Western Australian Auditor General’s Report

Accuracy of WA Health's Activity Based Funding Data

Report 5: April 2017
Accuracy of WA Health's Activity Based Funding Data
ACCURACY OF WA HEALTH’S ACTIVITY BASED FUNDING DATA

This report has been prepared for submission to Parliament under the provisions of section 25 of the Auditor General Act 2006.

The objective of our audit was to determine whether WA Health has suitable processes and controls for recording, collating and submitting activity data and to determine if activity data was accurate.

Our testing found a low error rate in the accuracy of patient activity records. However, we did identify a higher error rate in data soon to be used for activity based funding. We also found a need for improvement in controls for collecting and reporting activity based information, to ensure ongoing data quality.

I wish to acknowledge the assistance of the staff at the agencies involved in this audit.

COLIN MURPHY
AUDITOR GENERAL
11 April 2017
Contents

Accuracy of WA Health’s Activity Based Funding Data ........................................... 4
  Introduction ........................................................................................................... 4
  Background .......................................................................................................... 4
  What we did .......................................................................................................... 5
  Conclusion ............................................................................................................. 6
What did we find? .................................................................................................... 7
  Policies and procedures are in place, but not fully implemented ...................... 7
  Data extraction processes are not preventing errors ........................................... 8
  Information security controls require improvement ............................................. 8
  No consistent verification of third party activity data .......................................... 9
  Activity data had some errors ............................................................................ 9
  A high error rate exists in data soon to be used for funding .............................. 10
  Improved recordkeeping is needed to support patient care and accuracy of reporting .......................................................... 11
Recommendations .................................................................................................. 12
Response from Department of Health .................................................................. 12
Accuracy of WA Health’s Activity Based Funding Data

Introduction

In 2015-16, $4.2 billion of WA Health’s $8 billion funding was allocated under activity based funding arrangements. WA Health uses health activity based data to allocate funding to the various health services. In addition, the Commonwealth uses health activity based data from each state or territory to help determine the funding it provides to each jurisdiction. Basically, this data is the number and type of clinical procedures, such as hip replacements or tonsillectomies, performed by each jurisdiction’s health services.

Robust controls over the accuracy and completeness of activity data are pivotal to ensuring that Western Australia (WA) health services receive the right level of activity based funding. Not only is it important to ensure that services are coded to the right activity type (referred to as clinical coding), it is also important that data flows accurately and completely from each of the information systems used to collect the data. Our audit focused on the accuracy of this data.

Background

Activity based funding models rely on good activity data to correctly fund different medical activities and for identifying opportunities to improve hospital efficiency.

WA has used an activity based funding model since 2010 to calculate and distribute funds to support its different health activities. In 2012, the Commonwealth revised its funding model so that most of its funding to states, through the National Health Reform Agreement (NHRA) was also activity based.

Activity based funding is calculated by multiplying patient activity by the relevant price paid for each activity.

After a patient is provided care in a health facility, a clinical coder will review the clinical information in the medical records and then assign the procedure a code in accordance with set standards. Each procedure code is grouped and given a weighting based on its complexity. An average hospital service is worth 1 weighting unit, known as the national weighted activity unit (NWAU). For instance, a hip replacement has a weighting of 4.06 and a tonsillectomy has a weighting of 0.71.

Activity based funding differs from other commonly used funding models because it is based on the actual clinical services delivered, rather than overall prior year costs.

Figure 1 shows state and Commonwealth health funding flows.
Figure 1: Australian Public Hospital System Funding and Payment Framework. National Health Funding Pool Annual Report 2015-16 page 13

Each year, WA Health provides extensive costing and activity data to the Commonwealth to support the funding that the Commonwealth will provide for the upcoming year. Costing information is provided to the Independent Hospital Pricing Authority (IHPA) to help determine the national efficient price (NEP). Estimated and actual activity information is provided to the National Health Funding Body (NHFB) to help determine the amount of funding to be allocated to WA’s local hospital network.

Hospital services are funded in 5 distinct categories:

1. Acute admitted patient services: this refers to instances where a person is admitted into hospital to perform surgery, cure an illness or relieve symptoms of an injury. It excludes mental health care.
2. Emergency department services: this includes all services provided at hospital emergency departments.
3. Subacute and non-acute care: this refers to specialised multidisciplinary care to treat a patient with an ongoing condition. It includes rehabilitation care, palliative care and geriatric evaluation and management.
4. Admitted mental health services: refers to services provided to patients who are admitted to hospital with a mental health diagnosis.
5. Non-admitted services: refers to services provided to patients who are not admitted to hospital. These include services performed at hospital outpatient clinics, community based clinics and in patient’s homes.

In 2015-16, there were around 3,600,000\(^1\) funded patient activity episodes in WA.

**What we did**

The objective of this audit was to determine whether WA Health has suitable processes and controls for recording, collating and submitting activity data and to determine if activity based

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\(^1\) Source – Department of Health.
data was accurate. To assist us in this audit, we engaged experienced clinical coding auditors to determine whether the coding applied to specific clinical procedures was accurate.

Our audit focused on the accuracy and completeness of patient activity information collected by WA Health during 2015-16. We did not review information relating to the cost of the various medical procedures, or the allocation of funding to the various WA health services.

We audited a sample of 255 patient activity episodes across 4 hospitals: Bentley Hospital, Joondalup Health Campus (an external service provider), Sir Charles Gairdner Hospital and Royal Perth Hospital. Our specialist clinical coding auditors checked the coding of a further 168 samples across the latter 3 hospitals. This involved checking whether key information in patient records was accurately coded and recorded in the health systems.

We also tested a sample of 40 patient activity episodes at 2 other external service providers contracted by WA Health to provide patient services (Silver Chain and Fresenius Home Therapies), bringing our total sample to 463.

We assessed WA Health against the following lines of inquiry:

1. Does WA Health have suitable policies and controls over the collection and vetting of activity based information?
2. Is activity based information complete and accurate?

We conducted this narrow scope performance audit under section 18 of the Auditor General Act 2006 and in accordance with Australian Auditing and Assurance Standards.

**Conclusion**

Our testing of patient activity records, which included the appropriateness of clinical coding, found an error rate of 5.2%. This error rate does not appear high given the complexity of activity coding and especially given that the nature of the errors meant that they would have minimal impact on funding allocations. However, a much higher error rate was found in a few elements of the suite of mental health information and, while this will not impact current mental health funding, it could impact Commonwealth funding in 2018-19.

We also identified weaknesses in processes and controls for collecting and reporting activity based funding information. In particular, there is no data quality framework in place covering the data submissions. Data quality controls are inconsistent and there are security concerns with the data warehouse and one of the systems. These weaknesses increase the risk of errors or unauthorised changes. Processes and controls over data collection for non-admitted patients needs the most improvement, particularly as this is a relatively new and expanding data collection.
What did we find?

Policies and procedures are in place, but not fully implemented

Inconsistent practices arising from a lack of specific policies and data quality framework adds to the risk that activity data is incomplete or inaccurate.

An overarching data quality policy is important for ensuring that data collected is high quality and fit for its intended use. WA Health has a Data Quality Policy, which sets out roles and responsibilities in relation to data quality. Supporting this policy is the Data Stewardship and Custodian Policy that establishes clear responsibilities for data custodians and stewards. There are also working groups which meet regularly to discuss data quality issues.

An important element of a data quality policy is the need to assess the quality of individual data collections to identify strengths, and to address potential gaps. These assessments help to achieve a culture of continuous improvement in data collections. However, we found that WA Health has not performed any assessments for its data collections supporting activity based funding.

The processes that WA Health use to capture and collate activity information are complex and rely on the integration of many separate systems, referred to as feeder systems.

Patient level activity is captured in these feeder systems and is then transferred to a central repository – or data warehouse. Raw data is extracted from the data warehouse using a script that ensures the data is in the format required by Commonwealth agencies. Figure 2 shows the feeder systems and processes.

![Image](image-url)

**Figure 2: WA Health sources for activity information**
It is important that the extensive data recorded in feeder systems is collected properly and in the right format. To support this, we expected the Department of Health would have a data quality framework to ensure consistent data quality processes are applied to all data collections.

We found the Department does not have a data quality framework that is applicable to the entire activity based funding submission. Although manuals exist for the general collection of patient level data, they are not specific to the Commonwealth data submission. Further, the data custodians who are responsible for the system approve the manuals, without a higher-level review.

We also found that consistent data validation checks are not done for all patient data.

WA Health checks ‘admitted patient’ data from hospitals for obvious errors such as missing or invalid fields. These checks are also being trialled for emergency data, but only at a limited number of hospitals. No checks are done of non-admitted patient information. Consequently, errors in emergency or non-admitted data may not be identified and corrected.

Data extraction processes are not preventing errors

Our testing of patient data identified errors in a mid-year 2016 data submission to the Commonwealth where disability assessment scores were incorrectly recorded as scores from another assessment scale. This data is a key input to funding calculations. After we advised WA Health of the errors, they made corrections to the final 2015-16 submission.

The accuracy and completeness of data submitted to IHPA and NHFB depends on the criteria specified in the data queries run by patient data teams to extract the activity information from databases. There was no evidence that criteria were reviewed by someone other than the person compiling or editing the data query. Without independent checking, any errors in the data query will not be picked up unless identified by the Commonwealth's validation programs (after the data is submitted).

Information security controls require improvement

Strong information security controls help prevent or detect accidental or unauthorised changes, and to maintain the integrity of data. We found that information security controls over the main data warehouse (SAS Data Repository in Figure 2) expose WA Health to risks of data loss or errors. In particular, network password controls were weak, there was no encryption of the data and no proactive monitoring of security logs to identify any unauthorised changes to data.

The feeder systems for most data collections generally have controls in place to protect data integrity. However, we found weaknesses in the controls over aggregate non-admitted data, collected in the Interim Collection of Activity Data (ICAD) database.

ICAD uses desktop database software with limited security and logging controls for reviewing alterations to data. Further, data is entered from emails provided by contracted service providers. There is no system validation of this data when entered into the system. WA Health can minimise the risk of errors in aggregate non-admitted patient data by improving these controls.

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2 For example, the ‘Health Morbidity Data System’ (HMDS) manual, the ‘Sub-acute care data collection’ reference manual, the 'Emergency department data collection repository' specifications and the non-admitted patient activity and wait list data collection (NAPAAWL DC) data set specification.

3 These hospitals include Royal Perth Hospital, Sir Charles Gairdner Hospital, Princess Margaret Hospital and Peel Health Campus.
No consistent verification of third party activity data

Hundreds of millions of dollars of activity based funding is received annually by WA Health for services performed by contracted third party service providers, including a significant amount of non-admitted patient activity.

Within the Department, we found limited coordination between the Data Collection Directorate and Health’s contract managers relating to activity data collected from these third party providers.

The providers submit data to the Data Collection Directorate for the activity based data collection, and separate activity data to Health’s contract managers to support validation of invoices received from the third party providers. Opportunity exists to reduce undetected errors by combining these separate reporting processes.

We also identified instances where we, and WA Health, could not substantiate activity data provided by third party providers as part of their invoicing to the Department. This was because the provider submits a spreadsheet listing of services which is based on verbal conversations.

Improved coordination and communication between contract managers and the Data Collection Directorate may also help identify additional services provided by third parties, which warrant inclusion in the submission to the Commonwealth.

Activity data had some errors

Our testing of the accuracy of activity information found a 5.2% error rate. Most of these errors would have minimal impact on funding – for example a puncture wound of the thumb was incorrectly recorded as an open wound with infection. This is consistent with WA Health’s own clinical coding audits, which found that coding errors only have a small impact on the level of funding received.

Our approach to testing the accuracy involved 2 key steps:

- to confirm completeness and validity of records, we selected a sample of 255 patient episodes at 4 different hospitals to verify the information to patient files
- to confirm that clinical procedures were accurately coded, we engaged experienced clinical coders to review another sample of 168 admitted patient episodes to ensure that the clinical codes were correctly assigned, and consistent with the information in the patient files.

The combined results of the testing are included in Table 1.

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Number of records tested</th>
<th>Number of data errors</th>
<th>Error rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joondalup Health Campus</td>
<td>136</td>
<td>6</td>
<td>4.4</td>
</tr>
<tr>
<td>Sir Charles Gairdner Hospital</td>
<td>136</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td>Royal Perth Hospital</td>
<td>136</td>
<td>16</td>
<td>11.8</td>
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<tr>
<td>Bentley Hospital</td>
<td>15</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>External service providers</td>
<td>40</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>463</td>
<td>24</td>
<td><strong>5.2</strong></td>
</tr>
</tbody>
</table>

Table 1: Results of audit testing

4 Mamco Coding and Auditing Specialists were engaged to test the accuracy of clinical coding.
The errors were a combination of over and under-statements, with no discernible trend. The main errors were:

- At Joondalup Health Campus we identified 6 errors for admitted patients. Two of these were incorrectly coded diagnosis codes\(^5\). The other 4 did not meet the criteria for admission, as the patients did not leave the emergency department.
- There were 2 coding errors at Sir Charles Gairdner Hospital related to incorrect coding of the diagnosis.
- At Royal Perth Hospital, we found 3 data errors and 13 instances where we could not verify all key information to the patients’ files.

We concluded that the errors were not caused by a systemic underlying issue. Where relevant, patient information has been updated.

We also identified a number of other errors in the accuracy of information, which would not impact on the level of funding received. These included:

- 11 instances where complicating conditions were incorrectly assigned as primary conditions
- 85 instances where additional diagnosis or procedure codes were incorrectly assigned
- 18 instances where patient discharge times for emergency information were incorrectly recorded or could not be verified against the patient file. While the errors did not impact the activity based funding information, the Department needs to improve the quality of this data as it is used for performance indicator reporting.

The Department reviewed the errors we identified, and made the necessary corrections.

**A high error rate exists in data soon to be used for funding**

We also tested a suite of mental health information that currently has no impact on funding, but which is expected to do so in 2018-19. We found a much higher error rate in this information.

An important element of admitted mental health data is the ‘National Outcomes Casemix Collection’ (NOCC) information. Although Commonwealth funding for admitted mental health is not dependent on these scores, there is an intention that mental health services will be priced using NOCC information from 2018-19 onwards. Consequently, IHPA has requested that states start providing NOCC information in their submissions.

One important NOCC measure is the ‘Health of the Nation Outcome Scales’ score (HONOS score), which measures the severity of mental health conditions. Out of our sample of 100 HONOS scores, 54 were missing from the midyear data submission to IHPA for 2015-16. Of these, 41 scores were omitted from the 2015-16 final submission. This situation arose mainly because:

- the HONOS score was not recorded in the mental health clinical information system (PSOLIS)
- there were linkage issues between admitted patient information systems and PSOLIS.

Consequently, NOCC information provided to the Commonwealth was incomplete. Missing NOCC information may also impact on the hospitals’ ability to assess patient welfare and provide quality patient support.

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\(^5\) The Diagnosis-Related Group (DRG) code is used to calculate the weighting to be applied to hospital activity.
Improved recordkeeping is needed to support patient care and accuracy of reporting

In the course of assessing the accuracy of clinical coding, we identified a range of improvements needed to Department and hospital recordkeeping.

As indicated above, our testing at Royal Perth Hospital identified 13 occasions where we were unable to verify information in the system as key clinical information was not on the patients' files. Poor recordkeeping impacts management’s ability to monitor patient services.

It is common for hospitals to update patient information to account for errors or updates to patient information. Public hospital patient data held centrally by the Department is periodically refreshed for changes made by public hospitals. However, this data refresh does not consistently occur for public patient activity at privately operated hospitals. We identified an instance where a data amendment at the privately operated Joondalup Health Campus was not updated on the Department’s system.
**Recommendations**

**WA Health should:**

1. **By 30 June 2017**
   - perform data quality assessments for each of its data collections annually in line with its Data Quality Policy
   - develop a data quality framework applicable to Commonwealth data submissions, specifying the procedures, controls and responsibilities for submission of data
   - ensure that data submissions are approved by data stewards
   - review processes for performing data validation checks to ensure that they are being applied consistently to all data submissions
   - ensure that the criteria used to extract data from the data warehouse is independently reviewed for consistency with the Commonwealth's data specifications
   - regularly review administrator access and audit logs for the data warehouse
   - improve communication and coordination between the Data Collection Directorate and contract managers. Where possible, data provided by third parties should be checked for consistency with billing information or verified by an independent source
   - continue to support the accuracy of clinical coding throughout the health services through coding training and education processes and by performing regular reviews
   - review processes for filing and storing patient records at Royal Perth Hospital to ensure that patient information is being retained in accordance with the WA Health record keeping plan
   - regularly update public patient information provided by private hospitals for changes or corrections to data.

2. **By 31 December 2017**
   - consider replacing the Interim Collection of Activity Data (ICAD) database with a more robust application with greater information security controls
   - review processes by which mental health NOCC information is collected and recorded. In particular, the Department of Health should improve the information linkage process between the different patient and mental health databases.

**Response from Department of Health**

The Department of Health advised that it agreed with the recommendations of this report and indicated that many of the recommendations are currently being implemented.
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<td>11 April 2017</td>
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<td>3</td>
<td>Tender Processes and Contract Extensions</td>
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<td>2</td>
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