



# NSW Office of Social Impact Investment

**Analysis of future service usage for Out-of-Home-Care leavers**

July 2018

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# TABLE OF CONTENTS

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1	Executive summary.....	4
1.1	Introduction.....	4
1.2	Observations.....	4
1.3	Approach .....	5
1.4	Uncertainty.....	5
2	Introduction .....	6
2.1	Purpose.....	6
2.2	Summary of approach.....	6
3	Observations .....	11
3.1	Introduction.....	11
3.2	Cohort level observations .....	11
3.3	Segment level observations.....	16
3.4	Individual level observations .....	26
3.5	Commonwealth Government services.....	30
3.6	Conclusion: Relevance of key findings .....	38
3.7	Contents and potential applications of this report .....	40
4	Approach .....	41
4.1	Introduction.....	41
4.2	Developing a linked dataset .....	41
4.3	Overview of forecasting approach .....	43
4.4	Identifying segments of OOHC leavers that have different long-term costs.....	45
4.5	Assumptions, uncertainty and limitations .....	45

# 1 EXECUTIVE SUMMARY

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## 1.1 Introduction

Youth with a history of out-of-home care (OOHC) are believed to have a high risk of poor social outcomes, including homelessness, criminality, poor health and high levels of welfare receipt. Their long-term pathways can include high levels of contact with a range of social services that are not only costly, but reflective of a poor quality of life. The purpose of this project is to:

- Quantify the long-term costs to the NSW Government of meeting the service needs of OOHC leavers
- Quantify the long-term costs to the Commonwealth Government of meeting the welfare, Medicare Benefit Scheme (MBS) and Pharmaceutical Benefit Scheme (PBS) service needs of OOHC leavers
- Identify segments of OOHC leavers that have different expected long-term costs
- Understand how the lifetime service usage pathways of these segments differ.

## 1.2 Observations

The average cost of meeting the modelled service needs of an OOHC leaver is estimated to be about \$496,000 over 20 years. This estimate includes costs of some Commonwealth services, the 20-year cost to the NSW Government of meeting the modelled service needs of an OOHC leaver is estimated to be \$269,000.

The total modelled cost for the entire 16,279 OOHC leavers included in this study is estimated to be around \$8.1 billion over the 20 years following exit from OOHC. Just over half (54%) of the \$8.1 billion relates to NSW service usage that largely correlates with poor social outcomes such as child abuse and neglect, criminal activity, and health crises. Almost a fifth (18%) of the \$8.1 billion cost is justice-related, 14% comprises OOHC costs for the next generation and 8% comprises hospital costs. This suggests that breaking the cycle of family violence, and reducing risky and/or criminal behaviour are important components of a strategy to improve outcomes and reduce long-term costs for OOHC leavers. The correlation of education with reduced costs suggests improving educational outcomes may be important also. The remaining half (46%) of the \$8.1 billion total relates to Commonwealth service usage, the vast majority of which is welfare payments (42%).

Risk and cost are highly concentrated within a few low-volume segments. The average 20-year costs are highest for OOHC leavers with a child in OOHC themselves before exit and for Aboriginal and Torres Strait Islander (ATSI) males with prior court appearances or custody spells. For these groups the costs are three-and-a-half times higher than for the lowest-risk/cost segment of OOHC leavers. The relative difference in 20-year NSW costs is even larger.

Service usage pathways are generally high and vary considerably between segments. Some notable examples:

- In general, OOHC leavers' children are more than 10 times more likely to also need OOHC compared to the general population. This varies markedly by gender; 20% of females and 11% of males in the cohort are forecast to have a child in OOHC sometime in the 20 years since exit from care.
- Court appearance, time in custody and ambulatory mental health costs are on average significantly higher for males compared to females. We estimate that over 90% of male ATSI leavers with previous court or custody history will have future time in custody after OOHC exit.
- Commonwealth costs are higher for females than males. On average, welfare costs are 30% higher, and Medicare and Pharmaceutical benefit scheme costs are double for females compared to males.

- More than half of all OOHC leavers utilise some form of homelessness assistance. Homelessness services are used 46% less by those OOHC leavers who were exclusively in kin or relative care.
- On average leavers will spend one-and-a-third years in public housing in the 20 years after exit from care. It is up to double this amount for ATSI leavers.
- 85% of all leavers will receive income support at some point over the 20 years.

### 1.3 Approach

The population cohort included in this analysis is all people who left OOHC for the last time from 1996/97 to 2013/14, inclusive, and were aged between 14 and 18 when they left.

To build a cross-agency view of lifetime pathways of NSW and Commonwealth Government service usage, we developed an anonymised linked dataset detailing the cohort's contact with justice, health, housing, disability, welfare, Medicare and other services – as well as their children's entry into Department of Family and Community Services (FACS) care services.

The long-term costs of service usage were then estimated by:

- Forecasting the service usage pathways for each individual in the cohort for the 20-year period after exiting care
- Developing assumptions for the cost of each service using information from the Government agencies that provide the services
- Summing the costs of service use over a 20-year period for each individual, different segments of the cohort and the cohort as a whole.

### 1.4 Uncertainty

The cost estimates provided in this report are highly uncertain and should be treated as indicative only. The sources of uncertainty are detailed in Section 4.5 of the report.

## 2 INTRODUCTION

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### 2.1 Purpose

Youth with a history of out-of-home care (OOHC) are believed to have a high risk of poor social outcomes, including homelessness, criminality, poor health and high levels of welfare receipt. Their long-term pathways can include high levels of contact with a range of social services that are not only costly, but reflective of a poor quality of life.

The NSW Office of Social Impact Investment commissioned Taylor Fry to undertake a project to estimate the lifetime cost to government of service usage by young people leaving OOHC.

The purpose of this project is to:

- Quantify the long-term costs to the NSW and Commonwealth Governments of meeting the service needs of OOHC leavers
- Identify segments of OOHC leavers that have different expected long-term costs
- Understand how the lifetime service usage pathways of these segments differ.

Due to staggered approvals for obtaining data, this project has had a series of phases. This report relates to phase 3 of the project in which we include life course outcomes for:

- Welfare receipt (using linked DHS data)
- Medicare Benefit Scheme (MBS) and Pharmaceutical Benefit Scheme (PBS) use.

### 2.2 Summary of approach

#### 2.2.1 Study population

The population cohort included in this analysis is all people who left OOHC for the last time from 1996/97 to 2013/14, inclusive, and were aged between 14 and 18 when they left.

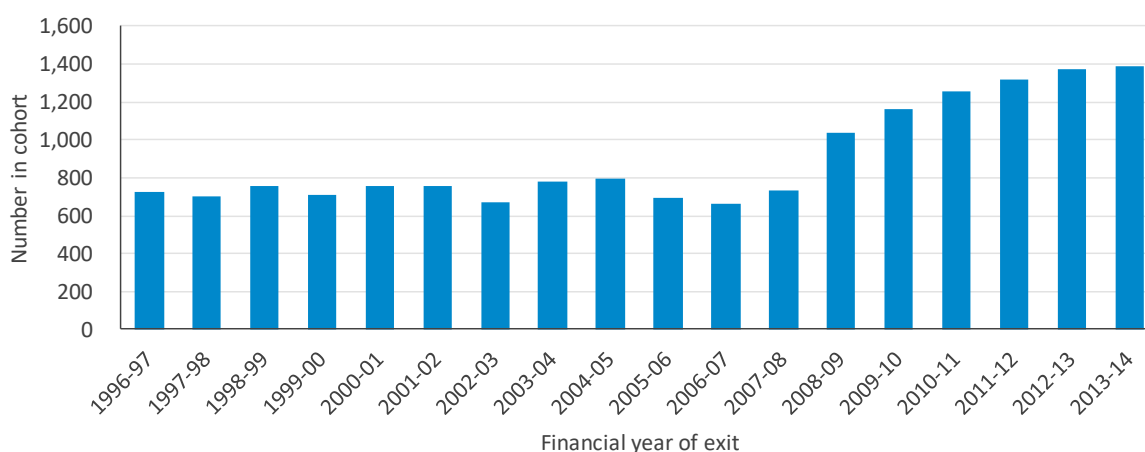
The study population is only a subset of children who have a history of OOHC and hence the findings of this analysis are specific to this cohort of OOHC leavers. Those exiting OOHC below age 14 are more likely to be subject to family restoration, with likely different lifetime trajectories.

Members of the cohort were identified by the NSW Department of Family and Community Services (FACS). The cohort consisted of 16,279 cases each identified by the Statistical Linkage Key identifier (SLK-581). For privacy reasons, the SLKs were encrypted by FACS. For each member of the cohort, FACS provided:

- Demographic characteristics such as age, gender, location and language
- Information about the individuals OOHC history, such as age of exit and length of time in OOHC.

Figure 2.1 below shows the number of people in the cohort by year of final OOHC exit. Since 2009, there have been large increases in the number of people exiting care. These increases reflect increases in the number of people in OOHC rather than an increase in exit rates.

**Figure 2.1 Numbers in study cohort by financial year of final OOHC exit**



### 2.2.2 Service usage pathways

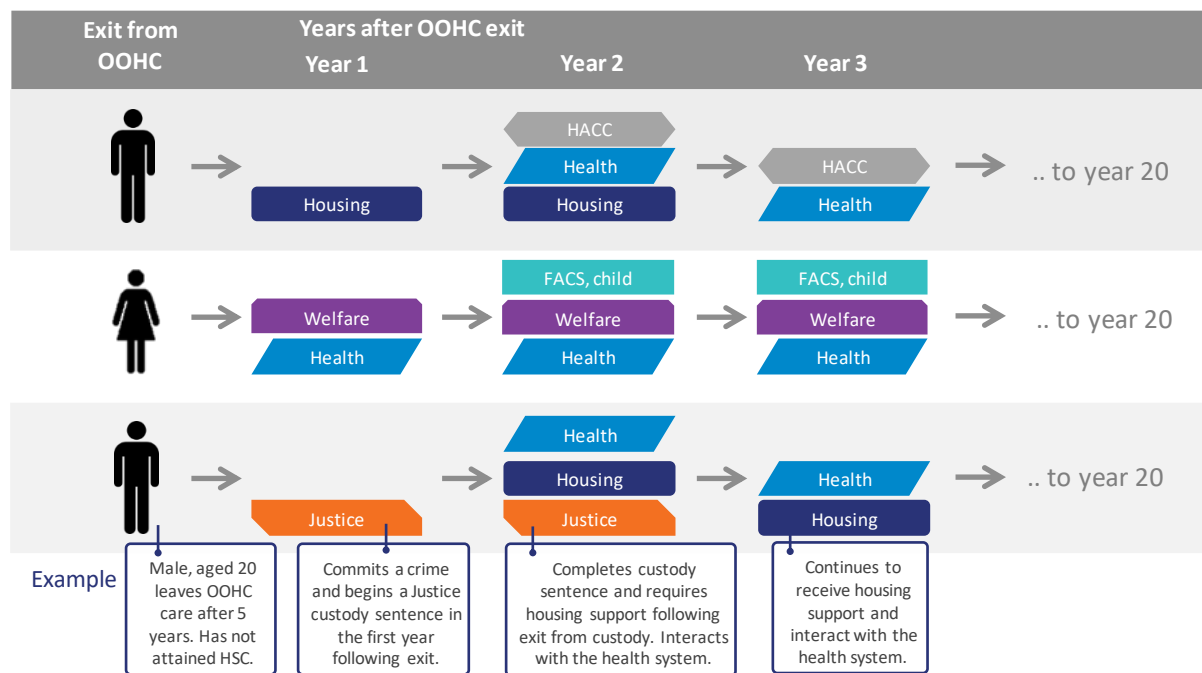
This project focuses on the cohort's use of government services after they exited care. For this study, the government services of interest were those provided by the NSW and Commonwealth Governments.

The service usage for each person in the cohort was analysed on a yearly basis for each available year after exit. The longest available service use history after exit was 17 years for those who exited care in 1996/97. For cohort members that exited in 2013/14, there was at most one year of post-exit service use history.

Eighteen different types of service use were analysed. Each individual's service usage history is summarised by a **service usage pathway**. These show the yearly use of services by type for each individual in the cohort.

To illustrate, Figure 2.2 shows three hypothetical service usage pathways over a three-year period from exit. The first person receives just housing support in year one. He remains in social housing in year two, and also accesses Health and Home and Community Care (HACC) services. In year 3, he accesses the latter two services but is no longer in social housing.

Figure 2.2 Service usage pathways



The schematic shows some key aspects of our approach. First, we model at an individual level so that we can better identify specific risk factors associated with higher future cost. Second, we simulate forward plausible pathways that includes extended usage of particular services. Third, the projection is cross-sectoral, where use of one service might increase the likelihood of requiring other types of support.

### 2.2.3 Services in scope

To build a cross-agency view of lifetime pathways of government service usage, we developed an anonymised linked dataset detailing the cohort’s contact with justice, health, housing, disability, homelessness, Medicare, welfare and other services – as well as their children’s entry into FACS care services.

The types of service usage included in our analysis are listed in Table 2.1, the Government that provides the service is also listed. The three Commonwealth Government services are new to Phase 3.



**Table 2.1 Types of service usage included in the analysis**

	Description	Responsibility
<b>Justice</b>	Number of court appearances	NSW Government
	Number of police warnings, cautions or youth justice conferences	NSW Government
	Time in custody	NSW Government
	Community supervision	NSW Government
<b>Health</b>	Number and length of hospital stays (incl. emergency and outpatients)	NSW Government
	Number of ambulatory mental health services	NSW Government
	Number of Medicare subsidised health services	Commonwealth Government
	Number of subsidised prescriptions filled	Commonwealth Government
<b>Housing</b>	Length of social housing tenancies	NSW Government
	Number of Temporary accommodation events	NSW Government
	Private rental subsidy and rental assistance	NSW Government
	Homelessness services	NSW Government
<b>Welfare</b>	Length and type of welfare support spells	Commonwealth Government
<b>FACS, child</b>	Children in OOHC	NSW Government
<b>DS, HACC</b>	Disability services and home and community care	NSW Government
<b>Others</b>	Victims services	NSW Government
	Legal aid	NSW Government
	Unpaid fines	NSW Government

### New services in Phase 3

The three government services added to the model for phase 3 are welfare, Medicare Benefit Scheme (MBS) and Pharmaceutical Benefit Scheme (PBS).

- Welfare payment data was provided by the Commonwealth Department of Human Services and linked by the Australian Institute of Health and Welfare (AIHW). Throughout the report we split welfare payments into income support (payments designed to support people in the absence of an income, such as Youth Allowance, the Newstart benefit and the Disability Support Pension) and supplementary payments (which are payments available to a broader range of people, such as childcare subsidies, family tax benefit payments and rental assistance). A person receiving supplementary benefits may or may not be also receiving income support.
- MBS payments are the subsidies paid to health professionals to subsidise access to healthcare. These include doctor consultations, scans, and many hospital treatments.
- PBS payments are the subsidies paid to pharmacies for the supply of prescription medications.

We discuss these in greater detail in Section 3.5.

### 2.2.4 Approach to forecasting the long-term costs of service usage

The long-term costs of service usage were estimated by:

- Forecasting the service usage pathways for each individual in the cohort for the 20-year period after exiting care
- Developing assumptions for the cost of each service using information from the Government agencies that provide the services
- Summing the costs of service use over a 20-year period for each individual, different segments of the cohort and the cohort as a whole.

Forecasts of service usage were made using statistical models constructed by analysing the historical service use pathways of the cohort. These models gave predictions of service usage in a financial year that depend on:

- The characteristics associated with each individual at the time they exited, such as age, education, and length of time in care. Certain characteristics are 'risk factors' for high service usage pathways.
- The path of past service usage up to the financial year of interest.

Further details on the approach used for forecasting service use are found in Section 4.3. The cost assumptions associated with service usage are detailed in Section 4.3.2.

## 3 OBSERVATIONS

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### 3.1 Introduction

This section presents the observations arising from our analysis of long-term service usage costs to the NSW and Commonwealth Governments. The results are presented:

- For the full cohort included in the study, highlighting how pathways change over time, and where costs are concentrated by service type
- At the segment level, identifying segments of the cohort where risk and cost are concentrated and differences between pathways for segments with higher and lower long-term service costs
- At the individual level, enabling a more detailed discussion of different pathways.

This section concludes with a summary of findings, and examples of their potential implications for policy and delivery.

### 3.2 Cohort level observations

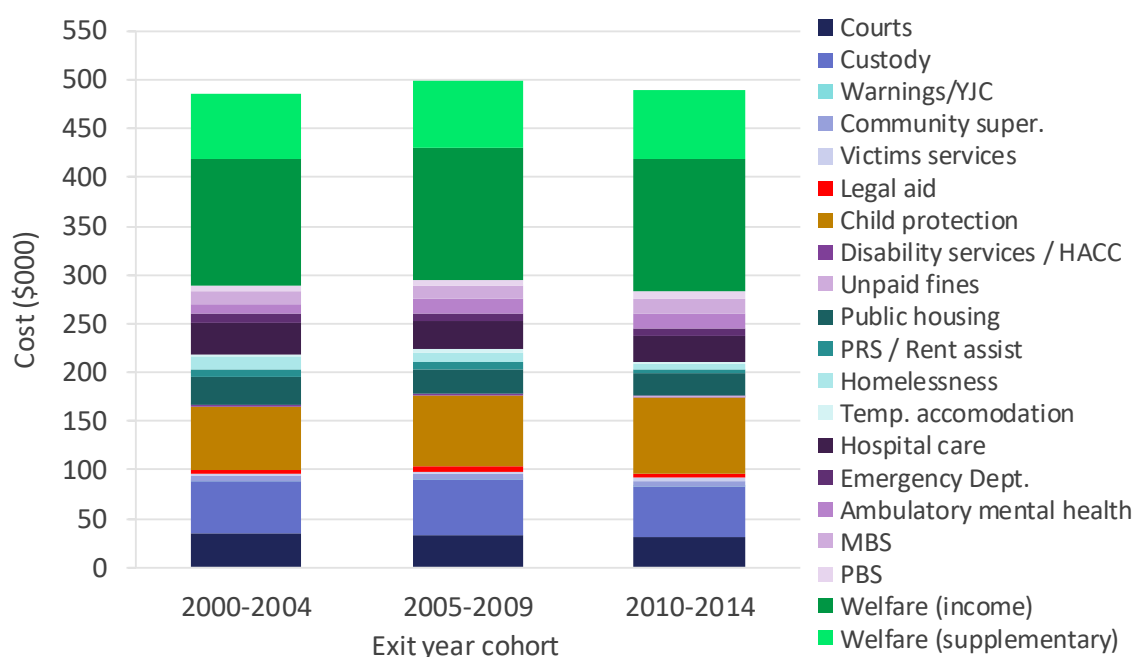
#### 3.2.1 Long-term service usage pathways and costs

The average cost of meeting the modelled service needs of an OOHC leaver is estimated to be about **\$496,000** over 20 years. The total modelled cost for the entire cohort included in this study is estimated to be around \$8.1 billion over the 20 years after exit from OOHC. The most recent cohort of 1,386 people exiting in 2013/14 is forecast to cost \$683m over the subsequent 20 years.

Figure 3.1 shows the breakdown of 20-year service usage costs by service type, providing insight into where costs – and poor outcomes – are concentrated from a long-term perspective. The costs for some service types – notably warnings, cautions, youth justice conferences (YJC) and unpaid fines – are small relative to the other service types and can't be seen clearly in the figure. The total 20-year cost is fairly stable across the range of exit years.

Of the 18 services modelled, three are Commonwealth services that represent 46% of the total (or around \$227,000 over 20 years). The 20-year cost to the NSW Government of meeting the modelled service needs of an OOHC leaver is estimated to be \$269,000.

Figure 3.1 Average 20-year cost of service usage by exit year cohort, by service usage type



Almost 90% of 20-year cost results from six service types:

- Welfare (42%)
- Child protection for children of leavers (14%)
- Time in custody (11%)
- Hospital care (8%)
- Court appearances (7%)
- Public housing (5%)

Other services are smaller in cost, although they may still be important indicators of poor life course outcomes for OOHc leavers.

Figure 3.2 illustrates how service usage and costs evolve over the course of the 20-year period – the average OOHc pathway. Figure 3.3 provides a split of NSW and Commonwealth costs. In both figures, for each year from exit shown on the horizontal axis, the average costs per person of service usage are shown in different colours. For example, the total average costs in the first year after leaving OOHc are approximately \$27,000. The largest components of year 1 costs are court appearances, custody spells and welfare payments.

The level of usage of some service types changes considerably over the life course of an OOHc leaver. We observe that:

- **Welfare costs are large and increase over time.** The average annual cost increases with the number of years after OOHc exit, likely due to the changes in benefit types being received as people age and some have children.
- **Court costs are highly concentrated in the first 5 years from exit** – the decrease in court costs over the life course reflects fewer appearances in court as the leaver ages and an increased likelihood that appearances will be in lower cost courts. For younger ages most court appearances are in higher-cost children’s, drug and district courts, while in the later years of the projection most court appearances are in lower-cost local courts.
- **Child protection costs** for the children of OOHc leavers begin to rise significantly about four years after leaving exit and increase steadily until about 16 years following the leaver’s own exit.

- **Public housing and hospital care** costs are forecast to decrease slightly over time.
- **MBS and PBS** costs are forecast to increase slightly over time.

Figure 3.2 Average service-usage cost each year since exit from OOHC, by service usage type

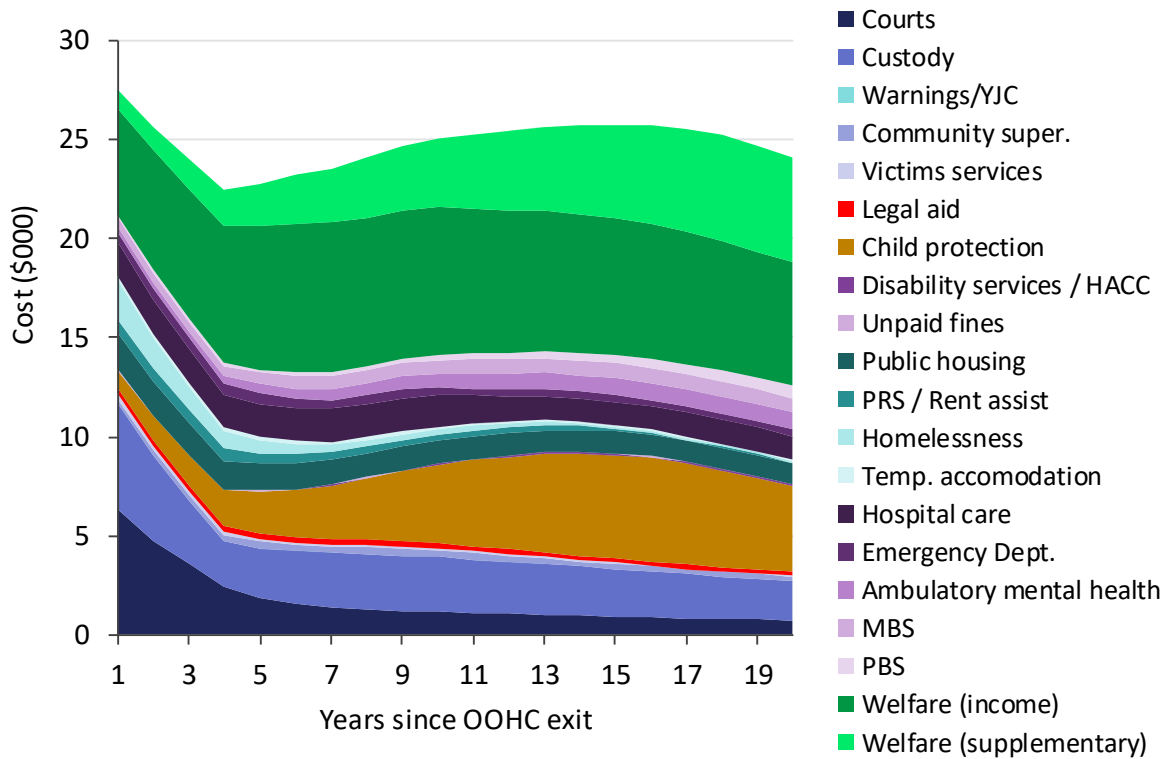
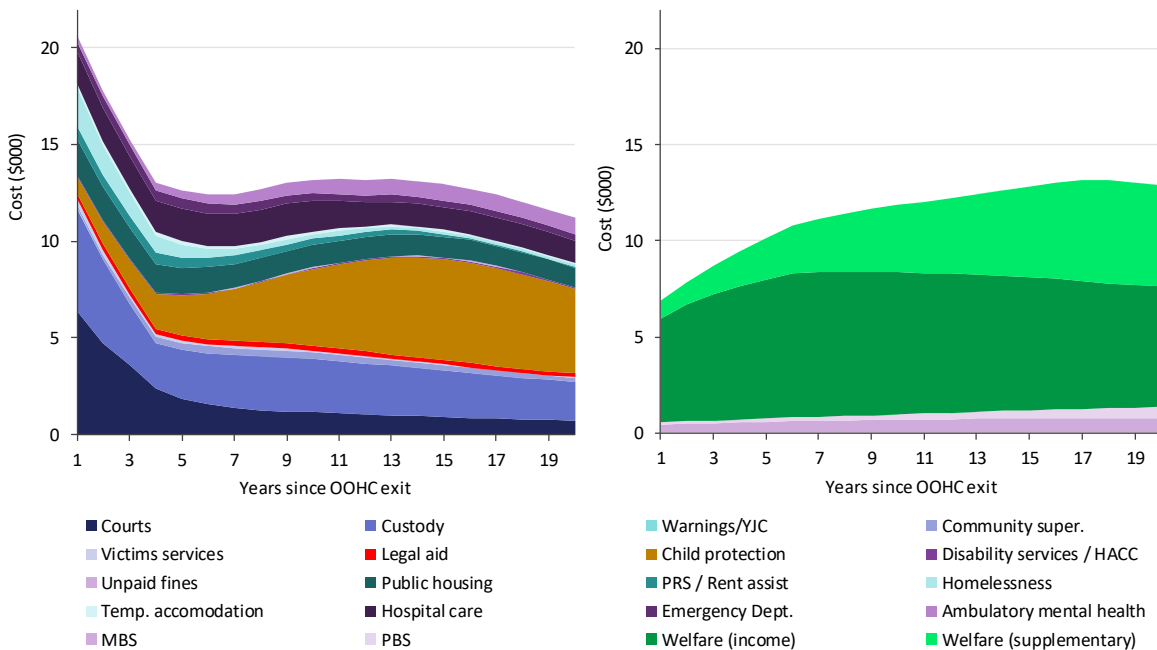


Figure 3.3 Average service-usage cost each year since exit from OOHC, by service usage type for NSW Government (left panel) and Commonwealth Government (right panel)



Some of the larger service costs are discussed in turn below.



### 3.2.2 Welfare payments

On average, welfare payments make up over two-fifths (42%) of the 20-year service cost. Our forecasts indicate that over the 20 years following OOHC exit:

- Leavers will receive around \$210,000 of welfare payments, with \$140,000 being income support and \$70,000 being supplementary payments.
- Females will receive around \$240,000 of welfare payments, which is 30% more than the estimate for males (\$180,000).

Commonwealth costs are discussed further in Section 3.5 – Commonwealth Government services, including a description of what has been counted as income support compared to supplementary payments.

### 3.2.3 Child OOHC entries

The highest average costs of any modelled NSW service type for OOHC leavers are future OOHC costs related to the children of this cohort (27% of the NSW costs, or an average of \$72,000 per leaver over 20 years). This is an indicator of the high prevalence of the intergenerational transmission of abuse and neglect. Of particular note:

- We forecast that 20% of females and 11% of males in the cohort will have a child in OOHC sometime in the 20 years since exit from care.
- Child OOHC costs are less immediate. Service usage costs are lower for the first 5 years following exit and highest around 10-20 years after exit.
- OOHC leavers' children are more than 10 times more likely to also need OOHC compared to the general population.<sup>1</sup>

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<sup>1</sup> A rough estimate of the proportion of children in OOHC in NSW is around 0.1%-0.2% (<https://aifs.gov.au/cfca/publications/children-care>). This implies at most about 0.4% of parents have a child in OOHC. 834 of the OOHC cohort of ~16,000 had a child in care at June 2015 implying 5% of the cohort have a child in care. Other research on intergenerational child protection risks has been undertaken by FACS: [https://www.facs.nsw.gov.au/\\_data/assets/pdf\\_file/0016/421531/FACS\\_SAR.pdf](https://www.facs.nsw.gov.au/_data/assets/pdf_file/0016/421531/FACS_SAR.pdf)

Figure 3.4 Average lifetime service usage pathway and cost for males and females, by service usage type

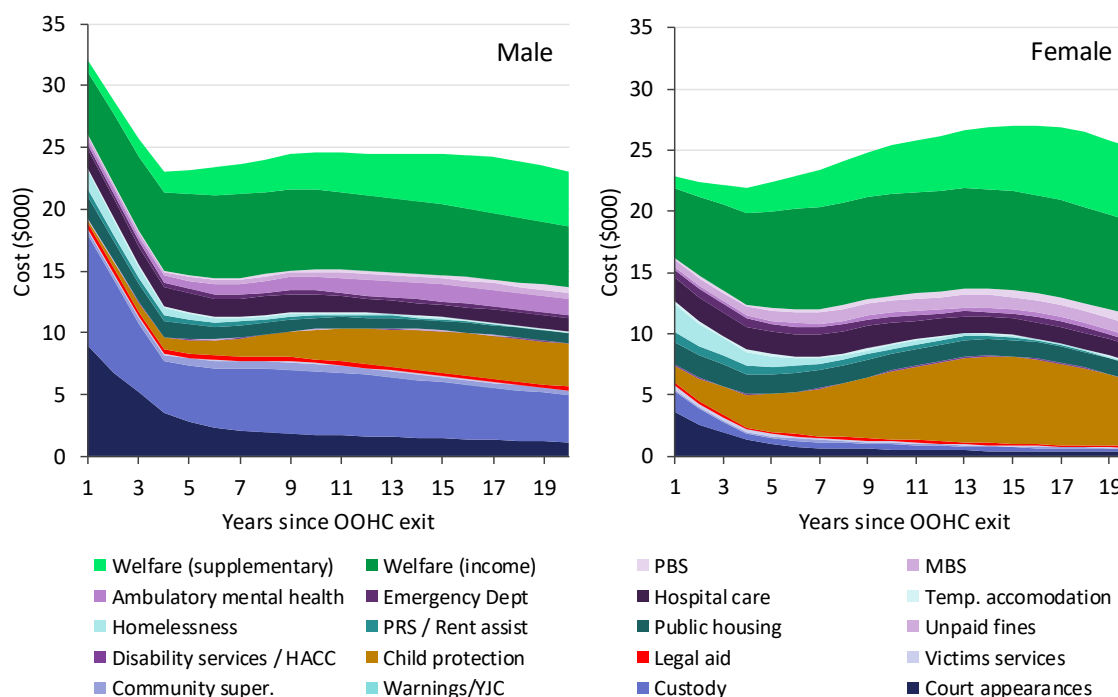


Figure 3.4 illustrates the different pattern of service usage costs for males and females. The increased OOHC costs for females are readily apparent. This reflects the predominance of females as sole parents interacting with the child protection system – the father is often not recorded. For this reason, the results should **not** be interpreted as female OOHC leavers being more likely to neglect their children than male OOHC leavers.

### 3.2.4 Court appearance and custody costs

Together court appearance and custody costs make up 33% of the modelled NSW costs. This is large, but it is also highly concentrated on a small subgroup of people. In contrast to child protection costs, court appearance and time in custody costs are on average significantly higher for males compared to females (Figure 3.4). The higher court and custody costs for males reflect the greater rates of offending amongst males observed in the general population. Our forecasts indicate that over the 20 years following exit, the average cost associated with custody and courts for females is less than one-fifth, or 20%, of that for males.

### 3.2.5 Homelessness services

The average 20-year costs for the use of homelessness services is \$9,300. This equates to being registered as using homelessness services for an average of 65 days. The use of homelessness services is widespread for the cohort, with over 50% having already used homelessness services up until 30 June 2015. However, the forecast use of homelessness services is still concentrated, with nearly 40% of future homelessness costs attributable to just 10% of the cohort in our forecasts.

### 3.2.6 Uncertainty in the cohort level average 20-year cost estimate

There are a number of sources of uncertainty that mean the average cost estimate of around \$496k should be treated as an indicative cost only. In particular:

- The cost assumptions applied to each service use are approximate. In general, there is no fixed price associated with service use and we have had to rely on the necessarily approximate cost allocations made by the relevant government departments and agencies.

- The unique identifier (the Statistical Linkage Key, or SLK) used to link cross-agency service use to each member of the cohort has known limitations which are likely to lead to some underestimation of service usage by the cohort. For example, when an OOHC leaver changes their name (say as the result of marriage), uses an alias, or if there are errors in the spelling of a name or a date or birth, the service usage will not be linked back to the leaver.
- When the OOHC leavers exiting each financial year are considered in isolation there is variation in the estimated average cost from year to year. Over the most recent 15 financial years of exit the estimated average 20-year cost has varied by up to  $\pm\$39,000$  ( $\pm 8\%$ ). This reflects the variation in the characteristics of leavers, and such compositional change would likely continue in the future.
- Fathers are much less likely to be recorded when a child enters OOHC. This means that the (lower) forecasts for males for child OOHC costs are likely underestimated.
- In addition to the variation from year to year, there are a number of observed trends in service usage across cohorts exiting in different financial years. For example, ambulatory mental health service usage and child OOHC costs are forecast to be higher for OOHC leavers exiting in the 2009/10 to 2013/14 financial years compared to earlier years, while private rental subsidy and rental assistance costs are forecast to be lower (see Figure 3.1). The existence of these trends adds considerable uncertainty to the forecast of long-term cost estimates as it is evidence that future trends may continue to emerge.
- The estimates of service use beyond 15 years after exit are based on very little data and are particularly uncertain. The only service usage information we have beyond 15 years comes from those who exited OOHC in 1996/97 and 1997/98 and the service usage for these groups covers at most 17 years post exit. One consequence of this is that the forecast decrease in child OOHC costs from around 15 years after exit is based on a very small volume of data and so the timing and magnitude of any decrease in costs is very uncertain.

### 3.3 Segment level observations

#### 3.3.1 Purpose and approach

The analysis presented in the previous sections concentrated on the average service usage of the cohort as a whole. In this section we split the cohort into segments to identify:

- Segments of the cohort where risk and cost are concentrated
- Differences between pathways for segments with higher and lower long-term service costs.

Segmentation analysis can potentially be useful to:

- Identify which characteristics or risk factors are most predictive of poor outcomes
- Target interventions towards high risk/high cost segments
- Tailor different intervention approaches to different segments.

#### 3.3.2 Segmentation by lifetime service usage costs

We segmented the OOHC leavers cohort into segments that had very different average 20-year **NSW Government costs**. The segmentation was based on the characteristics at exit from OOHC that were most important for predicting leaver's expected pathways/costs.

This resulted in the eleven segments. The characteristics used to define each segment, the number of people belonging to each segment and their average 20-year NSW, Commonwealth and total costs are shown in Table 3.1.



**Table 3.1 Segmentation of OOHC leavers by 20-year NSW service usage costs**

Segment	Child of leaver in OOHC care prior to leaver's exit	ATSI	Gender	Court appearance in year of exit, prior year OR custody in year of exit	Population	Avg. NSW 20yr cost (\$000)	Avg. Cmwth 20yr cost (\$000)	Avg. total 20yr cost (\$000)
1	No	No	Female	No	5,283	166	259	425
2				Yes	561	322	300	621
3			Male	No	4,511	149	191	340
4				Yes	1,436	460	210	670
5		Yes	Female	No	1,652	292	240	532
6				Yes	313	622	297	919
7			Male	No	1,137	343	167	510
8				Yes	628	984	191	1,175
9	Yes	No			107	862	305	1,166
10		Yes			57	1,170	278	1,447
11		Missing court data			594	241	264	504
<b>Total</b>					<b>16,279</b>	<b>269</b>	<b>227</b>	<b>496</b>

In interpreting the table above, it is useful to think of a splitting process from left to right which divides the cohort into groups with higher and lower service costs. For example, the first split is between OOHC leavers who had a child in care before exiting care themselves. The implication is that this is one of the most important risk factors in predicting future service usage – those with a child in care prior to exiting care themselves tend to have significantly higher costs after exit. This is seen by comparing the average 20-year costs for segments 9 and 10 with the other segments.

The second split is based on Aboriginal or Torres Strait Islander (ATSI) status, as recorded in the FACS database. Segments with members who are ATSI have higher estimated costs (\$100k-\$500k higher across comparable segments). This can be seen by comparing segment 1 with segment 5 or segment 2 with segment 6. In both cases the comparison is between segments which are the same except for their ATSI status.

Segment 11 is a group separated out mainly for statistical convenience; this group are all 1996/97 leavers for whom we were unable to merge on historical court usage data. For this reason, while their 20-year projected cost estimates are reasonable, their comparability with the other segments is limited.

There is a significant contrast between service usage and costs by higher volume/lower risk segments versus lower volume/higher risk segments:

- The lowest risk, highest volume segments are segments 1 and 3. These segments account for 60% of the cohort and have an average 20-year service usage cost of around \$386,000. Members of these segments do not have a child in care prior to exit, are not ATSI and in their year of exit they were not in custody and hadn't had a court appearance in the previous two financial years.
- The highest cost segment, though with a low number of people in it, is segment 10. The 57 members of this segment had a child in OOHC prior to leaving care themselves and are ATSI. Their average 20-year service usage cost is \$1.45m. Segment 9 also has a high average cost. Together segments 9 and 10 make up just 1% of the cohort and have an average 20-year service usage cost of around \$1.3m. This is more than three times higher than for segments 1 and 3.
- Commonwealth costs are more uniform across the adopted segments than NSW costs. 20-year NSW service costs are six times higher for segments 9 and 10 compared to segments 1 and 2.

### 3.3.3 A comparison of segment pathways and costs

The segments shown in Table 3.1 not only differ according to their average 20-year costs, they also have very different service usage pathways. The forecast pathways for segments are compared below.

#### Non-ATSI segments

Figure 3.5 compares the service usage pathways for segments 1 and 2; these are non-ATSI females without a child in OOHC, without and with court appearances respectively. Segment 1 has the second lowest average cost of any segment and represents a third of the leavers cohort. The average forecast cost for segment 2 is close to 50% higher than segment 1; the difference is driven by higher court costs in the short term and higher child OOHC and welfare costs in the longer term.

Figure 3.5 Average 20-year service usage pathway and cost for segments 1 and 2

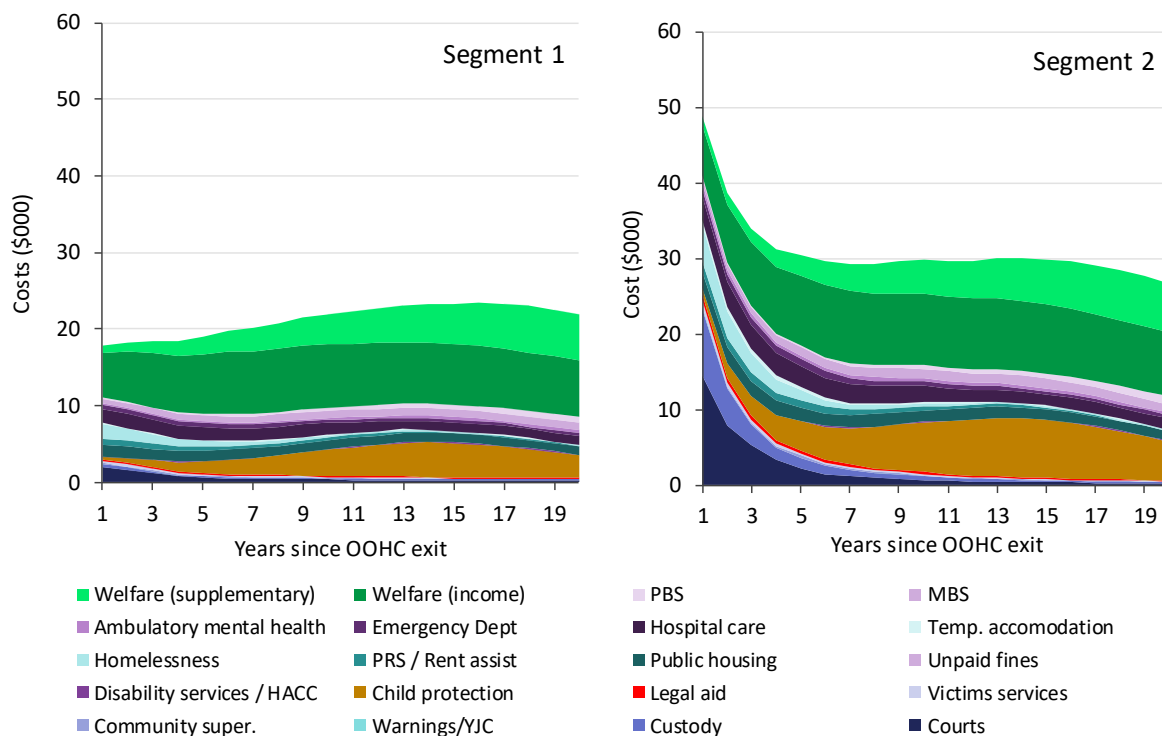


Figure 3.6 compares the service usage pathways for segments 3 and 4. Members of these segments are males who are non-ATSI and did not have a child in care prior to exit. The difference between the two segments is that:

- Segment 3 members have had no court appearances in the two financial years up to the year of exit and are not in custody in the year of exit, while
- Segment 4 members did have court appearances in the two financial years up to the year of exit or were in custody in the year of exit.

**Figure 3.6 Average lifetime service usage pathway and cost for segments 3 and 4**

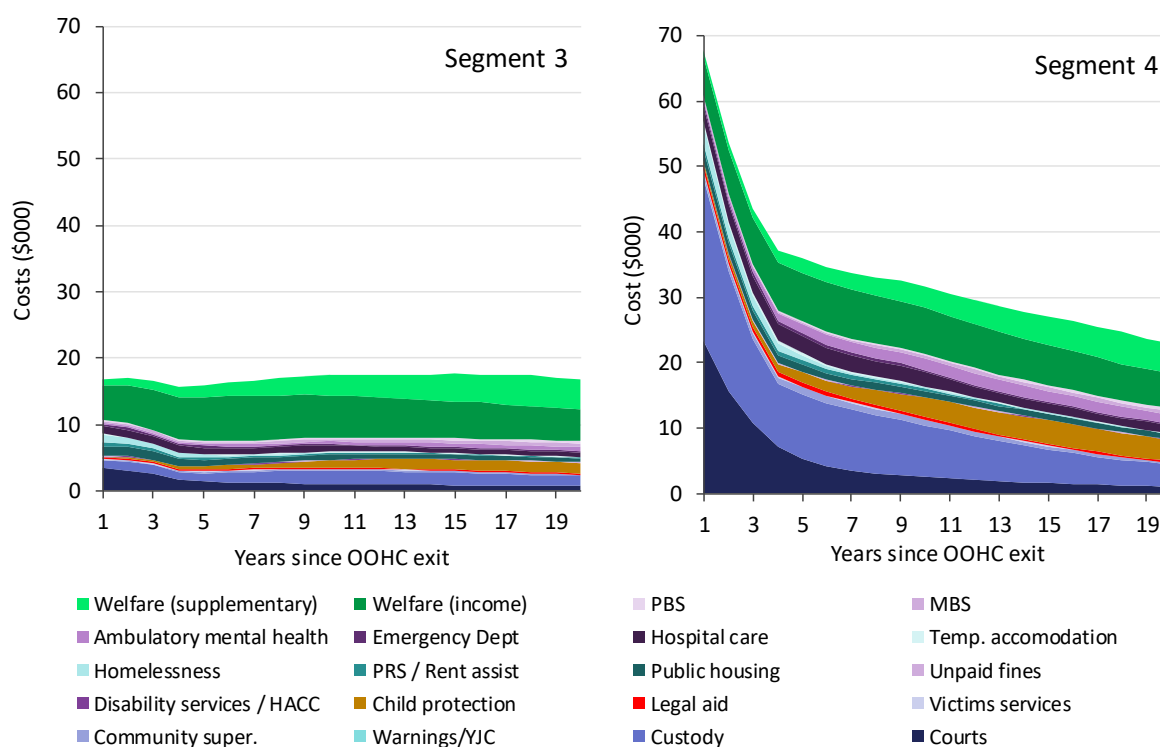


Figure 3.6 shows:

- Leavers with court appearances or in custody prior to exit have significantly higher justice sector costs over their life course. Court and custody costs for this segment are particularly high immediately after exit and decrease rapidly over the first five years since exit.
- Hospital costs and child protection costs are also higher (over double) for segment 4, compared with segment 3.

### ATSI segments

Figure 3.7 shows the service usage pathways for segments 5 and 6; female ATSI leavers without a child in OOHC, without and with justice interactions respectively. Future costs are about 30% larger than for the non-ATSI segments 1 and 2, with the biggest differences in future OOHC costs for their children. The NSW costs are close to double for segments 1 and 2.

Figure 3.7 Average lifetime service usage pathway and cost for segments 5 and 6

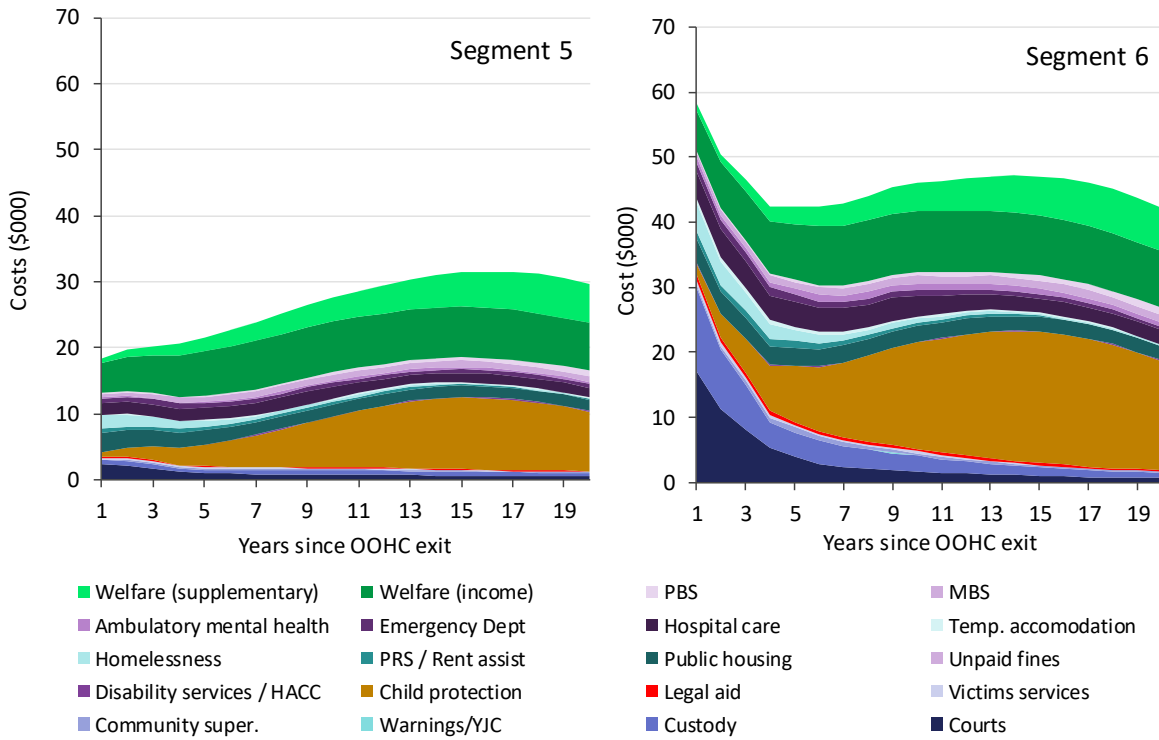


Figure 3.8 compares the service usage pathways for segments 7 and 8. These segments are the same as segments 3 and 4 except for their ATSI status.

Figure 3.8 Average lifetime service usage pathway and cost for segments 7 and 8

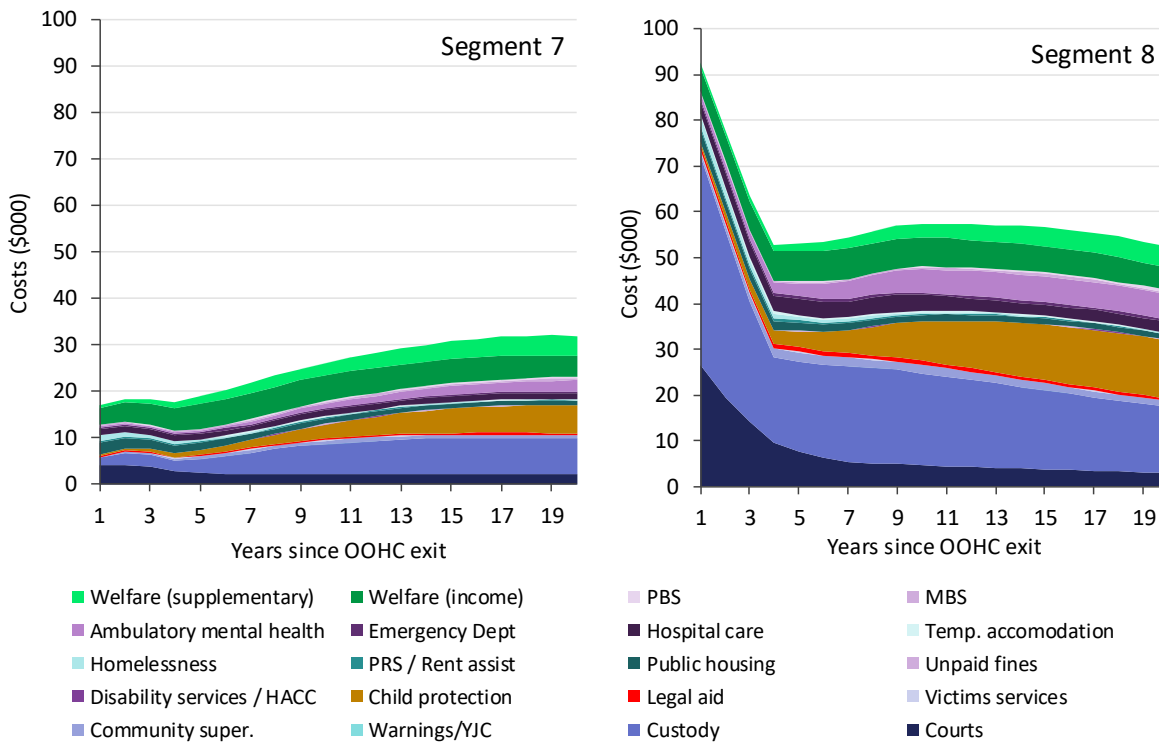


Figure 3.8 shows:

- ATSI males with no court appearances and not in custody prior to exit (segment 7) have very similar costs to the corresponding non-ATSI segment (segment 3, see Figure 3.6) over the first five years following exit. Over the longer term the costs increase relative to the non-ATSI segment due to increasing costs of custody and child OOHC. The slightly lower costs of welfare potentially reflect the higher probability of being in custody.
- Segment 8 has very high costs, similar to those who have a child in OOHC prior to exiting. Custody costs are high through-out and probably explain the relatively low welfare costs. Initially court costs are high, these are then partially replaced by child OOHC costs as members of the segment age.

### Child of leaver in care prior to leaver's exit

Segments 9 and 10 consist of leavers who had a child in care prior to their own exit from care. The difference between segments 9 and 10 is that segment 10 members are ATSI. The service usage pathways for these segments are shown in Figure 3.9.

Figure 3.9 Average lifetime service usage pathway and cost for segments 9 and 10

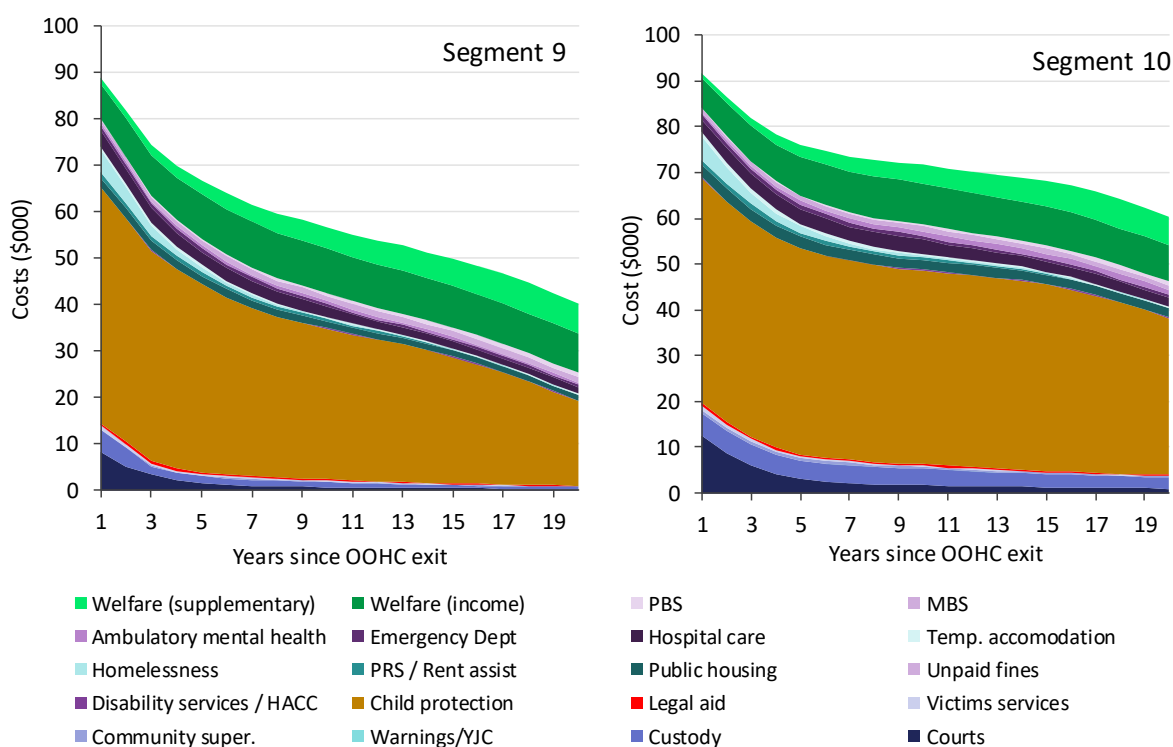


Figure 3.9 shows:

- The service usage costs of cohort members who have a child in care prior to exit are dominated by child OOHC costs throughout the projection
- The costs for these members are significantly higher if they are also ATSI, with higher child protection costs over the medium to long term.

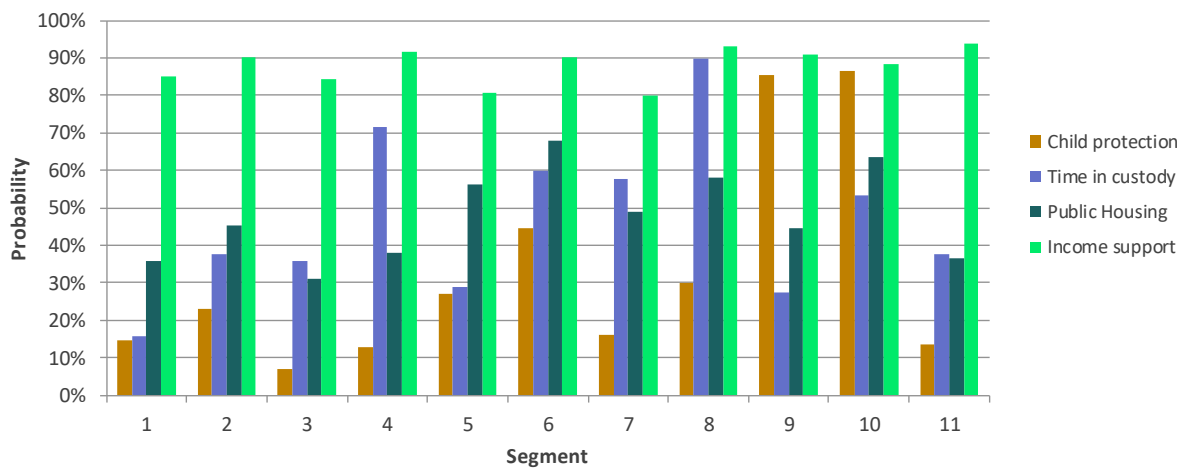
### 3.3.4 Non-financial outcome measures

The focus of the analysis presented above has been the financial cost of service usage. However, the forecast model also allows the prediction of outcomes other than cost. For example, Figure 3.10 shows the **probability** (on average) that a member of each segment will, over the course of 20 years, have a

child enter care services, spend time in custody, access public housing or receive income support. Figure 3.10 shows that those with justice interactions shortly before their OOHC exit have a higher probability of accessing key services:

- Leavers in the non-ATSI segments without justice interactions (segment 1 – non-ATSI females without justice interactions and segment 3 – non-ATSI males without justice interactions) have a lower probability of children entering OOHC, spending time in custody, using public housing and receiving income support when compared to the equivalent segments with justice interactions (segment 2 – non-ATSI females with justice interactions and segment 4 – non-ATSI males with justice interactions).
- Similar relativities can be observed between the lower and higher cost ATSI segments (segments 5 – ATSI females without justice interactions and 7 – ATSI males without justice interactions) and higher cost ATSI segments (segments 6 – ATSI females with justice interactions and 8 – ATSI males with justice interactions).
- Probabilities of accessing income support are high for all segments.

**Figure 3.10 Probability of at least one contact with selected services over 20 years, by segment**



Another way to look at the forecast results is in terms of the number of contacts with various service touchpoints – for example, the number of court appearances. This type of analysis brings a different perspective to service pathways. Table 3.2 looks at service pathways using these non-financial measures for each segment on average, and for all OOHC leavers on average.

**Table 3.2 Average use of government service over the 20-year projection, by segment**

Service type	Segment											All
	1	2	3	4	5	6	7	8	9	10	11	
Court appearances <sup>(a)</sup>	1	3	3	9	2	6	6	15	3	6	4	4
Time in custody <sup>(c)</sup>	20	70	140	670	50	220	520	1700	100	320	180	230
Warnings/Cautions/YJC <sup>(a)</sup>	0.1	0.2	0.1	0.2	0.1	0.2	0.2	0.2	0.1	0.1	0.0	0.1
Child OOHC entries <sup>(b)</sup>	1	2	0	1	3	5	1	3	12	15	1	1
Community supervision <sup>(b)</sup>	0	1	1	4	1	2	3	8	1	2	1	1
Disability services / HACC <sup>(b)</sup>	0.3	0.4	0.2	0.2	0.4	0.5	0.2	0.2	0.4	0.5	0.2	0.3
Unpaid fines <sup>(b)</sup>	0	0	1	1	0	0	1	2	0	0	0	1
Ambulatory mental health <sup>(a)</sup>	30	60	50	190	40	110	150	550	70	130	50	80
Hospital care <sup>(c)</sup>	20	30	10	30	20	50	20	40	30	40	20	20
MBS <sup>(a)</sup>	500	650	250	250	450	650	200	250	650	550	300	400
PBS <sup>(a)</sup>	200	250	100	100	200	300	100	100	300	250	100	150
Homelessness <sup>(c)</sup>	70	140	40	80	80	160	40	80	110	140	80	70
PRS / Rent assistance <sup>(a)</sup>	0.6	0.9	0.3	0.6	0.5	0.8	0.3	0.5	0.8	0.8	0.9	0.5
Temp. accommodation <sup>(a)</sup>	1	3	1	3	2	5	2	4	4	6	2	2
Public housing <sup>(c)</sup>	450	600	300	400	750	950	500	600	550	850	400	450
Legal aid services <sup>(b)</sup>	1	2	2	4	1	3	3	7	2	3	2	2
Victims services <sup>(b)</sup>	0.3	0.4	0.1	0.1	0.3	0.5	0.1	0.2	0.4	0.5	0.1	0.2
Welfare <sup>(d)</sup>	270	310	210	230	250	310	180	210	320	290	300	240

Notes (a) Number of events  
 (b) Number of years the service was used at least once  
 (c) Total days  
 (d) Number of fortnights

Some interesting results from Table 3.2 include:

- ATSI males with involvement with the justice sector up to the year of exit (segment 8) have on average 1,700 days (nearly five years) in custody over the 20 years after exit. This contrasts with low risk non-ATSI females (segment 1) who are forecast to spend on average 20 days in custody.
- On average, leavers will spend one-and-a-quarter years in public housing. It is up to double this amount for ATSI leavers.
- On average leavers will receive income support for 240 fortnights (nine years). ATSI males without a child in OOHC before exit and without justice interactions prior to exit (segment 7) are forecast to have the fewest fortnights with income support (180 fortnights, or about seven years).

### 3.3.5 Comparison to general population

The analysis performed in this study allows us to compare service usage pathways for different segments of the cohort. It **does not provide a baseline measurement** of service usage in the general population to use for comparison.

However, some services have comparable statistics for utilisation among the general population – for example, hospital care. The Australian Institute of Health and Welfare (AIHW) publishes the average number of hospital days by age group in the general population and this can be compared to the cohort hospital service usage projections. Table 3.3 shows that at younger ages (around time of exit) the lowest cost segments (segments 1 and 3) have higher hospital service usage than the general population, the usage level moves towards the population average as the segment members age. For the two oldest age



groups service usage is slightly below the general population, this is probably an anomaly; the small amount of data observations we have at these ages make comparison difficult. However, the trends indicate that **service usage, even for the lowest cost segment, may be higher than among the general population.**

**Table 3.3 Average hospital days for general population<sup>(a)</sup> and segments 1 and 3**

Age Group	Average hospital and emergency department days	
	General population	Segments 1 and 3
15-19	0.5	1.1
20-24	0.6	1.0
25-29	0.7	0.8
30-34	0.8	0.7
35-39	0.8	0.6

Notes (a) Calculated using Separation statistics by principal diagnosis (ICD-10-AM 7th edition), Australia, 2011-12 to 2012-13 and Australian Hospital Statistics 2012/13: Emergency Department Care, both available from the AIHW website.

### 3.3.6 Variability in average cost estimates for each segment

The uncertainties in the cost estimates at the overall cohort level are magnified at the segment level. In general, the smaller the size of the segment the more uncertainty there is around the accuracy of the cost estimate. Table 3.4 and Figure 3.11 illustrate the range of cost outcomes that are estimated in each segment.

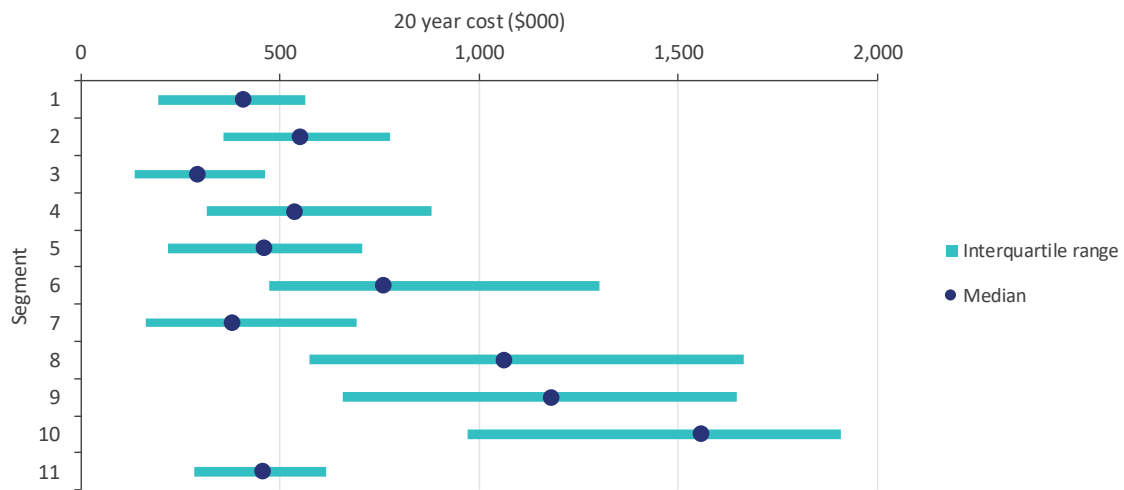
**Table 3.4 Spread of total and NSW 20-year cost outcomes estimated for each segment**

Segment	Population	Total 20 year cost, \$000					NSW 20 year cost, \$000				
		Average	Standard deviation	1st quartile	Median	3rd quartile	Average	Standard deviation	1st quartile	Median	3rd quartile
1	5,283	425	300	195	404	562	166	219	37	86	197
2	561	621	396	357	550	777	322	336	100	200	413
3	4,511	340	283	133	290	463	149	230	27	69	168
4	1,436	670	511	314	534	878	460	498	114	270	639
5	1,652	532	412	218	458	704	292	340	64	154	379
6	313	919	603	472	758	1,300	622	549	184	424	967
7	1,137	510	472	161	379	693	343	437	52	154	470
8	628	1,175	747	573	1,061	1,663	984	743	347	854	1,469
9	107	1,166	599	659	1,179	1,648	862	550	367	868	1,317
10	57	1,447	683	969	1,557	1,907	1,170	632	698	1,315	1,542
11	594	504	335	284	453	616	241	302	63	130	282
<b>Total</b>	<b>16,279</b>	<b>496</b>					<b>269</b>				

For example, although the average 20-year cost for segment 1 is \$425k, we would expect only half the cohort in that segment to actually have service usage costs in the (\$195k, \$562k) interquartile range. We expect that a quarter of people will have costs lower than \$195k, and a quarter will be higher than \$562k.



**Figure 3.11 Median and interquartile range for segments. Interquartile range shows the band between 25<sup>th</sup> and 75<sup>th</sup> percentiles for individual simulations within a segment.**



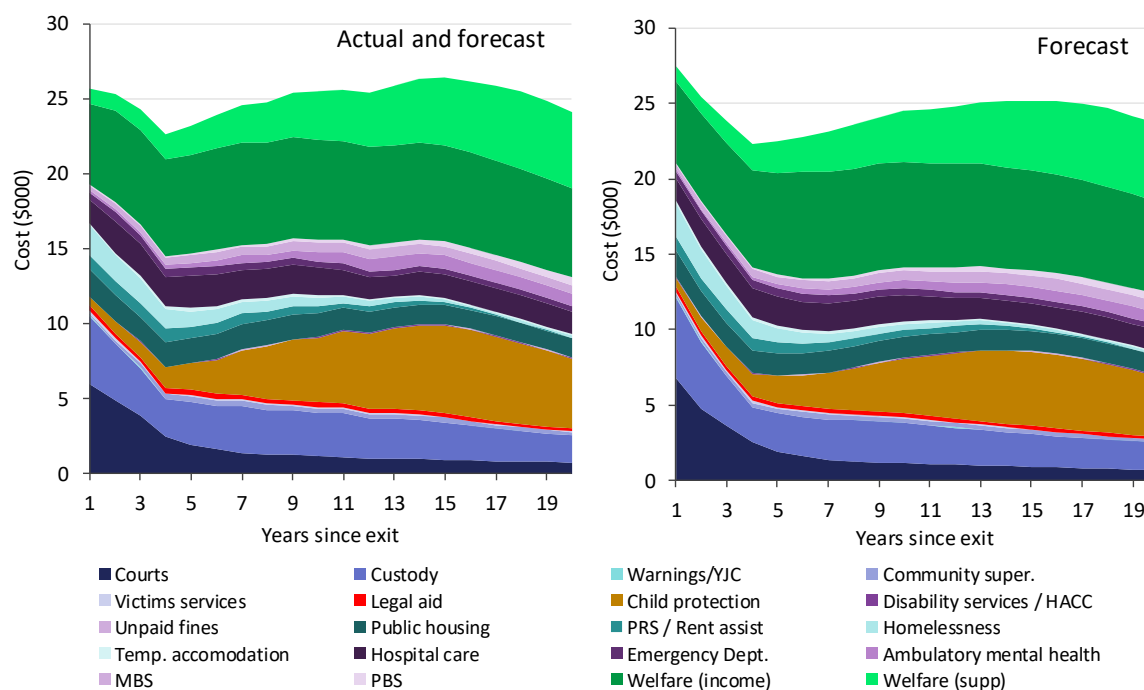
Given this uncertainty, the question of whether the cost estimates and service usage pathways are reasonable arises.

### 3.3.7 Comparison to actual observed service usage costs

One way to assess the reasonableness of forecast service usage pathways is to compare the forecast pathways with what actually happened historically. For members of the cohort who exited between 1999/00 to 2003/04<sup>2</sup> we have 10 to 15 years of actual service use post exit. This can be compared to the service usage forecasts. Such a comparison is shown in Figure 3.12 below.

<sup>2</sup> This analysis has excluded leavers who exited prior to 1999/2000 because the service usage history for these leavers is incomplete.

**Figure 3.12 Comparison of actual and forecast pathways for leavers who exited between 1999/2000 to 2003/04 inclusive**



The left-hand panel in Figure 3.12 shows a combination of forecast and actual service usage for those who exited between 1999/00 to 2003/04 inclusive. The first 10 years since exit show only actual service usage, years 11 to 15 post exit show a mixture of actual and forecast service usage (depending on exit year) and years 16 and later show purely forecast service usage. The forecasts here have been made using the actual service history for each leaver up until 30 June 2015.

The right-hand panel shows purely forecast service usage for the same group as above. This forecast is made using only information available at exit. The consistency in pathways between the two diagrams is a measure of the reasonableness of the forecast service usage pathways.

We have also compared the actual and forecast service usage at a segment level; the comparisons show forecast and actual tracking closely for most of the segments. There are some departures for smaller segments (notably 2 and 6). However, it is difficult to know whether the model is underestimating cost for these segments or whether the departure is a natural result of the large variability in costs expected for small segments.

### 3.4 Individual level observations

#### 3.4.1 Introduction

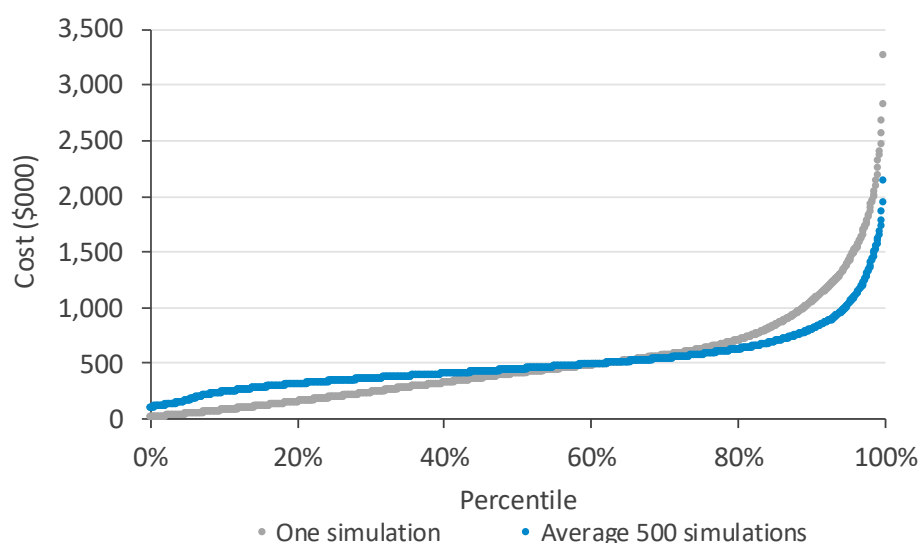
The analysis presented in the previous sections focused on the average service usage in the cohort as a whole and in a small number of segments.

The forecast model also provides individual estimates of future service usage pathways and costs for each OOHC leaver in the cohort. These estimates order OOHC leavers from high cost to low cost with more accuracy and granularity than the segmentation model shown earlier. They also allow a deeper understanding of how various risk factors influence service usage pathways.

### 3.4.2 Spread of service usage estimates in the cohort

Figure 3.13 shows the range of individual 20-year cost estimates for all 16,279 members of the cohort. The blue line shows the distribution for average 20-year cost estimate for permilles (thousandths), ordered from lowest cost to highest cost. The lowest cost 0.1% of the cohort is expected to have an average 20-year cost of around \$100,000 while the highest cost 0.1% of the cohort is expected to have an average 20-year cost of around \$2.1m. The distribution of average costs is slightly skewed, with 62% of the cohort having expected average costs below the mean. This skewness is also illustrated by the fact that the median of the distribution (\$445,000) is less than the mean (\$496,000). The skewness is actually lower after the addition of Commonwealth welfare, MBS and PBS costs; these tend to be more evenly spread across the leavers cohort than NSW costs.

**Figure 3.13 Spread of average individual 20-year cost and one simulation 20-year cost**



The grey line in Figure 3.13 shows the distribution of ‘one simulation’ costs<sup>3</sup>. This differs from the blue line in that it allows for the inherent variability in an individual’s service usage. Our model will predict the same average 20-year costs for individuals with the same characteristics at exit such as age, education, length of time in care and prior service usage. However, in reality individuals will have different levels of service usage due to inherently random, or unpredictable, influences on service use. The grey line allows for this inherent variability and is a better estimate of the distribution of 20-year costs that one would obtain if the costs of all cohort members were tallied over the 20 years post exit. This distribution is more skewed than the blue one – the median of the grey distribution is \$409,000 while the mean is \$497,000 and the top 10% high cost individuals are 31% of the total cost.

### 3.4.3 Model Performance

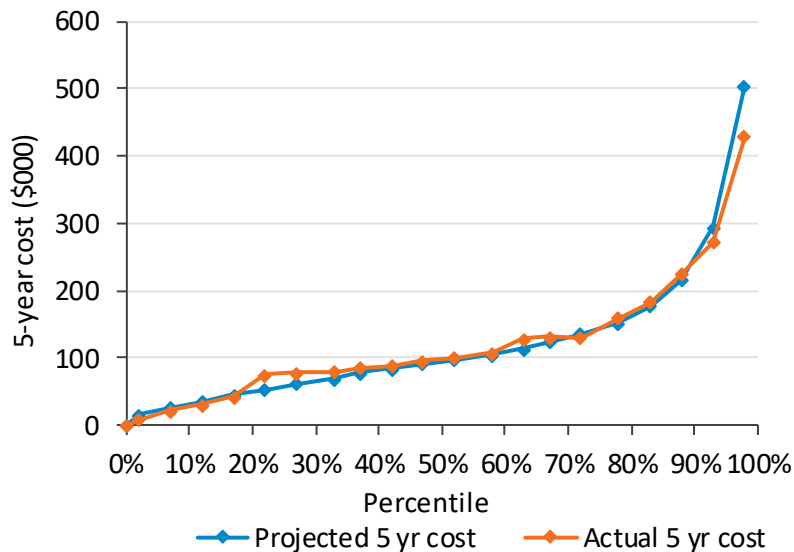
A typical way to assess model performance would be to compare predicted costs with actual costs. Section 3.3.7 looked at these at a segment level, but we can also examine this at an individual level. Note that for the current analysis our data provides an incomplete picture of actual costs. At most we have 17 years of actual service use history for those who exited in 1996/97, while for those who exited in 2013/14 we only have one year of actual service use history.

<sup>3</sup> Up to this point we have looked at average expected costs for individuals. We produce the average by simulating the individual’s projected costs many times and taking the average across the simulations. The actual distribution of costs will be more skewed as some people will incur costs higher than their expected average and others below. We can illustrate this pattern by running a single projection simulation as a proxy for what a ‘real’ cost incurred pattern might look like.

As a partial test of model performance we compared model predictions of costs over the first 5 years since exit for those leavers who exited care between 2002/03 to 2008/09 with actual 5 year costs from this cohort (Figure 3.14). In the figure all cohort members are ordered from lowest predicted cost to highest predicted cost. Actual costs are then compared with predicted costs by dividing members into 20 groups of equal size. The figure shows:

- The 5% of the cohort with the highest expected costs have 5-year costs more than 30 times that of the 5% of the cohort with the lowest expected costs.
- That actual costs are reasonably close to predicted costs across the range of predicted costs.

**Figure 3.14 Assessment of model performance based on service usage within 5 years of exit**



### 3.4.4 Insights into service usage pathways

As well as providing more accurate and granular cost estimates, the individual forecast model allows a deeper understanding of how various risk factors influence service usage pathways.

For example, the model shows that:

- OOHC leavers with a history of crime or health issues will continue to have them.
- There is a greater than 90% chance that an OOHC leaver with a child in OOHC care will still have that child in care one year later.
- OOHC leavers who make more use of ambulatory mental health services have a higher probability of appearing before a court. We estimate those who used ambulatory mental health services in the prior year are two times more likely to appear before a court (holding all other factors constant).
- Age at exit from OOHC does not strongly differentiate the long-term cost outcomes of OOHC leavers.
- Of those with a full year of income support, over 80% will have a full year of income support in the following year.
- Obtaining HSC is correlated with lower long-term costs and service use. Earlier OOHC leavers were less likely to have HSC and this may reflect policy changes about compulsory study. The impact estimated above is averaged across all exit years. ATSI cohort members are about 25% less likely to have HSC compared to non-ATSI members.

- In general, OOHC leavers' children are more than 10 times more likely to also need OOHC compared to the general population. This varies markedly by gender; 20% of females and 11% of males in the cohort are forecast to have a child in OOHC sometime in the 20 years after exit from care.
- Court appearance, time in custody and ambulatory mental health costs are on average significantly higher for males compared to females. Male ATSI leavers with previous court or custody history are more than 90% likely to have future time in custody.
- On average OOHC leavers will spend one and a third years in public housing. It is up to double this amount for ATSI leavers, a combination of higher entry and lower exit rates.
- 85% of all leavers will receive income support at some point over the 20 years. This is 92% for those with justice interactions shortly before their OOHC exit.
- On average, females are forecast to access Medicare 26 times per year and the Pharmaceutical Benefit Scheme 22 times per year. Males are forecast to use these two services about half as much.

The individual forecast model also allows us to understand which risk factors are most useful for predicting long-term cost at exit from OOHC. The following table lists the top ten risk-factors.

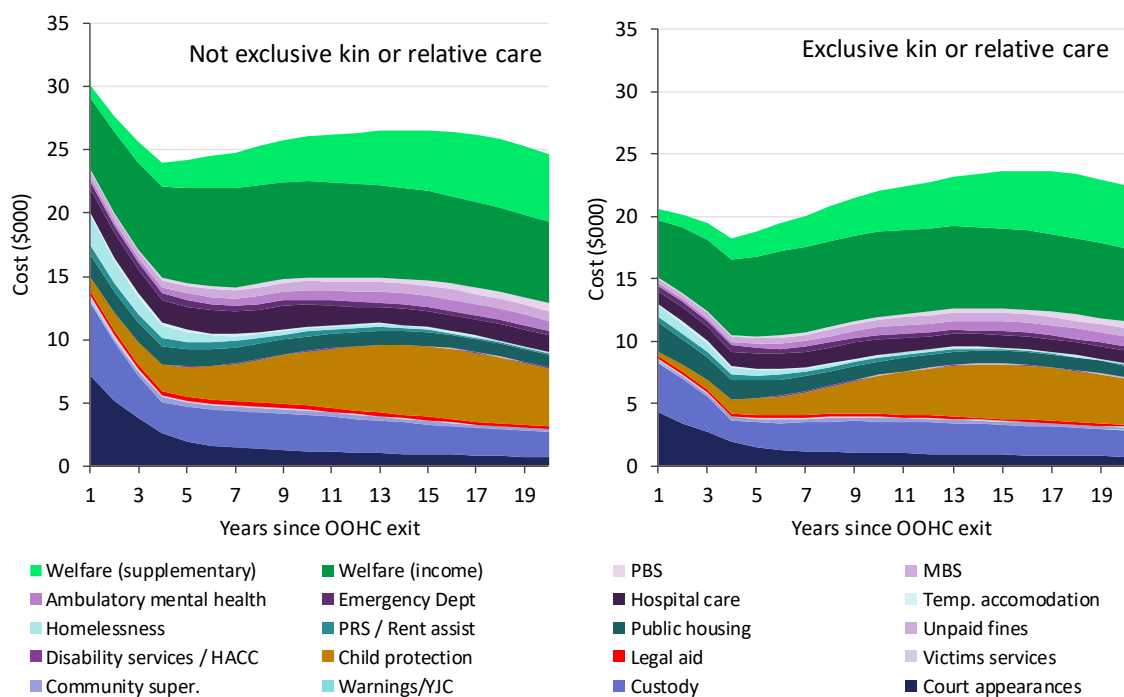
**Table 3.5 Top 10 risk-factors associated with high 20-year cost. Unless stated otherwise, risk-factors relate to years prior to OOHC exit.**

Rank	Risk Factor
1	Custody in year of exit
2	Court appearances
3	ATSI indicator
4	Intensity of Medicare use
5	Welfare receipt
6	Days in hospital
7	Number of OOHC placements
8	Number of non-kin placements in teen years
9	Homelessness services
10	Male

Each of these risk-factors has been allowed for in the model's forecasts of service usage.

Figure 3.15 shows the forecast usage pathways for members of the cohort who were exclusively in kin or relative care compared to those who spent time in foster care. The 20-year cost estimates are 17% lower for those exclusively in kin or relative care (\$430k vs \$520k). The differences in pathways are most marked in the first 5 to 10 years since exit. In general, most services are used less by those exclusively in kin or relative care. The biggest percentage difference is seen in the use of homelessness services (shown by the light turquoise area) for which forecast use is 48% less among those exclusively in kin or relative care. A possible explanation for this is a higher likelihood of remaining in the kinship household after aging out of OOHC at age 18.

**Figure 3.15 Average lifetime service usage pathways for those cohort members who were exclusively in kin or relative care versus those who were not**



### 3.5 Commonwealth Government services

In this section we provide more detail on the included Commonwealth government services and their historical and forecast usage. These are new to this iteration of the OOHC leavers model.

#### 3.5.1 Welfare

The Department of Social Services classifies a benefit as income support if it is a regular payment that helps with living costs<sup>4</sup>. Supplementary benefits are lower-rate payments available to a broader range of people (although income support recipients will often receive supplementary benefits in addition to income support). We have used this classification to group welfare payments into Income support or Supplementary for the purposes of modelling and projection. For our study cohort, the largest benefit types, by total amount paid, are shown in the following table.

**Table 3.6 Key welfare benefit types received, split into income support and supplementary payment types**

Income support	Supplementary	
Austudy	Family tax benefits	Childcare benefit
Carer payment	Abstudy	DFaCS PES (Dept. Family & Community Services)
Disability Support Pension	Carer allowance	Maternity payment
Newstart allowance	Baby bonus	Abstudy schooling applicant
Parenting payment	Mobility allowance	Paid parental leave
Youth allowance		

Rental allowance does not appear in the above table as it may be paid to clients as a component of either an income support benefit or a supplementary benefit.

<sup>4</sup> See: <https://www.humanservices.gov.au/individuals/enablers/income-support-payment-description/34696>



### Historical service use

The proportion of the cohort, split by gender, receiving each income support type around the time of exit from care is shown in Figure 3.16 below. For the figure we have allocated each person one benefit type per year - whatever benefit type they received most commonly over the year.

**Figure 3.16 Actual proportion of the cohort by benefit type for males (left panel) and females (right panel)**

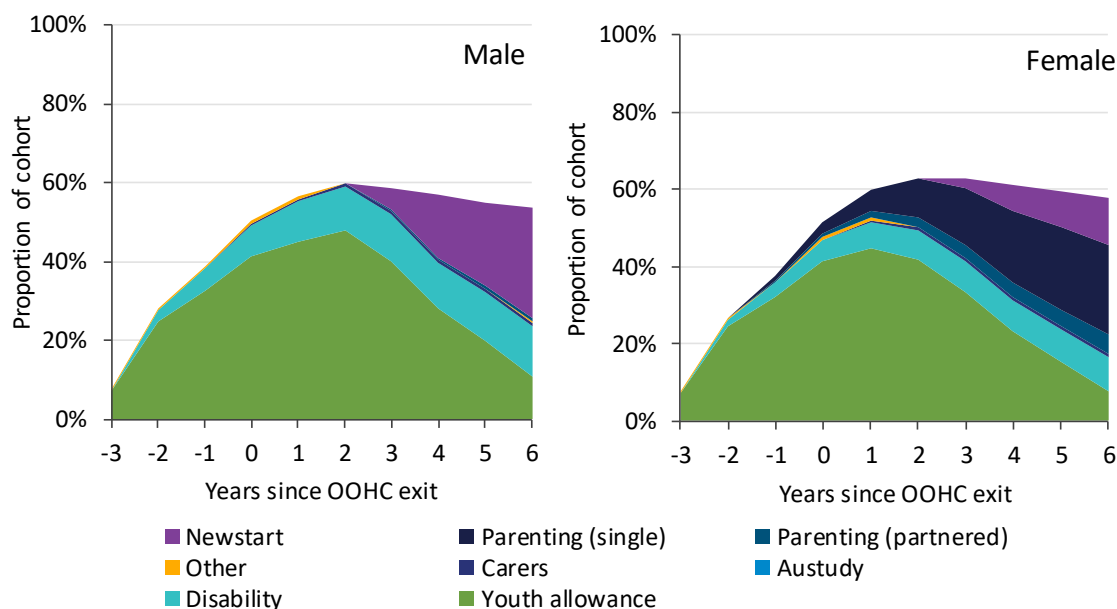


Figure 3.16 shows:

- In the year of exit about 50% of the cohort receive income support, predominantly Youth Allowance
- In the first three years following exit from OOHC, the proportion accessing income support increases to 63% for females and 59% for males
- The proportion accessing Youth Allowance decreases from about 1-2 years post exit as cohort members age and are no longer eligible for this benefit type
- A growing proportion of males and females receive Disability Support Pension payments (13% of males and 9% of females five years after exit)
- Males are twice as likely to be receiving New Start Allowance five years after exit
- Females are much more likely to receive of Parental Support benefits.

### Forecast service use

For forecasting welfare service use we have used three states to characterise an individual's welfare service use in any year:

- Full year – Received income support payments in at least 24 fortnights of the year
- Part year – Received income support payments in 1 to 23 (inclusive) fortnights of the year
- None – Did not receive income support in the year.

Figure 3.17 shows the forecast proportions of the cohort accessing income support and the average welfare payments following OOHC exit.

**Figure 3.17 Forecast proportion of the cohort by welfare state (left panel) and average cost (right panel)**

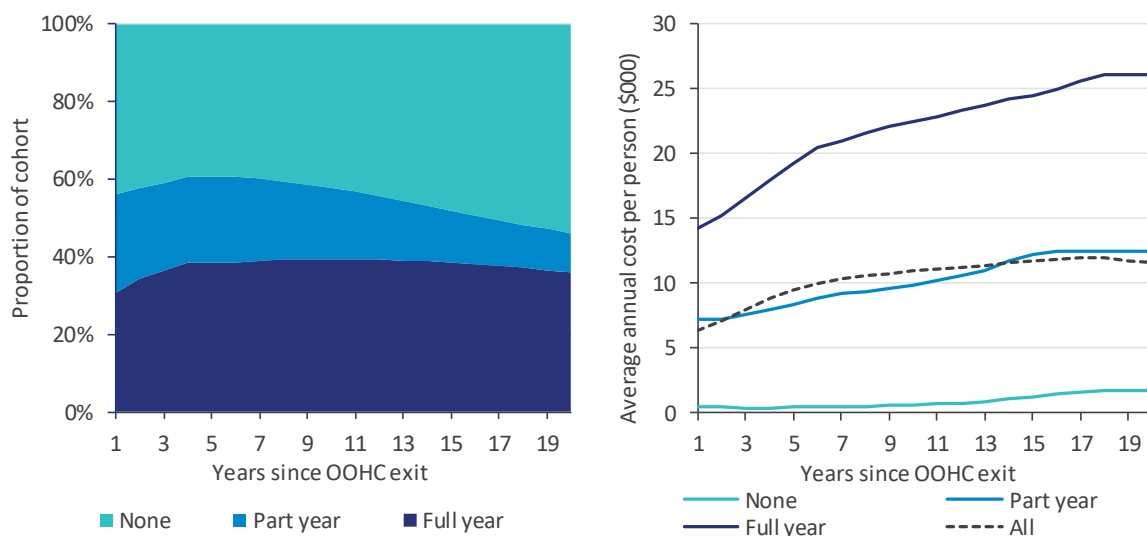


Figure 3.17 shows:

- In first year following exit more than half (56%) cohort are forecast to receive income support.
- The proportion of the cohort forecast to receive income support increases to 60% over the first three years following OOHC exit. The proportion forecast to receive income support for the full year increases from 31% in the first-year post exit to 39% by the fourth year.
- Average annual payments increase with time since exit, this is likely due to the changes in benefit types being received as people age and some have children. For those in the 'Part year' or 'None' states this may also be caused by an increase in the average number of fortnights with payments.

We have further split the segments (as in Table 3.1) by receipt of income support in the year of exit, this is shown in Table 3.7. Within a segment, leavers who received income support in their year of exit have higher 20-year costs and the increase in 20-year-Commonwealth cost is greater than the increase in 20-year-NSW cost. As an example, consider segment 1. Nearly a third (32%) of leavers after 2001 are members of segment 1. Average 20-year costs are \$210k higher for those with income support in their year of exit. Three-quarters of this increase (\$157k) relates to increased future Commonwealth service usage. This trend holds for all segments.



**Table 3.7 Segmentation of 20-year service usage costs with a further split base on income support receipt, for those exiting post 2001**

Segment	Child of leaver in OOHC care prior to leaver's exit	ATSI	Gender	Court appearance in year of exit, prior year OR custody in year of exit	Income support in year of exit	Population	Avg. NSW 20yr cost (\$000)	Avg. Cmwth 20yr cost (\$000)	Avg. total 20yr cost (\$000)
1	No	No	Female	No	No	1,851	131	174	305
				Yes	Yes	2,169	183	331	515
2				Yes	No	131	297	213	510
				Yes	Yes	259	359	359	718
3			Male	No	No	1,785	116	137	253
				Yes	Yes	1,865	153	244	397
4				Yes	No	350	429	158	587
				Yes	Yes	616	473	241	714
5	Yes	No	Female	No	No	921	241	178	419
				Yes	Yes	601	350	331	681
6				Yes	No	113	548	227	776
				Yes	Yes	161	693	353	1,046
7			Male	No	No	728	307	134	440
				Yes	Yes	362	385	232	618
8				Yes	No	250	933	161	1,095
				Yes	Yes	331	1,003	215	1,218
9	Yes	No		No	No	21	726	180	906
				Yes	Yes	59	968	365	1,333
10		Yes		No	No	19	980	173	1,153
				Yes	Yes	31	1,289	342	1,631
<b>Total</b>						<b>12,623</b>	<b>267</b>	<b>225</b>	<b>492</b>

Another welfare-related question is how it correlates to other types of need, as evidenced by other types of service usage. To explore this, we have looked at a single point in time, five years after exiting OOHC. Those with a full year of income support also showed higher service use across other key areas. This is shown in the Table 3.8 below.

**Table 3.8 Average service use five years after exit, split by welfare state in that year**

Welfare category	Number	Proportion with service use:					Increase in risk:				
		Child in OOHC care	Public housing	Hospital visits	Courts	Partial year of custody	Child in OOHC care	Public housing	Hospital visits	Courts	Partial year of custody
Full year	4,024	6%	17%	22%	16%	5%	2.4	3.1	2.6	1.7	1.2
Part year	2,259	3%	9%	17%	27%	21%	1.4	1.6	2.0	2.8	5.2
None	4,665	2%	6%	9%	10%	4%	1.0	1.0	1.0	1.0	1.0
<b>All</b>	<b>10,948</b>	<b>4%</b>	<b>10%</b>	<b>15%</b>	<b>16%</b>	<b>8%</b>					

Table 3.8 shows that, compared to those with no income support, those with a full year of income support five years after exit where:

- Twice as likely to have a child in care in the same year
- Three times as likely to be in public housing in the same year
- Two-and-a-half time more likely to have a hospital stay in the same year.

### 3.5.2 MBS and PBS use and related mental health treatments

Medicare Benefit Scheme (MBS) and Pharmaceutical Benefit Scheme (PBS) datasets have been provided through the AIHW. The MBS dataset lists events subsidised under Medicare, which covers a wide range of health services (e.g. a GP visit, an x-ray at an emergency department, surgery in hospital, etc.). The PBS dataset lists events related to prescription medications that are subsidised under the scheme.



The MBS and PBS data contains an item code, which can be used to flag mental health services. To do this we have followed the classification published by the AIHW in their report, 'Mental health services in Australia'<sup>5</sup>. MBS mental health services include mental health-specific services provided by psychiatrists, GPs, psychologists and other allied health professionals. Services occur in a variety of settings, for example hospitals, consulting rooms, home visits, over the phone, and online videoconferencing. PBS mental health services include prescriptions for a variety of mental health-related medications such as antidepressants, antipsychotics, and anxiolytics.

### Historical service use

As shown in Figure 3.18 a high proportion of the cohort (70-80%) have accessed MBS each year, including before their exit from OOHC. The average MBS cost per year among those with at least one service increases with time since exit, this reflects a higher number of services per person rather than an increase in average cost per service. As time since OOHC exit increases a larger proportion of the cohort accesses MBS mental health services (the lighter blue shaded area in the figure).

**Figure 3.18 Actual proportion of cohort accessing MBS services in any year and average cost among those who access MBS services**

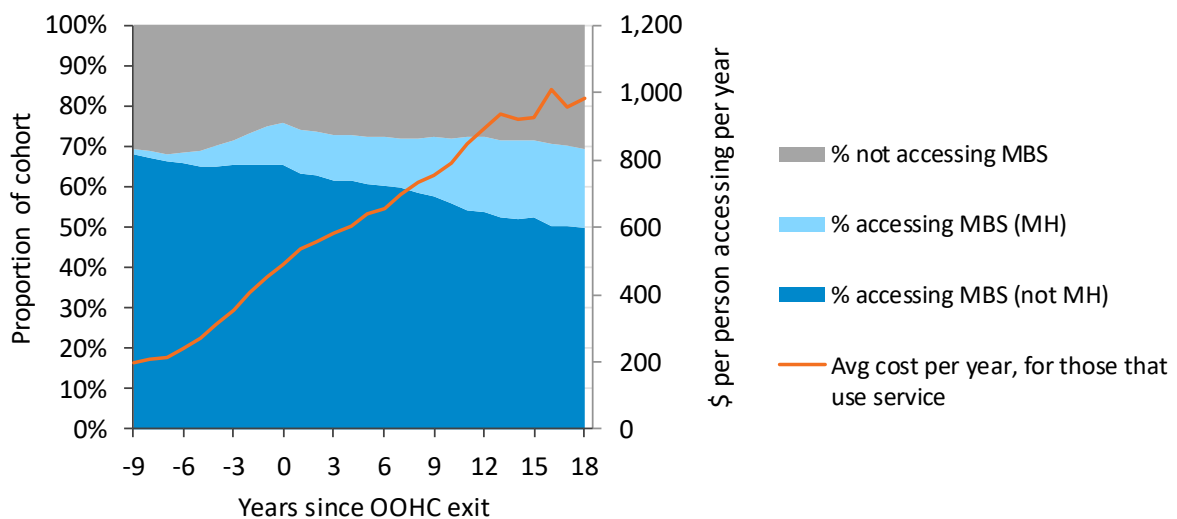


Figure 3.19 shows the proportion accessing PBS services each year is lower than that accessing MBS. In the year of OOHC exit about half the cohort receive at least one PBS subsidised prescription, this proportion increases to around 60% as time since exit increases. The proportion of the cohort accessing mental health related prescriptions also increases with time since exit. The average PBS cost per year among those with at least one prescription increases with time since exit; as with MBS this reflects a higher number of prescriptions per person.

<sup>5</sup> Available online: <https://www.aihw.gov.au/reports/mental-health-services/mental-health-services-in-australia/report-contents/mental-health-related-prescriptions>

**Figure 3.19 Actual proportion of cohort accessing PBS services in any year and average cost among those who access PBS services**

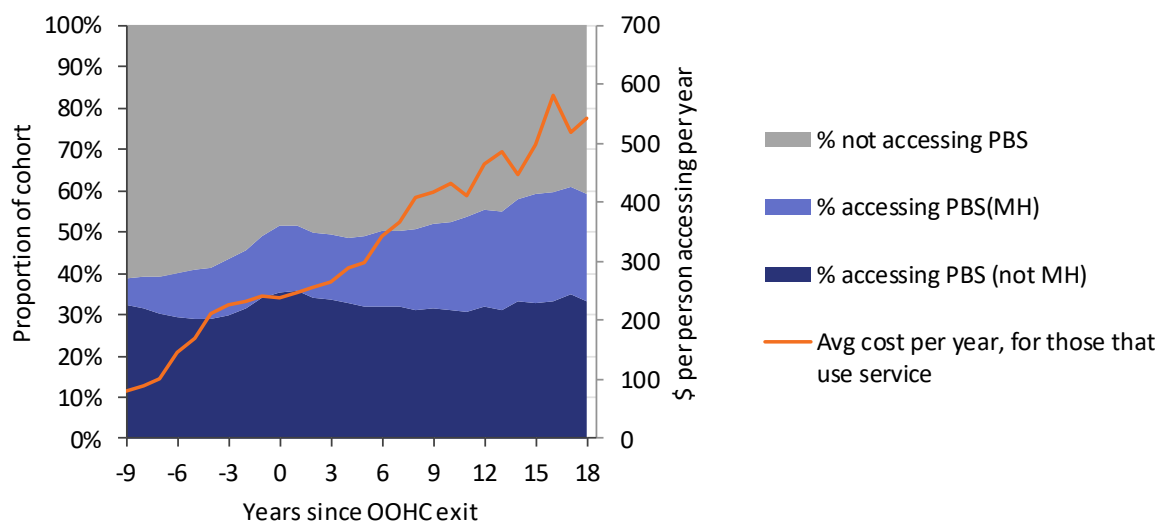


Table 3.9 below shows the proportion of the cohort of leavers accessing mental health services each year over 2010/11 to 2013/14. For the 15-24 age group, treated mental health conditions are about 50% higher for the leavers group compared to the baseline population estimate.

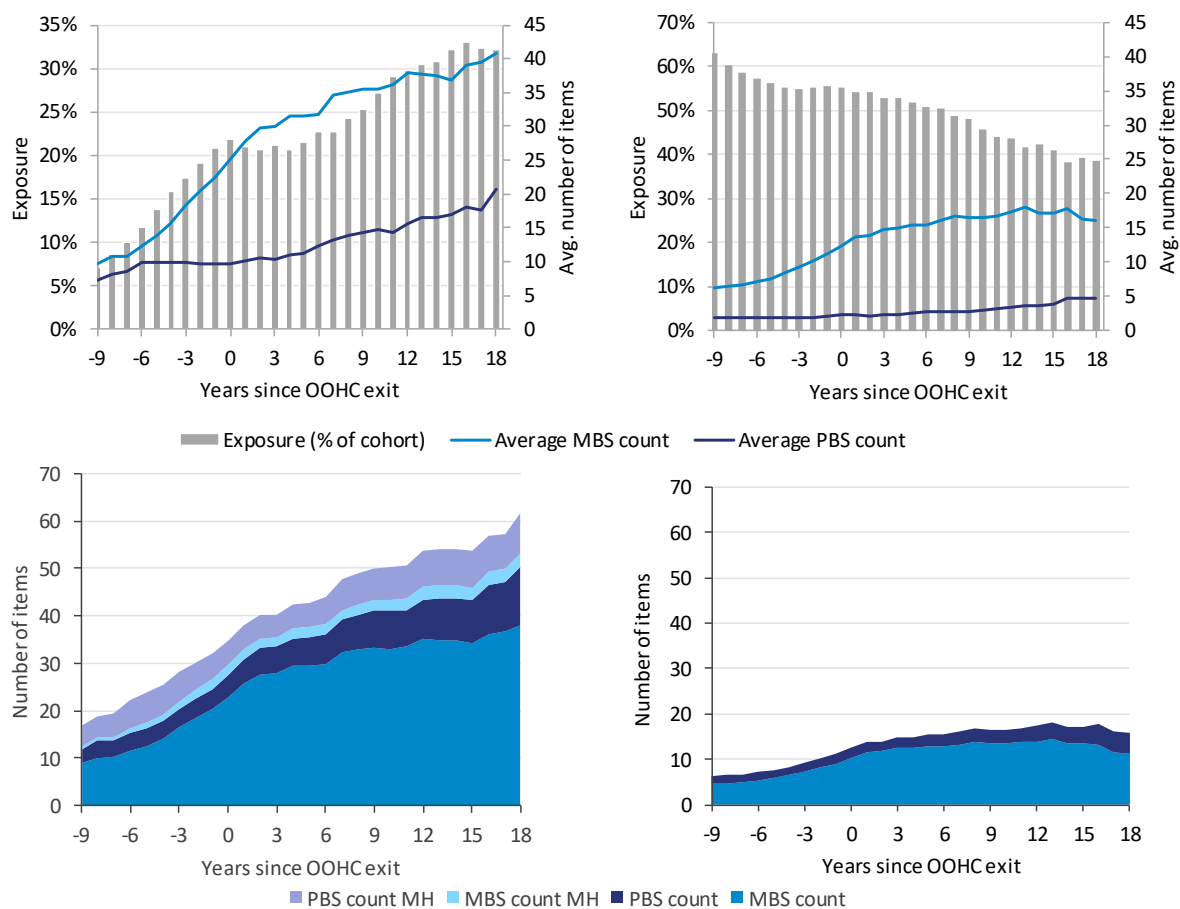
**Table 3.9 Rate of use of MBS mental health services for cohort compared to population**

Proportion of accessing MBS mental health services each year				
Age	Population	OOHC leavers, over 2011-2014		
	2016-2017	All	Female	Male
<15	5.0%	18.8%	17.7%	20.0%
15-24	12.6%	18.5%	22.1%	14.8%

Those who access MBS or PBS mental health services have much higher yearly counts of MBS and PBS services. This can be seen in Figure 3.20:

- The top left panel show the average number of MBS and PBS services in a year among people who accessed mental-health services. At eighteen years following exit, the average MBS service count is 41 over the year.
- The top right panel shows the equivalent averages among people who had at least one MBS or PBS service, but mental-health related services in the year. Eighteen years following exit, the average MBS service count is 16.
- The bottom panels split the service use for the two groups above, according to whether the services are mental health related or not. While the service use is much higher among those accessing mental health services, most of the heightened claiming rates are **not** specifically mental health related.

**Figure 3.20 Average number of MBS and PBS services, based on actual data, split according to use of mental health service in the year. Left panels are among those accessing mental health services, and right panels are those accessing services but none related to mental health.**



As with welfare, we can ask whether mental health related MBS/PBS claiming is associated with other types of increased service usage later. To explore the longer-term service use of those with mental health service usage we have split the cohort according to whether or not they accessed MBS/PBS mental health services in their year of exit. We have then looked at rates of service use five years after exit. This is shown in Table 3.10 below.

**Table 3.10 Proportion of cohort accessing key services five years following exit, split by use of mental health service in year of exit**

MBS/PBS Mental health service in exit year	Number of people	5 years after exit				
		% with child in OOHC	% in housing for some of the year	% with income support	% with a court appearance	% in custody for part of the year
No	9,617	4%	10%	56%	15%	8%
Yes	1,331	6%	13%	71%	16%	9%
All	10,948	4%	10%	57%	16%	8%

We observe that five years after exit those who accessed mental health services in their year of exit are:

- About 50% more likely to have a child in OOHC
- About 25% more likely to be in public housing
- Nearly 50% more likely to be receiving income support
- Slightly more likely to have a court appearance.

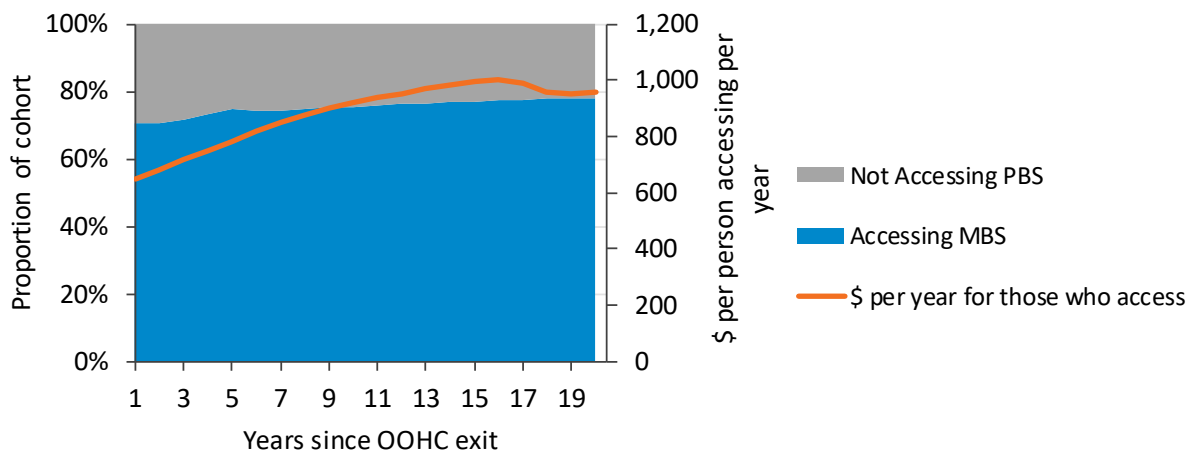


This indicates there is an increase in service use over the medium-term for those seeking support for mental health issues.

### Forecast service use

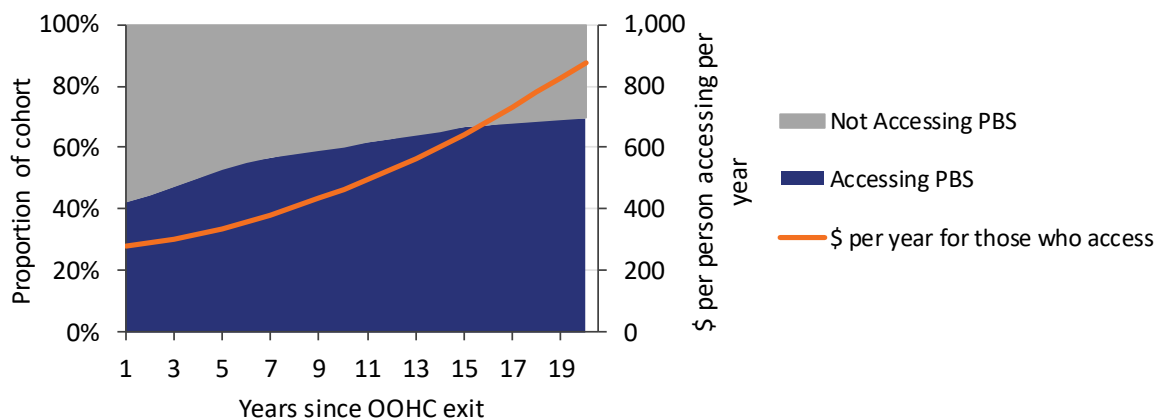
The historical usage patterns have been built into the projection model. The forecast MBS service use is summarised in Figure 3.21. We forecast a gradual increase from 70% of the cohort accessing MBS in their first year following exit to 78% in their 20<sup>th</sup> year. Over the same period the average number of services per year (among people with at least one) increases from 18 to 27. This is reflected in the increase in average annual cost per person accessing MBS which increases from about \$650 to \$950 per year over the same period.

**Figure 3.21 Forecast proportion of cohort accessing MBS and average cost per year among those accessing**



The forecast PBS service use is summarised in Figure 3.22. We forecast a steady increase from 42% of the cohort accessing PBS in their first year following exit to 70% in their 20<sup>th</sup> year. Over the same period the average number of services per year (among people with at least one) triples, increasing from 7 to 22. This is reflected in the increase in average cost per person accessing PBS which increases from about \$280 to \$870 per year over the same period.

**Figure 3.22 Forecast proportion of cohort accessing MBS and average cost per year among those accessing**



Over the 20-year forecast the average total MBS service costs are \$13k and the average PBS service costs are \$7k per person. However, as shown in Table 3.11, this varies significantly by gender with female service use expected to be more than double that of males.

**Table 3.11 Average 20-year MBS and PBS service costs, selected subgroups**

Child of leaver in OOHC care prior to leaver's exit	Gender	Number in cohort	Avg. 20yr MBS service cost (\$000)	Avg. 20yr PBS service cost (\$000)
No	Female	7,809	18.2	8.5
	Male	7,712	8.3	4.4
Yes		164	21.7	10.4
<b>All</b>		<b>15,685</b>	<b>13.4</b>	<b>6.5</b>

### 3.6 Conclusion: Relevance of key findings

Understanding long-term pathways and costs can help to build a business case for prevention activities such as social investment transactions to improve outcomes for vulnerable groups. Such transactions may also offer opportunities to reduce the long-term costs associated with high service usage.

**The average cost to NSW and the Commonwealth of meeting the modelled service needs of an OOHC leaver is estimated to be about \$496,000 over 20 years.** The 20-year cost to the NSW Government of meeting the modelled service needs of an OOHC leaver is estimated to be \$269,000.

**The total modelled cost for the entire cohort included in this study is estimated to be around \$8.1 billion over the 20 years following exit from OOHC.** Just over half (54%) of the \$8.1 billion relates to NSW service usage that largely correlates with poor social outcomes such as child abuse and neglect, criminal activity, and health crises. Almost a fifth (18%) of the \$8.1 billion cost is justice-related, 14% comprises OOHC costs for the next generation and 8% comprises hospital costs. This suggests that breaking the cycle of family violence, and reducing risky or criminal behaviour are important components of a strategy to improve outcomes and reduce long-term costs for OOHC leavers. The correlation of education with reduced costs suggests improving educational outcomes may be important also. The remaining costs (46%) relate to Commonwealth service usage, the vast majority of which is welfare payments (42%).

**Risk and cost are highly concentrated** within a few low-volume segments. The average 20-year costs are highest for OOHC leavers with a child in OOHC themselves before exit and for ATSI males with court appearances or custody spells around their time of exit. For these groups the costs are three-and-a-half times higher than for the lowest-risk/cost segment of OOHC leavers. The relative difference in 20-year NSW Government costs is even larger.

**Service usage pathways are generally high and vary considerably between segments.** Some notable examples:

- In general, OOHC leavers' children are more than 10 times more likely to also need OOHC compared to the general population. This varies markedly by gender; 20% of females and 11% of males in the cohort are forecast to have a child in OOHC sometime in the 20 years since exit from care.
- Court appearance, time in custody and ambulatory mental health costs are on average significantly higher for males compared to females. We estimate that over 90% of male ATSI leavers with previous court or custody history will have future time in custody after OOHC exit.
- Commonwealth costs are higher for females than males. On average, welfare costs are 30% higher, and Medicare and Pharmaceutical benefit scheme costs are double for females compared to males.
- More than half of all OOHC leavers utilise some form of homelessness assistance. Homelessness services are used 48% less by those OOHC leavers who were exclusively in kin or relative care.

- On average leavers will spend one-and-a-third years in public housing in the 20 years after exit from care. It is up to double this amount for ATSI leavers.

Characteristics upon exit from care that are associated with higher long-term service usage and costs can be **useful in selecting target groups** for interventions to improve outcomes. For example, court appearances prior to leaving OOHC combined with ATSI status may be relevant for cohort definition.

Early patterns of service usage following exit from care that are associated with higher long-term service usage and costs can be **useful in developing indicators** to measure progress for such interventions. For example, reduced time in custody or reduced court appearance after leaving OOHC (compared to expected) are examples of potential indicators of near-term progress.

The very limited discussion of general population-level trends in Sections 3.2.3, 3.3.5 and 3.5.2 suggests that even the lower risk segments of OOHC leavers may have higher than average service usage over the long-term. Applying a similar method to a broader population of NSW service users would provide a more reliable basis for comparison, potentially also opening up the opportunity to compare savings across different social investment programs.

We also note that the indicators above point to other potential high-risk groups that may not be fully captured within the OOHC leaver population such as young offenders, youth with mental health issues, and ATSI youth. Early contact in youth with health and justice services, and ATSI status appear to be indicators of higher service usage over the life course.

### 3.6.1 Strengths and limitations of the approach

The current approach selected for this analysis was chosen because it:

- Provides an objective estimate of the long-term service usage costs of the cohort
- Provides a cross-agency view of the full cost of NSW service usage
- Provides a view of key Commonwealth service costs
- Offers insights into pathways and risk factors for high service usage.

The approach does have some limitations. **One limitation of this approach is that the intervention logic is unclear.** That is, there is no distinction between costs that are ‘investments’ and costs that are associated with poor outcomes. In other words, higher or lower costs are not uniformly associated with a poorer outcome; for example, some expenditures are preventative in nature. Some service costs were excluded from scope for this reason – notably education costs. Education is generally viewed as an investment in improving people’s long-term outcomes and economic viability – higher education tends to be correlated with better rather than worse social outcomes. Therefore, in this work education information is included as a characteristic to provide insight into risk of high service usage, but not as a cost associated with service usage.

**A second limitation is that having high cost does not necessarily mean costs can be reduced.** Some of the highest cost individuals will have limited opportunity for intervention – for example, people currently serving an extended sentence or receiving long-term health care. Furthermore, some costs are fixed in the short-term – such as jail infrastructure – and so improvements in outcomes for individuals may not result in cost reductions in the short-term. Similarly, wait lists for social housing may mean that there is cost substitution – improvements in outcomes may reduce the size of wait lists but not costs. Furthermore, in some cases service costs may represent an upper bound of savings and not necessarily be reduced to zero by an improved outcome. For example, if someone finds employment their welfare payments may reduce as they no longer receive income support, however they may still be eligible for supplementary payments.

**Another limitation is the lack of a general population baseline for comparison.** We have made some broad comparisons to general population statistics where readily available in Sections 3.2.3, 3.3.5 and 3.5.2.

### 3.7 Contents and potential applications of this report

In summary, this report:

- Quantifies the long-term (20-year) costs to the NSW and Commonwealth Governments of meeting the service needs (for modelled services) of OOHC leavers who left care between 1996/97 and 2013/14 (inclusive) and were aged between 14 and 18 when they left.
- Examines how these costs are concentrated by service type – providing insight into the long-term pathways of OOHC leavers.
- Breaks OOHC leavers into ‘segments’ based on their level of risk of poor long-term outcomes as indicated by high service usage costs – to understand how pathways differ, and to identify subgroups at particularly high risk of exceptionally high service usage.
- Estimates individual long-term service usage pathways for the population – to make more detailed observations about the impact of risk-factors on an individual’s future service usage.
- Documents our approach to developing a dataset and our modelling approach.

There are a range of **potential applications** for this analysis, including:

- **Understanding where high service usage costs are concentrated** (by service type and by sub-group of OOHC users) in order to identify opportunities to improve outcomes for vulnerable groups.
- **Tailoring service approaches** to different segments, based on a better understanding of their expected service usage pathways.
- Understanding risk factors that are associated with high service usage pathways in **order to target interventions and develop indicators of effectiveness** in improving problematic trajectories
- **Setting a benchmark** for expected long-term service usage pathways and costs based on historical patterns, **in order to measure change** from expected pathway as a result of new interventions and/or continual improvement of existing service offerings.



## 4 APPROACH

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### 4.1 Introduction

This section explains our approach to estimating lifetime pathways and costs for OOHC leavers. It outlines:

- Our approach to developing a linked cross-agency data set of service use
- Our approach to forecasting pathways of service use and long-term costs
- Our approach to identifying segments of OOHC leavers that have different expected long-term costs
- Considerations in interpreting the analysis – such as assumptions, uncertainty and other limitations.

### 4.2 Developing a linked dataset

#### 4.2.1 Identifying the cohort

Members of the cohort were identified by FACS. The cohort consisted of 16,279 cases each identified by the Statistical Linkage Key identifier (SLK-581). SLK-581 is a key that is constructed by concatenating:

- 3 letters selected from the surname
- 3 letters selected from the surname
- 8 digits from the date of birth
- 1 character representing the person's gender.

For privacy reasons the SLKs were encrypted by FACS. For each member of the cohort FACS provided:

- Demographic characteristics, such as age, gender, location and language
- Information about the individuals OOHC history, such as age of exit, length of time in OOHC.

Information of the educational attainment for the cohort was provided by the Board of Studies Teaching and Education Standards (BOSTES).

#### 4.2.2 Service usage data

Service usage data relating to cohort members was provided by the following agencies:

- NSW Bureau of Crime Statistics and Research (BOCSAR) provided two datasets covering court, caution, warning and youth justice conference events, and the resulting findings as well as custody events (including remand), and some status/outcome information
- The Centre for Health Record Linkage (CHeReL) provided three datasets covering hospital admissions, emergency department usage and ambulatory mental health service usage
- FACS provided details on the children of leavers who had also had an OOHC placement along with information about the OOHC history for these children
- FACS provided details on social housing spells, temporary accommodation and cost, details on rental assistance and rent subsidy payments, as well as the use of disability services and home and community care
- Victims Services provided details of the number, type and cost of victims support services
- Corrective Services provided details on the number and duration of periods of community supervision

- The Department of Finance, Services and Innovation provided details on the number and value of unpaid fines
- The AIHW provided details on the use of homelessness services recorded in the Specialist Homelessness Services Collection and the Supported Accommodation Assistance Program Collection
- Legal Aid NSW provided details on the use of legal aid
- The Department of Human Services (with linkage via the AIHW) provided details on the use and cost of welfare support via Centrelink payments
- The AIHW provided details on the use and cost of medical services subsidised by the MBS
- The AIHW provided details on the use and cost of prescriptions subsidised by the PBS.

Service usage was linked to the cohort using encrypted SLKs.

#### 4.2.3 Construction of linked datasets

Two datasets were created to identify risk factors and model service usage pathways:

- A **'characteristics on leaving'** dataset – this dataset consisted of one row per cohort member showing a range of characteristics related to demographics, OOHC history, educational achievement and service usage up to the financial year of exit.
- A **'timeline post leaving'** dataset – this dataset consisted of one row per cohort member per year through to 2014/15 showing the history of service usage across the 18 service types summarised in Table 2.1. The service usage showed the following information by type of service:
  - How many units were used over the last year
  - The average units used over the preceding two and five years
  - The number of consecutive years the service had been used up to the current year.

#### 4.2.4 Data limitations

##### Time period coverage and service usage matching rates

The service usage data provided by agencies was incomplete in some of the earlier time periods. This is illustrated in Figure 4.1 which shows that the coverage is complete between 2005/06 and 2013/14, but incomplete prior to 2005/06. Of particular note are health related service use data. Between 2002/03 and 2004/05 emergency department data is unavailable, between 2000/01 and 2001/02 hospital admission data is unavailable and prior to 2000/01 all health data is unavailable. The incomplete service usage information means that particular caution needs to be placed on lifetime cost estimates for those members of the cohort who exited prior to 2002/03.

**Figure 4.1 Time period coverage and service usage matching rates**

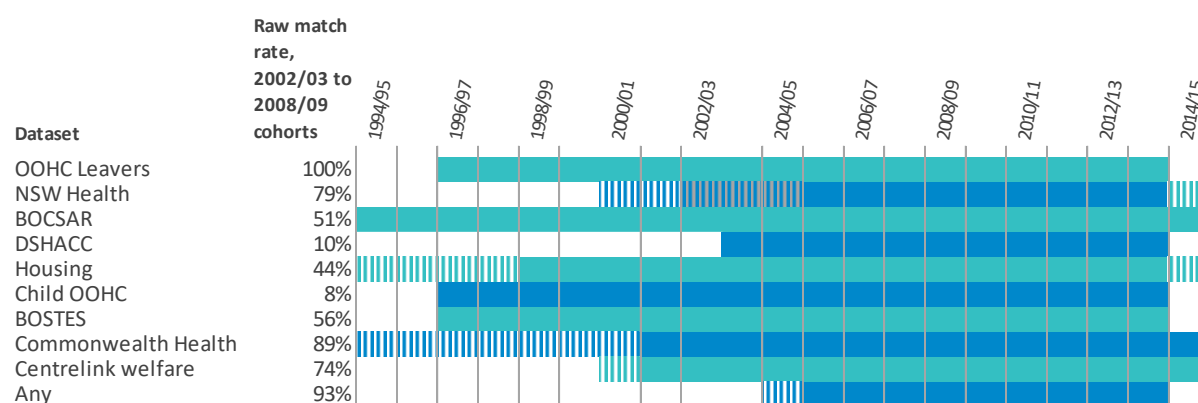


Figure 4.1 also shows the match rate between the service usage datasets and cohort members who exited between 2002/03 and 2008/09. This cohort can be considered to have a reasonably complete service usage history and for this cohort we observe that about 93% of members have at least one service usage, 89% have at least one Commonwealth health service usage and 79% having at least one NSW health service usage. Overall, we see reasonably good match rates for health, welfare, housing and BOCSAR.

As noted earlier in this report, the matching of service use records to the cohort has occurred via an encrypted SLK. This identifier has known limitations. In particular:

- It is possible for there to be failure to match the service usage of an OOHC leaver to that leaver because they change their name (say as the result of marriage), use an alias, or if there are errors in the spelling of their name or their date or birth.
- It is possible to falsely assign service usage to an OOHC leaver because of similarities in names and dates of birth with another person.

The relatively high match rates for health, housing and BOCSAR is reasonably encouraging. Nevertheless, the known limitations of SLKs mean that some service usage for the cohort may be missing. A quantification of the impact of this issue was outside the scope of this project.

### Overlapping spells

The data show a number of instances of overlapping spells. Overlapping spells occur when a cohort member is recorded as using a service that overlaps with the use of another service in an inconsistent way. These overlaps can occur both within a sector (for example simultaneous custody spells) and across sectors (for example a member is shown to be both simultaneously in custody and in social housing). A quantification of these overlapping spells shows:

- 2.8% of days in social housing have the same SLK in another tenancy on the same day
- 3.0% of days in custody have the same SLK in another custody spell on the same day
- For 0.9% of days in social housing, the SLK is also recorded as in custody
- For 10% of the temporary accommodation events, SLK already in a social house tenancy that day.

Overlapping spells for hospital data cannot be accurately measured as we are provided with month of admission, rather than day.

For custody spells we removed overlaps so that the overlapping periods were not double counted. No adjustments were made for the other overlaps. The impact of the remaining overlapping spells on the accuracy of the projection is expected to be small relative to the other uncertainties in the model.

## 4.3 Overview of forecasting approach

Forecasts of long-term costs were made for each individual in the cohort by:

- Forecasting service usage across the 18 different service types shown in Table 2.1 on a yearly basis for 20 years after exiting care.
- Determining the 'per unit' service costs for each service type. For example, the cost per court appearance, the daily cost of custody, or the average cost of victims services each year for those who receive such services.
- Multiplying the forecasts of service usage with the assumed per unit service costs to determine the cost per service type per year for each individual. These costs were then aggregated by service type, year and individual to estimate total 20-year service cost for individuals, segments or the cohort as a whole.

Further detail on these three steps follows.

### 4.3.1 Forecasts of service usage

Forecasts of service usage were made using statistical models constructed by analysing the historical service use pathways in the cohort. These models give predictions of service usage in a financial year that depend on:

- The characteristics associated with each individual at the time they exited, such as age, education, and length of time in care. Certain characteristics are 'risk factors' for elevated service usage pathways (as shown in the 'characteristics on leaving' dataset – see Section 4.2.3)
- The path of past service usage up to the financial year of interest (as shown in the 'timeline post leaving' dataset – see Section 4.2.3).

The process of forecasting service use has two distinct steps: first construct the statistical models of service use, and then make forecasts using those models. These are described in turn.

#### Approach to constructing statistical models of service use

The statistical models of service use were built using Generalized Linear Models (GLMs). For example, a GLM will model the probability that someone is in custody next year, based on their current characteristics.

For service-use models the process of selecting the variables that were used in the model involved:

- Creating a short-list of variables that are considered the strongest risk factors for predicting future service use. This was done using a machine learning algorithm.
- Refining the short-list by eliminating those risk factors which were highly correlated with other risk factors. Highly correlated variables were identified using correlation analysis and variable clustering algorithms.
- Evaluating the strength of the risk factors within the GLM.

#### Forecasting service use

The statistical models of service use make predictions of service use in a financial year that depend on the characteristics of the OOHC leaver at exit and the path of past service usage up to the financial year of interest. Using such models it is possible to forecast service usage over a projection window of 20 years by chaining together model predictions. The chaining occurs as follows:

- Starting with the known characteristics at exit for an OOHC leaver and their pathway of service use up to and including the financial year of exit, the service use models are used to forecast service use in the **first year post exit** for the leaver
- Then, using both the characteristics at exit and the pathway of service use up to the **first year post exit**, a forecast is made for the **second year post exit** for the leaver
- This process is then repeated until a forecast is made for the last year in the 20-year window.

The future service use of any individual can never be forecast with certainty. The models of service use deal with this by forecasting both the expected average future service use and the distribution of possible service use. When chaining together service use models it is important that the process is done by randomly selecting from the range of possible service outcomes rather than just using the expected service outcome.

Using this approach, each forecast (or **simulation**) for an individual shows one possible service use pathway. By performing many simulations (500 for this study) a distribution of possible service usage outcomes for an individual is estimated. By averaging over all (500) simulations for an individual, an average individual service usage pathway is obtained.

#### 4.3.2 'Per-unit' service costs

Having made forecasts of future service use, the next step is to determine the 'per unit' cost assumptions associated with service use. In general, there is no fixed price associated with service use and we have had to rely on the approximate cost allocations made by the relevant government departments and agencies to determine these assumptions.

#### 4.3.3 Determining total 20-year costs

The cost per service type per year for each individual was estimated by multiplying the forecasts of service usage each year with the assumed per unit service costs. Results can then be aggregated in a number of ways including:

- The average 20-year cost for each individual
- The average 20-year cost for each segment
- The average 20-year cost for the total cohort.

#### 4.3.4 Inflation and discounting for the time value of money

All service unit cost estimates and cost forecasts shown in this report are in 2014/15 values. No allowance has been made for future service cost inflation. In addition, the cost estimates have not been discounted to allow for the time value of money.

As at April 2018 the yields on 10-year T-Corp bonds were around 2.5%. This is similar to the expected rate of inflation for service costs. Hence, had we allowed for both inflation and the time value of money, the impact on the 20-year cost estimate would have been small relative to the uncertainty in the cost estimates.

### 4.4 Identifying segments of OOHC leavers that have different long-term costs

To identify average pathways based on patterns of higher and lower service usage, we segmented the OOHC leavers' cohort into segments that differentiate meaningfully between their average 20-year NSW Government costs. The segmentation is based on characteristics at exit from OOHC that are most important in predicting their expected pathways/costs.

The segmentations were built with the aid of a Classification and Regression Tree (CART) which segmented the cohort into segments which minimised the mean squared error of 20-year cost.

### 4.5 Assumptions, uncertainty and limitations

#### 4.5.1 Reliance on data

In preparing this report, Taylor Fry has relied on historical data and other quantitative and qualitative information supplied by FACS and a number of Government agencies. It has not been Taylor Fry's function to audit or verify the accuracy of the data. We did however carry some high-level checks on the data, including some checks for internal consistency, with significant issues raised with Treasury. We have found no indications of material inaccuracies. However, data accuracy remains the responsibility of the NSW Government and any material discrepancies discovered in the data should be reported to Taylor Fry. The conclusions drawn in this report are sensitive to data inaccuracies and our advice may alter if material inaccuracies are discovered.

#### 4.5.2 Uncertainty

The cost estimates provided in this report are highly uncertain and should be treated as indicative only. The key sources of uncertainty were summarised in Section 3.2.6 and include:

- Known limitations in the unique identifier (the SLK) used to link cross-agency service use to each member of the cohort is likely to lead to some underestimation of service usage by the cohort. The quantification of this underestimation was outside of the scope of this project and we cannot comment on its likely size.
- Service use is also inherently variable and different exit year cohorts can show very different levels of service use. Furthermore, some service types have seen large time-related trends and this increases uncertainty as it is evidence that future trends may emerge that are not easily predicted.
- The estimates of service use beyond 15 years after exit are based on very little data and are particularly uncertain. The only service use information we have beyond 15 years comes from those who exited OOHC in 1996/7 and 1997/8 and the service usage for these years is at most 17 years post exit.
- The historical data provided for this analysis has not been audited for accuracy. Errors in the supplied data could materially change the results of this analysis.
- The estimates of costs for each service type are also highly uncertain as there is no fixed price for these services. We have relied on input from the relevant Government agencies and the NSW Office of Social Impact Investment when setting these assumptions.

Furthermore, the uncertainties in the cost estimates at the overall cohort level are magnified at the segment level. In general, the smaller the size of the segment the more uncertainty there is around the accuracy of the cost estimate.

#### 4.5.3 Limitations on use

Detailed judgements about the methodology, analyses, assumptions and cost estimates presented in this report should be made only after considering the report in its entirety. Sections of the report could be misinterpreted if they were considered in isolation. Other cost and technical assumptions have been provided to NSW Treasury.

The purpose of this project is to:

- Quantify the long-term costs to the NSW Government of meeting the service needs of OOHC leavers
- Quantify the long-term costs to the Commonwealth Government of meeting the service needs of OOHC leavers
- Identify segments of OOHC leavers that have different expected long-term costs
- Understand how the lifetime service usage pathways of these segments differ.

No reliance should be placed on this report for any other purpose without first confirming with us that such a purpose is appropriate. Taylor Fry specifically disclaims any responsibility or liability to any party which might claim to suffer any loss as a direct or indirect consequence of relying on this report for any purpose other than the specific purpose described in the previous paragraph.