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The costs and benefits of the Magistrates' Early Referral into Treatment (MERIT) program

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AIM

To estimate the costs of the Magistrates' Early Referral into Treatment (MERIT) program, and its justice, health service usage, and mortality benefits over two years from referral.

METHOD

We use a linked dataset of justice and health service variables for 9,874 court appearances involving a MERIT referral and 322,711 court appearances for defendants who met the MERIT eligibility criteria but were not referred, for the period between 2012 and 2017. First, we enumerate the costs of the MERIT program from information on staffing, micro-level data on alcohol and other drug (AOD) treatment, and estimates of other administrative costs. Second, we directly estimate the impacts of the program on each person's: a) number of reoffences; b) days spent in custody; c) cost of ambulance callouts; d) cost of emergency department presentations; e) cost of unplanned hospital admissions; and f) probability of mortality, using propensity score matching and regression analysis. Then, we compile the discounted value of the costs and benefits of the program in 2019 dollars and test the sensitivity of our results to a range of costing assumptions as well as the variability of our estimates using a Monte Carlo simulation.

RESULTS

In present $2019, the average cost of delivering MERIT was $6,339 per individual, comprising of staffing costs, which account for 57% of all costs, followed by AOD treatment costs (26%), additional court costs (11%) and other administrative costs (6%).

On average, per individual, the following notable benefits were associated with a referral to the MERIT program:

- $7,342 in reduced criminal justice system costs within two years of being referred to MERIT, from
  - avoided prison costs ($4,552) and avoided community corrections costs ($1,185)
  - $1,069 in avoided victim costs, including intangible costs
- $116 in additional health costs resulting from minor increases in ambulance and emergency department presentation costs.

Taken together these results indicate that MERIT resulted in a net benefit of $887 per participant, or, equivalently, a benefit-cost ratio of 1.14.

CONCLUSION

The MERIT program's criminal justice benefits exceed the costs of the program, despite the program also being associated with slight increases in health service usage.

KEYWORDS Drug diversion | Cost-benefit analysis | Propensity score matching | Recidivism

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INTRODUCTION

There are high levels of illicit drug use among those involved in the criminal justice system. The results of the 2021 Drug Use Monitoring in Australia (DUMA) study indicated that 8 in 10 of the 716 police detainees in the study who provided a urine sample tested positive for at least one drug, with 50% of this group testing positive for methamphetamine (Voce & Sullivan, 2022). Comparable studies from England and Wales (Bennett, 2000) show similarly high rates of drug use among arrestees. A study of soon-to-be released prisoners from the NSW Justice Health and Forensic Mental Health Network (2017) also supports high rates of drug use and dependency among custodial populations. The first comprehensive report of inmate health in NSW using administrative data, the 2020 People in NSW Prisons study (NSW Justice Health and Forensic Mental Health Network, 2022), also indicates that more than half of inmates entering NSW public prisons in 2020 had used drugs in the four weeks preceding their reception. Of these inmates, more than half (55.2%) had used methamphetamine.

There are at least four reasons why drug use is highly correlated with crime (Caulkins & Kleiman, 2011; Goldstein, 1985). The first and most obvious mechanism is the criminalisation of drug possession, supply and driving with the presence of illicit drugs. Second, some individuals may commit crimes while intoxicated (Goldsmid & Willis, 2016), or to fund their drug use (although evidence for the latter in Australia is mixed[1]). Third, the accumulation of interactions with police for minor drug offences may increase the likelihood of an individual being policed and contribute towards a lengthening of their criminal record. Last, illicit drug markets (and their enforcement) can generate crime through territorial disputes and other supply-related crimes (Lipton et al., 2013). The strength of these links in the NSW context is evident from the large reductions in crime observed following the Australian heroin shortage of 2001 (Degenhardt et al., 2005; Weatherburn & Rahman, 2021).

These links have motivated the introduction of interventions that aim to address both alcohol and other drug (AOD) use and recidivism. A 2008 review (Ritter and Hughes, 2008) identified at least 51 diversion programs implemented by police and courts for drug offenders in Australia. Three-quarters (74%) of these involved some form of treatment. Taken together, these programs cover a broad spectrum of offenders at various stages of the criminal justice system in Australia.

The Magistrates' Early Referral into Treatment (MERIT) program

The Magistrates' Early Referral into Treatment (MERIT) program is a voluntary, pre-plea program for adults in the NSW Local Court (NSW Local Court, 2023). MERIT aims to reduce offending and improve the health and well-being of adults who have issues related to alcohol and other drug use and who are in contact with the criminal justice system. It also may support a better sentencing result by providing defendants with the opportunity to demonstrate their commitment to rehabilitation.

MERIT commenced in 2000 and operates in 62 of the 137 NSW Local Courts (NSW Department of Communities and Justice, 2021). Of these 62 courts, 55 provide the MERIT program offering illicit drug addiction services, and in seven regional courts, alcohol services are also available where alcohol can be the principal drug of concern.[2]

A person can be referred to MERIT by a magistrate, a solicitor, the police, themselves, or other people (including parole officers, and family members). In 2019, the most common referral sources were solicitors (40%); magistrates (36%); self-referrals (13%) with the remaining 11% referred from a range of other sources (NSW Department of Communities and Justice, 2021). Eligibility and suitability requirements

1 An early study from England of heroin users (Jarvis & Parker, 1989) suggests that they commit acquisitive crime to fund drug purchases, but Australian research indicates that drug users often rely on a range of income sources (Maher et al., 2002) and heroin users more commonly cite drug purchases as a motivation for crime (Payne & Gaffney, 2012; Goldsmid & Willis, 2016), but not cannabis nor methamphetamine users.

2 The Alcohol MERIT program originated from the Rural Alcohol Diversion (RAD) program. RAD started in Orange and Bathurst (Martire & Larney, 2009) and aimed to divert defendants with alcohol problems contributing to their offending. It has since expanded to also cover metropolitan and regional courts. Presently these courts also treat those with co-occurring drug and alcohol problems.

determine whether a defendant referred to MERIT will be accepted into the program. To be eligible for MERIT the participant must:

- be an adult;
- be on bail or does not require bail;
- not be charged with sexual assault offences, or any offence that will be heard in the District Court;
- be suspected of drug use or have a known history of issues with alcohol and/or drug use;
- have a treatable alcohol and/or drug (AOD) problem;
- live in or have a connection to an area (e.g., full-time work) that provides MERIT; and
- consent to participate.

Figure 1. MERIT referral and treatment process

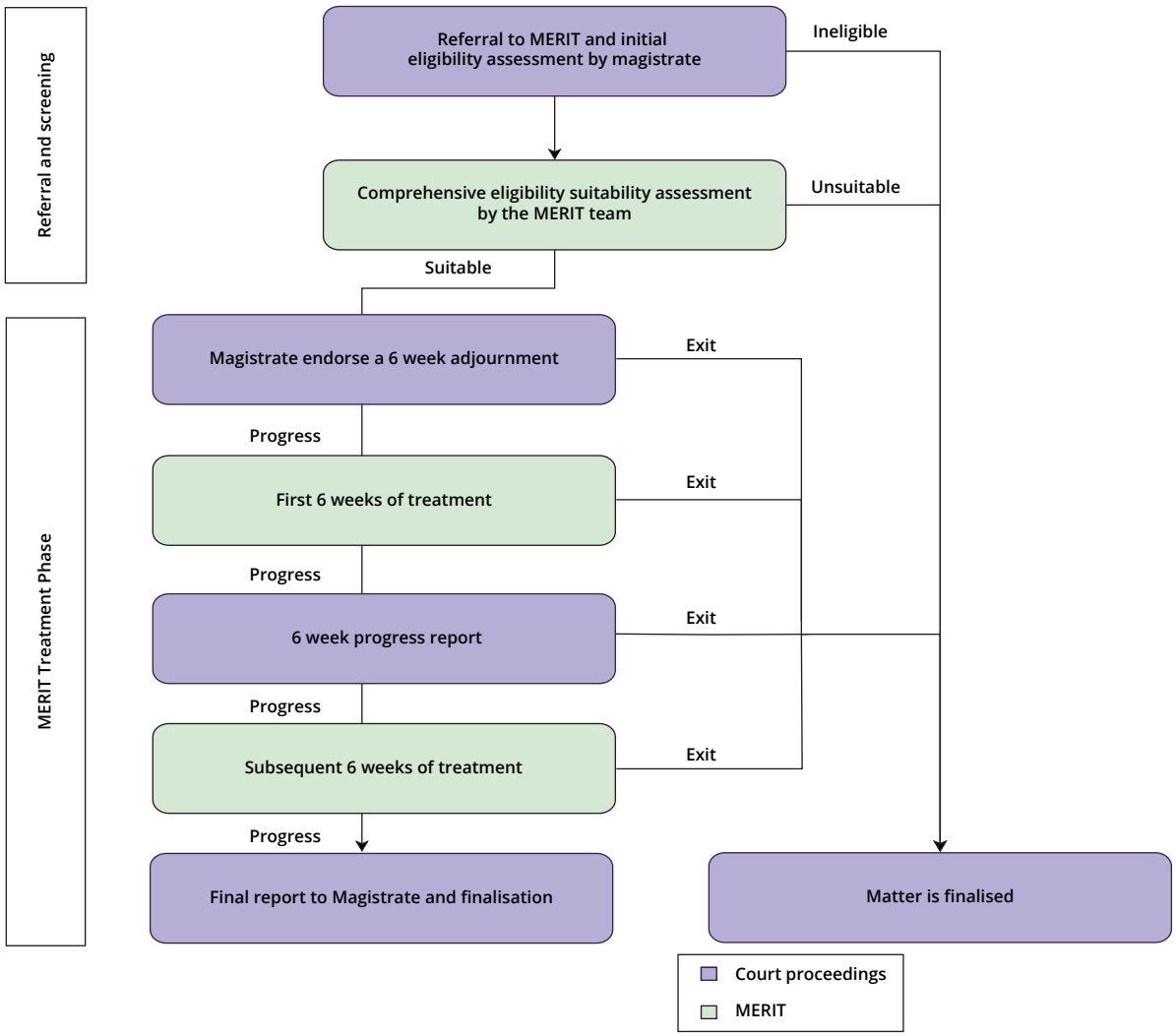


Figure 1 summarises the process of the MERIT program. After a person is referred to MERIT, the magistrate undertakes an initial eligibility assessment of the defendant. If the person is eligible and the magistrate is supportive, they proceed to a comprehensive assessment carried out by the MERIT team. The MERIT team then assesses an individual's suitability for the program based on the nature and extent of a person's drug problem and their motivation to participate in the program (NSW Department of Health, 2007). If a person is determined to be eligible and suitable for MERIT, the magistrate adjourns court proceedings for 6 weeks for the person to undergo treatment, typically AOD counselling and case management, and withdrawal management and/or residential rehabilitation as needed.

At the 6-week mark, a MERIT worker submits a progress report to the magistrate, which if endorsed, results in a further 6-week adjournment for additional treatment. This treatment can include counselling, withdrawal management, residential rehabilitation, as well as referrals to other services. A final report is submitted to the magistrate, who then finalises their matter and can take completion of the MERIT program into consideration in sentencing. Other than completion of the MERIT program, a person may exit MERIT at any point during the 12 week program due to non-compliance with program conditions, voluntary withdrawal, removal by the court, finalisation, or dismissal of their court matters prior to completion, and death. There is no punishment for not completing the MERIT program.

The MERIT program accepts a large proportion of people referred, and approximately six in 10 people who begin the program complete it. In 2019, there were 4,062 defendants referred to the program and approximately 59% (or 2,410 defendants) were accepted onto the program (NSW Department of Communities and Justice, 2021). The main reasons for non-acceptance were ineligibility or unwillingness to participate. In 2019, 1,522 people (or 63% of those accepted) completed the MERIT program. The most common reason for exiting the program was non-compliance with program conditions. The average number of days on the program was 91 days for completers and 56 days for non-completers, in both 2018 and 2019.

The profile of referrals to the MERIT program has changed in several ways since it commenced in 2000 as a pilot program. First, the volume of referrals to MERIT has increased in more recent years. Between 2007 and 2014, the average number of referrals per year was 3,200. In 2015, the number of referrals increased to 4,035 defendants, and since then, referrals have remained at around 4,000 per year. Second, the principal drug of concern among participants has changed. In 2008, nearly half (47%) of those accepted onto MERIT reported cannabis as their principal drug of concern but this was true for only one-quarter (28%) of those accepted in 2019. In contrast, opiates were the principal drug of concern for one-fifth (21%) of accepted individuals in 2008 but only 9% of those accepted into MERIT in 2019. In 2008, 20% of participants reported stimulants (typically amphetamines) as their principal drug of concern, compared with 55% in 2019. This is consistent with general changes in the pattern of drug usage among criminal justice-involved populations in Australia.[3]

Literature review

A critical question for policymakers in considering the usage and expansion of AOD treatment programs in criminal justice settings is whether the social benefits of these programs exceed their costs. The utility of cost-benefit analysis in public policy is well-documented[4]. Public decision-makers must choose how to expend finite resources on numerous possible rehabilitation, diversion, or sentencing approaches to reduce offending. Cost-benefit analysis sheds light on whether (and to what extent) programs' benefits outweigh their costs. There are a few more reasons why cost-benefit analysis can be useful in studying substance abuse programs in the criminal justice system. These programs can be fairly costly, particularly if they include pharmacological treatments. Furthermore, these programs are typically premised upon reducing burden on both criminal justice and health systems. Cost-benefit analysis helps us quantify the extent to which savings to these systems actually occur.

3 For example, in 2008, 26 per cent of police detainees tested positive for any opioid in the Drug Use Monitoring in Australia sample (Gaffney et al., 2010), versus 19 per cent in 2019 (Doherty & Sullivan, 2020).

4 Interested readers are directed to Dobes et al. (2016) for examples of applications of cost-benefit analysis to social policy in Australia and New Zealand.

Some criminal justice AOD treatment programs have been subjected to economic evaluation. However, many of these programs are from the United States, and these are not all analogous to MERIT. An early study by Cartwright (2000) reviewed 10 academic and eight government cost-benefit analyses of drug treatment programs in the United States and found that program benefits exceeded their costs. The studies included in the review contained a broad range of possible benefits, including, but not limited to: a) savings that accrue to the criminal justice system from fewer reoffences and spells of imprisonment; b) savings to the health system from reduced service usage; c) benefits to the individual of no longer being dependent on drugs; and d) benefits to the individual from being in gainful employment. The cost-benefit analysis that provided arguably the best evidence among those included in this review was one which examined outcomes for 102 drug offenders randomly assigned to regular detoxification (withdrawal management), or regular detoxification plus contingency contracts (i.e., cash credits for remaining substance-free; Hartz et al., 1999). There was a statistically non-significant benefit-cost ratio of 4.87 in avoided health costs for the contingency contracts. However, the relevance of the Cartwright review to the present setting is somewhat limited given only one of these studies analysed outcomes for an offender sample (although many of the cost-benefit analyses considered offending as an outcome). Furthermore, the review included estimates from 10 *ex-ante* cost-benefit analyses, which primarily rely upon policymaker or researcher assumptions regarding how successful the program will be in achieving the desired outcomes.

Since then, there have been several other economic analyses of offender drug treatment programs in the criminal justice system. Perhaps the best international summary of evidence available on drug treatment in the criminal justice system is the Washington State Institute for Public Policy's (WSIPP) benefit-cost analysis of drug courts for adults (2019). Using a meta-regression of 72 effect sizes of drug courts on recidivism, WSIPP estimate that drug courts result in $5,746 in benefits accruing to taxpayers and $10,654 to other members of the public. Contrasting this with an average per-participant annual cost of $5,803, results in average net benefits of $10,567 for drug courts. There are several points to note about this meta-analysis. First, unlike other diversionary programs, drug courts typically involve significant and frequent judicial supervision, as well as a mix of drug screening, AOD treatment, and sanctions or incentives. They may also be significantly more punitive and take a zero-tolerance (as opposed to harm reduction) approach to program participation and drug treatment. Second, drug court programs tend to be significantly longer than MERIT; the length of the drug court programs included in the WSIPP review ranged from 12 to 26 months. Third, the WSIPP review does not estimate the benefits of drug courts in improving health outcomes.

One international study that may be of greater relevance to MERIT is that by Bhati et al. (2016). Rather than evaluating a particular drug treatment program, they estimate an *ex-ante* cost benefit analysis of drug treatment by linking data on drug treatment, health outcomes, and offending and estimating the benefits of drug treatment from several U.S. national surveys. In other words, they conduct a policy simulation of what the effects might be of expanding drug treatment programs in courts (which typically have strict eligibility criteria) to all offenders with drug problems. Their analysis also aims to discern which groups may benefit from brief treatment versus more intensive therapeutic jurisprudence approaches. Their linked dataset consisted of information from the U.S. National Survey on Drug Use and Health, the Arrestee Drug Abuse Monitoring Program, and the Drug Abuse Treatment Outcome Study. Using the survey data on drug use, they developed profiles of drug users, for whom they estimate the prevalence of substance use and dependence disorders. They then compared data on offenders within these "profiles" who were treated for drug use versus with those who were not, to simulate the expected crime reduction benefits from different modes of treatment (long-term residential, short-term inpatient, outpatient methadone, and outpatient drug-free). They found that drug treatment results in US$2.21 of benefits for each dollar spent on the program. Notably, expanding treatment to those with pending matters was particularly beneficial, resulting in a benefit-cost ratio of 4:1. Outpatient drug-free treatment (counselling and/or crisis intervention) resulted in the largest (33%) reductions in recidivism. One limitation of this study is that they use U.S. "willingness-to-pay" methods to calculate the cost of crime. These methods often yield high, and often variable, estimates of the benefits of crime reduction. For example, they apply

an assumption of victim costs from a robbery of $30,253. A consequence of this is that the magnitude of their findings is highly sensitive to assumptions about the cost of crime. Their overall cost-benefit ratio for current drug court regimes decreases from 2.73 to 2.14 when alternative measures of the cost of crime are used.

Few economic evaluations of U.S. drug treatment programs examine both health and criminal justice benefits. One exception is an evaluation of the U.S. Drug Treatment Alternative to Prison (DTAP) program undertaken by Zarkin et al. (2005). This program aims to both address drug use and divert them from imprisonment. Zarkin et al. (2005) examined the costs and benefits associated with DTAP, which placed people convicted of non-felony drug offences into community-based residential treatment. DTAP is a deferred sentencing model for people convicted of non-felony drug offences, where a person who has entered a guilty plea has their sentence deferred for 15 to 24 months while they undertake drug treatment. Treatment typically occurs in a residential rehabilitation program, but may also include vocational and educational training and a gradual re-entry into society. Zarkin et al. estimated that the DTAP program costs on average $40,718 per participant, mostly consisting of the costs of the 487 days each participant spent in residential treatment. Even so, these substantial costs were still exceeded by the program's benefits estimated at $47,836 per participant. This was largely due to non-participants having longer prison sentences and higher rearrest rates in the six years post-treatment, incurring $124,995 in criminal justice costs on average. This compares with just $36,441 in criminal justice costs for DTAP participants in the six years post-treatment.

Another U.S. study of drug treatment which compared program costs to a broad range of benefits was that conducted by Ettner et al. (2006) as part of the California Treatment Outcome Project (CalTOP). This study examined 2,567 clients entering substance abuse treatment (methadone maintenance, outpatient treatment, and residential treatment) in California between January 2000 and May 2001 and who had completed 9 month follow-up surveys. Sensitivity analyses also considered administrative data pertaining to a larger cohort of 6,546 individuals treated over the same period, yielding a longer follow up but fewer outcome measures. The costs of the program were estimated by surveying treatment providers using a standardised economic cost instrument known as the Drug Abuse Treatment Cost Analysis Program instrument (DATCAP; French et al., 1997). The average cost of the program was found to be $1,583 per participant (in 2001 U.S. dollars). Benefits were estimated by comparing self-reported (emergency department visits, employment, unemployment, and welfare payments) and administrative (crime, incarceration, mental health service usage) measures of outcomes for participants in the 9 months before and after treatment. They found that the largest sources of benefits of the program were increased employment income (of $3,352), reduced victimisation costs from fewer crimes (of $3,019), reduced other criminal justice costs (of $2,657) and reduced imprisonment costs (of $1,788). The authors also found small reductions in emergency department costs (of $223) and costs of hospital admissions ($372) post-treatment. While promising, the relevance of these results to criminal justice diversionary programs, like MERIT, may be limited as this study considered both offender and non-offender populations. Furthermore, the pre-post method is limited in that it may conflate dynamics in outcomes unrelated to treatment (for example, from aging) with the impacts of treatment.

The only economic evaluation of the MERIT program undertaken so far was conducted on its early pilot phase. The pilot was evaluated by Passey et al. (2003), and included an outcomes evaluation, process evaluation, cost-benefit assessment, and legal review. The study found that completers generally received less severe sentences, demonstrated better social and psychological outcomes, reduced drug use, and improved family relationships. In their cost-benefit analysis of the pilot, they contrasted program costs against (1) the savings from reduced imprisonment and (2) the sum of savings from reduced imprisonment and the savings from reduced police crime investigation time, hospitalisations, and societal benefits arising from fewer crimes committed. Comparing these costs and benefits they identify that the pilot program resulted in $2.41 in benefits for each dollar spent on costs, when only savings from reduced imprisonment are considered. In their least conservative case, which considered additional savings from reduced crime, hospitalisations, and police investigation time they estimated that the possible benefits could exceed the costs by a ratio of 5.54 to 1.

Since then, the MERIT program has been studied several times but not in any economic analyses. Passey et al. (2007) compared outcomes of 90 individuals who completed MERIT with 79 individuals who were referred but did not complete the program. They conducted Cox regressions of several measures of "free time" (i.e., time out of custody) and elapsed time to any offence, any drug offence, any theft offence, and any robbery offence. The study controlled for several factors, including gender, Aboriginality, accommodation, principal drug of concern, prior imprisonment, and MERIT program exit status. The findings included that at any point during the follow-up period, completers were half as likely to reoffend as their comparison counterparts. However, this comparison is hampered by the fact that completers, aside from being much less likely to receive a prison sentence, may also have been significantly different to non-completers on important factors motivating both completion and recidivism, such as motivation and financial stability. A later study by Lulham (2009) examined the effectiveness of MERIT using an instrumental variables approach, leveraging the fact that legal representation was a significant predictor of being referred to MERIT. Comparing 2,396 individuals accepted onto the program with 23,960 individuals who were not, the author first predicted the likelihood of being accepted (and completed) into MERIT based on whether a person was legally represented, then using these predicted probabilities, considered the effect of being accepted into MERIT on recidivism. Lulham found a 12 percentage point reduction in the likelihood of any reoffence among those accepted onto the program, and a 42 percent reduction for those who completed the program. He was not able to detect reductions in a drug offence with precision but found significant reductions in the likelihood of a theft reoffence. Ultimately, however, the validity of Lulham's (2009) approach hinges on the instrumental variable being random, which is a tenuous assumption. Legal aid is granted partly based on a means test, and people who are more likely to receive a prison sentence are also more likely to engage a legal representative.

The sole study which examined the health outcomes of MERIT was that conducted by NSW Health (2007). They interviewed MERIT participants at entry and at program exit about their mental health and drug use. They used a sample of 2,200 individuals at entry, 1,411 of whom also completed an exit interview during the study period. They found significant reductions in the frequency of drug use at exit, as well as the proportion using drugs, and decreased use of participants' principal drugs of concern at exit. In fact, almost 40% of those interviewed at exit were abstinent from illicit drugs. Self-reported needle-sharing over the last three months also significantly declined, as did psychological distress (measured via a Kessler-10 instrument). Significant improvements in self-reported physical and psychological health were also reported. While this study is the first to offer insight into the health benefits of the program and uses validated health measures, it too is somewhat limited by its design. As there was no comparison group, it is unclear whether the reductions observed occurred due to treatment or due to other factors which may have coincided with treatment (for example, a person feeling less stressed after their court matter was resolved). Furthermore, it is unclear whether these benefits extend further beyond program completion, and whether these reductions also translate into less burden on the health system via formal emergency department or admitted contacts.

NSW studies have produced mixed results on the cost-effectiveness of offender drug treatment programs. The NSW Drug Court has been the subject of two economic evaluations. The first, by Lind et al. (2002) considered the cost-effectiveness of the court. They examined outcomes for persons randomised to either the Drug Court (n=309) or a control group (n=121) between 8 February 1999 to 30 June 2000. Reoffending was measured with each person followed up from their date of referral to the Drug Court until the 30 September 2000. The effects of the program on theft and drug offences were estimated using survival analyses and costs and incremental cost-effectiveness ratios (ICERs) in units of days were reported. Lind et al. found that when program costs per day and costs of the final sanctions imposed on participants were considered, the NSW Drug Court cost less per day than the typical criminal justice pathway. While the Drug Court did not reduce the time taken to commit a first shop stealing or use/possess offence, it did reduce the frequency of such offences during the follow-up period, indicating that the Drug Court was more cost-effective than the typical pathway in reducing reoffences.

Goodall et al. (2008) conducted a second cost-effectiveness study of the NSW Drug Court after a number of operational changes were made to the program to improve its effectiveness. These changes included: a) allowing re-balloting of Aboriginal people and women; b) adding further conditions to reduce risk of misconduct on the program; c) allowing participants to accrue up to 14 days of sanctions before imprisonment; d) applying a stricter measure of prospective success in considering whether participants should continue through the program; and e) dealing with any newly discovered offences as part of Drug Court proceedings. This study examined referrals to the Drug Court, (between 1 January 2005 and 31 December 2006) and the authors gathered information on all resources used in the court until August 2008. This included treatment episodes and length, court activities such as report-backs, and sanctions accrued and served. They estimated that the NSW Drug Court cost $32.7 million annually compared with $36.3 million for conventional sanctions. The authors concluded that the Drug Court is cost-effective given it also reduced recidivism (Weatherburn et al., 2008). As with the previous economic analysis, the authors noted the limitation that they were unable to examine health costs.

MERIT, unlike the Drug Court (Lind et al., 2002), has not been subjected to an economic evaluation since its pilot phase. Meanwhile, prior evaluations have either considered criminal justice outcomes (Lulham, 2009; Passey et al., 2007; Reilly et al., 2002) or health outcomes (NSW Health, 2007) in isolation. Thus, no study of the program so far provides a comprehensive (and contemporary) assessment of the program's benefits against its costs.

THE CURRENT STUDY

Prior international and NSW evaluations generally provide evidence in favour of drug treatment programs. However, these evaluations have limited relevance to MERIT for several reasons. First, most are evaluations of drug courts, which are typically more intensive interventions and target a different population. Second, few evaluations have examined the health outcomes associated with these programs. Third, the samples included in the NSW Drug Court evaluations (and early evaluations of the MERIT pilot) were mostly comprised of opioid users, but currently the MERIT program services a significant number of participants with cannabis and methamphetamines as their primary drug of concern.

While there are several evaluations of MERIT, so far no studies have identified whether the program's benefits outweigh its costs. The present study therefore seeks to answer the following questions:

1. What is the average per-participant cost of the MERIT program?
2. What are the justice, health service usage, and mortality benefits of the MERIT program compared to traditional sentencing in the NSW Local Court?
3. What are the net costs or benefits of the MERIT program?

METHOD

To facilitate a direct comparison of the costs and benefits of MERIT, we undertook a cost-benefit analysis. Cost-benefit analysis is one among many methods of economic analysis in public policy, such as cost-minimisation analysis, cost-effectiveness analysis, cost efficiency analysis, cost-utility analysis, and cost-consequences analysis. Unlike these other forms of analysis, cost-benefit analysis seeks to identify the total social return of an investment or an initiative. By valuing all costs and benefits using a common unit, namely, dollar values, cost-benefit analysis can incorporate multiple outcomes (unlike cost-effectiveness and cost-utility analysis). This is particularly relevant to substance abuse treatment in criminal justice settings, which could plausibly lead to improvements to public safety, reductions in other government service use, and increased productivity (Chisholm, 2000; Roman, 2013).

The validity of a cost-benefit analysis hinges upon several conditions. First, the analysis should include all major costs and benefits of the program (although this is rarely achieved in practice). Second, the monetary values used should estimate all the social and monetary costs of an outcome of the program to a reasonable degree of accuracy. Third, the methods used to infer the benefits of the program (versus a counterfactual) should be as close to causal as possible. In sum, cost-benefit analyses should aim to be as rigorous and comprehensive as possible.

Our approach seeks to meet these conditions in several ways. We use a linked data set encompassing health service and criminal justice data that enables us to examine most of the theorised benefits of the program (and some of its costs) at the micro or 'episode' level. We use several established valuation methods and published monetary values to estimate the benefits of MERIT to government. This also aids in the comparability of our findings to other NSW-based cost-benefit analyses (Ananthapavan et al., 2021). Finally, we use a mix of propensity score matching and regression methods. This enables us to estimate the benefits of the program by comparing MERIT participants to a counterfactual, adjusting for observable differences in these groups' profiles.

Data

We use a large, de-identified linked unit record dataset, consisting of all adults appearing in the NSW Local Court over the period January 2007 to December 2019, drawn from the NSW Bureau of Crime Statistics and Research's Re-offending Database (ROD). The ROD extract contained all police, court, and custody episodes for each participant during the period of interest. The NSW Centre for Health Record Linkage linked these individuals to their health care service records in the following datasets:

- **NSW Emergency Department Data Collection (EDDC).** These data included complete records of emergency department episodes from January 2005 to 30 September 2021 for all individuals in our ROD sample. To include only unplanned presentations, we excluded from this data the following visit types: planned return visits, outpatient clinics and pre-arranged admissions.
- **NSW Ambulance datasets:** We linked datasets from the Computerised Automated Dispatch (CAD) to two datasets: the Emergency Medical Record (EMR) and Patient Healthcare Record (PHCR), which preceded the EMR. The CAD dataset captures operational information for emergency and urgent episodes of care for NSW Ambulance patients who were transported to a hospital, were left at a scene following clinician assessment, or, who died at the scene. The EMR and PHCR datasets provide clinical information regarding each ambulance episode. The data we used included all ambulance dispatch and patient information from January 2001 to September 2021.
- **NSW Admitted Patient Data Collection (APDC):** This collection records all admitted patient services provided by NSW public hospitals, public psychiatric hospitals, public multi-purpose services, private hospitals, and private day procedures centres. The data we used included all admissions from 1 July 2001 to 30 September 2021 for the ROD cohort specified above. In processing this dataset, we combined overlapping episodes into single episodes, but considered diagnoses from each component episode when classifying episodes as drug- and alcohol-related.
- **NSW Minimum Data Set for Drug and Alcohol Treatment Services (NSW MDS DATS).** This collection includes information on all publicly funded episodes of drug and alcohol treatment from 2006 to 2019, including those undertaken in Justice Health facilities, Aboriginal health services, non-government organisations, community health services and multi-purpose centres (if they also provide specialist drug and alcohol services), and services provided by hospitals and drug replacement therapy providers. We obtained data from 1 January 2015 to 25 November 2021 for the ROD cohort.
- **NSW Controlled Drugs Data Collection (CoDDaC).** This dataset records details of authorities to prescribe Schedule 8 (S8) drugs, namely opioids, psychostimulants, benzodiazepines, and cannabis-based medicines (in circumstances where an authority is required). For this study we focused specifically on prescriptions under the Opioid Treatment Program (OTP) subcollection, which relates

to opioid agonist pharmacotherapy provided under the program. This data was available from January 1985 to December 2021 for the ROD cohort.

- **NSW Births, Deaths, and Marriages Cause of Death (CoD) unit record data:** Death registrations from The Registry of Births, Deaths, and Marriages (RBDM) and the Australian Coordinating Registry (ACR) Cause of Death Unit Record File (COD URF), which also includes Australian Bureau of Statistics (ABS) death registration data prior to 2006. This data was available for the ROD cohort from 2008 to the end of the study period.

This resulted in a combined dataset comprising 1,008,900 finalised court appearances. We further refined this dataset by restricting observations to those from 2012 onwards. This enabled us to use several measures of prior ambulance callouts in our analysis, specifically in the one and two years before the index appearance. In addition, we excluded individuals with a principal driving charge.[5] The final sample consisted of 322,711 court appearances, including court appearances for 9,874 MERIT participants. While we select only one finalised appearance (and only the earliest referral to MERIT) for all the MERIT participants, a person in the comparison group may have multiple appearances in our dataset.[6]

Variables

We measured several outcomes in the one and two years following referral:

1. Criminal justice contacts:
   a) The number of proven[7] reoffences
   b) Days spent in custody[8]
2. Health service contacts following MERIT: specifically, the number of ambulance callouts, unplanned emergency department (ED) presentations, and hospital admissions. The definitions of these variables are presented further in this paper.
3. Mortality: Whether a person died within the two years following referral to MERIT.

Measuring these variables in these periods enables us to consider effects while the program is active, as well as any effects that may persist after its completion or after those who are imprisoned are released. We also estimate and present results in relation to several complementary outcomes within these follow-up periods to identify the mechanisms most responsible for changes in our primary outcomes. These are: the probability of a proven reoffence, the probability of imprisonment at the index contact, the number of alcohol-and drug-related hospitalisations (defined in Appendix Table A1 and Table A2), and the probability of an alcohol-or-drug related death within the first and the second years following referral.[9] In addition to this, we examine the length of stay in hospital within 2 years following referral. These help us understand whether the effects we observe are driven by particular mechanisms (for example, whether the reductions in days in custody accrue primarily from reduced reoffending or more lenient sentencing).

We consider a range of demographic covariates: age (categorised as 18-24; 25-34; 35-44; 45-54; 55+); gender; Aboriginality (ever recorded in ROD; coded as Aboriginal, non-Aboriginal, or unknown); the Socioeconomic Indexes for Areas (SEIFA) quartile of postcode of residence (coded Q1-Q4 from most to least disadvantaged; ABS 2016a); and the remoteness of area of residence (coded as major cities, inner regional, and outer regional areas; ABS 2016b).

5 We exclude these as they comprise a large volume of Local Court matters but are highly unlikely to involve a MERIT referral.
6 We account for these later using person-level clustering in our standard errors.
7 We define a proven offence as one proven in the Local, District, or Supreme Courts, or dealt with by way of cannabis caution or police caution.
8 We calculate this from the custody data in ROD, combining any overlapping spells of imprisonment longer than a day in the follow-up period, multiplied by a $198 daily cost of imprisonment in 2019.
9 While we are able to estimate the impact of MERIT on alcohol- and drug-related health contacts, we do not cost these separately in our cost-benefit analysis to avoid double counting. These benefits are already quantified in our general measures of these health contacts.

The criminal justice covariates we include relate to the index offence, and the person's criminal history. In relation to the former, we include the principal offence at the index appearance[10] (coded as violent, property, drug, breach, and other), the number of concurrent charges at index (coded 1, 2-4, 5 or more), and flags for the presence of any acts intended to cause injury, property, driving, and drug offences. In terms of prior criminal history we include: the number of prior finalised court appearances with at least one proven offence (coded 0, 1-2, 3-5, and 6 or more); any prior prison sentence; any prior cannabis caution; and any prior conviction for a violent, property, domestic violence, drug, use/possess drugs or drug driving offence. We also include separate flags for whether the person had previously been convicted of an offence where amphetamines, cannabis, or opioids was recorded as the principal drug involved.

Furthermore, we include several measures of prior health usage. Specifically, these are: the number of ambulance callouts in one and two years prior to the first index appearance[11]; hospital admissions, emergency department presentations in the two and five years prior to the index appearance; analogous variables for these health contacts that were classified as drug- and alcohol-related; the number of prior treatment episodes on the Opioid Treatment Program (OTP); and the number of episodes of drug and alcohol treatment as recorded in the MDS DATS in the five years preceding the index appearance. To account for the complexity of a person's health contacts, we also include measures of their prior costs of ED presentations and hospital admissions in the two and five years preceding referral.[12]

Our dataset also offers us two variables of interest in estimating the costs of MERIT, specifically the number of residential rehabilitation episodes and withdrawal management days incurred as part of MERIT. These are calculated from the MDS DATS dataset and are only available from 1 January 2015 onwards.

Estimating the impact of MERIT on outcomes

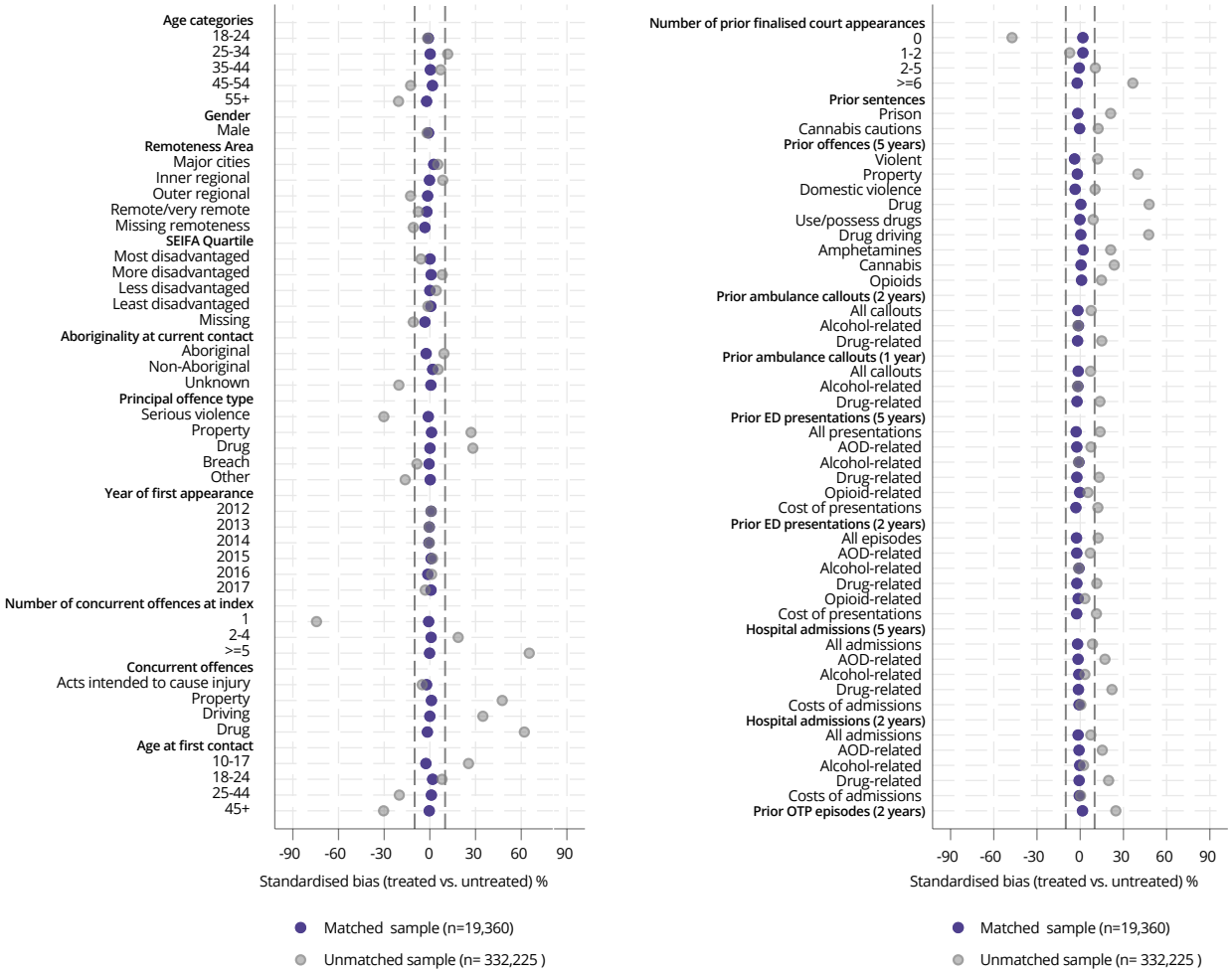
To estimate the impact of MERIT, we apply several regression-based analyses.[13] First, we use propensity score matching to derive a comparable group of offenders who were not referred to MERIT. These offenders include both those in appearing in courts MERIT was and was not available. We use a 1:1 matching procedure with a calliper of 0.05 and our full selection of covariates in the matching procedure. This enables us to derive a group of people with similar characteristics at index appearance (to those referred to MERIT) but who were never referred to MERIT.[14]

Figure 2 shows measures of standardised bias across our full set of covariates, before and after matching MERIT participants to defendants in the control group. The typical "rule of thumb" for successful bias reduction is an absolute standardised bias value below 10 (Austin, 2009). We achieved standardised bias below these levels for all our covariates after matching. Notably, the covariates that demonstrate the greatest bias (and thus, bias reduction from our matching approach) are the criminal justice variables. Specifically: the type of the principal offence, the number of concurrent offences, the types of concurrent offences, the age at first contact, and the number of prior offences of different types. This suggests that our matching approach corrects mostly for differences in the criminal justice profiles of MERIT referrals and the comparison observations. This does not rule out that any extant health differences between the groups such as drug use were also corrected, only that these cannot be observed in our set of available covariates.

10 We code these into serious violent (ANZSOC divisions 01, 02, 03, and 06), property, drug, breach or other offences.
11 Recall that our ambulance data starts at 31 December 2009, providing us with a minimum of two years prior data for each person in our sample.
12 We do not include prior ambulance costs as these are primarily determined by distance rather than diagnosis.
13 All statistical analyses in this report were carried out using Stata 18.
14 For those in the comparison group, we retain all appearances where they met the eligibility criteria for the program. While this means we have multiple observations for some people, we use clustered standard errors to deal with possible dependence in unobserved variance within a person.

Even so, to reduce bias further, in our analyses we estimated linear regressions of each outcome against our full set of covariates for our matched cohort. This adjusted for any bias remaining after matching and yields the marginal increase or reduction in each outcome from being referred to MERIT. A comparison of estimates from simple linear regression, after matching (but without the inclusion of covariates), and the matching approach with covariates is presented in Appendix Figure A1.

Figure 2. Standardised bias, unmatched and matched MERIT groups



It is worth noting two limitations of this approach. Propensity score matching results in associative estimates of the benefits of MERIT even where there is good balance across groups. This is because we do not observe all factors that affect both referral to MERIT and our outcomes. Most glaring among these omitted factors is actual substance use. Our datasets do not include any variables relating to the types, frequency, and amount of substance use by individuals in our study. Thus, we rely on our justice and health covariates (for example, cannabis cautions, drug driving offences, AOD-related health contacts) as rough proxies for substance usage but nevertheless, we cannot guarantee that individuals in the control group matched to MERIT participants were in fact, eligible for MERIT.

Furthermore, we used an intention-to-treat approach which compares referred individuals to non-referrals. As approximately 60% of those referred start MERIT, and a further 60% of starters complete the program, we may be underestimating the true benefits of MERIT. Even so, this approach arguably represents a more accurate picture of the effectiveness of the program given government expends resources in adjournments and assessments of individuals who are referred but not placed on the program.

Base case, base year values, referent group, and follow-up period

Our cost-benefit analysis compares costs and benefits to the people of NSW of the MERIT program from 2012 to 2017 relative to a base case, or a counterfactual.[15] Our base case is the usual Local Court sentencing process for similar defendants. In other words, our base case is the average criminal justice, health, and mortality outcomes for matched defendants eligible for MERIT who are not referred to the program, but are observably similar to those who are referred to the program, and thus have their matter finalised and sentenced according to usual way. We restricted our follow-up period to two years after the referral date to MERIT for several reasons. First, the bulk of the benefits of the program are likely to accrue within this period. Second, this enabled us to maximise our sample size and thus precision in our analysis.

Where expenses sourced are in dollar values other than 2019 dollars, we firstly adjusted the value to real 2019 dollars. All values presented within this report are real 2019 dollars unless otherwise stated since the final year of the follow up period of this study is 2019. We adjusted to real 2019 dollars based on NSW Treasury's published actual Sydney consumer price index (Sydney CPI) for the years between the year of the cost and 2019. NSW Treasury publishes the final Sydney CPI for historical years within the economic outlook chapter in the *Budget Statement* of each published budget for New South Wales.[16]

When presenting the results of this cost-benefit analysis (see Table 5), we also present our findings in estimated "present" 2019 values (Harrison, 2010). Where values are stated to be present $2019 values, we used the NSW Government standard discount rate of 5% (NSW Treasury, 2023a) and we included the higher (7%) and lower (3%) results to test for sensitivity to the discount rate. To calculate these results, we compounded historical values up to the present value as at 2019 (NSW Treasury, 2023b).

Costs of the MERIT program

We derived the per-person cost of MERIT from four types of operational costs: employee related costs, treatment costs, other administrative/operational costs, and court costs.[17] These represent the cost categories for MERIT that are additional to the regular Local Court process.

First, the **employee-related costs** of the program include the costs of both health service delivery staff (MERIT team) and policy staff. MERIT team staffing costs were obtained from data supplied by NSW Health for the period 2008 to 2017. This includes the number of full-time equivalent (FTE) employees at the differing grades for managers, clinicians, and administrative staff for the MERIT program at each site. In relation to policy staff, we assumed that MERIT requires 0.6 of an FTE for policy support within the two relevant agencies: NSW Health and the Department of Communities and Justice (formerly the Department of Justice). Employee related costs also assume that each staff member incurs roughly 20% of "on-costs" for leave loading, superannuation, long service leave and workers' compensation costs. We summed all staffing costs then divided this by the number of people serviced by MERIT (i.e., those referred to the program) in each year to obtain an average cost per individual referred, in 2019 dollars. This results in an average cost of $3,466 per referral over the period 2012 to 2019.

The second source of costs are **AOD outpatient treatment costs**. Specifically, we consider withdrawal management and residential rehabilitation episodes of treatment. These types of treatments were costed as part of the Business and Funding Models (BAFM) study (Centre for International Economics, 2021). This study, commissioned by the NSW Ministry of Health, surveyed AOD services around the state on the cost of provision of such services. In 2020 dollars, the average cost of an episode of withdrawal management was $11,266 and the average cost of a bed day in residential rehabilitation was $296. Those in MERIT

15 This is the recommended referent group in the NSW Treasury's (2023a) guidance on cost-benefit analysis.
16 See for example Table 2.1 *NSW – economic performance and outlook page 2-1* in the NSW Treasury Budget Paper No. 1 – Budget Statement 2020-21 which provides the final outcome for 2018-19.
17 It is worthwhile to note that some of the U.S. economic evaluations count the cost of imprisonment as part of the program, and as a result, obtain 'cost estimates' of drug treatment pathways that are very similar to regular court pathways. However, as diversion from imprisonment is one of the explicit outcomes of the MERIT program, we consider the avoided costs of imprisonment as part of the program's benefits.

have an average of 0.09 episodes of withdrawal management, and 4.5 days of residential rehabilitation while in MERIT. Meanwhile, those not to referred to MERIT have an average of 0.02 episodes of withdrawal management and on average, fewer than a day in withdrawal management. Taking the weighted average of costs for MERIT referrals over our study period, in 2019 dollars, the cost of outpatient treatment is $1,548 per person referred to MERIT.

The third source of costs are **other administrative/operational costs**, which includes establishment costs, training programs costs and general corporate costs. We applied a standard NSW government assumption[18] of 10% to all employee related costs (excluding payroll tax). This includes general corporate allowances for administrative expenses, utilities, insurance, training and development, telecommunications, and travel.

The fourth cost incurred by people referred to MERIT pertains to **Local Court costs**. Recall that here too, we only consider costs that are *additional* to what they may have incurred had they not been referred to MERIT. As indicated in Figure 1 the MERIT process involves up to two additional mentions relative to the ordinary Local Court process: the first, to adjourn the matter for 6 weeks following MERIT Team assessment of the referral, and the second, a further mention for the magistrate to receive the 6-week progress report for program participants. A mention in the NSW Local Court for a guilty plea is relatively short. The NSW Local Criminal Court fees to file a court attendance notice (under Chapter 4 of the *Criminal Procedure Act 1986* to commence proceedings to which Parts 2–4 of that Chapter apply) was $97 in 2019 (sourced from the *Criminal Procedure Amendment (Fees) Regulation 2019*). However, as this fee has been set at an accessible rate for the general public it is likely an underestimate of the actual cost of a mention. Therefore, we doubled the cost estimate to $194 per mention. This equates to 34% of the Productivity Commission's *Report on Government Services* (RoGS) average Local Court finalisation cost for the same year. However, RoGS Local Court costs omit additional costs incurred by other criminal justice agencies involved in the court process, such as Legal Aid NSW and Department of Communities and Justice corporate overheads. Therefore, we inflated the RoGS average court costs by around 75% (based on departmental advice) to account for the additional government agency costs related to Local Court finalisations for the primary scenario (Scenario 1) and for robustness, other scenarios are run excluding the additional government agency costs. The proportion was then applied to Local Court costs including other agency costs in the primary scenario for each relevant year to find the cost per additional mention: the cost of a mention is then applied once to referrals that did not progress to MERIT and twice to referrals that did progress to the program (averaging $347 per referral, per mention).

Health service usage and mortality benefits

We estimated the health service usage benefits of MERIT at the micro-level. In other words, we costed each episode of health contact for every individual in our dataset over our study period. We then aggregated these costs over the first and second years after referral to MERIT and used these as outcome variables. This enabled us to directly estimate the difference in the total cost of ambulance, emergency department, and admission contacts between MERIT participants and the matched counterfactual group.

To cost emergency department and admissions, we used activity-based funding estimates published by the Independent Health and Aged Care Pricing Authority (IHACPA).[19] The activity-based funding model calculates the cost of healthcare episodes based on their complexity. IHACPA uses Urgency Disposition Groups (UDGs) to classify emergency services from 1 July 2012. The current version of UDGs defines 17 end classes for visits, based on the type of visit, episode end status, and triage category.

18 This is an informal NSW Government standard assumption used when costing budget proposals.
19 Numerous Australian cost-benefit analyses in health use IHACPA (previously known as the Independent Health Pricing Authority) estimates of the cost of hospitalisations and emergency department contacts, for example, Vuong et al. (2020), Curtis et al. (2021), and Williams et al. (2022).

Thus, we estimated the cost of an **emergency department episode** using the following formula:

$$ED_t = NEP_t * NWAU_{DRG} * i_t$$

Specifically, we estimated the cost of each emergency department episode (ED) as the product of the National Efficient Price in year *t,* the National Weighted Activity Unit (NWAU) for its DRG, and the inflation factor to convert the cost of the episode to 2018/19 dollars.

We used two methods to calculate the cost of each **hospital admission.**[20] As with emergency episodes, IHACPA assigns NWAUs to each episode based on its classification. For acute hospital admissions, we calculated the appropriate NWAU for each episode using the Australian Refined Diagnosis-Related Groups (AR-DRG) classification for that episode type and the length of the hospitalisation episode. A specific AR-DRG may have a "same-day" cost, an "inlier" per diem cost for episodes below a specific length, and an "outlier" per diem cost. We then multiplied this by the relevant national efficient price for each year, escalated to 2019 dollars. The AN-SNAP classifications, used to classify the sub-acute hospital episodes, is not available in our admissions dataset and hence, we applied an average cost of $1,200 (in $2019) to each sub-acute admission (Independent Hospital Pricing Authority, 2018).

To enumerate the cost of each **ambulance** trip, we applied the published estimates of the cost of an ambulance callout in 2021, deflated to $2019 (NSW Ambulance, 2021). This results in a callout fee of $407 and a per-kilometre cost of $3.67. Where an ambulance episode did not have a distance record, we assumed the trip was 10 kilometres (the median value of distance in our ambulance records).

For **mortality**, we use 2019 estimates of the value of a statistical life reported by the Australian Department of Prime Minister and Cabinet's Office of Best Practice Regulation (2020), of $4.9m.

Criminal justice benefits

In seeking to identify the criminal justice benefits (if any) of the MERIT program compared to ordinary sentencing in the NSW Local Court, we reviewed criminal justice outcomes for the cohort referred to MERIT and the matched control group in terms of average reoffence rates per person, as well as average custodial and community corrections outcomes both from the index sentence and any new offences. In terms of differences in reoffence rates, if the individuals referred to the MERIT program were found to reoffend less than their matched counterparts, the criminal justice benefits, or avoided costs of crime and criminal justice services, may include avoided police investigation and victim costs, as well as court, prison, and community corrections costs. Conversely, if those participating in MERIT were found to offend more, then these would be counted as additional costs of the program. We also sought to identify if the program itself may result in differences in time spent in custody or under community corrections supervision. Therefore, the estimated avoided costs are based on the difference between people referred to MERIT and the control group in their average number of reoffences to calculate police, victim, court and corrective services costs, and their average number of days in custody for prison costs.[21]

Costing changes in reoffences

We started by calculating the costs of crime in terms of police investigation and victim costs. To cost police investigations, we referred to figures released by NSW Police annually in their *User Fees and Charges Schedule*. We used the cost line item 8 *Labour for services requested at short notice* in the 2019 Schedule. We then multiplied that by two based on the assumption that on average, police will spend a minimum of two hours per offence (Donnelly et al., 2007)[22] of investigation time per offence. We then multiplied this output by the average number of reduced (or increased) reoffences per individual referred to MERIT.

20 Unplanned hospital admissions are those which exclude 'planned' episodes which may relate to routine care. This enables us to focus on changes in health status that might occur because of AOD use.

21 This includes the average reduction in the number of prison days for the entire two-year follow up period for program participants after their referral to MERIT, and the same period for the matched control group, including the sentenced and remand episodes for the index offence and any reoffences thereafter.

22 Donnelly et al. (2007) find that on average, police spend just under two hours investigating alcohol-related crime. Using their estimates for police time spent on specific types of alcohol-related crime and the distribution of reoffences in our MERIT and comparison groups, the weighted average police investigation time for the types of reoffences committed by those in the sample was also approximately two hours.

Victim costs include medical costs, lost output, property loss and damage and intangible losses such as victim pain and suffering (Smith et al., 2014). Intangible costs seek to value pain, suffering and a reduction in quality of life resulting from the crime but can be subjective and may vary greatly. Smith et al. (2014) are our best source for victim costs of crime, but their report only provides costings for some violent and property crimes. Other crimes that are likely to incur costs for victims are abduction and kidnapping, drink driving, and drug supply. Thus, rather than applying offence-level costings we chose to compute a weighted average cost of reoffences based on the distribution of reoffences of each type where costs were available. First, we summarised all NSW Local Court proven reoffences for individuals referred to MERIT, and then repeated this for the matched individuals (n = 9,680 for both the treatment and control groups). Based on each group's distribution of offences, we obtained the weighted average victim cost per reoffence for each group. This was then multiplied by the number of reoffences for each group and the difference taken between the total costs for those two groups to determine if there was an overall benefit for individuals referred to MERIT. This was completed both with tangible and intangible costs for the primary scenario (Scenario 1) as well as Scenarios 3, 5 and 6. Intangible costs are not included in the remaining scenarios.

Next, we identified criminal justice system costs per reoffence, including court, prison, and community corrections costs. These costs are sourced from the RoGS (Part C Justice) for each relevant year of the study. We adjusted the annual costs into 2019 dollars using the Sydney consumer price index. RoGS draws upon data provided by Australian state governments to report on the equity, effectiveness, and efficiency of government services in each state.

In terms of court savings (or costs), we applied the same approach used to cost the MERIT program (above) to the benefit (or dis-benefit) of the MERIT program in terms of reduced (or increased) reoffending. That is, we applied the RoGS average cost of a Local Court finalisation plus 75% for other agency costs such as Legal Aid NSW for each relevant year of the study (in 2019 dollars; excluded for some scenario testing) to the benefit of the MERIT program in terms of reduced reoffending.[23] The cost of a Local Court finalisation has been used because most criminal prosecutions in NSW are finalised in the Local Court. We estimated a 1:1 ratio of offences to finalisations. That is, a reduction in one offence results in one less finalisation. Since we only count reoffences that are proven in court, it is possible that we underestimate the benefits arising from reduced reoffending or overestimate the costs if an increase in reoffending is found. However, this under- or overestimate is likely offset by any additional offences that are finalised within the same court appearance.

To estimate the flow-on impacts of reduced reoffences on community corrections, we used BOCSAR's Criminal Justice Simulation Model (Halloran & Fitzgerald, 2018) to estimate the reduction in days under management by community corrections per referral to MERIT arising from any reductions in reoffending.

Costing changes in the average number of days in custody

Custody costs were estimated by multiplying the RoGS prisoner cost per day by the difference in the number of days in custody within the first 12 months by the number of MERIT referrals for each relevant year of the study. A similar calculation was conducted for the average days in custody for the following 12 months, i.e., the second year after being referred to MERIT.

23 This is a standard assumption used by department staff in ex-ante cost-benefit analyses.

Table 1. Summary of costing sources used in this evaluation

	Source
Costs of MERIT program	
Employee costs - MERIT Health practitioners	Data from NSW Health on the number of full-time equivalent employees in MERIT teams (i.e., managers, clinicians, and administrative staff) from 2008-2019
Employee costs - Specialist policy officers	NSW Health and DCJ advice on the number of full-time equivalent policy officers employed in relation to MERIT which includes all employee on costs such as workers compensation, superannuation, leave entitlements and so on (excluding payroll tax)
Other operational expenses – treatment costs	Estimates of cost per episode of withdrawal management ($11,533) and a $293 per diem for residential rehabilitation from (Centre for International Economics, 2021)
Other operational expenses – other administrative	Assumed to be 10% of all employee-related costs to account for establishment costs, training programs costs and general corporate costs
Other operational expenses – additional court costs	Court filing fees listed in the *Criminal Procedure Amendment (Fees) Regulation 2019* used as a proxy for additional court costs, and doubled on the assumption that the filing fee is an underestimate of a Local Court mention. Assumed to be incurred once at referral and again for those who commenced the program for the six-week progress report
Benefits (including avoided costs to government)	
Court costs of reoffences	Estimates of the costs of a Local Court finalisation from the RoGS (Productivity Commission) for each relevant year, averaging around $703 per finalisation
Prison costs	Estimates of the daily cost of imprisonment between 2012 and 2019 from the RoGS (Productivity Commission), averaging $196 per day
Community corrections costs	Estimates of the daily cost of community corrections supervision between 2012 and 2019 from the RoGS (Productivity Commission), averaging $26 per day
Police investigation costs	Estimated costs of $362 for two hours of investigation per incident, with hourly costs drawn from *NSW Police's User Charges and Fees Schedule*
Victim costs	Estimates of costs to victims from Smith et al. (2014) and weighted by share of sentences by offences for each offence group.
Ambulance costs	Trip-level estimates of the cost of each ambulance trip based on published NSW Ambulance call-out fees ($407) and $3.67 per-kilometre costs
Emergency department presentations costs	Presentation-level cost estimates based on the product of the episode's Urgency Disposition Groups (UDGs) price weights, and the yearly National Efficient Price of healthcare, inflated to $2019
Hospital admissions costs	Episode-level cost estimates based on the product of price weights for the episode's Australian Refined Diagnosis-Related Groups (AR-DRGs) and the yearly National Efficient Price of healthcare, inflated to $2019

Table 1 presents a summary of the sources we used to estimate the costs and benefits of the program. While we have attempted to include a comprehensive range of costs and benefits, we do not account for some possible benefits of the program. We have not considered any benefits that may accrue to the individual from reduced AOD use or any benefits to the individual of being in treatment (such as reduced harms from AOD use, connection with social services, improved mental or physical health, improved family relationships, or other indicators of subjective wellbeing). These outcomes are not in our data and are therefore excluded.

It is also worth acknowledging that some of our measures are imprecise. We were not able to directly cost episodes of sub-acute admissions, for example. Another example is that we only considered the average operational daily cost of imprisonment. It is plausible that each episode of imprisonment incurs some fixed or capital costs, which we do not consider. However, our analysis also omits fixed or capital costs from the program costs for MERIT as the national efficient prices do not account for capital costs (J. Hume, IHACPA, personal communication, 20 October 2023).

Net present value, benefit-cost ratio, and Monte Carlo simulation

We calculated the net present value (NPV) as the per-person sum of the benefits of MERIT minus the sum of the costs of the program in real 2019 dollars. For completeness, we also repeated this with historical years of value compounded to determine the present 2019 value of expenses and benefits. We also calculated the benefit-cost ratio (BCR), which is the ratio of the sum of the benefits of MERIT to the sum of the costs, at the individual level.

We also undertook a Monte Carlo simulation of the results above. In this analysis, we repeatedly compute the NPV and the BCR 100,000 times, drawing upon distributions of the treatment effects and in the costs of withdrawal management and residential rehabilitation. This enables us to test the sensitivity of our main cost-benefit analysis results in numerous scenarios to the variability in each of the cost and benefit components.

Table A3 summarises the parameters for each cost and benefit we used in our simulations. For all variables, except the discount rate, we applied a normal distribution. For the discount rate, we used a triangular distribution. This enabled us to examine sensitivity to discount rates within the "low" and "high" ranges only.

Regarding the costs of MERIT, we considered both the variability in the average usage of outpatient services among participants, as well as the variability in the costs of these services, from the BAFM study. We then considered the variability in our estimates from our preferred matching specifications. Last, we also varied the discount rate between the recommended "'high" and "'low" values prescribed by NSW Treasury (2023b). The Monte Carlo analysis yields an estimate of the proportion of the time in which the benefits of MERIT exceed its costs.

RESULTS

Characteristics of MERIT referrals and comparison group

Table 2 presents the characteristics of those referred to MERIT and adults in the Local Court meeting the MERIT eligibility criteria, from 2012 to 2017. Panel A presents each group's demographic characteristics. We observe very little difference between MERIT participants and those meeting the observable eligibility criteria (i.e., on bail, not charged with an excluded offence) in these characteristics. In both groups, 80% were male and 62.1% of those referred to MERIT were aged under 35 (compared with 57.3% for those not referred to MERIT). While both groups had similar proportions of individuals from major cities, a slightly larger proportion of the MERIT group resided in inner regional areas (as opposed to more remote areas) compared to those not referred. MERIT referrals were approximately four percentage points more likely to be Aboriginal (15.6% versus 12.4%).

Table 2. Descriptive statistics, individuals referred to MERIT between 2012 and 2017 and comparison group

Variable	Treatment group (n=9,889)	Not referred to MERIT (n=322,696)	Difference (T-C)
Panel A. Demographic characteristics			
Age categories (%)			
18-24	26.68	27.33	-0.66
25-34	35.44	29.94	5.49
35-44	26.73	23.67	3.06
45-54	9.28	13.24	-3.96
55+	1.88	5.81	-3.93
Male (%)	78.54	79.29	-0.75
Remoteness area (%)			
Major cities	67.12	64.67	2.45
Inner regional	24.31	20.74	3.57
Outer regional	4.08	6.98	-2.90
Remote/very remote	0.58	1.31	-0.73
Missing remoteness	3.92	6.31	-2.39
SEIFA quartile (%)			
Most disadvantaged	26.22	28.85	-2.63
More disadvantaged	29.16	25.53	3.63
Less disadvantaged	26.26	24.42	1.84
Least disadvantaged	14.44	14.90	-0.45
Missing	3.92	6.31	-2.39
Aboriginality at current contact (%)			
Aboriginal	15.57	12.40	3.17
Non-Aboriginal	79.32	77.05	2.27
Unknown	5.11	10.55	-5.43
Panel B. Index offence characteristics			
Principal offence type (%)			
Serious violence	17.99	30.83	-12.85
Property	23.74	13.34	10.40
Drug	28.80	17.04	11.76
Breach	14.27	17.35	-3.08
Other	15.20	21.44	-6.24
Number of concurrent offences at index (%)			
1	22.28	56.35	-34.07
2-4	44.88	35.79	9.09
>=5	32.84	7.86	24.98
Any acts intended to cause injury offence (mean)	0.30	0.32	-0.02
Any property offence (mean)	0.34	0.14	0.20
Any driving offences (mean)	0.16	0.06	0.11
Any drug offence (mean)	0.48	0.20	0.28
Panel C. Criminal history			
Age at first contact (%)			
<18	37.20	24.50	12.80
18-24	37.80	33.00	4.80
25-44	23.30	32.90	-9.60
45+	1.70	9.70	-7.90
Number of prior finalised court appearances (%)			
0	11.13	29.67	-18.54
1-2	20.64	23.67	-3.03
3-5	22.93	18.66	4.27
>=6	45.30	27.99	17.31

Table 2. Descriptive statistics, individuals referred to MERIT between 2012 and 2017 and comparison group (continued)

Variable	Treatment group (n=9,889)	Not referred to MERIT (n=322,696)	Difference (T-C)
Prior finalisations within 5 years with specific offences			
Violent offence (%)	32.05	26.54	5.51
Property offence (%)	35.93	18.47	17.46
Domestic violence offence (%)	22.55	18.40	4.16
Drug driving offence (%)	37.49	16.92	20.57
Drug offence (mean)	0.37	0.17	0.21
Use/possess drugs (mean)	0.48	0.31	0.18
Amphetamine offence (mean)	0.81	0.27	0.54
Cannabis offence (mean)	1.15	0.49	0.65
Opioids offence (mean)	0.29	0.09	0.20
Prison sentence (%)	20.06	12.33	7.74
Cannabis cautions (mean)	0.07	0.04	0.03
Panel D. Emergency department presentations			
Within 2 years of first appearance (mean)			
Any presentation	2.56	2.00	0.56
AOD-related	0.20	0.13	0.07
Alcohol-related	0.06	0.07	-0.01
Drug-related	0.14	0.06	0.07
Opioid-related	0.03	0.01	0.01
Costs of admissions	1,060.71	1,041.49	19.22
Within 5 years of first appearance (mean)			
Any presentation	5.27	4.11	1.15
AOD-related	0.34	0.24	0.11
Alcohol-related	0.12	0.13	-0.01
Drug-related	0.23	0.11	0.12
Opioid-related	0.06	0.03	0.03
Costs of admissions	3,341.15	2,656.67	684.48
Panel E. Hospital admissions			
Within 2 years of first appearance (mean)			
Any episode	0.81	0.67	0.14
AOD-related	0.42	0.24	0.17
Alcohol-related	0.13	0.11	0.02
Drug-related	0.37	0.18	0.19
Costs of admissions	1,060.71	1,041.49	19.22
Within 5 years of first appearance (mean)			
Any episode	1.70	1.42	0.29
AOD-related	0.78	0.46	0.33
Alcohol-related	0.25	0.21	0.04
Drug-related	0.68	0.33	0.35
Costs of admissions	2,177.88	2,113.27	64.61
Panel F. Other health variables			
Ambulance callouts within 1 year of first appearance (mean)			
Any callouts	0.63	0.51	0.12
Drug-related	0.07	0.03	0.04
Alcohol-related	0.02	0.02	0.00
Ambulance callouts within 2 years of first appearance (mean)			
Any callouts	1.07	0.86	0.21
Drug-related	0.11	0.05	0.06
Alcohol-related	0.03	0.04	-0.01
OTP episode within 2 years of first appearance (mean)	0.16	0.05	0.12
OTP episode within 5 years of first appearance (mean)	0.37	0.11	0.26

Panel B contrasts each group's index appearance characteristics. Here the differences between those referred to MERIT and typical defendants appearing in the Local Court are more apparent. Those referred to MERIT were much more likely to have a property (23.7% vs. 13.3%) or drug (28.8% vs. 17.0%) offence as their principal offence than those not referred to MERIT, while those not referred to MERIT were more likely to be principally charged with a violent offence (31.0% vs. 18.0%). Those referred to MERIT also typically had more concurrent offences. Only 22.3% of those referred to MERIT had a single charge at their index contact, compared to nearly three-fifths (56.4%) of those not referred to MERIT. MERIT referrals were also more likely to be charged with a concurrent property, driving or drug offence at index than those not referred to MERIT.

Next, Panel C shows the criminal history of each group. Nearly two in five defendants referred to MERIT had their first criminal justice contact aged 10-17 (37.2%) versus approximately a quarter (24.5%) of defendants not referred to MERIT. Those referred to MERIT also tended to have more extensive criminal histories, with close to half (45.3%) having six or more prior court appearances with at least one proven offence, compared to slightly more than a quarter (28.0%) of Local Court defendants not referred to the program. MERIT referrals were also more likely to have prior violent, property, domestic violence, and drug driving offences. MERIT referrals had more drug offences, use/possess drug offences and offences with a principal drug type of amphetamines, cannabis, and opioids than those not referred to the program. Those referred to MERIT were also nearly ten percentage points more likely to have previously received a prison sentence (20.1% compared to 11.8%).

The remaining panels present the health characteristics of both groups in our study. First, Panel D presents differences in prior emergency department presentations. Those referred to MERIT had an average of 2.6 presentations in the two years preceding their first appearance versus 2.0 presentations among those not referred to MERIT. MERIT referrals also had, on average, more drug- and alcohol-related presentations, because of more drug-related (but not alcohol-related) presentations in the previous 2 years. However, emergency department presentation costs were very similar for both groups, estimated at approximately $1,000. These patterns were similar (albeit larger in magnitude) when examining the five years prior to the first appearance. Those referred to MERIT had at least one more ED presentation in the five years prior compared to than those not referred to the program. Alcohol- and drug-related ED presentations were also higher, but this was driven by MERIT referrals having more drug-related presentations in the five years prior to referral. The number of alcohol-related presentations was similar for both groups. The cost of prior ED admissions was significantly different for the two groups. Those referred to MERIT incurred $685 more in ED presentation costs in the five years prior to referral than those not referred to MERIT.

Next, Panel E displays hospital admissions within two and five years before the index court appearance. First, individuals referred to MERIT had more unplanned admissions on average than their counterparts who were not referred (0.81 versus 0.67 episodes). Furthermore, they had more alcohol- and drug-related hospital admissions, particularly drug-related episodes, compared to those not referred to MERIT. Unlike ED presentations, MERIT referrals had more of both alcohol- and drug-related unplanned hospital admissions respectively. Those referred to MERIT, on average, had 0.37 drug-related hospital admissions in the 2 years prior to referral compared to 0.18 among for those not referred to the program. Both groups incurred roughly the same amount of hospital admission costs of approximately $1,000. Again, we observe similar patterns when looking further back. Defendants referred to MERIT have a greater number of admissions for any reason and for alcohol- and drug-related reasons in the five years prior to referral than those not referred to the program. Average costs of hospital admissions for each group in this longer timeframe were also equal.

The last panel presents other health variables in our dataset. MERIT referrals have 0.63 ambulance callouts in the year before their index appearance compared to 0.51 among those not referred to MERIT. Those referred to MERIT also have slightly more drug-related callouts (0.07) versus those not referred to MERIT (0.02). The groups did not differ on the number of alcohol-related callouts. Looking further back to two years prior to the first appearance, again MERIT referrals had more callouts on average (1.07 vs. 0.86),

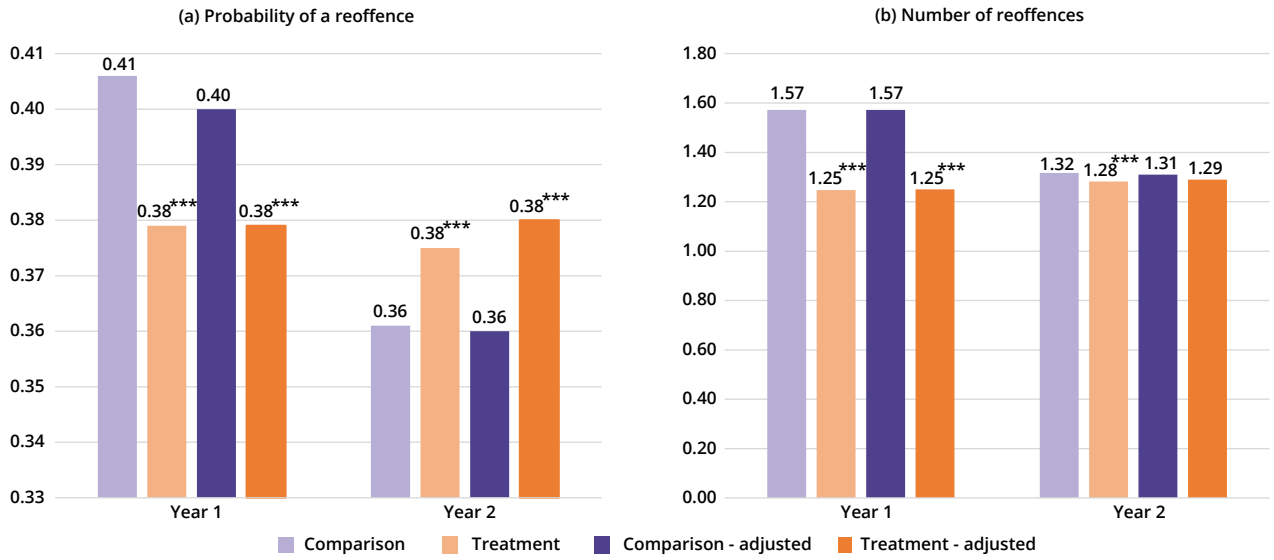
particularly for drug-related callouts (0.07 vs. 0.03). We also have the number of previous episodes on the Opioid Treatment Program (OTP) for both groups. MERIT referrals had a greater number of such episodes on average in the two years (0.16 vs. 0.05) and five years (0.37 vs 0.11) preceding referral.

These statistics demonstrate significant differences between the MERIT group and typical defendants appearing in the Local Court. Many of these differences are likely to influence reoffending, particularly the more extensive offending histories of MERIT participants. Those referred to MERIT also show a greater level of prior contact with the health system, particularly for drug-related reasons, necessitating an analysis that compares them to (at least) observably similar offenders.

Comparison of justice, health and mortality outcomes between MERIT referrals and matched defendants

Next, we present the results from our statistical analyses comparing outcomes for MERIT referrals with a matched cohort with similar distributions of characteristics. Figure 3 shows average comparisons for each of our outcomes, first comparing raw or unadjusted average outcomes between the matched groups, and second presenting adjusted outcomes which account for our full range of covariates. Table 4 summarises the estimated differences between MERIT referrals and the matched comparison group in outcomes, after adjusting for covariates. The estimates shown in Table 4 are the ones that we used in the cost-benefit analysis.

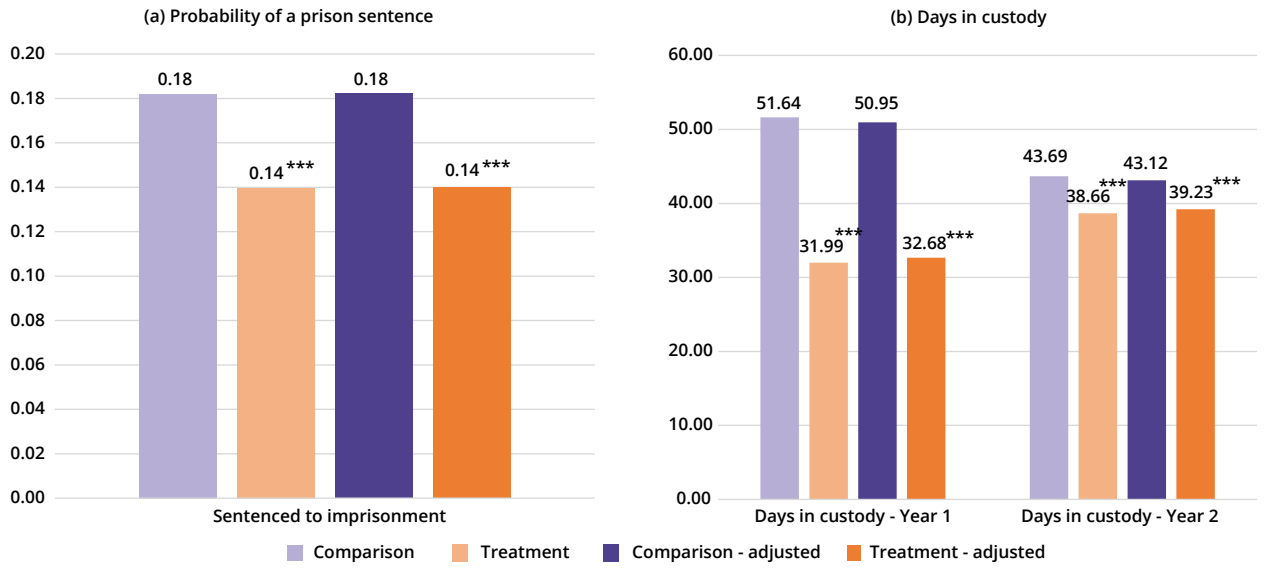
Figure 3. Probability and number of reoffences among unmatched comparison group, matched comparison group, and matched MERIT referrals, 2012-2019



Stars indicate statistically significant adjusted difference to matched comparison group
* *p*<.05 ** *p*<.01 *** *p*<.001

Figure 3(a) shows that the average likelihood of a reoffence within a year of referral to MERIT is 38% among those in our matched MERIT sample, compared to 41% among our unmatched comparison group. Once adjusting for covariates, we find a 2 percentage point (p.p.) difference in the likelihood of a reoffence for the matched MERIT sample in the first year following referral (38% vs. 40%). Meanwhile, there was small and statistically significant increase in the probability of a reoffence in the second year following referral to MERIT (of approximately 2 p.p.). Figure 3(b) shows the average number of reoffences committed by MERIT and matched comparison offenders in the first and second year following referral respectively. Referral to MERIT is associated with a statistically significant reduction in the average number of reoffences of 0.32 offences in the first year following referral. The corresponding difference in the second year of follow-up is in favour of MERIT referrals, but is not statistically significant.

Figure 4. Probability of a prison sentence at index and average length of imprisonment over one and two years among unmatched comparison group, matched comparison group, and matched MERIT referrals, 2012-2019

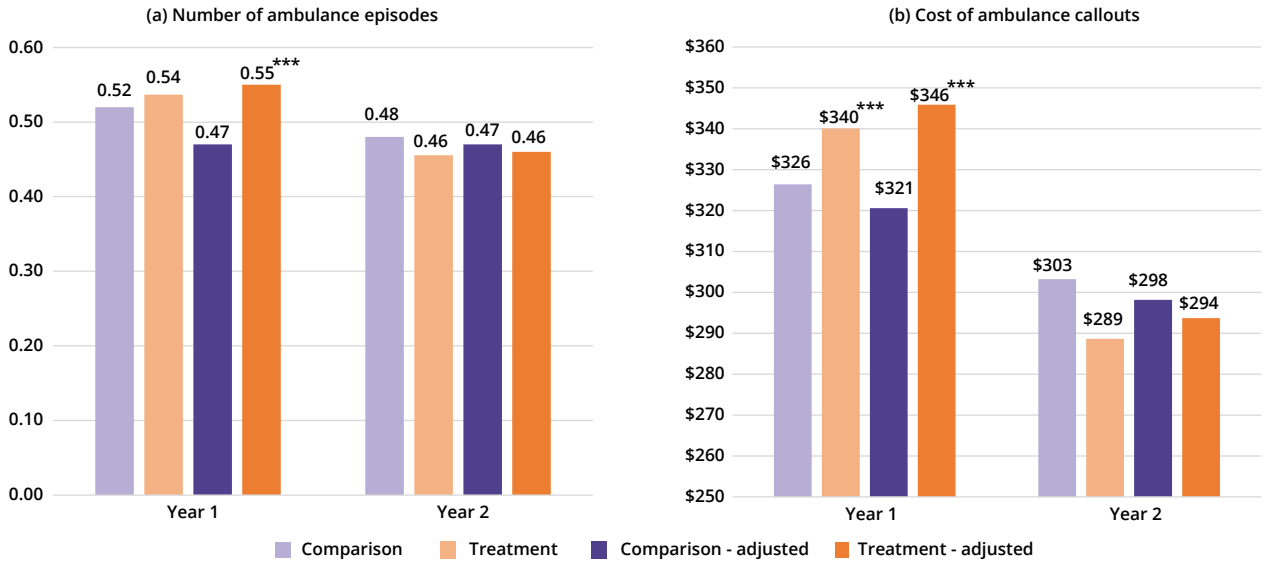


Stars indicate statistically significant adjusted difference to matched comparison group
* p<.05 ** p<.01 *** p<.001

Turning to custody outcomes, Figure 4 shows the probability of being sentenced to imprisonment at the index appearance and the average number of days in custody in each year of follow-up. Figure 4(a) shows the differences in receipt of a prison penalty at index appearance among defendants referred to MERIT and our matched comparison groups (with and without covariate adjustment). In both our unadjusted and adjusted comparisons, 14% of those referred to MERIT were sentenced to prison versus 18% of those in the comparison group, a statistically significant difference of 4 p.p. Figure 4(b) shows the average number of days in custody spent by those referred to MERIT and their matched comparison counterparts, before and after adjusting for covariates. On average, individuals in the matched comparison group spent approximately 51 days in custody in the first year after their index appearance, while those referred to MERIT spent 33 days in custody. In the second year after referral, we find that MERIT referrals spent four fewer days in prison, on average, resulting in a significant, but more modest reduction in prison costs (see Table 4).

Next, we present rates of contact with ambulance services in our follow-up period for those referred to MERIT and our comparison group (Figure 5). Those referred to MERIT had a slightly higher number of ambulance callouts in the first year following referral (i.e., 0.08 callouts on average). This translates to higher costs among MERIT referrals of approximately $25 compared to the comparison group. There is neither a statistically significant difference in the number of callouts nor in the costs of callouts in the second year of follow-up.

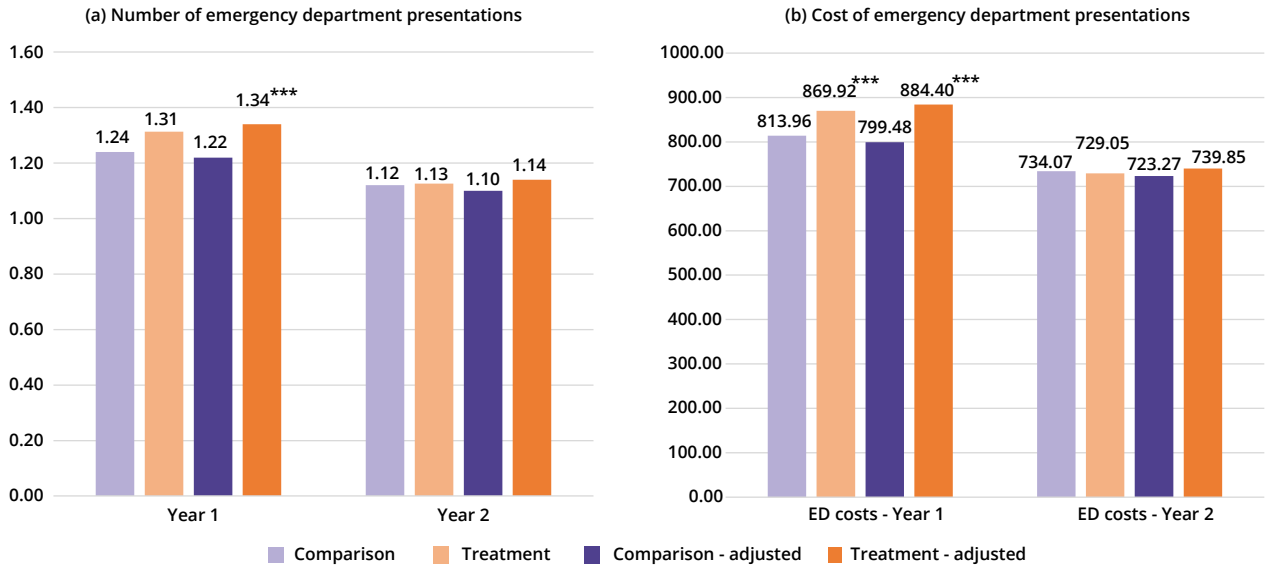
Figure 5. Number and cost of ambulance callouts among unmatched comparison group, matched comparison group, and matched MERIT referrals, 2012-2019



Stars indicate statistically significant adjusted difference to matched comparison group
* *p*<.05 ** *p*<.01 *** *p*<.001

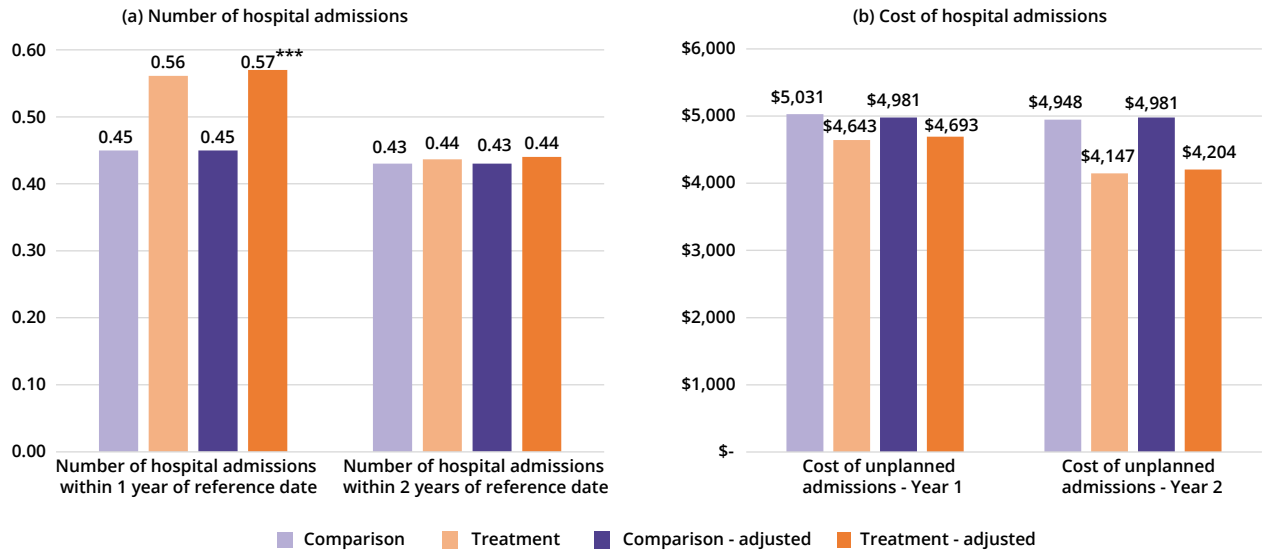
Figure 6 compares emergency department contacts among those referred to MERIT and offenders in the comparison group (Figure 6) over our two-year follow up period. Panel (a) shows the number of ED presentations for the matched comparison group and the matched group of MERIT referrals, again with and without covariate adjustment. As for ambulance callouts, we find a slightly higher number of ED presentations, on average, among those referred to MERIT (Figure 6(a)) compared to those in the matched comparison group. However, this difference is only observed in the first, but not the second year of follow-up. This translates to an increase in ED costs of approximately $85 for MERIT referrals.

Figure 6. Number and cost of emergency department presentations, among unmatched comparison group, matched comparison group, and matched MERIT referrals, 2012-2019



Stars indicate statistically significant adjusted difference to matched comparison group
* *p*<.05 ** *p*<.01 *** *p*<.001

Figure 7. Number of hospital admissions, AOD-related hospital related admissions, total length of stay, and cost of unplanned admissions among unmatched comparison group, matched comparison group, and matched MERIT referrals, 2012-2019



Stars indicate statistically significant adjusted difference to matched comparison group
* p<.05 ** p<.01 *** p<.001

Our results pertaining to hospital admissions are shown in Figure 7. We find an approximate increase of 0.12 hospital admissions, on average, in the first year following referral among those referred to MERIT (Figure 7(a)). Even so, we find that these individuals' hospital admissions costs are lower than the matched comparison group, although this difference is not statistically significant. We also find no statistically significant differences in the groups' frequency or cost of admissions in the year following referral.

Last, Figure 8 presents the average likelihood of death among MERIT referrals and the matched comparison group. We find reductions in the likelihood of death in the first year and second year following referral to MERIT (Figure 8). However, these differences are not statistically significant, possibly because our sample size is too small to estimate these effects with precision.

Figure 8. Probability of death among unmatched comparison group, matched comparison group, and matched MERIT referrals, 2012-2019

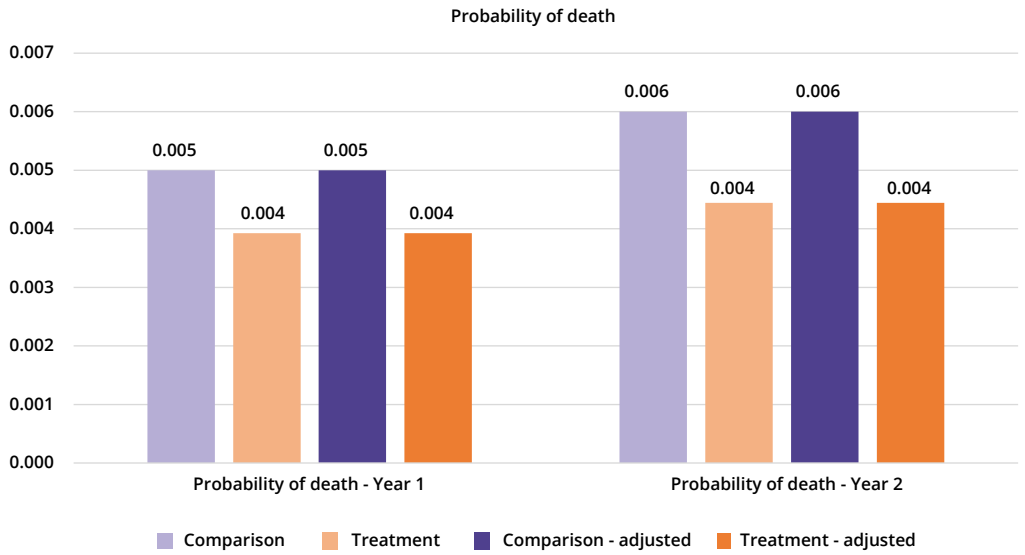


Table 4. Estimated associations between referral to MERIT and outcomes of interest

	(1) Number of reoffences – Year 1	(2) Number of reoffences – Year 2	(3) Custody cost – Year 1 ($)	(4) Custody cost – Year 2 ($)
Referred to MERIT	-0.32***	-0.019	-3,600.6***	-766.8***
	(7.35)	(0.47)	(16.95)	(-3.25)
Observations	19,360	19,360	19,360	19,360
	(5) Ambulance costs – Year 1	(6) Ambulance costs – Year 2	(7) ED costs – Year 1 ($)	(8) ED costs – Year 2 ($)
Referred to MERIT	25.28*	-4.46	84.93***	16.58
	(2.35)	(0.34)	(4.11)	(0.77)
Observations	19,360	19,360	19,360	19,360
	(9) Hospital admissions costs – Year 1 ($)	(10) Hospital admissions costs – Year 2 ($)	(11) Probability of death – Year 1 ($)	(12) Probability of death – Year 2 ($)
Referred to MERIT	-289.4	-687.9	-0.0007	0.0011
	(-0.90)	(1.57)	(0.76)	(1.10)
Observations	19,360	19,360	19,360	19,360

Standard errors in parentheses
* $p<.05$ ** $p<.01$ *** $p<.001$

These outcomes are also presented in Appendix Figure A1 and contrasted with the outcomes from two other specifications. The first set of coefficients in Figure A1 shows simple linear regression estimates, where instead of using a matched group, we simply compare all MERIT referrals to everyone in the comparison group, adjusting for all observed characteristics. The second group of coefficients shows the simple (unadjusted difference) between defendants referred to MERIT and their matched counterparts. The third group of coefficients are from our preferred specification, which we use in the main section of this report. Notably, our estimated results are very similar across the three specifications, with the exception of the cost of hospital admissions in the second year following referral. In our simple linear regression, there is a statistically significant reduction of $623 in the costs of hospital admissions following referral to MERIT. However, this is no longer significant at the 0.05 level in both our matched specifications (possibly because of less precision due to fewer observations in these analyses). We do not include it in the main set of cost-benefit analysis results we present henceforth.

Cost-benefit analysis, 2012-2019

So far, we have shown that the MERIT program is associated with reductions in reoffending and custody, but slight increases in ED and ambulance costs in the first year. In this section we present the results of our cost-benefit analysis which compare these differences in outcomes to the costs of delivering the program.

Table 5. Cost-benefit analysis results for the MERIT program

Summary findings, per person referred to MERIT	Unit	Nil discount rate (real $2019)	Low discount rate	Mid discount rate (present $2019)	High discount rate
Discount rate	%	-	3%	5%	7%
Key results					
Net present value	$	845	870	887	904
Benefit-cost ratio		1.14	1.14	1.14	1.14
Present value of benefits					
Avoided costs of crime due to reduced reoffending, Courts and community corrections					
Police	*$*	*114*	*118*	*120*	*122*
Courts	*$*	*396*	*408*	*416*	*424*
Community Corrections	*$*	*1,129*	*1,163*	*1,185*	*1,208*
Custody	*$*	*4,335*	*4,465*	*4,552*	*4,638*
Total avoided government costs	$	5,974	6,153	6,272	6,392
Avoided victim costs	$	1,018	1,049	1,069	1,090
Avoided health costs					
Avoided (increased) health costs	$	(110)	(114)	(116)	(118)
Total benefits	**$**	**6,882**	**7,088**	**7,226**	**7,364**
Present value of costs					
Employee related – staffing costs	$	3,466	3,570	3,639	3,708
Treatment costs	$	1,548	1,595	1,626	1,657
Administrative costs	$	347	357	364	371
Additional court costs	$	677	697	710	724
Total program costs	**$**	**6,037**	**6,218**	**6,339**	**6,460**

Table 5 summarises the results in real $2019 and reflects the result at various discount rates including the standard (mid) discount rate of 5%, used to present our findings within this report. We compared the costs and benefits of the program over its lifetime, considering both the changes in volume of referrals over time, and applying a discount rate compounded to obtain the NPV of the relative benefits and costs in $2019 (which is also referred to as the present 2019 dollar value). As mentioned earlier in this report, we apply "forward" discounting for each year to our base year, 2019, using the low (3%), mid (5%, preferred) and high (7%) discount rates suggested by NSW Treasury (2023a).

First, we considered the benefits of the program in monetary terms. Recall that in our preferred analysis we found statistically significant differences in criminal justice outcomes in favour of MERIT but differences in health outcomes in favour of the matched comparison group. Specifically, we found that those referred to MERIT committed fewer proven offences on average in their first year of follow-up and spent less time in custody over the two-year follow up but incurred greater (albeit modest) costs from ambulance call outs and emergency department presentations in the first year. Here we weigh up the benefits from reduced reoffences and less time in custody against the increase in ambulance and ED contacts over the first year.

Overall, MERIT results in $7,229 worth of benefits for each referral to the program. This includes $120 saved (per referral) in avoided police time attending and investigating offences due to the reduction in reoffences in the first year after referral. There is also a further saving of $416 in terms of court resources from fewer reoffences. Considering the typical community corrections resources incurred for offences finalised in the Local Court, we estimate that the fewer reoffences committed by MERIT referrals also result in $1,185 of savings in community correction costs from reduced supervision. These benefits,

coupled with the $4,552 in savings from less time spent in custody post-referral (which includes both benefits from fewer prison sentences at the index appearance and reduced reoffending during the follow up period), results in criminal justice savings of $6,272 to government in present $2019. Aside from fewer government resources spent on new offences and the index penalty, we also estimate that there is a reduction in costs to victims of $1,069 per referral to MERIT. Meanwhile, we observe small increases in ambulance and ED costs ($116).

In terms of the program costs, the average cost of delivering MERIT was $6,339 per individual referred to the MERIT program. The primary driver of this cost was staffing costs, which accounted for $3,639 or 57% of the total cost. The next biggest driver of cost was external treatment costs[24] (comprising of both withdrawal and residential rehabilitation services) which cost on average $1,626 per person referred to MERIT, accounting for 26% of the total costs of the program. The remainder of the costs of the MERIT program were additional Local Court costs (11% or $710) and other administrative costs (6% or $364).

Considered together, the present value of total benefits of the MERIT program is $7,226 per referral and the present value of the total costs of the program is $6,339 per referral. This translates into an NPV of $887 per individual referred to the MERIT program. In other words, a referral to MERIT results in $887 more in benefits than costs per referral. This is equivalent to a benefit-cost ratio of 1.14 or $1.14 in benefits for each dollar spent on the program.

These results are robust to applying the low and high discount rates. Under a 3% discount rate we estimate that the program yields $870 in net benefits. Under the 7% discount rate, the benefits of the program exceed the costs by $904. Meanwhile, the BCR remains steady at 1.14 in all three scenarios.

Table 6. Sensitivity analysis scenarios and NPV/BCRs

	Scenario							
Scenario inclusions	1	2	3	4	5	6	7	8
Intangible victim costs (↑ benefit)	YES	NO	YES	NO	YES	YES	NO	NO
Additional govt agency LC costs (↑ benefit, ↑ program cost)	YES	YES	YES	YES	NO	NO	NO	NO
MDS data for control group (↓ program cost)	YES	YES	NO	NO	YES	NO	YES	NO
Net present value ($m, $2019)	**20.0**	**13.9**	**2.3**	**(3.8)**	**22.9**	**5.2**	**16.8**	**(0.9)**
Benefit-cost ratio	**1.14**	**1.10**	**1.01**	**0.98**	**1.17**	**1.03**	**1.12**	**0.99**

24 One limitation to the estimated costs of the MERIT program is that the external treatment cost estimates only pertain to participants from 2015 onwards. In other words, while we apply these assumptions across our sample, it could be the case that the actual service usage among pre-2015 cohorts was greater (or less) than what we assume here.

Next, we consider the results from several scenarios where different aspects of our costing methods are varied.[25] This assesses the robustness of our estimates to our choice of assumptions. These variations as summarised in Table 6 include:

a) excluding intangible victim costs;
b) excluding additional government costs in all criminal justice system costings; and
c) excluding the costs of outpatient treatment incurred by those in the comparison group over the median MERIT period.

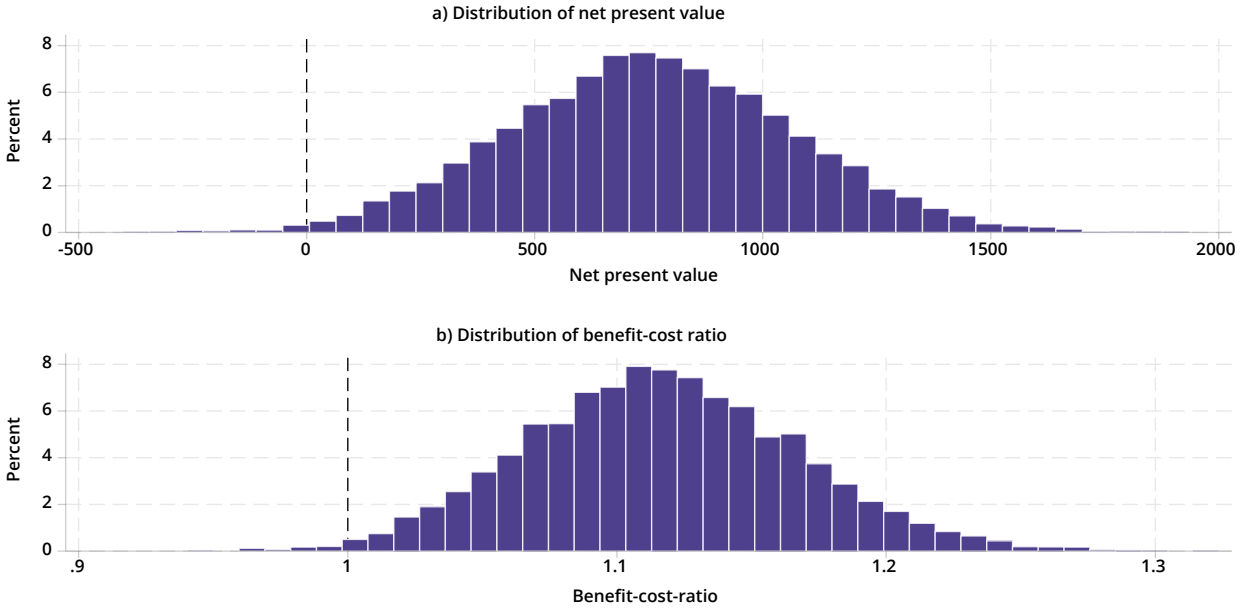
Scenario 5 in our sensitivity testing returns the highest BCR which is only 0.03 higher than the preferred approach (Scenario 1). This scenario includes intangible victim costs, and accounts for withdrawal and residential rehabilitation costs that matched counterparts would have otherwise undertaken. However, this scenario does not include any estimate of the government costs in addition to the court costs, such as Legal Aid NSW and Office of the Director of Public Prosecution costs. The lowest BCR results are found in Scenarios 4 and 8 where the BCRs reduce to 0.98 and 0.99 (respectively) for all discount rates, and the NPV at 5% reduces to a cost of (as opposed to a benefit) $170 or $42 (respectively) per person referred to MERIT. However, these scenarios do not include intangible victim costs for violent and property crimes, or any adjustment for withdrawal and residential rehabilitation treatment that matched counterparts undertake at a cost to NSW Health. Further, Scenario 8 also excludes additional government costs related to Local Court matters, impacting both the benefit value relating to avoided Local Court costs, and program costs for additional mentions for MERIT participants.

In summary, these sensitivity tests show that we lose a maximum of 0.16 percentage points from the primary study scenario (i.e., Scenario 1) under the most conservative assumptions, and across our scenarios, the average BCR is 1.07. Therefore, we find a generally positive BCR, that is sensitive to some alternative assumptions. Specifically, when we exclude intangible victim costs and when we do not offset the costs of residential rehabilitation and withdrawal management by that experienced by the comparison group, the BCR falls below 1.

We next examined the robustness of our results to the variability in our outcome estimates. Figure 9 presents our distributions of the individual-level net present value and benefit-cost ratio of the program from our simulation modelling, in real $2019. Considering the variability in our inputs, we find that the NPV of MERIT ranges from $-51 to $1,551 per referral. This is equivalent to a range of BCRs from 0.97 (i.e., a $0.97 return on each $1 invested) to 1.27 (where benefits exceed expenditure on the program by a quarter). In other words, across 100,000 scenarios, which consider the plausible range of values for our inputs, we find that 98% of the time the MERIT program yields more benefits than costs within the first two years following referral. In other words, our cost-benefit analysis results are not sensitive to variability in our estimates of the association between MERIT and our outcomes of interest.

25 We tested the sensitivity of our results to two additional changes. First, repeating our analysis from 2008, rather than 2012. This analysis is not analogous to that presented here as we lack the full range of our covariates. Even so, we find that our results are largely robust (net present value of approximately $632 in real $2019). Second, while we find small (statistically insignificant) reductions in deaths, Weatherburn et al. (2024) do find a statistically significant difference in favour of MERIT in time to death in a survival analysis using a similar matched cohort. If we counted the approximate 0.2 percentage point reduction in the likelihood of death in these findings, our estimates of the net benefit of MERIT would rise by approximately $10,000.

Figure 9. Costs of MERIT program, by type of expenditure (real $2019)



DISCUSSION

This report presents the results from the first cost-benefit analysis of the NSW MERIT program. The analysis aimed to: 1) document the costs of the MERIT program; 2) identify the monetary benefits associated with the MERIT program; and 3) evaluate whether the benefits of the MERIT program generally exceed its costs.

We found that the criminal justice and health benefits associated with MERIT (of $7,226 per referral) exceed the cost of delivering the program (which averages $6,339 per referral). The cost of the program is primarily driven by staffing and treatment costs, which together, make up a total of 83% of the program costs (57% and 26% respectively). Meanwhile, the greatest source of benefits generated by the program came from reduced imprisonment costs ($4,552) in the first two years after referral. The effect on imprisonment was largest in the first year following referral, driven partly by a 4 p.p. reduction in the likelihood of a prison sentence at the index court appearance. We found further significant benefits from reduced offending, but only in the first year following referral, totalling $2,790 per referral consisting of savings to community corrections ($1,185), victim benefits ($1,069), court and police benefits ($416 and $120 respectively). Finally, we also found small (but statistically significant) increases in expenditure on ambulance and emergency department services for MERIT referrals within a year which offset these criminal justice benefits.

It is somewhat difficult to compare the magnitude of our findings with those from economic analyses of other drug treatment programs. Previous studies have typically considered custody costs as part of program costs (rather than as program benefits) as these programs do not explicitly aim to divert participants from prison. Even so, we also find that the reductions in the cost of imprisonment help to "equalise" the costs of drug treatment relative to typical criminal justice pathways. In other words, the additional resources spent on assessment, monitoring, rehabilitation, and supervision of MERIT defendants is offset by lower custodial costs (either through reduced reoffending or fewer prison sentences), on average. We also found no increase in the costs of hospital admissions for those referred to MERIT, but slight increases in emergency department and ambulance contacts over the first year after treatment. These results are not consistent with Zarkin et al.'s (2005) evaluation of a Californian drug treatment program.

Our finding that MERIT reduces reoffending and imprisonment generally aligns with studies of other drug treatment programs in the criminal justice system (Ettner et al., 2006; Washington State Institute for Public Policy, 2019; Zarkin et al., 2005). It is worth noting, however, that we only find a reduction in offending in the first year after referral to the program. The magnitude of the difference in offending diminishes in the second year following treatment and is no longer significant. There are at least two possible reasons for this pattern of results. First, MERIT may only result in temporary reductions in drug usage. Our findings that some alcohol- and drug-related variables (admissions) reduce in the first year but subsequently increase in the second year following referral would suggest that some people who are referred to MERIT may relapse. This is consistent with evidence that those suffering from AOD use disorders have high rates of relapse, with fewer than 10% desisting from all AOD use within a year (Fleury et al., 2016). Second, the program may primarily reduce reoffending and improve health through monitoring and incentivising good behaviour, and thus, any benefits dissipate once the program ends.

Our findings that health service usage increases (albeit slightly) following referral also mirrors other evidence showing that referral to treatment may prompt individuals to seek treatment for other health problems. In some programs this may even be a direct consequence of counselling or treatment, where participants are encouraged to seek treatment or address other health issues they may be facing. Several studies of drug treatment programs seem to find increases in health usage following treatment. For example, a study of the Vancouver Drug Treatment Court (DTC; Rezansoff et al. 2015) finds that post-program, participants use more outpatient services (although they are not hospitalised more). While this study used a simple pre-post comparison, a meta-analytic review of five randomised trials of substance abuse treatment programs also found that usage of outpatient services increased during and after treatment (Olmstead et al., 2012). Even so, a possibly more plausible explanation for our findings could be that those referred to MERIT are less likely to be imprisoned and may have more opportunity to come into contact with the emergency department and ambulance services.

The main limitation of our study is that we were unable to obtain causal estimates of the impact of MERIT on our outcomes. We attempted to address all observable differences between the groups through propensity score matching individuals using a wide array of demographic, criminal justice, and health variables. Still, it is plausible that the groups differ on other omitted factors that affect both the likelihood of referral to MERIT and reoffending/imprisonment. Most crucial among these is whether a person has any AOD use, and if they do, which types of drugs they use, in what amounts, and how often. In other words, we may have compared those referred to MERIT to defendants without, or with less severe, AOD use problems. Those without AOD use problems tend to have lower rates of health system usage (Lewer et al., 2020) and thus a comparison to these individuals would likely underestimate the impact of MERIT. However, our finding that most of the reoffending benefits of the MERIT program accrue in the first year after referral suggests that more could be done to foster improved outcomes for participants over the longer term. To this end, understanding patterns of AOD use of MERIT participants whilst on the program and after completion might be helpful in discerning whether our findings arise because of successful treatment, monitoring or the prospect of a less severe penalty.

Another limitation is our inability to identify impacts for those who complete the program. We used an intention-to-treat approach, which considered outcomes for all referred participants, regardless of whether they completed the program. While it is certainly possible to calculate the differences in outcomes between those who complete MERIT and a group of observably similar offenders going through the Local Court, such an analysis would likely be severely flawed. This is because there are likely to be significant unobserved differences between individuals referred to MERIT who undergo the full 12 weeks of treatment and their counterparts who do not complete the program. For example, a person who completes the program may have greater financial resources or more stable housing which enables them to attend treatment regularly. MERIT completers may also be more motivated to change their behaviour than are other offenders appearing in the Local Court for similar offences. There may even be issues associated with reverse causality, since those who offend are unable to complete treatment. Given these factors are correlated with our outcomes, such an analysis would bias our estimates of the benefits associated with the MERIT program.

Finally, our study only considers a subset of the plausible benefits of the MERIT program. MERIT could plausibly improve morbidity, wellbeing, employment and family functioning. We were not able to consider these effects using the data available to us. Further, we may underestimate total societal benefits of the program by focusing on NSW. There are also several reasons why the costs and benefits we include may also lack precision. First, we use macro estimates of some of the components of MERIT program costs. For example, we apply a simple estimate of the average time a clinician spends with a MERIT participant by dividing the total staffing costs associated with MERIT by the number of participants. The limitation of this approach compared with an activity-level costing approach, (as employed in the economic analyses of the Drug Court), and the DATCAP approach, is that we are unable to discern which stage(s) of the 12-week MERIT program are most costly. Thus, we cannot comment on whether there is any scope for improved efficiency in the delivery of the program. Second, we only have data on rates of residential rehabilitation and withdrawal management from 2015 onwards. This data may be vulnerable to changes in the case mix over time. Third, capital costs are excluded from many of our estimates of government costs, including court, prison, and healthcare costs. We also do not include the costs borne by all other agencies. In particular, individuals who spent time in custody may have used Justice Health services (other than AOD treatment), but we neither observe nor include them in this study. Fourth, we use a standard assumption of additional government agency costs in the Local Court. While this aids comparability with other reports, it is plausible that actual costs pertaining to MERIT matters or reoffences may differ. Even so, we find that our results are likely robust to obtaining more precise costs estimates, based on our sensitivity analyses.

Despite these limitations, our study indicates that MERIT is a worthwhile investment as it reduces rates of imprisonment and reoffending in the short term with only minimal additional costs to the health system. This suggests that shorter, less intensive drug treatment programs, where offenders are offered the chance to avoid a prison sentence conditional on good behaviour and program completion, may indeed "pay for themselves". This form of brief treatment is also more scalable than intensive drug treatment programs, such as the NSW Drug Court, and likely to be a more appropriate instrument for offenders with less extensive AOD use and/or offending histories. Decisions regarding further expansion of MERIT to other parts of NSW, would however benefit from additional research to better understand the factors driving program non-completion. Currently, 60% of those who are accepted into MERIT end up completing the program and research suggests that those who do not complete reoffend at a higher rate (Passey et al., 2007). Supporting more individuals to complete the program therefore has the potential to generate further monetary benefits through increased diversions from prison and reduced reoffending.

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APPENDIX

Figure A1. Coefficients of the effect of MERIT on variables considered in calculating the benefits of MERIT, main specifications

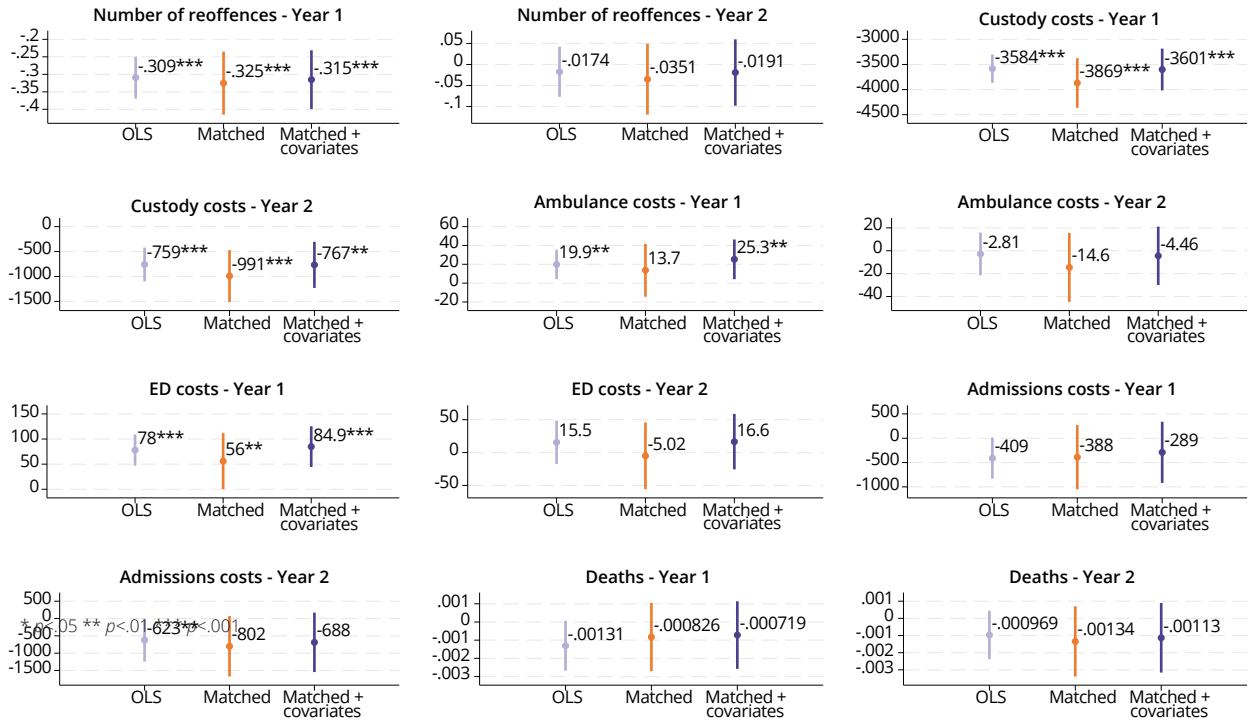

Table A1. Diagnosis codes used to flag drug and alcohol-related ED presentations

Type of episode	
Alcohol-related episodes, unplanned ED presentations*	**ICD-9:** 291, 303, 305.0, 535.3, 790.3, 980, E860 **ICD-10:** F10, K29.2, R78.0, T51, Y90.9, Y91, Z72.1 **SNOMED-CT:** 25702006, 15167005, 191480000, 66590003, 231466009, 2043009, 191802004, 228326007, 274776000, 219006, 82782008, 29212009, 67426006, 8635005, 42344001, 7052005, 269765000, 73097000, 160592001, 7200002, 102897001, 183098002, 32553006, 35637008, 365967005, 53041004, 63267000, 64297001, 85561006, 86933000, 87106005, 102612005, 135827004, 160573003, 160580001, 160581002, 160593006, 160599005, 161466001, 163184002, 171208001, 183486001, 18653004, 191471000, 191472007, 191473002, 191476005, 191477001, 191478006, 191479003, 191481001, 191482008, 191803009, 191804003, 191805002, 191806001, 191807005, 191809008, 191811004, 191812006, 191813001, 191814007, 191815008, 191882002, 191883007, 191885000, 192206005, 192207001, 192208006, 192209003, 192210008, 192211007, 192212000, 192213005, 192214004, 192215003, 192216002, 198431000000105, 20093000, 205351000000101, 207273009, 21000000, 212806006, 212807002, 212808007, 212809004, 212810009, 212811008, 212812001, 212813006, 212814000, 212815004, 212816003, 212817007, 212818002, 212819005, 212820004, 213687005, 216632000, 216633005, 216634004, 216635003, 216636002, 216637006, 216638001, 216639009, 216640006, 216643008, 216644002, 216645001, 216646000, 216648004, 216649007, 216650007, 216652004, 216653009, 221842002, 221843007, 221844001, 221845000, 221846004, 221847008, 221848003, 221849006, 221850006, 221851005, 221852003, 222103001, 222104007, 222105008, 222106009, 222107000, 222108005, 222110007, 222111006, 222112004, 222113009, 222114003, 222702003, 222703008, 222704002, 222705001, 222706000, 222707009, 222708004, 222709007, 222710002, 222711003, 222713000, 223333005, 223334004, 223335003, 223336002, 223337006, 223338001, 223339009, 223340006, 223341005, 223342003, 223343008, 223344002, 223345001, 223346000, 223347009, 223348004, 223349007, 226136002, 228273003, 228281002, 228312003, 228313008, 228315001, 228316000, 228317009, 228330005, 228350009, 228351008, 228353006, 228357007, 228358002, 228364009, 231463001, 231464007, 231465008, 231467000, 24165007, 242263000, 242265007, 268639004, 268645007, 268683008, 268684002, 268685001, 273265007, 273802002, 274257003, 28045007, 281004, 281078001, 284591009, 287166006, 292880007, 294420000, 300939009, 302237007, 304605000, 304606004, 307730003, 308742005, 311492009, 316322002, 316494009, 34938008, 361267005, 365973006, 371434005, 386449006, 38670004, 408945004, 408946003, 408947007, 408948002, 412198003, 413473000, 415685003, 417096006, 417633001, 419442005, 419572002, 420140004, 427013000, 429501006, 429775004, 431260004, 440652002, 441685000, 442766007, 444810000, 445628007, 4953006, 53527002, 53936005, 57346004, 61144001, 62213004, 6749002, 69482004, 77475008, 78524005, 79578000, 87460008, 89507002, 95906008
Illicit drug-related episodes, unplanned ED presentations*	**ICD-9:** 292, 304, 305.2, 305.5, 305.9, 965.0, 968.6, 969.8, 970.8, E850.0, E850.1, E854.1, E855.2, E935.0, E938.5, E939.6, E940 **ICD-10:** F11, F12, F14, F15, F16, F19, T40, Z50.3, Z722 **SNOMED-CT:** 1383008, 2403008, 3298001, 4863002, 5602001, 6348008, 6514006, 6525002, 7071007, 8686000, 8837000, 9769006, 9982009, 10140002, 10327003, 11061003, 11196001, 11387009, 12898000, 13187008, 14784000, 15233006, 15277004, 18052008, 18159001, 18768006, 19445006, 20260003, 20385005, 20871009, 21647008, 22574000, 23527004, 25753007, 26416006, 26714005, 27956007, 28602001, 29733004, 30310000, 30491001, 31715000, 31956009, 32267003, 33871004, 34743008, 37344009, 38247002, 39807006, 39951001, 40571009, 41016007, 41906002, 43497001, 44870007, 45421006, 45775001, 46975003, 47836003, 50026000, 50320000, 50722006, 51339003, 51443000, 51493001, 52866005, 53050002, 55967005, 56194001, 57005003, 58727001, 60199004, 63649001, 66214007, 67893003, 68099003, 70328006, 70545002, 70655008, 70932007, 71328000, 74264003, 74934004, 75544000, 77355000, 77721001, 78092008, 78267003, 78358001, 80868005, 81270000, 82339009, 82768008, 83367009, 84758004, 84916005, 85005007, 85975005, 87132004, 87858002, 88926005, 91388009, 95635002, 95661003, 105546006, 105547002, 105550004, 160607006, 160608001, 160609009, 160610004, 160611000, 160615009, 191483003, 191492000, 191494004, 191816009, 191818005, 191819002, 191820008, 191821007, 191822000, 191829009, 191830004, 191831000, 191832007, 191833002, 191834008, 191842009, 191843004, 191844005, 191845006, 191846007, 191865004, 191866003, 191867007, 191868002, 191869005, 191870006, 191871005, 191872003, 191873008, 191874002, 191875001, 191876000, 191909007, 191911003, 191912005, 191913000, 191914006, 191915007, 191916008, 191917004, 191918009, 191919001, 191920007, 191921006, 191923009, 191924003, 191925002, 191926001, 191927005, 192205009, 192217006, 192218001, 192219009, 192220003, 192221004, 192222006, 192223001, 192224007, 192225008, 192226009, 192227000, 192228005, 192229002, 192230007, 192231006, 192232004, 192233009, 192234003, 192235002, 192236001, 192237005, 192238000, 192251005, 192252003, 192253008, 192254002, 192255001, 192256000, 192257009, 192258004, 192259007, 192260002, 192261003, 192262005, 192263000, 192264006, 192265007, 192266008, 192267004, 192268009, 192269001, 192270000, 192271001, 192272008, 192273003, 192275005, 192276006, 192278007, 192279004, 192280001, 192281002, 192282009, 192283004, 192284005, 192285006, 192286007, 192287003, 192288008, 192289000, 192290009, 192291008, 192292001, 192293006, 192294000, 192295004, 192307004, 192308009, 192309001, 192310006, 192311005, 192312003, 192313008, 192314002, 192315001, 192316000, 192317009, 207300005, 207301009, 207302002, 207304001, 207639009, 212587008, 212588003, 212591003, 212667003, 212668008, 212670004, 212671000, 213658009, 213659001, 213660006, 213661005, 216463005, 216464004, 216465003, 216466002, 216467006, 216468001, 216469009, 216470005, 216550002, 216551003, 216552005, 216553000, 216554006, 216555007, 216556008, 216557004, 216558009, 216560006, 216561005, 216562003, 216563008, 216565001, 216566000, 216583009, 218791008, 221797001, 221798006, 221799003, 221800004, 221801000, 221802007, 221803002, 221805009, 221806005, 221807001, 221808006, 221809003, 221810008, 221811007, 221812000, 221813005, 221814004, 221815003, 221816002, 221817006, 221818001, 221819009, 222059008, 222060003, 222061004, 222062006, 222063001, 222064007, 222065008, 222066009, 222067000, 222068005, 222069002, 222070001, 222071002, 222072009, 222073004, 222074005, 222075006, 222076007, 222077003, 222078008, 222079000, 222080002, 222657009, 222658004, 222659007, 222660002, 222661003, 222662005, 222663000, 222664006, 222665007, 222666008, 222667004, 222668009, 222669001, 222670000, 222671001, 222672008, 222673003, 222674009, 222675005, 222676006, 222677002, 222678007, 226034001,

Table A1. Diagnosis codes used to flag drug and alcohol-related ED presentations (continued)

Type of episode	
Illicit drug-related episodes, unplanned ED presentations* (continued)	228366006, 228369004, 228371004, 228372006, 228373001, 228375008, 228388006, 231451006, 231466009, 231468005, 231469002, 231477003, 231478008, 231479000, 231480002, 231481003, 231482005, 236815006, 241749009, 241750009, 241752001, 241761001, 241768007, 242253008, 242257009, 242828004, 242829007, 242830002, 242831003, 255641001, 268642005, 268648009, 268686000, 268687009, 268688004, 268689007, 268690003, 269264002, 269745007, 271439001, 274777009, 274778004, 274779007, 274780005, 275471001, 288457001, 290137009, 290139007, 290150005, 290151009, 290152002, 290153007, 290154001, 290155000, 290156004, 290157008, 290158003, 290159006, 290160001, 290161002, 290162009, 290163004, 290164005, 290165006, 290166007, 290167003, 290168008, 290169000, 290170004, 290171000, 290172007, 290173002, 290174008, 290175009, 290176005, 290177001, 290178006, 290179003, 290180000, 290181001, 290182008, 290183003, 290184009, 290185005, 290186006, 290188007, 290189004, 290190008, 290191007, 290192000, 290193005, 290194004, 290196002, 290197006, 290198001, 290199009, 290200007, 290201006, 290202004, 290203009, 290204003, 290205002, 290206001, 290207005, 290208000, 290209008, 290210003, 290211004, 290216009, 290217000, 290218005, 290219002, 290220008, 290221007, 290222000, 290412009, 290413004, 290414005, 290415006, 290543000, 290544006, 290545007, 291240006, 291241005, 291242003, 291246000, 291247009, 291248004, 291249007, 291250007, 291251006, 291252004, 291253009, 291254003, 291255002, 291256001, 291257005, 291258000, 291259008, 291260003, 291261004, 291263001, 291264007, 291265008, 291266009, 291267000, 292052006, 292053001, 292054007, 292055008, 292059002, 292063009, 292181009, 293587005, 293594008, 293595009, 293597001, 293601001, 293604009, 293605005, 295127002, 295128007, 295129004, 295130009, 295131008, 295133006, 295140007, 295141006, 295142004, 295143009, 295144003, 295145002, 295146001, 295147005, 295148000, 295149008, 295150008, 295151007, 295152000, 295153005, 295154004, 295155003, 295156002, 295157006, 295158001, 295159009, 295160004, 295161000, 295163002, 295164008, 295165009, 295166005, 295167001, 295168006, 295169003, 295170002, 295171003, 295172005, 295173000, 295174006, 295175007, 295176008, 295177004, 295178009, 295179001, 295180003, 295181004, 295182006, 295183001, 295184007, 295185008, 295186009, 295187000, 295188005, 295189002, 295190006, 295191005, 295192003, 295193008, 295194002, 295195001, 295196000, 295197009, 295198004, 295199007, 295200005, 295201009, 295202002, 295203007, 295204001, 295209006, 295210001, 295211002, 295212009, 295213004, 295415009, 295416005, 295417001, 295418006, 295566002, 295567006, 295568001, 295570005, 296291005, 296292003, 296293008, 296294002, 296300004, 296301000, 296302007, 296303002, 296304008, 296305009, 296306005, 296307001, 296308006, 296309003, 296310008, 296311007, 296312000, 296313005, 296314004, 296315003, 296316002, 296317006, 296318001, 296319009, 296320003, 296321004, 296322006, 296323001, 296324007, 296325008, 296326009, 296327000, 296328005, 296329002, 296330007, 296331006, 296333009, 297199006, 307052004, 308374001, 309279000, 315747008, 315748003, 316233002, 361049005, 361055000, 363101005, 363908000, 371341003, 371422002, 391102000, 398747000, 410942007, 413367002, 413368007, 413369004, 413370003, 413371004, 413372006, 413373001, 413374007, 413375008, 413376009, 413377000, 414874007, 416479009, 417284009, 424461008, 441668002, 699449003, 735235000, 762323002, 19754100000010, 20296100000010, 20299100000010, 20464100000010
Opioid-related episodes, unplanned ED presentations* (used for matching primary drug)	**ICD-9:** 304, 305.5, 965.0, E850.0, E850.1, E850.2, E935.0, E935.1, E935.2 **ICD-10:** F11, T40 **SNOMED-CT:** 5602001, 9982009, 11196001, 12898000, 13187008, 14784000, 15233006, 18052008, 18768006, 19445006, 20385005, 29733004, 34743008, 41016007, 47836003, 52866005, 60199004, 67893003, 68099003, 70545002, 71328000, 74264003, 75544000, 77721001, 81270000, 82768008, 85975005, 87132004, 88926005, 191818005, 191819002, 191820008, 191821007, 191822000, 191865004, 191866003, 191867007, 191868002, 191869005, 191870006, 191909007, 191911003, 191912005, 191913000, 191914006, 191915007, 191916008, 191917004, 191918009, 191919001, 191920007, 191921006, 192217006, 192218001, 192219009, 192220003, 192221004, 192222006, 192223001, 192224007, 192225008, 192226009, 192227000, 212587008, 212588003, 212591003, 212667003, 212670004, 213658009, 213659001, 213660006, 213661005, 218791008, 231477003, 231478008, 231479000, 231480002, 241749009, 241750009, 241752001, 241761001, 241768007, 242253008, 242828004, 242829007, 242830002, 242831003, 268686000, 268687009, 269264002, 290137009, 290139007, 290150005, 290151009, 290152002, 290153007, 290154001, 290155000, 290156004, 290157008, 290158003, 290159006, 290160001, 290161002, 290162009, 290163004, 290164005, 290165006, 290166007, 290167003, 290168008, 290169000, 290170004, 290171000, 290172007, 290173002, 290174008, 290175009, 290176005, 290177001, 290178006, 290179003, 290180000, 290181001, 290182008, 290183003, 290184009, 290185005, 290186006, 290188007, 290189004, 290190008, 290191007, 290192000, 290193005, 290194004, 290196002, 290197006, 290198001, 290199009, 290200007, 290201006, 290202004, 290203009, 290204003, 290205002, 290206001, 290207005, 290208000, 290209008, 290210003, 290211004, 290216009, 290217000, 290218005, 290219002, 290220008, 290221007, 290222000, 290412009, 290413004, 290414005, 290415006, 290543000, 290544006, 290545007, 291246000, 291247009, 291248004, 291249007, 291250007, 291251006, 291252004, 291253009, 291254003, 291255002, 291256001, 291257005, 291261004, 291263001, 291264007, 292052006, 292053001, 292054007, 292055008, 292059002, 292063009, 292181009, 293587005, 293594008, 293595009, 293597001, 293601001, 293604009, 293605005, 295127002, 295128007, 295129004, 295130009, 295131008, 295133006, 295140007, 295141006, 295142004, 295143009, 295144003, 295145002, 295146001, 295147005, 295148000, 295149008, 295150008, 295151007, 295152000, 295153005, 295154004, 295155003, 295156002, 295157006, 295158001, 295159009, 295160004, 295161000, 295164008, 295165009, 295166005, 295167001, 295168006, 295169003, 295171003, 295172005, 295173000, 295174006, 295175007, 295176008, 295177004, 295178009, 295179001, 295180003, 295181004, 295182006, 295183001, 295184007, 295185008, 295186009, 295187000, 295188005, 295189002, 295190006, 295191005, 295192003, 295193008, 295194002, 295195001, 295196000, 295197009, 295198004, 295199007, 295200005, 295201009, 295202002, 295203007, 295204001, 295209006, 295210001, 295211002, 295212009, 295213004, 295415009, 295416005, 295417001, 295418006, 295566002, 295567006, 295568001, 295570005, 296300004, 296301000, 296302007, 296303002, 296304008, 296305009, 296306005, 296307001, 296308006, 296309003, 296310008, 296311007, 296312000, 296313005, 296314004, 296315003, 296316002, 296321004, 296322006, 296323001, 296324007, 296325008, 296326009, 296327000, 296328005, 297199006, 371341003, 391102000, 410942007, 20299100000010

Table A2. Diagnosis codes used to identify alcohol-, drug-, and opioid-related hospitalisations

Type of episode	ICD-10 (any diagnosis)
Alcohol-related episodes, hospitalisations	F10, G31.2, K29.2, I42.6, K70, K85.2, K86.0, T51, Z71.4
Drug-related episodes, hospitalisations	F11- F19, F55, T39, T40, T41, T42, T43, T52, T53, Z71.5
Opioid-related episodes, hospitalisations	F11, T40

Table A3. Summary of parameters and distributions used in Monte Carlo analysis

Variable	Parameters	Source
Costs		
Average number of withdrawal management episodes	Mean: 0.07 Standard error: 0.009	MDS DATS data for referrals from 2015 onwards
Cost of a withdrawal management episode	Mean: $11,153 Standard error: $3,153	Centre for International Economics (2021), discounted to $2019
Average number of days in residential rehabilitation	Mean: 3.6 Standard error: 0.21	MDS DATS data for referrals from 2015 onwards (treatment group average – comparison group average)
Cost per diem of residential rehabilitation	Mean: $293 Standard error: $96	Estimates from BAFM study, discounted to $2019
Benefits		
Reoffences in Year 1	Mean: -0.03 Standard error: 0.04	Estimates from preferred matching specification
Reoffences in Year 2	Mean: -0.02 Standard error: 0.04	Estimates from preferred matching specification
Avoided costs of custody in Year 1	Mean: $3,600.56 Standard error: $212.50	Estimates from preferred matching specification
Avoided costs of custody in Year 2	Mean: $766.82 Standard error: $3.25	Estimates from preferred matching specification
Avoided costs of ambulance callouts in Year 1	Mean: -$25.28 Standard error: $10.74	Estimates from preferred matching specification
Avoided costs of emergency department presentations in Year 1	Mean: $84.93 Standard error: $4.11	Estimates from preferred matching specification
Discount rate	Low: 3% Mid: 5% High: 7%	NSW Treasury recommended parameters (2023b)

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