

# CRIME AND JUSTICE BULLETIN

NUMBER 273 | APRIL 2026

## An outcome evaluation of the NSW Youth Action Meetings pilot program

Stewart Boiteux

### AIM

To examine whether participation in the Youth Action Meetings (YAMs) pilot program was associated with changes in multiagency service responses and criminal justice outcomes within a year of referral.

### METHOD

The YAMs pilot program was a police-led, multiagency initiative operating between 2020 and 2021 to coordinate services for 10-17 year olds with complex safety, welfare and wellbeing needs who were at risk of offending, escalating offending, or victimisation. Program participant data were linked with a large administrative dataset, enabling analysis across criminal justice, health, child protection, education and social housing service systems. A statistical matching approach was utilised to compare 143 YAMs participants with 622 similar young people who lived in areas where the program was not available. Cox proportional hazards regression survival analysis was used to estimate the association between program participation and several program targeted outputs within a year of program referral. These included: 1) child protection risk of significant harm (RoSH) reports; 2) police-recorded missing person reports; 3) school enrolment; and 4) mental health outpatient service usage. We further examine the influence of the program on two criminal justice outcomes: 1) proven offending; and 2) police-recorded crime victimisation.

### RESULTS

Within a year of referral, YAMs participants were significantly more likely to have a RoSH report (Hazard Ratio=1.37) or a missing person report (Hazard Ratio=1.95) recorded. These associations likely represent increased rates of detection and response, rather than altered service need amongst those on the program. Differences were also pilot site-specific, with higher prevalence of RoSH and missing person reports in the Campbelltown City Police Area Command which operated with greater implementation fidelity. No significant associations were observed for school enrolment, mental health outpatient service usage, proven offending or crime victimisation. Although the study assessed many factors related to the YAMs pilot program, it is unable to exclude the possibility that unobserved factors related to program participation may be influencing the results.

### CONCLUSION

Participation in the YAMs program was not significantly associated with changes in proven criminal offences or police-recorded crime victimisation. In the pilot site with higher implementation fidelity, YAMs participation was associated with significant changes in multiagency service responses.

#### KEYWORDS

Children, juveniles and young people

Policing

Multiagency

Human services

Evaluation reports

Recidivism

## INTRODUCTION

For the past two decades, New South Wales (NSW) has experienced a significant decline in crime rates, largely driven by reductions in youth offending (Fitzgerald, 2023; Trimboli, 2019). However, although fewer young people are entering the criminal justice system each year, those who do are exhibiting more persistent and diverse patterns of offending prior to adulthood (McCarthy, 2020; Payne et al., 2018).

This evolving trend has prompted concern among policymakers and researchers regarding the underlying drivers of youth offending. A consistent theme emerging from inquiries and empirical studies is the high prevalence of complex needs among young offenders (Clancey et al., 2020; Tune, 2016). For example, a systematic review of 124 studies across 13 countries (including 10 Australian studies) found that 87% of young offenders had experienced a traumatic event, and that they were over 12 times more likely to have experienced abuse, neglect, or household dysfunction than their non-offending peers (Malvaso et al., 2021). Consistent with this, the NSW Young People in Custody Health Survey reported high rates of psychological disorders (83%), substance use (58%), intellectual disability (17%), prior maltreatment (68%), school truancy (68%), suspension (94%), and physical violence (67%) among incarcerated youth (Justice Health & Forensic Mental Health Network and Juvenile Justice NSW, 2017).

Although research has established a clear link between complex needs and youth offending, few strategies are known to effectively mediate this. A common problem with programs aiming to address the complex needs of young offenders is that they target young people primarily based on their static or unchangeable factors, rather than dynamic or modifiable ones. While static factors are useful for predicting offending risk, they cannot be changed through intervention (Andrews et al., 2006). Such programs have also been criticised for overlooking the interrelated complexity of youth justice cohorts through narrow program targeting and outcome measurement (Baldry et al., 2018). This is a concern, as inappropriately designed and targeted programs may worsen outcomes, unnecessarily exclude people in need of support, reinforce negative experiences, and fail to engage young people effectively (DeMatteo & Marczyk, 2005; Richards, 2011).

Acknowledging these risks and broader trends, many have called for more effective strategies to reduce criminal justice system contact among young people with complex needs in NSW (Clancey et al., 2020; Dowse et al., 2014; Tune, 2016). One common approach is to develop a targeted and coordinated multiagency initiative to consolidate otherwise siloed mainstream service responses (Baldry et al., 2018). In line with this model, the Youth Action Meetings (YAMs) pilot program was developed to identify and coordinate services for young people with complex needs in NSW. Led by the NSW Police Force, the program convenes monthly forums with government and non-government stakeholders to develop tailored case plans aimed at improving wellbeing, reducing offending, and preventing victimisation.

### **Coordinated multiagency initiatives for young people with complex needs**

Coordinated multiagency initiatives, often referred to as “wraparound services”, are a common approach to support young people with complex needs. For example, in the United States (US), it is estimated that coordinated multiagency initiatives serve as many as 100,000 young people with complex needs each year with services available in all US States (Bruns et al., 2011; Sather & Bruns, 2016). Despite the ubiquity of these initiatives, substantial variation in program design, implementation fidelity, and intention has meant that evidence of their effectiveness is difficult to generalise between programs (Olson et al., 2021; Schurer Coldiron et al., 2017). This is further complicated where initiatives respond to localised community concerns or are shaped by the unique needs and characteristics of the populations they serve, as this variation may also arise between program sites (Meyer & Mazerolle, 2014). Acknowledging these challenges, several large reviews have examined the effectiveness of coordinated multiagency initiatives, consistently finding that they have a small but positive influence for young people with complex needs.

Perhaps the largest review comes from Schurer Coldiron et al. (2017), who conducted a narrative review of 206 peer reviewed papers published between 1990 and 2014. Of these publications, around 10% utilised a control group to empirically examine program outcomes (n=20) using either a quasi-experimental (n=13) or experimental design (n=7). Most studies demonstrated results in favour of coordinated multiagency initiatives. Where investigated, participants were commonly found to have improved school engagement, reduced frequency of running away from home, and to use more community services. Outcomes were less clear when considering arrests, reoffending, and placement in foster care, where studies found mixed results. While publications included in the review demonstrated quasi-experimental methodological approaches, authors noted significant issues with small unrepresentative samples and concerns relating to program implementation fidelity.

Leveraging more recent research on coordinated multiagency initiatives, Olson et al. (2021) were able to overcome some of these concerns in their systematic review and meta-analysis of 17 empirical studies.<sup>1</sup> All the studies included in their review utilised a quasi-experimental (n=10) or experimental approach (n=7) and examined at least one commonly addressed outcome including mental health symptoms, mental health functioning, youth justice, school functioning, residential outcomes, and costs. Meta-analytic pooled results from these studies mirrored the narrative findings of Schurer Coldiron et al. (2017). The coordinated multiagency initiatives examined were found to significantly improve housing outcomes ( $g=0.41, p=.001$ )<sup>2</sup> and school functioning ( $g=0.40, p=.007$ ). Smaller beneficial but significant effects were also observed for mental health symptoms ( $g=0.36, p=.033$ ) and functioning ( $g=0.32, p=.007$ ). Results for youth justice outcomes were mixed, leading authors to conclude that programs had an overall positive though non-significant effect ( $g=0.13, p=.347$ ). Although pooled results indicated that coordinated multiagency initiatives significantly reduced the overall cost of service provision for young people ( $g=0.39, p=.001$ ), the authors noted that this result was largely driven by the results of a single study. Similar to Schurer Coldiron et al. (2017), Olson et al. (2021) highlight concerns regarding the limited information about program implementation fidelity and treatment intensity provided across studies. Of the studies where this information was available, those with higher fidelity demonstrated more positive outcomes ( $g=0.29, p=.110$ , vs.  $g=0.13, p=.392$ ), though this difference was not statistically significant, likely due to the small sample of studies included.

A significant limitation of Olson et al. (2021) is that it does not consider the influence of coordinated multiagency initiatives on child protection reporting or outcomes experienced by young people. This is problematic, as young people in need of coordinated multiagency support often experience substantial involvement with the child protection system. Although published prior to Olson et al. (2021), Herbert and Bromfield (2017) offer relevant insight in their systematic review and qualitative synthesis of 63 studies which considered whether coordinated multiagency initiatives (specifically “multidisciplinary teams”) improve responses to physical and sexual child abuse. Of these publications, 16 were found to utilise a robust methodology, with six using an experimental approach and a further 10 making comparison to a non-treatment reference group. Similar to the findings reported by Olson et al. (2021), young people participating in coordinated multiagency initiatives consistently demonstrated increased engagement with mental health services (including school-based, inpatient, and outpatient services). Herbert and Bromfield (2017) also noted that participants experienced a heightened child protection response, demonstrated through improved reporting of child protection matters to police and increased substantiation of current and prior abuse. While higher rates of criminal proceedings against perpetrators of abuse were also noted, these results were mixed, with newer studies less likely to show statistically significant results. Authors posited that this difference may be explained by contemporary improvements to standard child protection responses, which in most jurisdictions now facilitate collaboration with police as a standard practice. This is an important consideration, as the efficacy of coordinated multiagency initiatives may be questionable if their practices do not meaningfully exceed the level of coordination already embedded in mainstream service provision (Schurer Coldiron et al., 2017).

<sup>1</sup> Overlap in study inclusion with Schurer Coldiron et al. (2017) was low, with only eight studies included in both reviews.

<sup>2</sup>  $g$  – Hedges’  $g$ , representing the difference between two group means in units of the pooled standard deviation.  $p$  – the  $p$ -value associated with each reported statistic.

Although generally positive about the influence that coordinated multiagency initiatives have on young people with complex needs, all three systematic reviews noted the importance of program design, implementation fidelity, and intention when considering program efficacy. Recognising this, it is beneficial to consider a functionally similar program to YAMs, the NSW Safety Action Meetings (SAMs) program. Similar to YAMs, SAMs are cross-government initiative chaired by the NSW Police Force, and the two programs have functionally similar program models. Unlike YAMs, SAMs instead focus on addressing the often multifaceted needs of victims of domestic violence (DV) to enhance victim safety. Examining the effectiveness of this program, Trimboli (2017) conducted structured telephone interviews with two groups of female victims of DV who were assessed as being at serious threat of future harm or violence. This included 69 women living in areas where SAMs were available and 61 women living in areas where SAMs were not part of the service system response. Although both groups experienced a reduction in DV behaviours over time, victims residing in areas where SAMs were available did not experience any greater benefit compared with those who received the conventional response. However, as is common with coordinated multiagency initiatives (Olson et al., 2021), the efficacy of the SAMs program may have been affected by differences in implementation fidelity between program sites.<sup>3</sup> Examining this directly, Wan et al. (2018) analysed differences between the nine policing regions in which the program operated. Five were found to have experienced no changes in aggregate rates of DV offending, and four demonstrated a small reduction in DV offending. Discussing possible reasons for these differences, Wan et al. (2018) noted governance at the local level varied across SAMs sites, as did the extent to which different agencies engaged with the process. While it is unclear whether the experiences of SAMs are relatable to the cohort of young people with complex needs targeted by YAMs, it is likely that differences in implementation fidelity, service availability, and participant needs may similarly impact the effectiveness of the program between sites.

## The Youth Action Meetings (YAMs) pilot program

The YAMs pilot program was one of several diversionary initiatives developed by the NSW Police Force as part of their Youth Strategy (NSW Police Force, 2019). The pilot program was one of 14 pilot initiatives funded under the “Their Futures Matter” reforms in NSW. Pilot initiatives were intended to improve the rate, quality and appropriateness of NSW Government responses to children and young people and their families, including through connecting them with services and supports across multiple NSW Government agencies.<sup>4</sup> In line with this, the YAMs pilot program aimed to identify and address the multifaceted and often-complex needs of young people aged between 10-17 who are at high risk of offending, crime victimisation, and/or child protection contact.

The YAMs pilot program commenced in two sites in early 2020: the Campbelltown City Police Area Command (PAC); and the Coffs/Clarence Police District (PD). Sites were selected for their high pre-existing rates of multisystemic needs in the youth population. Specifically, both sites demonstrated some of the highest rates of recorded offending and crime victimisation amongst young people in NSW, and a large number of escalated child-at-risk incidents.<sup>5</sup> Figure 1 shows the total number of YAMs pilot program participants referred each month, and the site in which the pilot program took place. Subject to capacity constraints, sites were encouraged to meet referral targets of approximately ten new YAMs participants monthly during the pilot. In the initial stages of the pilot program between February and May 2020, only the Campbelltown City PAC pilot site was in operation. Onboarding program participants was somewhat slow during this period, with around 1-2 new participants referred each month. From June 2020, the Coffs/Clarence PD pilot site came into operation, and the number of program participants referred each month more closely reflected referral targets.<sup>6</sup> In total, the number of program participants referred

<sup>3</sup> It is also likely that the estimates in Trimboli (2017) were relatively underpowered to detect a statistical difference due to small sample size (n=130).

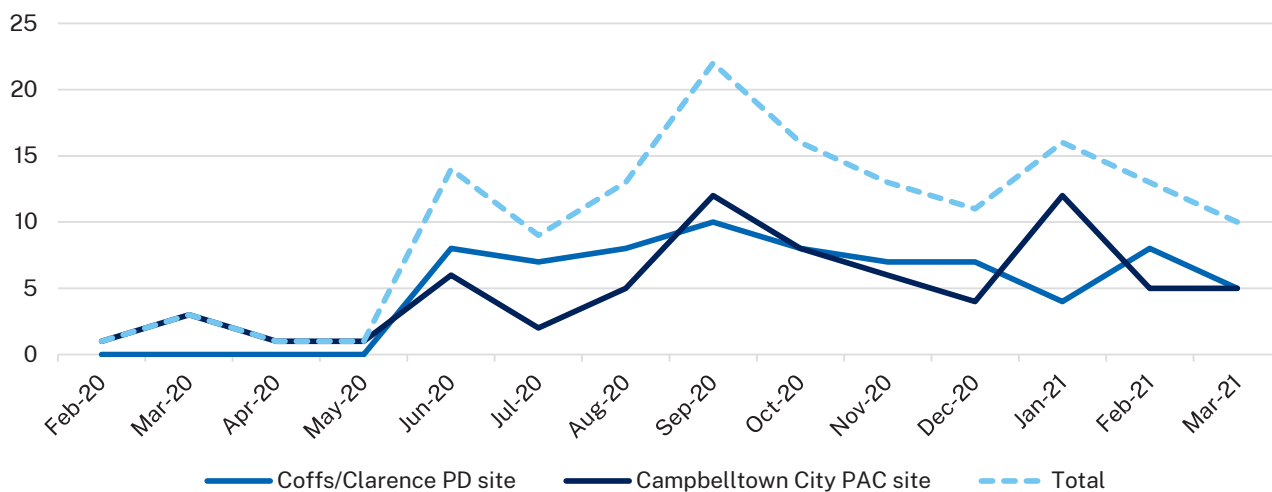
<sup>4</sup> For more information on these reforms and pilot programs, see (Australian Institute of Health and Welfare [AIHW], 2024).

<sup>5</sup> These include child protection reporting where a young person was identified as being at either “imminent risk of significant harm” or at a “risk of significant harm” (RoSH).

<sup>6</sup> Although pilot program data included information on referral dates for those placed on the program, data limitations meant that we were unable to observe total referrals or the number of participants concurrently assisted by the program.

each month ranged from nine to 22. Between February 2020 and March 2021, 143 young people had participated in the YAMs pilot program, with a similar number of participants in the Campbelltown City PAC (n=71) and Coffs/Clarence PD (n=72).

**Figure 1. Number of young people placed on Youth Action Meetings program, by month of referral and site**



Employing a collaborative approach, the YAMs pilot program brought together representatives from multiple government and non-governmental agencies at a police-led monthly forum. Forum meetings lasted between two to three hours, and would include regular attendees from the NSW Police Force, NSW Department of Education, NSW Health, and NSW Department of Communities and Justice (DCJ), along with relevant non-governmental agencies.

Meetings were chaired and led by a senior member of the NSW Police Force, but were primarily organised and facilitated by a dedicated civilian employee of the NSW Police Force known as a YAMs Coordinator. In the pilot program, both program sites were intended to have a consistent and dedicated YAMs Coordinator. In practice, although this was possible in the Campbelltown City PAC site, the YAMs Coordinator position in the Coffs/Clarence PD site had higher rates of staff turnover. During the pilot, this position was filled by three different people and remained vacant for a total of 17 weeks. While the YAMs pilot program model did not recommend or require consistency in the meeting chair, this role was fulfilled quite differently between sites. In the Campbelltown City PAC site, meetings were consistently chaired by the same Detective Chief Inspector, while in the Coffs/Clarence site the chairing position was held by five different senior police officers.

Both the NSW Police Force and external agencies could refer young people to the program if they:

1. were 10-17 years of age;
2. resided in a YAMs pilot program location (Campbelltown City PAC or Coffs/Clarence PD);
3. were at risk of offending or victimisation; and
4. had multiple risk factors related to safety, welfare or wellbeing.<sup>7</sup>

In line with these eligibility criteria, YAMs referrals could include detailed information about a young person's demographics, socio-economic background, health, school involvement, and/or history of victimisation and offending. YAMs Coordinators regularly reviewed referrals to identify service needs and

<sup>7</sup> Risk factors were reflective of complex and multiagency needs. Some noted examples of risk factors include aggressive behaviour, mental health needs, disabilities, alcohol or drug concerns, criminal justice involvement as a victim or offender, school engagement and absenteeism, and/or missing person reports.

criminogenic concerns, prioritising those with greatest need for placement on the YAMs agenda. While YAMs Coordinators were responsible for documenting and processing referrals, placement decisions were made collaboratively with YAMs-involved members of the NSW Police Force (i.e., the YAMs Chair, Youth Officers, Aboriginal Community Liaison Officers, other YAMs Coordinators).

Before each meeting, YAMs Coordinators securely circulated an agenda to partner agencies. Following this, either the local YAMs Coordinator, an appropriate police officer, or a relevant agency attempted to contact each referred young person and their family to inform them of the YAMs process and to gather additional information. In practice, this contact was often unsuccessful. Early evidence from the pilot program suggested that between February 2020 and October 2020, only 29% of YAMs participants were contacted, with higher rates of contact in the Campbelltown City PAC site (34%) than in the Coffs/Clarence PD site (25%).

Prior to each meeting, YAMs partner agencies searched their internal databases for relevant information about each young person on the agenda and their risks that may be shared between agencies at the meeting. Information sharing in the YAMs pilot program was governed by Chapter 16A of the *Children and Young Persons (Care and Protection) Act 1998* (NSW). This legislation allows for prescribed organisations<sup>8</sup> to share information that promotes the safety, welfare or wellbeing of children and young persons. In line with this, information shared during meetings was for the purposes of identifying risks to safety, welfare or wellbeing, and could not be exchanged or used as evidence in a civil or criminal matter. To remind agencies of their information sharing responsibilities, YAMs Coordinators required the signing of a confidentiality agreement and the disclosure of any conflicts of interest at the beginning of each meeting. While the program emphasises the importance of confidentiality when sharing information about young people during meetings, and sought to consult and gain consent from young people for their participation in the YAMs process, direct consent was not a mandatory requirement for participation in the pilot program.

During each meeting, a discussion was facilitated by the YAMs Coordinator or meeting chair, where representatives from partner agencies shared information to help inform a holistic understanding of each young person's needs and/or strengths. Partner agencies then collaborated to develop tailored action plans, with distinct actions to be delivered by each agency.<sup>9</sup> To ensure actions could be committed to and swiftly implemented, agency representatives had to hold a senior role with decision-making authority. Following each meeting, the YAMs Coordinator would attempt to contact each young person and their family to inform them of agreed actions and any support available to them. Actions were reviewed at subsequent meetings every three months.

When agencies agreed that all actions had been implemented, or when young people had received necessary support and no further action was thought to be required, YAMs participants were removed from the meeting agenda. Removal from the agenda also occurred if a young person repeatedly failed to engage with risk reduction actions, their circumstances changed and they were no longer at risk, or they relocated outside the area.

The YAMs pilot program model represented a significant shift in the way the NSW Police Force engages young people with complex needs. While police are routinely called upon to de-escalate behavioural health crises, respond to homelessness, and act on disciplinary concerns in out-of-home care (OOHC) or schools, conventional policing practices are not designed to address these issues effectively. In many cases, police intervention may inadvertently contribute to the criminalisation of young people whose behaviours stem from unmet health and social needs (Dowse et al., 2021). By facilitating early coordinated

---

8 Government agencies involved in YAMs pilot program were prescribed bodies. Non-governmental agencies needed to be a prescribed body including any other body or class of bodies prescribed by the regulations. The Care Regulation prescribes: "any other organisation the duties of which include direct responsibility for, or direct supervision of, the provision of health care, welfare, education, children's services, residential services, or law enforcement, wholly or partly to children".

9 Actions are tailored to a young person's needs rather than being drawn from a standard list. Some examples of actions include: police to notify the school of the young person's bail conditions; conduct a family group conference to encourage a return to the family home; conduct a school enrolment meeting; explore alternative education placement options; refer the young person to fitness programs; explore alternative foster care arrangements.

engagement with multiagency support services, the YAMs pilot program model enabled police to act as a service coordinator rather than focusing on enforcement. A primary facilitator of this was the program model's safeguards which prevent the use of information collected through YAMs for prosecutorial purposes, reducing the risk of criminalisation. Recognising the benefits of this form of coordinated, therapeutic and preventative approach to community safety, the YAMs pilot program model broadly aligns with recommendation 6 of the review of the operation of *doli incapax* in NSW for children under 14 which advocates for an alternative intervention pathway for at-risk children (Bellew & Loy, 2025).

## The current study

While international evidence suggests that coordinated multiagency initiatives can be an efficacious approach to improve outcomes for young people with complex needs, the success of these initiatives is known to be highly context dependent. The current study contributes to this literature by undertaking the first outcome evaluation of the YAMs program model in NSW. In this bulletin, we examined whether participation in the YAMs pilot program was associated with changes in multiagency service responses (RoSH reports, school enrolment, mental health service use, and missing person reports) and/or criminal justice outcomes (offending and victimisation) within a year of referral.

---

# METHOD

## Data

This study draws on two primary sources of data:

- 1. YAMs pilot program participation data:** An extract drawn from the NSW Police Force YAMs pilot program database, documenting YAMs program participation in Campbelltown City PAC and Coffs/Clarence PD sites between February 2020 and March 2021. The extract provides date of referral, the YAMs pilot site in which meetings occurred, and the agency responsible for program referral. It also contains sociodemographic characteristics of participants, including their age, gender, and Aboriginality.
- 2. The Department of Communities and Justice Human Services Dataset (HSDS):** The HSDS is a large linked administrative dataset administered by the NSW DCJ. The dataset brings together over 30 years of data from more than 100 administrative databases, 60 frontline services and 11 NSW Government agencies. It includes unit record information regarding health; education; child protection; police and justice system interaction; public housing; homelessness; and births, deaths and marriages. Data were available for all individuals in NSW born on or after 01 January 1990, and includes data from their families, guardians, and carers.<sup>10</sup>

Program data were linked with the HSDS by NSW Health's Centre for Health Record Linkage, using a combination of probabilistic matching, direct matching on source system linkage keys, and clerical reviews to validate the linkage. Linkage was very successful, with 100% of program participants linked to the HSDS. The final sample was comprised of three groups. The first group, hereafter referred to as "YAMs participants", contained all young people referred to and placed on a YAMs pilot program agenda between February 2020 and March 2021 (N = 143). The second group, hereafter referred to as the "population group", contained records for all people aged 10-18 who had at least one recorded HSDS service contact with a YAMs partner agency between February 2020 and March 2021 (N = 1,332,426). From this group, we further excluded those who died within a year of index service contact and those missing information on demographic characteristics. In an attempt to avoid introducing statistical bias

---

<sup>10</sup> Interested readers are directed to DCJ (2025) for more information. The HSDS is regularly updated with new information. For this study, we make use of a HSDS version containing service contact records until June 2022.

into our estimations, we also applied several location-based exclusion criteria to the comparison group. Specifically, we excluded those living in Coffs/Clarence PD or the Campbelltown City PAC, those living in sites where a competing program Youth On Track<sup>11</sup> was operating, and those living in southwest Sydney postcodes impacted by more stringent COVID-19 related lockdowns in the study period. After applying these exclusions, the population group contained 549,876 records of young people in contact with YAMs partner agencies.

While the population group contains young people who could have been referred to YAMs if they demonstrated multiagency needs in line with the YAMs pilot program eligibility criteria, the majority of young people in the population group were not observably comparable to the YAMs participants and would not meet this eligibility threshold. To overcome this issue, we pruned the population group to a more observably similar and likely eligible subset of young people from the population group, hereafter referred to as the “comparison group” (N=622).<sup>12</sup> The final analysis sample contained information on 765 young people, including 143 YAMs participants and 622 members of the comparison group.

For the YAMs participants, we defined an index service contact as the referral to the YAMs program. For the comparison group, we defined an index service contact as any contact with a YAMs partner agency. This is important, as such contact could have led to a YAMs referral if: 1) YAMs had been available to people in the comparison group; and 2) young people in the comparison group demonstrated multiagency needs.

## Variables

### Explanatory variables

Multiple variables relating to an offender’s sociodemographic background, characteristics of their index service contact, offending history, child protection contact history, prior health service contacts, and school participation were included in our analysis.

#### 1. Sociodemographic background:

Sociodemographic variables were compiled from multiple source datasets available in the HSDS.<sup>13</sup> The sociodemographic variables included were:

- Remoteness of residence: The statistical remoteness area derived from the postcode of a young person’s residence.<sup>14</sup>
- Socio-economic disadvantage: The Socio-Economic Indices for Areas (SEIFA) Index of Relative Disadvantage derived from the postcode of a young person’s residence.<sup>15</sup>
- Disability: An indicator variable equal to one if a young person was ever recorded as receiving disability-related support in school, and zero otherwise. Specifically, this refers to students having received Integrated Funding Support or registration for a support class in the Support Class Administration System.<sup>16</sup>
- Gender: An indicator variable equal to one if a young person was female, and zero otherwise.

11 See Klauzner et al. (2022) for an overview and outcome evaluation of the Youth On Track scheme.

12 To prune the data, we employ a 1:5 propensity score matching model with replacement. For a detailed exposition of this process and robustness considerations, see Appendix E.

13 In this process a hierarchy of data sources was developed, and rules were created to determine the characteristics, preferencing agreement between sources. High levels of consistency were present in the dataset, and where disagreement existed between datasets, the most commonly recorded gender, date of birth, and date of death were utilised.

14 Postcodes and corresponding service dates were derived from all data collections where they were available, and the closest recorded postcode to the index service date was selected as the postcode of residence. Remoteness area was derived from the Australian Bureau of Statistics (ABS) Accessibility and Remoteness Index of Australia (ARIA+), remoteness area is organised into four categories based on relative access to services in each area (see ABS [2016]). Categories include Greater cities, Inner regional, Outer regional, and Remote or Very Remote.

15 SEIFA scores are censored into quartiles reflecting broad groups or relative disadvantage (see ABS [2018]).

16 We use education data to identify disability as suggested by Boiteux and Poynton (2023), who note that it is a particularly important point of service contact for young people with disability in NSW. Specifically, recent survey data suggest that less than 1% of people with disability over the age of 15 had never attended school (ABS, 2019). In supporting the decision to focus on education disability supports, we examined a variety of data included in Boiteux and Poynton (2023), finding that nearly all people with disability identifiable using other data sources were in receipt of disability-specific school supports.

- **Aboriginality:** A linked dataset measure of whether a young person has consistently self-identified or been recorded as an Aboriginal and/or Torres Strait Islander person while in contact with mainstream services.<sup>17, 18</sup>
- **Age at index service contact:** An offender's age in years at the date of index service contact.

## 2. Index service information:

Several factors were included regarding an individual's index service contact. These include:

- **Service contact sector:** A categorical variable representing the service sector of index service contact, grouped into four categories (justice, health, education, and child protection and OOHHC).
- **Month and year of contact:** A collection of indicator variables capturing the month and year that a young person experienced their index service contact.

## 3. Criminal offending:

- **Number of prior proven offences:** A categorical variable capturing the number of finalised proven offences (including court appearances, youth justice conferences, and police cautions) for each young person in the three years prior to index service contact, coded as (0, 1, 2-3, 4+).
- **Prior offence type:** An indicator variable equal to one if a young person had a proven offence type in the three years prior to index service contact. Offence type is defined using the Australian and New Zealand Offence Classification (ANZSOC) Division associated with each offence.<sup>19</sup> Indicators are included for property offending,<sup>20</sup> violent offending,<sup>21</sup> DV offending,<sup>22</sup> drug-related offending,<sup>23</sup> and property damage offending.<sup>24</sup>
- **Prior sentenced custodial episode:** An indicator variable equal to one if a young person had a sentenced custodial episode in the three years prior to index service contact, and zero otherwise.
- **Prior entries into custody:** An indicator variable equal to one if a young person had prior entries into either remanded or sentenced custody in the three years prior to index service contact, and zero otherwise.
- **In custody at index service contact:** An indicator variable equal to one if a young person was in custody at the time of their index service contact, and zero otherwise.

## 4. Crime victimisation:

- **Number of prior victimisation events:** A categorical variable capturing the number of reported criminal victimisation events (regardless of proceeding outcome) of each young person in the three years prior to index service contact, coded as (0, 1, 2, 3-4, 5+).
- **Prior property victimisation:** An indicator variable equal to one if a young person has been the victim of a reported property offence in the three years prior to index service contact. Offence type is defined using the incident category associated with incidents nested in the event.

17 In line with best practice approaches to measuring Aboriginality in linked data environments, we make use of a linked dataset measurement approach known as the Multi-Stage Median Algorithm (AIHW and ABS, 2012). For further information on the approach, see Boiteux and Poynton (2023). We chose this measure as it has previously been shown to improve accuracy in reporting across data collections, including those used in this study (Nelson et al., 2020).

18 Based on advice from the Aboriginal Services Unit within the NSW Department of Communities and Justice, in this report we predominantly use the term "Aboriginal" to denote people elsewhere referred to as "First Nations people", "First Peoples", and/or "Aboriginal and Torres Strait Islander people".

19 Interested readers are directed to ABS (2011) for further details on ANZSOC offence categorisations.

20 Including unlawful entry with intent/burglary, break and enter (Division 07); theft and related offences (Division 08); and, fraud, deception and related offences (Division 09).

21 Comprised of acts intended to cause injury (ANZSOC division 02); and, sexual assault and related offences (ANZSOC division 03).

22 Specifically, any offences flagged as DV-related.

23 Including all illicit drug offences (ANZSOC division 10).

24 All property damage and environmental pollution offences (ANZSOC division 12).

Property offending includes any event with a criminal incident of break and enter dwelling, break and enter non-dwelling, motor vehicle theft, steal from motor vehicle, steal from retail store, steal from dwelling, steal from person, stock theft, and/or other theft.

- Prior violent victimisation: An indicator variable equal to one if a young person has been the victim of a reported violent offence in the three years prior to index service contact. As above, offence type is defined using the incident category associated with incidents nested in the event. Violent offending includes any event with a criminal incident of murder, attempted murder, manslaughter, domestic violence related assault, non-domestic violence related assault, assault police, sexual assault, sexual touching, sexual act and other sexual offences, robbery without a weapon, robbery with a firearm, and/or robbery with a weapon not a firearm.
- Prior other victimisation: An indicator variable equal to one if a young person has been the victim of a reported offence, that is not otherwise coded as a property or violent offence, in the three years prior to index service contact.

#### **5. Missing person reports:**

- Number of prior missing person reports recorded by the NSW Police: A categorical variable capturing the number of events where a young person was reported as missing in the three years prior to index service contact, coded as (0, 1-3, 4+).

#### **6. Child protection and OOHC:**

- Number of Risk of Significant Harm (RoSH) reports: A categorical variable capturing the number of child protection reports where a young person was found to be at RoSH in the three years prior to index service contact. Coded as (0, 1-2, 3-4, 5-11, 12+).
- Primary child protection issues associated with RoSH reports: A collection of indicator variables equal to one if a young person was the subject of a RoSH report with one of nine primary concern types in the three years prior to index service contact. Concern types include at risk due to own behaviour, carer mental health, carer other, domestic violence, carer drug and alcohol use, emotional abuse, neglect, physical abuse, and sexual abuse.
- Number of non-continuous OOHC placements: A categorical variable capturing the number of placements a young person has experienced in OOHC in the prior three years. Coded as (0, 1, 2+).<sup>25</sup>
- Type of prior OOHC placements: A set of indicator variables equal to one if a young person has experienced a placement in foster care, kinship care, residential care, or other care types in the prior three years, and zero otherwise.
- In OOHC at index service contact: An indicator variable equal to one if a young person is in OOHC at the time of their index service contact, and zero otherwise.

#### **7. Health services:**

- Number of admitted patient care episodes: A categorical variable capturing the number of admitted patient hospitalisations experienced by a young person in the three years prior to index service contact. Coded as (0, 1, 2, 3+).<sup>26</sup>
- Alcohol and illicit drug related hospitalisations: Indicator variables equal to one if a young person experienced any alcohol or illicit drug related admitted patient care episodes in the three years prior to index service contact, and zero otherwise.<sup>27</sup>

<sup>25</sup> In alignment with national reporting standards, we define non-continuous placements as those separated by a minimum of eight weeks (see AIHW, 2024).

<sup>26</sup> To support reporting consistency between regions, we exclude a small number of episodes where the entire episode was within the emergency department.

<sup>27</sup> Diagnostic codes representing alcohol and illicit drug related hospitalisations were provided by NSW Health, and are described in Rahman and Chronopoulos Theore (2024).

- Number of mental health ambulatory care episodes: A categorical variable capturing the number of recorded episodes in the three years prior to index service contact. Coded as (0, 1-2, 3-5, 6-15, 16+).<sup>28</sup>
- Mental health diagnosis from mental health ambulatory services: An indicator variable equal to one if a young person had a mental health diagnosis recorded during contact with mental health ambulatory services in the three years prior to index service contact, and zero otherwise.

#### **8. School participation:**

- Prior suspensions: A categorical variable counting the number of prior suspensions that a young person has had from school within a year prior to index service contact. Coded as (0, 1, 2-3, 4-5, 6+).
- Reason for suspension: A collection of indicator variables equal to one if a young person was suspended for a given reason in the three years prior to index service contact, and zero otherwise. Reasons include aggressive behaviour, continued disobedience, persistent or serious misbehaviour, physical violence, or other.
- Prior suspended days: A categorical variable representing the proportion of enrolled days that a young person was suspended from school in the prior year. Coded as a percentage in coarsened bins (0, 1-4, 5-10, 11-19, 20+).
- Prior unexplained absence: A categorical variable representing the proportion of enrolled days that a young person had unexplained absence from school in the prior year. Coded as a percentage in coarsened bins (0, 1-4, 5-10, 11-19, 20+).
- Prior enrolled school days: A categorical variable representing the number of weeks that a young person was enrolled in school in the prior year, coded as (0, 1-4, 5-9, 10-17, 18+).
- Suspended at index contact: An indicator variable equal to one if a young person was suspended at the time of their index service contact, and zero otherwise.

### **Output and outcome variables**

The primary aim of the YAMs pilot program was to address the needs of young people referred to the program through the provision of a targeted and coordinated multiagency response. By identifying significant issues faced by program participants, and developing tailored action plans to address these concerns, the program aimed to address factors relating to the young person's risk of offending and/or criminal victimisation.

Dependent on the need of a specific young person, tailored action plans were developed to directly intervene in their: 1) engagement with the education system; 2) engagement with mental health services; 3) interaction with the child protection system (particularly RoSH reporting); and 4) interaction with the police missing person reporting system.<sup>29</sup> In line with this theorised mechanism of change, we consider four time-based output variables which might be suggestive of the mechanism by which the YAMs pilot

<sup>28</sup> Mental health service contacts are drawn from the NSW Mental Health Ambulatory Data Collection, which includes records of assessment, treatment, rehabilitation and care of non-admitted patients. For example, the dataset includes both mental health day programs and psychiatric outpatients and outreach services. The data records 'contacts' (as opposed to 'episodes of care') by clinicians to a patient. In line with recommendations from the NSW Department of Customer Service Better Outcomes Lab, several non-client related service/activity codes were excluded from the measure. These include service/activity codes representing: close service request, open service request, administration, participation in staff training in learning role, care conference, other legal activity not related to Mental Health Act, legal activity related to Mental Health Act, missed appointment, refer client, documentation and report writing, clinical review, service coordination, skills training – unspecified, supervision clinical, participation in staff training in teaching role, and waiting time – late client.

<sup>29</sup> Missing person reporting was not explicitly documented as a consideration in YAMs program logic. However, during the study period, the YAMs pilot program collaborated significantly with the NSW Police Force Missing Persons Registry with the aim to improve reporting and to address the needs of young people repeatedly reported as missing. As part of this work, the Missing Persons Registry would provide a list of repeat missing persons to YAMs Coordinators for risk assessment, with many subsequently placed on the program. Recognising this work, police recorded missing person reporting has been included here as an output.

program could influence criminal justice outcomes.<sup>30</sup> These include child protection RoSH reports, mental health service use, school enrolment, and police-recorded missing person reports. We then consider two time-based criminal justice outcomes targeted by the program, proven offending and police-recorded crime victimisation.

Although we assess the association between YAMs participation and program outputs, care should be taken in interpreting the results. For outputs, the examination of cases during multiagency meetings increases the chances that outputs are directly detected, documented, addressed and recorded. As a result, observed changes in outputs are more likely indicative of enhanced surveillance rather than a change in the level of need. While surveillance effects remain possible for criminal justice outcomes, the pathway is typically less direct, involving additional procedural decision points and evidentiary thresholds beyond the immediate control of YAMs partner agencies (e.g., incident detection, reporting, investigation, and formal system processing).

Outputs and outcomes are identified similarly to their counterpart explanatory variables described in the previous section. To facilitate our analysis, each are recorded as the number of days between index service contact and the first of: 1) the young person's next output or outcome as recorded in the HSDS; or 2) 365 days.

## Empirical approach

We use a matching technique to ensure YAMs participants are comparable to our counterfactual group of young people not participating in the program. We then apply survival analysis methods on a matched sample of YAMs and non-YAMs participants to determine the extent to which program participation was associated with changes in four multiagency outputs, and two criminal justice outcomes targeted by the program.

### Matching approach and survival analysis

We start with a sample of 143 YAMs participants and 622 records of similar young people who were in contact with YAMs partner agencies, but who lived in areas where the program was not available.<sup>31</sup> Following from the data section of this report, we refer to those not placed on the program as the "comparison group". As the YAMs referral and placement process prioritises access to the program for young people with multiple and complex needs, those placed on the program likely have a higher prevalence of prior service contacts indicative of adverse experiences. This preferencing of young people with complex needs in the referral process introduces negative selection bias, and as a result, we cannot identify the causal impact of the program by simply comparing outputs and outcomes between groups. If those with multiple and complex needs are also more likely to offend or to be the victim of crime, our estimate of the influence of the YAMs program on these criminal justice outcomes would be biased upwards.

To reduce the potential influence of this selection bias, we use a matching method to find young people in the comparison group who are observably similar to YAMs participants. In its simplest form, this would entail pairing each YAMs participant with a young person from the comparison group with the closest set of characteristics. This is complicated by the large number of criteria taken into consideration in making a referral to the YAMs pilot program, as the concept of "closeness" between pairs is not well defined when employing numerous explanatory variables (see Hainmueller, 2012). To overcome this concern, we employ entropy balancing to calibrate a set of doubly-robust matching weights that, by design, require reweighted groups to match as closely as possible on observable characteristics (Hainmueller,

<sup>30</sup> A distinction between outputs and outcomes is common in evaluation and aligns with the NSW Treasury's policy and guidelines for program evaluation (2023). While the NSW Treasury guidelines reference the benefits of separating outputs and outcomes, little guidance is provided to aid in distinguishing between the two. One widely accepted distinguishing feature is the level of influence that program managers may have over their attainment, with higher levels of influence or immediacy of attainment being common features of outputs. For a detailed exposition of the differences between outputs and outcomes, see Perrin (2006) and Funnell and Rogers (2011).

<sup>31</sup> This group further excludes those living in areas where a competing program Youth On Track was available, and in southwest Sydney postcodes which experienced significant COVID-19 associated lockdowns. For further details, see the data section of this report.

2012; Zhao & Percival, 2017).<sup>32</sup> This approach has two broad benefits over simpler matching methods. First, it achieves a balance of observables that is as good as or better than that achieved by propensity score matching alone (Hainmueller, 2012). Second, it reduces modelling bias by removing the need for researchers to manually iterate between different propensity score models until all covariates are balanced appropriately.

Despite these methodological benefits, it is not always possible to identify a comparable group using entropy balancing. In our context, this would occur if there were few or no young people in the comparison group who share enough observable characteristics with YAMs participants. Under this scenario, entropy balancing would return large matching weights. This would allow the experiences of relatively few young people in the comparison group to unduly influence the results of any weighted estimations. To check for the presence of such exaggerated weighting, we examine the distribution of entropy balancing weights for the presence of large outlier values (presented in Appendix Figure A1). While there is no standard rule to decide a reasonable limit for the size of weights, values as high as 20-30 have been suggested as acceptably low (McMullin & Schonberger, 2022; Parish et al., 2017). Supporting the comparability of YAMs participants to the entropy balanced counterfactual group, the largest weight applied to the comparison group was significantly below this threshold, around 1.5. After examining matching weights, we employed further diagnostic tests to make sure that YAMs participants and the entropy-balanced comparison group were comparable. This involved determining whether the standardised bias,<sup>33</sup> which quantifies the remaining differences in observable characteristics between groups, was reasonably small after matching. As imbalance in this study exists in covariates known to directly influence the likelihood of measured outputs and outcomes, we adopt a conservative threshold of 10% as a marker of covariate balance (Austin, 2009).

After applying the weights from the entropy balancing matching approach, we use survival analysis methods to examine how YAMs participation is associated with multiagency outputs and criminal justice outcomes. Outputs and outcomes are defined as above, and are right-censored. Censoring is limited to the one-year follow-up period of the study, as all young people included in the analysis group were observable for 365 days from index service contact. Independently for each output and outcome, we report survival curves from weighted Kaplan-Meier analysis, and hazard ratios<sup>34</sup> from a weighted Cox proportional hazards regression model. Estimates are presented for an aggregated sample combining both YAMs sites, and for each site independently. In an extension, we repeat our analysis using alternative matching strategies and control groups. In doing so, we are able to determine the degree to which our estimates are robust to methodological choices (Rosenbaum, 1987).<sup>35</sup>

### Limitations

Several contextual features of our study pose risks to internal validity. The first is that our sample of young people placed on the YAMs pilot program begins in March 2020, the same month that public health orders were introduced in NSW to limit the spread of COVID-19. It is plausible that these policies may have influenced the likelihood of measured outputs and outcomes, such as the opportunity to have a child protection report, or to offend. This may represent an issue for our estimates of program effectiveness if there is a significant difference in the distribution of index referral dates for the YAMs participants and counterfactual group. While we only compare YAMs participants with a counterfactual group with a similar distribution of index referral dates to mitigate this issue (see Appendix Figure A2), it remains possible that COVID-19 related policies have influenced our results.

32 To facilitate a site-specific sub-analysis, we apply an entropy balancing framework to each site in isolation. For our main combined site analysis, site-specific weights are additively pooled over treatment and control units. In doing so, we ensure that 1) each estimation makes use of the same matched counterfactual group and 2) similar young people are identified in sub-group analysis.

33 Specifically, we calculate Rosenbaum and Rubin's (1985) standardised bias, as the mean difference between the YAMs participant and comparison group, divided by the standard deviation of the YAMs participant group.

34 Associations are expressed in hazard ratios (HR), where a HR greater than one means that a group with a relevant characteristic has a faster time to the next output or outcome. Conversely, a HR less than one indicates a slower time to the next output or outcome. A HR of one implies that groups have a similar time to next output outcome.

35 For a detailed discussion of these approaches, see Appendix E.

The second potential risk is omitted variable bias. An important limitation of our study is that we are not able to match on variables we do not observe. As a result, we cannot guarantee that matched groups are comparable across all factors that may influence program participation, outputs or outcomes. Notably, we do not observe contact with a variety of services involved in the YAMs program (e.g., those operated by non-governmental organisations), and we are unable to examine risk factors at the same fidelity as was standard in the program's referral and triage process. Although we include a large range of variables in our matching models to reduce observable differences between YAMs participants and counterfactual groups, caution is recommended when interpreting the associative (non-causal) estimates reported in this bulletin.

A third potential risk is selection bias. In our study, program data limitations meant that we were only able to examine program participants rather than everyone referred to the program. As a result, we measure a treatment effect on the treated (TOT) estimate rather than a more robust intent to treat (ITT) estimate. Commonly, this approach may introduce bias into program evaluation estimates as it is unable to account for selective uptake or attrition in a program. Although data limitations restrict our analysis to examining a TOT estimate, the process by which young people are placed on the YAMs agenda mitigates the selection bias risk that this introduces. Specifically, while referred young people may have been consulted about placement on the YAMs pilot program, their explicit consent was not required for participation. As program uptake decisions were made without direct influence of program participants, it is unlikely that this form of selection bias influences our results.

The final risk is an issue of limited statistical power related to the small sample size used in this evaluation. Our main analysis sample contains information for 765 young people, with 143 being YAMs participants. The site-specific analyses use smaller sample sizes, with approximately half of the sample in each site. If this sample size is too small, it is possible that our methodological approach could fail to detect true differences between groups. We examine this in Appendix B, where we consider statistical power directly. While we find that the main methodological approach likely meets required statistical power thresholds, the smaller sample size available in site-specific analysis is likely underpowered. Though the site-specific analysis may provide insight into whether a pilot site contributed particularly strongly to the combined site analysis, care should be taken when interpreting statistical significance and coefficient estimates from site-specific analyses.

---

## RESULTS

### Descriptive statistics

Table 1 describes and compares the sociodemographic and background characteristics of YAMs participants (column 3) with the population group (column 1) and comparison group (column 2). As the population group are broadly representative of young people in contact with NSW Government mainstream services, they may be used as a baseline to assess the scale of multiagency needs demonstrated by the comparison YAMs participants. This difference is represented in column 4.

YAMs participants were on average around 14 years of age at program referral. Slightly more than half were male, and nearly half were Aboriginal. Reflecting the regions of the two pilot sites, the majority of participants lived in areas considered to be major cities (48%) or inner regional areas (48%), associated with the highest two quartiles of socio-economic disadvantage (93%). The majority of program referrals came from criminal justice system staff (86%), followed by staff involved with child protection (8%), education (4%), and health systems (2%).

In line with the program eligibility criteria requiring participants to have multiple risk factors related to safety, welfare or wellbeing, YAMs participants demonstrated significant and high levels of criminal justice system contact. Compared to the population group, YAMs participants were more than twice as likely to

have received education related disability supports (41%, vs. 18%), nearly three times as likely to have had a proven offence in the prior three years (37%, vs. 13%), and over two times more likely to have experienced an episode in custody (13%, vs. 5%). While the majority of YAMs participants did not have a proven offence prior to YAMs referral (63%), nearly one in five participants had more than two proven offences, and around one in twelve had accumulated more than four proven offences. Rates of crime victimisation were similarly high. When compared to the population group, YAMs participants were more than twice as likely to have been recorded as a victim of crime reported to the NSW Police Force (56%, vs. 25%), with notably higher rates of victimisation for violent crimes (49%, vs. 21%).

Rates of prior contact with multiagency services were similarly high amongst YAMs participants. Compared to the population group, YAMs participants were around two and a half times more likely to have experienced contact with NSW Government housing services (42%, vs. 17%) and had significantly higher rates of any missing person report (71%, vs. 26%). Differences were particularly notable when considering repeat missing person reports, where YAMs participants were nearly four times as likely to have four or more missing person reports recorded in the prior three years (40%, vs. 12%). Differences in child protection reporting mirrored this trend. Nearly all YAMs participants (92%) were the subject of a RoSH report in the three years prior to referral (compared with 48% for the population group), and YAMs participants were nearly three times as likely to have been the subject of five or more RoSH reports (58%, vs. 21%). Most commonly, primary RoSH report concerns for YAMs participants were recorded as physical abuse (64%), neglect (61%), at risk due to their own behaviour (59%), sexual abuse (45%), emotional abuse (41%), and DV (15%). In line with high rates of RoSH reporting, YAMs participants were also significantly more likely to enter OOHC than the population group (19%, vs. 7%), and to be in OOHC at the time of referral (13%, vs. 5%).

Compared to the population group, YAMs participants had relatively higher but still low rates of alcohol (2%, vs. 1%) and drug (5%, vs. 3%) hospitalisations. Interestingly, YAMs participants were similarly likely to be in contact with mental health services (42%, vs. 45%). However, YAMs participants demonstrated a different pattern of service usage to those in the population group. Specifically, YAMs participants were less likely to have a significant number of mental health service contacts (17% with more than 16 episodes, vs. 30%), and more likely to have between three and 15 episodes (23%, vs. 14%). YAMs participants were more likely to be enrolled in school in the year prior to referral (90%, vs. 75%). They also had disproportionately higher rates of school suspension (85%, vs. 32%), and repeated suspensions (36% with more than 6 suspensions, vs. 9%). Most commonly, YAMs participants were suspended for aggressive behaviour (65%), continued disobedience (50%), persistent or serious misbehaviour (43%), or physical violence (36%). In line with these high rates of suspension, 9% of YAMs participants were suspended from school at the time of referral.

While the YAMs participants had significantly higher prevalence of multiagency needs than the population group, differences were much smaller when considering the comparison group identified for analysis (see column 5). Across all variables considered in Table 1, we observe no statistically significant differences between YAMs participants and the comparison group. Although this means that the comparison group is similar to YAMs participants in their observable multiagency needs, several small (though not statistically significant) differences remained between groups. Of particular note is that YAMs participants had an observably higher prevalence of RoSH reports with primary concern of emotional (41%, vs. 35%) or sexual abuse (45%, vs. 40%), relatively higher alcohol (2%, vs. 0%) and drug (5%, vs. 3%) hospitalisations, higher prevalence of repeated school suspension (36% with 6 or more, vs. 32%), and higher prevalence of suspensions for aggressive behaviour (65%, vs. 60%).

**Table 1. Differences in the characteristics of YAMs participants and comparison groups**

|  |                          | (1)<br>Population<br>group<br>(N=549,876) | (2)<br>Comparison<br>group<br>(N=622) | (3)<br>YAMs<br>participants<br>(N=143) | (4)<br>Difference<br>(3)-(1)<br>(N=550,019) | (5)<br>Difference<br>(3)-(2)<br>(N=765) |
|--|--------------------------|---|---------------------------------------|--|---|---|
| <b>Panel A: Demographic characteristics</b>                    |                          |   |                                       |  |   |   |
| Age at index start date (years)                                |                          | 13.93                                     | 14.20                                 | 14.11                                  | 0.18  | -0.09                                   |
| Female   |                          | 0.52                                      | 0.43                                  | 0.43                                   | -0.09**                                     | 0.00                                    |
| Aboriginal   |                          | 0.20                                      | 0.50                                  | 0.47                                   | 0.27***                                     | -0.03                                   |
| Disability-related education support                           |                          | 0.18                                      | 0.41                                  | 0.41                                   | 0.23***                                     | 0.00                                    |
| Socio-economic disadvantage                                    | Q1 (most disadvantaged)  | 0.19                                      | 0.34                                  | 0.32                                   | 0.13***                                     | -0.02                                   |
|  | Q2                       | 0.30                                      | 0.59                                  | 0.58                                   | 0.28***                                     | -0.01                                   |
|  | Q3                       | 0.22                                      | 0.05                                  | 0.07                                   | -0.15***                                    | 0.02                                    |
|  | Q4 (least disadvantaged) | 0.30                                      | 0.02                                  | 0.03                                   | -0.27***                                    | 0.01                                    |
| Remoteness   | Major cities             | 0.60                                      | 0.48                                  | 0.50                                   | -0.10**                                     | 0.02                                    |
|  | Inner regional           | 0.32                                      | 0.48                                  | 0.48                                   | 0.16***                                     | 0.00                                    |
|  | Outer regional           | 0.06                                      | 0.04                                  | 0.02                                   | -0.04                                       | -0.02                                   |
|  | Remote or very remote    | 0.02                                      | 0.00                                  | 0.00                                   | -0.02*                                      | 0.00                                    |
| <b>Panel B: Index service contact</b>                          |                          |   |                                       |  |   |   |
| Index service contact type                                     | Child protection         | 0.18                                      | 0.11                                  | 0.08                                   | -0.10***                                    | -0.03                                   |
|  | Education                | 0.05                                      | 0.04                                  | 0.04                                   | -0.01                                       | 0.00                                    |
|  | Health                   | 0.62                                      | 0.02                                  | 0.02                                   | -0.60***                                    | 0.03                                    |
|  | Criminal justice         | 0.14                                      | 0.83                                  | 0.86                                   | 0.72***                                     | 0.00                                    |
| <b>Panel C: Criminal offending in prior three years</b>        |                          |   |                                       |  |   |   |
| Number of proven offences                                      | 0                        | 0.87                                      | 0.60                                  | 0.63                                   | -0.24***                                    | 0.03                                    |
|  | 1                        | 0.05                                      | 0.18                                  | 0.18                                   | 0.13***                                     | 0.00                                    |
|  | 2-3                      | 0.04                                      | 0.12                                  | 0.10                                   | 0.06***                                     | -0.02                                   |
|  | 4+                       | 0.03                                      | 0.10                                  | 0.08                                   | 0.05***                                     | -0.02                                   |
| Prior offence types  | Violent                  | 0.07                                      | 0.19                                  | 0.17                                   | 0.10***                                     | -0.02                                   |
|  | Property                 | 0.07                                      | 0.21                                  | 0.20                                   | 0.13***                                     | -0.01                                   |
|  | Drug-related             | 0.03                                      | 0.05                                  | 0.04                                   | 0.01  | -0.01                                   |
| Any entries into remanded or sentenced custody                 |                          | 0.05                                      | 0.11                                  | 0.13                                   | 0.08***                                     | 0.02                                    |
| In custody at index service contact                            |                          | 0.01                                      | 0.00                                  | 0.00                                   | -0.01***                                    | 0.00                                    |
| <b>Panel D: Crime victimisation in prior three years</b>       |                          |   |                                       |  |   |   |
| Number of victimisation events                                 | 0                        | 0.75                                      | 0.45                                  | 0.44                                   | -0.31***                                    | -0.01                                   |
|  | 1                        | 0.14                                      | 0.24                                  | 0.24                                   | 0.10***                                     | 0.00                                    |
|  | 2                        | 0.05                                      | 0.16                                  | 0.17                                   | 0.12***                                     | 0.01                                    |
|  | 3-4                      | 0.04                                      | 0.11                                  | 0.10                                   | 0.06***                                     | -0.01                                   |
|  | 5+                       | 0.02                                      | 0.05                                  | 0.05                                   | 0.03***                                     | 0.00                                    |
| Prior incident types   | Violent                  | 0.21                                      | 0.46                                  | 0.49                                   | 0.28***                                     | 0.03                                    |
|  | Property                 | 0.02                                      | 0.05                                  | 0.06                                   | 0.04***                                     | 0.01                                    |
|  | Other                    | 0.08                                      | 0.21                                  | 0.18                                   | 0.10***                                     | -0.03                                   |
| <b>Panel E: Contact with housing services in prior 3 years</b> |                          | 0.17                                      | 0.40                                  | 0.42                                   | 0.25***                                     | 0.02                                    |
| <b>Panel F: Missing person reports in prior 3 years</b>        |                          |   |                                       |  |   |   |
| Number of missing person reports                               | 0                        | 0.74                                      | 0.28                                  | 0.29                                   | -0.45***                                    | 0.01                                    |
|  | 1-3                      | 0.14                                      | 0.33                                  | 0.31                                   | 0.17***                                     | -0.02                                   |
|  | 4+                       | 0.12                                      | 0.39                                  | 0.40                                   | 0.28***                                     | 0.01                                    |

**Table 1. Differences in the characteristics of YAMs participants and comparison groups (continued)**

|   |                                    | (1)<br>Population<br>group<br>(N=549,876) | (2)<br>Comparison<br>group<br>(N=622) | (3)<br>YAMs<br>participants<br>(N=143) | (4)<br>Difference<br>(3)-(1)<br>(N=550,019) | (5)<br>Difference<br>(3)-(2)<br>(N=765) |
|---|------------------------------------|---|---------------------------------------|--|---|---|
| <b>Panel G: Child protection and OOHC in prior 3 years</b>    |                                    |   |                                       |  |   |   |
| Number of RoSH reports  | 0                                  | 0.52                                      | 0.10                                  | 0.08                                   | -0.44***                                    | -0.02                                   |
|   | 1-2                                | 0.19                                      | 0.16                                  | 0.17                                   | -0.02                                       | 0.01                                    |
|   | 3-4                                | 0.09                                      | 0.19                                  | 0.17                                   | 0.08***                                     | -0.02                                   |
|   | 5-11                               | 0.13                                      | 0.34                                  | 0.35                                   | 0.22***                                     | 0.01                                    |
|   | 12+                                | 0.08                                      | 0.20                                  | 0.23                                   | 0.15***                                     | 0.03                                    |
| Prior primary concerns identified by RoSH reports             | At risk due to own behaviour       | 0.20                                      | 0.57                                  | 0.59                                   | 0.39***                                     | 0.02                                    |
|   | Domestic violence                  | 0.07                                      | 0.16                                  | 0.15                                   | 0.08***                                     | -0.01                                   |
|   | Carer drug or alcohol use          | 0.02                                      | 0.03                                  | 0.03                                   | 0.01  | 0.00                                    |
|   | Emotional abuse                    | 0.17                                      | 0.35                                  | 0.41                                   | 0.24***                                     | 0.06                                    |
|   | Neglect                            | 0.24                                      | 0.60                                  | 0.61                                   | 0.37***                                     | 0.01                                    |
|   | Physical abuse                     | 0.24                                      | 0.60                                  | 0.64                                   | 0.40***                                     | 0.04                                    |
|   | Sexual abuse                       | 0.23                                      | 0.40                                  | 0.45                                   | 0.22***                                     | 0.05                                    |
| Number of non-continuous OOHC placements                      | 0                                  | 0.93                                      | 0.83                                  | 0.81                                   | -0.12***                                    | -0.02                                   |
|   | 1                                  | 0.06                                      | 0.15                                  | 0.18                                   | 0.12***                                     | 0.03                                    |
|   | 2+                                 | 0.01                                      | 0.02                                  | 0.03                                   | 0.02  | 0.01                                    |
| Prior placement into OOHC type                                | Foster care                        | 0.04                                      | 0.07                                  | 0.10                                   | 0.06***                                     | 0.03                                    |
|   | Kinship care                       | 0.04                                      | 0.11                                  | 0.12                                   | 0.08***                                     | 0.01                                    |
|   | Residential care                   | 0.02                                      | 0.04                                  | 0.05                                   | 0.03**                                      | 0.01                                    |
|   | Other                              | 0.04                                      | 0.08                                  | 0.10                                   | 0.06***                                     | 0.02                                    |
| In OOHC at index contact                                      | 0.05                               | 0.12                                      | 0.13                                  | 0.08***                                | 0.01  |   |
| <b>Panel H: Health service usage in prior 3 years</b>         |                                    |   |                                       |  |   |   |
| Alcohol or drug related admissions                            | Alcohol-related                    | 0.01                                      | 0.00                                  | 0.02                                   | 0.01  | 0.02                                    |
|   | Drug-related                       | 0.03                                      | 0.03                                  | 0.05                                   | 0.02  | 0.02                                    |
| Number of mental health ambulatory episodes                   | 0                                  | 0.55                                      | 0.59                                  | 0.58                                   | 0.03  | -0.01                                   |
|   | 1-2                                | 0.01                                      | 0.00                                  | 0.01                                   | 0.00  | 0.01                                    |
|   | 3-5                                | 0.04                                      | 0.07                                  | 0.08                                   | 0.04**                                      | 0.01                                    |
|   | 6-15                               | 0.10                                      | 0.17                                  | 0.15                                   | *0.05                                       | -0.02                                   |
|   | 16+                                | 0.30                                      | 0.17                                  | 0.17                                   | -0.13***                                    | 0.00                                    |
| Mental health diagnosis from ambulatory services              | 0.48                               | 0.48                                      | 0.51                                  | -0.03                                  | -0.03                                       |   |
| <b>Panel I: School attendance and exclusion in prior year</b> |                                    |   |                                       |  |   |   |
| Number of suspensions   | 0                                  | 0.68                                      | 0.20                                  | 0.15                                   | -0.53***                                    | -0.05                                   |
|   | 1                                  | 0.09                                      | 0.10                                  | 0.10                                   | 0.01  | 0.00                                    |
|   | 2-3                                | 0.09                                      | 0.20                                  | 0.20                                   | 0.11***                                     | 0.00                                    |
|   | 4-5                                | 0.05                                      | 0.18                                  | 0.19                                   | 0.14***                                     | 0.01                                    |
|   | 6+                                 | 0.09                                      | 0.32                                  | 0.36                                   | 0.27***                                     | 0.04                                    |
| Primary reasons for suspension                                | Aggressive behaviour               | 0.23                                      | 0.60                                  | 0.65                                   | 0.42***                                     | 0.05                                    |
|   | Continued disobedience             | 0.18                                      | 0.49                                  | 0.50                                   | 0.32***                                     | 0.01                                    |
|   | Persistent or serious misbehaviour | 0.11                                      | 0.39                                  | 0.43                                   | 0.32***                                     | 0.04                                    |
|   | Physical violence                  | 0.10                                      | 0.36                                  | 0.36                                   | 0.26***                                     | 0.00                                    |
|   | Other                              | 0.06                                      | 0.26                                  | 0.30                                   | 0.24***                                     | 0.04                                    |

**Table 1. Differences in the characteristics of YAMs participants and comparison groups (continued)**

|                            |       | (1)              | (2)              | (3)               | (4)                | (5)                |
|----------------------------|-------|------------------|------------------|-------------------|--------------------|--------------------|
|                            |       | Population group | Comparison group | YAMs participants | Difference (3)-(1) | Difference (3)-(2) |
|                            |       | (N=549,876)      | (N=622)          | (N=143)           | (N=550,019)        | (N=765)            |
| Weeks enrolled             | 0     | 0.25             | 0.10             | 0.07              | -0.18***           | -0.03              |
|                            | 1-4   | 0.03             | 0.02             | 0.02              | -0.01              | 0.00               |
|                            | 5-9   | 0.04             | 0.03             | 0.02              | -0.02              | -0.01              |
|                            | 10-17 | 0.06             | 0.14             | 0.14              | 0.08***            | 0.00               |
|                            | 18+   | 0.63             | 0.71             | 0.74              | 0.11***            | 0.03               |
| Suspended at index contact |       | 0.01             | 0.09             | 0.10              | 0.09***            | 0.01               |

Note. Values are reported in proportions unless otherwise stated. Minor perturbation has been applied to this table to prevent reidentification. As a result, grouped columns may not sum to totals within or between tables. Stars indicate statistical significance at a variety of conventional thresholds of statistical significance: \* - 10%, \*\* - 5%, \*\*\* - 1%. Proportions are reported for a selection of variables, see Appendix Table A1 for YAMs participant data by program site.

## Matching analysis

### Diagnostic testing

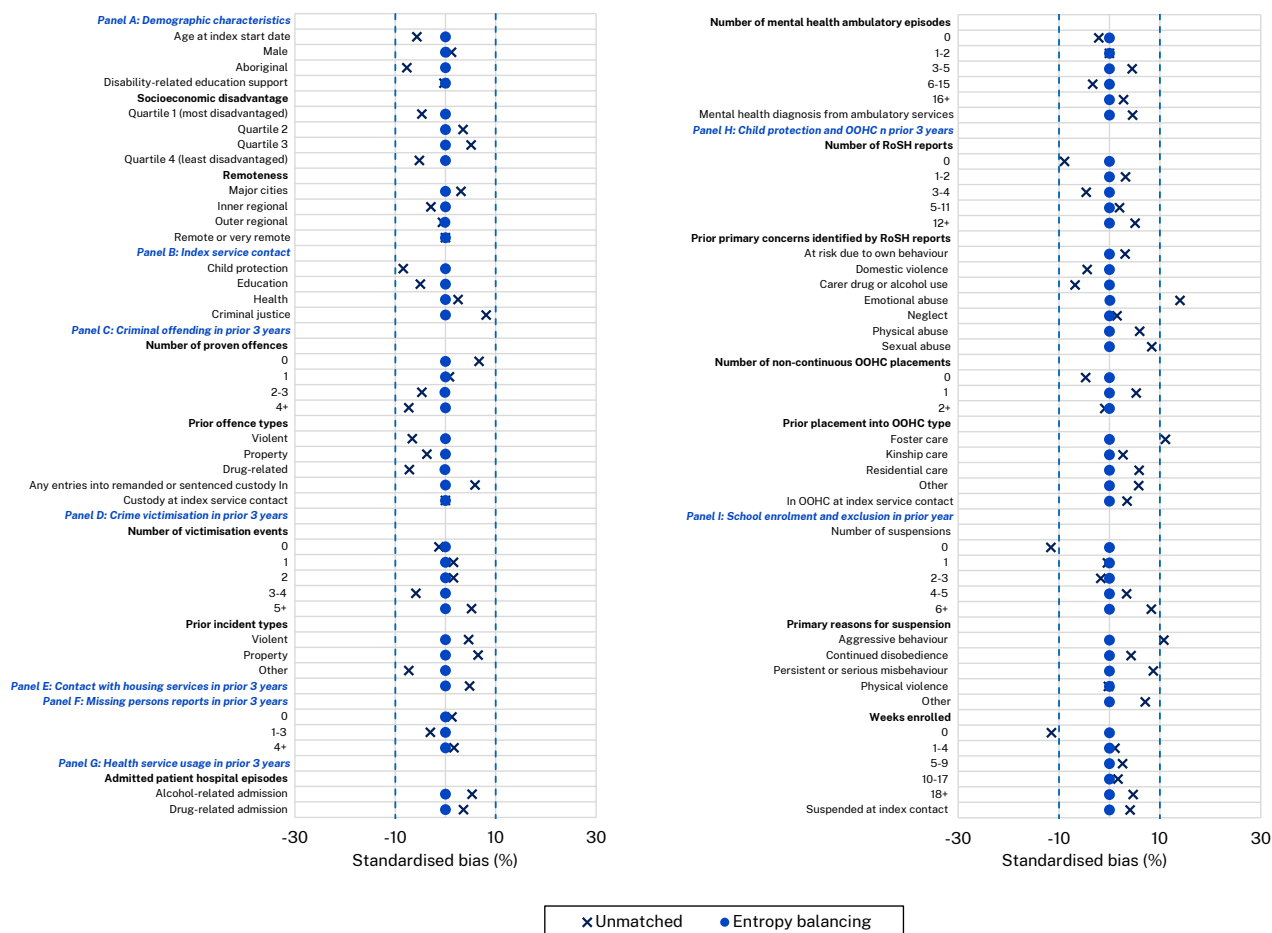
As is evident in the previous section, the application of YAMs eligibility criteria and the prioritisation of higher risk individuals for the program has resulted in the program participants showing strong evidence for multiagency needs compared to the population group. These differences were significantly smaller when comparing YAMs participants to the comparison group identified through the initial data pruning process.

We examine these differences in Figure 2, which shows the standardised bias before and after matching, for a selection of covariates used in the analysis.<sup>36</sup> A 10% threshold for standardised bias, depicted in the figure by two vertical dashed lines, is used to indicate adequate balance for a covariate. As the comparison group was selected for their high level of multiagency needs, many covariates were inside this threshold. However, several factors remained outside the 10% threshold. Specifically, YAMs participants were more likely to have a recorded report of emotional abuse, foster care placement, any suspension from school, and a suspension related to aggressive behaviour. YAMs participants were also more likely to have been enrolled in school in the year prior to the program.

To mitigate the influence of these differences on our analysis, we used a statistical matching method to improve the comparability of the comparison group to YAMs participants. After applying this entropy balancing matching approach, all covariates were inside the 10% standardised bias threshold. Importantly for our analysis, although the standardised bias between groups was within this acceptable threshold for many factors prior to matching, our entropy balancing matching approach significantly improved balance between groups across all factors. The largest standardised bias post matching was 0.1 for the combined sites, and 0.2 when considering sites independently.

<sup>36</sup> Full post matching diagnostic results are reported in Appendix Table A2.

Figure 2. Standardised bias between YAMs participants and control group before and after matching



## Regression results

### Combined sites

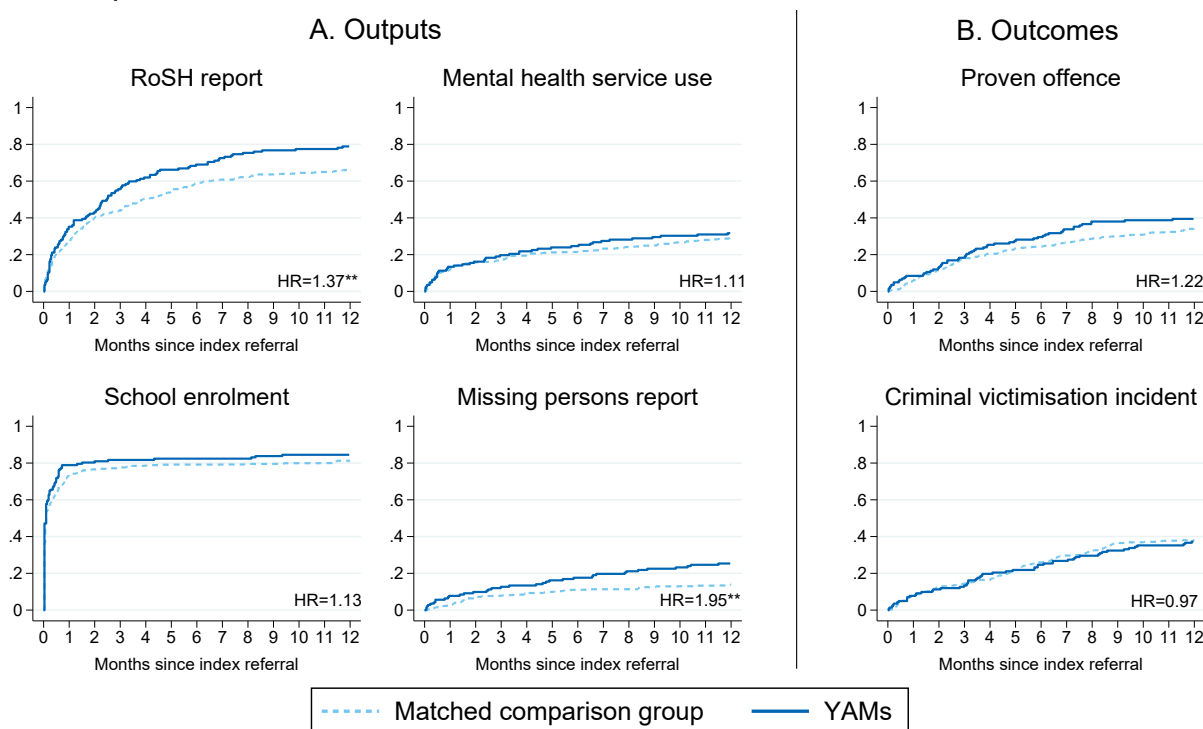
Figure 3 depicts weighted Kaplan-Meier survival curves for all YAMs participants and the matched comparison group of young people not placed on the program, by each output and outcome. Curves represent the cumulative daily proportion of each group who experienced outputs and outcomes in the year following referral. YAMs participants are depicted by a solid line, and the matched comparison group are depicted by a dashed line. Figures also include associated hazard ratios from weighted Cox regression survival analysis.<sup>37</sup>

We first consider outputs in Figure 3 Panel A, which reflect changes in service delivery associated with program participation within a year of referral. We estimate that at a 5% significance level, YAMs participants were 37% more likely to have a RoSH report recorded (HR=1.37), and nearly twice as likely to have a missing person report recorded (HR=1.95). We note that differences between groups emerged during the first few months after referral, supporting the notion that increased RoSH and missing person reports may have been due to the fact that the young person was on the YAMs agenda. As a result, these increases likely reflect heightened surveillance and formal reporting rather than being indicative of a change in the level of need experienced by young people. Although we observe that YAMs participants experienced a 13% higher likelihood of school enrolment (HR=1.13) and 11% higher likelihood of mental health service use (HR=1.11), these differences were not statistically significant at conventional levels of statistical significance.

<sup>37</sup> For detailed regression results, see Appendix C.

Next we consider outcomes in Figure 3 Panel B, which represent the association between YAMs participation and criminal justice interactions in the year following referral. Unlike outputs, changes in outcomes are beyond the direct influence of YAMs attendees and actions, and are less likely to be driven by changes in surveillance and reporting changes. Examining outcomes, we find no statistically significant differences in proven offending (HR=1.22) or crime victimisation (HR=0.97).<sup>38</sup>

**Figure 3. Daily cumulative prevalence of multiagency outputs and criminal justice outcomes for YAMs participants and matched comparison group in the year following program referral, combined pilot sites**



Note. HR – Hazard Ratio from a weighted Cox Proportional Hazards survival analysis regression. Stars indicate statistical significance at a variety of conventional thresholds: \*  $p < .10$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ .

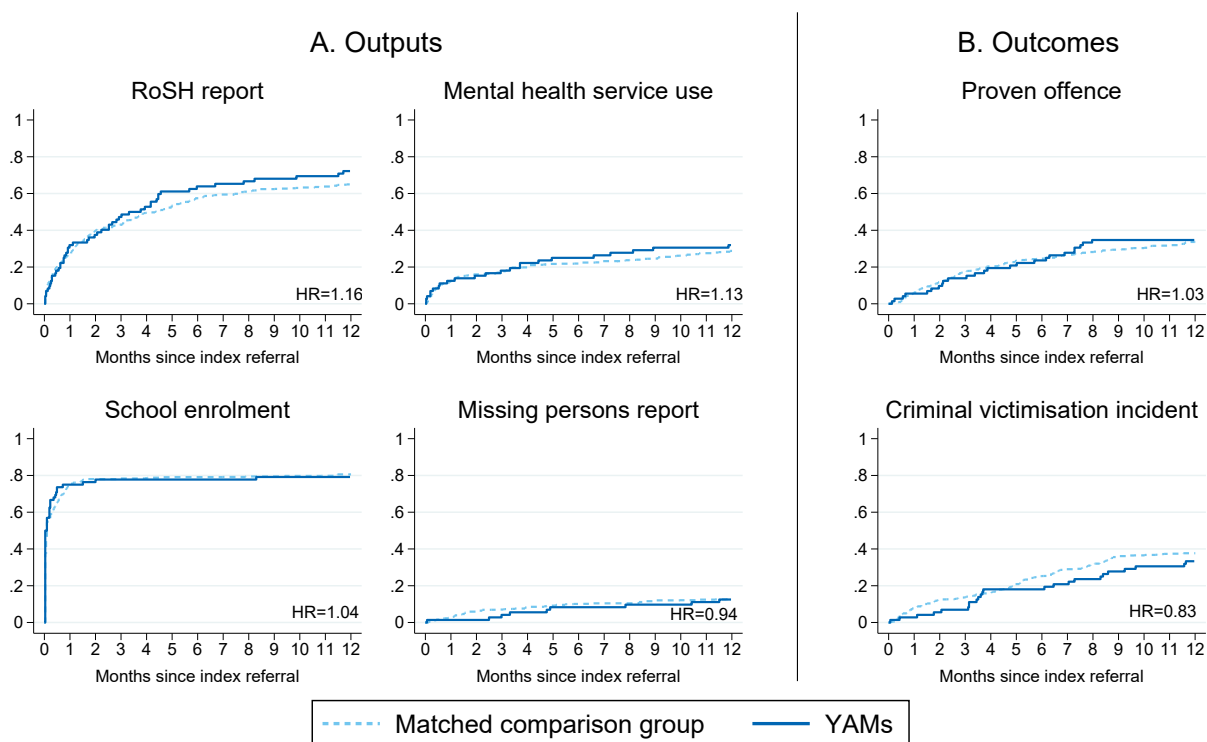
### Coffs/Clarence PD pilot site

Similar to Figure 3, Figure 4 depicts weighted Kaplan-Meier survival curves for YAMs participants in the Coffs/Clarence PD pilot site and the matched comparison group, by output and outcome. Figures also include associated hazard ratios from weighted Cox regression survival analysis. Unlike results in Figure 3, analyses reported in this section make use of a much smaller sample size (N=72) and may lack the statistical power to detect small differences between groups.

We first consider outputs in Figure 4 Panel A. We observe that YAMs participants experienced a 16% higher likelihood of RoSH reporting (HR=1.16), 13% higher likelihood of mental health service use (HR=1.13), 4% higher likelihood of school enrolment (HR=1.04) and 6% lower likelihood of a missing person report (HR=0.94). Though the directionality of these small differences may imply small changes in multiagency service use, these differences were not statistically significant at conventional levels. When interpreted with reference to the combined site analysis in Figure 3, these results imply that the Coffs/Clarence PD pilot site was not driving the increased RoSH and missing person reports found in our main analysis. Turning to the outcomes shown in Figure 4 Panel B, we find no statistically significant differences between YAMs participants and the matched comparison group in proven offending (HR=1.03) or crime victimisation (HR=0.83) within a year of program referral.

<sup>38</sup> In an extension, we consider whether criminal justice outcome vary across property or violent offence categories, and find no statistically significant differences for YAMs participants. Results are available in Appendix D.

**Figure 4. Daily cumulative prevalence of multiagency outputs and criminal justice outcomes for YAMs participants and matched comparison group in the year following program referral, Coffs/Clarence PD pilot site**



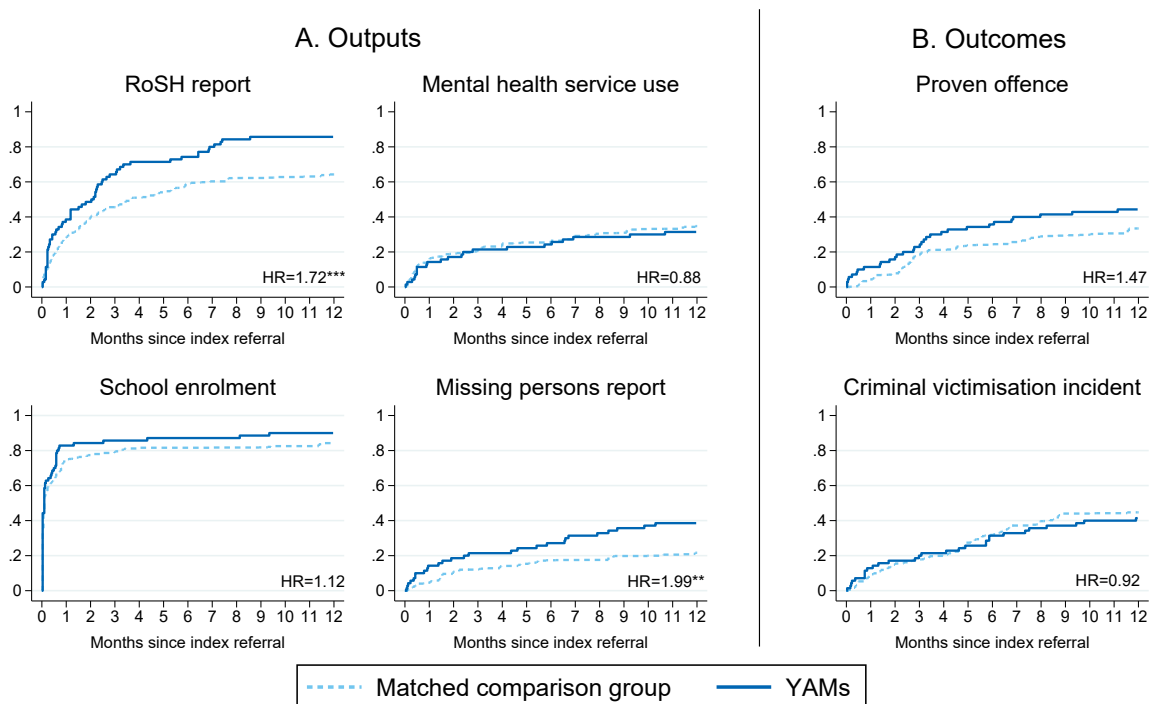
Note. HR – Hazard Ratio from a weighted Cox Proportional Hazards survival analysis regression. Stars indicate statistical significance at a variety of conventional thresholds: \*  $p < .10$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ .

### Campbelltown City PAC pilot site

Similar to Figure 3, Figure 5 depicts weighted Kaplan-Meier survival curves for YAMs participants in the Campbelltown City PAC pilot site and the matched comparison group, by output and outcome. Figures also include associated hazard ratios from weighted Cox regression survival analysis. Similar to results in Figure 4, the analyses reported in this section make use of a much smaller sample size ( $N=71$ ) and may lack the statistical power to detect small differences between groups.

We first consider outputs in Figure 5 Panel A. We observe that within a year of referral, YAMs participants had a 72% higher likelihood of RoSH reporting ( $HR=1.72$ ) and were nearly twice as likely to have a missing person report recorded. Both results were statistically significant at conventional levels of statistical significance (1% and 5%, respectively). When interpreted with reference to analyses shown in Figures 3 and 4, these results imply that the Campbelltown City PAC pilot site was largely responsible for the statistically significant differences in RoSH and missing person reports found in our main combined site analysis. We observe that YAMs participants experienced a 12% higher likelihood of school enrolment and a 12% lower likelihood of mental health service use. Though the directionality of these small differences may imply small changes in multiagency service use, these differences were not statistically significant at conventional levels. Turning to the outcomes shown in Figure 5 Panel B, we find no statistically significant differences between the YAMs participants and the matched comparison group in proven offending ( $HR=1.47$ ) or crime victimisation ( $HR=0.92$ ) within a year of program referral.

**Figure 5. Daily cumulative prevalence of multiagency outputs and criminal justice outcomes for YAMs participants and matched comparison group in the year following program referral, Campbelltown City PAC pilot site**



Note. HR – Hazard Ratio from a weighted Cox Proportional Hazards survival analysis regression. Stars indicate statistical significance at a variety of conventional thresholds: \*  $p < .10$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ .

### Robustness checks

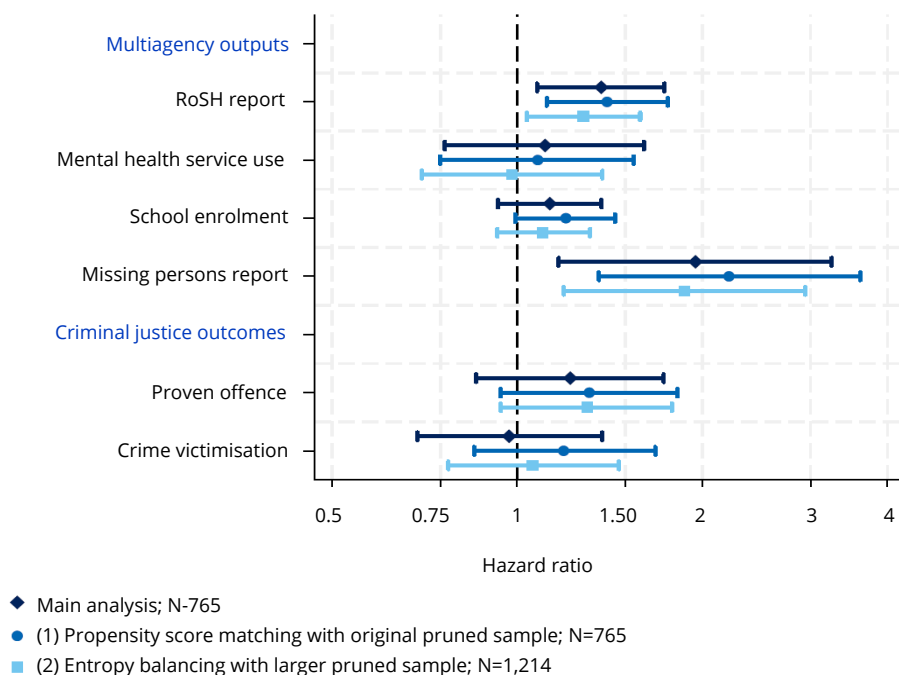
A primary concern when applying a statistical matching approach is that estimates may be sensitive to the choice of comparison group or matching method. To examine whether our empirical approach is robust to these concerns, we follow the advice of Rosenbaum (2020, 1987) who recommends the estimation of multiple models to ensure estimates remain stable across approaches. We specifically consider the influence of two modelling choices in our main model: 1) the use of entropy balancing after data pruning; and 2) the size of the pruned counterfactual group.

In line with this, we estimate a further two models without these choices. The first model (1) utilises the propensity score modelling approach used in our analysis to prune the population group to the comparison group used for analysis. Resultantly, this estimation uses the same comparison group as our main analysis but does not rebalance covariates using entropy balancing. The second model (2) follows a similar approach to our main analysis, but instead utilises a larger pruned comparison group (N=1,071). Results are estimated independently for each output and outcome. Figure 6 shows Hazard Ratio point estimates and confidence intervals from Cox proportional hazards regression models using our main analysis, and each alternative approach. If our estimates are unaffected by modelling choices, we should note a small improvement in variance and no large changes in estimated hazard ratios.<sup>39</sup>

Regression coefficients and confidence intervals are very similar across each methodological approach. At the 5% significance level, YAMs increased the likelihood of RoSH and missing person reporting by around 1.3 and 2 times, respectively, regardless of matching method and control group. Similarly, across all models, we find no statistically significant differences in the likelihood of school enrolment, mental health service use, proven offending or crime victimisation. The strong consistency in estimates obtained using different modelling approaches provides evidence that our estimated effect of YAMs participation is robust to sample restrictions introduced by pruning and the choice of matching methodology.

<sup>39</sup> Further description of these robustness checks, modelling considerations, and detailed results of robustness modelling are included in Appendix E.

**Figure 6. Differences in outputs and outcomes between YAMs participation and matched group, by matching method and comparison group, combined pilot sites**



## DISCUSSION

In this study, we examined whether participation in the YAMs pilot program was associated with changes in multiagency service responses and/or criminal justice outcomes within a year of referral. We found that compared to similar young people not placed on the program, YAMs participants were 37% more likely to have a RoSH report recorded and nearly twice as likely to have a missing person report recorded. As YAMs was designed to coordinate an enhanced service system response to the complex needs of young people, these differences likely reflect improved surveillance and service system responsiveness rather than increased underlying need. This was supported by the timing of reporting, which occurred while young people were affected by the program. No significant differences were observed for school enrolment, mental health service usage, proven offending or crime victimisation.

Though substantial variation in program design and implementation make comparisons between coordinated multiagency initiatives difficult, our results are broadly consistent with international evidence concerning the effectiveness of these initiatives for young people with complex needs. Increased RoSH and missing person reporting identified in our study aligns with findings from Herbert and Bromfield (2017), who note that coordinated multiagency initiatives promote a heightened child protection response for young participants, commonly through improved reporting practices. Despite these similarities, our results diverge from international research which finds consistent evidence that coordinated multiagency initiatives have a small but positive influence on mental health and school functioning (Olson et al., 2021). One reason for this difference may be the lead agency coordinating services responses, as this may allow them a greater influence over specific service responses (Meyer & Mazerolle, 2014). While the YAMs pilot program operated a police-led model, this is somewhat uncommon amongst well-evaluated coordinated multiagency initiatives. Of the ten programs examining mental health and/or school functioning in Olson et al.'s (2021) systematic review, most were led by child protection services (n=6, 60%) or mental health agencies (n=3, 30%). Another explanation for these differences is the variety of measures of mental health and school functioning used across published work, with many studies using detailed measures of psychosocial or self-reported functioning. In our study, we were limited to examining less descriptive administrative records of school enrolment and outpatient mental health service use, which may not be

suitable for capturing nuanced or otherwise unrecorded changes in functioning. As these administrative indicators reflect service contact rather than underlying wellbeing, subtle improvements or deteriorations in mental health, engagement, or daily functioning may not be accurately reflected in our estimates.

Our finding that the YAMs pilot program did not have a statistically significant influence on crime victimisation or offending behaviour mirrors results from the two largest international reviews of coordinated multiagency initiatives, which find mixed and commonly non-statistically significant effects on youth justice outcomes (Olson et al., 2021; Schurer Coldiron et al., 2017). Several explanations have been posited for these findings. The first focuses on the mechanism by which coordinated multiagency initiatives are thought to affect outcomes. By eliciting an enhanced service system response to the complex needs of young people, these programs aim to indirectly affect criminal justice system contact by reducing criminogenic needs of those who might offend. It is plausible that any criminal justice benefits of this approach might take some time to realise or may fade over time if program support is not continuously maintained. This is evident in the work by Schurer Coldiron et al. (2017), who examined the effectiveness of a coordinated multiagency initiative for young people with complex needs over 20 months. Although the authors observed significant decreases in arrests for young people supported by the program, these differences were only observable after 200 days of continuous program support. Data limitations in our study meant that we were unable to examine either the length of time young people remained on the YAMs agenda or outcomes beyond the year following program referral.

Another common explanation for variations in program effectiveness are differences in program implementation fidelity. Where programs are delivered with a greater intensity, longer duration and/or stronger adherence to a planned program model, effectiveness is often higher (Olson et al., 2021; Schurer Coldiron et al., 2017). Compared with other coordinated multiagency initiatives examined in Olson et al. (2021), which mostly included young people directly in the planning and implementation of service supports, the YAMs pilot program had less direct engagement with young people. Although the pilot intended to contact young people and their families throughout the YAMs process, less than one third of young people were successfully contacted. The idea that implementation fidelity might have influenced the effectiveness of the pilot program is supported by our site-specific results, showing that changes in RoSH and missing person reporting were primarily driven by the Campbelltown City PAC site. During the pilot, several important operational differences arose which may have contributed to this. Firstly, although rates of contact with young people were low in both sites, they were higher in the Campbelltown City PAC site (34%) than in the Coffs/Clarence PD site (25%). Secondly, the YAMs Coordinator position was more consistently filled in the Campbelltown City PAC site, while the YAMs Coordinator position in the Coffs/Clarence PD site saw significant staff turnover. During the pilot period, the Coffs/Clarence PD YAMs Coordinator role was filled by three different people, and was vacant for around 17 weeks. Thirdly, sites took different approaches to filling the YAMs chair position, with the Campbelltown City PAC site having a consistent meeting chair and the Coffs/Clarence site opting for a rotating chair filled by five different police officers. Interestingly, evaluations of a functionally similar program SAMs showed comparable variation in effectiveness between program sites, with less successful sites having a rotating chairperson (Wan et al., 2018).

The YAMs pilot program examined in this study operated between 2020 and 2021. Since the implementation of the pilot, the YAMs program has improved data collection and expanded considerably. In 2025, the program operated across 20 sites (each with a dedicated YAMs Coordinator), held 207 meetings with 3,326 attendees, developed action plans for 2,281 young participants, and identified 4,107 unique actions to support young people. Non-police agencies were well represented at meetings, most commonly NSW Education (86%), DCJ child protection services (86%), NSW Health (85%), DCJ youth justice services (78%), and Homes NSW (42%). In line with findings from our pilot evaluation, current program referral data suggests that the program has continued to identify and support a cohort of young people with complex multiagency needs related to safety, welfare and wellbeing. In addition to increased scale and improved data collection, the YAMs program model has been altered since the implementation of the pilot program. The most recent program model has been in operation since November 2023. While the YAMs program continues to hold meetings in a similar manner to the pilot, the new program

has: 1) improved clarity (of the program model); 2) new onboarding and training processes for YAMs Coordinators; 3) documented networks of services, YAMs participants, and service need in each site; and 4) a clearer program logic with updated community-focused outcomes.

Though the YAMs program is now operating at a significantly greater scale with improved systems, findings from our evaluation and international research on similar program models suggest that implementation fidelity may still affect program effectiveness between sites. As a result, the YAMs program would likely benefit from further evaluation to assess whether the model is being implemented consistently and as intended in each site. From our evaluation, this should consider both the level of involvement that young people have in the YAMs process and the possible benefits of maintaining a consistent YAMs chairperson. As a similar but younger program model, YAMs may further benefit from recommendations made in prior process evaluations of SAMs. One successful example of this is the recently implemented improvements to YAMs program data collection. These changes are directly aligned with recommendations in Christian et al. (2019), and facilitate ongoing monitoring of risks, actions and action completion between program sites. Future research should consider both the appropriateness of actions in relation to identified risks, and the influence of the program on service cohesion and availability in the areas where it operates.

This study had several strengths in its approach. It is one of few quantitative evaluations making use of a large administrative dataset to understand associative effects from a multiagency program targeting at-risk youths. The HSDS provided wide-ranging data about sociodemographic characteristics of all young people in NSW with service contacts across education, health, child protection and criminal justice. This allowed us to observe and account for a substantial number of covariates that could confound estimates. Despite these strengths, data limitations meant that we were unable to observe all relevant risk factors and it remains possible that our estimates are affected by omitted variable bias. In addition, due to the small sample size of YAMs participants, analyses of subgroups was not possible, leaving key questions about the program's effectiveness unanswered. For example, it is unclear whether the program works particularly well for younger or older cohorts, for Aboriginal young people (who represented around half of pilot program participants), or for young people with disability (who comprised two fifths of pilot program participants). The expansion of the program and improvements in data management offer an opportunity to better understand the mechanisms by which YAMs influences service responses and outcomes. Future outcome evaluations should consider longer follow-up periods, incorporate qualitative data from participants and stakeholders, and explore the relationship between specific action plan components and observed changes.

---

## ACKNOWLEDGEMENTS

The author would like to thank colleagues from the NSW Centre for Health Record Linkage for their valuable assistance in linking the program data to the Human Services Dataset. Additionally, we would like to thank Evarn Ooi from the Department of Customer Service and Min-Taec Kim for their assistance in preparing the application for data linkage and dataset access. The author would also like to acknowledge several members of BOCSAR for their assistance in helping us to understand and use the multiple datasets examined in this report. Firstly, thank you to Tracy Painting for her expert advice and timely guidance on preparing and using data supplied by the NSW Police Force. Secondly, we would like to thank Sara Rahman for her thoughtful advice regarding medical coding systems. We would further like to thank Fan Cheng for her helpful guidance in using the HSDS. The author would also like to acknowledge support from the NSW Police Force Youth Command, and the YAMs State Manager Sarah Ellis for her assistance in understanding YAMs program operations. Finally, the author would like to thank the two anonymous reviewers for their helpful comments and feedback on an earlier draft of this work, as well as Suzanne Poynton for her valuable feedback on earlier drafts of the report, Adam Teperski for proofreading, and Florence Sin for desktop publishing the report.

## REFERENCES

- Allan, V., Ramagopalan, S. V., Mardekian, J., Jenkins, A., Li, X., Pan, X., & Luo, X. (2020). Propensity score matching and inverse probability of treatment weighting to address confounding by indication in comparative effectiveness research of oral anticoagulants. *Journal of Comparative Effectiveness Research*, 9(9), 603-14. <https://doi.org/10.2217/cer-2020-0013>.
- Andrews, D. A., Bonta, J., & Wormith, J. S. (2006). The recent past and near future of risk and/or need assessment. *Crime and Delinquency*, 52(1), 7-27. <https://doi.org/10.1177/0011128705281756>.
- Austin, P. C. (2009). Balance diagnostics for comparing the distribution of baseline covariates between treatment groups in propensity-score matched samples. *Statistics in Medicine*, 28(25), 3083-107. <https://doi.org/10.1002%2Fsim.3697>.
- Austin, P. C. (2010). Statistical criteria for selecting the optimal number of untreated subjects matched to each treated subject when using many-to-one matching on the propensity score. *American Journal of Epidemiology*, 172(9), 1092-7. <https://doi.org/10.1093/aje/kwq224>.
- Australian Bureau of Statistics. (2011). *Australian and New Zealand standard offence classification (ANZSOC)* (No. 1216.0). Retrieved from the Australian Bureau of Statistics website: <https://www.abs.gov.au/statistics/classifications/australian-and-new-zealand-standard-offence-classification-anzsoc/2011>.
- Australian Bureau of Statistics. (2016). *Australian statistical geography standard (ASGS): Volume 5 - Remoteness structure* (No. 1270.0). Retrieved from the Australian Bureau of Statistics website: <https://www.abs.gov.au/ausstats/abs@.nsf/mf/1270.0.55.005?OpenDocument>.
- Australian Bureau of Statistics. (2018). *Census of population and housing: Socio-economic indexes for areas (SEIFA), Australia, 2016* (No. 2033.0.55.001). Retrieved from the Australian Bureau of Statistics website: <https://www.abs.gov.au/ausstats/abs@.nsf/mf/2033.0.55.001>.
- Australian Bureau of Statistics. (2019). *Disability, ageing and carers, Australia* (No. 4430.0). Retrieved from the Australian Bureau of Statistics website: <https://www.abs.gov.au/statistics/health/disability/disability-ageing-and-carers-australia-summary-findings/2018>.
- Australian Institute of Health and Welfare, & Australian Bureau of Statistics. (2012). *National best practice guidelines for data linkage activities relating to Aboriginal and Torres Strait Islander people* (No. IHW 74). Retrieved from the Australian Institute of Health and Welfare website: <https://www.aihw.gov.au/getmedia/6d6b9365-9cc7-41ee-873f-13e69e038337/13627.pdf?v=20230605181020&inline=true>.
- Australian Institute of Health and Welfare. (2024). *Child protection Australia 2021–22: Appendices A to E*. (No. CWS 92). Retrieved from the Australian Institute of Health and Welfare website: <https://www.aihw.gov.au/getmedia/6a9836ff-9c81-4113-bad8-648efbcaa265/cpa-2021-22-appendices.pdf.aspx>.
- Baldry, E., Briggs, D. B., Goldson, B., & Russell, S. (2018). 'Cruel and unusual punishment': An inter-jurisdictional study of the criminalisation of young people with complex support needs. *Journal of Youth Studies*, 21(5), 636-52. <https://doi.org/10.1080/13676261.2017.1406072>.
- Bellew, G., & Loy, J. (2025). *Review of the operation of doli incapax in NSW for children under 14*. Retrieved from the NSW Department of Communities and Justice website: <https://dcj.nsw.gov.au/documents/legal-and-justice/laws-and-legislation/final-report-doli-Incapax-Review-29-August-2025.pdf>.
- Boiteux, S., & Poynton, S. (2023). *Offending by young people with disability: A NSW linkage study*. (Crime and Justice Bulletin No. 254). Retrieved from the NSW Bureau of Crime Statistics and Research website: <https://bocsar.nsw.gov.au/documents/publications/cjb/cjb251-300/cjb254-report-offending-by-young-people-with-disability.pdf>.

Bruns, E. J., Sather, A., Pullmann, M. D., & Stambaugh, L. F. (2011). National trends in implementing wraparound: Results from the state wraparound survey. *Journal of Child and Family Studies*, 20(6), 726–35. <https://doi.org/10.1007/s10826-011-9535-3>.

Clancey, G., Wang, S., & Lin, B. (2020). *Youth justice in Australia: Themes from recent inquiries* (Trends & Issues in Crime and Criminal Justice No. 605). Retrieved from the Australian Institute of Criminology website: [https://www.aic.gov.au/sites/default/files/2020-09/ti605\\_youth\\_justice\\_in\\_australia.pdf](https://www.aic.gov.au/sites/default/files/2020-09/ti605_youth_justice_in_australia.pdf).

Christian, F., Ellinson, A., Merlene, M., Hart, K., Koleth, M., Darvodelsky, M., Leahy, S., Kidson, J., Wakelin, D., Cassidy, J., Quail, S., Johansson, K., & Gatfield, R. L. (2019). *Safer Pathway evaluation: Final report*. Retrieved from the NSW Department of Communities and Justice website: <https://dcj.nsw.gov.au/documents/legal-and-justice/safety-pathway/safer-pathway-evaluation-report.pdf>.

DeMatteo, D., & Marczyk, G. (2005). Risk Factors, Protective Factors, and the Prevention of Antisocial Behavior Among Juveniles. In K. Heilbrun, N. E. Sevin Goldstein, & R. E. Redding (Eds.), *Juvenile delinquency: Prevention, assessment, and intervention* (1<sup>st</sup> ed., Vol. 1, pp. 19–44). Oxford University Press. <https://doi.org/10.1093/med:psych/9780195160079.003.0002>.

Dowse, L., Cumming, T. M., Strnadová, I., Lee, J., & Trofimovs, J. (2014). Young people with complex needs in the criminal justice system. *Research and Practice in Intellectual and Developmental Disabilities* 1(2), 174–85. <https://doi.org/10.1080/23297018.2014.953671>.

Dowse, L., Rowe, S., Baldry, E., & Baker, M. (2021). *Royal Commission into Violence, Abuse, Neglect and Exploitation of People with Disability research report: Police responses to people with disability*. Retrieved from the Disability Royal Commission website: <https://disability.royalcommission.gov.au/system/files/2023-05/Research%20Report%20-%20Police%20responses%20to%20people%20with%20disability.pdf>.

Fitzgerald, J. (2023). *Youth crime and youth justice trends*. In G. Clancey & R. Lulham (Eds.), *Youth crime, youth justice and Children's Courts in NSW* (Chapter 2). LexisNexis.

Funnell, S. C., & Rogers, P. J. (2011). *Purposeful program theory: Effective use of theories of change and logic models* (1<sup>st</sup> Ed.). John Wiley & Sons, Inc.

Hainmueller, J. (2012). Entropy balancing for causal effects: A multivariate reweighting method to produce balanced samples in observational studies. *Political Analysis*, 20(1), 25–46. <https://doi.org/10.1093/pan/mpr025>.

Herbert, J. L., & Bromfield, L. (2017). Better Together? A review of evidence for multi-disciplinary teams responding to physical and sexual child abuse. *Journal of Trauma, Violence, & Abuse*, 20(2), 214–28. <https://doi.org/10.1177/1524838017697268>.

Justice Health & Forensic Mental Health Network and Juvenile Justice NSW. (2017). *2015 young people in custody health survey: Full report*. Retrieved from the Justice Health NSW website: [https://www.nsw.gov.au/sites/default/files/2022-05/2015\\_YPiCHS\\_Full\\_report.pdf](https://www.nsw.gov.au/sites/default/files/2022-05/2015_YPiCHS_Full_report.pdf).

Klauzner, I., Poynton, S., Weatherburn, D., & Thorburn, H. (2022). *Evaluating Youth on Track: A randomised controlled trial of an early intervention program for young people who offend*. (Crime and Justice Bulletin No. 249). Retrieved from the NSW Bureau of Crime Statistics and Research website: <https://bocsar.nsw.gov.au/documents/publications/cjb/cjb201-250/cjb249-report-youth-on-track-evaluation-2022.pdf>.

Malvaso, C. G., Cale, J., Whitten, T., Day, A., Singh, S., Hackett, L., Delfabbro, P. H., & Ross, S. (2021). Associations between adverse childhood experiences and trauma among young people who offend: A systematic literature review. *Trauma, Violence, & Abuse*, 23(5), 1677–94. <https://doi.org/10.1177/15248380211013132>.

Matsouaka, R. A., Liu, Y., & Zhou, Y. (2024). Overlap, matching, or entropy weights: What are we weighting for? *Communications in Statistics - Simulation and Computation*, 54(7), 2672–91. <https://doi.org/10.1080/03610918.2024.2319419>.

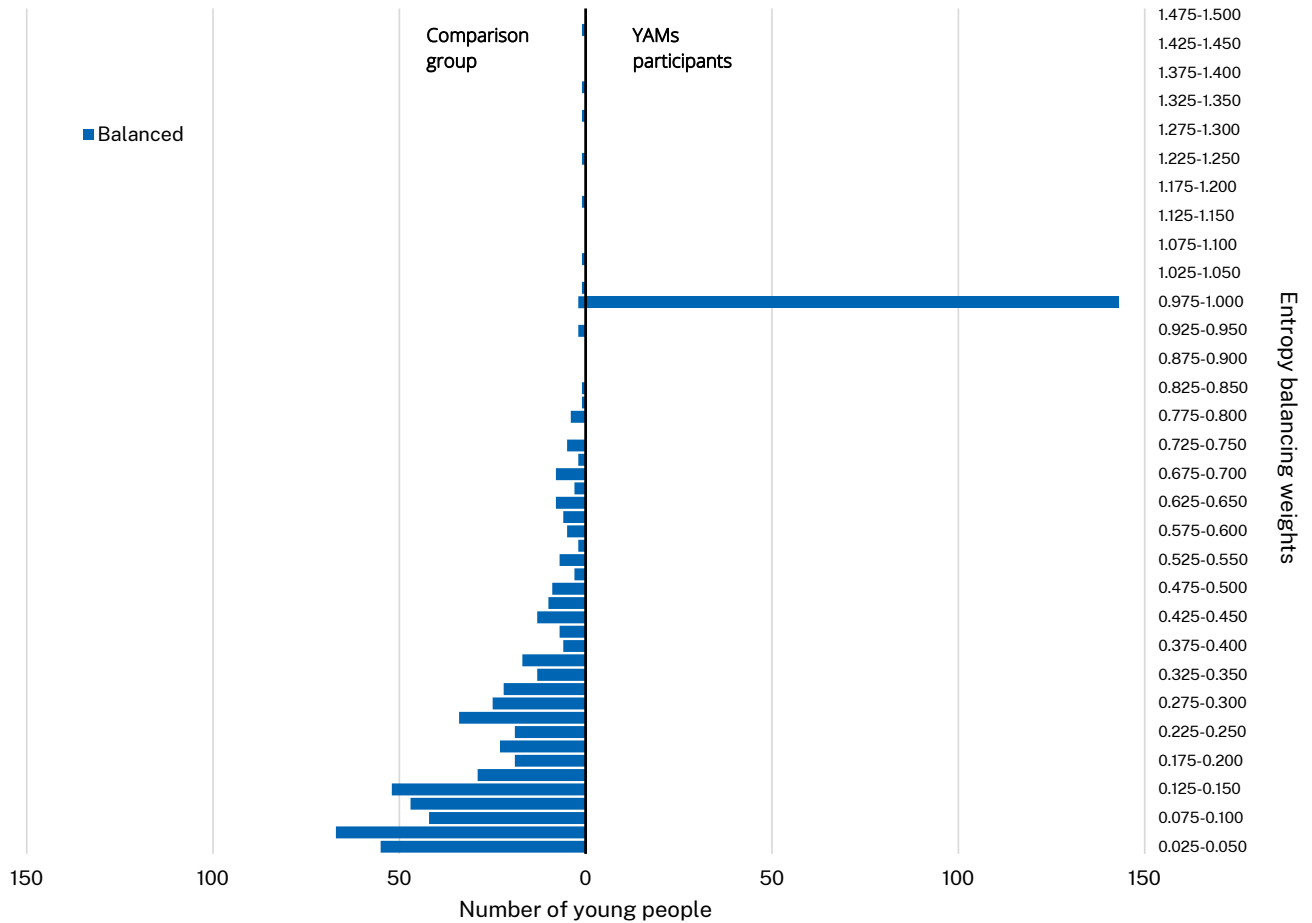
- McCarthy, M. (2020). How universal is the youth crime drop? Disentangling recent trends in youth offending through a socio-economic lens. *Victims and Offenders, 16*(6), 796-818. <https://doi.org/10.1080/15564886.2020.1855281>.
- McMullin, J., & Schonberger, B. (2022). When good balance goes bad: A discussion of common pitfalls when using entropy balancing. *Journal of Financial Reporting, 7*(1), 167-96. <https://doi.org/10.2308/JFR-2021-007>.
- Meyer, S., & Mazerolle, L. (2014). Police-led partnership responses to high risk youths and their families: Challenges associated with forming successful and sustainable partnerships, *Policing and Society: An International Journal of Research and Policy, 24*(2), 242-60. <https://doi.org/10.1080/10439463.2013.784295>.
- Nelson, M. A., Lim, K., Boyd, J., Cordery, D., Went, A., Meharg, D., Jackson-Pulver, L., Winch, S., & Taylor, L. K. (2020). Accuracy of reporting of Aboriginality on administrative health data collections using linked data in NSW, Australia. *BMC Medical Research Methodology, 20*(267), 1-8. <https://doi.org/10.1186/s12874-020-01152-2>.
- NSW Department of Communities and Justice. (2025). *About the Human Services Dataset*. Retrieved from the NSW Department of Communities and Justice website: <https://dcj.nsw.gov.au/about-us/facsiar/human-services-dataset-hsds/about-the-human-services-dataset.html>.
- NSW Police Force. (2019). *NSW Police Force Youth Strategy* (No. D/2018/547733). Retrieved from the NSW Police Force website: [https://web.archive.org/web/20220121234526/https://www.police.nsw.gov.au/\\_data/assets/pdf\\_file/0010/616816/YouthStrategy\\_D17.pdf](https://web.archive.org/web/20220121234526/https://www.police.nsw.gov.au/_data/assets/pdf_file/0010/616816/YouthStrategy_D17.pdf).
- NSW Treasury. (2023). *Evaluation Guidelines* (No. TPG22-22). Retrieved from the NSW Administrative Requirements Portal website: <https://arp.nsw.gov.au/assets/ars/attachments/tpg22-22-evaluation-guidelines.pdf>.
- Olson, J. R., Benjamin, P. H., Azman, A. A., Kellogg, M. A., Pullmann, M. D., Suter, J. C., & Bruns, E. J. (2021). Systematic review and meta-analysis: Effectiveness of wraparound care coordination for children and adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry, 60*(11), 1353-66. <https://doi.org/10.1016/j.jaac.2021.02.022>.
- Parish, W. J., Keyes, V., Beadles, C., & Kandilov, A. (2017). Using entropy balancing to strengthen an observational cohort study design: Lessons learned from an evaluation of a complex multi-state federal demonstration. *Health Services and Outcomes Research Methodology, 18*(1), 17-46. <https://doi.org/10.1007/s10742-017-0174-z>.
- Payne, J., Brown, R., & Broadhurst, R. (2018). *Where have all the young offenders gone? Examining changes in offending between two NSW birth cohorts* (Trends & Issues in Crime and Criminal Justice No. 553). Retrieved from the Australian Institute of Criminology website: [https://www.aic.gov.au/sites/default/files/2020-05/ti\\_553\\_091118.pdf](https://www.aic.gov.au/sites/default/files/2020-05/ti_553_091118.pdf).
- Perrin, B. (2006). *Moving from outputs to outcomes: Practical advice from governments around the world*. Retrieved from the IBM Center for the Business of Government website: <https://www.businessofgovernment.org/sites/default/files/PerrinReport.pdf>.
- Rahman, S., & Chronopoulos Theore, N. (2024). *The costs and benefits of the Magistrates' Early Referral into Treatment (MERIT) program*. (Crime and Justice Bulletin No. 266). Retrieved from the NSW Bureau of Crime Statistics and Research website: <https://bocsar.nsw.gov.au/documents/publications/cjb/cjb251-300/CJB266-Report-merit-costs-benefits.pdf>.
- Richards, K. (2011). *What makes juvenile offenders different from adult offenders?* (Trends & Issues in Crime and Criminal Justice No. 409). Retrieved from the Australian Institute of Criminology website: <https://www.aic.gov.au/sites/default/files/2020-05/tandi409.pdf>.

- Rosenbaum, P. R. (1987). The role of a second control group in an observational study. *Statistical Science*, 2(3), 292-306. <https://doi.org/10.1214/ss/1177013232>.
- Rosenbaum, P. R. (2020). Modern algorithms for matching in observational studies. *Annual Review of Statistics and Its Application*, 7(1), 143-76. <https://doi.org/10.1146/annurev-statistics-031219-041058>.
- Rosenbaum, P. R., & Rubin, D. B. (1985). The bias due to incomplete matching. *Biometrics*, 41(1), 103-16. <https://pubmed.ncbi.nlm.nih.gov/4005368/>.
- Rubin, D. B., & Thomas, N. (2000). Combining propensity score matching with additional adjustments for prognostic covariates. *Journal of the American Statistical Association*, 95(450), 573-85. <http://www.jstor.org/stable/2669400>.
- Sather, A., & Bruns, E. J. (2016). National trends in implementing wraparound: Results of the state wraparound survey, 2013. *Journal of Child and Family Studies*, 25(10), 3160-72. <https://doi.org/10.1007/s10826-016-0469-7>.
- Schurer Coldiron, J., Bruns, E. J., & Quick, H. (2017). A comprehensive review of wraparound care coordination research, 1986–2014. *Journal of Child and Family Studies*, 26(5), 1245-65. <https://doi.org/10.1007/s10826-016-0639-7>.
- Trimboli, L. (2017). *Outcome evaluation of NSW's Safer Pathway program: Victims' experiences* (Crime and Justice Bulletin No. 202). Retrieved from the NSW Bureau of Crime Statistics and Research website: <https://bocsar.nsw.gov.au/documents/publications/cjb/cjb201-250/cjb202-report-outcome-evaluation-of-nsws-safer-pathway-program-victims-experiences-2017.pdf>.
- Trimboli, L. (2019). *NSW trends in the age-specific rates of offending, 1995 – 2018* (Bureau Brief No. 143). Retrieved from the NSW Bureau of Crime Statistics and Research website: <https://bocsar.nsw.gov.au/documents/publications/bb/bb101-150/bb143-report-nsw-trends-in-the-age-specific-rates-of-offending.pdf>.
- Tune, D. (2016). *Independent review of out of home care in New South Wales: Final report*. Retrieved from the Association of Children's Welfare Agencies website: <https://www.acwa.asn.au/wp-content/uploads/2018/06/TUNE-REPORT-indepth-review-out-of-home-care-in-nsw.pdf>.
- Ury, H. K. (1975). Efficiency of case-control studies with multiple controls per case: Continuous or dichotomous data. *Biometrics*, 31(3), 643-9. <http://www.jstor.org/stable/2529548>.
- Wan, W. Y., Thorburn, H., Poynton, S. and Trimboli, L. (2018). *Assessing the impact of NSW's Safer Pathway Program on recorded crime outcomes – An aggregate-level analysis* (Crime and Justice Bulletin No. 210). Retrieved from the NSW Bureau of Crime Statistics and Research website: <https://bocsar.nsw.gov.au/documents/publications/cjb/cjb201-250/cjb210-report-assessing-the-impact-of-nsws-safer-pathway-program-on-recorded-crime-outcomes-2018.pdf>.
- Zhao, Q., & Percival, D. (2017). Entropy balancing is doubly robust. *Journal of Causal Inference*, 5(1), 1-19. <https://doi.org/10.1515/jci-2016-0010>.
- Zühlke, A., Kugler, P., Hackenberger, A., & Brändle, T. (2020). *Accounting for investment risk in educational decisions: New evidence for lifetime returns in Germany* (Institute for Applied Economic Research Discussion Papers No. 133). Retrieved from the Institute for Applied Economic Research website: [https://www.iaw.edu/RePEc/iaw/pdf/iaw\\_dp\\_133.pdf](https://www.iaw.edu/RePEc/iaw/pdf/iaw_dp_133.pdf).

## APPENDIX

### Appendix A – Combined sample entropy balancing diagnostics

Figure A1. Distribution of entropy balancing weights for young people in the YAMs and comparison groups



Note. The large majority of observations for the comparison group were assigned a weight between 0 and 1 ( $n = 615$ , 99%). A small proportion of the comparison group contributed were oversampled, having a weight greater than 1 ( $n = 7$ , 1%). The largest weight for the comparison group was between 1.450 and 1.475

Figure A2. Proportion of YAMs participants and balanced comparison sample, by month and year of index service contact

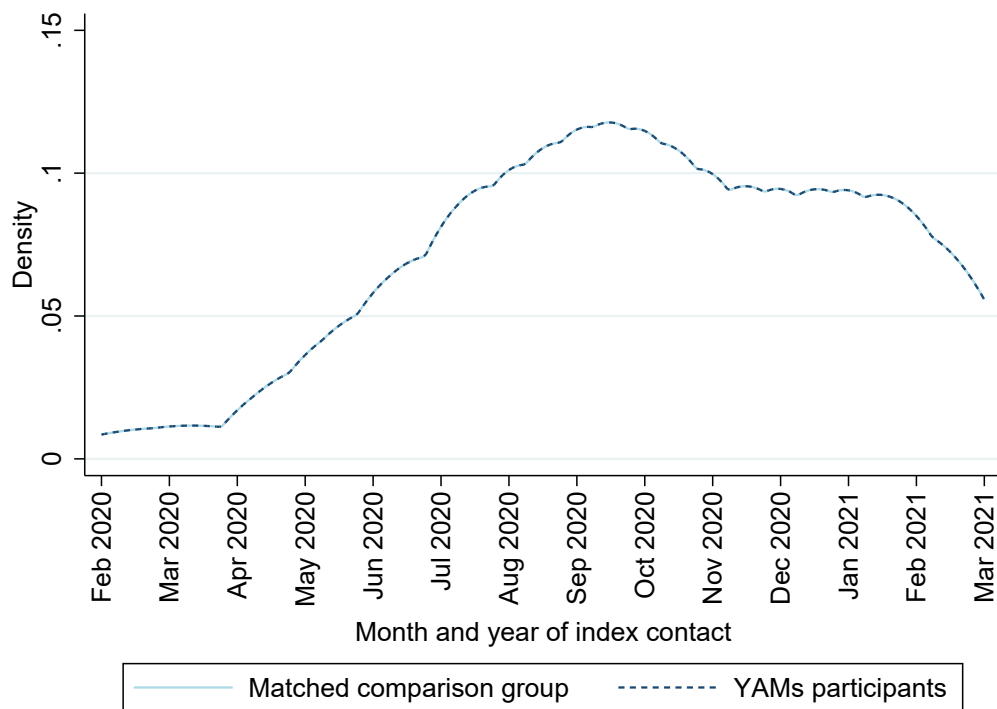


Table A1. Characteristics of YAMs participants, by pilot program site and for combined sites

|   |                          | Campbelltown<br>City PAC<br>(N=71) | Coffs/Clarence<br>PD<br>(N=72) | Combined<br>sites<br>(N=143) |
|---|--------------------------|------------------------------------|--------------------------------|------------------------------|
| <b>Panel A: Demographic characteristics</b> |                          |                                    |                                |                              |
| Age at index start date                     |                          | 14.11                              | 14.11                          | 14.11                        |
| Female                                      |                          | 0.45                               | 0.42                           | 0.43                         |
| Aboriginal                                  |                          | 0.45                               | 0.49                           | 0.47                         |
| Disability-related education support        |                          | 0.46                               | 0.36                           | 0.41                         |
| Socio-economic disadvantage                 | Q1 (most disadvantaged)  | 0.34                               | 0.29                           | 0.32                         |
|   | Q2                       | 0.51                               | 0.71                           | 0.58                         |
|   | Q3                       | 0.12                               | 0.00                           | 0.07                         |
|   | Q4 (least disadvantaged) | 0.05                               | 0.00                           | 0.03                         |
| Remoteness                                  | Major cities             | 1.00                               | 0.00                           | 0.50                         |
|   | Inner regional           | 0.00                               | 0.91                           | 0.48                         |
|   | Outer regional           | 0.00                               | 0.09                           | 0.02                         |
|   | Remote or very remote    | 0.00                               | 0.00                           | 0.00                         |
| <b>Panel B: Index service contact</b>       |                          |                                    |                                |                              |
| Index service contact type                  | Child protection         | 0.05                               | 0.14                           | 0.08                         |
|   | Education                | 0.02                               | 0.02                           | 0.04                         |
|   | Health                   | 0.02                               | 0.05                           | 0.02                         |
|   | Criminal justice         | 0.91                               | 0.79                           | 0.86                         |

**Table A1. Characteristics of YAMs participants, by pilot program site and for combined sites (continued)**

|  |                              | Campbelltown<br>City PAC<br>(N=71) | Coffs/Clarence<br>PD<br>(N=72) | Combined<br>sites<br>(N=143) |
|--|------------------------------|------------------------------------|--------------------------------|------------------------------|
| <b>Panel C: Criminal offending within prior three years</b>        |                              |                                    |                                |                              |
| Number of proven offences  | 0                            | 0.61                               | 0.67                           | 0.63                         |
|  | 1                            | 0.17                               | 0.18                           | 0.18                         |
|  | 2-3                          | 0.12                               | 0.09                           | 0.10                         |
|  | 4+                           | 0.10                               | 0.05                           | 0.08                         |
| Prior offence types  | Violent                      | 0.20                               | 0.14                           | 0.17                         |
|  | DV                           | 0.14                               | 0.06                           | 0.10                         |
|  | Property                     | 0.23                               | 0.18                           | 0.20                         |
|  | Drug-related                 | 0.04                               | 0.05                           | 0.04                         |
|  | Property damage              | 0.13                               | 0.15                           | 0.15                         |
| Any entries into remanded or sentenced custody                     | 0.18                         | 0.06                               | 0.13                           |                              |
| Prior sentenced custodial episode                                  | 0.00                         | 0.00                               | 0.00                           |                              |
| In custody at index service contact                                | 0.00                         | 0.00                               | 0.00                           |                              |
| <b>Panel D: Crime victimisation within prior three years</b>       |                              |                                    |                                |                              |
| Number of victimisation events                                     | 0                            | 0.42                               | 0.46                           | 0.44                         |
|  | 1                            | 0.27                               | 0.22                           | 0.24                         |
|  | 2                            | 0.20                               | 0.15                           | 0.17                         |
|  | 3-4                          | 0.06                               | 0.10                           | 0.10                         |
|  | 5+                           | 0.05                               | 0.07                           | 0.05                         |
| Prior incident types   | Violent                      | 0.54                               | 0.44                           | 0.49                         |
|  | Property                     | 0.02                               | 0.11                           | 0.06                         |
|  | Other                        | 0.17                               | 0.19                           | 0.18                         |
| <b>Panel E: Contact with housing services in prior three years</b> |                              | 0.41                               | 0.43                           | 0.42                         |
| <b>Panel F: Missing person reports within prior three years</b>    |                              |                                    |                                |                              |
| Number of missing person reports                                   | 0                            | 0.24                               | 0.33                           | 0.29                         |
|  | 1-3                          | 0.27                               | 0.36                           | 0.31                         |
|  | 4+                           | 0.49                               | 0.31                           | 0.40                         |
| <b>Panel G: Child protection and OOHC within prior three years</b> |                              |                                    |                                |                              |
| Number of RoSH reports   | 0                            | 0.05                               | 0.11                           | 0.08                         |
|  | 1-2                          | 0.18                               | 0.18                           | 0.17                         |
|  | 3-4                          | 0.12                               | 0.22                           | 0.17                         |
|  | 5-11                         | 0.33                               | 0.36                           | 0.35                         |
|  | 12+                          | 0.32                               | 0.13                           | 0.23                         |
| Prior primary concerns identified by RoSH reports                  | At risk due to own behaviour | 0.69                               | 0.49                           | 0.59                         |
|  | Carer mental health          | 0.01                               | 0.00                           | 0.00                         |
|  | Carer other                  | 0.02                               | 0.00                           | 0.00                         |
|  | Domestic violence            | 0.12                               | 0.18                           | 0.15                         |
|  | Carer drug or alcohol use    | 0.04                               | 0.02                           | 0.03                         |
|  | Emotional abuse              | 0.45                               | 0.38                           | 0.41                         |
|  | Neglect                      | 0.62                               | 0.60                           | 0.61                         |
|  | Physical abuse               | 0.65                               | 0.63                           | 0.64                         |
|  | Sexual abuse                 | 0.54                               | 0.36                           | 0.45                         |
| Number of non-continuous OOHC placements                           | 0                            | 0.76                               | 0.86                           | 0.81                         |
|  | 1                            | 0.19                               | 0.14                           | 0.18                         |
|  | 2+                           | 0.05                               | 0.00                           | 0.03                         |

**Table A1. Characteristics of YAMs participants, by pilot program site and for combined sites (continued)**

|   |                                    | Campbelltown<br>City PAC<br>(N=71) | Coffs/Clarence<br>PD<br>(N=72) | Combined<br>sites<br>(N=143) |
|---|------------------------------------|------------------------------------|--------------------------------|------------------------------|
| Prior placement into OOHC type                                    | Foster care                        | 0.13                               | 0.06                           | 0.10                         |
|   | Kinship care                       | 0.15                               | 0.11                           | 0.12                         |
|   | Residential care                   | 0.09                               | 0.02                           | 0.05                         |
|   | Other                              | 0.13                               | 0.05                           | 0.10                         |
| In OOHC at index service contact                                  |                                    | 0.13                               | 0.11                           | 0.13                         |
| <b>Panel H: Health service usage within prior three years</b>     |                                    |                                    |                                |                              |
| Number of admitted patient care episodes                          | 0                                  | 0.63                               | 0.72                           | 0.69                         |
|   | 1                                  | 0.24                               | 0.15                           | 0.19                         |
|   | 2                                  | 0.05                               | 0.08                           | 0.08                         |
|   | 3+                                 | 0.08                               | 0.05                           | 0.05                         |
| Alcohol or drug related admissions                                | Alcohol-related                    | 0.04                               | 0.01                           | 0.02                         |
|   | Drug-related                       | 0.04                               | 0.05                           | 0.05                         |
| Number of mental health ambulatory episodes                       | 0                                  | 0.51                               | 0.65                           | 0.58                         |
|   | 1-2                                | 0.02                               | 0.00                           | 0.01                         |
|   | 3-5                                | 0.11                               | 0.06                           | 0.08                         |
|   | 6-15                               | 0.14                               | 0.15                           | 0.15                         |
|   | 16+                                | 0.24                               | 0.14                           | 0.17                         |
| Mental health diagnosis from ambulatory services                  |                                    | 0.63                               | 0.39                           | 0.51                         |
| <b>Panel I: School attendance and exclusion within prior year</b> |                                    |                                    |                                |                              |
| Number of suspensions   | 0                                  | 0.08                               | 0.23                           | 0.15                         |
|   | 1                                  | 0.13                               | 0.07                           | 0.10                         |
|   | 2-3                                | 0.20                               | 0.21                           | 0.20                         |
|   | 4-5                                | 0.15                               | 0.22                           | 0.19                         |
|   | 6+                                 | 0.44                               | 0.28                           | 0.36                         |
| Primary reasons for suspension                                    | Aggressive behaviour               | 0.69                               | 0.61                           | 0.65                         |
|   | Continued disobedience             | 0.51                               | 0.50                           | 0.50                         |
|   | Persistent or serious misbehaviour | 0.45                               | 0.42                           | 0.43                         |
|   | Physical violence                  | 0.38                               | 0.35                           | 0.36                         |
|   | Other                              | 0.38                               | 0.22                           | 0.30                         |
| Proportion of enrolled days suspended                             | 0                                  | 0.38                               | 0.64                           | 0.51                         |
|   | 1-4                                | 0.25                               | 0.13                           | 0.19                         |
|   | 5-10                               | 0.17                               | 0.10                           | 0.14                         |
|   | 11-19                              | 0.10                               | 0.07                           | 0.08                         |
|   | 20+                                | 0.09                               | 0.06                           | 0.08                         |
| Proportion of enrolled days with unexplained absence              | 0                                  | 0.07                               | 0.26                           | 0.17                         |
|   | 1-4                                | 0.19                               | 0.15                           | 0.17                         |
|   | 5-10                               | 0.24                               | 0.15                           | 0.20                         |
|   | 11-19                              | 0.14                               | 0.14                           | 0.13                         |
|   | 20+                                | 0.35                               | 0.30                           | 0.33                         |
| Weeks enrolled  | 0                                  | 0.05                               | 0.09                           | 0.07                         |
|   | 1-4                                | 0.02                               | 0.01                           | 0.02                         |
|   | 5-9                                | 0.02                               | 0.07                           | 0.02                         |
|   | 10-17                              | 0.12                               | 0.17                           | 0.14                         |
|   | 18+                                | 0.79                               | 0.67                           | 0.74                         |
| Suspended at index contact  |                                    | 0.08                               | 0.14                           | 0.10                         |

Note. Values are reported as proportions unless otherwise stated. Minor perturbation has been applied to this table to prevent reidentification. As a result, grouped columns may not sum to totals within or between tables.

**Table A2. Standardised bias tables for entropy balanced model, by pilot program site and for combined sites**

|  |                          | Standardised bias post matching (%) |                      |                |
|--|--------------------------|-------------------------------------|----------------------|----------------|
|  |                          | Campbelltown<br>City PAC            | Coffs/Clarence<br>PD | Combined sites |
| <b>Panel A: Demographic characteristics</b>                        |                          |                                     |                      |                |
| Age at index start date  |                          | 0.0                                 | 0.0                  | 0.0            |
| Female   |                          | 0.0                                 | 0.0                  | 0.0            |
| Aboriginal   |                          | 0.0                                 | 0.0                  | 0.0            |
| Disability-related education support                               |                          | 0.0                                 | 0.0                  | 0.0            |
| Socio-economic disadvantage  | Q1 (most disadvantaged)  | 0.0                                 | 0.0                  | 0.0            |
|  | Q2                       | 0.0                                 | 0.0                  | 0.0            |
|  | Q3                       | 0.0                                 | 0.0                  | 0.0            |
|  | Q4 (least disadvantaged) | 0.0                                 | 0.0                  | 0.0            |
| Remoteness   | Major cities             | 0.0                                 | 0.0                  | 0.0            |
|  | Inner regional           | 0.0                                 | 0.1                  | 0.0            |
|  | Outer regional           | 0.0                                 | -0.1                 | -0.1           |
|  | Remote or very remote    | 0.0                                 | 0.0                  | 0.0            |
| <b>Panel B: Index service contact</b>                              |                          |                                     |                      |                |
| Index service contact type   | Child protection         | -0.1                                | 0.0                  | 0.0            |
|  | Education                | 0.0                                 | 0.0                  | 0.0            |
|  | Health                   | 0.0                                 | 0.0                  | 0.0            |
|  | Criminal justice         | 0.1                                 | 0.0                  | 0.0            |
| <b>Panel C: Criminal offending within prior three years</b>        |                          |                                     |                      |                |
| Number of proven offences  | 0                        | 0.0                                 | 0.1                  | 0.0            |
|  | 1                        | 0.0                                 | 0.0                  | 0.0            |
|  | 2-3                      | 0.0                                 | -0.1                 | -0.1           |
|  | 4+                       | 0.0                                 | -0.1                 | 0.0            |
| Prior offence types  | Violent                  | 0.0                                 | -0.1                 | 0.0            |
|  | DV                       | 0.0                                 | -0.2                 | -0.1           |
|  | Property                 | 0.0                                 | -0.1                 | 0.0            |
|  | Drug-related             | 0.0                                 | -0.2                 | -0.1           |
|  | Property damage          | 0.0                                 | -0.1                 | -0.1           |
| Any entries into remanded or sentenced custody                     |                          | 0.0                                 | 0.0                  | 0.0            |
| Prior sentenced custodial episode                                  |                          | 0.0                                 | 0.0                  | 0.0            |
| In custody at index service contact                                |                          | 0.0                                 | 0.0                  | 0.0            |
| <b>Panel D: Crime victimisation within prior three years</b>       |                          |                                     |                      |                |
| Number of victimisation events                                     | 0                        | 0.0                                 | 0.0                  | 0.0            |
|  | 1                        | 0.0                                 | 0.0                  | 0.0            |
|  | 2                        | 0.0                                 | 0.0                  | 0.0            |
|  | 3-4                      | 0.0                                 | 0.0                  | 0.0            |
|  | 5+                       | 0.0                                 | 0.0                  | 0.0            |
| Prior incident types   | Violent                  | 0.0                                 | 0.0                  | 0.0            |
|  | Property                 | 0.0                                 | 0.1                  | 0.0            |
|  | Other                    | 0.0                                 | 0.0                  | 0.0            |
| <b>Panel E: Contact with housing services in prior three years</b> |                          | 0.0                                 | 0.0                  | 0.0            |

**Table A2. Standardised bias tables for entropy balanced model, by pilot program site and for combined sites  
(continued)**

|  |                              | Standardised bias post matching (%) |                      |                |
|--|------------------------------|-------------------------------------|----------------------|----------------|
|  |                              | Campbelltown<br>City PAC            | Coffs/Clarence<br>PD | Combined sites |
| <b>Panel F: Missing person reports within prior three years</b>    |                              |                                     |                      |                |
| Number of missing person reports                                   | 0                            | 0.0                                 | 0.0                  | 0.0            |
|  | 1-3                          | 0.0                                 | 0.0                  | 0.0            |
|  | 4+                           | 0.1                                 | -0.1                 | 0.0            |
| <b>Panel G: Child protection and OOHC within prior three years</b> |                              |                                     |                      |                |
| Number of RoSH reports   | 0                            | 0.0                                 | 0.0                  | 0.0            |
|  | 1-2                          | 0.0                                 | 0.0                  | 0.0            |
|  | 3-4                          | 0.0                                 | 0.0                  | 0.0            |
|  | 5-11                         | 0.0                                 | -0.1                 | 0.0            |
|  | 12+                          | 0.0                                 | 0.0                  | 0.0            |
| Prior primary concerns identified by RoSH reports                  | At risk due to own behaviour | 0.0                                 | 0.0                  | 0.0            |
|  | Carer mental health          | 0.0                                 | 0.0                  | 0.0            |
|  | Carer other                  | 0.0                                 | 0.0                  | 0.0            |
|  | Domestic violence            | 0.0                                 | 0.0                  | 0.0            |
|  | Carer drug or alcohol use    | 0.0                                 | 0.0                  | 0.0            |
|  | Emotional abuse              | 0.0                                 | 0.1                  | 0.1            |
|  | Neglect                      | 0.0                                 | 0.0                  | 0.0            |
|  | Physical abuse               | 0.0                                 | 0.0                  | 0.0            |
|  | Sexual abuse                 | 0.0                                 | 0.1                  | 0.0            |
| Number of non-continuous OOHC placements                           | 0                            | 0.0                                 | 0.0                  | 0.0            |
|  | 1                            | 0.0                                 | 0.0                  | 0.0            |
|  | 2+                           | 0.0                                 | 0.0                  | 0.0            |
| Prior placement into OOHC type                                     | Foster care                  | 0.0                                 | 0.1                  | 0.0            |
|  | Kinship care                 | 0.0                                 | 0.0                  | 0.0            |
|  | Residential care             | 0.0                                 | 0.0                  | 0.0            |
|  | Other                        | 0.0                                 | 0.0                  | 0.0            |
| In OOHC at index service contact                                   | 0.0                          | 0.0                                 | 0.0                  |                |
| <b>Panel H: Health service usage within prior three years</b>      |                              |                                     |                      |                |
| Number of admitted patient care episodes                           | 0                            | -0.1                                | 0.0                  | 0.0            |
|  | 1                            | 0.0                                 | 0.0                  | 0.0            |
|  | 2                            | 0.0                                 | 0.0                  | 0.0            |
|  | 3+                           | 0.0                                 | 0.0                  | 0.0            |
| Alcohol or drug related admissions                                 | Alcohol-related              | 0.0                                 | 0.0                  | 0.0            |
|  | Drug-related                 | 0.0                                 | 0.0                  | 0.0            |
| Number of mental health ambulatory episodes                        | 0                            | 0.0                                 | 0.0                  | 0.0            |
|  | 1-2                          | 0.0                                 | 0.0                  | 0.0            |
|  | 3-5                          | 0.0                                 | 0.0                  | 0.0            |
|  | 6-15                         | 0.0                                 | 0.0                  | 0.0            |
|  | 16+                          | 0.0                                 | 0.0                  | 0.0            |
| Mental health diagnosis from ambulatory services                   | 0.0                          | 0.0                                 | 0.0                  |                |

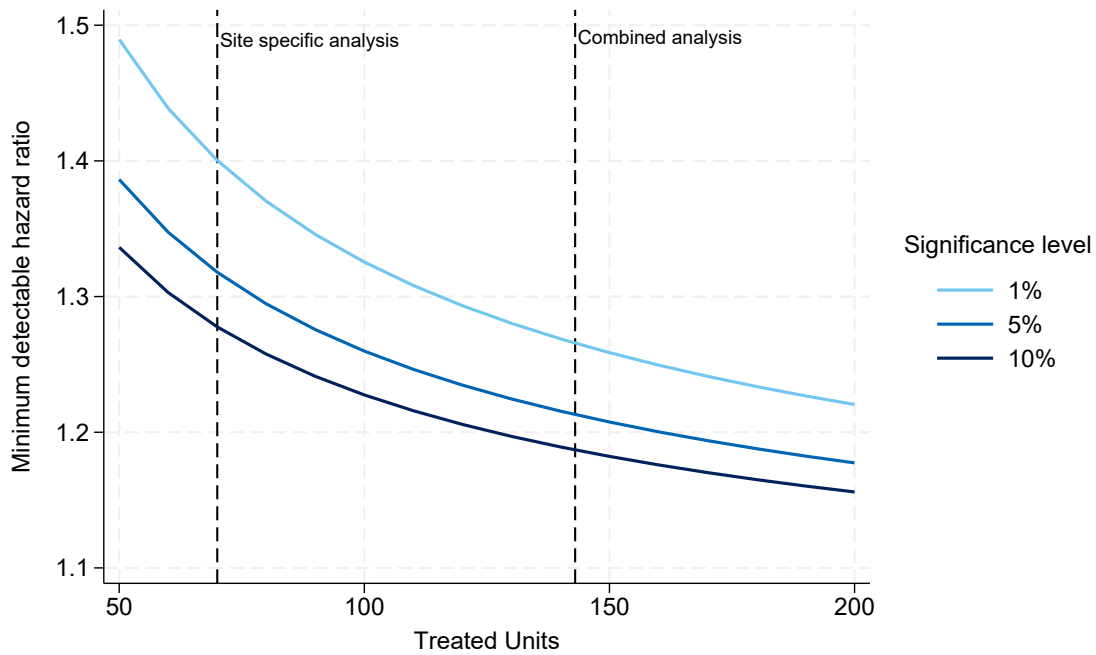
**Table A2. Standardised bias tables for entropy balanced model, by pilot program site and for combined sites  
(continued)**

|   |                                    | Standardised bias post matching (%) |                      |                |
|---|------------------------------------|-------------------------------------|----------------------|----------------|
|   |                                    | Campbelltown<br>City PAC            | Coffs/Clarence<br>PD | Combined sites |
| <b>Panel I: School attendance and exclusion within prior year</b> |                                    |                                     |                      |                |
| Number of suspensions   | 0                                  | -0.1                                | 0.0                  | 0.0            |
|   | 1                                  | 0.0                                 | 0.0                  | 0.0            |
|   | 2-3                                | 0.0                                 | 0.0                  | 0.0            |
|   | 4-5                                | 0.0                                 | 0.0                  | 0.0            |
|   | 6+                                 | 0.0                                 | 0.0                  | 0.0            |
| Primary reasons for suspension                                    | Aggressive behaviour               | 0.0                                 | 0.0                  | 0.0            |
|   | Continued disobedience             | 0.0                                 | 0.0                  | 0.0            |
|   | Persistent or serious misbehaviour | 0.0                                 | 0.0                  | 0.0            |
|   | Physical violence                  | 0.0                                 | 0.0                  | 0.0            |
|   | Other                              | 0.1                                 | 0.0                  | 0.0            |
| Proportion of enrolled days suspended                             | 0                                  | 0.0                                 | 0.0                  | 0.0            |
|   | 1-4                                | 0.0                                 | 0.0                  | 0.0            |
|   | 5-10                               | 0.0                                 | 0.0                  | 0.0            |
|   | 11-19                              | 0.0                                 | 0.1                  | 0.0            |
|   | 20+                                | 0.0                                 | 0.0                  | 0.0            |
| Proportion of enrolled days with unexplained absence              | 0                                  | 0.0                                 | 0.0                  | 0.0            |
|   | 1-4                                | 0.0                                 | 0.0                  | 0.0            |
|   | 5-10                               | 0.0                                 | 0.0                  | 0.0            |
|   | 11-19                              | 0.0                                 | 0.0                  | 0.0            |
|   | 20+                                | 0.0                                 | -0.1                 | 0.0            |
| Weeks enrolled  | 0                                  | 0.0                                 | 0.0                  | 0.0            |
|   | 1-4                                | 0.0                                 | 0.0                  | 0.0            |
|   | 5-9                                | -0.1                                | 0.0                  | 0.0            |
|   | 10-17                              | 0.0                                 | 0.0                  | 0.0            |
|   | 18+                                | 0.0                                 | 0.0                  | 0.0            |
| Suspended at index contact  |                                    | 0.0                                 | 0.0                  | 0.0            |

Note. Reported values represent Rosenbaum and Rubin's (1985) standardised bias, calculated as the mean difference between the YAMs participant and comparison group divided by the standard deviation of the YAMs participant group. Standardised bias is presented post matching for each pilot site, and for combined sites. Stars indicate statistical significance at a variety of conventional thresholds of statistical significance: \* - 10%, \*\* - 5%, \*\*\* - 1%.

## Appendix B – Power calculations

Figure B1. Minimum detectable effect power curve for primary analysis, by number of treated units and significance level



Note. Power calculations are based on the primary weighted Cox proportional hazard regression model utilised in our main analysis. Minimum detectable effects are presented as hazard ratios at three conventional levels of statistical significance. Vertical dashed lines are included at the primary YAMs participant sample sizes included in our main analysis (n=143), and site-specific analysis (n=71).

## Appendix C – Detailed regression results

Table C1. Cox proportional hazards regression survival analysis results and model diagnostics, by site, outputs and outcomes

|                   |   | Effect estimate | 95% CI       | Standard error | p-value | Rewighted Total N | YAMs participant N |
|-------------------|---|-----------------|--------------|----------------|---------|-------------------|--------------------|
| <b>Outputs</b>    | <b>Panel A: RoSH report</b>                     |                 |              |                |         |                   |                    |
|                   | Combined sites                                  | 1.37**          | [1.08, 1.74] | 0.167          | .011    | 286               | 143                |
|                   | Coffs/Clarence site                             | 1.16            | [0.85, 1.87] | 0.181          | .351    | 144               | 72                 |
|                   | Campbelltown site                               | 1.72***         | [1.22, 2.43] | 0.303          | .002    | 142               | 71                 |
|                   | <b>Panel B: Mental health service usage</b>     |                 |              |                |         |                   |                    |
|                   | Combined sites                                  | 1.11            | [0.76, 1.61] | 0.211          | .211    | 286               | 143                |
|                   | Coffs/Clarence site                             | 1.13            | [0.70, 1.81] | 0.272          | .614    | 144               | 72                 |
|                   | Campbelltown site                               | 0.88            | [0.53, 1.48] | 0.233          | .639    | 142               | 71                 |
|                   | <b>Panel C: School enrolment</b>                |                 |              |                |         |                   |                    |
|                   | Combined sites                                  | 1.13            | [0.93, 1.37] | 0.112          | .218    | 286               | 143                |
|                   | Coffs/Clarence site                             | 1.04            | [0.80, 1.35] | 0.138          | .786    | 144               | 72                 |
|                   | Campbelltown site                               | 1.19            | [0.90, 1.58] | 0.171          | .229    | 142               | 71                 |
|                   | <b>Panel D: Missing person report</b>           |                 |              |                |         |                   |                    |
|                   | Combined sites                                  | 1.95**          | [1.17, 3.25] | 0.508          | .011    | 286               | 143                |
|                   | Coffs/Clarence site                             | 0.94            | [0.44, 2.03] | 0.369          | .875    | 144               | 72                 |
| Campbelltown site | 1.99**  | [1.10, 3.60]    | 0.602        | .024           | 142     | 71                |                    |
| <b>Outcomes</b>   | <b>Panel E: Proven offence</b>                  |                 |              |                |         |                   |                    |
|                   | Combined sites                                  | 1.22            | [0.86, 1.73] | 0.218          | .271    | 286               | 143                |
|                   | Coffs/Clarence site                             | 1.03            | [0.65, 1.63] | 0.241          | .896    | 144               | 72                 |
|                   | Campbelltown site                               | 1.47            | [0.90, 2.42] | 0.372          | .124    | 142               | 71                 |
|                   | <b>Panel F: Criminal victimisation incident</b> |                 |              |                |         |                   |                    |
|                   | Combined sites                                  | 0.97            | [0.69, 1.38] | 0.172          | .874    | 286               | 143                |
|                   | Coffs/Clarence site                             | 0.83            | [0.53, 1.31] | 0.192          | .429    | 144               | 72                 |
|                   | Campbelltown site                               | 0.92            | [0.58, 1.47] | 0.219          | .729    | 142               | 71                 |

Note. This table reports hazard ratios from Cox proportional hazards regression models used in our main analysis. Results are estimated independently for each output and outcome. Reported standard errors are robust and clustered at the person level. Stars indicate statistical significance at a variety of conventional thresholds of statistical significance: \* - 10%, \*\* - 5%, \*\*\* - 1%.

## Appendix D – Criminal justice outcomes, by offence type

Table D1. Cox proportional hazards regression survival analysis results and model diagnostics, by site and criminal justice outcome type

|                                     |  | Effect estimate | 95% CI       | Standard error | p-value | Rewighted Total N | YAMs participant N |
|-------------------------------------|--|-----------------|--------------|----------------|---------|-------------------|--------------------|
| <b>Proven offending</b>             | <b>Panel A: Any offending</b>          |                 |              |                |         |                   |                    |
|                                     | Combined sites                         | 1.22            | [0.86, 1.73] | 0.218          | .271    | 286               | 143                |
|                                     | Coffs/Clarence PD                      | 1.03            | [0.65, 1.63] | 0.241          | .896    | 144               | 72                 |
|                                     | Campbelltown City PAC                  | 1.47            | [0.90, 2.42] | 0.372          | .124    | 142               | 71                 |
|                                     | <b>Panel B: Violent offending</b>      |                 |              |                |         |                   |                    |
|                                     | Combined sites                         | 0.88            | [0.49, 1.57] | 0.259          | 0.661   | 286               | 143                |
|                                     | Coffs/Clarence PD                      | 0.98            | [0.48, 1.98] | 0.353          | 0.947   | 144               | 72                 |
|                                     | Campbelltown City PAC                  | 0.90            | [0.38, 2.18] | 0.405          | 0.823   | 142               | 71                 |
|                                     | <b>Panel C: Property offending</b>     |                 |              |                |         |                   |                    |
|                                     | Combined sites                         | 0.80            | [0.43, 1.47] | 0.250          | 0.475   | 286               | 143                |
|                                     | Coffs/Clarence PD                      | 0.46            | [0.18, 1.20] | 0.225          | 0.112   | 144               | 72                 |
|                                     | Campbelltown City PAC                  | 1.08            | [0.47, 2.48] | 0.459          | 0.847   | 142               | 71                 |
| <b>Reported crime victimisation</b> | <b>Panel D: Any victimisation</b>      |                 |              |                |         |                   |                    |
|                                     | Combined sites                         | 0.97            | [0.69, 1.38] | 0.172          | .874    | 286               | 143                |
|                                     | Coffs/Clarence PD                      | 0.83            | [0.53, 1.31] | 0.192          | .429    | 144               | 72                 |
|                                     | Campbelltown City PAC                  | 0.92            | [0.58, 1.47] | 0.219          | .729    | 142               | 71                 |
|                                     | <b>Panel E: Violent victimisation</b>  |                 |              |                |         |                   |                    |
|                                     | Combined sites                         | 0.95            | [0.64, 1.40] | 0.190          | 0.783   | 286               | 143                |
|                                     | Coffs/Clarence PD                      | 0.75            | [0.44, 1.29] | 0.206          | 0.297   | 144               | 72                 |
|                                     | Campbelltown City PAC                  | 0.95            | [0.56, 1.58] | 0.249          | 0.830   | 142               | 71                 |
|                                     | <b>Panel F: Property victimisation</b> |                 |              |                |         |                   |                    |
|                                     | Combined sites                         | 0.61            | [0.16, 2.34] | 0.417          | 0.466   | 286               | 143                |
|                                     | Coffs/Clarence PD                      | 1.28            | [0.32, 5.08] | 0.901          | 0.723   | 144               | 72                 |
|                                     | Campbelltown City PAC <sup>^</sup>     | .               | .            | .              | .       | .                 | .                  |

Note. This table reports hazard ratios from Cox proportional hazards regression models used in our main analysis. Results are estimated independently for each output and outcome. Reported standard errors are robust and clustered at the person level. Stars indicate statistical significance at a variety of conventional thresholds of statistical significance: \* – 10%, \*\* – 5%, \*\*\* – 1%. ^ - Incidence of recorded property victimisation in Campbelltown City PAC site was too low to estimate site-specific analysis. Definitions for violent and property offending and victimisation are available in the data section of the main report.

## Appendix E – Data pruning and robustness checking

In this section we discuss: 1) the data pruning process used in our main analysis; 2) the rationale behind robustness checking used in the study; and 3) the results of robustness checking approaches.

In our study, data pruning was implemented prior to entropy balancing to directly overcome issues relating to comparability or “common support” between the population group and YAMs participants. Although the population group contains young people who could have been referred to YAMs if they demonstrated multiagency needs in line with the YAMs pilot program eligibility criteria, the majority of young people in the population group were not observably comparable to the YAMs participants and would not meet this eligibility threshold. Compounding this concern, the relative size of the population group was exceedingly large (N=549,876) compared to YAMs participants (N=143). In this context, data pruning prior to entropy balancing represents two broad benefits over entropy balancing alone. These include:

- 1. Estimator efficiency and precision:** Data pruning prior to entropy balancing may improve the efficiency and precision of the estimator for two reasons. The first relates to the large ratio between control and treatment groups in our context. As we know that many young people in the population group would not be eligible for the YAMs program as they do not demonstrate

complex needs, the inclusion of these young people in the control group may introduce noise into estimates. In practical applications of matching and regression, estimators have been found to demonstrate greater efficiency with a matching ratio between one and five control units per treated unit (Austin, 2010; Ury, 1975). The second relates to the weighting schema applied by entropy balancing, which requires the assignment of non-zero weights to all control units. In our analysis, this would involve the assignment of near-zero weights to the majority of the population group, who do not demonstrate complex needs. Unlike the issue of large matching weights which allow relatively few observations to exert a disproportionate influence on results, a very high incidence of small matching weights imply the opposite. Specifically, that many observations exert a disproportionately small influence on results (Matsouaka et al., 2024). In practice, this may manifest as a small reduction in the precision of the estimator (Hainmueller, 2012). Although few studies examine the relative efficiency of matching estimators across treatment and control group ratios, entropy balancing has been found to have greater precision and efficiency than alternative approaches at a ratio between one and five (Hainmueller, 2012).

- 2. Interpretability:** As mentioned above, the large imbalance between the population group and YAMs participants means that an entropy balancing approach used in isolation would assign near-zero weights to the majority of the population group who do not demonstrate complex needs. Outside of the effect of this on statistical precision, this extreme weighting schema may complicate the understanding and communication of the study methodology for a non-technical audience (Allan, et al., 2020). By applying a widely accepted and well understood pruning approach, we aim to improve the general interpretability of the study without compromising on the validity of the methodological approach. This is important for methodological transparency, and may help to frame critical discussion of results (Rosenbaum, 2020).

Following the practical guidance in McMullin and Schonberger (2022) and Zühlke et al. (2020), we leverage these benefits by pruning the large population group to a smaller and more comparable control group. We specifically follow suggestions by McMullin and Schonberger (2022) who recommend the use of a propensity score matching approach to trim control group observations that are not comparable to treated observations. In line with Austin (2010) and Ury (1975), and to maximise data usage within efficient control group ratios described by Hainmueller (2012), we choose a control group ratio of five.<sup>40</sup> In doing so, we identify 622 young people with complex needs from the population group who would likely be eligible for YAMs if it were available in their area of residence. We refer to this group as “comparison group”.

Importantly for our analysis, entropy balancing is easily combined with other matching methods (Hainmueller, 2012). Though there is limited research comparing the relative efficiency of combined matching designs, this approach has been demonstrated to reduce estimator bias when compared to propensity score matching alone (Rubin & Thomas, 2000). This improvement is driven by reductions in observed standardised bias in covariates. In our main analysis, we observe large reductions in standardised bias when comparing the comparison group pruned through propensity score matching before and after entropy balancing was applied (see Figure 2). Supporting our methodological approach, common support in our main analysis is implied by the lack of extreme weights from entropy balancing (see Appendix Figure A1).

Despite the benefits associated with data pruning in our context, estimates can be sensitive to pruning if it is applied in inappropriate contexts (Zühlke et al., 2020). To ensure the stability of estimates, Rosenbaum (2020; 1987) recommends the use of multiple matching methods to ensure estimates are robust to the failures of individual methods. Following this advice, we present results from three alternative model specifications in Table E1. If our estimates are unaffected by modelling choices such as the pruning procedure, we should note a negligible change or small improvement in variance and no large changes in point estimates. Model (1) is analogous to that in our main analysis. Model (2) utilises propensity score

<sup>40</sup> Specifically, we employ a 1:5 propensity score matching model with replacement, and include the same set of matching variables as in our main analysis.

modelling used in our analysis to prune to population sample to the comparison group, but does not apply additional entropy balancing. Model (3) follows the entropy balancing approach of our main analysis, but instead uses a larger pruned comparison group (N=1,071). Results are estimated independently for each output and outcome.

We begin by comparing results from our main analysis in Model (1) with the pruning propensity score matching approach in Model (2). Estimated hazard ratios and measures of statistical significance are very similar between models. Small differences arise in point estimates, likely driven by the higher levels of standardised bias in covariates in Model (2) discussed above. In line with Hainmueller (2012), we further note that standard errors are consistently smaller or negligibly different in our entropy balanced main analysis than in Model (2). While this supports the use of our entropy balancing matching approach, it also provides evidence to suggest that our estimates are robust to the choice of matching strategy. Next, we consider the difference between our main approach in Model (1), and the same approach with a larger pruned counterfactual group presented in Model (3). Similar to the previous comparison, we find that estimated hazard ratios are very close between models for all outputs and outcomes. We also note that standard errors are similar across all specifications. This again supports the use of our main approach, and provides evidence that our estimates are not sensitive to the specific pruning applied in the study.

**Table E1. Robustness checks: regression results and diagnostics for alternative modelling approaches and counterfactual groups**

|                 |   | (1)<br>Entropy<br>balancing<br>Main control group<br>(N=765) | (2)<br>Propensity score<br>matching<br>Main control group<br>(N=765) | (3)<br>Entropy<br>balancing<br>Larger control group<br>(N=1,214) |
|-----------------|---|--|--|--|
| <b>Outputs</b>  | <b>Panel A: RoSH report</b>                     |  |  |  |
|                 | Hazard ratio                                    | 1.37**   | 1.40***  | 1.28**   |
|                 | Standard error                                  | (0.167)  | (0.162)  | (0.139)  |
|                 | <b>Panel B: Mental health service usage</b>     |  |  |  |
|                 | Hazard ratio                                    | 1.11   | 1.08   | 0.98   |
|                 | Standard error                                  | (0.211)  | (0.199)  | (0.169)  |
|                 | <b>Panel C: School enrolment</b>                |  |  |  |
|                 | Hazard ratio                                    | 1.13   | 1.20*  | 1.10   |
|                 | Standard error                                  | (0.112)  | (0.114)  | (0.098)  |
|                 | <b>Panel D: Missing person report</b>           |  |  |  |
|                 | Hazard ratio                                    | 1.95**   | 2.21***  | 1.87***  |
|                 | Standard error                                  | (0.508)  | (0.552)  | (0.432)  |
| <b>Outcomes</b> | <b>Panel E: Proven offence</b>                  |  |  |  |
|                 | Hazard ratio                                    | 1.22   | 1.31   | 1.30   |
|                 | Standard error                                  | (0.218)  | (0.221)  | (0.212)  |
|                 | <b>Panel F: Criminal victimisation incident</b> |  |  |  |
|                 | Hazard ratio                                    | 0.97   | 1.19   | 1.06   |
|                 | Standard error                                  | (0.172)  | (0.207)  | (0.174)  |

Note. This table reports hazard ratios from Cox proportional hazards regression models. Reported standard errors are robust and clustered at the person level. Stars indicate statistical significance at a variety of conventional thresholds of statistical significance: \* – 10%, \*\* – 5%, \*\*\* – 1%.