported number of whole ICU hours. This amount is deducted from the in-scope costs used for modelling the same-day payment AR-DRG, short stay outlier, inlier and long stay outlier costs and associated adjustments, but added back in for the ICU adjustment. Whole ICU days are also removed from each eligible episode's length of stay.

2.2.6 DRG Inlier/Outlier Model

Initial parameters are derived for designated same-day payment AR-DRG episodes, short-stay outlier episodes, inlier episodes, and long-stay outlier episodes. The steps involved are as follows:

a. *Designate same-day AR-DRG episodes:* calculate the mean cost per episode.

b. *Inlier episodes:* calculate the mean cost per episode.

c. *Short-stay outlier episodes:* calculate the base cost as the average of total Operating Room, SPS and Prosthesis costs, then calculate the cost per diem to ensure an even growth in cost to that of the inlier episode.

d. *Long-stay outlier episodes.* The mean inlier cost is assigned to each episode as a base amount. A per diem for each outlier day is calculated using one of two methods:

- In AR-DRGs where the length of stay profile was adequately wide and regular to allow robust regression analysis to be undertaken, the per diem cost was taken as the length of stay regression coefficient; this process excluded designated same-day episodes and overly influential observations (as determined by the DFFITS statistical measure).

- In the remaining AR-DRGs, cost buckets were partitioned into 'fixed' and 'variable' (similar to the short-stay outlier process for surgical AR-DRGs), and the per diem cost was taken as the mean variable cost per patient day.

Where there are fewer than 100 separations in an AR-DRG the separations are combined with those from 2010-11, indexed appropriately, to calculate the cost parameter.

All AR-DRG parameters are then uniformly calibrated to ensure the modelled costs are equalised against actual costs.

Figure 3 illustrates the general form of the cost model within each AR-DRG. However, an AR-DRG's form may differ depending on whether it has a designated same-day separation category, a short-stay outlier category, or a long-stay outlier category.

Figure 3: Initial parameters for the assignment of cost weights

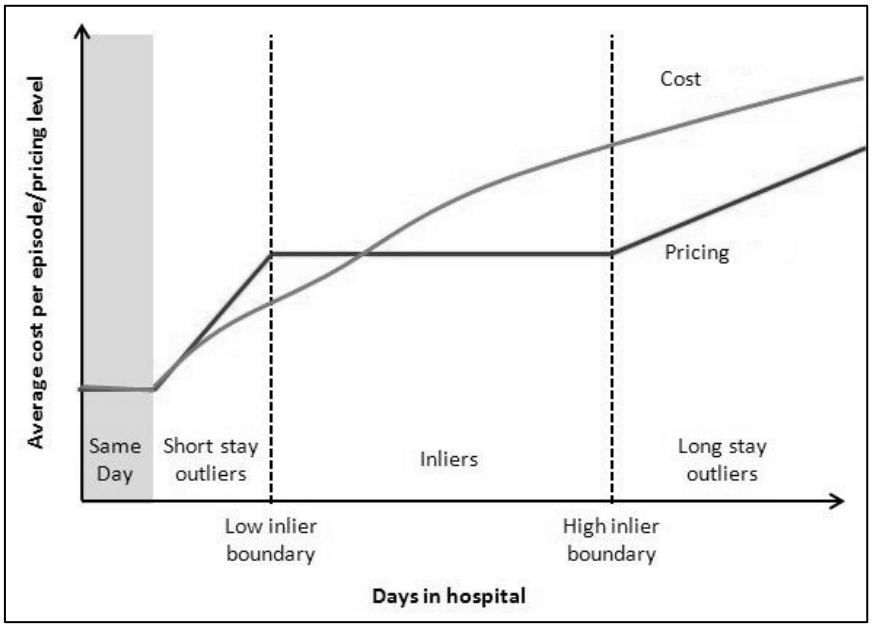
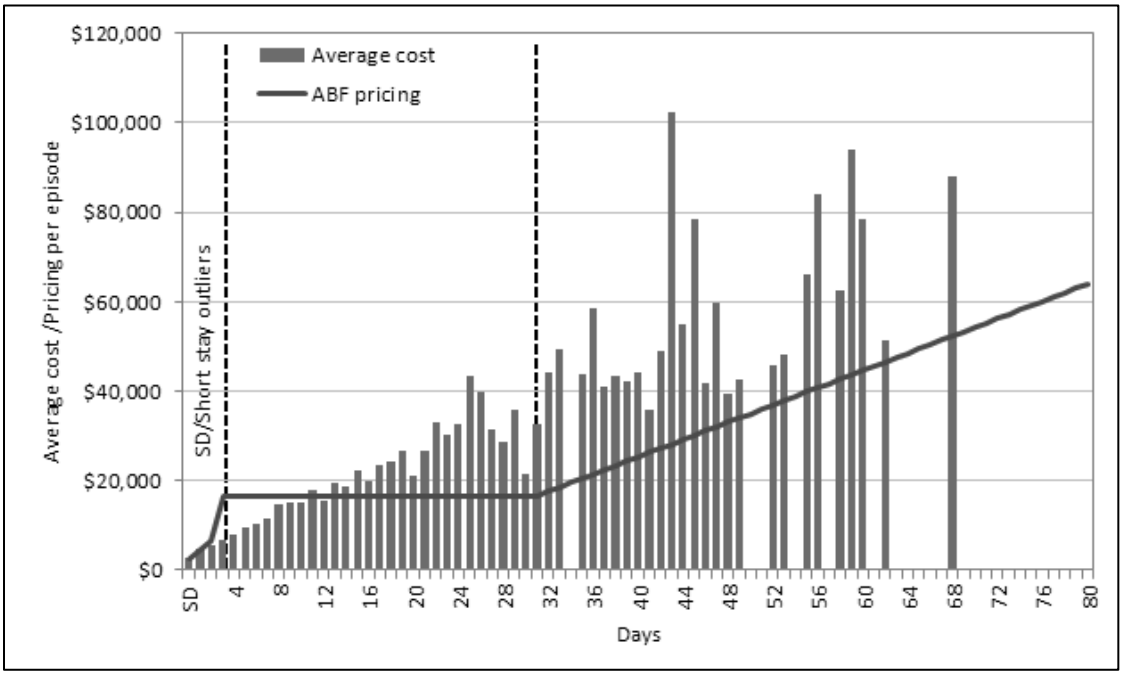


Figure 4 provides an example of the model with a particular AR-DRG, showing the reported mean cost per episode by length of stay, and plots the cost model levels arising from applying the initial parameters.

Figure 4: Example of an AR-DRG - Initial parameters for model and average cost by length of stay



2.2.7 Calculation of additional adjustments

After the AR-DRG inlier/outlier model was derived, the following four adjustments were calculated based on factors considered to have a material impact on the cost of acute services.

Paediatric adjustment

A paediatric adjustment is derived by AR-DRG using a process similar to the 2010-11 acute admitted cost model. Specialised paediatric patients are identified as being less than or equal to 16 years of age, from an establishment identified as delivering specialised paediatric services (listed in the NEC14 Glossary as Specialised Children's Hospital), and excluding AR-DRGs from Major Diagnostic Category (MDC) 15 (newborns and other neonates).

The paediatric adjustment for each AR-DRG is:

a. Rounded to the nearest whole per cent;
b. Capped and floored at 2.0 and 0.8 respectively; and
c. Set to 1 (i.e. no adjustment) if the adjustment was less than 0.05 either side of 1.

Further to this, the paediatric adjustment is compared against that of the 2010-11 cost model for AR-DRGs that have not significantly changed from version 6.x to 7.0, and changes are stabilised for AR-DRGs where either of the cost data samples (paediatric or non-paediatric) contain fewer than 500 observations. This stabilisation involves taking the average adjustment across the two years.

The cost parameters of each AR-DRG are then calibrated to ensure that the modelled costs, with paediatric adjustment applied, are equal to the actual costs of the AR-DRG.

Specialist psychiatric age adjustment

See Section 6.

Indigenous adjustment and remoteness adjustment

These adjustments are derived in the same way as in the 2009-10 and 2010-11 cost models:

a. A multivariate least squares weighted regression model is used to estimate the extent to which indigenous status and remoteness of a patient's usual residence explains the variation in the mean cost per weighted episode. Episodes are weighted to control the level to which the model already explains costs (i.e. through the AR-DRG inlier/outlier model together with the paediatric and specialist psychiatric age adjustments). The coefficients estimated from this model indicate the extent to which indigenous status and remoteness of a patient's usual residence explains residual variation in costs.
b. The analysis yields an adjustment for indigenous patients and three adjustments for patients residing in outer regional, remote and very remote areas.
c. The adjustments are additive where more than one adjustment applies, so for example, where an indigenous patient resides in a remote area, an adjustment equal to the addition of the indigenous and remoteness adjustments is applicable.

Radiotherapy adjustment

This adjustment is new for NEP14 and is derived in the similar way and at the same time as the indigenous and remoteness adjustments. The adjustment compensates for the extra costs of radiotherapy services which are recognised when the patient record reports any radiotherapy-related procedures as specified in Appendix B of the *NEP14 Determination.* Patients with these procedures are normally treated in a limited number of metropolitan and regional hospitals, hence only the hospitals that have more than or equal to 100 radiotherapy patients per year are used to estimate the adjustment.

AR-DRG cost parameters are then uniformly calibrated to ensure cost neutrality of the model (including indigenous, remoteness and radiotherapy adjustments) against actual costs.

2.2.8 Private patient adjustments

Private patient episodes in scope for ABF include those episodes occurring in a public hospital with a funding source of either '02 Private health insurance' or '03 Self-funded' in the 2011-12 data sets.

The NHRA requires that in setting the NEP, IHPA take into account costs of private patients that are met through alternative funding sources. These alternative sources include medical benefits payments by the Australian Government, private health insurance benefits payments and payments made by patients.

A revised methodology was introduced in NEP14 to make use of the Hospital Casemix Protocol (HCP) data set which is reported by private insurance companies. HCP data identifies both the charges and benefits paid for private patients receiving public hospital services. The private patient records in the HCP data were matched with the records in the APC and NHCDC data sets, providing a sample of about 70 per cent matched records. Those private patient records in the NHCDC that were not matched to the HCP data were assumed to have similar characteristics to the matched data set.

Using the HCP data, a more accurate estimate could be made of the amount of private patient costs that were not included in the NHCDC costing data and needed a correction factor applied. The correction factor of 3.3 per cent estimated in NEP13 was revised down to only 1.7 per cent for NEP14.

The HCP data provided a more accurate amount of benefits received from MBS and private insurers for medical hospital services and prostheses which could be used to calculate the private patient service adjustment.

A private patient service adjustment was then calculated at the AR-DRG level, although for some AR-DRGs with small samples, the adjustment was derived at a more aggregate level. The adjustment was calculated at the following ratio taken at the AR-DRG level:

Removed costs / Total AR-DRG model costs

It should be noted that the AR-DRG model costs referred to here, exclude the application of any other adjustments. That is, the private patient service adjustment is calculated in such a way that excludes any effect on the paediatric, specialist psychiatric, indigenous or remoteness adjustments.

The AR-DRG cost parameters were then uniformly calibrated to ensure cost neutrality of the cost model (including private patient service adjustment and previously derived adjustments) against actual costs.

In addition to medical and prostheses costs, insurers are also charged for accommodation. A private patient accommodation adjustment is applied to account for revenue received in relation to these charges. For the purpose of deriving the adjustment associated with the 2014-15 NEP, 2013-14 average default benefits for private health insurers by state/territory were indexed forward one year by 3.25 per cent to 2014-15.

2.2.9 Incorporation of aggregate-level and outlier samples of cost data

The development of the cost model to this point is based on the sample of patient-level cost data evaluated as fit for use to develop AR-DRG cost profiles. Thus, the sample of patient-level cost data identified as not fit for use at the AR-DRG level, together with the sample of aggregate-level cost data, have not been used within the cost model.

The following process is used to calibrate the cost model against the entire sample of cost data:

a. The cost model developed to this point, including all adjustments (except the private patient adjustments) is applied to the entire cost data sample. Note that for the sample of aggregate-level cost data, the cost model has to be applied to the corresponding activity from the APC activity dataset. This process results in model costs across the entire sample of cost data.
b. The AR-DRG cost parameters are then uniformly adjusted to ensure the resulting total modelled cost across the entire sample is equalised against the total actual costs of the entire sample.

It should be noted again that sample-to-population weights are used throughout all stages in the development of the cost model.

2.2.10 Price weights and NWAU

The final step in the process involves the conversion of the 2011-12 cost model parameters to cost weight values by dividing the cost parameters by a reference cost.

The reference cost used was the 2010-11 reference cost indexed one year by the growth rate in the consecutive years' cost models, where this growth rate is standardised against the 2011-12 activity data. Specifically, the standardised growth rate was derived by applying the 2010-11 and 2011-12 cost models (excluding private patient adjustments) to the 2011-12 activity data, and calculating the change in total modelled costs between the two models. This was the same methodology that had been used to calculate the 2010-11 reference cost from the 2009-10 reference cost and is explained further in **Attachment B**.

These resulting cost weights are then converted to the price weights that are used to assign NWAU, as explained at **Attachment B**.

2.3 Applying the NEP

As set out in *2014-15 NEP Determination*, the price of an ABF Activity is calculated using the following formula, with adjustments applied as applicable:

$$\begin{aligned}&\text{Price of an admitted acute ABF activity}\\&\quad=\{[\text{PW}\times \text{A}_{\text{Paed}}\times(1+\text{A}_{\text{SPA}})\times(1+\text{A}_{\text{Ind}}+\text{A}_{\text{A}}+\text{A}_{\text{RT}})+(\text{A}_{\text{ICU}}\times \text{ICU hours})]\\&\quad-[(\text{PW}+\text{A}_{\text{ICU}}\times \text{ICU hours})\times \text{A}_{\text{PPS}}+\text{LOS}\times \text{A}_{\text{Acc}}]\}\times \text{NEP}\end{aligned}$$

Where:

- PW means the Price Weight for an ABF activity as set out at Appendix B of the *NEP Determination*
- A_{Paed} means the paediatric adjustment
- A_{SPA} means the specialist psychiatric age adjustment
- A_{Ind} means the indigenous adjustment
- A_{A} means the remoteness area adjustment
- A_{RT} means the radiotherapy adjustment
- A_{ICU} means the ICU adjustment
- ICU hours means the number of hours spent by a person within a Level 3 ICU/PICU
- A_{PPS} means the private patient service adjustment
- A_{Acc} means the private patient accommodation adjustment applicable to the state/territory of hospitalisation and length of stay
- LOS means length of stay in hospital (in days)
- NEP is the National Efficient Price 2014-15

In the event that the application of the private patient adjustments return a negative NWAU(14) value for a particular patient, the NWAU(14) value is held to be zero; that is, negative NWAU(14) values are not permitted for any patients under the National Pricing Model.

Note: the definition of APPS as the Private Patient Service Adjustment is now expressed as a discount and equates to (1 - APPS) in NEP13.

2.4 Assigning NWAU to acute admitted patient data

This section describes how the NWAU resulting from the analysis of costs described in the previous sections can be applied to acute admitted patient activity data to assign NWAU to acute admitted episodes. To enable users to implement the NWAU to activity data, this section gives detailed definitions of the variables required throughout the process of assigning NWAU.

The key steps in determining NWAU for acute admitted activity are:

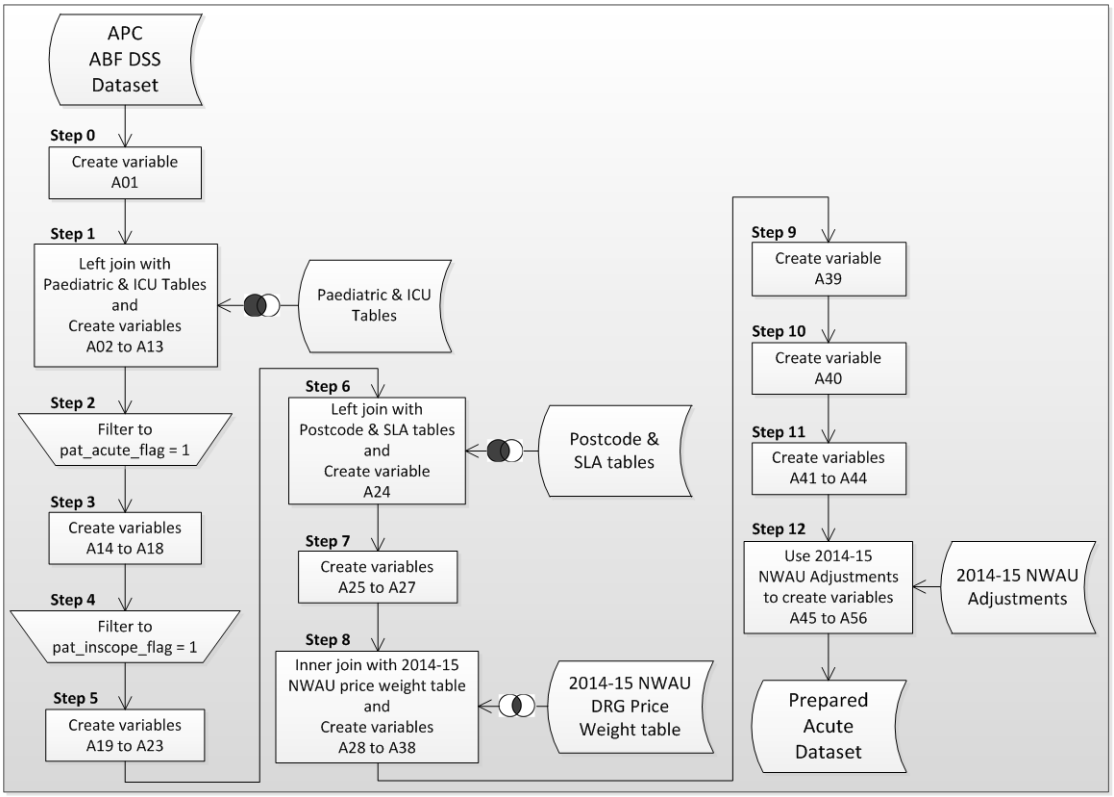
Stage 1. Preparation of acute admitted patient data and creation of variables required for NWAU calculation.

Stage 2. Calculation of NWAU using acute admitted patient data prepared in Stage 1.

2.4.1 Data Preparation

The data preparation stage is illustrated in Figure 5. The process is broken into 13 steps inclusive of step 0, each requiring variables created in previous steps. The resulting dataset is called the 'prepared acute dataset'

Figure 5: Assigning NWAU to acute admitted patient data – Stage 1 – Data Preparation



The process requires the six input datasets or tables referred to in Table 4.

The input APC dataset has 17 variables. Table 5 lists these variables, which form part of the APC ABF DSS, located on the IHPA website.

The variable definitions required to apply the Stage 1 process are given in Table 6.

Table 4: Dataset and tables required for assignment of NWAU to acute admitted patient data

Input dataset or table	Description
APC ABF DSS Dataset	Dataset based on the 2014-15 Admitted Patient Care ABF Data Set Specifications located on the IHPA website.
Postcode table	Table of postcodes mapped to the 2011 ASGS Remoteness Area classification. Each postcode is mapped to the Remoteness Area category within which the majority of the postcode's population resides. PO Box postcodes are mapped to the Remoteness Area category within which the Post Office is located.
SLA table	Table of Statistical Local Areas (SLAs) mapped to the 2011 ASGS Remoteness Area classification. Each SLA is mapped to the Remoteness Area category within which the majority of the SLA's population resides.
ICU Rate and Paediatric Adjustment eligibility table	Table listing establishments with an eligible ICU or PICU, found in the 2014-15 *NEP Determination* and Glossary.
2014-15 NWAU Price Weight table	2014-15 Acute Admitted NWAU Price Weight table, found in the 2014-15 *NEP Determination*.
2014-15 NWAU Adjustments	2014-15 Acute Admitted NWAU Adjustments, found in the 2014-15 *NEP Determination*.

Table 5: APC ABF DSS variables used to calculate 2014-15 acute admitted NWAU

APC DSS Variable
State Identifier
Establishment Identifier
Hospital geographical Indicator
Date of Birth
Date of Admission
Date of Separation
Care Type
Number of Qualified Days for Newborns
Total Psychiatric Care Days
Indigenous Status
Funding Source[11]
Diagnosis Related Group v7.0
Total Leave Days
Total Hours spent in Intensive Care Unit
Postcode of Patient's Usual Residence
Statistical Local Area of Patient's Usual Residence
Either the identifier signifying radiotherapy treatment/planning or the list of patient's ICD-10 7th Edition procedure codes.

[11] Data element *Principal source of funding (Funding source for hospital patient)* [METeOR identifier: 339080]

Table 6: Assigning NWAU to acute admitted patient data – Stage 1 – Data Preparation – variable definitions

Step	Variable	Name	Description	Definition
Step 0	A01	pat_radiotherapy_flag	Radiotherapy eligible separation. Either supplied in the input dataset or derived from the list of supplied procedure codes.	1 if patient had radiotherapy related treatment or planning procedure.
Step 1	A02	est_eligible_icu_flag	ICU rate adjustment eligible establishment, derived from ICU and paediatric eligibility table	1 if establishment is designated as eligible for ICU rate adjustment; else 0.
	A03	est_eligible_paed_flag	Paediatric adjustment eligible establishment, derived from ICU paediatric eligibility table	1 if establishment is designated as eligible for paediatric adjustment; else 0.
	A04	est_remoteness	Establishment Remoteness Area	2011 ASGS Remoteness Area category of the establishment location taken from the hospital geographical indicator variable, where: 0 = Major City; 1 = Inner Regional; 2 = Outer Regional; 3 = Remote; and 4 = Very Remote.
	A05	pat_los	Length of stay	max(1, (Date of Separation) - (Date of Admission) - (Total Leave Days)) if Care Type = 1; else Total Qualified Days if Care Type = 7.
	A06	pat_sameday_flag	Same-day flag	1 if Date of Admission = Date of Separation; else 0.
	A07	pat_acute_flag	Acute patient flag	1 if (Care Type = 1) or (Care Type = 7 and Number of Qualified Days for Newborns > 0); else 0.
	A08	pat_age_years	Age at admission (in years)	total whole years from Date of Birth to Date of Admission.
	A09	pat_icu_hours	Whole hours spent in ICU	total whole Hours Spent in Intensive Care Unit if hours are greater than or equal to 1; else 0.
	A10	pat_ind_flag	Indigenous patient flag	1 if Patient Indigenous Status = 1, 2 or 3; else 0.
	A11	pat_pcd_flag	Psychiatric care days flag	1 if Total Psychiatric Care Days > 0; else 0.
	A12	pat_private_flag	Private patient flag	1 if Funding Source = 2 or 3 for 2011-12 data; else 0.[12]
	A13	pat_public_flag	Public patient flag	1 if Funding Source = 1, 10 or 11 for 2011-12 data; else 0.[13]

[12] Or 1 if Funding Source = 9 or 13 for 2014-15 data.
[13] Or 1 if Funding Source = 1, 2, 3 or 8 for 2014-15 data.

Step	Variable	Name	Description	Definition
Step 3	A14	pat_in-scope_flag	In-scope patient flag	pat_public_flag + pat_private_flag
	A15	pat_0to16years_flag	Patient age group flag: 0 to 16 years	1 if pat_age_years ≤ 16; else 0.
	A16	pat_0to17years_flag	Patient age group flag: 0 to 17 years	1 if pat_age_years ≤ 17; else 0.
	A17	pat_65to84years_flag	Patient age group flag: 65 to 84 years	1 if pat_age_years ≥ 65 and age_years ≤ 84; else 0.
	A18	pat_85plusyears_flag	Patient age group flag: 85 plus years	1 if pat_age_years ≥ 85; else 0.
Step 5	A19	pat_eligible_paed_flag	Paediatric Adjustment eligible patient	est_eligible_paed_flag * pat_0to16years_flag.
	A20	pat_spa_0to17nonspecpaed_flag	Specialist psychiatric adjustment eligible patient age group flag: 0 to 17 years from establishment not eligible for Paediatric Adjustment	pat_pcd_flag * pat_0to17years_flag * (1 - est_eligible_paed_flag).
	A21	pat_spa_0to17specpaed_flag	Specialist psychiatric adjustment eligible patient age group flag: 0 to 17 years from establishment eligible for Paediatric Adjustment	pat_pcd_flag * pat_0to17years_flag * est_eligible_paed_flag.
	A22	pat_spa_65to84_flag	Specialist psychiatric adjustment eligible patient age group flag: 65 to 84 years	pat_pcd_flag * pat_65to84years_flag.
	A23	pat_spa_85plus_flag	Specialist psychiatric adjustment eligible patient age group flag: 85 plus years	pat_pcd_flag * pat_85plusyears_flag.
Step 6	A24	pat_remoteness	Patient Remoteness Area	ra11 value from joined postcode table if non-missing; else ra11 value from joined SLA table if non-missing; else est_remoteness.
Step 7	A25	pat_ra_oreg_flag	Outer regional patient flag	1 if pat_remoteness = 2; else 0.
	A26	pat_ra_rem_flag	Remote patient flag	1 if pat_remoteness = 3; else 0.
	A27	pat_ra_vrem_flag	Very remote patient flag	1 if pat_remoteness = 4; else 0.
Step 8	A28	drg_inlier_lb	Inlier lower bound	inlier lower bound from NWAU AR-DRG Price Weight table.
	A29	drg_inlier_ub	Inlier upper bound	inlier upper bound from NWAU AR-DRG Price Weight table.

Step	Variable	Name	Description	Definition
	A30	drg_samedaylist_flag	Same-day price list flag	1 if Same-Day Price List variable from joined NWAU AR-DRG Price Weight table equals 'Yes'; else 0.
	A31	drg_bundled_icu_flag	Bundled ICU flag	1 if Bundled ICU variable from joined NWAU AR-DRG Price Weight table equals 'Yes'; else 0.
	A32	drg_adj_paed	Paediatric adjustment	paediatric adjustment from joined NWAU AR-DRG Price Weight table.
	A33	drg_adj_privpat_serv	Private patient service adjustment	private patient service adjustment from joined NWAU AR-DRG Price Weight table.
	A34	drg_pw_sd	Same-Day Price Weight	same-day price weight from joined NWAU AR-DRG Price Weight table if not missing; else 0.
	A35	drg_pw_sso_base	Short-Stay Outlier Base Price Weight	short-stay outlier base price weight from joined NWAU AR-DRG Price Weight table if not missing; else 0.
	A36	drg_pw_sso_perdiem	Short-Stay Outlier Per Diem Price Weight	short-stay outlier per diem price weight from joined NWAU AR-DRG Price Weight table if not missing; else 0.
	A37	drg_pw_inlier	Inlier Price Weight	inlier price weight from joined NWAU AR-DRG Price Weight table.
	A38	drg_pw_lso_perdiem	Long-Stay Outlier Per Diem Price Weight	long-stay outlier per diem price weight from joined NWAU AR-DRG Price Weight table if not missing; else 0.
Step 9	A39	pat_eligible_icu_hours	Unbundled ICU hours	est_eligible_icu_flag * (1 - drg_bundled_icu_flag) * pat_icu_hours.
Step 10	A40	pat_los_icu_removed	Length of Stay with unbundled ICU hours removed	max(1, pat_los - int(pat_eligible_icu_hours ÷ 24)).
Step 11	A41	pat_sepcat_sd_flag	Same-day separation category flag	1 if drg_samedaylist_flag = 1 and pat_sameday_flag = 1; else 0.
	A42	pat_sepcat_sso_flag	Short-stay outlier separation category flag	0 if drg_samedaylist_flag = 1 and pat_sameday_flag = 1; else 1 if pat_los_icu_removed < drg_inlier_lb; else 0.
	A43	pat_sepcat_inlier_flag	Inlier separation category flag	0 if drg_samedaylist_flag = 1 and pat_sameday_flag = 1; else 1 if pat_los_icu_removed ≥ drg_inlier_lb and pat_los_icu_removed ≤ drg_inlier_ub; else 0.

Step	Variable	Name	Description	Definition
	A44	pat_sepcat_lso_flag	Long-stay outlier separation category flag	1 if pat_los_icu_removed > drg_inlier_ub; else 0.
Step 12	A45	adj_spa_0to17nonspecpaed	See definition	specialist psychiatric age adjustment: patient aged 0 to 17 years and from an establishment not eligible for paediatric adjustment.
	A46	adj_spa_0to17specpaed	See definition	specialist psychiatric age adjustment: patient aged 0 to 17 years and from an establishment eligible for paediatric adjustment.
	A47	adj_spa_65to84	See definition	specialist psychiatric age adjustment: patient aged 65 to 84 years.
	A48	adj_spa_85plus	See definition	specialist psychiatric age adjustment: patient aged 85 years or older.
	A49	adj_indigenous	See definition	indigenous adjustment.
	A50	adj_remoteness_oreg	See definition	remoteness adjustment: outer regional patient.
	A51	adj_remoteness_rem	See definition	remoteness adjustment: remote patient.
	A52	adj_remoteness_vrem	See definition	remoteness adjustment: very remote patient.
	A53	adj_radiotherapy	See definition	radiotherapy adjustment
	A54	state_adj_privpat_accomm_sd	See definition	private patient accommodation adjustment: same-day rate (state-specific adjustment).
	A55	state_adj_privpat_accomm_on	See definition	private patient accommodation adjustment: overnight per diem rate (state-specific adjustment).
	A56	adj_icu_rate	See definition	unbundled ICU rate.

2.4.2 Calculation of NWAU

The NWAU calculation stage is illustrated in Figure 6. The process is broken into seven steps, which correspond to steps 13 through 19 in the overall NWAU assignment process. The first of the seven steps require the 'prepared acute dataset' output from Stage 1, and each of the steps that follow require the variable created in the previous step.

Table 7 details the variables created in each of the steps, with the last step (Step 19) resulting in a variable containing the 2014-15 NWAU.

Figure 6: Assigning NWAU to acute admitted patient data – Stage 2 – NWAU calculation

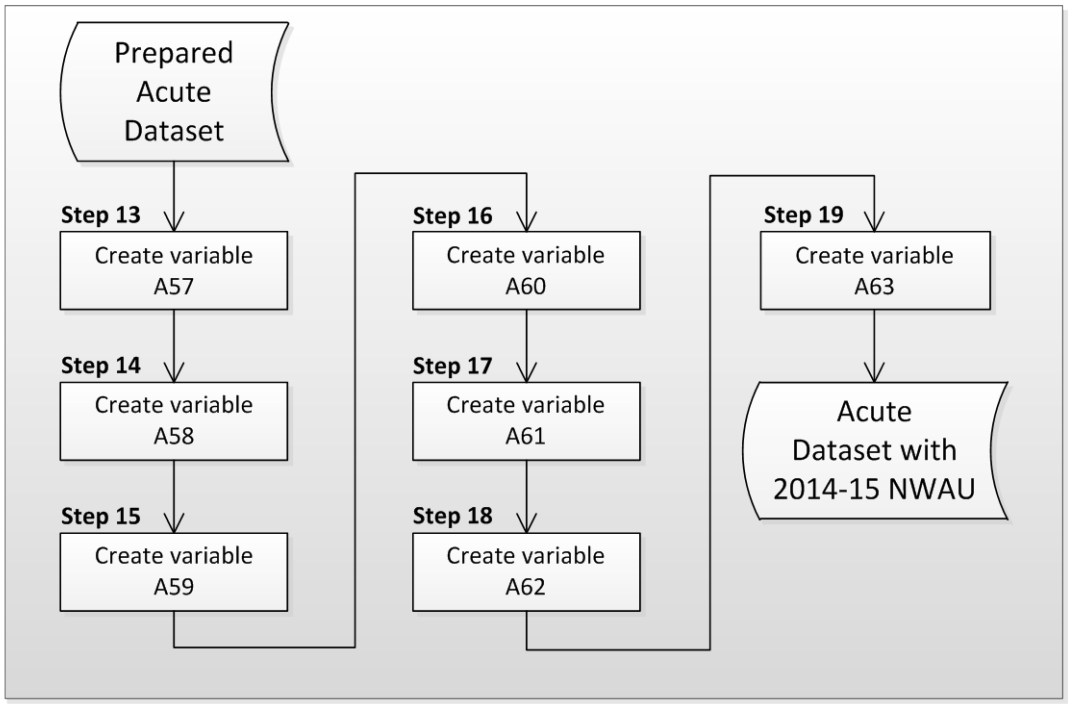


Table 7: Assigning NWAU to acute admitted patient data – Stage 2 – NWAU calculation – variable definitions

Step	Variable	Name	Description	Definition
Step 13	A57	w01	DRG by inlier/outlier weight	pat_sepcat_sd_flag * drg_pw_sd + pat_sepcat_sso_flag * (drg_pw_sso_base + drg_pw_sso_perdiem * pat_los_icu_removed) + pat_sepcat_inlier_flag * drg_pw_inlier + pat_sepcat_lso_flag * (drg_pw_inlier + (pat_los_icu_removed - drg_inlier_ub) * drg_pw_lso_perdiem).
Step 14	A58	w02	Application of the paediatric adjustment	w01 * (1 + pat_eligible_paed_flag * (drg_adj_paed - 1)).
Step15	A59	w03	Application of the specialist psychiatric age adjustment	w02 * (1 + pat_spa_0to17nonspecpaed_flag * adj_spa_0to17nonspecpaed + pat_spa_0to17specpaed_flag * adj_spa_0to17specpaed + pat_spa_65to84_flag * adj_spa_65to84 + pat_spa_85plus_flag * adj_spa_85plus).
Step 16	A60	w04	Application of the indigenous, remoteness and radiotherapy adjustments	w03 * (1 + pat_ind_flag * adj_indigenous + pat_ra_oreg_flag * adj_remoteness_oreg + pat_ra_rem_flag * adj_remoteness_rem + pat_ra_vrem_flag * adj_remoteness_vrem+ pat_radiotherapy_flag * adj_radiotherapy).
Step 17	A61	w05	Application of the ICU rate adjustment	w04 + pat_eligible_icu_hours * adj_icu_rate.
Step 18	A62	w06	Application of the private patient service adjustment	w05 - pat_private_flag * drg_adj_privpat_serv * (w01 + pat_eligible_icu_hours * adj_icu_rate).
Step 19	A63	NWAU14	Application of the private patient accommodation adjustment	max(0, w06 - pat_private_flag * (pat_sameday_flag * state_adj_privpat_accomm_sd + (1 - pat_sameday_flag) * pat_los * state_adj_privpat_accomm_on)).

3 Emergency care cost model

3.1 General issues

3.1.1 Cost unit

The cost unit for ABF for emergency care is an 'emergency department stay'[14] or presentation. It includes stays for patients who are treated and go home, and ones that are subsequently admitted to hospital or transferred to another facility for further care.

3.1.2 Scope

Emergency care is that provided to patients registered for care in an emergency department within a selected public hospital. Patients declared dead on arrival are considered in scope if the death is certified by an emergency department clinician. Patients who leave the emergency department after being triaged and advised of alternative treatment options, are also considered in scope.

All patients in the Emergency Department Care and Emergency Services ABF DSS datasets are in scope.

Patients being treated in emergency departments may subsequently become 'admitted'. All patients remain in scope for ABF for emergency care until they are recorded as having physically departed the emergency department, regardless of whether they have been admitted.

3.1.3 Classification

Two systems are used to classify emergency care for the purposes of ABF of these services from 1 July 2014: Urgency Related Groups (URGs) Version 1.4 and Urgency Disposition Groups (UDGs) Version 1.3. The former applies to level 3B to 6 emergency departments, and the latter to all others (i.e. levels 1 to 3A). The levels are defined in the *NEP Determination* (Glossary).

[14] See data set specification *Non-admitted patient emergency department care DSS 1 January 2012-30 June 2012* [METeOR identifier: 471595].

3.2 Analysis of costs to derive NWAU for emergency care

3.2.1 Data preparation

NHCDC Round 16 reported 5,343,000 presentations in 137 ABF establishments with patient-level cost data, and 187,000 presentations from 11 establishments with aggregate-level cost data. Together this represents 85 per cent of the total ED population as reported in the ABF DSS datasets: Non-Admitted Patients Emergency Department (NAPED); and NPHED (**Attachment C**).

The initial data preparation processes were similar to that used for NEP13. For NEP14 the data has been trimmed for extreme outliers using a more conservative methodology to that used for NEP13. The cleansed data was a mixture of episode level data grouped by URG or UDG, and aggregate data reported at the establishment level. The following data was not used in deriving relativities across URGs and UDGs, but was used to calibrate the overall cost level of the model. This was done in a similar way to the integration of aggregate-level cost data in the acute admitted model:

a. Aggregate data provided at the establishment level in NHCDC Round 16 such as for cost modelled sites;
b. Presentations that grouped to error URGs and UDGs due to missing or invalid data fields;
c. Presentations that were less than $5; and
d. Extreme cost outliers within each UDG class.

3.2.2 Sample weights

The NHCDC provides a sample of emergency care activity in public hospitals. To ensure the resulting calculations for the NWAU are appropriate for the full population of emergency care activity, observations from the NHCDC are weighted up to reflect the entire population of emergency care activity by state/territory.

3.2.3 Cost parameters and adjustments

Data enters the cost model at one of three levels: by URG, by UDG, or aggregated to an establishment level. URG data was used to derive an initial set of URG cost parameters. The URG and UDG data was combined to obtain cost parameters across UDGs, and the URG parameters were then calibrated against the UDG parameters. Finally, the URG and UDG datasets were combined with the aggregate data (controlled for UDG casemix) to obtain an overall cost level across the entire sample. The URG and UDG cost parameters are calibrated against this cost level.

This process ensures that the URG and UDG cost parameters are aligned and the overall model costs are equal to actual costs.

3.2.4 Price weights and NWAU

The final step of the process involves the conversion of cost parameters to cost weights. This is done by dividing the URG and UDG cost parameters by the reference cost for the acute admitted cost model. These cost weights are then converted to the price weights used to calculate NWAU.

3.3 Assigning NWAU for emergency care

NWAU are assigned to emergency care activity on the basis of a URG or a UDG. The former is applied to level 3B to six emergency departments, and the latter to Level 1 to 3A emergency services.

The steps involved in assigning NWAU to emergency department presentations are illustrated in Figure 7 below. The two stages of data preparation and NWAU calculation are combined in the following section.

3.3.1 Data Preparation and calculation of NWAU

This section details how to assign NWAU to emergency department patient data. The data preparation and NWAU calculation stages are illustrated in Figure 7. The process is broken into seven steps, each requiring variables created in previous steps, with the final step (Step 7) resulting in a variable containing the 2014-15 NWAU.

The process requires the three input datasets or tables referred to in Table 8.

Six variables are required to form the input ED dataset:

a. Establishment Identifier;
b. Indigenous status;
c. Episode end status;
d. Type of visit to Emergency Department;
e. Triage category; and
f. URG (Version 1.4) or UDG (Version 1.3).

These variables form part of the Emergency Department Care ABF DSS on the IHPA website.

Table 9 details the variables created in the process of assigning NWAU to emergency department patient data.

Figure 7: Assigning NWAU to emergency department patient data

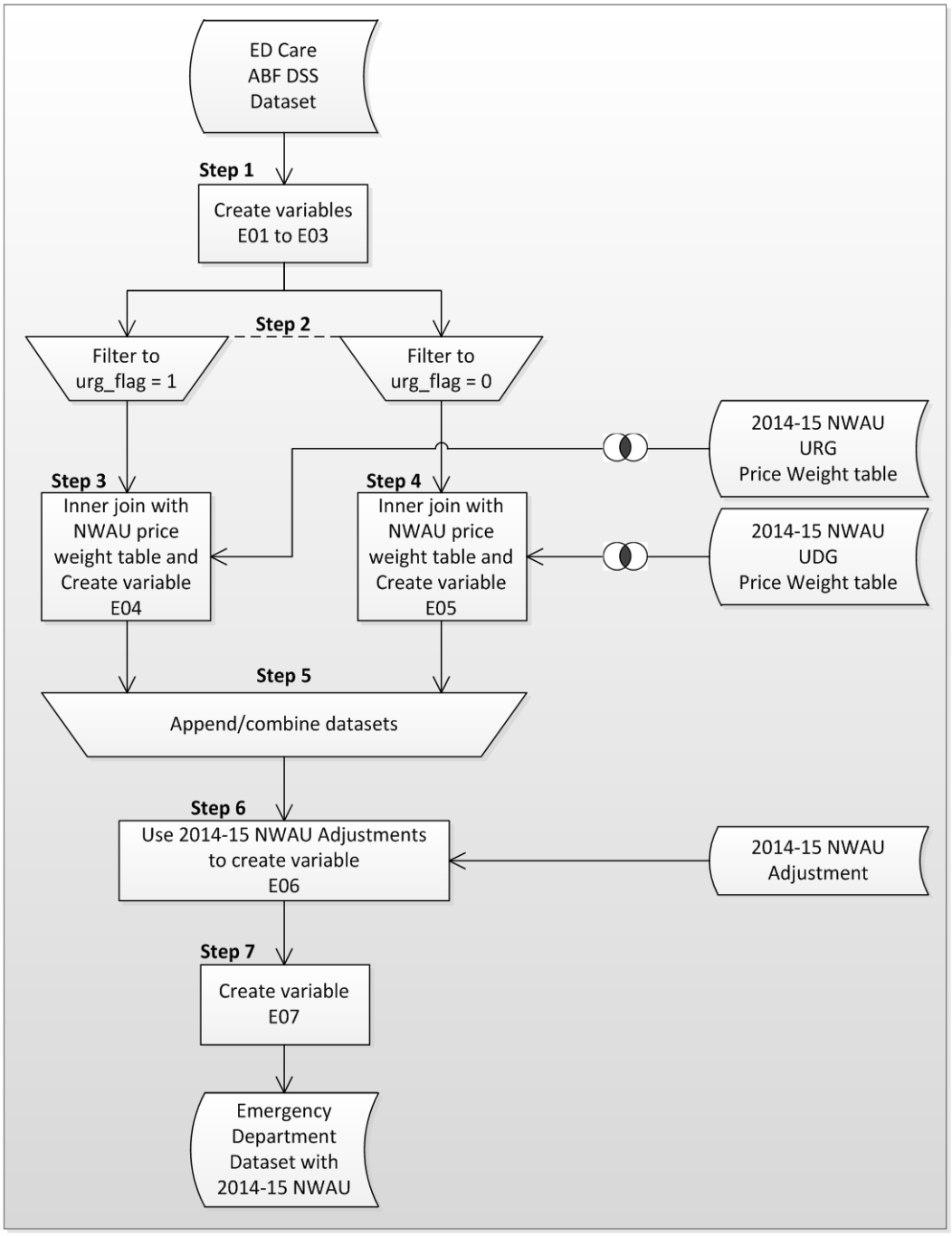


Table 8: Dataset and tables required for assignment of NWAU to emergency department patient data

Input dataset or table	Description
Emergency Department Care ABF DSS Dataset	Dataset based on the 2014-15 Emergency Department Care ABF Data Set Specifications located on the IHPA website.
2014-15 NWAU Price Weight tables	2014-15 Emergency Department NWAU URG and UDG Price Weight tables, found in the 2013-14 *NEP Determination*.
2014-15 NWAU Adjustments	2014-15 Emergency Department NWAU Adjustments, found in the 2014-15 *NEP Determination*.

Table 9: Assigning NWAU to emergency department patient data – variable definitions

Step	Variable	Name	Description	Definition
Step 1	E01	pat_ind_flag	Indigenous patient flag	1 if Patient Indigenous Status = 1, 2 or 3; else 0.
	E02	urg_flag	URG v1.4 flag	1 if urgency related group is not missing; else 0.
	E03	udg	UDG v1.3	Derived from DSS variables: type of visit to Emergency Department, triage category, and episode end status. See IHPA website for details.
Step 3	E04	w01_a	See definition	URG price weight, taken from NWAU Price Weight table.
Step 4	E05	w01_b	See definition	UDG price weight, taken from NWAU Price Weight table.
Step 6	E06	adj_indigenous	See definition	Indigenous adjustment from NWAU Adjustment table.
Step 7	E07	NWAU13	Application of indigenous adjustment	w01_a * (1 + pat_ind_flag * adj_indigenous) if urg_flag = 1; else w01_b * (1 + pat_ind_flag * adj_indigenous).

4 Non-admitted care cost model

4.1 General issues

4.1.1 Cost unit

The cost unit for non-admitted care is a Non-Admitted Patient Service Event. This is "*An interaction between one or more healthcare provider(s) with one non-admitted patient, which must contain therapeutic/clinical content and result in a dated entry in the patient's medical record*" [15].

4.1.2 Scope

The scope of non-admitted care includes service events occurring in outpatient clinics in ABF hospitals and in the community, as explained in the Pricing Framework.

4.1.3 Classification

The NHCDC Tier 2 clinics v3.0 is used to classify non-admitted care for the purposes of ABF as explained in the Pricing Framework and set out in the *NEP14 Determination*.

4.2 Analysis of costs to derive NWAU for non-admitted outpatient care

4.2.1 Data preparation

Non-admitted patient data was received for six jurisdictions, one more than for 2010-11. NHCDC Round 16 included non-admitted data for 78 ABF establishments and 106 Tier 2 Clinics. This compares to 56 ABF establishments and 103 Tier 2 Clinics in 2010-11. On advice from jurisdictions, a further four establishments and 1,994,069 virtual patient records were removed from Queensland based on poor quality data.

Last year, the methodology was substantively improved to -better reflect real cost levels. A group of Technical Advisory Committee (TAC) representatives experienced in costing for non-admitted services was convened to review the NHCDC Round 15 cost data. This resulted in a detailed set of instructions on how to trim the data by hospital or by hospital-clinic combination, where the cost data was clearly outliers. In reviewing each outpatient clinic, the TAC team identified particular establishment-clinic combinations that were clear outliers to remove them from the modelling of clinic costs. Several 10.xx clinics were linked to the same-day acute admitted costs of treatment; acute admitted activity was identified for this purpose on the basis of procedure codes relevant to the clinic procedures.

This year, conservative outlier exclusion was carried out using statistical methods at both the establishment/clinic level and at record level. Establishment/clinic combinations were excluded if they had (1) too few records, (2) very high influence on calculation of the overall clinic mean, (3) a mean considerably higher or lower than other establishments for that clinic, or (4) a cost ratio statistically different from other establishments within that clinic. Clinic specific outlier exclusion rules developed last year was also applied. Whole establishments were then excluded if their cost ratios across clinics remained consistently high. Conservative record level trimming within clinics followed, excluding records statistically different from the majority.

[15] See object class *Non-admitted patient service event* [METeOR identifier: 400604].

The main purpose of the NHCDC Round 16 data was to serve as a benchmark for calibration. Specifically, the total spend based on parameters from varying sources was calibrated to the total spend in the trimmed NHCDC. The majority of clinics were costed using data from the non-admitted costing study, as explained below.

4.2.2 Sample weights

The cost weights calculated from the non-admitted costing study were calibrated against the trimmed data sample from NHCDC Round 16. The majority of cost parameters were created using costing study data where it was sufficient, followed in order of preference by (1) logical links to other clinics, (2) NHCDC data (3) logical links to acute data, and finally (4) the average of the relevant series. Table 10 gives the number of clinics costed by each method. New clinics introduced via the Tier 2 classification v3.0 were either costed via linkage with similar clinics or block funded.

Table 10. Summary of data sources used to determine 2011-12 Non-Admitted Price Weights

Source	No of Clinics
Victorian Radiotherapy Costs	2
Costing Study	104
NHCDC Round 16	8
Acute Admitted	1
Average of series	5
Total	**120**

4.2.3 Cost parameters and adjustments

The non-admitted care model calculates the mean cost for the relevant data in each Tier 2 clinic: sourced from the costing study; the trimmed NHCDC Round 16 data; acute NHCDC data; or Victorian radiotherapy data. These clinic means are then calibrated to ensure the total predicted costs for the NHCDC Round 16 non-admitted data adds up to the total actual costs.

The new clinic 10.20 (Radiation Oncology - Simulation and Planning) was split from 10.12 (Radiation Oncology - Treatment) using relativities from specially provided Victorian radiotherapy data. The resulting cost parameters were then calibrated to national figures using the NHCDC Round 16 cost data. In this calibration, all cost weights moved together maintaining relativities between clinic cost weights. As there was no comprehensive cost dataset on non-admitted activity in 2011-12, it was not possible to do a weighting of the cost sample in the same way that was done for acute separations and ED presentations.

The non-admitted cost parameters for 2011-12 differ significantly from those of 2010-11 but there is still a relatively moderate correlation of about 50 per cent. The 2011-12 cost parameters are considered to be more representative of the actual costs and variability of costs of the Tier 2 Clinics because their measurement is based on empirical data of time and resources actually expended to provide the services.

The fit of the 2011-12 non-admitted cost model was comparable to that for 2010-11 but still low. That is, the r-squared statistic is low but comparable to last year, and reflects the considerable variation in the NHCDC non-admitted cost data. The NEP13 indigenous adjustment was applied to non-admitted episodes in the same way as for ED presentations.

4.2.4 Price weights and NWAU

The cost parameters are converted to cost weights by dividing each by the reference cost for the acute admitted cost model. These cost weights are then converted to the price weights used to assign NWAU.

4.3 Assigning NWAU for non-admitted care

NWAU are assigned to non-admitted care on the basis of the Tier 2 clinic providing the care.

The steps involved in assigning NWAU to non-admitted activity are illustrated in Figure 8 below. The data preparation and NWAU calculation stages are combined together in the following section.

4.3.1 Data preparation and calculation of NWAU

This section details how to assign NWAU to in-scope non-admitted patient data. The data preparation and NWAU calculation process is illustrated in Figure 8.

The process is broken into four steps, each requiring variables created in previous steps, with the final step resulting in a variable containing the 2014-15 NWAU.

The process requires the three input datasets or tables referred to in Table 11.

Figure 8: Assigning NWAU to non-admitted patient data

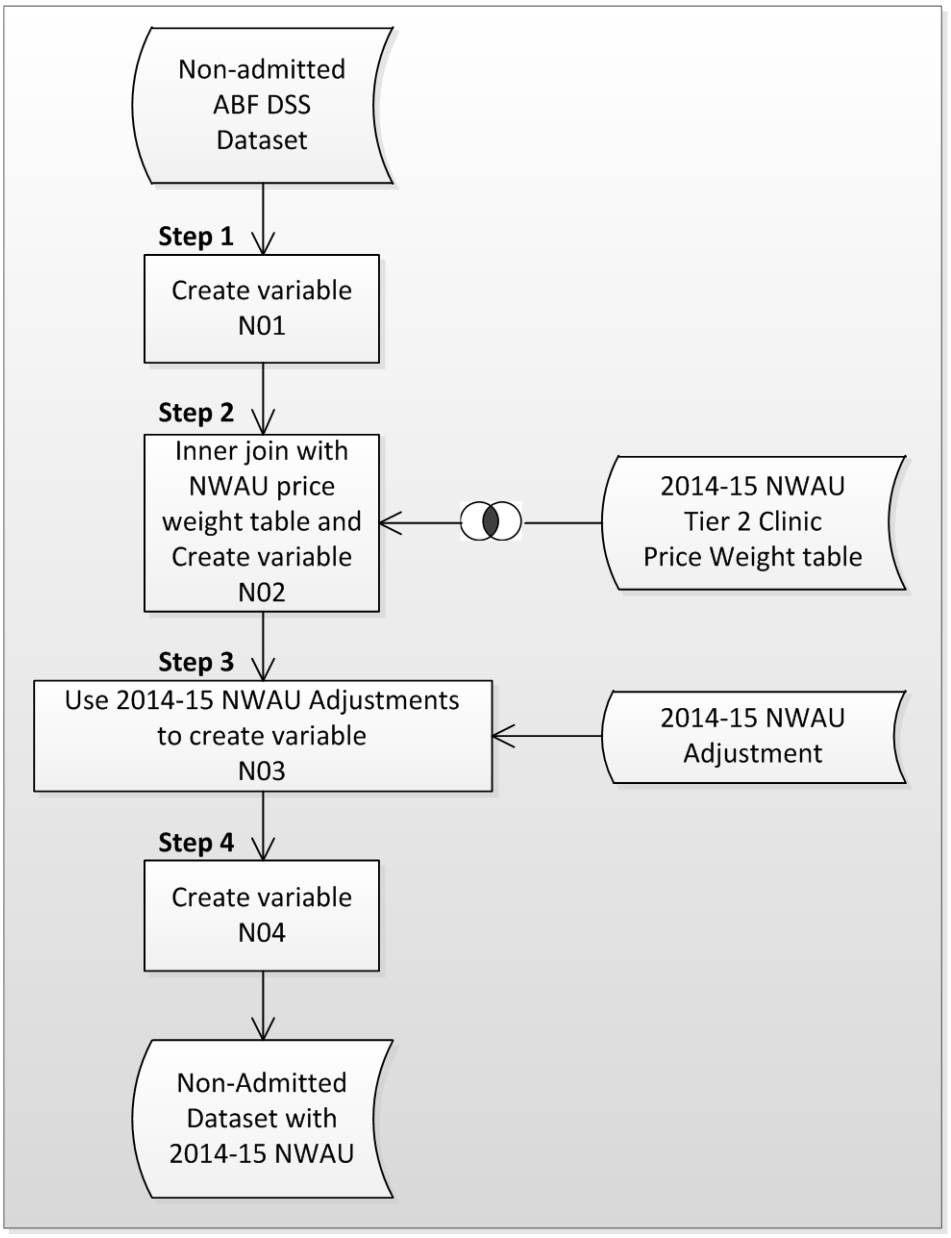


Table 11: Dataset and tables required for assignment of NWAU to non-admitted patient data

Input dataset or table	Description
Non-admitted patient ABF DSS Dataset	Dataset based on the 2014-15 Non-admitted patient ABF Data Set Specifications located on the IHPA website.
2014-15 NWAU Price Weight table	2014-15 Non-Admitted NWAU Price Weight table, found in the 2014-15 *NEP Determination*.
2014-15 NWAU Adjustment	2014-15 Non-Admitted NWAU Adjustment, found in the 2014-15 *NEP Determination*.

Four variables are required to form the input non-admitted dataset:

a. Establishment Identifier;
b. Indigenous status;
c. Outpatient clinic type Tier 2 (Version 3.0); and the
d. Funding source.

These variables form part of the Non-Admitted Patient ABF Data Set Specifications on the IHPA website.

Table 12 details the variables created in the process of assigning NWAU to non-admitted patient data.

Table 12: Assigning NWAU to non-admitted patient data – variable definitions

Step	Variable	Name	Description	Definition
Step 1	N01	pat_ind_flag	Indigenous patient flag	1 if Patient Indigenous Status = 1, 2 or 3; else 0.
Step 2	N02	w01	See definition	Tier 2 Clinic price weight, taken from NWAU Price Weight table.
Step 3	N03	adj_indigenous	See definition	Indigenous adjustment from NWAU Adjustment table.
Step 4	N04	NWAU14	Application of indigenous adjustment	w01 * (1 + pat_ind_flag * adj_indigenous).

5 Subacute and non-acute admitted care cost model

5.1 General issues

5.1.1 Cost Unit

An 'episode of admitted patient care'[16] is the cost unit for subacute and non-acute admitted patients. It is "[t]*he period of admitted patient care … characterised by only one care type*" [17], and covers the period of care from admission to discharge.

5.1.2 Scope

Subacute and non-acute admitted care is that provided to patients who undergo a facility's formal admission[18] processes, where the clinical intent or treatment goal is the provision of subacute or non-acute care.

In-scope hospitals and patients are as defined for acute admitted patients, except that the patients are admitted into a care type for subacute or non-acute care.

5.1.3 Classification

Version 3 of Australian National Sub and Non-Acute Patient Classification (AN-SNAP v3) is used to classify subacute and non-acute admitted care. Where data on AN-SNAP classification is not available, the episode is classified by care type.

5.2 Analysis of costs to derive NWAU for subacute admitted care

The following steps are taken in developing the cost parameters and weights for subacute and non-acute admitted care:

- Prepare data.
- Develop sample-to-population weights.
- Classify AN-SNAP episodes into relevant categories: inliers, short-stay and long-stay outliers.
- Apply University of Wollongong (UoW) AN-SNAP V2 cost weights and calibrate them within each care type imposing a maximum relative change of 10 per cent to AN-SNAP weights.
- Calculate care type per diem rates implied by the calibrated AN-SNAP model.
- Derive paediatric, indigenous and remoteness adjustments.
- Derive private patient service adjustments for each care type.
- Assign the calibrated AN-SNAP V2 cost parameters to the matching AN-SNAP V3 classes.

These steps are described in more detail below.

5.2.1 Data preparation

The 2011-12 subacute cost sample consists of the following groups:

a. Patient level care type or AN-SNAP classified data

[16] See object class *Episode of admitted patient care* [METeOR identifier: 268956].

[17] Ibid.

[18] See glossary item *Admission* [METeOR identifier: 327206].

- 184 establishments reported patient level cost data comprising of 140,366 episodes involving 1,910,585 patient days;

b. AN-SNAP classified data – a subset of (a)
    - 101 establishments reported AN-SNAP v2 classified data comprising of 61,501 episodes involving 1,054,653 patient days; and
c. Aggregate level cost data
    - 14 establishments reported aggregate level cost data comprising of 1,826 separations involving 57,068 patient days.

As in the acute model, HCP data was used to correct for the missing private patient costs in the NHCDC, as well as for subsequent estimates of private patient service adjustments (see Section 2.2.8).

5.2.2 Stratification and weighting

The sample of AN-SNAP classified data was weighted to account for the fact that the used sample excludes all activity with an admission date prior to 1 July 2011 (see Section 2.2.2).

5.2.3 Determining AN-SNAP Version 3 cost parameters

The AN-SNAP cost model parameters comprise:

a. An episode cost parameter for inliers and long-stay outliers, which varies according to the relevant AN-SNAP class; **plus**
b. A per diem cost parameter which varies according to whether the length of stay (LOS) is:
    - a short-stay outlier with a per diem payment which varies across AN-SNAP classes;
    - an inlier, with a per diem payment which is the same across all AN-SNAP classes; or
    - a long-stay outlier, with an inlier payment for each day up to and including the upper inlier bound, plus the outlier per diem payment which varies across AN-SNAP classes for every day above the inlier upper bound.

In a similar process to the 2010-11 subacute cost model, the AN-SNAP V2 cost weights developed by UoW and implemented by NSW Health, were calibrated with the cost data. In contrast to the NEP13 method where this was done independently for each care type, for NEP14, all subacute parameters were calibrated together. This was done as follows:

a. The (trimmed) AN-SNAP Version 2 classified data was partitioned into inliers, short-stay outliers and long-stay outliers and the UoW cost weights were applied.
b. The total UoW cost weights were divided by total length of stay for each care type to obtain overnight care type relativities implied by the UoW model.
c. NHCDC data was analysed to obtain the average ratio of same day cost to overnight cost and then multiplied by the overnight relativities in (b) to obtain same day care type relativities. The care type relativities in (b) and (c) were scaled appropriately (calibrated) so that the total model predicted cost is equal to the total in scope cost (groups (a) and (c)).
d. The UoW weights were calibrated so that the two models (AN-SNAP and care type per diem) return equal funding to the available AN-SNAP population (group (b)).

5.2.4 Calculation of additional adjustments

The following adjustments were derived within the subacute cost model:

a. *Paediatric adjustment:* All subacute patients whose age is less than or equal to 16 years of age at the time of admission are considered eligible for paediatric adjustment. Paediatric adjustments are calculated to apply to paediatric patients in all hospitals.
b. *Indigenous adjustment and remoteness adjustment*: These adjustments are calculated in the same way as for the acute model. The three components of the remoteness adjustment are harmonised and set to be equal to their counterparts in the acute admitted model. This is because they all differed from their acute counterpart only by a very small margin. The indigenous adjustment is derived from the 2010-11 subacute data.
c. *Private patient service adjustment:* This adjustment is calculated by care type in the same way as it is calculated by AR-DRG within the acute admitted cost model.
d. *Private patient accommodation adjustment:* This adjustment is identical to that of the acute admitted cost model (see Section 2.2.8).

In summary the proportion of NHCDC activity for which the adjustments apply are as follows:

a. The paediatric adjustment applied to 0.6% of subacute activity.
b. The indigenous adjustment applied to 1.5% of subacute activity.
c. The remoteness adjustment applied to 6.6% of subacute activity.
d. The private patient adjustments applied to 17.6% of subacute activity.

The cost model (including all adjustments except the private patient adjustments) was then calibrated to ensure model costs are equalised against actual costs.

5.2.5 Price weights and NWAU

The conversion of cost parameters to price weights involved the following:

a. Dividing dollar-valued cost parameters by the reference cost to obtain cost weights. The same reference cost is used across all streams of activity and is discussed in Section 2.2.10.
b. Mapping AN-SNAP v 2 cost weights to AN-SNAP v 3.
c. Capping the care type per-diem cost weights not to exceed the outlier per diem weight of the most frequent AN-SNAP class within each care type.
d. These cost weights are then converted to the price weights used to assign NWAU.

5.3 Applying the NEP

As set out in the *2014-15 NEP Determination*, the price of an ABF Activity is calculated using the following formula, with adjustments applied as applicable:

$$\text{Price of an admitted subacute ABF activity} = \{[\text{PW} \times \text{A}_{\text{Paed}} \times (1 + \text{A}_{\text{Ind}} + \text{A}_{\text{A}})] - [\text{PW} \times \text{A}_{\text{PPS}} + \text{LOS} \times \text{A}_{\text{Acc}}]\} \times \text{NEP}$$

Where:

- PW means the Price Weight for an ABF Activity as set out at Appendix B of the *NEP13 Determination*.
- A_{Paed} means the paediatric adjustment
- A_{Ind} means the Indigenous adjustment
- A_{A} means each or any remoteness area adjustment
- A_{PPS} means the private patient service adjustment
- A_{Acc} means the private patient accommodation adjustment applicable to the state/territory of hospitalisation and length of stay
- LOS means length of stay in hospital (in days)
- NEP is the 2014-15 National Efficient Price

In the event that the application of the private patient accommodation adjustment and the private patient service adjustment returns a negative NWAU value for a patient, the NWAU value is held to be zero, as negative NWAU values are not permitted for any patients under the National Pricing Model.

Note: the definition of APPS as the Private Patient Service Adjustment is now expressed as a discount and equates to (1 - APPS) in NEP13.

5.4 Assigning NWAU to subacute and non-acute admitted patient data

This section describes how the cost parameters calculated in the previous section can be applied to subacute and non-acute patient activity data to calculate NWAU for each episode. The process is broken into two stages:

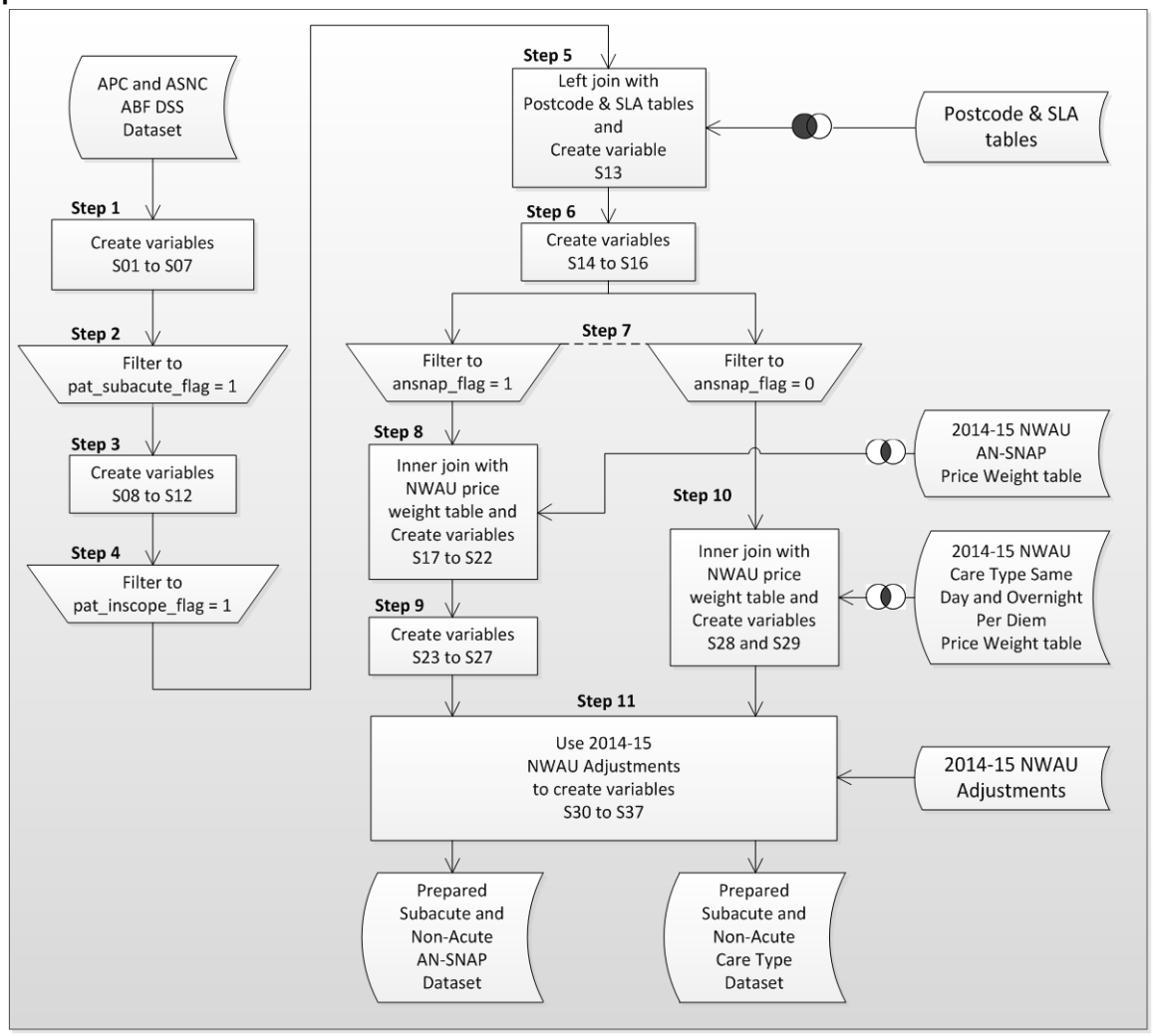
Stage 1. Preparation of subacute and non-acute admitted patient data and creation of variables required for NWAU calculation.

Stage 2. Calculation of NWAU using subacute and non-acute admitted patient data (from Stage 1).

5.4.1 Data Preparation

The data preparation stage is illustrated in Figure 9.

Figure 9: Assigning NWAU to subacute and non-acute admitted patient data – Stage 1 – Data Preparation



The process is broken into eleven steps, each requiring variables created in previous steps. There are two resulting datasets, one containing data grouped to AN-SNAP Version 3 and the other containing only Care Type information.

The process requires the five input datasets or tables referred to in Table 13.

Fifteen variables are required to form the input APC dataset. These variables form part of the APC and ASNC ABF Data Set Specifications on the IHPA website and are listed in Table 14.

The variable definitions required to apply the Stage 1 process are given in Table 15.

Table 13: Datasets and tables used for assignment of NWAU to subacute admitted patient data

Input dataset or table	Description
APC & ASNC ABF DSS Dataset	Dataset based on the 2014-15 Admitted Patient Care ABF Data Set Specifications, with extra AN-SNAP information from the Admitted Subacute and Non acute Care ABF DSS, where available. Dataset specifications are located on the IHPA website.
Postcode table	Table of postcodes mapped to the 2010 ASGS Remoteness Area classification. Each postcode is mapped to the Remoteness Area category within which the majority of the postcode's population reside. PO Box postcodes are mapped to the Remoteness Area category within which the Post Office is located.
SLA table	Table of Statistical Local Areas (SLAs) mapped to the 2010 ASGS Remoteness Area classification. Each SLA is mapped to the Remoteness Area category within which the majority of the SLA's population reside.
2014-15 NWAU Price Weight tables	2014-15 NWAU Subacute and Non-Acute Admitted AN-SNAP and Care Type Same Day and Overnight Per Diem Price Weight tables, found in the 2014-15 *NEP Determination*
2014-15 NWAU Adjustments	2014-15 NWAU Subacute and Non-Acute Admitted Adjustments, found in the 2014-15 *NEP Determination*

Table 14: APC & ASNC ABF DSS variables used to calculate 2014-15 subacute admitted NWAU

APC ABF DSS	State Identifier
	Establishment Identifier
	Hospital geographical Indicator
	Date of Birth
	Date of Admission
	Date of Separation
	Care Type
	Indigenous Status
	Funding Source
	Total Leave Days
	Postcode of Patient's Usual Residence
	Statistical Local Area of Patient's Usual Residence
ASNC ABF DSS	AN-SNAP Class (Version 3)
	Palliative phase of care start date
	Palliative phase of care end date

Table 15: Assigning NWAU to subacute and non-acute admitted patient data – Stage 1 – Data Preparation – variable definitions

Step	Variable	Name	Description	Definition
Step 1	S01	est_remoteness	Establishment Remoteness Area	2006 ASGC Remoteness Area category of the establishment location taken from the hospital geographical indicator variable, where: 0 = Major City; 1 = Inner Regional; 2 = Outer Regional; 3 = Remote; and 4 = Very Remote.
	S02	pat_age_years	Age at admission (in years)	total whole years from Date of Birth to Date of Admission.
	S03	pat_ind_flag	Indigenous patient flag	1 if Patient Indigenous Status = 1, 2 or 3; else 0.
	S04	pat_private_flag	Private patient flag	1 if Funding Source = 2 or 3; else 0.
	S05	pat_public_flag	Public patient flag	1 if Funding Source = 1, 10 or 11; else 0.
	S06	pat_subacute_flag	Subacute and non-acute patient flag	1 if Care Type = 2, 3, 4, 5, 6 or 8; else 0.
	S07	pat_phase_flag	Palliative care phase flag	1 if Care Type = 3 and (PalCare Phase Start and End Dates are not missing); else 0.
Step 3	S08	pat_in-scope_flag	In-scope patient flag	pat_public_flag + pat_private_flag
	S09	ansnap_flag	AN-SNAP grouped flag	1 if AN-SNAP Class is not missing and non-error; else 0.
	S10	pat_epi_length	Episode length	max(1, (PalCare Phase End Date) - (PalCare Phase Start Date)) if pat_phase_flag = 1; else max(1, (Date of Separation) - (Date of Admission) - (Total Leave Days)).
	S11	pat_sameday_flag	Patient same-day flag	1 if pat_phase_flag = 1 and (PalCare Phase Start Date) = (PalCare Phase End Date); else 1 if pat_phase_flag = 0 and (Date of Admission) = (Date of Separation); else 0.
	S12	pat_0to16years_flag	Patient age group flag: 0 to 16 years	1 if pat_age_years ≤ 16; else 0.
Step 5	S13	pat_remoteness	Patient Remoteness Area	ra06 value from joined postcode table if non-missing; else ra06 value from joined SLA table if non-missing; else est_remoteness.
Step 6	S14	pat_ra_oreg_flag	Outer Regional patient flag	1 if pat_remoteness = 2; else 0.
	S15	pat_ra_rem_flag	Remote patient flag	1 if pat_remoteness = 3; else 0.
	S16	pat_ra_vrem_flag	Very Remote patient flag	1 if pat_remoteness = 4; else 0.
Step 8	S17	ansnap_inlier_lb	Inlier lower bound	(inlier lower bound from NWAU AN-SNAP Price Weight table) if not missing; else 0.

Step	Variable	Name	Description	Definition
	S18	ansnap_inlier_ub	Inlier upper bound	(inlier upper bound from NWAU AN-SNAP Price Weight table) if not missing; 0
	S19	ansnap_pw_sd	Same Day Price Weight	(same day price weight from joined NWAU AN-SNAP Price Weight table) if not missing; else 0
	S20	ansnap_pw_inlier	Inlier Price Weight	(inlier price weight from joined NWAU AN-SNAP Price Weight table) if not missing; else 0.
	S21	ansnap_pw_inlier_perdiem	Inlier Per Diem Price Weight	(inlier per diem price weight from joined NWAU AN-SNAP Price Weight table) if not missing; else 0.
	S22	ansnap_pw_outlier_perdiem	Outlier Per Diem Price Weight	(outlier per diem price weight from joined NWAU AN-SNAP Price Weight table) if not missing; else 0.
Step 9	S23	pat_epicat_sd_flag	Same-day episode category flag	1 if pat_sameday_flag = 1 and ansnap_pw_sd > 0 else 0.
	S24	pat_epicat_perdiem_flag	Per diem episode category flag	1 if (ansnap_inlier_lb = 0) and (ansnap_pw_inlier = 0); else 0.
	S25	pat_epicat_sso_flag	Short-stay outlier episode category flag	1 if (ansnap_inlier_lb ≥ 1) and (pat_epi_length < ansnap_inlier_lb); else 0.
	S26	pat_epicat_inlier_flag	Inlier episode category flag	1 if ((ansnap_inlier_lb ≥ 1) and (pat_epi_length ≥ ansnap_inlier_lb) and (pat_epi_length ≤ ansnap_inlier_ub)) or ((ansnap_inlier_lb = 0) and (ansnap_pw_outlier_perdiem = 0);); else 0.
	S27	pat_epicat_lso_flag	Long-stay outlier episode category flag	1 if (ansnap_inlier_lb ≥ 1) and (pat_epi_length > ansnap_inlier_ub); else 0.
Step 10	S28	caretype_sameday	Care Type Same Day Weight	Care Type Same Dayper diem price weight from joined NWAU Care Type Price Weight table.
	S29	caretype_overnight_perdiem	Care Type Overnight Per Diem Weight	Care Type Overnight per diem price weight from joined NWAU Care Type Price Weight table
Step 11	S30	adj_paed	See definition	paediatric adjustment.
	S31	adj_indigenous	See definition	indigenous adjustment.
	S32	adj_remoteness_oreg	See definition	remoteness adjustment: outer regional patient.
	S33	adj_remoteness_rem	See definition	remoteness adjustment: remote patient.
	S34	adj_remoteness_vrem	See definition	remoteness adjustment: very remote patient.
	S35	caretype_adj_privpat_serv	See definition	private patient service adjustment (care type specific adjustment).
	S36	state_adj_privpat_accomm_sd	See definition	private patient accommodation adjustment: same-day rate (state-specific adjustment).
	S37	state_adj_privpat_accomm_on	See definition	private patient accommodation adjustment: overnight per diem rate (state-specific adjustment).

5.4.2 Calculation of NWAU

The NWAU calculation stage is illustrated in Figure 10. The process is broken into eight steps, which correspond to steps 12 through 19 in the overall NWAU assignment process. The first two steps require the two prepared subacute and non-acute datasets output from Stage 1, and each of the steps that follow require the variables created in previous steps.

Table 16 details the variables created in each of the steps, with the last step (Step 19) resulting in a variable containing the 2014-15 NWAU.

Figure 10: Assigning NWAU to subacute and non-acute admitted patient data – Stage 2 - NWAU calculation

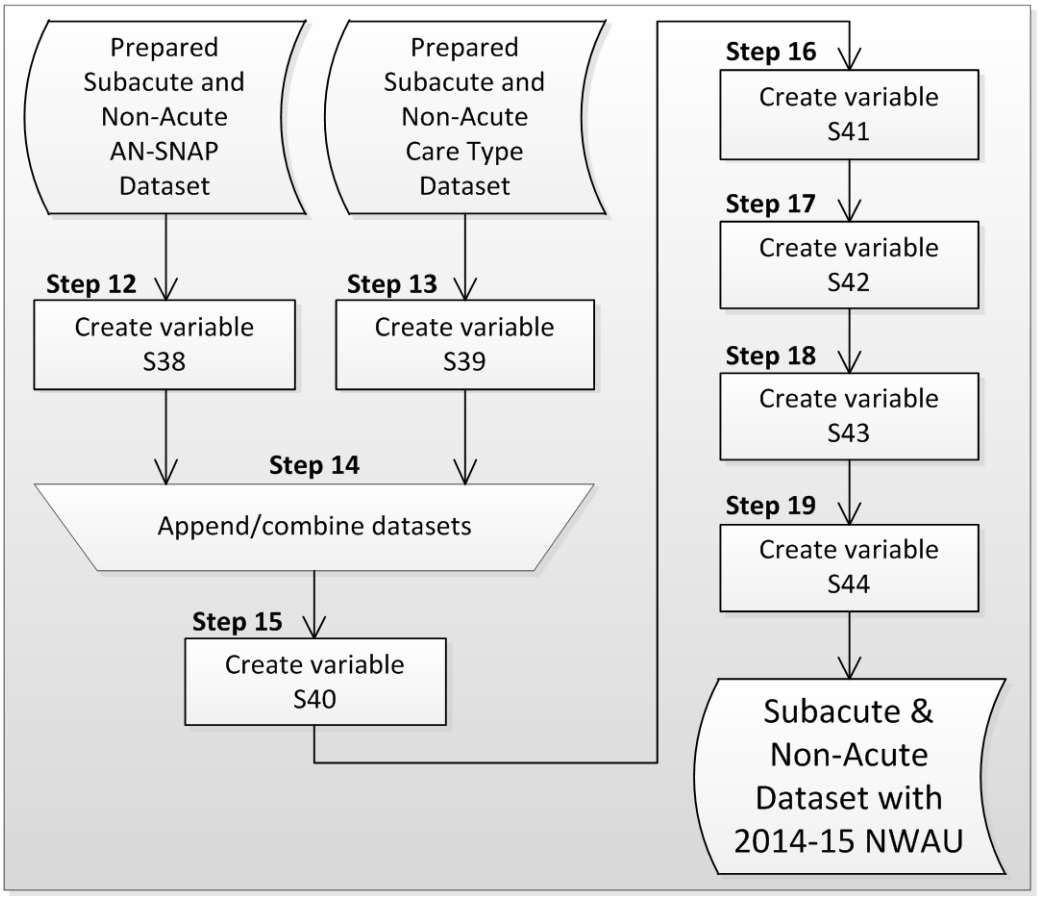


Table 16: Assigning NWAU to subacute and non-acute admitted patient data – Stage 2 – NWAU calculation – variable definitions

Step	Variable	Name	Description	Definition
Step 12	S38	w01_a	AN-SNAP inlier/outlier weight	pat_epicat_sd_flag * ansnap_pw_sd + pat_epicat_perdiem_flag * pat_epi_length * ansnap_pw_outlier_perdiem + pat_epicat_sso_flag * pat_epi_length * ansnap_pw_outlier_perdiem + pat_epicat_inlier_flag * (ansnap_pw_inlier + pat_epi_length * ansnap_pw_inlier_perdiem) + pat_epicat_lso_flag * (ansnap_pw_inlier + ansnap_inlier_ub * ansnap_pw_inlier_perdiem + (pat_epi_length - ansnap_inlier_ub) * ansnap_pw_outlier_perdiem)
Step 13	S39	w01_b	Care Type weight	pat_sameday_flag * caretype_sameday + (1-pat_sameday_flag) * caretype_overnight_perdiem * pat_epi_length
Step 15	S40	w02	AN-SNAP or Care Type weight	w01_a if ansnap_flag = 1; else w01_b.
Step 16	S41	w03	Application of paediatric adjustment	w02 * (1 + pat_0to16years_flag * (adj_paed - 1)).
Step 17	S42	w04	Application of indigenous and remoteness adjustments	w03 * (1 + pat_ind_flag * adj_indigenous + pat_ra_oreg_flag * adj_remoteness_oreg + pat_ra_rem_flag * adj_remoteness_rem + pat_ra_vrem_flag * adj_remoteness_vrem).
Step 18	S43	w05	Application of the private patient service adjustment	w04 - pat_private_flag * caretype_adj_privpat_serv * w02.
Step 19	S44	NWAU14	Application of the Private Patient Accommodation Adjustment	max(0, w05 - pat_private_flag * (pat_sameday_flag * state_adj_privpat_accomm_sd + (1 - pat_sameday_flag) * pat_epi_length * state_adj_privpat_accomm_on)).

6 Mental health care cost model

6.1 General issues

6.1.1 Cost unit

An 'episode of admitted patient care'[19] is the cost unit for mental health patients. As was done in NEP13, mental health patients are specifically defined as only those acute admitted patients that are in MDCs 19 and 20 (Mental Diseases and Disorders, and Alcohol/Drug Use and Alcohol/Drug Induced Organic Mental Disorders respectively) and those patients in ther MDCs that have recorded psychiatric care days.

As such, acute admitted mental health patients are a subset of acute admitted patients and are analysed under the Acute Cost Model.

Mental health patients receiving ED and non-admitted care services are not differentiated in the 2014-15 NEP and so receive payments as defined for the relevant ABF product category.

6.1.2 Scope

Mental health admitted care is that provided to patients who undergo a facility's formal admission[20] processes where the clinical intent or treatment goal is the provision of acute care.

In scope hospitals and patients are as defined for acute admitted, as outlined in Section 2.

6.1.3 Classification

AR-DRGs are used to classify acute admitted care including the mental health acute patients. The version applying for funding in 2014-15 is AR-DRG v7.0.

6.2 Analysis of costs to derive NWAU for mental health care

6.2.1 Data preparation

See Section 2.2.1.

6.2.2 Stratification and weighting

See Section 2.2.2.

6.2.3 Inlier bounds

The inlier bounds for AR-DRGs within MDCs 19 and 20 were set using the L1.5 H1.5 method while all other MDCs in the Acute Cost Model remained at L3H3 (see Section 2.2.3).

These narrower inlier bounds resulted in a lower proportion of inliers and a corresponding higher proportion of short-stay and long-stay outliers, as shown in Table 17.

[19] See object class *Episode of admitted patient care* [METeOR identifier: 268956].

[20] See glossary item *Admission* [METeOR identifier: 327206].

Table 17: MDCs 19 & 20 (Mental health) – activity and cost distribution

	Short-Stay Outlier	Inlier	Long-Stay Outlier
Separations	37%	49%	14%
Patient Days	14%	32%	54%
Actual Costs	18%	37%	45%

Note: *Same-day payment separation category has been combined with the short-stay outlier category.*

Table 18 shows the corresponding distribution of activity and costs across the medical AR-DRGs (which are classified under the L3H3 inlier bounds policy).

Table 18: Medical AR-DRGs excluding MDC 19 & 20 – activity and cost distribution

	Short-Stay Outlier	Inlier	Long-Stay Outlier
Separations	6%	93%	1%
Patient Days	2%	85%	12%
Actual Costs	2%	87%	10%

Note: *Same-day payment separation category has been combined with the short-stay outlier category.*

Applying the narrower inlier bounds to MDCs 19 and 20 (mental health) significantly improves the explanatory power of the AR-DRG inlier/outlier model for mental health patients to a level comparable to the model applied across all other activity.

6.2.4 Cost parameters and adjustments

The cost parameters of the AR-DRG inlier/outlier model that apply to mental health patients are calculated in the same way as those for acute patients (see Sections 2.2.3 to 2.2.6). The resulting cost parameters for mental health patients differ to the extent that MDCs 19 and 20 use L1.5H1.5 to define the inlier bounds.

The calculation and application of the adjustments are broadly similar to the acute model, with a number of important differences. Empirical evidence was analysed for a number of mental health specific adjustments, on the advice of the IHPA Mental Health Working Group.

The different adjustments for mental health patients are as follows:

a. Patients with registered psychiatric care days are identified and broken into five age groups, with the following three groups exhibiting significantly higher costs making them eligible for adjustment:
    - Less than or equal to 17 years;
    - 65 to 84 years; and
    - Greater than or equal to 85 years.
b. Patients under the age of 17 years with registered psychiatric care days are further divided into two groups, those that have received care in one of the nine specialist paediatric hospitals and those that have not.
c. Specialist psychiatric age adjustments are derived from the age categories, as set out in Table 1 of the *NEP14 Determination*.
d. Mental health patients also accrue other relevant adjustments that apply to acute admitted patients.

6.2.5 Price weights and NWAU

See Section 2.2.10.

6.3 Assigning NWAU to mental health patient data

See Sections 2.3 and 2.4.

7 Cost model for block funded hospitals

7.1 General issues

7.1.1 Cost unit

The cost unit is a hospital.

7.1.2 Scope

Hospitals are in-scope if they have been nominated by a jurisdiction, meet the criteria for block funded hospitals and provide in-scope hospital services.

The draft criteria for block funded hospitals (**Attachment D**) are currently with COAG for approval.

7.1.3 Classification

As with the 2010-11 block funded cost model for the 2013-14 NEC (NEC13), the 2011-12 cost model for the 2014-15 NEC (NEC14) assigns a size-location cell to each of the nominated block funded hospitals based on an average three year total NWAU and the Australian Statistical Geography Standard (ASGS) Remoteness Areas. Similarly, the availability volume groupings have been retained for NEC14.

The block funded hospitals are categorised into seven size groupings (A to G) and five locality groupings based on the ASGS regional areas: Major Cities to Very Remote, making 35 size-locality cells each with their own level of average expenditure.

Funding is comprised of two parts, namely:

a. Hospitals in groups A to E receive a single fixed payment, an 'availability' payment, which is the average reported/estimated cost of all hospitals in their respective size-locality cell; and
b. Hospitals in groups F and G receive a fixed price set at a percentage of the average cost of a hospital in their respective size-locality cells, and a service volume payment based on their historic activity levels. The service volume contribution is set at 10 per cent for NEC14.

The category matrix and those groups eligible for the service volume payment used in NEC14 are visualised in Table 19.

Table 19: NEC14 Block Funding Model Structure

ASGS Remoteness Classification	Availability Volume Groups (boundaries measured in 3 year average total NWAU)						
	Group A 0-199.9	Group B 200-374.9	Group C 375-674.9	Group D 675-1049.9	Group E 1050-1499.9	Group F 1500-2649.9	Group G 2650+
Major Cities							
Inner Regional							
Outer Regional							
Remote							
Very Remote							

Eligible for Service Volume Payment

7.2 Analysis of costs

7.2.1 Data preparation

The broad approach underpinning IHPA's data preparation process for NEC14, which has received broad support, basically involves:

a. extraction of activity data from APC, IHPA ABF DSS and NAPED for each block funded hospital and conversion of that data into in-scope NWAUs;
b. extraction of patient and aggregate establishment cost data from the NHCDC and aggregate establishment expenditure data from NPHED; and
c. pre-modelling the data to determine total in-scope expenditure and to calculate missing values for in-scope block funded hospitals.

The establishment data required to populate the similar 2011-12 cost model table are:

a. Latest 3-year average of total in-scope NWAU per annum (2009-10 to 2011-12); and
b. Total in-scope establishment expenditure in 2011-12

The first step is to check the eligibility of hospitals for block funding by ensuring that the latest 3-year average of acute admitted NWAU is less than 3,500 NWAU per annum for rural hospitals and less than 1800 NWAU per annum for city hospitals.

The NWAU activity measure is calculated first and then the best estimate of 2011-12 in scope expenditure is derived, as set out below. To ensure that only in-scope activity and expenditure are included and the out-of-scope expenditure is excluded, it is necessary to calculate the in scope activity per ABF product stream first and then estimate the in scope expenditure for each of those product streams (**Attachment E**).

For NEC14, with regard to hospitals missing data, the following rules apply:

- Hospitals missing expenditure data are assigned their published NEC13 value (for 2010-11) indexed up one year using the year-on-year growth between 2010-11 and 2011-12 of 3.5 per cent.
- Hospitals missing NWAU are assigned to the group its cost is closest to.

These hospitals are then treated in the same way as those hospitals with both cost and activity data for the purposes of determining its 2011-12 model average cost and 2014-15 establishment efficient cost, discussed in Section 7.3.

In-scope Activity

Acute and subacute admitted NWAU

Patient-level admitted data is available for all but a few hospitals in the IHPA ABF DSS (and the AIHW APC data sets).

The patient-level admitted data has been fed through the NEP13 NWAU calculator to calculate the in-scope NWAU and a slightly adapted version to calculate public patient equivalent NWAU of all in-scope hospital activity. This includes private patients, DVA and compensable (the latter being used only for internal modelling purposes).

For the few hospitals that do not supply patient level admitted data, the NWAU needs to be calculated from NPHED establishment level data. The only available information on admitted activity is the inpatient fraction (I-frac) which when multiplied by the total NPHED expenditure gives the estimated expenditure on admitted activity. The number of admitted NWAU is calculated by multiplying this amount by the Acute multiplier of 0.000176 NWAU per in-scope admitted dollars.

- The acute multiplier is derived by the regression slope of a plot of NWAUs (using the NEP13 NWAU calculator) versus I-frac dollar amount for all those many hospitals that have patient-level data.

ED in-scope NWAU

Patient-level ED data is available for most block funded hospitals in the IHPA ABF DSS or NAPED data sets. The patient-level ED data has been fed through the NEP13 NWAU calculator to calculate the in-scope NWAU for ED.

Where patient-level ED data is not available for a particular hospital, the establishment level count of ED presentations is extracted from the NPHED. The NWAU for a particular hospital is calculated by multiplying the count of ED presentations by the ED multiplier of 0.0933 NWAU per NPHED ED presentation.

- The ED multiplier is derived by the regression slope of a plot of NWAUs (using the NEP13NWAU calculator) versus NPHED ED presentation for all those many hospitals that have patient-level data.

Non-admitted in-scope NWAU

There is only a small amount of patient-level data but a substantial amount of clinic-level data available for block funded hospitals in the IHPA ABF DSS. About half of the block funded hospitals report aggregate service event information at the clinic level and where available, these data are used to determine NWAU values utilising the NEP13 price weights.

Where patient-level non-admitted data is not available for a particular hospital, the establishment level counts of non-admitted occasions of service are extracted from the NPHED. The NWAU for a particular hospital is calculated by multiplying the count of non-admitted occasions of service by the non-admitted multiplier of 0.028 NWAU per NPHED non-admitted occasion of service.

- The non-admitted multiplier is derived by the regression slope of a plot of NWAUs (using the NEP13 NWAU calculator) versus NPHED non-admitted occasions of service for those hospitals (about half the total) that have clinic-level data.

The non-admitted multiplier can be calculated with a high level of statistical confidence because the sample size still comprises about half the total number of block funded hospitals.

In-scope Expenditure (Attachment F)

Depreciation is excluded from both the NHCDC and NPHED reports of expenditure.

Multipurpose Services (MPS) expenditure is excluded from the NPHED total expenditure except where the jurisdictions have advised that MPS amounts were already excluded in the NPHED reported expenditure.

Acute and subacute admitted expenditure

A key principle adopted in the calculation of in-scope expenditure is to rely primarily on the NPHED reported expenditure. The expenditure against admitted activity is calculated by multiplying the I-frac by the adjusted total NPHED expenditure.

It has been estimated that the I-frac amount of expenditure is about 10 per cent on average, greater than the NHCDC cost of admitted patients where both are reported. It is thought that a large part of this difference is made up by the exclusion of the costs of work-in-progress patients in the NHCDC.

The private patient adjustments and the exclusion of DVA and compensables expenditure are calculated using the patient level data. These adjustments are only enacted to the extent that the patients can be identified.

ED and non-admitted in-scope expenditure

The ED and non-admitted in-scope expenditure is also taken primarily from the NPHED expenditure data. The non-inpatient fraction of total NPHED expenditure comprises:

a. In-scope ED expenditure;
b. In-scope non-admitted expenditure; and
c. Out-of-scope expenditure.

The challenge is to separate out the out-of-scope expenditure.

This can be done directly if the hospital has reported to the NHCDC and if there is a reasonable match between the NHCDC costs and the reported in-scope activity.

In the main, the identification of out-of-scope expenditure is done indirectly by estimating the amount of in-scope ED and non-admitted expenditure based on their level of activity. The calculation takes the presumption that the non-inpatient fraction of expenditure is likely to be in respect of only in-scope activity and tests for the fact that it may be substantially over-priced activity. It does this by employing a so-called reasonableness test as follows.

The average $/NWAU for ED and non-admitted for block funded hospitals is calculated on the basis of the in-scope expenditure and NWAU13 for those hospitals (involving 60 such block funded hospitals) that have reported in the 2011-12 NHCDC. As most of the block-funded hospitals reporting in the NHCDC are from Queensland, the catchment of hospitals was broadened to include smaller ABF hospitals with less than 10,000 separations. As a consequence, roughly 40 per cent of hospitals used to calculate the $ per NWAU for non-admitted multiplier are from Queensland.

For a particular establishment, the count of ED and non-admitted NWAU is multiplied by the respective average $/NWAU amounts to come up with a total $ amount for the hospital.

a. If $ amount based on NWAUs is less than 25% of the non-inpatient fraction of total NPHED expenditure, then only 25% of the latter amount is regarded as ED and NA expenditure.
b. If $ amount based on NWAUs is less than 50% of the non-inpatient fraction of total NPHED expenditure, then only 50% of the latter amount is regarded as ED and NA expenditure.
c. If $ amount based on NWAUs is less than 75% of the non-inpatient fraction of total NPHED expenditure, then only 75% of the latter amount is regarded as ED and NA expenditure.
d. If $ amount based on NWAUs is greater than 75% of the non-inpatient fraction of total NPHED expenditure, then it is all regarded as ED and NA expenditure.

This approach results in determining that the NPHED reported expenditure for some 57 per cent of all block funded hospitals is solely in respect of only NHRA in-scope hospital services, as shown in Table 20.

Table 20: Results of determining out-of-scope expenditure by hospital

% on in-scope services	% on out-of-scope services	Count of establishments	% of establishments
25%	75%	32	8%
50%	50%	65	15%
75%	25%	84	20%
100%	0%	239	57%

Jurisdictions were invited to review the amount of expenditure allocated to in-scope and out-of-scope hospital services and advise if more or less of the 2011-12 expenditure had been spent on in-scope hospital services as agreed with IHPA. There would have to be an approximate lining up of in-scope expenditure with the in-scope activity count, or an assurance that there were no out-of-scope hospital services involved, and that indeed the in-scope services were very expensive.

Any adaptions made on the advice of jurisdictions are expected to be reflected in the NPHED reporting in future years.

7.2.2 Calculation of cost parameters

The placement of a hospital in a group is based on the average total NWAU over the three years from 2009-10 to 2011-12; namely, the sum of the NWAU for all acute admitted, subacute, ED, and non-admitted in-scope hospital services, as calculated above.

The improved methodology for estimating the NWAU for block funded hospitals results in an increase of 20 per cent on average, in the NWAU. The availability volume grouping thresholds remain the same as for NEC13.

For NEC14, 436 hospitals have been designated as block funded, with 16 of these hospitals being treated separately as specialist mental health establishments. The 420 block funded hospitals have been grouped by size and locality in the NEC14 cost model for the specification of availability and service capacity elements to determine NEC14. The distribution of these 420 hospitals within the 35 size-locality cells is shown in Table 21.

Table 21: Distribution of block funded hospitals across size-locality cells

	Availability Volume Groups (boundaries measured in 3 year average total NWAU)						
ASGS Remoteness Classification	Group A 0-199.9	Group B 200-374.9	Group C 375-674.9	Group D 675-1049.9	Group E 1050-1499.9	Group F 1500-2649.9	Group G 2650+
Major Cities	0	0	2	0	0	5	5
Inner Regional	7	13	22	16	20	18	18
Outer Regional	25	34	40	32	17	26	12
Remote	5	12	20	7	3	6	3
Very Remote	6	5	17	9	5	6	4

7.3 Calculation of National Efficient Cost

As outlined in Section 7.2.2, the block funded model for NEC14 retains the same size-locality model structure as that used for NEC13.

However, unlike for NEC13, where outliers were excluded from the calculation of the average cost, for NEC14, the average cost is defined based on the average in-scope expenditure of *all* hospitals that satisfy the block funded criteria (Attachment D) including outliers (refer to Section 7.3.1).

Therefore, the NEC14 average model cost for the year is given as a simple average of total expenditure across all model in-scope hospitals. This is reported as the NEC per block funded hospital in the *NEC14 Determination*.

7.3.1 Inlier bounds

For NEC13, all hospitals with a cost ratio of >1.8 or <0.3 were defined as outliers and removed from the cost model. Following subsequent negotiation with jurisdictions, an efficient cost for these hospitals that equated with their current level of in-scope expenditure was agreed and a cost ratio was effectively set at 1.

For NEC14, the inlier range was limited to those hospitals whose cost ratios sat between the symmetrical boundary points 0.56 and 1.8 inclusive. The thresholds are symmetrical so that a hospital that is twice the cost of the mean gets treated in a similar way to a hospital that has a cost of half the mean.

7.3.2 Calculation of the efficient cost for a particular hospital

The efficient cost of an inlier, in-scope block funded hospital is given by the sum of its availability and service payment where:

- The availability payment is the average cell cost of the size-locality cell to which the hospital is allocated; and
- The service payment is the total in-scope 2011-12 NWAU of the hospital multiplied by the service payment per NWAU.

A small cell averaging approach is used for those cells containing fewer than three hospitals. Adjacent hospitals within the same group with total NWAU within a specified percentage of the small cell's mean are included as part of the cell to re-calculate the small cell's mean cost.

Outliers and specialist psychiatric hospitals are treated separately to inlier hospitals within the model and are addressed further in Sections 7.3.3 and 7.3.4.

Outliers

Hospitals with cost ratios that fall outside the prescribed cost ratio boundaries, 0.56 and 1.8, referred to as cost outliers, and are prescribed capped cost ratios.

Hospitals with a cost ratio greater than 1.8 are assigned an efficient cost equal to its actual cost divided by 1.8.

$$CR > 1.8 \qquad efficient\ cost = \frac{actual\ Cost}{1.8}$$

Hospitals with a cost ratio less than 0.56 are assigned an efficient cost equal to its actual cost multiplied by 1.8 (or divided by 0.56).

$$CR < 0.56 \qquad efficient\ cost = actual\ cost\ \times 1.8$$

Hospitals missing data

Hospitals missing activity and/or cost data are also accounted for in the model based on the following rules:

- Hospitals missing activity data are prescribed a group that most closely matches their reported cost, where available, and
- Hospitals missing cost data are assigned their NEC13 equivalent 2011-12 cost.

These hospitals are then treated in the same way as hospitals reporting adequate data for the purposes of determining their 2011-12 and 2014-15 efficient costs.

7.3.3 Calculation of the efficient cost of specialist psychiatric hospitals

Specialist mental health hospitals are marked as Out-of-Scope (OOS) and excluded from the model from the outset. These hospitals are assigned model costs based on advice from jurisdictions.

For the purposes of NEC14, these hospitals are priced after consultation with jurisdictions. Subject to this advice, their prices are set at their actual cost for 2011-12 or 2012-13, and are indexed at the same rate applied to the in-scope hospitals in the 2011-12 cost model for NEC14. Indexation is described in further detail in Section 7.4.

7.4 Indexation of the 2011-12 Model

Given the three year time lag in data collection from the year the NEC is being calculated, cost model results for 2011-12 must be appropriately indexed over three years to give a price model for 2014-15.

The indexation to grow the 2011-12 cost model to the 2014-15 price model used to determine NEC14 has been calculated following a broadly similar methodology as that used for NEC13 and NEP13 and NEP14.

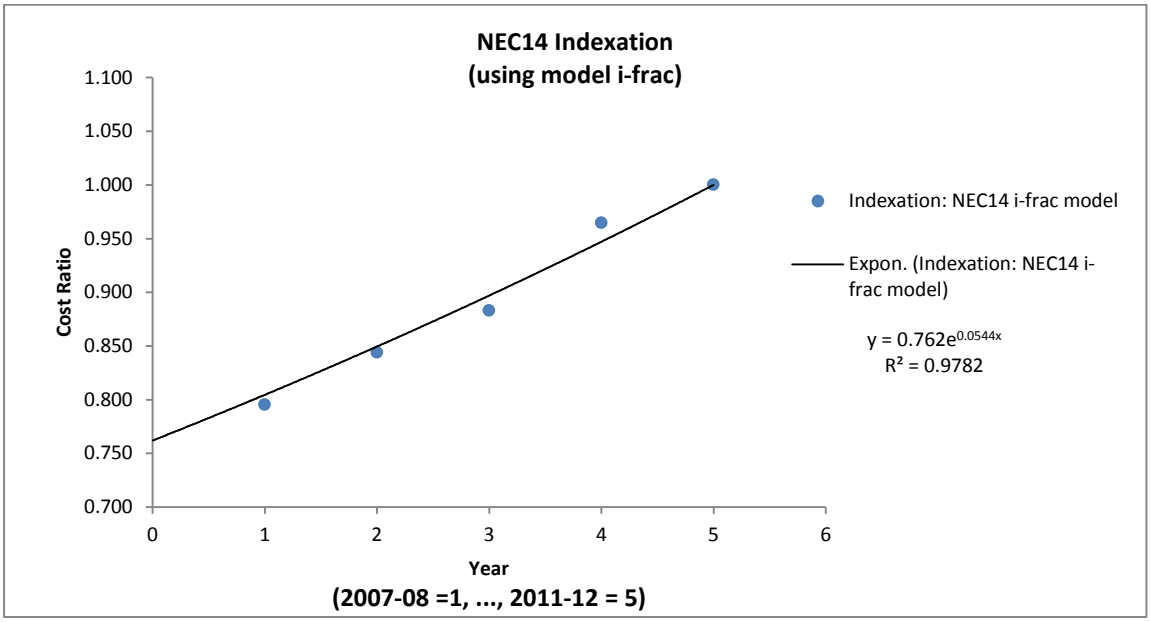
Of note, the indexation of the model is based on the growth of admitted expenditure of all block funded hospitals rather than total in-scope expenditure based on the NPHED I-frac of expenditure, which has been reasonably stable over past years. This also takes into account that almost all inpatient activity reported is in-scope (after removal of MPS-related expenditure). The I-frac of expenditure has been approximately 60 per cent of the total in-scope expenditure of block funded hospitals.

Using the I-frac of the NPHED expenditure to calculate the historical growth experienced by block funded hospitals mirrors the methodology used in determining the indexation of the NEP from the acute admitted program. Except where NEP patient-level input data is used, hospital level data is used for the purposes of the NEC.

The indexation rate is given by the slope of the exponential line of best-fit at Figure 11.

The overall 2011-12 model average spend was projected to 2014-15 using the annual indexation factor as specified in the *NEC14 Determination*.

Figure 11: NEC14 Indexation



7.5 Backcasting

IHPA's backcasting policy states that IHPA will determine backcasting multipliers for each service category (i.e. admitted, subacute etc.) and for each state/territory.

Backcasting applies when there has been a significant change in the classification or costing methodologies used to determine the NEC from the previous year. For NEC14, the need to backcast was substantiated by the number of significant changes to the methodology used in its determination.

These changes are:

a. Methodological changes in how the input data is derived (see Section 7.2.1).

b. Methodological changes in the cost model (treatment of outliers etc.) (see Section 7.3).

c. Changes in treatment of Commonwealth funded programs (pharmaceuticals and blood).

d. An improved indexation methodology (see Section 7.4).

State/territory-specific backcasting multipliers for items A and B above are derived by applying the NEC14 methodology to the NEC13.

The backcasting multiplier for item C above represents the factor that was discounted from the NEC13 to account for the relevant Commonwealth programs.

The backcasting multiplier for item D above represents the ratio of the indexation rate determined using NEC13 methodology (refer to the *NEC 2013-14 Determination*) to the indexation rate used in NEC14 (refer to the *NEC 2014-15 Determination*).

The final backcasting multiplier for each state/territory is a multiplicative application of these multipliers and is tabled in the *NEC14 Determination*.

Attachment A

Summary of 2011-12 input data

Table 1. Summary of 2010-11 and 2011-12 Patient-Costed NHCDC data (ABF hospitals)

	Establishments			Activity (Separations/Episodes)			Total Reported In-scope Cost	
	2010-11	2011-12	% Change	2010-11	2011-12	% Change	2010-11	2011-12
Acute Admitted	176	196	11.4%	4.1 M	4.3 M	6.8%	$ 17.8 B	$ 20.3 B
Emergency	118	137	16.1%	4.7 M	5.3 M	13.4%	$ 2.4 B	$ 3.1 B
Non-admitted	63	74	17.5%	4.0 M	7.4 M	84.4%	$ 2.0 B	$ 2.6 B
Subacute	157	184	17.2%	99,747	143,506	43.9%	$ 1.3 B	$ 1.9 B

Table 2. Summary of 2010-11 and 2011-12 Population data (ABF hospitals)

	Establishments			Activity (Separations/Episodes)		
	2010-11	2011-12	% Change	2010-11	2011-12	% Change
Acute Admitted	250	245	-2.0%	4.5 M	4.7 M	3.2%
Emergency	189	183	-3.2%	6.4 M	6.5 M	1.3%
Non-admitted						
Subacute	231	232	0.4%	152,223	165,880	9.0%

*Actual refers to modelled total costs

Table 3. Shows the costed (NHCDC) sample as proportion of total population

	Establishments		Activity (Separations)	
	2010-11	2011-12	2010-11	2011-12
Acute Admitted	70.4%	80.0%	89.6%	92.8%
Emergency	62.4%	74.9%	73.7%	82.5%
Non-admitted				
Subacute	68.0%	79.3%	65.5%	86.5%

Note: Only the NHCDC activity is used in the non-admitted Cost Model.

Development of the National Pricing Model

Contents

1. Purpose

The purpose of this paper is to explain the steps undertaken to transform the historical cost and activity data into the National Pricing Model, which includes the National Efficient Price (NEP), Price Weights and Adjustments.

2. Overview

The 2014-15 National Pricing Model is the second annual pricing model that IHPA has produced. Each pricing model comprises a National Efficient Price (NEP), Price Weights and Adjustments, and each is based on cost and activity data from three years prior: the 2014-15 pricing model is based on 2011-12 cost and activity data.

The cost and activity data for each of the historical years are used to derive a cost model for that year, with only those costs and activity from ABF establishments being used. The cost model is designed to ensure that the total model costs are equalised with the estimated total actual costs across the ABF establishments.

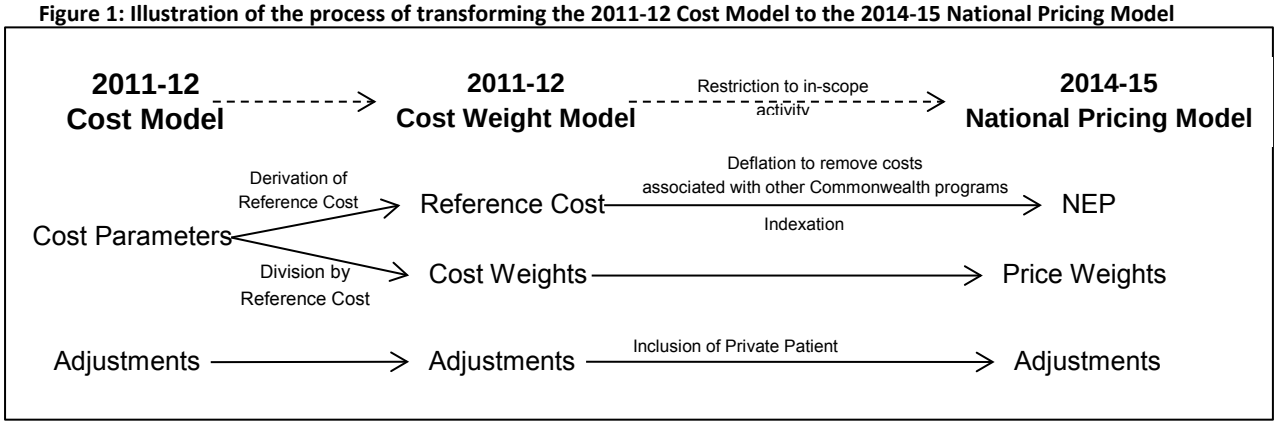
The cost model is made up of cost parameters and adjustments, including the paediatric adjustment, specialist mental health age adjustment, indigenous adjustment, remoteness area adjustment and ICU adjustment, but excluding the private patient service adjustment and private patient accommodation adjustment. The latter two adjustments are introduced in the pricing model to remove out of scope costs associated with private patients (see Section 3).

There are four steps in the transformation of each year's cost model into its associated pricing model, namely:

1. Identification and exclusion of costs and activity regarded under the National Health Reform Agreement as out of scope for the purpose of activity based funding (ABF);
2. Derivation of a reference cost used to transform the cost model into a cost weight model;
3. Derivation of an annual indexation rate used to inflate the cost model to a level reflective of the estimated cost of delivering hospital services in the year of the pricing model; and
4. Transformation of the cost model to the pricing model using the results of the previous three steps.

Figure 1 summarises this process of transforming the 2011-12 Cost Model to the 2014-15 National Pricing Model.

Figure 1: Illustration of the process of transforming the 2011-12 Cost Model to the 2014-15 National Pricing Model



3. Identification of out of scope costs

The first step in the process of transforming cost model to pricing model involves the identification of out of scope costs, such as those associated with programs covered entirely or in part by other Commonwealth funding. These out of scope costs can be separated into three groups:

1. Costs associated with out of scope activity, including activity delivered to out of scope patient types such as DVA, Defence and Compensable, and activity not regarded as from an in-scope service type, such as that delivered through out of scope non-admitted Tier 2 Clinics.
2. Those proportions of costs associated with private patients that are offset by non-government and Commonwealth revenue.
3. Costs associated with other Commonwealth programs that are inherent within the cost data but not identifiable at a patient level, such as the Highly Specialised Drugs program and Pharmacy Reform Agreements.

Exclusion of these costs from the cost model is undertaken as follows:

1. Group 1 costs are excluded by simply restricting the cost model to in-scope activity.
2. Group 2 costs are excluded through the implementation of the private patient service adjustment and private patient accommodation adjustment within the pricing model.
3. Group 3 costs are excluded by first calculating the costs as a percentage of estimated total costs, and then deflating the cost model by this percentage.

4. Derivation of a reference cost

The second step in the transformation of cost model to pricing model is the derivation of a reference cost that is used to convert the cost model into a cost weight model. Put simply, the parameters of the cost model are divided by this reference cost, converting the parameters to cost weights.

A separate reference cost is derived for each year's cost model based on the modelled costs of acute admitted activity in-scope for ABF. In particular, this activity excludes the Group 1 out of scope costs discussed in Section 3.

The 2009-10 reference cost associated with IHPA's first National Pricing Model is defined as the mean model cost taken across all 2009-10 acute admitted activity in-scope for ABF. This mean model cost is $4,260.

From 2010-11 onward, reference cost is defined so that change in the reference cost over time reflects change in unit costs, excluding any influence of underlying changes in activity profiles between years (i.e. case-mix change). So, the 2010-11 reference cost is defined so that the change from the 2009-10 reference cost represents change in unit costs between the 2009-10 and 2010-11 cost models, excluding the effect of any changes in case-mix between 2009-10 and 2010-11. Similarly, the 2011-12 reference cost represents the change in unit cost between the 2010-11 and 2011-12 cost models, excluding the effect of any changes in case-mix between 2010-11 and 2011-12.

To exclude the external effects of case-mix change between years, the two cost models are compared by first applying them to a common set of activity, namely 2011-12 acute admitted activity in-scope for ABF. Once applied to this activity, the resulting pair of mean model costs is calculated, and the change between the two cost models is defined as the change in these two mean values. This is referred to as the standardised change in cost models, with the associated growth referred to as the standardised growth rate. In other words, the growth between the 2010-11 and 2011-12 cost models is standardised against 2011-12 activity.

Table 1 shows the mean model costs of each model based on their application to the 2011-12 ABF activity along with the resulting standardised growth rate.

Table 1: Mean model costs when each cost model is applied to 2011-12 in-scope acute admitted activity data, and resulting standardised growth rate

2010-11 cost model	2011-12 cost model	Standardised growth rate
$4,440	$4,556	2.6%

Finally, the 2011-12 reference cost is defined as the 2010-11 reference cost indexed by the standardised growth rate; that is, the 2011-12 reference cost:

= (2010-11 reference cost) × (standardised growth rate)

= $4,350 × 102.6%

= $4,464

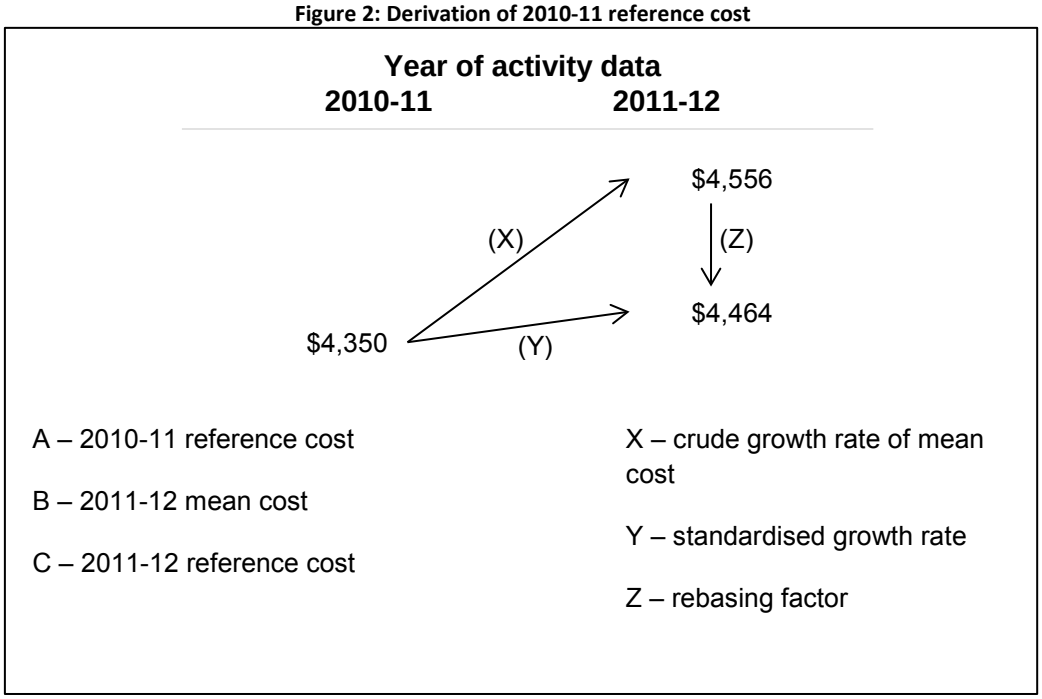
Both 2010-11 and 2011-12 reference costs are given in Table 2.

Table 2: Reference costs for 2009-10 and 2010-11 cost models

2010-11	2011-12
$4,350	$4,464

The conversion of the 2011-12 unadjusted mean model cost given in Table 1 to the 2011-12 reference cost given in Table 2 (i.e. $4,556→$4,464) is often referred to as 'rebasing'. Figure 2 illustrates this rebasing process in the context of the derivation of the 2011-12 reference cost.

Figure 2: Derivation of 2010-11 reference cost



There are two intended consequences of the selection of the reference costs:

1. The change in reference costs represents change in unit costs excluding the effect of any changes in case-mix; and
2. The 2010-11 and 2011-12 cost weight models give the same total weighted volume when applied to the 2011-12 activity data on which the standardised growth rate is derived.

5. Indexation

The final step in the transformation of the cost model to pricing model is the indexation of costs to estimate those in the year of the pricing model. Describing the methodology in the context of the 2014-15 pricing model, the objective is to derive an annual indexation rate that is used to inflate the 2011-12 cost model over three years to a level reflective of estimated 2014-15 costs.

To derive this rate, the 2011-12 cost model is applied retrospectively to the five years of patient costed acute admitted activity data[21] up to 2011-12, and comparisons are made

[21] That is, activity from patient costed sites within the National Hospital Cost Data Collection (NHCDC).

between actual and model costs to determine the scaling of the 2011-12 cost model required to equalise each year's model costs and actual costs. The trend of these scaling factors from 2007-08 to 2011-12 is then projected to model the indexation rate for the following three years.

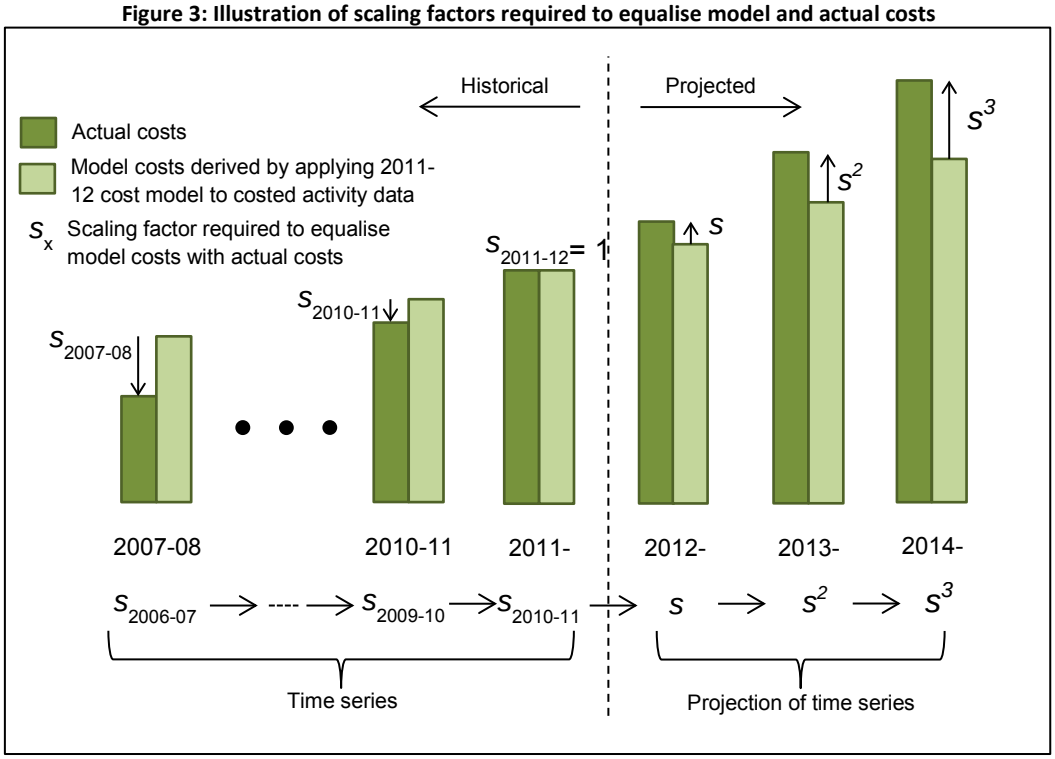
Figure 3 illustrates the 2011-12 cost model applied to patient costed acute admitted activity data and shows the scaling factors required to ensure the model costs are equalised with actual costs. Since the 2011-12 cost model itself is equalised against 2011-12 actual costs, the scaling factor for 2011-12 is equal to 1 (i.e. no scaling required). Going back through the prior four years of cost data, scaling factors of less than 1 are required to deflate the modelled costs down to the level of the actual costs. This time series of scaling factors

$$s_{2007\text{-}08} \rightarrow \ldots \rightarrow s_{2011\text{-}12}$$

is then used to model an annual scaling factor, denoted *s*, which would inflate the 2011-12 cost model up to 2014-15 projected actual costs. The indexation rate is then based on this annual scaling factor.

Figure 3 also illustrates the projected annual scaling factor *s* together with projected actual and model costs. The 2014-15 projected scaling factor of s^3 is pictured alongside projected actual and model costs to illustrate that the 2011-12 cost model would require scaling by s^3 to ensure that the resulting 's^3-scaled 2011-12 cost model', when applied to 2014-15 patient costed activity, would estimate the actual costs of the activity.

Figure 3: Illustration of scaling factors required to equalise model and actual costs



Denoting the historical total actual costs of the activity by

$$C_{2007\text{-}08}, \ldots, C_{2011\text{-}12}$$

and denoting the total model costs associated with the 2011-12 cost model applied to each year's costed activity by

$$M_{2007\text{-}08}, \ldots, M_{2011\text{-}12},$$

each year's scaling factor r_x is given by

$$s_x = C_x / M_x .$$

This ratio is referred to as the cost ratio.

It is worth noting that multiplying each year's cost ratio by the 2011-12 reference cost of \$4,464 converts the $\{s_x\}$ time series to the time series of costs per weighted separation, where the weighted separations are determined by 2011-12 cost weight model.

A crucial requirement of the cost ratio time series is comparability over time. One way to ensure this occurs is to restrict the data on which the ratios are calculated to the set of establishments for which data is present across all five years; that is, to ensure that all five ratios are calculated across a common set of establishments. While this approach ensures comparability over time, it places significant restrictions on the sample of data.

Instead, an alternate method is used that greatly increases the data sample while maintaining comparability of the ratios over time. This method relies on the fact that any time series of ratios can be equivalently represented as the time series of year to year changes in ratios together with a single value of the time series (in this case, the 2011-12 cost ratio of 1.000). This method only requires that each year to year comparison uses a common set of establishments (rather than requiring the establishments to be common across all five years).

Table 3 shows the year to year changes in cost ratio calculated by applying the 2011-12 cost model to pairs of consecutive years' cost data, ensuring a common set of establishments are present in each pairwise comparison.

Table 3: Year to year changes in cost ratio

2007-08 to 2008-09	2008-09 to 2009-10	2009-10 to 2010-11	2010-11 to 2011-12
105.6%	107.2%	102.0%	102.8%

Table 4 shows the resulting cost ratio time series derived by backcasting the 2011-12 cost ratio of 1.000 using the inverse of the year to year changes given in Table 3. Table 4 also shows the equivalent cost per weighted separation time series, and Figure 4 illustrates the two time series graphically.

Table 4: Cost ratios and costs per weighted separation time series derived by applying the 2010-11 cost model and cost weight model to historical patient costed activity data

	2007-08	2008-09	2009-10	2010-11	2011-12
Cost ratio	0.842	0.890	0.954	0.973	1.000

	2007-08	2008-09	2009-10	2010-11	2011-12
Cost per weighted separation	$3,759	$3,973	$4,259	$4,343	$4,464

The next step in the process of deriving an annual indexation rate is to model a line of best fit against the time series of cost ratios (or equivalently, against the time series of costs per weighted separation). This line of best fit is used to estimate the projected annual inflation factor *s* shown in Figure 3.

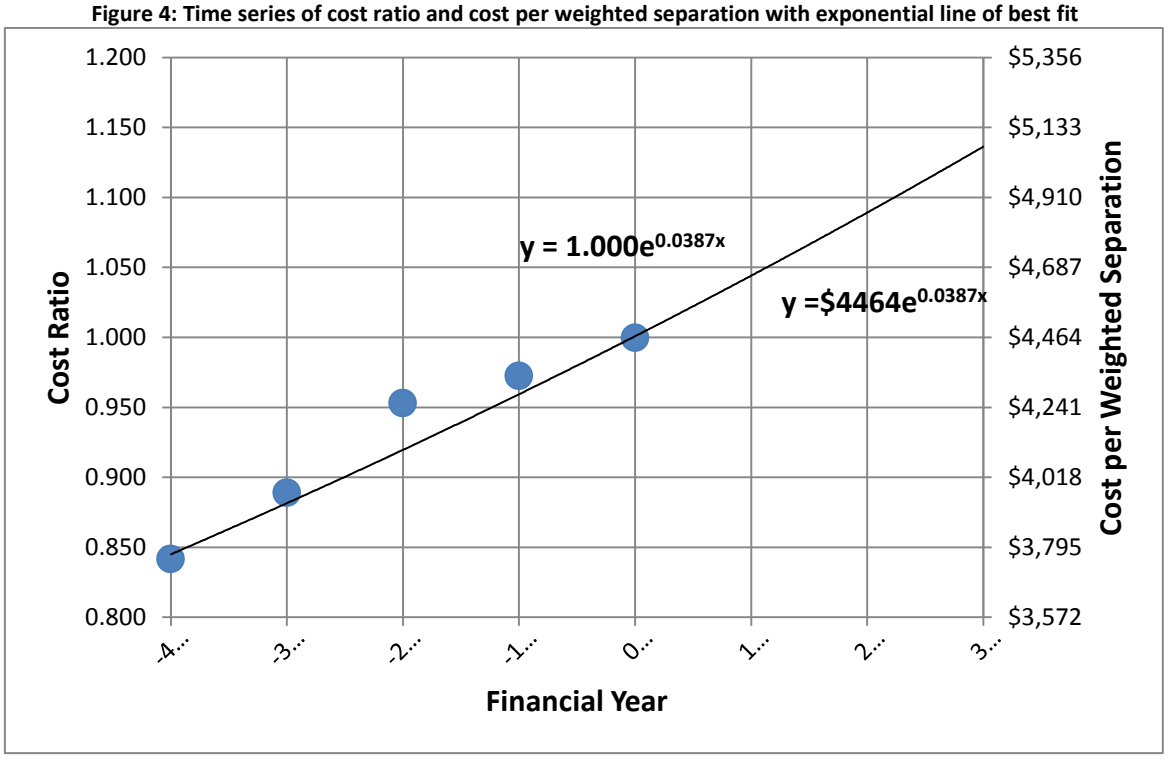
Given that the inflation factor *s* being modelled is an annual growth rate (i.e. $s \approx s_{x+1} / s_x$) as opposed to an arithmetic change each year (i.e. $s_{x+1} - s_x$), the line of best fit is taken to have an exponential form. In other words, an exponential form is chosen because exponential functions Ae^{Bx} have the characteristic that their annual growth rate is constant:

$$Ae^{B(x+1)} / Ae^{Bx} = e^{B} = \text{constant.}$$

The exponential line of best fit is also modelled so that it passes through the 2011-12 observation to ensure that the resulting annual scaling factor applies to the 2011-12 cost ratio of 1 (or equivalently, to the 2011-12 reference cost of $4,464).

The time series and associated exponential line of best fit are shown in Figure 4. The two equations displayed in Figure 4 represent the exponential line expressed in terms of the cost ratio time series and the cost per weighted separation time series.

Figure 4: Time series of cost ratio and cost per weighted separation with exponential line of best fit



Note that although the two equations in Figure 4 have different coefficients multiplying the exponential function (i.e. 1.000 and $4464), both have precisely the same coefficient inside

the exponential function (i.e. 0.0387). The two different coefficients multiplying the exponential function represent the estimated cost ratio and cost per weighted separation in 'year zero' (i.e. x = 0), which is 2011-12. That is, the regression modelled cost ratio for 2011-12 is 1.000 and the modelled cost per weighted separation for 2011-12 is $4,464.

The regression modelled estimates of cost ratio and cost per weighted separation for each of the years from 2007-08 to 2011-12 are given by substituting x = -4,…,0 into the equations. For example, substituting x = 0 into the equations results in the 2011-12 cost ratio and cost per weighted separation:

$$\begin{aligned} 2011-12 &= (2010-11 \text{ reference cost}) \times (\text{standardised growth rate}) \\ &= \$4350 \times 102.6\% \\ &= \$4464 \end{aligned}$$

And

$$\begin{aligned} 2011-12 \text{ Cost per Weighted Separation} &= \$4464 \times \mathrm{e}^{(0.0387 \times 0)} \\ &= \$4464 \times e^{0} \\ &= \$4464 \end{aligned}$$

Finally, the annual scaling factor (i.e. *s* in Figure 3) is then defined as the annual rate of change associated with the exponential line of best fit, and the indexation rate is the growth rate of this annual scaling factor. The annual rate of change of the exponential line is $s = \mathrm{e}^{0.0387}$, which is equal to 1.039, or 103.9 per cent. Therefore the indexation rate is 3.9 per cent.

6. Transformation of cost model to pricing model

The final step in the process of developing the pricing models uses the three steps detailed in Sections 3, 4 and 5 to transform each cost model to the corresponding pricing model.

Each year's pricing model is designed to reflect estimated total in-scope costs associated ABF activity in the year of the pricing model. The pricing model is therefore given by the inflated cost model defined in Section 5 with those out of scope costs defined in Section 3 removed. However, the pricing model is represented by the NEP together with Price Weights and Adjustments. This splitting of prices into an NEP component and a Price Weight component is where the reference cost defined in Section 4 plays its role.

To describe the process in the context of the 2014-15 National Pricing Model, first the 2011-12 cost model is transformed into a cost weight model by dividing it through by the 2011-12 reference cost of $4,464 (see Section 4). The 2010-11 cost model is then represented by a reference cost, cost weights and adjustments.

The inflation of the 2011-12 cost model to estimated 2014-15 costs is then undertaken by inflating the 2011-12 reference cost by the annual indexation rate defined in Section 5 and keeping the cost weights and adjustments fixed. The indexed 2011-12 reference cost is $5,007.

The indexed 2011-12 reference cost together with the 2011-12 cost weights and adjustments then represent the estimated 2014-15 cost model. Example 1 demonstrates how this process of indexing the reference cost and keeping the cost weights fixed has the same effect as indexing the entire cost model, as is done in Section 5.

Example 1: Two equivalent methods to derive estimated 2013-14 costs - DRG E42C - Bronchoscopy, Same day

The 2011-12 cost parameter associated with E42C is $1,789. Applying the annual indexation rate of 3.9% to the 2011-12 cost, the estimated cost of E42C in 2014-15 is given by

2014-15 estimated cost of E42C = (2011-12 estimated cost) × (indexation)

= $1,789 × $(103.9\%)^3$

= $2,006.

On the other hand, the cost weight associated with E42C is 0.4007 (= $1,789 / $4,464). Applying the annual indexation rate to the 2011-12 reference cost, the resulting estimated cost of E42C in 2014-15 is given by

2014-15 estimated cost of E42C = (2011-12 cost weight) × (indexed reference cost)

= 0.4007 × ($4,464 × $(103.9\%)^3$)

= 0.4007 × $5,007

= $2,006.

The final step in transforming the 2011-12 cost model to the 2014-15 National Pricing Model is the removal of the out of scope costs. As detailed in Section 3, there are three ways in which these costs are removed: restriction of the pricing model to in-scope activity and application of the private patient service and accommodation adjustments.

The exclusion of the first group of out of scope costs, which involves the restriction of the pricing model to in-scope activity, places conditions on how the pricing model is applied and does not play a direct role in the transformation of the cost model to pricing model.

The exclusion of the second group of out of scope costs, which involves the application of the private patient service and accommodation adjustments, transforms the cost model to a pricing model by extending the set of adjustments that apply in the cost model to include these two adjustments.

Attachment C

Emergency Department Activity and Cost Data

Table 1: 2011-12 activity and cost data for ABF establishments

	Population 2011-12 Source: ABF DSS, NAPED, PHE		Sample 2011-12 cost data Source: NHCDC patient costed			Sample 2011-12 cost data Source: NHCDC aggregate-level data		
State	Activity (million)	Estabs	Activity (million)	Estabs	In-scope costs ($million)	Activity	Estabs	In-scope costs ($million)
NSW	2.036	60	2.010	59	$1,194.0	-	-	-
VIC	1.524	46	1.182	26	$599.6	-	-	-
QLD	1.350	33	1.205	31	$758.9	-	-	-
SA	0.478	18	0.302	6	$193.9	0.040	4	$8.8
WA	0.730	18	0.290	8	$132.8	0.129	6	$53.0
TAS	0.142	4	0.140	4	$72.4	-	-	-
NT	0.122	3	0.122	3	$62.7	-	-	-
ACT	0.119	2	0.119	2	$96.4	-	-	-
Total	**6.502**	**184**	**5.369**	**139**	**$3,110.6**	**0.169**	**10**	**$61.8**

Table 2: 2010-11 activity and cost data for ABF establishments

	Population 2010-11 Source: ABF DSS, NAPED, PHE		Sample 2010–11 cost data Source: NHCDC Patient costed			Sample 2010–11 cost data Source: NHCDC aggregate-level data		
State	Activity (million)	Estabs	Activity (millions)	Estabs	In-scope costs ($million)	Activity (million)	Estabs	In-scope Costs ($million)
NSW	1.997	64	1.404	39	$688.9	-	-	-
VIC	1.553	49	1.128	30	$530.6	-	-	-
QLD	1.303	32	1.107	26	$601.6	-	-	-
SA	0.480	17	0.298	6	$183.3	0.075	8	$5.4
WA	0.688	18	0.404	8	$203.1	0.168	7	$74.6
TAS	0.144	4	0.143	4	$61.9	-	-	-
NT	0.118	3	0.118	3	$56.3	-	-	-
ACT	0.112	2	0.112	2	$79.0	-	-	-
Total	**6.396**	**189**	**4.713**	**118**	**$2,404.6**	**0.243**	**15**	**$80.1**

Attachment D

Draft eligibility criteria of block funded hospitals

The following draft eligibility criteria for block funded hospitals have been submitted to COAG for consideration.

Public hospitals, or public hospital services, will be eligible for block grant funding if:

a) **The technical requirements for applying activity based funding (ABF) are not able to be satisfied; and/or**
b) There is an absence of economies of scale that mean some services would not be financially viable under ABF.

Examples of circumstances which may meet the criteria proposed above include, for each of the criteria:

Inability to satisfy technical requirements

ABF may be impractical in situations where there is:

- No or poor product specification/classification, meaning that there is no basis for differentiating/describing the 'product' that is to be priced; and/or
- No or poor costs associated with any product classification, or where there is no cost homogeneity of the product classification; and/or
- No suitable 'unit of output' for counting and funding the product, such as a well-defined occasion of service, episode of care, or bed-day, amongst others.

Absence of economies of scale/lack of financial viability

ABF may be impractical in situations where there is:

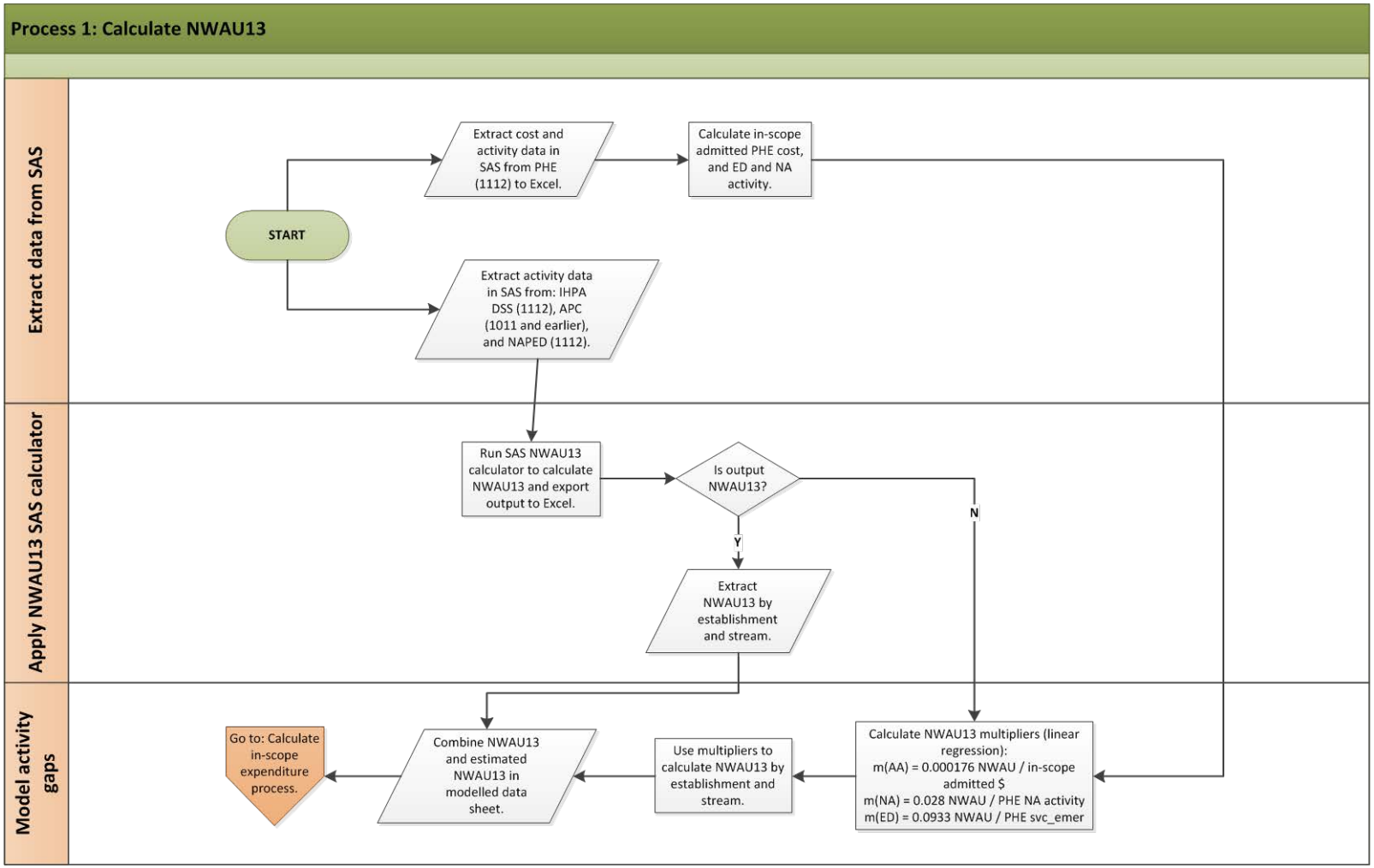
- A low volume of services, with an outcome being that the costs of keeping the health service open and 'available' exceed the funding that would be able to be achieved under ABF payments;
- Instability or unpredictability in service volumes, accompanied by an inability to manage input costs in accordance with changing service patterns; and
- A skewed profile of services and/or costs.

Other considerations

IHPA is also releasing some indicative guidelines on 'low volume' thresholds that might form part of draft Block Funding Criteria for use from 2013-2014. Under these thresholds, hospitals may be eligible for block funding if:

- They are in a metropolitan area (defined as 'major city' in the Australian Statistical Geography Standard) and they provide ≤ 1,800 inpatient National Weighted Activity Units (NWAU) per annum; or
- They are in a rural area (defined as all remaining areas, including 'inner regional', 'outer regional', 'remote' and 'very remote' in the Australian Statistical Geography Standard and they provide ≤ 3,500 inpatient NWAU per annum.

Process to calculate NWAU13



Attachment F

Process to calculate in-scope expenditure