

Independent Review of the National Hospital Cost Data Collection

Round 22 (2017/18)

Independent Hospital Pricing Authority

February 2020



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1. Executive summary

1.1 Overview of the National Hospital Cost Data Collection

The National Hospital Cost Data Collection (NHCDC) is compiled annually by the Independent Hospital Pricing Authority (IHPA) as the primary input in determining the National Efficient Price (NEP). The NEP signals the efficient cost of providing public hospital services and underpins the activity based funding of public hospital services. An annual review is conducted on a selection of NHCDC-submitting hospitals from each Australian jurisdiction to ensure NHCDC data is fit for purpose and robust.

For the first time, this year's review included a deep dive into the consistency of costing methodology and processes across all care settings in a specific area. Pharmacy was chosen as the deep dive area for Round 22. The purpose of this review was to identify variation in the costs that were included in the pharmacy cost bucket, and understand the allocation methods in use across the country to appreciate the limitations of existing data and what steps can be taken to drive greater consistency in costing.

IHPA engaged PwC to conduct the Independent Financial Review (IFR) of the Round 22 Public Sector NHCDC for the 2017-18 financial year.

1.2 Findings and Recommendations

In line with findings from previous Rounds of the IFR, jurisdictions and LHNs continue to evolve the costing processes and controls which underpin the robustness of the NHCDC.

All participants shared examples of incremental improvements that had been made in the current year, which varied from specific costing allocation methodologies, process improvements meaning that more time can be spent on sharing insights rather than processing data, improving feeder system data, enhancements to improve linking rules, improvements to the working relationships between jurisdiction and LHN teams.

There was significant focus on the Quality Assurance (QA) processes on the NHCDC dataset in each jurisdiction. This revealed a level of consistency around the country, albeit using different platforms to conduct QA (checks inbuilt into costing systems, or bespoke apps and tools developed by jurisdictions / LHNs).

Almost all sites expressed a desire for more regular costing, as this was seen to improve both the relevance and usability of the data for stakeholders. A number of jurisdictions have made the move to costing on a quarterly or six-monthly basis.

Jurisdictions are using costing data to varying levels among clinical and hospital executive stakeholders. Some are regularly using costing data for benchmarking efficiency of services, business cases for investment in clinical services and understanding clinical variation, with costing performance regularly included in management reporting, while others are at the early stages of using the data to engage with both clinical and operational staff. Those who reported frequent and effective use of the data appeared to have developed visual tools or dashboards which were able to be understood and used by clinical and operational teams.

Round 22 was the first year that the new version of the Australian Hospital Patient Costing Standards (v4.0) were used, and feedback was sought from jurisdictions on their compliance against the costing standards, and any areas of further guidance required. Jurisdictions reported that the costing standards were very similar in content to the previous v3.1, and therefore in line with previous years, all jurisdictions were materially compliant. Feedback to IHPA on areas for further enhancements on the standards included support to implement

the new Mental Health Care Classification (AMHCC), clarifications for in scope / out of scope patient transport costs, organ retrieval, clarification on allocation methods to be used for diagnostics staff time and further detail and specificity on a number of costing guidelines, and requests for more to be developed. These are set out in full on page 11.

In light of the findings highlighted in this report, a summary of key recommendations is shown below:

Table 1: Recommendations from Round 22 IFR

No.	Recommendation
1	Future IFRs should continue the approach of selecting a deep dive in costing methodology, with jurisdictions providing input into areas that could benefit from greater consistency via the NAC.
2	In addition to a high level discussion of all improvements over the course of the Round, the approach for future IFRs could be expanded to include a more detailed demonstration of one improvement made in the past year, including details on a revised methodology and tangible outcomes. This would be particularly beneficial when peers are in attendance.
3	<p>In a resource-constrained environment with demands for high quality and user-friendly costing data, there is value in considering how jurisdictions can facilitate sharing of templates, tools, reporting and methodologies nationally, within the confines of IT capabilities. Specific examples include:</p> <ul style="list-style-type: none"> • Different tools, apps and platforms for the interrogation of costing outputs nationally (and in some cases across different LHNs within a jurisdiction), to complement the functionality provided by the National Benchmarking Portal at a local level; • Given the variation in the usage of costing methodologies, for example feeder systems vs relative value units, it would be beneficial if LHNs with robust feeder data / systems could share reports with those who have not yet set up processes to use feeder data (where available) for costing purposes, to enable LHNs to move away from RVUs where such data already exists. <p>Given that the majority of jurisdictions use the same costing platform, PPM2, and similarly consistent source systems in a number of areas, the similarity of the costing output should enable this type of collaboration.</p>
4	IHPA should provide clarification on the cost bucket matrix and how line items and cost centres will be classified for NHCDC purposes, to drive standardisation in costing practices.
5	It is recommended that IHPA consider the feedback provided on the standards and self-assessment templates (in Table 3) and if changes are considered relevant, that next steps are agreed with the NAC.
6	In addition to considering the feedback in Table 3, the developmental agenda of the NAC to continue to evolve the NHCDC should include discussion around the standards, self-assessment tools, IFR, cost reports, understanding of variations and development of future costing methodologies, including:

No.	Recommendation
	<ul style="list-style-type: none"> • Future improvements (for Round 23 onwards) needed to cover costing mental health activity at the phase of care level and improving costing processes for non-admitted activity. • An area of interest for consideration in future reviews may be to investigate the quantum of unlinked records or costs from feeder systems which cannot be matched to in-scope episodes, and therefore excluded from submission.
7	<p>In light of the feedback from participants, it is recommended that future IFR rounds continue to offer the opportunity to participate in the peer review. Participants from multiple jurisdictions should be encouraged and accommodated where feasible, to enrich the quality of knowledge sharing and discussion.</p> <p>It is also worth considering how this forum could be held more regularly and by a wider membership than the NAC, with a focus on probing costing outputs in detail, eg. By investigating drivers for variation within specific DRG(s), and how consistent costing methods can be developed.</p>
8	<p>Following the Pharmacy deep dive, IHPA, in conjunction with the NAC and within input from relevant clinical groups where necessary, should continue to evolve the costing standards and business rules for pharmacy to cover areas of observed variation in more detail. Specific areas where further guidance would be beneficial include:</p> <ul style="list-style-type: none"> • Allocation of pharmacy staff costs in a standardised way which reflects resource consumed and new ways of working within pharmacy (i.e. ward-based activities including a focus on admission avoidance and medication reviews, rather than traditional dispensing roles); • Clarification of whether point of service or order date should be used for linking; • Treatment of returned drugs.

2. Introduction

2.1 Scope of the Independent Financial Review

The scope of the IFR was to:

- Assess the level of compliance with Australian Hospital Patient Costing Standards (AHPCS) Version 4.0 for all data submitted to the NHCDC and make an assessment of the likely impact where variation in alignment is identified;
- Assess the degree to which the NHCDC data is robust and fit for purpose;
- Describe the level of alignment in the cost allocation process across jurisdictions and between health services and make recommendations as to how further alignment could be achieved;
- Provide a targeted deep dive review of pharmacy as a cost area, as nominated by the NHCDC Advisory Committee; and
- Identify improvements implemented at the health service and/or jurisdiction level from the previous round of the NHCDC and address any developments made in response to the findings from the previous IFR report.

This review is not an audit and as a result, no assurance on the completeness or accuracy of the costing has been provided. The outcomes and results rely heavily on the representations and data submissions made by hospital costing teams and jurisdiction representatives.

Procedures performed were limited to reviewing supporting schedules, agreeing to financial statements, discussions with costing teams and obtaining extracts from costing systems.

2.2 Methodology

The IFR team gathered information required throughout the course of the review from the following sources:

- A financial and activity data collection template distributed to hospitals and jurisdictions and tailored to provide the required information for the scope of this review. This included:
 - Reconciliation amounts, details of QA checks carried out
 - Collection of data relating to pharmacy costs, including a breakdown of costs within the pharmacy cost centre, allocation methods used, details of feeder systems used, linking rules and matching rates;
- IHPA's Data Quality Self-assessments completed by jurisdictions. The information in these templates included an assessment of compliance against the Australian Hospital Patient Hospital Costing Standards (AHPCS) v4.0, which was discussed in more depth during site visits. It also included cost amounts and adjustment values, which were used in conjunction with data in the data collection template to complete a reconciliation from GL to NHCDC submitted costs;
- Site visits with each of the hospital costing team and jurisdictional representatives, with follow-up discussions to address feedback and outstanding issues as required;
- Sample testing of five patients at each participating site to test the transfer of patient cost data from the facility to IHPA;

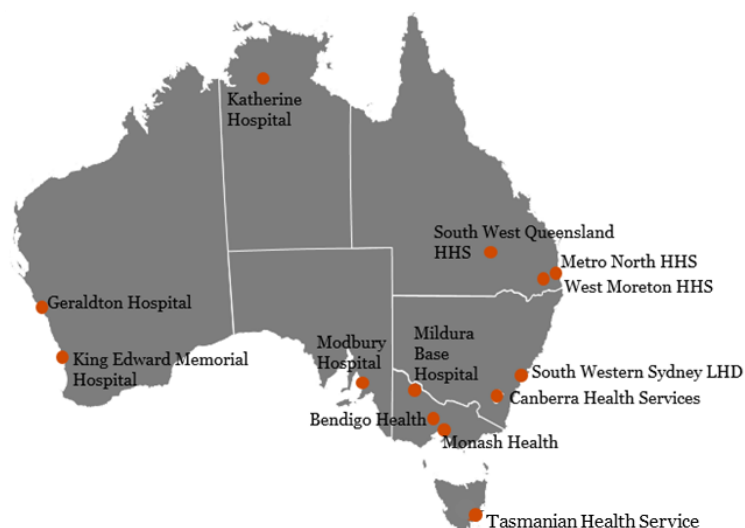
- Reconciliation between overall costs submitted for selected sites by jurisdictions and figures received for those sites by IHPA; and
- Consultation with IHPA teams to understand the processes in place for the collection, adjustments and quality assurance conducted on financial and activity data received from the jurisdictions.

A peer review process formed part of the review, to allow costing practitioners to attend other site visits to share information, processes, challenges and costing methodologies.

2.3 Participating sites

Each of the eight jurisdictions participated in the Round 22 IFR. The sample for review was consistent with the pragmatic approach of previous rounds, recognising the need for jurisdictional support for the IFR, resource constraints and a desire to obtain a geographical and mix of facility types. The selection of the sample was undertaken by each jurisdiction with consideration of the volume of patient activity, complexity of services, remoteness of location and history of participation in previous IFRs. Each jurisdiction was provided with a list of hospitals meeting these criteria, and ultimately nominated participating sites.

Diagram 1: Participating sites and locations of the Round 22 IFR



3. Findings from the Independent Financial Review

3.1 Overarching observations from Round 22

The Round 22 IFR saw representation from every jurisdiction, with some nominating a single hospital or LHN and other jurisdictions with up to three LHNs or sites participating. Consistent with prior years, the IFR was well received and attended by jurisdictions and sites, with good participation from peer reviews.

The approach for Round 22 differed in that there was less focus on the reconciliation process from the general ledger through to the submitted costed data, and instead a deep dive was performed on the costing process for pharmacy. This revealed a number of inconsistencies across the country in terms of which costs were included, and how these were allocated to patient records. Feedback on the changed IFR approach was positive, with participants observing that more value was being obtained from their jurisdiction's IFR and peer visits.

3.1.1 Robustness of the NHCDC

Costing processes continue to evolve and improve at sites, LHNs and jurisdictions, with many locations moving towards a higher frequency of costing either six-monthly or quarterly. Almost all sites expressed a desire for more regular costing, as this was seen to improve both the accuracy of the data as well as its efficacy.

All participants shared examples of improvements that had been made in the current year, which varied from specific areas such as allocating costs of 'interpreters' through to improving feeder system data to improve linking rules. While there did not appear to be any common themes in the improvements from Round 21 to Round 22, a consistent message was heard that future improvements (for Round 23 onwards) should cover costing mental health activity at the phase of care level, and improving costing processes for non-admitted activity. For mental health activity, participants cited challenges with business rules for the linking and creation of phases of care. During the Round 22 IFR site visits, peer participants appeared to benefit from the detailed discussions around costing improvements during the year, especially as these were often in areas where costing challenges were frequently seen.

Another area explored during the IFR was the quality assurance (QA) checks undertaken by jurisdictions and LHNs before data was submitted. This revealed a level of consistency around the country, with similar checks being performed such as trend analysis, review of outliers and investigating episodes above or below a certain dollar threshold, for example. One of the differences we identified was the tools, visual dashboards or platforms that were being used to perform the QA checks, almost all of which had been built or created in-house by the LHN or jurisdiction costing teams. Some jurisdictions used statewide tools to perform QA, whilst others had their own tool or platform tailored to their site/LHN.

In exploring the uses of the costing data, there was some variability between sites that regularly use the data for benchmarking, business cases and clinical analysis to those who are at the early stages of using the data and engaging with both clinical and operational staff. Those who reported frequent and effective use of the data appeared to have developed visual tools or dashboards which were able to be understood and used by clinical and operational teams. In almost all cases, it was mentioned that the costed output was used together with Health Round Table to perform benchmarking, and use of IHPA's benchmarking portal, or other internally developed benchmarking tools varied by state.

Our observation was that the longevity of the majority of costing personnel in their roles, the quality assurance checks and data validation through benchmarking and sharing the costed output, all contribute towards the robustness of the costing processes and NHCDC dataset.

3.1.2 Variation in costing teams and systems between jurisdictions

The most widely used costing software in the country is PPM, which is used exclusively in five jurisdictions and at some sites in a sixth jurisdiction, with CostPro (used by some HHSs in Victoria), UserCost (Tasmania) and Transition II (Queensland) also used across the country. This is shown in the table below.

Table 2: Costing systems in use during Round 22

Jurisdiction	PPM	CostPro	UserCost	Transition II	Others
New South Wales	✓				
Victoria	✓	✓			✓
Queensland	✓	✓		✓	
Western Australia	✓				
South Australia	✓				
Tasmania			✓		
Australian Capital Territory	✓				
Northern Territory	✓				

The parties that actually perform the costing also vary by jurisdiction. Costing is conducted either by the jurisdiction team, LHN team or facility team, or in some smaller LHNs, outsourced to a third party provider. Northern Territory has an external contractor to support the costing team at a jurisdiction level. The costing relationship between the jurisdictions and sites differs, with the process for some states supported and governed centrally by the jurisdiction, whilst for others the process is highly devolved in comparison.

3.1.3 Reconciliation from LHN/Hospital to jurisdictions to IHPA

The total NHCDC costs for Round 22 (across all hospital products) was \$47.1bn. A reconciliation was performed for each participating site, starting with their general ledger through the various stages of the costing process through to the costed output ultimately included in the NHCDC. This has been shown in the diagram below.

Diagram 3: Reconciliation process from LHN / Hospital to IHPA



The details of the reconciliation for each participating site have been included in the relevant jurisdiction chapters, which show all adjustments made throughout the process and the split of costs for each hospital product. Some of these adjustments related to out-of-scope items; however, a large portion also related to activity that could not be linked to patient records due to incomplete records or an inability to match the costs to activity. There are a number of scenarios and reasons where this may occur, for example, an outpatient / inpatient may choose to have diagnostics in a different setting to their prime clinic / admission, which cannot be matched across multiple hospitals. We noted variability of how these unmatched costs were treated, with some jurisdictions excluding them from the final submitted dataset and others allocating the costs across all activity within that hospital product.

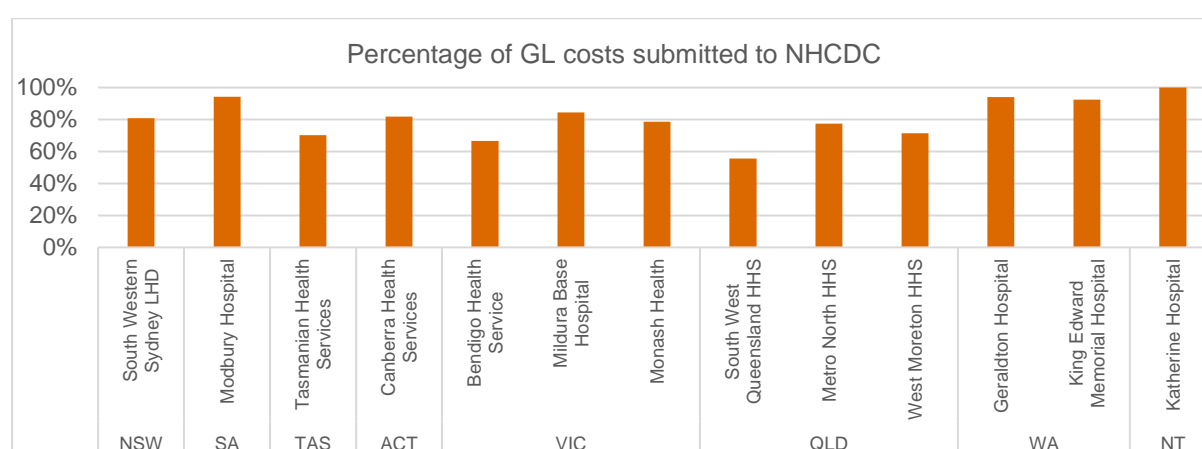
The data flows from the LHN to jurisdictions and ultimately through to IHPA were reconciled by participants and by IHPA and provided to the review team as part of the IFR process. We did not identify any material variances in these reconciliations, with immaterial variances (less than 0.1%) existing in two of the 13 participating LHNs.

3.1.4 Unmatched activity

The percentage of the costs in the GL being submitted to the NHCDC varies between facilities, ranging from 55% to 100% for the sites participating in Round 22 as displayed in the graph below.

While there may be valid reasons for the exclusion of some costs from the GL for costing purposes (e.g. costs relating to out of scope items; which may vary significantly depending on the type of facility), an area of interest for consideration in future reviews may be to investigate the quantum of unlinked records or costs from feeder systems which cannot be matched to in-scope episodes, and is therefore excluded from submission. Such analysis may provide meaningful insights on data unable to be reported and captured in the NHCDC and the corresponding impact on cost buckets for different hospital products and any benchmarking.

Graph 1: Percentage of GL costs submitted to NHDC



For example, as part of this review, we have observed that facilities typically have very high matching rates for low-cost, high-volume drugs dispensed to inpatients, but typically face more challenges linking very high-cost drugs for chronic conditions in the outpatient setting, resulting in high values of pharmacy costs being excluded from the NHCDC submission.

3.1.5 Testing data flow at a patient level to IHPA

The review included selecting a sample of five patients from each participating facility for the purpose of testing the data flow from jurisdictions to IHPA at the patient level. Records were selected by participants across a range of care types to include, at a minimum, one admitted patient, one ED patient, one WIP patient, and one who has received PBS / high cost drugs. Costs for these patients were reconciled between source cost records and IHPA records.

Of the 65 records sampled, two related to unqualified babies and were out of scope for IHPA. All remaining 63 records reconciled (within 1 cent).

3.1.6 Deep dives for future rounds

Jurisdictions reported significant value and insight from this year's deep dive into pharmacy, and therefore it is recommended that future deep dives into costing methodologies are conducted in following rounds to continue to evolve and standardise costing practices. Potential topics for consideration that were proposed by participants include:

- Nursing salaries and wages allocation
- Non admitted costs

- Teaching, Training and Research
- Costing of interstate patients (ie. Costs incurred by HHS' for the treatment of their residents to interstate facilities)
- Patient Transport Services (which is especially material for jurisdictions with high rural and remote costs)
- Costing of interpreter services as centralised versus decentralized resources

3.2 Australian Hospital Patient Costing Standards (v4.0) and the Round 22 NHCDC process

Overall, all jurisdictions reported material compliance with AHPCS v4.0 through the Data Quality Self-Assessment template provided by IHPA. NSW and ACT used v3.1 of the standards for costing in Round 22. However, in discussions the jurisdictions commented that the primary distinction between V4 and the former v3 of the standards is not in the content, but in the structure of the standards.

As part of the Round 22, costing practitioners were asked for feedback on the practicality and applicability of v4.0, to highlight where require further guidance may be required from IHPA or where standards may need to be refined. The table below sets out feedback received from jurisdictions relating to the AHPCS v4.0 and the Round 22 NHCDC process.

Table 3: Feedback from participants from site visits on the AHPCS v4.0 standards and NHCDC process

Theme	Feedback
Feedback on the standards and areas for further guidance	Mental health: It would be beneficial for IHPA to run a workshop around the AMHCC classification with jurisdiction, LHN and MH professionals to unpack issues with the implementation of the classification, data challenges, and business rules / guidance around the reconciliation and matching between occasions of service and phases of care.
	Patient transport: clarification on what types of patient transport are in scope vs out of scope. Primary and inter-hospital transfer retrieval could benefit from clarification.
	Organ retrieval: costing practitioners would welcome guidance. There are challenges with admitting a deceased patient for the purposes of allocating the retrieval costs, and with allocating costs among multiple organ recipients.
	Multi-specialty wards: guidance around this area, in particular, nursing costs.
	Remove references to accounting standards within costing standards as these are not relevant for costing purposes.
	Inclusion of cost bucket matrix in future versions of the standards.
	Guidance around the allocation methods to be used for pharmacy, radiology, pathology staff time, and clarity on whether the 'point of service' or 'point of request' for the test should be used as the basis for linking the activity.
	Costing guidelines need more examples and specificity. Areas for further guidance include (Allocation methodologies of medical costs to Teaching, Training & Research), inclusion of guidance on the preferred allocation of overheads. A guideline on Rights of Private Practice (RoPP) was requested
	Include guidance on preferred allocation for overheads.
	Current assessment method relies on a subjective assessment.

Theme	Feedback
Feedback on the Data Quality Self-Assessment template	Comment box should be available to provide narrative on why a certain score was awarded.
	Give wider scoring options on the scale of compliance (current options of full, partial or no compliance are not intuitive as partial can mean 5% or 95% compliance).
Other feedback relating to Round 22 NHCDC	Share the QA rules earlier to allow jurisdictions to build this into their QA to reduce likelihood of resubmissions.
	IHPA to include an interactive analytics dashboard in the benchmarking portal to highlight efficiency opportunities.
	There is an opportunity to use the NAC to conduct deep dives or have discussions on standards with all jurisdictions to develop further guidelines (e.g. allocate time to developing 1-2 business rules per session as a standing agenda item).
	Jurisdictions saw value in the opportunity to complete a deep dive into a specific cost area during Round 22. There is an opportunity to use the NAC to conduct further deep dives throughout the year.

3.3 Quality Assurance insights

One of the focus areas of the Round 22 IFR was to understand the controls and quality assurance procedures undertaken by each site, as well as at the jurisdiction level. In this round, in recognition of the fact that general quality has been adequate over recent years, the focus has been in rather understanding the checks and balances occurring at the site and jurisdictional level and has moved away from a detailed reconciliation at each site.

The IFR has found that significant reconciliation and quality assurance on both cost and activity datasets is performed for data, at both the costed site and the jurisdiction level. Facilities and jurisdictions are reconciling data to audited financial statements, checking feeder extracts for completeness, performing logic checks, analysing trends compared to prior periods, reviewing high and low costs and outliers, and conducting comparisons across the state. Details of quality assurance procedures are included in each of the jurisdiction subchapters below.

Varying levels of sophistication of tools employed to conduct QA have been observed across the site visits, for example, some jurisdictions are using apps or dashboards (NSW and WA), others use SQL or data quality scorecards and others use inbuilt QA functionality within costing software. Additionally, the frequency of QA procedures and the parties who perform QA vary across the nation.

While every year the QA checks carried out are iteratively reviewed, most QA is conducted against costing outputs in the previous period, e.g. distribution of costs within products, or movement against costs in previous periods. There would be opportunities to evolve existing QA in areas of known complexity / challenge (e.g. allocation of staff time in pharmacy).

IHPA noted that there was a considerable delay in jurisdictions providing their interim and final submissions in line with the NHCDC timelines set out in the Three Year Data Plan, and perhaps more robust QA processes could help mitigate this in the future.

3.4 Peer Review

3.4.1 Peer review process

During the Round 21 IFR, five jurisdictions nominated representatives to participate in the peer review, an increase from three participants in Round 21. These included both facility and jurisdiction costing practitioners. Barriers to participation from remaining jurisdictions were cited as timing and travel / cost constraints.

3.4.2 Objectives and benefits of the peer review

Participants reported the following benefits:

- Participating peers reported that they received substantial value from attending the site visits and see the IFR as a key opportunity to share knowledge and learning. Particular value was reported from smaller jurisdictions that do not have regular costing forums.
- The changed focus for the Round 22 IFR to include costing methodologies and the deep dive area was widely reported to be significantly more useful for peers than the reconciliation focus in previous years. It was a valuable exercise for local costing teams to explain their processes and systems to peer reviewers. The peer review process also facilitated the understanding and sharing of ideas of what other jurisdictions do in the event of a lack of sophisticated feeder data or systems. The peer review process for this round facilitated improvements through the opportunity to showcase the feeder management practices in other states, in particular where there are better practices that reduce the effort in obtaining data.

3.4.3 Considerations for future IFRs

- **Location** - In Round 22, site visits were conducted at both hospital sites and jurisdiction offices. Hospital site meetings were reported to be more beneficial as they allowed involvement from clinical or technical staff who could add extra depth to the discussion. Conducting the IFR at hospital sites provides visibility and connectedness between IHPA as the end user of the data and the hospitals which produce the data. Participants reported that the local setting was instrumental to understanding the environment the hospital operates in, and any impacts this had on the costing data.
- **Multiple participants** - The presence of multiple jurisdictions as peer reviewers in two site visits worked well to prompt richer discussion and lively comparison between jurisdictions. Previous rounds had encouraged a limit of one peer reviewer per visit, but participants said that there was significant value in the learnings shared. Time constraints were the predominant concern with this approach. Peers reported that having jurisdictions and LHNs present in the same meeting was valuable as it brings the different parts of the costing process together. Having LHN staff attending as peers was a useful learning exercise for participants in this round's IFR.
- **Preparation and context** - Peers reported they felt sufficiently prepared for the IFR and able to contribute to discussion. During site visits, some sites presented the demographics of their area and an overview of their costing process. This was stated by peers as useful for non-metropolitan sites as their demographics and context presents different problems and flow-through impacts on the costing process.
- **Demonstration of costing output files** – Participants reported benefits in the opportunity of observing costing output files and visual dashboards during the visit to gain a richer understanding of costing activities.

- **Further deep dives** - A suggestion was made to consider the inclusion of deep dives into costing methodologies outside the IFR process, for example as part of NHCDC Advisory Committee (NAC) meetings. Further suggestions for consideration were to include smaller areas of focus on less complicated topics as part of the IFR process, in areas with inconsistencies such as patient transport and interpreters. A proposed format could include several discussion points on the chosen topic as part of the IFR to be published in the final report. Clarification and assessing consistency across jurisdictions in these areas would be invaluable.

4. Pharmacy costing insights

Pharmacy was selected as a deep dive area for the Round 22 IFR. The purpose of this review was to identify variation in the costs that were included in the pharmacy cost bucket, and understand the allocation methods in use across the country to appreciate the limitations of existing data and what steps can be taken to drive greater consistency in costing. The selection of pharmacy aligns with one of the focus areas of the National Efficient Price Fundamental Review, and is an area where insight into the variation of costing methodologies will be particularly valuable. Pharmacy also represents a significant portion of costs submitted as part of the NHCDC, representing \$2.0bn of the \$47.4bn (4.3% of total NHCDC costs).

4.1 Pharmacy feeder systems

Across jurisdictions, two main pharmacy systems are in use: iPharmacy and Merlin. Of the thirteen sites visited, three used Merlin and nine used iPharmacy. One facility outsourced pharmacy to a third party and the system was not known. The table below sets out where these systems are used across the country.

Table 4: Use of pharmacy feeder systems in use within Round 22 participating sites

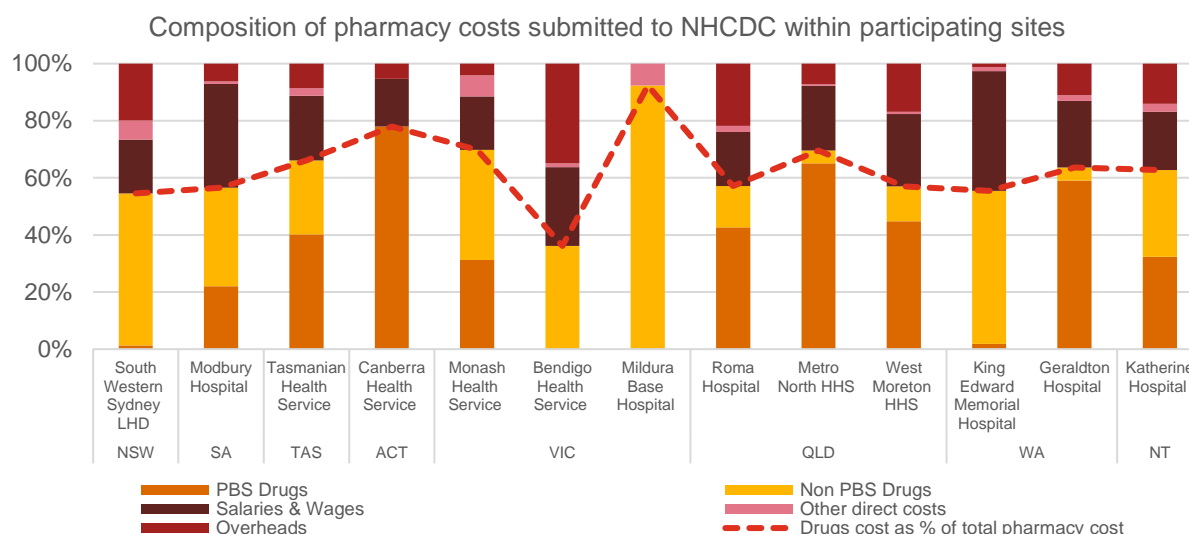
Jurisdiction	Merlin	iPharmacy
New South Wales		✓
South Australia		✓
Australian Capital Territory	✓	
Tasmania		✓
Victoria	✓	
Queensland		✓
Western Australia		✓
Northern Territory	✓	

4.2 Composition of the pharmacy cost bucket

Data on pharmacy costs was collected through the IFR data collection template. Most participants are including dispensed PBS / non PBS drugs, imprest drugs (i.e. drugs held in stock cupboards in wards, ED, OR and other clinical areas, and handed out to patients as required), pharmacist salaries and wages, goods and services (e.g. pharmacy consumables) and corporate overheads within the values reported.

Drugs typically make up the largest component of the pharmacy cost bucket, ranging from 55% to 92% of submitted costs. Salaries & wages for pharmacists represented the second largest component (19% to 42% of costs across the sites visited).

Graph 2: Composition of pharmacy costs by participating site



There were a number of differences identified in where costs are classified for the NHCDC, after IHPA allocates cost buckets (using the cost bucket matrix). These may have an impact when benchmarking pharmacy costs. For example:

- For imprest drugs in OR / ED cost centres with the PBS / Non PBS drugs line item, costs map to OR / ED cost buckets, not pharmacy. This treatment was consistent in most of the facilities visited.
- Pharmacist salaries and wages within the Salaries & Wages Allied Health line item map to the pharmacy cost bucket. However, in two of the sites visited there were pharmacist posts identified which did not sit in the pharmacy cost centre. Situations where different treatment was used include when ward / specialty focused pharmacists' costs were held in other cost centres, and also where a Chief Pharmacist position was shared amongst multiple facilities within an LHN and a portion recharged. In these scenarios the costs would map to the 'Allied Health' cost bucket.

There was different treatment for PBS drugs. For example:

- NSW does not submit any costs relating to PBS drugs as it has not signed up to PBS reform and has different processes in place from the rest of the nation for PBS drugs;
- Some jurisdictions are not able to differentiate between PBS and non-PBS drugs on their general ledger, and have to derive splits using a proxy measure.
- Within jurisdictions, there are some instances where PBS drugs are excluded by exception within certain facilities. For example, in Victoria PBS drugs are submitted by most providers, but two of the three facilities visited did not include them in their submission: one was not able to allocate them to patients; and another used a third party provider for pharmacy services which managed the purchasing and reclaiming and so no PBS costs passed through the general ledger.

4.3 Pharmacy feeder systems

As explained above, there are two main pharmacy systems in use across the country, iPharmacy and Merlin.

Despite the small number of systems, not all participants were using consistent methodologies to link feeder data to patient episodes and therefore allocate dispensed pharmacy costs at a patient level. Three of the thirteen sites did not have access to a feeder system for dispensed drugs (Bendigo and Mildura (VIC), and Geraldton Hospital (WA)). Most agreed that feeder data was theoretically available, but challenges in obtaining feeder data included data capture at the point of care (especially the use of the pharmacy system in community care), resource limitations in costing teams to establish feeder data files, or configuration challenges with extracting the relevant data from the pharmacy system. Where patient-level feeder data was not available, service weights and RVUs were used to allocate drug costs.

The ten participants with patient level feeders had mixed linking rules which typically sought to match to records within +/- one day for ED and admitted patients. However, there was a significant range of linking rules for outpatients, from seven to 120 days. Participants reported that outpatients represented the most challenging cohort of patients to link as a result of PBS reform, under which repeat scripts have become increasingly common, to give patients access to repeat medications for chronic conditions without having to return to their GP.

Higher linking rules typically resulted in higher matching rates, although this increased the risk of matching to the incorrect episode.

4.4 Allocation methodologies

There was significant variation in how facilities are allocating pharmacy costs other than dispensed drugs. Methods include:

- Use of RVUs across all patients within different care types to allocate imprest drugs, staff costs overheads, and other direct costs; and
- Allocation of imprest across all dispensed drugs, based on the relative value of dispensed drugs (noting that this may over-allocate costs to high cost drug areas such as oncology, and under-allocate costs to wards with a high volume of low value imprest dispensing).

4.5 Conclusions and recommendations

There are a number of inconsistencies identified in how pharmacy is costed, both in terms of the costs included and the allocation methodologies used, which should be considered before conducting any benchmarking. Although there may be less variation within jurisdictions, the jurisdictions that participated in multiple site reviews during Round 22 (QLD, VIC and WA) still had significant structural differences which may affect any local cost comparisons.

5. Jurisdiction Chapters

5.1 New South Wales

Jurisdictional Overview

The NSW Ministry of Health (MOH) costing function leads and manages clinical costing for the state's Local Health Districts (LHDs), Specialty Health Networks (SHNs) and the five health pillars. The NSW jurisdiction includes 8 LHDs encompassing the Sydney metropolitan region, and 7 covering regional NSW plus two specialty networks.

The MOH plays a key role in supporting districts and networks for both the semi-annual and the full financial year District Network Return (DNR). The DNR is a condition of subsidy and fulfils the requirements for a range of submissions to national bodies such as the Independent Hospital Pricing Authority (IHPA) and the Australian Institute of Health and Welfare (AIHW) including the:

- National Hospital Cost Data Collection (NHCCDC);
- Public Hospital Establishment (PHE);
- Mental Health Expenditure National Minimum Data Set (MHE NMDS);
- Health Expenditure data collection (HEX);
- Report on Government Spending (ROGS).

Additionally, the Jurisdiction has developed, distributed and maintains applications (apps) and tools to support the DNR and general costing processes. NSW has several statewide feeder systems which are managed by the MOH for all Districts and Networks. These are of varying maturities and cover areas including oral health, imaging, pharmacy, pathology, blood, organ retrieval, mental health and non-emergency patient transport. PPM is the costing system used across the state.

Activity Based Management (ABM) works with other branches in the Ministry, in particular finance, to prepare the DNR. ABM also develops training and support for costing teams across the state on an ongoing basis. There is a culture of collaboration and shared learnings to improve performance within the LHD/ SHN costing teams which is led and supported by ABM function. For example, monthly costing face-to-face forums are held with the Costing Standards User Group (CSUG), where all costing team members get together to discuss methodologies, feeder file issues, new and improved apps etc. In addition, the CSUG contributes to the development and maintenance of the NSW Costing Standards [Cost Accounting Guidelines] as well as sharing information and supporting the costing process for new classification systems or reporting requirements. ABM also has a secondment program with LHD / SHN costing staff seconded to its team.

The Jurisdiction costing team consists of six FTEs, and includes a role for costing initiatives and methodology improvements.

South Western Sydney LHD Overview

Within NSW, the selected site for the Round 22 Independent Financial Review was South Western Sydney Local Health District (SWSLHD). SWSLHD covers 7 Local Government Areas from Bankstown to Wingecarribee, both rural and suburban communities, and has a population of approximately 820,000 people. The District is among the most rapidly growing populations in NSW and is expected to become the most populous LHD in NSW in the next decade. The District manages six acute public hospitals and 14 major community health centres, providing prevention, early intervention and community-based treatment, palliative care and rehabilitation services.

Costing at SWSLHD (and all LHDs across the state) is currently conducted on a half-yearly and full financial year basis. Currently, the timeframe required for SWSLHD to complete the costing/DNR process is approximately one month between 4 FTEs. There is a desire to eventually move to monthly costing. However, the timeline for this transformation is not expected to be within the next two years.

Costing data is used by SWSLHD and across the Jurisdiction for benchmarking, clinical variation and other analysis. The tools used are IHPA's National Benchmarking Portal, the Ministry's ABM portal and Reasonableness & Quality (RQ) app. The RQ app is a Qlikview tool developed by ABM that loads the DNR data and runs quality checks over the data and drives improvements statewide to costing data. However, increasing the use of costing data internally to gather more insights is a focus for SWSLHD and the NSW Jurisdiction. There is a desire within the SWSLHD costing team to increase interactions with clinicians to improve data collection and quality.

5.1.1 Reconciliation

This section discusses major variances, reconciling items and adjustments in the reconciliation process. The information is based on the SWSLHD's data collection template, data quality self-assessment and review discussions.

The table presents a summary reconciliation from SWSLHD's General Ledger to the final NHCDC submission for Round 22.

SWSLHD's final GL balance of \$1,882,953 was reconciled by the costing team to the audited financial statements.

Explanation of reconciling items

Adjustments made at the LHD level (Item B)

- Medical indemnity (\$31.7m) is the largest general ledger inclusion at SWSLHD. The total cost for medical indemnity is held centrally by NSW Health and allocated to Districts and Networks based on estimates and calculations conducted by the insurance provider. SWSLHD's medical indemnity inclusion value was higher than other LHDs across the state, which reflects a number of factors including their casemix profile and claims history.
- Shared service costs of \$0.3m are also bundled into the general ledger inclusions.
- The balancing \$22.8m of inclusions relates to expenditure incurred by third schedule hospitals which are not contained in the starting GL. However, these are then offset in the exclusions listed below and therefore have no impact on the costs submitted.

Adjustments made at the jurisdiction level (Item E)

- A WIP adjustment of \$24.6m was made for 2016-17, representing costs for patients who were discharged in the Round 22 year (2017-18) but admitted in the previous (2016-17) year. Similarly, a WIP adjustment to remove the costs for patients admitted in 2017-18 who had not been discharged by year end totalled \$46.4m.
- An adjustment of -\$127m relating to Z encounters was made to account for items costed to programs without activity. This figure includes population health surveys, immunisation, and teaching and research.
- Aggregated NAP encounters costed to \$11.1m were removed, where activity records did not exist to link these to individual encounters.

- Dummy encounter adjustments of \$17.3m were removed, which mainly related to pathology and medical imaging costs incurred for private patients or those without identifiable records (such as sexual health).
- \$5.7m was listed for project maintenance costs, incurred by eHealth on behalf of districts. This amount was added to the costed projects as it sits outside of the GL of the LHDs.
- \$196.3m of costs were removed as they did not meet IHPA's specifications for costing submissions. This was largely block funded activity and also included a proportion of mental health activity with erroneous coding. SWSLHD advised that the quantum of this activity had been investigated and had not changed significantly from prior years.
- There was a reconciling difference of \$91k between the post allocation adjustments provided by the Jurisdiction through the data quality self-assessment, and adjustments provided in the data collection template (Item F). This difference was because costs associated with organ retrieval were omitted from the costs in the data quality self-assessment.

The breakdown of post allocation adjustments by product type is displayed in section G of the diagram below:

Table 5: Reconciliation from General Ledger to final NHCDC costs – SWSLHD

Source: Self-assessment	South Western Sydney LHD			Source: Data collection template	Jurisdiction			Source: Data collection template	IHPA		
	Item	Amount			Item	Amount			Item	Amount	
	A General Ledger (GL)	\$	1,882,952,508		D Costed Products received by jurisdiction	\$	1,914,878,104		G Total costed products received by IHPA	\$	1,547,149,009
	B Adjustments to the GL				E Post Allocation Adjustments		(\$367,729,094)		H IHPA Adjustments		\$0
	Inclusions		\$54,874,314		WIP 2016 - 17		\$24,691,912		OA - transfer to OG		(\$58,478)
	Exclusions		(\$22,858,134)	WIP 2017-18		(\$46,220,344)	OG - transfer from OA		\$58,478		
				Z Others		(\$127,149,721)	Newborn - transfer to acute		(\$483,698)		
				Aggregated NAP Encounters		(\$11,060,957)	Acute - transfer from newborn		\$483,698		
				Dummy encounters		(\$17,268,365)	Final NHCDC costs	\$	1,547,149,009		
				Cost of project maintenance of the Clinical systems ii		\$5,666,730	I % of GL submitted to NHCDC		81%		
				Other adjustments to product types		(\$196,388,349)					
	Total hospital expenditure	\$	1,914,968,688	Total costs submitted to IHPA	\$	1,547,149,009					
Source: Data collection template	C Costed products submitted to jurisdiction			Source: Data collection template	F Costed products submitted to IHPA			Source: Data collection template	Costed Products per NHCDC		
	Acute	AR DRG	\$ 955,418,959		Acute	AR DRG	\$ 975,006,402		Acute	\$ 1,009,113,845	
		Newborns	\$ 32,603,259			Newborns	\$ 34,107,443		Outpatient	\$ 174,769,499	
	Outpatient	Outpatient - Tier 2	\$ 254,094,460		Outpatient	Outpatient - Tier 2	\$ 174,769,499		Emergency	\$ 194,003,489	
		Outpatient Non Tier 2	\$ -			Outpatient Non Tier 2	\$ -		Sub Acute	\$ 106,717,868	
	Emergency	URG - Admitted	\$ 83,802,591	Emergency	URG - Admitted	\$ 84,689,382	Mental Health	\$ 62,485,829			
		URG - Non- Admitted	\$ 108,239,406		URG - Non- Admitted	\$ 109,314,107	Other	\$ 58,478			
		UDG - Admitted	\$ -		UDG - Admitted	\$ -	Total	\$ 1,547,149,009			
		UDG - Non Admitted	\$ -		UDG - Non Admitted	\$ -					
	Sub Acute	Rehabilitation	\$ 48,985,827	Sub Acute	Rehabilitation	\$ 53,738,644					
		Palliative Care	\$ 22,508,773		Palliative Care	\$ 22,806,627					
		GEM	\$ 10,769,941		GEM	\$ 11,124,711					
		Psych Geriatric	\$ 3,184,237		Psych Geriatric	\$ 3,360,346					
		Maintenance	\$ 14,244,021		Maintenance	\$ 15,687,540					
	Mental Health	Admitted Mental Health (MC)	\$ 62,573,797	Mental Health	Admitted Mental Health (MC)	\$ 62,485,829					
		Non Admitted Specialist Mental Health (MS)	\$ -		Non Admitted Specialist Mental Health (MS)	\$ -					
		Non Admitted Mental Health (MH)	\$ 52,334,120		Non Admitted Mental Health (MH)	\$ -					
		Residential Mental Health (MR)	\$ -		Residential Mental Health (MR)	\$ -					
	Other	Other Admitted Patient Care	\$ 47,877,373	Other	Other Admitted Patient Care	\$ 58,478					
		Organ Procurement	\$ -		Organ Procurement	\$ -					
		Outreach & community care	\$ -		Outreach & community care	\$ -					
		Boarder	\$ -		Boarder	\$ -					
		Other	\$ -		Other	\$ -					
		Research	\$ 17,424,653		Research	\$ -					
		Teaching & Training	\$ 50,888,047		Teaching & Training	\$ -					
		Dummy/virtual patients (No NHCDC Product)	\$ 149,928,641		Dummy/virtual patients (No NHCDC Product)	\$ -					
	Total	\$	1,914,878,104	Total	\$	1,547,149,009					

5.1.2 Application of Australian Hospital Patient Costing Standards (v4.0)

NSW has developed Cost Accounting Guidelines (CAG) as a complementary guideline to national AHPCS, which the NSW Districts and Networks follow. The CAG addresses NSW-specific data considerations, tools and practices to connect the national Standards into NSW specifications for the DNR. These are updated frequently and are widely adopted by LHDs and hospitals across the state. For Round 22, the CAG complied with AHPCS Version 3.1 for Round 22, with amendments to the CAG in line with AHPCS Version 4.0 to be implemented from Round 23 onwards.

NSW self-reported that it was largely compliant with national v4.0 Standards. The most significant exception to compliance relates to the treatment of special purpose & trust accounts (SP&Ts), which are currently excluded from costing due to challenges in accessing information from the SP&Ts. Within the LHD visited for Round 22, SWSLHD identified its SP&T costs were immaterial.

NSW reported partial compliance against the following standards and business rules:

- Stage 1.2- Identify Relevant Expenses -Third Party Expenses
- Stage 1.3- Identify Relevant Expenses - Offsets and Recoveries
- Stage 2.1- Create the Cost Ledger - Cost Ledger Framework
- Stage 2.2 -Create the Cost Ledger - Matching Cost Objects and Expenses
- Stage 3.2- Create Final Cost Centres - Allocation of Expenses in Overhead Cost Centres
- Stage 6.1- Review and reconcile -Data Quality Framework
- Stage 6.2- Review and reconcile - Reconciliation to source data
- Business Rule 1.1/1.1A – Medical expenses for private and public patients

In the above standards, NSW assessed that it was materially compliant with the standards, but partial compliance was reported due to non-compliance of immaterial items or wording in the standards being unclear or contradictory. It selected 'partial' as an indicator that there was work to do with implementing v4.0.

5.1.3 Quality Assurance

The NSW MOH has developed a range of tools to support costing teams at the LHDs to drive improvements in data quality and support benchmarking and use of costing data across the state. These include:

1. The Reasonableness and Quality (RQ) app, which is used by LHDs to perform data quality checks on costing output across all care types and to 'score' districts based on their costing and data quality. Items flagged by the data quality checks in the RQ app are reviewed by the LHD costing team and followed up with the relevant facility staff to make any required adjustments. The Ministry regularly updates the tests to align with NHCD requirements, for example, by removing redundant tests and accounting for new DRGs / classification systems. Examples of the sorts of checks in use for Round 22 include thresholds of costs, procedures with no theatre time, and operating room procedures with no associated operating room costs.
2. The Weighted Activity Unit (WAU) app allows trend analysis to be performed on the distribution of costs across care products to prior periods. The WAU app is a tool used to compare against peers and provides transparency in costing performed by LHDs.

On a monthly basis, SWSLHD performs a review of the feeder system data, reconciling the data files to the source systems and resolving any differences that are identified.

SWSLHD and the NSW MOH outlined in the data request template for the IFR a range of quality assurance activities carried out, performed either on a monthly basis or as part of the six-monthly costing cycle.

The table below sets out the range of quality assurance activities carried out.

Table 6: Quality Assurance performed by NSW MOH and SWSLHD

Specific Quality Assurance	Performed by NSW MOH	Performed by SWSLHD
Reconciliation		
Reconciliation back to general ledger & audited records	Annual review of GL for negative balances	Reconciled GL to costed products for each costing cycle (six-monthly)
Reconciliation of activities back to source systems	Monthly reviews of all state-managed feeder systems.	Monthly review of all LHD-managed feeder systems with unlinked records investigated, corrected or manually linked.
Validation of costing data		
Reasonableness check of excluded items or out of scope costs e.g. WIP patients	Yes – through WAU app	Yes – through WAU app for each costing cycle
Trend analysis to prior periods in terms of distribution of costs across care products and LHD	Yes – through WAU app	Yes – through WAU app
Analysis of outliers at the cost, LoS or cost bucket level	Yes – through WAU app	Yes – through WAU app
Proportion of direct vs overhead costs	Yes – through WAU app	Yes – through WAU app
Proportion of costs sitting in each product (eg % costs in acute, ED, OP)	Yes – through WAU app	Yes – through WAU app
Specific logic checks	Yes – through the RQ app	
Costing Governance		
Regularly hold costing meetings	Monthly Costing Standards User Group (CSUG) meetings held across the state and attended by costing professionals from every LHD to discuss costing methodologies and educate costers / share learning.	Formal costing meetings held on a bi-monthly period, increasing to weekly during the costing period.
Regularly review and update cost centre allocations	N/A	Annual update of cost centre allocations and product fractions in consultations with clinicians and facility managers
Formal process sign off on data and accountability for data	Formal signoff and reconciliation process in place.	Sign-off is conducted first at the internal management level of the facilities, then the directors of finance, and final sign-off is performed by the chief executive. After the costing process, the data is also subject to audit which is signed off by the chief executive and director of finance.
Reviews on data are conducted prior to submission	Review and sign-off by ABM costing team	Review of data by costing manager, operational teams and executives
Local guidelines to support national AHPCS standards	Yes – NSW Cost Accounting Guidelines	

5.1.4 Pharmacy costing processes

Pharmacy costs and allocation methods

SWSLHD identified \$83.4m in pharmacy costs for Round 22, of which \$47.6m were submitted to IHPA. The excluded items related to adjustments at the jurisdictional level for S100 (\$33.9m), PBS (\$0.6m) and non PBS drugs for de-identified patients (\$1.3m), which were costed to Z encounters by SWSLHD. NSW excludes S100 and PBS reimbursed drugs costs from the costing submissions to IHPA for all Districts and Networks.

The diagram below depicts the categories of expenditure that are mapped to the pharmacy cost bucket in NSW and allocation methods used.

Diagram 6: Allocation methods and make-up of pharmacy costs submitted to NHCDC

Cost Category	Allocation method	Description of allocation method	% of pharmacy cost bucket
S100 drugs		S100 drugs are costed to Z encounters. In NSW S100 are not submitted to IHPA through the NHCDC, and totalled \$33.9m for Round 22.	
PBS Drugs		PBS drugs are costed to Z encounters. In NSW S100 are not submitted to IHPA through the NHCDC, and totalled \$0.6m for Round 22.	
Non PBS dispensed drugs	Feeder	Non PBS drug costs (ie. dispensed through Pharmacy which do not attract PBS reimbursement) are allocated using iPharmacy feeder system to match drug costs to their associated episode. SWSLHD achieves a linking rate of 98.7%	54%
Ward imprest drugs		Ward imprest drugs are allocated using a relative weighting depending on occupied bed days, in line with other ward goods and services.	
Anaesthetic drugs		Anaesthetic drugs and associated costs are held in theatre imprest and mapped to the OR cost bucket using the relative weighting from the theatre (SurgiNet) feeder.	
Pharmacist S&W	RVU	Pharmacist S&W are allocated across S100, PBS and NPBS drugs based on the weighting derived from the value of the drugs.	19%
Ward based pharmacists		N/A – all pharmacist costs are sitting within the Pharmacy cost centre.	
Pharmacy system costs / licences		The costs associated with the iPharmacy system are mapped to an overhead cost centre and distributed in line with other overheads.	
Overheads / indirect costs	RVU	Pharmacy overheads include heat, light, facilities charges and overhead salaries and wages	20%
Other direct costs (transport, logistics / distribution / production costs)	RVU	Transport, distribution and procurement costs are centralised and are captured in price for drug. Other direct costs includes on-costs, depreciation, medical indemnity plus others.	7%

Pharmacy linking rules

SWSLHD uses iterative linking rules to match dispensed non PBS drug costs from iPharmacy to an episode. (PBS and S100 drugs are costed to Z encounters and ultimately excluded from costing submissions.) The rules initially attempt to match the data to ED encounters (within one

hour), inpatient encounters (within four hours) and non admitted encounters (within four hours) of the drug dispensed timestamp in the iPharmacy feeder, before widening the linking over multiple iterations to 3 days (ED), 10 days (inpatient), and 30 days (non admitted). SWSLHD has not done any analysis on the accuracy or capture rate of the linking rules at each iteration of the process.

Following this linking stage, all unmatched records are checked through a patient register to interrogate data quality, and where required, operational staff are requested to amend the source data to facilitate linking to episodic data. Where this is not possible, records which are still unmatched are manually checked on the Cerner system and linked to the appropriate episode. Checking the linking of all feeder systems is an activity conducted by the costing team on a monthly basis. This method achieves a linking rate of 98.7% of records, corresponding to 95.5% of non-PBS drugs expenditure. Whilst this level of linkage appears to be very high, we note that this does not include PBS and S100 records, which appear to be more challenging to link, based on consultations with other jurisdictions. 4.5% of the dispensed non-PBS drugs value (representing 1.3% of records) remained unlinked, were costed to Z encounters and were not submitted to the NHCDC. SWSLHD advised that these are largely de-identified patients (eg. sexual health).

Table 7: Linked feeder records from iPharmacy by volume and value

Product	iPharmacy records – Volume	iPharmacy records – Value (\$m)	Maximum Linking Rules
Acute	396,648	22.4	To 10 days
OP	33,779	4.9	To 30 days
ED	8,144	0.5	To 3 days
Sub Acute	-	-	N/A
MH	-	-	N/A
Linked	438,571	27.9	
Unlinked	5,575	1.3	
Unlinked %	1.3%	4.5%	

PBS and S100 drugs

The revenue team at SWSLHD conducts a monthly process to claim reimbursement for S100 drugs from the Commonwealth. The source of this claim comes from iPharmacy and is claimed at the level that the drugs are dispensed. Under NSW arrangements and in the absence of PBS Reform across the state, the patient co-payment element of PBS drugs dispensed to inpatients is claimed from the MOH every six months. A reconciliation between revenue and costs is carried out by the Finance team annually. There was 0.56% variance between the value of S100 / PBS claimed, and revenue received. SWSLHD reported that this was due to a small volume of claims for ineligible patients. No analysis has been carried out on the variance between the cost of drugs and revenue received.

5.1.5 Improvements

Improvements since Round 21

The NSW MOH has carried out work to make improvements to the following areas since Round 21:

- Improvements to the allocation of theatre time costs, by allocating unutilised time at a session level rather than allocating all unutilised time across all patients on the basis of theatre minutes.
- Ongoing improvements to the quality of pathology and blood feeder data. A data warehouse is being built to allow real time access to pathology data, which is a significant change from the disparate systems that pathology data was sourced from in previous rounds.
- Improving data quality for patient transport with HealthShare to allow a feeder system to be implemented, in particular around the linking issues to incorporate phone bookings which are recorded after hours rather than inputted into the system.

Future improvements in development for Round 23

- Developing a feeder for interpreter services. These costs are currently treated as an overhead but will be allocated as direct costs through this new feeder from Round 23.
- Commenced a costing study on admitted hospital in the home to develop RVUs for improved cost allocations of hospital in the home services by bed type.
- Commenced a costing study on Leading Better Value Care (LBVC) outpatient clinics to develop RVUs for improved cost allocations for LBVC clinics. LBVC is a NSW Health wide program seeking to identify and implement opportunities for delivering value based care to the people of NSW, using a systematic approach to embed good practice and measure care, experiences and health outcomes.

5.2 Victoria

Jurisdictional Overview

The Victorian Department of Health and Human Services (DHHS)'s costing function coordinates clinical costing for 38 Local Health Networks (LHNs) and 79 separate campuses in Victoria. In addition, Victoria has a number of small, block funded regional hospitals. Victoria has been conducting the Victorian Cost Data Collection (VCDC) which covers a broader scope than the NHCDC. The VCDC is an annual submission of costing data that collects patient level cost information across all hospital patient settings, which is used in the development of Victorian funding models.

There is a statewide chart of accounts in use in Victoria; however, there are no statewide feeder systems in place, and a devolved approach to clinical and feeder systems. A number of costing systems are in use across the state. Of the 38 health services, approximately 14 have in-house costing teams and use PPM, approximately 21 use CostPro with costing performed by SyRis Consulting and three smaller regional hospitals use a Health Economics consultancy firm to perform the costing for them. In-house costing teams typically consist of 1-2 FTE, largely as a result of the period of time that costing has been carried out in Victoria, resulting in well-defined and established processes since the inception of the cost data collection for Victoria's casemix funding model.

Hospitals/Health Services submit three VCDC datasets to DHHS, one covering cost data, one covering minimal activity data corresponding to the costed data and a further cost file at a more granular level for palliative care and mental health phase of care reporting. These are submitted on an annual basis in October each year. Following various quality assurance processes, the VCDC is converted to the NHCDC output by DHHS through a mapping exercise which maps the VCDC products into NHCDC products. This process also results in a significant amount of excluded items as a number of areas are in scope for VCDC purposes but out of scope for NHCDC, including community and residential homes. Within the Jurisdiction there are 2 FTE staff responsible for conducting and managing the VCDC and NHCDC processes at a state level, who are supported by 2 technical support staff. The Jurisdiction recognises that the current costing database used for the Victorian Cost Data Collection, which includes QA and mapping to the NHCDC output, is outdated and leads to significant processing time. As a result, a decision has been made to move to a scalable and more sustainable solution. The DHHS has developed a 9-12 month plan for the implementation of a cloud-based costing data warehouse in Azure, which uses Python and Power BI for the generation of costing dashboard visualisations.

Internally within the Jurisdiction, costing data is used by a number of teams, including the Funding, Program and Performance teams, as well as by external teams such as for research purposes.

Costing and operational staff in Victorian health services have recently been able to access IHPA's benchmarking portal, following resolution of issues with the connection security model. This will be supported by state-based dashboards in future rounds.

Monthly meetings for the Victorian Clinical Costing User Group (VCCUG) are conducted with health service costing practitioners, and focus on costing changes happening nationally, upcoming changes that will impact Victoria, and development of specific Victorian costing guidance. Sub-committees also operate on an ad-hoc basis, with membership tailored to include costing and health service representatives from specific areas, eg. Mental Health. There is also an annual costing forum open to anyone within the health service presenting costing topics, which compares data to the previous round. Last year this featured presentations from clinicians

using costing data to evaluate changes to clinical service models from inpatient to community. The forum has grown significantly over time and had over 200 attendees in FY19.

The three sites selected to participate in the Round 22 IFR were Monash Health, Bendigo Health and Mildura Base Hospital. Items specific to these facilities are discussed in later sections of this chapter.

5.2.1 Australian Hospital Patient Costing Standards v4.0

Compliance against AHPCS v4.0

Across Victoria, the AHPCS are viewed primarily as a resource that is useful for new costing practitioners, with experienced practitioners only reading them for changes and new ways of conducting costing. Victoria has developed specific guidelines to supplement national standards, providing additional information in areas not covered in sufficient detail by AHPCS 4.0, which health services are expected to adhere to. Currently the Victorian guidelines support AHPCS V4.0 and they cannot identify any areas of non-compliance against v4.0. The jurisdiction plans to review these during the next year to ensure full compliance against v4.0 and to develop further costing guidelines where necessary. Examples of where the local guidelines have been developed to date include salary and wages recovery, overhead allocation statistics, theatre allocations, posthumous organ donation, and the medical cost of treating private patients in specialist clinics.

All sites reported being materially compliant with the AHPCS v4.0 standards, with the exception of posthumous organ donation. PMI/PAS systems in use across the state prohibit the admission of a deceased patient for the purposes of allocation of the organ retrieval costs. Instead these are costed to dummy patients.

Feedback on AHPCS v4.0

Sites generally reported that the national standards supported by the local guidelines work well to meet their costing requirements. Specific feedback or areas for further development include:

- There are gaps in AHPCS v4.0 where there is a need for clarity, particularly with some business rules and how these can be applied to individual jurisdictions. An example of this is preferred allocation for overheads, which has been removed from AHPCS 4.0, and is an area where DHHS has provided additional guidance. This should be re-included into the next version of standards.
- Further development on the guidance in respect to posthumous organ donations and medical expenses for private and public patients.
- Inclusion of the cost bucket matrix in the next version of the standards would be helpful, as this has been omitted from v4.0.
- The Jurisdiction felt that the references to Australian accounting standards should not form part of the AHPCS as these were not relevant for costing purposes.
- The Jurisdiction would welcome business rules to cover the matching activity to cost for mental health activity at the phase of care level, where there are gaps in a phase being attributed over the course of an episode of care.

5.2.2 Quality Assurance

Victorian DHHS conducts extensive QA checks where records are flagged based on certain criteria and tolerance levels, with health services required to review and provide feedback on the validity of records. If, after investigation, costs are deemed invalid, health services can request that they are excluded from further use in analysis and funding development. The table below sets out a summary of the QA checks performed within Victoria.

Table 8: Summary of the QA checks performed within Victoria

Specific Quality Assurance	Performed by DHHS	Performed by facilities
Reconciliation		
Reconciliation back to general ledger & audited records	DHHS confirms that submissions match back to audited totals per the F1.	Yes – all sites reconciled the costing ledger back to the F1 submission to DHHS.
Reconciliation of activities back to source systems	N/A – all source systems are locally owned and devolved structures are in place.	Monash Health reconciles against datasets and where departments provide the data then the assumption is that the data is correct. Reconciliations are done on source systems at Bendigo, with particular focus on datasets with known issues e.g. VINAH (non-admitted activity). Reconciliations are performed by the Health Information Team at Mildura prior to sharing data extracts with SyRis for costing.
Reasonableness check of excluded items or out of scope costs e.g. WIP patients	Jurisdiction runs a number of automated checks on cost bucket variation in % / \$ terms, high total cost episodes, with health services required to review and provide feedback on outliers, including if costs are valid. If major issues are identified then health services may be asked to resubmit.	Reasonableness checks on out of scope costs (e.g. dummies, WIP, exclusions) are conducted by all sites, and are submitted as a reconciliation back to the F1 statement.
Trend analysis to prior periods in terms of distribution of costs across care products and LHD		These checks are built into the costing software used as audit checks on both PPM and CostPro. These pick up the majority of items for investigation before further audit checks are run by the jurisdiction. There is some overlap in the tests conducted, resulting in the majority of issues being investigated and corrected before submission to the jurisdiction.
Analysis of outliers at the cost, LoS or cost bucket level		
Proportion of direct vs overhead costs		
Proportion of costs sitting in each product (e.g. % costs in acute, ED, OP)		
Specific logic checks		
Regularly hold costing meetings?	There is a monthly VCCUG forum for all Victorian costing practitioners, and an annual conference to present the data to wider health service stakeholders.	Internal costing meetings are held monthly (Monash). At Bendigo and Mildura, meetings are held on an ad hoc basis given small number of FTE involved.
Regularly review and update cost centre allocations?	DHHS conducts annual checks on the mappings from VCDC to NHCDC products.	Monash – cost centre allocations are reviewed on a two-year rolling basis, focussing on priority areas or those with known issues. Bendigo and Mildura – cost centre allocations are reviewed annually with Finance.
Formal process sign off on data and accountability for data?	Yes	At Monash, the Director of Financial Operations signs off quarterly costing, with the CFO signing off the annual (NHCDC) costing submission. At Bendigo, the CFO signs off the annual submission. Mildura – Director of Commercial Services signs off the annual submission.
Reviews on data are conducted prior to submission?	Yes	Yes
Do local guidelines to support national AHPCS standards exist?	Guidelines covering a number of areas supplement national standards, with a view to developing a set of Victorian standards.	

5.2.3 Pharmacy

Pharmacy linking rules

Of the three sites visited, only one, Monash Health, used a feeder system to allocate dispensed pharmacy drugs on a patient basis. Bendigo and Mildura's pharmacy allocation methodologies are discussed in their subchapters below.

There is a Merlin feeder system in use for dispensed drugs at Monash Health, covering all PBS (including high cost S100 drugs) and non-PBS drugs. Of the \$93.8m of dispensed drugs costs identified from the feeder, \$17.4m was not able to be linked to episodic level data. This was costed to Z encounters and ultimately not submitted to IHPA.

Monash Health uses iterative linking rules to match dispensed drugs from Merlin to an episode. The linking rules attempt to match the UR number, date and time with firstly an ED encounter, then an inpatient, then private hospital outpatients, then flick back to ED 4 hours, 30 days either way. If none of these rules are fulfilled, the cost is allocated to a dummy encounter.

For each costing cycle, the costing team validates the data, reviews for missing data and goes back to pharmacy to fix any missing fields to maximise linking rates.

The linking rules yield a matching rate of 88.9% of records, corresponding to 86.3% of the value of dispensed PBS and non PBS drugs.

Monash Health has not performed any analysis to identify specific drivers of unlinked pharmacy cost, but cited challenges in a number of areas:

- A proportion of the unlinked value relates to drugs supplied to outside pharmacies for dispensing.
- Linking repeat scripts (which have increased in volume and value under PBS reform) is a significant challenge and disproportionately affects higher cost drugs for chronic conditions. Monash Health also has a fertility clinic, which results in repeat scripts for high value fertility drugs, often with no repeat attendances / admissions.

Table 9: Linked feeder records from pharmacy systems by volume and value – All Victorian sites

	Monash Health			Bendigo	Mildura
Product	Merlin linked records – Volume	Merlin linked records – Value	Maximum linking rule		
Acute	397,382	75,275,564	To 30 days*	iPharmacy system in place but not being used as a feeder for costing purposes	Merlin system in place but not being used as a feeder for costing purposes. PBS drugs do not pass through the GL as the service is handled by a third party provider.
OP	106,464	32,652,349			
ED	22,009	1,462,014			
Sub Acute					
MH					
Other					
Linked	88.9%	86.3%			
Unlinked	65,393	17,373,720			
Unlinked %	11.1%	13.7%			

* Chemotherapy linking rules are different due to pharmacy process of recording drugs for treatment anywhere up to 5 days before admission. Chemotherapy drugs are identified at the patient level. Monash are unable to identify specific drugs in the Merlin system that were dispensed for Chemotherapy purposes but have a list of drugs used as Chemotherapy and separate these from the Pharmacy drugs in the extract manually.

PBS and S100 drugs

Information on PBS processes was collected through the IFR data collection template and discussed in site visits with costing teams. At Bendigo, the pharmacy team was also involved in the IFR site visit.

Acute hospitals within Victoria submit PBS claims on monthly basis online to Medicare, and claims are paid out the following week. The source of claims is the pharmacy system (iPharmacy at Bendigo and Merlin at Monash). At Mildura, claims for PBS reimbursement are managed by the third party operating its pharmacy service, hence no PBS revenue or expenses pass through Mildura's GL.

Based on the information provided in the data collection templates, at Bendigo \$17.1m was the cost of reimbursable PBS / S100 drugs, for which \$18.3m revenue was received.

Bendigo advised that differences may be due to volume discounts obtained on the purchase price of drugs under Health Purchasing Victoria arrangements and the Commonwealth manufactured price which forms the basis for reimbursement. It was also noted that the reimbursement includes an 11.1% mark-up for dispensing costs.

Data on PBS drugs purchased versus claimed was not readily available for Monash, and not applicable for Mildura due to the third party purchasing and claiming arrangements.

5.2.4 Improvements

Improvements since Round 21

All sites have conducted work to make improvements since Round 21. The following improvements were identified:

- Monash Health used h-trak, an information management system used in theatres, where the direct scanning of prostheses at the point of care and the automatic link to pricing information is attached. This data was used for costing purposes from Round 22;
- Anaesthetics – off-floor work was added to more accurately reflect costs to areas including imaging, ICU, Cath Lab, MRI and pain management activities. This change was developed following consultation with the Anaesthetics team (Monash).
- Refined ED nursing and medical staffing cost allocations to allocate higher costs for penalty rates on weekends (Bendigo).
- Developed costings for transition care programs and palliative care community programs (Bendigo).
- Developed benchmarking / reporting at DRG level against peers (Mildura).

Future improvements in development for Round 23:

- Development of a patient revenue system to inform internal resource allocation at a patient and service level (Bendigo).
- Developing NEPT feeder and focus on data quality improvement plans relating to the TrakCare IPM feeder (Mildura).
- Projects at Bendigo Health include: developing telehealth allocation methods; reviewing allocations for allied health; and development of an iPharmacy feeder system to allow patient-level allocation of PBS drugs. Work on each of these projects is expected to take one FTE 2-3 months to complete and will involve review of activity and cost data and consultation with operational managers.

5.2.5 Monash Health Overview

Monash Health operates across eight sites as the biggest health network in Victoria with more than 1,900 beds. Monash Health will be inheriting the specialised Victorian Heart Hospital within the next two years. Currently Monash Health includes five acute hospitals, three emergency departments, a rehabilitation aged care facility, and a private hospital (which is costed, but not submitted to the VCDC or NHCDC). Across all sites there is a single PAS, making it easy for patients to transfer across sites with a unique identifier. There is one General Ledger and a single theatre system.

Costing at Monash Health is conducted quarterly, with each quarter being a year-to-date costing exercise where previous quarters are cleared out and re-costed. Currently this takes two to three weeks to conduct the costing process, using 1.6 FTE. There is a desire to move to monthly costing by senior stakeholders, but capacity within the team limits this. Monash Health conducts costing using PPM2 and has 68 feeder systems in place.

The Monash Health costing team has attempted to engage clinicians and executives with costing data outputs. Although a few clinicians have requested data for research purposes, there is a lack of engagement from the wider health service. Recently there has been an increase in interest in costing data and benchmarking of cost against peer facilities driven by executive changes, which has resulted in more costing data being distributed to business managers. Despite this, the Monash Health team has observed that there is limited resource investment for costing in health services in Victoria, and limited understanding of how services can be improved using the data available.

5.2.5.1 Monash Health Reconciliation

Table 10 presents a summary reconciliation from Monash Health's general ledger (GL) to the final NHCDC submission for Round 22.

Monash Health's final GL of \$1,882.1m was reconciled by the Health Service to the audited financial statements.

Explanation of reconciling items

Adjustments made at the Health Service level (Item B)

- Inclusions (\$22.4m) consists of National Blood Authority costs (\$20.6m), plus \$1.6m Health Purchasing Victoria (HPV) costs relating to a share of salary costs associated with statewide procurement activities. Both these costs are held centrally by DHHS and brought into scope for costing.
- Exclusions (\$14.2m) consists of capital expenditure.
- A WIP adjustment of \$55.0m was made for 2016-17, representing costs for patients who were discharged in the Round 22 year (2017-18) but admitted in the previous (2016-17) year. Similarly, a WIP adjustment to remove the costs for patients admitted in 2017-18 who had not been discharged by year end totalled \$65.7m.
- \$51.7m of costs sitting in cost centres associated with delivering healthcare to private patients in a public setting were excluded from the GL position.

After the adjustments above, \$1,828m of costs were submitted to the Jurisdiction as part of the VCDC collection.

Adjustments made at the jurisdiction level (Item E)

Jurisdiction adjustments to Monash Health's costed products totalled a reduction of \$339.5m, and were required to align the data submitted for VCDC to NHCDC data and remove the out-of-scope products. These adjustments consisted of:

- Quality assurance exclusions totalling \$283k, most of which (\$229k) was in the admitted setting. The majority of these exclusions relate to records which did not meet IHPA's cost data specification and were flagged by IHPA's QA. A small portion of these episodes did not contain critical errors, but were flagged as outliers by hospitals and requested not to be submitted by the Jurisdiction. Victoria is the only jurisdiction to exclude such costs.
- Other out-of-scope (OFS) costs within the U (Other Non-Admitted), W (Other Admitted), X (Other / Non-Patient), M (Mental Health) and C (Community Health) programs were excluded as these are in scope for VCDC but out of scope for NHCDC:

- Other non-admitted (U) totalled \$185.0m exclusions and mainly consists of Z / dummy encounter costs which could not be linked to inpatient or outpatient episodes (\$87m), with the balance relating to costs associated with private / directly referred Medicare activity within diagnostics / catheterisation labs;
- Other admitted (W) costs of \$26.7m were excluded, as these related to nursing homes and are not in scope for NHCDC;
- Mental Health (M), which includes community activity and totals \$68.9m, was excluded this round (Acute Mental Health sits in the 'Admitted' (A) VCDC program); and
- Non patient products (X) of \$25.6m were removed.

The value of NHCDC-costed products submitted to IHPA after the above adjustments was \$1,436.4m.

Table 10: Reconciliation from General Ledger to NHCDC Costed Products – Monash Health

Monash Health			Jurisdiction			IHPA					
Item		Amount	Item		Amount	Item		Amount			
Source: Self-Assessment	A	General Ledger (GL)	\$ 1,882,147,915	D	Costed products received by jurisdiction	\$ 1,827,973,068	G	Total costed products received by IHPA	\$ 1,436,440,107		
	B	Adjustments to the GL		Source: Data collection template	E	Post Allocation Adjustments		H	IHPA Adjustments	\$ -	
		Inclusions	\$22,419,733			QA Exclusions	(\$283,277)		Newborn - transfer to acute	(\$9,333,218)	
		Exclusions	(\$14,234,764)			OFS Exclusions	(\$391,249,681)		Acute - transfer from newborn	\$9,333,218	
		WIP included (2016-17 patients)	\$55,071,731			Total costs submitted to IHPA	\$1,436,440,110	I	Final NHCDC costs	\$1,436,440,107	
		WIP excluded (2017-18 patients)	(\$65,717,897)						% of GL submitted to NHCDC	79%	
		Private patient costs	(\$51,713,646)								
		Total hospital expenditure	\$ 1,827,973,072								
Source: Data collection template	C	Costed products submitted to jurisdiction		Source: Data collection template	F	Costed products submitted to IHPA (remapped from VCDC to NHCDC products)	Costed products per NHCDC				
		A - Admitted	\$ 1,103,826,412			Acute	\$864,454,703	Acute	\$ 927,957,086		
		C - Community	\$ 54,924,219			Newborns	\$ 63,502,383	Outpatient	\$ 196,510,747		
		E - Emergency	\$ 142,602,549			Outpatient - Tier 2	\$ 196,510,747	Emergency	\$ 142,602,549		
		M - Mental Health (Comm)	\$ 68,897,950			Outpatient Non Tier 2		Sub Acute	\$ 86,130,218		
		N - Non-Admitted	\$ 220,388,883			URG - Admitted	\$ 91,791,190	Mental Health	\$ 83,058,376		
		U - Other Non-Admitted	\$ 184,950,967			URG - Non- Admitted	\$ 50,811,359	Other	\$ 181,131		
		W - Other Admitted	\$ 26,746,413			UDG - Admitted		Total	\$ 1,436,440,107		
		X - Other Non-Patient	\$ 25,635,676			UDG - Non Admitted					
		Total	\$ 1,827,973,068			Sub Acute	Rehabilitation	\$ 45,478,355			
		Variance	\$ 4				Palliative Care	\$ 8,337,114			
							GEM	\$ 32,314,749			
							Psych Geriatric Maintenance				
							Mental Health	Admitted Mental Health (MC)	\$ 83,058,376		
								Non Admitted Specialist Mental Health (MS)			
								Non Admitted Mental Health (MH)			
								Residential Mental Health (MR)			
						Other Admitted Patient Care					
						Organ Procurement	\$ 181,131				
						Outreach & community care					
						Boarder					
						Other					
						Research					
						Teaching & Training					
						Dummy/virtual patients (No NHCDC Product)					
						Total	\$ 1,436,440,107				

5.2.5.2 Monash Health Pharmacy

Pharmacy costs and allocation methods

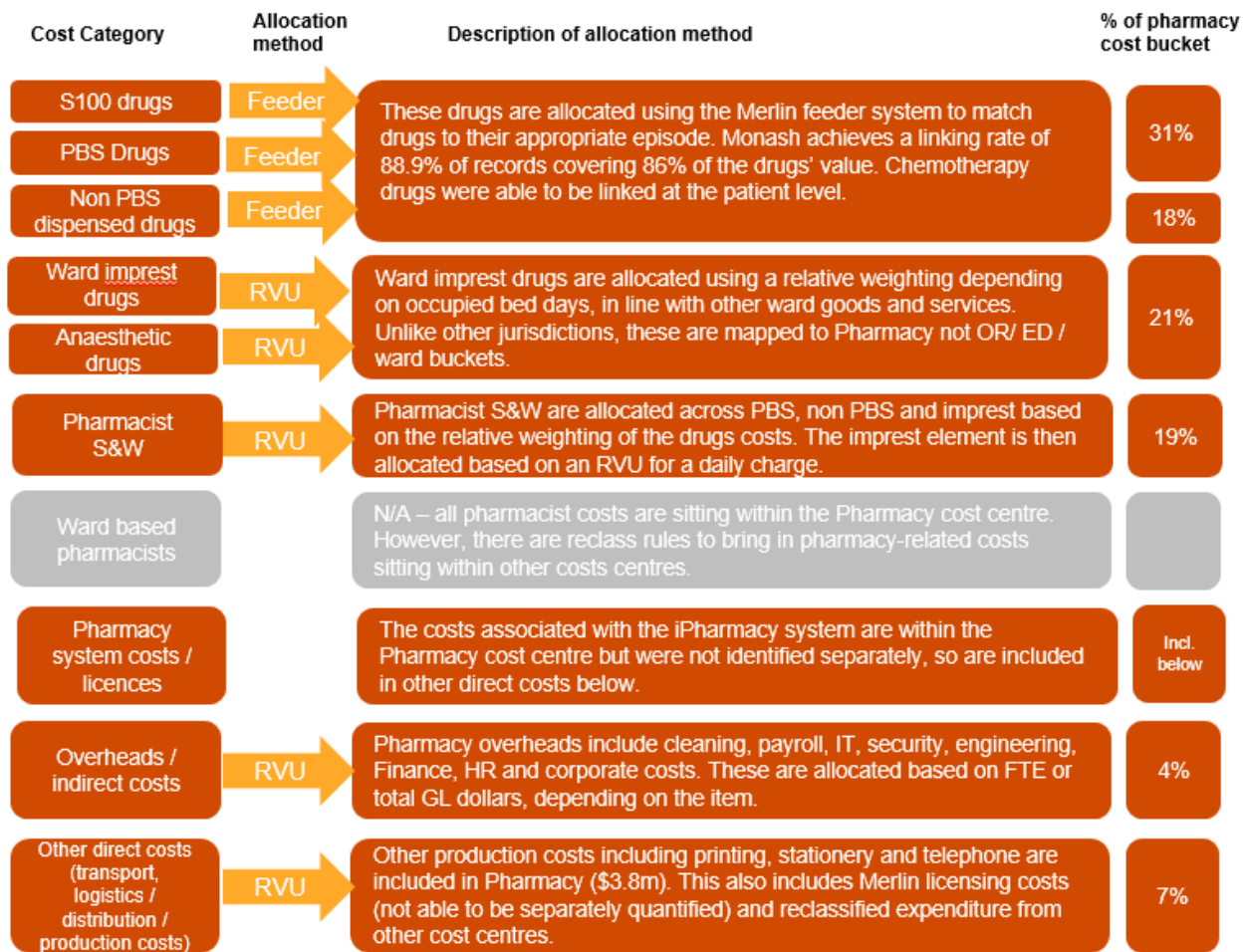
The diagrams and narratives below outline the categories of expenditure that are mapped to the pharmacy cost bucket in Monash, as well as allocation methods used.

Based on information collected from the site visits and IFR data collection templates, Monash Health identified \$126.8m of pharmacy costs for Round 22, comprising:

- Drug costs of \$93.8m (split into PBS drugs \$51.5m, imprest drugs \$22.5m and non PBS drugs \$19.7m). Imprest drugs are not linked to a unique reference identifier and are allocated dependent on the allocation methodologies in use in those areas, for example, length of stay, theatre minutes, or ED minutes;
- Pharmacy salaries and wages (\$20.4m);
- Other goods and services (\$3.8m), which includes Merlin system costs;
- Reclassified expenditure sitting in non-pharmacy areas (\$4.3m), which includes expenditure in pharmacy-related account codes, such as drug lines in corporate cost centres; and
- Overheads (\$4.5m), which include a proportion of cleaning, payroll, IT, security, engineering, finance, HR and corporate costs. These are allocated based on FTE or GL total dollars, depending on the overhead item.

\$17.4m of costs could not be linked to episodes and were costed to dummies, meaning that approximately \$109.4m pharmacy costs were included in the NHCDC submission.

Diagram 8 – Allocation methods and make-up of pharmacy costs submitted to NHCDC - Monash



5.2.6 Bendigo Health Overview

The second selected site for the Round 22 Independent Review in Victoria was Bendigo Health. Bendigo Health operates as one of the larger regional health services in Victoria, with approximately 450 beds, and treats around 80,000 patients per year. The new Bendigo Hospital opened in January 2017. Bendigo Health also manages four residential care facilities, services a large part of the community in the Loddon Mallee Region and is developing a larger presence in the delivery of telehealth services.

Costing at Bendigo Health is conducted annually across acute, sub-acute and psychiatry by 1.8 FTE, using the PPM system. Until recently the costing team was operating with 1 FTE. Currently the timeframe for completing the costing process is 3-4 months. The process involves reviewing existing or new cost centre mappings within the GL, extracting activity and interface (feeder) data and reviewing known problem areas, and loading into the costing system. Bendigo has 38 feeder systems in place.

Costing data is used at Bendigo Health to support business cases and research studies to good success. A static dashboard has been developed by the costing team to allow for additional engagement with clinicians and allied health; however, there is a desire for more collaboration

between clinicians and the Bendigo Health costing team to inform the organisation regarding improved resource allocation opportunities.

5.2.6.1 Bendigo Health Reconciliation

The table below presents a summary reconciliation from Bendigo Health's general ledger (GL) to the final NHCDC submission for Round 22. Bendigo Health's GL of \$511.2m reconciled by the health service to the audited financial statements.

Explanation of reconciling items at the hospital level

- Inclusions (\$3.3m) consist of National Blood Authority costs (\$2.8m), plus \$0.5m Health Purchasing Victoria (HPV) costs relating to a share of salary costs associated with statewide procurement activities. Both these costs are held centrally by DHHS and brought into scope for costing.
- Exclusions (\$68.2m) consist of capital, non-operational expenses that should not be used to allocate cost. The high value of this exclusion reflects Bendigo being a public/private partnership hospital with significant capital costs which are included on the GL but are out of scope for costing purposes. The largest components of this capital relate to EMR planning and the new hospital development.
- A WIP adjustment of \$4.4m was made for 2016-17, representing costs for patients who were discharged in the Round 22 year (2017-18) but admitted in the previous (2016-17) year. Similarly, a WIP adjustment to remove the costs for patients admitted in 2017-18 who had not been discharged by year end totalled \$7.5m. The movement in WIP reflects normal fluctuations in length of stay for sub-acute patients, plus some long-term psychiatric patients whose treatment crossed costing years.

These adjustments resulted in \$443.4m being submitted to the Jurisdiction as part of the VCDC submission.

Adjustments made at the jurisdiction level (Item E)

Jurisdiction adjustments to Bendigo Health's costed products reduced costs by \$148.5m, and were required to align the data submitted for VCDC to NHCDC data. These adjustments consisted of:

- Quality assurance exclusions of \$37k. The majority of these exclusions relate to records which did not meet IHPA's cost data specification and were flagged by IHPA's QA. A small portion of these episodes did not contain critical errors, but are flagged as outliers by hospitals and requested not to be submitted by the Jurisdiction. Victoria is the only jurisdiction to exclude such costs.
- Other out of scope (OFS) costs of \$148.4m within the U, W, X, M and C VCDC programs were excluded as these are in scope for VCDC, but out of scope for NHCDC:
 - Other non-admitted (U) totalled \$42.8m exclusions and mainly consists of Z / dummy encounter costs which could not be linked to inpatient or outpatient episodes, or costs associated with private / directly referred Medicare activity within diagnostics / catheterisation lab;
 - Other admitted (W) costs (\$24.4m) predominantly related to nursing homes and are not in scope for NHCDC;
 - Mental health (M) relating to community mental health (\$39.6m) was excluded;

- Community (C) costs (\$9.6m) - the most significant component of this was oral health;
- \$13.6m of costs was removed from Admitted, ED and Non admitted as out of scope (note that the majority of costs in these buckets was submitted to NHCDC); and
- Other non patient products (X) of \$18.7m were removed.

The value of NHCDC costed products submitted to IHPA after the above adjustments was \$294.9m.

Table 11 – Reconciliation from General Ledger to NHCDC Costed Products – Bendigo Health

	Bendigo Health		Jurisdiction		IHPA
Item	Amount	Item	Amount	Item	Amount
Source: Self-Assessment	A General Ledger (GL) \$ 511,237,588	D Costed products received by jurisdiction \$ 443,381,193	G Total costed products received by \$ 294,917,610	H IHPA Adjustments \$0	
B Adjustments to the GL	Inclusions \$3,315,716	E Post Allocation Adjustments (\$148,463,583)	H Newborn - transfer to acute \$4,584,113	I Acute - transfer from newborn (\$4,584,113)	
	Exclusions (\$68,162,366)	QA and OFS Exclusions (\$148,463,583)	I Final NHCDC costs \$ 294,917,610	% of GL submitted to NHCDC 67%	
	WIP included (patients discharged current FY) \$4,447,041	Total costs submitted to IHPA \$ 294,917,610			
	WIP 2017 - 18 (\$7,456,787)				
	Total hospital expenditure \$ 443,381,193				
Source: Data collection template	C Costed products submitted to jurisdiction	Source: Data collection template	F Costed products submitted to IHPA (remapped from VCDC to NHCDC products)		
Bendigo Hospital	A - Admitted \$ 229,615,870	Acute	AR DRG \$167,701,671	Costed products per NHCDC	
	C - Community \$ 9,583,666		Newborns \$9,581,967	Acute \$ 177,283,638	
	E - Emergency \$ 36,383,265	Outpatient	Outpatient - Tier 2 \$24,540,528	Outpatient \$ 24,540,528	
	M - Mental Health (Comm) \$ 39,432,936		Outpatient Non Tier 2	Emergency \$ 36,381,095	
	N - Non-Admitted \$ 33,018,311	Emergency	URG - Admitted \$13,704,451	Sub Acute \$ 26,124,521	
	U - Other Non-Admitted \$ 42,845,841		URG - Non- Admitted \$22,676,644	Mental Health \$ 25,840,596	
	W - Other Admitted \$ 24,214,905		UDG - Admitted	Other \$ 4,747,232	
	X - Other Non-Patient \$ 18,652,949		UDG - Non Admitted	Total \$ 294,917,610	
Anne Caudle	M - Mental Health (Comm) \$ 140,831	Sub Acute	Rehabilitation \$13,672,206		
	N - Non-Admitted \$ 9,492,619		Palliative Care \$2,435,879		
	Total \$ 443,381,193		GEM \$10,016,436		
Variance	\$ 0	Mental Health	Psych Geriatric Maintenance		
			Admitted Mental Health (MC) \$25,840,596		
			Non Admitted Specialist Mental Health (MS)		
			Non Admitted Mental Health (MH)		
		Other	Residential Mental Health (MR)		
			Other Admitted Patient Care		
			Organ Procurement \$4,747,232		
			Outreach & community care		
			Boarder		
			Other		
			Research		
			Teaching & Training		
			Dummy/virtual patients (No NHCDC Product)		
			Total \$ 294,917,610		

5.2.6.2 Bendigo Health Pharmacy

Through the data collection template and in consultation with the pharmacy and costing team, Bendigo Health identified \$27.8m of pharmacy costs for Round 22, comprising:

- Drug costs of \$21.0m (split into PBS drugs (\$17.1m) and non PBS drugs (\$3.9m);
- Pharmacy salaries and wages (\$3.0m) covering approximately 30 FTE: 21 pharmacists, 8 Technicians and 2 interns;
- Other goods and services (\$150k), which relate to storage costs and pharmacy consumables;
- Central overheads (\$3.7m), including finance, HR electricity, gas and administration costs; and
- \$11k of out of scope costs were excluded.

There is no feeder system to link dispensed drugs at an episode level, and so \$17.1m PBS drugs were allocated to dummy encounters and excluded from NHCDC submission, meaning that only approximately \$10.7m pharmacy costs were included in the NHCDC submission.

Diagram 10: Allocation methods and make-up of pharmacy costs submitted to NHCDC - Bendigo

Cost Category	Allocation method	Description of allocation method	% of pharmacy cost bucket
S100 drugs		There is no feeder system in use for pharmacy at Bendigo Health, and as a result PBS drugs are costed to a dummy encounter and excluded from submission to the NHCDC. These totalled \$17.1m of the \$27.8m pharmacy costs identified by Bendigo Health.	
PBS Drugs			
Non PBS dispensed drugs	RVU	Non PBS outpatients are allocated using an RVU with a constant of 1 across all outpatient clinics. Note that in the data provided, costs for imprest and non PBS dispensed drugs were not able to be separated.	36%
Ward imprest drugs	RVU	Ward imprest drugs are allocated using a relative weighting depending on occupied bed days, in line with other ward goods and services. Unlike other jurisdictions, these are mapped to Pharmacy, not OR/ ED / ward buckets.	
Anaesthetic drugs	RVU		
Pharmacist S&W	RVU	Pharmacist S&W are first fractioned across inpatients, outpatients, emergency, mental health and subacute specific accounts, and then allocated equally across these cohorts of activity.	28%
Ward based pharmacists		N/A – all pharmacist costs are sitting within the Pharmacy cost centre.	
Pharmacy system costs / licences		These are sitting within IT and allocated as overheads.	
Overheads / indirect costs	RVU	Pharmacy overheads include finance, HR, electricity, gas and administration costs. These are allocated based on FTE or total GL dollars depending on the item.	35%
Other (transport, logistics / distribution / production costs)	RVU	Other direct costs include storage costs and pharmacy consumables, offset by a small reduction of out of scope costs, netting to \$139k.	1%

5.2.7 Mildura Base Hospital Overview

Mildura Base Hospital has 186 beds including 18 sub-acute beds that service a geographical region with a large retirement and indigenous population, seasonal overseas workers and many mental health issues. Overall, the hospital services around 20,000 patients per year, as well as 30,000 emergency presentations out of a single facility. Mildura Base Hospital is unique in that it is managed by Ramsay Health Care, a private operator, as a public hospital.

SyRis Consulting conducted the costing at Mildura Base Hospital annually during Round 22 as an outsourced activity. Previously costing was conducted quarterly, but the implementation of a new PMI system (Intersystems TrakCare) has led to a number of data quality issues. Some of the most significant issues stem from the ward transfer report, which identifies which ward an inpatient was on at a given point in time, driving the allocation of many ward-based costs based on a patient's ward stay duration. Once these issues are resolved, there is a desire to move back to quarterly, and ultimately monthly costing. Around 0.5 FTE are involved with costing Mildura

Base Hospital at SyRis Consulting, with the costing round currently taking 2-3 months to complete. In comparison, other Victorian SyRis sites take 2-3 weeks to cost once the feeder system issues are resolved.

Mildura Hospital Health Information Services provide feeder data extracts directly to SyRis Consulting. Feeders in use include Victorian Weighted Inlier Equivalent Separation (WIES) extract, theatre register, ward LoS report, pathology extract (third party service performed by ClinicalLabs), radiology, ED triage data, VMO and prosthesis. Mildura has 11 feeder systems in place.

The final output of costing was reported to be rarely used by the hospital; however, it has been sporadically used for peer reviews by doctors and to support business case submissions. Recently costing outputs have been requested by the Director of Corporate Services, in order to better manage surgical services and emergency beds at the hospital.

5.2.7.1 Mildura Health Reconciliation

The table below presents a summary reconciliation from Mildura Base Hospital's general ledger (GL) to the final NHCDC submission for Round 22. Bendigo Health's GL of \$116.8m was reconciled by the health service to the audited financial statements.

Explanation of reconciling items at the hospital level

- Inclusions (\$2.3m) consist of National Blood Authority costs plus Health Purchasing Victoria (HPV) costs relating to a share of salary costs associated with statewide procurement activities. Both these costs are held centrally by DHHS and brought into scope for costing.
- \$2.4m was excluded as costed activity could not be matched to episodes. The majority of this (\$1.8m) related to pathology activity which did not include episode numbers during TrakCare migration. Matching procedures were updated in 2019, so this value is expected to reduce in Round 23. Other unmatched utilisation included outpatient diagnostic imaging (\$0.2m), VMO payments (\$0.3m) and theatre (\$0.1m).
- Exclusions (\$1.1m) relates to payroll tax, which is out of scope for NHCDC purposes but is payable by Mildura as a result of being privately operated.
- WIP adjustment of \$1.7m was made for 2016-17 to include costs for patients who were discharged in the Round 22 year (2017-18) but admitted in the previous (2016-17) year. The WIP adjustment to remove the costs for patients admitted in 2017-18 who had not been discharged by year end was just \$27k. The movement in WIP reflects an issue in extracting data relating to WIP patients following the new PMI implementation when the data was extracted in June 2018, and is likely to understate closing WIP, resulting in Round 22 costs being overstated by approximately \$1.7m (1.7% of costed products submitted to IHPA).
- \$0.3m of special purpose fund costs for the cafeteria was removed as did not relate to patient care.

These adjustments resulted in \$116.9m being submitted to the Jurisdiction as part of the VCDC submission.

Adjustments made at the jurisdiction level (Item E)

Jurisdiction adjustments to Mildura Base Hospital's costed products reduced them by \$18.3m, and were required to align the data submitted for VCDC to NHCDC data and remove costs relating to out-of-scope products. These adjustments consisted of:

- Quality assurance exclusions of \$1.4m in the admitted setting. The majority of these exclusions relate to records which did not meet IHPA's cost data specification and were flagged by IHPA's QA. A small portion of these episodes did not contain critical errors, but are flagged as outliers by hospitals and requested not to be submitted by the jurisdiction. Victoria is the only jurisdiction to exclude such costs.
- Other out of scope (OFS) costs totalling \$16.9m within the U, W, X and C VCDC programs were excluded as these are in scope for VCDC, but out of scope for NHCDC:
 - Other non-admitted (U) totalled \$42.8m exclusions and mainly consists of Z / dummy encounter costs which could not be linked to inpatient or outpatient episodes, or costs associated with private / directly referred Medicare activity within diagnostics / catheterisation lab;
 - Other admitted (W) costs of \$24.4m were excluded. These predominantly related to nursing homes and are not in scope for NHCDC;
 - Mental health (M) costs of \$39.6m were excluded this year;
 - Community (C) costs (\$9.6m), the most significant component of which was oral health;
 - \$13.6m of costs was removed from Admitted, ED and Non admitted as out of scope (note that the majority of costs in these buckets was submitted to NHCDC); and
 - Other non patient products (X) (\$18.7m).

The value of NHCDC costed products submitted to IHPA after the above adjustments was \$98.7m

Table 12 – Reconciliation from General Ledger to NHCDC Costed Products – Mildura Base Hospital

Mildura Base Hospital			Jurisdiction			IHPA		
Item	Amount		Item	Amount		Item	Amount	
Source: Self-Assessment			Source: Data collection template					
A	General Ledger (GL)	\$ 116,821,088	D	Costed products received by jurisdiction (VCDC)	\$ 116,936,809	G	Total costed products received by IHPA	\$ 98,658,673
B	Adjustments to the GL		E			H	IHPA Adjustments	\$0
	Inclusions	\$2,317,247		QA Exclusions	(\$1,397,962)		Newborn - transfer to acute	(\$877,967)
	Exclusions	(\$1,114,673)		OFS Exclusions	(\$16,880,174)		Acute - transfer from newborn	\$877,967
	WIP 2016-17	\$1,693,801		Total costs submitted to IHPA	\$ 98,658,673	I	Final NHCDC costs	\$ 98,658,673
	WIP 2017-18	(\$27,873)						
	Other post allocation exclusions	(\$2,752,781)					% of GL submitted to NHCDC	84%
	Total hospital expenditure	\$ 116,936,809						
			Source: Data collection template					
C	Costed products submitted to jurisdiction (VCDC)		F	Costed products submitted to IHPA (remapped from VCDC to NHCDC products)			Costed products per NHCDC	
Source: Data collection template							Acute	\$ 73,785,247
	A - Admitted	\$ 85,871,193	Acute	AR DRG	\$ 71,017,923		Outpatient	\$ -
	C - Community	\$ -		Newborns	\$ 2,767,324		Emergency	\$ 14,207,858
	E - Emergency	\$ 16,114,736	Outpatient	Outpatient - Tier 2			Sub Acute	\$ 6,278,992
	M - Mental Health (Comm)	\$ 9,340,835		Outpatient Non Tier 2			Mental Health	\$ 4,386,576
	N - Non-Admitted	\$ -	Emergency	URG - Admitted	\$ 3,687,493		Other	\$ -
	U - Other Non-Admitted	\$ 5,610,045		URG - Non- Admitted	\$ 10,520,365		Total	\$ 98,658,673
	W - Other Admitted	\$ -		UDG - Admitted				
	X - Other Non-Patient	\$ -		UDG - Non Admitted				
	Total	\$ 116,936,809	Sub Acute	Rehabilitation	\$ 5,532,733			
	Variance	\$0		Palliative Care	\$ 699,635			
				GEM	\$ 46,624			
				Psych Geriatric Maintenance				
			Mental Health	Admitted Mental Health (MC)	\$ 4,386,576			
				Non Admitted Specialist Mental Health (MS)				
				Non Admitted Mental Health (MH)				
				Residential Mental Health (MR)				
			Other	Other Admitted Patient Care				
				Organ Procurement				
				Outreach & community care				
				Boarder				
				Other				
				Research				
				Teaching & Training				
				Dummy/virtual patients (No NHCDC Product)				
			Total	\$ 98,658,673				

5.2.7.2 Mildura Base Hospital Pharmacy

Through the data collection template and in consultation with the Information Manager and SyRis costing team, Mildura Base Hospital identified \$2.3m of pharmacy costs for Round 22, comprising:

- Drug costs of \$2.6m, which comprised \$1.6m ward imprest, \$0.4m theatre drugs, \$0.4m ED drugs and \$0.2m external pharmacy costs
- \$0.2m costs relating to nursing admin, executive and education were removed to go into overheads for allocation to other cost centres

Since July 2017 the pharmacy service has been run by a third party and so no pharmacist salaries and wages costs sit on Mildura's ledger, with these costs being built into the cost of drugs supplied. The third party also runs the PBS purchasing and claiming on Mildura's behalf, which means that PBS costs of an estimated \$5-6m do not pass through the GL. These drugs are recorded on a separate pharmacy system, with Merlin only covering dispensed non PBS and imprest drugs. It is possible that Mildura loses out on an incremental profit because of this arrangement.

There is no feeder system to link dispensed or imprest drugs at an episode level. Instead these are allocated based on theatre minutes, ward hours or ED weighted minutes.

Diagram 12– Allocation methods and make-up of pharmacy costs submitted to NHCDC - Mildura Base Hospital

Cost Category	Allocation method	Description of allocation method	% of pharmacy cost bucket
S100 drugs		The cost of PBS drugs does not sit on Mildura's GL as the purchase and claiming are managed by a third party on their behalf. The costs incurred by the third party were estimated at \$5-6m, entirely offset by revenue (plus a small mark up).	
PBS Drugs			
Non PBS dispensed drugs	RVU	<p>In the data provided, imprest and non PBS dispensed drugs were not able to be separated.</p> <p>Non PBS outpatients are allocated using an RVU with a constant of 1 across all outpatient clinics.</p> <p>Ward imprest drugs are allocated across all inpatients on that ward based on ward hours.</p>	69%
Ward imprest drugs	RVU		
Anaesthetic drugs	RVU	Anaesthetic drugs totalling \$376k were allocated based on theatre minutes. Similarly, ED drugs totalling \$361k were allocated based on weighted ED minutes.	16%
ED drugs	RVU	ED drugs totalling \$361k were allocated based on weighted ED minutes.	15%
Pharmacist S&W		No Pharmacist S&W pass through Mildura's GL as a result of the third party provision of pharmacy services.	
Ward based pharmacists		N/A – no pharmacist costs are sitting in other cost centres.	
Pharmacy system costs / licences		These costs are allocated as overheads.	
Overheads / indirect costs		No overheads are allocated to Pharmacy as a result of the third party provision arrangements. Instead, \$197k are removed and allocated to other parts of the hospital. These costs relate to nursing admin and executive	
Other direct costs		No additional costs are sitting within Pharmacy	

5.3 Queensland

Jurisdictional Overview

The Queensland Department of Health (DoH) provides the oversight and governance for the costing function undertaken within the state's 16 Hospital and Health Services (HHSs). The Queensland DoH activity costing team directly performs the costing function for four rural and remote Hospital and Health Services: South West Queensland, Central West Queensland, North West Queensland, and Torres and Cape. The remaining 12 HHSs have their own costing teams and perform costing at the HHS level. The majority of jurisdiction and HHSs cost patient activity on a monthly basis with some quarterly and some annually. Data is submitted to IHPA annually for the purposes of the NHCDC. In Round 22, costing data for 508 facilities were submitted to the Queensland DoH; of these, 196 facilities were in scope for the NHCDC.

Three costing systems were in use across Queensland during Round 22. These included the legacy costing system, Transition II (TII), which was used by the Queensland Department of Health and facilities with in house costing teams participating in the Round 22 IFR. Power Performance Manager (PPM2) and CostPro are also in use.

The jurisdiction activity costing team comprised 4 FTE for Round 22 who manage the data transformation process of Hospital and Health Service costing data for jurisdictional reporting and for submission for national costing datasets. There are approximately 20 FTE involved directly in the management of the costing function in HHS costing teams across Queensland, and a similar number of FTE's who are in business and clinical analysis roles who are regular consumers of the HHS costing data.

There is a monthly costing network teleconference meeting attended by costing teams state-wide and chaired by the Queensland Department of Health. The department facilitates discussion between all the costing teams with a focus on disseminating information provided by IHPA, jurisdictional programs and activities associated with costing, funding and purchasing. There is also an informal costing network at the HHS level which does not involve the department staff. Through these networks, costing knowledge is shared, and ideas are discussed to promote best costing practice across all HHSs. In addition, an annual costing forum takes place, which is attended by health service stakeholders. The forum involves department-led and HHS-led presentations, with topics based on costing processes and outcomes, funding models, purchasing models and clinical service delivery models and incentives, including value-based healthcare.

There are several state-wide and multi-site feeder systems common to the HHSs. These systems are listed in the table below.

Table 13– Feeder systems in use across Queensland during R22

FEEDER SYSTEM TYPE	SYSTEMS
Allied Health Intervention Data	PI5, ABC, ALLIED One, AHIIS
Outpatient Data	APP2, OSIM, ESM
Blood Products Data	BLOOD
Community Mental Health Data	CIMHA
Delivery (Birthing) Data	DEL
Diagnostic Imaging Data	QRIS, RIPS, KESTRAL, CRIS
Emergency Presentation Data	EDIS, REDDIT, EMG2, Firstnet
Medical ATD (Bedday) Data	ATD (derived data)
Nursing Acuity Data	Trendcare (not all sites)
Nursing ATD (Bedday)Data	ADT (derived data)
Operating Theatre Data	ORMIS, Surginet
Pathology Data	Auslab
Pharmacy Data	iPharmacy
Virtual Patient Data	VPG

In addition to the feeder systems shown above, several HHS teams have implemented additional local clinical systems to improve the utilisation capture of the patient journey. These include but are not limited to Intensive Care, Cardiology, Lithotripsy, Community Health, Prosthetics (where not captured in operating theatre feeder data), Sub-Acute, Total Parenteral Nutrition, Procedure Suite and Oncology.

Queensland has a nursing acuity system in use, called Trendcare which is used at several facilities. This system is based on time and motion studies associated with nursing staff undertaking defined common clinical functions, which are each assigned a time. At the commencement of the shift the nurse will review and update the care plan for each patient, and this is reviewed by the nurse at the end of the shift. The system adds the value of each clinical function and calculates the clinical time in minutes. Facilities have been successfully using this system for a number of years, but the jurisdiction recognises that barriers to implementing this more widely include the cost of the system, and impact on nursing staff. The system also enables the costing team to add evening and weekend loadings using timestamps. Reviews undertaken with costing data in previous years identify that while the overall cost outcome for nursing costs may not significantly differ in a ward environment for patients of similar clinical acuity across their length of stay, a clearly different daily costing profile can be observed using Trendcare, which more accurately reflects the patient's clinical resourcing requirements. This information has been used in clinical service delivery analysis.

Patient level costing in Queensland works on a consumption model. At a department or clinical unit level services are created for the diagnosis, treatment and support of health outcomes. To provide these services, human and material resources are consumed. The relative costliness of a service (product) is calculated by using relative value units - which weight the resources required to produce a product and product volumes as a percentage of the department budget. All labour is costed as time in minutes / relative time value in minutes. Where the available product is a count-based product as occurs with admission/discharge/transfer (ADT) data (fractional bed days), a base RVU is applied to the costing data based on average time spent by each clinical stream (for example, number of minutes per patient per day for a given type of clinical staff). This is then reviewed locally and adjusted as required to ensure accurate reflection of the costed intermediate product from a human and material resource perspective.

Three HHSs participated in the Round 22 IFR: South West Queensland HHS, Metro North HHS, and West Moreton HHS. The review was conducted with staff from each of these HHSs.

5.3.1 Application of Australian Hospital Patient Costing Standards (v4.0)

Across the jurisdiction all HHSs used v4.0 of the AHPCS for Round 22. To supplement national standards and increase consistency across the state, the department has developed guidelines to support the implementation in line with the data outputs and systems in use across Queensland. All HHSs consulted for this review utilised the Queensland guidelines.

All sites reported being materially compliant with the AHPCS v4.0 standards, with challenges noted in the following areas:

- **Posthumous organ donation** – Patient Master Index systems in use across the state prohibit the admission of a deceased patient for the purposes of allocation of the organ retrieval costs. Further, organ donations can impact multiple patients.
- **Depreciation** – Across the state building depreciation is costed to a virtual patient and ultimately not submitted to the NHCDC, in contrast to the AHPCS standards which state it should be treated as an indirect cost. Where depreciation is specific to a facility this is mapped to the direct department as an overhead.
- **Hotel Services** – In Queensland during the build of the costing databases, hotel services are treated as direct (final) departments. This follows the definition that services are directly received/ consumed by patients from those areas. Length of stay and hospital clinic attendances are used for costing hotel services. The jurisdiction noted that this treatment as a direct cost does not change the mapping in IHPA's cost bucket matrix.

5.3.2 Quality Assurance

Quality assurance of data is undertaken at both the HHS and the jurisdiction level. The HHS costing teams run weekly and monthly audit reports to resolve any source / feeder data that requires review and liaising with operational teams to make changes at source level.

There are 25 end of year specific data checks at the HHS level, and the majority of these checks are audit reports generated by the costing teams. These are largely run on Crystal reports and are standardised across the jurisdiction for both metropolitan and rural and remote facilities. These are designed to highlight anomalies with source data or possible incorrect cost codes and data matching. Anomalies are then investigated by the local costing team and corrected at the source. These checks can also be conducted at the monthly reconciliation to ensure all costs are mapped correctly and consistently.

There are also non-automated QA checks undertaken. In costing teams there is often a dedicated FTE to communicate with clinicians and clinical department directors to ensure cost mapping is occurring efficiently and correctly. There are investigations into missing feeder systems or valid data that cannot be matched. Very high and low cost patients are examined to determine their validity.

The table below sets out a summary of the QA checks performed within Queensland

Table 14: Quality Assurance checks – Queensland

Specific Quality Assurance	Performed by Queensland Department of Health	Performed by HHS Costing Team
Reconciliation		
Reconciliation back to general ledger & audited records	Annual review of GL for negative balances carried out by the Department	Reconciled GL to costed products for each costing cycle (monthly)
Reconciliation of activities back to source systems	Approximately 0.5 days per month per jurisdiction costed HHS spent checking feeder data and conducting completeness checks.	Monthly review of all HHS-managed feeder systems with unlinked records investigated, corrected or manually linked.
Validation of costing data		
5 year comparison costs outcome report generated	Created by jurisdiction and distributed state-wide.	The report is used to engage with stakeholders and executives and show costing trends over multi year periods.
System based audit reports	No	Yes - run on data on a monthly basis and checked with source if data does not appear valid
Crystal audit reports	The department uses SQL server-based reports over the data which has the same audit selection criteria for the rural and remote HHS's managed by the department.	Yes - run on data on a weekly/monthly basis and checked with source if data does not appear valid
Third party feeder system error report	No	Yes – used on all third-party feeder systems
Activity summary year-to-date of a balance between GL and costed at patient level	No	Yes – ensure that they are within 0.1% confidence level, if not data is investigated
Specific logic checks	Extreme high and low-cost outliers are examined and flagged by the jurisdiction prior to submission to IHPA. Each self-costed HHS is likely to have slightly different logic checks as they are all operating off their own costing database. Jurisdiction checks largely mirror IHPA's QA and provide a richer level of validation than that carried out by HHSs.	
Costing Governance		
Regularly hold costing meetings	Monthly costing network teleconference meeting attended by costing teams state-wide (approx. 2-4 FTE) and chaired by the DoH. The department facilitates discussion between all the costing teams with a focus on status of jurisdictional costing, funding and purchasing functions and outputs, improving the quality of costing data and disseminating information provided by IHPA. Informal teleconferences are conducted between HHS costing practitioners to communicate costing methodologies.	
Regularly review and update cost centre allocations	High level review conducted for HHSs which are costed by jurisdictions	HHSs conduct this in accordance with their processing cycle and consultation method.
Formal process sign off on data and accountability for data	There is a documented process, with final sign off performed by the CFO at each HHS. The department sends a reconciliation schedule showing any adjustments made at the jurisdictional level and what activity and cost data was submitted to IHPA.	
Local guidelines to support national AHPCS standards	Yes – created by the jurisdiction	Utilised to provide clarity on costing methods with considerations to Queensland's systems

5.3.3 Pharmacy

Pharmacy costs and allocation methods

South West Queensland HHS, Metro North HHS and West Moreton HHS each identified \$3.2m, \$122.8m and \$27.5m of pharmacy costs respectively. Of these totals, 67% (South West Queensland), 86% (Metro North) and 54% (West Moreton) were included in the final values submitted to IHPA within the pharmacy cost bucket. The remaining costs were either out of scope for the NHCDC or could not be linked to a submitted episode of care within the IHPA activity datasets.

Details of the costs included within the pharmacy cost bucket, specific allocation methods and linking rules at a site level are included in the subchapters below. Across Queensland the following principles are followed for allocating pharmacy costs:

- Dispensed drugs are allocated to a patient using a feeder from iPharmacy systems;
- All dispensed drugs costs are brought into the pharmacy cost centre for costing purposes, and allocated to matched patient episodes.
- Imprest drug costs are left in cost centers as charged by the pharmacy journals and distributed to patients based on the resource utilisation of those locations (eg, a ward, clinic)
- Pharmacy staff costs (and other non labour costs) are based on the clinics conducted by pharmacists (non-admitted activity) and remaining costs are allocated based on the dispensed drug allocation, using a fixed RVU.

The jurisdiction recognises that there is an opportunity to improve the allocation of labour costs and this may not accurately reflect actual pharmacy working practices and resource consumed at a patient level. This is largely reflective of automation within the dispensing process (at some facilities) and a shift in pharmacist roles to focus on admission avoidance, patient education and medication reviews.

Pharmacy linking rules

Queensland uses standardised linking rules from the iPharmacy system to match all dispensed drugs to an episode and tries to link to:

- Episodes within 24 hours of admission or discharge (acute, emergency and sub-acute)
- Episodes within 30 days for outpatient and mental health

The jurisdiction has performed analysis on linking rates and has found that 88% of records link to episodes within 24 hours. There is significant variation in linking rates across sites visited, ranging from 66.8% - 95.5% of the volume of records, and representing 40.6% - 82.4% of the value of dispensed drugs. These reflect several demographic factors which are discussed below.

Following the linking stage, all unmatched feeder system records with valid activity not able to be matched have an unlinked outpatient episode created. This is costed in the same manner as linked records (and attracts a dispensing charge, any relevant overheads and non-labour charges). As there is no Tier 2 clinic to match to, these records are not included in the activity submission and they form part of the exclusions with no matching activity record as discussed in the 'reconciliation' sections below.

PBS and S100 drugs

Acute hospitals within Queensland submit PBS claims on a monthly basis online to Medicare, and claims are paid out weekly. The source of claims is iPharmacy. Claims are made at the dispensed level once the patient has filled the script.

None of the facilities / HHSs visited was able to easily provide information or analysis relating to the purchase price of PBS drugs versus the amount successfully reclaimed. Stakeholders advised that any variances would be due to PBS incentives greater than drug costs or standing offer arrangements to benefit improved vendor prices through jurisdictional contracts. They also advised that there were instances where PBS reimbursement did not fully cover the cost of purchasing PBS drugs.

The reason for challenges in supplying this data is that the GL utilised in HHSs statewide does not separate PBS and non-PBS drugs. The jurisdiction maps the proportion of outpatient and community health drugs as a proxy for PBS drugs to allocate to the PBS drugs line for NHDC purposes. This may overstate the cost and proportion of PBS drugs within the PBS line item at some facilities where there is a greater number of patients who are ineligible for PBS, MBS and Medicare, without impacting the total quantum of drugs. For sites visited, all costing is based on the bin price (i.e. purchase price) extracted from the pharmacy system for each drug price to get a price per unit. The jurisdiction is recommending a change to the source feeder file so that it would incorporate whether the drug was PBS claimable.

5.3.4 Improvements

There have been several improvements made during Round 22 at the jurisdictional level. These include:

- **Activity matching** - the key focus at a jurisdiction level from Round 21 to 22 has been to improve activity matching:
 - For Outpatients this has been significantly improved due to several matching criteria being added into the formula to allow a higher percentage of cost records to be matched to an activity record as submitted to IHPA, yielding an increase in the matching rate from 78% to 80%.
 - Inpatient matching rates have remained consistently high at 98%+;
 - As a result of the introduction of the phase of care in Mental Health patient activity and the provision of costed patient level community mental health data for the first time, the matching percentages have been impacted (from 81% to 41%) for Round 22. This masks improvements to the activity matching code and highlights an area of challenge faced by many jurisdictions. These issues were raised during the data collection for Round 23 with IHPA and a subsequent national workshop has been held to discuss these issues.
 - ED matching remains high at 96%-98%.
- **Pharmacy cost allocation** - The jurisdiction recognises that an increasing amount of pharmacists' time is focused on patient education, medication reviews and admission avoidance activities.
- For Round 22, new systems were implemented in one or more of the rural and remote HHS' where the jurisdiction team manages the costing function. These include Breast Screening, Endoscopy, Patient Transport, Oral Health, Primary Health Care, private practice. This centralised system data is planned for implementation more widely across the jurisdiction in future rounds. In some instances these systems

include patient data currently out of scope for the NHCDC but form a part of the jurisdictional clinical service delivery profile.

At a HHS level, specific improvements anticipated for Round 23 include:

- Introduction of new feeder systems covering maternity, gastroenterology and community care (Metro North);
- A reduction of virtual patient costs from 12% to 4-6% as a result of new feeder systems and having patient level data, which previously had only been aggregate costs (Metro North).
- Inclusion of GL transaction based feeder data for patient transport costs associated with taxi, bus, rail and accommodation for the rural and remote HHS's to improve the patient transport cost profile and more accurately reflect the actual expense of all forms of patient transport in the rural and remote areas where this is a significant expense.
- Identification of weekend and public holiday intermediate products and allocating relative value units to identify the impact of weekend and public holiday penalties. This will also be trialled as a proof of concept at rural and remote HHS's prior to further state-wide rollout.

5.3.5 South West Queensland HHS including Roma Hospital

South West Queensland HHS is a rural and remote public health service and is one of the four HHSs where the costing function is managed by the Department. The area covers more than 310,000 square kilometres and provides service to a population of approximately 26,000 people. The HHS comprises of 26 health care facilities. These include four hospitals, seven multi-purpose health services, four primary health care centres, two aged care facilities and nine general practice services.

Roma Hospital is the largest facility within South West Queensland HHS and provides ambulatory and admitted service (23 beds), visiting specialist services, community and allied health services, and home and community care services.

During Round 22, summarised patient level costing was performed on a quarterly basis. As part of this process, inpatient and demographic data are extracted on a weekly basis by the department. General ledger data, payroll data, emergency department data, outpatient data, ancillary system data, specialty clinical systems data, patient transport data and virtual patient data are extracted on a monthly basis. Every month, new accounts are created, and the costing structure build is updated with new cost centres and feeder system products.

One significant area of costing challenge within the HHS is how to reflect costs for services delivered using hub and spoke models. Given the rural nature and small size, many clinicians deliver services at smaller / community sites, whereas their costs will be sitting in central cost centres.

Year to date costing data has not been easily available within South West Queensland HHS during Round 22 due to data visibility over the legacy costing system during the in-year costing processes. Final annual costs have been reviewed by the HHS in line with performance monitoring and occasionally used for business cases. South West Queensland HHS only has access to its own data and does not currently have visibility over data for other QLD health services for benchmarking purposes. The perception of costing data as a jurisdiction output limits engagement with clinicians and ownership of the data.

The department is working with South West Queensland HHS to improve the visibility of the data for reporting.

South West Queensland HHS has 16 feeder systems in use covering pathology, blood products, diagnostic imaging, pharmacy, medical, ward movement, appointment scheduling, emergency, community mental health, allied health, operating theatre, endoscopy, private practice, breast screening and patient transport.

5.3.5.1 South West Queensland HHS Reconciliation

The diagram below presents a summary reconciliation from South West Queensland HHS's general ledger (GL) to the final NHCDC submission for Round 22.

South West Queensland HHS's final GL of \$149,979,676 was reconciled by the HHS to the audited financial statements.

Adjustments made at the HHS level

- Prior year WIP of (\$39.1m). This value represents patients who were admitted in previous years and discharged in the 2017/18 year.
- There were net exclusions of \$44k at the LHN level.

Adjustments made at the jurisdiction level

- A WIP adjustment of \$37.6m for 2017/18 was to remove the costs for patients admitted in 2017/18 who had not been discharged by year end.
- Out-of-scope costs are removed by the Jurisdiction and these totaled \$31k.
- Quality assurance adjustments removed \$8.3m from the total costs submitted to IHPA. The costs removed include records in which the audit processes did not meet IHPA's data specification and contained critical errors which did not allow them to be submitted. These costs were subsequently investigated by the Jurisdiction and removed if they were invalid.
- The largest adjustment made by the Jurisdiction was the removal of unmatched records (\$61m) from the costs submitted to IHPA. The majority of these unmatched cost records were Outpatient – Tier 2 (\$32.1m). These costs could not be attributed to a reportable patient level episode of care as outpatient data for many of the facilities within South West Queensland HHS were reported at aggregate level for Round 22 and were therefore excluded from the Jurisdiction's submission to IHPA. Other costs are associated with services from facilities which are out of scope for the NHCDC.

After these adjustments, the value of NHCDC costed products submitted to IHPA was \$82.0m.

There was a minor reconciling difference between the costed products submitted to IHPA and the final NHCDC costed products. This was less than 0.1% of the costs submitted. IHPA are investigating the reasons why this data from Outpatients and SNAP which had been matched to valid reported activity records prior to submission could not be fully reconciled.

Table 15: Reconciliation from General Ledger to NHCDC costs – South West Queensland HHS

South West Queensland HHS			Jurisdiction			IHPA			
Item		Amount	Item		Amount	Item		Amount	
Source: Self-Assessment	A	General Ledger (GL)	\$	149,979,676		D	Costed products received by jurisdiction	\$	188,998,082
	B	Adjustments to the GL				E	Jurisdiction Adjustments		(\$106,958,515)
		Inclusions		\$0			WIP 2017 - 18 (breakdown below)		(\$37,594,855)
		Exclusions		(\$44,887)			QA		(\$8,284,088)
		WIP 2016-17		\$39,063,294			Unmatched records		(\$61,048,316)
		Total hospital expenditure	\$	188,998,082			Out of scope		(\$31,257)
							Total costs submitted to IHPA	\$	82,039,568
Source: Data collection template	C	Costed products submitted to jurisdiction				F	Costed products submitted to IHPA		
	Acute	AR DRG	\$	31,871,024		Acute	AR DRG	\$31,322,537	
		Newborns	\$	744,751			Newborns	\$736,070	
	Outpatient	Outpatient - Tier 2	\$	49,732,809		Outpatient	Outpatient - Tier 2	\$16,822,067	
		Outpatient Non Tier 2	\$	-			Outpatient Non Tier 2	\$0	
	Emergency	URG - Admitted	\$	25,421,160		Emergency	URG - Admitted	\$2,745,341	
	URG - Non- Admitted	\$	-			URG - Non- Admitted	\$21,422,955		
	UDG - Admitted	\$	-			UDG - Admitted	\$0		
	UDG - Non Admitted	\$	-			UDG - Non Admitted	\$0		
Sub Acute	Rehabilitation	\$	1,452,131		Sub Acute	Rehabilitation	\$1,389,977		
	Palliative Care	\$	671,299			Palliative Care	\$651,853		
	GEM	\$	365,676			GEM	\$362,644		
	Psych Geriatric	\$	-			Psych Geriatric	\$0		
	Maintenance	\$	2,855,026			Maintenance	\$2,499,378		
Mental	Admitted Mental Health (MC)	\$	-		Mental	Admitted Mental Health (MC)	\$0		
Health	Non Admitted Specialist Mental Health (MS)	\$	5,074,355		Health	Non Admitted Specialist Mental Health (MS)	\$4,072,380		
	Non Admitted Mental Health (MH)	\$	-			Non Admitted Mental Health (MH)	\$0		
	Residential Mental Health (MR)	\$	-			Residential Mental Health (MR)	\$0		
Other	Other Admitted Patient Care	\$	70,114,749		Other	Other Admitted Patient Care	\$0		
	Organ Procurement	\$	-			Organ Procurement	\$0		
	Outreach & community care	\$	81,452			Outreach & community care	\$0		
	Boarder	\$	14,617			Boarder	\$14,366		
	Other	\$	-			Other	\$0		
	Research	\$	14,194			Research	\$0		
	Teaching & Training	\$	-			Teaching & Training	\$0		
	Dummy/virtual patients (No NHCDC Product)	\$	584,839			Dummy/virtual patients (No NHCDC Product)	\$0		
	Total	\$	188,998,082			Total	\$82,039,568		
		-\$	0				-\$	0.05	

5.3.5.2 Pharmacy

Pharmacy allocation methods

Through the data collection template and in consultation with the Jurisdiction costing team and staff, SWQHHS identified \$27.5m of pharmacy costs for Round 22, including:

- Drug costs of \$1.9m, split using a proxy estimate into PBS drugs (\$1.6m) and non PBS drugs (\$0.3m). Non PBS includes imprest drugs within wards, ED and theatres, which were not separately identified.
- Pharmacy salaries and wages (\$0.7m)
- Other pharmacy purchase costs (\$0.2m), which relate pharmacy consumables and other costs sitting within the pharmacy cost centre
- Central overheads (\$0.5m), including Finance, HR electricity, gas and administration costs

The diagram below depicts the categories of expenditure that are mapped to the pharmacy cost bucket in SWQHHS, and allocation methods used.

Diagram 15 – Allocation methods and make up of pharmacy costs submitted to NHCDC - South West Queensland HHS

Cost Category	Allocation method	Description of allocation method	% of pharmacy cost bucket
PBS Drugs	Feeder	The cost of PBS / S100 drugs is allocated using a feeder from the iPharmacy system. This achieves a match of 66.8% of records (65.2% of dispensed drugs value) across SWQHHS.	43%
S100 drugs	Feeder		
Non PBS dispensed drugs	Feeder		
Imprest drugs (Ward, ED, OR)	RVU	All imprest drugs are allocated across all episodes with a dispensed drug record, dependent on the proportionate value of dispensed drugs.	14%
Pharmacist S&W	RVU	Pharmacy staff costs are spread evenly over all patient episodes with a dispensed pharmacy cost to derive a fixed RVU as a dispensing charge.	19%
Ward based pharmacists		N/A – all pharmacy costs are included within the pharmacy cost centre.	
Pharmacy system costs / licences		These costs are allocated as overheads.	
Overheads / indirect costs	RVU	Overheads are allocated based on the indirect overhead allocation structure, which is informed by DoH.	22%
Other direct costs	RVU	No additional costs are sitting within Pharmacy	2%

Pharmacy linking rules

The linking rules and matching rates for both the volume and value of dispensed drugs at South West Queensland HHS are shown in the table below.

Table 16: Linked feeder records from iPharmacy by volume and value for South West Queensland HHS

Product	iPharmacy records – volume	iPharmacy records – value (\$)	Maximum Linking Rules
Acute	2,606	575,235	+/- 24 hours admit to discharge datetime
OP	1,843	455,237	+/- 30 days from admitted datetime
ED	3,353	113,293	+/- 24 hours admit to discharge datetime
Sub Acute	538	29,523	+/- 24 hours admit to discharge datetime
MH	128	65,937	+/- 30 days from admitted datetime
Linked	8,468	1,239,225	
Unlinked	4,210	660,246	
Unlinked %	33.2%	34.8%	

5.3.6 Metro North HHS (including The Prince Charles Hospital)

HHS Overview

Metro North HHS is the largest of the 16 HHSs in Queensland. The HHS provides services to a population of approximately 900,000. The HHS contains two tertiary facilities, The Prince Charles Hospital and The Royal Brisbane and Women's Hospital, and two secondary facilities, Redcliffe Hospital and Caboolture Hospital. There are also services provided from subacute speciality facilities and community based general and mental health services. The Prince Charles Hospital contains approximately 630 beds. The team, responsible for the costing for the HHS, contains 6 FTEs based at the Royal Brisbane and Women's Hospital.

A typical monthly costing process involves loading all year-to-date activity records into Transition II, along with all feeder files. Feeder records are matched to episodes using a separate system, Talons, and then loaded into Transition II. The general ledger and payroll are also brought into Transition II to map all costs to a department. Once all costs have been mapped, audit reports are produced and the data is checked to ensure its accuracy.

Metro North has 15 feeder systems in use covering pathology, blood products, diagnostic imaging, pharmacy, medical, ward transfer, appointment scheduling, emergency, community mental health, allied health, operating theatre, local procedure suite system and nursing acuity. The HHS reported having good feeder data coverage across most acute areas, with the most significant gaps in being able to allocate costs at a patient level in mental health services.

5.3.6.1 Metro North Reconciliation

This section discusses major variances, reconciling items and adjustments in the reconciliation process. The information is based on the IFR data collection templates, data quality self-assessments and review discussions for each participating site.

The table overleaf presents a summary reconciliation from Metro North HHS's general ledger (GL) to the final NHCDC submission for Round 22.

Metro North HHS's final GL of \$2,737.1m was reconciled by the HHS to the audited financial statements.

Adjustments made at the HHS level

- A prior year WIP adjustment of \$36.0m was made representing costs for patients who were discharged in the Round 22 year but admitted in the previous (2016/17) year.
- The Jurisdiction reported GL exclusions of \$442k representing non patient related costs which were out of scope for the NHCDC.
- There was a \$31k reconciling difference (less than 0.01% of costs submitted) between the GL and the HHS' costing output. It was noted by the jurisdiction that some small rounding does occur with the reverse engineering of the overhead allocation structure required for the NHCDC data transformation process. This is due to one table in the legacy costing system having two decimal places less than the other related tables.

Adjustments made at the jurisdiction level

- A WIP adjustment of \$31.6m, to remove the costs for patients admitted in 2017/18 who had not been discharged by year end. The movement in WIP reflects a policy decision to discharge residential mental health patients prior to the end of the financial year, and also reflects lower activity at the end of the 2017/18 fiscal year as a result of the timing of Queensland holidays and the associated shutdown period.
- Out-of-scope costs are removed by the jurisdiction. These totaled \$1.9m and included cost records without associated clinical and support services not included in the NHCDC. These are included in the NHCDC data transformation reconciliation process undertaken by the jurisdiction and provided back to each HHS.
- The largest adjustment made by the jurisdiction for all Metro North HHS data was \$374.4m removed from the total costs submitted to IHPA of which the largest components were dental, sexual health, other ambulatory services and unlinked feeder data.
- The removal of unmatched records from the costs submitted to IHPA (\$139.6m). Most of these unmatched ancillary system (Pharmacy, Pathology & Diagnostic Imaging system) records with time date stamps outside of the encounter matching window (\$73.8m). These costs cannot be attributed to a reportable episode of care and are therefore excluded from the jurisdiction's submission to IHPA.

The value of NHCDC-costed products submitted to IHPA, after the above adjustments, was \$2,225.5m.

Table 17: Reconciliation from General Ledger to NHCDC costs – Metro North HHS

Metro North HHS			Jurisdiction			IHPA				
Item		Amount	Item		Amount	Item				
Source: Self-Assessment	A	General Ledger (GL)	\$ 2,737,127,527	D	Costed products received by jurisdiction	\$ 2,772,633,775	G	Costed products received by IHPA	\$ 2,225,507,160	
	B	Adjustments to the GL		Source: Data collection template	E	Jurisdiction adjustments	(\$547,126,614)	H	IHPA Adjustments	\$0
		Inclusions				WIP 2017/18	(\$31,602,795)		Newborn - transfer to acute	(\$9,584,197)
		Reconciling difference	(\$31,781)			Out of scope costs	(\$1,891,891)		Acute - transfer from newborn	\$9,584,197
		Exclusions	(\$442,254)			QA	(\$374,472,840)	I	Final costed products per NHCDC	\$ 2,225,507,160
		WIP 2016 - 17	\$35,980,282			Unmatched records	(\$139,159,089)			
		Total hospital expenditure	\$ 2,772,633,775		Total costs submitted to IHPA	\$ 2,225,507,160				
						% of GL submitted to NHCDC			80%	
Source: Data collection template	C	Costed products submitted to jurisdiction		Source: Data collection template	F	Costed products submitted to IHPA		Costed products per NHCDC		
	Acute	AR DRG	\$ 1,326,758,082		Acute	AR DRG	\$ 1,299,001,824	Acute	\$ 1,358,590,802	
		Newborns	\$ 61,516,100			Newborns	\$ 59,588,979	Outpatient	\$ 369,607,156	
Outpatient		Outpatient - Tier 2	\$ 796,363,895	Outpatient		Outpatient - Tier 2	\$ 369,607,156	Emergency	\$ 217,365,875	
		Outpatient Non Tier 2	\$ -			Outpatient Non Tier 2	\$ -	Sub Acute	\$ 114,581,182	
Emergency		URG - Admitted	\$ 224,340,381	Emergency		URG - Admitted	\$ 104,393,593	Mental Health	\$ 164,103,861	
		URG - Non- Admitted	\$ -			URG - Non- Admitted	\$ 112,972,282	Other	\$ 1,258,299	
		UDG - Admitted	\$ -			UDG - Admitted	\$ -	Total	\$ 2,225,507,176	
		UDG - Non Admitted	\$ -			UDG - Non Admitted	\$ -			
Sub Acute		Rehabilitation	\$ 65,505,041	Sub Acute		Rehabilitation	\$ 55,823,664			
		Palliative Care	\$ 21,215,015			Palliative Care	\$ 20,555,623			
		GEM	\$ 20,074,983			GEM	\$ 19,494,809			
		Psych Geriatric	\$ 3,825,121			Psych Geriatric	\$ 3,692,109			
		Maintenance	\$ 15,783,031			Maintenance	\$ 15,014,977			
Mental		Admitted Mental Health (MC)	\$ 98,605,576	Mental		Admitted Mental Health (MC)	\$ 82,617,482			
Health		Non Admitted Specialist Mental Health (MS)	\$ 108,572,702	Health		Non Admitted Specialist Mental Health (MS)	\$ 81,486,379			
		Non Admitted Mental Health (MH)	\$ -			Non Admitted Mental Health (MH)	\$ -			
		Residential Mental Health (MR)	\$ -			Residential Mental Health (MR)	\$ -			
Other		Other Admitted Patient Care	\$ 28,791,923	Other		Other Admitted Patient Care	\$ -			
		Organ Procurement	\$ -			Organ Procurement	\$ -			
		Outreach & community care	\$ -			Outreach & community care	\$ -			
		Boarder	\$ 1,280,482			Boarder	\$ 1,258,299			
		Other	\$ -			Other	\$ -			
		Research	\$ -			Research	\$ -			
		Teaching & Training	\$ -			Teaching & Training	\$ -			
		Dummy/virtual patients (No NHCDC Product)	\$ 1,443			Dummy/virtual patients (No NHCDC Product)	\$ -			
		Total	\$ 2,772,633,775			Total	\$ 2,225,507,176			
			-\$ 0				\$ 15			

5.3.6.2 Pharmacy

Pharmacy costs and allocation methods

Through the data collection template and in consultation with the costing team, Metro North HHS identified \$122.8m of pharmacy costs for Round 22, including:

- Drug costs of \$85.5m, using a proxy estimate to split into PBS drugs (\$79.9m) and non-PBS drugs (\$5.5m). Non-PBS drugs includes imprest drugs within wards, ED and theatres, which weren't separately identified.
- Pharmacy salaries and wages (\$27.8m)
- Other pharmacy purchase costs (\$0.6m), which relate pharmacy consumables and other costs sitting within the pharmacy cost centre
- Central overheads (\$8.9m), including finance, HR, electricity, gas and administration costs.

The diagram below depicts the categories of expenditure that are mapped to the pharmacy cost bucket in Metro North HHS, and allocation methods used.

Diagram 17: Allocation methods and make up of pharmacy costs submitted to NHCDC – Metro North HHS

Cost Category	Allocation method	Description of allocation method	% of pharmacy cost bucket
PBS Drugs	Feeder	The cost of PBS / S100 drugs is allocated using a feeder from the iPharmacy system. This achieves a match of 66.8% of records (65.2% of dispensed drugs value) across Metro North HHS.	<1%
S100 drugs	Feeder		61%
Non PBS dispensed drugs	Feeder		
Imprest drugs (Ward, ED, OR)	RVU	All impost drugs are allocated across all episodes with a dispensed drug record, dependent on the proportionate value of dispensed drugs.	5%
Pharmacist S&W	RVU	Pharmacy staff costs are spread evenly over all patient episodes with a dispensed pharmacy cost to derive a fixed RVU as a dispensing charge.	25%
Ward based pharmacists		N/A – all pharmacy costs are included within the pharmacy cost centre.	
Pharmacy system costs / licences		These costs are allocated as overheads.	
Overheads / indirect costs	RVU	Overheads are allocated based on the indirect overhead allocation structure, which is informed by DoH	8%
Other direct costs	RVU	No additional costs are sitting within Pharmacy	1%

Pharmacy linking rules

Metro North uses an iPharmacy system and this forms the feeder system for costing PBS and dispensed drugs. These yield a matching rate of 93.2% of records, which corresponds to 82.8% of the value of drugs.

Table 18 - Linked feeder records from iPharmacy by volume and value for Metro North HHS

Product	iPharmacy records – volume	iPharmacy records – value (\$)	Maximum Linking Rules
Acute	202,821	30,937,741	+/- 24 hours admit to discharge datetime
OP	76,906	36,831,197	+/- 30 days from admitted datetime
ED	3,065	170,884	+/- 24 hours admit to discharge datetime
Sub Acute	29,007	1,078,730	+/- 24 hours admit to discharge datetime
MH	17,873	1,362,141	+/- 30 days from admitted datetime
Linked	329,673	70,380,693	
Unlinked	24,205	15,069,172	
Unlinked %	6.8%	17.6%	

5.3.7 West Moreton HHS (including Ipswich Hospital)

HHS Overview

West Moreton HHS serves a population of approximately 252,000 people, with the largest projected population growth rate of any other HHS in Queensland. Their demographics are diverse and include metropolitan and rural communities. The HHS is made up of 10 facilities, of which Ipswich Hospital is the largest. Ipswich Hospital has 388 beds. The costing team for West Moreton HHS was made up of 4 FTE's in the Round 22 year. The costing team is well established and has been operating together for six years.

At the start of the fiscal year the team updates their costing structure, deletes any products not used in the previous fiscal year. Two FTE's work on the costing structure, consulting with clinical / operational areas, investigate notifications of changes to existing products, and process cost centre changes. After this stage the GL and payroll are extracted, and the 12 months of budget are loaded into Transition II. Subsequently, third party values and all feeder systems are loaded onto Talons and matched with activity data on a monthly basis. Data is then extracted and populated into the clinical costing system. The costing structure build is updated monthly with new cost centres and feeder system products. Once all costs have been mapped, audit reports are produced, and all data checked to ensure its accuracy.

West Moreton HHS has 14 feeder systems in use covering pathology, blood products, diagnostic imaging, pharmacy, medical ATD, ward ATD, appointment scheduling, ED, Community Mental Health, Allied Health, Operating Theatre and nursing acuity.

5.3.7.1 West Moreton HHS Reconciliation

Table 19 (below) presents a summary reconciliation from West Moreton HHS's general ledger (GL) to the final NHCDC submission for Round 22.

West Moreton HHS's final GL of \$593.8m reconciled to the audited financial statements.

Adjustments made at the HHS level

- There were net exclusions of \$2.5m for costs sitting on West Moreton's GL that were out of scope for costing.
- A prior year WIP adjustment of \$78.5m was made representing costs for patients who were discharged in the Round 22 year but admitted in the previous (2016/17) year.

Adjustments made at the jurisdiction level

- A WIP adjustment of \$99.5m, to remove costs for patients admitted in 2017/18 but not discharged by year end. The movement in WIP reflects growth in long stay admitted mental health patients given significant increase in demand of approximately 8-10% for specialised inpatient mental health services provided from Ipswich Hospital.
- Out-of-scope costs (\$151k) are removed by the jurisdiction. The removal includes Outpatient Tier 2, URG – Admitted, and Non-Admitted Specialist Mental Health which relate to breast screening services and services delivered to prisons.
- Quality assurance adjustments (\$109.0m) were removed by the jurisdiction comprising outpatient virtual patient costs (\$53m) plus \$56m relating to virtual patients for oral services, breast screening, Patient Transport and depreciation. The cost is high compared to the other facilities in the jurisdiction who do not have large standalone mental health facilities and offender health services and reflects aggregate counting within mental health and challenges in matching several costs (outlined above) directly to episodes of care.
- Removal of unmatched records from the costs submitted to IHPA (\$37.4m). Most of these unmatched records are unlinked Ancillary System records (\$30.1m). These costs cannot be attributed to an episode of care and are therefore excluded from the jurisdiction's submission to IHPA.

The value of NHCDC costed products submitted to IHPA after the above adjustments was \$423.8m.

Table 19: Reconciliation from General Ledger to NHCDC costs – West Moreton HHS

West Moreton HHS			Jurisdiction			IHPA					
Item		Amount	Item		Amount	Item		Amount			
Source: Self-Assessment	A	General Ledger (GL)	\$	D	Costed products received by jurisdiction	\$669,783,719	G	Costed products received by IHPA	\$423,760,892		
	B	Adjustments to the GL		Source: Data collection template	E	Jurisdiction Adjustments		H	IHPA Adjustments	(\$2,385)	
		Inclusions	\$0			WIP 2017/18	(\$99,464,141)		Newborn - transfer to acute	(\$2,029,205)	
		General Ledger exclusions	(\$2,529,196)			Out of scope costs	(\$150,936)		Acute - transfer from newborn	\$2,029,205	
		WIP 2016/17	\$78,511,825			QA	(\$109,017,374)	I	Removal of unmatched newborn	(\$2,385)	
		Total hospital expenditure	\$669,783,718			Unmatched records	(\$37,390,374)		Final costed products per NHCDC	\$423,756,122	
					Total costs submitted to IHPA	\$423,760,893					
							% of GL submitted to NHCDC		63%		
Source: Data collection template	C	Costed products submitted to jurisdiction		Source: Data collection template	F	Costed products submitted to IHPA			Costed products per NHCDC		
	Acute	AR DRG	\$223,096,018		Acute	AR DRG	\$219,352,181		Acute	\$	226,644,499
		Newborns	\$7,551,576			Newborns	\$7,292,318		Outpatient	\$	48,348,933
	Outpatient	Outpatient - Tier 2	\$132,413,593		Outpatient	Outpatient - Tier 2	\$48,348,933		Emergency	\$	53,297,961
		Outpatient Non Tier 2	\$0			Outpatient Non Tier 2	\$0		Sub Acute	\$	25,830,512
	Emergency	URG - Admitted	\$54,779,308		Emergency	URG - Admitted	\$30,095,607		Mental Health	\$	69,583,317
	URG - Non- Admitted	\$0		URG - Non- Admitted	\$23,202,354		Other	\$	55,671		
	UDG - Admitted	\$0		UDG - Admitted	\$0		Total	\$	423,760,892		
	UDG - Non Admitted	\$0		UDG - Non Admitted	\$0						
Sub Acute	Rehabilitation	\$10,524,825	Sub Acute	Rehabilitation	\$9,978,329						
	Palliative Care	\$5,617,661		Palliative Care	\$5,532,929						
	GEM	\$3,657,010		GEM	\$3,397,262						
	Psych Geriatric	\$0		Psych Geriatric	\$0						
	Maintenance	\$8,385,749		Maintenance	\$6,921,992						
Mental Health	Admitted Mental Health (MC)	\$154,744,026	Mental Health	Admitted Mental Health (MC)	\$55,740,118						
	Non Admitted Specialist Mental Health	\$16,209,024		Non Admitted Specialist Mental Health (MS)	\$13,843,199						
	Non Admitted Mental Health (MH)	\$0		Non Admitted Mental Health (MH)	\$0						
	Residential Mental Health (MR)	\$0		Residential Mental Health (MR)	\$0						
Other	Other Admitted Patient Care	\$737,749	Other	Other Admitted Patient Care	\$0						
	Organ Procurement	\$0		Organ Procurement	\$0						
	Outreach & community care	\$0		Outreach & community care	\$0						
	Boarder	\$56,484		Boarder	\$55,671						
	Other	\$0		Other	\$0						
	Research	\$0		Research	\$0						
	Teaching & Training	\$0		Teaching & Training	\$0						
	Dummy/virtual patients (No NHCDC Prc	\$52,010,696		Dummy/virtual patients (No NHCDC Product)	\$0						
	Total	\$669,783,719		Total	\$423,760,892						
Variance		\$	0	Variance		\$	0				

5.3.7.2 West Moreton HHS – Pharmacy

Pharmacy costs and allocation methods

Through the data collection template and in consultation with the costing team, West Moreton HHS identified \$27.5m of pharmacy costs for Round 22, including:

- Drug costs of \$20.9m, using a proxy estimate to split into PBS drugs (\$19.0m) and non-PBS drugs (\$1.8m). Non-PBS drugs includes imprest drugs within wards, ED and theatres, which were not separately identified.
- Pharmacy salaries and wages (\$4.0m)
- Other pharmacy purchase costs (\$150k), which relate pharmacy consumables and other costs sitting within the pharmacy cost centre
- Central overheads (\$2.5m), including finance, HR electricity, gas and administration costs

The diagram below depicts the categories of expenditure that are mapped to the pharmacy cost bucket in West Moreton Health, and allocation methods used.

Diagram 18 – Allocation methods and make up of pharmacy costs submitted to NHCDC - West Moreton HHS

Cost Category	Allocation method	Description of allocation method	% of pharmacy cost bucket
PBS Drugs	Feeder	The cost of PBS / S100 drugs is allocated using a feeder from the iPharmacy system. This achieves a match of 95.5% of records (40.6% of values).	45%
S100 drugs	Feeder		
Non PBS dispensed drugs	Feeder		
Imprest drugs (Ward, ED, OR)	RVU	All imprest drugs are allocated across all episodes with a dispensed drug record, dependent on the proportionate value of dispensed drugs.	12%
Pharmacist S&W	RVU	Pharmacy staff costs are spread evenly over all patient episodes with a dispensed pharmacy cost to derive a fixed RVU as a dispensing charge.	25%
Ward based pharmacists		The costing team believes that pharmacist costs are sitting in other cost centres and these posts are not brought into the pharmacy cost centre for costing purposes.	
Pharmacy system costs / licences		These costs are allocated as overheads.	
Overheads / indirect costs	RVU	Overheads are allocated based on the indirect overhead allocation structure, which is informed by DoH.	17%
Other direct costs	RVU	No additional costs are sitting within Pharmacy	1%

Pharmacy linking rules

West Moreton HHS uses an iPharmacy system and this forms the feeder system for costing PBS and dispensed drugs. These yield a matching rate of 95.5% of records, which corresponds to 40.6% of the value of drugs.

The low linked value of drugs can be attributed to the Hepatitis C program within prisons, which is block funded and out of scope for NHCDC purposes. This accounts for almost all of the unmatched value (approximately \$12m). This is costed to a virtual patient.

Table 20 – Allocation methods and make up of pharmacy costs submitted to NHCDC – West Moreton HHS

Product	iPharmacy records – volume	iPharmacy records – value (\$)	Maximum Linking Rules
Acute	27,467	2,758,630	+/- 24 hours admit to discharge datetime
OP	10,984	3,687,013	+/- 30 days from admitted datetime
ED	148	20,345	+/- 24 hours admit to discharge datetime
Sub Acute	4,393	246,849	+/- 24 hours admit to discharge datetime
MH	6,135	1,749,138	+/- 30 days from admitted datetime
Linked	49,127	8,461,976	
Unlinked	2,316	12,401,484	
Unlinked %	4.5%	59.4%	

5.4 Western Australia

Jurisdictional Overview

The WA Department of Health (WA Health) co-ordinates clinical costing for the state's public hospitals and is responsible for the preparation of the Western Australian (WA) NHCDC submission.

There is a statewide, centralised Unique Record Number (URN) database and a patient administration system (PAS) for most hospitals, with the exception of some rural hospitals who are on different PAS systems. From the next round, all hospitals will be on the statewide PAS. A URN is issued the first time a patient goes into a Western Australian hospital, and this record number is retained by the patient for all future admissions. Whilst the URN provides benefits to linking data across the state, there are plans to develop business rules to increase the confidence in linking.

Health Support Services (HSS) is the shared service centre for Western Australia's health system, and is responsible for providing activity extracts for Western Australia's health services. HSS is required to perform validity checks on activity data on a monthly basis against agreed data standards such as ensuring completeness and logic checks. On a monthly basis, HSS also informs the LHNs of new cost centres to include into their reference files.

There are statewide feeders managed by HSS for all areas except for some local systems such as cardiology, and additionally the emergency department information at North Metropolitan Health Service. Feeder system data is centrally held, and is accessible to health services on an as needs basis. HSS collates and provides all source information and feeder system data to each health service costing team, for the health service to validate and import into PPM. The provided feeder files are formatted for Power Performance Manager (PPM) compatibility to enable efficiency in the file importing process.

The costing system in use in WA is PPM2, and there are two FTE staff who are responsible for conducting and managing the NHCDC process at the state level. Local costing teams at each LHN perform the costing process with WA Health coordinating the process, performing QA and ultimately submitting the final output to IHPA. Costing is performed quarterly for some sites and annually for others.

Health services do not have access to the IHPA National Benchmarking Portal. A benchmarking tool was developed by the jurisdiction but was last updated in 2014/15. Given the remoteness issues unique to WACHS, and the varying constructs of the four metropolitan health services, each have developed benchmarking / cost analytics platforms independently to allow them to benchmark across their own facilities.

The state has a Costing Business User Group run by HSS, which plays several roles including liaising with clinical and operational staff to ensure applicability of costing methodologies, and sharing information relating to the NHCDC. The business user group holds statewide monthly meetings, which are attended in person by representatives of the health service costing teams, and are a key touchpoint between the jurisdiction and health services around changes or updates related to the NHCDC. The NHCDC is a recurring agenda item for these meetings.

WA Health has indicated forums with other jurisdictions would be insightful to gather learnings from the costing processes in other states and discuss innovations in costing areas.

Two facilities participated in this Round's Independent Financial Review – King Edward Memorial (KEM) Hospital (part of North Metropolitan Health Service) and Geraldton Hospital (part of Western Australia Country Health Service).

5.4.1 AHPCS 4.0

Compliance against AHPCS v4.0

WA reported being materially compliant with AHPCS Version 4.0 for Round 22. WA has its own costing guidelines, last updated a few years ago with plans for further updates in line with v4.0 standards.

- The following areas were discussed in the site visit as areas where WA deviates from the national costing standards or other jurisdictions:
- **Blood Products** – this area was marked as partially compliant as blood product costs are held at a state level and not brought into the general ledger of facilities for costing purposes. A methodology has not been established to allocate these costs.
- **Teaching, Training and Research** - The allocations used for TTR are based on methodology devised from a costing study from 2012, and have not been updated in recent years. Feedback on the v4.0 standards regarding TTR indicates the definitions do not clarify the allotment of time to TTR.
- **Organ retrieval** – the WA Admission, Readmission, Discharge and Transfer Policy does not allow for the admission of a deceased patient for the purposes of allocation of the organ retrieval costs. WA Health indicated that instead of allocating costs at an episode level, the costs of posthumous retrieval of organs are spread across patients assessed by the organ retrieval team, regardless of whether an attempted retrieval took place.

Feedback on AHPCS v4.0

The Jurisdiction indicated that more detail and case studies for the business rules in the AHPCS Version 4.0 would be useful. In particular:

- Guidance around the allocation of pharmacy, radiology, pathology staff time – specifically where staff in these areas should be classified and to what extent “staff costs” covers (i.e. on costs, staff amenities), and clarity on whether the point of service or point of request for the test should be used as the basis for allocating the cost.
- Business rules around patient transport, for example, primary and inter-hospital transfer retrieval could benefit from clarification.
- Allocation of clinical time to TTR activities was an area where further granularity in guidelines would be beneficial.

5.4.2 Quality Assurance

For Round 22, quality assurance (QA) was undertaken by both the health service and the Jurisdiction at various stages throughout the costing cycle.

At the jurisdiction level, QA is performed through SAS and Excel checks. These include reliability and validity checks on the data to ensure the IHPA requirements are met. As part of

this process, the number of unmatched records was monitored and reviewed against prior periods.

Costing files are tested through IHPA's portal, to which the Jurisdiction uploads the costing files. Automated checks are run including reviewing very high / low costs, overhead percentages, pre-set tolerances and critical errors in structural values, which the Jurisdiction feeds back to health services to resolve prior to the final submission. WA Health re-runs the QA after any subsequent amendments and resubmissions from health services.

KEM

Feeder files from managed services undergo QA for completeness and data quality by the shared services provider, HSS. The costing team then runs a series of QA tests using SQL prior to loading the data into PPM. This set list of tests aims to validate known issues that impact costing and reporting.

The Cost Performance Application is a Spotfire app built by the Jurisdiction, which is used to quality assure the costed outputs. This presents results to internal management and allows comparison of cost results at a facility and DRG level with comparisons against funding.

GERALDTON

The QA process at WACHS involves finance managers in the regions, and is facilitated by two tools:

1. **Quality Assurance Review Process (QuARP)** toolkit is used to sense-check the costing outputs and contains a dashboard breaking down costing outputs at ward, product, DRG and patient level, including comparisons to funding. It contains detail of overhead allocations and adjustments made during the costing process. It is used by finance managers to review the costing outputs for their areas and feedback any changes or areas to the costing team. This process is repeated between July and September until the costing output is finalised.
2. **Performance Reporting and Efficiency Support Tool (PRESTO)** is a highly visual tool that is used to share the costing outputs, and has a further level of granularity – for example, it breaks down individual costs by wards and provides overhead distributions to particular cost centre categories.

The table below sets out a summary of the QA checks performed within WA.

Table 21: Summary of QA checks performed – WA

Specific Quality Assurance	Performed by WA Health	Performed by KEM	Performed by Geraldton
Reconciliation back to general ledger & audited records	Annual reconciliation and sanity checks / threshold checks conducted	Reconciliation between costing output and out of scope items at each NMHS site, and NMHS general ledger	Reconciliation conducted annually and provided as separate working papers
Reconciliation of activities back to source systems	N/A	Conducted by HSS	Conducted by HSS
Reasonableness check of excluded items or out of scope costs e.g. WIP patients	Yes - Done annually	Yes - currently reviewed using Costing QA application on ad-hoc basis but will be quarterly from Round 23.	The health service has developed tools to conduct their own tests annually which include: Reviewing dummy and non-admitted areas; tracking of activity against average funding level; length of stay parameters e.g. discharge times; average cost per NWAU
Trend analysis to prior periods in terms of distribution of costs across care products and LHD	Yes – Done annually		
Analysis of outliers at the cost, LoS or cost bucket level	Yes – Done annually		
Proportion of direct vs overhead costs	Yes – Done annually		
Proportion of costs sitting in each product (eg % costs in acute, ED, OP)	Yes – Done annually		
Specific logic checks	Some conducted through AHS		
Regularly hold costing meetings?	Costing business user group meetings held monthly	Semi-annual meetings with finance and business managers from hospitals to discuss changes to cost centre structures and update resource consumptions in different clinical settings	Annual QuARP process engages functional areas with a service associated with the clinical costing process
Regularly review and update cost centre allocations?	Conducted by AHS	Major review conducted annually, interim reviews conducted when new cost centres are established	Annual
Formal process sign off on data and accountability for data?	Sign off by Chief Executive at AHS	Data is signed off on an annual basis by the Director of Business Information & Performance, CFO, and Executive Director Business Performance at NMH. In Round 22 the Chief Executive also performed signoff.	Data signoff conducted by Regional Director (Executive) for each region and then Executive Director Business Services.
Reviews on data are conducted prior to submission?	Multiple reviews conducted	Multiple reviews conducted prior to signoff	Multiple reviews conducted prior to signoff
Do local guidelines to support national AHPCS standards exist?	Yes		

5.4.3 Pharmacy costing processes

Pharmacy costs and allocation methods

KEM and Geraldton Hospital identified \$6.4m and \$6.3m of pharmacy costs respectively. Of these totals, 97% (KEM), and 65% (Geraldton) were included in the final values submitted to IHPA within the pharmacy cost bucket. The reasons for exclusions were:

- Costs out of scope for the NHCDC, relating to PBS Hepatitis C drugs provided to correctional facilities (\$2.1m at Geraldton);
- Drugs that could not be linked to an episode of care (\$0.2m at KEM).

Details of the costs included within the pharmacy cost bucket, specific allocation methods and linking rules at a site level are included below.

Pharmacy linking rules

KEM used the iPharmacy feeder system to allocate dispensed drugs costs at a patient level.

KEM has previously run reports on PPM to identify which rules pick up the most matches. This identified that the zero day catchments pick up the vast majority of records.

While WACHS (including Geraldton) has an iPharmacy system, it is being used inconsistently across the region and currently does not provide sufficient information to enable its use as a feeder system across all facilities. Instead, DRG level service weights (inpatients) and Tier 2 weights (outpatients) are used for costing purposes for dispensed drugs. However, the recent appointment of a Chief Pharmacist may drive changes in practice and improvements to the pharmacy data available.

Table 22: Pharmacy linking rules in WA

	KEM		Geraldton
Product	iPharmacy linked records – volume	iPharmacy linked records – value	Linking rule / allocation method
Linked	33,004	651,498	<p>The linking rules have multiple iterations and first attempt to match to activity records based on unique identifier and hospital, with the following order:</p> <ul style="list-style-type: none"> • ED attendances within +/- 1 hour, then • inpatient, ED and outpatient within 0 days, then • inpatient, ED and outpatient within +1/-5 days, then • inpatient, ED and outpatient within +10/-10 days • inpatient, then outpatient within +10/-30 days <p>iPharmacy system in place but not being used as a feeder for costing purposes due to data capture completeness / quality</p>
Unlinked	1,858	86,686	
Unlinked %	5.3%	11.7%	

PBS and S100 drugs

Acute hospitals within WA submit PBS claims on monthly basis online to Medicare, and claims are paid out weekly. The source of claims is iPharmacy. Claims are made at the dispensed level once the patient has filled the script.

- KEM identified \$387k in PBS revenue claimed from Commonwealth during 2017/18, but only \$202k spend.
- Geraldton Hospital identified \$4,628k of PBS revenue claimed from Commonwealth, compared to \$4,603k of PBS spend.

Reasons for the variances include:

- Across WA PBS costs are likely to be understated due to a known issue with the iPharmacy extract missing a PBS flag for items dispensed to other pharmacy stores (patients dispensed directly are unaffected). This does not impact the PBS claiming process (as a different extraction process is used) but does mean the split between PBS and non PBS line items for costing purposes is likely to be inaccurate. This specifically affects chemotherapy drugs.
- There are likely to be small timing differences between the cost of drugs hitting the GL and the point at which they are claimed via iPharmacy.

5.4.4 Improvements

Improvements since Round 21

WA Health has carried out work to make improvements to the following areas since Round 21:

- More accurate costing of qualified and unqualified babies was produced this Round by mapping and costing babies based on patients with the age of zero. Previously, the costs associated with unqualified babies were allocated to incorrect areas. (KEM)
- Revised the costing audit report, which is produced annually to include ED and outpatient areas. This information is fed back to costing teams, business managers and senior staff at health services for commentary, and the report underpins the accuracy of ABF in WA.
- Increasing resources at the jurisdiction level to utilise costing information more effectively. There are plans to further increase resources to improve quality assurance and processing of costing data.

Future improvements in development for Round 23

- In Round 22 QA was conducted on an ad-hoc basis, but from Round 23 onwards there will be a quarterly QA conducted to address any issues in a timely manner. (KEM)
- WA Health will revise TTR allocations in the next few years for currency and relevance. The current approach is based on a historic costing study conducted across the state and tailored at a facility level where appropriate, but is now outdated.
- Standardising an approach of capturing costs and activity for innovative service delivery models, e.g. inpatient telehealth services. (WACHS)

- Implementing a defined process for pharmacy costing for Round 23 with a chief pharmacist. (WACHS)
- Greater definition of standards for hospitals with multi-purpose services, e.g. providing residential aged care services in rural areas. WACHS has assessed resource allocation for patients, predominantly in acute flexible ward environments, which will aid the articulation of costing challenges. (WACHS)

5.4.5 Facility Subchapters

5.4.5.1 King Edward Memorial Hospital (KEM) Overview

King Edward Memorial Hospital (KEM) is part of the North Metropolitan Health Service (NMHS), which consists of four hospitals in metropolitan Perth. KEM is the statewide provider of maternity services and the largest maternity hospital in Western Australia. It is the only referral centre for complex pregnancies. There is also a statewide inpatient treatment centre for mental health, in addition to various outpatient clinics. KEM is also a teaching facility and provider of various statewide programs not funded through ABF, including the statewide obstetric support unit, WA cervical cancer prevention program, and the newborn emergency transport service.

The costing team at NMHS consists of four FTE, with one dedicated to costing KEM and approximately one-and-a-half FTEs performing QA on activity and outputs for the entire health service. There are centrally-held feeder systems at KEM for areas including allied health, pathology, visiting medical practitioners (VMPs), prosthetics and consumables. NMHS has access to the ED system (EDIS) and NMHS supplements extracts from the EDIS system with other information from HSS to create time-driven cost allocations. This differs from other sites in WA which largely cost ED based on RVUs. The quality of ED feeder system information has also provided workflow planning in the different areas of ED.

Costing is performed on a quarterly basis at health service level. There is one GL for NMHS, which is separated into individual GLs for the hospitals within the health service for costing purposes. Most cost centres are facility-specific, but a few (eg. corporate overheads) are apportioned across all facilities. The health service excludes expenses unrelated to hospital products before submission to the jurisdiction. The apportionment of overheads only happens for the full year costing round, not the previous three quarters.

During Round 22, quality assurance (QA) was performed on an ad-hoc basis prior to the files being loaded into PPM, which occurred quarterly. From the next round, there will be more formalised regular QA conducted monthly on the files to ensure the timely resolution of any issues that arise with clinical teams.

Costing takes approximately four days, including two days for the QA process (which helps KEM's costing team target and adjust service files for any issues), and an additional two days to load data into PPM.

Changes to the neo-natal costing methodology were implemented in Round 22 and they materially impacted the costs of unqualified babies and qualified babies in this round. Previously, costing only accounted for qualified babies and as a result, unqualified newborns were not allocated their share of costs and qualified newborns were over-allocated costs, which was evident in comparison to national benchmarks.

Another change was that patient-assisted travel scheme expense account codes were excluded in Round 22, but will be included for Round 23.

KEM uses costing and activity data for various purposes including workflow planning and benchmarking against the state price to determine profitability. A web-based platform is used across NMHS to provide granularity in costing information with finance managers. Finance managers verify and sign off the data in this tool, which is then presented to executives in an area executive group (AEG). On an annual basis, the results of the previous costing process and IFRAcs process are discussed to determine improvement areas for the next round.

Benchmarking at KEM is conducted using Health Round Table data, which provides the standard for various clinical indicators. Benchmarking at KEM is predominantly performed against KEM's prior year performance, due to the unique, specialised maternity casemix at the hospital which does not offer practical comparison with the rest of Western Australia.

5.4.5.1.2 King Edward Memorial Hospital Reconciliation

This section discusses major variances, reconciling items and adjustments in the reconciliation process. The information is based on the KEM's data collection template, data quality self-assessment and review discussions.

Diagram 19 (overleaf) presents a summary reconciliation from KEM's general ledger (GL) to the final NHCDC submission for Round 22.

KEM's final GL of \$301,259,068 was reconciled by the Health Service to the audited financial statements. This value reflects a KEM's share of NMHS' GL, which includes KEM specific cost centres and KEM's share of central cost centres.

Explanation of reconciling items

Adjustments made at the LHN level (Item B)

- There are reclassification rules to remove out-of-scope costs not associated with patients, including block funded community programs (\$30.2m), community mental health (\$9.5m), genetic services (\$6.8m), other block funded items (\$3.8m) and TTR without associated activity. These exclusions totalled \$53.4m.

Adjustments made at the jurisdiction level (Item E)

- A WIP adjustment of \$6.3m added in costs for patients discharged in the Round 22 year (2017/18) but admitted in the previous (2016/17) year. Similarly, a WIP adjustment of \$5.9m removed the costs for patients admitted in 2017/18 who had not been discharged by year end.
- DM of \$3.2m was removed, for dummy records in ancillary services which were stripped out.
- Unmatched records of \$0.9m were removed. These arise from reasons including data issues, records in edit, or unmatched outpatient records. The percentage of unmatched records has generally decreased each year.
- Teaching, training and research (TTR) costs of \$15.1m were excluded by the jurisdiction. These are calculated based on a proportion of salaries and wages for medical, nursing and allied health, which is based on a previous costing study.

Table 23: Reconciliation between General Ledger and NHCDC products – King Edward Memorial Hospital

King Edward Memorial Hospital			Jurisdiction			IHPA		
Item		Amount	Item		Amount	Item		Amount
Source: Self-Assessment	A	General Ledger (GL)	\$	301,259,066		G	Total costed products received by IHPA	\$ 228,368,246
	B	Adjustments to the GL				H	IHPA Adjustments	\$0
Source: Data collection template		Inclusions					Newborn - transfer to acute	(\$877,967)
		Exclusions					Acute - transfer from newborn	\$877,967
		Genetic Services - Aggregate Amount				I	Final NHCDC costs	\$ 228,368,246
		Non-admitted mental health services					% of GL submitted to NHCDC	92%
		Block funded community programs						
		Other block funded programs						
		TTR without associated activity						
		Other						
		Total hospital expenditure	\$	247,297,550				
Source: Data collection template	C	Costed products submitted to jurisdiction				F	Costed products submitted to IHPA	
	Acute	AR DRG	\$94,122,883			Acute	AR DRG	\$94,373,159
		Newborns	\$73,757,932				Newborns	\$73,935,368
	Outpatient	Outpatient - Tier 2	\$46,999,693			Outpatient	Outpatient - Tier 2	\$46,318,501
		Outpatient Non Tier 2	\$0				Outpatient Non Tier 2	\$0
	Emergency	URG - Admitted	\$1,847,309			Emergency	URG - Admitted	\$1,733,851
		URG - Non- Admitted	\$5,989,804				URG - Non- Admitted	\$5,989,557
		UDG - Admitted	\$0				UDG - Admitted	\$0
		UDG - Non Admitted	\$0				UDG - Non Admitted	\$0
	Sub Acute	Rehabilitation	\$0			Sub Acute	Rehabilitation	\$0
		Palliative Care	\$0				Palliative Care	\$0
		GEM	\$0				GEM	\$0
		Psych Geriatric	\$0				Psych Geriatric	\$0
		Maintenance	\$0				Maintenance	\$0
	Mental Health	Admitted Mental Health (MC)	\$6,199,352			Mental Health	Admitted Mental Health (MC)	\$6,017,810
		Non Admitted Specialist Mental Health (MS)	\$0				Non Admitted Specialist Mental Health (MS)	\$0
		Non Admitted Mental Health (MH)	\$0				Non Admitted Mental Health (MH)	\$0
		Residential Mental Health (MR)	\$0				Residential Mental Health (MR)	\$0
	Other	Other Admitted Patient Care	\$2,132			Other	Other Admitted Patient Care	\$0
		Organ Procurement	\$0				Organ Procurement	\$0
		Outreach & community care	\$0				Outreach & community care	\$0
		Boarder	\$0				Boarder	\$0
		Other	\$0				Other	\$0
		Research	\$3,249,663				Research	\$0
		Teaching & Training	\$11,990,459				Teaching & Training	\$0
		Dummy/virtual patients (No NHCDC Product)	\$3,138,323				Dummy/virtual patients (No NHCDC Product)	\$0
		Total	\$	247,297,550			Total	\$ 228,368,246

5.4.5.1.3 KEM – Pharmacy

The diagrams and narratives below outline the categories of expenditure that are mapped to the pharmacy cost bucket in KEM, as well as allocation methods used.

Based on information collected from the site visits and IFR data collection templates, KEM identified \$6.4m of pharmacy costs for Round 22, comprising:

- Drug costs of \$3.6m (split into PBS drugs \$0.2m, imprest drugs \$2.7m and non PBS drugs \$0.6m). Imprest drugs are not linked to a unique reference identifier and are allocated depending on the ward hours;
- Pharmacy salaries and wages (\$2.7m);
- Other goods and services (\$93k);
- Corporate overheads (\$72k). iPharmacy costs are included in the HSS overhead, of which a portion would be allocated to pharmacy.

\$157k of costs could not be linked to episodes and were costed to dummies, meaning that approximately \$6.3m pharmacy costs were included in the NHCDC submission.

Diagram 21: Allocation methods and make up of pharmacy costs submitted to NHCDC - KEM

Cost Category	Allocation method	Description of allocation method	% of pharmacy cost bucket
S100 drugs / PBS drugs	Feeder	The costs of dispensed drugs are allocated using a feeder from the iPharmacy system. The total dispensed drugs was \$738k, of which \$202k related to PBS. Of the \$738k, 94.7% of records (88.3% of dispensed drugs value) was able to be matched	2%
Non PBS dispensed drugs	Feeder		10%
Imprest drugs (Ward, ED, OR)	RVU	All imprest drugs are allocated across based on ward bed hours of that patient (including theatre and drugs dispensed in ED).	44%
Pharmacist S&W	RVU	\$2.7m Pharmacy staff costs are spread over all patient episodes with a dispensed pharmacy cost, based on relative dispensed drugs value. Due to PPM system configuration, KEM includes these costs as 'indirect' costs within the pharmacy cost centre (% included in overhead line below)	
Ward based pharmacists		N/A – all pharmacy costs are included within the pharmacy cost centre, including ward pharmacist roles.	
Pharmacy system costs / licences		These costs are within the health service's charge from HHS. Pharmacy receives a portion of these costs allocated as overheads.	
Overheads / indirect costs	RVU	Corporate overheads of \$72k are included, and are allocated based on the overhead allocation structure. Goods and services (\$94k) and salaries and wages (\$2.7m) are allocated as described above / below, but included as an indirect cost.	45%
Other direct costs	RVU	There are \$72k goods and services costs (including consumables) within the pharmacy cost centre. Due to PPM system configuration, KEM includes these costs as 'indirect' costs within the pharmacy cost centre (% included in overhead line below)	

5.4.5.2 Geraldton Hospital - Overview

Geraldton Hospital is part of the Western Australia Country Health Service (WACHS), which consists of 70 hospitals. WACHS is split into seven regions which cover the entirety of Western Australia, excluding the Perth metropolitan area. Geraldton is a regional health campus which has expanded over the last few years, including the addition of a cancer centre, and has plans for further expansion to address capacity constraints. For example, there are considerations for an integrated community mental health service at the hospital to support mental health patients, as well as for expanding the emergency department. Additionally, access to residential aged care is limited in Geraldton, resulting in some of these patients being admitted to the hospital for extended stays.

Costing is conducted annually by one FTE, who costs 21 ABF funded regional health campuses and integrated district health services within WACHS. This individual also manages the business improvement function outside the costing cycle.

The feeder systems are predominantly health service-wide and provided by HSS. There are feeder systems for areas including theatre management, pathology, VMP (for VMO costs) and pharmacy. Pharmacy and VMP feeders are used to validate the general ledger and the accurate recording of expenditure, rather than directly linking costs to patients, as they offer only partial coverage across WACHS. Geraldton uses WebPAS extracts from HSS for outpatients, inpatients and ED activity.

As part of the costing process, planning for the costing period is undertaken in May and June. The WACHS costing team then performs the preliminary configuration and quality assurance in July. Meetings are conducted with business managers and operational and clinical staff across all seven regions over a two-month period from August to September. The end of the process is in October when finalisation of costing and sign-off occur. The engagement with the regions is used to review the assumptions in place affecting costing, and to determine any changes required, e.g. reclassification changes. It also serves to inform the annual QA process to review the current costing process. The changes and suggestions from hospitals are implemented weekly throughout this process until the end of September. During these meetings, training is run using the analytical tools the health service has developed which are provided to hospitals. Any changes made to costing by WACHS can be viewed and validated by finance managers in the regions.

WACHS has used a data visualisation and analytical product (Spotfire) to develop the Performance Review and Efficiency Support Tool (PRESTo), with support from the health service business intelligence (BI) team. These tools support the monitoring of length of stay issues, access to clinical costing information, and ED and inpatient activity. They are also used to inform the redesigning of workflow for greater efficiency, and for performance reviews. WACHS regions also have access to an end-to-end Quality Assurance Process Toolkit (QuARP Toolkit), which is explored further in the QA section of this report. WACHS has performed training with hospital staff on the QA and performance tools discussed above to increase the utility of costing information over the last few years and use it for more strategic purposes.

The source files have a QA check conducted annually to flag data issues before being processed into PPM. Any errors are filtered to health information managers who coordinate edits. WACHS has built its own QA checks, which differ from the ones in use at KEM as there are different feeders in use between the sites. WACHS also leverages off Web PAS, which offers some QA on outpatient areas. Benchmarking is conducted across WACHS by hospitals to compare their performance to other hospitals in the health service.

Patient Assistance Travel Scheme (PATS) is not included in the costing data as per costing standards. The Royal Flying Doctor Service costs are managed within WACHS for Western Australia, and these are stripped out of the NHCDC as a non-patient product.

5.4.5.2.1 Geraldton Hospital Reconciliation

This section discusses major variances, reconciling items and adjustments in the reconciliation process. The information is based on the Geraldton's data collection template, data quality self-assessment and review discussions.

The table overleaf presents a summary reconciliation from Geraldton's general ledger (GL) to the final NHCDC submission for Round 22.

Geraldton's final GL of \$112,583,355 was reconciled by the health service to the audited financial statements.

Explanation of reconciling items

Adjustments made at the LHN level (Item B)

None

Adjustments made at the jurisdiction level (Item E)

- A WIP adjustment of \$1.2m was made for 2016-17, representing costs for patients who were discharged in the Round 22 year (2017-18) but admitted in the previous year. The opening WIP figure was incorporated into costed products submitted to IHPA. Similarly, a WIP adjustment removing the costs for patients admitted in 2017-18 who had not been discharged by year end totaled \$850K.
- Removal of DM (\$1.3m) for dummy records in ancillary services, i.e. pathology and imaging, which were stripped out.
- Exclusion of errors in continuing WIP of \$1.8k, which was an immaterial adjustment for an error.
- Unmatched records of \$929k were removed, largely in outpatient areas. There are no unmatched ED records and only a small number of unmatched inpatient records due to improvements statewide in matching as a result of Web PAS and the Jurisdiction's matching processes.
- Teaching, training and research (TTR) costs of \$4.8m have been excluded. These are calculated based on a proportion of salaries and wages for medical, nursing and allied health areas. This proportion has been adjusted by WACHS to more accurately reflect its TTR activity. Only the larger hospitals in WACHS have TTR components, and this is allocated by the health service

Table 24: Reconciliation from General Ledger to NHCDC costed products – Geraldton Hospital

Geraldton Hospital			Jurisdiction			IHPA				
Item		Amount	Item		Amount	Item		Amount		
Source: Self- Assessment	A	General Ledger (GL)	\$ 112,583,355	D	Costed products received by jurisdiction	\$ 112,583,479	G	Total costed products received by IHPA	\$ 105,864,961	
	B	Adjustments to the GL		Source: Data collection template	E	Post Allocation Adjustments	(\$6,718,394)	H	IHPA Adjustments	\$0
		Inclusions				WIP 2016 - 17	\$1,172,932		Newborn - transfer to acute	(\$157,560)
		Exclusions				WIP 2017 - 18	(\$850,467)		Acute - transfer from newborn	\$157,560
		Total hospital expenditure	\$ 112,583,355			Removal of DM	(\$1,314,801)	I	Final NHCDC costs	\$ 105,864,961
					Removal of error in continuing WIP	(\$1,779)		% of GL submitted to NHCDC	94%	
					Unmatched records	(\$928,922)				
					Teaching and Research	(\$4,795,357)				
					Total costs submitted to IHPA	\$ 105,865,085				
				Source: Data collection template						
	C	Costed products submitted to jurisdiction		F	Costed products submitted to IHPA			Costed products per NHCDC		
Acute		AR DRG	\$64,654,466	Acute		AR DRG	\$63,973,598	Acute	\$ 64,587,618	
		Newborns	\$26,939			Newborns	\$614,020	Outpatient	\$ 12,838,854	
Outpatient		Outpatient - Tier 2	\$13,668,456	Outpatient		Outpatient - Tier 2	\$12,838,854	Emergency	\$ 19,980,356	
		Outpatient Non Tier 2	\$0			Outpatient Non Tier 2	\$0	Sub Acute	\$ 8,458,133	
Emergency		URG - Admitted	\$7,754,951	Emergency		URG - Admitted	\$7,748,961	Mental Health	\$ -	
		URG - Non- Admitted	\$12,227,585			URG - Non- Admitted	\$12,231,394	Other	\$ -	
		UDG - Admitted	\$0			UDG - Admitted	\$0	Total	\$ 105,864,961	
		UDG - Non Admitted	\$0			UDG - Non Admitted	\$0			
Sub Acute		Rehabilitation	\$2,890,586	Sub Acute		Rehabilitation	\$2,928,512			
		Palliative Care	\$2,351,318			Palliative Care	\$2,057,600			
		GEM	\$357,634			GEM	\$357,634			
		Psych Geriatric	\$0			Psych Geriatric	\$0			
Mental		Maintenance	\$2,541,924	Mental		Maintenance	\$3,114,386			
		Admitted Mental Health (MC)	\$0			Admitted Mental Health (MC)	\$0			
		Non Admitted Specialist Mental Health (MS)	\$0			Non Admitted Specialist Mental Health (MS)	\$0			
		Non Admitted Mental Health (MH)	\$0			Non Admitted Mental Health (MH)	\$0			
Other		Residential Mental Health (MR)	\$0	Other		Residential Mental Health (MR)	\$0			
		Other Admitted Patient Care	\$0			Other Admitted Patient Care	\$0			
		Organ Procurement	\$0			Organ Procurement	\$0			
		Outreach & community care	\$0			Outreach & community care	\$0			
		Boarder	\$0			Boarder	\$0			
		Other	\$818			Other	\$0			
		Research	\$912,652			Research	\$0			
		Teaching & Training	\$3,881,349			Teaching & Training	\$0			
		Dummy/virtual patients (No NHCDC Product)	\$1,314,801			Dummy/virtual patients (No NHCDC Product)	\$0			
		Total	\$ 112,583,479			Total	\$ 105,864,961			
Variance		\$ 124	Variance		-\$ 124					

5.4.5.2.2 Geraldton – Pharmacy

The diagrams and narratives below outline the categories of expenditure that are mapped to the pharmacy cost bucket in Geraldton, as well as allocation methods used.

Based on information collected from the site visits and IFR data collection templates, Geraldton identified \$6.3m of pharmacy costs for Round 22, comprising:

- Drug costs of \$4.8m (split into PBS drugs \$2.4m, imprest drugs and non PBS dispensed drugs \$0.2m, and out of scope drugs dispensed to correctional facilities, which were excluded and ultimately not submitted to IHPA as part of the NHCDC);
- Pharmacy salaries and wages (\$1.0m);
- Other goods and services (\$84k);
- Corporate overheads (\$0.5m). iPharmacy costs are included in the HSS overhead, of which a portion would be allocated to pharmacy.

After the excluded items, Geraldton submitted \$4.1m of pharmacy costs as part of the NHCDC submission.

Diagram 23: Allocation methods and make up of pharmacy costs submitted to NHCDC – Geraldton

Cost Category	Allocation method	Description of allocation method	% of pharmacy cost bucket
S100 drugs / PBS drugs	RVU	Drugs are allocated to separate cost centres in PPM and allocated using tier 2 service weights for outpatients, ward length of stay for ward imprest, URG service weight (with differentiation for complexity) for ED imprest, theatre minutes for OR imprest. All remaining drugs costs are allocated based on service weights based on the DRG to all inpatients.	59%
Non PBS dispensed drugs	RVU		4.7%
Imprest drugs (Ward, ED, OR)	RVU		
Pharmacist S&W	RVU	\$1.0m Pharmacy staff costs are spread over all inpatient episodes with a dispensed pharmacy cost, based on relative drugs value.	23%
Ward based pharmacists		N/A – all pharmacy costs are included within the pharmacy cost centre, including ward pharmacist roles.	
Pharmacy system costs / licences		These costs are within the health service's charge from HHS. Pharmacy receives a portion of these costs allocated as overheads.	
Overheads / indirect costs	RVU	Corporate overheads of \$0.5m are included, and are allocated based on the overhead allocation structure.	11%
Other direct costs	RVU	There are \$84k goods and services costs (including consumables) within the pharmacy cost centre. Due to PPM system configuration, KEM includes these costs as 'indirect' costs within the pharmacy cost centre (% included in overhead line below)	2%

5.5 South Australia

Jurisdictional Overview

The Department of Health and Wellbeing (DHW) leads and performs clinical costing for the state's Local Health Networks (LHNs). The department is responsible for the preparation and submission of the South Australia NHCDC process. The South Australia (SA) jurisdiction contains five LHNs: four covering the Adelaide metropolitan region including the Women's and Children's Health Network and one covering regional SA, which is largely block funded.

Costing is performed centrally by the Jurisdiction on a quarterly basis and the costing system in use is Power Performance Management 2 (PPM). The Jurisdiction sources inpatient and emergency data centrally from statewide data warehouses on a quarterly basis whilst receiving outpatient data from LHN data. The DHW team consists of five FTE and currently the timeframe required to complete costing is six to eight weeks. Some of the LHNs (NALHN, CALHN and partially SALHN) use Power Health Solution (PHS) contractors to provide some clinical costing support.

There are statewide feeder systems for pharmacy, imaging and pathology, with a few exceptions of hospitals not on the statewide pharmacy and imaging systems. Pathology datasets are provided by SA Pathology to LHNs, who submit the data to DHW as pathology data is not sourced centrally by the department. For the few sites not using the statewide PAS such as NALHN, they submit PAS data directly into the statewide data warehouse. At NALHN, there are two hospital-specific Patient Administration Systems (PAS) in use which are provided to the statewide data warehouse.

There are difficulties in obtaining accurate patient-level data for patient transport activity due to the poor quality of the dataset that requires data matching to find the correct URN prior to use in costing. The process to obtain the correct URN enables allocation of this cost at an individual patient level, and if this cannot be achieved the costs are allocated on relative value units (RVUs).

Community mental health costing has not been undertaken by NALHN during 2017-18, but a project has commenced to undertake this work in 2018-19. There are a number of components to this costing project, including finance data, feeders and in particular ensuring that there is reliable activity data available within clinical datasets. The availability of this costing data in 2018-19 is expected to support management processes and national collections such as the NHCDC and the National Mental Health Survey.

DHW holds corporate charges, i.e. ICT, procurement and shared services, which are allocated annually to each of the LHNs as part of the annual NHCDC process. Medical indemnity is paid by the LHNs.

Prior to submitting NHCDC data to IHPA, the Jurisdiction's Patient Costing team provides each LHN with a reconciliation of any changes in the costing submission since the last review and seeks executive sign-off from the LHN for the current NHCDC submission. The Manager of Patient Costing is responsible for the sign-off of the final data submitted to IHPA and does this following the LHN CFO's endorsement that the costings are fit for purpose.

Monthly costing working group meetings attended by the LHNs and Jurisdiction are the primary mechanism for information sharing in South Australia. These are used as a forum to discuss costing standards and changes, share improvements and problems. The costing team at DHW contacts other jurisdictions on an ad-hoc basis to resolve costing challenges.

Modbury Hospital Overview

Within SA, the selected site for the Round 22 Independent Financial Review was Modbury Hospital, part of the Northern Adelaide Local Health Network (NALHN). Modbury Hospital is an acute care teaching hospital that provides inpatient, outpatient and emergency services to a population of nearly 200,000 people in Adelaide's north-eastern suburbs. The hospital has a specific focus on rehabilitation, older persons and palliative care service, and is a high volume surgery site. Modbury Hospital is affiliated with the University of Adelaide.

The NALHN case-mix team oversees clinical costing of Modbury activity and consists of three LHN FTEs and two part-time PHS contractors. PHS is used at NALHN and CALHN, and partially used at SALHN for its expertise in the parameters for costing and to perform some quality assurance. If there are changes required for new cost centres, adjusting of product fractions (PFRACS) or changes in service files, then the LHNs will advise the Department of these for the Jurisdiction to reflect in the costing system.

At a high level, the process for LHNs in preparation for the Jurisdiction's quarterly costing is:

- Reviewing the business rules in PPM2 to ensure it is relevant to the reporting period;
- Reviewing and reporting to Jurisdiction any changes required to PFRACS, new cost centres/account codes, new clinics etc.;
- Compiling, preparing and submitting local activity and service files to the Department
- Undertaking quality assurance checks of the outputs; and
- Sharing results with relevant stakeholders, including the lead clinicians, to ensure the outputs align with operational expectations before being signed off.

Centralised clinical, GL and other datasets are loaded to PPM2 by the Department.

In addition to the statewide feeder systems mentioned previously, Modbury Hospital has feeders for hospital theatre, imaging (third party provider), allied health services, translation services, patient transport, security and Medical Emergency Team (MET) calls. Prosthetics are costed at Modbury Hospital using a Relative Value Unit (RVU) based on the prosthetics feeder of another hospital in South Australia that uses the statewide provider for prosthetics. Prosthetics are purchased under a statewide agreement and therefore this approach should not be distorting the prosthesis cost bucket.

When new services are introduced, LHNs involve clinicians and site teams to establish data capture processes, conduct test runs to check the accuracy of the captured data and review general ledger entries, and determine the reasonableness of costed output for the new service. During Round 22 NHCDC, this was performed for sub-acute activities which were re-aligned to NALHN from other sites, and subsequently impacted the costing for this product in Round 22.

In addition to the annual NHCDC review, Modbury Hospital participates in Health Roundtable and Women's and Children's Health Asia benchmarking associations. Modbury Hospital submits its costing data to these organisations and uses the reports from the review for benchmarking. LHNs have access to PPM as a reporting tool. This data is also available on the Department's LARS reporting system and IHPA's National Benchmarking Portal is used. As well as these external benchmarking sources, NALHN benchmarks services internally and uses these information sets to engage clinicians and executives in performance management and strategy decisions.

The LHN and Modbury Hospital use the costed output datasets to enable annual workforce and service planning modelling and discussions, particularly in sub-acute divisions and in allied health. Costing data for 2017-18 was used extensively by the Department to develop contracts with the private sector to conduct services, and to support business cases when new services arise.

The costing team identifies anomalies between different feeder systems and audited patient records, which are submitted to the Jurisdiction on a quarterly basis and compared to the patient costing DHW central database. The accuracy of these mismatched records is improving, as the LHN patient costing manager has worked with the manager of medical records to improve the submission process.

Challenges for Round 22 have been:

- Allocations of Rights of Private Practice (RoPP), which is being worked on by the Patient Costing team at a state level to ensure that these medical expenses can be included in the patient costing data for 2018-19. It was not possible use the data available in subsidiary accounting systems during 2017-18 for RoPP.
- Forensic patients are challenging to cost as they are on another LHN PAS system and therefore present a data management issue to ensure the correct activity is aligned to the NALHN costing GL. In the longer term, DHW will need to review this so that data management can occur more efficiently for all LHNs. This cohort contains fewer than 100 patients, but they are high-cost patients to service.

5.5.1 Reconciliation

This section discusses major variances, reconciling items and adjustments in the reconciliation process. The information is based on the Modbury Hospital's data collection template, data quality self-assessment and review discussions.

The table overleaf presents a summary reconciliation from Modbury Hospital's general ledger (GL) to the final NHCDC submission for Round 22.

Modbury's final GL of \$137,875,145 was reconciled by the LHN to the audited financial statements.

Explanation of reconciling items

Adjustments made at the LHN level (Item B)

- Inclusions consist of centralised costs (\$3.1m) and costs on other regions' general ledgers which relate to Modbury Hospital's activity (\$2.4m). Centralised costs are corporate costs that have not been automatically recharged to Modbury Hospital including ICT, procurement and shared services. NALHN's costs on the GLs of other regions includes pharmacy salary and wages, and goods and services costs which are in Central Adelaide Local Health Network's (CALHN's) cost centres. Additionally, costs associated with NALHN forensic patients are recorded on another LHN's general ledger and need to be included into Modbury Hospital's general ledger.
- Bad debts expenses make up the majority of the exclusions (\$15.6K), for example, unfulfilled patient co-payments. The remaining \$1.5K is the removal of imaging charges as these costs have already been mapped directly to Modbury Hospital.
- Adjustments of \$4.6m were made within PPM based on costing system rules. These adjustments reflect the net movements of costs and activity between the two NALHN hospitals: Modbury and Lyell McEwin.

Adjustments made at the jurisdiction level (Item E)

- DHW submitted costs for all patients discharged in 2017-18 (including those admitted in prior years) and removed WIP costs for patients who were still admitted at 30 June 2018. The movement in WIP across the period increased from \$1.1m to \$3.0m as a result of new wards which have significantly increased capacity, mainly for sub-acute beds.
- Morbidity adjustments amounting to -\$2.7m account for legitimate activity which has been costed but cannot be submitted to IHPA as a result of not meeting specific costing data specifications. This may be caused by time constraints to fix the data before final end of year submissions are due to the Department, and is flagged as a continuing focus area for data improvement.
- Teaching and training costs of \$3.7m are excluded in the IHPA submission as per costing standards.
- Dummy encounter adjustments of -\$205K are made for out of scope encounters. These are usually unmatched records from feeder files and represent activity that is costed but not submitted to IHPA. For example, imaging services are run by SA Medical Imaging and performed at NALHN, hence the costs are attributed to NALHN even though the service is not necessarily delivered to NALHN patients. These subsequently appear as dummy encounters and are stripped out from NALHN costs.

Table 25: Reconciliation from GL to NHCDC costs – Modbury Hospital

Modbury Hospital			Jurisdiction			IHPA		
Item	Amount		Item	Amount		Item	Amount	
Source: Self-Assessment	A General Ledger (GL)	\$ 137,875,145	Source: Data collection template	D Costed products received by jurisdiction	\$ 147,905,052	G Total costed products received by	\$ 139,468,607	
	B Adjustments to the GL			E Post Allocation Adjustments	(\$8,436,445)	H IHPA Adjustments		\$0
	GL Inclusions	\$ 5,469,166		WIP 2016 - 17	\$1,104,416	I Final NHCDC costs	\$ 139,468,607	
	GL Exclusions	(\$17,122)		WIP 2017 - 18	(\$3,000,717)			
	PPM System Costing Process Movements	\$ 4,577,869		Morbidity submission adjustments to product	(\$2,669,622)	% of GL submitted to NHCDC		94%
	Total hospital expenditure	\$ 147,905,058		Rounding	(\$633)			
			Teaching & Training	(\$3,664,952)				
			Dummy/virtual patients (No NHCDC Product)	(\$204,937)				
			Total costs submitted to IHPA	\$ 139,468,607				
Source: Data collection template	C Costed products submitted to jurisdiction		Source: Data collection template	F Costed products submitted to IHPA		Costed products per NHCDC		
	Acute			Acute	\$39,587,559	Acute	\$ 39,587,559	
	AR DRG	\$ 40,034,813		Newborns	\$0	Outpatient	\$ 25,343,290	
	Newborns	\$ -		Outpatient - Tier 2	\$25,343,290	Emergency	\$ 32,836,207	
	Outpatient			Outpatient Non Tier 2	\$0	Sub Acute	\$ 33,863,371	
	Outpatient - Tier 2	\$ 25,963,697		Emergency		URG - Admitted	\$ 7,838,179	
	URG - Admitted	\$ 7,173,793		URG - Non- Admitted	\$25,662,414	Mental Health	\$ 7,838,179	
	URG - Non- Admitted	\$ 25,697,149		UDG - Admitted	\$0	Other	\$ -	
	UDG - Admitted	\$ -		UDG - Non Admitted	\$0	Total	\$ 139,468,607	
	UDG - Non Admitted	\$ -		Rehabilitation	\$17,375,909			
	Sub Acute			Palliative Care	\$6,492,277			
	Rehabilitation	\$ 18,942,100		GEM	\$8,520,389			
	Palliative Care	\$ 6,850,793		Psych Geriatric	\$0			
	GEM	\$ 8,873,233		Maintenance	\$1,474,796			
	Psych Geriatric	\$ -		Admitted Mental Health (MC)	\$7,838,179			
	Maintenance	\$ 1,893,388		Non Admitted Specialist Mental Health (MS)	\$0			
	Mental			Non Admitted Mental Health (MH)	\$0			
	Admitted Mental Health (MC)	\$ 8,606,198		Residential Mental Health (MR)	\$0			
	Non Admitted Specialist Mental Health (MS)	\$ -		Other Admitted Patient Care	\$0			
	Non Admitted Mental Health (MH)	\$ -		Organ Procurement	\$0			
	Residential Mental Health (MR)	\$ -		Outreach & community care	\$0			
	Other			Boarder	\$0			
	Other Admitted Patient Care	\$ -		Other	\$0			
	Organ Procurement	\$ -		Research	\$0			
	Outreach & community care	\$ -		Teaching & Training	\$0			
	Boarder	\$ -		Dummy/virtual patients (No NHCDC Product)	\$0			
	Other	\$ -		Total	\$ 139,468,607			
	Research	\$ -						
	Teaching & Training	\$ 3,664,952						
	Dummy/virtual patients (No NHCDC Product)	\$ 204,937						
Total		\$ 147,905,052	Total		\$ 139,468,607			

5.5.2 Application of Australian Hospital Patient Costing Standards (v4.0)

From the site review, South Australia discussed being materially in compliance with AHPCS Version 4.0 for Round 22. SA reported partial compliance against the following standards and costing guidelines:

- Stage 1.1- Identify Relevant Expenses – General. Only partial compliance due to the RoPP and blood products. Challenges in linking the tests conducted by the private pathology provider to patients means not all RoPP patient costs are being included. The treatment of blood product costs is highlighted as these are held centrally and unable to be linked to patient records.
- Stage 4.1 - Identify Products - Product Types. Partial compliance only, largely due to Jurisdiction / LHN challenges in reconciling the requirements from the AMHCC and IHPA NHCDC data reporting requirements for community mental health. Additionally, patient travel and transport is separately identified and costed, but not submitted as a separate cost item due to the Data Request Specification changes which occurred some time after the end of the financial year.
- Stage 4.2 - Identify Products - Information Requirements. Only partial compliance as teaching, training and research is not costed as a product due to limitations in system capabilities in allocating these costs.
- CG 7 Posthumous organ donation. Partial compliance only, as posthumous care episodes are not captured and thus organ donation was not costed.

5.5.3 Quality Assurance

The Jurisdiction conducts basic checks and reconciliations on a quarterly basis as set out in the table below, and performs a SA state annual DRG review across all products. DHW benchmarks the SA costs against the national IHPA data and compares costs at the cost bucket level to inform the threshold setting for QA tests.

DHW viewed that the circulation of an IHPA document containing the list of DRGs within each acute cost bucket would better inform the QA process around DRGs. For example, the QA check on prosthesis costing identifies episodes that have a prosthesis procedure code and the attributable cost in the prostheses cost bucket.

Areas highlighted by South Australia for improvement are:

- The variability in the quality of data capture between LHNs has resulted in the adoption of wide iterative linking rules in statewide feeders to minimise unlinked records. The timeframes of the linking rules could be revised to reduce incorrect matching of patient records.
- When patients are stepped down in care, the costing or weighting is not adjusted.

Quality assurance at Modbury Hospital was achieved using a combination of inbuilt system thresholds, e.g. inpatient costs under a set amount, and Excel analysis against QA tolerances based on the experience of the costing team.

The table below sets out the range of quality assurance activities carried out.

Table 26: Quality assurance performed in South Australia

Specific Quality Assurance	Performed by DHW	Performed by Modbury Hospital
Reconciliation		
Reconciliation back to general ledger & audited records	Quarterly reconciliation and basic checks / threshold checks conducted	Reconciled GL to costed products for each costing cycle (quarterly)
Reconciliation of activities back to source systems	Reviews on all state managed feeder systems	Feeder systems are checked quarterly and benchmarked against accepted values
Validation of costing data		
Reasonableness check of excluded items or out of scope costs e.g. WIP patients	Yes – through Excel	Yes – through Excel
Trend analysis to prior periods in terms of distribution of costs across care products and LHD	Yes – through Excel	Yes – through Excel
Analysis of outliers at the cost, LoS or cost bucket level	Yes – through Excel	Yes – through Excel
Proportion of direct vs overhead costs	Yes – through Excel	Yes – through Excel
Proportion of costs sitting in each product (eg % costs in acute, ED, OP)		Yes – through Excel
Specific logic checks	Yes – through PPM (theatre time logic checks) and Excel (patient costs outside thresholds for care duration, dummy and Z encounters, unusual RVUs etc.)	
Costing Governance		
Regularly hold costing meetings?	Monthly	NALHN meets on ad-hoc basis when issues arise
Regularly review and update cost centre allocations?	Quarterly	Quarterly review of overhead methodologies and allocation statistics
Formal process sign off on data and accountability for data?	DNR submission is signed off by LHN Costing Managers	Sign-off for data reviews conducted at internal management level of the facility, and final sign-off is conducted by the Chief Finance Officer
Reviews on data are conducted prior to submission?	Multiple reviews conducted and signed off by Costing Manager	Review of data and sign-off on annual review
Do local guidelines to support national AHPCS standards exist?	No	No

5.5.4 Pharmacy costing processes

Pharmacy costs and allocation methods

Modbury Hospital identified \$2.7m costs in the pharmacy cost bucket for Round 22 (and a further \$1.0m imprest drugs which were allocated to other areas including wards, ED and the OR). This comprised dispensed drugs \$1.1m (which includes PBS, S100 and non PBS), salaries and wages (\$1.3m), overheads (\$0.2m) and a small amount of other direct costs including goods and services (\$30k).

Of the \$2.7m, \$59k (2.2%) was unable to be linked to episodic level data. This was costed to Z encounters and ultimately not submitted to IHPA.

There is a desire across the state to review the allocation of pharmacist costs, recognising that the current allocation method for pharmacist time (based on the value of drugs as a proportion of total spend) may not accurately reflect the proportion of pharmacist time associated with PBS and non PBS dispensing activities.

The diagram below depicts the categories of expenditure that are mapped to the pharmacy cost bucket in South Australia and allocation methods used.

Diagram 25: Allocation methods and make up of pharmacy costs submitted to NHCDC – Modbury Hospital

Cost Category	Allocation method	Description of allocation method	% of pharmacy cost bucket
S100 drugs		PBS and S100 dispensed drugs are included in a single line item and total \$811k. These drugs are allocated using iPharmacy feeder system to match drugs to their associated episode.	31%
PBS Drugs			
NPBS dispensed drugs	Feeder	NPBS drug costs (ie. dispensed through Pharmacy which do not attract PBS reimbursement) are allocated using iPharmacy feeder system to match drug costs to their associated episode. These total \$232k.	9%
Ward imprest drugs		Ward Imprest drugs are allocated using a relative weighting depending on occupied bed days, in line with other ward goods and services. ED drugs make up the most significant proportion of imprest and these are allocated based on ED minutes.	
Anaesthetic drugs		Anaesthetic imprest drugs are held in theatre imprest and mapped to the OR cost bucket using the relative weighting from the theatre (Surginet) feeder, based on theatre minutes.	
Pharmacist S&W	RVU	Pharmacist S&W are allocated across dispensed (ie included in the pharmacy cost bucket) and imprest (ie mapped to issuing ED / theatres / wards) based on the weighting derived from the value of the drugs. This equates to approximately 50% of the total pharmacist spend, and is treated as a direct cost.	50%
Ward based pharmacists		The remaining proportion of pharmacist S&W is allocated to imprest areas including theatre, ED, wards based on the proportional value of imprest drugs against total drugs spend. This is treated as an overhead.	
Pharmacy system costs / licences		The costs associated with the IPharmacy system are mapped to an overhead cost centre and distributed in line with other overheads.	
Overheads / indirect costs	RVU	Pharmacy overheads total \$230k and include depreciation, cleaning, IT, state wide SA Pharmacy services, utilities, administration and workers comp.	9%
Other direct costs (transport, logistics / distribution / production costs)	RVU	Transport, distribution and procurement costs are centralised and are captured in price for drug. Other costs included in the pharmacy bucket include goods and services totalling \$31k.	1%

Pharmacy linking rules

Modbury Hospital, like all major facilities in South Australian LHNs, uses an iPharmacy system for dispensing drugs and as a feeder system for costing PBS and dispensed drugs. Imprest drugs are not costed to the pharmacy cost bucket and are costed to the relevant imprest area (ward, OR or ED) under the non PBS line item. Imprest drugs are not linked to a unique reference identifier and at Modbury are allocated on the basis outlined in the table above. This treatment of imprest drugs is consistent across the state. The exception to this is Royal Adelaide Hospital which has a robotic imprest system and has a feeder system for ward imprest in place.

Modbury Hospital uses iterative linking rules to match dispensed PBS and non PBS drug costs from iPharmacy to an episode. The rules initially attempt to match to ED encounters (within one hour), inpatient (within four hours) and non-admitted (within one day) of the order date timestamp in the iPharmacy feeder, before widening over multiple iterations to two days (ED and inpatient), and 120 days (non admitted). Modbury Hospital has not done any analysis on the accuracy or capture rate of linking rates at each iteration of the process.

The Jurisdiction cited challenges as a result of PBS Reform in linking repeat scripts to the correct outpatient encounter across the state, and used to have 30 day linking rules in place, which resulted in an unmatched statewide value of \$42m in 2016-17. Following a program of work, linking rules have been updated across the state and at one facility stretch to 365 days for non admitted, and as a consequence unlinked encounters have fallen to \$20m in 2017-18. The Jurisdiction and costing teams would welcome guidance from IHPA on national linking rules to address the costing problem associated with repeat scripts.

The linking rules yield a matching rate of 97.8% of records at Modbury, corresponding to 95.1% of dispensed drugs. The remainder is costed to Z encounters and not submitted to NHDC. A proportion of the unlinked value also relates to drugs dispensed to country facilities from Modbury (resulting in a change of unique reference number) and de-identified drugs.

Table 27 - Linked feeder records from iPharmacy by volume and value

Product	iPharmacy linked records – volume	iPharmacy linked records – value (\$)	Maximum linking rule
Acute	17,634	136,249	To 2 days
OP	3,262	702,765	To 120 days
ED	2,081	14,954	To 2 days
Sub Acute	28,773	273,049	To 2 days (admitted), 120 days (non admitted)
MH	2,752	26,532	To 2 days (admitted), 120 days (non admitted)
Linked	54,502	1,153,549	
Unlinked	1,208	59,157	
Unlinked %	2.2%	4.9%	

PBS and S100 drugs

The Finance and Pharmacy teams conduct a monthly process to claim reimbursement for PBS drugs from the Commonwealth. These claims are largely automated via a PBS flag in the iPharmacy system, and claimed at the level at which the drugs are dispensed. No analysis has been carried out on the variance between the cost of drugs and revenue received.

There are challenges in claiming PBS reimbursements when drugs are dispensed to patients in country hospitals from NALHN's hospital sites that are not recorded in the patient record.

The jurisdiction is aware of discrepancies between the PBS costs allocated to episodes and IHPA's statistical matches to Medicare revenue data, which are stripped from episode costs when calculating the National Efficient Price. The Jurisdiction highlighted the following reasons for discrepancies:

- The facility's costs may be higher or lower than the reimbursement price set by Medicare for individual drugs subject to purchasing arrangements;
- 11% dispensing costs are included in PBS reimbursement prices used by IHPA to account for pharmacist time associated with dispensing drugs and salaries would not be included in the costed PBS line;
- The linking rules used by the facility costing team, and statistical matching used by IHPA, may link the drugs' costs to different episodes, ie. both methods have a margin of error; and
- Instances where drugs were dispensed from a different facility from where the patient was treated (eg. for country hospitals) may result in PBS drugs not being able to be matched to episodes.

5.5.5 Improvements

Improvements since Round 21

DHW has carried out work to make improvements to the following areas since Round 21:

- Working group set up to review the cost of hospital-acquired complication (HAC) patients compared to non-HAC patients. There will be more robust costing data for HAC patients in the next round.
- Improvement in the recording of sub-acute activity based on consultation with LHNs and specialists funded under sub-acute products, to respond to the significant increase in sub-acute activity across the new/upgraded facilities.
- New feeder system provides transfer of patient transport information and ensures every patient transported has a URN.
- An improvement from previous rounds is that all ED and outpatient costing is done at a patient level, compared to previous years where this was undertaken at an aggregate level.

Future improvements in development for Round 23

- Inclusion of clauses in contracts with third parties to ensure additional private patient data will be available for costing purposes from imaging providers, in particular patient URNs that will facilitate better costing.
- Greater clinician engagement to understand the costs of HAC patients and in which wards HACs commonly arise.
- Costing community mental health care at NALHN and CALHN to start in Round 23.
- Discussions commenced late in 2018 to support the development of state systems in response to national processes to develop the Australian Mental Health Clinical

Classification. A community mental health costing project commenced in NALHN for Round 23.

5.6 Tasmania

Jurisdictional and LHN Overview

The Department of Health (DoH) Clinical Costing Unit in Planning, Purchasing and Performance leads and coordinates clinical costing for the Tasmanian Health Service (THS). Across the state there are four major ABF hospitals, eighteen ABF block funded rural hospitals and one Mental Health Service facility (with multiple campuses). The Round 22 IFR was carried out at a jurisdictional level across THS.

Costing in Tasmania is currently conducted on an annual basis by two FTEs at the Jurisdiction, with an aim to move towards quarterly costing in the longer term. The preliminary costing process and preparations commence in July, and formally begin in October when the annual accrual ledger is completed and signed off by the Department. The costing process takes approximately ten months.

The jurisdiction uses cash accounting for its monthly and internal end-of-year financial management, with an end-of-year accrual adjustment applied to comply with external financial data requirements. The annual accrual adjusted general ledger data is extracted from Finance One and stored in the Health Central warehouse for use in the Clinical Costing Processes and cost study development.

The costing software used in Tasmania is UserCost, and the data is stored in the Clinical Costing SQL database with QlikView as the reporting tool.

The state has a variety of feeder systems covering areas including pharmacy, imaging, pathology, blood, interpreters, theatre time, allied health specialty time, ward movements, emergency department location and staffing time-based units, nurse rosters information, community carers, and a statewide patient administration system (PAS). DoH has identified improvement areas in outpatients and mental health for better data capture and feeder systems. There is a statewide data warehouse called Health Central, which stores THS and private contracted patient utilisation data. DoH extracts activity and general ledger data from Health Central. Facilities do not have access to the costing system. DoH reconciles costing data into annual financial statements and produces costing reports which are then reviewed by facility business managers.

The Clinical Costing Unit within Planning, Purchasing and Performance (PPP) at DoH is responsible for preparing and submitting NHCD data to IHPA. The Clinical Costing Unit undertakes the annual cost studies development, in consultation with key stakeholders at facilities, which largely occurs during the processing stage to resolve critical errors. The key stakeholders at the facilities include ward managers and business managers, who review costing allocations, account for changes at facilities, and improve clinical accuracy for better costing. Within the costing unit at DoH, there are discussions around costing issues and improvements on a weekly basis during the costing process.

Costing data is used internally at DoH for business cases, to allocate corporate services costs to sites and for analysis on the discrepancy between costed activity and the funding received. It is also used to benchmark across sites in Tasmania, as well as against national averages for DRGs.

IHPA's National Benchmarking Portal is used by the DoH to perform national benchmarking on DRGs. Only a limited number of individuals have access to the portal, as costing and quality assurance is performed by the Jurisdiction.

5.6.1 Reconciliation

This section discusses major variances, reconciling items and adjustments in the reconciliation process. The information is based on the Tasmania Health Service's data collection template, data quality self-assessment and review discussions.

The table presents a summary reconciliation from Tasmania Health Service's General Ledger to the final NHCDC submission for Round 22.

Tasmania Health Service's final GL of \$1,621,268,625 was reconciled by the DoH to the audited financial statements.

Explanation of reconciling items

Adjustments made at LHN/jurisdiction level (Item B and E)

- Inclusions were due to corporate cost centres (\$3.8m) being brought into the general ledger.
- Exclusions (-\$22.2m) consist of recoveries for both salaries and wages, and workers compensation. These recoveries offset against the general ledger amounts for both line items and a reimbursement is provided by the University of Tasmania for additional payments to staff members.
- DoH submitted costs for all patients discharged in 2017-18 (including those admitted in prior years) and removed WIP costs for patients who were still admitted at 30 June 2018. The movement in WIP across the period increased from \$31.5m to \$45.6m as a result of the increased scope of activity submitted by the Jurisdiction to the NHCDC. Previously, records not in scope for funding were excluded at the jurisdiction level. This included transitional care programs, bulk-billed items and long stay nursing home patients, which largely arose from rural facilities. For Round 22, DoH submitted these items for IHPA to exclude.
- Other costs not submitted (\$133m) are items such as data anomalies unable to be allocated to activity in the ED due to errors in the emergency information system, and for costed bulk billed outpatient activity due to internal mapping and data linkage failures. It is envisaged for Round 23 that these reporting practices will be captured correctly in the patient dataset.
- Teaching, training and research (TTR) costs of \$66m are stripped out of the NHCDC submission.
- Dummy and virtual patients (\$241m) consists of expenditure that cannot be aligned with NHCDC products. This includes unmatched pharmacy data from repeat scripts, pathology and imaging activity. It also comprises costs excluded as they are out of scope for the NHCDC, such as oral health, capital works, external supplies and food services, and interstate charging that is unrelated to patient care. The figure for dummy / virtual patients is reported to be generally stable year on year by the Jurisdiction.

Table 28: Reconciliation from General Ledger to NHCDC costs – Tasmanian Health Service

	THS			Jurisdiction			IHPA			
	Item	Amount		Item	Amount		Item	Amount		
Source: Self-Assessment	A	General Ledger (GL)	\$ 1,621,268,625	D	Costed products received by jurisdiction	\$ 1,634,294,693	G	Total costed products received by IHPA	\$ 1,148,044,381	
	B	Adjustments to the GL		Source: Data collection template	E	Post Allocation Adjustments		H	IHPA Adjustments	\$1,571
		Inclusions	\$ 3,803,910			WIP 2017 - 18	(\$45,622,256)		Removal of UBQ from Newborns	\$1,571
		WIP 2016 - 17	\$ 31,457,676			Costs not submitted	\$840,648,897		Newborn - transfer to acute	(\$6,715,436)
		Exclusions	(\$22,235,441)			Research	(\$4,655,591)		Acute - transfer from newborn	\$6,715,436
	Total hospital expenditure	\$ 1,634,294,770			Teaching & Training	(\$61,017,400)	I	Final NHCDC costs	\$ 1,148,045,952	
					Dummy/virtual patients (No NHCDC Product)	(\$241,722,646)				
					Total costs submitted to IHPA	\$ 1,148,044,534		% of GL submitted to NHCDC	70%	
Source: Data collection template	C	Costed products submitted to jurisdiction		Source: Data collection template	F	Costed products submitted to IHPA			Costed products per NHCDC	
	Acute	AR DRG	\$ 685,636,699		Acute	AR DRG	\$ 671,618,018	Acute	\$ 701,410,963	
		Newborns	\$ 30,653,465			Newborns	\$ 29,792,946	Outpatient	\$ 164,179,580	
	Outpatient	Outpatient - Tier 2	\$ 197,806,180		Outpatient	Outpatient - Tier 2	\$ 164,179,580	Emergency	\$ 127,682,143	
		Outpatient Non Tier 2	\$ -			Outpatient Non Tier 2	\$ -	Sub Acute	\$ 65,480,774	
	Emergency	URG - Admitted	\$ 83,184,545	Emergency	URG - Admitted	\$ 83,184,545	Mental Health	\$ 68,648,496		
		URG - Non- Admitted	\$ 44,497,598		URG - Non- Admitted	\$ 44,497,598	Other	\$ 20,642,424		
		UDG - Admitted	\$ 622,703		UDG - Admitted	\$ -	Total	\$ 1,148,044,381		
		UDG - Non Admitted	\$ 11,146,706		UDG - Non Admitted	\$ -				
	Sub Acute	Rehabilitation	\$ 30,033,303	Sub Acute	Rehabilitation	\$ 28,054,267				
		Palliative Care	\$ 10,558,380		Palliative Care	\$ 10,014,295				
		GEM	\$ 16,598		GEM	\$ 16,598				
		Psych Geriatric	\$ 13,222		Psych Geriatric	\$ 13,116				
		Maintenance	\$ 29,157,001		Maintenance	\$ 27,382,499				
	Mental Health	Admitted Mental Health (MC)	\$ 39,277,442	Mental Health	Admitted Mental Health (MC)	\$ 36,786,698				
		Non Admitted Specialist Mental Health (MS)	\$ 31,867,394		Non Admitted Specialist Mental Health (MS)	\$ 31,861,798				
		Non Admitted Mental Health (MH)	\$ 18,230,026		Non Admitted Mental Health (MH)	\$ -				
		Residential Mental Health (MR)	\$ -		Residential Mental Health (MR)	\$ -				
	Other	Other Admitted Patient Care	\$ 47,364,976	Other	Other Admitted Patient Care	\$ 20,275,360				
		Organ Procurement	\$ 193,602		Organ Procurement	\$ 193,602				
		Outreach & community care	\$ 66,459,451		Outreach & community care	\$ -				
		Boarder	\$ 174,704		Boarder	\$ 173,463				
		Other	\$ 241,727,709		Other	\$ -				
		Research	\$ 4,655,591		Research	\$ -				
		Teaching & Training	\$ 61,017,400		Teaching & Training	\$ -				
	Dummy/virtual patients (No NHCDC Product)	\$ -		Dummy/virtual patients (No NHCDC Product)	\$ -					
	Total	\$ 1,634,294,693		Total	\$ 1,148,044,381					

5.6.2 Application of Australian Hospital Patient Costing Standards (v4.0)

For Round 22, Tasmania self-reported it was materially in compliance with AHPCS Version 4.0 with the exception of the areas discussed below. Being a small jurisdiction, Tasmania uses the AHPCS and has not developed local standards or guidelines. The Jurisdiction reported partial compliance in the following areas:

- Costing Guideline 4 - Teaching and training
- Costing Guideline 5 - Research

Partial compliance was self-reported in these areas, as TTR costs are allocated as a percentage of costs to a virtual patient due to the lack of established systems and processes to record this product.

5.6.3 Quality Assurance

DoH leads and is accountable for quality assurance (QA) in Tasmania, primarily involving site staff for validation of QA results and when errors are identified in the costing data. Findings from the QA process are then presented to the LHN board, in addition to a costing report which can be distributed to other LHN staff.

The Jurisdiction outlined a range of QA activities carried out during the annual costing cycle. There is not a formalised set of specific logic tests or quality assurance items used. Rather, the data is reviewed for anomalies through a variable set of tests including high / low cost patients, length of stay outside of normal thresholds nationally, and comparisons against DRG costs from previous years.

At the beginning of the costing cycle, a review of cost allocations and changes to cost centres is conducted by DOH, together with business managers, to adjust cost centres accordingly. Additionally, there is a discussion of improvements to be made based on the previous round of costing to recognise ways to advance the costing process. Throughout costing, any issues identified are resolved in consultation with business managers at sites, and with operational teams if required.

Qlikview is the tool used by DoH to review and QA the patient level data and run comparisons against the hospitals in the state. The tool is occasionally shown to site staff to display costing results during meetings, as the hospitals do not have access to Qlikview.

In Round 22, there have been a few additional QA checks implemented, as a result of a change of costing team leadership and previous discrepancies flagged by IHPA after initial submission. These ensure the GL and financial statement figures are consistent, and checks logic in the GL after adjustments are made.

The table below sets out the range of quality assurance activities carried out.

Table 29: Quality Assurance activities, Tasmania

Specific Quality Assurance	Performed by DOH/THS	Performed by sites
Reconciliation		
Reconciliation back to general ledger & audited records	Review amounts if system flags error with reconciliation of figures between financial statements and system	Not checked by sites.
Reconciliation of activities back to source systems	Annual review of patient level data for anomalies and discrepancies against benchmarked national figures	Not checked as activity data is fed directly from source systems.
Validation of costing data		
Reasonableness check for excluded items or out of scope costs e.g. WIP patients	Yes – in Qlikview during annual costing process	Data validation done by DoH, and any issues raised are shared with site staff to resolve.
Trend analysis to prior periods in terms of distribution of costs across care products and LHD		
Analysis of outliers at the cost, LoS, or cost bucket level		
Proportion of direct vs overhead costs		
Proportion of costs sitting in each product (eg % costs in acute, ED, OP)		
Specific logic checks		
Costing Governance		
Regularly hold costing meetings?	There are no regular formal costing meetings. A Data Quality User Group was recently set up, with ad hoc meetings held during the costing process.	No
Regularly review and update cost centre allocations?	Annual update of cost centre allocations and product fractions in consultation with business managers.	Annual update of cost centre allocations and product fractions in consultation with business managers.
Formal process sign-off on data and accountability for data?	Internal data quality statement is first signed off by Manager of Health Informatics, Information Governance and Clinical Costing. Final sign-off is performed by the Director of Monitoring, Reporting and Analysis.	No formal sign off is conducted at hospital level.
Reviews on data are conducted prior to submission?	Internal review between ABF submission and NHCDC. Review and sign-off by Department Executive and THS Executive.	No
Do local guidelines exist to support national AHPCS standards?	No	

5.6.4 Pharmacy costing processes

Pharmacy costs and allocation methods

Based on information collected from the site visits and IFR data collection templates, Tasmanian Health Services identified \$87.4m costs in the pharmacy cost bucket for Round 22. This comprised dispensed PBS drugs of \$63.7m (including S100 drugs), non-PBS dispensed drugs of \$10.2m, salaries and wages (\$9.0m), overheads (\$3.4m) and a small amount of other direct costs including goods and services (\$1.0k).

Imprest drugs are not costed to the pharmacy cost bucket and are costed to the relevant imprest area (ward, OR or ED). Imprest drugs are not linked to a unique reference identifier and are allocated depending on the allocation method in use for that area. For example:

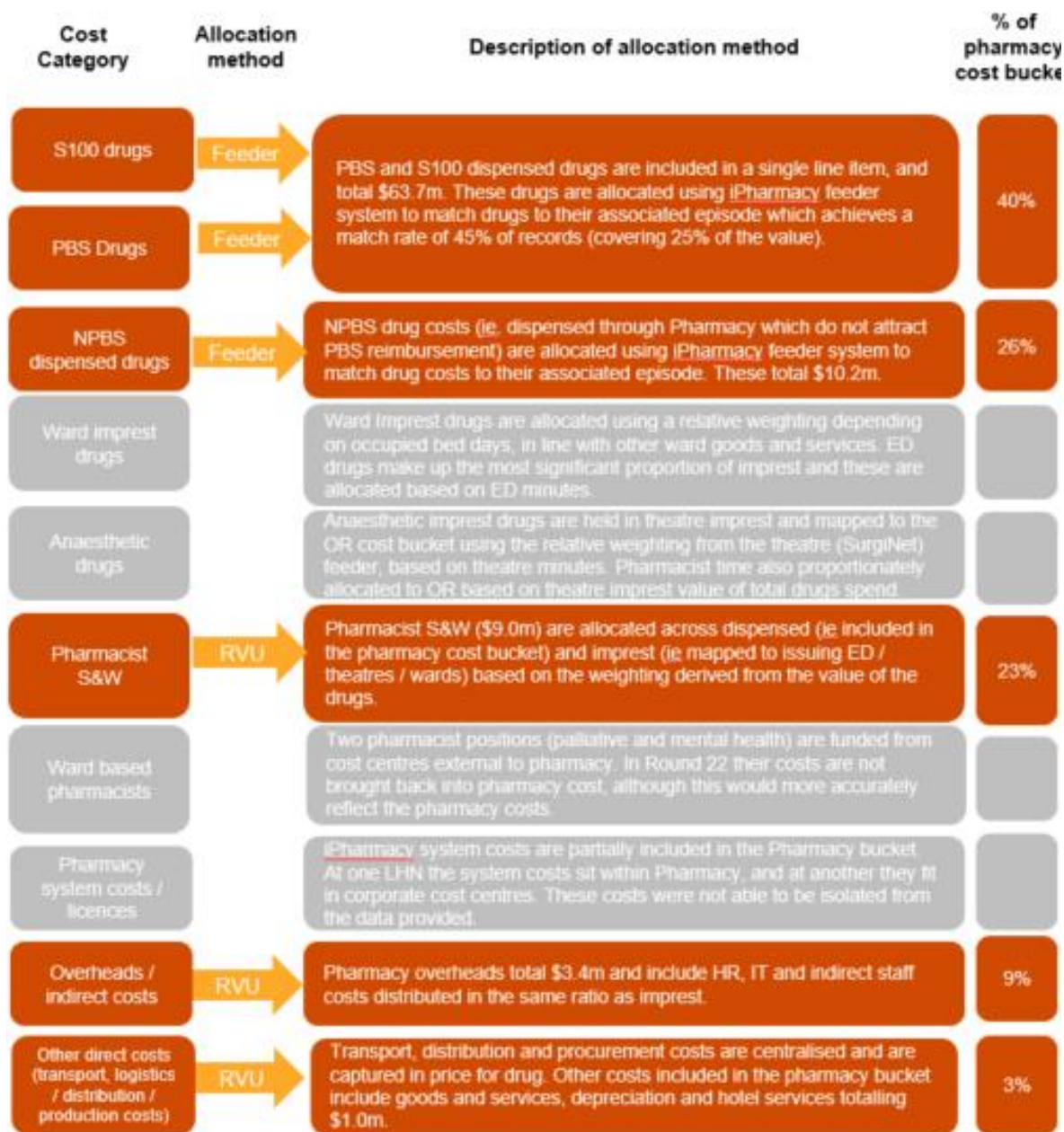
- General Ward imprest drugs are predominantly allocated on ward bed days, although one site has developed an acuity-driven allocation, based on nurse roster [number of nurses in particular ward at particular time], patient complexity (derived from DRG complexity level) and length of stay, with ICU, HDU and NICU beds receiving a higher weighting.
- OR imprest drugs is based on theatre minutes.
- ED imprest is based on ED minutes exclusive of ramping time (discussed further in improvements section below).

Of the \$87.4m, \$47.8m (54.7%) was not able to be linked to episodic level data. This was costed to Z encounters and ultimately not submitted to IHPA. The reasons behind these unlinked episodes are explained below.

The site visit was attended by pharmacy staff from THS as well as members of the costing teams. There is a desire across the state to review the allocation of pharmacist costs, recognising that the current allocation method for pharmacist time (based on the value of drugs as a proportion of total spend) may not accurately reflect the proportion of pharmacist time associated with PBS and non PBS dispensing activities, and may over-allocate pharmacist time to high cost drug areas (eg. oncology) and under-allocate time to wards with a high volume of low value imprest dispensing.

The diagram below depicts the categories of expenditure that are mapped to the pharmacy cost bucket in Tasmania and allocation methods used.

Diagram 26: Allocation methods and make-up of pharmacy costs submitted to NHCDC - THS



Pharmacy linking rules

THS uses an iPharmacy system for dispensing drugs and this forms the feeder system for costing PBS and dispensed drugs.

THS uses iterative linking rules to match dispensed PBS and non PBS drug costs from iPharmacy to an episode. The rules initially attempt to match to an episode on the same day, then expand incrementally by one day in each direction up to seven days, until a match is found. The rules do not differ across the product types. THS and DOH have not done any analysis on the accuracy or capture rate of linking rates at each iteration of the process.

The linking rules yield a matching rate of 76.1% of records, corresponding to 45.3% of the value of dispensed drugs. This matching rate is lower than some other jurisdictions, as a result of a tighter linking rules compared to other jurisdictions, particularly for non-admitted. Unlinked records are costed to Z encounters and not submitted to NHCDC. THS cited challenges in a number of areas which contribute to the value of unlinked pharmacy activity:

- A proportion of the unlinked value relates to drugs which are supplied to prisons under imprest arrangements. These are dispensed by the prison pharmacists, not from THS to patients, hence THS does not have patient records to match these drugs to and these may not be Medicare-eligible patients.
- Linking repeat scripts (which have increased in volume under recent PBS reform, to reduce pressure on GPs by making it easier for patients to access repeat scripts) is a significant challenge and disproportionately affects higher cost drugs for chronic conditions, eg. Hepatitis C, which can be issued for three months and can exceed \$20,000 per bottle / dispensed dose. The Jurisdiction and costing teams would welcome guidance from IHPA on linking rules and repeat scripts.

Table 30: Linked feeder records from iPharmacy by volume and value

Product	iPharmacy linked records – Volume	iPharmacy linked records – Value (\$m)	Maximum linking rule
Acute	175,666	12.66	To 7 days
OP	33,044	24.87	To 7 days
ED	10,095	0.87	To 7 days
Sub Acute	18,135	0.61	To 7 days
MH	10,346	0.50	To 7 days
Other	2,238	0.08	
Linked	249,525	39.58	
Unlinked	59,732	47.82	
Unlinked %	23.9%	54.7%	

PBS and S100 drugs

Acute hospitals within THS submit PBS claims on monthly basis online to Medicare, and claims are paid out weekly. The source of claims is iPharmacy. Claims are done at the dispensed level once the patient has filled the script. Rejections for claims are unlikely, and any rejected claims are followed up to ensure they can be successfully claimed (e.g., if insufficient data is submitted to prove eligibility for PBS medication). There can be timing differences between claims being submitted and received, especially around end of FY as this cuts across a payment period. Twice per year, THS selects a sample of patients at random and follows through the purchase costs,

PBS claim and reimbursement amount. Individual hospitals also do a broad reconciliation between expense and income for reimbursable (PBS) drugs.

In recent periods, pharmacies across Tasmania have occasionally experienced shortages of certain PBS drugs and have had to source alternatives that are not on the PBS list so cannot be claimed. Additionally, some drugs are dual listed and only eligible when prescribed for specific indications. When prescribed outside PBS criteria, these are counted as non PBS drugs.

PBS reimbursements (excluding S100 drugs) have a markup of 11.1% on Commonwealth set manufactured price to cover the associated costs of pharmacist time and other dispensing costs. This will decrease to 7% nationally starting 1 July 2019, which will affect the value of revenue claims and could impact the ability of facilities to run pharmacy services within their current budgets.

Based on the information provided in the data collection template, \$63.7m was the cost of PBS / S100 drugs and \$61.3m revenue was received. THS advised that differences may be due to PBS drugs supplied to PBS ineligible patients (e.g. prisoners), or differences between the price of pharmaceuticals purchased under state purchasing arrangements and the Commonwealth manufactured price. The actual gap between purchased and reimbursed is likely to be even larger, as the reimbursement already includes an 11.1% markup for dispensing costs.

5.6.5 Improvements

Improvements since Round 21

DOH has carried out work to make improvements to the following areas since Round 21:

- Audit checks implemented for the first time in Round 22 to ensure the general ledger matches financial statements, and QA on general ledger cost centres.
- Updated accuracy of the matching criteria for utilisation data, by increasing the matching to now increment daily from the episode. Previously, the software matched 0 days, then 1 day, 3 days, 5 days and 7 days.
- Reviewed ED allocations in the following areas:
 - Costs of emergency department (ED) minutes were adjusted to remove ramping time as patients are still under the care of paramedics during this period. Ramping time is a field in the ED dataset and was subtracted from total ED minutes.
 - Updated emergency department cost allocation based on location e.g. 10% costs go to the waiting room. This is based on consultation with ED staff.
 - Separation of emergency department and emergency medical unit (EMU) staff costs from one cost centre. This was done through use of the nurse roster and consultation with department leaders, and improves the accuracy of costing staff by product type.
 - Team now has access to the GL and therefore it can run its own reports, once CFO releases results to the business. This has improved the time that the team can then review the financials and take the information to the business for their review and input into the costing process.

Future improvements in development for Round 23

- The costing team is working with the finance team to allocate costs in greater granularity to enable costing to be more accurate for more frequent reporting requirements.
- Building a multi-year NHCDC report, including re-mapping of classification version changes, to enable benchmarking internally and review trends in finance and activity. This will address challenges in the consistency of costing to ensure year-on-year methodologies are consistent.
- To increase the validity and quality of the NHCDC, in Round 23 a data quality user group meeting was held with representation from the THS sites, corporate finance staff and other areas of DoH to review the preliminary outcomes of the Round 22 result. The purpose of the working group is to jointly resolve issues identified during the costing process.

5.7 Australian Capital Territory

Jurisdictional Overview

The Performance Reporting and Data (PRD) Division of Australian Capital Territory (ACT) Health is responsible for the extraction, validation, processing, reconciliation and submission of the National Hospital Cost Data Collection (NHCDC) data to the Independent Hospital Pricing Authority (IHPA) for all hospitals in the ACT.

Canberra Health Services (CHS), one of the two public hospitals in the ACT, was selected as the sample hospital in the ACT for the Round 22 Independent Financial Review (IFR).

PRD branch is responsible for the management of the clinical costing system and the overall processing of the NHCDC submission. ACT Health uses the Power Performance Manager 2 (PPM2) costing application for patient level costing. All activity is costed and the costing process is currently performed once per year, but there is a plan to move to half yearly costing in the future.

The health services in consultation with PRD staff prepare and provide their general ledger and feeder files to the Jurisdiction for costing. For Round 22 the costing team from the Ministry office performed costing activities on behalf of CHS.

PRD staff perform data validation on feeder data received from each hospital and if issues are identified, the data is returned to the hospital for resolution. Once the cost model has been run and all data is linked, PRD staff provide cost summary reports for review.

Encounter Activity data is sourced and validated by PRD staff from a centralised data repository which covers admitted, emergency, non-admitted and community mental health patients.

The majority of the extracts used within the costing process are extracted from the ACT Health data repository and feeder data is extracted from hospital source systems. Data cleansing, reconciling and reporting is undertaken by both ACT Health and CPHB. Activity data is also reconciled by ACT Health.

A number of key initiatives implemented in the last couple of years has seen a reduction in average costs, and improved expenditure identification to teaching, training and research functions. Key initiatives include a review of relevant operating expenses within the single ACT Health general ledger to ensure the expenses could be identified and quarantined to source functions.

In Round 21 ACT undertook a process of analysing their different functions within the department, to separate out the costs relating to district-level activities and health services activities. Prior to this stage, with one general ledger most of the ministry costs were included. While a large component of these jurisdiction-level costs were excluded from the costing process, some may have been costed and allocated towards patient episodes, driving the high average costs when benchmarked to other states. This resulted in the separation of costs between ACT Health and CHS, which resulted in a significant reduction in the territory's average costs overall. In addition, a major survey was conducted involving consultations with business units to update the fractions used to distribute costs across the products. The allocation methodologies used in Round 22 were kept broadly in line with Round 21 across all areas.

The patient administration system (PAS) is territory-wide and centralised at the Jurisdiction, and is used as the main source of activity information. Additionally, territory-wide feeders are in

place for pathology, imaging, blood products and admitted contacts. The sites also have local feeders for theatre, pharmacy, prosthetics and medical emergency team (MET) calls. All feeder extracts are at patient level, containing URNs, date of service to allocate costs, rather than using service weights.

ACT Health participates in other cost, activity and benchmarking data collections in addition to the NHCDC, such as Health Roundtable, Public Hospital Expenditure to AIHW, and Women's and Children's Healthcare Australasia's data collections. IHPA's national benchmarking portal is accessible and used for benchmarking purposes.

Canberra Health Service (CHS) Overview

Within ACT, the selected health service for the Round 22 Independent Financial Review was Canberra Health Services.

CHS is an acute care teaching hospital of 600 beds. It is a tertiary referral centre that provides a broad range of specialist services to the people of the ACT and South East New South Wales. CHS is the largest public hospital in the region, with strong links to community-based services that provide continuity of care for patients.

CHS is the principal teaching hospital of the Australian National University Medical School. The school enhances the hospital's teaching status and capacity in clinical services, teaching and research.

For Round 22, costing was performed by the Jurisdiction on behalf of CHS.

5.7.1 Reconciliation

This section discusses major variances, reconciling items and adjustments in the reconciliation process. The information is based on the CHS' data collection template, data quality self-assessment and review discussions.

Table 31 presents a summary reconciliation from ACT Health's general ledger (GL) to the final NHCDC submission for Round 22.

Explanation of reconciling items

Adjustments made at the LHN level (Item B)

- Inclusions (\$6.7m) are predominantly staff specialist bonus payments. Exclusions (\$403m) are predominantly Ministry costs marked as out-of-scope from patient costing (\$309m). These include costs:
- Departmental costs not directly related to hospital services such as Policy and Government Relations (\$75m)
- Population Health services (\$30m)
- Pathology services provided to external agencies (\$25m)
- Dental services provided in the community (\$15m)

From Round 23, the exclusion amounts should be smaller as these costs will not sit within CHS ledger following the restructuring of the organisations.

Adjustments made at the Jurisdiction level (Item E)

- A WIP adjustment of \$3.2m was made for 2016-17, representing costs for patients who were discharged in the Round 22 year (2017-18) but admitted in the previous (2016-17) year. The opening WIP figure was incorporated into costed products submitted to IHPA. Similarly, a WIP adjustment removing the costs for patients admitted in 2017-18 who had not been discharged by year end totalled \$3.9m.
- Block funded activities (\$99.5m), made up of teaching, training and research (\$47.6m), and community mental health costs (\$51.8m), are excluded from NHCDC submission.
- Depreciation and line item costs of \$34.8m are removed.
- Outpatient indirect contacts (\$11m) consist of occasions of service for non-admitted patients that do not roll up into a service event meeting the criteria for submission to NHCDC, and are therefore excluded as the records do not match the IHPA ABF submissions. Examples include recurring contact with patients via telephone which are rolled into one service event and reported once.
- Unlinked feeder data (\$20.3m) is excluded and reflects difficulties across all jurisdictions in linking feeder data.
- Unqualified babies are costed and excluded from the IHPA submission (\$7.5m).

Table 31: Reconciliation from CHS General Ledger to NHCDC costed products

CHS			Jurisdiction			IHPA									
Item		Amount	Item		Amount	Item									
Source: Self-Assessment	A	General Ledger (GL)	\$	1,375,927,735		D	Costed products received by jurisdiction	\$979,238,440	G	Costed products received by IHPA	\$	801,957,317			
	B	Adjustments to the GL				Source: Data collection template	E	Post Allocation Adjustments		(177,281,123)	H	IHPA Adjustments		\$0	
		Inclusions		\$6,691,168				WIP 2016 - 17				Newborn - transfer to acute		(\$152,939)	
		Exclusions		(\$403,380,463)				WIP 2017 - 18		(\$3,883,823)			Acute - transfer from newborn		\$152,939
	Total hospital expenditure	\$	979,238,440				Block funded activity		(\$99,524,392)	I	Final costed products per NHCDC	\$	801,957,317		
							Depreciation and line item costs		(\$34,884,151)						
							Outpatient - indirect contacts		(\$11,216,599)						
							Unlinked feeder		(\$20,259,569)						
							Unqualified babies		(\$7,512,588)						
							Total costs submitted to IHPA	\$	801,957,317				% of GL submitted to NHCDC	82%	
Source: Data collection template	C	Costed products submitted to jurisdiction				Source: Data collection template	F	Costed products submitted to IHPA					Costed products per NHCDC		
	Acute	AR DRG	\$	448,822,059			Acute	AR DRG	\$	430,621,567			Acute	\$	457,036,862
		Newborns	\$	27,326,247				Newborns	\$	26,415,295			Outpatient	\$	195,674,379
	Outpatient	Outpatient - Tier 2	\$	216,301,201			Outpatient	Outpatient - Tier 2	\$	195,674,379			Emergency	\$	73,004,683
		Outpatient Non Tier 2	\$	-			Outpatient Non Tier 2	\$	-			Sub Acute	\$	46,435,495	
Emergency	URG - Admitted	\$	42,808,291		Emergency	URG - Admitted	\$	41,050,293				Mental Health	\$	29,555,717	
	URG - Non- Admitted	\$	33,183,905			URG - Non- Admitted	\$	31,954,390				Other	\$	250,182	
	UDG - Admitted	\$	-			UDG - Admitted	\$	-				Total	\$	801,957,317	
	UDG - Non Admitted	\$	-			UDG - Non Admitted	\$	-							
Sub Acute	Rehabilitation	\$	25,105,116		Sub Acute	Rehabilitation	\$	24,020,791							
	Palliative Care	\$	2,627,825			Palliative Care	\$	2,532,255							
	GEM	\$	3,769,367			GEM	\$	3,622,686							
	Psych Geriatric	\$	184,102			Psych Geriatric	\$	177,092							
	Maintenance	\$	16,678,576			Maintenance	\$	16,082,671							
Mental Health	Admitted Mental Health (MC)	\$	30,991,687		Mental Health	Admitted Mental Health (MC)	\$	29,555,717							
	Non Admitted Specialist Mental Health (MS)	\$	-			Non Admitted Specialist Mental Health (MS)	\$	-							
	Non Admitted Mental Health (MH)	\$	51,852,335			Non Admitted Mental Health (MH)	\$	-							
	Residential Mental Health (MR)	\$	-			Residential Mental Health (MR)	\$	-							
Other	Other Admitted Patient Care	\$	-		Other	Other Admitted Patient Care	\$	-							
	Organ Procurement	\$	259,690			Organ Procurement	\$	250,182							
	Outreach & community care	\$	-			Outreach & community care	\$	-							
	Boarder	\$	-			Boarder	\$	-							
	Other	\$	11,396,411			Other	\$	-							
	Research	\$	19,030,754			Research	\$	-							
	Teaching & Training	\$	28,641,303			Teaching & Training	\$	-							
	Dummy/virtual patients (No NHCDC Product)	\$	20,259,569			Dummy/virtual patients (No NHCDC Product)	\$	-							
	Total	\$	979,238,440			Total	\$	801,957,317							

5.7.2 AHPCS 4.0

ACT reported being materially compliant with AHPCS Version 4.0 for Round 22. ACT used AHPCS Version 3.1 for costing for Round 22 and reports to IHPA against Version 4.0.

The following areas were discussed in the site visit as areas where ACT deviates from the national costing standards or other jurisdictions:

- Posthumous organ donation (Costing Guideline 7) - There is no organ retrieval team in ACT and extremely low activity volumes (approx. 6 per annum). Any costs associated with organ retrieval (eg. surgeon and theatre time) are not identified separately, but these are deemed immaterial.
- Unqualified babies – CHS costed the unqualified babies but are excluded from the NHCDC submission. The Jurisdiction has indicated that further guidance from IHPA on the treatment of corporate costs, mental health patients (eg. guidelines on the proportion of costs that should reasonably be allocated to teaching, training and research) would be useful, as this differs between jurisdictions.

5.7.3 Quality Assurance

For Round 22, quality assurance (QA) was undertaken by the Jurisdiction at various stages throughout the costing cycle. ACT Health raises any issues to the site for amendment and re-runs QA after the issue has been addressed. In future rounds, QA will be undertaken by both ACT Health and CHS.

QA is largely an automated process and uses SQL code to capture in-scope costs and compare them to previous years. The Jurisdiction also uses PPM reports and automatic logic checks to perform annual QA checks, although during key costing periods this is performed daily. As a result, only basic analysis is conducted on results in Excel.

Table 32: Summary of the QA checks performed within ACT.

Specific Quality Assurance	Performed by ACT Health	Performed by CHS
Reconciliation		
Reconciliation back to general ledger & audited records	Annual reconciliation and sanity checks / threshold checks conducted	
Reconciliation of activities back to source systems	Annual reviews on all feeder systems and source systems.	
Validation of costing data		
Reasonableness check of excluded items or out of scope costs e.g. WIP patients	Yes - Done annually	If there is an error raised by the Jurisdiction, CHS will review costing data and amend
Trend analysis to prior periods in terms of distribution of costs across care products and LHD	Yes – Done annually	
Analysis of outliers at the cost, LoS or cost bucket level	Yes – Done annually. Outliers are reviewed with site members.	
Proportion of direct vs overhead costs	Yes – Done annually	
Proportion of costs sitting in each product (eg % costs in acute, ED, OP)	Yes – Done annually	
Specific logic checks	Yes – through PPM (theatre time logic checks) and automated logical checks. Basic analysis is conducted through Excel.	
Costing Governance		
Regularly hold costing meetings?	Ad hoc (monthly from Round 23)	
Regularly review and update cost centre allocations?	Annually	
Formal process sign off on data and accountability for data?	The data is reviewed by CFO/CEO at the Health Service, and final sign-off is by Director General	
Reviews on data are conducted prior to submission?	Multiple reviews conducted	
Do local guidelines to support national AHPCS standards exist?	No	

5.7.3 Pharmacy costing processes

Pharmacy costs and allocation methods

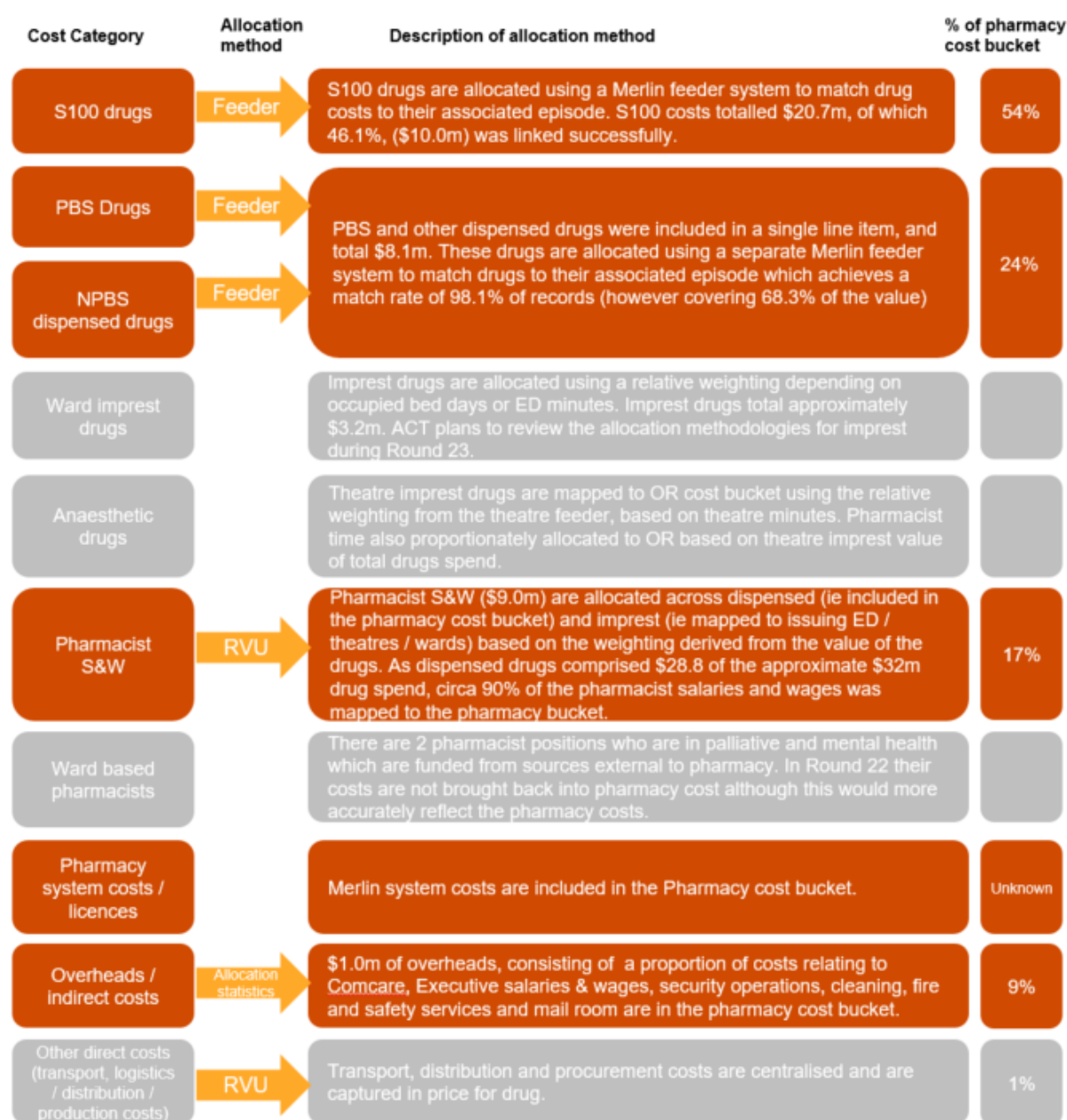
Based on information collected from the site visits and IFR data collection templates, Canberra Health Services identified (\$32.8m) costs in the pharmacy cost bucket for Round 22. This comprised dispensed PBS and non PBS dispensed drugs of \$8.1m, S100 drugs totalling \$20.7m, salaries and wages (\$3.1m) and overheads (\$1.0m). Overheads included in the pharmacy cost bucket include a proportion of Comcare, executive salaries & wages, security operations, cleaning, fire and safety services and mail room. However, \$10.7m (S100) and \$3.6m (PBS /

non PBS) could not be linked to episodes and were costed to dummies, meaning that only approximately \$18.5m pharmacy costs were included in the NHCDC submission.

Approximately \$3.2m of imprest drugs are not costed to the pharmacy cost centre and are instead costed to the relevant imprest area (eg. Ward, OR or ED). Imprest drugs are not linked to a unique reference identifier and are allocated dependent on the allocation methodologies in use in those areas, for example, length of stay, theatre minutes, or ED minutes.

The diagram below depicts the categories of expenditure that are mapped to the pharmacy cost bucket in ACT and allocation methods used.

Diagram 28: Allocation methods and make-up of pharmacy costs submitted to NHCDC, ACT



Pharmacy linking rules

There are two Merlin feeder systems in use for dispensed drugs, covering S100 and PBS / non-PBS drugs respectively. Of the \$28.8m of dispensed drugs costs identified from the feeder, \$14.3m (49.7%) was not able to be linked to episodic level data. This was costed to Z encounters and ultimately not submitted to IHPA.

CHS uses iterative linking rules to match dispensed S100, PBS and non PBS drug costs from Merlin to an episode. The rules initially attempt to match to an episode on the same day using the URN and date of service, then expand incrementally by one day in each direction up to thirty days until a match is found. CHS has not done any analysis on the accuracy or capture rate of linking rates at each iteration of the process.

For each costing cycle, the costing team validates the data, reviews for missing data and goes back to pharmacy to fix any missing fields.

The linking rules yield a matching rate of:

- 98.9% of records, corresponding to 68.3% of the value of dispensed PBS and non PBS drugs;
- 53.9% of records, corresponding to 51.8% of the value of S100 drugs.
- CHS cited challenges in a number of areas that contribute to the value of unlinked pharmacy activity:
- Non admitted patients present challenges in linking drugs to the appropriate episode of care
- A proportion of the unlinked value also relates to drugs which are supplied to prisons
- Linking repeat scripts (which have increased in volume and value under PBS reform) is a significant challenge and disproportionately affects higher cost drugs for chronic conditions
- An element of the unlinked relates to drugs for de-identified patients (e.g. sexual health).

Costing team have previously reviewed their linking rules and stretched them to 75 days, but this did not make a significant difference in terms of the matching rates. ACT Health would welcome consultation and consistent approach undertaken across all jurisdictions and would welcome a workshop from IHPA on this.

Table 33 - Linked feeder records from Merlin by volume and value

Product	PBS / non PBS		S100 (high cost drugs)		Maximum linking rule
	Merlin linked records – Volume	Merlin linked records – Value (\$m)	Merlin linked records – Volume	Merlin linked records – Value (\$m)	
Acute	184,770	2.52	0	0	0-3 days
OP	8,952	4.71	4,842	10.0	0-30 days (S100 only)

	PBS / non PBS		S100 (high cost drugs)		Maximum linking rule
Product	Merlin linked records – Volume	Merlin linked records – Value (\$m)	Merlin linked records – Volume	Merlin linked records – Value (\$m)	
ED	8,770	0.14	0	0	0-1 days
Sub Acute	0	0.36	0	0	0-3 days
MH	0	0.04	0	0	0-3 days
Other	5,130	0.00	0	0	0-30 days
Linked	207,662	7.79	4,842	10.0	
Unlinked	3,919	3.62	4,141	10.7	
Unlinked %	1.9%	31.7%	46.1%	48.2%	

PBS and S100 drugs

In ACT, Pharmacy teams in the two acute hospitals, CHS and Calvary, submit PBS (including S100) claims on monthly basis online to Medicare. The source of claims data is the Merlin pharmacy system. Claims are submitted at the dispensed level once the patient has filled the script.

At the end of the financial year a reconciliation is done between drugs purchased, amounts claimed from Medicare and revenue received.

Based on the information provided in the data collection template, \$17.4m revenue was received for S100 drugs, versus a \$20.7m spend. The Jurisdiction advised that reasons for the shortfall could include differences between the Commonwealth manufactured price (which is the basis for reimbursements nationally) and prices paid for drugs under ACT's purchasing arrangements.

5.7.4 Improvements

Improvements since Round 21

ACT Health has carried out work to make improvements to the following areas since Round 21:

- The Jurisdiction is conducting digital work in pathology, imaging, and prosthetics to reduce the quantum of unlinked feeder data. This has decreased from \$26m in Round 21 to \$20m in Round 22.
- A review of costs unrelated to patient care has led to the exclusion of Ministry costs, non-hospital related expenditure and non-direct patient care expenditure from NHCDC submissions.

Future improvements in development for Round 23

- CHS plans to improve the counting and capture of non-admitted patient contacts in source systems to improve the alignment of activity to reportable service events. This work will involve a review and consultation with relevant clinical and operational

stakeholders, and it is anticipated that this will reduce the volume of outpatient costs and episodes removed for failing to meet the required specification (\$11m in Round 22).

- ACT Health is improving the working relationship with health services. They have an active costing working group with Calvary for Round 23, and aim to establish a similar working group with CHS.
- A new data repository is being developed. One of the outcomes from the new repository is improved data collection and reporting, which will drive improvements in the quality of costing outputs.

5.8 Northern Territory

Jurisdictional Overview

NT Department of Health leads and performs clinical costing for the Territory's health services, and is responsible for the preparation and submission of the Northern Territory NHCDC process. NT has two health services: Top End Health Service (TEHS) with two Activity Based Funded (ABF) hospitals and one block funded site, and Central Australia Health Service (CAHS) which comprises two ABF hospitals. From Round 23, a new hospital, Palmerston, will be included in TEHS.

There is one integrated PAS across the territory which enables the existence of a territory-wide universal Hospital Record Number (HRN). This also extends to primary health care, mental health, alcohol and other drugs (AOD) services, enabling service coordination within the NT Health network.

Costing is performed annually in NT by the jurisdiction, with long-term plans to move to half-yearly costing when appropriate systems and frameworks are in place. The costing team at the jurisdiction comprises of one FTE, supported by managers who provide oversight, plus one Power Health Solutions (PHS) contractor who provides costing support for both health services. There are weekly costing meetings between the PHS contractor and the jurisdiction.

A centralised data warehouse is used to store some feeder information and financial information. This data is used in conjunction with information gathered from engagement with various stakeholders in the Department and at the health services. Approximately 22 feeder files are extracted both from the centralised data warehouse and from other areas. The data quality review is the longest part of the costing process, taking up to three months as systems may not have captured all the information required for costing and the data needs to be thoroughly reviewed and standardised.

There are territory-wide feeders for blood products, emergency department, imaging, pathology, nursing, surgery, recovery, anaesthesia, allied health, travel, cardiac and pharmacy. Many of these feeders are obtained from various system, given the disparate systems in place across the NT. An identified area where feeder data may be useful is prosthetics, which currently uses procedural weights based on an RVU from another state to allocate costs. The jurisdiction extracts feeder files and conducts quality assurance checks in preparation for the costing run. Activities and services are grouped to align the GL with the cost ledger in consultation with health services, who then engage with the hospitals.

Patient transport constitutes a significant cost for NT's rural hospitals in comparison to national benchmarks. These costs are attributed to the hospital sending the patient, and are calculated through a transport contract which has a set dollar value for each kilometre travelled. There are feeder files for the in-scope and out-of-scope patient transport costs.

The costing methodology is largely consistent between the two health services in the Territory, with one exception identified for Round 22: allied health feeder information was not captured at CAHS as allied health staff stopped recording this information in the format required for costing, whereas TEHS has a functioning feeder system that allocates costs at a patient level. In the absence of feeder information, CAHS used the Allied Health Intervention codes to allocate allied health to the correct service provided and then allocated the cost of allied health across all relevant patients based on the type of service, e.g. all physiotherapy patients had the same share of physiotherapy costs for CAHS. Feeder data is expected to resume at CAHS from Round 23

due to engagement with the clinical and hospital staff to explain the type of information that is required to be captured in the system.

NT Health engages with health services throughout the costing process and for the first time in Round 22, facilitated three workshops throughout the year to increase knowledge of the costing process. The first workshop was held in November and was an overview of the costing process and the granularity of activity data used to determine costing data by the jurisdiction. Costing was then performed by the jurisdiction, and a second workshop was conducted in early March for health services to validate costing results and address any issues. The first submission to IHPA occurred in March for IHPA's QA feedback. The costing data then underwent further refinements and the jurisdiction re-ran the costing process throughout the month, before the final submission to IHPA by the end of March. The third workshop was held in July to present the costing results to health services, including identification of opportunities for financial or operational efficiency service / department level. These workshops were attended by the stakeholders at the health service including business managers and financial management teams who work closely with clinical representatives at the hospitals.

Costing information is used to some degree at the jurisdiction level in management reports, primarily used for NHCDC purposes. The jurisdiction has indicated there are goals to increase the utility of data beyond the IHPA submission.

5.8.1 Katherine Hospital Overview

Within NT, the selected site for the Round 22 Independent Financial Review was Katherine Hospital, part of TEHS. Katherine services several remote communities with a combined population of approximately 12,000 and has a very high Indigenous demographic. Katherine Hospital offers a full range of acute services, ED, maternity, palliative care (with guidance from specialists in Royal Darwin Hospital - RDH), rehabilitation services, a cancer unit, mental health and outreach services. Due to the lack of primary health care in the area, there are integrated health services including alcohol and other drugs, paediatric and obstetric services. These services are coordinated with Indigenous organisations that provide primary health care. Given remote locations and multiple health services treating the same population, the health services highlighted reliance on the statewide Electronic Medical Record (EMR).

Katherine Hospital is just over three hours away from the RDH, the primary referral hospital. As a result, the ED in Katherine has comparatively longer stays due to patients waiting for transportation to other sites due to their single ambulance for the health service. Katherine plays a large service coordination role, for example, one of the major chronic health conditions present in the region is kidney failure, which is treated by renal dialysis through an external partnership using a remote satellite dialysis ward. There are also a large number of fly in/fly out arrangements for medical specialists from Darwin. Katherine Hospital coordinates and runs remote community health centres in outreach areas to provide services closer to the homes of patients, including a number of services via telehealth. The network and range of outreach centres is being expanded. There are challenges in the usage of different information systems as a hospital PAS is not always available in these remote centres.

At TEHS, costing is conducted by the Jurisdiction, with sign-off by the CFO. The Jurisdiction liaises with TEHS to understand any changes in service delivery or issues that impact costing. The health service receives costing data and summary reports in the workshops that are run by the areas mentioned above. Whilst health services have access to PPM, potential gaps have been identified in their capability to run reports from the system.

At the health service level, the costing data is used for comparison against peers and IHPA published data, as well as benchmarking to the Health Round Table data. The health services use this information to understand areas causing significant variations between funding and costs to target areas to improve efficiencies. There are also cost and activity targets set for different divisions (mental health, ED, etc.) within a hospital, which are signed off by clinical leadership.

5.8.2 Reconciliation

This section discusses major variances, reconciling items and adjustments in the reconciliation process. The information is based on Katherine Hospital's data collection template, data quality self-assessment and review discussions.

The table overleaf presents a summary reconciliation from Katherine Hospital's general ledger (GL) to the final NHCDC submission for Round 22.

Katherine's final GL of \$57,882,595 was reconciled by the jurisdiction to the audited financial statements.

Explanation of reconciling items

Adjustments made at the health service level (Item B)

None

Adjustments made at the jurisdiction level (Item E)

- NT Health submitted costs for all patients discharged in 2017/18 (including those admitted in prior years) amounting to \$2.3m and removed WIP costs of \$341k for patients who were still admitted at 30 June 2018. The movement in WIP across the period decreased significantly as a result of one very long-term (more than two years) maintenance patient who was discharged, and three other patients who were discharged after over a year.

Table 34: Reconciliation from Katherine Hospital General Ledger to NHCDC costed products

Katherine Hospital			Jurisdiction			IHPA		
Source: Self-Assessment	Item	Amount	Item	Amount	Item	Amount		
A	General Ledger (GL)	\$ 57,882,595	C	Total hospital expenditure	\$ 57,882,595	G	Total costed products received by IHPA	\$ 59,840,770
	B	Adjustments to the GL	D	Adjustments to the GL	\$1,958,175	H	IHPA Adjustments	\$0
	Inclusions		WIP Prior Years	\$ 2,299,470	I	Final NHCDC costs	\$ 59,840,770	
	Exclusions		WIP 2017-18	(\$341,294)				
	Total hospital expenditure	\$ 57,882,595	E	Total costs submitted to IHPA	\$ 59,840,770			

5.8.3 AHPCS 4.0

From the site review, Northern Territory discussed being materially in compliance with AHPCS Version 4.0 for Round 22. NT reported partial compliance against the following standards and costing guidelines:

- **Rights of Private Practice (RoPP)** – NT reported partial compliance of Stage 1.1 Identify Relevant Expenses – General. Two clinicians have a RoPP arrangement in NT. Partial compliance was marked against this item as payments made to trust accounts for the RoPP are not brought into scope for costing purposes, but are considered immaterial.
- **Third party expenses** – Under Stage 1.2 Identify Relevant Expenses - Third Party Expenses, NT reported that some remoteness expenses incurred from other government bodies subsidising a remote workforce in the territory may have not been included into the NHCDC. These have not yet been able to be quantified, and there are plans to potentially incorporate them into the scope of costing for Round 23.
- **Mental health** - Stage 2.1 Create the Cost Ledger - Cost Ledger Framework, Stage 2.2 Create the Cost Ledger - Matching Cost Objects and Expenses, Stage 4.1 Identify Products - Product Types, Stage 4.2 Identify Products - Information Requirements and Costing Guideline 9 - Mental health services, NT reported partial compliance as currently the Territory is not collecting at phase of care level for mental health (but plans to begin collecting from Round 23) .
- **Reconciliation** - Stage 6.1 and 6.2 (Review and reconcile – Data Quality Framework and reconciliation to source data) indicates that in order to be fully compliant, the hospital / LHN are required to conduct the reconciliation. NT marked partial compliance as this was assessed by the jurisdiction in NT as this is the level at which costing is undertaken.
- **Medical expenses for public and private patients** (Costing Guideline 1.1A) – NT reported partial compliance as NT costs private and public patients in the same way, as opposed to the process specified in the Costing Guideline.
- **Teaching, Training and Research (TTR)** – For Costing Guideline 4, partial compliance was marked as the costing of students and the activity side of costing is not recorded. The existing process at NT for TTR allocates a fraction of a portion of clinical workloads to TTR, based on consultation with the health service and recently using the clinical specialty areas and booking information for training rooms in the facility.
- **Posthumous organ donation** – For Costing Guideline 7, partial compliance was reported as only three episodes were recorded for this Round and therefore there are likely to be clinical and administrative reasons for differing practice for statistical discharges. Requirements for reporting this item are unclear, and costs are likely to be included in the patient episode rather than posthumous care. Costs for both successful and unsuccessful donor patients are spread across all patients that received posthumous care. There is desire for guidance on treatment of posthumous patients, ensuring guidance is clinically and administratively appropriate and practicable.

Partial compliance was marked for the items above as the jurisdiction reported the assessment tool was fairly subjective. As a result, the jurisdiction did not indicate full compliance as a precautionary measure. NT Health would like clarity from IHPA on specific items for the jurisdictions to confirm compliance against the standards. Feedback on the standards are that

given limited resources and small size, NT Health relies heavily on knowledge and skill of specialist contractors to implement the national standards.

5.8.4 Quality Assurance

The jurisdiction conducts quality assurance (QA) as part of the annual costing process. Files are checked for consistency in structure and the data is reviewed across each month for any unexpected changes. Feeder extracts are also reviewed for completeness and linking volumes.

The Jurisdiction team checks costing data for reasonability, based on thresholds set using prior knowledge and experience. These checks include reviewing high and low costs for inpatient, outpatient and ED encounters. Any problematic areas are investigated at the individual record level and followed up with health services for resolution and amendment of the source file if necessary. Depending on the issues, resolution may require the involvement of hospital representatives. IHPA QA, which identifies issue areas, serves as a more broad checkpoint on the quality of costing data. NT Health then reviews these issues through follow-up with health services. The costing process is re-run if there are material changes from resolving these issues.

The table below sets out a summary of the QA checks performed within NT.

Table 35: Summary of the QA checks performed within NT

Specific Quality Assurance	Performed by NT Health	Performed by Health Service
Reconciliation		
Reconciliation back to general ledger & audited records	Reconciliation conducted annually in PPM against costing dataset and loaded GL.	No
Reconciliation of activities back to source systems	Reviews on all state managed feeder systems	No
Validation of costing data		
Reasonableness check of excluded items or out of scope costs e.g. WIP patients	Yes – compare to previous years	No
Trend analysis to prior periods in terms of distribution of costs across care products and LHD	Yes – compare all product and service costs to prior years	No
Analysis of outliers at the cost, LoS, or cost bucket level	Yes – analyse all low/high cost outliers to ensure a clinical not a costing issue	No
Proportion of direct vs overhead costs	Yes	No
Proportion of costs sitting in each product (eg % costs in acute, ED, OP)	Yes – reviews on quantum of GL items performed with senior representative and divisional representative from health service	No
Specific logic checks	Yes (including allied health services only linked to allied health GL areas, nursing costs allocated and no medical costs for Nursing-led Tier 2, and medical costs within Medical-led Tier 2).	No
Costing Governance		
Regularly hold costing meetings?	Weekly with PHS contractor and jurisdiction team	Hospital representatives attend jurisdiction costing meeting when required
Regularly review and update cost centre allocations?	Annually	No
Formal process sign off on data and accountability for data?	Final sign-off conducted by the Director of Casemix and Clinical Costing	Preliminary sign-off by Health Service CFO.
Reviews on data are conducted prior to submission?	Multiple reviews conducted, both with the health service, through Costing Workshops and the QA reports from IHPA	Yes
Do local guidelines to support national AHPCS standards exist?	No	No

5.8.5 Pharmacy costing processes

Pharmacy costs and allocation methods

Based on information collected from the site visits and IFR data collection templates, Katherine Hospital identified \$1.7m costs in the pharmacy cost bucket for Round 22. This included dispensed PBS drugs (\$0.6m), non-PBS dispensed drugs (\$0.5m), salaries and wages (\$0.4m), overheads (\$0.2m) and a small amount of other direct costs including goods and services and drugs freight (\$48k).

Imprest drugs comprised \$0.3m of the \$0.5m PBS spend. Imprest drugs are not linked to a unique reference identifier and are allocated depending on the allocation method in use for that area. For example:

- General Ward imprest drugs are allocated on ward bed days, while clinic drugs are allocated evenly across outpatients;
- OR imprest drugs is based on theatre minutes; and
- ED imprest is allocated based on ED minutes.

The diagram below depicts the categories of expenditure that are mapped to the pharmacy cost bucket in Katherine Hospital and allocation methods used.

Diagram 30: Allocation methods and make up of pharmacy costs submitted to NHCDC - NT

Cost Category	Allocation method	Description of allocation method	% of pharmacy cost bucket
S100 drugs	Feeder	PBS and S100 dispensed drugs are included in a single line item, in Northern Territory, and total \$560k. These drugs are allocated using Merlin feeder system to match drugs to their associated episode. The HSD feeder at Katherine hospital achieves a linking rate of approximately 98% of the value and volume of these drugs.	32%
PBS Drugs	Feeder		
NPBS dispensed drugs	Feeder	NPBS drug costs (ie. dispensed through Pharmacy which do not attract PBS reimbursement) are allocated using eMMA and Merlin feeder system to match drug costs to their associated episode. These total \$232k, and cover two feeders.	11%
Ward imprest drugs	RVU	Ward and clinic imprest drugs are allocated using a relative weighting depending on occupied bed days, or allocated across outpatients at a clinic level. ED drugs make up the most significant proportion of imprest and these are allocated based on ED minutes.	15%
Anaesthetic drugs		Anaesthetic imprest drugs are held in theatre imprest and mapped to the OR cost bucket using the relative weighting from the theatre (Surginet) feeder, based on theatre minutes.	4%
Pharmacist S&W	RVU	Pharmacist S&W are allocated across dispensed and imprest drugs on the proportion of the value of drug expenditure.	20%
Ward based pharmacists		N/A – there are no ward based pharmacists at Katherine Hospital.	
Pharmacy system costs / licences		The costs associated with the Merlin system are mapped to an overhead cost centre and distributed in line with other overheads.	
Overheads / indirect costs	RVU	Pharmacy overheads total \$230k and include depreciation, cleaning, IT, and Merlin system costs	14%
Other direct costs (transport, logistics / distribution / production costs)	RVU	Freight and other goods and services eg. Pharmacy consumables total \$31k.	3%

Pharmacy linking rules

In line with other facilities in the state, Katherine Hospital uses the Merlin system for dispensing drugs, and obtains three different feeders: one covering PBS (high cost) drugs; one covering eMMA (electronic Medication Management Allocation, including ED, inpatient imprest and non-admitted); and one covering general non-PBS dispensing. The different feeders reflect the gradual expansion of services. For other facilities at THS there is a fourth feeder for ICU, but no ICU services are provided from Katherine Hospital.

Katherine Hospital uses iterative linking rules to match dispensed PBS and non PBS drug costs from Merlin to an episode. The rules initially attempt to match to ED encounters (within one hour), inpatient (within one hour) and non-admitted (within one hour) of the order date timestamp in the Merlin feeder, before widening over multiple iterations to four hours, one day and two days (ED and inpatient maximum), and 120 days (non-admitted maximum). With the recent PPM upgrade, Katherine Hospital is able to obtain data about which linking rule captures the most patients.

The Jurisdiction has opted for linking rules up to 120 days for non-admitted across the state, reflecting increased volumes of repeat scripts being issued to patients under PBS reform. This produces a high match rate to ensure drugs costs are not excluded inappropriately from the submitted encounters, although this brings a higher risk that some records match to the incorrect non-admitted episode.

The Jurisdiction and costing teams would welcome guidance from IHPA on national linking rules to address the potential inconsistency across the nation in dealing with repeat scripts, along with imaging and pathology tests which are often conducted between outpatient visits.

Across all three feeders, the linking rules yield a matching rate of 99.3% of records at Katherine, corresponding to 98.3% of dispensed drugs. The remainder is costed to D (dummy) encounters and not submitted to NHCDC.

Table 36 - Linked feeder records from Merlin, eMMA and HSD feeders by volume and value

	Pharmacy		Pharmacy - eMMA		Pharmacy - HSD		linking rule
Product	Merlin linked records – volume	Merlin linked records – value (\$)	Merlin linked records – volume	Merlin linked records – value (\$)	Merlin linked records – volume	Merlin linked records – value (\$)	
Acute	3,932	162,440	51,612	199,697	514	254,621	1 hour, 4 hours, 1 day, 2 days
OP	655	229,399	98	388	244	264,725	1 hour, 4 hours, 1 day, 2 days 120 days
ED	83	2,898	136	403	8	24,500	1 hour, 4 hours 1 day, 2 days
Sub Acute	272	2,884	12,155	26,350	2	175	1 hour, 4 hours, 1 day, 2 days
Linked	4,942	397,621	64,001	226,838	768	554,022	
Unlinked	67	5,841	435	2,494	14	12,494	
Unlinked %	1.3%	1.4%	0.7%	1.1%	1.8%	2.2%	

PBS and S100 drugs

The Jurisdiction confirmed that no PBS revenue was offset from pharmacy expenses and is consistent with direction given in the AHPCS Version 4.0.

5.8.6 Improvements

Improvements since Round 21

NT Health has made the following improvements since Round 21:

- There have been improvements to automate the process of submitting feeder datasets to the Jurisdiction via the data warehouse, resulting in time saved during the costing process, and ensuring completeness checks are conducted as another layer of validation. During the next year, the process will be further implemented across more feeder files.
- There was increased involvement of the Health Services in the costing process through workshops and reporting, which introduced additional checks and validation of the costing outputs. This is expected to increase the accuracy and use of the data.

Future improvements in development for Round 23

- Allied health feeder data will be captured across CAHS in Round 23, making the allied health allocations fully duration-based for NT.
- A dedicated contact for costing related queries from CAHS will be trained and available to support the costing process for Round 23.
- NT will review and bring into scope any relevant remoteness subsidies which are paid by other government departments in relation to subsidising health services delivered in remote locations.
- From the next round, there is a desire to incorporate cost data into current management reporting.
- For Round 23, NT plans to run the hospital acquired complication (HAC) module in PPM2. This will facilitate action to reduce the number of HACs within areas with significant HAC rates, by flagging episodes with HACs and allowing triangulation of cost data with incidents.

6. IHPA Review

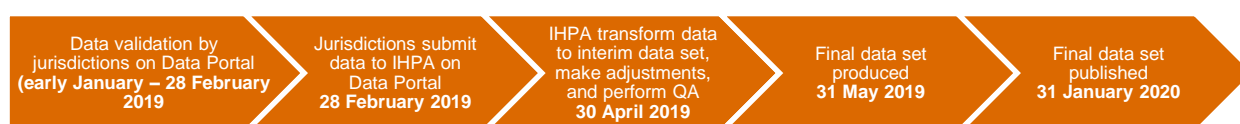
6.1 IHPA process for the NHCDC

This section outlines IHPA's processes for receiving, validating and performing Quality Assurance (QA) procedures data for Round 22, including any adjustments made to datasets received from jurisdictions, before the publication of the final NHCDC datasets.

NHCDC Timeframes

The NHCDC timeframes for Round 22 are published in IHPA's Three Year Data Plan, and are set out below for Round 22.

Diagram 31: IHPA's three year data plan process



Currently, the timeframe for the process is approximately one year after data has been submitted by jurisdictions, translating to eighteen months after the end of the financial year being costed. IHPA has indicated a future preference to shorten the NHCDC timeframe and move to more frequent costing periods nationally. As at Round 22, several jurisdictions continue to cost on an annual basis and it is understood that one of the drivers for this is that general ledgers may not be prepared until the end of the financial year.

Delays and extensions to published timeframes are frequently experienced. The majority of jurisdictions re-submit their data multiple times, which generates additional repeated activities from IHPA's teams, although large parts of the process outlined below are automated. The largest contributor to delays is the multiple resubmission of data from jurisdictions, which requires complete repeats of the below stages. Additionally, if there is a resubmission for one hospital, QA reports are re-produced for all hospitals in the jurisdiction. As a result, IHPA's dates for the final data set from jurisdictions can stretch up to early July (almost 6 months later than the published timeline) to accommodate resubmissions.

Stage 0: Data validation on the Data Portal

Prior to costing submissions to IHPA, jurisdictions could run their costing data through IHPA's data validation program once they uploaded their cost files and activity files to the data portal. This ensures data adheres to IHPA's requirements, is structurally in line with specifications set out in the DRS and meets all checks and linking ratios to provide validation on the data. This process is reported to minimise the majority of data formatting issues, and can be run multiple times by jurisdictions from when it is available in early January. During this stage, only jurisdictions view and address any warnings flagged on the data unless IHPA's input is specially requested. The data validation was used by the majority of jurisdictions, with the exceptions being the smaller states/territories. Jurisdictions submitted their costing data to IHPA by late February, and had to resolve all critical errors in order to submit.

Stage 1: Extract, Transform and Load process

Once data was submitted by jurisdictions, IHPA's data acquisition team commenced the Extract, Transform and Load process (ETL). This process took approximately two days for each

jurisdiction, and transformed the submitted files into interim data sets at a stream (product) level by jurisdiction. In Round 22, the mental health stream was combined with acute due to the transition to the new AMHCC standards, which resulted in some mental health activity still being submitted as an acute product.

Cost bucket creation

This step involved transforming cost data submitted by jurisdictions at the line item / cost centre level, to cost buckets, using the cost bucket matrix for Round 22.

Stage 2 and 3: Revision of products and activity

The product types were revised based on activity information through a matching process between cost and activity data. At this step, neither the total cost nor activity submitted changed; however, the distribution by product could change. The majority of changes occurred between admitted and non-admitted products, and also for newborn babies and the admitted 'mother' episode. This process took approximately two days for each jurisdiction.

Stage 4: Unqualified Babies (UQB) adjustment

The next stage linked UQB costs to the mother's separation, resulting in UQB activity being removed from the newborn (NB) care type and the costs transferred from the newborn to the admitted stream. Unqualified babies are those without care interventions following birth, and are less than ten days old when they are discharged. Unqualified babies with lengths of stay over ten days incur 'qualified' days which need to be recorded for the activity data submission within the NB care type.

The submission of newborn data differed between jurisdictions, for example Victoria and Queensland submitted mother and baby records separately, whilst ACT and New South Wales submitted combined records. However, from Round 23 IHPA's expectation is that this will become standard practice to combine records, removing the need for IHPA to complete this adjustment. The methodology IHPA applied for Round 22 is set out below:

- Where a mother separation could be directly linked with a UQB separation (using the mother's linking key submitted with the UQB record), the costs of that UQB separation were allocated to the mother.
- Where a linking key was not provided, any unallocated UQB separations were linked to remaining mother separations (those with obstetric DRGs) at the same establishment, using dates to attempt to match the mother and baby record and using a 1:1 ratio (i.e. one UQB separation per mother separation), with costs allocated based on length of stay.
- Any remaining UQB separations that could not be matched following these two steps had their UQB costs excluded from the NHCDC. In Round 22, this activity and cost was reported by IHPA as immaterial (\$27k across all sites participating in Round 22 IFR).

Stage 5: Reconciliations

Reconciliations were conducted to document any adjustments to activity and costs in each of the areas above. The final output of this stage was the total cost with a breakdown of product costs against revised product types, which was provided to the jurisdiction alongside the QA report.

Stage 6: Quality Assurance

Prior to conducting quality assurance, IHPA removed the WIP episodes of patients admitted before the start of the previous financial year (ie. those admitted before 1 July 2016, who were discharged in the 2017/18 year). The quantum of these excluded WIP records was not large and usually arose as a result of the ETL stage which used the dates in the activity file, whereas hospitals performed reconciliations using dates from their costing file.

The QA process conducted by IHPA's Data Acquisition team was largely automated and run through SAS and SQL, producing Excel outputs with conditional formatting to highlight any significant movement in costs between years and products, or values above designated thresholds. The timeframe for QA was one week per jurisdiction, and it was conducted by one FTE. There were two levels of checks: the first being the structure of data and the second the content, which included the values and data linkage. Comparisons were then run to data from the previous year to ensure reasonability. The process also reviewed cost bucket flipping and DRG flipping, checking costs were in alignment with the complexity of DRG, as well as investigating any negative cost buckets. Throughout this process, IHPA communicated with jurisdictions to address material errors.

The QA report presented the total cost by episode and the split of these costs. It also contained a comparison at the stream, cost bucket, line item, product type and DRG levels to previous years. This comparison was conducted for the jurisdiction and all sites, with the exception of NSW which did comparisons at an LHD level. IHPA's costing team provided narrative highlighting items for investigation, when providing the report back to jurisdictions.

The advertised timeframe for jurisdictions to review the QA report and determine if re-submissions were required was by the end of April, but in practice it stretched beyond this date. In the event of resubmission, all stages were repeated on the revised datasets.

Stage 8: Final submission

Once all QA queries were resolved, jurisdictions informed IHPA via email that their submission was finalised. After this stage, the jurisdiction prepared a Data Quality Statement detailing their application of the costing standards for the Round and any changes within hospitals that materially impacted costing.

The target date for the finalisation of IHPA's output was by the end of October, though this was delayed due to jurisdictional data resubmissions. IHPA's finalised output was only released in the cost report, which will be submitted to the Ministry in November and published in January 2020. The finalised data was also available to jurisdictions in the National Benchmarking Portal.

6.2 Improvements

Improvements since Round 21

IHPA has carried out work to make improvements to the following areas since Round 21:

- Summary QA has been made available through the data portal, so that jurisdictions can view errors and warnings on their data immediately after submission without needing to wait for manual download of reports. The summary QA function presents the total costs and average costs at the jurisdiction and LHN level.

- Through the inclusion of the deep dive into pharmacy, IHPA has evolved the approach and scope of discussion for the Round 22 IFR to drive consistency in costing processes, methodologies and systems.
- IHPA has updated the presentation of the cost report for greater readability, and included new series of infographics which was developed for Round 22.
- Mental Health costing submissions were allowed for the first time in Round 22. This will continue to be an area of focus in future rounds.

Future improvements in development for Round 23

- Make changes to the DRS and simplify the linking process between activity and cost data by moving away from product types.
- There are plans for future rounds to have an automated QA process in the data portal. Additionally, IHPA has indicated goals to make the data portal available from early January each year (it was previously late January), to allow jurisdictions extra time to get their submissions completed.
- Review and update the cost bucket matrix for inclusion in the next version of the DRS.
- The National Benchmarking Portal, which is a secure web-based application that provides access to compare costs and activity data from public hospitals across the country, is currently hosted by NSW Health. However, there is appetite to bring this in-house to IHPA and increase the availability of this data to a wider audience.

6.3 Testing data flow at an episode level to IHPA

This review included selecting a sample of five episodes from each participating facility for the purpose of testing the data flow from jurisdictions to IHPA at the episode level. Records were selected across a range of care types (to include, at a minimum, one admitted patient, one ED patient, one WIP patient, and one who has received PBS / high cost drugs). Costs for these patients were reconciled between source cost records (at the LHN / Jurisdiction) and IHPA records.

Of the 65 records sampled, two related to unqualified babies and were out of scope for IHPA. All remaining 63 records reconciled (within 1 cent).

7. Appendix

1 Reconciliation of individual records

Table 37 – Reconciliation of costs from LHN / jurisdictions to IHPA

Jurisdiction	Facility	Care type	LHN / jurisdiction record	Received by IHPA	Variance
ACT	Canberra Health Services	OP	\$185.19	\$185.19	\$-
		ED	\$649.98	\$649.98	\$-
		AC	\$22,171.88	\$22,171.88	\$-
		ED	\$3,373.44	\$3,373.44	\$-
		AC	\$5,283.38	\$5,283.38	\$-
NSW	South Western Sydney LHD	AC	\$76,850.44	\$76,850.44	\$-
		AC	\$3,072.20	\$3,072.20	\$-
		ED	\$776.29	\$776.29	\$-
		NB	\$311,514.93	\$311,514.93	\$-
		AC	\$461.69	\$461.69	\$-
QLD	Prince Charles Hospital	OP	\$698.40	\$698.40	\$-
		MH	\$2,779.56	\$2,779.56	\$-
		AC	\$7,459.96	\$7,459.96	\$-
		ED	\$823.54	\$823.54	\$-
		RH	\$33,826.22	\$33,826.22	\$-
	Ipswich Hospital	RH	\$67,811.10	\$67,811.10	\$-
		AC	\$6,426.57	\$6,426.57	\$-
		MH	\$574.53	\$574.53	\$-
		ED	\$497.45	\$497.45	\$-
		OP	\$360.19	\$360.19	\$-
	Roma Hospital	AC	\$1,509.56	\$1,509.56	\$-
		RH	\$21,451.90	\$21,451.90	\$-
		MH	\$12,458.80	\$12,458.80	\$-
		ED	\$561.89	\$561.89	\$-
		OP	\$364.81	\$364.81	\$-
SA	NALHN (Modbury Hospital)	GM	\$6,835.04	\$6,835.04	\$-
		RH	\$29,886.94	\$29,886.94	\$-
		GM	\$18,034.37	\$18,034.38	\$0.01
		ED	\$1,535.08	\$1,535.08	\$-
		OP	\$539.40	\$539.40	\$-
TAS	Tasmanian Health Services	OP	\$274,260.27	\$274,260.27	\$-
		AC	\$632,679.88	\$632,679.88	\$-
		AC	\$105,664.76	\$105,664.76	\$-
		ED	\$1,108.41	\$1,108.41	\$-
		MH	\$36,056.38	\$36,056.38	\$-

Jurisdiction	Facility	Care type	LHN / jurisdiction record	Received by IHPA	Variance
VIC	Bendigo Hospital	OP	\$239.58	\$239.58	\$-
		AC	\$907.90	\$907.90	\$-
		RH	\$26,632.82	\$26,632.82	\$-
		AC	\$5,048.72	\$5,048.72	\$-
		ED	\$534.18	\$534.18	\$-
	Mildura Hospital	AC	\$10,016.52	\$10,016.52	\$-
		RH	\$142,843.07	\$142,843.07	\$-
		AC	\$615.66	\$615.66	\$-
		AC	\$3,723.32	\$3,723.32	\$-
		ED	\$319.65	\$319.65	\$-
	Monash Health	OP	\$114.49	\$114.49	\$-
		AC	\$1,512.45	\$1,512.45	\$-
		NB	\$2,006.74	Out of scope (UQB)	Out of scope (UQB)
		ED	\$90.55	\$90.55	\$-
		AC	\$1,145,025.49	\$1,145,025.49	\$-
WA	King Edward Memorial	ED	\$565.02	\$565.02	\$-
		AC	\$7,130.53	\$7,130.53	\$-
		AC	\$12,641.85	\$12,641.85	\$-
		NB	\$1,998.05	Out of scope (UQB)	Out of scope (UQB)
		OP	\$240.36	\$240.36	\$-
	Geraldton Hospital	OP	\$653.14	\$651.88	\$-
		AC	\$14,578.68	\$14,578.68	\$-
		AE	\$1,703.12	\$1,703.12	\$-
		AC	\$8,897.70	\$8,897.70	\$-
		AC	\$52,318.19	\$52,318.19	\$-
NT	Katherine Hospital	ED	\$2,277.76	\$2,277.76	\$-
		AC	\$11,780.50	\$11,780.50	\$-
		RH	\$16,946.84	\$16,946.84	\$-
		AC	\$729.92	\$729.92	\$-
		OP	\$30,745.16	\$30,745.16	\$-