

## The relationship between participation in intervention pathways and short-term reoffending

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### Aims

This study aimed to explore the relationship between participation in intervention pathways (structured bundles of custody-based interventions) and short-term reoffending in New South Wales prisons.

### Methods

We compared rates of short-term general reoffending and return to custody between people who participated in an intervention pathway and those who were unable to participate due to administrative reasons, such as capacity constraints or delays at the custodial case management level. We used coarsened exact matching and logistic regression analysis to isolate the relationship between participation and short-term reoffending.

### Results

On average, people who participated in an intervention pathway had lower rates of short-term general reoffending and return to custody compared to people who were unable to participate due to administrative reasons. However, these estimates of average intervention effects were disproportionately influenced by larger pathways – such as the HIPU, SSIP and EQUIPS pathways – which comprised larger shares of people in custody. Subsequent pathway-level analysis revealed heterogeneity in the relationship between participation and reoffending. While participation in the HIPU pathway was significantly associated with lower reoffending, we found only tentative evidence that participation in the other pathways contributed to lower short-term reoffending, though small sample sizes constrained the analysis.

### Conclusion

This study provides quantitative evidence that custodial programs and services delivered under the Intervention Pathways model are contributing to reduced short-term reoffending for people in NSW prisons. As the Intervention Pathways framework and supporting data mature, future research will be well-positioned to explore longer-term reoffending and the mechanisms underlying variation in pathway effectiveness.

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## INTRODUCTION

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Desistance from crime is a complex and varied psychosocial process (Laub & Sampson, 2001). Reoffending significantly contributes to crime rates worldwide, impacting community safety, increasing burdens on public healthcare, and imposing economic costs (Yukhnenko et al., 2023). In New South Wales (NSW), Australia's most populous state, over 40% of adults released from custody are reconvicted within 12 months post-release (BOCSAR, 2025). While evidence for supporting desistance from crime is growing, further research is needed to expand our understanding of which interventions can best support people in custody and the potential role of innovative modes of service delivery (Polaschek & Day, 2019).

Logistical barriers have been an ongoing challenge for the delivery of custody-based interventions across correctional jurisdictions, including Corrective Services NSW. People in NSW prisons sometimes received program referrals late in their sentence, leaving insufficient time to complete the program or to engage with treatment during periods of heightened motivation (Bower et al., 2024; Howard, 2016; Mahajan et al., 2021; 2022). Although interventions were designed to target specific criminogenic needs, in some cases they were insufficient to cover the full range of risk factors associated with reoffending (Bower et al., 2024; Zhang et al., 2019). Furthermore, people in prison were not always able to receive an initial program placement appropriate for their current needs because of the administrative burden of the risk assessment process and competition for prospective participants from other

rehabilitation, education or employment programs (Mahajan et al., 2021; Raudino et al., 2018; Xie et al., 2018).

In 2020, Corrective Services NSW developed the Intervention Pathways (IP) model to respond to these concerns. An intervention pathway comprised a structured cluster of custody-based programs, case management and reintegration services, and educational interventions. The key directives of the IP model were to improve the comprehensiveness of assessment for eligibility for criminogenic programs, increase intensive criminogenic program dosage for people at higher risk of reoffending, and introduce innovative modes of dosage delivery. To achieve these directives, the IP model restructured the delivery of existing criminogenic programs and used an improved classification and placement system to allocate people to various intervention pathways within the constraints of their sentence length, risk and needs, and other eligibility considerations (Mahajan et al., 2024b). Only individuals classified as being higher risk of reoffending are eligible for intervention pathways.

### Operation of the IP model

The IP model was designed to enhance the allocation of custodial interventions in line with the Risk Needs Responsivity model (Bonta & Andrews, 2016). The Risk Needs Responsivity model is underpinned by three key principles: 1) higher-risk individuals should receive more intensive intervention, 2) interventions should target the specific factors that contribute to an individual's offending behaviour (i.e. criminogenic needs), and 3) the intervention approach should be tailored to an individual's learning style,

motivation, and abilities. Accordingly, the allocation of people to various intervention pathways depended not only on the nature of their most recent offence, but their personal characteristics – such as cognitive abilities, mental health status or cultural background – and broader criminogenic needs.

The IP model introduced a novel assessment and classification system for allocating people to pathways. To be assessed as eligible for any pathway, an algorithm (Criminogenic Program Eligibility Overview) incorporated time to serve in custody and Custody TRAS score (an automated tool developed by Corrective Services NSW to determine risk of general recidivism; Raudino et al., 2019). This ensured that individuals had sufficient time remaining on their sentence to complete the pathway, and intensive programs were targeted towards those at higher risk of reoffending. If found eligible, custodial staff used a pathway-specific assessment tool, the Most Appropriate Program Pathway (MAPP), to identify the most appropriate intervention for individuals based on their needs. A Pre-Program Suitability Assessment was then used to determine an individual's suitability for a specific intervention indicated by the MAPP. These assessments were intended to ensure that programs and services were tailored to an individual's criminogenic needs and responsivity. Given the outcome of the assessments, the individual was then enrolled in an intervention pathway that includes intensive criminogenic and non-criminogenic interventions, reintegration services, education programs and

other offence-specific case management activities.

There were eight primary pathways in the IP model, which were identified in reference to the main intensive program(s) involved in the pathway.<sup>1</sup> The EQUIPS suite of programs formed the cornerstone of intervention for the general custodial population, involving the flexible delivery of a foundation module (general offending) and three offence- and need-specific modules addressing aggression, domestic abuse and addiction issues. Two pathways targeted individuals serving shorter sentences: High Intensity Program Units (HIPU) delivered intensive interventions and services to people serving between five months and three years, and the Short Sentence Intensive Program (SSIP) delivered accelerated interventions to people serving less than five months. Individuals that were identified as having more severe needs related to violent offences typically received intervention under the Violent Offender Therapeutic Program (VOTP), and individuals with needs related to sexual offences were assigned to the Sex Offender Programs (SOP). The Intensive Drug and Alcohol Treatment Program (IDATP) was designed for individuals with serious substance abuse problems. The Young Adult Offender Program (YAOP) was targeted toward young men aged 25 or less serving between five months and three years. The Macquarie Intensive Program (MIP) delivered intensive interventions to individuals who were identified for other

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<sup>1</sup> These programs predated the IP model. For a detailed description of these programs, see the Corrective Services NSW Compendium of Offender Behaviour Change Programs (Corrective Services NSW, 2023)

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pathways but were not be suitable due to security or classification issues.

Evidence on the effectiveness of custodial intervention programs in NSW is mixed. While programs such as the EQUIPS, SOP, and VOTP programs were associated with significant reductions in general reoffending (Bower et al., 2024; Halstead, 2016; Rahman et al., 2018), others like the HIPU, IDATP and YAOP programs demonstrated effects in the anticipated direction, but tended to be small or failed to reach statistical significance (Halstead & Poynton, 2016; Kim, 2022; Tran et al., 2021). Qualitative evidence indicates positive experiences of the SSIP, with personalised offence-specific content particularly valued (Ross et al., 2023; 2024). A quantitative analysis of SSIP and MIP participation presents an opportunity to add to the evidence base on existing custodial interventions.

## The current study

A key limitation of traditional custodial interventions has been the failure to systematically assess individual needs and allocate programs accordingly—an issue that may partly explain their limited effectiveness in reducing reoffending (Arbour et al., 2021; Gill & Wilson, 2017; Long et al., 2019). Further research is needed to improve our understanding of how personalised and innovative modes of assessment and intervention delivery can improve reoffending outcomes for people in custody (Polaschek & Day, 2019). The introduction of the IP model allowed for a closer look at how the timely and consistent assessment of risk of reoffending, criminogenic needs and readiness for change can improve program

allocation and ultimately support desistance from crime.

The primary aim of this study was to explore the relationship between participation in different intervention pathways and reoffending outcomes. While previous studies examined Corrective Services NSW's core criminogenic programs in isolation, there have been no studies examining how the allocation and delivery of a personalised structured bundle of custody-based programs and services can impact reoffending outcomes. The IP model's standardised intervention assessment and allocation processes presented a unique opportunity to investigate how the delivery of a coordinated cluster of interventions – including criminogenic programs, education, employment, case management, and reintegration services – contributed to reoffending outcomes. In doing so, this study built on earlier evaluations that examined the IP model's implementation (Mahajan et al., 2024a, 2024b) and intervention dosage effects (Mahajan et al., in prep.). While not intended as a definitive causal assessment of program impacts, this study also built on existing qualitative evidence to provide the first quantitative evidence on reoffending outcomes for participants of the SSIP and MIP interventions (Howard et al., 2022; Ross et al., 2023; 2024; Thaler et al., 2022).

We used a quasi-experimental research design to compare reoffending outcomes between participants and non-participants. Concerns around selection bias related to motivation or other unobservable factors were addressed by constructing a comparison group of people that could not participate due to administrative reasons, such as capacity constraints or delays at

the custodial case management level. Balance between intervention groups was achieved using coarsened exact matching, a statistical matching procedure which ensured participants were compared to observationally similar non-participants from the comparison group. We estimated reoffending outcomes using a series of binary logistic regression models and found that participation in an intervention pathway was associated with lower odds of short-term reoffending on average. In subsequent analysis, we found evidence of heterogeneity in the relationship between participation and reoffending across pathways, though small sample sizes constrained the analysis.

## METHODS

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### Research design

We employed a quasi-experimental research design to assess the relationship between pathway participation and reoffending. Quasi-experimental research designs can approximate random experiments and provide valid estimates of intervention effects if they define appropriate comparison groups and properly control for systematic selection biases (Heinsman & Shadish, 1996; Rubin, 2008). We defined ‘treatment’ as participation in an intervention pathway, in accordance with an intention to treat (ITT) design whereby all participants are categorised into the intervention group regardless of completion status. The ITT design helped minimise bias resulting from non-compliance or attrition and provided a more reliable estimate of the intervention effect in an applied setting.

### Sample

The sample comprised 10,712 individuals (1,024 women; 9,688 men) who were serving a custodial sentence and assessed as eligible for an intervention pathway following the introduction of the IP model in July 2020. This included people that had already commenced their custodial sentences prior to implementation of the IP model and were subsequently assigned to an intervention pathway. For these people, interventions delivered before the rollout of the IP model were recognised as part of their assigned pathways to maintain continuity in treatment. To be eligible for this study, individuals were required to have ended their index custodial episode prior to 31 December 2023.

### The intervention group

The intervention group comprised 621 women and 5,718 men that participated in an intervention pathway regardless of their completion status (hereafter referred to as participants). We defined participation as having undertaken at least two hours of intensive criminogenic program dosage (the typical length of one intensive intervention session). We used engagement with intensive programs as the primary indicator of participation because intensive dosage formed the cornerstone of each intervention pathway. Consequently, there were some individuals who had completed substantial amounts of other intervention dosage (e.g. foundational or vocational education programs) but were not classified as participants because they did not engage with their primary intensive program intervention. Nonetheless, those that did not participate in intensive programs generally

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had low engagement across other intervention categories. Table 1 shows the size of the intervention groups for the full cohort and pathway cohorts.

## The comparison group

Quasi-experimental research designs are vulnerable to unobservable selection bias, which arises when people in the intervention and comparison groups differ in latent characteristics. This can confound estimated intervention effects, as observed differences in outcomes may reflect hidden traits rather than the intervention itself. For example, people may have been more likely to participate if they were intrinsically motivated to change, which itself is associated with lower risk of reoffending (Michie 2011). To mitigate this risk, we compared participants against people that could not participate for reasons outside of their personal control.

The comparison group comprised 403 women and 3,790 men that were assigned to an intervention pathway but, due to various administrative reasons recorded as part of the integrated IP model process, were unable to complete sufficient dosage to be considered participants (hereafter referred to as non-participants). Administrative reasons refer to situations in which an individual was unable to participate because of factors outside of a pathway's routine operational procedures, such as capacity constraints or delays at the custodial case management level. Importantly, we excluded people from the comparison group who were assigned a pathway but did not participate due to reasons that can be attributed directly to

the individual, such as refused participation, misconduct, or security risk.

We were unable to identify a robust comparison group for the YAOP and MIP cohorts using our primary selection approach. This challenge stemmed from the stringent suitability assessments and fewer available placements for the YAOP and MIP pathways. As a result, there were very few individuals assigned to the YAOP (n = 7) or MIP pathways (n = 7) who were unable to participate due to administrative reasons. Given the importance of assessing of each pathway under the IP model and expanding on existing evidence, we expanded the comparison group for YAOP and MIP cohorts using closely matched individuals from comparable pathways.

For the YAOP pathway comparison group, we included individuals who were assigned to a HIPU, EQUIPS or SSIP pathway; were aged 25 years or younger; were male; and had minimum security classification (n = 360). We drew from these pathways because they, like YAOP, were targeted at the general custodial population rather than specific offences or needs. This produced a final comparison group of 367 individuals for the YAOP pathway.

For the MIP pathway comparison group, we included individuals who were assigned to a HIPU, VOTP, YAOP, IDATP or EQUIPS pathway; were male and were unable to participate in their assigned pathway due to security or association reasons (n = 85). We drew from these pathways because the people eligible for them share similar characteristics with MIP participants, the pathways are of comparable duration, and they reflect the pathways MIP participants are unable to conventionally access. This produced a final

comparison group of 92 individuals for the MIP pathway. The final size of both the groups for the full cohort and pathway cohorts is presented in the Table 1.

**Table 1.** Sample size by cohort and intervention group

Cohort	Comparison group	Intervention group	Total
EQUIPS	251	1564	1815
HIPU	440	2262	2702
IDATP	76	434	510
MIP	92	91	183
SOP	354	455	809
SSIP	3194	947	4141
VOTP	53	479	532
YAOP	367	107	477
Full cohort	4373	6339	10712

## Data sources

**Offender Integrated Management System (OIMS).** We extracted administrative custodial data from OIMS, Corrective Services NSW's central operational database which supports the management of individuals in custody and under supervision in the community. OIMS provided operational data on custodial episodes, sentence-related data and individuals' demographic characteristics. It also provided variables related to intervention pathways, including allocation of pathways, different categories of program dosage and reasons for non-participation.

**Reoffending Database (ROD).** We obtained reoffending data from the ROD, which is maintained by the NSW Bureau of Crime Statistics and Research (BOCSAR) and contains records for every person who has made a court appearance in NSW. To measure short-term reoffending, we extracted finalised convictions in the 12 months following release from index custodial episode.

**Oxford COVID-19 Government Response Tracker (OxCGRT).** The introduction of the IP model in mid-2020 coincided with the COVID-19 pandemic. Containment measures associated with COVID-19, such as social distancing and lockdowns, contributed to sharp falls in most types of reported criminal offences in NSW (Kim & Leung, 2020). To account for the effects of COVID-19 in the current study, we used OxCGRT (Hale et al., 2021) to capture the intensity of government policies related to closure and containment, health and economic policy in NSW during the COVID-19 pandemic. We used the stringency index, which aggregates indicators such as travel bans and workplace closures into a single number from 0 to 100, with higher values corresponding to stricter controls.

## Analytical plan

### Matching procedure

We used statistical matching to address imbalance in the observable characteristics of our intervention and comparison groups. Statistical matching is a procedure used in many quasi-experimental studies to reduce bias from confounding factors between intervention and comparison groups (Stuart & Rubin, 2008). The aim of statistical matching was to compare individuals from the intervention group to individuals from the comparison group with similar characteristics, which provided more certainty that remaining differences in outcomes are attributable to pathway participation. We chose a parsimonious set of matching covariates from the available data with reference to the existing literature on custodial behavioural change programs and the balance of our sample (see Table 2).

**Table 2.** Description of covariates included in the CEM matching procedure.

Covariate	Description
Age	Age (years) of the individual at start of index custodial episode.
Gender	Gender of the individual was recorded as a binary variable (equal to one for male, zero for female).
Aboriginal status	Whether the individual identified as Aboriginal (for the purposes of this report, we hereafter use the term 'Aboriginal' to refer to all First Nations Australians including Aboriginal and Torres Strait Islander peoples)
Culturally and Linguistically Diverse (CALD)	Whether the individual was identified as having a culturally and linguistically diverse background.
Custodial episode length	Length (in days) of the offender's index custodial episode.
Custody TRAS	Score from the Custody Triage Risk Assessment Score (TRAS), an automated actuarial risk assessment tool used to determine the risk of general reoffending, defined as any return to custody with a new conviction within two years among participants who have received custodial sentences. For ease of interpretation in statistical analysis, the TRAS score was rescaled from a percentage format to a 0-100 scale.
Security classification	Most recent security classification for index custodial categorised into low, medium or high risk. Security classification is determined by factors such as seriousness of offence, behaviour, and previous custodial history.
Intervention pathways	Pathway that an individual is assigned to, identified in reference to the main intensive program(s) involved (EQUIPS, HIPU, IDATP, MIP, SOP, SSIP, VOTP or YAOP). This covariate is not relevant for the analysis by pathway cohort.

We used coarsened exact matching (CEM) to control for observable differences between the intervention and comparison groups. In its first stage, CEM temporarily simplified each matching variable into meaningful groups (e.g. the continuous variable 'age' into ten-year increments). It then matched observationally similar individuals that fall into the same groups. Groups without at least one member from the intervention and comparison group were pruned from the sample to avoid forcing unreasonable matches. CEM offers several potential advantages over propensity score matching, an alternative matching procedure used frequently in the literature, such as requiring fewer assumptions to be met, reduced model dependency and explicit control of the trade-off between balance and sample size (Iacus et al., 2012; King & Nielsen, 2019).

Any method of statistical matching inherently involves a trade-off between variance and bias. Bias arises when intervention and comparison cohorts are not sufficiently similar to draw meaningful comparisons. Increasing the granularity of matching can reduce bias by improving covariate balance, but this comes at the cost of discarding unmatched observations, which in turn increases variance and model-dependence. To navigate this trade-off, we adopted an iterative matching strategy, refining the matching criteria while carefully monitoring the trade-off between covariate imbalance and sample retention. Overall balance between the groups was deemed achieved when further improvements yielded diminishing returns in imbalance reduction, and the retained sample remained sufficiently representative.

## Reoffending analysis

We used logistic regression analysis to estimate the relationship between participation in an intervention pathway and the odds of short-term reoffending. We define short-term reoffending as finalised convictions for a new offence in the 12 months following release from custody. The 12-month window was chosen because it provided a clear, interpretable benchmark for assessing the short-term impact of intervention pathways.

Two reoffending outcomes were considered in this study: general reoffending and return to custody. General reoffending was defined as any finalised instance of conviction for a new offence during the 12 months following release from custody excluding breaches of custodial or community-based orders. Return to custody was defined as any finalised conviction for a new offence resulting in a custodial sentence during the 12 months following release from custody. Return to custody tends to provide an indication of more serious or repeated offences relative to general reoffending.

We separately estimated two regression models for each reoffending outcome and each cohort: a baseline model and a covariate-adjusted model. In the baseline model, participation was the sole predictor. However, given our limited sample size, it was unlikely that matching could fully offset bias resulting from imbalance between the intervention and control comparison. Thus, we estimated a covariate-adjusted model using our set of matching variables as covariates to adjust for imbalances that remained after matching (Austin, 2009; Ho et al., 2007). We also included the rolling 12-month-ahead average of the stringency index for NSW from OxCGRT in the

covariate-adjusted model to adjust for potential bias arising from the impact of COVID-19 in the reoffending window.

## RESULTS

### Sample characteristics

#### Full Cohort

Of the 10,712 unique individuals in the full cohort, 40% (n = 4,325) identified as Aboriginal, 90% were male (n = 9,688), and 19% (n = 2,076) were of a CALD background. Median age across the sample was 34 years, and the median estimated general recidivism risk was 47% (Custody TRAS = .47). On average, individuals spent 524 days in custody during the index episode and the majority were assigned a minimum-security classification.

Table 3 shows the descriptive statistics of the covariates disaggregated into intervention and comparison groups. Participants were, on average, slightly younger and less likely to have identified as Aboriginal. Both participants and non-participants were predominantly male, but participants were on average more likely to be of a CALD background. The median general recidivism risk was lower for participants, as was the proportion of people classified as minimum security. Participants also tended to have longer index custodial episodes. While the EQUIPS, HIPU, IDATP, and VOTP pathways had higher shares of participants than non-participants, the opposite was true for the SSIP pathway. The number of people allocated to the SOP, MIP and YAOP pathways were low and similar across comparison and intervention groups.

**Table 3.** Mean and standard deviation of covariates for the full cohort (standard deviation in parentheses).

Variable	Comparison group	Intervention group
Age	35 (11)	33 (9)
Aboriginal	0.44 (0.50)	0.38 (0.49)
CALD	0.18 (0.39)	0.20 (0.40)
Custodial episode length	260 (498)	707 (955)
Maximum security	0.11 (0.31)	0.08 (0.28)
Medium security	0.43 (0.65)	0.41 (0.70)
Minimum security	0.65 (0.48)	0.70 (0.46)
Gender	0.91 (0.29)	0.90 (0.30)
Custody TRAS	49 (17)	45 (18)
EQUIPS	0.06 (0.23)	0.25 (0.43)
HIPU	0.10 (0.30)	0.36 (0.48)
IDATP	0.02 (0.13)	0.07 (0.25)
MIP	0.00 (0.04)	0.01 (0.11)
SOP	0.08 (0.27)	0.07 (0.26)
SSIP	0.73 (0.44)	0.15 (0.36)
VOTP	0.01 (0.11)	0.08 (0.26)
YAOP	0.00 (0.04)	0.02 (0.13)

## Pathways cohorts

For brevity, the descriptive statistics of the covariates for the intervention and comparison groups across the eight pathway cohorts are reported in the Appendix (Tables 7a and 7b). Overall, the findings were similar to the full cohort but revealed important differences for some pathways. Across pathways, participants tended to be of similar age or slightly younger than non-participants. In the SOP and VOTP pathways there was a relatively larger share of Aboriginal people in the intervention group relative to the comparison group, while the opposite was true for the HIPU and EQUIPS pathways. Generally, the share of people that were male or of a CALD background was balanced between intervention and comparison groups across pathway cohorts. The EQUIPS, HIPU and IDATP pathways had a higher proportion of participants classified as minimum security relative to non-participants. Across most pathways, participants tended to have longer

custodial episodes and lower assessed risk of general recidivism according to Custody TRAS, similar to the findings in the full cohort. The imbalance in observed characteristics between comparison and intervention groups underlines the importance of statistical matching to mitigate potential bias when estimating intervention effects.

## Matching model diagnostics

Following matching, we conducted a series of diagnostic checks to ensure balance was achieved between intervention and comparison groups. We used standardised mean differences to assess univariate imbalance (the difference between group means in terms of standard deviations). The key advantage of this measure was that it provided a scale-independent measure of imbalance that was not sensitive to sample size, allowing comparisons to be drawn across different pathways with varying sample sizes. We adopted a threshold of 0.1 as a

conservative estimate for achieving balance, with values below this threshold indicating negligible imbalance between groups (Andrade, 2020; Austin 2009). We achieved balance for all variables in the full cohort (Figure 1). We were able to significantly improve balance for the pathway cohorts but were not able to achieve complete balance in the IDATP, HIPU, MIP, YAOP and VOTP pathways due to limited sample size (Appendix, Figure 3).

Assessments of univariate balance, while informative, may overlook imbalances in the joint distribution of covariates. To address this limitation, we also examined the multivariate L1

statistic (using the Sturges method for breaks), which compares the entire joint distribution of covariates across groups (Iacus et al., 2012). The value of the multivariate L1 statistic ranges from zero to one, with lower values indicating improved balance. Table 4 presents the sample size and L1 statistic before and after matching. The results indicate that we were able to improve balance across all pathways. While efforts were made to maintain a robust overall sample size, the number of participants allocated to the intervention and comparison groups of some pathways was relatively small. This limitation affected the precision of pathway-specific analyses and is important when interpreting the results.

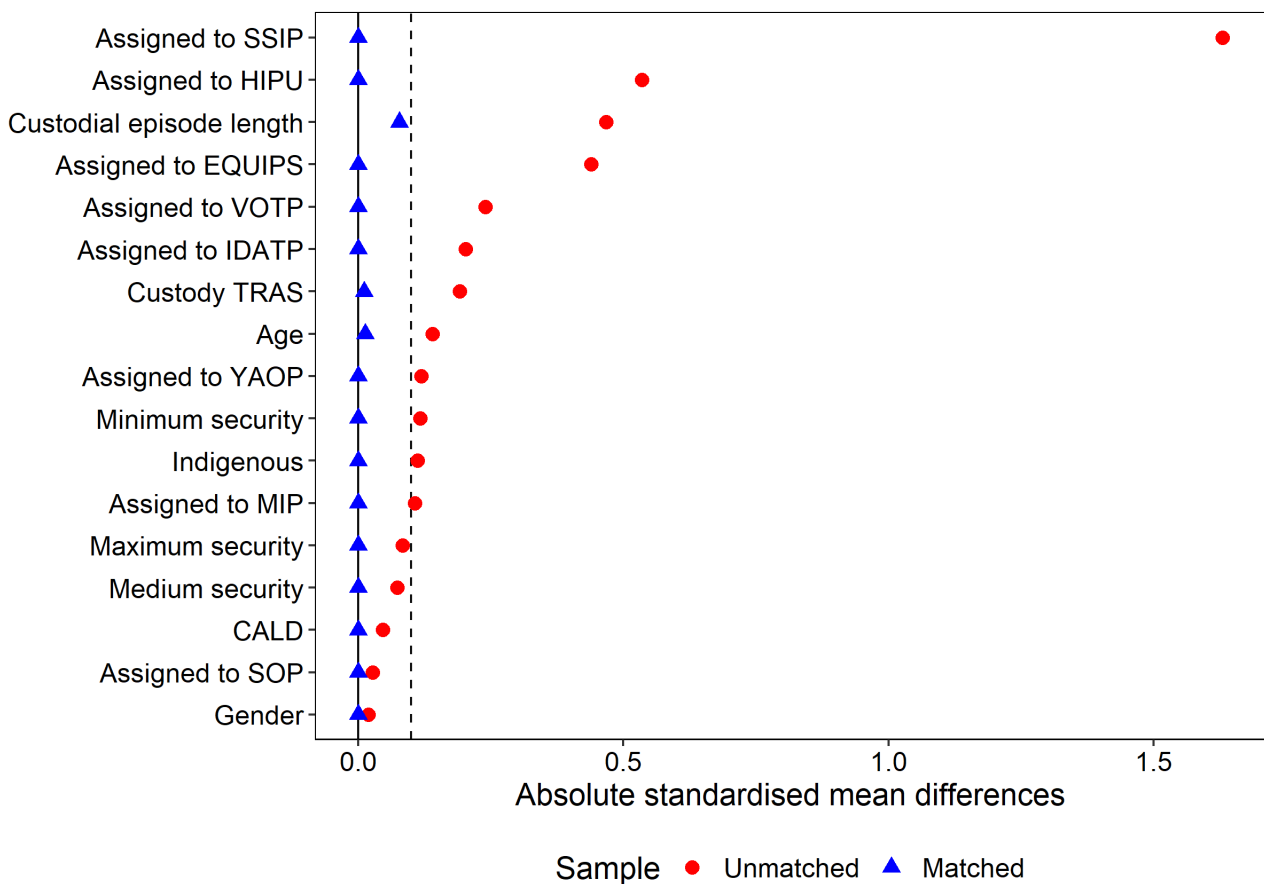


Figure 1. Covariate balance before and after matching (full cohort)

**Table 4.** Sample sizes before and after CEM matching across all pathways

Cohort	Before matching			After matching		
	N (comparison)	N (intervention)	Multivariate L1 Statistic	N (comparison)	N (intervention)	Multivariate L1 Statistic
Full cohort	4373	6339	0.74	4034	4022	0.50
EQUIPS	251	1564	0.79	229	706	0.60
HIPU	440	2262	0.76	384	1228	0.62
IDATP	76	434	0.89	57	107	0.66
MIP	92	91	0.93	46	42	0.90
SOP	345	455	0.69	302	279	0.47
SSIP	3194	947	0.64	2212	726	0.41
VOTP	53	479	0.96	39	82	0.79
YAOP	367	107	0.80	320	74	0.69

## Reoffending analysis

### Average relationship between participation and reoffending across pathways

Following statistical matching, we assessed the average relationship between participation in an intervention pathway and likelihood of reoffending on average across all pathways. For the full cohort matched comparison group, average baseline rates of general reoffending and return to custody within 12 months of release were 69% and 48%, respectively. In contrast, the matched intervention group exhibited lower overall rates for general reoffending (60%) and return to custody (38%).

Table 5 illustrates the results from the baseline and covariate-adjusted logistic regression models. The odds ratio in this table indicates the likelihood of the reoffending outcome for the intervention group relative to the comparison group. An odds ratio of less than one indicates individuals in the intervention group had lower odds of reoffending within 12 months relative to the individuals in the comparison group. For transparency around potential model-

dependence, we reported the results from both the baseline and covariate-adjusted models. While the results are similar, our preferred estimates come from the covariate-adjusted model which adjusted for imbalance remaining after matching and the effects of COVID-19.

Based on the estimates from the covariate-adjusted model, participation in an intervention pathway was significantly associated with 18% lower odds of general reoffending and 22% lower odds of return to custody on average relative to the comparison group. Our analysis controlled for pathway assignment, which adjusts the model to account for differences in program content, intensity and target population characteristics across pathways (Mahajan et al., 2024a; 2024b). This ensures that the estimated intervention effect reflects the impact of participation rather than underlying differences attributable to the pathways themselves.

**Table 5.** Regression results for the full cohort

Variable	General reoffending				Return to custody			
	B	p	OR	95% CI	B	p	OR	95% CI
Baseline model								
Constant	0.63	< .01	1.88	[1.76, 2.00]	-0.23	< .01	0.79	[0.75, 0.84]
Intervention	-0.21	< .01	0.81	[0.74, 0.89]	-0.24	< .01	0.79	[0.72, 0.86]
Covariate adjusted model								
Constant	-0.98	< .01	0.38	[0.25, 0.58]	-2.01	< .01	0.13	[0.09, 0.20]
Intervention	-0.19	< .01	0.82	[0.74, 0.92]	-0.25	< .01	0.78	[0.70, 0.86]
Gender	0.42	.00	1.53	[1.28, 1.83]	0.75	< .01	2.11	[1.74, 2.57]
Aboriginal	0.16	.01	1.18	[1.05, 1.32]	0.2	< .01	1.22	[1.09, 1.36]
CALD	-0.05	.53	0.95	[0.83, 1.11]	0.02	0.79	1.02	[0.88, 1.18]
Custodial episode length	0.00	< .01	1.00	[1.00, 1.00]	0	< .01	1	[1.00, 1.00]
Age	0.01	.01	1.01	[1.01, 1.01]	0	0.93	1	[0.99, 1.01]
Custody TRAS	0.04	.00	1.04	[1.04, 1.04]	0.03	< .01	1.03	[1.03, 1.04]
Medium security	-0.24	.06	0.79	[0.61, 1.02]	-0.25	0.02	0.78	[0.63, 0.96]
Minimum Security	-0.68	< .01	0.51	[0.40, 0.64]	-0.65	< .01	0.52	[0.43, 0.64]
HIPU	-0.14	.06	0.87	[0.75, 1.01]	-0.06	0.37	0.94	[0.82, 1.07]
IDATP	-0.12	.49	0.89	[0.64, 1.25]	0.08	0.63	1.08	[0.79, 1.47]
MIP	-0.58	.28	0.56	[0.19, 1.65]	-0.11	0.82	0.9	[0.35, 2.29]
SOP	-1.43	< .01	0.24	[0.16, 0.36]	-0.81	< .01	0.45	[0.29, 0.68]
SSIP	0.01	.87	1.01	[0.85, 1.21]	0.07	0.35	1.08	[0.92, 1.26]
VOTP	0.16	.48	1.18	[0.74, 1.88]	0.38	0.1	1.46	[0.93, 2.29]
YAOP	0.27	.31	1.31	[0.78, 2.21]	0.67	0.01	1.96	[1.20, 3.18]
Stringency index	0.002	.02	1.002	[1.000, 1.005]	0.004	< .01	1.004	[1.00, 1.01]

This result suggests that that participation in an intervention pathway was associated with lower likelihood of reoffending on average across intervention pathways. However, it is important to note that pathways with larger cohort sizes disproportionately influence the estimated intervention effects. The HIPU (46%), SSIP (23%) and EQUIPS (19%) pathways accounted for the largest share of weighted observations in the matched sample. This means that this finding mainly reflects intervention effects from pathways with larger cohorts.

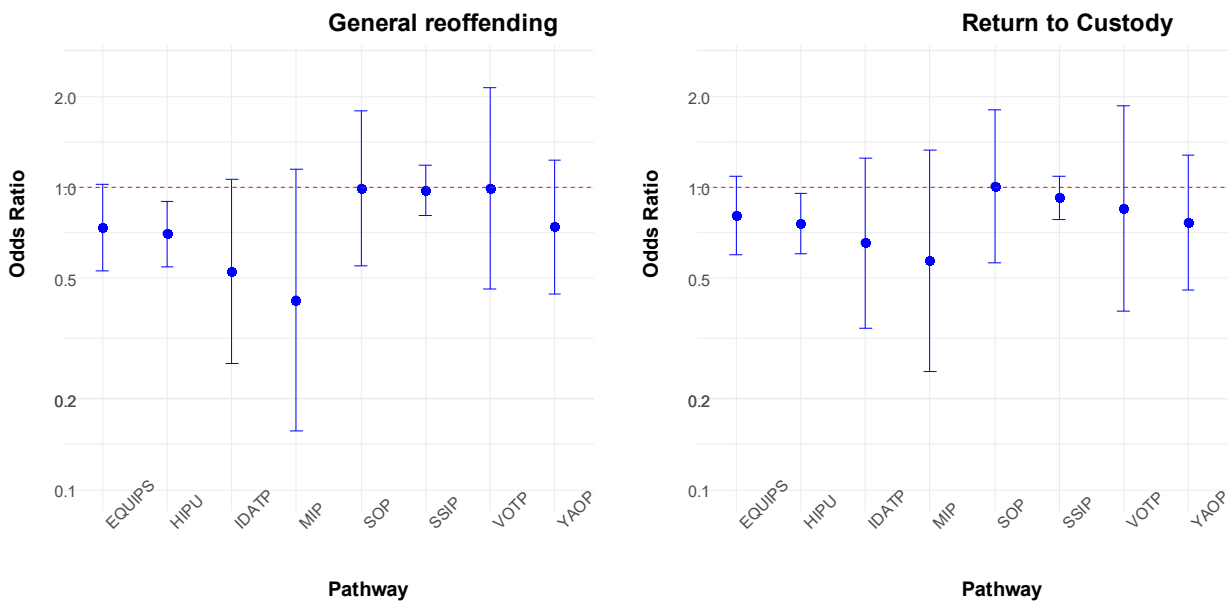
### Differences in the relationship between participation and reoffending by intervention pathway

While the full cohort analysis revealed that participation intervention pathway was, on

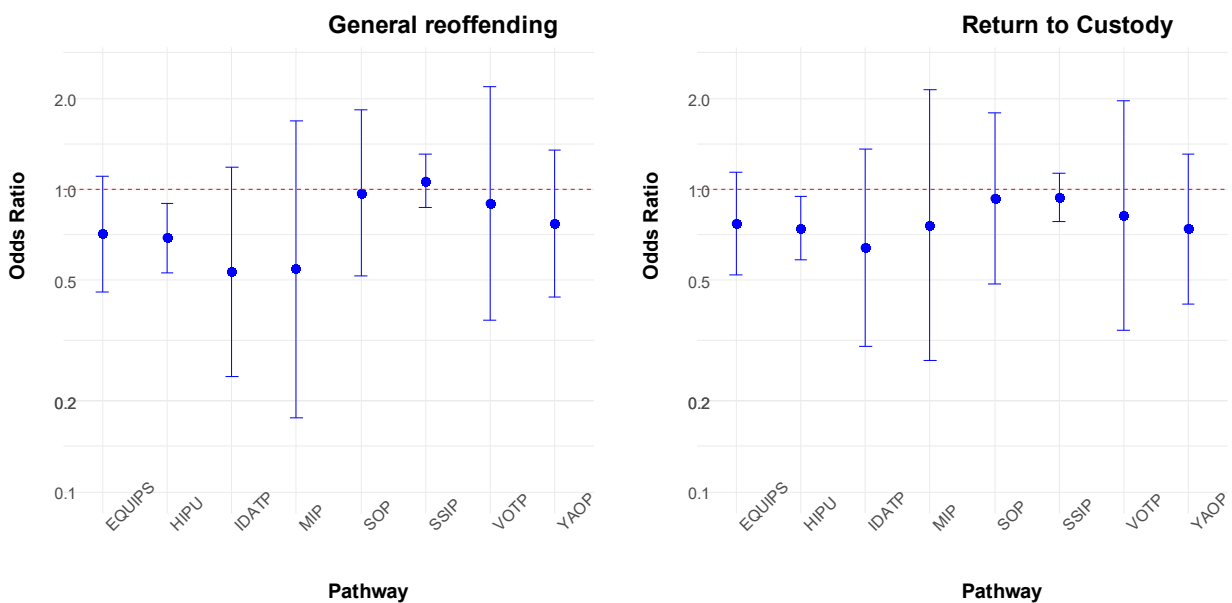
average, associated with lower reoffending, our main analyses focused on assessing heterogeneity in intervention effects across pathways. Table 6 shows average reoffending rates for individuals in the matched intervention and comparison groups across the eight pathways. Except for the SOP pathway which showed lower reoffending rates, most pathways exhibited comparable reoffending rates. Lower reoffending rates among individuals who participated in the SOP is consistent with the low baseline recidivism among individuals convicted of sexual offences (Schmucker & Lösel, 2015).

**Table 6.** Average reoffending rates across all pathways

Pathway	General reoffending		Return to custody	
	Comparison	Intervention	Comparison	Intervention
EQUIPS	76%	66%	58%	43%
HIPU	70%	63%	46%	38%
IDATP	72%	59%	60%	45%
MIP	83%	67%	52%	43%
SOP	4%	8%	4%	9%
SSIP	75%	73%	51%	49%
VOTP	56%	55%	38%	37%
YAOP	66%	55%	45%	39%



**Figure 2.** Odds ratios for two reoffending outcomes across individual intervention pathways (baseline models).



**Figure 3.** Odds ratios for two reoffending outcomes across individual intervention pathways (covariate-adjusted models).

Figures 2 and 3 illustrate the estimated intervention effects from the baseline and covariate-adjusted logistic regression models, depicted as odds ratios across all individual pathways for the two reoffending outcomes (we report only intervention effects for brevity; full regression results are presented in Tables 9 and 10 in the Appendix).

The overall trend across both the baseline and covariate-adjusted models suggests participants for most pathways had lower likelihood of general reoffending and return to custody than people who could not participate for administrative reasons. Specifically, the EQUIPS and HIPU pathways demonstrated stronger intervention effects with reduced uncertainty, as evidenced by narrower confidence intervals. In contrast, while the IDATP, YAOP and MIP pathways also exhibited positive intervention effects, reflected in odds ratios well below 1, these estimates were accompanied by wide confidence intervals. Meanwhile, the SOP, SSIP and VOTP pathways exhibited comparatively attenuated intervention effects with odds ratios approaching 1 (particularly for general reoffending), suggesting weaker relationship between participation and reoffending. However, the estimates for the SOP and VOTP pathways exhibited wide confidence intervals, reflecting small sample size.

HIPU emerged as the only program with statistically significant association between participation and lower reoffending. The results from the covariate-adjusted model revealed that participation in the HIPU pathway was associated with a 31% lower odds of general reoffending ( $B = -0.37$ ,  $OR = 0.69$ ,  $95\% CI = [0.53, 0.90]$ ,  $p = .01$ ) and 26% lower odds of return to custody ( $B = -0.30$ ,

$OR = 0.74$ ,  $95\% CI = [0.58, 0.95]$ ,  $p = .02$ ) compared to the matched comparison group. The SSIP pathway also had a robust sample size and relatively narrow confidence intervals, which provided greater certainty that there was a weak relationship between participation and odds of general reoffending ( $B = 0.064$ ,  $OR = 1.07$ ,  $95\% CI = [0.87, 1.30]$ ,  $p = .53$ ) and return to custody ( $B = -0.059$ ,  $OR = 0.94$ ,  $95\% CI = [0.78, 1.13]$ ,  $p = .53$ ). Any conclusions regarding intervention effects for the other pathways should be considered tentative given the observed statistical uncertainty.

## DISCUSSION

The IP model introduced a novel framework that improved the assessment, placement and delivery of custodial interventions for people at higher risk of reoffending in NSW. This study aimed to explore the relationship between participation in various intervention pathways and reoffending. We adopted a quasi-experimental research design to explore the differences in reoffending outcomes between pathway participants and individuals who were eligible for a pathway, but unable to participate due to administrative reasons.

On average, people who participated in an intervention pathway had significantly lower rates of general reoffending and return to custody compared to those who were unable to participate due to administrative reasons. These results reflect patterns seen in broader research around behavioural change, although evidence on the impact of custodial interventions on reoffending remains inconclusive and is often limited by methodological constraints (Beaudry

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et. al., 2021; Davis et al., 2013; Lipsey & Cullen, 2007; Wilson et al., 2000). Our study extends this body of research by examining the contribution of coordinated clusters of programs rather than isolated behaviour change programs. Furthermore, this study underscores the importance of needs-based assessment and allocation in enhancing the effectiveness of such interventions (Arbour et al., 2021; Gill & Wilson, 2017; Long et al., 2019).

However, our estimates of average intervention effects were disproportionately influenced by larger pathways – such as the HIPU, SSIP and EQUIPS pathways – which comprised larger shares of people in custody. To explore pathway-specific intervention effects, we examined the relationship between participation in individual pathways and reoffending. Only the HIPU pathway demonstrated statistically significant effects of participation on reoffending, aligning with qualitative analysis of the HIPUs implementation which reported that the program was well matched with the risk and needs of short-sentenced offenders (Mahajan et al., 2021). This finding, however, contrasts with Kim’s (2022) evaluation of the HIPUs, which reported small and statistically non-significant effects. This may reflect that Kim’s evaluation was conducted prior to the implementation of the IP model, which introduced updated placement procedures and better coordinated the delivery of different interventions.

Conversely, participation in the SSIP pathway was not associated with reductions in short-term reoffending, a finding which does not appear to be driven by small sample size or statistical uncertainty. Despite offering opportunities for short-sentenced individuals with less than five

months to serve, engagement with the SSIP pathway may have been limited by the transience of the target population (Ross et al., 2023; 2024). Although statistically non-significant, the strength of the relationship between participation in the EQUIPS pathway and reoffending was similar to previous evaluations of the EQUIPS programs (Bower et al., 2024; Zhang et al., 2019; Kim, 2022). However, as in previous studies, the robustness of findings for the SOP, IDATP, YAOP and VOTP pathways were limited by small sample sizes (Halstead, 2016; Halstead & Poynton, 2016; Rahman et al., 2018; Tran et al., 2021). Nonetheless, we found tentative evidence that participation was associated with reduced reoffending for the IDATP, MIP and YAOP pathways, though cautious interpretation is warranted due to statistical uncertainty.

## **Mechanisms contributing to differences across pathways**

The impact of participation in an intervention pathway on reoffending outcomes likely operated through multiple mechanisms, which may help explain the observed heterogeneity of the relationship between participation and reoffending across pathways. These mechanisms included overall dosage, composition of interventions, intervention modality and offence-specific targeting. Although the precise impact of each mechanism on reoffending is uncertain, they are important for understanding how different aspects of intervention design may contribute to better reoffending outcomes for people leaving custody.

Overall intervention dosage varied considerably across pathways, which was likely an important mechanism between participation and

reoffending. Research suggests people assessed as moderately high to higher risk of reoffending – such as those eligible for intervention pathways – should receive between 100 and 300 hours of targeted intervention (Bourgon & Armstrong, 2005; Day et al., 2019; Mahajan et al., in prep.; Makarios et al., 2014). In the context of the IP model, Mahajan et al. (2024a) found people assigned to an intervention pathway received 95 hours of total dosage on average, but with variation across pathways. People assigned to the SSIP pathway received much lower total dosage than other pathways (around 20 hours on average) due to the constraints of their short sentence length, which may explain why participation in this pathway had a relatively weak relationship with reoffending outcomes. Meanwhile participants in the VOTP and SOP pathways received substantial dosage but dispersed over a longer sentence which may have attenuated the relationship between overall dosage and reoffending. Program attrition may be another moderating factor related to dosage. The HIPU, YAOP and MIP pathways have substantially higher completion rates than other pathways (Mahajan et al., 2024b) and demonstrated stronger associations between participation and lower reoffending. While this may reflect differences in motivation or personal characteristics across pathways, it could also reflect characteristics of the pathways themselves that might make them more engaging and effective.

Differences in the relationship between participation and reoffending may also be partly explained by the different composition of interventions across pathways. An emerging body of research suggests that combining multiple types of interventions may have a

cumulative effect in reducing reoffending compared to standalone interventions (Hsieh et al., 2022; Mahajan et al., in prep.). The HIPU, MIP and YAOP pathways delivered the highest dosage of non-criminogenic interventions (such as emotional regulation, cultural strengthening and parenting programs) and showed relatively strong intervention effects. The HIPU pathway provided additional support through higher dosage of reintegration programs and case management relative to other pathways, potentially contributing to improved post-release outcomes. While diverse custodial interventions could contribute to lower reoffending, the optimal composition of dosage remains uncertain, highlighting the need for future research.

Another key mechanism underlying the relationship between participation and reoffending is the modality of interventions, including novel approaches to service delivery and institutional climate. For instance, the YAOP pathway incorporates adventure therapy, experiential learning and personal development programs, which may complement traditional programs and case management (Tran et al., 2021). The MIP pathway is delivered at Macquarie Correctional Centre, an innovative prison model that provides greater freedom and a more prosocial environment than traditional correctional centres, potentially contributing to stronger participation effects (Howard et al., 2022; Thaler et al., 2022). While participation in these pathways appears to be strongly associated with lower reoffending, the smaller sample sizes in the YAOP and MIP pathways warrant cautious interpretation. In contrast, the SSIP pathway's short-sentenced population necessitated a fast-paced delivery modality

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involving rolling groups, in-cell activities and accelerated sessions. While both practitioners and recipients viewed the SSIP as a promising intervention, they also reported challenges associated with competing priorities, logistical issues, program content and modality of delivery, and difficulty building engagement due to the transience of the target population (Ross et al., 2023; 2024). These implementation challenges may have contributed to the weak relationship between SSIP pathway participation and reoffending outcomes.

The specific reoffending and reintegration outcomes targeted by different pathways may have also been an important mechanism between participation and reoffending. While this study focused on short-term general reoffending and return to custody within 12 months of release, it did not assess other types of reoffending. For example, participation in the SOP pathway was not associated with lower odds of general reoffending or return to custody, but this may overlook its intended impact on sexual recidivism which was not measured in this study. Similarly, the VOTP pathway was linked to lower rates of return to custody, which could reflect reductions in violent offences targeted by the program, but not lower rates of general reoffending. Given that sexual and violent reoffending occur at lower rates than general reoffending, meaningful assessment of these outcomes may require examining longer-term reoffending outcomes. Moreover, the study did not account for broader reintegration outcomes such as housing, employment, mental health or social networks. Given that pathways target different criminogenic needs, there is a valuable opportunity for future evaluations to take a

broader perspective on reoffending and reintegration.

## Limitations

Several limitations of our study stemmed from the small sample sizes for certain pathways. The statistical power in the pathway-level analysis was particularly constrained for the IDATP, MIP, VOTP, SOP and YAOP pathways, contributing to wide confidence intervals. While matching improved comparability between participants and non-participants, the pruning of unmatched individuals further reduced sample size and statistical power. The MIP and YAOP pathways had additional sampling limitations, which required constructing alternative comparison groups using individuals from other pathways. Although these individuals appear similar on observable characteristics, it is difficult to rule out unobservable bias resulting from differences in the constructed comparison groups for these pathways. As the IP framework matures, increased sample size could help overcome these limitations and give a more accurate estimate of the effect of participation on reoffending for all pathways.

Another key limitation of this study was that the matching process produced a more homogenous sample, which may reduce how well the findings apply to the wider custodial population. Statistical matching helped control for confounding factors that could otherwise bias the results, such as demographic or sentence characteristics. However, excluding unmatched individuals who were too different to match reliably may have produced a matched sample that is no longer representative. While this did not prove to be the case for most observable

characteristics, administrative exits from pathways were often associated with earlier exit from custody, which resulted in a matched sample that was slightly biased towards individuals serving shorter custodial sentences (Appendix Tables 8a and 8b).

Further limitations for this study may have arisen from its quasi-experimental research design. Despite efforts to identify individuals that exit only due to administrative reasons, we cannot completely rule out the possibility that non-participants differed systematically from participants in ways not captured by observable variables. For example, some administrative exits that result in insufficient time to participate in a pathway may be related to successful appeal for release. If people that have their appeal upheld differ from participants in terms of unobservable characteristics, such as stronger legal representation resulting from higher socioeconomic status, this could introduce unobservable variable bias. Identifying the causal effects of custodial interventions remains a recurring challenge for retrospective evaluations. Where possible, embedding evaluation strategies during the implementation phase – such as randomised control trials, staged rollouts or strict eligibility criteria – can help support more robust causal inference and support better policy around custodial interventions. Nonetheless, using administrative exits to construct a comparison group that was less vulnerable to unobservable bias and applying statistical matching to account for observable differences has strengthened the evidence supporting a causal relationship between pathway participation and reoffending.

## Conclusions

Supporting desistance from crime remains a persistent challenge for policymakers. Custody-based interventions offer a valuable opportunity to reduce reoffending, but their effectiveness depends on overcoming logistical barriers and tailoring programs to individual needs. This study provides quantitative evidence that custodial programs and services delivered under the Intervention Pathways model are contributing to reduced short-term reoffending for people in NSW prisons, though the strength of this relationship varied across pathways. Several factors may explain this variation, including intervention dosage and its composition, delivery modality and offence-specific targeting. As the IP framework and data mature, future research will be well-positioned to explore longer-term effects, a broader range of outcomes and the mechanisms underlying any variation in pathway effectiveness.

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## APPENDIX

**Table 7a.** Mean and standard deviation of covariates before matching (standard deviations presented in parentheses)

Variable	EQUIPS		HIPU		IDATP		MIP	
	Comparison group	Intervention group	Comparison group	Intervention group	Comparison group	Intervention group	Comparison group	Intervention group
Age	32 (10)	32 (10)	35 (9)	34 (9)	33 (8)	32 (8)	32 (9)	31 (8)
Aboriginal	0.50 (0.5)	0.36 (0.48)	0.47 (0.5)	0.38 (0.49)	0.58 (0.5)	0.40 (0.49)	0.50 (0.5)	0.48 (0.5)
CALD	0.19 (0.39)	0.23 (0.42)	0.21 (0.41)	0.19 (0.39)	0.20 (0.4)	0.21 (0.41)	0.20 (0.4)	0.19 (0.39)
Custodial episode length	365 (321)	728 (761)	197 (130)	353 (264)	402 (257)	920 (744)	285 (160)	450 (327)
Maximum security	0.30 (0.46)	0.12 (0.32)	0.10 (0.3)	0.05 (0.22)	0.22 (0.42)	0.07 (0.25)	0.23 (0.42)	0.20 (0.4)
Medium security	0.41 (0.49)	0.24 (0.43)	0.21 (0.41)	0.20 (0.4)	0.42 (0.5)	0.24 (0.43)	0.42 (0.5)	0.65 (0.48)
Minimum security	0.29 (0.46)	0.64 (0.48)	0.70 (0.46)	0.75 (0.43)	0.36 (0.48)	0.69 (0.46)	0.35 (0.48)	0.15 (0.36)
Gender	0.94 (0.24)	0.95 (0.23)	0.84 (0.37)	0.87 (0.33)	0.92 (0.27)	0.84 (0.37)	1.00 (0)	1.00 (0)
Custody TRAS	52 (17)	42 (19)	51 (16)	47 (17)	54 (13)	51 (15)	57 (16)	55 (17)
N	251	1564	440	2262	76	434	92	91

**Table 7b.** Mean and standard deviation of covariates before matching (standard deviations presented in parentheses)

Variable	SOP		SSIP		VOTP		YAOP	
	Comparison group	Intervention group	Comparison group	Intervention group	Comparison group	Intervention group	Comparison group	Intervention group
Age	49 (16)	38 (13)	33 (9)	34 (9)	32 (10)	29 (8)	22 (2)	22 (2)
Aboriginal	0.13 (0.34)	0.24 (0.42)	0.46 (0.5)	0.44 (0.5)	0.34 (0.48)	0.43 (0.5)	0.46 (0.5)	0.42 (0.5)
CALD	0.22 (0.42)	0.17 (0.38)	0.17 (0.38)	0.19 (0.39)	0.30 (0.46)	0.22 (0.41)	0.18 (0.38)	0.21 (0.41)
Custodial episode length	1330 (894)	1874 (1385)	117 (109)	170 (149)	1796 (1657)	2205 (1634)	134 (158)	308 (216)
Maximum security	0.02 (0.15)	0.03 (0.16)	0.10 (0.29)	0.08 (0.27)	0.30 (0.46)	0.18 (0.39)	0.00 (0)	0.01 (0.1)
Medium security	0.03 (0.17)	0.02 (0.15)	0.26 (0.44)	0.26 (0.44)	0.15 (0.36)	0.25 (0.43)	0.00 (0)	0.05 (0.21)
Minimum security	0.95 (0.22)	0.95 (0.22)	0.65 (0.48)	0.66 (0.47)	0.55 (0.5)	0.56 (0.5)	1.00 (0)	0.94 (0.23)
Gender	1.00 (0)	1.00 (0)	0.90 (0.3)	0.81 (0.4)	1.00 (0)	1.00 (0)	1.00 (0)	1.00 (0)
Custody TRAS	17 (14)	27 (16)	52 (015)	51 (15)	47 (20)	48 (17)	52 (16)	46 (17)
N	345	455	3194	947	53	479	367	107

**Table 8a.** Mean and standard deviation of covariates after matching (standard deviations presented in parentheses)

Variable	EQUIPS		HIPU		IDATP		MIP	
	Comparison group	Intervention group	Comparison group	Intervention group	Comparison group	Intervention group	Comparison group	Intervention group
Age	31 (9)	32 (9)	35 (8)	35 (7)	32 (6)	31 (6)	29 (7)	31 (7)
Aboriginal	0.53 (0.5)	0.44 (0.5)	0.47 (0.5)	0.44 (0.5)	0.6 (0.49)	0.48 (0.5)	0.57 (0.5)	0.48 (0.51)
CALD	0.18 (0.39)	0.13 (0.34)	0.18 (0.39)	0.16 (0.36)	0.18 (0.38)	0.16 (0.37)	0.2 (0.4)	0.24 (0.43)
Custodial episode length	344 (285)	389 (285)	187 (117)	243 (105)	431 (277)	607 (284)	283 (178)	321 (180)
Maximum security	0.29 (0.45)	0.15 (0.36)	0.06 (0.24)	0.03 (0.16)	0.12 (0.33)	0.05 (0.21)	0.26 (0.44)	0.21 (0.42)
Medium security	0.41 (0.49)	0.3 (0.46)	0.2 (0.4)	0.14 (0.34)	0.44 (0.5)	0.36 (0.48)	0.54 (0.5)	0.67 (0.48)
Minimum security	0.3 (0.46)	0.55 (0.5)	0.74 (0.44)	0.84 (0.37)	0.44 (0.5)	0.59 (0.49)	0.2 (0.4)	0.12 (0.33)
Gender	0.97 (0.17)	0.99 (0.12)	0.86 (0.34)	0.94 (0.23)	0.96 (0.19)	0.97 (0.17)	1 (0)	1 (0)
Custody TRAS	52 (16)	49 (17)	51 (15)	48 (15)	55 (14)	52 (13)	60 (15)	59 (14)
N	229	706	384	1228	57	107	46	42

**Table 8b.** Mean and standard deviation of covariates after matching (standard deviations presented in parentheses)

Variable	SOP		SSIP		VOTP		YAOP	
	Comparison group	Intervention group	Comparison group	Intervention group	Comparison group	Intervention group	Comparison group	Intervention group
Age	50 (16)	41 (13)	33 (8)	34 (8)	31 (9)	30 (7)	22 (2)	22 (2)
Aboriginal	0.09 (0.29)	0.1 (0.31)	0.48 (0.5)	0.44 (0.5)	0.41 (0.5)	0.45 (0.5)	0 (0.49)	0.35 (0.48)
CALD	0.2 (0.4)	0.16 (0.37)	0.13 (0.34)	0.15 (0.36)	0.23 (0.43)	0.2 (0.4)	0 (0.4)	0.23 (0.42)
Custodial episode length	1276 (777)	1441 (725)	98 (67)	141 (82)	1429 (715)	1467 (615)	123 (92)	248 (113)
Maximum security	0.01 (0.1)	0.01 (0.08)	0.04 (0.19)	0.06 (0.23)	0.28 (0.46)	0.23 (0.42)	0 (0)	0 (0)
Medium security	0.01 (0.08)	0.01 (0.08)	0.22 (0.42)	0.24 (0.43)	0.13 (0.34)	0.18 (0.39)	0 (0)	0.04 (0.2)
Minimum security	0.98 (0.13)	0.99 (0.12)	0.74 (0.44)	0.71 (0.46)	0.59 (0.5)	0.59 (0.5)	1 (0)	0.96 (0.2)
Gender	1 (0)	1 (0)	0.94 (0.24)	0.87 (0.33)	1 (0)	1 (0)	1 (0)	1 (0)
Custody TRAS	14 (9)	20 (10)	52 (13)	52 (14)	50 (18)	51 (16)	53 (16)	50 (17)
N	302	279	2212	726	39	82	320	74

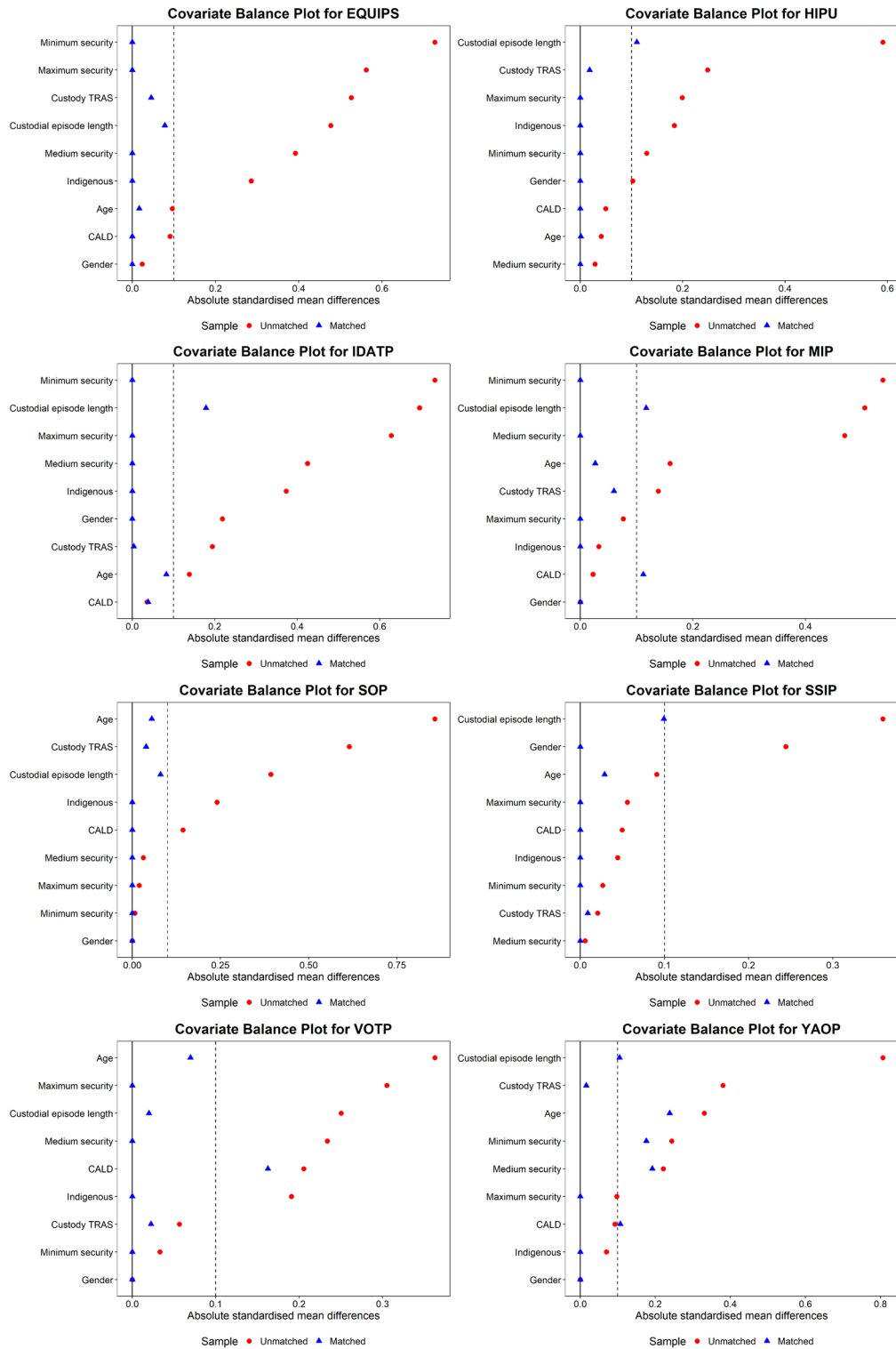


Figure 3. Covariate balance before and after matching (individual pathway cohort)

**Table 9.** Odds ratios from logit models predicting general reoffending within 12 months following release (\* denotes statistically significant odds ratios (p<0.05); [ ] denotes 95% confidence intervals)

Variable	EQUIPS	HIPU	IDATP	MIP	SOP	SSIP	VOTP	YAOP
Baseline model								
Constant	2.65*	2.48*	2.72*	4.73*	0.09*	2.76*	1.23	1.68*
	[1.9, 3.6]	[12.0, 3.1]	[1.5, 4.9]	[2.2, 10.1]	[0.1, 0.2]	[2.5, 3.0]	[0.6, 2.3]	[1.3, 2.1]
Participation	0.74	0.70*	0.53	0.42	0.99	0.98	0.99	0.74
	[0.5, 1.0]	[0.6, 0.9]	[0.3, 1.1]	[0.16, 1.14]	[0.6, 1.8]	[0.8, 1.2]	[0.5, 2.1]	[0.4, 1.2]
Covariate - model								
Constant	0.35	0.37	0.94	0.00*	0.06*	0.15*	0.02*	0.00*
	[0.1, 1.7]	[0.1, 1.2]	[0.0, 224.6]	[0.0, 0.00]	[0.0, 1.0]	[0.1, 0.30]	[0.0, 0.4]	[0.0, 0.0]
Participation	0.71	0.69*	0.54	0.55	0.97	1.07	0.90	0.77
	[0.5, 1.1]	[0.5, 0.9]	[0.2, 1.2]	[0.2, 1.7]	[0.5, 1.8]	[0.9, 1.3]	[0.4, 2.2]	[0.4, 1.3]
Gender	0.99	1.45	2.60			1.02	0.00*	
	[0.3, 3.3]	[0.9, 2.3]	[0.3, 21.2]			[0.8, 1.3]	[0.0, 0.0]	
Aboriginal	1.31	1.22	1.21	1.19	0.57	1.04	0.40	1.85*
	[0.9, 1.9]	[0.9, 1.5]	[0.5, 2.8]	[0.3, 4.70]	[0.2, 1.6]	[0.9, 1.3]	[0.1, 1.3]	[1.0, 3.2]
CALD	1.08	0.98	0.82	0.22*	1.04	0.95	0.75	0.68
	[0.7, 1.8]	[0.7, 1.3]	[0.3, 2.3]	[0.1, 0.9]	[0.4, 2.6]	[0.7, 1.2]	[0.2, 2.4]	[0.4, 1.2]
Custodial episode length	1.00	1.00*	1.00*	1.00	1.00	1.00	1.00	1.00
	[1.0, 1.0]	[1.0, 1.0]	[1.0, 1.0]	[0.9, 1.0]	[1.0, 1.0]	[1.0, 1.1]	[1.0, 1.0]	[1.0, 1.0]
Age	1.00	1.01	1.02	1.01	1.02	1.01	1.05	1.27*
	[0.9, 1.0]	[1.0, 1.0]	[1.0, 1.1]	[0.9, 1.1]	[1.0, 1.1]	[1.0, 1.1]	[1.0, 1.1]	[1.1, 1.4]
Custody TRAS	1.05*	1.04*	1.05*	1.04	1.08*	1.05*	1.08*	1.02*
	[1.0, 1.1]	[1.0, 1.1]	[1.0, 1.1]	[1.0, 1.1]	[1.0, 1.1]	[1.0, 1.1]	[1.0, 1.1]	[0.9, 1.0]
Medium security	0.82	0.72	0.10	1.20	0.28	1.52*	0.20*	
	[0.5, 1.4]	[0.3, 1.7]	[0.0, 5.1]	[0.2, 6.1]	[0.0, 7.4]	[1.01, 2.3]	[0.0, 1.0]	
Minimum security	0.49*	0.53	0.08	1.07	0.19	1.34	0.28*	
	[0.3, 0.8]	[0.2, 1.2]	[0.0, 4.3]	[0.1, 8.0]	[0.0, 2.0]	[0.9, 1.2]	[0.1, 1.0]	
Stringency index	1.00	1.00*	1.01	1.01	0.99	1.01*	1.00	1.00
	[0.9, 1.0]	[1.0, 1.01]	[1.0, 1.0]	[1.0, 1.0]	[0.9, 1.0]	[1.0, 1.0]	[0.9, 1.0]	[0.9, 1.0]
N	935	1612	164	88	581	2938	121	394

**Table 10.** Odds ratios from logit models predicting return to custody within 12 months following release (\* denotes statistically significant odds ratios (p<0.05); [ ] denotes 95% confidence intervals)

Variable	EQUIPS	HIPU	IDATP	MIP	SOP	SSIP	VOTP	YAOP
Baseline model								
Constant	0.95 [0.7, 1.2]	0.81* [0.7, 1.0]	1.24 [0.7, 2.1]	1.31 [0.7, 2.4]	0.09* [0.1, 0.2]	1.03 [0.9, 1.1]	0.68 [0.4, 1.3]	0.84 [0.7, 1.1]
Participation	0.81 [0.6, 1.1]	0.76* [0.6, 1.0]	0.65 [0.3, 1.3]	0.57 [0.3, 1.3]	1.01 [0.6, 1.8]	0.92 [0.8, 1.1]	0.85 [0.4, 1.9]	0.76 [0.5, 1.3]
Covariate - model								
Constant	0.14* [0.0, 0.6]	0.34 [0.1, 1.1]	0.33 [0.0 35.4]	0.00* [0.0, 1.0]	0.04* [0.0, 0.8]	0.04* [0.0, 0.1]	0.09 [0.0, 1.6]	0.00* [0.0, 0.0]
Participation	0.77 [0.5, 1.1]	0.74* [0.6, 1.0]	0.64 [0.3, 1.4]	0.76 [0.3, 2.1]	0.93 [0.5, 1.8]	0.94 [0.9, 1.1]	0.82 [0.3, 2.0]	0.74 [0.4, 1.3]
Gender	0.94 [0.3, 3.0]	1.62 [1.0, 2.7]	7.15 [0.7, 70.1]			2.50* [1.9, 3.3]		
Aboriginal	1.10 [0.8, 1.5]	1.33* [1.1, 1.7]	0.86 [0.4, 1.9]	1.45 [0.4, 4.9]	0.39 [0.1, 1.2]	0.95 [0.8, 1.1]	0.35 [0.1, 1.2]	1.20 [0.7, 2.0]
CALD	0.92 [0.6, 1.5]	1.17 [0.9, 1.6]	1.09 [0.4, 3.0]	0.48 [0.1, 1.8]	0.14 [0.0, 1.1]	0.93 [0.7, 1.8]	0.48 [0.2, 1.6]	0.36* [0.2, 0.7]
Custodial episode length	1.00 [1.0, 1.0]	1.00 [1.0, 1.0]	1.00 [1.0, 1.0]	1.00 [1.0, 1.0]	1.00 [1.0, 1.0]	1.00 [1.0, 1.0]	1.00 [1.0, 1.0]	1.00 [1.0, 1.0]
Age	1.01 [0.9, 1.0]	1.00 [0.9, 1.0]	1.00 [0.9, 1.1]	1.08 [1.0, 1.2]	1.04* [1.0, 1.1]	1.00 [0.9, 1.0]	0.99 [0.9, 1.1]	1.24* [1.1, 1.4]
Custody TRAS	1.05* [1.0, 1.1]	1.03* [1.0, 1.0]	1.05* [1.0, 1.1]	1.07* [1.0, 1.1]	1.11* [1.1, 1.6]	1.05* [1.0, 1.1]	1.07* [1.0, 1.1]	1.03* [1.0, 1.1]
Medium security	0.84 [0.5, 1.3]	0.37* [0.2, 0.8]	0.11 [0.0, 2.0]	1.37 [0.3, 6.0]	0.08 [0.0, 2.9]	1.19 [0.8, 1.7]	0.36 [1.0, 1.5]	
Minimum security	0.48* [0.3, 0.7]	0.32* [0.2, 0.7]	0.07 [0.0, 1.4]	1.20 [0.2, 8.6]	0.07 [0.0, 1.1]	0.96 [0.7, 1.4]	0.45 [0.1, 1.5]	
Stringency index	1.00 [1.0, 1.0]	1.01* [1.0, 1.0]	1.01 [0.9, 1.0]	1.04* [1.0, 1.1]	0.99 [0.9, 1.0]	1.00 [1.0, 1.0]	1.00 [0.9, 1.0]	1.00 [0.9, 1.0]
N	935	1612	164	88	581	2938	121	394

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