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# A Cost Assessment of the NSW Involuntary Drug and Alcohol Treatment (IDAT) Program

Drug Policy Modelling Program  
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# Executive summary

## Context

The Drug Policy Modelling Program at the National Drug and Alcohol Research Centre, UNSW Sydney was commissioned by the NSW Ministry of Health to conduct this cost assessment of the New South Wales Involuntary Drug and Alcohol Treatment (IDAT) Program, reflecting the first four years of the program. A process evaluation was completed in April 2017 and a separate outcome evaluation is currently underway (September 2016 – December 2019). This summary reflects the findings of the cost assessment of the IDAT Program.

## Aim of the cost assessment

The overall objective of the cost assessment was to report on the estimates of the costs of delivering the IDAT program across four years - from the commencement of the program (July 2012) to June 2016. This timeframe includes the periods of start-up and stabilisation. This was also the period for the process evaluation which included quantitative analyses of program data (the IDAT database). The perspective of this study was the clinical costs associated with delivery of IDAT, excluding infrastructure costs. Wherever possible this study used cost estimates of actual program delivery rather than the funding allocated to the program. The focus on actual costs is important for understanding the real costs of service provision, planning for future budget allocations, and providing the basis for potential future comparative analyses.

Specifically, the cost assessment involved understanding and estimating the costs of the three program components of the IDAT program:

- 1) Referral and assessment: Cost items include: a) the cost of time devoted by the Involuntary Drug Treatment Liaison Officer (ITLOs); and b) the cost of transporting patients to the IDAT units for admission (Transport Fund). The ITLO has a key role in the process of ensuring that the four IDAT eligibility criteria are met;
- 2) Inpatient treatment: The costs of inpatient treatment includes all costs related to the inpatient stay (patient care, any medical, clinical and medication services);
- 3) Six-month community aftercare: the costs here include: a) the cost of time devoted by community case managers/care coordinators; and b) expenditure of the Brokerage Fund to support the patients' on-going aftercare.

## Methodology

The costing work was conducted using the perspective of the service provider. In each instance as much detailed data as was available was used. The original intent was to collect detailed data on time taken to undertake IDAT tasks from all ITLOs and community case managers to allow detailed costing. However, as this was not feasible, averages were generated from available data and applied to all cases. The inpatient costs reflect costs provided to the evaluation team by the hospital financial data managers of the two hospitals for the care of IDAT patients. These costs reflect the accounting systems in the hospitals, as well as the type and duration of stay. Where costs are summed across years they are converted into 2016 AUD using the Health Price Index.

## Results

### Cost of patient referral/assessment phase of IDAT

#### Cost of the ITLOs' time:

From a sample of ITLOs (n=11; 18% participation rate in the survey), the mean number of hours spent on a typical IDAT referral (regardless whether the referral was successful) was 14.2 hours (range from 4 to 40 hours). The average cost of one typical IDAT referral was estimated to be \$929 (median=\$559) with a standard deviation of \$746 and the range of \$2,174 (min: \$201; max: \$2,375). Given the total number of 640 referrals (July 2012 to June 2016), the estimated cost of referrals to the IDAT program over the four years of the program was \$594,560 (\$929 x 640).

#### Cost of transporting patients to the treatment units:

The evaluation team was not able to obtain individual patient data on transportation as it was not included in any of the data files available to us, nor was it recorded by the hospitals as part of IDAT costs. Therefore, the budget allocation amount (\$19,000 per LHD per year) was used, with the concomitant assumptions that these expenditures have occurred and were directed to the IDAT program.

### Cost of inpatient treatment phase of IDAT

Reflecting the fact that the IDAT patients, by design, have longer than normal length of stay for hospital inpatient treatment, two methods of costing hospital stays were examined: the patient-specific cost estimated by the hospitals (actual costs incurred to the hospitals) and the National Weighted Activity Unit (NWAU), which is the activity-based funding hospitals receive.

#### Patient-specific cost (actual costs):

For the patient-specific cost estimated by the hospital, the total cost of the IDAT program, for both treatment units, for the four financial years for 329 treatment episodes (112 treatment episodes in Herbert St Clinic - HSC, and 217 episodes in Bloomfield - BF) was \$27,530,370 (CPI adjusted using 2015-16 AUD), which equates to \$83,679 per treatment episode. The average cost per day was \$2,129 and the average LOS was 41.55 days. The per annum range of total inpatient treatment costs ranged from \$5.2 million to \$7.6 million per year for 57 to 93 treatment episodes.

#### Actual costs versus NWAU costs:

The differences between the patient-specific costs and the price based on the NWAU weights indicate that if the IDAT program were funded under the current activity-based funding model, the price paid to the hospitals based on NWAU would be much lower than the actual patient-specific costs of providing treatment to IDAT patients at both treatment units (about half). One of the reasons for this is because the actual average LOS was about 10 times that of the DRG average LOS. If the total cost was estimated using the NWAU, the total was \$12,231,383 compared to \$27,530,370.

#### Patient characteristics that are potential cost drivers:

Multiple linear regression analyses identified two patient characteristics that were potential cost drivers: length of stay (LOS) and age (after controlling for the statistically significant effect of treatment unit). A one day increase in LOS appears to increase total costs by 2.2% (0.022\*100%), after controlling for the effect of age and treatment unit. Being one year older in age would increase

costs by 0.8%, after controlling for LOS and treatment unit. Because it is evident that BF had higher costs compared to HSC, the 'treatment unit' variable was used in the model as a confounder rather than an explanatory variable. This means that the effects of 'LOS' and 'age' can be reported with more confidence.

### Cost of aftercare coordination and services

Within the limitations of the data, the mean number of hours per week an aftercare coordinator/case manager spent on coordination of aftercare services for a typical IDAT patient was estimated at 1.33 (SD=0.52). If one assumes a 6-month aftercare period, the average number of hours spent for one IDAT patient was estimated to be 34.58 hours (1.33 hours x 26 weeks). The average time cost for providing 6-month aftercare services for one typical IDAT patient was therefore estimated to be \$2,196 (SD=\$1,267). However, only a small proportion of IDAT patients receive the aftercare component. With 329 treatment episodes (July 2012 to June 2016, as reported in the Process Evaluation report), the assumed estimated costs of aftercare coordination to the IDAT program over the four years of the program were reported in two scenarios as follow:

- Scenario 1: Assuming that only 26% of IDAT patients receive aftercare coordination services for 6 months, this would yield a total cost of \$187,846 ( $\$2,196 \times 329 \times 0.26$ ).
- Scenario 2: Assuming 'best case scenario' that all IDAT patients receive aftercare coordination services for 6 months as per the Model of Care. This would yield a total cost of \$722,484 ( $\$2,196 \times 329$ ).

### Conclusions

Over the first four years, the cost of the IDAT program was estimated to be \$32,474,955 (assuming only 26% of IDAT patients receiving aftercare) or \$33,009,593 (if it is assumed that 100% of IDAT patients receive aftercare). On average, each IDAT referral cost \$929, each inpatient treatment episode cost \$83,678 and the unit cost of 6-month aftercare coordination was \$2,196. While the expenditure data on the Transport Fund and the Brokerage Fund were not available, it was estimated using the proxy data (allocated funding). The four-year total costs for transporting patients to the IDAT treatment units was \$1,337,529 and the four-year total costs for the Brokerage Fund was \$2,824,650. All components combined (assessment and referral cost, cost of transportation, inpatient treatment cost, cost of aftercare coordination, and expenditure of the Brokerage Fund), the estimated average cost for one IDAT treatment episode was \$99,454.

IDAT is an expensive program, especially when compared to voluntary residential rehabilitation (average inpatient treatment cost per day is 10 times higher). But it is a unique program targeting a group with severe alcohol and drug dependence, providing treatment within an acute hospital setting, and in an involuntary context. By definition, the patients entering IDAT have complex mental and physical health diagnoses and are identified as having potential to harm themselves or others (as defined in the eligibility criteria for IDAT treatment). That this is occurring, is evidenced by data which demonstrates that in addition to drug and alcohol dependence, a substantial proportion of IDAT patients suffer from complex physical illnesses and or mental health disorders, as well as social and economic dislocations (for example, homelessness). The extent of their concurrent and comorbid conditions would have made many IDAT participants unsuitable for treatment within residential rehabilitation centres as it is unlikely that the necessary medical treatments would be available. As such, it is not surprising that the hospital costs of the IDAT program are higher than residential rehabilitation. The extent to which this difference is "reasonable" is a judgement not able

to be made from this cost assessment alone. A cost-effectiveness study, taking into account patient characteristics and underlying health status, would be required to answer this question. However, the magnitude of the costs of providing the IDAT program in its first four years suggest it is important to monitor costs into the future, both for budget planning and for potential expansion.

If the IDAT program were to be expanded in NSW, the relevant findings herein that could inform such an expansion include: the choice of program location (metro versus rural) and associated cost implications for the inpatient care component; the requirement for additional resources over and above that allocated through activity-based funding; the cost savings associated with the existing network of ITLOs (which would not require expansion); the potential cost advantages of co-location with an existing detoxification program; and the under-utilisation of the six month aftercare services. These considerations would also apply to other Australian jurisdictions considering the establishment of an IDAT-type program.

As hopefully has been made clear, undertaking cost assessments is not for the faint-hearted. There are many complexities associated with obtaining and analysing the data in a rigorous fashion. For example, the hospital product costing method is constantly changing. Specifically, in Australia, from 2012, the activity-based funding model is driven by the National Efficient Price and the associated NWAU (having replaced activity-based funding driven by the AR-DRG). It is important for researchers seeking to cost AOD inpatient/hospital treatment to understand the current model and its associated implications to facilitate accurate data cleaning and proper interrogation of the data provided by the hospitals. Another example is duplication of patient records across financial years. As noted elsewhere, some data could not be obtained (transport funds and brokerage funds). The compromise was to use the budget allocations, but this conflates actual costs with funding amounts. Future costs assessments would preferably rely only on actual costs data, but this would require substantial research time and resources (for example patient interviews regarding transportation), which for us was beyond the scope of this study. Respondent sample sizes for surveys is a perennial problem for researchers – many clinicians are simply too busy to complete research surveys. This reduces the reliability and validity of the data. Significant effort to increase response rates is worthwhile where the data are to be generalised.

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## List of acronyms

<b>AOD</b>	Alcohol and other drugs
<b>AR-DRG</b>	Australian Refined Diagnosis Related Groups
<b>AMP</b>	Accredited Medical Practitioner
<b>BF</b>	Bloomfield Hospital
<b>CPI</b>	Consumer price index
<b>DPMP</b>	The Drug Policy Modelling Program
<b>HSC</b>	Herbert Street Clinic
<b>ICD-10-AM</b>	International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification.
<b>IDAT</b>	Involuntary Drug and Alcohol Treatment Program
<b>ITLO</b>	Involuntary Treatment Liaison Officer
<b>LHD</b>	Local Health District
<b>LOS</b>	Length of stay
<b>MoH</b>	Ministry of Health
<b>MRN</b>	Medical record number
<b>NDARC</b>	The National Drug and Alcohol Research Centre
<b>NEP</b>	National Efficient Price
<b>NGO</b>	Non-governmental organisation
<b>NWAU</b>	National Weighted Activity Unit
<b>SHN</b>	Special Health Network

# 1 Context and aims of the cost assessment

In February 2016, the NSW Ministry of Health engaged the Drug Policy Modelling Program (DPMP) at the National Drug and Alcohol Research Centre (NDARC) to conduct an evaluation of the NSW Involuntary Drug and Alcohol Treatment (IDAT) program. The evaluation comprises three components: *a process evaluation, an outcome evaluation and a cost assessment*. The process evaluation was completed with the final report submitted to the Ministry on 27 April 2017. The outcome evaluation began in September 2016 and will be completed in July 2019. This report provides estimates of the costs of the IDAT program.

The overall objective is to report on the estimates of the costs of delivering the IDAT program across four years - from the commencement of the program (July 2012) to June 2016. This timeframe includes the periods of start-up and stabilisation. This was also the period for quantitative data analyses of the process evaluation (the IDAT database). Wherever possible this study used actual cost estimates of program delivery rather than the funding allocated to the program. Using only the funding allocated may or may not be a reliable representation of actual costs as allocated funding may not cover full costs, or alternatively could be utilised on other services. Having said that, the assessment of actual costs of service delivery can be fraught: records may not necessarily be complete and accurate, and assumptions need to be made to move from the data available to a cost assessment. There are surprisingly few cost assessments of alcohol and other drug treatments in NSW (or Australia for that matter). Yet cost assessments are vitally important in understanding the real costs of service provision, planning for future budget allocations, and providing the basis for potential future comparative analyses. These comparative analyses may include assessing how costs within a program evolve and change over time or comparing the costs of program A with program B, or comparing the costs between different types of programs for the same target group. In addition, costs assessments can be used in future research to assess cost-effectiveness of programs.

A thorough cost assessment involves understanding the program to be examined and identifying the key costs components. The IDAT program involves three main treatment phases: 1) referral and assessment; 2) inpatient treatment; and 3) 6-month community aftercare. The categories of costs to be measured for each of the three phases are described below.

- 1) Referral and assessment: The referral and assessment phase of the IDAT program ensures that the four IDAT eligibility criteria<sup>1</sup> are met by individual patients. The Involuntary Drug Treatment Liaison Officer (ITLO)<sup>2</sup> has a critical role in this process. Cost items comprise:
  - a. The cost of time devoted to assessment and referral of patients to the IDAT program by the ITLOs;
  - b. The cost of transporting patients from the community to the IDAT treatment units for admission;

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<sup>1</sup> The four eligibility criteria for IDAT are: a) severe substance dependence; b) potential for harm to self or others; c) benefit from treatment; d) no other appropriate options.

<sup>2</sup> An ITLO is a qualified professional either doctors or nurses who are trained for IDAT assessment, has at least five years' experience of providing direct drug and alcohol patient care and the skills to screen persons who may be eligible for a Dependency Certificate under the Drug and Alcohol Treatment Act (2007). Across NSW, there are more than 100 ITLOs who have been appointed and trained by the Ministry of Health.

- 2) Inpatient treatment: The costs of inpatient treatment involves all costs related to the inpatient stay (patient care, any medical, clinical and medication services);
- 3) 6-month community aftercare involves:
  - a. The cost of time devoted by community case managers/care coordinators assigned to provide aftercare support for IDAT patients; and
  - b. Expenditure of the Brokerage Fund used to pay for services that aim to support the patients' on-going aftercare.

## 2 Outline of the report

The remainder of this report is presented in four sections as follows:

- The section on methodology describes how the costs were estimated, including the sources of data, the challenges and issues with the data collection and how the costs are reported in later sections;
- The results section presents findings for each of the three phases of the program;
- The discussion section brings together the key findings, including the extent to which findings are reliable and valid. In this section, issues such as budget allocations versus actual costs and reimbursement versus actual costs are discussed. An attempt was made to compare treatment unit costs of the IDAT program with inpatient residential rehabilitation treatment unit costs. Insights are provided on possible cost drivers to assist with planning if the characteristics of the patients change. Finally, the section offers suggestions on future research and implications for other researchers seeking to cost AOD inpatients/hospital treatment;
- Appendices and References.

## 3 Methodology

This costing work was conducted using the perspective of the service provider. The details of costing each of the identified activities are described below. In each instance as much detailed data as was available was used. The original intent was to collect detailed data on time taken to undertake IDAT tasks from all ITLOs and community case managers to allow detailed costing. However, as this was not feasible, averages were generated from available data and applied to all cases. The inpatient costs reflect costs provided to the evaluation team by the respective hospital financial data managers for the care of IDAT patients. As described below these costs reflect the accounting systems in the facilities, as well as the type and duration of stay.

Where costs are summed across years they are converted into 2016 AUD using the Health Price Index<sup>3</sup>.

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<sup>3</sup> Consumer Price Index for Medical and Hospital Services, Australian Bureau of Statistics, Table 7, row 96. <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6401.0Jun%202017?OpenDocument>

### 3.1 Methodology for estimating patient referral/assessment cost

To estimate the costs of referrals and assessment, a survey was designed to collect data on the time spent by the ITLOs on coordination of referrals and assessment of identified patients for the IDAT program<sup>4</sup>. The survey is provided in Appendix 1. Questions in the survey focussed on: 1) job title and position classification; 2) the number of years' experience as an ITLO; 3) the total number of IDAT referrals to date; 4) the average number of IDAT referrals a year; 5) the average time to complete a typical IDAT referral; 6) a break-down of time spent on a range of required tasks for referral; and 7) the average rate of successful referrals.

An invitation was sent via email to all the 65 ITLOs who work in five LHDs: Northern Sydney, Western NSW, South Eastern Sydney, Illawarra Shoalhaven and Hunter New England (these are the same LHDs included in the process evaluation). This represented 43% of the total of 151 ITLOs in NSW. The first two LHDs were selected because each has one of the two IDAT treatment units in its LHD. The remaining three LHDs were selected because they represent both high-referring (South Eastern Sydney and Illawarra Shoalhaven) and low-referring LHD (Hunter New England) to attempt to capture the diversity of referral patterns. The proportion of IDAT patients referred by these five LHD was 57.51% (see the Process Evaluation report, page 47).

An invitation letter signed by the NSW Ministry of Health, the consent form and the survey were sent by Northern Sydney LHD IDAT Treatment Unit on 4 September 2017<sup>5</sup>. Two reminder emails were sent. Two of the 65 ITLOs responded via email stating that they are not ITLOs; three others were no longer working for the services as notified by other ITLOs working in the same services. This reduced the sample to 60 ITLOs. As of 22 September 2017, 11 ITLOs had returned completed surveys, representing 18% participation rate (of the total of 60<sup>6</sup>).

More than half of the responding ITLOs (n=6) reported their position classification to be Clinical Nurse Consultant/Specialist, with a further 3 as Health Education Officer, 1 Staff Specialist and 1 Registered Nurse. Detailed position classifications of the surveyed ITLOs in the context of all the ITLOs in five LHDs are presented in Table 1. Given the small sample size, it would not be expected that we could match the actual distribution of position classifications in the 5 LHDs. However, while the sample under-represented Clinical Psychologists and Registered Nurses, there was a strong response from Clinical Nurse Consultants and Counsellors/Health Educators (See Table 1).

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<sup>4</sup> Full NEAF application approved by the Northern Sydney LHD HREC on 14 July 2016, approval number HREC/16/HAWKE/159. UNSW HREC for non-LHD data collection: approved on 7 September 2016, approval number HC16633.

<sup>5</sup> The invitation emails were sent to the ITLOs by the Northern Sydney LHD IDAT Treatment Unit (rather than by the evaluation team) to ensure an arms-length approach to study participants such that they can truly choose to participate voluntarily without feeling coerced.

<sup>6</sup> Two ITLOs responded via email stating that they are willing and interested to participate in the survey. Follow-ups via email and phone calls were attempted by the evaluation team. However, due to time constraints the two ITLOs did not manage to complete the survey.

*Table 1: Job classifications of the surveyed ITLOs compared to the ITLOs of 5 LHDs*

List of classifications	ITLOs of 5 LHDs	%	Surveyed ITLOs	%
Nursing Unit Manager (NUM)	1	1.5%	-	0.0%
Manager Nursing Services	1	1.5%	-	0.0%
Clinical Nurse Consultant	17	26.2%	4	36.4%
Clinical Nurse Specialist	3	4.6%	1	9.1%
Clinical Psychologist	12	18.5%	-	0.0%
Psychologist	5	7.7%	-	0.0%
IDAS Manager	1	1.5%	-	0.0%
Registered Nurse	17	26.2%	1	9.1%
Counsellor/Health Educators	3	4.6%	3	27.3%
Nurse Practitioner,	4	6.2%	-	0.0%
Social Worker	3	4.6%	-	0.0%
Staff Specialist	3	4.6%	1	9.1%
D&A Specialist	12	18.5%	1	9.1%
<b>TOTAL</b>	<b>65</b>	<b>100.0%</b>	<b>11</b>	<b>100.0%</b>

The cost of one IDAT referral was estimated using the following steps:

1. Multiplying the ITLO-specific “average number of hours spent on one referral” by their hourly wage corresponding to their job classification. The time costs included wage costs and on-costs<sup>7</sup>. The wage costs and on-costs were sourced from NSW award wages for nurses and medical specialists (see Table 2 and sources below the table). These are the classifications provided by the 11 ITLOs who responded to the survey (see results section). This yielded the costs of one IDAT referral for job classification of ITLO;
2. Calculating the average cost of one IDAT referral across all 11 responding ITLOs by summing up the costs of one referral and dividing by 11. This method did not consider the fact that the 11 ITLOs have a large variation in the number of referrals they make a year. If this factor was taken into account by weighting the annual number of referrals, it was likely that the costs would be over-estimated because the ITLO who had the highest number of annual referrals had the second highest level of wages (a Clinical Nurse Consultant). Therefore, the former method was used (summing up the costs of one referral and dividing by 11).

<sup>7</sup> On-costs include annual leave, leave relief, superannuation, workers’ compensation, leave loading, long service leave, allowances and penalties.

Table 2: Job classification and hourly rate (2016)

Job classification	Salary		Salary and on-costs	
	Weekly rate	Hourly rate	Weekly rate	Hourly rate
Clinical Nurse Consultant (CNC)	\$1,871	\$49.24	\$2,656	\$69.89
Clinical Nurse Specialist	\$1,592	\$41.89	\$2,523	\$66.39
Health Education Officer	\$1,292	\$34.00	\$1,534	\$40.39
Registered Nurse	\$1,424	\$37.47	\$2,256	\$59.39
Staff Specialist	\$3,047	\$80.20	\$4,829	\$127.08

**Sources:**

1. Staff Specialists (State) Award - Industrial Relations Commission of NSW  
[http://www1.health.nsw.gov.au/pds/ArchivePDSDocuments/IB2016\\_033.pdf](http://www1.health.nsw.gov.au/pds/ArchivePDSDocuments/IB2016_033.pdf);
2. Public Health System Nurses & Midwives (State) Award - NSW Nurses and Midwives Association  
<http://www.nswnma.asn.au/wp-content/uploads/2013/07/Public-Health-System-Nurses-and-Midwives-State-Award-2015-Wage-Calculator-20160701-1-July-2016.pdf>.

Once the cost per average referral was estimated, it was applied to the total number of referrals across all LHDs for IDAT (including both those accepted into the program and those who were not). The total number of referrals made during the period of July 2012 - June 2016 was 640 (see the Process Evaluation report, Figure 1, page 43).

It is important to note that once the ITLOs have completed their assessment and referral, a final decision on whether the referred patient meets the eligibility criteria for IDAT is conducted by an Accredited Medical Practitioner (usually the AMPs are the Clinical Directors of IDAT at the Herbert St Clinic and Bloomfield Hospital). As such, these costs were captured in the hospital costs below.

***Important considerations and assumptions underpinning the all analyses of the cost data and methods in Section 2.1:***

For the data analysis pertaining to cost of referral, the underpinning assumptions are:

- ITLOs surveyed were representative of all ITLOs in the 5 LHDs and of all LHDs across NSW. As such, the average time costs for one referral from the surveyed ITLOs generalise to all ITLOs;
- The ITLOs accurately recall the information and data for the survey

### **Costs of transporting patients to the IDAT treatment units**

One important aspect of costs pertaining to referral is the cost of transporting patients from the local communities to the IDAT treatment units. As documented in the Process Evaluation report (page 10 and 91), \$19,000<sup>8</sup> was allocated to each of the 16 LHD/SHN across NSW as a specific IDAT transportation fund<sup>9</sup>. This is a fixed amount irrespective of distance from the IDAT units or patient referral numbers. This fund is only meant to be used to transport patients from the LHDs to the IDAT Treatment Units for admission. However, as reported in the Process Evaluation report, many ITLOs

<sup>8</sup> This \$19,000 was allocated to each LHD/SHN at the start of the IDAT program. The allocated funding for this item may have been changed over the years.

<sup>9</sup> This is different from the Brokerage Fund which is provided to the two IDAT Treatment Units, for supporting aftercare services.

interviewed were either not aware of the transportation fund or reported that the fund was not accessible. Nevertheless, in the Process Evaluation report, a small proportion of ITLOs reported that they did use the transportation fund to transport IDAT patients.

In order to document the actual costs of transporting patients to the IDAT program, the most accurate method would be to conduct a survey of all admitted patients noting how, from where they arrived, and who paid the transport costs. This information could then be used to estimate the transportation costs. However, the evaluation team did not survey the patients for this cost assessment, nor was this information in any of the data files available to us. Therefore, we were unable to obtain real transportation costs. In lieu of this, we have used the budget allocation amount (\$19,000 per LHD per year) and assumed that these expenditures have occurred and were directed to the IDAT program.

## 3.2 Methodology for estimating inpatient treatment costs

There were a number of steps to assessing the inpatient treatment costs for IDAT.

Patient level cost information was obtained from the Management Accountant of Northern Sydney Mental Health Drug and Alcohol (for HSC) and the Manager for Activity-Based Funding of Western NSW LHD (for BF). The request for these data occurred after discussions with the individual personnel from each LHD. To facilitate the request, the research team provided each facility with a list of MRNs for their respective IDAT treatment unit (obtained from the IDAT database, as part of the process evaluation). There were 95 unique IDAT patients for HSC and 159 unique IDAT patients for BF.

Reflecting the fact that the IDAT patients, by design, have longer than normal length of stay for hospital inpatient treatment, two methods of costing hospital stays were examined: the patient-specific cost estimated by the hospitals (actual costs incurred to the hospitals) and the National Weighted Activity Unit (NWAU), which is the price based on which the hospitals get funded in the current framework of activity-based funding.

This decision led to the following variables being requested:

1. The patient-specific cost per treatment episode. This is the estimate of the activity and spending by the hospitals, and is referred to as the actual costs of hospital outputs in the remainder of the report. These data are used for the main data analysis as they more likely reflect the true costs to the hospitals;
2. Patient-specific National Weighted Activity Unit (NWAU) for each treatment episode. The NWAU is the 'currency' that is used to express the price weights for all services that are funded to public hospitals on an activity basis. The NWAU was introduced in July 2012 as part of the Commonwealth Government's introduction of the activity-based funding framework. These data are used for secondary data analysis. They reflect how much each hospital can get funded for each treatment episode<sup>10</sup>. Comparing the results of item 1 with the results of item 2 provides an assessment of whether the current activity-based funding model would sufficiently cover the actual costs to the hospitals; For the NWAU, the evaluation team requested the following:
  - The patient-specific NWAU (if it is available)
  - If the NWAU was not provided, the 20 variables required to calculate the NWAU were also requested. This includes the AR-DRG (the Australian Refined Diagnosis Related Groups), an Australian admitted patient classification system which provides a clinically meaningful way of classifying patients and other factors recognised to impact the cost of the treatment episode. See Appendix 1 for the list of all 20 variables.
3. Diagnoses (principle diagnosis, ICD-10-AM) and procedures (principle procedure) related to each treatment episode. These data facilitate an assessment of the most common types of diagnosis among IDAT patients in determining potential cost drivers.

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<sup>10</sup> Under the current activity-based funding scheme, the total amount that a hospital can get reimburse is calculated as follow: Total price = NWAU x NEP (National Efficient Price). For example, if the NWAU of a treatment episode is 8.5, the total amount the hospital will get paid for that episode will be: 8.5 x \$4,971 (the National Efficient Price for one NWAU 2015-2016) = \$42,253.



The requested data provided detailed costs for each patient episode and patient characteristics which facilitated identification of potential patient-related cost drivers.

The inpatient treatment costs include direct and indirect costs of providing patient care. Direct cost includes medical and clinical services provided to the patients directly (i.e. nursing care, medical services, allied health care, imaging, pathology, pharmacy, prostheses etc...). Indirect cost includes non-clinical services to the patients (i.e. beds and cleaning, security, food, and on-costs).

The data analysis for inpatient treatment cost data is conducted in three parts:

- Part 1: Estimating actual patient-specific costs;
- Part 2: Comparing actual costs with the price that the hospitals would be paid based on the NWAU; and
- Part 3: Identification of potential patient-related cost drivers.

### **Part 1: Estimating actual patient-specific costs**

Actual patient-specific costs are presented by year, and in total (for each treatment unit separately and combined). Where costs are summed across years they are converted into 2016 AUD using the Health Price Index<sup>11</sup>. Average cost per of treatment episode, the average length of stay, and the average cost per day of treatment were estimated. From these estimates trends over four years and differences between two treatment units, and factors that may have contributed to these trends were assessed.

#### ***Imputation of missing data***

Inspection of the data identified that there were no missing data on actual patient-specific total costs for BF. However, for HSC, there were 13 records with missing values for 'total costs' variable. In order to ensure complete cost information, the following steps were undertaken for imputation:

1. Identify the DRG and the length of stay (LOS) for those patients whose records had a missing value for 'total costs';
2. Calculate the average cost per day for those patients who had a similar DRG (by dividing their total costs by their LOS);
3. Calculate the total costs for the 13 missing records by multiplying the average cost per day (from step 2) with the LOS of the records with missing value for 'total costs'.

This method of imputing took both the casemix (DRG) and the LOS into account.

#### ***Handling of data uncertainty***

There is no uncertainty in the BF data as provided. However, for HSC, the inpatient data provided by the hospital financial data manager included a total of 1,716 records, of which 30 were duplications due to patient length of stay overlapping two financial years. The non-duplicated 1,686 records included patient episodes for both the IDAT unit and the voluntary detoxification unit at HSC (because they are co-located in the same service). Following further discussions this issue was clarified. The evaluation team was then able to identify that:

- 1) 45 of the records completely matched across the two data sources (the IDAT database and the hospital records, based on MRN, date of admission and date of separation);

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<sup>11</sup> Consumer Price Index for Medical and Hospital Services, Australian Bureau of Statistics, Table 7, row 96. <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6401.0Jun%202017?OpenDocument>

- 2) 67 of the records were listed in the IDAT database but coded as "61 Detoxification" in the hospital records;
- 3) 31 of the records were NOT listed in the IDAT database but coded as "89 Drug and Alcohol Involuntary Treatment Bed" in the hospital records;
- 4) The remaining 1,543 records were NOT listed in the IDAT database and coded as "61 Detoxification" in the hospital records. As such, these data are not relevant to this study.

The evaluation team is very confident that the MRNs and the data recorded in the IDAT database truly reflect the data for the IDAT admissions. This is because the evaluation team had been working closely with the IDAT Program Data Manager throughout the process of data analyses for the Process Evaluation report. Therefore, a decision was made to select the records listed in item 1 and 2 for data analysis of this report (45 + 67=112 records). To confirm our confidence, the data of the 31 records (item 3) were also checked and it is clear the average LOS (14 days) and average cost per episode (\$15,784, in 2015-16 AUD) are much lower than those of the data from the 112 records (see results in Table 3)<sup>12</sup>.

## **Part 2: Comparing actual costs with the price that would be paid based on the NWAU**

The purpose of Part 2 is to identify if the actual cost of providing treatment for IDAT patients is different from the NWAU-based price which determines funding to the hospital if the IDAT program were funded under the current activity-based funding framework. This was done in the following three steps:

1. Determine the most common DRGs (defined as those with no fewer than 10 episodes) separately for each treatment unit;
2. Calculate the total price for each episode by multiplying the patient-specific NWAU by the \$4,971 (the National Efficient Price for one NWAU 2015-2016).
3. Calculating the average NWAU-based price by DRGs identified in Step 1.
4. Compare the average NWAU-based price with the average actual hospital costs per DRG (CPI-adjusted).

## **Part 3: Identifying patient characteristics that are potential cost drivers**

The purpose of Part 3 is to explore patient characteristics that could be potential cost drivers (explanatory factors of cost differences) with 'total cost' being the outcome variable (i.e. dependent variable). Five potential patient characteristic variables were sourced from the hospital data (age, ethnic origin - Aboriginal or Torres Strait Islander people, postcode - to identify if a patient is living in rural area, length of stay, and principle diagnosis), and seven other patient characteristics were obtained from the IDAT database and were merged with the hospital data. These seven variables were used for the process evaluation and included: gender, education, marital status, living arrangement (living alone: yes or no), type of accommodation (homelessness: yes or no), principle source of income, and poly substance use. This resulted in 12 potential explanatory variables for the analysis of potential cost drivers. This analysis was conducted in three steps:

1. Descriptive statistics were examined (mean and standard deviation for continuous variables, and proportion for categorical variables) for each treatment unit and for both treatment

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<sup>12</sup> The total costs of treatment for these 31 patient episodes were \$489,297.

units combined. These descriptive statistics then informed the selection of appropriate explanatory variables for the next step of the data analysis;

2. Univariate linear regression tests were conducted to identify potential cost drivers. Simple linear regression tests were conducted for each continuous variable (i.e. 'age' and 'LOS'). The outcome variable 'total cost', was log transformed as is often done with skewed data. For categorical variables, Mann-Whitney U test was used as the outcome variable 'total cost' was not normally distributed (highly skewed);
3. Multiple linear regression test was conducted with all potential explanatory variables with the p-value <0.20 in the univariate tests at item 2.

To meet the assumption that all observations for the data analysis of this section (identifying cost drivers) were independent, only unique patient data were used.

***Important considerations and assumptions underpinning the analyses of the cost data and methods in Section 2.2:***

- That the NWAU used was in AUD 2016 dollars (not the actual NWAU applied for that year of data);
- That the hospital costing data are accurate, and cover all direct and indirect costs for each patient (as described in Section 2.2);
- That the 'actual' patient-specific cost data obtained from each hospital product costing department reflects their internal accounting methods as the research team did not have access to all detailed calculations.

### 3.3 Methodology for estimating aftercare cost

The Model of Care of the IDAT Program specifies the importance of the community aftercare for IDAT patients that is provided by community care coordinators/case managers. This phase of the program is meant to provide support and interventions for up to six months. The NSW Model of Care suggests that the first few weeks post discharge from inpatient treatment should involve intensive case management and support. During the remainder of the period, a stepped down approach should be introduced. The community care coordinators/case managers can be employees of LHDs or NGOs.

Similar to the methods for estimating the costs of referrals/assessments, a mail-out survey was designed to collect data on the time spent by the community care coordinators/case managers on coordination of aftercare services for IDAT patients. The goal was to estimate the actual cost of providing 6-month aftercare services to IDAT patients. To initiate this the evaluation team requested a list of community care coordinators/case managers from the two IDAT treatment units. We were informed however, that a systematic list of community care coordinators/case managers was not available and creating this list would require one IDAT staff member from each treatment unit to review *all* patient records. Additionally, it became apparent from the analysis of the IDAT database and from the interviews with stakeholders for the process evaluation that only a small proportion of IDAT patients have an aftercare case manager/care coordinator. As of 14 December 2017, of the 38 IDAT patients interviewed at 6-month follow-up for the outcome evaluation (which is on-going), only 14 patients reported having a case manager. Of these patients, four reported having an IDAT-based case manager and 10 (26%) reported having a community-based case manager.

In light of these two issues and as the data from the IDAT database suggest that substantial proportion of ITLOs (approximately 55%) also function as aftercare case managers/care coordinators for IDAT patients, a decision was made by the evaluation team to combine the ITLO survey with the community care coordinator survey. As such, the survey had two sections: Section 1 for ITLOs and Section 2 only for those ITLOs who also function as community care coordinators for IDAT patients (see the survey in Appendix 2).

The key questions in Section 2 of the survey addressed: 1) the number of IDAT patients that the aftercare coordinator has provided aftercare services for since the beginning of the IDAT program; 2) the current number of IDAT patients they are providing aftercare for; 3) the average amount of time (hours) spent on coordination of aftercare services for one typical IDAT patient in a week (during the 1<sup>st</sup> month, 2<sup>nd</sup> month and 4<sup>th</sup>-6<sup>th</sup> of aftercare); 4) the proportion of IDAT patients who stay in aftercare for 4-6 months, for 2-3 months or 1 month; 5) the list of types of aftercare services that were in most demand by IDAT patients; 6) the estimated proportion of IDAT patient choosing the voluntary aftercare option; and 7) for IDAT patients who do not choose aftercare services, what they (the aftercare coordinator) think the reasons might be.

Of the 11 ITLOs returning the survey, seven reported they function both as an ITLO and aftercare case managers/coordinators for IDAT patients. Of these, two reported their position classification to be Clinical Nurse Consultant/Specialist, three as Health Education Officer, one Staff Specialist and one Registered Nurse.

Of the ITLO respondents, six reported ever actually providing aftercare services for IDAT patients since 2012. One reported that their 'first IDAT patient is waiting for an IDAT bed' therefore not able to answer any further questions in this section. At the time of the survey, only two were providing aftercare services for IDAT patients (one working with one patient and the other working with three patients). This suggests that the data in this section may be unreliable, and non-representative as it pertains to a very small proportion of the IDAT program patients.

Because of the small number of people identified as ITLOs/care coordinators and not all questions being answered fully (missing values), other matters that were planned to be explored during the design phase of the survey (as listed in the method section) could not proceed. These were:

- The average amount of time (hours) spent on coordination of aftercare services for one typical IDAT patient in a week (during the 1<sup>st</sup> month, 2<sup>nd</sup> month and 4<sup>th</sup>-6<sup>th</sup> of aftercare);
- The proportion of IDAT patients who stay in aftercare for 4-6 months, for 2-3 months or 1 month;
- The list of types of aftercare services that were in most demand by IDAT patients; and
- The estimated proportion of IDAT patient choosing the voluntary aftercare option.

Due to the above limitations of the data and only 26% of the IDAT patients reported having a community-based case manager (as explained above), two scenarios were explored:

- Scenario 1: Assume that only 26% of IDAT patients receive aftercare coordination services for six months as per the Model of Care. This scenario is used for the main analysis because it reflects the current standing of the program.
- Scenario 2: Assume 'best case scenario' that all IDAT patients receive aftercare coordination services for six months as per the Model of Care. While this is the 'best case scenario' at the time of the writing of this report, in the future this would represent the costs should all patients receive care as specified in the model of care (assuming that patients want the services).

Methods similar to the calculation of an IDAT referral were applied for calculating the cost of providing 6-month aftercare services for one IDAT patient. The average number of hours per patient per week was multiplied by 26 weeks (with the assumption that aftercare services are provided and maintained for the full 6 months) and then multiplied by the hourly cost of each aftercare coordinator. The costs included wage costs and on-costs. Again, the wage costs and on-costs were sourced from NSW wage for nurses and medical specialists (Table 1).

### **Brokerage fund**

The Brokerage Fund is a fund specific to the IDAT program. The fund can be used for a range of services to support and/or facilitate a patient's treatment, psychosocial welfare and recovery in the community. The funds are to be mainly used as part of the 'community based' aftercare component of the IDAT program. Examples of expenditures include: furniture storage fees (while the patients are in inpatient treatment), travel costs to return home (after completion of inpatient treatment), client fees for residential rehabilitation, fee gaps for private specialists, pharmaceuticals that are not

subsidised under the Pharmaceutical Benefits Scheme, food, travel costs associated with attending aftercare and follow-up appointments with health care providers, purchasing furniture to set up a new house, dental care, and accommodation (e.g. a hotel room) while waiting for long-term supported housing. On average each IDAT patient can receive funding of approximately \$6,000 per episode (it can be higher or less than \$6,000 depending on needs). At the start of the IDAT program, the Brokerage Fund allocated by the NSW Ministry Health for the IDAT program was \$642,000 a year (\$422,000 for BF and \$220,000 for HSC).

The evaluation team requested data on the expenditure of the Brokerage Fund from the financial management of Western NSW LHD and Northern Sydney LHD. After much effort and communication going into the identification of the correct entity reference, neither LHD could trace and identify expenditure of this fund. Therefore, we were unable to obtain real expenditure of the Brokerage Fund. In lieu of this, we have used the budget allocation amount (\$422,000 for BF and \$220,000 for HSC a year) and assumed that these expenditures have occurred and were directed to the IDAT program.

*Important considerations and assumptions underpinning the analyses of the cost data and methods in Section 2.3:*

- That the surveyed aftercare coordinators who also function as ITLOs are representative of all aftercare coordinators in the five LHDs;
- The surveyed aftercare coordinators who also function as ITLOs are representative all aftercare coordinators in the state;
- For those IDAT patients who receive aftercare services, they receive the services for the full 6 months, as specified in the Model of Care;

## 4 Results

### 4.1 Cost of patient referral/assessment phase of IDAT

Among the responding ITLOs, the median number of years in their current position was 9 years, with most (10) holding a full-time position, and having a median caseload of 30 drug and alcohol clients. The responding ITLOs reported a wide range of experience with the IDAT program with the total number of referrals ranging from 1 to 32 (mean=9.2; median=4) and the rate of successful referrals ranging from 50% to 80%. The mean number of IDAT referrals in a year was 5.36 (median=3) with a range from 1 to 25. The mean number of hours spent on a typical IDAT referral (regardless whether the referral was successful) was 14.2 hours (range from 4 to 40 hours).

Based on the responses from the 11 ITLOs, the tasks often required of an ITLO for an IDAT referral are listed below. The time to undertake these tasks varies across ITLOs.

1. Discuss with client and their family the eligibility criteria, the process and feasibility of admission to IDAT
2. Collect medical and clinical evidence to demonstrate eligibility for IDAT
3. Organise and conduct case conference, liaise with other teams involved with client care
4. Communicate with IDAT treatment unit on bed availability
5. Arrange and attend session for issuance of Dependency Certificate
6. Arrange and transport client to IDAT treatment unit (for admission)
7. Liaise with another agency to arrange a placement while waiting for IDAT bed

Using the calculation method described in Section 2.1, the average costs of one typical IDAT referral was estimated to be \$929 (median=\$559) with a standard deviation of \$746 and the range of \$2,174 (min: \$201; max: \$2,375). Given 640 referrals (July 2012 to June 2016), the estimated cost of referrals to the IDAT program over the four years of the program was \$594,560 (\$929 x 640).

### 4.2 Cost of inpatient treatment phase of IDAT

#### 4.2.1 Patient-specific costs

Table 3 presents results on the patient-specific costs in 2015/16 AUD over the four-year period (July 2012-June 2016) for each of the two treatment units separately, and then two treatment units combined. The total cost of this phase of the IDAT program, for both treatment units, for the four financial years for 329 treatment episodes (112 treatment episodes in HSC and 217 episodes in BF) was \$27,530,370, which equates to \$83,679 per treatment episode. The average cost per day was \$2,129 and the average LOS 41.55 days

BF provided 66% (217 out of 329) of the treatment episodes but incurred 73.8% (\$20,315,683 out of \$27,530,370) of the total costs. This higher proportion of cost incurred in BF compared to the proportion of treatment episodes does not appear to be explained by the difference in length of stay as the data indicate that both the mean and median LOS for BF were lower than those of HSC. A closer examination of the data revealed that the proportion of episodes that were cost outliers for

BF was much higher than for HSC. BF had 43 (19.8%) episodes with total costs greater than \$150,000 compared to 7 (6.3% of 112 episodes) at HSC (data not shown in table). Further, statistical analyses (see Section 3.2.3) were conducted to explore whether the impact of patient characteristics and LOS explain these remaining differences.

The data in Table 4 present the more detailed cost data by year to allow for examination of possible trends and/or possible explanation as to why the average treatment costs were different across two treatment units. These data are also in 2015-16 AUD.

The per annum range of total inpatient treatment costs was large: from \$5.2 million to \$7.6 million per year for 57 to 93 treatment episodes. For BF, the total cost for year 1 was \$4,395,883 while the number of treatment episodes was the lowest (n=26) compared to other years thus resulting higher average costs. Possible reasons for this could be high start-up costs and/ or low occupancy rate but higher staffing rates. Additionally, HSC had an existing voluntary drug and alcohol unit prior to IDAT and thus may not have incurred the same level of start-up costs. However, the data are not at the level of detail that allow for the examination of this possibility.

Figure 1 illustrates the average cost per episode and the average LOS for both units over time. The average cost per episode for HSC trended upwards while BF followed a trend downwards.



Table 3: Inpatient treatment cost over four years (July 2012 – June 2016), using actual length of stay and patient-specific costs provided by the hospitals (2015-16 AUD)

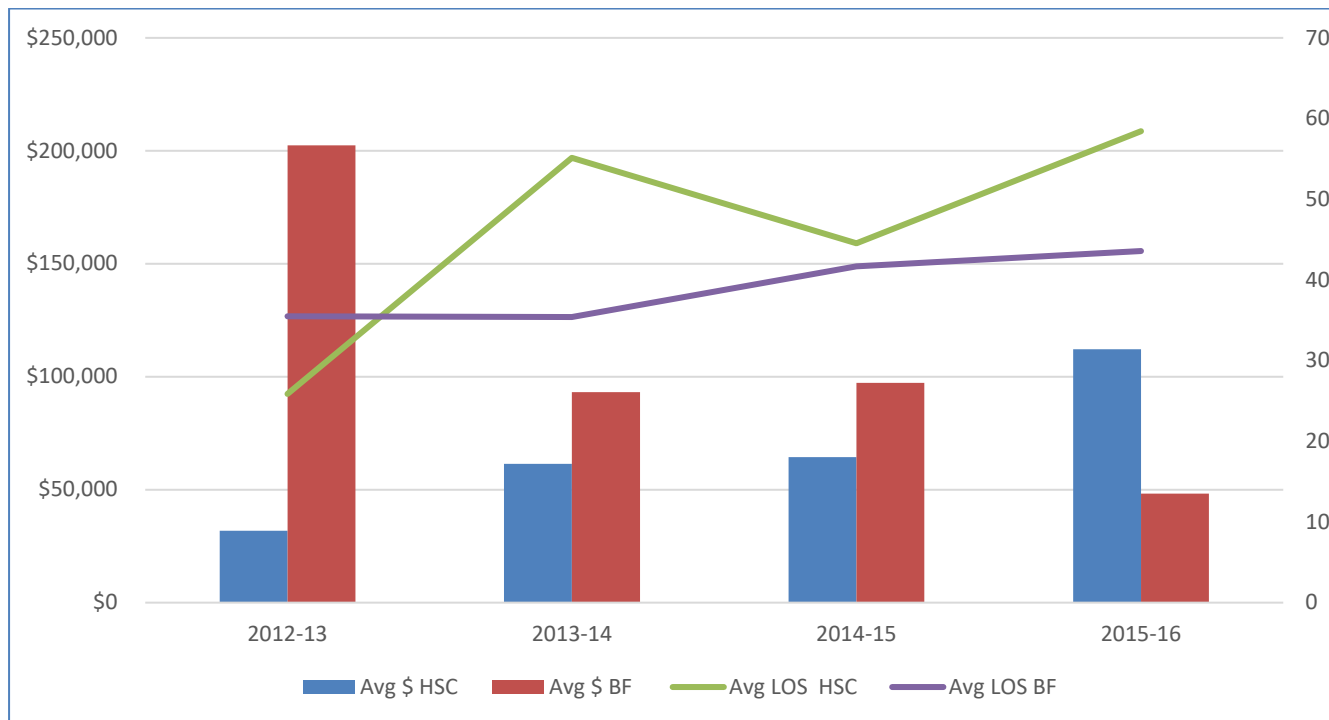
Treatment Unit	Total Costs	Number of Treatment Episodes	Average Cost per Episode	Average Length of Stay (LOS)	Average Cost per Day
HSC	\$7,214,687	112	Mean: \$64,417 Median: \$42,809 IQR: \$30,113 - \$89,902	Mean: 44.97 Median: 31.00 IQR: 25.00 - 61.75 Min-Max: 2.00 - 257.00	Mean: \$1,387 Median: \$1,351 IQR: \$1,122 - \$1,627
BF	\$20,315,684	217	Mean: \$93,621 Median: \$73,984 IQR: \$40,135 - \$135,623	Mean: 39.79 Median: 27.00 IQR: 25.00 - 54.50 Min-Max: 1.00 - 136.00	Mean: \$2,513 Median: \$2,331 IQR: \$1,530 - \$2,876
Both treatment units combined	\$27,530,370	329	Mean: \$83,679 Median: \$67,161 IQR: \$32,866 - \$115,155	Mean: 41.55 Median: 29.00 IQR: 25.00 - 56.00 Min-Max: 1.00 - 257.00	Mean: \$2,129 Median: \$1,165 IQR: \$1,255 - \$2,736

Table 4: Inpatient treatment cost by year for two treatment units (2015-16 AUD)

Treatment Unit	Total Costs	Number (%) of Treatment Episodes	Average Cost per Episode	Average Length of Stay (ALOS)	Average Cost per Day
<i>Year 1 (July 2012 – June 2013)</i>					
HSC	\$986,634	31 (54%)	Mean: \$31,827 Median: \$31,750 IQR: \$18,912 - \$41,944	Mean: 25.87 Median: 28.00 IQR: 14.00 - 33.00 (Min-Max: 4.00 - 58.00)	Mean: \$1,235 Median: \$1,323 IQR: \$1,107 - \$1,355
BF	\$5,264,531	26 (46%)	Mean: \$202,482 Median: \$188,747 IQR: \$166,016 - \$220,782	Mean: 35.50 Median: 29.00 IQR: 27.00 - 48.75 (Min-Max: 16.00 - 67.00)	Mean: \$5,895 Median: \$6,343 IQR: \$5,124 - \$6,634
<b>Total</b>	<b>\$6,251,165</b>	<b>57 (100%)</b>	--	--	--
<i>Year 2 (July 2013 – June 2014)</i>					
HSC	\$1,781,892	29 (32%)	Mean: \$61,445 Median: \$38,417 IQR: \$29,634 - \$80,179	Mean: 55.14 Median: 49.00 IQR: 26.00 - 69.50 (Min-Max: 2.00 - 257.00)	Mean: \$1,153 Median: \$1,121 IQR: \$1,051 - \$1,172
BF	\$5,591,047	60 (68 %)	Mean: \$93,184 Median: \$77,170 IQR: \$65,741 - \$96,310	Mean: 35.40 Median: 27.00 IQR: 25.00 - 45.00 (Min-Max: 2.00 - 90.00)	Mean: \$2,668 Median: \$2,825 IQR: \$2,211 - \$2,895
<b>Total</b>	<b>\$7,372,939</b>	<b>89 (100%)</b>	--	--	--
<i>Year 3 (July 2014 – June 2015)</i>					
HSC	\$1,866,432	29 (31%)	Mean: \$64,350 Median: \$57,360 IQR: \$35,322 - \$94,674	Mean: 44.55 Median: 32.00 IQR: 25.50 - 67.00 (Min-Max: 5.00 - 92.00)	Mean: \$1,459 Median: \$1,584 IQR: \$1,396 - \$1,636
BF	\$6,228,688	64 (69%)	Mean: \$97,323 Median: \$74,172 IQR: \$50,671 - \$144,532	Mean: 41.67 Median: 27.00 IQR: 25.00 - 61.75 (Min-Max: 1.00 - 121.00)	Mean: \$2,481 Median: \$2,630 IQR: \$2,109 - \$2,773
<b>Total</b>	<b>\$8,095,120</b>	<b>93 (100%)</b>	--	--	--
<i>Year 4 (July 2015 – June 2016)</i>					
HSC	\$2,579,729	23 (26%)	Mean: \$112,162 Median: \$103,123 IQR: \$38,660 - \$147,449	Mean: 58.43 Median: 49.00 IQR: 27.00 - 83.00 (Min-Max: 2.00 - 144.00)	Mean: \$1,796 Median: \$1,993 IQR: \$1,333 - \$2,040
BF	\$3,231,418	67 (74%)	Mean: \$48,230 Median: \$35,936	Mean: 43.58 Median: 28.00	Mean: \$1,090 Median: \$1,049

Treatment Unit	Total Costs	Number (%) of Treatment Episodes	Average Cost per Episode	Average Length of Stay (ALOS)	Average Cost per Day
			IQR: \$15,735 - \$69,168	IQR: 24.00 - 62.00 (Min-Max: 4.00 - 136.00)	IQR: \$624 - \$1,542
<b>Total</b>	<b>\$5,811,147</b>	<b>90 (100%)</b>	--	--	--

Figure 1: Average cost per episode versus average LOS over the four years by treatment unit (2015-16 AUD)



#### 4.2.2 Comparison of actual patient-specific costs with the National Efficient Price (NEP) that would be paid based on the NWAU

The differences between the patient-specific costs and the price based on the NWAU weights are presented in Table 5 for those DRGs with at least 10 cases. The data presented in Table 5 indicate that if the IDAT program were funded under the current activity-based funding model, the price paid to the hospitals based on NWAU would be much lower than the actual patient-specific costs of providing treatment to IDAT patients at both treatment units (about half). One of the reasons for this is because the actual average LOS was about 10 times that of the DRG average LOS (data not shown in Table 5). If we look at the total cost using the NEP/NWAU, the total was \$12,231,383 (not presented in table) compared to \$27,530,370 (the actual cost reported by the hospital reported in Table 3). In other words, if the two hospitals were funded based on the NWAU for treatment of IDAT patients the costs would not be fully covered.

Table 5: Actual patient-specific costs and price based on NWAU for common DRGs

DRG	DRG Name	Treatment episodes	Avg actual NWAU	Average price based on NWAU <sup>13</sup>	Avg Actual Costs - CPI adjusted
<b>HSC</b>					
V62Z	Alcohol Use and Dependence	71	7.04	\$31,268	\$56,798
V64Z	Other Drug Use and Dependence	10	8.07	\$18,442	\$36,607
<b>Total HSC</b>		<b>81</b>		-	-
<b>BF</b>					
V60A	Alcohol Intoxication and Withdrawal W CC	16	7.53	\$37,416	\$79,920
V60B	Alcohol Intoxication and Withdrawal W/O CC	25	8.12	\$40,364	\$78,742
V62A*	Alcohol Use and Dependence W Major Complexity	18	3.96	\$19,704	\$209,723
V62Z	Alcohol Use and Dependence	125	7.04	\$34,997	\$81,583
V64Z	Other Drug Use and Dependence	15	8.07	\$40,125	\$80,869
<b>Total BF</b>		<b>199</b>			

\* DRG version 6.0 as no longer exists in DGR version 7.0.

<sup>13</sup> As explained in the method section, this was calculated by multiplying the NWAU by the 2015-16 National Efficient Price of an NWAU of \$4,971.

### **4.2.3 Patient characteristics that are potential cost drivers**

Patient characteristics are presented in Table 6 below. As a reminder, this table serves three purposes: 1) to describe the patient profile for each hospital and for the two hospitals combined; 2) to facilitate selection of potential explanatory variables for the analyses to identify cost drivers; and 3) to assist with interpretation of the analyses of potential cost drivers (if any).

As discussed in the methods section, the results presented here are based on data for 253 unique patients (90 in HSC and 163 in BF). The mean age (44.3 years) of IDAT patients was similar in the two hospitals. Just over half (55.3%) of the IDAT sample were identified as being male. As only a small proportion of patients were identified as Aboriginal or Torres Strait Islander peoples (6.7%), this variable was not used for later analysis to identify cost drivers as the sub-sample would be too small to detect statistically significant results even if there were differences.

A high proportion (68.6%) of patients in BF was from rural areas compared to only 6.7% of patients at HSC. This is not unexpected because BF hospital is located in a rural regional centre while HSC is in Sydney. On educational attainment, a larger proportion of patients at HSC (72.7%) completed year 11 compared to 56.9% of patients in BF. In terms of accommodation, a larger proportion (39.9%) of patients at BF was experiencing homelessness, or no usual residence, or living in supported housing compared to 17.9% of patients at HSC. A small proportion of patients were full-time or part-time employed (5.1%) therefore data analysis to use 'principle income' as potential cost driver was not conducted. The mean length of stay for patients at HSC was slightly higher over the four years (49 vs 41 days). Two importance differences were: 1) a higher proportion of patients in BF being recorded as being poly substance users (93.5% vs 30.2%); and 2) a higher proportion having a principle diagnosis of ICD-10-AM clinical code F.10 (Mental and behavioural disorders due to alcohol dependence syndrome) (82.8% vs 65.6%).

Table 6: Characteristics at treatment entry as potential cost drivers

	HSC (n=90)	BF (n=163)	Both treatment units combined (n=253)
Age (years) (missing data = zero)	Mean (SD <sup>a</sup> ) = 42.6 (10.8) Median = 42	Mean (SD) = 45.3 (12.4) Median = 45	Mean (SD) = 44.3 (11.9) Median = 43
Gender = male (missing data = zero)	51.1%	57.7%	55.3%
Aboriginal and Torres Strait Islander (missing data = zero)	4.4%	8.0%	6.7%
Living in Rural Areas (based on postcodes) (missing data = 16, of which 7 are in BF patients)	6.7%	68.6%	44.7%
Education = completed year 11 or higher (including TAFE, trade and tertiary) (missing data =46, of which 27 are in BF patients; and inadequately described = 44, of which 6 are in BF patients)	72.7%	56.9%	60.1%
Marital status = never married (missing data = 26, of which 11 are in BF patients; and inadequately described = 4, of which 1 is in BF patients)	50.7%	50.0%	50.2%
Living arrangement = living alone (missing data = 14, of which 4 are in BF patients; and inadequately described = 15, of which 6 are in BF patients)	44.2%	50.3%	48.1%
Type of accommodation			
Homelessness, no usual residence or supported housing	17.9%	39.9%	32.1%
Privately owned or rented house or flat	82.1%	60.1%	67.9%
(missing data = 16, of which 10 are in BF patients)			
Principle income			
Pension (e.g. aged, disability)	64.0%	67.3%	66.1%
Temporary benefit (e.g. unemployment)	20.9%	20.3%	20.5%
Full-time or part-time employment	5.3%	4.7%	5.1%
(missing data = 16, of which 10 are in BF patients)			

<p>Poly substance use  <i>Using at least 2 types of substances (not including tobacco) at the time of admission to IDAT</i>  <i>(missing data = 14, of which 10 are in BF patients)</i></p>	<p>30.2%</p>	<p>93.5%</p>	<p>70.7%</p>
<p>Principle diagnosis  <i>ICD-10-CM = F.10 (Mental and behavioural disorders due to alcohol dependence syndrome)<sup>b</sup></i>  <i>(missing data = 6, of which 2 are in BF patients)</i></p>	<p>65.6%</p>	<p>82.8%</p>	<p>76.7%</p>
<p>Length of stay (LOS) (days) (missing data = zero)</p>	<p>Mean (SD) = 49.06 (38.79)                      Median = 34</p>	<p>Mean (SD) = 41.44 (25.40)                      Median = 28</p>	<p>Mean (SD) = 44.15 (30.98)                      Median = 31</p>

<sup>a</sup> SD = Standard deviation;

<sup>b</sup> Other ICD-10-AM clinical codes include F.11, F.12, F.13, F.14 and F.15 depending on the type of substance of dependence (i.e. opioid, cannabinoids, sedatives, cocaine or stimulants);

Table 7 presents the results from the univariate linear regression analysis testing the impact of the two continuous variables (age and LOS) as potential costs drivers (for both hospitals combined). Within the univariate linear regression analysis, 'length of stay' was a strong predictor of cost, as evidenced by a small p-value (<0.001). The Beta coefficient value of 0.018 means for each additional day of stay the total cost will be increased by 1.8% (0.018\*100%) for an average patient.

Table 8 presents the results from the Mann-Whitney U test to identify whether each of the potential explanatory variables (which are categorical variables) explain the differences in costs. The results show that individually, none of the categorical variables were explanatory variables of costs. 'Living in rural areas' appears to have statistically significant effect on cost when using data for patients from both hospitals. However, as indicated in Table 6, only 6.7% of HSC patients were from rural areas while this was 68.6% for BF. Therefore, the statistically significant effect of 'living in rural area' on total cost ( $p=0.001$ ) may be confounded by the effect of hospital. When a separate analysis was conducted for 'living in rural area' for BF patients only the results do not show an effect on 'living in rural area' on cost ( $p=0.23$ ).

*Table 7: Potential cost drivers (continuous variables)*

Potential cost predictors (or cost drivers?)	Coefficients (Beta, Standard Error and P-value)
Age (in years) (n=253)	$\beta = 0.010$ (SE=0.005); $P=0.059$
LOS (in days) (n=253)	$\beta = 0.018$ (SE=0.002); $P<0.001$

Note: Simple linear regression was conducted to test the linear relationship between each of the two potential explanatory factors (age and LOS) and the outcome (the natural log of total costs per episode).



Table 8: Potential cost drivers (categorical variables)

Potential cost predictors (or cost drivers?)	Mean and median of average cost per episode (CPI adjusted)	Mean difference and median difference between two groups	P-value
Gender (n=253) <i>Male (55.3%)</i> <i>Female</i>	Mean = \$88,625; median = \$68,588; Mean = \$90,842; median = \$73,644;	Mean diff. = \$2,217; Median diff. = \$5,056	p = 0.54
Living in rural areas (BF patients only) (n=156) <i>Rural (68.6%)</i> <i>Urban</i>	Mean = \$102,087; median = \$78,830; Mean = \$91,787; median = \$71,534;	Mean diff. = \$10,300; Median diff. = \$7,296	p = 0.23
Education (n=163) <i>Completed year 10 or less</i> <i>Completed year 11 or higher</i>	Mean = \$87,830; median = \$73,571; Mean = \$80,321; median = \$69,302;	Mean diff. = \$7,509; Median diff. = \$4,269	p = 0.35
Marital status (n=223) <i>Never married</i> <i>Ever married</i>	Mean = \$92,226; median = \$71,407; Mean = \$83,468; median = \$70,667;	Mean diff. = \$8,758; Median diff. = \$740	p = 0.81
Living arrangement (n=224) <i>Living alone</i> <i>Living with other people</i>	Mean = \$95,028; median = \$71,282; Mean = \$77,979; median = \$69,017;	Mean diff. = \$17,049; Median diff. = \$2,265	p = 0.52
Type of accommodation (n=237) <i>Homelessness, no usual residence or supported housing (32.1%)</i> <i>Privately owned or rented house or flat</i>	Mean = \$91,212; median = \$72,723; Mean = \$83,965; median = \$67,161;	Mean diff. = \$7,247; Median diff. = \$5,562	p = 0.29
Principle income	data analysis was not conducted because only 5.1% patients had full-time or part-time employment		
Poly substance use (n=239) <i>poly substance users</i> <i>Not poly substance users</i>	Mean = \$89,695; median = \$73,273; Mean = \$77,701; median = \$47,413;	Mean diff. = \$11,994; Median diff. = \$25,860	p = 0.08
Principle diagnosis = F.10 (related to alcohol dependence) (n=247) <i>F.10 (76.7%)</i> <i>Other than F.10 (other substances)</i>	Mean = \$95,433; median = \$73,548; Mean = \$76,641; median = \$62,667;	Mean diff. = \$18,792; Median diff. = \$10,881	p = 0.59

From Table 7 and Table 8, the univariate tests to identify the relationship between cost and three factors (LOS, age and poly substance use) have p-value of <0.20, indicating a possibility of effect in a multiple linear regression model. As such, these three factors plus the variable ‘treatment unit’ were included in the multivariate regression model. Table 9 shows that three factors explain the differences in cost per treatment episodes: LOS, age and treatment unit. Poly substance use does not have a statistically significant effect on costs. A one day increase in LOS will increase total costs by 2.2% (0.022\*100%), after controlling for the effect of age and treatment unit. One year older in age will increase total costs by 0.8%, after controlling for LOS and treatment unit. Because it is evident that BF has higher costs compared to HSC, the ‘treatment unit’ variable is used in the model as a confounder rather than an explanatory variable. This means that the effects of ‘LOS’ and ‘age’ can be reported with more confidence.

*Table 9: Potential cost drivers - Multiple linear regression with natural log of ‘total costs’ as outcome variable*

Potential cost drivers	Coefficients (Beta, Standard Error and P-value)
LOS (in days) (n=253)	$\beta = 0.022$ (SE=0.002); P<0.001
Age (in years)	$\beta = 0.008$ (SE=0.004); P=0.031
Treatment unit (BF coded as 1 and HSC coded as 0)	$\beta = 0.632$ (SE=0.128); P<0.001
Poly substance use (categorical variable: Yes and No)	$\beta = -0.114$ (SE=0.135); P=0.401

**Note:** Multiple linear regression was conducted to test the relationship between the LOS and total costs per episode (CPI adjusted), controlling for ‘age’ (as a categorical variable), ‘poly substance use’ and ‘treatment unit’.

### 4.3 Cost of aftercare coordination and services

Within the limitations of the data (see Methodology section), the mean number of hours per week spent on coordination of aftercare services for a typical IDAT patient was 1.33 (SD=0.52). If one assumes a 6-month aftercare period, the average number of hours spent for one IDAT patient was estimated to be 34.58 hours (1.33 hours x 26 weeks). The average time cost for providing 6-month aftercare services for one typical IDAT patient was therefore estimated to be \$2,196 (SD=\$1,267). Given 329 treatment episodes (July 2012 to June 2016, as reported in the Process Evaluation report), the assumed estimated costs of aftercare coordination to the IDAT program over the four years of the program are reporting in two scenarios as follow:

- **Scenario 1:** Assuming that only 26% of IDAT patients receive aftercare coordination services for 6 months as per the Model of Care. This would yield a total cost of \$187,846 (\$2,196 x 329 x 0.26).
- **Scenario 2:** Assuming ‘best case scenario’ that all IDAT patients receive aftercare coordination services for 6 months as per the Model of Care. This would yield a total cost of \$722,484 (\$2,196 x 329).

As reported earlier, a small proportion of IDAT patients have received the voluntary aftercare option. The 11 ITLOs reported the following reasons for IDAT patients not choosing aftercare options:

*“Due to involuntary status, continued to either not desire aftercare of a rehab or IDAT was the mechanism for change”*

*“Family have stepped in and taken responsibility for the client”*

*“Initially it was for transition back to community but often lacks the assertive follow up required post discharge”*

*“May go to rehab or into residential care”*

*“May decline any further support”*

*“Remote and rural locations can cause barrier: far from services if the patients need to get to treatment services and far distance for the aftercare coordination to meet with the patients”.*

Of the reasons for IDAT patients not choosing aftercare services above (as reported by the surveyed ITLOs), “going to rehab or into residential care” is technically not a reason. Rather, going to rehab or into residential care is one aftercare option. It is possible that if an IDAT patient goes to residential care, it is unlikely that the community case manager (often the ITLO) will have a chance to continue their engagement with the patient. This could explain why the proportion of patients receiving aftercare reported by the surveyed community case managers was low because “going to rehab or into residential care” might not be seen by some community case managers as aftercare.

## 4.4 Summary of results

The findings of this cost assessment are summarised in Table 10 below. Over the first four years, the cost of the IDAT program is estimated to be \$32,474,955 (if scenario 1 for aftercare coordination cost is used; i.e. 26% of the IDAT patients receiving aftercare) or \$33,009,593 (if scenario 2 is used; i.e. 100% of the IDAT patients receiving aftercare). While the expenditure data on the Transport Fund and the Brokerage Fund are not available, it is estimated using the proxy data (allocated funding). The four-year total costs for transporting patients to the IDAT treatment units was \$1,337,529 and the four-year total costs for the Brokerage Fund was \$2,824,650. On average, each IDAT referral cost \$929, transportation cost for each patient admission is \$4,065, each inpatient treatment episode cost \$83,678, the unit cost of 6-month aftercare coordination is \$2,196, and the brokerage fund expenditure for each patient episode is \$8,585. As such, the combined cost for one treatment episode is \$99,454 for all cost components.

Table 10: Summary of Results (in 2016 dollars)

	Cost of referrals (n=640 referrals)	Transportation costs for admission (n=329 episodes)	Inpatient treatment (n=329 episodes)	6-month aftercare coordination (n=329 episodes)	Costs of aftercare (Brokerage Fund) (n=329 episodes)	Total
Average unit cost	\$929	4,065 <sup>14</sup>	\$83,678	\$2,196	\$8,585 <sup>15</sup>	<b>\$99,454</b>
Total cost over four years (with scenario 1 of aftercare coordination cost)	\$594,560	Expenditure unknown; Allocated to all 16 LHDs/SHNs: \$1,337,529;	\$27,530,370	<u>Scenario 1:</u> \$187,846	Expenditure unknown; Allocated to two treatment units: \$2,824,650;	<b>\$32,474,955</b>
<i>Percentage of total cost (scenario 1)</i>	1.83%	4.12%	84.77%	0.58%	8.70%	
Total cost over four years (with scenario 2 of aftercare coordination cost)	As above	As above	As above	<u>Scenario 2:</u> \$722,484	As above	<b>\$33,009,593</b>
<i>Percentage of total cost (scenario 2)</i>	1.80%	4.05%	83.40%	2.19%	8.56%	

<sup>14</sup> Derived from the total cost over 4 years with scenario 1 of aftercare coordination divided by the total number of treatment episodes (\$1,337,529 : 329).

<sup>15</sup> Derived from the total cost over 4 years with scenario 1 of aftercare coordination divided by the total number of treatment episodes (\$2,824,650 : 329).

As per the Model of Care, the legislated inpatient treatment length of stay is 28 days, and the aftercare is provided for 6 months to all IDAT patients. Therefore, we calculated what the cost of one treatment episode should be if every patient were to be provided the level of care as per the Model of Care. With the estimated inpatient treatment cost of \$59,612 per treatment episode (28 days x \$2,129<sup>16</sup>), the combined cost for one treatment episode for all cost components will be \$75,387<sup>17</sup>.

## 5 Discussion

Before putting the results of the cost assessment into perspective, it is important to identify some of the limitations. First, while patient-specific data are available for the inpatient treatment, we did not have patient-specific data for the other important components (assessment/referral, transportation, aftercare coordination and brokerage services). As such, the data for these components were averages derived from surveys of the ITLOs and aftercare coordinators, averages of allocated funding, and assumptions (e.g. 6-months of aftercare). However, given that the inpatient treatment component is the most expensive component of the entire IDAT program (84.77% of the total cost of all components combined, see Table 10), the data quality and completeness of this component matters the most. Second, given the small number of returned ITLO surveys (n=11 out of 60) and the aftercare coordinators (n=7), and the potential for recall bias as the ITLOs were asked to reflect on their experience in making referrals to the IDAT program over four years, the costs presented may not be representative. It is clear from both the survey data (in this cost assessment), and interview data conducted with patients (in the outcome evaluation), not all patients are availing themselves of case management and follow-up care. Third, the expenditures on both the Transport Fund (for transporting patients to the IDAT treatment units) and the Brokerage Fund (for services that support the 6-month aftercare) were not available to the research team. Therefore, the original allocated amounts for these two activities were used as a proxy. Fourth, the set-up costs of the IDAT program and the training costs for the ITLOs were beyond the scope of this cost assessment. Finally, as discussed in the methods, we have relied on the financial data provided by the two hospitals and there is no way of confirming its precision. In considering the findings it is important to keep these factors in mind.

The findings of this study show that the total cost using the NWAU/NEP (\$12,231,383) was less than the actual cost reported by the hospital (\$27,530,370). The higher actual costs (likely due to the level of acute physical illnesses, high proportion of patients with comorbidity of drug and alcohol dependence and mental health conditions, and longer lengths of stay) compared to the NWAU/NEP costs suggests that if IDAT is to be replicated, additional funding for the program over and above the current activity-based funding model would be necessary for the program to be sustainable. This phenomenon has been observed for other health conditions in Australia, such as those encountered in rehabilitation and palliative care<sup>18</sup>, and trauma patient care<sup>19</sup>. Regarding the NSW Ministry of Health budget allocations, we were advised that the annual budget allocated by the NSW Ministry of Health to the IDAT program was \$4,837,700 (of which \$642,000 was allocated for the Brokerage

<sup>16</sup> Average inpatient treatment cost per day (taken from Table 3).

<sup>17</sup> \$929 + \$4,065 + \$59,612 + \$2,196 + \$8,585.

<sup>18</sup> Eager, K. and Harvey, R. (2001). Australia not ready to implement 'best practice' health financing model. *Health Cover* 10: 52-56.

<sup>19</sup> Curtis, K., Mitchell, R., Dickson, C., Black, D., & Lam, M. (2011). Do AR-DRGs adequately describe the trauma patient episode in New South Wales, Australia? *Health Information Management Journal*, 40(1), 7-13.

Fund)<sup>20</sup>. This means the annual budget allocated for inpatient treatment was \$4,195,700. Appendix 3 illustrates the actual inpatient treatment cost by year for two treatment units (not CPI adjusted) to enable comparison with the budget allocated by the NSW Ministry of Health each year. The actual cost of the inpatient phase of the IDAT program for both treatment units combined was consistently higher (ranging from \$5,236,204 to \$7,601,689) than the annual budget allocated.

IDAT is an expensive program. But it is a unique program targeting a patient group with severe alcohol and drug dependence, providing treatment within an acute hospital setting, and in an involuntary context. By definition, the patients entering IDAT have complex mental and physical health diagnoses and are identified as having potential to harm themselves or others (as defined in the eligibility criteria for IDAT treatment). That this is occurring, is evidenced by data which demonstrates that in addition to drug and alcohol dependence, a substantial proportion of IDAT patients suffer from complex physical illnesses and or mental health disorders, as well as social and economic dislocations (for example, homelessness). For example, there was evidence of chronic diseases and conditions attributable to heavy alcohol consumption such as alcoholic polyneuropathy and alcoholic cirrhosis of liver, profuse gastric bleeding, and dementia which were treated while in IDAT inpatient care. In addition, some patients required caesarean sections with severe complications, others required treatment for alcohol or other drug poisonings. It is possible that the complexity of this client group, and that the treatment of comorbid issues is not factored into the funding of the IDAT Program by the Ministry, but these costs have been included in the hospital inpatient costs.

The extent of their concurrent and comorbid conditions would have made many IDAT participants unsuitable for treatment within residential rehabilitation centres as it is unlikely that the necessary medical treatments would be available. As such, it is not surprising that the hospital costs of the IDAT program are higher than residential rehabilitation. Keeping this in mind, the average cost per day for inpatient IDAT treatment of \$2,129 is approximately 10 times greater than that of residential rehabilitation in NSW. (The residential costs derive from studies conducted several years ago<sup>21,22</sup>, and updated using the CPI Health index). The extent to which this difference is “reasonable” is a judgement not able to be made from this cost assessment alone. A cost-effectiveness study, taking into account patient characteristics and underlying health status, would be required to answer this question. Patient characteristics are clearly important, and one part of this cost assessment endeavoured to assess the importance of patient characteristics in driving costs. Within the limitation of the data (small samples), multiple linear regression testing shows that three factors explain the differences in cost per treatment episodes: LOS, age and treatment unit, with patients of older age incurring higher costs. The results are consistent with the literature in that cost drivers are both patient-related (i.e. patients’ age) and hospital-related (treatment unit). In this analysis, patient-related characteristics were much less significant than factors related to the treatment unit.

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<sup>20</sup> Project Summary of the IDAT Program, provided by the NSW Ministry of Health.

<sup>21</sup> The NSW alcohol and drug residential rehabilitation costing study. (2005). Health Policy Analysis Pty Ltd. <https://www.pc.gov.au/inquiries/completed/not-for-profit/submissions/sub066-attachment2.pdf>

<sup>22</sup> Shanahan, M., Havard, A., Mills, K., Williamson, A., Ross, J., Teesson, M., Darke, S., Ali, R., Ritter, A., Cooke, R. and Lynskey, M. (2003). Health services use and treatment costs over 12 months among heroin users: Findings from the Australian Treatment Outcome Study (ATOS). *Sydney: National Drug and Alcohol Research Centre, University of New South Wales.*

Having said that, the magnitude of the costs of providing the IDAT program in its first four years suggest it is important to monitor costs into the future, both for budget planning and for potential expansion. There were significant cost differences between the two IDAT units (HSC and BF) although this difference narrowed over time. The process evaluation confirmed that patients admitted to the IDAT Treatment Unit at BF had more physical diagnoses and had a higher proportion of patients having recorded mental health illnesses and polydrug use. This may have contributed to higher costs. Another mitigating factor is economies of scale. HSC combines a voluntary detoxification unit with the IDAT program, whereas BF is a stand-alone IDAT unit. Plus, the voluntary unit existed at HSC prior to the implementation of IDAT program, which may have resulted in lower start-up costs. This factor combined with the economies of scale with some costs at HSC (including operational and staffing costs) shared across two programs may have led to early efficiencies. This is another factor to consider in interpreting the cost differences between the two units. A third consideration in the cost differences between the two treatment units is the metropolitan (HSC) versus rural (BF) location. Hospitals in rural and remote areas in NSW (and in Australia generally) experience difficulties in attracting and retaining health staff – including mental health care and allied health services. Higher costs are often expected for rural hospitals.

If the IDAT program were to be expanded elsewhere in NSW, the relevant findings that could inform such an expansion include: the choice of program location (metro versus rural) and associated cost implications for the inpatient care component; the requirement for additional resources over and above that allocated through activity-based funding; the cost savings associated with the existing network of ITLOs (which would not require expansion); the potential cost advantages of co-location with an existing detoxification program; and the under-utilisation of the six month aftercare services. These considerations would also apply to other Australian jurisdictions thinking about the establishment of an IDAT-type program.

Undertaking cost assessments are challenging due to the complexities associated with obtaining and analysing the data in a rigorous fashion. With the constant change in hospital costing methods, it is critical for researchers seeking to cost AOD inpatient/hospital treatment to understand the current model and its associated implications to facilitate accurate data cleaning and proper interrogation of the data provided by the hospitals. Future costs assessments would preferably rely only on actual costs data, but this would require substantial research time and resources (for example patient interviews regarding transportation), which for us was beyond the scope of this study. Respondent sample sizes for surveys is a perennial problem for researchers - many clinicians are simply too busy to complete research surveys. This reduces the reliability and validity of the data. Significant effort to increase response rates is worthwhile where the data are to be generalised.

## 6 Appendices

### Appendix 1: Variables required for the calculation of the NWAU

1. Pat_AgeYears	11. Hosp_Paed_Flag
2. Pat_Indigenous_Flag	12. Funding Source
3. Pat_Radiotherapy_Flag	13. Admission Date
4. Pat_Dialysis_Flag	14. Separation Date
5. Pat_Postcode	15. Leave Days
6. Pat_SA2 <sup>23</sup>	16. ICU hours
7. Pat_SLA <sup>24</sup>	17. Psych_Days
8. EST_Remoteness	18. QL Days <sup>25</sup>
9. Hosp_State	19. Care Type
10. Hosp_Level3ICU_Flag	20. AR-DRG

Source: The Independent Hospital Pricing Authority (IHPA): NWAU calculators 2015–16<sup>26</sup>.

<sup>23</sup> Patient's Australian Statistical Geography Standard Statistical Area 2 (SA2).

<sup>24</sup> Patient's Australian Statistical Geography Standard Statistical Local Area (SLA).

<sup>25</sup> Patient's Number of Qualified Days for Newborns.

<sup>26</sup> <https://www.ihoa.gov.au/what-we-do/national-weighted-activity-unit-nwau-calculators-2015-16>



**Appendix 2: ITLO/care coordinator survey**

***An evaluation study of the New South Wales  
Involuntary Drug and Alcohol Treatment (IDAT) Program***

**Survey for Involuntary Treatment Liaison Officers (ITLOs)\_ IDAT Program**

**We develop this survey to collect data to estimate the average cost of making one IDAT referral. If you think any of the questions is not relevant for your role, please kindly provide us some information next to the question. Thank you!**

**SECTION 1**

1. What is your job title? .....
2. What is your position classification? .....
3. Are you working full-time or part-time? ..... What is the FTE (full-time equivalent)? .....
4. How long have you worked in the current job title? ..... years
5. How long have you worked in the role of an Involuntary Treatment Liaison Officer (ITLO)? ..... years
6. Which Local Health District are you working in? .....
7. What is your average total case load (the total number of clients you are working with, both D&A clients and non-D&A clients?) .....
8. Of the total case load, how many are D&A clients? .....
9. Since the IDAT program began in 2012, of all the D&A clients you have worked with, what is the estimated proportion being referred to IDAT by yourself in the role of an ITLO (both successful and unsuccessful referrals)? .....
10. Since the IDAT program began in 2012, how many IDAT referrals have you made? .....  
Of all the referrals, what is the rate of admission to IDAT (clients admitted to IDAT treatment)? ..... %
11. On average, how many IDAT referrals do you work on per year? .....
12. On average, how many hours are required to make one IDAT referral application? ..... hours  
(we understand that all the work might not be done within one sitting or within one day so please provide an estimate).
13. To break the “total hours” down, below is a tentative list of tasks we understand are often required of you in your role as an ITLO for referring clients to IDAT. Please  
a) check  the tasks that are relevant; b) add new tasks as needed; AND c) indicate the average amount of time required for each task (for *one typical IDAT referral*)  
On average, how long does it take to do this task?  

<ol style="list-style-type: none"> <li>a. <input type="checkbox"/> <i>Discuss with client and their family the eligibility criteria, the process and feasibility of admission to IDAT.</i> .....</li> </ol>	.....mins/ hrs
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- b.  Collect clinical data to gather evidence to demonstrate eligibility for IDAT . . . . . mins/ hrs
- c.  Communicate with IDAT treatment unit on bed availability. . . . . mins/ hrs
- d.  Arrange and attend session for issuance of Dependency Certificate. . . . . mins/ hrs
- e.  Arrange and transport client to IDAT treatment unit (for admission) . . . . . mins/ hrs
- f.  Other 1 . . . . . mins/ hrs
- g.  Other 2 . . . . . mins/ hrs
- h.  Other 3 . . . . . mins/ hrs
- i.  Other 4 . . . . . mins/ hrs

14. Of all the clients you have successfully referred to IDAT, do you have the knowledge of when the clients complete the IDAT inpatient treatment?

- Yes
- No. If no, please indicate probable reasons. . . . .
- .....
- Yes, but not about all clients. Please indicate proportion: . . . . . %

15. Of all the clients you have successfully referred to IDAT and have completed IDAT inpatient treatment, in your knowledge, what proportion of them chooses aftercare option? (We are aware that the concept of “aftercare” has different interpretations. For the purpose of this survey, we use the definition stated in the IDAT Program’s Model of Care as “community based component of the IDAT program that provides ongoing health and social support and intervention to patients for a period of up to six months, once they have been discharged from inpatient care”) . . . . .

16. For those who don’t choose aftercare option, could you please share your thoughts on why? . . . . .

.....

.....

.....

.....

17. In your current role, do you also provide aftercare services to IDAT patients after they complete inpatient treatment?

- Yes. If Yes, please continue with Question 18.
- No. If no, your survey is complete. Thank you.

**SECTION 2**

18. Since the IDAT program began in 2012, how many IDAT clients have you provided community aftercare services for? . . . . .

19. Currently, how many IDAT clients are you providing community aftercare for? . . . . .

20. On average, how much time do you spend on coordination of aftercare services for one typical IDAT client? . . . . . hours/week.

21. Please indicate the average time you spend per week per IDAT client based on duration of time in aftercare:

- a. During the 1<sup>st</sup> month. . . . . hours/week
- b. During the 2<sup>nd</sup> and 3<sup>rd</sup> months . . . . . hours/week
- c. During months 4-6 . . . . . hours/week

22. We understand that the amount of time providing care to one IDAT client might be different compared to a non-IDAT client. Which of the following best describe your experience?

- There is no difference in the time I spend providing care to IDAT clients compared to other clients.
- The time to provide care for one IDAT client is much MORE than for other clients.  
Please indicate how much MORE? . . . . . % (estimate)
- The time to provide care for one IDAT client is much LESS than for other clients.  
Please indicate how much LESS? . . . . . % (estimate)

23. Of all the IDAT clients who have been under your aftercare, what proportion of them is under your aftercare for:

- a. ≤ 1 month? . . . . . %
- b. ≤ 3 months? . . . . . %
- c. ≤ 6 months? . . . . . %

24. Below is the tentative list of the types of aftercare activities that could be most needed for IDAT clients. Please a) check  the types of activities that are needed by the IDAT clients that you have worked with; b) add new types of activities as needed; AND c) rank them in order of need (with 1 as being needed by most IDAT clients).

Ranking in order of need by IDAT clients

- a.  Temporary housing . . . . .
- b.  Long-term housing . . . . .
- c.  Access to residential rehab . . . . .
- d.  Access to a psychiatrist . . . . .
- e.  Access to a psychologist . . . . .

- f.  Access to on-going AOD pharmacotherapy treatment: .....
- g.  Other 1: .....
- h.  Other 2: .....
- i.  Other 3: .....

**Thank you very much for completing the survey!**

*Please send it to:*

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**The National Drug and Alcohol Research Centre**  
**UNSW Australia**  
**22-32 King Street, Randwick, NSW 2031**  
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**Appendix 3: Inpatient treatment cost by year for two treatment units (not CPI adjusted)**

Treatment Unit	Total Costs	Number (%) of Treatment Episodes	Average Cost per Episode	Average Length of Stay (ALOS)	Average Cost per Day
<i>Year 1 (July 2012 – June 2013)</i>					
HSC	\$840,321	31 (54%)	Mean: \$27,107 Median: \$27,557 IQR: \$15,791 – \$35,022	Mean: 26 Median: 28 IQR: 14 - 33 (Min-Max: 4-58)	Mean: \$1,030 Median: \$1,105 IQR: \$923 - \$1,131
BF	\$4,395,883	26 (46%)	Mean: \$169,072 Median: \$157,603 IQR: \$138,623 - \$184,352	Mean: 36 Median: 29 IQR: 27 - 49 (Min-Max: 16-67)	Mean: \$4,922 Median: \$5,296 IQR: \$4,278 - \$5,539
<b>Total</b>	<b>\$5,236,204</b>	<b>57 (100%)</b>	--	--	--
<i>Year 2 (July 2013 – June 2014)</i>					
HSC	\$1,572,991	29 (32%)	Mean: \$54,241 Median: \$33,884 IQR: \$26,137 - \$70,718	Mean: 55 Median: 49 IQR: 26 - 69 (Min-Max: 2-257)	Mean: \$1,017 Median: \$989 IQR: \$926 - \$1,033
BF	\$4,931,303	60 (68 %)	Mean: \$82,188 Median: \$68,064 IQR: \$57,983 - \$84,945	Mean: 35 Median: 27 IQR: 25 - 45 (Min-Max: 2-90)	Mean: \$2,353 Median: \$2,491 IQR: \$1,950 - \$2,553
<b>Total</b>	<b>\$6,504,294</b>	<b>89 (100%)</b>	--	--	--
<i>Year 3 (July 2014 – June 2015)</i>					
HSC	\$1,771,637	29 (31%)	Mean: \$61,090 Median: \$44,478 IQR: \$31,868 - \$102,475	Mean: 45 Median: 32 IQR: 25 - 67 (Min-Max: 5-92)	Mean: \$1,365 Median: \$1,482 IQR: \$1,306 - \$1,531
BF	\$5,830,052	64 (69%)	Mean: \$91,094 Median: \$69,424 IQR: \$47,427 - \$135,281	Mean: 42 Median: 27 IQR: 25 - 62 (Min-Max: 1-121)	Mean: \$2,322 Median: \$2,461 IQR: \$1,971 - \$2,595
<b>Total</b>	<b>\$7,601,689</b>	<b>93 (100%)</b>	--	--	--
<i>Year 4 (July 2015 – June 2016)</i>					
HSC	\$2,532,100	23 (26%)	Mean: \$110,091 Median: \$91,983 IQR: \$38,359 - \$147,449	Mean: 58 Median: 49 IQR: 27 - 83 (Min-Max: 2-144)	Mean: \$1,795 Median: \$1,992 IQR: \$1,333 - \$2,040
BF	\$3,231,417	67 (74%)	Mean: \$48,230 Median: \$35,936	Mean: 44 Median: 28	Mean: \$1,090 Median: \$1,049

Treatment Unit	Total Costs	Number (%) of Treatment Episodes	Average Cost per Episode	Average Length of Stay (ALOS)	Average Cost per Day
			IQR: \$15,735 - \$69,167	IQR: 24 - 62 (Min-Max: 4-136)	IQR: \$624 - \$1,541
<b>Total</b>	<b>\$5,763,517</b>	<b>90 (100%)</b>	--	--	--

**Appendix 4: IDAT staffing profile for each treatment unit**

<b>Current FTE – Bloomfield</b>	
Senior D&A Outreach Worker	1.0
Occupational Therapist	0.5
Psychologist	0.5
Social Worker	1.0
Nurse Unit Manager	1.0
Registered Nurse	9.6
Admin Assistant	0.5
Medical Officer	1.0
Addictions Specialist/Director	0.5
Pharmacist	0.5
Dietitian	0.2
	<b>16.3</b>
<b>Current FTE – Herbert St Clinic</b>	
Nurse Unit Manager (NUM)	0.5
Consultant Psychiatrist	0.2
Resident Medical Officer	0.3
Intern	0.3
Psychiatry Registrar	0.4
Clinical Nurse Consultant	1.0
Administrative Officer	0.5
Registered Nurse	7.6
Outreach staff/nurses	2.0
Social Worker	1.0
Occupational Therapist	1.0
Clinical Psychologist	1.0
Consultant Psychiatrist/IDAT Director	0.4
	<b>16.2</b>

Source: IDAT Program Process Evaluation report, page 67.