BANKWEST CURTIN ECONOMICS CENTRE

EVALUATING LITERACY AND NUMERACY PROGRESSIONS IN CUSTODY AND DESISTANCE FROM CRIME: EVIDENCE FROM WESTERN AUSTRALIA

Research work funded by the Western Australian Office of Crime Statistics and Research, WA Department of Justice

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The findings and views reported in this report, however, are those of the authors and should not be attributed to Dr Esgin or the Department of Justice, or considered to be endorsed by the Department or an expression of the policies or views of the Department. Any errors of omission or commission are the responsibility of the authors.

Acknowledgement of Country

We acknowledge the Whadjuk Noongar people as the Traditional Custodians of the lands on which this research was undertaken. We pay our respects to Elders past and present. We honour the unbroken sovereignty, knowledge systems, and cultural authority of Aboriginal and Torres Strait Islander peoples, whose custodianship of Country has never been ceded.

We recognise that prisons are not neutral institutions: they are colonial constructs that continue to enact dispossession, surveillance, and control over First Nations peoples. Against this backdrop, Aboriginal and Torres Strait Islander communities sustain powerful traditions of education, law, and justice that stand as living alternatives to carcerality.

Terminology

Throughout the report the term 'Aboriginal' is used to refer to people of Aboriginal and/or Torres Strait Islander descent, the First Nations peoples of the Australian continent.

ACRONYMS AND ABBREVIATIONS

ABE	Adult Basic Education
ABS	Australian Bureau of Statistics
ANZSOC	Australian and New Zealand Standard Offence Classification
BCEC	Bankwest Curtin Economics Centre
BOCSAR	Bureau of Crime Statistics and Research (of New South Wales)
NASEM	National Academies of Sciences, Engineering, and Medicine
NSW	New South Wales
OICS	Office of the Inspector of Custodial Services (of Western Australia)
RAAC	Research Applications and Advisory Committee
RNR	Risk-need-responsivity
TAFE	Tertiary and Further Education
UK	United Kingdom
US	United States
VET	Vocational education and training
WA	Western Australia
WACSAR	Western Australian Office of Crime Statistics and Research

ABSTRACT

This study investigates the impact of prisoners' participation in literacy and numeracy courses while in custody on desistance from crime using administrative data on custodial stays in Western Australian (WA) adult prisons from 2000 to 2024. Participation in literacy and numeracy courses is found to be associated with a nine-percentage point reduction, from 49 to 40 percent, in the probability of a typical prisoner returning to prison within two years of release, relative to prisoners who did not participate in any courses. Participation in other types of courses is estimated to have a similar effect. Key results are robust to alternative specifications of time to recidivism, and the modelling provides evidence on how other prisoner characteristics affect recidivism. Separate estimates for key subgroups show the effect of course participation to be larger for more educated prisoners and more serious offenders, but much smaller for Aboriginal female prisoners.

EXECUTIVE SUMMARY

Aims

The main objective of this research is to evaluate the effect of prisoners' participation in Adult Basic Education (ABE) - literacy and numeracy courses provided in adult prisons in WA on recidivism and desistance from crime.

Data

The analysis is based on de-identified data consisting of WA Department of Justice administrative records on custodial spells from 2000 to 2024. The key outcome indicator is a measure of recidivism, based on whether a prisoner commences a further custodial sentence within two years of release, which can be observed for stays with a release date up to late 2022.

The dataset is in the form of a panel, with repeat observations on custodial stays for individuals. An average of 2.24 stays were recorded per prisoner, ranging to a maximum of 28 stays for an individual. For estimating the main models there were almost 100,000 observations available on completed prison stays by around 43,000 individual prisoners.

Methods

With the outcome defined in binary form – the prisoner either did or did not return to custody within two years – binary logistic regression models are estimated. These provide estimates of the effect of participation in courses, along with the effect of control variables such as gender and length of sentence, on the probability of a prisoner returning to custody within two years of release.

A simple evaluation design would compare recidivism outcomes for prisoners who participated in courses with the outcomes for prisoners who did not participate. However, modelling the effect of ABE courses is not so straight-forward because prisoners typically participate in multiple courses - both ABE and non-ABE courses - during a custodial stay. On average, prisoners participated in 0.7 ABE classes and seven classes in total per stay. To capture the effect of participation in ABE classes, participants were classified into two mutually exclusive categories: prisoners that attended at least one ABE class during their stay (around 17 percent of stays) and prisoners that attended only non-ABE classes (40 percent of stays). In the logistic regression modelling, these are compared to the 'reference' category comprised of prisoners who did not participate in any courses (44 percent of stays).

Results

For 41 percent of completed prison stays, the person was observed to return to custody in a WA prison within two years of release. The modelling results indicate that participation in an ABE class is associated with a reduction in recidivism by nine percentage points: from 43 percent for non-participants to 34 percent for ABE participants. Put another way, the likelihood of recidivism is around 20 percent lower for ABE participants. Participation in only other (non-ABE) classes is estimated to be associated with a slightly larger reduction in recidivism.

Results for other control variables included in the models are in line with findings in the existing literature. Recidivism rates are markedly higher for men compared to women, for younger prisoners, and for those with relatively low prior educational attainment. Longer custodial stays are associated with higher subsequent rates of recidivism. Aboriginal prisoners also have much higher rates of recidivism. This result must be understood in the context of the many factors that contribute to the over-representation of Aboriginal Australians in the criminal justice system in the first place, including the effects of trauma and marginalisation associated with the impacts of colonisation, forced removal, and other injustices, and the likely compounding of these effects by the experience of incarceration.

Results for key sub-samples

When models are estimated separately for the main sub-groups within the prison population, the estimated benefits of participation in ABE and in non-ABE classes are found to be substantially larger for men than for women; are similar for younger and older prisoners; and are much larger for prisoners with higher levels of educational attainment. The benefits associated with course participation are also lower for Aboriginal prisoners, particularly for female Aboriginal prisoners. Factors contributing to this result may include Aboriginal prisoners' shorter average custodial spells, lower initial levels of literacy and numeracy, and potential cultural misalignment in program delivery. There is some evidence that participation in classes has a larger impact for prisoners convicted of more serious crimes: the estimated effect of participation in ABE classes on recidivism is insignificant for prisoners convicted of a range of more minor offences.

Sensitivity checks

To test the sensitivity of the results to the chosen modelling approach, binary logistic regression models are estimated for the likelihood or recidivism after one year of release, and after five years of release. Survival models were also estimated in which the duration of post-release spells out of prison is modelled as a continuous variable, avoiding the need to pick an arbitrary post-release reference point at which to measure recidivism. The key results relating to class participation and to other control variables are robust to these alternative specifications.

Survival modelling indicates that upon release prisoners remain out of prison for an average duration of 5.5 years. Compared to spells in which the prisoner did not participate in any classes, individuals remain out of prison for 70 percent longer if they had participated in an ABE course during their spell, and twice as long if the prisoner participated only in non-ABE courses.

Association versus causation

These estimates are highly significant in the statistical sense, meaning we can very confidently reject the null hypothesis of no association between participation in classes and recidivism. However, that does not establish causation between class participation and lower recidivism. The main challenge to establishing causation is the potential for 'omitted variables': that there are systematic differences between participants and non-participants that we have not controlled for in the model, and which are also correlated with the likelihood of recidivism. A special case of this is 'selection bias', where there are unobservable attributes that make some prisoners more likely to participate in classes and also less likely to reoffend upon release. Examples may include prisoners' levels of motivation or sense of self-efficacy; or bias in the processes by which prisoners are given access to classes.

A number of steps are taken to address the question of causation. As there are multiple observations on custodial stays for individuals, the recidivism model is estimated as a panel model using the

random-effects specification, which partially controls for unobserved individual effects. Estimating the model with the fixed-effects estimator, which more rigorously controls for unobserved individual effects, returns smaller but still substantial and statistically significant impacts of participation in ABE classes and non-ABE classes on recidivism. We also tested a Heckman two-stage model, which adds a correction for selection in the model of recidivism after first modelling selection into ABE-classes. While we are not confident in the validity of the instruments tested to model selection, the key findings are also robust to this approach. While we cannot claim to have established causation, the analysis goes further than in most observational studies in attempting to address potential omitted variables and selection bias.

Potential casual channels

Alternative outcome measures are modelled to explore potential causal links between participation and recidivism, and as a way of moving beyond recidivism to capture other dimensions of desistance from crime. These included prisoner progressions in literacy and numeracy, the incidence and timing of in-prison offences, and whether a returning prisoner was charged with a more serious offence than in the prior completed spell. However, these exercises were largely unsuccessful in shedding further light on the effects of participation in ABE and other classes on desistance from crime. We also modelled the number of classes a prisoner participates in and found the act of having participated at all is what matters most, rather than the 'dose'.

Key findings

The main finding is the strong statistical evidence that prisoner participation in ABE and other classes in custody is associated with substantially reduced recidivism.

A full cost-benefit analyses of ABE and other training provided in prisons would require additional information on the cost of providing classes. Even then, such an analysis would be challenging given the conflation of the types and number of classes prisoners undertake, and uncertainty around the extent to which participation has a causal effect on recidivism. However, we can calculate that the reduced days of imprisonment associated with a prisoner participating in ABE classes, as opposed to not participating in any classes, equates to savings of around $0.5 million.

Our exploration of potential causal pathways between participation in ABE courses and desistance from crime proved inconclusive. Some results are suggestive of 'identity-based' mechanisms in which class participation leads to a more positive sense of self-identity rather than 'control-based' mechanisms whereby participation raises prisoners' skills and competencies and, thereby, increases control over their outcomes. These include evidence that participation in itself is as important or more important than the number of classes undertaken, the effect of participation being larger for more educated prisoners, and for more serious offenders. In contrast, evidence of positive effects of participation on post-release desistance from crime but not on in-prison offences, is more suggestive of 'control-based' mechanisms.

There may be value in reviewing the content and delivery of classes for prisoners with lower levels of education and for female Aboriginal prisoners. To improve understanding of the links between course participation and desistance from crime, improved data on prisoners' initial literacy and numeracy skill levels, and how these progress over time with participation, would be of particular benefit for future research and evaluation.

1. INTRODUCTION

According to published estimates from the Australian Bureau of Statistics (ABS), there were 7,814 adult prisoners held in WA prisons as of June 30, 2024, equating to 341 prisoners per 100,000 adults in the population (ABS 2025a). This compares to a national incarceration rate of 208 per 100,000 adults, and an increase from 265 per 100,000 adults in WA in 2014, with WA's prisoner population growing at an average 4.1 percent per annum over the decade. Total expenditure on corrective services for the State was estimated to stand at $0.83 billion in 2023-24, equating to $382 per prisoner per day, and $307 per prisoner per day in operating expenditure (excluding capital costs) (Productivity Commission 2025).

For 2023-24, the adult recidivism rate for WA – the proportion of released adult prisoners who return to prison within two years – was estimated by the Productivity Commission (2025) to be 31 percent. Based on the data used in this report, more than three-quarters of adult prisoners in WA jails as at June 30, 2024, had completed at least one prior custodial spell in the State. Clearly, developing programs that reduce the rate at which prisoners reoffend and return to custody offers potentially large direct budgetary savings, in addition to the direct benefits to those prisoners, their families, and wider society.

International evidence indicates that prisoner participation in learning activities is associated with reduced rates of reoffending and positive outcomes in other domains, such as health and employment, potentially offering significant cost-savings to governments. The Department's Education, Employment and Transitional Services (EETS) deliver a wide range of courses, from entry level courses addressing acknowledged low levels of literacy and numeracy among the WA prison population, through to courses facilitating entry to Tertiary and Further Education (TAFE) and university studies, and certificate level, accredited courses (Office of the Auditor General 2021). A small proportion of prisoners are able to enrol in tertiary courses while in custody.

Based on confidentialised (anonymous) administrative data provided by the Department, this research looks at the effects of prisoners' participation in literacy and numeracy classes while in custody. Specifically, it looks at participation in what the Department classifies as ABE. The main focus is on how participation in these education programs affect recidivism. However, since recidivism is a partial and imperfect measure of engagement in criminal activity, additional indicators of prisoners' desistance from crime are explored conditional upon participation in ABE classes. The aim is to broaden the outcome measures used to assess the effect of participation in courses, and to understand the causal mechanisms through which participation in education may impact upon prisoners' desistance.

The following section provides a brief background on relevant theoretical perspectives and existing empirical evidence. An overview of the methods and the dataset are provided in Sections 3 and 4, respectively. The main empirical results are presented in Section 5, in which a preferred 'base-line' binary logit model of recidivism is developed, along with a range of specification tests. Separate estimates for selected sub-groups of the population using the base-line model are presented in Section 6, and Section 7 tests the robustness of the base-line model to estimation of the effect of participation using continuous-time (survival) modelling of the duration of post-release spells. Results from separate analyses for Aboriginal prisoners using both approaches are presented in Section 8. The concluding chapter discusses the implications that can be drawn from the analysis, noting the strengths and weakness of the research, and highlights priorities for data collection to advance

research in this area and to support improvements in the delivery of education and training in WA prisons.

2. BACKGROUND AND LITERATURE REVIEW

As of June 2024, WA's incarceration rate was 341 prisoners per 100,000 adult population (ABS, 2025a), which was 63 percent higher than the national rate of 209.5. Incarceration rates in WA have increased over the past decade, with rates for men (613) and women (69) in 2024 having increased by 28 percent and 44 percent, respectively, since 2014 (ABS 2025a). The ABS figures also suggest 60 percent of those prisoners are known to have served prior prison sentences. As noted above, the data used in this report indicate the proportion is considerably higher. The Productivity Commission (2025) estimate the recidivism rate for WA to have been 30.8 percent for 2023-24, indicating that that almost one-third of adults released from prison return with a new sentence within two years.

Ensuring community safety, through the delivery of rehabilitation programs and interventions that promote desistance from crime, is a key objective of corrective services. In addition to the direct benefits of reducing reoffending, lowering the rate at which prisoners return to prison can be cost-effective and reduce the financial burden on corrective services. Provision of education and training courses to prisoners during custody is a key approach for reducing reoffending. Within the Department, EETS facilitates a wide range of education and vocational training courses delivered within the prison system, as well as career and employment counselling services. While these are available to all prisoners, the Department prioritises the provision of ABE for prisoners with low language, literacy, and numeracy skills in recognition that this is a contributing factor to incarceration risk (Department of Justice 2024: 37-38).

This report draws on administrative data provided by the Department to provide new empirical evidence on the effectiveness of ABE courses. While the evaluation is necessarily shaped by the nature of that dataset, it is useful to place the research in the context of the existing literature to enrich the interpretation of the analyses. Three broad aspects are important to consider, and this section provides a brief review of existing literature relevant to those questions. The first is the question of the theoretical links between participation in education and training and reoffending. Why would we expect such participation to reduce reoffending? Through what mechanisms would such effects be mediated? The second is the methodological question of how to identify such effects, including issues around the measurement of outcomes. And finally, what do those approaches tell us about the likely impact of such programs, and how they can best be delivered?

2.1 Desistance from crime

Cavanaugh (2011) describes a classical view of crime as one in which individuals are seen as rational and deterred from committing crimes by fear of punishment. Numerous disciplines have built on and challenged this conception, in particular noting that criminal behaviour could often be attributed empirically to factors that were outside an individual's control. These include internal (psychological and biological) factors and external social factors. Sociological theories highlight socially constructed factors associated with criminal offending, including social exclusion, inequality in opportunity and power, and conflict created by social and legal constraints. Criminal behaviours can develop from life-experiences and learned behaviours within family and other social groups.

Like the classical tradition, economic models focus on rational, utility maximising actors for whom whether or not to commit a crime comes down to a series of individual cost-benefit analyses. Such an approach can readily align with other approaches by simply changing the emphasis placed on different perceived costs and benefits, such as the desire to fit in with social groups, risk aversity, or perceived

costs of punishment. This can include, for example, explaining higher crime rates for those in poverty, unemployment, racial minorities, or other disadvantaged groups in terms of a lower 'opportunity cost' of offending and is consistent with alternatively formulated sociological theories. A challenge to the economic approach of the rational decision-maker, as Jacob (2011) highlights, is evidence that much criminal behaviour is compulsive rather than arising from a considered, evaluative process (Cavanaugh 2011). Equally, this observation creates challenges for interventions aimed at addressing behaviour and for punitive or deterrent models.

While these many perspectives provide valuable insights – including guidance for formulating policy to reduce crime – there are undoubtedly individual factors such as sociopathy and psychopathy that do not fit general theories, and extenuating risk factors such as drug and alcohol use or addiction, mental health conditions, and undiagnosed intellectual disability. For practical application, theoretical approaches need to be able to accommodate well-established empirical realities, including that criminal offending is more common among the less educated (WA Office of the Inspector of Custodial Services [OICS] 2014, Ooi 2021), among colonised groups and persons otherwise subject to discrimination as minorities (National Academies of Sciences, Engineering, and Medicine [NASEM] 2022: 101-102, Trudgett et al. 2024), and declines with age (NASEM 2022: 71). These associations have also been observed for Western Australian prisoners (see, for example, OICS 2014, and Payne 2007 for an Australian review of correlates with recidivism).

NASEM note that theories of reoffending tend to be grounded in general theories of criminal offending, but adapted to explain repeat offending (2022: 70). Those adaptions are likely to reflect 'system responses' to the experiences of being imprisoned, and subsequent change in the consequences of reoffending. NASEM identifies six groups of factors arising in theories on reoffending: personal risk factors, confinement experiences, societal attachments, re-entry stressors, ecological influence, and supervision regimes.

Personal risk factors include substance abuse, mental health, unemployment, a lack of housing and transport, inadequate support services (Lacourse et al. 2019, Newton et al 2018). Reoffending is positively associated with a more extensive criminal history, whether in terms of number or severity of offences. Imprisonment is generally thought to reduce recidivism through a 'specific deterrence' effect, whereby the experience of incarceration reduces the willingness of a person to reoffend as they learn of the unpleasant experience. Evidence of such a deterrence effect is not compelling for Australia (Weatherburn 2021) or internationally, with some research suggesting prisons can instead act as 'schools of crime' (NASEM 2022: 74).

Social attachment and re-entry stressors relate to the social networks and circumstances released prisoners return to. These may include strained relationships, weakened social ties, poverty, precarious housing, and victimisation, potentially leading to emotional states that can invoke reoffending, such as frustration and a sense of injustice (McNeill 2006, Lacourse et al. 2019, Wallace et al. 2016). Wallace et al. (2016) find family support to be important for prisoners' post-release mental health. Ecological perspectives also consider the environments individuals return to, with an emphasis on neighbourhood disadvantage and employment opportunity (Chamberlain and Wallace, 2016). Elements of supervision regimes may include surveillance or drug testing that limit opportunity to reoffend or heighten the risk of doing so.

These theories suggest a range of possible mechanisms through which participation in training while in prison may promote desistance from crime, as well as perspectives for interpreting empirical results. If that education improves a prisoner's post-release employment prospects and earnings potential in the labour market, both economic and sociological theories would suggest this would reduce the risk of reoffending. Such an effect may occur through the 'cost-benefit' nexus whereby the

opportunity cost of re-incarceration is higher, or through improved resources, ability to maintain social ties, better housing, and opportunity to relocate to more positive environments.

Following human capital theory, the causal effect operating through enhanced labour market prospects would require that participation in education and training raised the trainees' productivity, a channel potentially testable through observations of changes in actual numeracy, literacy, or other measures of skill. However, signalling and queuing theories of the labour market suggest the act of completing a course or gaining a credential may be used as a screening mechanism by potential employers (Spence 1973, Thurow 1975), meaning employment prospects may be raised without need to establish a casual effect on productivity.

Further, such effects may occur whether there is a real change in labour market prospects, or simply a change in prisoners' perceptions, and the way they assess risks. Giles and Whale (2013) cite evidence that increased education is associated with less myopic decision-making – applying lower discount rates to future benefits – therefore placing lower weight on immediate gratification and greater adverse weight on risks of future incarceration. Similar processes may promote positive lifestyle behaviours, such as reduced substance use, which in turn reduce the risk of reoffending.

Another potential mechanism, which we have not found referenced in the existing literature, is that participation in education and training may change the circle of persons a prisoner associates with while in custody. If this extends prisoners' networks outside of particular crime-related, ethnic, or cohort groups this may help reduce the potential effect of prisons as 'crime schools' and provide positive peer-group effects within classes.

NASEM (2022: 80-81) contrast such 'control-based' mechanism with 'identity-based' mechanisms, whereby participation in education and training may shift prisoners' concepts of self-identity, such as in terms of feelings of self-esteem, self-efficacy, or worthiness, in turn leading to behaviour change to mitigate against reoffending and engaging in risk factors, such as substance abuse. A related literature addresses the question of the change process or 'desistance paradigm': understanding why and how ex-offenders change their behaviours, which McNeill (2006) argues need to be the precursor to developing correctional practices. Desistance is understood as a process, with the literature commonly distinguishing between primary desistance and secondary desistance. Primary desistance is simply the achievement of a period free of offending, while secondary desistance relates to an underlying, positive change in the ex-offenders' self-identity.

Accumulating evidence of the importance of secondary desistance can be found in McNeill 2006 and McNeill et al. 2012. Among other factors, the development of a sense of agency, the quality or relationships and sense of respect between program participants and prison staff or probation officers, interventions that respond to individuals' wider family and social contexts, promote a sense of self-worth, and valuing social connections have been found to support a commitment to desistence. These can all impact on ex-offenders' motivation to change and desist from crime.

The prominent model for guiding offender treatment is the Risk-Need-Responsivity (RNR) model, based on the principles that the higher the offender's risk level, the more intensive treatment should be (risk), that treatments target the offender's needs (need), and are appropriate for the offender's learning style and ability (Andrews, Bonta, and Wormith 2011). In developing the 'Good Lives Model', Ward and Stewart (2003) argued for a greater emphasis on basic human needs associated with propose, such as friendships, creative pursuits, and intellectually challenging or satisfying work, as a means to promote offender motivation and positive personal identity (McNeill et all 2016, see Andrews et al. (2011) for a critical comparison of the RNR and Good Lives Models).

McNeill et al. (2016) identify three preconditions for such change: motivation, capacity (or skills), and opportunity. Prisoner participation in education and training potentially aligns with each of these, and

the principles of offender treatment. From extensive qualitative research with male prisoners in NSW, McGregor (2020) also highlights the importance of these mechanisms beyond employability. She finds participation in basic skills education induced a significant shift in prisoners' own attitudes about their capabilities, agency, and desire to desist from crime. In Australia, Giles et al. (2007) also find prisoners participated in vocational training expected better post-release labour market outcomes, consistent with a potential change in motivation and sense of agency.

2.2 Measuring and modelling desistance from crime

For assessing the impact of education and training courses in custody, our interest is in desistance from crime in a holistic sense, along with other potential positive impacts on prisoners' wellbeing. Reflecting an inevitable bias in empirical work towards outcomes that are readily quantifiable, recidivism has been the main outcome measure in analyses of the effects of prisoner participation in education and training. However, recidivism is a far from perfect measure of desistance from crime, as is comprehensively detailed in NASEM's (2022) *Limits of Recidivism* (see, also, McNeill et al. 2012).

Desistance from crime can often be a gradual process, and not a linear one, as ex-offenders encounter relapses and setbacks, with substance use a prominent risk factor. In contrast, recidivism typically offers a measure at a single point in time. Ideally, recidivism would relate to re-engaging in crime but measures need to be based on some observable criterion, such as rearrest, reconviction, reincarceration, parole violation, or even self-report, that are less than perfect indicators of criminal behaviour (Davis et al. 2013; NASEM 2022; OICS 2014, Payne 2007). Some criminal activity goes undetected or unpunished and people may be wrongly arrested or convicted. Recidivism measures are typically binary and based on a particular post-release point in time, and therefore fail to capture important dimensions such as the frequency and severity of criminal activity. They may be sensitive to systems factors, such as the extent of surveillance and monitoring. On top of measurement issues, NASEM (2022: 79-80) argue the key distinction between recidivism and desistence from crime is that recidivism focusses on a negative outcome, whereas desistance refers to positive changes over time contributing to reduced criminal behaviour.

While there is no single accepted definition of recidivism, it is typically a binary indicator taken at a point in time, usually specified in reference to the date of release from prison. The OICS suggest 'The period of two years is generally accepted locally, nationally and internationally." (2014: 2). This is also the reference period used in the Productivity Commission's reporting framework on Australian government services in Justice. However, the most common period used in the 'high-quality' studies included in Davis et al.'s (2013) meta-analysis was one year. Ooi's (2021) study of recidivism in NSW measures recidivism as a 'new and proven' offence within 1 year of release on the grounds that a large proportion of ex-prisoners are reconvicted within a year of release.

As in this study, many empirical analyses will test the sensitivity of results to the choice of time period for measuring recidivism, or model elapsed periods without observed reoffending as a continuous variable, including using survival models (as in Weatherburn 2021 and Section 7 below). However, using alternative choices in defining or modelling the elapsed time to reoffending does not overcome challenges noted in determining when reoffending has actually occurred.

Broader measures of desistance may incorporate more nuanced assessment of pathways, measures of severity of offence, and outcomes in other domains conducive to positive social reintegration, such as in post-release employment, education, relationships and family functioning, and civic engagement (NASEM 2022). With much of the empirical literature based on administrative data from corrective services, such measures beyond criminality are often unavailable to researchers.

The focus on recidivism as an outcome measure shapes the methodological approaches used in evaluating the impact of participation in education and training in custody. These include simple comparisons of outcomes for participants and non-participants, and the use of multivariate regression models to control for differences between the two groups, often binary models (see Davis et al. 2013, NASEM 2022 for reviews). The nature of access to and provision of education and training and other treatments means that few evaluations have used random control trials or experimental methods for in-prison treatments. Despite this, there seem to be few studies that have used formal statistical methods to control for selection bias on unobservables. A study by the United Kingdom (UK) Ministry of Justice and Department of Education (2017) provides an example of an application of propensity score matching to establish a synthetic control group.

2.3 Effects of prisoner participation in education - previous estimates

There is widespread - though not universal - evidence that participation in education and training is associated with reduced recidivism upon release. In a meta-analysis of US studies Davis et al. (2013) find "… on average, inmates who participated in correctional education programs had *43 percent lower odds of recidivating* [after one year] than inmates who did not … This translates into a reduction in the risk of recidivating of 13 percentage points …". They were unable to disentangle findings relating to the effects of ABE, vocational, or other forms of education on recidivism, given prisoners often participate in multiple programs. The UK study noted above using propensity score matching drew on data on 5.2 million ex-prisoners and found almost a 10-percentage point lower rate of return to prison after one year for prisoners who had participated in learning activities during their spell: 34 percent compared to 43 percent for non-participants (Ministry of Justice/Department of Education 2017).

Numerous other international and Australian studies have identified positive associations (Giles and Whale 2013), though one needs to be cautious of 'publication bias' in which studies that find significant effects are more likely to be accepted for publication. Among Australian studies, Ooi (2021) uses data on prisoners who participated in a traineeship program prior to release from 2010 to 2019 and a comparison group drawn from Bureau of Crime Statistics and Research (BOCSAR) data for ex-prisoners who did not participate in traineeships. When a model using all available controls is estimated, the results show 2.9 percentage points lower rate of reconviction after one year for participants, around six-percentage point lower rates of conviction for personal, property, or serious drug offences, and a small but statistically insignificant reduction in re-imprisonment rates. The effects are larger among for those with lower risk of reoffending, based on their score on the 'LSI-R', described as '…a predictive tool to assess an offender's risk of recidivism and identify the offender's criminogenic needs.'

For a sample of Queensland prisoners, Callan and Gardner (2005) find participation in vocational education and training programs while in prison reduced recidivism between 24 and 28 percent depending on the measure used. Using matched WACSAR and Centrelink (welfare) data for WA prisoners from 2005 to 2010, Giles (2016) found marginally reduced recidivism four-five years after release and reduced seriousness of offending associated with the number of successful classes completed in prison. A measure of upskilling – completing higher level classes than previously - was found to be associated with lower seriousness of offending, but not reincarceration. For the more limited sample of prisoners with multiple custodial spells, upskilling was significantly associated with higher recidivism. A study by OICS also found an increased likelihood of recidivism associated with treatment programs in WA prisons between 2008 and 2010, arguing 'If the program is not aligned to the correct person, treatment programs can be harmful.' (OICS 2014: iii). Note that the programs

evaluated were treatment programs, such as for sex offending and substance abuse, not education and training programs.

Empirical evidence appears quite limited in terms of the mechanisms through which in-prison education and training impact upon desistance from crime. There is evidence that in-prison education and training does often positively affect post-release labour market outcomes (Ooi 2021), and also that better labour market conditions reduce the likelihood of reoffending (NASEM 2022: 77), leading Ooi to observe 'there is emerging evidence that recidivism of ex-inmates is strongly linked to improving their educational outcomes and their ability to find stable employment post-release.' (2021: 2). Interestingly, the large-sample matching study by the UK Ministry of Justice/Department of Education (2017) found little difference in the impact of prisoner education and learning activities conditional upon whether or not the course was completed, suggesting it is taking part that has the biggest impact rather than achievement. This is consistent with effects being mediated through 'identity-based' mechanisms rather 'control-based' mechanisms.

3. AN OVERVIEW OF THE APPROACH

This evaluation seeks to estimate the effect of WA prisoners' participation in numeracy and literacy courses while in custody on desistence from crime. This section provides an overview of the approach taken, with full details of the analyses reserved for the relevant chapters. The central research question can be framed in terms of a standard evaluation problem. There is a population of subjects (prisoners) who may participate in a treatment (undertake a course), and we wish to know the effectiveness of the treatment. To do so, ideally, we would like to observe the post-course outcomes of participants and compare them to the outcomes that the participants would have experienced had they not participated in the treatment. In reality, only one of those states of the world can be observed, and the essence of the evaluation problem is to determine the counterfactual: what would participants' outcomes have been if they had not participated in a course?

The so called 'gold standard' approach to such evaluation problems is to conduct a randomised control trial. Random allocation of individuals to a treatment group and a control group, in theory, ensures that a comparison of outcomes between the participants and the control group represents the net impact of the treatment. In the absence of such a trial, and working with retrospective data, analysts typically compare outcomes of participants with non-participants whilst employing a variety of empirical approaches to control, as best as possible, for other factors likely to affect outcomes of the two groups, in order to isolate the 'causal' effect of the treatment on outcomes.

For the purposes of this project, the Department provided data extracted from their administrative systems relating to all custodial spells in WA prisons since 2000. The key measure of desistance from crime is recidivism – the rate at which prisoners return to prison after being released from a custodial prison stay. However, more nuanced indicators of desistance from crime are also explored including seriousness of reoffending and frequency and severity of in-custody offences. The data for the analyses are sourced from two separate data files provided by the Department:

- a 'stays file' that contains one record for each prison stay and includes information relating to that prison stay and to the prisoner. It includes a 'stay identifier' that is unique to each stay, plus a prisoner identifier that is unique to each individual, so that multiple stays can be matched to the individual person.
- A 'classes file' containing one record for each class a prisoner participates in while in custody. Classes are described in the documentation as "… children (descendants) of courses". That is to say, a course may be comprised of a number of classes. The classes file also includes a course code which uniquely identifies the associated course. Multiple classes and courses can be associated with the one prison stay.

The data are de-identified (anonymous) but can be matched through the unique stay identifier common to both data files: courses can be linked to stays which, in turn, can be linked to individuals. The primary unit of analysis is custodial stays (also termed 'spells'). Prisoners can and typically do have multiple stays. Our estimation approach allows for the fact that we have repeat observations on stays for individuals (prisoners). The data provided relate to all stays in Western Australian prisons with a discharge date from 1 January 2000. Only completed custodial spells are used in the evaluation, and the data include stays with a discharge date up until mid-December 2024. A custodial stay is one in which the prisoner has been convicted of a crime. This is distinct from being on remand, which refers to the time a prisoner is imprisoned while awaiting their court case or sentencing. The reception dates for those custodial spells range from as early as 1979 to the end of November 2024. Almost half (47%) of custodial spells have some initial period of remand.

The stays dataset includes observations on 96,781 completed custodial spells of 43,220 different prisoners. On average, prisoners participate in seven different classes during a custodial stay. Not all these observations can be used in the analysis due to missing values for other variables used in the modelling. A descriptive overview of the sample population is provided in Section 4.

As explained below, two approaches to modelling recidivism are used: binary regression models and survival models (also referred to as hazard models).

3.1 Binary regression models

Following the bulk of the empirical literature, our first approach is to model whether or not a prisoner is observed to have returned to prison within a given time after being released, conditional upon course participation. Initially, the recidivism outcome variable (Y_i) is defined on the basis of whether a prisoner is (Y_i=1) or is not (Y_i=0) observed to return to prison within two years of release from a previous stay. In this case Y_i can only be observed for stays from which the prisoner was released at least two years prior to the extraction date of the data.

With a binary outcome variable, the impact of course participation on the likelihood of reoffending can be estimated by fitting a binary regression model of the form:

$$Prob(Y_{ij} = 1) = \alpha + \beta X_{ij} + \theta P_i + \mu_j + \varepsilon_{ij} \qquad (1)$$

That is, the probability of returning to prison within two years is modelled as a function of a vector of characteristics (X_{ij}) relating to the individual prisoner (denoted j) and a specific custodial stay (denoted i), with associated vector of coefficients (β) to be estimated. P_i is an indicator or whether the prisoner participated in literacy and numeracy classes during that stay. The key parameter of interest is the associated coefficient, θ, which represents the estimated impact of course participation on the likelihood of returning to prison within two years (discussed further in Section 3.1.1 below). The vector X_i represents the set of 'control variables', included to capture characteristics other than course participation that may affect outcomes and thereby reduce any bias in the estimate of the effect of participation on recidivism, such as prisoner age, gender, sentencing duration, and prison location.

The final terms in Equation (1) - μ_j and ε_{ij} - are statistical error terms. The availability of multiple observations (spells) for individuals allows an individual-specific error term (μ_j) to be estimated to capture unobserved characteristics specific to each individual, while ε_{ij} is the residual error term fitted to have a mean of zero across all observations. Such models are usually fitted using the binary probit or binary logit model, with the difference lying in the assumption regarding whether that error term has a normal distribution (probit model) or logistic distribution (logit model). In practice, and with sufficiently large samples, the two specifications tend to give very similar results. We confirm that to be the case here and present the results from the logit model in the form of odds ratios for ease of interpretation.

The choice of a two-year period following release from a custodial spell is common in the literature but still somewhat arbitrary. This is addressed by testing the sensitivity of key findings to the chosen reference period. In addition to modelling recidivism using a two-year reference period, results are also reported based on one-year and five-year reference periods for re-imprisonment.

As discussed in Section 2, there are conceptual and practical limitations around measures of recidivism as an indicator of desistance from crime. Some ex-prisoners may reoffend but not get charged or not return to custody. Some may move out of WA, or pass away after release, which we cannot observe in the data. To limit the scope for prisoners passing away to affect the results we also estimate the model using the younger cohort of prisoners aged 30 years and under.

3.1.1 Defining course participation

The focus in this report is on the effects of prisoners participating in ABE literacy and numeracy classes on recidivism. For simplicity, the model set out above refers to a single variable (P_i) indicating whether the prisoner participated in an ABE class in a particular custodial stay. The reality is not so clear cut because prisoners typically participate in multiple classes during a stay. This can include multiple ABE classes and multiple non-ABE classes, and combinations of ABE and non-ABE classes. Hence, a simple binary distinction between ABE participants and non-participants will not capture the reality that the comparison group of non-ABE participants includes prisoners who undertook other classes along with those who participated in no classes at all.

To more fully capture the effects of participation in classes, two dummy (binary) variables are included in the model:

- Attended at least 1 ABE class – this variable takes on a value of 1 if, during the completed spell, the prisoner participated in an ABE class, and zero if not.
- Attended only other classes – takes on a value of 1 if, during the completed spell, the prisoner participated in classes but did not attend ABE classes, and zero otherwise.

The omitted or 'comparison' category is spells in which the prisoner did not attend any classes. This appears to be the best option for modelling participation in ABE classes, given that in the majority of spells in which the prisoner participates in an ABE class they also participate in other classes. Excluding them from the definition of ABE participation would likely miss much of the potential effect of basic numeracy and literacy education. However, the estimated effect of participation in ABE classes cannot be strictly separated from the effects of other classes those prisoners attended during the spell.

3.2 Survival or hazard models

Instead of choosing an inevitably arbitrary time-point at which to observe reoffending, an alternative approach is to model the time from release to return to prison as a continuous variable. Models of the continuous duration of spells are variously termed survival models or hazard models and are examples of the more general class of duration models. Perhaps the most common application is with respect to life-expectancy. The proportion of people in an initial birth cohort who survive to each year of age is an example of a survival function. It must be a decreasing function with age: by definition, fewer people survive to 70 years of age than survive to 60 years of age. The hazard function maps the proportion of the cohort who die (the hazard rate or failure rate) in the following period, given that they have survived to a certain age, for example, the proportion of people who have reached 60 who die in the following year. The hazard function therefore determines the survival function and vice versa.

In the example of life-expectancy the terms 'survival' and 'hazard' make intuitive sense, as survival is seen as a positive outcome, and dying as an unwelcomed risk. In other contexts, such as modelling the duration of unemployment spells, survival (remaining in unemployment) is a negative outcome and the hazard (exiting unemployment) a positive outcome. In the current application to the duration of post-release spells out of prison, survival is a positive outcome (remaining out of prison) and the hazard or failure a negative outcome (a return to prison).

There is a range of potential specifications for modelling the hazard function, as discussed in Section 7. Generally, the approach can be seen as estimating the parameters that give the best fit to a model of the basic form:

$$h_i(t) = f\{X_i, P_i, t\} \qquad (2)$$

Where the hazard rate at time t $\left(h_i(t)\right)$ is some function (f) of the characteristics of the prisoner and their prior stay (X_i), their course participation (P_i), and the elapsed duration (t) since leaving prison. If participation in literacy and numeracy courses is associated with a lower hazard at a given time t, then the ex-prisoner is less likely to return to prison and recidivism can be seen to be lower.

For many observations, the post-release spell may be ongoing at the time the data were extracted (ie. December 2024). In this case we do not know if or when the person may return to prison. In duration analysis such ongoing spells are referred to as 'censored' spells, and these can still be included in the sample for analysis. Although we cannot observe the eventual end-point of such spells, the estimation technique can take account of the information that the spell has lasted up to at least that point. For these censored spells, the elapsed duration is the time from release to the data extraction date of 30 November 2024.

3.3 Correcting for selection-bias

Through the regression models we hope to establish the effect of participation in a training course on desistance from crime, including recidivism. For various reasons, however, we cannot strictly interpret the coefficient on course participation (θ in model (1) above) as a causal effect. One of those reasons is the possibility of the estimate being affected by selection bias, or 'selection on unobservables': that there is some systematic difference between class participants and non-participants that we have not controlled for. For example, prisoners may differ in their level of motivation or commitment to getting out of and staying out of prison. Those prisoners may also be more likely to participate in classes, and it may be the higher motivation of participants relative to non-participants that causes the difference in outcomes, and not the actual act of participating in the class. Since motivation cannot be observed or measured, we cannot include it as a control variable in the model. Any such unobservable trait that affects both the likelihood of participation and outcomes will mean the estimated effect of participation will be biased.

To the extent that motivation or other unobservable individual characteristics are fixed over time, the use of the panel models offers some degree of control for such bias. Another commonly used model is the Heckman selection model (Heckman 1974), which we utilise here. To effectively control for selection bias, the Heckman selection model requires an 'exclusion restriction' – a variable that significantly affects participation but not the outcome. It is rare to be able to identify a convincing exclusion restriction to use in evaluations. Discussions with staff from the Department indicated that prisoners who were on remand were less likely to participate in courses, given they might not ultimately be sentenced. This insight led us to experiment with proportion of time a prisoner is on remand during a spell as a potential instrument to use in the modelling: a potential source of variation in the likelihood to participate that is not systematically related to recidivism. Unfortunately, our analyses do not support the use of remand time as a valid instrument as discussed in Section 5.2, and this remains an avenue for future investigation.

3.4 Identifying causal mechanisms

If an association between participation in ABE classes and desistance from crime is identified, ideally we would like to be able to say something about the mechanisms through which that participation affected outcomes. Potentially, differential effects across sub-groups within the prison population may offer some clues. A number of other avenues are explored (see Section 5.1):

- Investigating changes in scores of literacy, numeracy, and oracy skills contained in the data, to test if participation leads to a measurable increase in competency in these areas.

- Modelling the number of classes a prisoner participates in, rather than just the state of having participated or not participated.
- Modelling the effects of class participation on in-prison offences, to see if class attendance leads to behaviour change during the prison stay.

If impacts on recidivism occur because of improved competencies, possibly by enhancing prisoners' post-release employment opportunities, then we might expect participation to be associated with improvement in the various scores. This could be more directly tested by modelling recidivism conditional upon those scores. The absence of identifying effects of progression could be taken to infer any positive effect of participation related more to psychological and motivational effects of participation, rather than skills enhancement. As discussed below the data currently available are found to be unable to support this approach.

3.5 Estimates by key demographic groups

In Models (1) and (2) above, the coefficient on the participation variable represents the estimated effect of the training on recidivism. When such models are fitted using data for the full sample, this represents the average effect across all prisoner-stays. Potentially, participation in training courses may have differential effects for sub-groups of prisons, such as by gender or age.

To allow for such differential effects, models are estimated separately for key sub-groups for which there are adequate sample numbers. This also allows for differential effects of the control variables. For example, the effect of age on recidivism may be different for men and women.

Separate models are estimated for the following groups:

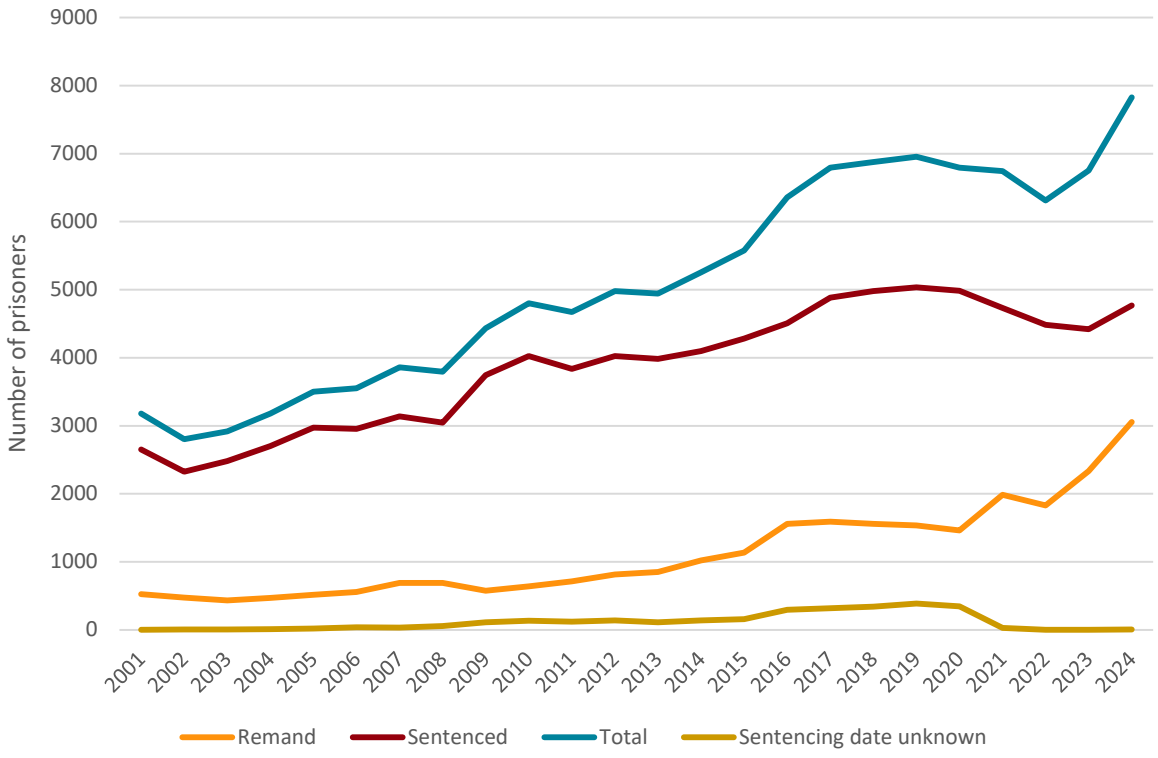
- Males and females
- Younger prisoners (aged 30 years and below) and older prisoners (over 30 years of age)
- By level of prior educational attainment
- Main offence types
- Aboriginal prisoners and non-Aboriginal prisoners (Section 8).

Descriptive statistics for those samples are provided in the relevant sections below.

4. DESCRIPTIVE STATISTICS: AN OVERVIEW OF WA'S PRISON POPULATION

Based on the dataset provided by the Department, and taking stock at 30 June in each year, the number of prisoners undertaking a custodial sentence and the number held on remand from 2001 to 2024 is shown in Figure 1. While the evaluation focusses on custodial spells, it is noteworthy that the proportion of prisoners on remand dropped to a low of 13.4 percent in 2009 and has since increased markedly, reaching 39.0 percent in 2024. The number of sentenced prisoners increased from around 2,500 in the early 2000's to peak at just over 5,000 in 2019, and reached 4,769 at June 30 2024. Using ABS (2025c) estimates of the WA resident population aged 18 and over, this translates to a total incarceration rate of 339 per 100,000 adult population in 2024, up from 224 in 2001; and 187 per 100,000 adults in custodial spells in 2001 rising to 206 in 2024. As noted above, the ABS reported an adult incarceration rate for WA of 340 prisoners per 100,000 adult population (ABS 2025a), in line with the estimate here based on the Department's 'stays' data.

Figure 1: Number of prisoners sentenced and on remand, 30 June 2001-2024

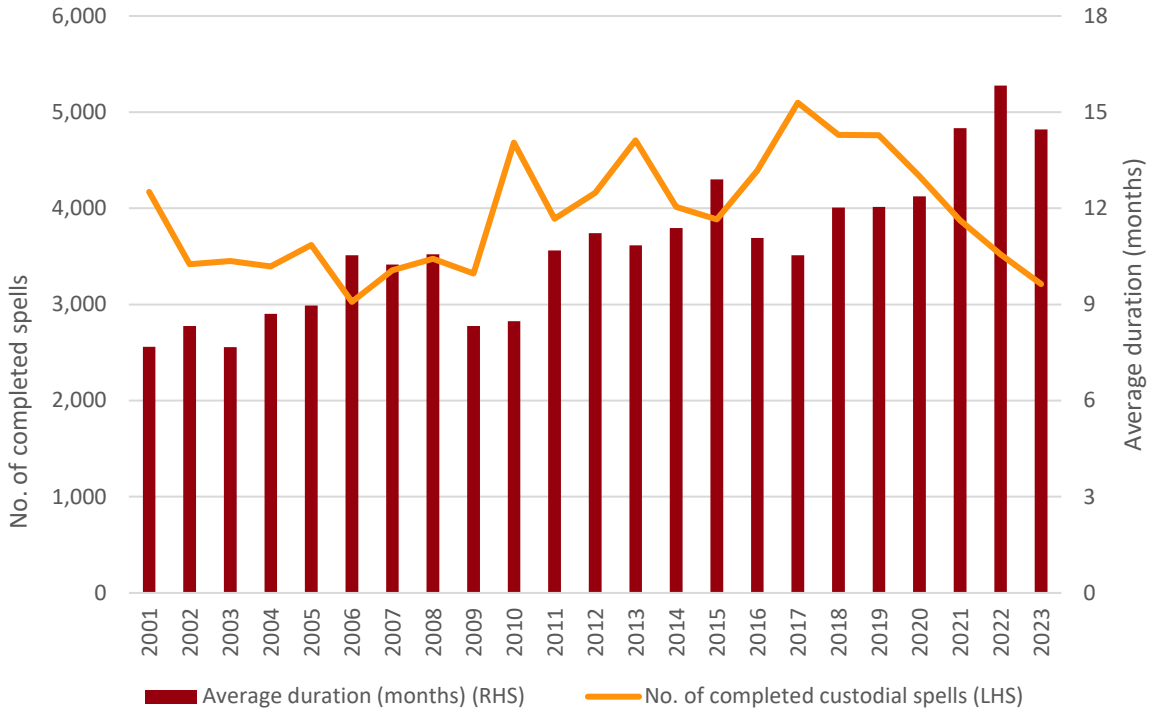


Notes: Prison stays for which the sentencing date is unknown are omitted from the denominator for calculating the percentage of prisoners on remand.

The original dataset contains records for 202,993 spells, encompassing both sentenced prisoners and those on remand, across 65,477 unique individuals. As noted, the main unit of analysis for the evaluation is completed custodial stays, and we remove any stays during which prisoners are on remand only, and any stays that were ongoing at the end of the period covered by the data. Over the full span of the dataset, there are observations for 105,557 such completed spells for 47,063 unique prisoners, equating to an average of 2.24 stays per individual prisoner (see Table 1).

The average duration of those stays, based on the time from date of sentencing to the release date, is just under one year at 11.5 months, which is around one month less than the average length of the sentence given. The number of completed stays in each year fluctuates around 4,000 from 2001 to 2023, reaching just over 5,000 in 2017 and since declining to 3,213 in 2023. However, the average duration of custodial stays has trended upwards, and was close to 15 months for spells completed in 2023 (Figure 2).

Figure 2: Number of completed custodial stays and average duration, 2001 to 2023 (based on discharge date)



Notes: Average duration excludes time on remand.

Table 1 provides further selected descriptive statistics relating to the sample of completed custodial spells. Around half of all custodial spells commence with the prisoner initially on remand, and later becoming sentenced. The population of prisoners has, on average, very low levels of formal educational attainment, with only around 20 percent having completed secondary school. Across all custodial prisoners over this period, 45 percent identified as being Aboriginal, with the proportion higher for female custodial spells (57%), than for males (43%). For men, Hakea Prison is the main reception facility, and 29 percent of spells commence in regional prisons. Bandyup Women's Prison (Bandyup) is the most common reception for women, and fewer (21%) enter regional prisons.

Table 1: Characteristics of custodial spells: means by gender 2001-2024

	Male spells (90,854)	Female spells (14,703)	All spells (105,557)	No. of observations with missing
Spells per prisoner	2.30	1.96	2.24	0
Duration of completed custodial stays (months)	11.51	6.79	10.86	8,066
Sentencing duration (months)	12.59	7.59	11.89	0
On remand at reception	0.51	0.42	0.50	0
Age in reception year	32.84	33.51	32.93	0
Age in discharge year	33.87	34.14	33.91	0
Highest level of education: Primary school	0.67	0.67	0.67	684
Secondary school	0.12	0.18	0.12	684
Tertiary	0.07	0.06	0.07	684
No formal schooling	0.14	0.10	0.14	684
Not stated/missing	0.01	0.01	0.01	0
Has a disability	0.01	0.02	0.01	0
Aboriginal	0.43	0.57	0.45	0
Country of birth: Australia	0.87	0.91	0.87	27
Primary language is English	0.97	0.98	0.97	1,609
Deportation (prisoner potentially subject to)	0.04	0.03	0.04	0
Prison reception				
Acacia Prison	0.00	0.00	0.00	0
Albany Regional Prison	0.02	0.02	0.02	0
Bandyup Women's Prison	0.00	0.48	0.07	0
Boronia Pre Release Centre	0.00	0.00	0.00	0
Broome Regional Prison	0.08	0.05	0.08	0
Bunbury Regional Prison	0.04	0.00	0.04	0
Canning Vale Prison	0.01	0.00	0.00	0
Casuarina Prison	0.03	0.00	0.03	0
Cw Campbell Remand Centre	0.02	0.00	0.02	0
East Perth Lockup	0.00	0.00	0.00	0
Eastern Goldfields Regional Prison	0.07	0.07	0.07	0
Fremantle Prison	0.00	0.00	0.00	0
Greenough Regional Prison	0.05	0.06	0.05	0
Hakea Prison	0.60	0.00	0.52	0
Kalgoorlie Regional Prison	0.00	0.00	0.00	0
Karnet Prison Farm	0.00	0.17	0.02	0
Melaleuca Remand and Reintegration	0.00	0.09	0.01	0

	Male spells (90,854)	Female spells (14,703)	All spells (105,557)	No. of observations with missing
Melaleuca Women's Prison	0.00	0.00	0.00	0
Pardelup Prison Farm	0.06	0.05	0.06	0
Roebourne Regional Prison	0.01	0.01	0.01	0
West Kimberley Regional Prison	0.01	0.00	0.01	0
Wooroloo Prison Farm	0.00	0.00	0.00	0
Prison in regional areas	0.29	0.21	0.28	0
Most serious offence:				
Homicide and related offences	0.01	0.01	0.01	194
Acts intended to cause injury	0.19	0.16	0.18	194
Sexual assault and related offences	0.05	0.00	0.05	194
Dangerous or negligent acts endangering persons	0.10	0.09	0.10	194
Abduction, harassment and other offences against the person	0.02	0.01	0.02	194
Robbery, extortion and related offences	0.06	0.05	0.06	194
Unlawful entry with intent/burglary, break and enter	0.14	0.11	0.14	194
Theft and related offences	0.05	0.07	0.05	194
Fraud, deception and related offences	0.02	0.06	0.02	194
Illicit drug offences	0.09	0.12	0.10	194
Prohibited and regulated weapons and explosives offences	0.01	0.01	0.01	194
Property damage and environmental pollution	0.02	0.02	0.02	194
Public order offences	0.02	0.02	0.02	194
Traffic and vehicle regulatory offences	0.13	0.15	0.13	194
Offences against justice procedures, government security and government operations	0.09	0.11	0.10	194
Miscellaneous offences	0.01	0.00	0.01	194

The final set of characteristics reported for custodial stays indicates the most serious offence that the prisoner had been convicted for in relation to that particular spell. These are classified according to the Australian and New Zealand Standard Offence Classification (ANZSOC) 2011. The frequency of most serious offence types is similar across genders, with 'acts intended to cause injury' (assault) as the most common, representing 19 percent and 16 percent of male and female completed custodial spells, respectively. Other common offences include theft, violation of justice procedures, harming or endangering persons, offences against government, and weapons and explosives offences.

4.1 Participation in training courses

Prisoners participate in a range of vocational and educational courses while in custody. The 'Classes' data file provided by the Department consists of one record for each class a prisoner participates in. These can then be matched to their associated stay and participant through the unique stay identifier.

The Classes file includes a course code and industry training category for each class. Contacts from the Department's EETS provided a concordance to indicate which courses should be considered ABE literacy and numeracy courses, allowing us to identify ABE (literacy and numeracy) classes. The vast bulk of these (94%) are also coded to the industry training category of 'General Education – ABE'. However, ABE classes do also appear under several other industry training categories, including 'construction and maintenance' and 'business', as shown Table 2.

Table 2: Classes by ABE status and Industry Training code

Industry Training Category	All classes		ABE classes		Other classes
	Num.	Col percent	Num.	Col percent	Number
Agriculture & Horticulture	48,170	6.97	0	0	48,170
Automotive, Panel & Paint	4,759	0.69	0	0	4,759
Business	56,967	8.24	613	1.0	56,354
Carpentry	4,934	0.71	111	0.2	4,823
Cleaning	17,623	2.55	0	0	17,623
Community Services	14,574	2.11	24	0.0	14,550
Construction & Maintenance	57,580	8.33	1,364	2.1	56,216
Creative Arts & Music	14,889	2.15	0	0	14,889
Food Processing	7,775	1.12	169	0.3	7,606
General Education - ABE	184,228	26.64	59,803	94.0	124,425
General Education - Other	46,988	6.8	260	0.4	46,728
General Education - VET	6,466	0.94	161	0.3	6,305
Hospitality	21,288	3.08	58	0.1	21,230
Information Technology	19,825	2.87	0	0	19,825
Laundry	2,121	0.31	0	0	2,121
Metals & Engineering	17,647	2.55	274	0.4	17,373
Mining	7,967	1.15	68	0.1	7,899
Retail & Canteen	4,010	0.58	0	0	4,010
Sport & Recreation	12,423	1.8	0	0	12,423
Tertiary Education	2,019	0.29	3	0.0	2,016
Textiles, Garments & Upholstery	4,562	0.66	28	0.0	4,534
Textiles, Clothing & Upholstery	72	0.01	0	0	72
Transport, Warehousing & Storage	13,886	2.01	283	0.4	13,603
Not Applicable	*120,705*	*17.46*	*381*	*0.6*	*120,324*
Total	**691,478**	**100**	**63,600**	**100**	**627,878**

On average, prisoners participate in seven classes per stay (Table 3). Fifty-six percent of custodial stays included attendance in a class, while 17 percent of stays included attendance in at least one ABE class. The 'comparison group' of non-participants used in our analysis is made up of the 43 percent of completed spells during which the prisoner did not attend any classes.

Table 3: Adult Basic Education and other class participation during completed custodial stays

Variable	Mean	Min	Max
Attended any classes (Y/N)	56%	0	1
Attended ABE classes (Y/N)	17%	0	1
Attended other classes (Y/N)	40%	0	1
Number of classes	7.0	0	208
Number of ABE classes	0.6	0	51
Number of other classes	6.3	0	186
Number of observations	98,976		

5. COURSE PARTICIPATION AND RECIDIVISM – BINARY REGRESSION ESTIMATES

This section presents estimates from binary regression models, assessing the effect of course participation on recidivism. We commence by estimating the base model set out in Equation (1) above and then test the sensitivity of the results to a range of alternative specifications for the dependent variable and for some of the independent variables. In all the regression models the sample is restricted to completed custodial spells. These may or may not have been preceded by time on remand (prior to the prisoner being sentenced) during the same prison stay, but remand-only stays are excluded.

In the base model (Model 4.1, Table 4) there are 96,781 observed completed custodial spells for 43,220 individuals, an average of 2.2 observations per prisoner and ranging up to a maximum of 28 completed custodial spells for the one individual across the 23 years. For 41 percent of spells, the prisoner was observed to commence a further custodial spell within two years of release.

The regression estimates are reported in the form of odds ratios. In interpreting odds ratios, an estimate of 1 indicates no difference from - or no effect relative to - the comparison category; while an estimate above (below) 1 indicates a higher (lower) probability of recidivism. The estimate of 0.683 for having participated in at least 1 ABE class indicates that prisoners who participated in ABE classes were 31.7 percent lower odds of returning to prison within two years than a prisoner who did not participate in any courses (0.683-1 = -0.317 = -31.7%). In contrast, the estimate of 1.365 for the prisoner being aged 18 to 25 years at release indicates a 36.5 percent higher probability of recidivism compared to the base case of prisoners aged 26 to 35 years (1.365–1 = +0.365 = +36.5%).

However, to appreciate what these estimates mean for the probability of recidivism requires a further step. Denoting that probability as p, the odds are defined as p/(1-p). The coefficients from the logistic regression models can be used to calculate predicted probabilities given a prisoner's characteristics in terms of the independent variables. We take the 'base case' corresponding to the reference categories in the regression model: a prisoner aged from 26 to 35 years, with no formal schooling, and reception into one of the major metropolitan prisons, and with mean characteristics of all prisoners in the sample for other variables.

The predicted probability of recidivism within two years for this 'base case' assuming they did not participate in any courses is 48.9 percent. The predicted probability of recidivism given that same prisoner had completed at least one ABE course is 39.5 percent, meaning the estimated effect associated with participation in an ABE course is to reduce the probability of recidivism after two years by around 9.4 percentage points (or by 29.2%).

To see how this relates to the odds-ratio, the odds of recidivism for this base case prisoner who participated in an ABE course is given by [0.395/(1-0.395) = 0.654]. The odds for a prisoner who did not participate in any courses is [0.489/(1-0.489) = 0.958]. Hence the odds ratio for these two cases is 0.654/0.958 = 0.682, as reported in Model 4.1 for attending at least 1 ABE course, and equating to 31.7 percent lower odds.

The estimate that participation in an ABE course reduces the odds of recidivism is statistically significant at the one percent level. Also denoted 'p<0.01', this means there is less than a one percent chance that a relationship of that magnitude would be observed if there was in fact no relationship between participation and recidivism (the null hypothesis). The estimate can be interpreted as the independent effect after controlling for the range of explanatory variables reported Table 4.

Model 4.1 partially controls for unobserved individual effects using the random-effects estimator. To test the sensitivity of the result, Model 4.2 is estimated using the fixed-effects specification, which more rigorously controls for unobserved individual effects. The estimate for participation in ABE course is 0.734 and remains significant ($p<0.01$), indicating around 27 percent lower odds of recidivism. However, the fixed-effects model can only be estimated for individuals who have experienced at least one spell ending in recidivism and at least one that did not, resulting in a large loss of sample for estimation. Also, the fixed-effects model does not generate estimates for time invariant characteristics, some of which are of key interest, such as gender and Aboriginality. For these reasons we prefer the random-effects specification and use this as the base model for further sensitivity analyses.

The estimated reduction in recidivism associated with participation in an ABE class is the reduction relative to custodial spells in which the prisoner did not undertake any classes, which was the case for around 44 percent of completed spells. There is a third category of spells, in which prisoners attended only non-ABE classes. Participation in only non-ABE courses is estimated to have a similar effect as participation in ABE courses, compared to doing no classes, and the estimate is also significant at the one percent level. In fact, attending only non-ABE classes has a slightly larger estimated effect on recidivism, reducing the odds of returning to custody by 38.2 percent. For our base case prisoner with otherwise mean characteristics, this equates to 11.7 percentage points lower likelihood of recidivism after two years compared to non-participants (37.2% compared to 48.9%) and equating to a 24.0 percent reduction.

Table 4: Recidivism: binary logistic regression results – odds ratios

	(4.1)	(4.2)	(4.3)	(4.4)
	Recidivism within 2 years (random-effects)	Recidivism within 2 years (fixed-effects)	Recidivism within 1 year (random-effects)	Recidivism within 5 years (random-effects)
Reference group: No training				
Attended at least 1 ABE class	0.683***	0.734***	0.751***	0.571***
Attended only other classes	0.618***	0.699***	0.692***	0.509***
Female	0.553***		0.657***	0.460***
Age in discharge year:				
18-25 years	1.365***	1.662***	1.318***	1.617***
26-35 years (reference group)				
36-50 years	0.614***	0.511***	0.686***	0.487***
Age in discharge year: 51+	0.213***	0.154***	0.280***	0.121***
Disability	0.509***	0.217***	0.658***	1.000
Aboriginal	1.972***		1.598***	2.766***
Born overseas	0.788***		0.793***	0.758***
Primary language is not English	0.522***	0.779	0.566***	0.430***
Deportation flag	0.508***	0.715***	0.579***	0.406***
Highest education:				
Reference group: No formal schooling				
Primary school	0.728***	0.443***	0.774***	0.639***
Secondary school	0.528***	0.518***	0.570***	0.431***
Higher education	0.497***	0.375***	0.557***	0.410***
Sentencing duration (years)	1.063***	0.993	1.024***	1.104***
Prison at reception				
Reference group: Hakea/Bandyup				
Other metropolitan prison	1.019	1.107*	1.016	1.025
Regional prison	0.766***	1.017	0.791***	0.747***
WA unemployment rate in discharge month	1.071***	1.089***	1.065***	0.976**
Mean of dep. Variable	0.409	0.595	0.294	0.554
Individuals	43,220	14,202	44,191	39,026
Observations	96781	58993	99965	83846
Log likelihood	-58,669***	-21,465***	-56,162***	-49,171***

Notes: Logit random-effects and fixed-effects models are used. * p<0.10, ** p<0.05, *** p<0.01

To test the sensitivity of the results to the choice of two-years as the post-release interval for defining recidivism, the random-effects model was also estimated with recidivism defined as a return to custody within one year of release (Model 4.3) and within five years of release (Model 4.4). Note the

means for the sample show that 29 percent of prisoners return to custody within one year of release, 41 percent within two years, and 45 percent within five years. The estimates confirm the association between participation in ABE classes and reduced recidivism, by 24.9 percent lower odds after one year and 42.9 percent lower odds after five years (both $p<0.01$). Importantly, the key finding that participation in ABE courses, and in other classes, is associated with substantially reduced recidivism is robust to these different specifications.

In terms of the other control variables, the estimates show that recidivism rates are higher for younger, less educated, Aboriginal, and male prisoners. Women have around 45 percent lower odds of returning to prison within two years. Migrant status has an interesting effect. Prisoners who were born overseas and those whose first language is not English have lower recidivism rates. Note these effects are additive for people who were born overseas and have a primary language other than English, which will be the case for many. Possibly this is partly a result of a significant proportion of those individuals leaving Australia upon release. Note we also control for the 'deportation flag' which indicates that the prisoner is subject to deportation from Australia, although we cannot tell from the data whether deportation actually occurred. As expected, if a prisoner is identified as subject to deportation in a custodial spell, that prisoner has around half the odds of returning to custody within two years.

Aboriginal prisoners have almost twice the odds as non-Aboriginal prisoners of returning to custody. For the base case, this equates to 16.8 percentage points higher probability of recidivism (around 40% higher) compared to non-Aboriginal prisoners. This higher rate of recidivism needs to be understood in the wider context of the over-representation of Aboriginal Australians in the criminal justice system, the causes of which include heightened statistically-established risk factors such as low formal educational attainment and homelessness; along with the effects of feelings of trauma, discrimination, and injustice associated with the impact of colonisation, including forced removal from family, and the disruption of connections to lands and culture (Hovane, Dalton, and Smith 2014; Tamatea 2017; Trudgett et al. 2024; Young et al. 2025). To the extent that feelings of disempowerment, marginalisation, and discrimination contribute to the initial over-representation of Aboriginal Australians in the criminal justice system, experiences of incarceration in a colonial-based prison system can only compound those effects into subsequent recidivism risk. This may be exacerbated by cultural biases in offender risk-assessment mechanisms (Tamatea 2017) and in the design of offender rehabilitation programs (Hovane et al. 2014), intensified policing, monitoring and surveillance. A comprehensive assessment of justice issues facing Aboriginal peoples is beyond the scope of this report. Effects for Aboriginal prisoners are explored in more detail in Section 8 and, like the statistical results reported here, must be interpreted with similar recognition that they tell only a very partial story.

To capture potential differences in recidivism by location or facility, we include a dummy variable to indicate the prison of reception was the major metropolitan prison: Hakea Prison for men or Bandyup for women. These two facilities account for around 60 percent of male custodial stays and just under one-half of spells for female prisoners. Variables are included for two other categories, one representing all other metropolitan facilities, and one for regional prisons. There is little evidence of any difference in recidivism rates given reception at the main metropolitan prison versus other metropolitan facilities, but the random-effect models indicate the odds of recidivism are around 25 percent lower for those entering regional prisons (no difference is observed in the fixed-effect model). Note we can control only for the facility of reception whereas prisoners often move frequently between facilities during a stay, and hence the results should not be interpreted as prison-specific effects.

To capture the potential effects of employment opportunity, the WA unemployment rate for themonth in which the prisoner was discharged was included. This has the anticipated effect in models 4.1, 4.2, and 4.3, indicating each 1 percentage point increase in the unemployment rate is associated with an increase in the odds of a prisoner returning to custody by around 7 percent in the immediate term (1-2 years). However, the effects of labour market conditions at the time a spell ends do not seem to persist to recidivism measured five-years after release.

Control variables were tested to capture the most serious offence the prisoner was convicted of in relation to each custodial stay. However, the results are difficult to interpret, with no clear pattern by seriousness. This is likely to be associated with interaction between the most serious offence and the sentence duration, which is already controlled for in the model. Our preference is to retain the control for duration of sentence, and we further explore effects of participation in courses by type of offence below.

5.1 The 'black box': pathways and other sensitivity tests

Having identified a substantial and statistically significant association between participation in ABE classes and other classes and a reduced rate of recidivism, several avenues were explored to try to identify causal mechanisms generating this result. However, these have provided little definitive evidence on those mechanisms as discussed below.

In addition to recidivism at certain points in time, another measure of desistance (the dependent variable) was tested, based on whether a returning prisoner was charged with a more serious offence than in the prior competed spell. These results were ambiguous. Participation in ABE and other classes was associated with a lower likelihood that the prisoner returned with a conviction for a less serious offence, the opposite of what would be expected if there was a desistance effect. However, it was also associated with a reduced likelihood of returning with a more serious offence. These two results sound contradictory, but the explanation lies in the fact that class participants were significantly more likely to be reconvicted for an offence of the same level of seriousness as their previous conviction. Consequently, they were less likely to return with less serious or with more serious offences. Similar results were observed when the model was estimated across different sub-groups within the population by age, gender, and Aboriginal status.

Note that models in which the dependent variable is based on a change in the seriousness of offence can only be estimated for prisoners with at least two completed spells, which reduces the sample for estimation by around half.

5.1.1 Literacy and numeracy progressions

One possibility was to see if class attendance correlates to improvements in prisoners' skills, or progressions in literacy and numeracy. The 'classes' dataset contains fields relating to a screening score, rescreening score, and 'Stage 2' numeracy, literacy, and oracy scores. The screening score is described in the data documentation as:

> 'A value rating a student's screening score against assessment criteria. A lower score represents lower achievement level. Values include 0 to 4. The value "9" means a student declined to participate.'

The rescreening score is simply a subsequent score, and associated screening and rescreening dates are recorded. The 'Stage 2' scores have a similar description but relate specifically to those areas of competence.

We hoped to test, first, if participation in ABE classes led to improvements in these scores and, second, if such progressions correlate with (reduced) recidivism. Unfortunately, data are missing in the vast majority of cases for the screening, rescreening, and 'Stage 2' scores in the classes file. When matched to individuals, the screening scores are missing for all stays, as are 93 percent of the rescreening scores. The proportion of missing observations for the 'Stage 2' scores ranges from 68 percent for oracy to 79 percent for reading and numeracy. This makes it very difficult to assess progressions and there would be reservations about the representativeness of results given the small number of prisoners for which progression measures could be generated.

5.1.2 Number of classes

We tested entering the class attendance variables in the form of the count of the number of ABE classes attended and number of other classes attended, rather than as binary variables (attended/didn't attend). The continuous number of ABE classes attended was no longer significant in the recidivism models, suggesting the state of being a participant, rather than the 'dose' is what matters most. For non-ABE classes the number of classes taken was significant, but the magnitude of the coefficient does not suggest any larger effect over and above the state of having attended any class.

5.1.3 In-prison offences

We examined whether participating in training reduces in-prison offences. Estimating models with custodial stays as the unit of observation, we found that taking classes (both ABE and non-ABE) was instead associated with a higher likelihood of committing in-prison offences using the binary logit model, and with having more in-prison offences based on a standard linear regression. These results are consistent across different offence types (aggravated, minor), timing (all offences or only those committed after taking classes), subgroups of prisoners by gender, Aboriginal status, and age. A considerable number of those estimates across the specifications tested are statistically significant. A possible explanation is that course participation generates increased interaction between prisoners who do not normally mix, leading to negative peer influences, heightened tensions, and opportunities for conflict.

These results go against expectations, and certainly offer no support for the proposition that participation in ABE and other classes lowers in-prison offences as part of a pathway to reduced recidivism or to desistance from crime more generally.

5.2 Controlling for selection bias

To address possible selection bias in our analysis, we use the Heckman two-stage model (see Heckman 1974, Vella 1998). Participation in literacy and numeracy training is not random and people who choose to take classes may differ from those who don't, in ways we can observe and control for (like age or education) and in ways we cannot observe (such as motivation, or sense of self-efficacy). These unobservable differences could also affect their chance of reoffending. The Heckman model corrects for this by first modelling who participates in training (the selection stage), then including an adjustment, known as the 'inverse Mills ratio', in the second stage to account for these differences. This helps us to generate better estimates of the link between training and recidivism.

Estimating the two-stage model requires an exclusion restriction: a variable that affects the chance of attending classes but not reoffending directly. Following consultation with staff from the Department's EETS, a potential instrument for the exclusion restriction was proposed, based on the

expectation that while prisoners are on remand they are less likely to be given the opportunity to participate in courses.

We tested three measures to model the effect of remand time on ABE class participation in the first stage-model: (1) duration of remand time, (2) remand time as a share of the total prison spell, (3) proportion of time from reception to sentencing compared to sentencing to discharge. Against expectations, however, time on remand was not associated with a lower likelihood of attending ABE classes, violating the logic of the instrument.

Further experimentation showed that the expected negative association between the share of time on remand and attending classes did hold if the sample is restricted only to those spells with positive (non-zero) remand time. That is, if we include only custodial spells for which the prisoner had yet to be sentenced at the commencement of their stay, the share of time spent on remand is negatively associated with ABE class participation. However, these spells represents less than half of the stay observations.

If we do limit the analysis to stays with positive remand time, the remand time share is negatively associated with ABE class participation in the first-stage equation, and the Inverse Mills ratio is insignificant in the second-stage model. On face value, this suggests selection bias is not an issue in the model for the restricted sample. In that model, the estimated effect of having participated in any ABE class implies an even larger and significant ($p<0.01$) reduction in the probability of recidivism after two years. However, we are not confident in this result for the reasons above and given there seems no justification for excluding the large proportion of the sample of spells in which the prisoner spent no time on remand.

6. ESTIMATES BY GENDER AND OTHER SUB-GROUPS

The results reported in Table 4 above indicate that participation in basic numeracy and literacy courses is associated with reduced recidivism after controlling for gender, age, length of the prison sentence, and a number of other observable characteristics of the prisoner and custodial spell. Model 4.1 suggests that women have around 45 percent lower odds of returning to custody within two years of release than men. While the model controls for gender, the estimated effect of course participation is the average effect across the male and female prison populations. Estimating models separately for males and females allows the effects of course participation and of the other variables to differ by gender. This similarly applies for other sub-groups analysed in this section, and for outcomes for Aboriginal prisoners, which are analysed in more detail in Section 8.

Table 5 presents the results when the base model (4.1) is estimated separately for the female and male sub-samples of completed custodial spells, and for younger and older prisoners. The figures presented are again in the form of odds ratios. The results suggest that the association between participation in courses and recidivism is stronger for male prisoners (model 5.2) than for female prisoners (model 5.1). The estimates show that a male prisoner who participated in an ABE course during their custodial spell, other things equal, has 34 percent lower odds of returning to custody within two years of release compared to a male prisoner who did not participate in any courses. For males, the corresponding reduction is around 19 percent lower odds. In terms of the predicted likelihood for our base case, this equates to a 10.3-percentage point reduction for male prisoners (from 51.2% for non-participants to 40.9% for ABE participants). The estimated effect is smaller for female prisoners, with a 4.9 percentage point reduction in the probability of recidivism (from 38.7% for non-participants to 33.8% for ABE participants).

For both males and females, participation in only other (non-ABE) courses has a slightly larger beneficial effect. Again the estimated effect of participation is larger for men. All estimates for course participation are significant at the one per cent level ($p<0.01$).

Generally, the other variables have similar effects for males and females, although some exceptions are worth noting. For males, the estimated effect of the prisoner having a disability is associated with around 50 percent lower odds of returning to custody within two years ($p<0.01$). For women the estimate is of some magnitude (a 40% reduction) but is not significant. That is to say, for women, we cannot reject the hypothesis that disability status has no effect on recidivism with any confidence. The large reductions in recidivism associated with male prisoners having been born overseas and being potentially subject to deportation are also much smaller and insignificant for women.

The estimated effects of course participation are very similar for younger and older prisoners. The observation persists that participation in other (non-ABE) classes has a larger association with (reduced) recidivism than participation in ABE classes. Estimates for other variables are mostly similar for younger and older prisoners. The fall in recidivism associated with higher prior educational attainment is markedly more pronounced for the younger cohort. The lower recidivism for prisoners classified as having a disability appears to apply primarily to younger prisoners. Being potentially subject to deportation is highly significant for both age groups but has a substantially larger effect for younger prisoners.

Table 5: Recidivism after 2-years: binary logistic regression results by gender and age - odds ratios

	Prisoner gender		Prisoner age in discharge year	
	Female	Male	Aged <=30	Aged >30
	(5.1)	(5.2)	(5.3)	(5.4)
Reference group: No training				
Attended at least 1 ABE class	0.808**	0.658***	0.638***	0.678***
Attended only other classes	0.741***	0.599***	0.589***	0.596***
Female			0.550***	0.553***
Age in discharge year:				
18-25 years	1.365***	1.364***	1.336***	
26-35 years (reference group)				
36-50 years	0.590***	0.617***		0.582***
Age in discharge year: 51+	0.217***	0.212***		0.198***
Disability	0.600	0.476***	0.371***	0.652*
Aboriginal	1.815***	2.025***	2.157***	1.871***
Born overseas	0.949	0.776***	0.784***	0.787***
Primary language is not English	0.436***	0.532***	0.592***	0.474***
Deportation flag	0.780	0.486***	0.342***	0.600***
Highest education[a]:				
Reference group: No formal schooling				
Primary school	0.710***	0.729***	0.549***	0.831***
Secondary school	0.572***	0.512***	0.354***	0.647***
Higher education	0.520***	0.493***	0.303***	0.608***
Sentencing duration (years)	1.176***	1.058***	1.228***	1.052***
Prison at reception:				
Reference group: Hakea/Bandyup				
Other metropolitan prison	1.047	0.985	1.019	0.943
Regional prison	0.661***	0.774***	0.708***	0.793***
WA unemp. rate in discharge month	1.103***	1.067***	1.055***	1.080***
Model	Logit RE	Logit RE	Logit RE	Logit RE
Mean	0.334	0.422	0.474	0.360
Individuals	6,936	36,284	21,985	28,531
Observations	13,492	83,289	41,883	54,898
Log Likelihood	-7,830***	-50,790***	-26,386***	-32,534***

Notes: Logit random-effects models are used. * p<0.10, ** p<0.05, *** p<0.01. a. Education levels used here map to the following categories in the data: 'No formal schooling' is a single category; Primary includes 'Primary only' and 'Part Secondary'; Secondary includes 'Completed Secondary' and 'Post Secondary Undefined'; Higher includes 'Tertiary', 'Technical – Trade', 'Technical – College', and 'Business College'.

Table 6 reports the estimates for the key variables of interest – class participation – when the base model is estimated separately for groups defined by their highest level of prior education as recorded upon reception to prison. The categories for the highest level of education variable are coded into four groups: no formal schooling, primary education, secondary education, and tertiary education. The results suggest the beneficial effect of course participation while in prison increases with the prisoner's prior level of education. There are grounds to have expected the opposite result: that course participation, particularly in basic literacy and numeracy education, would be of most benefit to prisoners with relatively low levels of existing education. The finding may reflect more entrenched barriers to those with the lowest levels of prior education, ones that are not readily addressed through participation in education. The differences in the estimated associations across the groups are large, and apply to participation in ABE courses and in other courses. Taking attendance in at least one ABE class, the odds-ratio estimates imply a reduction in the odds of returning to prison within two years by 24 percent for prisoners with no prior formal schooling, ranging to 57 percent lower odds for those with higher education (which includes technical and trade education).

The larger effect of participation for more educated prisoners applies both to those who participated in ABE classes and who participated in only non-ABE classes. For those with lower levels of prior education – no formal schooling (Model 6.1) or primary/part-secondary level schooling (Model 6.2) – the impact of participation in only non-ABE classes is larger than for having attended an ABE class, as in the base model for the full sample (Model 4.1). However, for those who had completed secondary school or had some post-secondary education, the effects of ABE participation are similar to, and in fact slightly larger than, participation in only other courses.

Table 6: Recidivism after 2-years: binary logistic regression results for sub-samples by prior level of education (odds ratios)

	No formal schooling	Highest education: Primary	Highest education: Secondary	Highest education: Higher
	(6.1)	(6.2)	(6.3)	(6.4)
Reference group: No training				
Attended at least 1 ABE class	0.762***	0.714***	0.521***	0.428***
Attended only other classes	0.653***	0.634***	0.560***	0.440***
Mean outcome variable	0.477	0.428	0.313	0.264
Individuals	5,597	28,374	6,967	4,222
Observations	13,163	65,119	11,881	6,618
Log Likelihood	-8,079***	-40,478***	-6,700***	-3,471***

Notes: Logit random-effects models are used, including the set of controls used in baseline model 4.1. *p<0.10, ** p<0.05, *** p<0.01.

In the final set of estimates across subsets of the prison population, Table 7 presents odds-ratios for the class participation variables for custodial spells according to the most serious offence relating to the prisoner's conviction for each spell. There is substantial variation, and it does appear that the effect of participation in classes is larger for more serious crimes. The models suggest no significant effect of having attended an ABE class on recidivism for those spells in which the most serious offence was a weapons or explosives offence, public order offence, traffic offence, offence against justice procedures/orders, or miscellaneous offence. In contrast, the estimated impacts are particularly large and highly significant for custodial spells for convictions for homicide, sexual assault related offences,

robbery or extortion, and illicit drug offences. For each of these, the estimates suggest participation in at least one ABE class is associated with a 60 – 70 percent reduction in the odds of recidivism within two years. Estimates of around 40-50 percent reductions in the odds of reoffending associated with participation in ABE classes are observed for abduction or harassment and unlawful entry/break and enter offences.

Table 7: Recidivism after 2-years: binary logistic regression results for sub-samples by most serious offence

	Odds ratios (reference group: no training)			Observations	
	Attended at least 1 ABE class	Attended only other classes	Mean (Recidivism after 2 yrs)	Individuals	Stays
Homicide and related offences	0.362***	0.318***	0.301	772	1018
Acts intended to cause injury	0.536***	0.445***	0.428	10665	17468
Sexual assault and related offences	0.335***	0.242***	0.194	3562	4180
Dangerous or negligent acts endangering persons	0.936	0.738***	0.394	6672	9342
Abduction, harassment and other offences against the person	0.446***	0.412***	0.414	1213	1443
Robbery, extortion and related offences	0.326***	0.333***	0.553	3466	5929
Unlawful entry with intent/burglary, break and enter	0.475***	0.449***	0.585	6813	13337
Theft and related offences	0.670***	0.652***	0.516	3770	5149
Fraud, deception and related offences	0.588*	0.263***	0.243	1891	2226
Illicit drug offences	0.337***	0.375***	0.266	7056	9239
Prohibited and regulated weapons and explosives offences	0.862	0.826	0.46	898	988
Property damage and environmental pollution	0.571**	0.560***	0.413	1477	1743
Public order offences	1.461	0.986	0.408	1425	1584
Traffic and vehicle regulatory offences	0.847	0.776***	0.33	9152	12909
Offences against justice procedures, government security and operations	0.854	0.684***	0.403	7286	9448
Miscellaneous offences	0.699	0.383*	0.095	561	591

Notes: Logit random-effects models are used, including the set of controls used in baseline model 4.1. *p<0.10, ** p<0.05, *** p<0.01.

7. SURVIVAL ANALYSIS

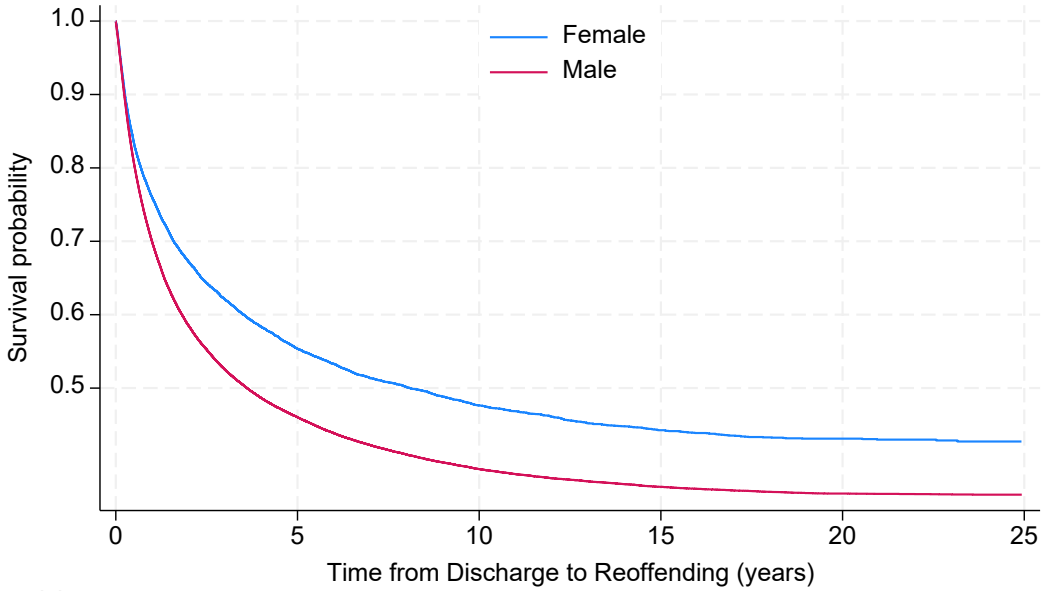
Using duration modelling allows full information on the length of post-release spells to be utilised, rather than selecting specific periods after release as a reference-point to define recidivism. Using the full set of post-release spells from the data, Figure 3 uses a statistical technique (Kaplan-Meier) to fit a line of best fit to the survival function of those spells. With reference to the release date as the starting time for each post-release spell, the survival function maps out the proportion of the spells which are still ongoing by elapsed duration. Panel (a) shows estimates separately for men and women. Taking men as an example, the function shows that around half of all post-release spells have ended (the person returned to custody) after around 4 years, and around half are continuing ('surviving'). After 10 years, around 80 percent of spells have ended and only 20 percent are ongoing. The schedule for males lies below the survival function for women indicating that, on average, men's post-release spells end sooner, and male prisoners return to custody more quickly than female prisoners.

The fact that the survival function becomes flatter indicates that the longer a spell out of prison continues, the less likely it is to end in the coming period. After 25 years, the curve becomes almost horizontal, meaning persons who have remained out of prison for that long have a very low probability of then being observed to return to prison. Around 10 percent of post-release spells for men and 35 percent of spells for women last at least 25 years, and those people are unlikely to ever return to prison. In many cases they may have moved out of the state or passed away, however, we are not able to observe those outcomes. It is likely that the declining hazard rate is partly due to a causal effect whereby time out of prison itself reduces the likelihood of a person reoffending. Strictly speaking, however, such 'duration dependence' cannot be inferred from the flattening of the curve, since those prisoners who initially had a lower likelihood of reoffending will be disproportionately represented among the longer surviving spells. There is an ongoing process of selection in which those persons with the lowest probability of reoffending become increasingly concentrated in the surviving spells. It is very difficult to distinguish a declining probability of recidivism with time out of prison from unobserved effects that were already in play at the time of release.

Panel (b) of Figure 3 shows the survival functions conditional upon released prisoners' participation in ABE literacy and numeracy classes during that prison stay. For the purposes of the figure, non-ABE participants include all others, made up of both those who participated in only non-ABE classes and who participated in no classes. It can be seen that those who had participated in an ABE course during their incarceration return to prison at a lower rate than non-participants. At five years after release, only around 50 percent of ABE course participants had returned to custody, compared to around 60 percent of non-ABE participants.

Figure 3: Post-release spells out of custody – Kaplan-Meier survival estimates

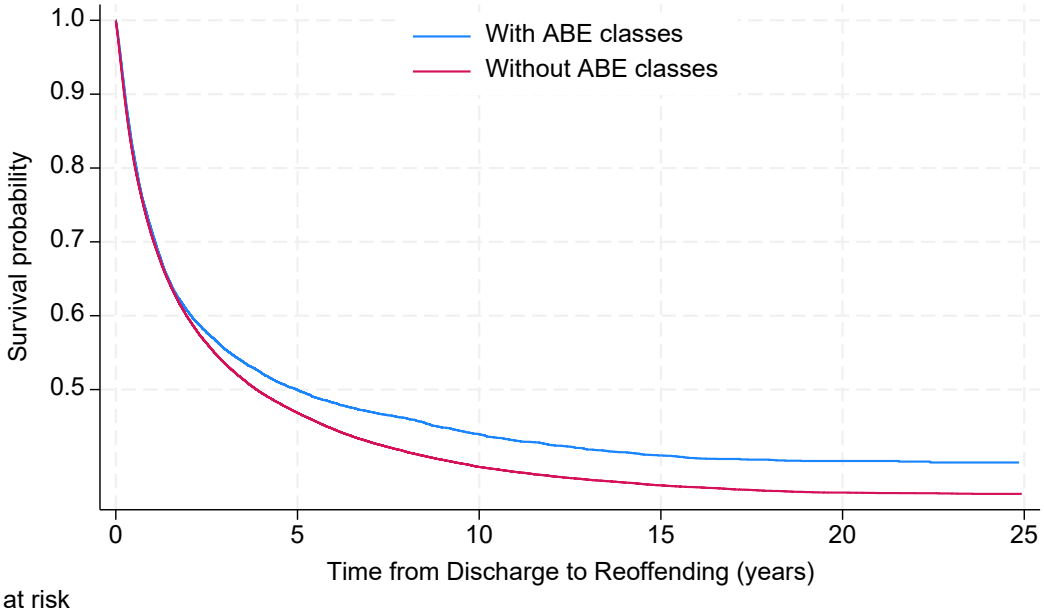
(a) Males and females



Number at risk

Female	13811	6474	3452	1478	781	0
Male	85052	32646	17982	8975	4475	0

(b) ABE course participants and others



Number at risk

With ABE	16450	5985	2700	1719	775	0
Without ABE	82413	33135	18734	8734	4481	0

Notes: Without ABE classes includes completed stays in which the prison participated in no classes or participated in non-ABE classes only.

To model the effect of covariates on survival rates requires the selection of the functional form of the model: the equation that specifies the nature of the relationship between the variables and the probability of the spell ending at a given time. Following formal model selection tests, the generalised gamma model was chosen for the modelling the post-release spells data. Tests showed that the proportional hazard assumptions underlying the commonly used Cox proportionate hazard model did not hold for this sample of spells. Based on Akaike's information criterion (AIC) and Bayesian information criterion (BIC) the generalised gamma function was preferred over the log-normal, log-logistic, Weibull, and exponential specifications. Table 8 reports the estimates from fitting the gamma model to the data with the same independent variables as included in the binary regression models.

A comparison of the estimates confirms the direction of effects and their relative magnitudes align closely to those from the binary logit models of recidivism. As before, the asterisks indicate the level of confidence with which we can reject the null hypothesis that the variable has no effect, or the likelihood of observing a coefficient of that magnitude if the there was no actual association. A positive coefficient indicates a variable is associated with an upward shift in the survival function, and with the prisoner remaining out of custody for longer. In interpreting the magnitude of the effects, the exponential of the coefficient translates to the percentage change in the expected survival time or duration of the post-release spell. Taking the estimated coefficient for 'Female' of 0.598 as an example: $e^{0.598} = 1.70$, or a 70 percent increase in the expected post-release spell relative to men.

A coefficient of zero would imply no effect ($e^{0} = 1$), and a negative coefficient is associated with downward shift in the survival function, or a higher rate of recidivism. The estimated coefficient for the duration of the custodial spell prior to release is -0.056. This implies the average effect of each year longer in prison is to reduce the expected time before reoffending upon release by 5.5 percent ($e^{-0.056} = 0.945$). Hence longer periods of imprisonment are associated with a quicker return to prison following release, but noting that association cannot necessarily be taken to imply causation. Table 8 also reports the percentage changes in post-release survival time as implied by the estimated coefficient for each variable.

Turning to class participation, the estimates imply a prisoner who participated in at least one ABE class will, upon release, remain out of custody for 70 percent longer than a prisoner who did not participate in any classes. The estimate is significant ($p<0.01$) and can be interpreted as an additional effect after controlling for the other explanatory variables, such as gender, age, duration of sentencing, and so on. As observed in the binary logit models of recidivism, participation in only other (non-ABE) courses has a larger effect again, equating to a doubling of the expected time out of prison (or 100 percent increase in duration).

Table 8: Survival function for post-release spells, regression estimates, full sample

Explanatory variables	Coeff-icient (β)	Exponential of coefficient (e^β)	Percentage change in survival time (%)	Effect on recidivism
Reference group: No training and education				
Attended at least 1 ABE class	0.531***	1.70	70.0	Reduce
Attended only other classes	0.694***	2.00	100.1	Reduce
Female	0.598***	1.82	81.9	Reduce
Age in discharge year: 18-25 years	-0.312***	0.73	-26.8	Increase
26-35 years (reference group)				
36-50 years	0.518***	1.68	67.9	Reduce
Age in discharge year: 51+	1.917***	6.80	580.2	Reduce
Disability	0.251	1.29	28.5	Insignif.
Aboriginal	-0.801***	0.45	-55.1	Increase
Born overseas	0.334***	1.40	39.6	Reduce
Primary language is not English	0.883***	2.42	141.7	Reduce
Deportation Flag	0.962***	2.62	161.6	Reduce
Highest education: *Reference group: No formal schooling*				
Primary school	0.277***	1.32	31.9	Reduce
Secondary school	0.726***	2.07	106.7	Reduce
Higher education	0.781***	2.18	118.4	Reduce
Sentencing duration (years)	-0.056***	0.95	-5.5	Increase
Prison at reception *Reference group: Hakea/Bandyup*				
Other metropolitan prison	0.093***	1.10	9.8	Reduce
Regional prison	0.313***	1.37	36.7	Reduce
WA unemployment rate in discharge month	-0.025***	0.97	-2.5	Increase
Mean duration, post-release spells (years)	5.51			
Observations	96,669			

Notes: *p<0.10, ** p<0.05, *** p<0.01.

The strong correspondence between the results of the binary models of recidivism and the survival model can be seen in Figure 4. Note the two series presented are not measuring the same thing and cannot be directly compared: one, on the left axis, is the percentage change in the odds of recidivism within two years, while the other is the percentage increase in the expected duration of post-release

spells out of custody. However, in both case they show the effects relative to some base case, for example, the effect of participating in ABE classes as opposed to no classes, or of being female as opposed to male. For ease of comparability both have been scaled such that a positive number is associated with a beneficial effect: the percentage reduction in the odds of recidivism and the percent increase in time out of prison. Negative coefficients (below zero on the vertical axis) represent the percent increase in the odds of recidivism, or the percent reduction in the time before returning to custody.

Importantly, the estimated effects have consistent directions and relative magnitude when compared to other variables. This includes the relative effects of having attended an ABE class during the prison stay, and larger effect of attending only non-ABE classes, relative to not having attended any classes during a stay. The exception to the consistency in the direction of estimated effects is having been received at a metropolitan prison other than the main prison (Hakea Prison for men or Bandyup for women). However, that estimate is not significantly different from zero in the logit model.

Figure 4: Comparison of estimated effects: binary logit model of recidivism after 2 years and survival model of post-release survival spells

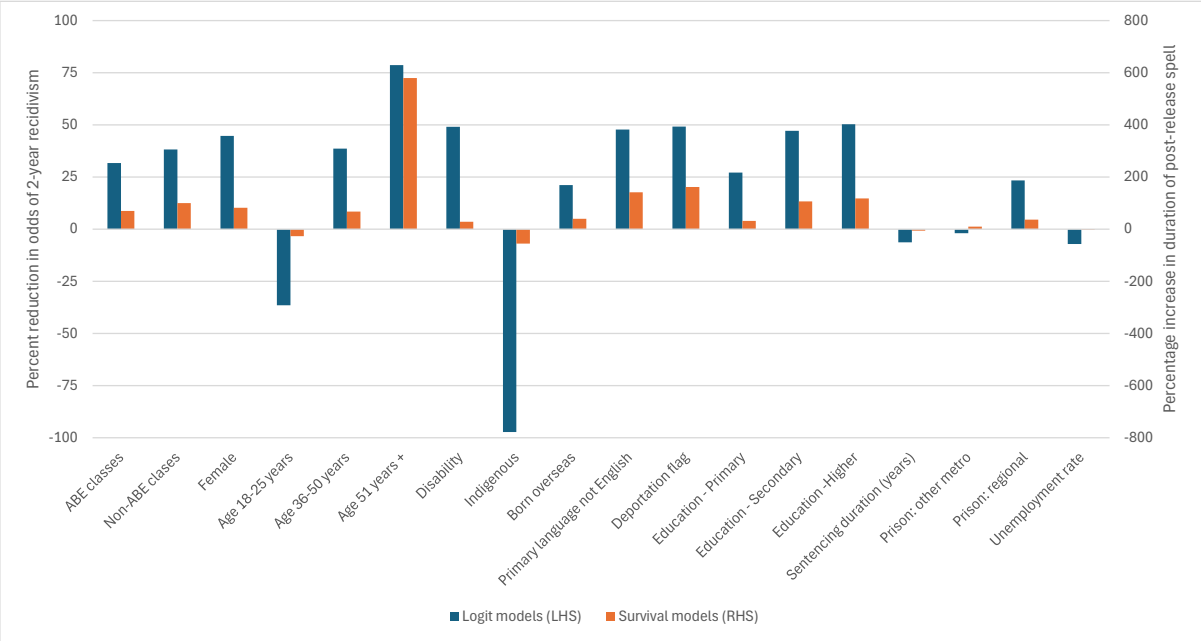


Table 9 presents results for the survival models estimated separately for male and female prisoners. The survival specification returns the same result that the estimated beneficial effect of participation on recidivism is larger for males than for females, and this holds for both ABE class participants and participation in only other classes. The relative effects of other estimated coefficients between gender are also very similar to those from the logit models. Given the close concordance with the logit models, the results for other covariates are not further discussed.

Table 9: Post-release spells, survival function regression estimates, by gender

	Male prisoners		Female prisoners	
	Coef. (β)	Percentage change in survival time (%)	Coef. (β)	Percentage change in survival time (%)
Reference group: No training/education				
Attended at least 1 ABE class	0.572***	77.2	0.330***	39.1
Attended only other classes	0.731***	107.6	0.474***	60.6
Age in discharge year:				
18-25 years	-0.302***	-26.1	-0.387***	-32.1
26-35 years (reference group)				
36-50 years	0.488***	62.8	0.723***	106.0
51 years and over	1.888***	560.6	2.074***	695.3
Disability	0.304*	35.6	0.241	27.3
Aboriginal	-0.788***	-54.5	-0.950***	-61.3
Born overseas	0.370***	44.7	-0.066	-6.4
Primary language is not English	0.831***	129.5	1.385***	299.6
Deportation	1.005***	173.2	0.502**	65.2
Highest education:				
Reference group: No formal schooling				
Primary school	0.251***	28.5	0.488***	62.9
Secondary school	0.721***	105.7	0.870***	138.7
Higher education	0.753***	112.4	1.026***	179.1
Sentencing duration (years)	-0.049***	-4.8	-0.202***	-18.3
Prison at reception:				
Reference group: Hakea/Bandyup				
Other metropolitan prison	0.132***	14.1	0.044	4.5
Regional prison	0.282***	32.6	0.616***	85.1
WA unemp. rate in discharge month	-0.023***	-2.3	-0.040*	-3.9
Mean duration, post-release spells (years)	5.39		6.22	
Observations	83,191		13,478	

Notes: * p<0.10, ** p<0.05, *** p<0.01

8. ABORIGINAL PRISONERS

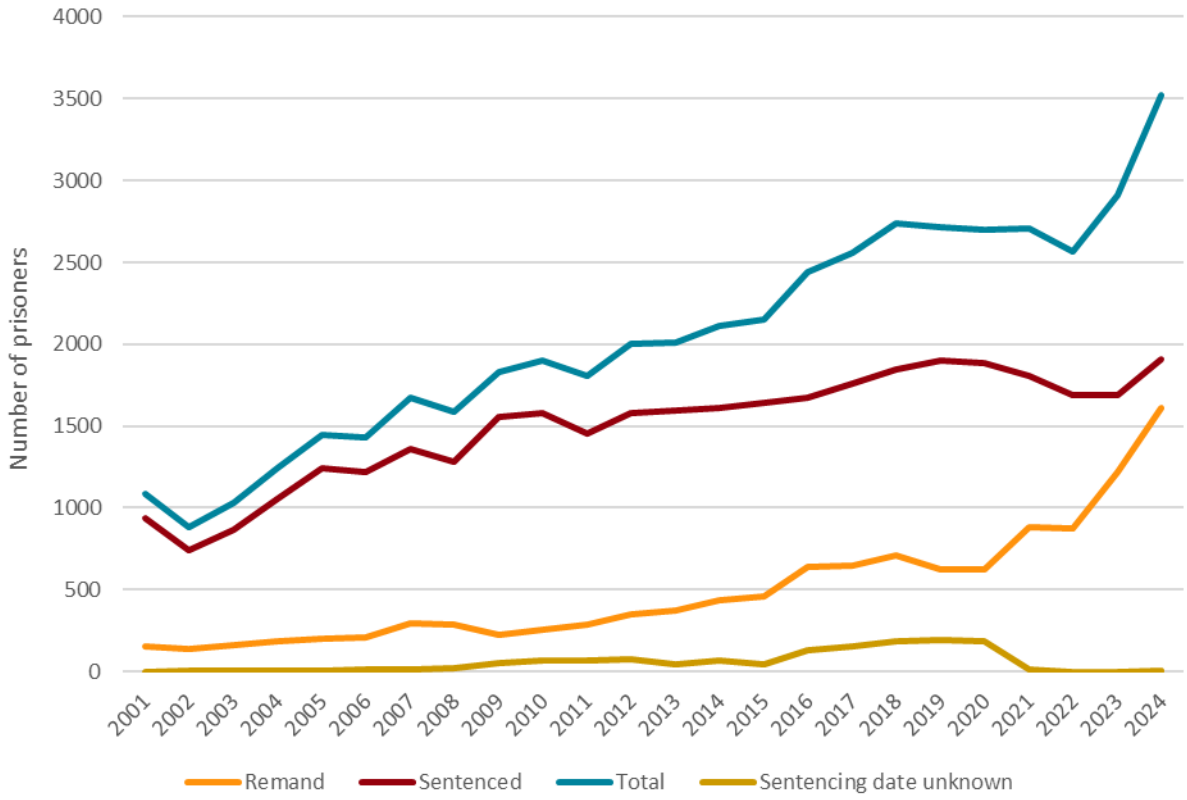
Australians of Aboriginal descent are significantly over-represented in the Australian justice system (Productivity Commission 2025). As noted in Section 5, the reasons for this are deep-rooted and complex, and reach far beyond the scope of this report. Results presented here need to be interpreted with an understanding of the many ongoing legacies of colonisation and recognition that the justice system and prisons themselves constitute instruments of colonisation (see, for example, Tamatea 2017; Trudgett et al. 2024; Young et al. 2025).

Aboriginal prisoners accounted for 45 percent of the completed stays in the dataset (see Table 1), and the multivariate analyses finds they have markedly higher recidivism rates. Such statistical findings should not be taken to reflect deficits associated with Aboriginal peoples or their cultures, but rather contribute to an appreciation of how the existing justice system has failed Aboriginal people and, we hope, evidence on how outcomes may be improved by approaches that draw upon the strengths and resilience inherent in Aboriginal cultures, knowledge, and communities (Dockery 2013, Hovane et al. 2014, Young et al. 2025).

This section provides the results of models of the factors shaping recidivism for Aboriginal prisoners. We commence with a descriptive overview of Aboriginal representation in the dataset, and progress to comparative analyses of recidivism using both binary logit and survival models, building on the base models developed in the preceding section. Comparisons made to the non-Aboriginal prison population should not be taken to infer that those benchmarks represent some preferred 'norm' that has any greater legitimacy than metrics for Aboriginal prisoners. They simply reflect the general convention in descriptive and multivariate analyses, and used throughout the report, that the largest (most numerous) category is used as the 'default' or 'comparison' category for categorical variables.

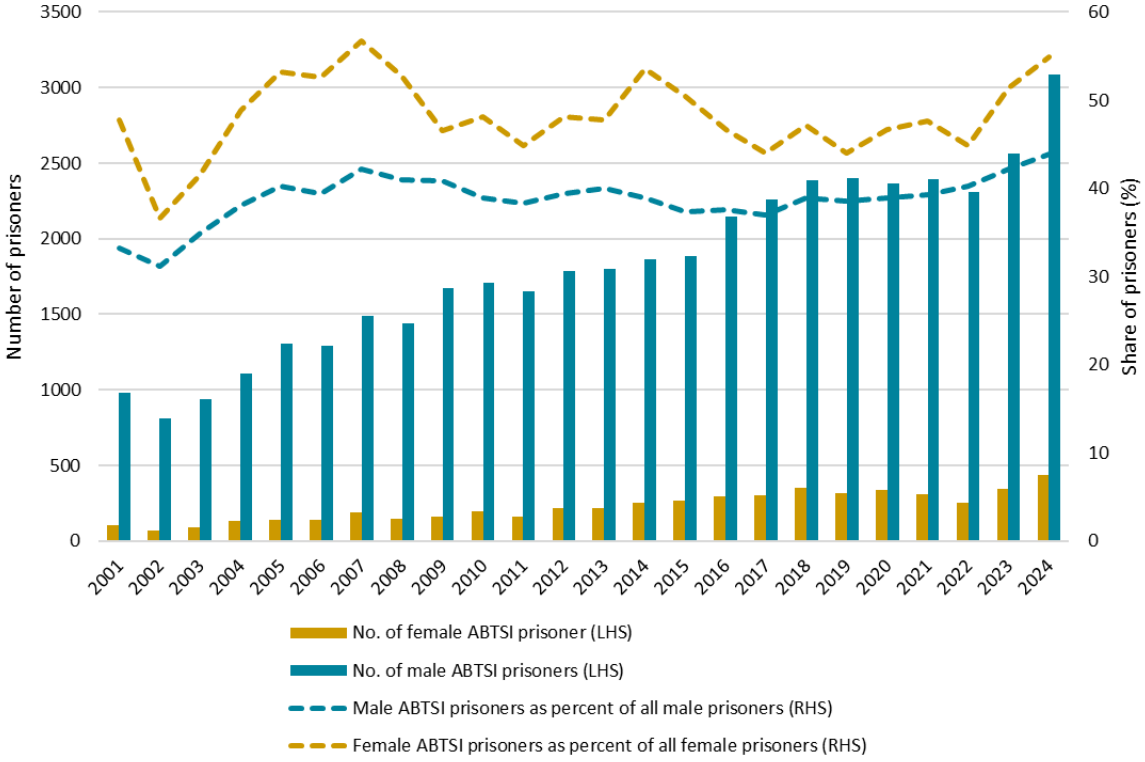
The identification of Aboriginal prisoners and of the custodial spells of Aboriginal prisoners is based on a variable within the 'stays' dataset which identifies the prisoner associated with a stay as either 'Aboriginal' or 'Non-Aboriginal'. We cannot say how accurately the indicator captures Aboriginality, as the classification relies upon the prisoner self-identifying as being of Aboriginal descent. Under-counting due to non-identification or non-response by Aboriginal persons is known to be significant in many data collections, including the ABS census (see Dockery et al. 2021). Changes in rates of identification can substantially affect time series trends relating to the Aboriginal population. However, while the data documentation does indicate an 'Unknown' category for the Aboriginality field, all observations in the matched data used in the analysis had a positive identification. With this in mind, Figure 5 shows the number of prisoners identified as Aboriginal in the dataset at 30 June in each year. The number of Aboriginal prisoners escalated rapidly from 2022, due largely to a sharp rise in the number of Aboriginal prisoners on remand.

Figure 5: Number of Aboriginal prisoners sentenced and on remand, 30 June 2000-2024



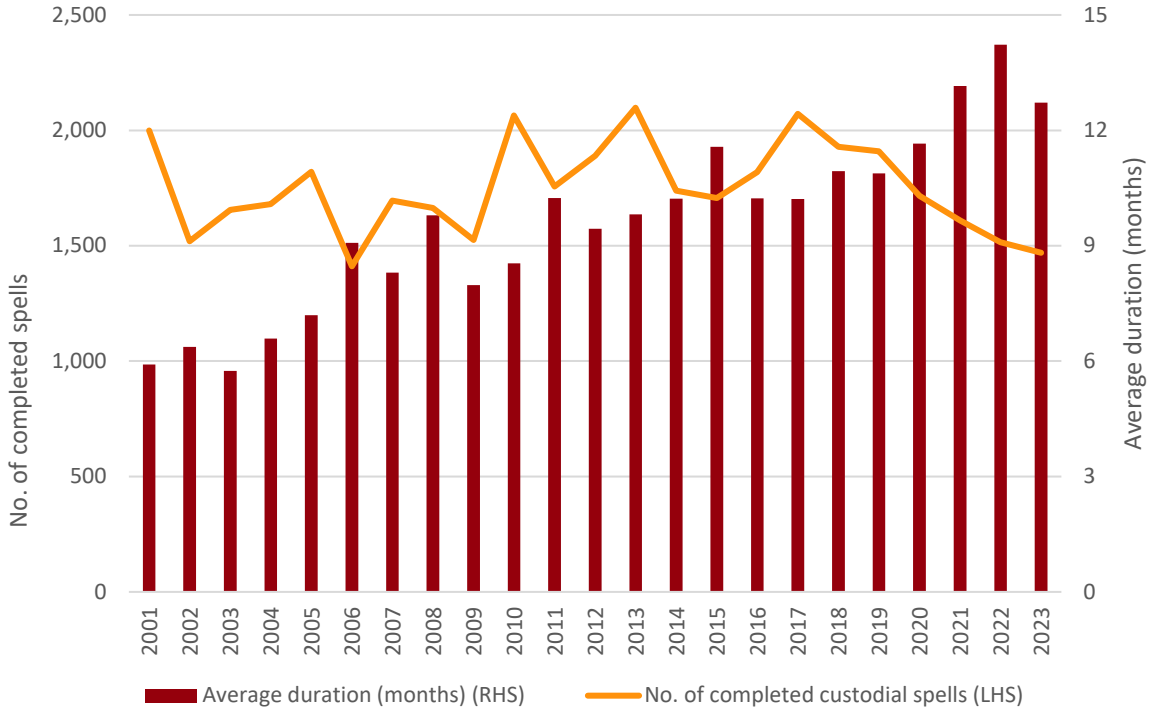
The number of both male and female Aboriginal prisoners has more than tripled from the early 2000s. While the number of male Aboriginal prisoners is much higher than the number of Aboriginal female prisoners, when expressed as a proportion of the male and female prison population the share is higher for Aboriginal women (Figure 6). Both shares have generally trended upwards over the time frame covered by the data. Taking estimates of the Aboriginal and total population for WA (ABS 2024, 2025c), the Aboriginal shares in the prison population at 30 June 2024 equate to a 13-times over-representation in prison for Aboriginal males, and 16-fold over-representation for Aboriginal women.

Figure 6: Number of Aboriginal prisoners and share of prison population by gender, 2001-2024



Turning to the number of stays, Table 1 reported that Aboriginal prisoners accounted for 45 percent of spells in the dataset, with the figure higher for females (57%) than for males (43%). The number of completed custodial stays for Aboriginal prisoners by calendar year remained relatively stable between 2001 and 2023. Hence the rise in the number of Aboriginal prisoners at a point in time can be attributed in part to the increase in prisoners held on remand, but largely to the upward trend in the average duration of stays (Figure 7).

Figure 7: Number of completed custodial stays of Aboriginal prisoners and average duration, 2001 to 2023



The means for completed custodial stays (Table 10) show that Aboriginal prisoners tend to have more spells per person but of shorter duration. They are more likely than non-Aboriginal prisoners to be on remand at reception.

The Aboriginal prison population is relatively younger and with lower levels of prior educational attainment. A much higher proportion of Aboriginal custodial spells commence in regional prisons: 43 percent as opposed to 15 percent for non-Aboriginal prisoners, with the reception for substantial proportions of Aboriginal custodial spells occurring at regional prisons in Broome (15%), Eastern Goldfields (12%), Greenough (9%), and Pardelup Prison Farm near Mount Barker in the Great Southern region (11%).

In terms of the most serious offences associated with custodial stays, one key difference between the Aboriginal and non-Aboriginal prison populations is the higher proportion of stays for Aboriginal prisoners for assault (acts intended to cause injury) and dangerous or negligent acts endangering persons. These two categories together account for 40 percent of stays for Aboriginal prisoners compared to 18 percent for other prisoners. The other notable contrast is the smaller proportion of Aboriginal prisoners convicted of illicit drug offences, at 2 percent of stays compared to 16 percent for non-Aboriginal prisoners.

Table 10: Characteristics of custodial spells: means by Aboriginal status and gender, 2000-2024

	Non-Aboriginal spells (58,288)	Aboriginal spells		
		All Aboriginal (47,269)	Male Aboriginal (38,937)	Female Aboriginal (8,332)
Spells per prisoner	1.84	3.08	3.27	2.41
Durations of completed custodial stays (months)	11.94	9.52	10.34	5.68
Sentencing duration (months)	12.98	10.55	11.42	6.49
On remand at reception	0.47	0.53	0.56	0.44
Age in reception year	33.84	31.80	31.65	32.55
Age in discharge year	34.91	32.67	32.58	33.08
Highest level of education:				
Primary school	0.63	0.71	0.71	0.72
Secondary school	0.16	0.09	0.08	0.12
Tertiary	0.11	0.02	0.02	0.02
No formal schooling	0.10	0.19	0.20	0.14
Not stated/missing	0.01	0.01	0.01	0.01
Has a disability	0.01	0.02	0.02	0.02
Country of birth: Australia	0.77	1.00	1.00	1.00
Primary language is English	0.95	0.99	0.99	0.99
Deportation (prisoner potentially subject to)	0.07	0.002	0.002	0.001
Prison reception				
Acacia Prison	0.00	0.00	0.00	0.00
Albany Regional Prison	0.02	0.02	0.02	0.02
Bandyup Women's Prison	0.06	0.07	0.00	0.39
Boronia Pre Release Centre	0.00	0.00	0.00	0.00
Broome Regional Prison	0.01	0.15	0.16	0.09
Bunbury Regional Prison	0.05	0.02	0.02	0.00
Canning Vale Prison	0.01	0.00	0.00	0.00
Casuarina Prison	0.03	0.01	0.02	0.00
Cw Campbell Remand Centre	0.02	0.01	0.01	0.00
East Perth Lockup	0.00	0.00	0.00	0.00
Eastern Goldfields Regional Prison	0.03	0.12	0.12	0.10
Fremantle Prison	0.00	0.00	0.00	0.00
Greenough Regional Prison	0.02	0.09	0.10	0.09
Hakea Prison	0.68	0.32	0.39	0.00
Kalgoorlie Regional Prison	0.00	0.00	0.00	0.00
Karnet Prison Farm	0.02	0.02	0.00	0.13
Melaleuca Remand and Reintegration	0.01	0.01	0.00	0.07

	Non-Aboriginal spells (58,288)	Aboriginal spells		
		All Aboriginal (47,269)	Male Aboriginal (38,937)	Female Aboriginal (8,332)
Melaleuca Women's Prison	0.00	0.00	0.00	0.00
Pardelup Prison Farm	0.01	0.11	0.12	0.08
Roebourne Regional Prison	0.00	0.03	0.03	0.02
West Kimberley Regional Prison	0.01	0.00	0.00	0.00
Wooroloo Prison Farm	0.00	0.00	0.00	0.00
Prison in regional areas	0.15	0.43	0.46	0.32
Most serious offence:				
Homicide and related offences	0.01	0.01	0.01	0.01
Acts intended to cause injury	0.11	0.27	0.28	0.23
Sexual assault and related offences	0.06	0.03	0.03	0.00
Dangerous or negligent acts endangering persons	0.07	0.13	0.13	0.11
Abduction, harassment and other offences against the person	0.01	0.02	0.02	0.01
Robbery, extortion and related offences	0.07	0.05	0.05	0.05
Unlawful entry with intent/burglary, break and enter	0.12	0.16	0.16	0.13
Theft and related offences	0.06	0.05	0.04	0.07
Fraud, deception and related offences	0.04	0.01	0.00	0.03
Illicit drug offences	0.16	0.02	0.02	0.03
Prohibited and regulated weapons and explosives offences	0.01	0.01	0.01	0.01
Property damage and environmental pollution	0.02	0.02	0.02	0.02
Public order offences	0.01	0.02	0.02	0.03
Traffic and vehicle regulatory offences	0.14	0.12	0.11	0.15
Offences against justice procedures, government security and operations	0.09	0.10	0.10	0.12
Miscellaneous offences	0.01	0.00	0.00	0.00

In terms of participation in training courses, Aboriginal prisoners were slightly more likely than non-Aboriginal prisoners to have participated in ABE courses during a stay (Table 11). Both Aboriginal men and women were observed to have attended at least one ABE class in 19 percent of stays, marginally higher than for the full sample of prisoners. However, Aboriginal prisoners were less likely to have attended non-ABE courses. The lower participation in non-ABE classes is particularly evident for Aboriginal women.

Table 11: Participation in training courses during completed custodial stays, by Aboriginal status and gender

Variable	Total sample	Non-Aboriginal stays		Aboriginal stays	
		Men	Women	Men	Women
Panel A: Attended class (Y/N)					
Any classes	0.56	0.61	0.59	0.52	0.46
ABE classes	0.17	0.14	0.17	0.19	0.19
Other (non-ABE) classes	0.40	0.47	0.42	0.32	0.27
Panel B: Number of classes					
Any classes	7.0	7.7	10.7	5.8	5.5
ABE classes	0.6	0.6	0.6	0.7	0.7
Other (non-ABE) classes	6.3	7.1	10.1	5.1	4.9
Number of observations	98,976	48,763	5,983	36,388	7,842

8.1 Modelling recidivism for Aboriginal custodial stays

The results of the multivariate analyses above indicate that, after being released from a custodial stay, Aboriginal prisoners have almost twice the odds of returning to custody within two years (Table 4) and, upon release, experience spells out of custody that are typically around half as long as those for non-Aboriginal prisoners (Table 8). Those effects are after controlling for observable characteristics captured by the other covariates, such as the differences in the profiles of Aboriginal and non-Aboriginal prisoners in terms of age, gender, and prior education.

Separate estimation of the multivariate models provides estimates of the effects of explanatory variables that are specific to the Aboriginal population, and for these to be compared to estimates for the non-Aboriginal population. These are presented in Table 12 for the binary logit model for recidivism and in Table 13 for the survival models of the duration of post-release spells.

Most importantly, the results indicate that participation in classes during a prisoner's stay has a much smaller effect on subsequent recidivism for Aboriginal prisoners. While attendance in at least one ABE class is estimated to reduce the odds of recidivism by 45 percent for non-Aboriginal prisoners, the estimate is close to a 20 percent reduction for Aboriginal prisoners. Converting those estimates into the implied likelihood of recidivism, this translates to a reduction of 11.6 percentage points in the probability of recidivism after two years from 32.0 percent to 20.4 percent for non-Aboriginal prisoners (or 36% lower). For Aboriginal prisoners, attending ABE classes is associated with a much smaller 5.3 percentage point reduction in recidivism from 51.9 percent to 46.5 percent (just 10% lower). Recall, these predicted probabilities are calculated by applying the logit model estimates to the base case of a prisoner aged 26-35 years, with no formal schooling, received into the main metropolitan prison, and other characteristics evaluated at their means.

The estimate remains significant for the sample of spells for all Aboriginal prisoners, but there is some variation by gender. For Aboriginal males, the estimated effect is a reduction in the odds of recidivism of 23 percent ($p<0.01$), but for females the estimates imply just an 8 percent reduction in the odds of returning to custody after two years, and the estimate is not significantly different from zero. Results

from models of the survival functions (Table 13) are consistent with this: for non-Aboriginal prisoners the estimate implies participation in at least one ABE class more than doubles the expected post-release time out of custody (+146%), while for Aboriginal prisoners the effect is to increase the post-release spell by just 29 percent ($p<0.01$). For Aboriginal males the estimated effect is to increase time out of custody by 35 percent ($p<0.01$) while the estimate for Aboriginal females (+13%) is insignificant (associated percentage changes in survival times are not reported for the male and female coefficients).

Results for having attended only other (non-ABE) classes during the stay have a similar pattern by Aboriginal status. The estimates of beneficial effects are smaller for the Aboriginal prison population, and particularly so for Aboriginal women. In the survival models, however, the estimate for women remains highly significant and implies a roughly 30 percent increase (not reported) in the duration of post-release spells. In estimating models for the full sample above, it was noted that the impacts of attending only non-ABE classes tend to be larger than that associated with attending at least one ABE class. The results reported here show that is primarily true of the Aboriginal prison population. For the non-Aboriginal population the estimated effects of each type of class attendance are essentially identical.

Most variables have similar effects on recidivism for Aboriginal and non-Aboriginal prisoners. Understandably, very few Aboriginal prisoners are recorded as born overseas or being potentially subject to deportation. For the purposes of comparability these variables have been retained in the models for Aboriginal prisoners and they do attain significance in some of the survival models. In interpreting those results, however, it should be borne in mind that they relate to a small number of individuals who are, presumably, in quite unique circumstances.

There is evidence, most clearly from the survival model results, that the initial sentencing duration has a stronger effect for Aboriginal prisoners, whereby the longer the sentence imposed, the more likely prisoners are to return to custody. Recall the period in custody is typically shorter than the sentence imposed, and this variable captures the severity of the offence committed as well as the stay duration. The difference in estimates for Aboriginal and non-Aboriginal prisoners is primarily driven by stronger effects for Aboriginal females – the coefficient reported in the survival model implies each additional sentencing year is associated with around a 40 percent reduction in the length of the post-release spell. The odds ratio reported in Table 12 (+1.397, $p<0.01$) similarly indicates a 40 percent increase in the likelihood an Aboriginal woman will have returned to custody within two years with each year of their sentence.

Table 12: Recidivism after 2-years: binary logistic regression results– by Aboriginal status and gender (Odds ratios)

Outcome variable: Recidivism within 2 years (random-effects)	(12.1) Non-Aboriginal	(12.2) All Aboriginal	(12.3) Male Aboriginal	(12.4) Female Aboriginal
Reference group: No training				
Attended at least 1 ABE class	0.545***	0.808***	0.770***	0.919
Attended only other classes	0.553***	0.694***	0.659***	0.842*
Female	0.617***	0.513***		
Age in discharge year:				
18-25 years	1.319***	1.413***	1.421***	1.361***
26-35 years (reference group)				
36-50 years	0.671***	0.556***	0.550***	0.576***
51 years and over	0.232***	0.192***	0.183***	0.283***
Disability	0.453**	0.517***	0.508***	0.451
Born overseas	0.794***	0.350	0.313	0.529
Primary language is not English	0.501***	0.660**	0.706*	0.379*
Deportation flag	0.523***	0.895	0.863	1.642
Highest education:				
Reference group: No formal schooling				
Primary school	0.768***	0.692***	0.684***	0.690***
Secondary school	0.543***	0.518***	0.502***	0.547***
Higher education	0.527***	0.424***	0.413***	0.452**
Sentencing duration (years)	1.052***	1.091***	1.077***	1.397***
Prison at reception:				
Reference group: Hakea/Bandyup				
Other metropolitan prison	1.118**	0.931	0.846***	1.093
Regional prison	0.766***	0.747***	0.749***	0.677***
WA unemployment rate in discharge month	1.078***	1.063***	1.060***	1.071**
Mean of dep. variable	0.331	0.505	0.528	0.397
Individuals	28901	14322	11083	3239
Observations	53305	43476	35823	7653
Log Likelihood	-30,718***	-27,868***	-23,076***	-4,748***

Notes: * p<0.10, ** p<0.05, *** p<0.01.

Table 13: Post-release spells, survival function regression estimates, by Aboriginal status and gender

	Non-Aboriginal prisoners		Aboriginal prisoners			
			All Aboriginal		Male	Female
	β	Change in survival time (%)	β	Change in survival time (%)	β	β
Reference group: No training/education						
Attended at least 1 ABE class	0.900***	146.0	0.253***	28.8	0.303***	0.122
Attended only other classes	0.885***	142.2	0.470***	60.0	0.524***	0.269***
Female	0.578***	78.3	0.562***	75.4		
Age in discharge year:						
18-25 years	-0.277***	-24.2	-0.341***	-28.9	-0.332***	-0.377***
26-35 years (reference group)						
36-50 years	0.464***	59.0	0.544***	72.3	0.519***	0.672***
51 years and over	1.977***	622.3	1.651***	421.1	1.626***	1.669***
Disability	0.417	51.8	0.191	21.0	0.219	0.344
Born overseas	0.318***	37.5	1.333***	279.2	1.378**	0.984
Primary language is not English	0.924***	151.9	0.565***	76.0	0.438***	1.928***
Deportation	0.962***	161.8	0.431*	53.9	0.472*	-0.353
Ref. group: No formal schooling						
Highest education: Primary	0.220***	24.6	0.300***	35.0	0.282***	0.435***
Highest education: Secondary	0.738***	109.2	0.657***	92.9	0.645***	0.788***
Highest education: Higher	0.745***	110.8	0.872***	139.2	0.883***	0.885***
Sentencing duration (years)	-0.017*	-1.7	-0.108***	-10.2	-0.087***	-0.477***
Prison at reception:						
Reference group: Hakea/Bandyup						
Other metropolitan prison	0.000	0.0	0.142***	15.2	0.216***	-0.002
Regional prison	0.357***	42.9	0.282***	32.6	0.246***	0.555***
WA unemployment rate	-0.052***	-5.0	-0.002	-0.2	-0.002	0.01
Mean duration of post-release spells (years)	6.57		4.20		3.92	5.51
Observations	53,273		43,396		35,755	7,641

Notes: * p<0.10, ** p<0.05, *** p<0.01.

9. DISCUSSION AND CONCLUSIONS

Key findings

Using matched Departmental administrative data on custodial prison stays and participation in classes, this report has sought to provide insights into the effects of prisoner participation in basic numeracy and literacy education while in custody on desistance from crime. The key finding is that prisoners who participate in such adult basic education while in custody have substantially lower recidivism rates than 'like' prisoners who did not participate in any form of classes during a prison stay. Having participated in other classes (non-ABE classes only) has a similarly large association with reduced recidivism.

The estimates suggest that, compared to attending no classes during a custodial stay, participation in ABE classes is associated with a prisoner having 25 percent lower odds of returning to a further custodial spell within one year of release, 32 percent lower odds of returning after two years, and 43 percent lower odds of returning after five years. Expressed in terms of the probability of returning to custody after two years, this translates to a reduction in recidivism by around 9 percentage points (or around 20%) from 49 percent for non-participants to 40 percent for those who participated in at least one ABE course. Participation in at least one ABE course is associated with a 70 percent increase in the expected time ex-prisoners will remain out of jail after release.

The magnitude of the estimated associations between class participation and recidivism are large but quite in line with existing estimates. Davis et al. (2013) meta-study of education programs in US prisons returned an average estimated effect of 43 percent lower odds of recidivism after one year, a larger effect than our estimate of 25 percent lower odds and equating to a 13-percentage point reduction. UK Ministry of Justice/Department of Education (2017), using a large administrative matched-sample, estimated a 10-percentage point reduction in one year recidivism associated with participation in learning activities, equating to a 20 percent reduction (our estimate for one-year recidivism equates to an 8 percentage point reduction). Previous Australian estimates vary. As noted, OICS (2014) found WA offender-treatment programs (as opposed to education programs) during some of the years covered by our data to be associated with increased recidivism. Our estimates are broadly in line with Callan and Gardner's (2005) estimates relating to vocational education and training programs in Queensland prisons.

Strengths and limitations

The current research has both strengths and weaknesses and, as always, we must be cautious of accepting the results as implying a causal effect of participation in classes on prisoners' outcomes. We have been able to access a very large dataset covering over 20 years of adult prison stays in WA prisons. The key results relating to recidivism are robust to a number of different specifications, including the post-release time-period used and survival modelling of post-release spells measured in continuous time. We have gone to more lengths than in most other observational studies in the literature to control for selection bias. With many repeat observations (stays) for prisoners, we have been able to partially control for unobserved individual-specific effects using random-effects models, and more rigorously through the fixed-effects model, which returned an estimated 27 percent reduction in the odds of recidivism after two years. While we do not have strong confidence in the modelled correction for selection bias, the finding of a significant effect of attending ABE classes is robust to the test.

Major weaknesses include omitted variables – there is a lot we do not know about prisoners, their stays, and post-release spells that could impact upon their likelihood to engage in crime. This includes their work patterns while in prison or other potential substitute activities to attending classes, transfers between prisons that may interrupt learning, or the family, social, housing, and other environments they return to upon release. The 'stays' dataset does include a variable relating to the prisoner's 'release type', however this included 110 different categories, many of which we were unsure of their interpretation or how they could best be categorised. Potentially, grouping these into a meaningful, tractable set of smaller categories would enhance the modelling of recidivism, but would be unlikely to greatly alter estimates for other covariates, such as class participation.

A further complication for assessing a causal effect of participation in basic literacy and numeracy education, the primary goal of the research, is that prisoners typically participate in a range of courses. Prisoners who attended ABE classes have often also participated in non-ABE classes. Indeed, this is likely the intent of attending ABE classes, to then progress to other vocational training. This makes it impossible to isolate an 'ABE participation effect', an issue also noted in the Davis et al. (2013) meta-analysis. Instead, we estimate the effect of having participated in any ABE classes, which will be a combined effect of the bundle of classes undertaken. There may be value in exploring patterns of the combinations of classes and their timing during stays in future research.

Being unable to attribute effects specifically to specific types of classes also makes it difficult to assess the cost savings associated with providing ABE to prisoners. The most straight-forward way to do this is to take the estimated effects on the average duration of post-release spells from the survival models. With a mean post-release duration of 5.5 years, the estimate of a 70 percent increase in survival time associated with attending ABE courses, and operating costs per day per prisoner of $307 (Productivity Commission 2025), this equates to a future saving of around $432,000 in direct costs for each prisoner who participates in ABE courses. If we use the daily cost inclusive of corrective services including capital costs per prisoner ($382), this equates to a future saving of $537,000 per participant. Of course, there will be substantial individual and social benefits in addition to these direct savings in expenditure on custodial services.

Several things should be noted in relation to this ball-park figure. First, it assumes a causal effect between participation in ABE classes and lower recidivism. Second, it is in comparison to the hypothetical case in which the prisoner does not participate in any classes. Third, it is the effect of the full bundle of classes (ABE and non-ABE classes) that ABE students participate in. And finally, technically speaking, those future savings would need to be discounted to the present value if one was to make a comparison to the cost of providing in-prison education and training. As noted, the combinations of classes prisoners tend to participate in would make it difficult to assign a particular cost for the purposes of making that comparison.

9.1 Causal pathways to desistance

So, what can we say about causal effects and their potential mechanisms? Keeping in mind caveats over claiming causal effects, the results do cast some light into the workings inside the 'black box' that links in-prison attendance in education to desistance from crime. The competing possibilities can be broadly thought of as either 'control-based' or 'identity-based' mechanisms, though the two should not necessarily be seen as mutually exclusive. The former suggests class attendance raises participants' skills and competencies providing greater ability to control their life circumstances, such as increased employability. The latter relates to creating a more positive sense of self-identity or self-worth that mitigates against criminal offending.

The objective was to look at more general measures of desistance from crime, not just recidivism. However, we find little evidence of desistance effects beyond reduced rates of reincarceration. The results relating to whether any subsequent stay was due to a conviction for a less serious offence were ambiguous. Despite testing a range of specifications, in-prison offending appears to be positively correlated with participation in ABE classes and in non-ABE classes in these data. It could be argued that control-based mechanisms would have a greater effect on post-release outcomes relative to in-prison outcomes, while identity-based effects should become apparent both within prison and post-release. The fact that we find stronger evidence of positive effects post-release may support evidence that control-based effects dominate. However, a number of other findings are not in line with this interpretation.

It is worth repeating that both ABE classes and other classes are estimated to have beneficial associations with recidivism. The magnitude and statistical significance of those two effects are similar for the non-Aboriginal prison population, but among Aboriginal prisoners it appears participation in ABE classes has a smaller effect. This is particularly so for female Aboriginal prisoners, for whom we find no beneficial effect from attendance at ABE classes. Factors potentially contributing to a smaller relative effect of participation in ABE classes for Aboriginal prisoners may include their shorter average custodial spells combined with lower initial levels of literacy and numeracy, given the finding that affects are stronger for those with higher initial levels of education. Previous literature has highlighted that offender programs are often not culturally aligned or tailored to Aboriginal people's needs, and this may similarly apply to the content and delivery of ABE courses (Hovane et al. 2014, Tamatea 2017, Trudgett et al. 2024).

We cannot test in this study whether participation in ABE or other courses led to improved employment outcomes. However, we do find evidence consistent with existing literature that more favourable labour market conditions upon release are associated with lower recidivism, consistent with this possibility. Unfortunately, the data on progressions in literacy and numeracy, which would be of substantial value for assessing causal pathways, are not able to support that analysis. We do not find evidence that participating in a higher number of classes has any added effect beyond the benefit of participating. This is consistent with the Ministry of Justice/Department of Education's (2017) study for learning activity in UK prisons, which found taking part in learning activities appeared to matter more than actual achievement.

Further, reductions in recidivism associated with participation in ABE classes and other classes are much larger for more educated prisoners. Clearly, prisoners with low levels of education would stand to gain the most in terms of enhanced skills and competencies from participating in basic literacy and numeracy education. The fact that those prisoners benefit the least would seem to favour identity-based interpretations over control-based mechanisms. Finally, we find reductions in recidivism associated with participation in classes is substantially higher for spells with convictions for more serious offences. This finding is perhaps also more consistent with participation in education and training prompting a shift in prisoners' sense of self-identity, rather than directly enhancing skills and competencies as the mechanism for reducing the probability of reoffending. However, unobserved selection effects may also be stronger among more serious offenders.

9.2 Some implications and avenues for future research

The findings add weight to existing evidence that suggests education and training provided in Australian prisons offers substantial benefits to the individual participants and to wider society. While this may not seem controversial, the OICS (2014) analysis of treatments for WA prisoners from 2008 to 2010 suggested those programs were actually harmful to participants' prospects of remaining out

of custody. Those treatment programs did not include education and training programs, and there is strong evidence of positive overall effects for vocational and educational programs provided in WA prisons between 2000 and 2022. Feedback from contacts within the Department suggested this may reflect that treatment projects are linked to offences or addictions, and therefore adopt a deficits-based view of the prisoner as an offender, in contrast to a strengths-based approach inherent in education courses.

That is not to say these educational courses could not be delivered more effectively. Our results suggest a review of the content and delivery mode of classes accessed by female Aboriginal prisoners is needed. Aboriginal women experience shorter but more frequent custodial stays than non-Aboriginal female prisoners. While their stays are equally as likely to include attendance at ABE classes, they do not appear to benefit from that participation in terms of reduced recidivism. Drawing on the RNR model, it seems likely that the style and mode of courses are poorly aligned to the prisoners' learnings styles and abilities (the 'Responsivity' principle).

A major obstacle to assessing how in-prison education and training benefits prisoners is the poor quality of the data relating to literacy and numeracy skill levels and progressions in those skills over time, or any indicator of whether individuals complete classes or courses. This may be because these data are not systematically collected or are difficult to extract and compile from the Department's systems. However, the availability of better measures of literacy and numeracy competencies and how they progress over time would seem critical to inform the design of in-prison education and training programs, and how to better target education to prisoners' needs. We understand the Department has been working on improvements in this area.

The fact that prisoners complete multiple types of classes means inference regarding the effects of the various forms of education and training is difficult, and makes evaluations aimed to improve delivery challenging. To assess the impact of participation in ABE classes in this study we distinguished between three categories of participation: those who participated in at least one ABE class, those who participated in only non-ABE classes, and those who participated in no classes. The ABE group includes prisoners who have participated in a range of non-ABE classes. Attempting to isolate an 'ABE only' effect would underestimate the value of that education to the extent that it is intended as a foundation for further vocational education and training. Further analyses of the patterns of participation over time and consultation with Department staff to identify a more informative stratification of course participation could offer more valuable insights for improving delivery of education and training to prisoners, and for understanding its impact on outcomes.

Finally, we note in the introduction that there are well-recognised limitations to the use of recidivism as a measure of desistance from crime, and we have had minimal success in operationalising alternative measures of desistance with the available data. However, a more complete evaluation of the benefits of prison-based education and training would go beyond measures relating to criminality and extend to wider measures of prisoner wellbeing. Such an evaluation would need to be based, in large part, on qualitative research. Critically, that should include elements of wellbeing important to Aboriginal learners, such as sustaining cultural identity, knowledge, and language, in order to link prison education to potential pathways beyond incarceration.

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