



# Pathways to Homelessness

FINAL REPORT – DECEMBER 2021

NSW Department of Communities and Justice



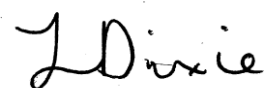
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# Glossary

Acronym/term	Name
Aboriginal people	Aboriginal, when used in this report, is inclusive of Aboriginal and/or Torres Strait Islander people/s.
ABS	Australian Bureau of Statistics
ADM	Admitted Patient information, including the number and length of (public) hospital stays
AH&MRC	Aboriginal Health and Medical Research Council
AIHW	Australian Institute of Health and Welfare
AMH	Ambulatory Mental Health services Specialised mental health services that provide services to people who are not currently admitted to a mental health admitted or residential service, including community-based crisis assessment and treatment teams, day programs and mental health outpatient clinics.
BOCSAR	Bureau of Crime Statistics and Research – Data on court appearances, youth justice events and time in custody were all sourced from the BOCSAR. Throughout the report we have grouped youth justice conferences and youth police cautions with court appearances.
CHeReL	Centre for Health Record Linkage
CMW	Commonwealth
D&A	Drug and Alcohol
DFV	Domestic and Family Violence Includes any behaviour, in an intimate or family relationship, which is violent, threatening, coercive or controlling, causing a person to live in fear.
DCJ	Department of Communities and Justice (former FACS and former Department of Justice)
DOMINO	Data Over Multiple Individual Occurrence Event-based data on individuals providing a longitudinal picture of the interaction of individual welfare recipients throughout their interactions with DSS payments.
DSP	Disability Support Pension
DVA	Department of Veterans Affairs
ED	Emergency Department
FACS	Department of Family and Community Services
Family services	Discussion sessions or other support dealing with family and relationship problems or issues. Also termed ‘relationship assistance’.
Homelessness Services	Specialist Homelessness Services (SHS) and Temporary Accommodation (TA)
HREC	Human Research Ethics Committee
MBS	Medicare Benefit Schedule
MEF	Medicare Enrolment File
MH	Mental health
NAPLAN	National Assessment Program – Literacy and Numeracy

Acronym/term	Name
NESA	NSW Education Standards Authority
OOHC	Out-of-home care The care of a child or young person who is in the parental responsibility of the Minister, or a non-related person, as a result of a Children’s Court order that lasts more than 14 days, or because they are a protected person.
Pathway	A series of events or services experienced by an individual
PBS	Pharmaceutical Benefit Scheme
PHSREC	Population and Health Services Research Ethics Committee
PRA	Private Rental Assistance
PRS	Private Rental Subsidy
RA	Rent Assistance, as provided through the Commonwealth welfare system
RoGS	Report on Government Services
SHS	Specialist Homelessness Services Assistance provided by a specialist homelessness agency aimed at responding to or preventing homelessness. Support includes accommodation provision, assistance to sustain housing, domestic and family violence services, mental health services, family/relationship assistance, disability services, drug/alcohol counselling, legal/financial services, immigration/cultural services and other general assistance and support.
SHSC	Specialist Homelessness Services Collection
SLK	Statistical Linkage Key
Social housing	Secure and affordable rental housing provided by not-for-profit, NGO or government organisations for people on low incomes who are unable to access suitable accommodation in the private rental market. The datasets included in this study cover public and Aboriginal housing.
SURE	Secure Unified Research Environment
TA	Temporary Accommodation – Emergency accommodation in low-cost hotels, motels, caravan parks, boarding houses and similar accommodation for people who are experiencing a housing crisis or homelessness. TA is designed to meet a gap in the service system by providing a short-term accommodation response for people without complex needs while they arrange more suitable longer-term accommodation. It is intended that people with complex needs requiring support receive accommodation and support from Specialist Homelessness Services (SHS).
Welfare	The following categories of welfare payments are included in the analysis: <ul style="list-style-type: none"> <li>▪ Disability Support Pension</li> <li>▪ Working age payments, predominantly Jobseeker (formerly Newstart Allowance)</li> <li>▪ Parenting Payment</li> <li>▪ Student payments, including Austudy, ABSTUDY and Youth Allowance</li> <li>▪ Age Pension</li> <li>▪ Carers Payment and allowances</li> <li>▪ Family Tax Benefit</li> <li>▪ Other family payments, including childcare and parental leave</li> </ul>
YJC	Youth justice conference

# A

## Executive summary

# Executive summary

## Background and purpose

The NSW Department of Communities and Justice (DCJ) commissioned Taylor Fry to prepare this report on Pathways to Homelessness, with support from stakeholder agencies. It presents a detailed investigation into what happens to people before, during and after homelessness.

Homelessness is a complex social issue with multiple and interwoven causes and impacts. An effective response requires an integrated approach across a range of services, including homelessness, housing, income support, health, justice, community services and education.

The NSW Homelessness Strategy 2018-2023 provides a framework for collaborative action, with a focus on prevention and improving the way services respond to people experiencing homelessness.

Pathways to Homelessness is a key action under the Strategy to improve the evidence base for prevention and early intervention. The project analyses a major cross-agency linked dataset to:

- Identify key risk factors to support early identification of groups at higher risk of homelessness
- Identify elevated government service use and costs associated with homelessness to inform investment in initiatives with the greatest potential to improve outcomes across the whole service system.

The findings also support key initiatives to deliver the Premier's Priority to halve street homelessness by 2025, including those with a focus on people exiting government services such as social housing, health facilities and correctional centres.

## Data and approach

The linked dataset created for this project is one of the most comprehensive datasets related to homelessness in Australia, covering over 625,000 people across 19 NSW and Commonwealth services. The study population is formed using a case and comparison design:

- The case group is 202,927 people who accessed Specialist Homelessness Services (SHS) in NSW from 1 July 2011 to 30 June 2017.
- The comparison (control) group is a random sample of 422,934 people in NSW, matched for age band and sex.

The dataset is large enough to be able to meaningfully analyse homelessness risk across the entire NSW population.

Table 1 – Services linked in the dataset

Sector	Administrative data
Homelessness	Specialist homelessness services (SHS) Temporary accommodation (TA)
Justice	Court appearances – including Youth Justice: Police cautions, conferences, Children’s Court Time in custody Police-recorded victim incidents Legal aid
Health	Number and length of hospital stays Emergency department presentations Ambulatory mental health services Births and deaths Controlled drugs of addiction Ambulance callouts Medicare use (aggregated) Pharmaceutical Benefit Scheme (PBS) prescriptions (aggregated)
Housing	Social housing tenancies Private rental subsidies and private rental assistance
Child protection	Out-of-home care (OOHC) placements
Education	NAPLAN and educational attainment
Welfare	Centrelink payments via DOMINO
Population	Medicare enrolment file <sup>1</sup>

For this study, homelessness services include Specialist Homelessness Services (SHS) and Temporary Accommodation (TA).

SHS provide services aimed at prevention and early intervention, as well as crisis and post crisis assistance to support people experiencing or at risk of homelessness. This includes crisis accommodation, but also assistance for people who are couch-surfing or living in overcrowded conditions, support to establish long-term housing or stabilise an at-risk tenancy, and support for victims of domestic and family violence (DFV).

TA is emergency accommodation provided by DCJ in hotels, motels, caravan parks, boarding houses and similar accommodation for people who are experiencing a housing crisis or homelessness.

## Overview of analysis

The research applies a set of analyses to the data:

1. Descriptive statistics to understand the key characteristics of homelessness presentations.

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<sup>1</sup> The Medicare enrolment file was used for defining the comparison cohort but is not counted as an additional service use category in our analysis.

2. Predictive modelling to identify people with a high likelihood of accessing homelessness services in the future, and associated factors to support intervention.
3. Two-way pathway analysis, which looks at homelessness presentations that follow other service use, to identify potential intervention points and estimate the elevated cost across government services for people experiencing or at risk of homelessness.
4. Additional analysis on vulnerable cohorts, including:
  - Financial hardship
  - Mental health conditions
  - Substance use
  - Domestic and family violence (DFV)
  - Exiting custody
  - Leaving out-of-home care (OOHC)
  - Aboriginal people.

### Limitations to the study

Some people experiencing homelessness are not visible in the administrative data, for example unmet requests for support and people who do not seek support from homelessness services. However, SHS presentations and TA support are measures of homelessness that are the most amenable to administrative data linkage and analysis.

The results of the predictive modelling are correlations rather than causative effects. Often service use correlation can be driven by underlying factors that are not fully visible in the administrative data, such as substance use or low income.

Accessing homelessness services is a proxy indicator to assess the risk of homelessness. It is important to note that in certain circumstances this risk increases after using other government services partly by design and may reflect the effectiveness of referrals. For example, people leaving custody who are at risk of homelessness may be referred to homelessness services for assistance.

The findings include limited information on outcomes. For example, if someone leaves social housing their subsequent housing status is often unclear unless they seek further support from Government services.

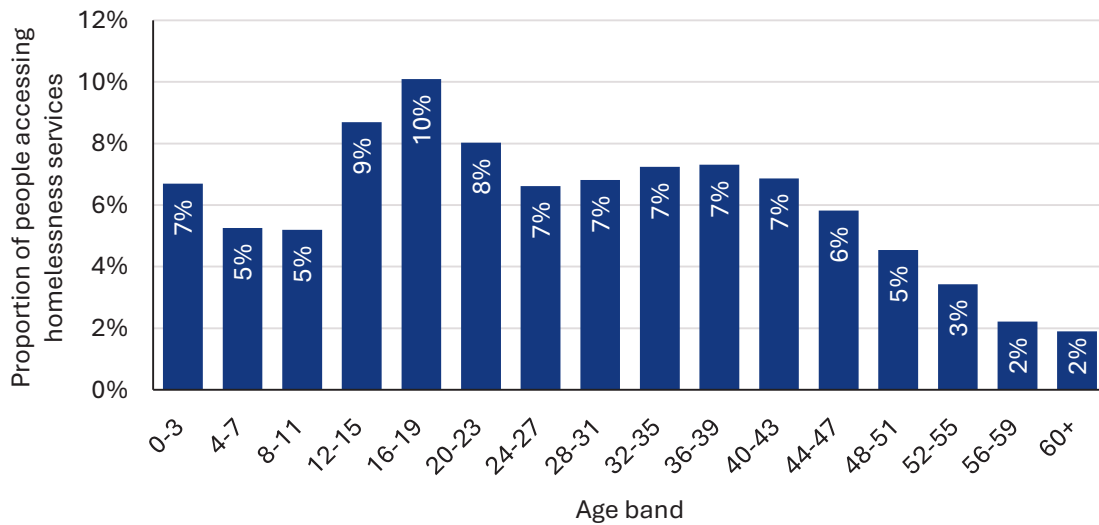
## Descriptive statistics: Homelessness service use and client characteristics

### Client characteristics

The linked dataset includes six years of homelessness services data for between July 2011 and June 2017. This data provides important information about the pattern of presentations to homelessness services.

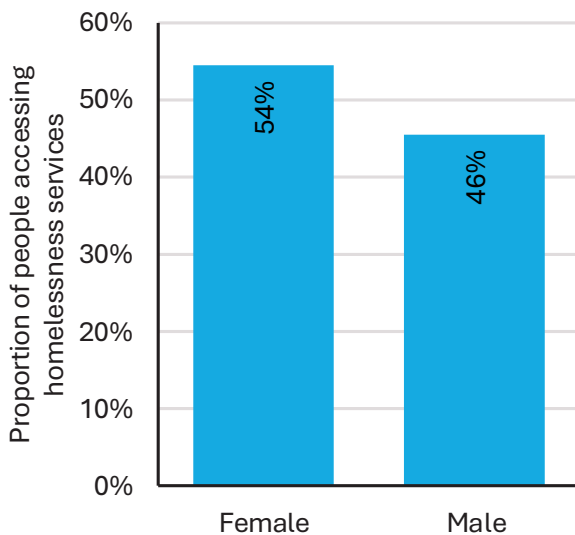
## Key demographic statistics for those accessing homelessness services

Figure 1 – People accessing homelessness services by age band, 2016/17



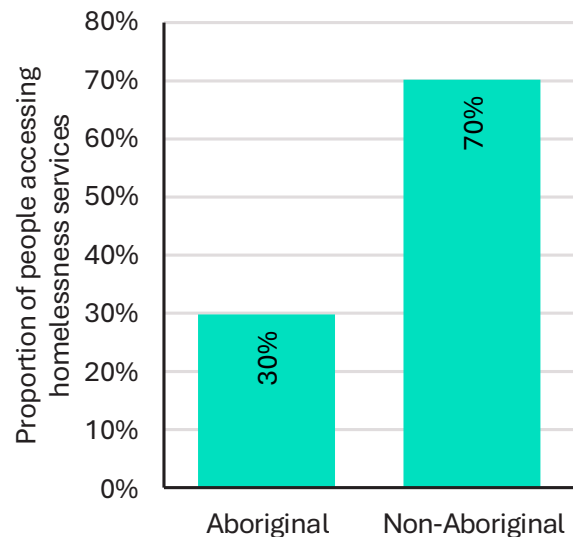
44% of people accessing homelessness services are under 24 and 41% are aged 24-47.

Figure 2 – People accessing homelessness services by sex, 2016/17



54% of people accessing homelessness services are female.

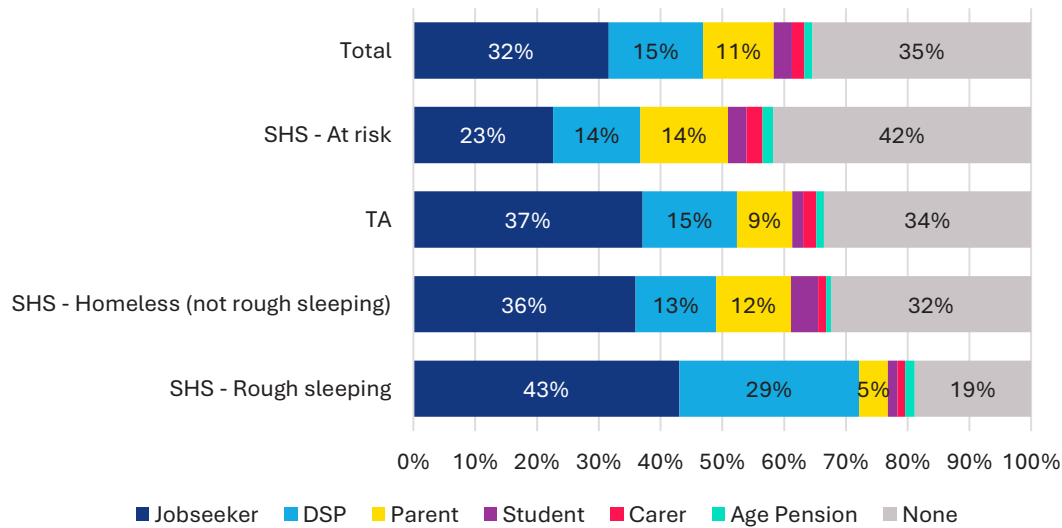
Figure 3 – People accessing homelessness services by Aboriginal identification, 2016/17



30% of people accessing homelessness services identify as Aboriginal, while making up around 3% of the population.

About two-thirds (65%) of people accessing homelessness services receive income support payments, with Jobseeker, Disability Support Pension and Parenting Payments the most common income support types.

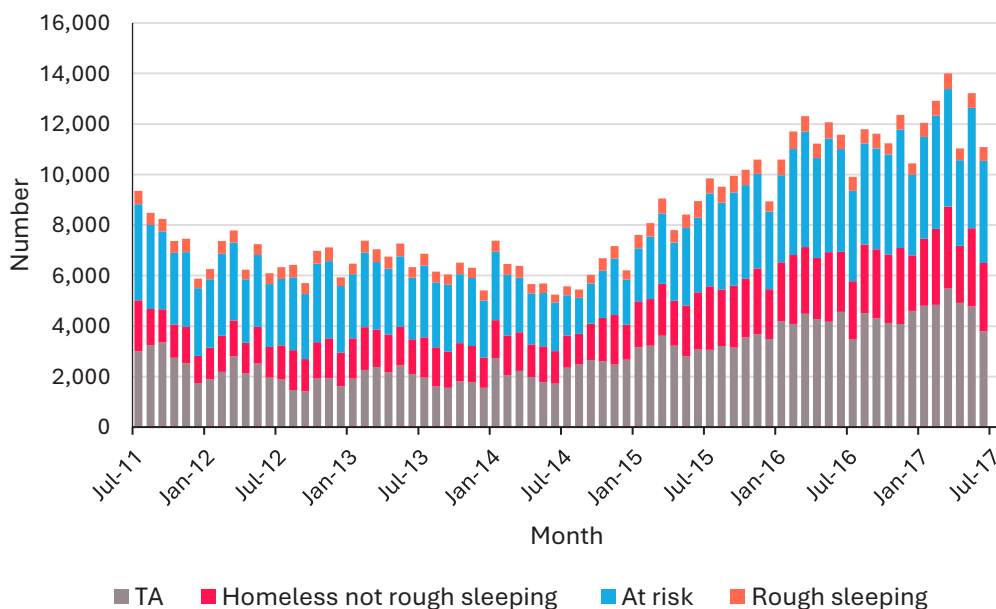
Figure 4 – Distribution of income support type in the quarter of accessing homelessness services over 2011/12 to 2016/17



### Time trends

SHS presentations and TA support increased significantly from 7,250 per month in 2011/12 to 11,800 in 2016/2017. This is partly due to funding and policy reform, including the *Going Home Staying Home* reforms and *No Wrong Door* policy approach, but also likely reflects increasing need for homelessness support.

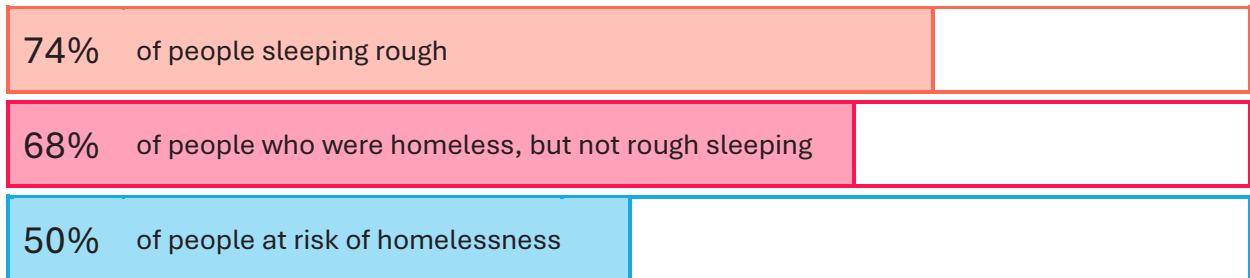
Figure 5 – Number of homeless presentations per month by categorisation of homelessness





## Repeat homelessness

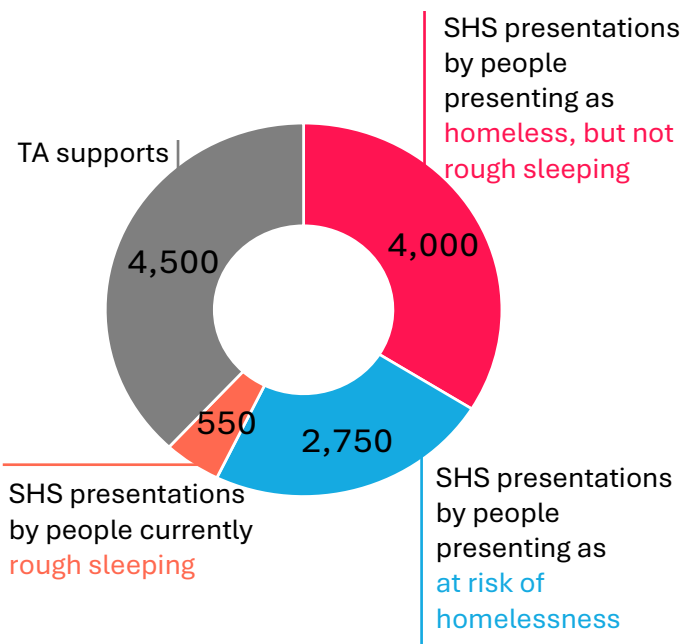
Repeated access to homelessness services often indicates an ongoing need. Of the group accessing services over the six years to 2016/17, 47% of clients accessed homelessness services multiple times.



## Housing status

In 2016/17, per month there were around 11,800 homelessness presentations per month.

Figure 6 – Number of homeless presentations per month by categorisation of homelessness, 2016/17



People presenting to homelessness services are classified based on their housing situation:

- People with no shelter or living in an improvised/inadequate dwelling are rough sleeping.
- People living in short term temporary accommodation, or as a couch surfer with no tenure are homeless. This includes people in Temporary Accommodation, noting some may have been rough sleeping.
- People living in social housing, private housing or institutional settings are at risk of homelessness.

## Rough sleeping

People rough sleeping are a particularly vulnerable group and are overrepresented as users of government services, particularly homelessness, health, and justice services. In the two years to June 2017, 8% of SHS presentations related to rough sleeping.

For people sleeping rough:

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<b>74%</b>	<b>64%</b>	<b>43%</b>	<b>30%</b>	<b>17%</b>
have experienced repeat homelessness	are male	are 40+ years	are Aboriginal	are young people (16-23 years)

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People sleeping rough are more likely to require additional support for mental health issues (21%), followed by drug and alcohol use (17%), DFV (13%) and legal issues (9%). Compared to other homelessness services clients, drug and alcohol rates are significantly higher for people sleeping rough, while DFV and family support needs are lower.

Over the six years to June 2017 four-fifths (80%) of people presenting as rough sleeping were receiving income support, and the majority (55%) of had been on income support for virtually the whole of the previous three years.

## Types of support

72% of people accessing homelessness services over the six years to June 2017 required housing and accommodation services (in addition to ‘general homelessness services’). This includes:

- 41% requiring short-term accommodation
- 27% requiring medium-term accommodation
- 32% requiring long-term accommodation
- 30% requiring assistance to sustain a tenancy.

Many clients face additional challenges that may make them more vulnerable to homelessness. 23% of presentations needed support for DFV, 14% for mental health, and 12% for family issues.

Table 2 – Proportion of SHS presentations with specialist support needs from 2011/12 to 2016/17, by homelessness categorisation at presentation

Service need	Categorisation of SHS presentation			
	Rough sleeping	Homeless but not rough sleeping	At risk of homelessness	All
Domestic Violence	13%	27%	23%	23%
Mental Health	21%	18%	10%	14%
Family	7%	15%	10%	12%
Legal	9%	11%	9%	10%
Drug and Alcohol	17%	8%	5%	7%
Immigration/Cultural	4%	9%	6%	7%
Disability	2%	2%	1%	2%

Table notes:

- (a) People making more than one presentation in a quarter are only counted once according to the categorisation of presentation which is leftmost in the table. For example, a person presenting once as rough sleeping and once as at risk of homelessness in the same quarter is counted once in the rough sleeping category.
- (b) These proportions differ to those reported by the AIHW due to different definitions and the use of longitudinal data.

### Other government service use

Compared to the broader NSW population, in any given year people accessing homelessness services are:

**24x**

more likely to be in controlled drug treatment

**20x**

more likely to have been in custody

**16x**

more likely to be receiving private rental assistance

**13x**

more likely to access Legal Aid

**10x**

more likely to have a court appearance

Table 3 – Rate of service use per year over for people accessing homelessness services compared to the sample of the NSW population, 2011/12 – 2016/17

Service	People accessing homelessness services	Sample of NSW population	Multiplier, rounded
Emergency department	31%	15%	2×
Admitted Patient	18%	11%	2×
Deaths	0.2%	0.1%	2×
Controlled drugs of addiction	2%	0%	24×
Ambulance	13%	3%	5×
Ambulatory mental health	11%	1%	9×
Police-recorded victim incident	19%	4%	5×
Legal aid	10%	1%	13×
Courts	9%	1%	10×
Custody	5%	0%	20×
Social housing	14%	2%	8×
PRA/PRS	5%	0%	16×
OOHC	2%	0%	6×
Education	4%	6%	1×
Welfare	54%	20%	3×
Medicare	74%	78%	1×
PBS	59%	54%	1×

### Intersections between service use

The linked dataset is useful for identifying service overlaps in the 12 months before accessing homelessness services. Understanding these overlaps is important when considering potential intervention points. For example, 76% of people leaving custody who present to homelessness services also access support from Legal Aid in the same year. Initiatives in these areas would need to recognise the heavy overlaps.

Table 4 – Overlap of service usage in the 12 months before accessing homelessness services

The proportion of people accessing...	...who also access this service in the same year:										
	Medicare	PBS	Time on welfare (any)	Emergency department	Hospital admission	Ambulatory mental health	Social housing	Police-recorded victim incident	Legal Aid	Court appearance	Custody spell ending
Medicare	100%	78%	70%	47%	28%	19%	18%	31%	19%	16%	9%
PBS	98%	100%	75%	51%	32%	22%	19%	33%	20%	17%	9%
Time on welfare (any)	88%	75%	100%	49%	32%	23%	19%	36%	24%	22%	12%
Emergency department	91%	78%	76%	100%	49%	31%	21%	41%	26%	23%	13%
Hospital admission	93%	82%	83%	83%	100%	40%	21%	42%	29%	24%	14%
Ambulatory mental health	91%	83%	87%	78%	58%	100%	21%	46%	37%	32%	21%
Social housing	87%	71%	72%	50%	30%	21%	100%	38%	21%	19%	10%
Police-recorded victim incident	89%	76%	83%	61%	37%	27%	23%	100%	31%	27%	13%
Legal Aid	88%	74%	88%	61%	41%	36%	20%	50%	100%	52%	36%
Court appearance	85%	69%	92%	63%	39%	36%	22%	49%	60%	100%	42%
Custody spell ending	83%	66%	92%	63%	42%	42%	19%	43%	76%	76%	100%

Table note: Average over 2014/15 to 2016/17

## Predicting homelessness

A key aim of the research is to support early identification of groups at risk of homelessness. This section identifies the most important factors for predicting homelessness, based on modelling using cross-agency service use and demographic information.

### Main predictive model

The main predictive model covers all presentations to homelessness services and is built on quarterly records in 2014/15 and 2015/16.

- 32% of homelessness presentations can be attributed to 1% of the NSW population.

- The 1% group at highest risk are more than 30 times more likely to access homelessness services in the next year than the general population.
- In addition to broad service use such as welfare services and Medicare, the most important factors for making these predictions are repeated homelessness service use, police-recorded victim incidents, social housing history, and court appearances. Aboriginal people are overrepresented in the group at highest risk.
- Longer time windows (for example, three years of service history, rather than one) tend to increase the accuracy of the modelling, suggesting that many risk factors for homelessness are chronic rather than acute.

### First-entry model

The first-entry model excludes people who have accessed SHS or TA in the last three years to predict 'new' entries into homelessness.

- Close to a quarter (23%) of homelessness presentations are from within the 1% group of people at highest risk in the model
- In this model, welfare services history is the most important factor, with Aboriginal identified, Medicare use, police-recorded victim incidents, social housing history, and walk-in mental health services also key factors
- The ability to predict those at highest risk of homelessness is not as strong as the main predictive model, as previous homelessness service use is no longer a predictor.

### Youth and young adult model

The youth and young adult model includes presentations to homelessness services for young people aged 15-24.

- People aged 15-24 are twice as likely as the general population to access homelessness services
- 43% of homelessness presentations for this cohort are from within the 1% group at highest risk
- For young people, completing Year 12 is associated with a 30% reduction in later risk of homelessness
- OOHC history increases the risk of homelessness by 17%, however the proportion of the population this relates to is small (<1%)
- Other important factors in the model include previous homelessness services use, welfare services, Aboriginal identified and police-recorded victim incidents.

### Rough sleeping model

The rough sleeping model includes presentations to homelessness services as rough sleeping.

- The model shows that the risk of rough sleeping is concentrated in a small fraction of the population. 0.2% of the NSW population (around 16,000 people) represent over a quarter (27%) of all rough sleeping presentations.
- This 0.2% at highest risk of rough sleeping are more likely to be Aboriginal, have hugely elevated past service use across housing and health services, and increased interactions with the justice system in the prior three years.

## Two-way analysis: Identifying potential intervention points

Many NSW services are good potential intervention points for initiatives aimed at homelessness prevention and early intervention.

The two-way pathway analysis examines other government services used in the 12 months prior to accessing homelessness services. This is a straightforward way of considering potential homelessness intervention points and could be strengthened by layering other findings from the prediction modelling. For example, the higher likelihood for Aboriginal people, young people aged 15-24, or people with low educational attainment.

### Risk uplift, coverage, and cost difference

- The **risk uplift** refers to how many more times a person is likely to access homelessness services if they have accessed the other service in the past year.
- The **coverage** is the proportion is the proportion of people presenting to homelessness services that also accessed the other service in the previous year.
- The **cost difference** is the additional costs across government services over three years for people who accessed both services, compared to people who just accessed the first service but did not go on to access homelessness services. It is per person and represents an upper bound on the potential cost savings from an effective intervention.

Using this framework, the most useful service interventions would target groups who are at high risk, have good coverage, and generate high potential savings. Generally, there is a trade-off between risk uplift and coverage – some services are highly predictive but identify a small slice of homelessness risk.

Table 5 – Two-way analysis results for any homelessness services presentation and given service use in the previous 12 months

Area	Service	Risk uplift <sup>(a)</sup>	Coverage	Additional 3-year cost across NSW govt <sup>(b)</sup>	Additional 3-year cost across CMW govt <sup>(b)</sup>
NSW Health	Emergency Department	3x	42%	\$51k	\$27k
	Emergency Department – MH diagnosis	21x	3%	\$79k	\$20k
	Admitted patients	2x	26%	\$55k	\$25k
	Admitted patients – MH diagnosis	15x	3%	\$67k	\$11k
	Walk-in mental health	13x	16%	\$58k	\$16k
	Controlled drugs of addiction	25x	3%	\$56k	\$8k
Commonwealth Health	Medicare	1x	80%	\$41k	\$29k
	Medicare relating to MH	3x	25%	\$47k	\$31k
	Medicare relating to addiction	12x	4%	\$73k	\$24k
	PBS script	1x	64%	\$40k	\$26k
	PBS script relating to addiction	3x	4%	\$38k	\$30k
	PBS script relating to MH	3x	27%	\$49k	\$22k
Justice	Police-recorded victim incident	7x	29%	\$51k	\$28k
	Police-recorded victim incident, DFV	20x	4%	\$33k	\$20k
	Legal Aid	17x	16%	\$55k	\$15k
	Court appearance/ Police caution or YJC	15x	16%	\$70k	\$25k
	Custodial spell ending	32x	8%	\$48k	\$13k
Housing	Public housing tenancy ending	12x	4%	\$41k	\$11k
Child protection	OOHC placement ending	13x	1%	\$60k	\$26k
Commonwealth Welfare	Rental Assistance receipt	5x	39%	\$39k	\$12k
	DSP income support	5x	14%	\$45k	-\$2k
	Jobseeker income support	6x	32%	\$44k	\$16k
	Parent income support	7x	14%	\$23k	\$11k
	Age pension	0.2x	1%	\$24k	-\$7k
	Centrelink risk of homelessness indicator	35x	8%	\$42k	\$6k

(a) Risk uplift is relative to a baseline risk of 0.73% p.a., and coverage relates to 57,500 presentations p.a., based on six years of homelessness services to June 2017.

(b) Costs have been inflated to June 2020 values.



Several NSW Government services provide a good balance of all three measures:

<b>Walk-in mental health services</b>	<b>Court appearances</b>	<b>Legal Aid</b>
13x more likely to access homelessness services	15x more likely to access homelessness services	17x more likely to access homelessness services
16% of future homelessness services clients	16% of future homelessness services clients	16% of future homelessness services clients
\$58k potential savings per person across NSW Government services from a successful intervention	\$70k potential savings per person across NSW Government services from a successful intervention	\$55k potential savings per person across NSW Government services from a successful intervention

### Distribution of costs to government

To better understand how costs to government accumulate in pockets of high risk, the analysis considers the six-year cost-to-government for adults accessing homelessness services in 2011/12 compared to the broader NSW population.

The average cost to government over six years for people accessing homelessness services is \$186k, nearly 4 times higher than the NSW population. Only 9% of costs relate to the homelessness and housing sector.

Within this group of people accessing homelessness services, the 5% with the highest cost represent 1,500 people. The average cost to government across six years is \$706k per person, with 84% of these costs attributable to the NSW Government, mostly in the health and justice sectors.

Table 6 – Average six-year cost to government for the NSW population, the subgroup presenting to an SHS in 2011/12, and the further subgroup with cost-to-government above the 95<sup>th</sup> percentile

Service	Top 5% of SHS presenters (1,500 people)	All 2011/12 SHS presenters (30,000 people)	NSW population (5.8m people)
SHS+TA	\$21k	\$9k	\$0.1k
Other NSW housing	\$12k	\$8k	\$1k
Public hospital	\$137k	\$22k	\$7k
Other NSW Health	\$15k	\$3k	\$0.3k
MBS & PBS	\$11k	\$9k	\$8k
Child protection	\$25k	\$2k	\$0.1k
Custody & police	\$201k	\$16k	\$1k
Courts & Legal Aid	\$182k	\$21k	\$1k
Welfare (Commonwealth)	\$102k	\$96k	\$32k
<b>NSW Subtotal</b>	<b>\$593k</b>	<b>\$81k</b>	<b>\$11k</b>
<b>Commonwealth Subtotal</b>	<b>\$113k</b>	<b>\$105k</b>	<b>\$40k</b>
<b>Total</b>	<b>\$706k</b>	<b>\$186k</b>	<b>\$51k</b>

Notes: Totals may not add up due to rounding. The table covers all people aged 16 years and over. Values are in June 2020 dollars.

## Vulnerable cohorts

Cross-agency data provides powerful insights for some vulnerable cohorts. The analysis illustrates support needs such as poor mental health or family and domestic violence correlate with higher likelihood of homelessness, as well as significant future costs across government services.

### Financial hardship



- Financial hardship, measured using welfare services data, is a strong indicator of future homelessness support need.
- People who have been on income support for an extended period and have also received rental assistance are at higher risk of homelessness:
  - 1 in 10 people on working age payments access homelessness services over a year (107,000). The risk increases significantly for people who have experienced repeat homelessness.
  - 1 in 12 people on parenting payments access homelessness services over a year (79,000). DFV victim incidents are high for this group.
- People receiving income support have elevated service use across all sectors, highlighting the secondary effects correlated with financial hardship.

## Mental health



- Over the six years to June 2017, 14% of people accessing homelessness services had a mental health service need.
- People with evidence of acute mental health issues in their service history are nine times more likely to present to homelessness services.
- Compared to the general population, people in the acute mental health group use 35 times the number of walk-in mental health services and spend 7.7 times the number of days in admitted patient services.
- Custody exits and court appearances represent other potential intervention points for this cohort.

## Substance use



- People with drug and alcohol-related service use are more likely to be male and older compared to all homelessness services clients, although younger people with drug and alcohol service use still appear to be at higher risk of needing support.
- People with drug and alcohol-related service history are 8 times more likely to access homelessness services.
- Of homelessness services clients with a drug and alcohol service need:
  - 74% had been to an emergency department in the last three years, 13% with a mental health related diagnosis code.
  - 13% had been admitted to hospital with a major diagnosis of toxic effects of drugs in the three years and 22% with a major diagnosis of substance use & substance induced organic mental disorders.
  - 45% had sought Legal Aid services in the three years.
  - 56% had a police-recorded victim incident, with 12% relating to DFV.
- Legal Aid and court appearances represent other potential intervention points for this cohort.

## Domestic and family violence



- Over the six years to June 2017, one-fifth of presentations (23%) to homelessness services reported a DFV service need. This group is more likely to be female and accompanied by children.
- People experiencing DFV are 20 times more likely than the wider NSW population to access homelessness services within a year of a police-recorded DFV incident. The risk is highest in the months immediately following the DFV incident but falls quickly.
- People accessing homelessness services with a DFV service need have a less intensive cross-sector service use history than other clients. Their main point of contact with other services is with NSW Police as a victim of a DFV incident. However, only 13% of people presenting to homelessness services with a DFV service need had a police-recorded DFV victim incident in the previous three years. SHS may represent the first point of contact with government services for many within this vulnerable group.
- Previous SHS and/or TA and walk-in mental health services are relevant predictors of homelessness and potential intervention points for people experiencing DFV.

### Exiting custody



- One in eight (12.4%) people leaving custody access homelessness services within a year – 20 times the rate of the wider NSW population.
- The rate for Aboriginal people is double that for non-Aboriginal people.
- A large proportion of people exiting custody also access Legal Aid (40%) and appear in court (38%) between their custody exit and accessing homelessness services.

### Leaving OOHC



- For young people leaving OOHC in the five years to June 2016, one in six (17%) accessed homelessness services in the next year, evidence of significant housing instability for this group.
- Previous homelessness, walk-in mental health service use, and court appearances (including Youth Justice Centres and police cautions) are all predictive of increased risk of later accessing homelessness services (pg. 102).
- OOHC leavers who have already accessed SHS or TA once prior to leaving care for the final time have a 91% chance of experiencing repeated homelessness.

### Aboriginal people



- Aboriginal people are significantly overrepresented in homelessness services, with one-third of people (30%) who access SHS identifying as Aboriginal, while making up around 3% of the NSW population. This is due to contemporary cultural, social and economic impacts and injustices, intergenerational trauma and historical impacts of past laws, policies and practices.
- Aboriginal people have elevated service use across all services compared to the broader NSW population, but particularly for homelessness services (10x), court appearances (7x), Legal Aid (6x) and walk-in mental health services (4x).
- For Aboriginal people, the highest increases in homelessness risk are associated with accessing mental health services.
- Aboriginal people with previous homelessness service use in the past three years are at very high risk of future homelessness. People experiencing repeat homelessness represent nearly half of SHS presentations by Aboriginal people.
- It is important to consider regional effects. The increase in rates of homelessness for Aboriginal people compared to the full population is larger in the greater Sydney region than outside the greater Sydney region.

# B

## Introduction and background

# 1 Introduction

## 1.1 Background

The NSW Department of Communities and Justice (DCJ) commissioned Taylor Fry ('us') to investigate the prevalence of homelessness and identify opportunities for prevention and early intervention.

Pathways to Homelessness is a key action under the NSW Homelessness Strategy 2018-2023. The research aims to increase early identification of groups at risk of homelessness and inform investment in programs with the greatest potential to improve outcomes across the whole service system. These interventions may also be cost-effective, particularly when considering potential reductions in the use of health, justice and other government services associated with homelessness.

Findings will also support delivery of the Premier's Priority on Reducing Homelessness, which includes a target to reduce street homelessness across NSW by 50% by 2025. Key initiatives include those with a focus on people exiting government services such as social housing, health facilities and correctional facilities.

For this project a new linked dataset has been specifically created. This is representative of the full NSW population, including people who have accessed homelessness services and a comparison group who have not. The data incorporates linked service usage across a wide range of government sectors and is described in more detail in Section 3.

## 1.2 Project aims

The project aims to improve the evidence base for prevention and early intervention for people at risk of homelessness.

The project has four key research questions:

1. For people requiring homelessness support, which other government services have they used before?
2. For people using other government services, how likely are they to require homelessness support?
3. Among the people identified, what other risk factors affect their likelihood of using homelessness services?
4. How do government service usage costs differ for people requiring homelessness services?

The first two questions form the core of understanding how people who engage with homelessness services interact with other services. The distinction between questions 1 and 2 is important; for example, the Medicare system is widely used by people requiring homelessness support (satisfying question 1), but the proportion of people who access Medicare who later become homeless is small (failing question 2). A well-targeted intervention requires both reasonable coverage of homelessness and demonstrably heightened risk of future homelessness.

Question 3 on other risk factors is important from a targeted intervention perspective. For example, the risk of homelessness might be particularly high in a particular location, or for people with a certain combination of past service use.

Finally, question 4 forms an important point of reference. Differences in future costs are relevant for cost-benefit analyses of potential programs when forming business cases for early intervention and prevention programs.

## 1.3 Definitions

In this report we use seeking Specialist Homelessness Services (SHS) and/or Temporary Accommodation (TA)<sup>2</sup> support to reflect experiences of homelessness.

SHS provide services aimed at prevention and early intervention, as well as crisis and post crisis assistance to support people experiencing or at risk of homelessness. TA represents emergency accommodation in hotels, motels, caravan parks, boarding houses and similar accommodation for people who are experiencing a housing crisis or homelessness. While not all people experiencing homelessness will access SHS/TA for assistance, SHS presentations and TA support are most amenable to administrative data linkage and analysis.

People who are rough sleeping are defined in this report as those reporting to be rough sleeping (currently living in improvised dwellings, tents or sleeping out) at the point of SHS presentation. The work does not attempt to measure the number of people rough sleeping who do not seek homelessness assistance.

See Section 8.3.2 for more on the definition of homelessness.

## 1.4 Structure of this report

The remainder of this report is structured into the following sections:

- Section 2 – Data and approach gives an overview of the dataset constructed for the project and the analysis performed.
- Section 3 – Descriptive results provides descriptive statistics for the study cohort. These are intended to frame the report and provide information on the type of homelessness risk discussed in the report.
- Section 4 – Predictive modelling discusses the important drivers of predicting homelessness and how a model based on service use and demographics can predict future homelessness risk.
- Section 5 – Two-way analysis looks at the direct pathways from other service use to homelessness.
- Section 6 – Vulnerable cohorts looks further at homelessness-related outcomes for selected subgroups including people with mental health conditions and people experiencing family and domestic violence.
- Section 7 – Aboriginal people explores the data and homelessness risk for Aboriginal people.
- Section 8 – Data and linkage gives additional detail on the construction of the dataset used in the study.
- Section 9 – Assumptions, uncertainty and limitations details important considerations when interpreting the results.
- Section 10 – Summary of key findings summarises the key findings throughout the report.

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<sup>2</sup> Emergency short-term accommodation provided through DCJ

## 2 Data and approach

### 2.1 Overview of the dataset

The linked dataset is one of the most comprehensive datasets relating to homelessness in Australia, comprising a study cohort of 625,861 people. The dataset was constructed as follows:

- The case cohort is 202,927 people who accessed Specialist Homelessness Services (SHS) in NSW from 1 July 2011 to 30 June 2017<sup>3</sup>.
- The comparison cohort is a 2:1 random sample of 422,934 people in NSW, matched on age band and sex. This allows us to compare service use for those not accessing homelessness services.

For each person we have their demographic characteristics and their linked service use. The linked service use data covers 19 services in all, including:

- SHS presentations, of which there are roughly 400,000
- TA presentations. While the formal construction of the case and control dataset relies on SHS presentations, we include TA presentations as homelessness events throughout our analysis.
- Fourteen other NSW services spanning justice, health, housing, child protection and education.
- Three Commonwealth services – welfare, Medicare and the Pharmaceutical Benefit Scheme

Table 7 lists the datasets included in the linkage.

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<sup>3</sup> These dates were chosen as the maximum set of records available at the time initial data applications were made.



Table 7 – Services linked in the dataset

Sector	Administrative data
Homelessness	Specialist homelessness services (SHS) Temporary accommodation (TA)
Justice	Court appearances – Youth Justice: Police cautions, conferences, Children’s Court Time in custody Police-recorded victim incidents Legal aid
Health	Number and length of hospital stays Emergency department presentations Ambulatory mental health services Births and deaths Controlled drugs of addiction Ambulance callouts Medicare use (aggregated) Pharmaceutical Benefit Scheme (PBS) prescriptions (aggregated)
Housing	Social housing tenancies Private rental subsidies and private rental assistance
Child protection	Out-of-home care (OOHC) placements
Education	NAPLAN and educational attainment
Welfare	Centrelink payments via DOMINO
Population	Medicare enrolment file <sup>4</sup>

We use weighting to allow this dataset to be representative of the whole NSW population – see Section 8.1 for further detail. This allows us to calculate population-wide statistics, such as the overall rates of homelessness among those accessing various services (such as welfare receipt) and demographic subgroups.

For this project our definition of homelessness is accessing SHS or TA. Section 8 provides more detail on the dataset construction as well as how this definition relates to the broader issue of homelessness.

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**Key finding 1:** The dataset combines a large cohort experiencing homelessness with a matched comparison group, plus an extensive linkage to other services. This gives a representative picture of homelessness interacting with other services and risk factors, plus related costs to government.

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<sup>4</sup> The Medicare enrolment file was used for defining the comparison cohort but is not counted as an additional service use category in our analysis.

## 2.2 Overview of approach

Report Sections 3 through 7 contain a series of analyses applied to the data:

- **Section 3 – Descriptive statistics.** These form a basis for understanding the key characteristics of the data. This focuses on the six-year period to 30 June 2017 and is divided into:
  - Statistics on homelessness presentations, including numbers and demographics
  - Degree of other service use in the linked data
  - The (annualised) rate of homelessness presentations in the next quarter, given the service use in the current quarter
  - Descriptive statistics specific to people presenting to SHS as rough sleeping.
- **Section 4 – Multivariate predictive modelling.** The modelling uses the full range of information about an individual available in the dataset to estimate the probability of presenting to homelessness services in the next year, for people observed in the 2014/15 and 2015/16 years. Predictors span demographic (e.g. age, sex, ethnicity), service use (e.g. number of hospital admissions in the past year) and other variables available in the linked data (e.g. highest level of school attainment). Gradient boosted decision tree models are used as a fast and flexible prediction algorithm. The performance of the model shows how efficiently cohorts can be targeted for intervention if they are judged at high likelihood of future homelessness presentations. We fit four variations of the model for different types of presentations and subgroups.
- **Section 5 – Two-way pathway analysis and fiscal costs.** This looks at each linked government service as a potential pathway to later homelessness presentations and assesses the risk uplift (e.g. how much more likely is someone to present to homelessness services in the next year after a custody exit?), the coverage (e.g. what proportion of homelessness presentations have a custody exit in the prior year?) and the subsequent additional fiscal cost to the NSW government (e.g. how much higher are the costs to government for people who exit custody and present to homelessness services, compared to those that exit custody and do not present to homelessness services?). The analysis also covers subsets of service use (e.g. emergency department presentations that are coded as mental health related).
- **Section 6 – Additional analysis on vulnerable cohorts.** We provide additional detail on people with recorded:
  - Financial hardship
  - Mental health conditions
  - Substance use
  - Domestic and family violence
  - Exits from custody
  - Young people leaving OOHC.

In each case we provide descriptive statistics and look at the homelessness presentation rates, including subgroups of people with particularly high likelihood of needing support.

The multifaceted approach is designed to collectively address the set of research questions.

- **Section 7 – Aboriginal people.** Analysis and results specific to Aboriginal people, who are overrepresented in homelessness services compared to the broader population.

C

# Analysis results

# 3 Descriptive results

## 3.1 Use of homelessness services

While the full dataset links 19 services together in total, the pattern of presentations to homelessness services (SHS and TA) are of primary importance.

SHS is assistance provided by a specialist homelessness agency aimed at responding to or preventing homelessness. A range of supports can be offered, including accommodation provision, assistance to sustain housing, domestic and family violence services, mental health services, family/relationship assistance, disability services, drug/alcohol counselling, legal/financial services, immigration/cultural services and other general assistance and support.

TA represents emergency accommodation in low-cost hotels, motels, caravan parks, boarding houses and similar accommodation for people who are experiencing a housing crisis or homelessness. TA is designed to meet a gap in the service system by providing a short-term accommodation response for people without complex needs while they arrange more suitable longer-term accommodation. It is intended that people with complex needs requiring support receive accommodation and support from SHS.

In this subsection, we present some descriptive statistics specific to these homelessness presentations.

### 3.1.1 Type of Homelessness

While much of this report focuses on whether a person presents to SHS or TA, it is important to recognise there are many different types of presentations and corresponding supports provided.

Figure 7 shows the different categorisations within homelessness services used in this report. While SHS and TA are both considered homelessness services, the detail on the data differs. This means we sometimes discuss them separately in this section. In Sections 4 through 6 we group TA and SHS as homelessness services, except where explicitly noted.

Figure 7 – Categorisation of homelessness services

Homelessness services			
SHS			TA
At risk	Homeless	Rough sleeping	Homeless

When a client presents to SHS they are classified as ‘Homeless’ or ‘At risk of homelessness’. This classification is based on their current housing situation at the beginning of the SHS presentation. Homeless covers people living:

- With no shelter or improvised/inadequate dwelling
- In short term temporary accommodation
- As a couch surfer or with no tenure in a house, townhouse or flat.

At risk covers people living in:

- Public or community housing (renter or rent free)
- Private or other housing (renter, rent free or owner)
- Institutional settings.

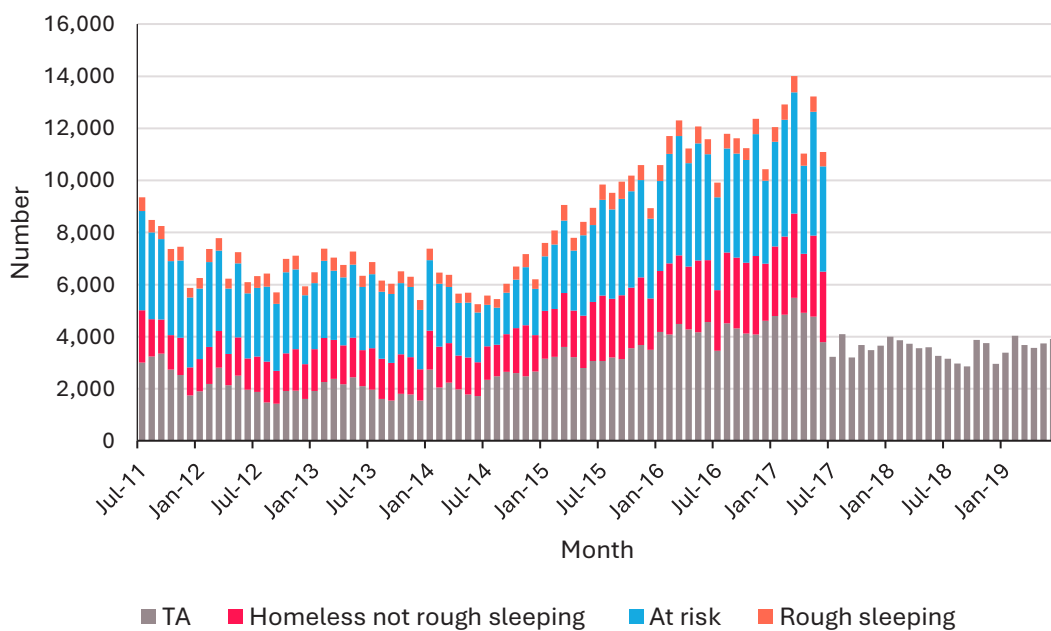
We can use this additional information to further identify which ‘Homeless’ SHS presentations relate to people who are rough sleeping, being those with no shelter or improvised/inadequate dwelling.

We do not have the same details recorded for TA presentations. We have classified all TA presentations as ‘homeless’, recognising that an unidentified subset of these people may be sleeping rough. Uncategorised SHS presentations are grouped with ‘at risk’, consistent with AIHW reports on the SHS Collection.

### 3.1.2 Time trends

Figure 8 shows the number of homelessness presentations by month, split by categorisation. While we do not have SHS data past June 2017, the data on TA extends to June 2019.

Figure 8 – Number of homeless presentations per month by categorisation of homelessness



The most notable feature over time is the increase in SHS presentations over 2014/15 to what looks like a new plateau, which we understand to largely correspond to the NSW Going Home Staying Home reforms at the time<sup>5</sup>. As part of these reforms, contracts for SHS providers were awarded through competitive tender and there was an expansion of SHS supply. The NSW Government increased funding for SHS providers by nearly 10% for the 2014/15 financial year<sup>6</sup>. Since then, the No Wrong Door policy has also been implemented for SHS which may have further increased service use.<sup>7</sup>

<sup>5</sup> Specialist Homelessness Services Collection, 2016–17; Quality Statement <http://meteor.aihw.gov.au/content/index.phtml/itemId/683255>

<sup>6</sup> UNSW, Early Review of the Specialist Homelessness Services Program: Final report [https://www.housing.nsw.gov.au/\\_data/assets/file/0006/428127/Early\\_Review\\_of\\_SHS\\_Program.pdf](https://www.housing.nsw.gov.au/_data/assets/file/0006/428127/Early_Review_of_SHS_Program.pdf)

<sup>7</sup> FACS Updates for the SHS sector, Release of 2016-17 Specialist Homelessness Services data <https://www.facs.nsw.gov.au/providers/homelessness-services/updates>

As well as the observations above, the AIHW 2016/17 data quality statement advises caution when applying time trend analysis because<sup>8</sup>:

- NSW began implementing the Domestic Violence Response enhancement in late 2015/16. This service change may be responsible, at least in part, for the increase in the number of SHS clients reporting domestic and family violence.
- Before 2015/16, clients recorded as having a care arrangement of either ‘parents’ or ‘other living arrangement’ were excluded. From 2015/16, these care types are now included. These changes constitute a break in statistical time series and hence previous data about clients and protection orders are not comparable.
- In 2014/15 changes also occurred in the way agencies were required to report ‘main reason’ and ‘reasons for seeking assistance’. Wording providing a specific example of housing crisis was removed from the section relating to reason for seeking assistance. Comparisons over time should be made with caution as the reporting of housing crisis, financial difficulties and housing affordability stress may be inconsistent between agencies.

An additional smaller effect is the changes to the SHS reporting process in 2014/15 which significantly reduced the rate of invalid records and incomplete responses. The proportion of records with a valid Statistical Linkage Key (SLK) increased from 94% to 97%<sup>9</sup>. This will have increased the proportion of records which are linkable for this study from that time.

From Figure 8, over July 2016 to June 2017 there were around:

- 4,000 presentations to SHS per month by people presenting as at risk of homelessness
- 2,750 presentations to SHS per month by people presenting as homeless, but not rough sleeping
- 550 presentations to SHS per month by people rough sleeping – a relatively small proportion of all homelessness presentations
- 4,500 TA supports per month.

Table 10 compares the average number of presentations by type in 2011/12 to 2016/17.

The increase in services over time is visible for all categories. The increase is largest for the SHS homeless but not rough sleeping category, followed by TA. Rough sleeping presentations have increased over time, but at a slower rate than other types of presentations.

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<sup>8</sup> Specialist Homelessness Services Collection, 2016–17; Quality Statement  
<http://meteor.aihw.gov.au/content/index.phtml/itemId/683255>

<sup>9</sup> Specialist Homelessness Services Collection Data Quality Statement 2014-15  
<http://meteor.aihw.gov.au/content/index.phtml/itemId/626455>

Specialist Homelessness Services Collection Data Quality Statement 2016-17  
<http://meteor.aihw.gov.au/content/index.phtml/itemId/683255>

Table 8 – Comparison of average number of monthly presentations in 2011/12 and 2016/17 by categorisation of homelessness

Year	Rough sleeping	Homeless not rough sleeping	At risk	TA	Total
2011/2012	450	1,500	3,000	2,500	7,250
2016/2017	550	2,750	4,000	4,500	11,750
<b>% increase</b>	<b>+19%</b>	<b>+97%</b>	<b>+37%</b>	<b>+78%</b>	<b>+61%</b>

Numbers do not add to Total due to rounding.

### 3.1.3 Demographic characteristics

Figure 9 shows the age distribution of people accessing homelessness services over 2016/17.

- 44% of people accessing homelessness services are aged under 24
- 41% are aged 24-47
- 15% are aged 48 years and older.

Figure 9 – People accessing homelessness services by age band, 2016/17

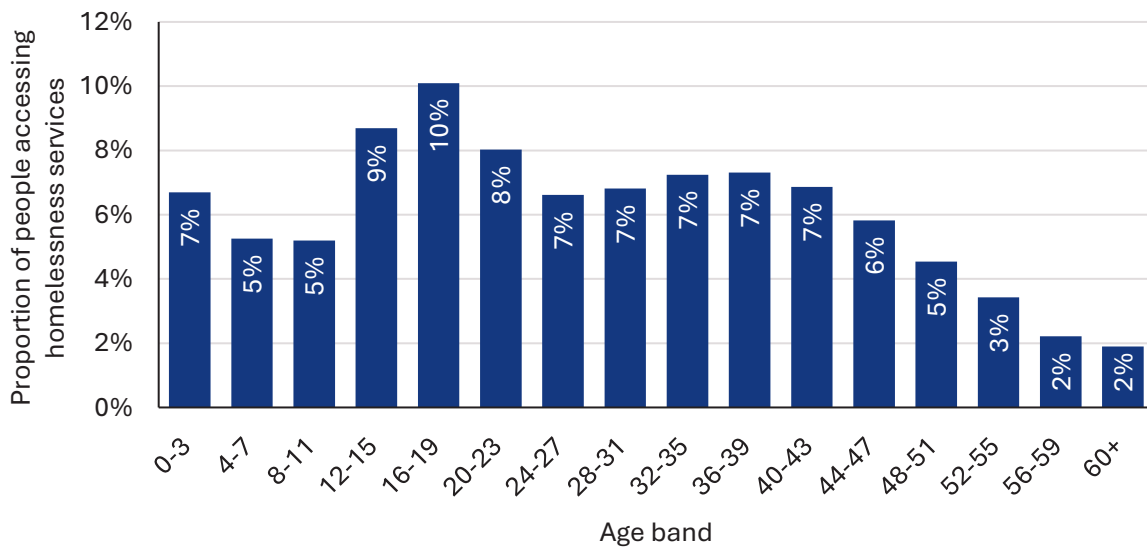
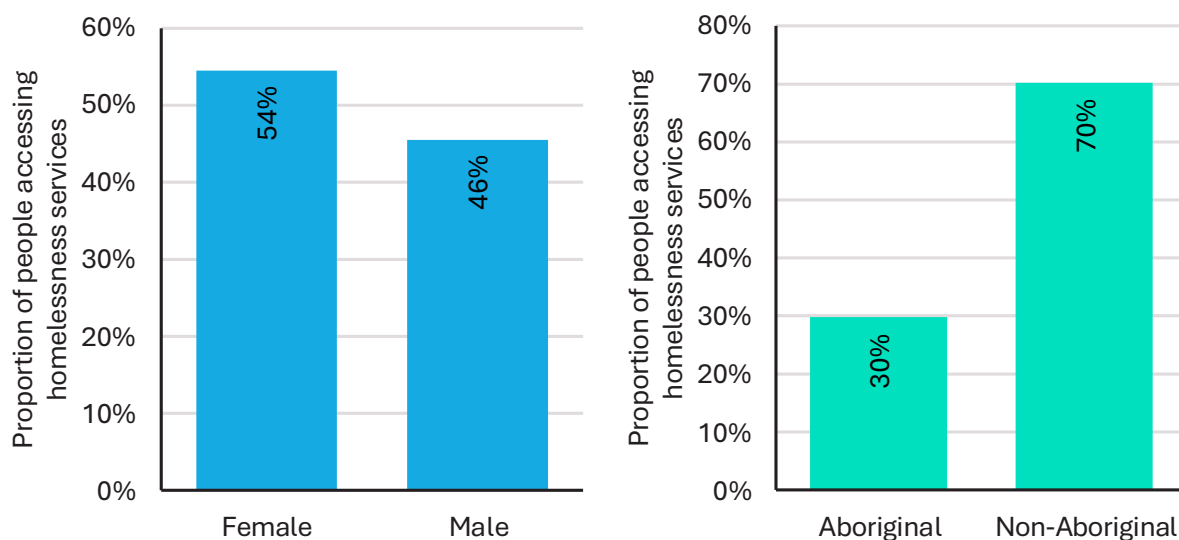


Figure 10 shows the proportion of people accessing homelessness services over 2016/17 by sex and Aboriginal identification:

- 62% of people accessing homelessness services are female.
- 30% of people accessing homelessness services identify as Aboriginal.

Figure 10 – People accessing homelessness services by sex (left panel) and Aboriginal identified (right panel), 2016/17



### 3.1.4 Rough sleeping and SHS

As discussed above, within the homeless category of SHS presentations we have considered people with no shelter or improvised/inadequate dwelling to be ‘rough sleeping’.

There is a current Premier’s Priority to reduce street homelessness.<sup>10</sup> While this project focuses on broader homelessness presentations, our report is relevant the priority in two ways:

- Many of the factors leading to street homelessness will be similar to, but not necessarily the same as, the drivers of broader homelessness presentations
- Many SHS and TA presentations are by people who are already rough sleeping, or who would be rough sleeping in the absence of SHS and/or TA support.

Over the two years to June 2017, 8% of all SHS presentations related to people rough sleeping – people with no (or inadequate) shelter for the night. This equates to 6,850 presentations per year.

The group of people rough sleeping:

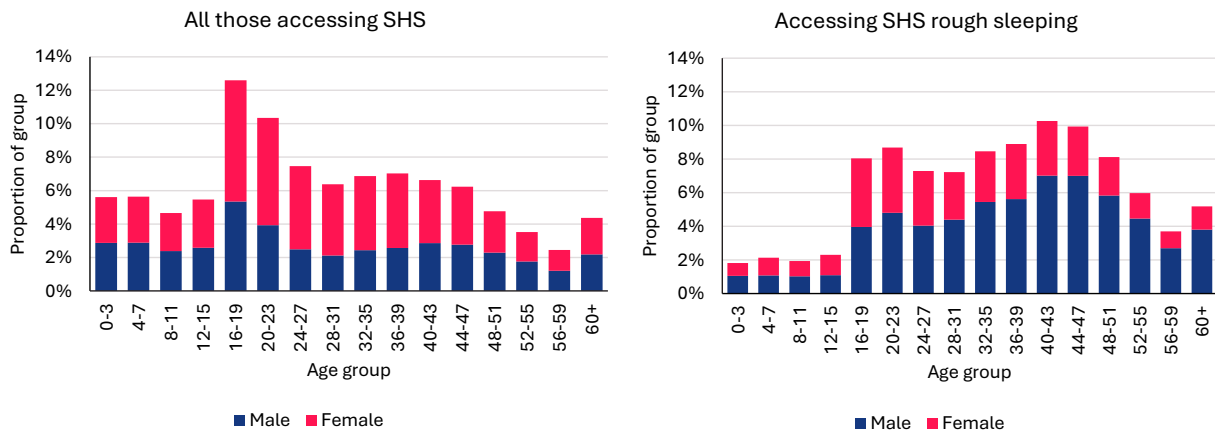
- Are more likely to be male (64%, compared to 43% for all SHS presentations)
- Includes a significant fraction of older Australians – 43% of presentations are by people aged over 40, compared to just 28% for all SHS presentations.
- Includes a significant overrepresentation of Aboriginal people. We see 30% of presentations are by Aboriginal people; a similar rate is seen for broader SHS presentations, whereas Aboriginal people represent only 3% of the broader NSW population.
- Are spread across the state. While 7% of Sydney SHS presentations are by those currently rough sleeping, this compares to 9% for regions outside Sydney. The Sydney portion represents 2,800 presentations per year.

<sup>10</sup> NSW Government Premier’s Priorities – Reducing homelessness <https://www.nsw.gov.au/premiers-priorities/reducing-homelessness>



Figure 11 shows the sex and age profile for all those accessing SHS compared to those accessing SHS rough sleeping. The higher proportion of males aged over 20 among people who are rough sleeping is visible.

Figure 11 – Comparison by age and sex of all people accessing SHS and people rough sleeping accessing SHS in NSW over the two years to June 2017



**Key finding 2:** The 6,850 rough sleeping presentations to SHS per year represent 8% of all SHS presentations. Relative to the broader SHS support population, they are more likely to be male and older. Aboriginal overrepresentation remains similar to that for all SHS presentations at 30% of presentations.

### 3.1.5 Number and frequency of access

The SHS data was supplied by the Australian Institute of Health and Welfare (AIHW). It covers almost 400,000 SHS presentations (which denotes a period of support for a person by the provider) between July 2011 and June 2017 for the 202,927 people in the case cohort.

The TA data was supplied by DCJ. It covers almost 150,000 TA supports between July 2011 and June 2017 for close to 60,000 people. On a population weighted basis this equates to around 210,000 supports for 97,000 people<sup>11</sup>.

A natural question is the extent to which people access homelessness services multiple times. Figure 12 shows the proportion of people accessing homelessness services by the number of times they accessed over 2011/12 to 2016/17. The top left panel shows a large proportion of people only accessed homelessness services a single time over this six-year period (53% for both females and males). The remaining panels shows the same information for subgroups.

From Figure 12, 47% of people accessing homelessness services over 2011/12 to 2016/17 accessed services multiple times.

The proportion accessing services multiple times is:

- 74% for people who accessed a SHS as rough sleeping
- 68% for people who accessed a SHS as homeless (but not rough sleeping)

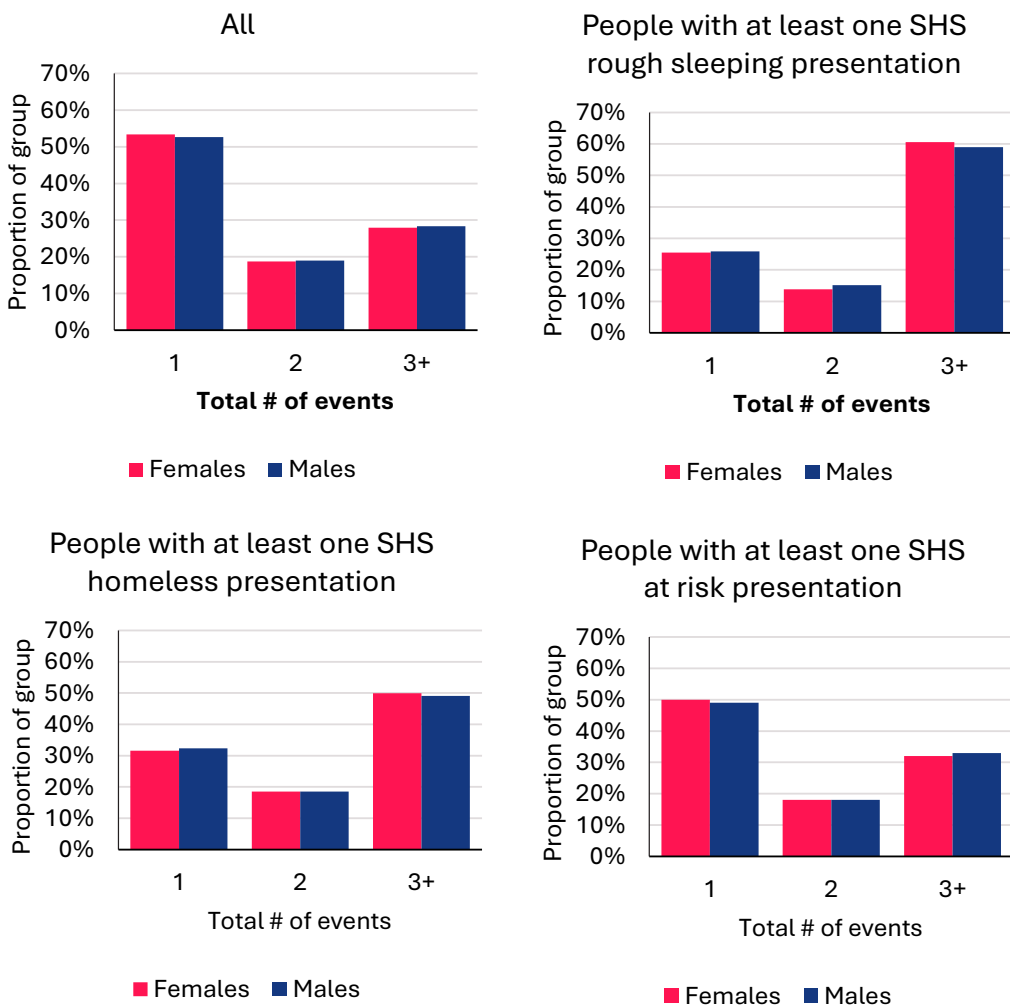
<sup>11</sup> While our dataset, by construction, contains all SHS presentations, it contains only a subset of TA presentations. All TA presentations among those who also access SHS are included, but only a sample of those from the ‘comparison’ population who do not access SHS. The weighting upscales this second group.

- 50% for people who accessed a SHS as at risk.

These differences show that accessing services as rough sleeping is the most reflective on recurring support needs, followed by homeless (but not rough sleeping). At risk presentations are less likely to require recurrent support. This can reflect both an escalation of severity over time (e.g. a person initially accessing services as at risk but eventually rough sleeping) as well as how easily barriers can be resolved (e.g. a person at risk receiving support which helps then with a short-term situation and they do not require further support).

The proportions are very similar for males and females. This shows that while females are less likely to present as rough sleeping, once they do, the ongoing level of support required is similar.

Figure 12 – Proportion of people accessing homelessness services by the number of times they accessed over 2011/12 to 2016/17



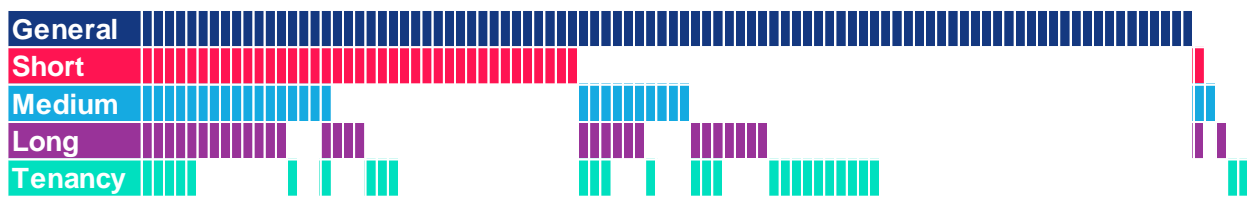
### 3.1.6 SHS types of support

SHS providers can offer a range of housing supports, and these support needs are captured on the SHS dataset. These are summarised in Figure 13. There is a strong tilt towards short-term housing support, but other types of support including advice and direct financial support are also provided. 94% of people presenting to SHS have ‘general homelessness services’ indicated as a service need. A large majority of presentations (72%) also need at least one of the following broad categories of support:

- Short-term accommodation (41%)
- Medium-term accommodation (27%)
- Long-term accommodation (32%)
- Assistance to sustain housing tenure (30%).

Often people will have support from more than one category, as shown in Figure 13 below. For example, the leftmost five columns indicate that 5% of SHS presentations are recorded as requiring support in all five categories. The rightmost two green columns indicate that 2% of all SHS presentations are recorded as requiring just tenancy support (and no accommodation or general services).

Figure 13 – Type of support need. Each column represents 1% of SHS presentations over 2011/12 to 2016/17.



For example, the first 5 columns represent 5% of presentation who require support in all five categories, whereas the next 8 columns are the 8% of presentations who need all but Tenancy support.

In addition to housing support needs, additional specialist support needs are provided and reflected in the data. Table 9 shows the percentage of presentations identified with various specialised support needs. Note that these are needs recorded either at the SHS initial assessment or during a support period – other needs can also be inferred from a person’s service usage patterns across other services.

Table 9 – Proportion of SHS presentations with specialist support needs from 2011/12 to 2016/17, by homelessness categorisation at presentation

Service need	Categorisation of SHS presentation			
	Rough sleeping	Homeless but not rough sleeping	At risk of homelessness	All
Domestic Violence	13%	27%	23%	23%
Mental Health	21%	18%	10%	14%
Family	7%	15%	10%	12%
Legal	9%	11%	9%	10%
Drug and Alcohol	17%	8%	5%	7%
Immigration/Cultural	4%	9%	6%	7%
Disability	2%	2%	1%	2%

Table notes:

- (a) Each person is only counted once per quarter. People making more than one presentation in a quarter are grouped according to the categorisation of presentation which is leftmost in the table. For example, a person presenting once

as rough sleeping and once as at risk of homelessness in the same quarter is counted once in the rough sleeping category.

- (b) These proportions are different to those reported by the AIHW. The AIHW reports are based on annual snapshots as opposed to longitudinal data (see Section 8). In addition, the AIHW measure is broader in two ways. Firstly, the measures include additional information such as referral pathway, previous residence, and self-declared past service use. Secondly, the information is aggregated over a financial year (or reporting period), this means information from any support period during the reporting period is applied to all support periods. The measures reported here are simply whether the client had additional service needs recorded, this may be at the start of, or during, a support period.

From Table 9:

- The most common support needs are Domestic Violence and Mental health
- Drug and alcohol support needs are significantly higher for people who are rough sleeping, whereas domestic and family violence and family support needs are lower
- A relatively small proportion of presentations are identified as needing Disability support.

The rates of different support needs also vary by sex. While Domestic Violence is the most frequently recorded service need this applies more frequently to women (26% for all females, on a basis consistent with Figure 14, compared to 10% for males). The rates have also changed over time. Figure 14 shows proportion of SHS support periods with the three most common service needs identified for all presentations, by sex over 2011/12 to 2016/17.

Figure 14 – The proportion of SHS support periods with particular service needs identified for all presentations, by sex and financial year

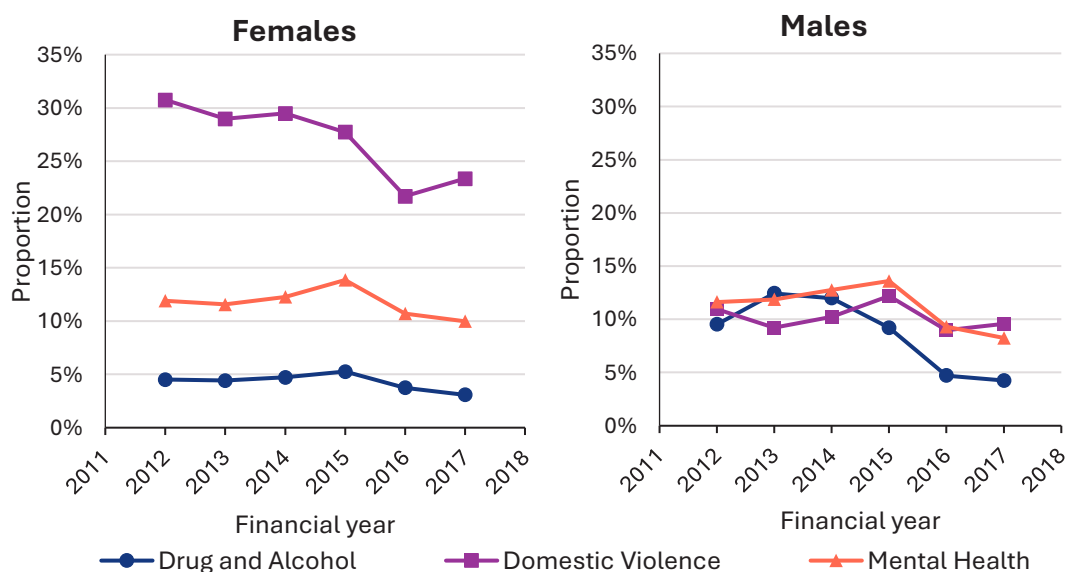


Figure 14 shows:

- The rates of reported specialist service needs have decreased over the time period. This is true for both those homeless and those at risk of homelessness. As seen in Figure 8 this is in the context of a significant increase in SHS presentation rates over time; absolute numbers of people with identified specialist need have not fallen, even if the percentages have.
- Mental health specialist support needs are identified at similar rates for females and males – both 11%.
- Over the full time period Drug and Alcohol service needs are identified twice as frequently for males (8% of presentations over the full period compared to 4% for females). However, this

rate has decreased more for males, over 2016/17 the rates were similar (4% for males and 3% for females).

### 3.1.7 Regional characteristics

Table 10 shows the number of homelessness presentations by DCJ region, as well the per capita rate.

Table 10 – Service use by DCJ region for the 2016/17 year

DCJ Region	2016 population, '000s	Number of homelessness events (all SHS and TA)	Homelessness per 100,000	# SHS presentations	SHS per 100,000	# TA supports	TA per 100,000
Sydney	587	9,869	1,680	5,692	969	4,177	711
Northern Sydney	889	3,579	403	2,429	273	1,150	129
South Eastern Sydney	823	19,946	2,424	16,089	1,955	3,857	469
South Western Sydney	1,120	10,627	949	6,205	554	4,422	395
Western Sydney	971	10,872	1,119	6,467	666	4,405	454
<b>All Sydney</b>	<b>4,390</b>	<b>54,893</b>	<b>1,250</b>	<b>36,882</b>	<b>840</b>	<b>18,011</b>	<b>410</b>
Central Coast	337	6,780	2,014	3,597	1,069	3,183	946
Far West	29	1,293	4,421	642	2,194	651	2,227
Hunter New England	819	18,878	2,305	12,138	1,482	6,740	823
Illawarra Shoalhaven	405	10,186	2,516	6,175	1,525	4,011	991
Mid North Coast	309	8,342	2,704	5,058	1,640	3,284	1,064
Murrumbidgee	293	5,930	2,025	4,031	1,377	1,899	649
Nepean Blue Mountains	368	4,970	1,350	3,361	913	1,609	437
Northern NSW	298	11,048	3,704	7,050	2,364	3,998	1,340
Southern NSW	205	5,503	2,686	3,537	1,726	1,966	959
Western NSW	279	7,879	2,826	5,403	1,938	2,476	888
<b>All non-Sydney</b>	<b>3,341</b>	<b>80,809</b>	<b>2,419</b>	<b>50,992</b>	<b>1,526</b>	<b>29,817</b>	<b>892</b>
<b>Total</b>	<b>7,732</b>	<b>135,702</b>	<b>1,755</b>	<b>87,874</b>	<b>1,137</b>	<b>47,828</b>	<b>619</b>

For SHS the DCJ region is based on location of the agency providing services rather than the location of the client receiving services (which may be different)

Some care is needed in understanding regional effects. SHS can be limited by supply-side effects, for instance, some areas will have lower rates of SHS as a result of lower supply, rather than fundamentally lower demand. TA is provided by DCJ and does not have the same types of supply-side constraint. The combination of SHS and TA as homelessness services means the overall rate should be reflective of demand.

The per capita rates of SHS and TA are highly correlated (coefficient of 0.78). For example, Northern Sydney has the lowest rate for both SHS and TA, whereas the Far West, Mid North Coast and Northern NSW are all high on both measures.

## 3.2 Population weighted measures

If we weight the dataset to be representative of the NSW population (see Section 8.1), we estimate:

- Over the two years to 30 June 2016, the overall forward-looking homelessness presentation rate (the probability that a person would present at least once in the next year) for the population was 0.89%. On an annual basis for the population of about 7.85m people, this implies 69,900 people presenting to homelessness services (SHS or TA).
- People aged 15-24 present to homelessness services at a rate of 1.73% – double the broader population average.
- People first present to homelessness services (people who have not accessed SHS/TA in the previous three years) at a rate of 0.58%.
- People present to SHS as rough sleeping at a rate of 0.074% – about a tenth of the overall population presentation rate.

This population-based presentation rate forms the basis of our predictive analysis in Section 4.

## 3.3 Other government service use

Figure 15 below shows the match rates between the study cohort and other datasets included in the linkage, as well as the time periods included for service data usage. The data supplied from the AIHW Specialist Homelessness Services Collection (SHSC) covers 2011/12 to 2016/17 (the collection does not exist in earlier years), but the other datasets often span a wider range, which is useful for understanding pathways in and out of homelessness. Most NSW service usage datasets go back to at least 2006/07. The exceptions are Ambulance callouts, Controlled drugs of addiction and Legal Aid which were all limited by electronic collection starting points. Health service usage datasets and Commonwealth datasets start from 2006/07, five years prior to the study period. DCJ datasets have the fullest history, extending back to 2000/01 or earlier.

Figure 15 – Summary of datasets, raw usage rates as a proportion of the study cohort, and time window covered by data

Dataset	Match rate to case group	Match rate to comparison group	Overall match rate	2000/01	2002/03	2004/05	2006/07	2008/09	2010/11	2012/13	2014/15	2016/17
Specialist Homelessness Service	100%	0%								■	■	■
Hospital stays	66%	56%	59%				■	■	■	■	■	■
Emergency Department visits	75%	62%	66%				■	■	■	■	■	■
Registered births	26%	33%	31%	■	■	■	■	■	■	■	■	■
Registered deaths	2%	0%	1%				■	■	■	■	■	■
Ambulatory mental health	33%	6%	15%				■	■	■	■	■	■
Ambulance callouts	45%	16%	25%					■	■	■	■	■
Controlled drugs	5%	0%	2%						■	■	■	■
Social housing tenancies	65%	12%	29%	■	■	■	■	■	■	■	■	■
Temporary Accommodation	65%	12%	29%	■	■	■	■	■	■	■	■	■
Private rental subsidy/assistance	65%	12%	29%	■	■	■	■	■	■	■	■	■
Out-of-home care	7%	1%	3%	■	■	■	■	■	■	■	■	■
Police-recorded victims incidents	58%	26%	37%				■	■	■	■	■	■
Legal Aid	35%	4%	14%					■	■	■	■	■
Court appearances	33%	7%	15%				■	■	■	■	■	■
Time in Custody	16%	1%	6%	■	■	■	■	■	■	■	■	■
Educational attainment	30%	33%	32%	■	■	■	■	■	■	■	■	■
Welfare	88%	91%	90%				■	■	■	■	■	■
Medicare	85%	93%	90%				■	■	■	■	■	■
Pharmaceutical Benefit Scheme	84%	89%	87%				■	■	■	■	■	■
Any	89%	95%	93%									

Figure 15 also shows the percentage of service use by the cohort. This is a raw match rate, indicating whether a person uses that service at any point in the time series. We note that:

- The match to any service other than SHS is 89% for the case group and 95% for the comparison group. Non-linkage can reflect both people genuinely not using services (e.g. not interacting with the justice system and using private or no healthcare), plus other linkage failures. The Commonwealth datasets (Welfare, Medicare and PBS) have high linkage rates for both groups. These are broad services which many people access in some form. In particular, the 5% of the comparison cohort not linked to Medicare provides an estimate of linkage accuracy. It suggests linkage failure is a small but material consideration in the analysis.
- For most services the rate for the case group (those accessing SHS) is higher. The exceptions are births, educational attainment, welfare, Medicare the PBS. Overall, the case cohort has much higher service use among the services considered here.

The higher service use rates among the case cohort is further demonstrated in Table 11. This shows the average proportion of each group that interacted with each service per year of 2011/12 to 2016/17. Notably people in the case cohort are:

- 3 times more likely to appear in the deaths data in any given year
- 24 times more likely to appear in the controlled drugs of addiction data in a year
- 20 times more likely to appear in the custody data in a year
- 6 times more likely to appear in the OOH data in a year
- 3 times more likely to appear in the welfare data in a year.

Table 11 – Rate of service use each year over 2011/12 through 2016/17 for case and comparison

Service	Case	Comparison	Multiplier, rounded
Emergency department	31%	15%	2×
Admitted Patient	18%	11%	2×
Deaths	0.2%	0.1%	2×
Controlled drugs of addiction	2%	0%	24×
Ambulance	13%	3%	5×
Ambulatory mental health	11%	1%	9×
Police-recorded victim incident	19%	4%	5×
Legal aid	10%	1%	13×
Courts	9%	1%	10×
Custody	5%	0%	20×
Social housing	14%	2%	8×
PRA/PRS	5%	0%	16×
OOHC	2%	0%	6×
NESA	4%	6%	1×
Welfare	54%	20%	3×
Medicare	74%	78%	1×
PBS	59%	54%	1×

Given the heightened cross-sectoral service use among the case cohort, this implies it is possible to predict homelessness service use based on cross-sectoral data. This is a topic explored further in Section 4.

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**Key finding 3:** People accessing homelessness services have significantly higher use of other government services than the broader population, sometimes over ten times the rate.

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## 3.4 Welfare support and homelessness

### 3.4.1 Welfare support prior to and during homelessness presentations

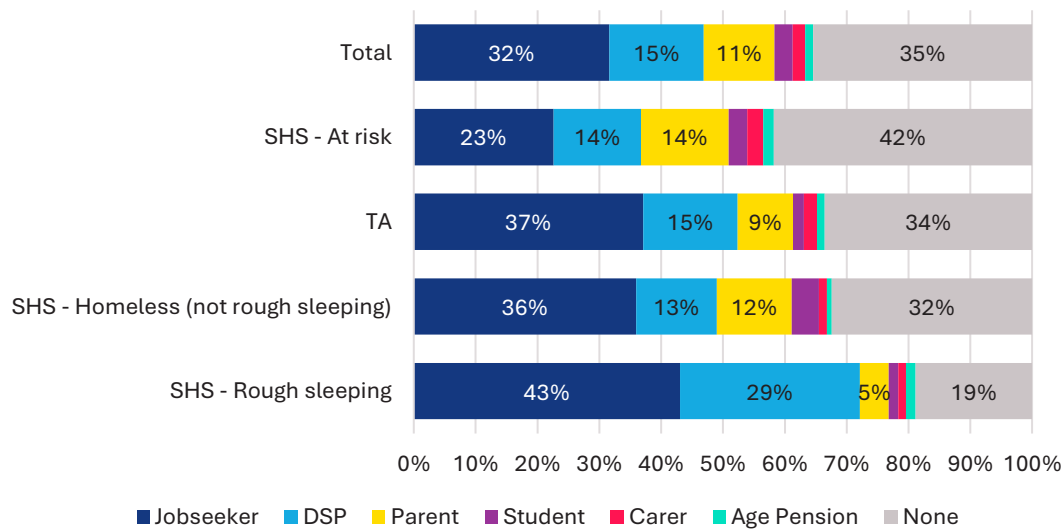
Linked welfare data means that we can understand the type and duration of welfare support provided to people seeking homelessness support. Figure 16 shows the distribution of people accessing homelessness services over 2011/12 to 2016/2017 by the type of income support<sup>12</sup> they received in the quarter they accessed homelessness services.

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<sup>12</sup> We refer to ‘income support’ payments as those that are provided as a main income source for people with low or no income. Jobseeker (formally Newstart), Disability Support Pension, Parent Payment (Sole or Partnered), Student allowances (such as Youth Allowance), Carers Payment and the Age Pension are the



Figure 16 – Distribution of income support type in the quarter of accessing homelessness services over 2011/12 to 2016/17



Each person is only counted once per quarter – if they present multiple times in the same quarter across categories, we have used a priority order for grouping: SHS – rough sleeping, SHS – homeless, TA, SHS – at risk.

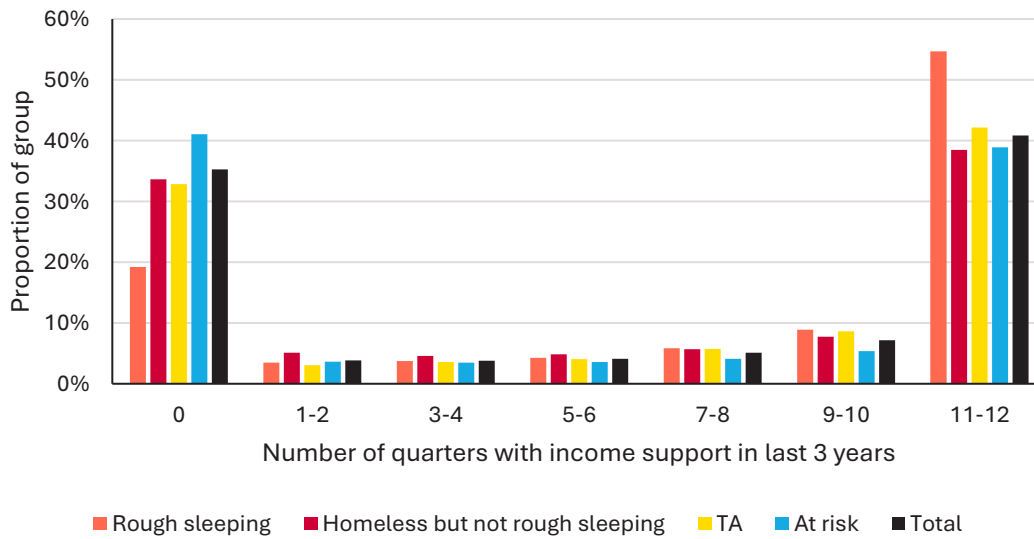
From Figure 16:

- 65% of people presenting to homelessness services over 2011/12 to 2016/17 received income support in the same quarter
- Most commonly people presenting to homelessness services received Jobseeker income support (32%) followed by DSP (15%)
- Those presenting as rough sleeping were much more likely to receive income support in the same quarter (81%), 43% received Jobseeker and 29% Disability Support Pension (DSP).
- Student allowances, Carer’s Payment and Age Pension income support are relatively infrequent among people accessing homelessness services.

Figure 17 shows the distribution of people accessing homelessness services over 2011/12 to 2016/17 by the number of quarters in which they have received income support in the prior three years (12 quarters).

main categories of income support. Other payment categories (e.g. Family Tax Benefit, or Carers Allowance) are smaller and supplemental to other income.

Figure 17 – Distribution of number of recent quarters with income support for those accessing homelessness services over 2011/12 to 2016/17, by category of homelessness



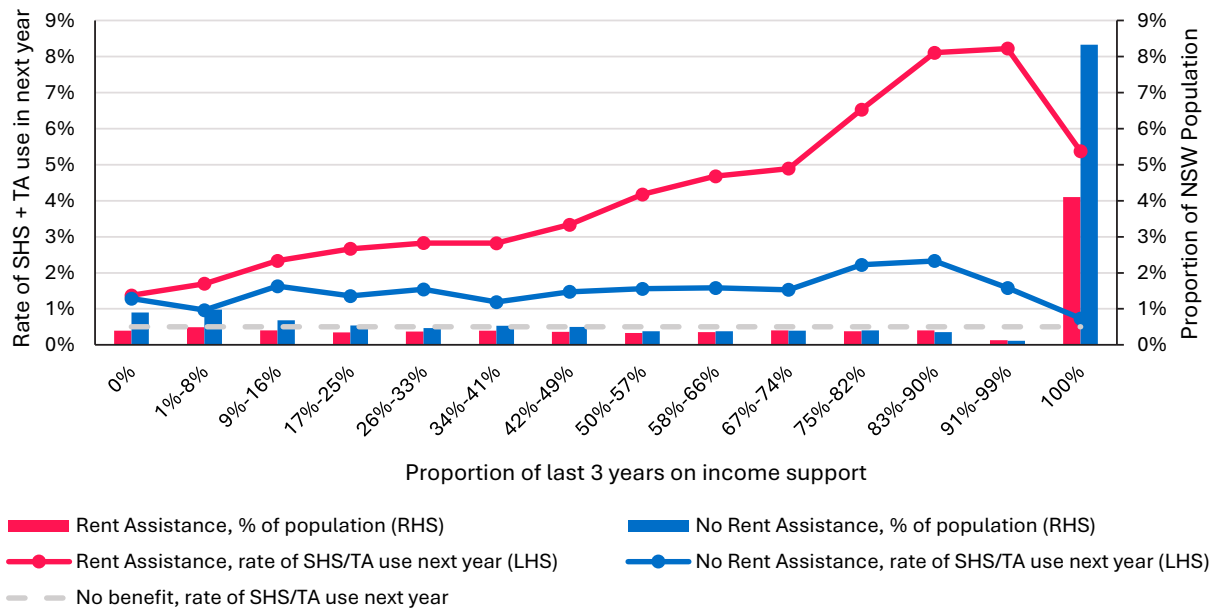
From Figure 17:

- Time on income support is typically extensive.
- People accessing homelessness support have generally either received extensive income support in the past three years, or none. These are likely two quite different groups, those with extensive income support and long-term financial hardship reaching crisis point (not necessarily for the first time) and those with recent triggers that have destabilised their income and housing.
- Just over a third (35%) of people accessing homelessness support have not received income support in any of the prior 12 quarters.
- A large portion (41%) of people accessing homelessness support have received income support in at least 11 of the prior 12 quarters. This is 55% for people accessing homelessness support as rough sleeping.

People receiving income support<sup>13</sup> are eligible for Rent Assistance if they are paying rent or other fees for lodging. Claiming rent assistance could be considered an indicator for seeking homelessness support in the future, if it is associated with a higher likelihood of someone with low income falling into rental distress. Figure 18 shows the relationship between the proportion of time with income support and receipt of Rent Assistance with homelessness service use.

<sup>13</sup> Some people can also receive Rent Assistance even if they are not on an income support payment. For example, people receiving Family Tax Benefit (Part A) are eligible for Rent Assistance.

Figure 18 – Rate of homelessness service use in year following 30 June 2016, recipients of income support payments in prior three years, split by days on support and receipt of Rent Assistance

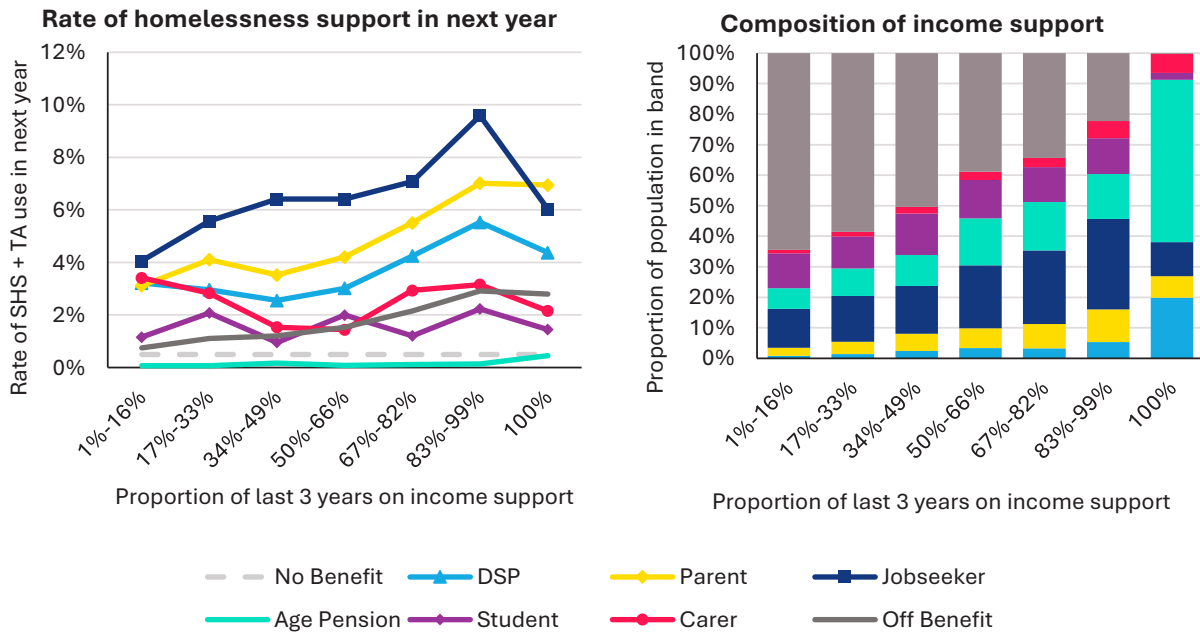


From Figure 18:

- On average, people who received income support over the three years to 30 June 2016 presented to homelessness services at a higher rate over the following year compared to those who did not; both the red and blue lines sit well above the grey dashed line, being the access rate for those not receiving income support.
- People who received RA are more likely to access homelessness support – the red line sits above blue along the chart. This suggests people receiving income support who are renting are at greater risk of falling into housing distress than those on income support who own property, are in social housing or are living rent-free.
- The rate of homelessness service usage increases with the proportion of time receiving income support payments markedly for those with RA (the rising shape in the red line), but remains relatively flat for those without. Those who received income support for the full three years to 30 June 2016 and also RA were 5.2 times more likely to access homelessness services over the following year compared to those without RA.
- At shorter durations of income support, a greater proportion of people do not receive RA. The proportion receiving RA grows with duration, except for the very highest duration band (100%), which includes a larger number of age pensioners (who presumably own property).
- The majority of the population with income support payments for the entire three years are receiving the Age Pension. These people have lower rates of homelessness presentation than the general (non-welfare) population, as can be seen in Figure 19 below. They are also less likely to be receiving RA compared to other longer duration welfare recipients.

While Figure 18 combines all income support types together, there are differences visible by the type of income support payment. Figure 19 further explores the people who received income support in the three years to 30 June 2016. The left-hand chart shows rate of homelessness service use in the next year by income support type as at 30 June 2016 and time with income support. The right-hand chart shows the income support type composition in each band.

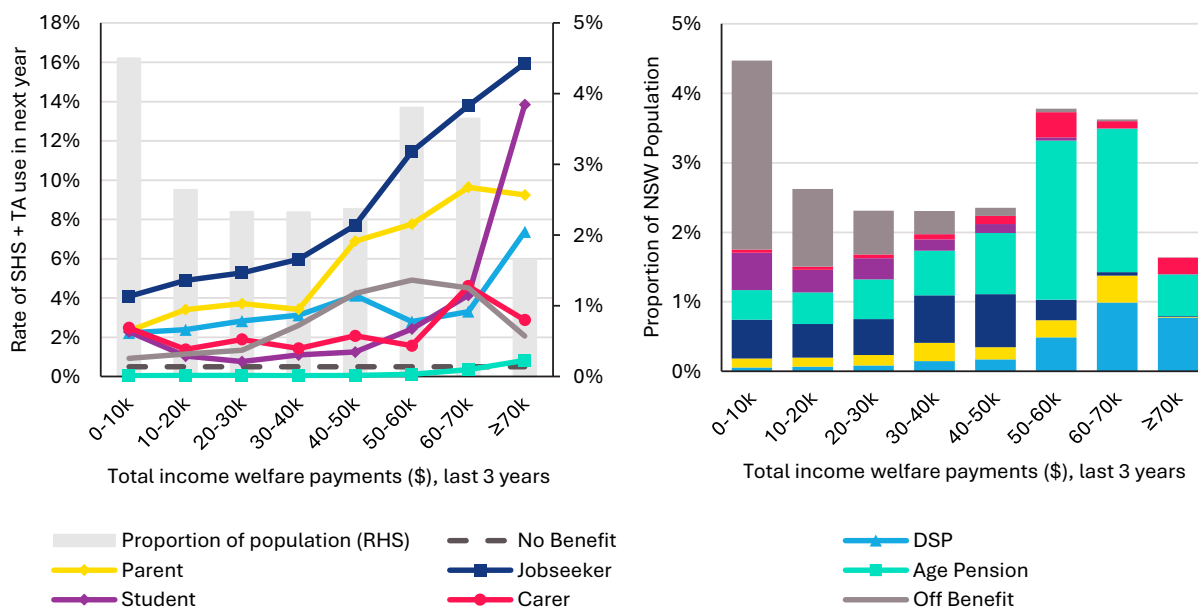
Figure 19 – Breakdown of people receiving income support in the prior three years by payment type, as at 30 June 2016



The charts show that working-age income support recipients (Jobseeker) had the highest rate of homelessness service usage across all duration bands. Age Pension recipients had the lowest rate of homelessness service usage and presented at a rate lower than that of the non-welfare population. These relationships do not control for other factors so some of this trend will be explained by age effects; working-age people have a higher rate of homelessness, whereas older people tend to have a lower rate.

Figure 20 shows the same group of people banded by total welfare payments rather than days with income support payments. This gives a similar picture, although it recognises people who receive a higher rate of welfare payment as well as those receiving extra supplementary payments on top of income support. The charts show that for all income support categories, people who receive more income support payments are more likely to use homelessness services. The large amount of people in the \$50k to \$70k total payment bands correspond to those who had three full years on a maximal rate of Age Pension or DSP.

Figure 20 – Breakdown of people receiving income support in the prior three years by total payments over the three years, as at 30 June 2016



### 3.4.2 Centrelink risk of homelessness indicator

The Centrelink welfare data includes an indicator of whether a person is currently experiencing homelessness or at risk of homelessness. The linkage to actual homelessness service use allows us to explore how the two relate. In short, the indicator is a fair predictor of someone being at increased risk of homelessness in the future, and the indicator covers a small slice of the total cohort of people who seek support.

As a broad summary of the relationship between the two, Table 12 summarises all those receiving income support according to whether they:

- Were recorded as at risk of homelessness in a quarter
- Accessed homelessness services in the following quarter.

Table 12 –Income support recipients according to Centrelink risk of homelessness indicator and whether they accessed homelessness services in the following quarter

Centrelink indicator status	Used homelessness services in following quarter		Total
	No	Yes	
No	96.6%	1.4%	97.9%
Yes	1.8%	0.2%	2.1%
<b>Total</b>	<b>98.4%</b>	<b>1.6%</b>	<b>100%</b>

Totals may not add due to rounding

From Table 12:

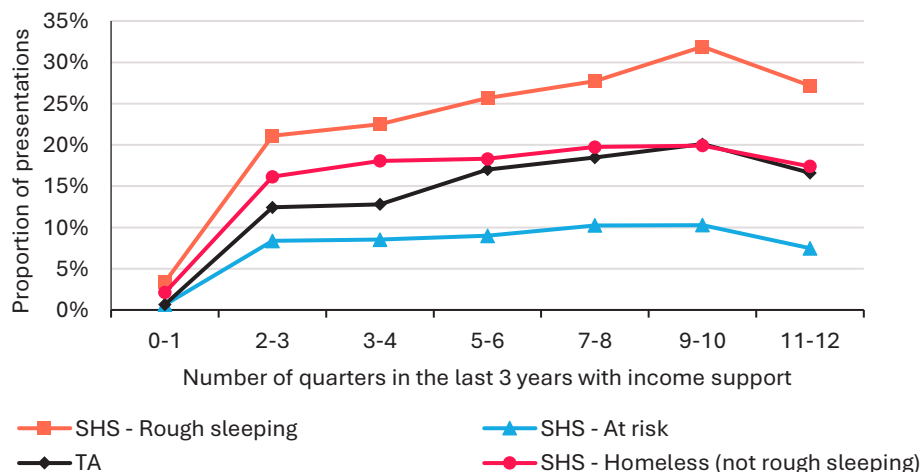
- Most income support recipients are not recorded as at risk of homelessness on the Centrelink data (97.9%).
- For those recorded as at risk on the Centrelink data (2.1% of income support recipients), one-in-ten accessed homelessness services in the following quarter. The presence of the

Centrelink indicator does indicate higher likelihood of homelessness. However, nine-in-ten did not access homelessness services the following quarter. This suggests it is picking up a broader homelessness vulnerability. Some of this effect is timing related – the increased likelihood of homelessness over a full year (rather than a quarter) is given in Section 5.3 and covers a greater share of homelessness presentations.

- For those accessing homelessness services in the following quarter (1.6% of income support recipients) around one-in-eight were flagged as at risk of homelessness on the Centrelink data. The low to moderate degree of non-overlap suggests that there is perhaps a lag in recording the risk of homelessness in the Centrelink data, or that a significant portion of those genuinely at risk are not recognised as such on the Centrelink data.

Figure 21 shows the proportion of presentations to homelessness services where the person had been recorded as at risk of homelessness on the Centrelink data over 2011/12 to 2016/17. This is split according to the type of homelessness on presentation and intensity of recent welfare support. This considers how well the Centrelink indicator accurately reflected the risk of homelessness service presentation, for those that do access homelessness services.

Figure 21 – Proportion of presentations to homelessness services with Centrelink indicator by duration of income support, 2011/12-2016/17



From Figure 21:

- Those accessing homelessness services with more intensive recent income support are more likely to be (correctly) recorded as at risk of homelessness on the Centrelink data. This is perhaps natural as:
  - The longer-term receipt of welfare services allows more accurate information on housing stability to be captured
  - When immediate crisis events lead to both income and housing instability quite suddenly, this is unlikely to be captured.
- Those accessing homelessness services as rough sleeping are much more likely to be (correctly) recorded as at risk of homelessness on the Centrelink data, than those accessing homelessness services at risk of homelessness. This perhaps reflects that rough sleeping is an extreme form of homelessness that may be more readily noticeable, say via a lack of address.

Table 13 shows the proportion of presentations to homelessness services where the person had been recorded as at risk of homelessness on the Centrelink data over 2011/12 to 2016/17. This is split according to the category of homelessness presentation and type of welfare support in the quarter.

Table 13 – Proportion of presentations to homelessness services with Centrelink indicator in the same quarter by income support type

Income support type in quarter	Homelessness presentation type				
	SHS – Rough sleeping	SHS – Homeless but not rough sleeping	TA	SHS – At risk	Total
Jobseeker	31%	23%	22%	13%	20%
Student	21%	15%	6%	8%	11%
Parent	8%	8%	7%	4%	6%
DSP	27%	17%	14%	8%	14%
Carer	11%	9%	9%	2%	6%
Age pension	16%	8%	3%	2%	4%
Nil	3%	1%	1%	1%	1%
<b>Total</b>	<b>23%</b>	<b>13%</b>	<b>12%</b>	<b>5%</b>	<b>10%</b>

For those accessing homelessness services over 2011/12 to 2016/17.

From Table 13:

- In all, 10% of people presenting to homelessness services were flagged as at risk of homelessness on the Centrelink data in the same quarter. This ranges from 20% for those with Jobseeker income support to 4% of those with age pension income support.
- The higher rate of being recorded as at risk on the Centrelink data for those accessing homelessness services as currently rough sleeping persists across the different income support types.

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**Key finding 4:** Most homelessness presentations are by those on income support, primarily those receiving Jobseeker, Parent or DSP payments. There is strong evidence that those who access Rent Assistance are more at risk of needing future support, and longer durations with welfare support indicate higher risk.

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### 3.5 Homelessness service use after accessing other services

Table 14 shows the annualised probability of accessing homelessness services in the quarter following other service use. This is a short-term risk measure to gain a feel for service use distributions and also a simple measure of homelessness risk. The table uses the six years of homelessness data 2011/12 to 2016/17. We have annualised the rates in the figure to make them more comparable to later analysis. We use weightings to ensure that the rates are representative of the rates for the whole NSW population.

Table 14 indicates the extent to which cross-sectoral service use can indicate an elevated risk of homelessness. For example, in the first row for emergency department visits we observe that:

- 95% of the NSW population do not have a recorded emergency department (ED) presentation in a given quarter.

- The annualised rate of homelessness in the following quarter for people who do not visit an emergency department is 0.8%, slightly lower than the 0.9% overall rate. However, this increases with service use to 4% for one or more emergency department visits in the quarter.



Table 14 – Annualised probability of homelessness service use in the quarter following other service use

Service	Proportion of population accessing in any quarter	Rate of homelessness service use in the following quarter:	
		for those not using service	for those using service
Emergency Department	5.0%	0.8%	3.7%
Admitted patients	4.6%	0.9%	2.2%
Admitted patients – mental health	0.1%	0.9%	18.3%
Ambulatory mental health	0.7%	0.8%	13.4%
Ambulance	1.1%	0.9%	6.8%
Controlled drugs of addiction	0.1%	0.9%	23.4%
Medicare	55.6%	0.8%	1.0%
Medicare relating to mental health	3.5%	0.8%	3.4%
Medicare relating to addiction	0.1%	0.9%	13.0%
PBS script	37.8%	0.9%	1.1%
PBS script relating to opioids	3.8%	0.9%	1.9%
PBS script relating to addiction	0.4%	0.9%	3.3%
PBS script relating to mental health	8.0%	0.8%	2.3%
Police-recorded victim incident	1.3%	0.8%	9.3%
Police-recorded victim incident – DFV	0.1%	0.9%	21.2%
Legal Aid	0.3%	0.9%	20.3%
Court appearance/ Police caution or YJC	0.3%	0.9%	17.4%
Custodial spell ending	0.1%	0.9%	33.7%
Public housing	2.0%	0.8%	6.3%
Private Rental Assistance	0.1%	0.9%	15.8%
Private Rental Subsidy	0.0%	0.9%	17.3%
OOHC placement ending	0.0%	0.9%	14.0%
Income support	18.7%	0.5%	3.0%
Rental Assistance	6.2%	0.7%	5.0%
DSP income support	3.0%	0.8%	4.7%
Carer income support	1.0%	0.9%	2.3%
Jobseeker income support	4.0%	0.7%	6.6%
Student income support	1.9%	0.9%	1.7%
Age pension	7.4%	1.0%	0.2%

Note: Average over the six years to June 2017

While these averages do not control for the correlations between service uses and other demographic characteristics, Table 14 does show that:

- In all cases, except the Age pension, service use is associated with increased risk of homelessness. The older age of people receiving the Age Pension means the relative risk of homelessness is lower.
- Many of the services apply to a very small fraction of the population in any given quarter. Often these smaller exposure measures give a much higher risk of homelessness. For example, controlled drug treatments apply to 0.1% of the population, but are associated with a very large increase in homelessness rates.
- At the other extreme, Medicare sees broad exposure (over half the people in NSW access Medicare in any given quarter), but only a very small increase in risk of homelessness.

The predictive modelling in the next section looks at more detailed variations of service use (e.g. use over a year, or even longer).

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**Key finding 5:** Very large increases in homelessness rates are associated with other service use, particularly for emergency department visits, ambulance, controlled drug use, Legal Aid, police-recorded victim incidents and OOHC placements ending. Homelessness rates are routinely ten times higher or more.

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## 3.6 Intersections between service use

A key feature of the linked dataset is that it allows us to understand intersections in service use. As people with service needs in one area typically access a broad range of other services, there are often important overlaps between service use. Understanding these overlaps can be useful when thinking about multiple potential intervention points; if the overlap is heavy then targeting two different intervention points makes less sense. Also, groups of people with heavy usage across a range of services potentially will generate the greatest fiscal benefits from effective early intervention. Table 15 shows the overall proportion of NSW people accessing broad services in a financial year.

Table 15 – Cross-table of overlap of service usage for the full NSW population in a financial year

The proportion of people accessing...	...who also access this service in the same year:										
	Medicare	PBS	Time on welfare (any)	Emergency department	Hospital admission	Ambulatory mental health	Social housing	Police-recorded victim incident	Legal Aid	Court appearance	Custody spell ending
Medicare	100%	75%	30%	19%	18%	2%	2%	5%	1%	1%	0%
PBS	99%	100%	35%	22%	21%	2%	2%	5%	1%	1%	0%
Time on welfare (any)	94%	83%	100%	23%	24%	3%	5%	7%	3%	2%	1%
Emergency department	96%	81%	37%	100%	45%	5%	5%	9%	3%	3%	1%
Hospital admission	97%	85%	42%	49%	100%	4%	3%	7%	2%	2%	1%
Ambulatory mental health	94%	87%	65%	62%	48%	100%	13%	22%	15%	13%	6%
Social housing	90%	77%	64%	37%	26%	9%	100%	17%	8%	7%	2%
Police-recorded victim incident	93%	77%	46%	37%	26%	7%	9%	100%	8%	7%	2%
Legal Aid	89%	74%	73%	45%	31%	20%	15%	32%	100%	38%	19%
Court appearance	85%	67%	61%	44%	26%	17%	13%	29%	37%	100%	20%
Custody spell ending	82%	62%	81%	52%	32%	32%	18%	33%	71%	76%	100%

Average over 2014/15 to 2016/17.

By way of interpretation, considering the first row of Table 15, in a year:

- 75% of people accessing Medicare also have a PBS script in the same year
- 30% of people accessing Medicare also access welfare payments in the same year
- 2% of people accessing Medicare also access ambulatory mental health services in the same year.

Table 16 shows the same information, but restricted to those accessing homelessness services, and considering only the year prior to accessing homelessness services. It can be read in the same way as Table 15. For example, from the first row of Table 16, 78% of people accessing homelessness services accessed Medicare and PBS in the year prior, 70% accessed Medicare and welfare.

Intersections are generally intuitive. There are heavy overlaps across different health services, and similar across different justice sector activity. Of the services shown, social housing is notable in having relatively low intersections with other services.

Table 16 – Cross-table of overlap of service usage in the 12 months prior to a homelessness presentation

The proportion of people accessing...	...who also access this service in the same year:										
	Medicare	PBS	Time on welfare (any)	Emergency department	Hospital admission	Ambulatory mental health	Social housing	Police-recorded victim incident	Legal Aid	Court appearance	Custody spell ending
Medicare	100%	78%	70%	47%	28%	19%	18%	31%	19%	16%	9%
PBS	98%	100%	75%	51%	32%	22%	19%	33%	20%	17%	9%
Time on welfare (any)	88%	75%	100%	49%	32%	23%	19%	36%	24%	22%	12%
Emergency department	91%	78%	76%	100%	49%	31%	21%	41%	26%	23%	13%
Hospital admission	93%	82%	83%	83%	100%	40%	21%	42%	29%	24%	14%
Ambulatory mental health	91%	83%	87%	78%	58%	100%	21%	46%	37%	32%	21%
Social housing	87%	71%	72%	50%	30%	21%	100%	38%	21%	19%	10%
Police-recorded victim incident	89%	76%	83%	61%	37%	27%	23%	100%	31%	27%	13%
Legal Aid	88%	74%	88%	61%	41%	36%	20%	50%	100%	52%	36%
Court appearance	85%	69%	92%	63%	39%	36%	22%	49%	60%	100%	42%
Custody spell ending	83%	66%	92%	63%	42%	42%	19%	43%	76%	76%	100%

Average over 2014/15 to 2016/17.

From Table 15 and Table 16 we can see the overlaps in service use are much higher prior to homelessness, but the broad trends appear similar. The degree of overlap may have implications for targeting; for example, a very high proportion of people who exit custody also have Legal Aid and Court appearance service use, so multiple initiatives in these areas would need to recognise the heavy overlaps. To explore any differences Table 17 shows the ratio of the two preceding tables. That is, how much bigger is the overlap in service use in the year prior to homelessness than it is for the population.

Table 17 –The ratio cross-table of overlap of service usage in the 12 months prior to a homelessness presentation compared to for the full population

The proportion of people accessing...	...who also access this service in the same year:										
	Medicare	PBS	Time on welfare	Emergency department	Hospital admission	Ambulatory mental health	Social housing	Police-recorded victim incident	Legal Aid	Court appearance	Custody spell ending
Medicare	1	1	2	2	2	12	8	7	17	15	31
PBS	1	1	2	2	2	11	8	7	16	15	32
Time on welfare (any)	1	1	1	2	1	7	4	5	8	9	14
Emergency department	1	1	2	1	1	6	5	4	9	8	15
Hospital admission	1	1	2	2	1	9	6	6	14	14	24
Ambulatory mental health	1	1	1	1	1	1	2	2	2	3	3
Social housing	1	1	1	1	1	2	1	2	3	3	4
Police recorded victim incident	1	1	2	2	1	4	3	1	4	4	6
Legal Aid	1	1	1	1	1	2	1	2	1	1	2
Court appearance	1	1	2	1	2	2	2	2	2	1	2
Custody spell ending	1	1	1	1	1	1	1	1	1	1	1

Note: Calculated as the Ratios of Table 16 divided by Table 15. Time window is the average over 2014/15 to 2016/17

From Table 17:

- The overlaps among services accessed broadly by the population like Medicare, welfare services and hospital for those accessing homelessness services are similar or slightly elevated compared to the general population (ratios of 1-2).
- The overlaps between the broad population services and more specific services in the housing and justice sectors are much larger. This is because people are more likely to access these more specific services in the year prior to homelessness.
- The overlaps between the more specific services are also larger. In the year prior to homelessness people, when compared to those not accessing homelessness, people:

- Who access ambulatory mental health are three times more likely to also have a court appearance (6<sup>th</sup> row, 10<sup>th</sup> column)
- Who have a court appearance are twice as likely to also access Legal Aid services.
- Who have a hospital admission are 24 times more likely to also have a custody exit.

This is strong evidence that people accessing homelessness services tend to access a suite of services, which is typically indicative of more complex needs.

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**Key finding 6:** Overlaps between service usage are significant and generally intuitive. These overlaps are far more pronounced for those requiring homelessness services, indicative of more complex needs.

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# 4 Predictive modelling

## 4.1 Introduction and approach

This section focuses on the prediction problem; given what we know about a person, how likely are they to access homelessness services in the next year? Prediction is important as it enables potential targeting of support to people most at risk, as well as identification of the drivers of risk. As elsewhere, homelessness services include SHS and TA.

This section fits a series of machine learning prediction models:

- **Model 1: Main predictive model** – Prediction of a homelessness presentation in the next year, for quarterly records in the time periods in 2014/15 and 2015/16.
- **Model 2: First-entry model** – As per model 1, excluding people that have accessed SHS/TA in the past three years – predicting ‘new’ homelessness presentations.
- **Model 3: Youth and young adult model** – As per model 1, but only for people aged 15-24.
- **Model 4: Rough sleeping model** – As per model 1, but only predicting SHS presentations for people rough sleeping.

Each of these models takes historical data and uses predictor variables (prior service use, demographic characteristics etc.) to predict whether a person will present to SHS.

The models are based on quarterly records in 2014/15 and 2015/16 with the target being SHS/TA presentations over the year following each of these quarters. This means we are effectively predicting SHS/TA presentations from 1 October 2014 to 30 June 2017, with about 80% of these being over 1 July 2015 to 30 June 2017. The time period is selected to make use of the most recent data possible because, as noted in Section 4.1.4, NSW has experienced significant reform and changes in rates of SHS presentations over time.

The main distinction between Models 1 and 2 is that Model 1 includes people with recent SHS/TA presentations (recognising that people who have previously accessed homelessness services are likely to return and other targeted assistance may be appropriate), whereas the second model is attempting to predict ‘new’ cases among people who have not recently accessed these services.

In each case, we have used gradient boosted decision trees as a fast, flexible and accurate way of fitting a prediction model. Model 1 was down-sampled to 953,000 person-quarter observations for some fits to decrease the time taken to fit.

A list of predictors used in the models are described in Appendix B. We tested various combinations of service use history but found that the best prediction accuracy was obtained when including longer service history variables (e.g. police-recorded victim incidents over three years, rather than one year). We interpret this as while there will be immediate triggers for homelessness indicated by the administrative data, the longer windows do provide a broader picture of vulnerability which is still useful.

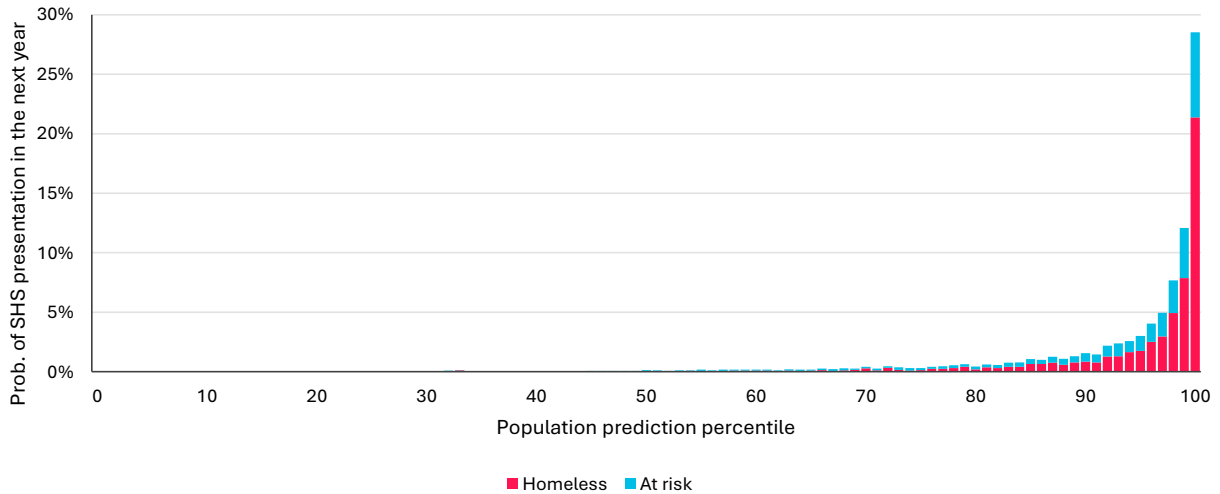
## 4.2 Model 1: Main predictive model

### 4.2.1 Overall model performance

As introduced in Section 3.2, the overall homelessness presentation rate for the population was 0.89%. On an annual basis for the population of about 7.85m people in NSW, this implies 69,900 people presenting to SHS. However, the distribution of risk in the model is extremely skewed.

Figure 13 below shows this skew by splitting the population by prediction band percentile; the bar on the very left of the chart are the 1% least likely (as predicted by the model) to present to an SHS/TA, whereas the 1% on the right are those most likely.

Figure 22 – Percentile plot for use of SHS/TA in the next year, main prediction model



Note: Chart is constructed by ordering the validation dataset from lowest likelihood of accessing SHS/TA to highest, and grouped into 1% population bands, using weights. The rightmost column indicates the 1% of observations most likely to access SHS/TA, and they do so 29% of the time.

We observe:

- The 1% at highest risk of homelessness, corresponding to about 78,500 people, represent just over one third (32%) of all homelessness presentations (22,600 out of 69,900), and do so at a rate 32 times higher than the population average. This corresponds to a 29% likelihood of accessing SHS/TA.
- The 9% of the population from percentiles 91 to 99 represent almost half (46%) of all homelessness presentations, presenting at five times the rate of the population average.
- The 20% of the population from percentiles 71 to 90 represent another 16% of presentations, at a rate slightly below the overall average.
- The 70% of the population at lowest risk represent 6% of presentations (4,200 out of 69,900 people in a given year). Their rate of access is 0.08%, less than a tenth of the overall average.

These results are also summarised in Table 18.



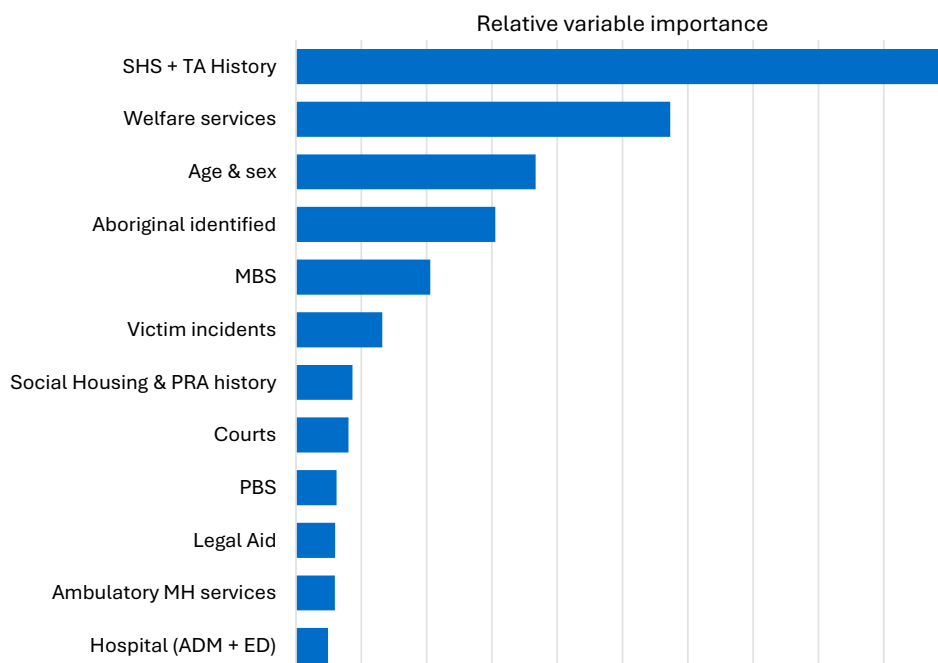
Table 18 – Summary of model results for the main homelessness predictive model

Percentile rate	Proportion of population	Number of SHS/TA presentations	Proportion of SHS/TA presentations	Rate <sup>14</sup>	Rate relative to overall average
1% - 70%	70%	4,200	6%	0.08%	x0.09
71%-90%	20%	11,200	16%	0.71%	x0.80
91%-99%	9%	31,900	46%	4.5%	x5.1
100%	1%	22,600	32%	28.5%	x32.3
<b>Total</b>		<b>69,900</b>		<b>0.89%</b>	

#### 4.2.2 Drivers of model performance

The main predictive model identifies a 1% subgroup who are **more than thirty times** more likely to receive homelessness support in the next year, using demographic and detailed service use data. While this pure predictive performance is of value, it is also useful to understand which pieces of information are contributing to this model performance. The model allows us to measure the relative contribution of each variable towards overall performance. These are the variables most important for predicting whether someone is at a very high or low risk of presenting to SHS or TA in the next year. This is shown in Figure 23 (we have grouped underlying variables together into their broader service usage category).

Figure 23 – Relative variable importance for key predictor groups in the main predictive model



<sup>14</sup> This is the population-weighted actual rate of SHS/TA on the ‘test’ dataset reserved for this purpose in the fitting procedure.

We also stress that the relationships found are correlations rather than causative effects. Often service use correlation can be driven by an underlying factor (e.g. substance use or low income) that is not fully visible in the administrative data. We caution against causal interpretations for this reason.

We observe from Figure 23:

- The most important set of variables for predicting future homelessness presentations relate to previous use of SHS/TA. The model includes last quarter, one-year and three-year history variables for SHS use, as well as the type of need (homeless versus at risk). It also includes one-quarter and three-year history variables for TA use. In some ways it is not surprising that a significant portion of people accessing SHS/TA are returning, and often this is consistent with effective case management. However, it is still an important point; people with previous SHS/TA use are at heightened risk of requiring support again in the future and may form a natural target group for intervention. We fit an alternative first-entry model in Section 4.3 to help clarify the picture for people without recent SHS/TA use.
- After SHS and TA, variables related to welfare payments are the most important for predicting future homelessness presentations. The model includes a range of variables describing welfare history including time with welfare payments, income support type, and homeowner information. Time spent on Rent Assistance was particularly important in this model, which reflects the vulnerability of this cohort who may be unable to afford accommodation without assistance from welfare payments.
- Demographic variables are important when viewed across the whole population. Significant differences in likelihoods of accessing homelessness services are visible for Aboriginal people which has been incorporated into the model. Age is also highly predictive and, to a lesser extent, sex. Education information is important but narrow in this model, as it is only linked for younger people in the study cohort.
- Most other services make a material contribution to the model – very few variables play no role in the predictions. After homelessness and welfare related variables, we have found Medicare services, police-recorded victim incidents, justice system presentations, and social housing history are the four services that are most important in the predictions.
- We include a variety of time windows in our variables (for example, days of welfare receipt over three years as well as over one year). In general, we observe that variables with longer time windows tend to give better predictive importance. This is interesting, since it suggests some contributors to homelessness may be chronic rather than acute.

While Figure 23 gives a sense of relative importance, it does not give an idea of the ‘shape’ of how each variable influences the likelihood of homelessness. One approach to generating this is using partial dependence plots. These give the average impact on the prediction, holding other factors constant.<sup>15</sup>

For example, Figure 24 shows the partial dependence effects for key demographic variables used in the model. The first panel relates to people identified as Aboriginal in the dataset (generally through the SHS or NSW Health portions of the linkage). The dataset has 3.2% of the population identified as Aboriginal (grey bars). For Aboriginal people, the rate of SHS is 2.7 times higher while holding all other factors constant (shown here as an increase from 0.8% to 2.2%). This increase

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<sup>15</sup> More formally, we take our dataset and cycle each observation through all possible values of a variable and see how the prediction changes (on average), holding other factors constant. We have defined the relative likelihood as the percentage change in entry probability against the overall average (about 4%). So, a +100% likelihood would indicate a doubling of entry likelihood.

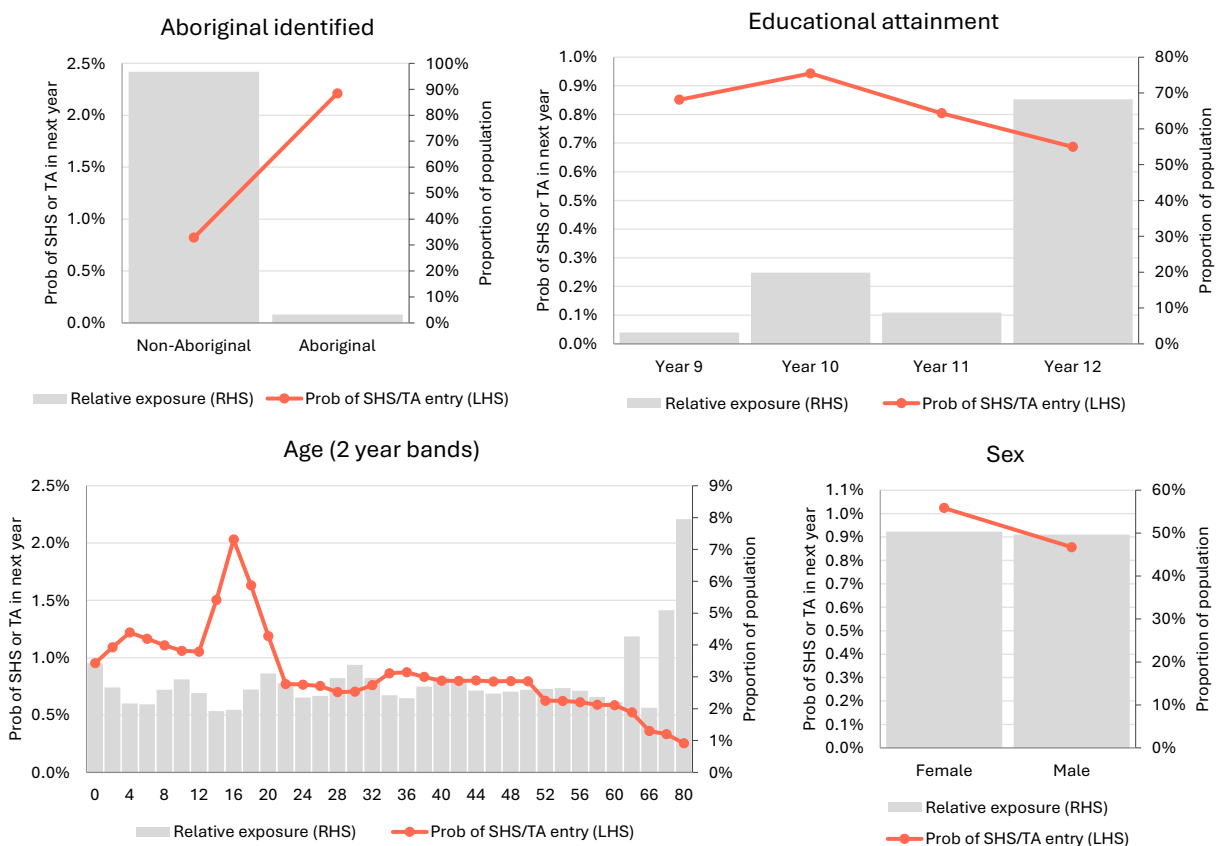
would be compounded if there are other correlated variables such as lower education or higher historical service use.

The second panel shows people who complete Years 11 and 12 are less likely to access SHS by 15% and 27% respectively, compared to those completing Year 10. While intuitive, school completion may indicate a variety of underlying causes (e.g. student motivation, home stability etc), so some care is needed in interpretation.

In the third panel, the age curve shows a large spike in risk for people aged 14 to 25, peaking for the 16-17 age band. There is also a smaller hump visible around age 35, which relates to family-violence related presentations who are more likely to be females with children.

The fourth panel shows that overall females are slightly more likely to present to SHS, other factors held constant.

Figure 24 – Partial dependence effects for main predictive model, key demographic characteristics



The impact of service use can also be seen through partial dependence plots and some of these are shown in Figure 25. We observe:

- Having at least one previous SHS presentation in the past three years increases future SHS/TA presentation rate by a factor of 2.4 times, all else equal; this effect can be further amplified by the other SHS variables in the model, such as the number of SHS events in the last year.
- Having any days on income support in the welfare system increases the likelihood, all else equal, by 32%, with this effect compounding further with other welfare variables built into the model such as days on Rent Assistance and type of support.
- At least one recorded victim incident increases predicted likelihood by 42%, although the likelihood continues to build with multiple events.

- Legal Aid history increases predicted likelihood by 14% for those accessing the service in the previous three years.
- Any ambulatory mental health service increases the rate of future homelessness presentation by more 30%, with not much further difference for increasing frequency of service use.
- One or two uses of Medicare mental health services over five years increases the rate of future homelessness presentation by 14%, however repeated use (>16 times) increases this rate to 33%. This variable compounds with use of other mental health services in the model.

Again, these relationships are correlations, useful for prediction, rather than causative effects. Service use history may indicate other underlying vulnerabilities, but are still potentially valuable as tangible intervention points.

Figure 25 – Partial dependence effects for main predictive model, key service use history variables

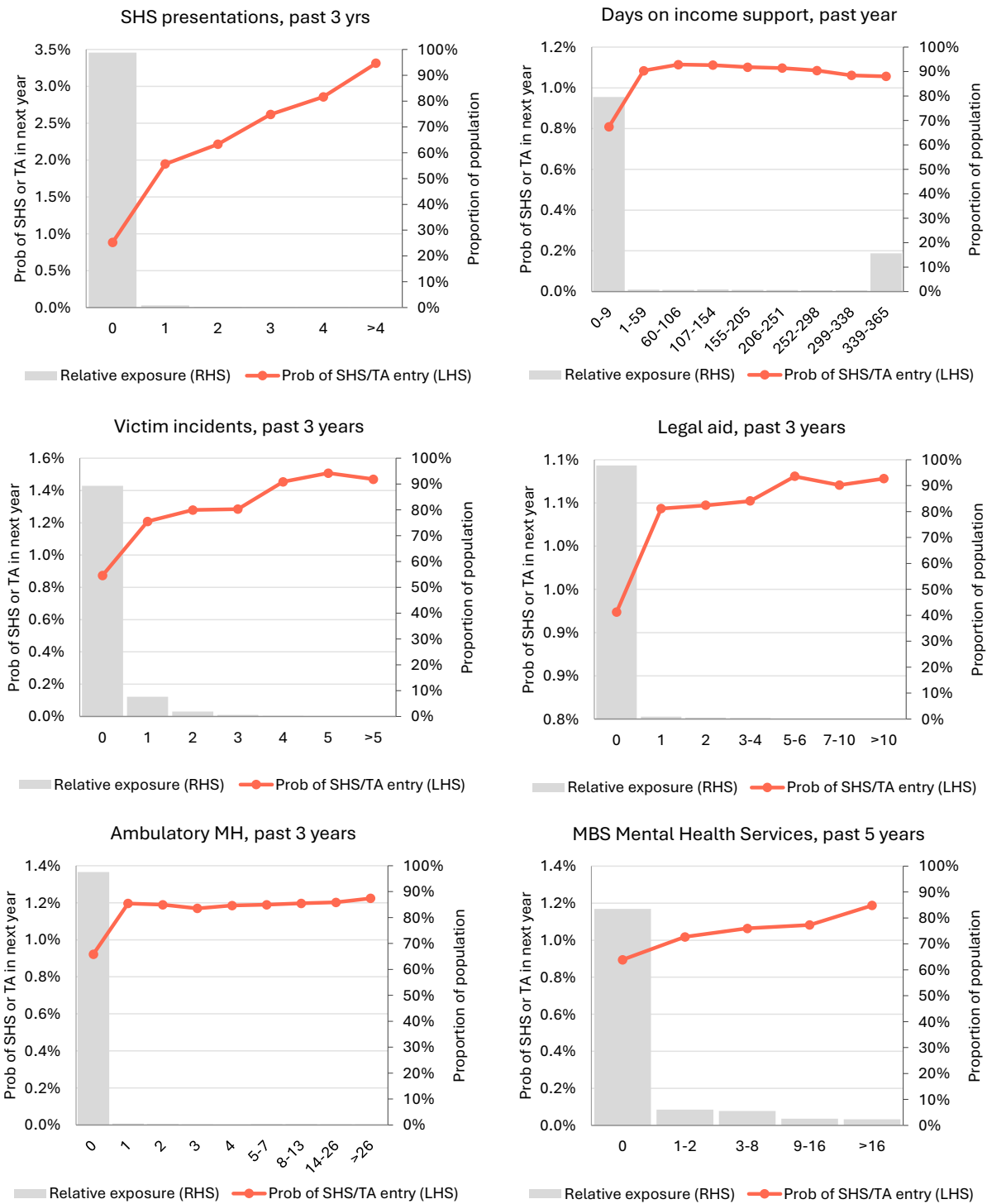


Table 19 below illustrates the elevated service use amongst those with highest predicted likelihood of accessing homelessness services by comparing service use characteristics for the 1% at highest risk compared to the general population.

Table 19 – Comparison of key service use measures for those at high risk of homelessness

Statistic	Group at highest risk (highest 1%) from prediction model <sup>16</sup>	Full population	Multiplier
Number of people	78,500	7,850,000	
SHS + TA presentation rate	28.5%	0.89%	32×
% Aboriginal identified	45%	3.3%	14×
Avg. # of police-recorded victim incidents per person, prev. 3yr	3.5	0.21	17×
Avg. # of court appearances/YJCs/cautions per person, prev. 3yr	3.2	0.10	34×
Avg. # of SHS presentations per person, prev. 3yr	1.2	0.022	55×
Avg. # of TA supports per person, prev. 3yr	0.8	0.011	72×
Avg. # of ED presentations per person, prev. 3yr	5.5	0.76	7×
Avg. # of ambulatory MH services per person, prev. 3yr	4.6	0.24	19×
Avg. # of admitted patient days per person, prev. 3yr	8.9	2.21	4×
Avg. # of Legal Aid presentations per person, prev. 3yr	2.9	0.08	36×
Avg. # of days on income support per person, prev. 3yr	718	191	4×
Avg. # of days on RA support per person, prev. 3yr	341	60	5×
Avg. # of Medicare services per person, prev. 3yr	50	39	1×
Avg. # of PBS scripts per person, prev. 3yr	31	27	1×

The group at highest risk has elevated service use across all examined services including, welfare, justice, housing and health over three years. Compared to the general population, people in this group receive welfare payments for four times the duration and have 17 times as many police-recorded victim incidents. Aboriginal people are overrepresented in this group.

**Key finding 7:** While previous SHS and TA use is an obvious and strong predictor of future use, very strong effects are observed both for demographics (age and Aboriginal identified) and prior cross-sectoral service use (including welfare payments, police-recorded victim incidents and mental health services). Longer term service use, such as number of incidents over three years, is generally more important than more acute shorter-run effects when predicting homelessness over the next year.

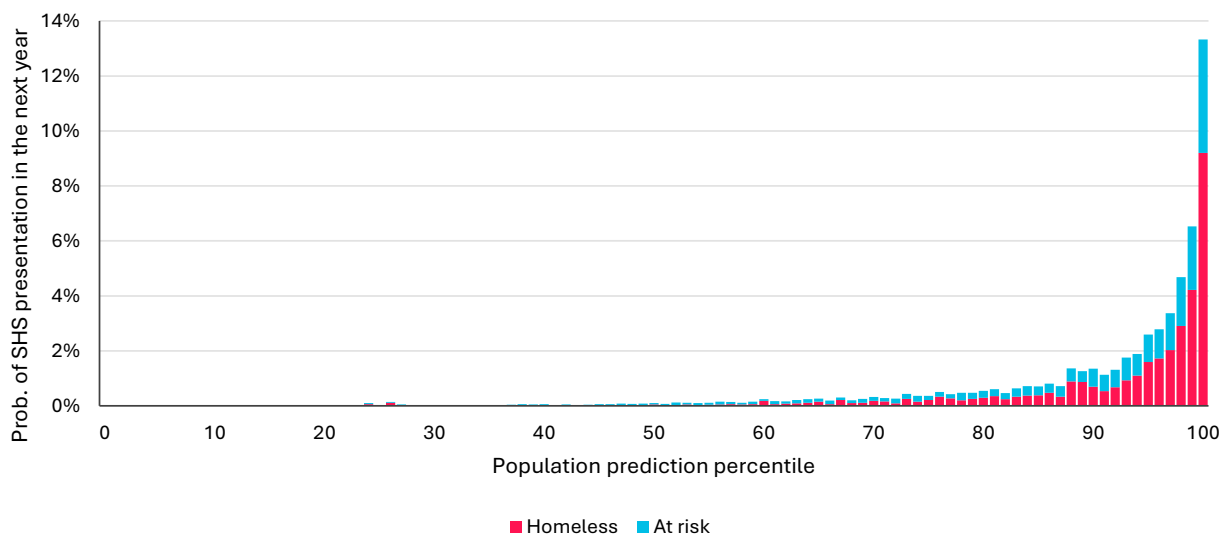
<sup>16</sup> These are the population-weighted usage rates on the ‘test’ dataset reserved for this purpose in the fitting procedure. By using a reserved dataset, the rates are will not carry bias inherited from the fitting process itself.

### 4.3 Model 2: First-entry model

The main predictive model predicts both first entry and re-entry (after a break) to homelessness services. We have also fit a first-entry model to predict SHS/TA presentations for people who have not had any SHS/TA use in the previous three years.

SHS and TA history variables are therefore not included in this model, leaving only other service use and demographic characteristics. Our ability to predict those at highest risk is not as strong as the main predictive model, which is natural since we have lost previous homelessness service usage as a predictor. Figure 26 shows the percentile plot of this first-entry model and Table 20 summarises these results.

Figure 26 – Percentile plot for first-entry SHS/TA predictive model



From Table 20, there is still a large degree of skewness, with almost 70% of presentations attributable to just 10% of the population that are rated as at higher risk by the model.

Table 20 – Summary of model results for the first-entry SHS/TA prediction model

Percentile rate	Proportion of population	Number of SHS/TA presentations	Proportion of SHS/TA presentations	Rate <sup>17</sup>	Rate relative to overall average
1% - 70%	70%	4,200	9%	0.08%	x0.13
71%-90%	20%	9,900	22%	0.64%	x1.1
91%-99%	9%	20,200	45%	2.9%	x5.0
100%	1%	10,300	23%	13.3%	x22.8
<b>Total</b>		<b>44,600</b>		<b>0.58%</b>	

Figure 27 shows the relative importance plot for the first-entry model. The importance of different variables in the first-entry model is broadly similar to the main predictive model. There are no SHS

<sup>17</sup> This is the population-weighted actual rate of SHS/TA on the ‘test’ dataset reserved for this purpose in the fitting procedure.

and TA terms for this model, by definition, as it predicts rates for people without SHS/TA history. Welfare history remains the most predictive of first-entry to SHS/TA services, reflecting the strong link between financial hardship and homelessness. Demographic effects remain prominent and partial dependence effects are fairly comparable. In some cases, the effects are slightly sharper, as the baseline ‘first entry’ rate is lower; for example, the partial effect for the 18-25 age group increases risk by slightly more in the first-entry model.

Figure 27 – Relative variable importance for key first-entry SHS/TA predictive model

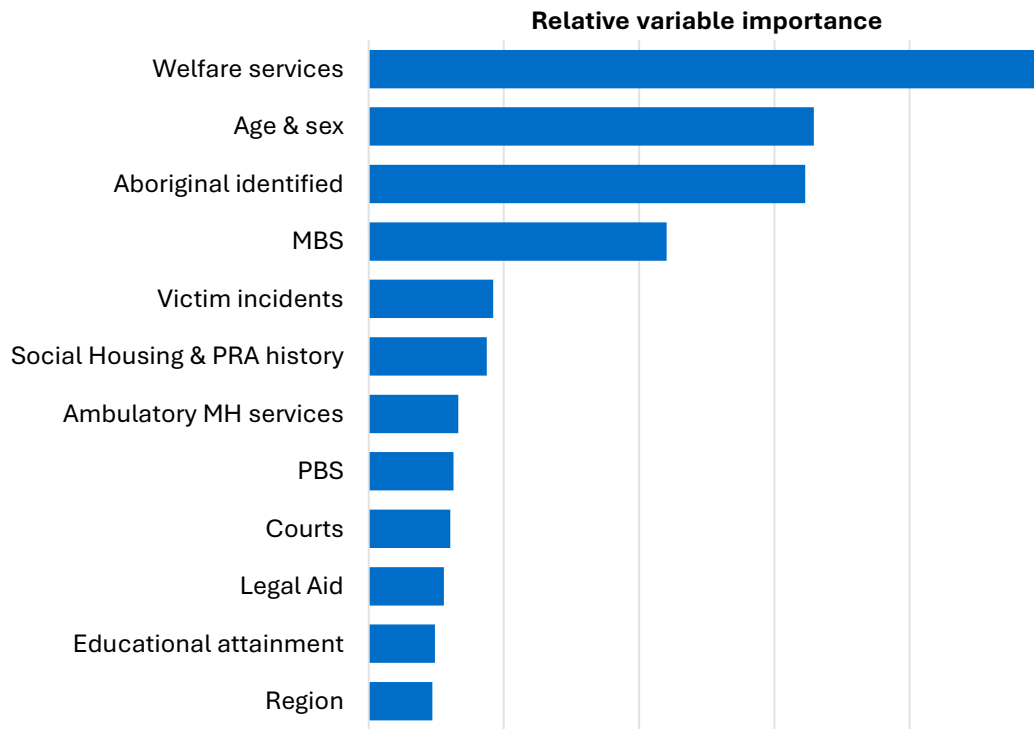


Table 21 below illustrates this by comparing service use characteristics for the 1% at highest risk compared to the general population.



Table 21 – Comparison of key service use measures for those at high risk of presenting to SHS/TA without SHS/TA history in the past three years

Statistic	Group at highest risk (highest 1%) from prediction model <sup>18</sup>	Full population without SHS/TA history in past 3 years	Multiplier
Number of people	77,300	7,730,000 <sup>19</sup>	
SHS + TA presentation rate	13.3%	0.58%	23×
% Aboriginal identified	50%	2.9%	18×
Avg. # of police-recorded victim incidents per person, prev. 3yr	2.3	0.18	13×
Avg. # of court appearances/YJCs/cautions per person, prev. 3yr	1.8	0.07	26×
Avg. # of SHS presentations per person, prev. 3yr			
Avg. # of TA supports per person, prev. 3yr			
Avg. # of ED presentations per person, prev. 3yr	3.8	0.72	5×
Avg. # of ambulatory MH services per person, prev. 3yr	4.0	0.20	20×
Avg. # of admitted patient days per person, prev. 3yr	8.0	2.13	4×
Avg. # of Legal Aid presentations per person, prev. 3yr	1.6	0.06	29×
Avg. # of days on income support per person, prev. 3yr	646	185	3×
Avg. # of days on RA support per person, prev. 3yr	296	57	5×
Avg. # of Medicare services per person, prev. 3yr	44	39	1×
Avg. # of PBS scripts per person, prev. 3yr	28	27	1×

The group at highest risk has elevated service use across all examined services, although the difference is less than that of model 1 due to the lower level of differentiation achievable without SHS and TA history. Half of this group identify as Aboriginal, indicating that the difficulties they face are not limited to the cycle of repeated homelessness.

<sup>18</sup> These are the population-weighted usage rates on the ‘test’ dataset reserved for this purpose in the fitting procedure.

<sup>19</sup> As estimated by the weighted fraction in our dataset – may vary slightly from other population estimates.

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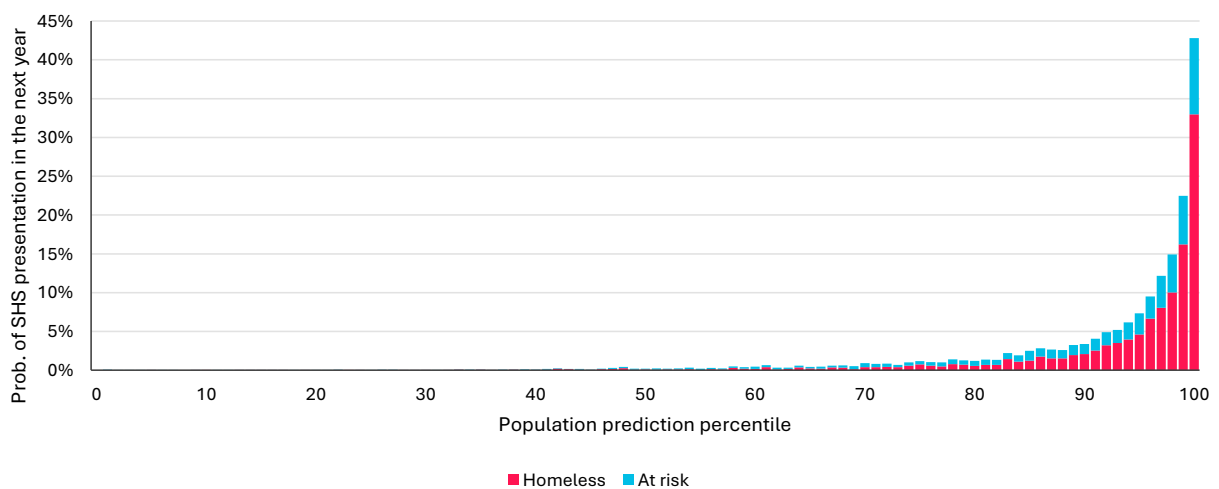
**Key finding 8:** When predicting new presentations to SHS or TA, the 1% of the population at highest risk represent just under a quarter of all presentations and present at 23 times the rate of the general population. History of welfare services remains a key factor in predicting likelihood of homelessness.

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## 4.4 Model 3: Predictions for youth and young adults

People aged 15-24 are twice as likely as the general population to access SHS or TA. They also have different service use pictures, since they have the potential to have recently interacted with both the (secondary) education system and OOHC. Figure 28 shows the percentile plot for this model.

Figure 28 – Percentile plot for SHS/TA presentations for people aged 15-24



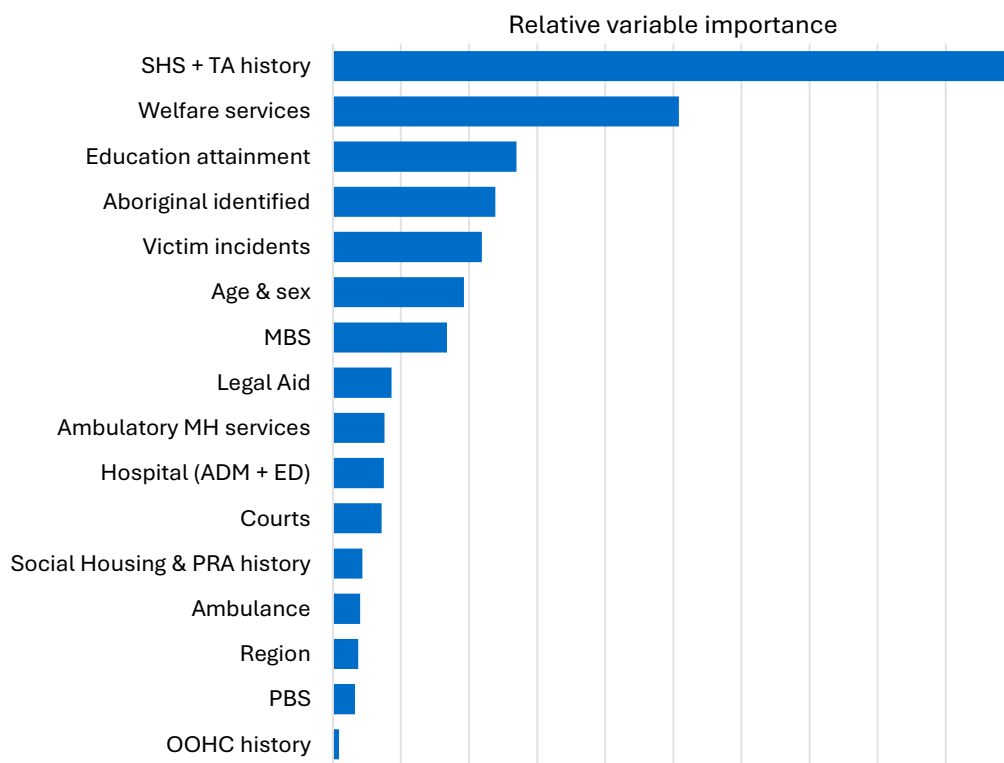
The youth and young adult model shows the strongest performance of all the models considered, in terms of the ability to identify people most likely to require future homelessness support. The 1% of people at highest likelihood, based on the model, have a 43% chance of requiring SHS/TA support in the next year. Nearly three-quarters (73%) of presentations are captured in the 10% of the population with highest likelihood.

Table 22 – Summary of model results for the youth and young adult SHS/TA prediction model

Percentile rate	Proportion of population	Number of SHS/TA presentations	Proportion of SHS/TA presentations	Rate <sup>20</sup>	Rate relative to overall average
1% - 70%	70%	1,200	7%	0.18%	x0.10
71%-90%	20%	3,400	20%	1.73%	x1.0
91%-99%	9%	8,600	49%	9.6%	x5.6
100%	1%	4,300	24%	42.8%	x25
<b>Total</b>		<b>17,500</b>		<b>1.73%</b>	

Educational attainment is significantly higher in relative variable importance, given the better linkage and relevance of this data for this age group.

Figure 29 – Relative variable importance for the youth and young adult SHS/TA prediction model



The partial effects (which hold all other factors constant) are particularly interesting for education and OOHC. These are shown in Figure 30. We note:

- The relationship between (highest) educational attainment is strong and clear, with a 30% reduction in risk for completion of Year 12.

<sup>20</sup> This is the population-weighted actual rate of SHS/TA on the ‘test’ dataset reserved for this purpose in the fitting procedure.

- OOHC history is a material risk factor in terms of effect size (a 17% increase), however the proportion of the NSW population affected is small (less than 1% of the cohort, even when filtered by age) – this contributes to the small variable importance in Figure 29.
- There is an elevated likelihood of SHS/TA presentation for people with low Year 9 NAPLAN results. People with scores below band 6 are significantly more likely to require homelessness services later. There is also some evidence that non-completion of NAPLAN is also indicative of heightened risk, although this effect interacts with linkage failure in the data plus age effects (23-24 year old people in the dataset would have been in Year 9 before NAPLAN was introduced) so is suggestive only. This result is additional to the educational attainment effect.

Figure 30 – Partial effect plots for selected variables, youth and young adult prediction model

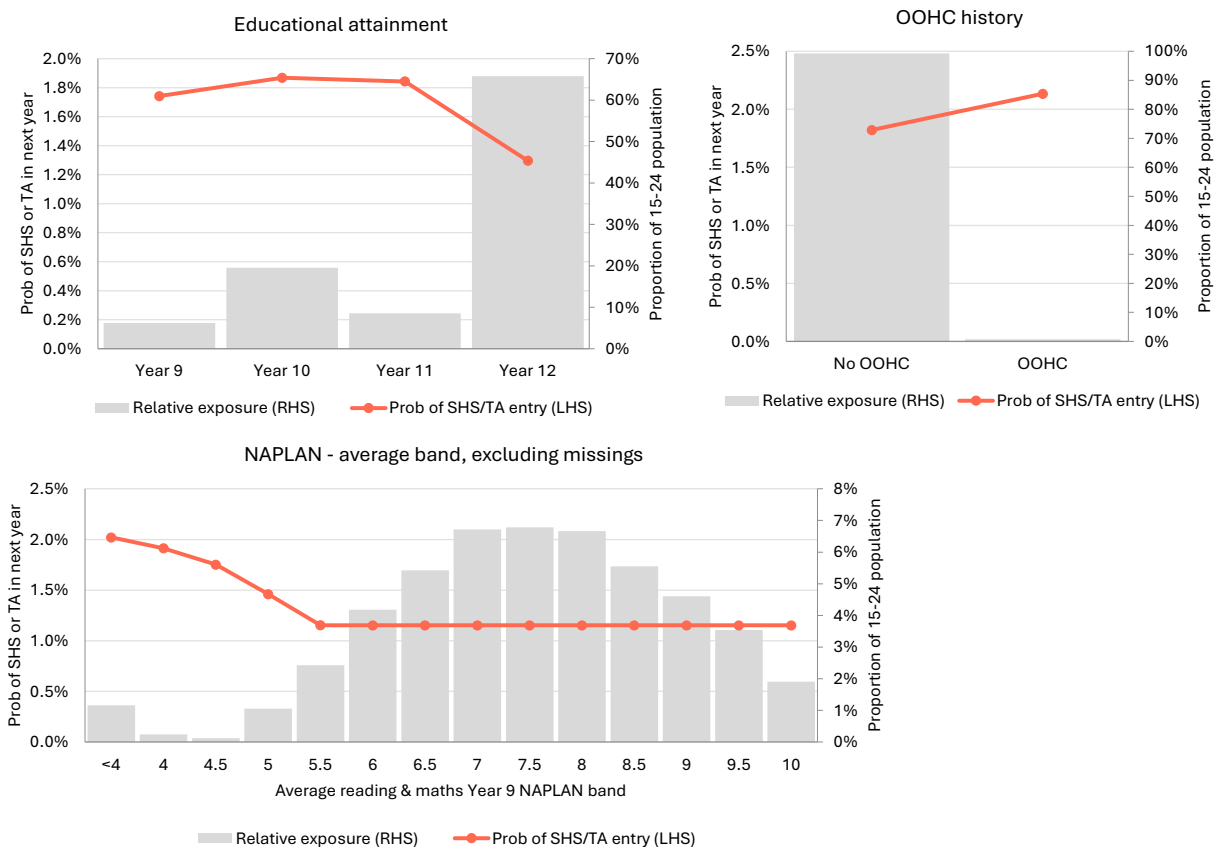


Table 23 below illustrates this by comparing service use characteristics for the 1% at highest risk compared to the general population.

Table 23 – Comparison of key service use measures for young people at high risk of presenting to SHS/TA in the next year (ages 15-24)

Statistic	Group at highest risk (highest 1%) from prediction model <sup>21</sup>	Full population aged 15-24	Multiplier
Number of people	9,900	990,000 <sup>22</sup>	
SHS + TA presentation rate	42.8%	1.7%	25×
% Aboriginal identified	48%	5.2%	9×
Avg. # of police-recorded victim incidents per person, prev. 3yr	5.1	0.34	15×
Avg. # of court appearances/YJCs/cautions per person, prev. 3yr	5.2	0.24	22×
Avg. # of SHS presentations per person, prev. 3yr	2.28	0.05	46×
Avg. # of TA supports per person, prev. 3yr	0.90	0.018	49×
Avg. # of ED presentations per person, prev. 3yr	5.8	0.92	6×
Avg. # of ambulatory MH services per person, prev. 3yr	6.3	0.42	15×
Avg. # of admitted patient days per person, prev. 3yr	8.6	1.1	8×
Avg. # of Legal Aid presentations per person, prev. 3yr	4.5	0.16	27×
Avg. # of days on income support per person, prev. 3yr	693	177	4×
Avg. # of days on RA support per person, prev. 3yr	197	47	4×
Avg. # of Medicare services per person, prev. 3yr	44	25	2×
Avg. # of PBS scripts per person, prev. 3yr	15	9	2×

The group at highest risk has elevated service use across all examined services, with this elevated rate higher than that seen in model 1. This is due to the young cohort having higher baseline usage rates across all these services, except admitted patient days, welfare history and Medicare/PBS.

**Key finding 9:** For young people, completion of year 12 education is associated with a 30% reduction in homelessness risk. OOH history also increases the risk of young people presenting to homelessness services by 17%.

## 4.5 Model 4: Predicting people rough sleeping

Identifying and predicting people who are rough sleeping is a more challenging task, mainly because the population is significantly smaller. For any cohort, the expected rate of presentation

<sup>21</sup> These are the population-weighted usage rates on the ‘test’ dataset reserved for this purpose in the fitting procedure.

<sup>22</sup> As estimated by the weighted fraction in our dataset – may vary slightly from other population estimates.

as rough sleeping will be lower than similarly sized cohorts targeting all SHS presentations. Offsetting this, our predictive model is ‘sharper’, with more concentration of high risk in a small fraction of the population.

People presenting to SHS as rough sleeping are not the full group of all people rough sleeping—there may be many who choose not to access support through an SHS service. However, the pattern of prior service use for those who do present may have some similarities for other people who are rough sleeping, so the usefulness of a targeting model may extend beyond the SHS cohort.

We have fit a prediction model for the probability of presenting to SHS with no current accommodation over the next year. The overall rate across the NSW population was 0.074%, corresponding to about 5,800 people per year.

Figure 31 and Table 24 show the performance of the prediction model for presenting to SHS as rough sleeping. The risk of accessing SHS as currently rough sleeping is negligible for the 90% of the cohort at the lowest (model-determined) risk; while this group corresponds to about one seventh of presentations, they are not easily targetable using the linked service use data.

For this reason, Figure 31 focuses on risk for the 10% of the cohort at the highest risk of presenting to SHS as rough sleeping, as determined by the model. Even within this 10%, the presentation rate for percentiles 91 to 99 is only 0.3%, meaning that anybody in this cohort is still very unlikely to present to SHS as rough sleeping.

Figure 31 – Risk of presenting as rough sleeping over the next year for the 10% of predictions at highest risk, shown in 0.1% bands

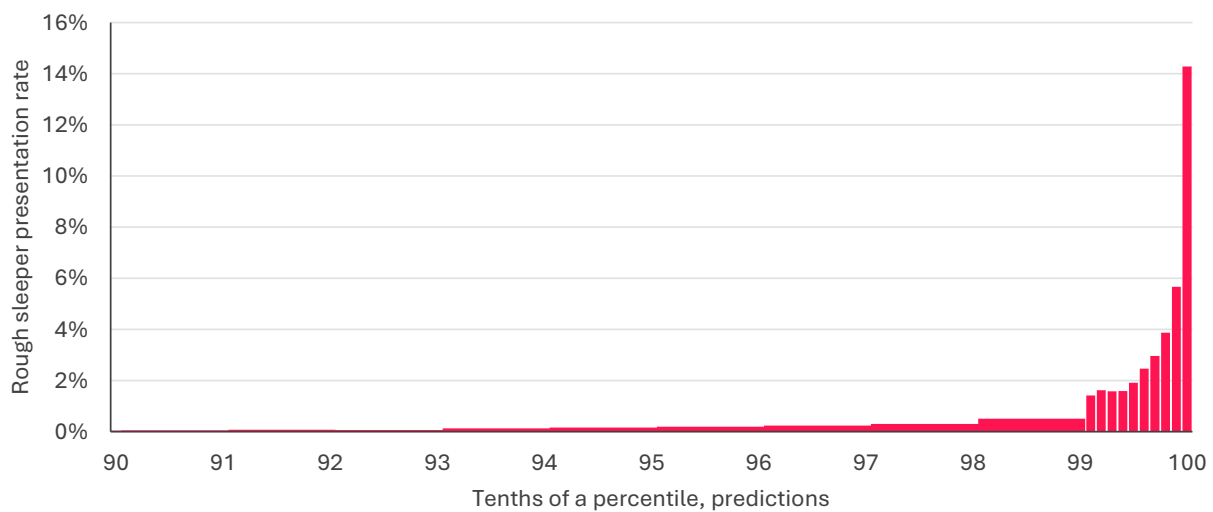


Figure Notes: The average for the 90% of the population at lowest risk is 0.01%.

**The 1% of the population most at risk in this model represents just over half of all rough sleeping presentations** and are at a much higher likelihood of accessing SHS as rough sleeping (over fifty times more likely than average). Within that group, people with very intensive service use history have an even higher probability of presenting to SHS. The 0.2% of the population at highest risk (as rated by the model, corresponding to 16,000 people in NSW) represent over a quarter (27%) of people presenting as rough sleeping and carry 134 times the likelihood of the general population.

Table 24 – Summary of model results for the rough sleeping SHS prediction model

Percentile rate	Proportion of population	Number of SHS presentations	Proportion of SHS presentations	Rate <sup>23</sup>	Rate relative to overall average
1% - 70%	70%	250	4%	0.005%	x0.06
71%-90%	20%	550	9%	0.035%	x0.47
91%-99%	9%	2,070	36%	0.3%	x4.0
100%	1%	2,910	50%	3.7%	x50
<i>100% subset</i>	<i>Top 0.2%</i>	<i>1,550</i>	<i>27%</i>	<i>10%</i>	<i>x134</i>
<b>Total</b>		<b>5,780</b>		<b>0.074%</b>	

The model identifies these extreme risks through demographic and service use history. Table 25 below illustrates this by comparing service use characteristics for the 0.2% at highest likelihood compared to the general population.

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<sup>23</sup> This is the population-weighted actual rate of SHS/TA on the ‘test’ dataset reserved for this purpose in the fitting procedure.

Table 25 – Comparison of key service use measures for those at high likelihood of presenting to SHS rough sleeping in the next year

Statistic	Group at highest risk (highest 0.2%) from prediction model <sup>24</sup>	Full population	Multiplier
Number of people	15,700	7,850,000	
SHS + TA presentation rate	10%	0.89%	11×
% Aboriginal identified	34%	3.3%	10×
Avg. # of police-recorded victim incidents per person, prev. 3yr	3.5	0.21	17×
Avg. # of court appearances/YJCs/cautions per person, prev. 3yr	5.4	0.10	56×
Avg. # of SHS presentations per person, prev. 3yr	2.3	0.022	107×
Avg. # of TA supports per person, prev. 3yr	1.7	0.011	150×
Avg. # of ED presentations per person, prev. 3yr	7.5	0.76	10×
Avg. # of ambulatory MH services per person, prev. 3yr	7.5	0.24	31×
Avg. # of admitted patient days per person, prev. 3yr	17	2.21	8×
Avg. # of Legal Aid presentations per person, prev. 3yr	4.7	0.08	58×
Avg. # of days on income support per person, prev. 3yr	904	191	5×
Avg. # of days on RA support per person, prev. 3yr	441	60	7×
Avg. # of Medicare services per person, prev. 3yr	50	39	1×
Avg. # of PBS scripts per person, prev. 3yr	38	27	1×

The group at highest likelihood has hugely elevated service use across justice, housing and health. One-third (34%) of this group identify as Aboriginal. While prior housing support is unsurprising, ten times the emergency department rate presentation and seventeen times the victimisation rate mean that many people who are rough sleeping are interacting repeatedly with other services. The high victimisation rate for people rough sleeping highlights the vulnerability of people without a safe place to reside.

The variable importance plot (Figure 32) shares many similarities with others in this section. The most notable differences are:

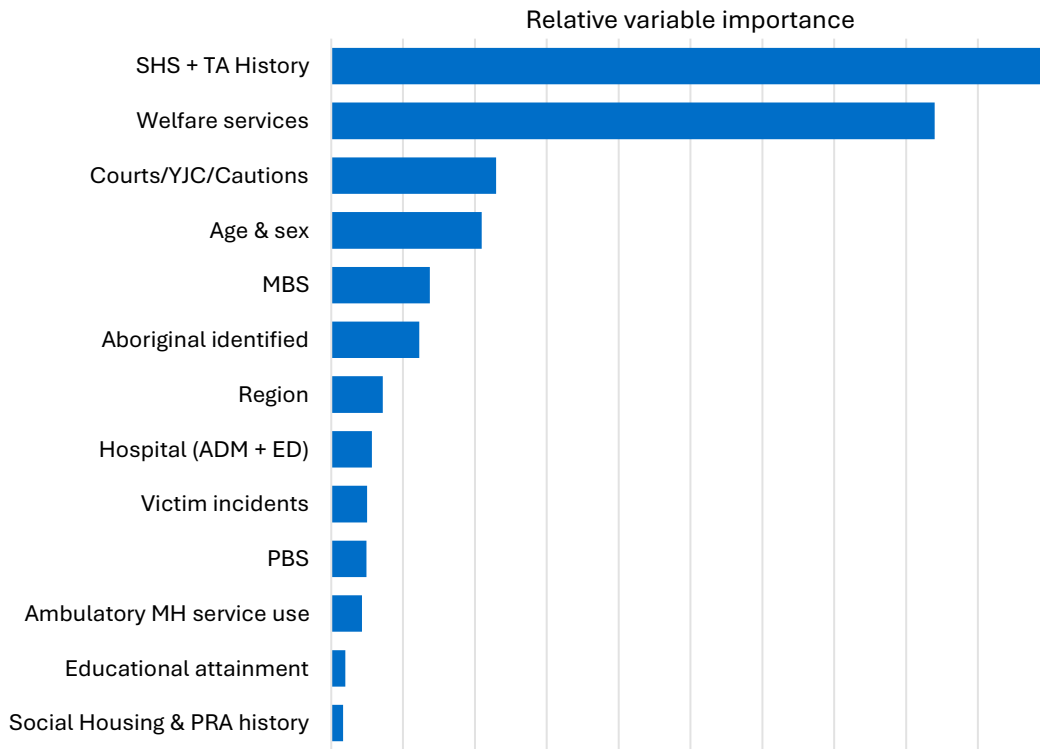
- Court appearances (including YJCs and cautions) are much more significant than in other models, higher than any health service usage and only lower than SHS/TA or welfare history. There is a corresponding increase in other justice interactions, such as police-recorded victim incidents.

<sup>24</sup> These are the population-weighted usage rates on the ‘test’ dataset reserved for this purpose in the fitting procedure



- While there is a spike in likelihood for young people (15-24), similar to other SHS presentations, there is also residual higher risk for those aged 35 to 50, indicating a wider range of age groups at risk of rough sleeping.
- Males have a 38% higher likelihood of rough sleeping, on average, compared to females. This is the opposite of the relationship in other models.

Figure 32 – Relative variable importance for key predictor groups in the rough sleeping model



### Moving from a predictive model to simplified rules

Most of the groups at high-risk identified by the model are multifaceted; there are rarely single indicators that solely determine being at very high risk. The prediction model represents the best possible targeting when all the past service use is known; in principle this detailed information could be used to assess prospective homelessness risk.

However, linked service use across the broad services is not readily available. An intermediate approach is to devise a simpler set of rules that reproduce some of the model power using a narrower set of information, which we term a ‘segmentation’. We provide an example of this in Table 26, which is a rule-based decomposition of rough sleeping presentation risk (but excluding prior SHS or TA as predictors). The segmentation demonstrates a more practical way to achieve targeting – it requires much less information and still achieves a significant differentiation in level of risk of rough sleeping.

In this example, the group at highest risk is represented by people with custody, mental health emergency department presentations, high emergency department use and income support payments. One-in-six people in this segment present to SHS as rough sleeping; slightly higher than the top 0.1% identified in the model. The very high-risk level is offset by the very low proportion (less than 0.004%) of the population that carry all these risk factors.

Table 26 – Example segmentation for risk of presenting to SHS as rough sleeping

Segment rules				% of Population	Rate of rough sleeping in next year	% of all rough sleeping presentations	
Not in custody in the past 3 years				99%	0.1%	81%	
<2 court appearances in 5 years				0.08%	1.7%	1.8%	
Some time in custody in the past 3 years	≥2 court appearances in past 5 years	Receiving DSP for all of last 3 years	No Rent Assistance in last 3 years	0.2%	1.2%	2.9%	
			Rent Assistance in last 3 years	0.2%	2.8%	8.8%	
		Not receiving DSP for all of last 3 years	No Rent Assistance in last 3 years		0.02%	4.1%	1.0%
			Rent Assistance in last 3 years	No MH ED presentations in last year	0.04%	6.9%	3.7%
				≥1 MH ED presentations in last year	0.004%	16.7%	0.9%
			<b>Total</b>				<b>100%</b>

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**Key finding 10:** The prediction model is efficient at identifying people at high or low risk of rough sleeping, with more than a quarter of presentations attributable to 0.2% of the population. These individuals have a high likelihood of rough sleeping and are typified by very high rates of service use across many sectors. Justice and welfare service use appear to be effective filters in a rule-based prediction approach.

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# 5 Two-way analysis and the costs of homelessness

## 5.1 Introduction

This section looks at the two-way interaction between homelessness services need and preceding service use. It also examines the costs across government services and how these differ for people accessing homelessness services compared to those that do not.

We explain our approach through the example shown in Table 27 which considers the interaction between homelessness risk and (admitted patient) hospital use, with each count in the table representing a person. On average (over the six years to 30 June 2017) there are about 7.9m people in NSW, shown as the total. On average, about 58,000 different individuals access homelessness services over a given year. For each person who accessed homelessness services in the year we test for a hospital admission in the preceding 12 months – 15,000 in the example. For the total population we randomly select one month in the six-year period and test for a hospital admission in the preceding 12 months. We observe a rate of 14.7% for this estimate of the overall NSW population, giving the values in the last column of 1.16 million having been to hospital and 6.70 million having not. These pieces of information then allow us to complete the two-way service usage table shown in Table 27. The percentages relating to the number of people are shown on the right of the table.

Table 27 – Homelessness service use in the six months following hospital admissions, averaged over 2011/12 to 2016/17

		Accessed homelessness services?					
		Number of people ('000)			Proportion (%)		
		No	Yes	Total	No	Yes	Total
Hospital (in the prior 12 months)?	No	6,656	43	6,699	84.7%	0.5%	85.3%
	Yes	1,142	15	1,157	14.5%	0.2%	14.7%
	Total	7,798	58	7,856	99.3%	0.7%	100.0%

We have averaged annual results from July 2011 to June 2017 inclusive – the six financial years for which SHS data is available. In each year in this period, about 0.7% of the total 7.9m people in NSW received homelessness support. Among people with a hospital admission, the proportion is higher at 1.3% (= 15,000 ÷ 1,157,000). This means people leaving hospital are a potential broad intervention group.

There are two key metrics that we use to summarise the table:

- The **risk uplift** is the ratio of homelessness support for people accessing a given service compared to the whole cohort. In the example we observe a risk uplift of (1.3% ÷ 0.7% =) 1.7, meaning that people with recent hospital history are nearly twice as likely to require homelessness support.
- The **coverage** is the proportion of cases where people access homelessness services that are covered by a given service. In this example, the coverage of (15,000 ÷ 58,000 =) 26% means that 26% of homelessness presentations would have been covered by focusing on those leaving hospital.

A 'good' result, in the sense of potential to be an operationally useful identifiable homelessness pathway, is higher risk uplift (the cohort is at high risk of homelessness) combined with a high coverage (covers a large portion of homelessness presentations before they happen). There is often a trade-off between the two; a subgroup with a large risk uplift will tend to have narrow coverage. In terms of potential programs, a large risk uplift and low coverage scenario would enable a smaller but more intensive targeted intervention, whereas groups with lower risk uplift and more coverage are more suitable for broader (but less intensive) support services.

We have also considered the reduction in cross-sectoral fiscal costs that could potentially be associated with successful interventions. As an example, the table below shows the average three-year fiscal cost<sup>25</sup> to the NSW Government, according to whether people had been in hospital and had subsequently accessed homelessness services. For this fiscal analysis, the service use period is limited to 1 July 2011 to 30 June 2014, so that costs can be observed for a full three-year period following the service use. The fiscal costs cover the services in Table 7 except for Educational Achievement and the Medicare Enrolment File. Unit cost assumptions shown in Appendix C.1 and are largely consistent with our previous work on the OOHC leavers' cohort<sup>26</sup>.

**Table 28 – Example calculation of average three-year fiscal costs across all included services according to whether people had accessed hospital and had subsequently assessed homelessness services**

		Accessed homelessness services?		
		No	Yes	
Hospital (in the prior 12 months)?	No			
	Yes	\$44k	\$124k	\$45k
	Total			

- (a) Fiscal costs are in June 2020 values
- (b) Groups for those accessing services consistent with per Table 27
- (c) Costs based on observations with service use prior to 1 July 2014, so that we can observe subsequent 3-year costs.

Table 28 shows the two-way results for hospital inpatient admissions and homelessness services. The average fiscal costs of in-scope services over three years are \$43k per person who is an admitted patient. For people who then access homelessness services, the three-year cost is \$120k, about three times higher. By contrast, the fiscal cost for those who have hospital use but not homelessness support is about \$42k. We refer to this difference as the additional costs across the NSW government (here \$124k-\$44k = \$80k). While it is too simplistic to label this difference as a 'potential saving', it is useful to measure the elevated costs across a range of government services as an upper bound on savings that could be realised from better early intervention.

The trio of risk uplift, coverage and additional costs together give a good view of investment potential – ideal investments are well targeted (risk uplift), have good reach (coverage) and generate high potential savings (offset against a larger additional costs).

<sup>25</sup> For each of the thirty-six months in the period following homelessness services access (or non-access) we have applied fixed unit cost assumptions to actual service usage for individuals. This gives individual three-year service costs which are then averaged among groups. These have been inflated to 30 June 2020 values.

<sup>26</sup> Analysis of future service usage of Out-of-Home Care leavers Report. Available from: <https://www.osii.nsw.gov.au/tools-and-resources/analysis-of-future-service-usage-of-out-of-home-care-leavers-report/>

## 5.2 Average service use costs

When considering the elevation in costs following homelessness, it is useful to first explore average service usage costs in more detail, including how they differ across demographic groups. Table 29 shows the average six-year costs (over 2011/12 to 2016/17) for the cohort split by whether they accessed homelessness services over the period and sex. For example, among females in the group accessing homelessness services the average six-year total cost is \$122k (\$12k housing+ \$12k justice + \$16k NSW health +\$6k child protection + \$8k Commonwealth health + \$67k welfare).

Table 29 – Average service use costs over 2011/12 to 2016/17 by sector split by whether people accessed homelessness services over 2011/12 to 2016/17 and sex

Sector	People who accessed homelessness services			People who did not access homelessness services		
	Females	Males	All	Females	Males	All
NSW Justice	\$12k	\$47k	\$28k	\$0.4k	\$2k	\$1k
NSW Health	\$16k	\$16k	\$16k	\$6k	\$6k	\$6k
NSW Housing	\$12k	\$11k	\$11k	\$0.7k	\$0.7k	\$0.7k
NSW Child Protection	\$6k	\$9k	\$7k	\$0.6k	\$0.7k	\$0.6k
<b>NSW total</b>	<b>\$47k</b>	<b>\$83k</b>	<b>\$63k</b>	<b>\$8k</b>	<b>\$10k</b>	<b>\$9k</b>
Commonwealth Health	\$8k	\$6k	\$7k	\$8k	\$6k	\$7k
Commonwealth Welfare services	\$67k	\$56k	\$62k	\$26k	\$20k	\$23k
<b>Total</b>	<b>\$122k</b>	<b>\$144k</b>	<b>\$132k</b>	<b>\$42k</b>	<b>\$35k</b>	<b>\$39k</b>

(a) Totals may not add due to rounding.

(b) Amounts inflated to June 2020 dollars.

Table 29 shows that service use costs are elevated among those who accessed homelessness services over 2011/12-2016/17) – the total average cost is three-to-four times that of the comparison group who did not access homelessness services. There are further differences by sector:

- Housing sector costs are more than 15 times higher among those accessing homelessness services
- Justice sector costs are around 30 times higher among those accessing homelessness services
- Health costs are about three times higher among those accessing homelessness services
- OOH costs are twelve times higher among those accessing homelessness services, albeit still a relatively small contribution to total costs
- Welfare costs are nearly three times higher among those accessing homelessness services.

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**Key finding 11:** Over a six-year period, costs across NSW government services are six times higher for females accessing homelessness services compared to females in the broader NSW population and nine times higher for males, indicating greater need and disadvantage. Of the \$50k difference, one fifth relates to housing-related support. The largest component relates to justice costs, which are particularly elevated for males.

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### 5.3 Results by service type

The main results for the two-way interaction between homelessness need and preceding service use are summarised in Table 30 below for any homelessness service use.

In Table 30 and other tables in this subsection the risk uplift and coverage is based on homelessness services in the six years to June 2017. The calculated additional costs across NSW and Commonwealth governments are based on homelessness service use in the three years to June 2014, so that subsequent service use can be observed. We have checked the risk uplift and coverage are comparable on the different periods to ensure reasonableness. These are cross-sectoral costs (Housing, Health, Justice and Child Protection for NSW, Welfare, Medicare and PBS for Commonwealth) and are per person. They have been inflated to 30 June 2020 values.

Table 30 – Two-way analysis results for homelessness services presentations and other service use in the prior 12 months

Area	Service	Risk uplift	Coverage	Additional 3-year cost across NSW govt	Additional 3-year cost across CMW govt
Health	Emergency Department	3x	42%	\$51k	\$27k
	Emergency Department - mental health diagnosis	21x	3%	\$79k	\$20k
	Admitted patients	2x	26%	\$55k	\$25k
	Admitted patients - mental health diagnosis	15x	3%	\$67k	\$11k
	Ambulatory mental health	13x	16%	\$58k	\$16k
	Ambulatory mental health - psychoactive substance use	26x	3%	\$52k	\$6k
	Ambulatory mental health - disorders of personality	25x	1%	\$62k	\$6k
	Ambulance	5x	19%	\$58k	\$17k
	Controlled drugs of addiction	25x	3%	\$56k	\$8k
Commonwealth Health	Medicare	1x	80%	\$41k	\$29k
	Medicare relating to mental health	3x	25%	\$47k	\$31k
	Medicare relating to addiction	12x	4%	\$73k	\$24k
	Medicare relating to chronic disease management	1x	11%	\$40k	\$17k
	PBS script	1x	64%	\$40k	\$26k
	PBS script relating to opioids	2x	16%	\$43k	\$22k
	PBS script relating to addiction	3x	4%	\$38k	\$30k
	PBS script relating to mental health	3x	27%	\$49k	\$22k
Justice	PBS script with Closing the Gap	11x	11%	\$32k	\$11k
	Police recorded victim	7x	29%	\$51k	\$28k
	Police recorded victim - domestic and family violence	20x	4%	\$33k	\$20k
	Legal Aid	17x	16%	\$55k	\$15k
	Court appearance/ Police caution or YJC	15x	16%	\$70k	\$25k
Housing	Custodial spell ending	32x	8%	\$48k	\$13k
	Public housing tenancy ending	12x	4%	\$41k	\$11k
Child protection	OOHC placement ending	13x	1%	\$60k	\$26k
Commonwealth Welfare	Some days on income support	3x	63%	\$41k	\$12k
	Rental Assistance receipt	5x	39%	\$39k	\$12k
	DSP income support	5x	14%	\$45k	-\$2k
	Jobseeker income support	6x	32%	\$44k	\$16k
	Parent income support	7x	14%	\$23k	\$11k
	Student income support	2x	6%	\$41k	\$19k
	Age pension	0.2x	1%	\$24k	-\$7k
	Centrelink risk of homelessness indicator	35x	8%	\$42k	\$6k

- (a) Risk uplift is how much more likely a person is to present to a homelessness service given other prior service use. It is relative to the NSW population baseline rate of homelessness presentation of 0.73% p.a.
- (b) Coverage is the proportion of all homelessness presentations that are preceded by the other service. It is a fraction of the 57,500 presentations p.a., based on six years of homelessness services to June 2017.
- (c) Additional cost compares the average elevated fiscal cost across government for those who presented to a homelessness service. Amounts are totals over three years, inflated to June 2020 values.

Note that the risk uplift figures relate to an individual service crossed with homelessness services. In many cases the prior services are detecting the same homelessness service presentations, so any intervention spanning multiple services needs to consider the intersections; see Section 5.5 for further exploration of intersections.

From Table 30 we observe:

- Risk uplift is generally high across a wide range of services, spanning justice, OOHC, Legal Aid, health and welfare.
- General hospital services (emergency department and admitted patients) have high coverages but are the least targeted intervention points; the risk uplifts are the lowest, reflecting the high number of hospital users not at risk of homelessness.
- Similarly, Medicare and PBS scripts have high coverages but almost no risk uplift. A large proportion of the population use these services with very low risk of homelessness.
- Also, welfare receipt has a high coverage but lower uplift. Even among those receiving rental assistance, many are not at high risk of accessing homelessness services. However, the Centrelink homelessness indicator has a very high risk uplift.
- Subcategories of service use can be considered, with some specific examples shown in the table. Restricting admitted hospital patients to people with a mental health diagnosis reduces the coverage from 26% to 3% but increases the risk uplift from two to 15 times.
- Additional costs across NSW government are generally in the range of \$30k to \$70k. They are higher for health-related services (with a corresponding elevation in subsequent health services). Fiscal costs for OOHC leavers who access SHS are also very high, at \$60k above other OOHC leavers over three years.
- Additional cost differences attributable to the Commonwealth Government are generally in the range of \$15k to \$30k. They are lower for income support services as the comparison group is also accessing income support.

Table 31 shows the results for only 'new' presentations. As in Section 4.3 (*Model 2: First-entry model*), new presentations are those with no SHS or TA support in the prior three years. New experiences are limited to the period 2014/15 to 2016/17 – we therefore have not attached the additional costs across NSW government since we did not observe fiscal pathways beyond 2016/17.

Table 32 shows the main results for the two-way interaction between presenting to homelessness services as currently rough sleeping and preceding service use. The most notable difference to Table 30 is the higher additional costs when considering rough sleeping presentations, as these represent a very vulnerable group with high service use.



Table 31 – Two-way analysis results for ‘new’ presentations and other service use in the prior 12 months

Area	Service	Risk uplift	Coverage
Health	Emergency Department	2x	36%
	Emergency Department - mental health diagnosis	11x	2%
	Admitted patients	1x	22%
	Admitted patients - mental health diagnosis	10x	2%
	Ambulatory mental health	9x	12%
	Ambulatory mental health - psychoactive substance use	15x	2%
	Ambulatory mental health - disorders of personality	12x	1%
	Ambulance	4x	15%
Commonwealth Health	Controlled drugs of addiction	13x	2%
	Medicare	1.0x	78%
	Medicare relating to mental health	3x	23%
	Medicare relating to addiction	7x	3%
	Medicare relating to chronic disease management	1.0x	11%
	PBS script	1x	62%
	PBS script relating to opioids	1x	14%
	PBS script relating to addiction	3x	3%
Justice	PBS script relating to mental health	2x	24%
	PBS script with Closing the Gap	8x	10%
	Police recorded victim	5x	21%
	Police recorded victim - domestic and family violence	14x	3%
	Legal Aid	11x	11%
Housing	Court appearance/ Police caution or YJC	10x	10%
	Custodial spell ending	17x	4%
Child protection	Public housing tenancy ending	9x	3%
	OOHC placement ending	10x	1%
Commonwealth Welfare	Some days on income support	2x	54%
	Rental Assistance receipt	4x	31%
	DSP income support	4x	11%
	Jobseeker income support	5x	27%
	Parent income support	6x	11%
	Student income support	2x	4%
	Age pension	0.2x	2%
Centrelink risk of homelessness indicator	13x	4%	

(a) Risk uplift is how much more likely a person is to present to a homelessness service given other prior service use. It is relative to the NSW population baseline rate of new homelessness presentation of 0.55% p.a.

(b) Coverage is the proportion of all homelessness presentations that are preceded by the other service. It is a fraction of the 43,000 presentations p.a., based on three years of homelessness services to June 2017.

Table 32 – Two-way analysis results for rough sleeping presentations and other service use in the prior 12 months

Area	Service	Risk uplift	Coverage	Additional 3-year cost across NSW govt	Additional 3-year cost across CMW govt
Health	Emergency Department	3x	49%	\$82k	\$35k
	Emergency Department - mental health diagnosis	56x	8%	\$111k	\$19k
	Admitted patients	2x	30%	\$94k	\$32k
	Admitted patients - mental health diagnosis	30x	5%	\$95k	\$10k
	Ambulatory mental health	20x	26%	\$83k	\$17k
	Ambulatory mental health - psychoactive substance use	54x	6%	\$71k	\$5k
	Ambulatory mental health - disorders of personality	42x	2%	\$97k	\$3k
	Ambulance	7x	28%	\$89k	\$21k
	Controlled drugs of addiction	49x	6%	\$57k	\$8k
Commonwealth Health	Medicare	1x	78%	\$66k	\$40k
	Medicare relating to mental health	4x	30%	\$75k	\$33k
	Medicare relating to addiction	20x	6%	\$92k	\$21k
	Medicare relating to chronic disease management	1x	12%	\$66k	\$20k
	PBS script	1x	65%	\$66k	\$35k
	PBS script relating to opioids	2x	20%	\$64k	\$23k
	PBS script relating to addiction	5x	5%	\$57k	\$30k
	PBS script relating to mental health	3x	38%	\$75k	\$22k
	PBS script with Closing the Gap	10x	10%	\$54k	\$19k
Justice	Police recorded victim	7x	31%	\$82k	\$33k
	Police recorded victim - domestic and family violence	16x	4%	\$62k	\$21k
	Legal Aid	24x	23%	\$78k	\$15k
	Court appearance/ Police caution or YJC	24x	25%	\$80k	\$26k
	Custodial spell ending	60x	15%	\$39k	\$14k
Housing	Public housing tenancy ending	12x	4%	\$67k	\$20k
Child protection	OOHC placement ending	11x	1%	\$130k	\$34k
Commonwealth Welfare	Some days on income support	3x	80%	\$61k	\$13k
	Rental Assistance receipt	8x	55%	\$60k	\$12k
	DSP income support	9x	28%	\$65k	-\$4k
	Jobseeker income support	8x	45%	\$54k	\$15k
	Parent income support	4x	7%	\$29k	\$10k
	Student income support	2x	4%	\$51k	\$22k
	Age pension	0.2x	1%	\$29k	-\$5k
	Centrelink risk of homelessness indicator	88x	20%	\$47k	\$6k

- (c) Risk uplift is how much more likely a person is to present to a homelessness service given other prior service use. It is relative to the NSW population baseline rate of homelessness presentation of 0.06% p.a.
- (d) Coverage is the proportion of all homelessness presentations that are preceded by the other service. It is a fraction of the 4,500 presentations p.a., based on six years of homelessness services to June 2017.
- (e) Additional cost compares the average elevated fiscal cost across government for those who presented to a homelessness service. Amounts are totals over three years, inflated to June 2020 values.

From Table 31 (new homelessness) we observe:

- In general, both the coverage and risk uplift levels are muted when considering first presentations, compared to any. This reflects the earlier intervention point being harder to identify.
- The implications are the same as for all homelessness (Table 30) – generally services are not significantly stronger or weaker at predicting first homelessness compared to any homelessness experiences. Small effects include:
  - Medicare, PBS services relating to mental health appear slightly stronger in terms of first presentations – the risk uplift and coverage decrease 10-20% compared to any presentations, whereas for other services the decrease is larger. For both admitted patients and emergency department presentations relating to mental health the decrease is 30-50%. However, this does not necessarily make Medicare and PBS services better early intervention points, the risk uplift is still five times higher for the more acute hospital services.
  - The end of a custodial spell is slightly less predictive of first homelessness compared to any homelessness. However, it still represents a fairly strong intervention point. With people exiting custody 17 times more likely to access homelessness services and 4% of new homelessness presentations having been in custody in the past 12 months.

From Table 32 (rough sleeping):

- In contrast to new presentations the coverage and risk uplift levels are higher when considering rough sleeping, compared to any homelessness. This reflects the more severe form of homelessness, often ongoing, being easier to identify.
- Services which appear stronger in terms of predicting rough sleeping homelessness include:
  - Emergency department presentations relating to mental health, this would cover 8% of all rough sleeping presentations. The risk uplift is 56 – following an emergency department presentation for mental health the risk of rough sleeping homelessness is over 50 times higher.
  - Being recorded as at risk of homelessness on Centrelink welfare data is a stronger indicator of future rough sleeping than of any homelessness. As in Section 3.4.2 (Centrelink risk of homelessness indicator), the Centrelink indicator is more likely to be recorded for both people with ongoing financial hardship and those who present as rough sleeping.
  - The end of a custodial spell is strongly associated with rough sleeping. People exiting custody are 60 times more likely to access homelessness services rough sleeping and 15% of rough sleeping presentations having been in custody in the past 12 months.
- With the exception of DSP, income support is slightly weaker in terms of identifying risk of rough sleeping compared to any homelessness. For DSP it is similar to for any homelessness presentations.

While Table 30, Table 31 and Table 32 show the results for a 12-month period (whether someone accessed a service in the prior 12 months), other time windows are possible. A shorter time window will, by definition, generate lower coverage, but will often have higher risk uplift since people tend to use services as clusters. For most services the risk elevation persists, to one or two years later. In contrast, the coverage increases quite rapidly as the time window extends. This suggests a one-year window provides a good balance of risk and coverage; smaller intervals do not generate the level of coverage needed.

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**Key finding 12:** Prior government service use is often a strong indicator of future homelessness presentations, with rates of presentation commonly increasing by a factor of 10-20 times compared to baseline rates. While some services can indicate acute risk (such as police-recorded victim incidents), many (such as ambulatory mental health) indicate ongoing risk over a full year. Hospital access provides the broadest coverage (the intervention point that includes the greatest fraction of future homelessness presenters), but with limited targeting ability. Risk uplifts are even higher when considering rates of rough sleeping following service use such as custodial sentences, Mental health-related emergency department presentations, or the Centrelink risk of homelessness indicator.

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## 5.4 Further results

The results above apply to the whole cohort, but it is equally possible to test subgroups of the population. For example, Table 33 shows the two-way results (equivalent to Table 30) for those aged 16-24<sup>27</sup>, aligned with the modelling in Section 4.4.

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<sup>27</sup> The age band is slightly fuzzy due to the use of two-year age bands in our cohort.

Table 33 – Two-way analysis results for young people aged approximately 16-24 for homelessness services presentations and other service use in the prior 12 months. Full population rates also shown for comparison (from Table 30).

Area	Service	Risk uplift	Coverage	Additional 3-year cost across NSW govt	Additional 3-year cost across CMW govt	Population risk uplift	Population coverage
Health	Emergency Department	3x	47%	\$53k	\$35k	3x	42%
	Emergency Department - mental health diagnosis	9x	3%	\$61k	\$27k	21x	3%
	Admitted patients	3x	26%	\$52k	\$35k	2x	26%
	Admitted patients - mental health diagnosis	10x	2%	\$71k	\$13k	15x	3%
	Ambulatory mental health	9x	20%	\$60k	\$20k	13x	16%
	Ambulatory mental health - psychoactive substance use	15x	3%	\$39k	\$11k	26x	3%
	Ambulatory mental health - disorders of personality	16x	1%	\$59k	\$14k	25x	1%
	Ambulance	6x	22%	\$61k	\$29k	5x	19%
	Controlled drugs of addiction	16x	1%	\$34k	\$14k	25x	3%
Commonwealth Health	Medicare	1x	81%	\$45k	\$39k	1x	80%
	Medicare relating to mental health	3x	27%	\$46k	\$31k	3x	25%
	Medicare relating to addiction	7x	3%	\$69k	\$28k	12x	4%
	Medicare relating to chronic disease management	2x	6%	\$47k	\$31k	1x	11%
	PBS script	1x	64%	\$43k	\$37k	1x	64%
	PBS script relating to opioids	2x	13%	\$47k	\$34k	2x	16%
	PBS script relating to addiction	3x	2%	\$38k	\$34k	3x	4%
	PBS script relating to mental health	3x	24%	\$50k	\$28k	3x	27%
Justice	PBS script with Closing the Gap	9x	12%	\$37k	\$17k	11x	11%
	Police recorded victim	5x	35%	\$51k	\$33k	7x	29%
	Police recorded victim - domestic and family violence	13x	6%	\$33k	\$19k	20x	4%
	Legal Aid	10x	19%	\$53k	\$18k	17x	16%
	Court appearance/ Police caution or YJC	7x	21%	\$67k	\$27k	15x	16%
Housing	Custodial spell ending	14x	8%	\$42k	\$16k	32x	8%
	Public housing tenancy ending	8x	4%	\$52k	\$17k	12x	4%
Child protection	OOHC placement ending	15x	3%	\$77k	\$11k	13x	1%
Commonwealth Welfare	Some days on income support	3x	76%	\$42k	\$19k	3x	63%
	Rental Assistance receipt	4x	38%	\$41k	\$18k	5x	39%
	DSP income support receipt	4x	7%	\$57k	\$1k	5x	14%
	Jobseeker income support receipt	4x	48%	\$43k	\$20k	6x	32%
	Parent income support receipt	7x	19%	\$22k	\$6k	7x	14%
	Student income support receipt	1x	17%	\$37k	\$18k	2x	6%
	Centrelink risk of homelessness indicator	17x	12%	\$42k	\$7k	35x	8%

- (a) Risk uplift is how much more likely a person is to present to a homelessness service given other prior service use. It is relative to the NSW population baseline rate of homelessness presentation of 1.5% p.a.
- (b) Coverage is the proportion of all homelessness presentations that are preceded by the other service. It is a fraction of the 13,500 presentations p.a., based on six years of homelessness services to June 2017.
- (c) Additional cost compares the average elevated fiscal cost across government for those who presented to a homelessness service. Amounts are totals over three years, inflated to June 2020 values.

From Table 33:

- The risk uplift multipliers are generally lower than the equivalent entries in Table 30. However, this is primarily due to the higher baseline homelessness rate for younger people; the absolute rates remain higher for younger people throughout.
- The increased likelihood of homelessness (risk uplift) following hospital admissions is larger for the young group than the general population likely reflecting the fact that younger people are generally less likely to be admitted to hospital admissions in the absence of other vulnerability.
- Leaving OOHC, DFV victim incidents, Controlled drugs of addiction, court appearances and youth justice conferences show the highest risk uplifts. Of these, court appearances, have the largest coverage followed by DFV victim incidents.
- Ambulatory mental health, Legal Aid, court appearances and Parenting Payments income support provide both high coverage and risk uplift estimates.

From Section 5.4, young people with lower educational attainment or OOHC history are at elevated risk. This could be used as additional screening criteria to increase the risk uplift associated with some broadly used services such as emergency departments.

It is also interesting to consider how some of this two-way analysis can vary by region, either due to differences in service availability or because there are genuine differences in typical pathways seen in different areas. Regional tables have been produced as part of the analysis.

## 5.5 Intersections between coverage

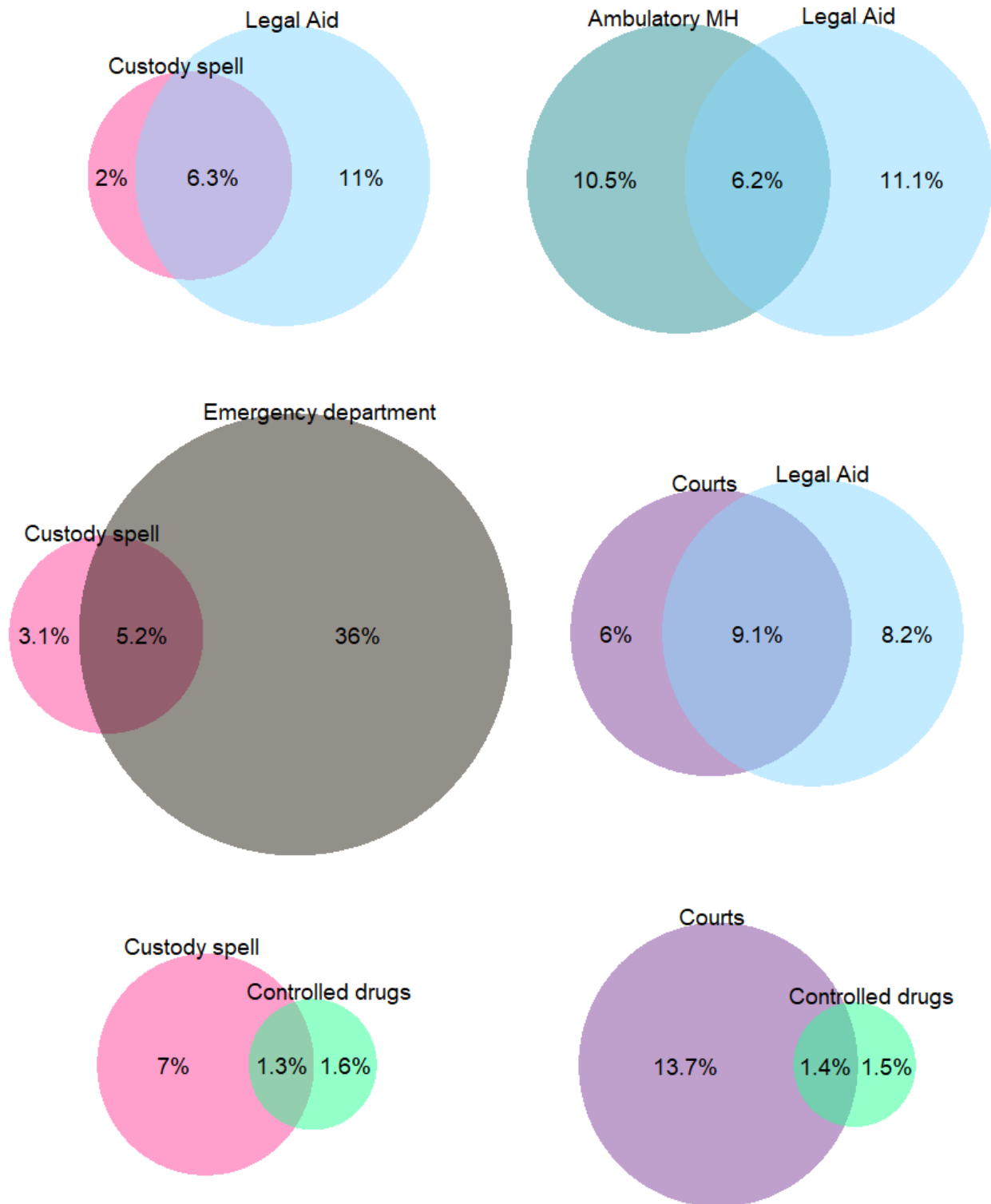
As in Section 3.6 (Intersections between service use) – there are often overlaps between service use: people with service requirements in one area are typically heavier users across a broad range of services. Understanding these overlaps is important when thinking about multiple intervention points; if the overlap is large then it would be preferable to target a single intervention point.

Figure 33 shows some example overlaps in service use in the 12 months prior to homelessness services. This is another way of visualising the same information as was presented in Table 16 in Section 3.6. The choice of services is illustrative.

These are intuitive:

- There is a large overlap between people leaving custody and people accessing Legal Aid. For people accessing homelessness services, 8.3% had a custody spell in the last 12 months, with 6.9% (three-quarters of people with a custody spell) also accessing Legal Aid.
- Similarly, those with a court appearance, 15.1% of people presenting to homelessness accessing homelessness services had a court appearance in the past 12 months. 9.1% (nearly two-thirds of those with a court appearance) also accessed Legal Aid.
- The overlap is smaller for cross-sectoral service use, 16.7% of people presenting to homelessness accessing homelessness services had used ambulatory mental health services in the past 12 months. 6.2% (one in three of those with ambulatory mental health service use) also accessed Legal Aid.
- For people presenting to homelessness services with controlled drugs of addiction service use in the past 12 months, half have also had a recent custody spell.

Figure 33 – Overlap of service use in the 12 months prior to homelessness services presentation, average over 2014/15 to 2016/17



## 5.6 The distribution of cost-to-government

The results presented throughout earlier parts of this section have focused on average three-year costs for different cohorts, but not the distribution of these costs within subpopulations. This subsection explores:

- The spread of costs in cohorts
- Costs over the full six years for which we have SHS and other history (July 2011 through June 2017).

Specifically, we look at the six-year cost of people presenting to an SHS provider in 2011/12 versus the broader population, for those aged 16 years and over in 2011/12.

Table 34 – Summary statistics for six-year cost to government for NSW population and the subset presenting to SHS in 2011/12

Group	# people (000s) aged ≥16	Six-year cost (\$000, June 2020 values)					
		Average (mean)	Median	75 <sup>th</sup> percent	90 <sup>th</sup> percent	95 <sup>th</sup> percent	99 <sup>th</sup> percent
2011/12 presenters	30	186	166	222	326	458	771
All of NSW	5,759	51	15	74	158	185	267

Note: Table covers all people aged 16 years and over

Table 34 shows that the median cost-to-government of those presenting to an SHS provider is \$166k, about 11 times higher than the median cost for the broader NSW population. Within the subgroup, there are some very high costs – the top 5% (corresponding to 1,500 people) have cost of \$458k or more, with an average of \$706k<sup>28</sup>. If we restrict attention to the 1% of people at the top end of the distribution (above the 99<sup>th</sup> percentile), this corresponds to a group of 300 people with an average cost-to-government of \$1.2m over the six-year period.

It is important to note that most of this cost to government is not in the homelessness support system itself, or even housing support. Those with high cost-to-government over the six years typically have very high health (mainly hospital) costs, high justice (custody and courts) costs, or both. We split average costs by sector in Table 35

<sup>28</sup> Note this is a post-hoc selection of the top 5%. It is not necessarily possible to identify those with highest cost-to-government at the point of 2011/12 presentation, but good estimates can be made based on the first 1-2 years of service usage.



Table 35 – Average six-year cost for NSW population, those presenting to an SHS in 2011/12, and those with cost-to-government above the 95<sup>th</sup> percentile (top 5%)

Service	Top 5% of SHS presenters (1,500 people), \$000	All 2011/12 SHS presenters (30,000 people), \$000	NSW population (5.8m people), \$000
SHS+TA	21	9	0.1
Other NSW housing	12	8	1
Public hospital	137	22	7
Other NSW Health	15	3	0.3
MBS & PBS	11	9	8
Child protection	25	2	0.1
Custody & police	201	16	1
Courts & Legal Aid	182	21	1
Welfare (Commonwealth)	102	96	32
<b>NSW Subtotal</b>	<b>593</b>	<b>81</b>	<b>11</b>
<b>Commonwealth Subtotal</b>	<b>113</b>	<b>105</b>	<b>40</b>
<b>Total</b>	<b>706</b>	<b>186</b>	<b>51</b>

(a) Totals may not add up due to rounding.

(b) Table covers all people aged 16 years and over.

(c) Values in June 2020 dollars.

The table shows:

- The 5% of SHS presenters with highest cost-to-government have an average cost \$706k over six years, with the bulk of this cost falling on the NSW Government (84%). This proportion is much higher than the corresponding fractions for all SHS presenters and the NSW population more broadly. The cost to the NSW government is more than 50 times higher for people in the 5% group than for the broader NSW population.
- This top 5% also have NSW justice costs that are 10 times higher per person than the broader SHS group and 160 times the NSW population. For health the ratios are six and 20 respectively.
- Even among the full group of SHS presenters, only a small fraction of cost is attributable to NSW housing (\$9k +\$8k = ) \$17k out of \$186k in costs, or 9%. For the top 5%, only 5% of costs are attributable to NSW housing.
- Welfare costs are remarkably similar for the top 5% and the whole group of SHS presenters, reflecting the fact that both groups are very dependent on welfare for the six-year period.

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**Key finding 13:** The median cost to government over six years of those presenting to SHS in 2011/12 is \$166k, which is 11 times higher than the NSW population. Within the group of SHS presenters, the 5% with the highest cost-to-government represent 1,500 people with an average cost of \$706k per person, 84% of which is attributable to the NSW government. Only 5% of the total relates directly to housing.

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# 6 Vulnerable cohorts

In this section we focus on the following vulnerable cohorts:

- People experiencing financial hardship
- People who have (or have had) a mental health condition
- People who have (or have had) issues associated with drug and alcohol use
- People who have been a victim of domestic and family violence
- People who have been discharged from custody
- People who have finished OOHC placements.

The first four groups are broader and cover types of vulnerabilities, whereas the latter two cover specific life events as triggers. In the following sections we consider both a ‘backwards’ and ‘forwards’ view:

- The **backwards** view considers previous service use for people who accessed homelessness services with a particular service need identified. While service needs are likely under-reported and practices may vary between providers, the reported information provides another lens on these vulnerable cohorts. This view is available for the mental health, substance use and domestic/family violence cohorts. Variables related to the other cohorts are not included in the SHS data for this project, so we do not perform the backwards analysis.
- The **forwards** view considers those who have used services (potentially) relating to this need and whether they present to homelessness services over the following period, including which subgroups are more likely to do so.

We consider homelessness service usage in 2016/17 as this is the most recent year of SHS data available at the time the data was linked. There have been policy changes in NSW which have influenced SHS access rates, so 2016/17 will better reflect current dynamics than a broader time-window.

We continue to use SHS/TA presentations as our main measure of homelessness in sections 6.1 through 6.4. Sections 6.5 (custody exits) and 6.6 (OOHC exits) focus exclusively on SHS.

For definition of the forwards view cohorts, we look at other service usage in the three years to 30 June 2016. As discussed in the modelling section, three-year history provides a good balance between the broader picture of vulnerability and short-term triggers of homelessness. Longer time periods risk diluting the elevated risk of homelessness observable, while shorter time periods may result in small cohorts that miss the long-term effects of service use.

## 6.1 Financial hardship

Financial hardship is often an underlying factor that leads to homelessness, both directly through inability to afford housing and indirectly through secondary effects of stress, poor health and relationship breakdowns<sup>29</sup>. Section 3.4 introduces the relationship between welfare support and homelessness. Welfare service interactions contribute significantly to the predictive models detailed in Section 4. In this section, we explore the characteristics and cross-sectoral service use

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<sup>29</sup> Steen, Adam and MacKenzie, David, Financial Stress, Financial Literacy, Counselling and the Risk of Homelessness, *Australasian Accounting, Business and Finance Journal*, 7(3), 2013, 31-48. doi:10.14453/aabfj.v7i3.3

of people who require income support for extended periods of time and some history of Rent Assistance receipt.

### 6.1.1 Forwards view

As explored in Section 3.4, people who are on income support for long durations, on Rent Assistance (RA) and on a working-age or parent payments income support type present to homeless services at an increased rate. We have examined two cohorts who had significant<sup>30</sup> welfare support interaction and some RA receipt in the three years to June 2016. These are:

1. People receiving working-age payment types (primarily Newstart, now Jobseeker<sup>31</sup>) as at 30 June 2016. One-in-ten (9.6%) of this group accessed homelessness services over 2016/17.
2. People receiving on Parenting Payments<sup>32</sup> as at 30 June 2016. One-in-twelve (7.9%) of this group accessed homelessness services over 2016/17.

On a population weighted basis, the working-age group represented 107,000 people, while the parenting group represented 79,000 people.

The basic age and sex profile of each group is shown in Figure 34. Naturally, the working-age cohort is skewed towards the working ages, with very few people under the age of 14. Parenting recipients are mostly female and younger than 34, with again very few people under the age of 14 or older than 55.

Figure 34 – Age and sex profiles of the two financial hardship cohorts – working-age recipients (left panel) and parenting recipients (right panel)

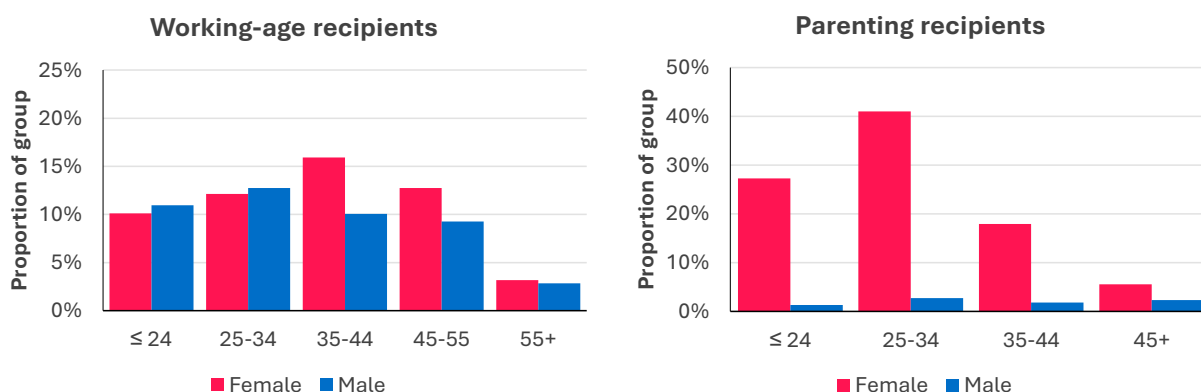


Table 36 and Table 37 further segment these cohorts according to the likelihood of accessing SHS/TA in the next year, for Parents and Working-age groups respectively. This segmentation is similar in spirit to the predictive modelling of Section 4, but attempts to separate those at lower and higher risk of homelessness presentation using a smaller number of simple rules for our cohort of interest. A decision tree model was used to produce the segmentation<sup>33</sup>.

<sup>30</sup> Defined as some income support in at least 10 of the previous 12 quarters.

<sup>31</sup> Working-age income support payment types are primarily Newstart payment, but also includes some less common, related payments: Youth Allowance (Other), Partner Allowance, Sickness Allowance, Special Benefit and Widow Allowance. The Newstart payment was renamed Jobseeker in March 2020.

<sup>32</sup> Parenting Payment (Single) or Parenting Payment (Partner)

<sup>33</sup> See Appendix E for further detail.

Table 36 – Example segmentation – Working-age financial hardship cohort according to likelihood of presenting to SHS/TA in 2016/17

Segment rules				% of cohort	Rate of SHS/TA in next year	% of all SHS/TA presentations in cohort
No SHS or TA use in last 3 years	No court presentations in last year	Not Aboriginal identified	<4 police-recorded victim incidents in last 3 years	68%	3.5%	25%
			≥4 police-recorded victim incidents in last 3 years	1%	12.4%	1%
			Aboriginal identified	6%	10.4%	7%
	≥1 court presentation in last year			5%	14.7%	8%
Some SHS or TA use in last 3 years	<2 court presentations in past 5 years			11%	23.7%	28%
	≥2 court presentations in past 5 years			8%	37.6%	31%
<b>Total</b>				<b>100%</b>	<b>9.6%</b>	<b>100%</b>

As an example of reading the segmentation, the last row of Table 36 indicates that the subgroup with SHS or TA in the past three years as well as two or more court appearances the past five years:

- Represents 8% of the financial hardship cohort
- Have an SHS/TA presentation rate of 37.6%, compared to the group average of about 10%. This elevated risk means the group represents 31% of all SHS/TA presentations across the working-age financial hardship cohort.

Previous SHS/TA service use is a strong indicator of future homelessness presentations. The segmentation also makes significant use of offending information, as indicated by court appearances.

Table 37 – Example segmentation – Parenting financial hardship cohort according to likelihood of presenting to SHS/TA in 2016/17

Segment rules				% of cohort	Rate of SHS/TA in next year	% of all SHS/TA presentations in cohort
No SHS or TA use in last 3 years	No police-recorded victim incidents in past quarter			69%	3.1%	27%
	≥1 police-recorded victim incidents in past quarter	Not Aboriginal identified		9%	9.1%	10%
		Aboriginal identified	≤1 ambulance service use in last 3 years	3%	13.0%	6%
			>1 ambulance service use in last 3 years	0.5%	39.0%	2%
Some SHS or TA use in last 3 years	No DFV police-recorded victim incidents in past year			13%	21.9%	37%
	≥1 DFV police-recorded victim incidents in past year			5%	30.4%	18%
<b>Total</b>				<b>100%</b>	<b>7.9%</b>	<b>100%</b>

The last row of Table 37 indicates that the subgroup with SHS or TA in the past 3 years as well as some DFV police-recorded victim incidents in the past year:

- Represents 5% of the financial hardship cohort
- Have an SHS/TA presentation rate of 30.4%, compared to the group average of about 7.8%. This elevated risk means the group represents 18% of all SHS/TA presentations across the parenting financial hardship cohort.

The table shows that for the Parenting financial hardship cohort, elevated risk of requiring SHS/TA support can be effectively targeted using a combination of SHS/TA history, police-recorded victim

incidents, ambulance and whether a person identifies as Aboriginal. The importance of DFV indicator is intuitive for the parenting group, given the high proportion of females in Parenting Payments as well as DFV victims incidents.

We stress that the two tables above are non-causative pathways; rather, they reflect correlated patterns of service use that can be used to predict the likelihood of presenting to SHS/TA.

Table 38 below illustrates this by comparing service use characteristics for the financial hardship cohorts compared to the general population.

Table 38 – Comparison of key service use measures for those in the financial hardship cohorts

Statistic	Working-age cohort	Parenting cohort	Full population
Number of people	107,000	79,000	7,850,000
SHS + TA presentation rate	9.6%	7.9%	0.89%
% Aboriginal identified	13%	16%	3.30%
Avg. # of police-recorded victim incidents per person, prev. 3yr	1.1	1.7	0.21
Avg. # of court appearances/YJCs/cautions per person, prev. 3yr	0.9	0.3	0.1
Avg. # of SHS presentations per person, prev. 3yr	0.3	0.3	0.022
Avg. # of TA supports per person, prev. 3yr	0.24	0.13	0.011
Avg. # of ED presentations per person, prev. 3yr	2.1	1.8	0.76
Avg. # of ambulatory MH services per person, prev. 3yr	1.1	0.5	0.24
Avg. # of admitted patient days per person, prev. 3yr	3.5	2.7	2.21
Avg. # of Legal Aid presentations per person, prev. 3yr	0.8	0.5	0.08
Avg. # of days on income support per person, prev. 3yr	1,073	1,083	191
Avg. # of days on RA support per person, prev. 3yr	733	815	60
Avg. # of Medicare services per person, prev. 3yr	54	62	39
Avg. # of PBS scripts per person, prev. 3yr	33	22	27

Both financial hardship groups have elevated service use across all sectors, highlighting the secondary effects correlated with financial difficulties. The working-age cohort has higher service use, with the exception of police-recorded victim incidents and Medicare services. A portion of the former will be related to family-specific events such as DFV, which parents have greater exposure to.

**Key finding 14:** Financial hardship, measured using welfare system data, is a strong indicator of future homelessness support need. Our identified subgroups present at 10 times the base population rate. In understanding future need, previous SHS/TA remains highly predictive. Rates of police-recorded victim incidents for those on parenting payments are high, as are court appearances for those on working-age income support, and these are associated with higher likelihood of SHS/TA presentations.

## 6.2 Mental health

Poor mental health and experiences of homelessness are often reported as interrelated<sup>34</sup>. These interactions make mental health an important theme to explore.

### 6.2.1 Backwards view

In this section, we consider the cohort who present to SHS and had a mental health service need identified. In 2016/17 about 7,200 people had at least one support period from homelessness services with a mental health service need identified - about 12% of people accessing SHS. Over the same period, 51,100 other people had SHS support without a mental health service need identified.

Figure 35 compares the age and sex split of the two groups above. The demographics are similar between the two. An identified mental health service need is slightly more common for females, with the biggest gap (relative to males) for those aged under 25.

Figure 35 – Comparison of age and sex profile for those who accessed SHS in 2016/17 by whether they had a mental health service need identified

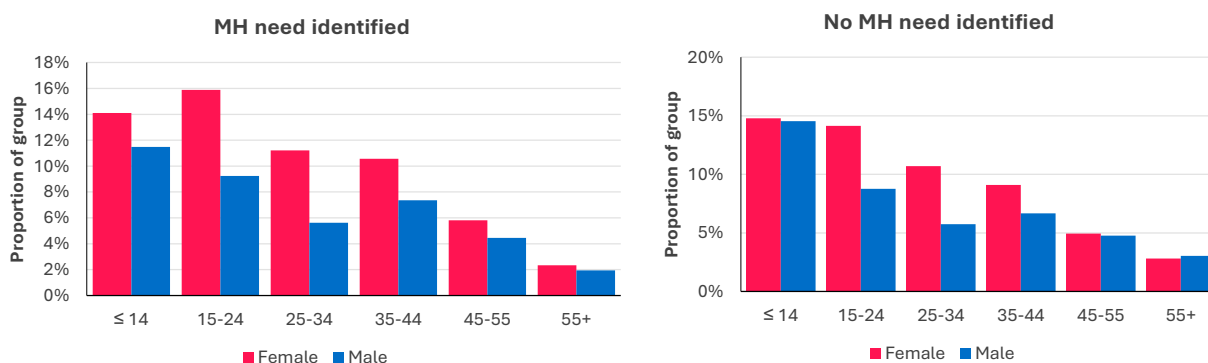


Table 39 shows the rates of cross-sectoral service use for SHS service users in 2016/17 with and without a mental health service need identified. The table uses a three-year service history, reflecting the fact that heightened vulnerability may persist for an extended period.

<sup>34</sup> Mental Health and Homelessness (2013), Australian Housing and Urban Research Institute Research Synthesis Service for the Mental Health Commission of NSW. Available from: <https://nswmentalhealthcommission.com.au/sites/default/files/publication-documents/Final%20Report%20-%20AHURI%20-%20Mental%20Health%20and%20Homelessness.pdf#page=25&zoom=100,0,98>

Table 39 – Rates of selected cross sectoral service use over the three years to 30 June 2016 for those who accessed SHS in 2016/17

	Emergency Department	ED – mental health related	Hospital	Hospital – MH unit	Ambulatory MH	Ambulatory MH - psychoactive	Medicare – mental health services	PBS – mental health prescription	Controlled drugs of addiction	Ambulance	Legal Aid	Victim incident (Police-recorded)	DFV victim incident (Police-recorded)	Court appearance /YJC / caution
No MH need identified	57%	4%	40%	6%	20%	4%	36%	34%	3%	29%	22%	39%	8%	21%
MH need identified	66%	8%	49%	17%	39%	8%	54%	50%	4%	40%	29%	48%	11%	28%
Multiplier	x1.2	x2.1	x1.2	x2.6	x1.9	x2.2	x1.5	x1.5	x1.5	x1.4	x1.3	x1.3	x1.3	x1.3

People with mental health service needs identified have more intensive service use across a range of sectors, particularly within the health sector. For example, 20% of those presenting to SHS without a mental health service need had accessed ambulatory mental health in the past three years, compared to 39% of those presenting to SHS with a mental health service need.

## 6.2.2 Forwards view

We examined two cohorts who had mental health service use over the three years to June 2016. The first cohort is defined by acute service usage:

- Ambulatory mental health services, excluding those with non-mental health diagnoses
- Emergency department visits relating to mental health (based on diagnosis code)
- Hospital admissions with time in a psychiatric unit or relating to mental health (based on diagnosis code).

The second cohort additionally includes people who use broader mental health services; Medicare mental health services and PBS mental health prescriptions.

The acute service usage group represented 217,000 people on a population weighted basis. The broader group represented 1.9m people on a population weighted basis. Table 40 shows the services included in the definition and the proportion of the cohort who had accessed them in the last three years.

Table 40 – Proportion of each cohort that accessing mental health services that contribute to the acute and broader mental health cohort definitions

	Proportion who used service	
	Acute mental health cohort	Broader mental health cohort
Ambulatory mental health services- excl. non-mental	91%	10%
Emergency department – mental health diagnosis code	13%	2%
Hospital admissions – psych unit or mental health diagnosis code	27%	3%
Medicare mental health	<i>Not in definition</i>	61%
PBS mental health	<i>Not in definition</i>	71%

The percentages do not add to 100% as people may have accessed more than one service type over the three years. The bulk of the acute group are in the cohort based on ambulatory mental health service use, whereas the bulk of the broader group are identified from Medicare and PBS usage.

The acute group is almost 9 times smaller than the broader group and the increased risk of homelessness is much more profound in the acute group. This can be seen in Figure 36, which shows the rate of homelessness in the broader group being much lower and closer to the general population than the acute group.

Figure 36 – Rate of SHS use over 2016/17 by number of quarters since last mental health service use for both cohorts compared to the population without mental health service use

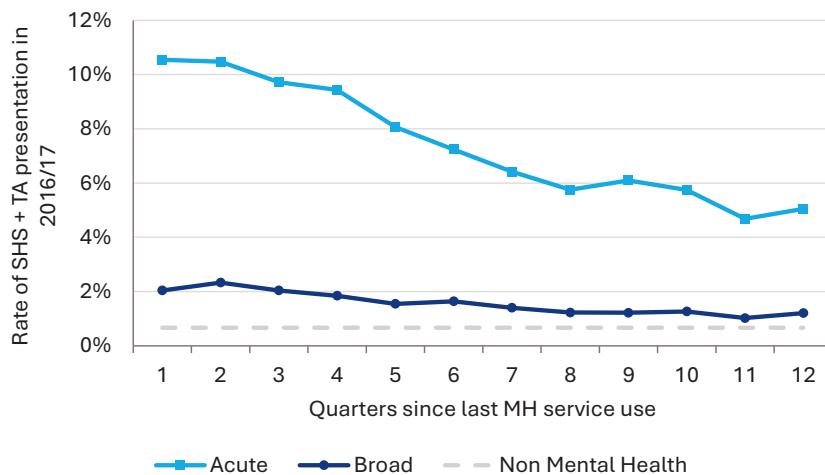


Figure 36 also shows that the acute mental health service use effect decays over time. The rate of SHS/TA presentation is highest in the quarter after acute mental health related service use (11%) and falls linearly to about three-quarters of this level (8.1%) of this level by a year later.

The acute service usage cohort covers a more distinct segment of the population, with a much higher risk of homelessness. The remaining analysis focuses on this group.

The basic age and sex profile of the acute group is shown in Figure 37, alongside those of the cohort identified as having mental health needs on SHS presentation.



Figure 37 – Age and sex distributions for those with mental health need identified on SHS presentation (left panel) and the acute mental health service use cohort (right panel)

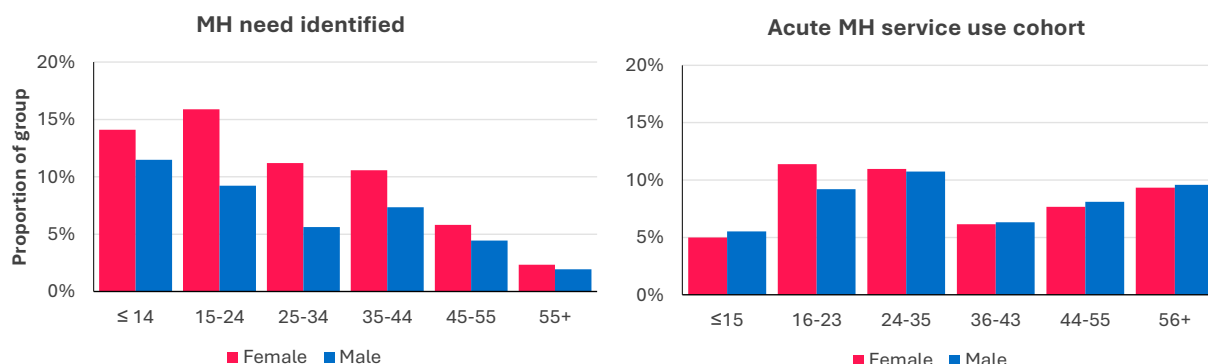


Table 41 further segments this cohort according to likelihood of accessing SHS/TA in the next year. This segmentation is derived using a decision tree model<sup>35</sup> and gives an example of how simple rules can be applied cross-sectoral service history to identify individuals at high-risk of homelessness within the mental health cohort. The result is a segmentation that is similar in spirit to the predictive models of Section 4, but swapping predictive power for a similar structure using fewer pieces of information.

Table 41 – Example segmentation – Acute mental health cohort according to likelihood of presenting to SHS/TA in 2016/17

Segment rules			% of cohort	Rate of SHS/TA in next year	% of all SHS/TA presentations in cohort
No SHS or TA use in last 3 years	No time in custody in last year		81%	3.4%	33%
	Some time in custody in last year	Less than 1/3 past year on income benefits	1.6%	10.8%	2%
		> 1/3 past year on income benefits	0.7%	12.8%	1%
		≥ 3 ambulatory mental health services in last 3 years	1.2%	27.1%	4%
Some SHS or TA use in last 3 years	No court presentations in last year		11%	26.3%	35%
	≥ 1 court presentations in last year		4.7%	42.9%	25%
<b>Total</b>			<b>100%</b>	<b>8.3%</b>	<b>100%</b>

As an example of interpreting the table, the last row of Table 41 indicates that the subgroup with SHS or TA in the past three years as well as some court presentations forms 5% of the group with acute mental health service use. This subgroup accounts for 25% of all SHS and TA presenters over the 2016/17 and presented at a rate of 42.9%.

The table also shows that among the group with mental health service use:

- There are significant differences in rates of SHS access within the cohort, ranging from 42.9% to 3.4% presenting to SHS/TA over 2016/17.
- Key intervention points for this cohort include courts and custody. These presentations cover 8.2% of the cohort but 32% of the cohort’s subsequent SHS/TA presentations (this is the sum of ‘proportion of all SHS/TA presentations in cohort’ over the second, third, fourth and sixth rows).
- SHS/TA service use history is associated with a high risk of further homelessness (31%).
- People without recent SHS/TA use, but with recent court presentations are about 1.6 times the risk of SHS/TA presentation (42.9%) than those without recent court presentations (26.3%).
- People experiencing financial hardship have elevated rates of SHS/TA presentations. For example, among those with no SHS/TA history but some days in custody, people who were on

<sup>35</sup> See Appendix E for further detail.

income support for more than 1/3 of a year in the last year were more than two times as likely to present to SHS/TA over the next year than those who were not (22% compared to 11%).

We stress that these are non-causative pathways; rather, they reflect correlated patterns of service use that can be used to predict the likelihood of presenting to SHS/TA.

It is interesting to consider, for those who did present to SHS, whether they had a mental health service need. For those in the mental health service use cohort who did present to SHS over 2016/17, 21% were identified as having a mental health service need. While well below 100%, this is more than one-and-a-half times higher than the overall proportion of SHS presenters identified as having a mental health service need (12.4%).

Table 42 below illustrates this by comparing service use characteristics for the acute mental health cohort compared to the general population.

Table 42 – Comparison of key service use measures for those in the acute mental health cohort

Statistic	Acute mental health cohort	Full population	Multiplier
Number of people	217,000	7,850,000	
SHS + TA presentation rate	8.3%	0.89%	9×
% Aboriginal identified	12%	3.3%	4×
Avg. # of police-recorded victim incidents per person, prev. 3yr	1.3	0.21	6×
Avg. # of court appearances/YJCs/cautions per person, prev. 3yr	1.5	0.10	15×
Avg. # of SHS presentations per person, prev. 3yr	0.3	0.022	13×
Avg. # of TA supports per person, prev. 3yr	0.18	0.011	17×
Avg. # of ED presentations per person, prev. 3yr	3.9	0.76	5×
Avg. # of ambulatory MH services per person, prev. 3yr	8.4	0.24	35×
Avg. # of admitted patient days per person, prev. 3yr	17.0	2.21	8×
Avg. # of Legal Aid presentations per person, prev. 3yr	1.3	0.08	16×
Avg. # of days on income support per person, prev. 3yr	549	191	3×
Avg. # of days on RA support per person, prev. 3yr	206	60	3×
Avg. # of Medicare services per person, prev. 3yr	76	39	2×
Avg. # of PBS scripts per person, prev. 3yr	61	27	2×

The acute mental health group has elevated service use across all sectors, but particularly in health. Compared to the general population, people in this group use 35 times the number of ambulatory mental health services and spend 7.7 times the number of days in admitted patient services. There is also a heightened degree of cross-sectoral service use, with the cohort accessing Legal Aid services at more than 16 times the rate of the general population and receiving welfare payments for longer.

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**Key finding 15:** People presenting to homelessness services and having a mental health support need are twice as likely to have had related health treatment in the previous three years. People with past mental health service use are nine times more likely to present to homelessness services. Custody and court interactions represent other potential intervention points for this cohort.

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## 6.3 Substance use

The strong associations between substance use and homelessness are widely acknowledged in homelessness research<sup>36</sup>. People with substance use are generally over-represented among people experiencing homelessness. In 2017/18, 7.4% of NSW SHS clients reported drug or substance use as a reason for seeking assistance, with 3.2% reporting alcohol use.<sup>37</sup> Further, clients with drug or alcohol use are more likely to be homeless (rather than at risk) on first presentation to SHS and tend to require more nights in accommodation and more frequent SHS support, for a longer period of time than other client groups.<sup>38</sup> These correlations make drug and alcohol use an important theme to explore.

### 6.3.1 Backwards view

In this section we consider the cohort who presented to SHS and had a drug and alcohol service need identified. Over 2016/17 there were about 2,900 people had at least one SHS presentations with a drug and alcohol service need. Over the same period 55,500 other people presented to an SHS and did not have a drug and alcohol service need identified.

Figure 38 compares the age and sex split of the two groups. People with a drug and alcohol need identified are skewed towards males in the younger adult age bands (15-24, 25-34 and 35-44), as well as females aged 25-34. The number of males aged over 45 is lower than younger age bands, but they are *relatively* overrepresented compared to those without a drug and alcohol service need.

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<sup>36</sup> For example, Scutella R, Chigavazra A, Killackey E, Herault N, Johnson G, Moschion J et al. 2014. Journeys home research report no. 4. Melbourne: University of Melbourne. Available from:

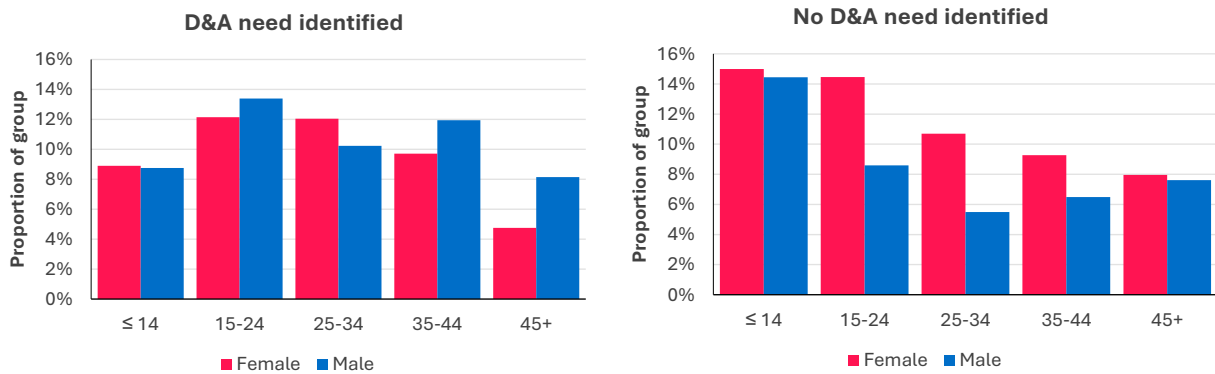
[https://melbourneinstitute.unimelb.edu.au/\\_data/assets/pdf\\_file/0008/2202857/Scutella\\_et\\_al\\_Journeys\\_Home\\_Research\\_Report\\_W4.pdf](https://melbourneinstitute.unimelb.edu.au/_data/assets/pdf_file/0008/2202857/Scutella_et_al_Journeys_Home_Research_Report_W4.pdf)

<sup>37</sup> Specialist homelessness services 2019–20 Supplementary tables – New South Wales. The AIHW. People reporting both drug and alcohol use as a reason for seeking support will appear in both statistics.

<sup>38</sup> The AIHW, Alcohol, tobacco & other drugs in Australia. Available from:

<https://www.aihw.gov.au/reports/alcohol/alcohol-tobacco-other-drugs-australia/contents/priority-populations/homeless-people>

Figure 38 – Comparison of age and sex profile of those who accessed SHS over 2016/17 by whether they had a drug and alcohol service need identified



The group who present and have a drug and alcohol service need have, on average, more intensive service use histories. Table 43 shows the proportion of the group that interacted with various services over the three years to 30 June 2016. Comparison rates are shown for those who accessed SHS over 2016/17, but without a drug and alcohol service need. Notably, of those who present at SHS and have a drug and alcohol service need:

- 74% had been to an emergency department in the three years, 13% with a mental health related diagnosis code.
- 13% had been admitted to hospital with a major diagnosis of toxic effects of drugs in the three years and 22% with a major diagnosis of substance use & substance induced organic mental disorders.
- 45% had sought Legal Aid services in the three years (twice the rate for those without a D&A service need).
- 56% had been a victim associated with a police-recorded victim incident, with 12% reported as relating to domestic and family violence.

Table 43 – Rates of selected cross sectoral service use over the three years to 30 June 2016 for those who accessed SHS over 2016/17

	Emergency Department	Emergency Department – MH	Hospital	Hospital - toxic drugs	Hospital - substance use	Ambulatory MH	Ambulatory MH - psychoactive substance	Ambulance	Ambulance- drugs	Controlled drugs of addiction	Medicare – Addiction services	Legal Aid	Victims incident	Victims incident DF&V
No D&A need identified	58%	4%	41%	5%	4%	22%	4%	29%	1%	3%	5%	22%	39%	8%
D&A need identified	74%	13%	58%	13%	22%	47%	15%	51%	4%	10%	20%	45%	56%	12%
Multiplier, rounded	x1.3	x3.2	x1.4	x2.5	x5.4	x2.2	x3.9	x1.8	x5.5	x3.6	x3.6	x2.1	x1.4	x1.5

### 6.3.2 Forwards view

We examined two cohorts from those who had drug and alcohol related service use over the three years to June 2016. The first cohort is defined by acute service usage:

- Hospital admissions with diagnosis codes relating to injury, poisoning and toxic effects of drugs or substance use & substance induced organic mental disorders.
- Emergency department visits relating to mental health, including substance use (based on diagnosis code)
- Ambulatory mental health services, with psychoactive substance diagnosis
- Spells of controlled drug administration
- Ambulance for drug toxicology

The second cohort additionally includes people who use broader mental health services; Medicare addiction services and PBS addiction or opioid prescription usage.

The acute service usage group represented 173,000 people on a population weighted basis. The broader group represented 1.7m people on a population weighted basis. Table 44 shows the services included in the definition and the proportion of the cohort who had accessed them in the last three years.

Table 44 – Proportion of each cohort that accessing underlying drug and alcohol services that contribute to the acute and broader D&A cohort definitions

	Proportion who used service	
	Acute D&A cohort	Broader D&A cohort
Hospital admissions – D&A related diagnosis code	75%	8%
Emergency department – MH diagnosis code	17%	2%
Ambulatory MH services - psychoactive substance diagnosis	11%	1%
Spells of controlled drug administration	8%	0.8%
Ambulance for drug toxicology	3%	0.3%
Medicare addiction services	<i>Not in definition</i>	3%
PBS addiction/opioid prescriptions	<i>Not in definition</i>	94%

The percentages do not add to 100% as people may have accessed more than one service type over the three years. The bulk of the acute group are in the cohort based on hospital admissions, whereas the bulk of the broader group are identified from PBS usage, which includes a relatively broad definition of painkillers.

The acute group is almost 10 times smaller than the broader group and the increased risk of homelessness is much more profound in the acute group. This can be seen in Figure 36, which shows the rate of homelessness in the broader group being much lower and closer to the general population than the acute group.

Figure 39 – Rate of SHS use over 2016/17 by number of quarters since last drug and alcohol service use for both cohorts compared to the population without drug and alcohol service use

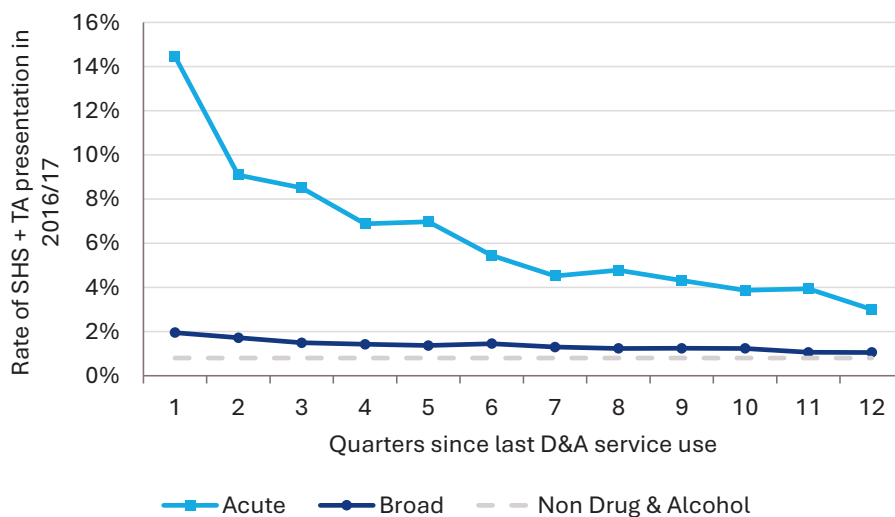


Figure 39 also shows that the acute drug and alcohol service use effect decays over time. The rate of SHS/TA presentation is highest in the quarter after acute drug and alcohol related service use (14%) and falls steeply in the second quarter to less than two-thirds of the level (9%), then continues to fall over time.

The acute service usage cohort covers a more distinct segment of the population, with a much higher risk of homelessness. The remaining analysis focuses on this group.

The basic age and sex profile of the acute group is shown in Figure 40, alongside those of the cohort identified as having drug and alcohol needs on SHS presentation.

Figure 40 – Age and sex distributions for those with drug and alcohol service need identified for their SHS support period (left panel) and the acute drug and alcohol service use cohort (right panel)

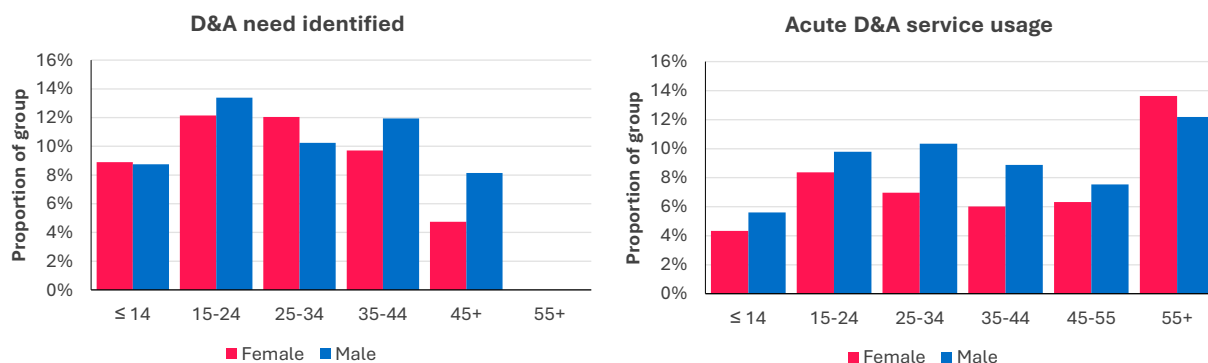


Table 45 further segments this cohort according to likelihood of accessing SHS/TA in the next year. This segmentation is based on a decision tree model and is an example of how subgroups with heightened likelihood of homelessness presentation can be identified within the drug and alcohol cohort. A decision tree was used to split the cohort into subgroups with differing rates of accessing SHS/TA<sup>39</sup>.

Table 45 – Example segmentation – Acute drug and alcohol cohort according to likelihood of presenting to SHS/TA in 2016/17

Segment rules				% of cohort	Rate of SHS/TA in next year	% of all SHS/TA presentations in cohort
No SHS or TA use in last 3 years	No Legal Aid in last 3 years			76%	1.9%	21%
	Some Legal Aid in last 3 years	No days in custody in last year		9%	7.9%	10%
		≥1 day in custody in last year	No Rent Assistance in last 3 years	1%	12.9%	3%
			Some Rent Assistance in last 3 years	1%	23.7%	4%
Some SHS or TA use in last 3 years	No court presentations in last year			9%	27.4%	33%
	≥1 court presentations in last year			5%	43.9%	30%
<b>Total</b>				<b>100%</b>	<b>7.0%</b>	<b>100%</b>

For example, the last row of Table 45 indicates that the subgroup with SHS or TA in the past three years as well as some court presentations forms 5% of the group with acute drug and alcohol related service use. This subgroup accounts for 30% of all SHS and TA presenters over the 2016/17 and presented at a rate of 43.9%.

The table also shows that among the group with acute drug and alcohol related service use:

- There are significant differences in rates of SHS access within the cohort, ranging from 43.9% to 1.9% presenting to SHS/TA over 2016/17.

<sup>39</sup> See Appendix E for further detail.

- Key intervention points for this cohort include courts and Legal Aid. These presentations cover 16% of the cohort but 46% of the cohort's subsequent SHS/TA presentations (this is the sum of 'proportion of all SHS/TA presentations in cohort' over the second, third, fourth and sixth rows).
- SHS/TA service use history is associated with a high risk of further homelessness (33%).
- People without recent SHS or TA use, but with recent court presentations have about 1.6 times the risk of SHS/TA presentation (43.9%) than those without recent court presentations (27.4%).
- People experiencing financial hardship have elevated rates of SHS/TA presentations. For example, among those with no SHS/TA history but some Legal Aid service use and some days in custody, people who were on RA in the last three years were more than 84% more likely to present to SHS/TA over the next year than those who were not (23.7% compared to 12.9%).

The segmentation of this cohort is similar to that of the acute mental health cohort described in Section 6.2.2, which is reflective of the significant overlap between the two groups. This overlap would be most prominent in those with homelessness service usage, who have heightened cross-sectoral service usage. It is likely that the most at-risk rows in Table 41 (mental health segmentation) and Table 45 (drug and alcohol segmentation) are identifying many of the same people.

We stress that these are non-causative pathways; rather, they reflect correlated patterns of service use that can be used to predict the likelihood of presenting to SHS/TA.

It is interesting to consider, for those in the acute drug and alcohol cohort who did present to SHS, whether they had a drug and alcohol service need. For those in this cohort who did present to SHS over 2016/17, 14% were identified as having a drug and alcohol service need. While well below 100%, this is almost three times higher than the overall proportion of SHS presenters identified as having a drug and alcohol service need (4.8%).

Table 46 below illustrates this by comparing service use characteristics for the acute drug and alcohol cohort compared to the general population.



Table 46 – Comparison of key service use measures for those in the acute drug and alcohol cohort

Statistic	Acute D&A cohort	Full population	Multiplier
Number of people	173,000	7,850,000	
SHS + TA presentation rate	7.0%	0.89%	8×
% Aboriginal identified	10%	3.30%	3×
Avg. # of police-recorded victim incidents per person, prev. 3yr	1.1	0.21	5×
Avg. # of court appearances/YJCs/cautions per person, prev. 3yr	1.5	0.1	15×
Avg. # of SHS presentations per person, prev. 3yr	0.2	0.022	11×
Avg. # of TA supports per person, prev. 3yr	0.18	0.011	16×
Avg. # of ED presentations per person, prev. 3yr	4.6	0.76	6×
Avg. # of ambulatory MH services per person, prev. 3yr	4.7	0.24	19×
Avg. # of admitted patient days per person, prev. 3yr	19.1	2.21	9×
Avg. # of Legal Aid presentations per person, prev. 3yr	1.2	0.08	15×
Avg. # of days on income support per person, prev. 3yr	515	191	3×
Avg. # of days on RA support per person, prev. 3yr	178	60	3×
Avg. # of Medicare services per person, prev. 3yr	80	39	2×
Avg. # of PBS scripts per person, prev. 3yr	67	27	2×

The acute drug and alcohol group has elevated service use across all sectors, similar to that of the acute mental health group. Compared to the acute mental health group population, people in this group present more to the emergency department, but less to ambulatory mental health services. Overall, they present to SHS and TA services at a lower rate than the mental health group.

**Key finding 16:** People with drug and alcohol use are skewed male and older compared to our overall study group, although younger people in the drug and alcohol cohort appear to be at high risk of accessing homelessness services. People with past drug & alcohol related service use are eight times more likely to present to homelessness services. Legal Aid and courts interactions represent other potential intervention points for this cohort. This cohort shares many service usage and risk characteristics with the mental health cohort.

## 6.4 Domestic and Family Violence

Domestic and Family Violence (DFV) is an important potential pathway to housing instability and homelessness. Recent policy changes have sought to increase options for people experiencing DFV, and many SHS providers specialise in this area.

The pathway is also notable in that sometimes SHS is the appropriate first point of intervention; DFV is chronically underreported. Police-recorded victim incidents can be indicative but only reflect a slice of the issue. Effective early support and family relationship strengthening may reduce violence and resulting demands on the homelessness system.

### 6.4.1 Backwards view

In this section, we consider the cohort who presented to SHS and had a DFV service need identified. In 2016/17 approximately:

- 13,000 people presented to SHS and had a DFV service need identified.
- 6,000 people presented to SHS and had a family/relationship need identified.
- 3,000 people had both identified service needs – half of those with family/relationship service needs also had DFV service needs. One-in-four of those with a DFV service need also had a family/relationship service need.
- 43,000 other people presented to SHS and had no DFV or family service needs identified.

Figure 41 compares the age and sex split of the group with either need identified to those with neither. The DFV cohort are strongly skewed towards females and children (who present with adults).

Figure 41 – Comparison of age and sex profile of those who accessed SHS in 2016/17 by whether they had a DFV or family service need identified

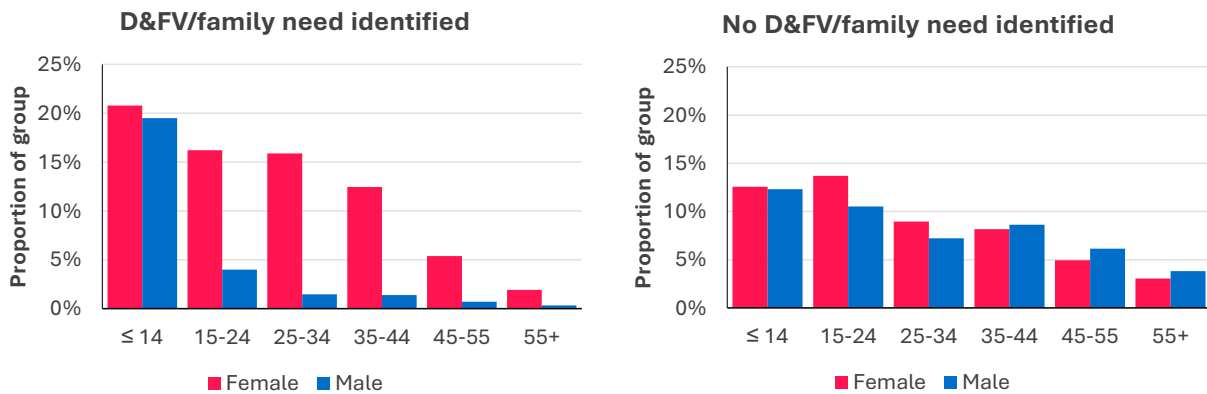


Table 47 shows the rates of cross-sectoral service use for SHS service users over 2016/17 with and without a DFV service need identified. The table uses a three-year service history, reflecting the fact that heightened vulnerability may persist for an extended period.

Table 47 – Rates of selected cross sectoral service use over the three years to 30 June 2016 for those who accessed SHS in 2016/17

	Emergency Department	ED – mental health related	Hospital	Hospital - MH unit	Ambulatory MH	Ambulatory MH - Anxiety	Controlled drugs of addiction	Ambulance	Legal Aid	Victim incident (Police-recorded)	DFV incident victim (Police-recorded)	Court appearance / YJC / caution	Custody spells
No DFV need identified	58%	5%	41%	8%	23%	4%	4%	31%	24%	39%	7%	24%	11%
DFV need identified	59%	4%	44%	6%	21%	5%	2%	28%	20%	43%	13%	17%	6%
Family need identified (no DFV need)	59%	3%	41%	5%	22%	5%	2%	30%	21%	41%	10%	19%	7%
Multiplier (DFV to No DFV)	x1.0	x0.7	x1.1	x0.8	x0.9	x1.2	x0.5	x0.9	x0.8	x1.1	x1.7	x0.7	x0.5

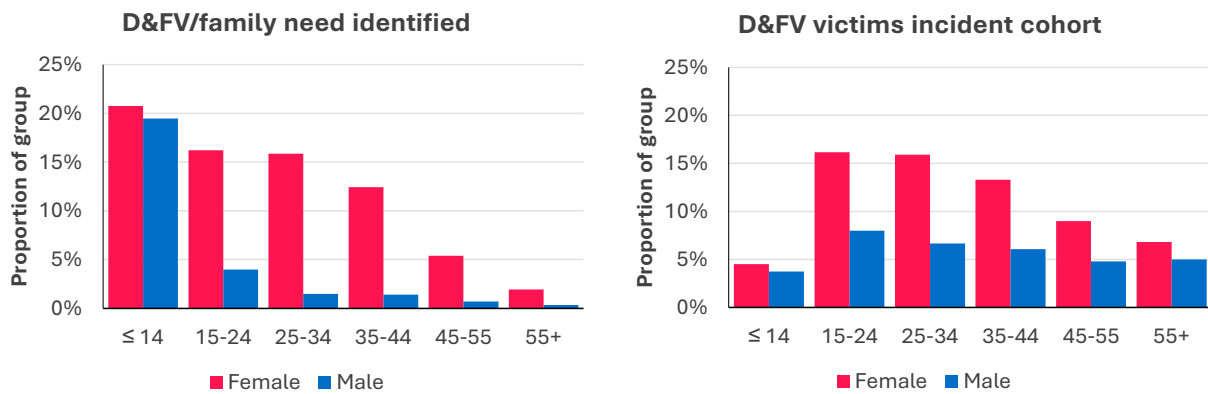
People with a DFV service need identified have **less** intensive service use across a range of sectors, particularly mental health and justice. This group appear harder to identify using service use data. The main service for which use is higher is DFV victim incidents, but this is only 1.7 times the rate for the broader SHS cohort. Only 13% of those identified as having a DFV need on the SHS data have a DFV victim incident recorded in the prior three years.

#### 6.4.2 Forwards view

For this study we have access to one of the broadest sources of data to identify experiences of DFV victims – police-recorded victim incidents. While this is still subject to under-reporting, it provides the earliest and widest signal of DFV available for a large study such as this. We have formed a cohort of those who were recorded as a victim relating to DFV over the three years to June 2016. This group represents about 166,000 people on a population weighted basis.

Figure 42 shows the age and sex distribution of this cohort. The cohort is skewed towards females aged 16 to 45. Compared to the cohort with DFV service need identified on this SHS support period there are more males and fewer young children.

Figure 42 – Age and sex profiles of the two DFV cohorts – those with DFV need identified on their SHS support period (left panel) and the DFV victim incidents cohort (right panel)



The rate of SHS/TA access for the DFV victim incidents cohort over 2016/17 is 9.9%, significantly higher than the baseline rate of about 0.9%. Figure 43 shows this rate by time since last DFV service use; the rate of SHS/TA presentation is highest in the quarter after the DFV victim incident (17%) and falls linearly to about half of this level (9%) of this level by a year later.

Figure 43 – Rate of SHS presentation for DFV victim incidents cohort over 2016/17 by time since last DFV victim incident

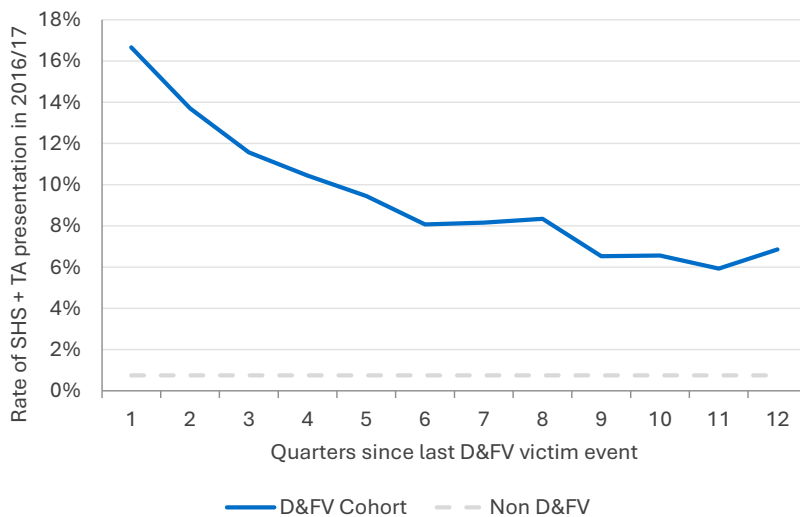


Table 48 further segments this cohort according to likelihood of accessing SHS/TA in the next year. This segmentation is based on a decision tree model and is an example of how subgroups with heightened likelihood of homelessness presentation can be identified within the DFV cohort. A decision tree model was used to split the cohort into subgroups with differing rates of accessing SHS/TA<sup>40</sup>.

<sup>40</sup> See Appendix E for further detail.

Table 48 – Example segmentation – DFV cohort according to likelihood of presenting to SHS/TA in 2016/17

Segment rules				% of cohort	Rate of SHS/TA in next year	% of all SHS/TA presentations in cohort
No SHS or TA use in last 3 years	Not on income benefits in last quarter			43%	2.5%	11%
	Income benefits in last quarter	No court presentations in last 5 years		30%	6.0%	18%
		≥ 1 court presentations in last 5 years	≤1 day in custody in the past year	6%	12.1%	8%
			>1 day in custody in the past year	1%	25.6%	2%
Some SHS or TA use in last 3 years	No court presentations in last year			15%	26.8%	40%
	≥1 court presentations in last year			5%	42.0%	21%
<b>Total</b>				<b>100%</b>	<b>9.9%</b>	<b>100%</b>

For example, the last row of Table 48 indicates that the subgroup with SHS or TA in the past three years as well as some court presentations forms 5% of the group with DFV victim incidents. This subgroup accounts for 21% of all SHS and TA presenters over the 2016/17 and presented at a rate of 42.0%.

The table also shows that among the group with DFV victim incidents:

- There are significant differences in rates of SHS access within the cohort, ranging from 42.0% to 2.5% presenting to SHS/TA over 2016/17.
- SHS/TA service use history is associated with a high risk of further homelessness (31%).
- People with recent SHS/TA use, but with recent court presentations are at about 1.6 times the risk of SHS/TA presentation (42.0%) than those without recent court presentations (26.8%).
- People experiencing financial hardship have elevated rates of SHS/TA presentations. For example, among those with no SHS/TA history, people who were on income support in the last quarter were three times more likely to present to SHS/TA over the next year than those who were not (7.5% compared to 2.5%).

We stress that these are non-causative pathways; rather, they reflect correlated patterns of service use that can be used to predict the likelihood of presenting to SHS/TA.

Of those in the DFV victim incident cohort who presented to SHS services in 2016/17, one-third (33%) were identified as having a DFV service need. This proportion was 2.6 times the rate for females than for males.

Table 51 below illustrates this by comparing service use characteristics for the DFV victim incident cohort compared to the general population.

Table 49 – Comparison of key service use measures for those in the DFV victim incident cohort

Statistic	DFV victim incident cohort	Full population	Multiplier
Number of people	166,000	7,850,000	
SHS + TA presentation rate	9.9%	0.89%	11×
% Aboriginal identified	17%	3.30%	5×
Avg. # of police-recorded victim incidents per person, prev. 3yr	4.0	0.21	19×
Avg. # of court appearances/YJCs/cautions per person, prev. 3yr	1.2	0.1	12×
Avg. # of SHS presentations per person, prev. 3yr	0.3	0.022	15×
Avg. # of TA supports per person, prev. 3yr	0.21	0.011	19×
Avg. # of ED presentations per person, prev. 3yr	2.9	0.76	4×
Avg. # of ambulatory MH services per person, prev. 3yr	1.8	0.24	7×
Avg. # of admitted patient days per person, prev. 3yr	5.5	2.21	2×
Avg. # of Legal Aid presentations per person, prev. 3yr	1.1	0.08	14×
Avg. # of days on income support per person, prev. 3yr	541	191	3×
Avg. # of days on RA support per person, prev. 3yr	256	60	4×
Avg. # of Medicare services per person, prev. 3yr	57	39	1×
Avg. # of PBS scripts per person, prev. 3yr	35	27	1×

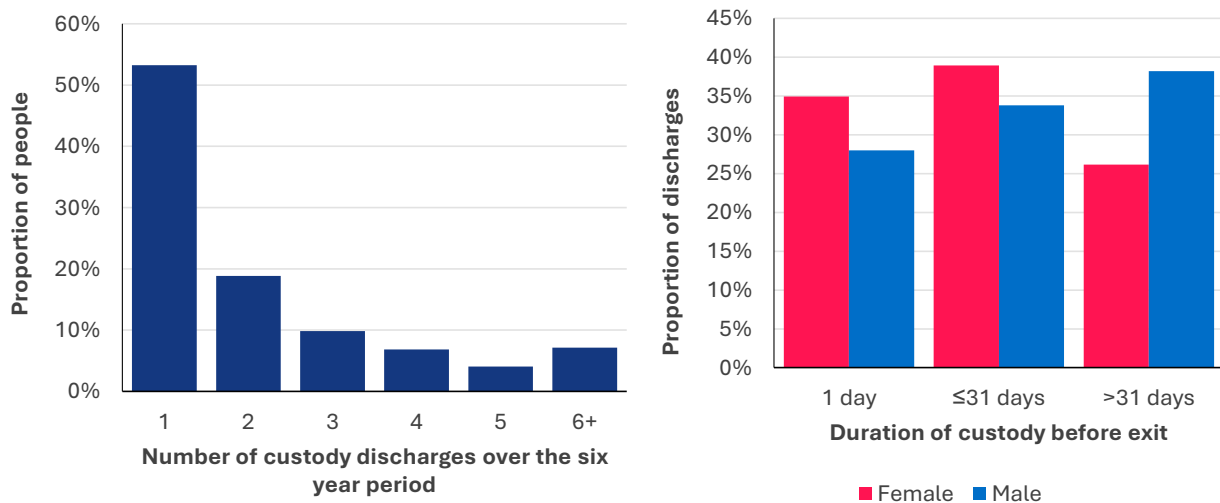
The DFV victim incident cohort has elevated service use across all sectors compared to the general population. However, although the rate of SHS/TA usage in this cohort is higher than the mental health/drug and alcohol groups, the increase in service usage is less. As mentioned in Section 6.4.1, this cohort appears harder to identify through service usage.

**Key finding 17:** DFV history, as measured by police-recorded victim incidents, is strongly associated with higher risk of homelessness. People in this cohort are much more likely to be female than male. Previous SHS/TA and welfare supports also appear to be relevant factors indicating increased risk and potential intervention points. The risk is highest soon after a victim incident.

## 6.5 Exiting custody

There were around 140,000 exits from custody over July 2011 to June 2016<sup>41</sup> in NSW<sup>42</sup>. These exits occur only among 28,000 people. Some of the people in this group have many custody spells over the period. The left side of Figure 44 groups those with exits from custody over July 2011 to June 2016 according to how many times they were discharged in that period. Just under half of those with at least one exit from custody over July 2011 to June 2016 had two or more exits over that period. The right side of Figure 44 shows that many custody spells are short. Among females 35% of spells were for one day, among males 28% of spells were for one day.

Figure 44 – Distribution of people with custody exits by number of exits over the five-year period (left) and distribution by grouped duration of custody spell (right)



An indicator of having recently been discharged from custody is not in the SHS data that was analysed for this project – so a backwards view is not possible.

Where people have multiple exits from custody in the period, we have randomly selected one to be used in the following analysis. This avoids double counting the SHS presentation where a person has multiple exits from custody within a year then accesses SHS.

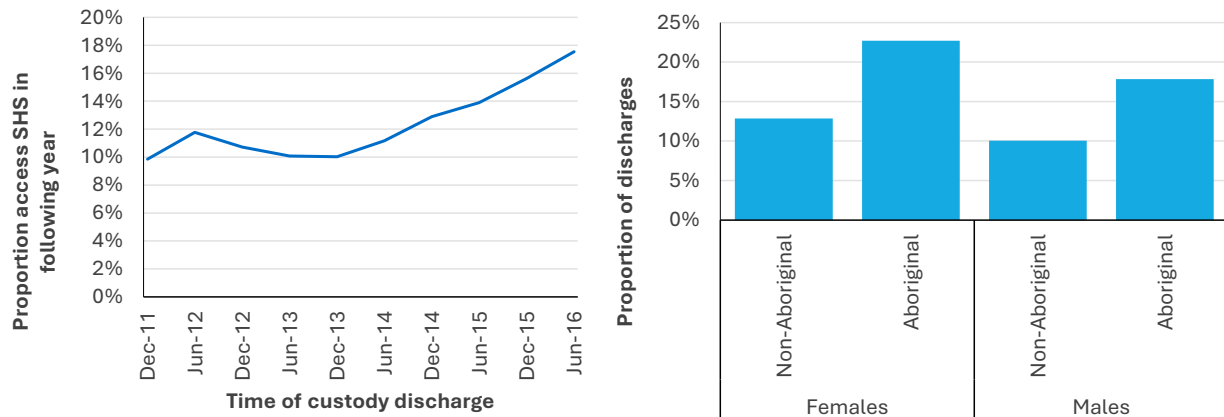
<sup>41</sup> We note that this number is higher than the roughly 95,000 discharges reported in official NSW custody statistics. Some of this discrepancy is due to the fact that BOCSAR only publicly reports on custodial episodes for persons held in gazetted correctional centres managed by Corrections NSW; the dataset used in this study includes persons received into and then discharged from 24 hour police/court cell complexes without entering a gazetted correctional centre.

<sup>42</sup> This includes upweighting the comparison group to represent the whole NSW population – the estimate is based on roughly 70,000 actual discharges on the dataset for that period.

### 6.5.1 Forwards view

People leaving custody are at heightened risk of homelessness. On average, for exits in the five years to June 2016, 12.4% accessed SHS over the following year. As shown in Figure 45, this is higher in recent years in line with general increases in SHS presentations. Figure 45 also shows the rates by sex and Aboriginal identified. While females make up a very small proportion of those with custodial sentences, the proportion who receive SHS support in the year following discharge is higher than for males.

Figure 45 – Rate of accessing SHS following an exit from custody over time (left), and by sex and Aboriginal identified (right)



For the 12.4% of people who did present to SHS within a year of exiting custody, we can explore what services they used over the intervening months. This is shown in Table 50 below, and includes the 19% of this group who access SHS the month following a custody exit with no other government service use (out of those included in this study) in between (as there are no months in between to observe service use in).

Table 50 – Service use in intervening period between exiting custody and presenting to SHS for those exiting custody in the five years to June 2016 and presenting to SHS within one year

Service	Proportion using service prior to SHS
Emergency Department	32%
ED – mental health related	3%
Hospital	19%
Hospital - MH unit	5%
Ambulatory MH	25%
Controlled drugs of addiction	9%
Temporary Accommodation	13%
Legal Aid	40%
Victim incident (Police-recorded)	21%
Courts / YJC / cautions	38%

Of note from Table 50, for people who presented to SHS within a year of exiting custody:

- 40% accessed Legal Aid in the intervening period.
- 25% accessed Ambulatory mental health services in the intervening period.
- 38% had at least one court appearance (or YJC/caution) in the intervening period.



We can also split the group into people with higher or lower risk of future SHS presentations based on their service use. One example is shown in Table 51; this segmentation is based on a single decision tree predicting an SHS presentation. There are other possible splits to use.

Table 51 – Example segmentation – Cohort of those exiting custody over July 2012 to June 2016

Segment rules				% of cohort	Rate of SHS in next year	% of all SHS presentations in cohort
SHS or TA in previous year	ED visit (mental health) ICD code in past year			2%	44%	6%
	No ED visit (mental health) ICD code in past year			15%	32%	37%
No SHS or TA in previous year	Aboriginal identified	Male			14%	13%
		Female			3%	24%
	Not Aboriginal identified	Ambulatory MH service use in past year			17%	11%
		No ambulatory MH service use in past year	Female		6%	10%
			Male		42%	5%
<b>Total</b>				<b>100%</b>	<b>13%</b>	<b>100%</b>

Note: The July 2012 to June 2016 period is chosen so that there is a year of prior SHS use for everyone and a year following exit to observe subsequent SHS presentations.

Among this group recently discharged from custody:

- Even with a fairly simple grouping, a range of risk levels can be identified – there is a relatively low risk of SHS presentation for non-Aboriginal males without recent SHS, TA or ambulatory mental health service use (5%).
- As with the broader population, previous SHS/TA service use is strongly predictive that someone will require further support. Among those exiting custody, those who also have accessed SHS or TA in the past year have a 33% rate of presentation over the year, compared to 9% without SHS/TA in the past year.
- Mental health services are indicative of a higher rate of SHS access, confirming an important interaction with mental health for this group.

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**Key finding 18:** People exiting custody access SHS at over 20 times the rate of the wider NSW population. The rate for Aboriginal people is about double that for non-Aboriginal people. A large proportion of people exiting custody also access Legal Aid and appear in court (including YJCs and police cautions) between their custody exit and SHS presentation.

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## 6.6 Young people leaving OOHC

Young people leaving OOHC face many challenges and experience poor social outcomes compared to their peers. Homelessness is a significant issue for young people leaving OOHC.<sup>43</sup> More than half of all OOHC leavers will access homelessness services at some point in their

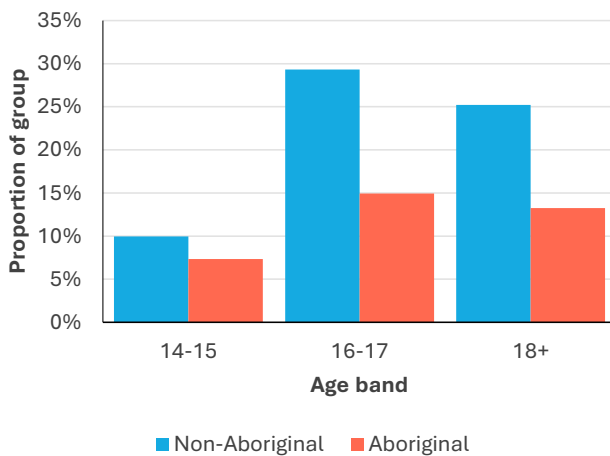
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<sup>43</sup> Campo, M., & Commerford, J. (2016). Supporting young people leaving out-of-home care (CFCA Paper No. 41). Melbourne: Child Family Community Australia information exchange, Australian Institute of Family Studies. Available from: <https://aifs.gov.au/cfca/publications/supporting-young-people-leaving-out-home-care>

lives.<sup>44</sup> This means young people finishing OOHC placements for the final time are an important cohort to consider.

Over the period 1 June 2011 to 30 June 2016, around 6,000 people aged 14 and over finished an OOHC placement, with no further OOHC placements to 30 June 2018. For this analysis, we refer to this group as OOHC leavers – we note this is imperfect as while everyone in this group has had at least a two-year break in OOHC placements, some could have further placements before age 18. The age band and Aboriginal identified profile of this group of OOHC leavers is shown in Figure 46.

Figure 46 – Age and Aboriginal identified profile of the OOHC leavers group

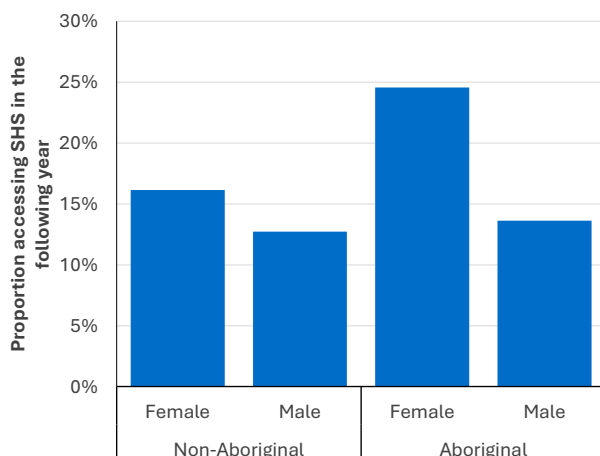


An indicator of having recently left OOHC is not in the SHS data that was analysed for this project – so a backwards view is not possible.

### 6.6.1 Forwards view

Young people leaving OOHC are at heightened risk of experiencing homelessness. On average, 17% of OOHC leavers access SHS over the following year. Figure 47 shows the rates by sex and Aboriginal identified.

Figure 47 – Rates of accessing SHS within a year of placement ending (1 June 2011 to 30 June 2016) for OOHC leaver cohort, by Aboriginal identified and sex



<sup>44</sup> Future service usage for Out-of-Home-Care leavers. Available from: <https://www.osii.nsw.gov.au/tools-and-resources/analysis-of-future-service-usage-of-out-of-home-care-leavers-report/>

Figure 47 shows the proportion accessing SHS is higher for Aboriginal people. Females who identify as Aboriginal have particularly high rates – 25% of Aboriginal female OOHC leavers accessed SHS within a year compared to 16% non-Aboriginal female OOHC leavers.

For the 17% who did present to SHS within a year of leaving OOHC, we can explore what other government services they used over the intervening months. This is shown in Table 52 and includes 17% of the subgroup who accessed SHS the month following the end of their placement, with no service use in between (as there are no months in between to observe service use over).

Table 52 – Service use in intervening period between end of OOHC placement and accessing SHS

	Emergency Department	ED – mental health related	Hospital	Hospital - MH unit	Ambulatory MH	Temporary Accommodation	Legal Aid	Victim incident (Police-recorded)	DFV Victim incident (Police-recorded)	Court appearance / YJC / caution	Custody
Proportion using service prior to SHS	29%	2%	12%	3%	18%	7%	16%	23%	2%	14%	8%

Of note from Table 52, for people who presented to SHS within a year of their OOHC placement ending:

- 18% accessed Ambulatory mental health in the intervening period.
- 16% accessed Legal Aid in the intervening period.
- 14% had court appearances (or YJC or cautions) in the intervening period.

We can split the group of all OOHC leavers into people with higher or lower risk of future SHS presentations based on their other service use. One example is shown in Table 53; this segmentation is based on a single decision tree predicting an SHS presentation – other splits are possible.

Table 53 - Example segmentation of the OOHC leaver group, restricted to those leaving over July 2012 to June 2016

Segment rules			% of cohort	Rate of SHS in next year	% of all SHS presentations in cohort
SHS or TA in previous year			16%	91%	60%
No SHS or TA in previous year	Court appearance in last year	Ambulatory MH service use in last year	4%	32%	6%
		No ambulatory MH service use in last year	9%	17%	6%
	No court appearance in last year	Ambulatory MH service use in last year	12%	16%	8%
		No ambulatory MH service use in last year	59%	8%	20%
<b>Total</b>			<b>100%</b>	<b>24%</b>	<b>100%</b>

Note: The July 2012 to June 2016 period is chosen so that there is a year of prior SHS use for everyone and a year following exit to observe subsequent SHS presentations.

Among this group of OOHC leavers:

- Those with previous SHS/TA service use are much more likely to need further support (91%)
- Even with a fairly simple grouping, a range of risk levels can be identified – there is a relatively low risk of presenting to SHS without recent service use
- Court appearances (including YJCs and cautions) and mental health services are indicative of a higher rate of SHS access.

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**Key finding 19:** For young people leaving OOHC in the five years to June 2016, 17% accessed SHS in the next year, evidence of significant housing instability for this group. Prior SHS/TA use, ambulatory mental health service use, and court appearances (including YJCs and police cautions) are all predictive of increased risk of later SHS presentation. OOHC leavers who have already accessed SHS or TA once prior to leaving care for the final time have a 91% chance of re-presentation.

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# 7 Aboriginal people

## 7.1 Introduction

Understanding and responding to homelessness for Aboriginal people<sup>45</sup> in NSW is important. Aboriginal people experience significant cultural, social or economic impacts and injustices, and historical impacts of past laws, policies and practices enforced upon Aboriginal people including those targeted at preventing the accumulation of intergenerational wealth and assets. Our report cannot take into account these broader concerns, but does recognise ongoing social inequity by highlighting the high rates of Aboriginal people accessing homelessness support and high rates of interaction with other services.

Aboriginal people are heavily overrepresented in homelessness support (as noted in Section 3.1) – about 30% of presentations related to Aboriginal people, whereas they make up 3% of the total NSW population. Higher service use is similarly seen in justice, welfare and health sectors. While these elevated rates reflect ongoing social inequity, they also indicate an opportunity to identify and support people earlier and more effectively. The information in this report will be used to improve how services and supports are delivered in partnership with Aboriginal people and communities.

We note the findings from other research on housing outcomes for Aboriginal people. For instance, the AIHW recently reported<sup>46</sup> that, while there is still much progress to be made and significant ongoing social inequity, the housing situation of Aboriginal people has improved over the last 15 years. They observed increases in home ownership and housing provided through the private rental market and falling levels of homelessness.

## 7.2 Descriptive results

### 7.2.1 Use of Homelessness Services

Over the two years to 30 June 2016, the likelihood of accessing SHS/TA at least once in the next year for Aboriginal people<sup>47</sup> was 8.0%. The equivalent rate for the NSW population is 0.89%.

Figure 48 shows the number of SHS presentations per month. This follows the NSW population trend observed in Section 3.1.2 (Figure 8). The most notable feature over time is the increase over 2014/15 to what looks like a new plateau, which we understand to largely correspond to Going Home Staying Home NSW reforms at the time. The NSW Government increased funding for SHS

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<sup>45</sup> Note that the term Aboriginal in this report is inclusive of both Aboriginal and/or Torres Strait Islander people/s in NSW.

<sup>46</sup> Australian Institute of Health and Welfare 2019. Aboriginal and Torres Strait Islander people: a focus report on housing and homelessness. Cat. no. HOU 301. Canberra: AIHW. Available from: <https://www.aihw.gov.au/reports/housing-assistance/indigenous-people-focus-housing-homelessness/contents/interactive-data-visualisation>

<sup>47</sup> In this work a person was considered Aboriginal if they identified as Aboriginal on the SHS, hospital admissions or emergency department datasets.

providers by nearly 10% for the 2014/15 financial year. The SHS data in this study only extends to 2016/17. The AIHW report above shows a fairly flat number over 2016/17 to 2019/20<sup>48</sup>.

Figure 48 – Number of homelessness presentations per month for Aboriginal people

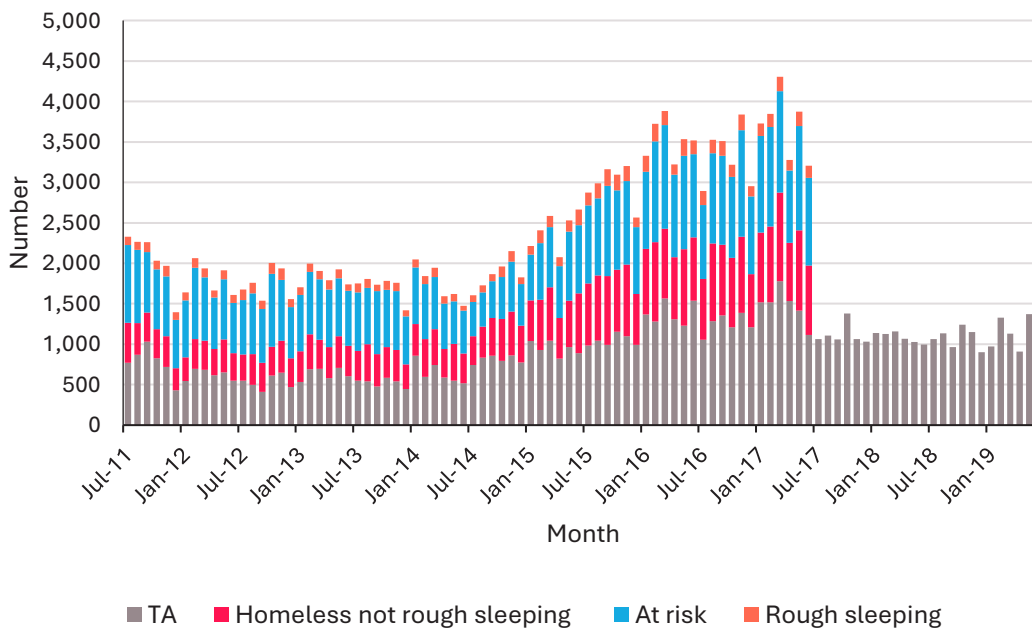


Figure 49 shows the proportion of Aboriginal people accessing homelessness services by the number of times they accessed over 2011/12 to 2016/17. The top left panel shows a large proportion of people only accessed homelessness services a single time over this six-year period (45% for females and 48% for males). The remaining panels show the same information for subgroups.

From Figure 49, 53% of people accessing homelessness services over 2011/12 to 2016/17 accessed services multiple times.

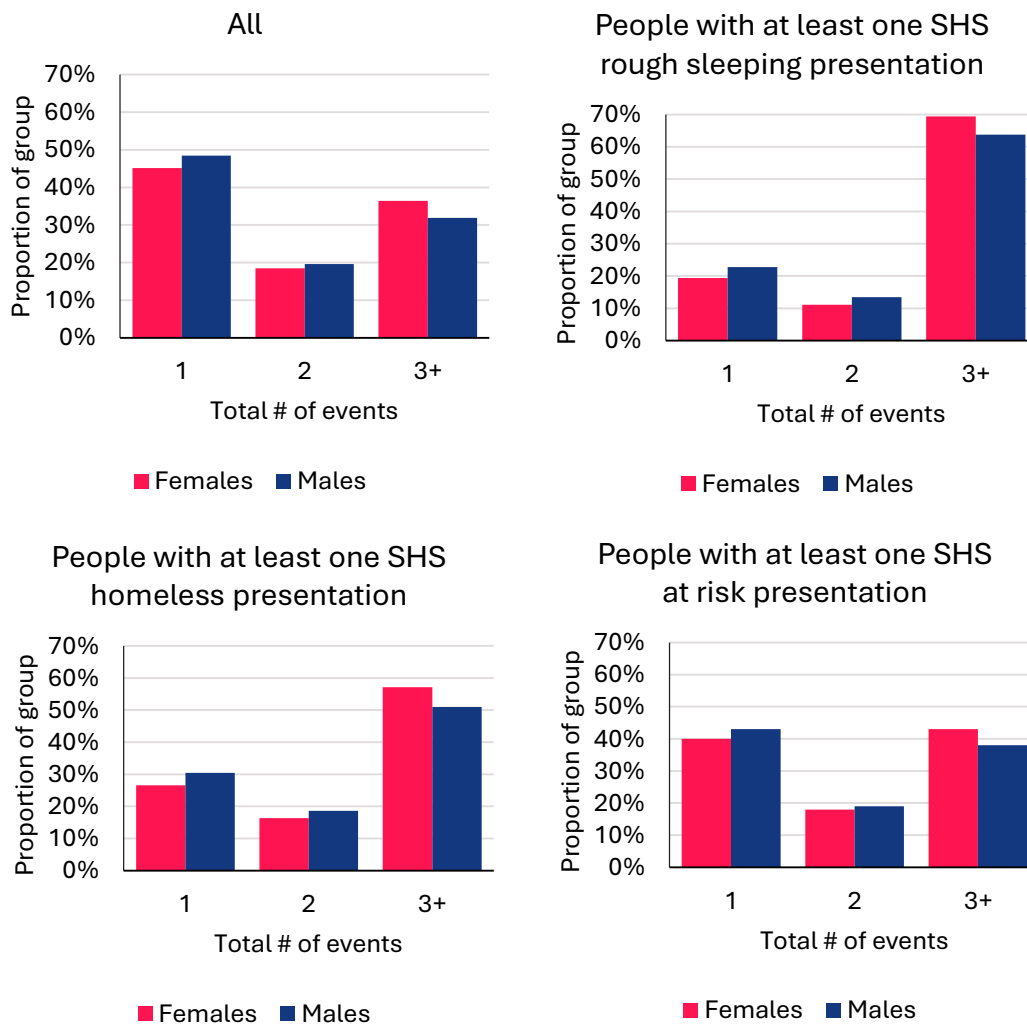
The proportion accessing services multiple times is:

- 79% for people accessed a SHS as rough sleeping
- 72% for people who accessed a SHS as homeless (but not rough sleeping)
- 59% for people who accessed a SHS as at risk.

The trends are similar to those for the full NSW population.

<sup>48</sup> Australian Institute of Health and Welfare 2020. Specialist homelessness services annual report. Cat. no. HOU 322. Canberra: AIHW. Viewed 14 January 2021, <https://www.aihw.gov.au/reports/homelessness-services/specialist-homelessness-services-annual-report>

Figure 49 – Proportion of Aboriginal people accessing homelessness services by the number of times they accessed over 2011/12 to 2016/17



The use of homelessness support services varies by region. Table 54 shows the number of homelessness presentations by DCJ region, as well the per capita rate for both the full NSW population and for Aboriginal people.

From Table 54:

- There is a significant variation in the per capita rates of homelessness support among Aboriginal people by region – ranging from 44,000 presentations per 100,000 Aboriginal people in South Eastern Sydney to 8,000 in Nepean Blue Mountains.
- The proportion of all presentations which are by Aboriginal people varies. In the greater Sydney area, a lower proportion of presentations are by Aboriginal people compared to outside the greater Sydney area. This reflects more Aboriginal people living outside the greater Sydney area.
- The increase in rate of presenting to homelessness services among Aboriginal people compared to the full population is bigger in the greater Sydney region.

Table 54 – Regional service usage for Aboriginal people compared to the NSW population<sup>49</sup>

DCJ Region	2016 population, '000s	Homelessness presentations	SHS+TA per 100,000	2016 Aboriginal population, '000s	Homelessness presentations by Aboriginal people	Homelessness per 100,000 Aboriginal people	Proportion of all presentations which are by Aboriginal people	Ratio of presentation rate (Aboriginal/ Full population)
Sydney	587	9,869	1,680	7	1,883	26,933	19%	16
Northern Sydney	889	3,579	403	4	282	7,038	8%	17
South Eastern Sydney	823	19,946	2,424	9	4,084	44,161	20%	18
South Western Sydney	1,120	10,627	949	21	2,022	9,481	19%	10
Western Sydney	971	10,872	1,119	17	2,072	12,534	19%	11
<b>All Sydney</b>	<b>4,390</b>	<b>54,893</b>	<b>1,250</b>	<b>58</b>	<b>10,342</b>	<b>17,803</b>	<b>19%</b>	<b>14</b>
Central Coast	337	6,780	2,014	15	1,664	10,829	25%	5.4
Far West	29	1,293	4,421	4	730	19,107	56%	4.3
Hunter New England	819	18,878	2,305	58	7,127	12,384	38%	5.4
Illawarra Shoalhaven	405	10,186	2,516	17	2,694	15,935	26%	6.3
Mid North Coast	309	8,342	2,704	22	3,485	16,077	42%	5.9
Murrumbidgee	293	5,930	2,025	15	1,846	11,921	31%	5.9
Nepean Blue Mountains	368	4,970	1,350	16	1,225	7,587	25%	5.6
Northern NSW	298	11,048	3,704	16	4,132	25,745	37%	7.0
Southern NSW	205	5,503	2,686	9	1,511	17,445	27%	6.5
Western NSW	279	7,879	2,826	36	4,232	11,801	54%	4.2
<b>All non-Sydney</b>	<b>3,341</b>	<b>80,809</b>	<b>2,419</b>	<b>208</b>	<b>28,648</b>	<b>13,804</b>	<b>35%</b>	<b>5.7</b>
<b>Total</b>	<b>7,732</b>	<b>135,702</b>	<b>1,755</b>	<b>266</b>	<b>38,990</b>	<b>14,678</b>	<b>29%</b>	<b>8.4</b>

As noted previously, care is needed in interpreting regional effects. SHS can be limited by supply-side effects, for instance, some areas will have lower rates of SHS as a result of lower supply, rather than fundamentally lower demand. Additionally, when considering Aboriginal people other important aspects include:

<sup>49</sup> Population based on ABS 2016 Census-based final estimates of Aboriginal and Torres Strait Islander and non-Indigenous Australians for various geographies. Available from: <https://www.abs.gov.au/statistics/people/aboriginal-and-torres-strait-islander-peoples/estimates-aboriginal-and-torres-strait-islander-australians/latest-release>



- The different geographical boundaries that Aboriginal Community Controlled Organisations need to abide by when delivering or supplying programs to Aboriginal clients (i.e. Government versus Community versus Traditional country).
- Whether the services are the right service providers in the right locations (easily accessible?) for Aboriginal people.

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**Key finding 20:** There is a significant variation in the rates of homelessness among Aboriginal people by region – ranging from 44,000 presentations to homelessness services per 100,000 Aboriginal people in South Eastern Sydney to 8,000 in Nepean Blue Mountains. The increase in rate of presenting to homelessness services among Aboriginal people compared to the full population is bigger in the greater Sydney region.

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### 7.2.2 Homelessness service use after accessing other services

Table 55 shows both the proportion of people using a given service in any quarter as well as the annualised probability of accessing homelessness services in the quarter following this service use. This is a short-term risk measure to gain a feel for service use distributions and also a simple measure of homelessness risk. The table uses the six years of homelessness data 2011/12 to 2016/17. We have annualised the rates in the figure to make them more comparable to later analysis.

Table 55 indicates the extent to which cross-sectoral service use can indicate an elevated risk of homelessness among Aboriginal people. For example, in the first row for emergency department visits we observe that:

- 11.7% of the NSW Aboriginal population have a recorded emergency department (ED) presentation in a given quarter. This compares to 5.0% among the full NSW population.
- The annualised rate of homelessness in the following quarter for Aboriginal people who have an emergency department presentation is 15.5%, more than twice the rate (7.1%) among Aboriginal people without an emergency department presentation.

Table 55 – Annualised probability of homelessness service use in the quarter following other service use for Aboriginal people. Average over 2011/12 to 2016/17.

Service	% of Aboriginal population accessing in any quarter	Proportion % of full NSW population accessing in any quarter	Rate of homelessness service use among Aboriginal people in the following quarter:	
			for those not using service	for those using service
Emergency Department	11.7%	5.0%	7.1%	15.5%
Admitted patients	6.6%	4.6%	7.7%	14.4%
Admitted patients - mental health	0.4%	0.1%	8.0%	42.3%
Ambulatory mental health	2.6%	0.7%	7.5%	29.0%
Ambulance	3.1%	1.1%	7.6%	24.4%
Controlled drugs of addiction	0.7%	0.1%	7.9%	32.3%
Medicare	56.5%	55.6%	7.9%	8.3%
Medicare relating to mental health	4.6%	3.5%	7.8%	15.3%
Medicare relating to addiction	0.5%	0.1%	8.0%	26.3%
PBS script	39.9%	37.8%	8.0%	8.3%
PBS script relating to opioids	6.3%	3.8%	8.0%	10.4%
PBS script relating to addiction	0.9%	0.4%	8.1%	12.1%
PBS script relating to mental health	10.6%	8.0%	7.6%	12.7%
Police-recorded victim incident	4.5%	1.3%	7.2%	26.6%
Police-recorded victim incident – DFV	0.4%	0.1%	8.0%	34.9%
Legal Aid	1.8%	0.3%	7.7%	30.3%
Court appearance/ Police caution or YJC	2.0%	0.3%	7.7%	30.0%
Custodial spell ending	0.8%	0.1%	7.8%	40.1%
Public housing	13.7%	2.0%	7.5%	12.2%
Private Rental Assistance	0.6%	0.1%	8.1%	21.9%
Private Rental Subsidy	0.0%	0.0%	8.1%	25.2%
OOHC placement ending	0.4%	0.0%	8.1%	16.3%
Income support	34.8%	18.7%	4.7%	14.3%
Rental Assistance	13.6%	6.2%	6.8%	16.7%
DSP income support	7.6%	3.0%	7.6%	15.1%
Carer income support	2.1%	1.0%	8.1%	10.5%
Jobseeker income support	11.3%	4.0%	6.6%	19.5%
Student income support	4.7%	1.9%	8.1%	8.8%
Age pension	4.3%	7.4%	8.5%	1.1%

While these averages do not control for the correlations between service use and other demographic characteristics, they do show that:

- Service use is generally higher among Aboriginal people compared to the full NSW population, up to 12 times the rate in some cases. The exceptions are:
  - Age pension which Aboriginal people are less likely to receive.
  - Rates of accessing Medicare and PBS are similar.

One implication is that any potential intervention points tied to service use naturally reach a higher proportion of Aboriginal people. This may be appropriate, given Aboriginal people have a higher rate of accessing homelessness services.

- In all cases (apart from the age pension), service use is associated with increased risk of homelessness. This is the same as for the full NSW population however, the size of the increase is smaller among Aboriginal people than among the full population.
- Many of the services apply to a very small fraction of the population in any given quarter. Often these smaller exposure measures give a much higher risk of homelessness. For example, drug treatments apply to 0.7% of Aboriginal people, but correspond to a large increase in SHS/TA presentation rates.
- At the other extreme, Medicare sees broad exposure (over half the Aboriginal people in NSW access Medicare in any given quarter), but there is no (to minimal) increase in risk of homelessness after accessing Medicare.

### 7.3 Homelessness

The two-way analysis was introduced in Section 5.1 (Two-way analysis: Introduction). In short, we report three measures:

- **Risk uplift** indicates how much higher the rate of homelessness services rate is in the year following the other service use (compared to people who did not access that service).
- **Coverage** shows what proportion of homelessness presentations used the other service in the prior year.
- **Cost difference** is the additional cost over three years for people who access a given service and homelessness services, compared to those just accessing a given service. These are cross-sectoral costs (Housing, Health, Justice and Child Protection for NSW, Welfare, Medicare and PBS for Commonwealth) and are per person. They have been inflated to 30 June 2020 values.

The trio of risk uplift, coverage and additional costs together give a good view of investment potential – ideal investments are well targeted (high risk uplift), have good reach (high coverage) and generate high potential savings (offset against a larger additional costs). There is usually a trade-off between targeting (risk uplift) and reach (coverage).

The main results for the two-way interaction between homelessness need and preceding service use for Aboriginal people are summarised in Table 56 below. The table shows the results for any homelessness service use and is comparable to Table 30 for the full NSW population.

Table 56 – Two-way analysis results for Aboriginal people. Relates to any SHS/TA presentation and given service use in the prior 12 months.

Area	Service	Risk uplift	Coverage	Additional 3-year cost across NSW govt	Additional 3-year cost across CMW govt
Health	Emergency Department	2x	47%	\$46k	\$17k
	Emergency Department - mental health diagnosis	5x	3%	\$71k	\$7k
	Admitted patients	1x	28%	\$52k	\$16k
	Admitted patients - mental health diagnosis	5x	2%	\$60k	\$8k
	Ambulatory mental health	3x	16%	\$34k	\$11k
	Ambulatory mental health - psychoactive substance use	5x	4%	\$17k	\$3k
	Ambulatory mental health - disorders of personality	5x	2%	\$24k	\$8k
	Ambulance	3x	22%	\$47k	\$9k
	Controlled drugs of addiction	5x	4%	\$55k	\$2k
Commonwealth Health	Medicare	1x	80%	\$41k	\$19k
	Medicare relating to mental health	2x	19%	\$43k	\$19k
	Medicare relating to addiction	3x	4%	\$55k	\$5k
	Medicare relating to chronic disease management	1x	9%	\$43k	\$9k
	PBS script	1x	64%	\$39k	\$17k
	PBS script relating to opioids	1x	17%	\$42k	\$10k
	PBS script relating to addiction	1x	4%	\$38k	\$12k
	PBS script relating to mental health	2x	24%	\$48k	\$9k
	PBS script with Closing the Gap	2x	37%	\$30k	\$10k
Justice	Police recorded victim incident	3x	33%	\$38k	\$13k
	Police recorded victim incident - domestic and family violence	4x	6%	\$28k	\$8k
	Legal Aid	3x	16%	\$26k	\$11k
	Court appearance/ Police caution or YJC	3x	20%	\$38k	\$10k
	Custodial spell ending	4x	10%	\$7k	\$8k
Housing	Public housing tenancy ending	3x	7%	\$29k	\$13k
Child protection	Out of home care placement ending	2x	2%	\$25k	\$23k
Commonwealth Welfare	Some days on income support	2x	63%	\$39k	\$7k
	Rental Assistance receipt	2x	35%	\$38k	\$5k
	DSP income support	2x	13%	\$51k	-\$2k
	Jobseeker income support	2x	31%	\$37k	\$9k
	Parent income support	3x	16%	\$18k	\$3k
	Student income support	1x	8%	\$40k	\$11k
	Age pension	0.2x	1%	\$69k	-\$1k
	Centrelink risk of homelessness indicator	6x	9%	\$31k	\$2k

(a) Risk uplift is how much more likely a person is to present to a homelessness service given other prior service use. It is relative to the NSW population baseline rate of homelessness presentation of 6.1% p.a.

(b) Coverage is the proportion of all homelessness presentations that are preceded by the other service. It is a fraction of the 16,000 presentations p.a., based on six years of homelessness services to June 2017.

(c) Additional cost compares the average elevated fiscal cost across government for those who presented to a homelessness service. Amounts are totals over three years, inflated to June 2020 values

From Table 56 we observe:

- General services have high coverages but are the least targeted intervention points; the risk uplifts are the lowest, reflecting the high number of users not at risk of homelessness:
  - Medicare and PBS scripts have high coverages but almost no risk uplift. A large proportion of the population use these services with very low risk of homelessness.
  - Similarly, welfare receipt has a high coverage but modest uplift. Even among those receiving rental assistance, many are not at high risk of accessing homelessness services. However, the Centrelink indicator for having a high risk of homelessness sees a substantial risk uplift (6x).
- The highest risk uplifts for Aboriginal people are associated with NSW mental health services:
  - Emergency department presentations and hospital admissions both related to mental health have risk-uplifts of around 5x, but fairly low coverages of 2-3%
  - The coverage from ambulatory mental health services is higher (16%) and the risk uplift is reduced to 3x
  - Medicare and PBS service use relating to mental health has a lower uplift, reflecting the less acute nature. This is the same as for the full NSW population.
- Additional costs across NSW government are generally in the range of \$25k to \$60k. They are higher for health-related services (with a corresponding elevation in subsequent health services).
- Additional cost differences attributable to the Commonwealth Government are generally in the range of \$2k to \$20k. They are lower for income support services as the comparison group is also accessing income support.

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**Key finding 21:** Both the baseline risk of homelessness is higher among Aboriginal people and rates of service use are higher. This means the *relative* levels of increased risk associated with service use is lower than for the full population, even if the absolute risk remains higher. The prior services most associated with increased likelihood of subsequent homelessness (risk uplift) for Aboriginal people are NSW mental health services.

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## 7.4 Intersections of service use

A key feature of the linked dataset is that it allows us to understand intersections in service use. There are often important overlaps between service use: people with service requirements in one area are typically heavier users across a broad range of services. Understanding these overlaps is important when thinking about multiple intervention points; if the overlap is heavy then targeting two different intervention points makes less sense. Also, groups of people with heavy usage across a range of services potentially will generate the greatest fiscal benefits from effective early intervention. Table 57 shows, for those accessing homelessness services, the combinations of services they accessed in the year prior to homelessness.

For example, from the first row of Table 57, 80% of Aboriginal people accessing homelessness services accessed Medicare and the PBS. Also, 71% accessed Medicare and welfare.

Intersections are generally intuitive. There are heavy overlaps across different health services, and across different justice sector activity.

From Table 57 for Aboriginal people accessing homelessness services:

- 30% of Aboriginal SHS clients who accessed ambulatory mental health services also exited custody in the past year
- 44% of Aboriginal SHS clients who had been in social housing in the past year also had a police-recorded victim incident

Table 57 – Cross-table of overlap of service usage in the 12 months prior to a homelessness services presentation for Aboriginal people, average over 2014/15 to 2016/17

The proportion of people accessing...	...who also access this service in the same year:										
	Medicare	PBS	Time on welfare (any)	Emergency department	Hospital admission	Ambulatory mental health	Social housing	Police-recorded victim incident	Legal Aid	Court appearance	Custody spell ending
Medicare	100%	80%	71%	54%	31%	20%	29%	38%	19%	20%	11%
PBS	98%	100%	75%	58%	34%	22%	30%	40%	20%	21%	11%
Time on welfare (any)	87%	74%	100%	55%	34%	24%	29%	44%	24%	27%	15%
Emergency department	89%	78%	75%	100%	47%	29%	31%	46%	25%	27%	15%
Hospital admission	92%	82%	82%	84%	100%	37%	32%	50%	29%	29%	18%
Ambulatory mental health	90%	82%	90%	79%	57%	100%	30%	55%	40%	42%	30%
Social housing	86%	71%	70%	56%	32%	19%	100%	44%	21%	22%	11%
Police-recorded victim incident	89%	76%	84%	65%	39%	28%	35%	100%	29%	31%	15%
Legal Aid	87%	75%	90%	68%	45%	40%	32%	56%	100%	58%	42%
Court appearance	84%	71%	93%	67%	41%	38%	31%	55%	53%	100%	44%
Custody spell ending	82%	67%	92%	68%	44%	49%	28%	48%	68%	78%	100%

The equivalent table for the full NSW population is Table 16, in Section 3.6 (Intersections between service use). Compared to the full population, intersections of service use for Aboriginal people are generally larger – the overall rates of service use are higher so the intersections are bigger. The exceptions are the intersections with Medicare, PBS and welfare. The effect is largest for intersections with social housing, court appearances and custody spells ending.

## 7.5 Service use intensity

Table 58 shows our key service use summary table for Aboriginal people and the full NSW population. From Table 58, Aboriginal people have elevated service use across all sectors than the

full NSW population but particularly so for homelessness support (9x), courts (7x), Legal Aid (6x) and ambulatory mental health services (4x).

Table 58 – Summary of service use for Aboriginal people and full population

Statistic	Aboriginal people	Full population	Multiplier
Number of people	322,000	7,850,000	
SHS + TA presentation rate	8.0%	0.89%	9×
% Aboriginal identified	100%	3.3%	30×
Avg. # of police-recorded victim incidents per person, prev. 3yr	0.8	0.21	4×
Avg. # of court appearances/YJCs/cautions per person, prev. 3yr	0.7	0.10	7×
Avg. # of SHS presentations per person, prev. 3yr	0.2	0.022	9×
Avg. # of TA supports per person, prev. 3yr	0.12	0.011	11×
Avg. # of ED presentations per person, prev. 3yr	2.1	0.76	3×
Avg. # of ambulatory MH services per person, prev. 3yr	0.9	0.24	4×
Avg. # of admitted patient days per person, prev. 3yr	4.0	2.21	2×
Avg. # of Legal Aid presentations per person, prev. 3yr	0.4	0.08	6×
Avg. # of days on income support per person, prev. 3yr	343	191	2×
Avg. # of days on RA support per person, prev. 3yr	127	60	2×
Avg. # of Medicare services per person, prev. 3yr	36	39	1×
Avg. # of PBS scripts per person, prev. 3yr	28	27	1×

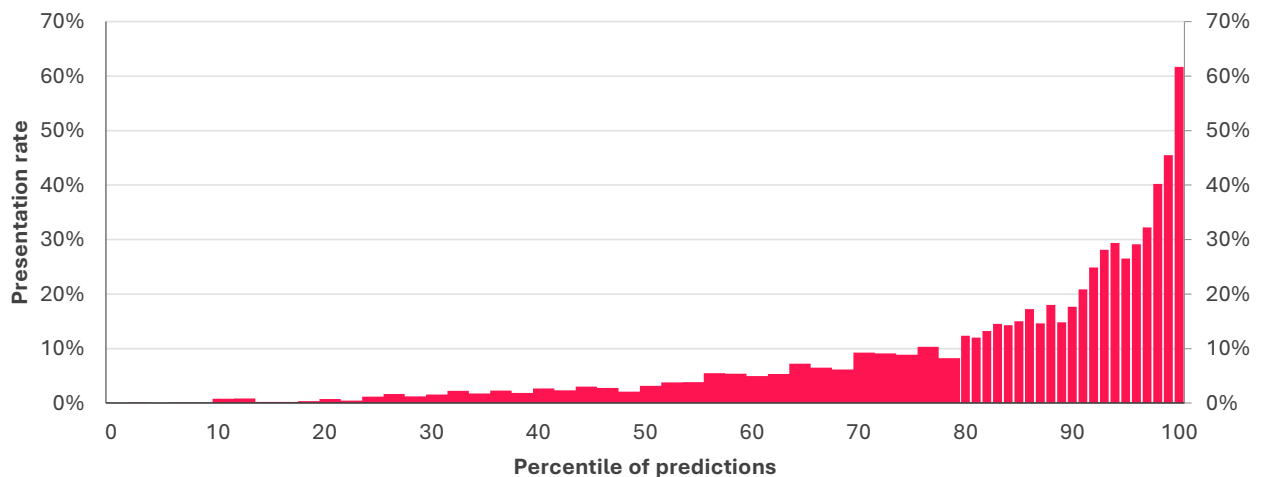
## 7.6 Predicting homelessness

### 7.6.1 Prediction model

As introduced in Section 3.2, the overall homelessness presentation rate for the population was 0.89%. On an annual basis for the population of about 7.85m people in NSW, this implies 69,900 people presenting to SHS. However, the distribution of risk in the model is extremely skewed. Among Aboriginal people the overall homelessness presentation rate is higher at 8.0%, and the distribution of risk is still skewed, although less so than for the full population. The skew is less than for the full population as Aboriginal people are a subgroup of the population at higher risk. This is due to contemporary cultural, social and economic impacts and injustices, and intergenerational trauma and historical impacts of past laws, policies and practices.

Figure 50 below shows this skew by splitting the population by prediction band percentile; the bar on the very left of the chart are the 2% least likely (as predicted by the model) to present to SHS/TA over the next year, whereas the 1% on the right are those most likely.

Figure 50 – Percentile plot for predicted use of SHS/TA in the next year.



Notes: To construct the chart, we have ordered the validation dataset from lowest likelihood of accessing SHS /TA to highest and grouped into (weighted) population bands. The rightmost column indicates the 1% of observations most likely to access homelessness services, and they do so 62% of the time.

We observe:

- The 1% at highest risk of homelessness, corresponding to about 3,200 people, represent just under one twelfth (8%) of all homelessness presentations (2,100 out of 25,700), and do so at a rate 8 times higher than the Aboriginal population average. This corresponds to a 64% likelihood of accessing SHS/TA.
- The 9% of the population from percentiles 91 to 99 represent just over a third (36%) of all homelessness presentations, presenting at four times the rate of the Aboriginal population average.
- The 20% of the population from percentiles 71 to 90 represent another 32% of presentations, at a rate slightly above the overall average.
- The 70% of the population at lowest risk represent still represent 24% of presentations (6,100 out of 25,700 people in a given year). While still a significant proportion of presentations, the rate of access is 3%, about a third of the overall average among Aboriginal people.

These results are also summarised in Table 59.



Table 59 – Summary of model results for Aboriginal people

Percentile range	Proportion of population	Number of SHS/TA presentations	Proportion of SHS/TA presentations	Rate <sup>50</sup>	Rate relative to overall average
1% - 70%	70%	6,100	24%	3%	x0.3
71%-90%	20%	8,200	32%	13%	x1.6
91%-99%	9%	9,300	36%	32%	x4.0
100%	1%	2,100	8%	64%	x8.0
<b>Total</b>		<b>25,700</b>		<b>8%</b>	

(d) Results shown for the cohort of Aboriginal people in the main predictive model of Section 4.2

**Key finding 22:** The 1% of Aboriginal people at highest risk account for 8% of all Aboriginal presentations to homelessness services in a year (2,100 out of 25,700). This vulnerable group accesses homelessness services at a rate eight times higher than the Aboriginal population average and 70 times higher than the full NSW population.

## 7.6.2 Subgroups at higher risk of homelessness

The potential value of prevention and early intervention can be shown by grouping the Aboriginal population into those with higher or lower risk of future homelessness based on their service use. While there are many such groupings, one example is shown in Table 60, created using a decision tree learning algorithm.

Most of the groups at high-risk identified by the model are multifaceted; there are rarely single indicators that solely determine being at very high risk. Table 60 demonstrates this by attempting a rule-based decomposition of homelessness presentation risk among Aboriginal people.

Table 60– Example segmentation for risk of presenting to SHS/TA among Aboriginal people. Annualised rate of presenting to SHS/TA over 2015/16 and 2016/17.

Segment rules				% of cohort	SHS/TA rate in next year	% of all SHS/TA presentations in cohort
No SHS or TA use in last 3 years	No court appearances in last 3 years	No Private rent assistance in last 3 years	≥2 Medicare services in last 5 years	66%	3.4%	28%
			<2 Medicare services in last 5 years	9%	7.9%	9%
		Private rent assistance in last 3 years		3%	11.6%	4%
		At least 1 court appearance in last 3 years		7%	11.9%	11%
Some SHS or TA use in last 3 years	No police-recorded victim incidents in last year			10%	21.9%	28%
	At least 1 police-recorded victim incident in last year			4%	39.5%	20%
<b>Total</b>				<b>100%</b>	<b>8.0%</b>	<b>100%</b>

From Table 60:

- The subgroup at high-risk is represented by people with prior homelessness service use and recent police-recorded victim incidents. The very high-risk level (two-fifths present to SHS/TA in

<sup>50</sup> This is the population-weighted actual rate of SHS/TA on the ‘test’ dataset reserved for this purpose in the fitting procedure.

the next year) is offset by the very low proportion (4.0%) of Aboriginal people that have this service use history.

- Aboriginal people with previous homelessness service use in the past three years are at very high risk of future homelessness. This group (combining the lower two rows):
  - Represent nearly half of homelessness presentations by Aboriginal people
  - Use homelessness services at a rate of 25%.

# D

## Details on data and limitations

# 8 Data and linkage

## 8.1 Study cohort and population weighting

The linked dataset created for this project is one of the most comprehensive datasets assembled related to homelessness in Australia and gives a realistic picture of whole-population dynamics through the inclusion of a comparison group. Further, the interest in government early intervention points means that understanding government service data is particularly relevant.

As introduced in Section 2, the research project makes use of a linked administrative dataset related to government-funded service usage, with a case-control design. The study cohort is made up of a case cohort (people who have accessed homelessness services) and a comparison cohort (those who have not):

- The case cohort is the 202,927 people who accessed Specialist Homelessness Services (SHS) in NSW over 1 July 2011 to 30 June 2017, drawn from the Australian Institute of Health and Welfare (AIHW) Specialist Homelessness Services Collection.
- The comparison cohort is a 2:1 random sample of 422,934 other people in NSW, matched on age band and sex. This provides a counterpoint to examine service use for those who are not at risk of homelessness. To draw this sample:
  - Identities were drawn from the Medicare Enrolment File (MEF) by the AIHW.
  - The sample frame (the population from which the comparison group was drawn) was people who were either born before 1 January 2014 and had registered at least one NSW address between 30 June 2010 and 1 January 2014, and alive at 1 January 2014, or children born after 1 January 2014 who have at least one NSW address since birth. 1 January 2014 was chosen as being at the centre of the time window for available SHS data, which is most appropriate for age-based matching.
  - Some oversampling was applied and identities that were found to be in the case cohort were removed.

Note that this group excludes people not eligible for Medicare, including foreign students and people with temporary visas.

Table 61 below shows the broad age distribution of the case, comparison and NSW population at the mid-point of the time window for available SHS data. Note this is not the age at SHS presentation, which could be up to three years higher or lower for the case group. The main observation is that the cohort is skewed towards younger bands; for example, 96% more people appear in the 15-24 age band than you would expect if SHS presentations were distributed in line with the broader population. Similarly, we observe 86% fewer presentations for those aged over 65. Another way to view this is through the control population weight. Each comparison person in the 0-14 age band represents about 13 people from the broader NSW population, whereas each comparison in the >65 group represents 137.

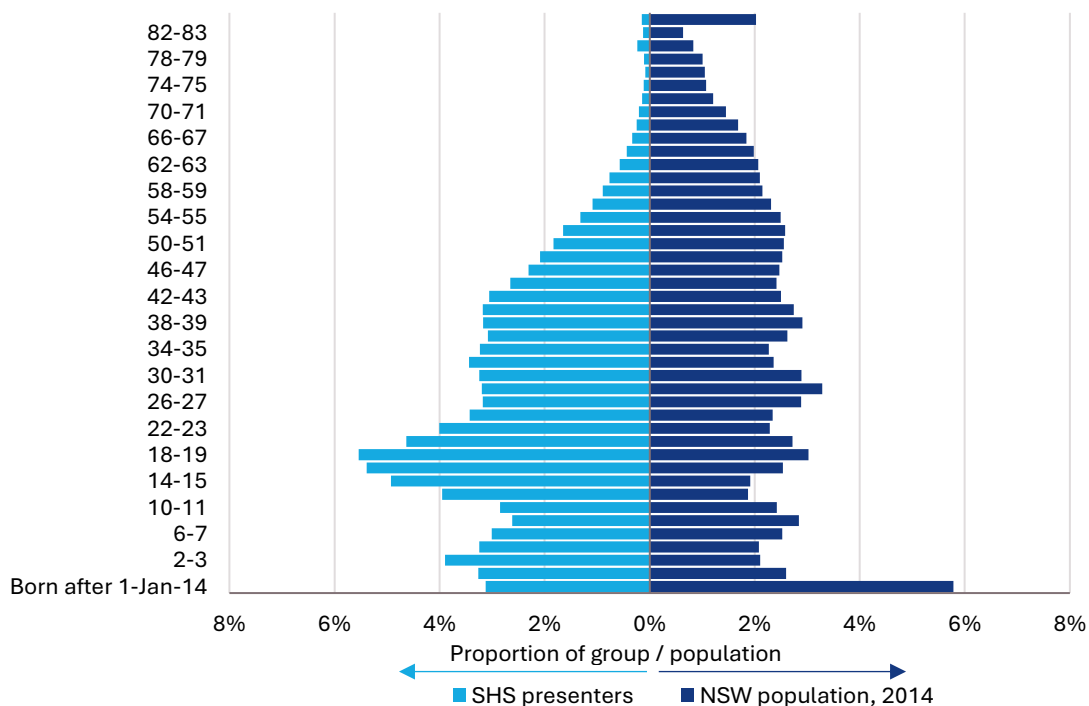
These weights are useful for estimating population-level rates of service usage, assuming the MEF is a representative sample. We use this feature throughout the report.

An extended version of this table for finer age bands is provided in Appendix A, which is also presented as a chart in Figure 51. It again shows the over-representation of the 15-24 age group in SHS presentations and the underrepresentation of those above age 55.

Table 61 – Summary of study cohort by age band

Age at 1 January 2014	Case (SHS presentation)	Control (no SHS presentation)	NSW Population, 2014
Born after 1-Jan-14	6,335	13,465	454,671
0-14	51,321	106,926	1,437,808
15-24	51,653	107,601	1,019,440
25-34	33,066	68,864	1,075,609
35-44	30,733	63,985	1,036,087
45-54	18,677	38,889	992,182
55-64	7,620	15,868	833,653
65+	3,523	7,336	1,007,317
<b>Total</b>	<b>202,927</b>	<b>422,934</b>	<b>7,856,766</b>

Figure 51 – Age distribution of ‘case’ (those with at least one SHS presentation) cohort with the NSW population, in two-year age bands



## 8.2 Data used

This project combined 19 linked administrative datasets (interchangeably referred to in this report as service use data) covering a range of government services. The list of services is shown in Table 7.

Court appearances, youth justice events and time in custody were all sourced from the NSW Bureau of Crime Statistics and Research: request number 19-18332, 2019. Throughout the report we have grouped youth justice conferences and youth police cautions with court appearances.

Government administrative data has the advantage of being comprehensive (all people using a service, rather than a limited sample) and generally of good quality. The main limitation is that that it gives a particular view of a person as defined by their service use; for instance, a person can have poor health and not go to hospital or have good health but still present to an emergency department for a minor ailment. This means that administrative data can answer some, but not all, questions about a person's outcomes across various domains.

The other key benefit of administrative data, in the context of this project, is that we are seeking potential points of early intervention. Government services represent the most obvious opportunities for such initiatives, which aligns well with the data.

### 8.2.1 Data custodian and ethics approvals

Ethics approvals were obtained for this research project and are listed below:

- AIHW Ethics Committee Reference:
  - EO2018/3/476, date of approval: 17/07/2018 and subsequent amendments
  - EO2020/2/134, date of approval: 05/05/2020
- NSW Population and Health Services Research Ethics Committee – AU RED reference: HREC/18/CIPHS/60, Cancer Institute NSW reference: 2018HRE1205, date of approval: 05/02/2019 and subsequent amendments
- Aboriginal Health and Medical Research Council Ethics Committee – HREC Reference number: 1455/18, date of approval: 29/10/2018 and subsequent amendments
- NSW Corrective Services Ethics Committee – approval reference: D19.0096874, date of approval: 21/02/2019

We would like to thank the data custodians of the collections listed in Table 7. Without their co-operation this research would not be possible. We would also like to thank the AIHW for their assistance throughout the project and the Centre for Health Record Linkage (CHeReL) for their assistance co-ordinating the linkage for the NSW datasets.

### 8.2.2 Linkage

The linkage consisted of three phases:

- CHeReL carried out linkage of the NSW service use data
- The AIHW carried out linkage between the SHSC and the MEF to draw the study cohort
- Subsequently the AIHW carried out further linkage using the AIHW National Linkage Map.

#### 8.2.2.1 Linkage of NSW service use data

CHeReL matched NSW service use based on probabilistic linkage using as many identifiers as possible. SLK-581 key linkage was then used to match people across those accessing SHS services, the MEF, and identities known to CHeReL. Using SLK-581 enables linkage while offering client privacy protection compared to full names. For this project, SLK linkage is the only viable option, since SLK is the only identifier available for linkage on the SHS collection. Standard SLK-581 linkage sensitivity rates are reported to be around 98.5%. However, it is worth noting the key limitations of SLK matching:

- It can be possible for there to be a failure to match service use to a person if they change their name (e.g. due to marriage), use an alias, or if there are errors in the spelling of their name or their date of birth.

- It may be possible to falsely assign service use to a person because of similarities in names, sex and date of birth with another person.

Biases can occur in SLK linkage because some groups are more or less likely to have consistently recorded details. For example, Aboriginal names are more likely to be spelt wrongly or inconsistently across multiple databases.

#### 8.2.2.2 Linkage between the SHSC and the MEF

The AIHW linked the SHSC and the MEF. This generated an 82.5% linkage rate. Of the 174,297 (82.5% of total) of SHS clients matched to the MEF, 165,757 (95%) were given unique identities after linkage to reflect that distinct SLKs can correspond to the same identities on the MEF (which takes account of name changes).

Linkage to broader NSW government services is more difficult to comment on, since in many cases people will not use a particular service. SLK-based linkage generally has effectiveness in the 90%-95% range, which is what we expect for this portion of the linkage and deem adequate to understand patterns and pathways. Statistics on rates of service use, which are analogous to linkage rates, are given in Figure 15.

#### 8.2.2.3 Secondary linkage between the study cohort and DOMINO

The AIHW further linked the study cohort to the AIHW National Linkage Map<sup>51</sup> and extracted associated DOMINO, Medicare and PBS content data. (The National Linkage Map was used only as a linkage resource in this project.) The use of the national linkage map improves the rates of and quality of linkage, as all variations of individual identifiers are recorded. Linkage to other Commonwealth datasets (DOMINO, Medicare and PBS) was done as a subsequent phase to the initial linkage due to the timeframes for Ethics approvals.

Additional links for the case cohort were made through this process. This resulted in identification of potential duplicates in the case group (11,260 people become 5,479), adopting these would reduce the case group size by 3% of the case group. We kept these people as separate identities noting the original NSW linkage did not identify them as a single person and the service use may be in conflict of a single identity.

An additional fourteen records from the control cohort were removed by the Department of Social Services in their annual maintenance and de-duplication of the Medicare Consumer Directory so did not undergo further linkage.

#### 8.2.2.4 Overall comments

Overall, our assessment is that:

- The linkage uses the available data (SHSC) to the extent possible.
- There is a material portion of SHS presentations that is not linked more broadly to individuals. It is plausible that the collection of personal information is inherently limited (e.g. people filling out forms incorrectly, or deliberately using different names or dates of birth) in a way that prevents some presentations being linked.
- The portion that is correctly linked is large and fairly representative; we are confident that the main findings extend to the whole SHS population on this basis.

We have not made any explicit corrections to the results to allow for linkage failure.

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<sup>51</sup> The AIHW National Linkage Map contains all individuals who have registered with Medicare since 1984, on DOMINO since 2000 and been recorded on the National Death Index since 1997.

### 8.2.3 Privacy protections

A range of precautions have been taken to protect the privacy of individuals:

- Separation of linkage and analysis: linkage was performed by CHeReL and the AIHW. These teams potentially saw personally identifying information such as name or date of birth but did not analyse service use data. The Taylor Fry research team analysing service use data used a de-identified dataset.
- To reduce the risk of re-identification within the de-identified data, the granularity of variables was reduced. Regional variables were provided to a SA4 level, all dates were provided as months (not exact dates), and ages were provided in two-year age bands.
- The linked data is stored in the Secure Unified Research Environment (SURE, Sax Institute) with heavily regulated access and independent checks that no personal information is ever exported. The SURE uses high quality three-factor security to protect against unauthorised logins. The environment is hosted in a tier 3+ (the best available) data centre.

These privacy protections were approved as part of the ethics applications.

## 8.3 Dataset limitations

### 8.3.1 General limitations on administrative data

This is an exploratory study with limitations around the use of administrative data and the impact of confounding variables. Particularly, limitations of administrative datasets include:

- Variable data quality.
- Limited information on outcomes – for example, if someone leaves public housing, their subsequent housing status is often unclear (unless they seek further support from Government).
- No information on individual-level social isolation, which is potentially important for understanding how effective support networks can reduce homelessness.
- Lack of full socioeconomic information, such as employment and income, which is relevant to homelessness risk.
- Lack of behavioural information, such as whether the person is a smoker.
- Lack of qualitative or survey information (self-declared homelessness and related causes) to complement what is available in the administrative data.
- Some people experiencing homelessness are not visible in the administrative data available (for example, unmet requests for support and those not seeking support).

These are genuine limitations to any research based on administrative data. However, the quality of the linkage, and the view on pathways to homelessness and intervention points, make it a powerful dataset despite these limitations.

### 8.3.2 Definition of Homelessness and the use of SHS and TA data

SHS provide services aimed at prevention and early intervention, as well as crisis and post crisis assistance to support people experiencing or at risk of homelessness. TA represents emergency accommodation in low-cost hotels, motels, caravan parks, boarding houses and similar accommodation for people who are experiencing a housing crisis or homelessness. While not all people experiencing homelessness will access SHS/TA for assistance, SHS presentations and TA support are most amenable to administrative data linkage and analysis.



Additionally, accessing homelessness services is a proxy indicator to assess the risk of homelessness. It is important to note that in certain circumstances this risk increases after using other government services partly by design. For example, people leaving custody who are at risk of homelessness may be referred to homelessness services for assistance.

We note that other definitions of homelessness can differ. For instance, the Australian Bureau of Statistics (ABS) statistical definition of homelessness considers a person to be homeless if they have no suitable accommodation alternatives and if their current living arrangement:

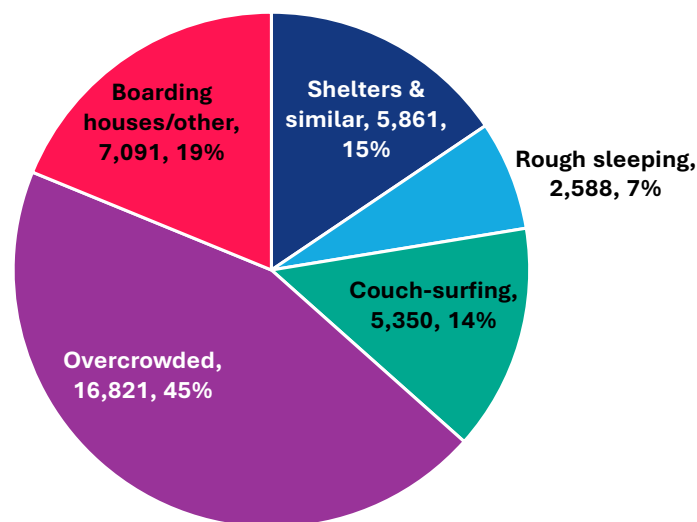
- Is in a dwelling that is inadequate;
- Has no tenure, or if their initial tenure is short and not extendable; or
- Does not allow them to have control of, and access to space for social relations.

The full definition includes:

- People presenting to homeless shelters
- Couch-surfing: Persons staying temporarily with other households
- Rough sleeping or Street sleeping: Persons living in improvised dwellings, tents, or sleeping out
- Overcrowding: Persons living in severely overcrowded dwellings
- Other: Persons living in boarding houses, or other temporary lodgings.

The ABS estimated that there were 37,711 people experiencing homelessness in NSW in the 2016 Census, split according to Figure 52.

Figure 52 – Census 2016 estimates of homelessness in NSW



Some categories are virtually invisible to government; there is little way, outside the Census, to identify and assist those who are couch-surfing unless they seek support and self-disclose their housing status. Our focus is therefore on measurable service use, in particular the use of SHS for people identifying as at risk of homelessness and experiencing homelessness, including people who are rough sleeping.

For the scope of this project, we use assistance by SHS providers or TA from DCJ to indicate the need for homelessness support. This is obviously a practical decision – high quality linkable data exists for people seeking government support. We note:

- Some people seek SHS assistance but are turned away for a variety of reasons (for example, the service provider may not have capacity, or the person may not be in the target group for the service provider). The AIHW reports that in 2016/17, SHS providers assisted 288,273 clients nationally, around three times the number of unassisted instances (95,392 nationally). Such instances of seeking SHS assistance and going unassisted are not included as homelessness experiences for this project. This is largely due to less data being collected when people are not assisted. For example, in 2017/18, 98% of SHS presentations had a valid SLK recorded, but only 52% of records on those who were unassisted had a valid SLK. We note that these ‘unassisted’ people:
  - May receive assistance on another occasion or from another provider
  - May receive TA, which does not have the same supply constraints.
- SHS and TA data does not capture all individuals experiencing homelessness. People experiencing homelessness and not seeking SHS or TA assistance are not captured. Due to the lack of data available on these individuals, this report does not reflect this group.

Additionally, only SHS support periods that were located in NSW were provided from this project. There may be people who accessed SHS in NSW and then moved states, or the other way around. These pathways are not captured.

The AIHW publishes reports based on the annual snapshots of the SHSC. Numbers in this report will not reconcile to the AIHW reports as this study makes use of longitudinal SHSC data. The key difference is the annual snapshots count all support periods in a financial year – where a support period spans two financial years it is counted in both. This allow the AIHW to report how many people received support from an SHS in a financial year. In the longitudinal data used for this report support periods are counted once by start date. This allows analysis of an individual’s sequence of government interactions.

## 8.4 Overall view of the data

Overall, we believe that the dataset design gives one of the most comprehensive views of pathways into and out of homelessness. It is suitable for addressing all aspects of the research questions set out in Section 1.2 – Project aims.

# 9 Assumptions, uncertainty and limitations

## 9.1 Reliance on data

In preparing this report, Taylor Fry has relied on historical data and other quantitative and qualitative information supplied by DCJ and several Government agencies. It has not been Taylor Fry's function to audit or verify the accuracy of the data. We did, however, complete some high-level checks on the data, including checks for internal consistency, with any significant issues raised with data providers. 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.

## 9.2 Limitations on the use of fiscal cost assumptions

We have used unit cost assumptions for service use based on relevant DCJ unit costings and other sources for other sectors. Unit costs carry some inherent limitations (for example, to what extent should they capture a portion of fixed costs?). Additionally, we have not tested our adopted assumptions with external stakeholders for appropriateness – in some cases revised estimates may exist for particular services.

## 9.3 Uncertainty

There are several sources of uncertainty related to the analysis, which 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. We have not attempted to adjust estimates for any linkage related issues and view the overall linkage process as satisfactory.
- Service use is also inherently variable, which means that future trends may differ from current estimates. Some service types, including SHS, have seen large time-related trends and this increases uncertainty. Generally, we would expect factors associated with increased with higher rates of homelessness and their relativities to remain relevant over time.
- We have adopted unit cost assumptions for services that appear reasonable. This has been based on data to the extent possible and advice from government departments, but there are inherent limitations; for instance, the treatment of fixed costs for individual-level allocation creates a natural tension on how realisable potential savings are.
- Administrative data necessarily gives a partial view of homelessness, as discussed in Section 8.3.

Such uncertainty should be considered when drawing conclusions from the report findings.

## 9.4 Limitations regarding causality

The report is primarily observational and predictive – what services tend to appear before and after homelessness presentations. This gives the common 'correlation is not causation' limitation. The

findings are not causative – the data does not support the conclusion that a particular pathway ‘causes’ homelessness risk. The main risk is that there are other correlated factors that both indicate higher service use and higher homelessness risk. For example, being a victim of abuse as a child correlates with OOHC service use, and perhaps later homelessness risk; the OOHC itself does not necessarily ‘cause’ homelessness.

That said, many of the results are suggestive – there are natural reasons why a person who leaves OOHC, with no place to stay, would seek homelessness support. Further, the predictive value of the modelling reflects the fact that certain services may represent good intervention points even if they do not cause the homelessness risk.

## 9.5 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. The purpose of this project is to address the following research questions:

1. For people requiring homelessness support, which other government services have they used before?
2. For people using other government services, how likely are they to require homelessness support?
3. Among the people identified, what other risk factors affect their likelihood of using homelessness services?
4. How do government service usage costs differ for people requiring homelessness services?

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 above.

# E

## Summary of key findings

# 10 Summary of key findings

By way of a brief conclusion we:

- List the key findings identified throughout the report. The executive summary also gives an overview of the main findings.
- Compare the cross-sectoral service use for the full NSW population and vulnerable cohorts identified in this report.

## 10.1 Key findings from throughout the report

### Data and linkage

1. The dataset combines a large cohort experiencing homelessness with a matched comparison group, plus an extensive linkage to other services. This gives a representative picture of homelessness interacting with other services and risk factors, plus related costs to government.

### Descriptive statistics

2. The 6,850 rough sleeping presentations to SHS per year represent 8% of all SHS presentations. Relative to the broader SHS support population, they are more likely to be male and older. Aboriginal overrepresentation remains similar to that for all SHS presentations at 30% of presentations.
3. People accessing homelessness services have significantly higher use of other government services than the broader population, sometimes over ten times the rate.
4. Most homelessness presentations are by those on income support, primarily those receiving Jobseeker, Parent or DSP payments. There is strong evidence that those who access Rent Assistance are more at risk of needing future support, and longer durations on welfare support indicate higher risk.
5. Very large increases in homelessness rates are associated with other service use, particularly for emergency department visits, ambulance, controlled drug use, Legal Aid, police-recorded victim incidents and OOHC placements ending. Homelessness rates are routinely ten times higher or more.
6. Overlaps between service usage are significant and generally intuitive. These overlaps are far more pronounced for those requiring homelessness services, indicative of more complex needs.

### Predictive modelling

7. While previous SHS and TA use is an obvious and strong predictor of future use, very strong effects are observed both for demographics (age and Aboriginal identified) and prior cross-sectoral service use (including welfare payments, police-recorded victim incidents and mental health services). Longer term service use, such as number of incidents over three years, is generally more important than more acute shorter-run effects when predicting homelessness over the next year.
8. When predicting new presentations to SHS or TA, the 1% of the population at highest risk represent just under a quarter of all presentations and present at 23 times the rate of the general population. History of welfare services remains a key factor in predicting likelihood of homelessness.

9. For young people, completion of year 12 education is associated with a 30% reduction in homelessness risk. OOHHC history also increases the risk of young people presenting to homelessness services by 17%.
10. The prediction model is efficient at identifying people at high or low risk of rough sleeping, with more than a quarter of presentations attributable to 0.2% of the population. These individuals have a high likelihood of rough sleeping and are typified by very high rates of service use across many sectors. Justice and welfare service use appear to be effective filters in a rule-based prediction approach.

### **Two-way analysis**

11. Over a six-year period, costs across NSW government services are six times higher for females accessing homelessness services compared to females in the broader NSW population and nine times higher for males, indicating greater need and disadvantage. Of the \$50k difference, one fifth relates to housing-related support. The largest component relates to justice costs, which are particularly elevated for males.
12. Prior government service use is often a strong indicator of future homelessness presentations, with rates of presentation commonly increasing by a factor of 10-20 times compared to baseline rates. While some services can indicate acute risk (such as police-recorded victim incidents), many (such as ambulatory mental health) indicate ongoing risk over a full year. Hospital access provides the broadest coverage (the intervention point that includes the greatest fraction of future homelessness presenters), but with limited targeting ability. Risk uplifts are even higher when considering rates of rough sleeping following service use such as custodial sentences, Mental health-related emergency department presentations, or the Centrelink risk of homelessness indicator.
13. The median cost to government over six years of those presenting to SHS in 2011/12 is \$166k, which is 11 times higher than the NSW population. Within the group of SHS presenters, the 5% with the highest cost-to-government represent 1,500 people with an average cost of \$706k per person, 84% of which is attributable to the NSW government. Only 5% of the total relates directly to housing.

### **Vulnerable cohorts**

14. Financial hardship, measured using welfare system data, is a strong indicator of future homelessness support need. Our identified subgroups present at 10 times the base population rate. In understanding future need, previous SHS/TA remains highly predictive. Rates of police-recorded victim incidents for those on parenting payments are high, as are court appearances for those on working-age income support, and these are associated with higher likelihood of SHS/TA presentations.
15. People presenting to homelessness services and having a mental health support need are twice as likely to have had related health treatment in the previous three years. People with past mental health service use are nine times more likely to present to homelessness services. Custody and court interactions represent other potential intervention points for this cohort.
16. People with drug and alcohol use are skewed male and older compared to our overall study group, although younger people in the drug and alcohol cohort appear to be at high risk of accessing homelessness services. People with past drug & alcohol related service use are eight times more likely to present to homelessness services. Legal Aid and courts interactions represent other potential intervention points for this cohort. This cohort shares many service usage and risk characteristics with the mental health cohort.
17. DFV history, as measured by police-recorded victim incidents, is strongly associated with higher risk of homelessness. People in this cohort are much more likely to be female than male.

Previous SHS/TA and welfare supports also appear to be relevant factors indicating increased risk and potential intervention points. The risk is highest soon after a victim incident.

18. People exiting custody access SHS at over 20 times the rate of the wider NSW population. The rate for Aboriginal people is about double that for non-Aboriginal people. A large proportion of people exiting custody also access Legal Aid and appear in court (including YJCs and police cautions) between their custody exit and SHS presentation.
19. For young people leaving OOHC in the five years to June 2016, 17% accessed SHS in the next year, evidence of significant housing instability for this group. Prior SHS/TA use, ambulatory mental health service use, and court appearances (including YJCs and police cautions) are all predictive of increased risk of later SHS presentation. OOHC leavers who have already accessed SHS or TA once prior to leaving care for the final time have a 91% chance of re-presentation.

### Aboriginal people

20. There is a significant variation in the rates of homelessness among Aboriginal people by region – ranging from 44,000 presentations to homelessness services per 100,000 Aboriginal people in South Eastern Sydney to 8,000 in Nepean Blue Mountains. The increase in rate of presenting to homelessness services among Aboriginal people compared to the full population is bigger in the greater Sydney region.
21. Both the baseline risk of homelessness is higher among Aboriginal people and rates of service use are higher. This means the *relative* levels of increased risk associated with service use is lower than for the full population, even if the absolute risk remains higher. The prior services most associated with increased likelihood of subsequent homelessness (risk uplift) for Aboriginal people are NSW mental health services.
22. The 1% of Aboriginal people at highest risk account for 8% of all Aboriginal presentations to homelessness services in a year (2,100 out of 25,700). This vulnerable group accesses homelessness services at a rate eight times higher than the Aboriginal population average and 70 times higher than the full NSW population.

## 10.2 Elevated cross-sectoral service use

Elevated cross-sectoral service use typically reflects a heightened likelihood of homelessness. Table 62 summarises the comparison of key service use measures for groups at higher risk of homelessness.

From Table 62 we see that for those at higher risk of homelessness, compared to the full NSW population:

- The average number of police-recorded victim incidents in the past three years is 3-17 times higher
- The average number of court appearances (including police cautions and YJC) in the past three years is 3-52 times higher
- The average number of ED presentations (including police cautions and YJC) in the past three years is 2-8 times higher
- The average number of days with rent assistance is 2-14 times higher.

The two cohorts selected based on modelled risk (1% at highest risk, and 1% of young people at highest risk) show the largest elevation in service use (as this service use has been used to select the cohort). The other (vulnerable) cohorts are selected based on broader literature on factors which place people at higher risk of homelessness (using administrative data to identify these factors). While the size of the increase is smaller, these vulnerable groups do have heightened service use in the same areas as the cohorts selected by modelled risk. This shows:



- Groups at even higher risk can be formed from those within vulnerable cohorts based on service use
- Elevated service use is useful proxy for vulnerable cohorts such as those experiencing mental illness and DFV.

Table 62 – Comparison of key service use measures for groups identified at higher risk of homelessness. Service use is average for group over in the past three years. For the cohorts at higher risk, service use is shown as a relativity to the full population rate.

	Full population	1% at highest modelled risk of homelessness	1% of young people at highest modelled risk of homelessness	Working-age income support cohort	Parenting income support cohort	Acute mental health cohort	Acute D&A cohort	DFV cohort	Aboriginal people
Number of people ('000)	7,850	79	10	107	79	217	173	166	322
SHS + TA rate	0.9%	28.5%	42.8%	9.6%	7.9%	8.3%	7.0%	9.9%	8.0%
% Aboriginal identified	3.3%	45%	48%	13%	16%	12%	10%	17%	100%
# of police-recorded victim incidents	0.21	13x	17x	5x	8x	6x	5x	19x	4x
# of court appearances	0.1	32x	52x	9x	3x	15x	15x	12x	7x
# of SHS presentations	0.022	54x	103x	15x	13x	13x	11x	15x	9x
# of TA supports	0.011	72x	49x	22x	11x	17x	16x	19x	11x
# of ED presentations	0.76	7x	8x	3x	2x	5x	6x	4x	3x
# of ambulatory mental health services	0.24	19x	26x	5x	2x	35x	19x	7x	4x
# of days as admitted patient	2.21	4x	4x	2x	1x	8x	9x	2x	2x
# of Legal Aid services	0.08	36x	56x	10x	7x	16x	15x	14x	6x
# of days on income support	191	4x	4x	6x	6x	3x	3x	3x	2x
# of days on Rent Assistance	60	6x	3x	12x	14x	3x	3x	4x	2x

# F

## Appendices

## Appendix A Cohort split by more age-bands and sex

Table A.1 provides a further breakdown of the study cohort by age and sex.

Table A.1 – Further age and sex splits for the cohort

Age (at Jan 2014)	Case (accessed SHS)		Control		NSW Population, 2014		Avg comparison population weight	
	Female	Male	Female	Male	Female	Male	Female	Male
Born after 1-Jan-14	3,087	3,248	6,525	6,940	225,390	229,281	34	33
0-1	3,171	3,445	6,609	7,176	98,904	105,024	14	14
2-3	3,929	3,976	8,187	8,284	80,791	84,693	9	10
4-5	3,209	3,379	6,688	7,042	79,911	83,730	11	11
6-7	2,950	3,151	6,147	6,567	96,263	102,133	15	15
8-9	2,596	2,717	5,409	5,660	108,029	115,416	19	20
10-11	3,021	2,761	6,292	5,749	92,274	97,978	14	17
12-13	4,335	3,685	9,031	7,677	71,931	75,421	7	9
14-15	5,573	4,418	11,609	9,207	73,356	76,949	6	8
16-17	6,182	4,759	12,883	9,916	96,547	102,565	7	10
18-19	6,633	4,609	13,816	9,604	114,911	122,651	8	12
20-21	5,691	3,706	11,851	7,717	104,314	109,565	8	14
22-23	5,100	3,024	10,626	6,300	88,890	90,951	8	14
24-25	4,566	2,387	9,509	4,971	91,804	92,246	9	18
26-27	4,201	2,246	8,748	4,675	113,054	113,452	12	24
28-29	4,254	2,237	8,856	4,659	129,079	129,344	14	27
30-31	4,186	2,404	8,719	5,007	113,753	113,359	13	22
32-33	4,438	2,540	9,243	5,294	93,201	92,061	10	17
34-35	4,073	2,487	8,484	5,179	89,890	88,416	10	17
36-37	3,721	2,527	7,752	5,260	103,821	102,426	13	19
38-39	3,827	2,614	7,973	5,440	114,911	113,434	14	20
40-41	3,734	2,715	7,771	5,653	108,953	106,431	14	18
42-43	3,583	2,621	7,457	5,455	100,155	96,426	13	17
44-45	2,983	2,408	6,209	5,015	96,555	92,975	15	18
46-47	2,491	2,195	5,188	4,571	98,153	96,077	18	21
48-49	2,222	2,018	4,627	4,199	99,763	98,804	21	23
50-51	1,886	1,836	3,926	3,826	101,436	99,281	25	25
52-53	1,751	1,600	3,644	3,334	103,119	99,384	28	29
54-55	1,356	1,322	2,822	2,752	99,958	96,207	35	34

	Case (accessed SHS)		Control		NSW Population, 2014		Avg comparison population weight	
56-57	1,102	1,109	2,293	2,309	91,952	89,752	40	38
58-59	890	926	1,852	1,930	84,875	83,881	45	43
60-61	762	795	1,587	1,656	83,373	81,515	52	49
62-63	539	612	1,121	1,276	82,800	79,734	73	62
64-65	418	467	871	973	79,196	76,575	90	78
66-67	335	336	698	700	72,561	72,037	103	102
68-69	255	245	531	510	65,746	66,683	123	130
70-71	214	197	446	411	57,845	56,428	129	137
72-73	150	146	313	304	49,764	45,356	159	149
74-75	108	118	225	246	44,982	39,582	199	160
76-77	90	83	188	173	43,501	39,106	231	226
78-79	120	100	250	207	41,467	37,518	165	181
80-81	258	213	538	443	36,120	29,257	67	66
82-83	130	127	269	265	30,221	19,884	112	75
84+	154	144	322	297	102,267	56,992	317	191
<b>Total</b>	<b>114,274</b>	<b>88,653</b>	<b>238,105</b>	<b>184,829</b>	<b>3,955,786</b>	<b>3,900,980</b>	<b>16</b>	<b>21</b>

## Appendix B Prediction model variables

The following table lists the variables included in prediction model testing. For each service use variable, we created versions reflecting current quarter service use (CQ), service use in the past 1 year (1Y), past three years (3Y) and past five years (5Y). The versions included in the final model (although some terms may be given zero weight in the fit) are indicated by the time period column.

Table B.1 – Full list of variables included in prediction model testing

Category	Variable	Time period
Demographics	Age at service use (2-year band)	CQ
	Country of Birth (Australia or Other)	Fixed
	Aboriginal identified	Fixed
	Sex	Fixed
Education	Education Attainment	Fixed
	Year 9 NAPLAN Score (average reading and numeracy)	Fixed
	NESA indicator (whether the person is in the NSW Education Standards Authority dataset)	Fixed
Time	Quarter of service use	CQ
SHS History	Number of 'at risk' presentations	CQ / 3Y
	Number of SHS presentations	CQ / 1Y / 3Y
	Number of 'homeless' presentations	CQ / 3Y
	Number of 'rough sleeping' presentations	1Y / 3Y
Hospital	Number of emergency department (ED) visits	CQ / 3Y
	Number of emergency department visits with a mental health related ICD code	1Y / 3Y
	Number of emergency department visits with a drug and alcohol related ICD code	1Y / 3Y
	Number of emergency department visits without an ICD code	3Y
	Number of admitted patient days	CQ / 1Y / 3Y
	Number of admitted patient days - Acute services	3Y
	Number of admitted patient days - Emergency Services	3Y
	Number of admitted patient days - Rehabilitation & Extended Care	3Y
	Number of admitted patient days - Mental Health Services	1Y / 3Y
	Whether an admitted patient stay ended	CQ
	Number of admitted patient stays ending	1Y
Legal Aid	Number of Legal Aid services	CQ
	Number of Legal Aid services - Civil Law	3Y
	Number of Legal Aid services - Criminal Law	3Y
	Number of Legal Aid services - Family Law	3Y
	Number of Legal Aid services - Grant aid	3Y
	Number of Legal Aid services - In house advice	3Y
	Number of ambulatory mental health service uses	CQ / 1Y / 3Y

Category	Variable	Time period
Ambulatory Mental Health	Number of ambulatory mental health service uses with psychoactive substance use diagnosis code	1Y / 3Y
Ambulance	Number of ambulance uses	CQ / 3Y
Justice	Number of court finalisations (including youth justice conferences and police cautions)	1Y / 3Y / 5Y
	Number of police cautions	3Y
	Number of youth justice conferences	1Y / 3Y
	Number of days in custody	1Y / 3Y / 5Y
	Number of quarters in which a custody spell finished	CQ / 1Y / 3Y / 5Y
	Whether there were any days in custody	CQ
OOHC	Whether an OOHC placement ended	CQ
	Number of OOHC placements ended	1Y / 3Y
	Number of months in OOHC	CQ / 3Y
Controlled Drugs	Number of quarters in which there was a controlled drugs of addiction spell	CQ / 3Y
Housing	Number of quarters in which PRA was provided	CQ / 3Y
	Number of quarters in which PRS was provided	CQ / 3Y
	Number of quarters in which TA was provided	CQ / 3Y
	Number of social housing exits	CQ / 1Y / 3Y
	Reason for social housing exit (if exiting)	CQ
	Number of months in social housing	CQ / 3Y
Victim Incidents	Number of appearances as victim in police-recorded incidents	CQ
	Number of quarters with an appearance as a victim in police-recorded incidents	1Y / 3Y
	Number of appearances as victim in police-recorded incidents - Domestic violence related	CQ / 3Y
Welfare	Days on DSP	3Y
	Days on Working age income support	CQ / 5Y
	Days on Parenting Payment (single)	5Y
	Days on Rent Assistance	3Y
	Days on Student-related income support	3Y
	Days on any income support	CQ / 1Y / 3Y / 5Y
	Whether an income support spell ended with imprisonment reason	5Y
	Days being a homeowner	CQ / 1Y
	Days of ongoing homelessness	1Y / 5Y
Medicare	Total addiction services	5Y
	Total GP services	1Y / 5Y
	Total hospital services	5Y
	Total mental health services	3Y / 5Y
	Total services	3Y / 5Y

Category	Variable	Time period
PBS	Total addiction scripts	5Y
	Total 'Closing the Gap' scripts	5Y
	Total cardiovascular scripts	5Y
	Total mental health scripts	3Y / 5Y
	Total opioid scripts	5Y
	Total scripts	3Y / 5Y

## Appendix C Other analysis inputs

### C.1 Unit costing summary

We have used unit cost assumptions for service use based on relevant DCJ unit costings and other sources for other sectors. Unit cost assumptions are largely consistent with our previous work on the OOHC leavers' cohort. Cost differences were inflated to 30 June 2020 using an average annual rate of 1.1% based on the Australian Consumer Price Index.

Table C.1 – Summary of unit costs used

Sector	Service type	Unit cost	Unit	Reference/Comment
<b>NSW</b>				
Housing	SHS	\$2,688	Per presentation	RoGS 2018 part G chapter 19 and SHS data
	Social housing	\$577	Per month	DCJ unit costing manual
	PRA	\$939	Per event	Payments data
	PRS	\$649	Per event	Payments data
	TA	\$325	Per event	Payments data
Child protection	OOHC care	Residential: \$3578 Non-residential: \$20,244	Per month	DCJ unit costing manual
Health	Hospital admission	\$5030	Per event (separation)	Independent Pricing Hospital Authority 2016/17 for NSW
	Emergency department	\$660	Per event	Independent Pricing Hospital Authority 2016/17 for NSW
	Ambulance callout	\$395	Per event	RoGS 2018 chapter 11 TABLE 11A.10
	Ambulatory mental health	\$174	Per event	The AIHW, Mental health services in Australia 2017/18
	Controlled drugs of addiction	\$228	Per month	Ritter, A., Chalmers, JJ. (2009)
Justice	Police-recorded victim incidents	\$320	Per event	Estimated
	Legal Aid	\$173 – \$2,842	Per event by service type	Estimated



Sector	Service type	Unit cost	Unit	Reference/Comment
	Courts	Supreme: \$79,797 District: \$13,534 Magistrate's/Local: \$4,651 Children's: \$7,568	Per finalisation	Court costs from RoGS 2018 Part C Chapter7, Prosecution costs from Allard et al, (2014), Police costs from NSW Treasury
	Youth Justice Conference	\$972	Per event	RoGS 2018 Part F chapter 17
	Police warning	\$391	Per event	Allard et al, (2014)
	Custody spell	Adults: \$269 Youth: \$1,394	Per day	RoGS 2018 part C chapter 8
<b>Commonwealth</b>				
Welfare	Income support payments	\$1,400	Per month with at least one day of income support	Payments data
	Supplementary payments	\$375	Per month with at least one day received	Payments data
Health	Medicare	\$56	Per service	Payments data
	PBS	\$40	Per script	Payments data

## C.2 Definitions for Medicare and PBS categorisations

Table C.2 – Medicare items, by MBS group, subgroup and item number included in categorisation of service use

Name	MBS group (and subgroup)	Category	Item codes
Non-referred GP visits	Broad Type of Service (BTOS) hierarchy 0101, 0102, 0103	General Practitioner frequency	All item codes under BTOS
Group Therapy	Group A6		170, 171, 172
Acupuncture and Non-specialist Practitioner items, group therapy	Group A7, Subgroup 4		All item codes
Acupuncture and Non-specialist Practitioner items, mental health care	Group A7, Subgroup 9		All item codes
GP Mental Health Treatment	Group A20		All item codes
Early intervention services for children with Autism, Pervasive Developmental Disorder or Disability	Group A29		All item codes
Mental health and Well-being video Conferencing Circulation	Group A30, Subgroup 3		All item codes
Autism, Pervasive Developmental Disorder And Disability Services	Group M10		82000, 82015
GP Focussed psychological strategies	Group M7	Mental Health	All item codes
Psychological Therapy Services	Group M6		All item codes
Allied Health Services	Group M3		10956, 10968
Relative Value Guide For Anaesthesia, Head (ECT)	Group T10, Subgroup 1		20104
Allied Health Services For Indigenous Australians Who Have Had A Health Check	Group M11		81325, 81355
Consultant Psychiatrist Attendances To Which No Other Item Applies	Group A8		All item codes
GP Management Plans, Team Care Arrangements, Multidisciplinary Care Plans, Case Conferences	Group A15, Subgroup 2		855, 857, 858, 861, 864, 866
Miscellaneous Therapeutic Procedures, Other Therapeutic Procedures (ECT)	Group T1, Subgroup 13		14224

<b>Name</b>	<b>MBS group (and subgroup)</b>	<b>Category</b>	<b>Item codes</b>
Addiction Medicine	Group A31	Addiction	All item codes
Drug detection	Group P2		66623, 66626
Completion of a cycle of care for patients with established diabetes mellitus	Group A18, Subgroup 2	Diabetes	All item codes
Completion of an annual cycle of care for patients with established diabetes mellitus	Group A19, Subgroup 2		All item codes
General Practitioner Attendance Associated With Pip Incentive Payments, Completion Of The Asthma Cycle Of Care	Group A18, Subgroup 3	Asthma	All item codes
Other non-referred Attendance Associated With Pip Incentive Payments, Completion Of The Asthma Cycle Of Care	Group A19, Subgroup 3		All item codes
Acupuncture and Non-Specialist Practitioner Items, Non-Specialist Practitioner attendances associated with Practice Incentive Program payments	Group A7, Subgroup 8		265, 266, 268, 269, 270, 271
Misc. therapeutic procedures, dialysis	Group T1, Subgroup 2	Dialysis	All item codes
Misc. therapeutic procedures, cardiovascular	Group T1, Subgroup 5		All item codes
Misc. therapeutic procedures, procedures associated with intensive care and cardiopulmonary support	Group T1, Subgroup 9	Cardiovascular	All item codes
Miscellaneous Diagnostic Procedures And Investigations, Cardiovascular	Group D1, Subgroup 6		All item codes
GP Management Plans, Team Care Arrangements, Multidisciplinary Care Plans	Group A15, Subgroup 1	Chronic disease management	All item codes
Miscellaneous Diagnostic Procedures And Investigations, Respiratory	Group D1, Subgroup 4	Respiratory	All item codes

Table C.3 – PBS items, by ATC-code included in categorisation of service use

ATC-code	Category	Comment
N05A	Mental illness	Codes from 2019 AIHW Mental Health services in Australia report. Available from: <a href="https://www.aihw.gov.au/reports/mental-health-services/mental-health-services-in-australia-in-brief-2019/contents/table-of-contents">https://www.aihw.gov.au/reports/mental-health-services/mental-health-services-in-australia-in-brief-2019/contents/table-of-contents</a>
N05B		
N05C		
N06A		
R03	Respiratory illness & Tuberculosis	Using item codes from: Using PBS and MBS data to report on the treatment and management of chronic respiratory condition, AIHW 2016-17. Available from: <a href="https://www.aihw.gov.au/reports/chronic-respiratory-conditions/pbs-mbs-data-report-treatment-management-crc-16-17/contents/table-of-contents">https://www.aihw.gov.au/reports/chronic-respiratory-conditions/pbs-mbs-data-report-treatment-management-crc-16-17/contents/table-of-contents</a>
J04A	Respiratory illness & Tuberculosis	Using codes given by WHO Collaborating centre for Drug Statistics Methodology <a href="https://www.whocc.no/">https://www.whocc.no/</a>
A10A	Diabetes	Using codes given by WHO Collaborating centre for Drug Statistics Methodology <a href="https://www.whocc.no/">https://www.whocc.no/</a>
A10B		
A10X		
B01AA	Cardiovascular Disease	Using PBS codes listed in: Medicines for cardiovascular disease, AIHW, 2017 Available from: <a href="https://www.aihw.gov.au/reports/heart-stroke-vascular-diseases/medicines-for-cardiovascular-disease/contents/table-of-contents">https://www.aihw.gov.au/reports/heart-stroke-vascular-diseases/medicines-for-cardiovascular-disease/contents/table-of-contents</a>
B01AC		
C01		
C04A		
C02		
C07		
C08		
C09A		
C09B		
C09C		
C09D		
C10		
N02A	Opioids	As suggested by AIHW
N07B	Addiction	Using codes given by WHO Collaborating centre for Drug Statistics Methodology <a href="https://www.whocc.no/">https://www.whocc.no/</a>
N07BC		
N07BB		
V03A	Kidney disease	Using codes given by WHO Collaborating centre for Drug Statistics Methodology <a href="https://www.whocc.no/">https://www.whocc.no/</a>
M01	Arthritis	Using codes given by WHO Collaborating centre for Drug Statistics Methodology <a href="https://www.whocc.no/">https://www.whocc.no/</a>

Appendix D Additional tables

Table D.1 – Cross table of overlaps in service use within a year. Number per 100,000 people. Average over three years to 2016/17.

	Emergency department	Emergency department - mental	Hospital admission	Hospital discharge	Ambulatory mental health	Ambulance	Controlled drugs	Medicare	Medicare - addiction	Medicare - mental health	PBS	PBS - Addiction	PBS - closing the gap	PBS - mental health	PBS - opioids	Social housing	Private rental assistance	Private rental subsidy	Temporary accomodation	Specialist homelessness services	Child protection	Police recorded victim event	Police recorded victim event - DV	Legal Aid	Courts data	Police caution	Court appearance	Youth Justice Conference	Custody ending	Time on welfare (any)	Income support - student	Income support - carer	Income support - dsp	Income support - jobseeker	Income support - parenting	Age pension	Commonwealth rental assistance	Non-income support welfare payments
Emergency department	16,150	145	7,280	7,240	839	3,450	62	15,470	147	2,250	13,150	323	527	3,490	3,560	736	148	9	189	286	81	1,480	117	449	475	26	452	5	139	5,940	363	274	958	1,320	460	2,220	1,890	1,650
Emergency department - mental health	145	145	89	88	87	83	4	137	9	79	125	13	13	100	36	17	5	0	15	20	2	41	5	25	26	2	25	0	12	98	7	3	37	41	7	10	54	19
Hospital admission	7,280	89	14,760	14,690	644	2,620	46	14,380	136	1,860	12,540	263	305	3,610	4,270	504	75	5	115	172	39	1,020	72	308	269	9	262	2	87	6,240	182	233	857	862	428	3,010	1,550	1,670
Hospital discharge	7,240	88	14,690	14,690	635	2,610	46	14,320	134	1,850	12,490	259	303	3,590	4,250	500	75	5	114	171	39	1,010	71	306	268	8	261	2	87	6,210	181	232	849	855	426	3,000	1,540	1,670
Ambulatory mental health	839	87	644	635	1,350	454	32	1,270	66	716	1,180	76	96	910	298	178	31	2	76	118	24	293	33	204	180	10	171	2	86	873	53	26	352	318	64	96	396	177
Ambulance	3,450	83	2,620	2,610	454	3,930	35	3,790	73	765	3,500	125	165	1,450	1,320	337	48	3	98	133	22	611	58	215	213	11	205	2	81	2,310	72	98	484	420	125	1,110	693	473
Controlled drugs	62	4	46	46	32	35	124	113	57	55	98	10	17	69	32	29	3	0	18	17	0	36	3	40	46	0	46	0	28	104	2	7	45	50	6	0	56	21
Medicare	15,470	137	14,380	14,320	1,270	3,790	113	79,930	361	8,630	60,000	1,060	1,300	12,330	9,880	1,780	303	23	302	537	230	3,680	232	899	918	49	872	9	221	24,040	2,200	1,130	2,840	4,840	1,760	8,040	7,080	7,830
Medicare - addiction	147	9	136	134	66	73	57	361	361	171	313	38	26	188	90	38	6	0	20	26	1	67	7	52	61	1	60	0	26	230	9	11	79	107	20	11	128	58
Medicare - mental health	2,250	79	1,860	1,850	716	765	55	8,630	171	8,630	7,550	300	255	4,500	1,680	350	74	6	107	195	41	811	78	340	300	13	288	2	95	3,930	404	210	815	1,320	409	528	1,690	1,390
PBS	13,150	125	12,540	12,490	1,180	3,500	98	60,000	313	7,550	60,790	1,070	1,310	12,520	10,030	1,510	244	19	243	441	157	3,050	194	745	717	36	685	6	166	21,040	1,590	1,020	2,710	3,960	1,510	7,830	6,150	6,600
PBS - Addiction	323	13	263	259	76	125	10	1,060	38	300	1,070	1,070	76	479	347	72	12	1	15	28	0	120	10	45	41	0	41	0	10	643	18	52	175	199	70	113	303	241
PBS - closing the gap	527	13	305	303	96	165	17	1,300	26	255	1,310	76	1,310	406	343	245	38	2	53	95	36	202	29	82	89	6	85	1	33	760	102	56	175	246	122	99	343	286
PBS - mental health	3,490	100	3,610	3,590	910	1,450	69	12,330	188	4,500	12,520	479	406	12,520	3,800	526	78	6	115	200	20	998	78	350	311	8	304	1	93	6,830	293	351	1,560	1,450	441	2,410	2,320	1,930
PBS - opioids	3,560	36	4,270	4,250	298	1,320	32	9,880	90	1,680	10,030	347	343	3,800	10,030	371	54	4	67	111	4	767	54	200	198	3	195	1	45	5,320	202	275	978	1,000	380	2,170	1,680	1,540
Social housing	736	17	504	500	178	337	29	1,780	38	350	1,510	72	245	526	371	1,970	29	4	74	105	52	345	38	154	140	10	132	2	48	1,260	88	109	386	349	142	262	233	402
Private rental assistance	148	5	75	75	31	48	3	303	6	74	244	12	38	78	54	29	335	7	57	76	6	78	13	36	25	1	24	0	7	177	11	16	33	68	62	5	149	97
Private rental subsidy	9	0	5	5	2	3	0	23	0	6	19	1	2	6	4	4	7	26	2	5	1	7	1	3	1	0	1	0	0	12	1	2	2	3	6	0	11	9
Temporary accomodation	189	15	115	114	76	98	18	302	20	107	243	15	53	115	67	74	57	2	345	162	8	130	21	90	92	2	91	0	53	246	13	11	57	147	41	6	174	70
Specialist homelessness services	286	20	172	171	118	133	17	537	26	195	441	28	95	200	111	105	76	5	162	660	13	192	36	115	100	7	95	2	46	424	37	22	94	217	95	10	295	162
Child protection	81	2	39	39	24	22	0	230	1	41	157	0	36	20	4	52	6	1	8	13	250	34	6	39	11	5	8	1	4	28	17	0	4	10	1	0	5	1
Police recorded victim event	1,480	41	1,020	1,010	293	611	36	3,680	67	811	3,050	120	202	998	767	345	78	7	130	192	34	3,980	248	319	311	18	296	4	89	1,830	147	117	324	606	306	245	808	777
Police recorded victim event - DV	117	5	72	71	33	58	3	232	7	78	194	10	29	78	54	38	13	1	21	36	6	248	248	46	34	3	32	1	9	159	9	13	22	55	56	6	86	97
Legal Aid	449	25	308	306	204	215	40	899	52	340	745	45	82	350	200	154	36	3	90	115	39	319	46	1,010	396	22	379	6	190	733	29	47	161	351	136	45	379	278
Courts data	475	26	269	268	180	213	46	918	61	300	717	41	89	311	198	140	25	1	92	100	11	311	34	396	1,080	58	1,030	10	204	641	35	37	124	394	64	17	312	153
Police caution	26	2	9	8	10	11	0	49	1	13	36	0	6	8	3	10	1	0	2	7	5	18	3	22	58	58	9	3	3	14	8	0	1	8	0	0	3	0
Court appearance	452	25	262	261	171	205	46	872	60	288	685	41	85	304	195	132	24	1	91	95	8	296	32	379	1,030	9	1,030	5	204	629	28	37	124	388	64	17	309	152
Youth Justice Conference	5	0	2	2	2	2	0	9	0	2	6	0	1	1	1	2	0	0	0	2	1	4	1	6	10	3	5	10	2	3	2	0	0	2	0	0	1	0
Custody ending	139	12	87	87	86	81	28	221	26	95	166	10	33	93	45	48	7	0	53	46	4	89	9	190	204	3	204	2	269	218	5	9	44	161	10	1	109	27
Time on welfare (any)	5,940	98	6,240	6,210	873	2,310	104	24,040	230	3,930	21,040	643	760	6,830	5,320	1,260	177	12	246	424	28	1,830	159	733	641	14	629	3	218	25,500	2,460	1,200	3,000	5,380	1,850	8,200	7,580	8,260
Income support - student	363	7	182	181	53	72	2	2,200	9	404	1,590	18	102	293	202	88	11	1	13	37	17	147	9	29	35	8	28	2	5	2,460	2,460	10	4	533	25	2	913	92
Income support - carer	274	3	233	232	26	98	7	1,130	11	210	1,020	52	56	351	275	109	16	2	11	22	0	117	13	47	37	0	37	0	9	1,200	10	1,200	7	137	36	31	399	1,140
Income support - dsp	958	37	857	849	352	484	45	2,840	79	815	2,710	175	175	1,560	978	386	33	2	57	94	4	324	22	161	124	1	124	0	44	3,000	4	7	3,000	71	4	113	1,160	364
Income support - jobseeker	1,320	41	862	855	318	420	50	4,840	107	1,320	3,960	199	246	1,450	1,000	349	68	3	147	217	10	606	55	351	394	8	388	2	161	5,380	533	137	71	5,380	241	80	2,430	1,040
Income support - parenting	460	7	428	426	64	125	6	1,760	20	409	1,510	70	122	441	380	142	62																					

Table D.2 – Cross table of overlaps in service use within a quarter. Number per 100,000 people. Average over three years to 2016/17.

	Emergency department	Emergency department - mental health	Hospital admission	Hospital discharge	Ambulatory mental health	Ambulance	Controlled drugs	Medicare	Medicare - addiction	Medicare - mental health	PBS	PBS - Addiction	PBS - closing the gap	PBS - mental health	PBS - opioids	Social housing	Private rental assistance	Private rental subsidy	Temporary accomodation	Specialist homelessness services	Child protection	Police recorded victim event	Police recorded victim event - DV	Legal Aid	Courts data	Police caution	Court appearance	Youth Justice Conference	Custody ending	Time on welfare (any)	Income support - student	Income support - carer	Income support - dsp	Income support - jobseeker	Income support - parenting	Age pension	Commonwealth rental assistance	Non-income support welfare payments	
Emergency department	5,190	42	1,890	1,840	236	992	21	4,460	29	401	3,470	46	144	908	816	253	16	1	31	44	26	228	17	71	60	3	57	1	22	1,910	82	80	355	367	137	730	570	508	
Emergency department - mental health	42	42	22	21	23	21	1	35	1	16	31	2	3	25	5	5	0	0	2	3	1	6	1	4	3	0	3	0	2	27	1	1	12	10	2	2	13	5	
Hospital admission	1,890	22	4,820	4,720	188	700	15	4,470	28	343	3,680	42	83	995	1,100	173	7	0	17	25	11	129	8	50	32	1	31	0	14	2,080	37	67	328	234	110	1,080	470	503	
Hospital discharge	1,840	21	4,720	4,720	178	677	14	4,390	27	333	3,620	41	80	969	1,080	167	7	0	16	24	11	126	8	48	30	1	30	0	13	2,020	37	67	313	228	108	1,050	455	495	
Ambulatory mental health	236	23	188	178	679	116	15	558	17	217	518	16	35	423	72	97	4	0	15	24	11	58	5	52	34	2	32	0	18	438	16	10	217	123	23	46	170	74	
Ambulance	992	21	700	677	116	1,190	10	1,060	13	133	942	18	44	371	291	107	5	0	14	19	6	104	9	35	26	1	25	0	12	719	14	26	168	111	32	350	193	130	
Controlled drugs	21	1	15	14	15	10	99	78	31	26	58	3	9	41	11	22	1	0	5	4	0	10	1	14	13	0	13	0	8	78	1	5	36	32	4	0	36	15	
Medicare	4,460	35	4,470	4,390	558	1,060	78	56,980	147	3,950	36,460	347	760	7,860	3,990	1,290	60	5	69	126	145	850	48	233	187	9	178	1	49	18,030	1,060	838	2,370	2,730	1,180	7,140	4,780	5,740	
Medicare - addiction	29	1	28	27	17	13	31	147	147	53	103	8	9	65	18	20	1	0	3	4	0	11	1	10	9	0	9	0	4	101	2	5	42	42	6	3	50	23	
Medicare - mental health	401	16	343	333	217	133	26	3,950	53	3,950	2,930	62	84	1,920	371	158	9	1	17	32	17	132	12	65	46	2	44	0	15	1,730	128	84	440	512	150	218	680	588	
PBS	3,470	31	3,680	3,620	518	942	58	36,460	103	2,930	40,420	361	820	8,650	4,190	1,030	41	3	48	90	85	638	35	172	130	5	124	1	32	15,560	641	733	2,320	2,100	850	7,130	3,980	4,360	
PBS - Addiction	46	2	42	41	16	18	3	347	8	62	361	361	25	138	68	23	1	0	2	3	0	12	1	6	4	0	4	0	1	214	4	16	65	55	19	39	93	76	
PBS - closing the gap	144	3	83	80	35	44	9	760	9	84	820	25	820	254	154	142	6	0	10	18	17	50	5	19	17	1	16	0	6	499	39	35	137	126	64	86	208	182	
PBS - mental health	908	25	995	969	423	371	41	7,860	65	1,920	8,650	138	254	8,650	1,580	367	14	1	25	44	13	219	15	84	61	1	59	0	19	4,750	124	223	1,250	775	240	1,740	1,450	1,260	
PBS - opioids	816	5	1,100	1,080	72	291	11	3,990	18	371	4,190	68	154	1,580	4,190	178	6	0	10	16	1	112	7	29	23	0	23	0	6	2,450	44	114	568	328	122	1,120	701	602	
Social housing	253	5	173	167	97	107	22	1,290	20	158	1,030	23	142	367	178	1,840	5	1	17	26	41	116	9	53	41	3	39	1	14	1,130	57	94	351	269	117	238	134	353	
Private rental assistance	16	0	7	7	4	5	1	60	1	9	41	1	6	14	6	5	88	1	10	12	1	8	1	4	2	0	2	0	1	46	2	4	9	15	16	1	37	25	
Private rental subsidy	1	0	0	0	0	0	0	5	0	1	3	0	0	1	0	1	1	7	0	1	0	1	0	0	0	0	0	0	0	3	0	0	0	1	2	0	3	2	
Temporary accomodation	31	2	17	16	15	14	5	69	3	17	48	2	10	25	10	17	10	0	105	37	1	21	3	14	12	0	11	0	9	74	2	3	18	42	10	2	44	18	
Specialist homelessness services	44	3	25	24	24	19	4	126	4	32	90	3	18	44	16	26	12	1	37	196	3	30	5	18	12	1	11	0	7	127	8	5	29	60	25	3	77	45	
Child protection	26	1	11	11	11	6	0	145	0	17	85	0	17	13	1	41	1	0	1	3	221	10	1	12	4	1	3	0	2	18	11	0	2	5	0	0	2	1	
Police recorded victim event	228	6	129	126	58	104	10	850	11	132	638	12	50	219	112	116	8	1	21	30	10	1,200	66	51	38	2	36	0	12	543	30	34	106	158	99	64	223	244	
Police recorded victim event - domestic violence	17	1	8	8	5	9	1	48	1	12	35	1	5	15	7	9	1	0	3	5	1	66	66	6	3	0	3	0	1	41	2	3	6	12	14	2	19	25	
Legal Aid	71	4	50	48	52	35	14	233	10	65	172	6	19	84	29	53	4	0	14	18	12	51	6	352	88	4	84	1	46	240	6	13	59	106	38	14	106	82	
Courts data	60	3	32	30	34	26	13	187	9	46	130	4	17	61	23	41	2	0	12	12	4	38	3	88	328	16	312	3	37	177	7	9	38	102	15	4	71	39	
Police caution	3	0	1	1	2	1	0	9	0	2	5	0	1	1	0	3	0	0	0	1	1	2	0	4	16	16	1	0	0	3	1	0	0	1	0	0	0	0	0
Court appearance	57	3	31	30	32	25	13	178	9	44	124	4	16	59	23	39	2	0	11	11	3	36	3	84	312	1	312	1	37	175	5	9	38	101	15	4	71	39	
Youth Justice Conference	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	3	0	1	3	0	1	0	0	0	0	0	0	0	0	0
Custody ending	22	2	14	13	18	12	8	49	4	15	32	1	6	19	6	14	1	0	9	7	2	12	1	46	37	0	37	0	86	66	1	2	14	48	2	0	25	6	
Time on welfare (any)	1,910	27	2,080	2,020	438	719	78	18,030	101	1,730	15,560	214	499	4,750	2,450	1,130	46	3	74	127	18	543	41	240	177	3	175	1	66	23,130	1,760	1,080	2,890	4,020	1,600	7,880	6,320	7,780	
Income support - student	82	1	37	37	16	14	1	1,060	2	128	641	4	39	124	44	57	2	0	2	8	11	30	2	6	7	1	5	0	1	1,760	1,760	2	1	137	6	1	592	48	
Income support - carer	80	1	67	67	10	26	5	838	5	84	733	16	35	223	114	94	4	0	3	5	0	34	3	13	9	0	9	0	2	1,080	2	1,080	2	34	9	8	330	1,030	
Income support - dsp	355	12	328	313	217	168	36	2,370	42	440	2,320	65	137	1,250	568	351	9	0	18	29	2	106	6	59	38	0	38	0	14	2,890	1	2	2,890	18	1	29	1,040	321	
Income support - jobseeker	367	10	234	228	123	111	32	2,730	42	512	2,100	55	126	775	328	269	15	1	42	60	5	158	12	106	102	1	101	0	48	4,020	137	34	18	4,020	58	19	1,590	698	
Income support - parenting	137	2	110	108	23	32	4	1,180	6	150	850	19	64	240	122	117	16	2	10	25	0	99	14	38	15	0	15	0	2	1,600	6	9	1	58	1,600	0	927	1,520	
Age pension	730	2	1,080	1,050	46	350	0	7,140	3	218	7,130	39	86	1,740	1,120	238	1	0	2	3	0	64	2	14	4	0	4	0	0	7,880	1	8	29	19	0	7,880	1,090	390	
Commonwealth rental assistance	570	13	470	455	170	193	36	4,780	50	680	3,980	93	208	1,450	701	134																							

## Appendix E Brief description of machine learning algorithms used

### E.1 Decision trees

Many of our segmentations, for example Table 41, are initially developed using decision tree models. These recursively ‘split’ the dataset into subgroups, using one of the predictor variables at a time, in order to create groups that maximally separate high and low risk. The resulting model is readily interpretable in that a series of rules (e.g. ‘males with no court appearances’) can be defined to split the population into statistically meaningful datasets.

### E.2 Gradient boosting machine with decision trees

Our prediction models in Section 4 (Predictive modelling) use boosted decision tree models. The model is initiated by a single decision tree, which is given partial weight. The model residuals are then calculated and another decision tree can be fit to the residuals. This second tree is given partial weight and the running predictions updated to allow for the second tree. This process of calculating residuals, fitting trees to the residuals, and updating the running residual is then done hundreds of times. The performance of the model is monitored on a validation dataset and a stopping rule used (generally when the model no longer improves the validation prediction error).

Gradient boosting has the advantages of being fast, flexible and accurate, while being less interpretable than other forms of model such as regression-based approaches.

The prediction models were fit using 70% of the data as training data, and then results shown are based on predictions using the remaining 30% validation sample.

Further details on the approaches above can be found in many standard statistics and machine learning references. For example, see Chapter 10 of *The Elements of Statistical Learning* by Hastie, Tibshirani and Friedman.



