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Title: Injecting drug use is an independent risk factor for reincarceration after release from prison: a prospective cohort study

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Abstract

Background: Once involved in the criminal justice system, people who inject drugs (PWID) have a high probability of multiple system encounters. Imprisonment typically fails to rehabilitate PWID, who upon return to the community are at considerable risk of returning to injecting drug use (IDU) and poor health and social outcomes. We examined the effect of IDU resumption, and a suite of other sociodemographic, criminogenic, health and behavioural indicators, on the timing of reincarceration among adults with a history of IDU following release from prison.

Methods: Structured interviews were conducted with 561 PWID in Queensland, Australia prior to release from prison and approximately one, three and six months post-release. Data were linked prospectively with correctional records and the National Death Index. Data collected at multiple time-points were treated as time-varying covariates. Kaplan-Meier survival estimates and Cox proportional hazards models were used to estimate the rate and hazards of reincarceration.

Results: Sixty-eight percent of participants (n=350) were reincarcerated over a combined observation time of 1043.5 years, representing a rate of 33.5 per 100 person-years (95% confidence interval [CI] 30.2-37.2). Time-invariant predictors of reincarceration in PWID were: male gender (adjusted hazard ratio [AHR]=1.62, 95% CI 1.19-2.21), older age at release (AHR=0.97, 95% CI 0.95-1.00), previous adult (AHR=2.00, 95% CI 1.41-2.84) or juvenile (AHR=1.78, 95% CI 1.27-2.49) imprisonment, shorter imprisonment (≤90 days *vs*. >365 days, AHR=2.09, 95% CI 1.30-3.34), release on parole (AHR=2.29, 95% CI 1.82-2.88), and drug-related sentence (AHR=1.84, 95% CI 1.34-2.53). Time-varying predictors included resumption of IDU (AHR=2.04, 95% CI 1.60-2.61), unemployment (AHR=1.53, 95% CI 1.07-2.19) and low perceived social support (AHR=1.41, 95% CI 1.05-1.90). Very high psychological distress at the most recent interview was protective against reincarceration (AHR=0.65, 95% CI 0.44-0.95).

Conclusions: Efforts to prevent resumption of IDU and address disadvantage, social inclusion and health service access in ex-prisoners through the scale-up and integration of prison-based and post-release interventions are likely to reap both public health and criminal justice benefits.

Keywords: Prisoners, Drug Users, Longitudinal Studies, Survival Analysis

INTRODUCTION

It is well known that a proportion of people who inject drugs (PWID) turn to illicit activity to generate income to support drug purchasing. These offending patterns, alongside the ongoing criminalisation of drug use itself, mean that drug users contribute disproportionately to recorded criminal offences [1]. Once involved in the criminal justice system, PWID have a high probability of multiple encounters with the system [2]. Drug use history is a well-established predictor of reoffending, rearrest and reincarceration [3], and this is especially true for PWID [4, 5]. Imprisonment often fails to rehabilitate PWID, who upon return to the community are at considerable risk of return to injecting drug use (IDU) [6, 7]. Patterns of repeated incarceration and ongoing drug use also compound health problems. Dose-response relationships between incarceration and detrimental post-release outcomes such as death [8], high-risk IDU behaviours [9], and HIV medication non-adherence [10] have been documented, alongside high rates of fatal and non-fatal overdose, infectious disease, mental disorder, and acute and chronic disease among ex-prisoners with histories of IDU [11-13]. The implications of the failure of correctional systems to support positive health and social outcomes are broad and far-reaching for both individuals and public health.

A complex array of factors have been identified as contributors to the 'revolving door' of imprisonment, including several social (e.g. poverty/debt [14, 15], unemployment [16, 17], unstable housing [4, 15]), health (e.g. mental disorder [4], perceived importance of physical health[14]), and criminal justice-related factors (e.g. parole [18], shorter previous incarcerations [4]). Factors that protect against reincarceration include older age [19, 20], post-release drug treatment [19, 21], retention in drug treatment after prison [20], chronic disease and sedentary lifestyles [14]. Many of these factors are modifiable, yet most programs address mainly behavioural aspects relating to reducing drug use without tackling concurrent environmental and social factors. Despite these high levels of need, prisoners and ex-prisoners are often excluded from accessing community health and support services [22]. Where drug treatment programs do exist, scarce resources mean they are often targeted at the minority of individuals who commit the majority of crime, leaving a high percentage of drug users with unmet treatment needs [23].

Several studies have examined the relationship between pre- and/or post-imprisonment substance use and rearrest or reincarceration. A number of these studies are limited because they

have short observation periods, do not control for events that occur after the date of release, or rely exclusively on retrospectively linked administrative data which are typically limited to basic demographic variables [3-5, 20]. These study designs make it difficult to tease out the progression of events and their relationship with resumption of substance use and other individual and social factors which impact reincarceration. Studies that have followed prisoners prospectively after release have mainly focussed on testing the effect of drug treatment interventions such as opioid substitution therapy or intensive residential rehabilitation programs (therapeutic communities) [20, 24, 25]. Few have examined the natural history of post-release drug use resumption and reincarceration.

We examined the effect of IDU resumption and a suite of other time-varying and time-invariant sociodemographic, criminogenic, health and behavioural indicators on the timing of reincarceration among ex-prisoners with a history of IDU following release from prison.

METHODS

Study design and setting

The *Passports* study was a multi-site, single-blinded, randomised controlled trial of a service-brokerage re-entry intervention for sentenced adult prisoners in the state of Queensland, Australia. The study methods are described in detail elsewhere [26]. Prior to randomisation, baseline interviews were conducted within six weeks of expected release from seven prisons where the majority of sentenced prisoners in the State were released. Participants were randomised to receive either usual care or a transitional intervention that included individualised case-management in the first four weeks following release [26]. Follow-up interviews were conducted approximately one, three and six months (to a maximum of 12 months) after release from prison. This paper describes the results of a sub-study of participants with a history of IDU sourced from the *Passports* randomised controlled trial.

Participants

Prisoners due to be released between September 2008 to August 2010 were identified through correctional records and screened for eligibility. Eligibility criteria included: (i) expected release within six weeks of interview; (ii) sentenced (i.e. not pre-trial detention); (iii) imprisoned for at

least four weeks; and (iv) able to give informed consent. Researchers who were not affiliated with correctional authorities explained the study and supplied a plain-language information sheet; participants provided written informed consent to participate. Of 1665 prisoners eligible and approached, 1325 (80%) consented to participate and completed a pre-release interview [26]. By key demographic and criminal justice indicators, participants were broadly representative of all persons released from prison in Queensland during the recruitment period, with the exception that women were intentionally oversampled to achieve adequate numbers for sex-stratified analyses [26].

Pre-release data were collected via face-to-face, researcher-administered structured questionnaires, typically taking 60-90 minutes to complete. Follow-up interviews were conducted by telephone in the community, or – for participants who had been reimprisoned – in prison, either by telephone or face-to-face. Participants who did not report a lifetime history of IDU at baseline or were released more than eight weeks after their baseline interview were excluded from the analyses presented here.

Measures

Time to reincarceration

The primary outcome measure was the first reincarceration. Participants' observation time was censored at the first occurrence of either: the date of their first reincarceration, date of death, or 31st December 2013. The dates for all prison admissions and releases up to and including 31st December 2013 were supplied by Queensland Correctional Services and linked deterministically using participants' unique corrections identification number. Participant deaths until 31 May 2013 were identified through probabilistic linkage with the National Death Index using name, sex, date of birth, address and all known aliases.

Exposures

The primary exposure of interest was self-reported IDU resumption in the community following release from the index incarceration (the incarceration during which baseline data were collected). Date of release marked the start of the observation period. At baseline, participants were asked about their lifetime IDU history (ever vs. never), and at follow-up about injection of specific

drugs since release or most recent interview. Reported injection of cocaine, amphetamines, heroin or other opioids in the community following incarceration was dichotomised as a time-varying variable reflecting IDU (yes/no) for each follow-up interval. For each drug type, the number of times used in the past 28 days was recorded to provide a description of frequency of use.

Other potential correlates of reincarceration were informed by the literature and obtained from the baseline and follow-up surveys, and from Queensland Correctional Services administrative records (Table 1). We selected a range of time-varying and time-invariant variables encompassing objective and subjective measures of sociodemographic and criminal justice characteristics, mental health, social support and illicit drug use [4, 14-16, 19, 27].

[insert Table 1 about here]

Data analysis

Stratified by reincarceration status, means and proportions were calculated for key baseline exposure variables for descriptive purposes. We used Pearson chi-square tests of independence and t-tests to explore differences in baseline characteristics between participants who did and did not complete at least one follow-up. Using the Kaplan-Meier survival estimator, the median time to reincarceration was compared for participants who did and did not report IDU resumption. Unadjusted and adjusted hazard ratios with 95% confidence intervals (CI) were calculated using a Cox proportional hazards model. Socio-demographic and other variables measured only at baseline were modelled as time-invariant exposures. Using a person-period/interview observation approach, variables measured across interviews were modelled contemporaneously as time-varying covariates (Table 1). The censor date always occurred after the reference period for each covariate. Time-varying data were not collected beyond approximately 6-months post release and a last observation carried forward method used where participants exhibited intermittent missing data on time-varying covariates across person-period records. Post-estimation Wald tests identified interactions between IDU resumption and other covariates. We assessed the proportional hazards assumption with variable-

specific chi-square tests, based on Schoenfeld residuals [28]. For factors that showed a non-linear relationship with time we relaxed the proportional hazards assumption in the Cox model. Post-estimation non-linear equations were specified to explore the nature of the effects for factors with non-proportional hazards [29]. Statistical significance was defined at the 5% level. All statistical analyses were performed using Stata version 13.1 (Stata Corp, Texas, USA).

Ethics

The research protocol was approved by The University of Queensland's Behavioural and Social Sciences Ethical Review Committee (#2007000607), Queensland Corrective Services Research Committee, the Australian Institute of Health and Welfare Ethics Committee (HREC/11/QHC/40 and EC2012/4/58).

RESULTS

Figure 1 shows participant inclusion and exclusion. A total of 561 eligible participants completed at least one follow-up interview; 460 (82%) completed a one-month follow-up (median days since release=33; interquartile range=31-38), 454 (81%) completed a three-month follow-up (median days=99; IQR=94-124) and 465 (83%) completed a six-month follow-up (median days=211; IQR=188-256). Compared with participants who were interviewed in the community following release, participants lost to follow-up (i.e. those who did not complete at least one post-release interview; n=99) were significantly more likely to be Indigenous ($\chi^2(1)=8.41$, $P=0.004$) and to have been incarcerated as a juvenile ($\chi^2(1)=12.83$, $P=<0.001$), and less likely to have been released on parole from their index incarceration ($\chi^2(1)=12.74$, $P<0.001$). Cohort characteristics at baseline are shown in Table 2.

[insert Figure 1 here]

[insert Table 2 here]

Reincarceration

Forty-nine participants (9%) were excluded from remaining analyses due to missing covariate data at baseline. Excluded participants were no more likely to be reincarcerated than included participants (adjusted hazard ratio (AHR)=0.81, 95% CI 0.57-1.15, *P*=0.233). The remaining 512 individuals contributed 1,169 observations, with a median of three observations per participant. Of the remaining 512 participants, 13 (3%) died during the period of observation; of these, nine were censored due to reincarceration prior to their death. Sixty-eight percent of participants (n=350) were reincarcerated between their index release and 31 December 2013 over a combined observation time of 1043.5 years (median observation time 4.4 years (IQR 4.0-4.8)), representing a rate of 33.5 per 100 person-years (95% CI 30.2-37.2).

IDU resumption

A total of 225 participants (44%) reported IDU resumption in the community following their index release from prison. Of these, 44% (n=98) reported IDU by one-month, 26% (n=59) at the three-month and 30% (n=68) at the six-month follow-up. Most (n=161; 72%) participants who resumed IDU reported injecting either methamphetamine or heroin or other opioids (n=126; 57%). Thirty-four percent (n=75) of those who resumed IDU reported injecting both methamphetamines and opioids during follow-up. Of the 225 participants who reported IDU resumption, IDU frequency data were missing for 57 participants (25%); 34% (n=75) reported injecting at least weekly in the four weeks prior to interview; 23% (n=51) reporting at least weekly methamphetamine and 18% (n=40) reporting at least weekly opioid injecting.

The median time to first reincarceration for participants who reported IDU resumption was 7.8 months (95%CI 5.6-9.0), compared with 29.9 months (95%CI 21.2-41.9) for those who did not report IDU resumption.

Factors associated with reincarceration

Unadjusted and adjusted Cox analyses of factors associated with reincarceration are shown in Table 3. Time-invariant, independent predictors of reincarceration were: male gender (AHR=1.62, 95% CI 1.19-2.21), previous adult (prior to index incarceration) (AHR=2.00, 95% CI 1.41-2.84) or juvenile (AHR=1.78, 95% CI 1.27-2.49) incarceration, shorter imprisonment (≤90 days *vs*. >365 days) (AHR=2.09, 95% CI 1.30-3.34), release on parole from the index incarceration (AHR=2.29, 95% CI 1.82-2.88), and a drug-related sentence (AHR=1.84, 95% CI 1.34-2.53). Older age was protective against reincarceration (AHR=0.97, 95% CI 0.95-1.00). Time-varying predictors of reincarceration included resumption of IDU (AHR=2.04, 95% CI 1.60-2.61), unemployment (AHR=1.53, 95% CI 1.07-2.19) and low perceived social support (AHR=1.41, 95% CI 1.05, 1.90) at the most recent interview. Very high psychological distress at the most recent interview was protective against reincarceration (AHR=0.65, 95%CI 0.44-0.95).

[insert Table 3 here]

In testing the proportional hazards assumption, we found the following factors showed effects that were time-dependent: unemployment ($\chi^2(1)=5.48$, p=0.019), shorter prison sentence (≤90 days vs. >365 days, ($\chi^2(1)=7.89$, *P*=0.005)), juvenile detention history ($\chi^2(1)=10.85$, *P*=0.001), and a drug-related index incarceration ($\chi^2(1)=5.62$, *P*=0.018). All of these factors were associated with an increased risk of reincarceration, however their effect decayed slightly over time: unemployment (AHR=0.98, 95% CI 0.96-0.99; *P*=0.023), shorter prison sentence (AHR=0.97, 95% CI 0.94-0.99, *P*=0.021), juvenile detention history (AHR=0.97, 95% CI 0.95-0.99, *P*=0.007) and a drug-related index incarceration (AHR=0.98, 95% CI 0.96-0.99, *P*=0.020). Post-estimation analyses of non-proportional effects showed that the positive effect of unemployment, shorter prison sentence (≤90 vs. >365 days), and a history of juvenile detention on re-incarceration was effectively negated after 18 months following index release from prison, and the effect of a drug-related index incarceration was negated after 24 months post-release.

In post-estimation Wald tests, history of adult incarceration prior to the index incarceration interacted with IDU resumption (Wald $\chi^2(1)=8.57$, *P*=0.003). A prior incarceration history attenuated the effect of IDU resumption on the risk of reincarceration (AHR=0.36, 95% CI 0.18-0.71; *P*=0.003).

DISCUSSION

IDU resumption after release from prison more than doubled the hazard of reincarceration in this study. This effect persisted after adjusting for factors known to be associated with reincarceration, including time-varying post-release measures. Other studies have demonstrated an association between lifetime history of IDU and reincarceration [4]; however, to the best of our knowledge this is the first study to examine the time-varying effect of post-release IDU on reincarceration among ex-prisoners with a history of IDU. Also notable is the array of other factors independently associated with reincarceration in the cohort. Factors associated with criminal justice responses to drug-users – histories of adult and juvenile incarceration, release on parole and short prison sentences – increased the risk of reincarceration, alongside psychosocial factors such as unemployment and low perceived social support.

In our models, the pre- and in-prison drug use factors that were significantly associated with reincarceration in unadjusted analyses were no longer significant after adjustment, while resumption of IDU after release from prison was associated with a doubling of the hazard of reincarceration. In light of the strong relationship between IDU in prison and risky drug use after release previously demonstrated [9, 30], the association between in-prison IDU and reincarceration is likely to have been mediated by post-release resumption of IDU in this study. The association between ongoing IDU and reincarceration in this cohort, and the high frequency of post-release IDU reported by many participants who resumed use, underscores the need for continued and strengthened efforts to provide drug treatment and other non-punitive and therapeutically-oriented responses to prevent a return to problematic drug use following release from prison. Previous studies have observed reductions in drug use and reincarceration through in-prison and transitional drug treatment programs including therapeutic communities and opioid substitution therapy [20, 24]. Although drug treatment programs delivered exclusively in prison were shown to delay resumption of drug use and reincarceration [24, 31], a greater effect size was observed from continued provision of care after release from prison [20, 24]. Integrated prison-to-community treatment programs were not routinely available to the participants in our study.

Our findings support other research demonstrating a critical need for broader psychosocial interventions for people being released from prison [32]. In our study, low perceived social support and unemployment at the most recent interview were closely linked with reincarceration, reflecting the challenges of community integration and engagement following release from prison. Perceiving adequate social support and inclusion is an intangible but critical aspect of supporting self-esteem and community participation [33]. Factors that are likely to influence perceptions of social support include employment, secure housing, and strong social ties. Whilst the association with unstable accommodation and reincarceration was not significant to the $p \leq 0.05$ level after adjustment, the adjusted hazard estimate (AHR=1.31, 95% CI 0.99-1.73) suggests stable housing is a prominent factor in protecting against reincarceration and this is consistent with other studies [15]. Safe and secure housing and ongoing employment provide concrete inducement to abstain from IDU and criminal activity [31, 34], and foster social inclusion. Combining health promotion and harm reduction interventions with strategies to improve social connectivity (such as facilitating contact/visits with significant others and minimising the barriers to early post-release workforce participation) prior to and post-release may protect against a rapid return to IDU, problematic patterns of IDU, and subsequent reincarceration. However, the limited evidence available suggests the recidivism reduction benefits gained from re-entry programs provided in the first few months post-release are not sustained after the support is withdrawn, underscoring the crucial role of continuity of program delivery, transition from forensic to mainstream support services, and client retention [35]. Supporting this contention, the protective effect of employment in our sample diminished over time. Employment flexibility may also be needed for ex-prisoners with a history of IDU who often have numerous parole conditions related to their drug use history, including attendance at supervision meetings and daily dispensing of opioid substitution therapy.

Of note in this study are the multiple predictors of reincarceration which are directly related to criminal justice responses to drug use. History of juvenile and adult incarceration, drug-related index incarceration, shorter prison sentence and release on parole all independently predicted reincarceration in our sample. These factors suggest that current criminal justice responses typically used to address problematic patterns of drug use are inadequate and potentially contribute to the revolving prison door. Drug users constitute a high proportion of the individuals cycling through prison on short sentences and those returned to prison through breaches of strict parole conditions. Punitive

criminal justice responses to drug use are demonstrably ineffective in reducing harmful drug use, drug related crime or associated incarceration [36]. For non-violent drug-related crimes, diversion from prison combined with drug treatment has been shown to reduce recidivism by 30% [37]. Well-resourced parole supervision which is therapeutically-oriented, grounded in evidence, and balances rewards, incentives and graded sanctions, could achieve considerable gains in improving health and social outcomes and simultaneously reducing the burden on the criminal justice system. Parole supervision has accomplished some documented positive outcomes including reports of delayed return to IDU [30], particularly when drug treatment is incorporated [31], suggesting that the existing structures of parole supervision could be capitalised upon to maximise the benefits. However, punitive public attitudes, combined with diminishing social service resources and increased demand for these services, has resulted in greater competition for increasingly limited resources.

Limitations

This study was limited by a number of factors. First, while the inclusion of time-varying covariates with established temporality between the outcome and exposure was a major strength, these exposures were measured to only approximately six months following prison release. We used a last observation carried forward approach for these covariates where data were missing and although this may have introduced some bias into estimation , missingness on time-varying covariates was negligible (no greater than 1.3%). Second, we were unable to censor for deaths during the last seven months of the study; if a participant died between 1 June and 31 December 2013, this was not recorded. Due to the small number of deaths in the cohort and existing evidence that deaths among ex-prisoners are concentrated soon after release [38], this is unlikely to have meaningfully affected our estimates. Third, the survival analyses undertaken are based on the common assumption that random censoring (i.e. loss-to-follow-up) in the cohort is, conditional on covariates, non-informative (i.e. censoring at a particular time is independent of a participant's hazard at that time). Potential bias may result where this assumption is not met, for example if those who were randomly censored in the study due to death exhibited greater hazard of reincarceration at the time. Fourth, we obtained imprisonment records from the state of Queensland only; reincarceration in other jurisdictions during the observation period was not included in our analysis. Finally, this study was conducted in one Australian state and our findings may not be generalisable to other jurisdictions.

CONCLUSION

Resumption of IDU after release from prison more than doubled the hazard of reincarceration in our study, after adjusting for covariates. To the extent that this association is causal, efforts to prevent resumption of IDU in ex-prisoners are therefore likely to reap both public health and criminal justice benefits. This study also identified other important risk factors for reincarceration that warrant consideration for policy and service delivery targeted at people with injecting drug use histories exiting prison. The first few months following prison release are a critical time to facilitate access to health and social support services. Our findings point to the need to scale-up and improve the integration of correctional and post-release interventions that address disadvantage, social inclusion, health service access and drug treatment.

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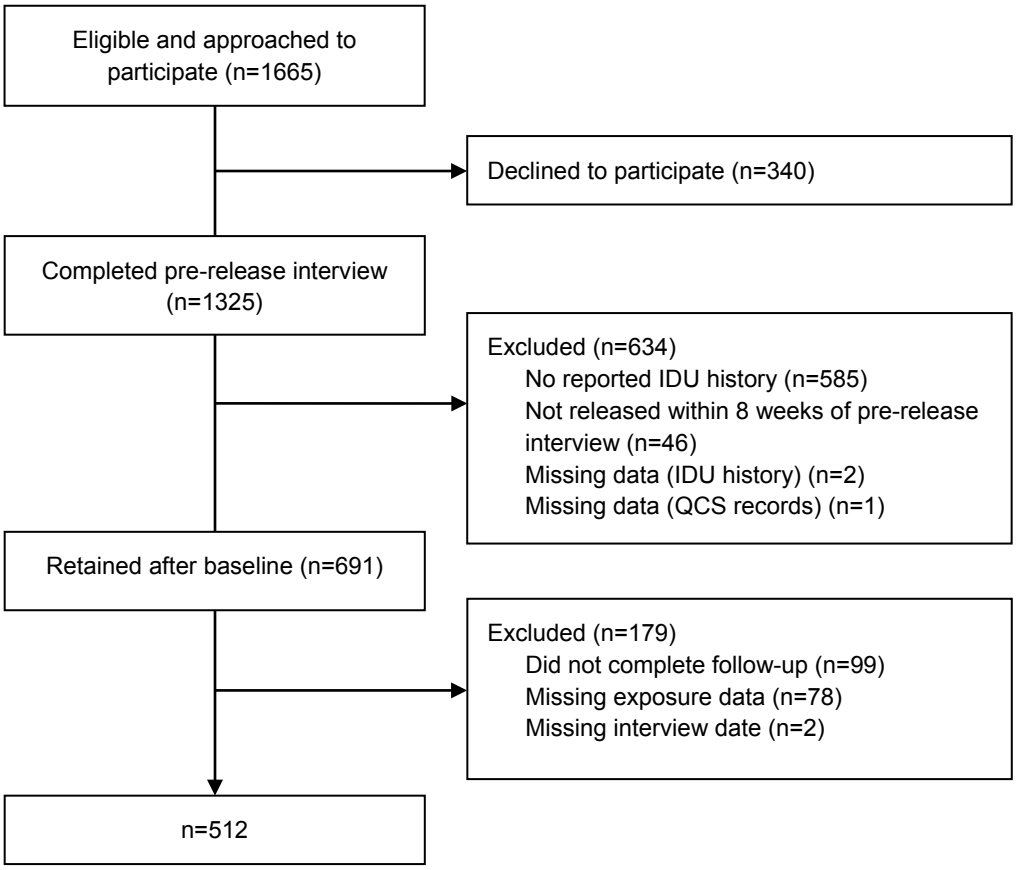
Figure 1: Participant inclusion and exclusion



IDU, injecting drug use; QCS, Queensland Corrective Services.

Table 1: Description of variables selected for inclusion in modelling

Variable	Description	Time-invariant or time-varying	Source
Randomised to Passports intervention	Received personalised case-management intervention after release from index incarceration (vs. usual care)	Time-invariant	*Passports* study records
Demographics			
Male	Male gender (vs. female)	Time-invariant	Baseline survey
Indigenous	Australian Aboriginal and/or Torres Strait Islander (vs. other)	Time-invariant	Baseline survey
Older age	Age in years at baseline	Time-invariant	Baseline survey
Socioeconomics			
<10 years schooling	Completed less than 10 years of schooling (vs. 10+ years)	Time-invariant	Baseline survey
Unemployed	Unemployed (vs part/full-time employment or study) during the 6 months prior to index incarceration (baseline), and in the community prior to follow-up	Time-varying	Baseline & follow-up surveys
Unstable accommodation	Unstable vs. stable accommodation in the 4 weeks prior to index incarceration (baseline), and in the community prior to follow-up	Time-varying	Baseline & follow-up surveys
Criminal justice			
History of adult incarceration	Any incarcerations aged $\geq$17 years prior to index incarceration (vs. no prior incarcerations)	Time-invariant	Baseline survey

History of juvenile incarceration	Any incarcerations aged <17 years (vs. no prior incarcerations)	Time-invariant	Baseline survey
Length of index incarceration	Total time spent incarcerated during the index incarceration, categorised into 3 groups (≤90 days, 91-365 days, >365 days)	Time-invariant	QCS administrative records
Released on parole from index incarceration	Completion of index sentence in the community under parole supervision (vs. no parole supervision)	Time-invariant	QCS administrative records
Mental health			
Prescribed CNS medications	Currently prescribed CNS medications (MIMS, 2014) by prison health service at baseline (vs. no recorded prescriptions)	Time-invariant	QCS health records
Very high psychological distress	Very high (vs low/medium/high) distress, measured by the Kessler 10 [39]	Time-varying	Baseline & follow-up surveys
Social support			
Married/de facto	Married or in a de facto relationship at baseline (vs. no relationship)	Time-invariant	Baseline survey
Received ≥1 visit in prison in past 4 weeks	Visited by friends or family in the 4 weeks prior to baseline interview during the index incarceration (vs. no visits)	Time-invariant	Baseline survey
Low perceived social support	Scored ≤2 on at least two of five items and a total score of ≤18 on the five item ESSI (vs. >3) [40]	Time-varying	Baseline & follow-up surveys
Drug use			
Years since first IDU	Years since first injection drug use at baseline, calculated from age of first injection and age at baseline.	Time-invariant	Baseline survey

IDU during index incarceration	Reported injecting drugs during index incarceration (vs. no IDU)	Time-invariant	Baseline survey
Risky amphetamine use	Scored ≥4 on the amphetamine risk measures on the ASSIST [41] during the 3 months prior to index incarceration (vs. <4)	Time-invariant	Baseline survey
Risky opioid use	Scored ≥4 on the heroin and/or other opioid measures on the ASSIST during the 3 months prior to index incarceration (vs. <4)	Time-invariant	Baseline survey
Drug-related index incarceration	Index incarceration identified as driven by drug-related crime (vs. not drug related)	Time-invariant	QCS administrative records
IDU resumption after index incarceration	≥1 IDU episode reported during follow-up (vs. none)	Time-varying	Follow-up surveys

ASSIST, Alcohol, Smoking and Substance Involvement Screening Test; CNS, central nervous system; ESSI, ENrICHD Social Support Inventory; QCS, Queensland Corrective Services, IDU=injecting drug use,

Table 2: Cohort characteristics at baseline

	Not reincarcerated n=162 n (%)*	Reincarcerated n=350 n (%)*	Total N=512 n (%)*
Randomised to *Passports* intervention	82 (50.6)	179 (51.1)	261 (51.0)
Demographics			
Male	113 (69.8)	277 (79.1)	390 (76.2)
Indigenous	24 (14.8)	75 (21.4)	99 (19.3)
Age in years, mean (SD)	32.4 (7.7)	30.0 (7.4)	30.8 (7.6)
Socioeconomics			
< 10 years schooling	89 (54.9)	174 (49.7)	263 (51.4)
Unemployed prior to index incarceration	76 (46.9)	190 (54.3)	266 (51.9)
Unstable accommodation prior to index incarceration	27 (16.8)	72 (20.6)	99 (19.4)
Criminal justice			
History of adult incarceration prior to index incarceration	115 (71.0)	306 (87.4)	421 (82.2)
History of juvenile incarceration	40 (24.7)	115 (32.9)	155 (30.3)
Length of index incarceration	55 (31.0)	112 (32.0)	167 (32.6)
≤ 90 days	81 (50.0)	174 (49.7)	255 (49.8)
91 – 365 days	26 (16.1)	64 (18.3)	90 (17.6)
> 365 days	45 (27.8)	171 (48.9)	216 (42.2)
Released on parole from index incarceration	60 (36.4)	132 (36.5)	192 (36.4)
Mental health			
Prescribed CNS medications	20 (11.3)	31 (8.1)	51 (9.1)

	Not reincarcerated n=162 n (%)*	Reincarcerated n=350 n (%)*	Total N=512 n (%)*
Very high psychological distress	66 (40.7)	139 (39.7)	205 (40.4)
Social support	73 (45.1)	151 (43.1)	224 (43.8)
Married/de facto	131 (26.0)	86 (22.5)	132 (23.6)
Received ≥ 1 visit in prison during past 4 weeks			
Low perceived social support	13.5 (7.6)	12.2 (6.7)	12.6 (7.0)
Drug use	21 (22.0)	88 (25.1)	109 (21.3)
Years since first IDU ((mean (SD))	98 (55.4)	261 (68.2)	359 (64.1)
IDU during index incarceration	48 (27.1)	163 (42.5)	211 (37.6)
Risky amphetamine use[a]	63 (38.9)	170 (48.6)	233 (45.5)
Risky opioid use[a]			
Drug-related index incarceration			

[a] During the three months prior to incarceration; * Percentages are rounded. CNS, central nervous system medication; IDU, injecting drug use; SD, standard deviation.

Table 3: Unadjusted and adjusted hazard ratios for reincarceration following release from prison (N=512)

	HR (95% CI)	*P*-value	AHR (95% CI)	*P*-value
Randomised to *Passports* intervention	1.02 (0.83-1.26)	0.839	1.08 (0.87-1.35)	0.490
Demographics				
Male	1.30 (1.00-1.68)	0.046	1.62 (1.19-2.21)	0.002
Indigenous	1.27 (0.98-1.64)	0.058	1.19 (0.90-1.57)	0.228
Older age (per year)	0.98 (0.96-0.99)	0.001	0.97 (0.95-1.00)	0.041
Socioeconomics				
<10 years schooling	1.12 (0.91-1.38)	0.279	0.88 (0.70-1.10)	0.262
Unstable accommodation[1]	1.62 (1.26-2.09)	<0.001	1.31 (0.99-1.73)	0.063
Unemployed[1]	1.16 (0.91-1.46)	0.227	1.53 (1.07-2.19)	0.020
Criminal justice				
History of adult incarceration prior to index incarceration	1.93 (1.41-2.65)	<0.001	2.00 (1.41-2.84)	<0.001
History of juvenile incarceration	1.42 (1.13-1.77)	0.002	1.78 (1.27-2.49)	0.001

	HR (95% CI)	*P*-value	AHR (95% CI)	*P*-value
Length of index incarceration				
< = 90 days	0.99 (0.73-1.35)	0.958	2.09 (1.30-3.34)	0.002
91 – 365 days	0.94 (0.71-1.26)	0.699	1.02 (0.67-1.55)	0.938
> 365 days	1		1	
Released on parole from index incarceration	1.76 (1.42-2.18)	<0.001	2.29 (1.82-2.88)	<0.001
Mental health				
Prescribed CNS medications	1.08 (0.87-1.34)	0.497	1.16 (0.92-1.50)	0.210
Very high psychological distress[1]	0.85 (0.59-1.22)	0.380	0.65 (0.44-0.95)	0.028
Social support				
Married / de facto	0.99 (0.80-1.23)	0.950	0.84 (0.65-1.06)	0.148
Received ≥1 visits in prison during past month	0.91 (0.74-1.13)	0.391	1.02 (0.81-1.29)	0.861
Low perceived social support[1]	1.42 (1.09-1.85)	0.010	1.41 (1.05-1.90)	0.022
Drug use				

	HR (95% CI)	*P*-value	AHR (95% CI)	*P*-value
Years since first IDU at baseline	0.98 (0.97-1.00)	0.054	0.99 (0.96-1.02)	0.409
IDU during index incarceration	1.52 (1.19-1.94)	0.001	1.13 (0.85-1.50)	0.403
Risky amphetamine use prior to index incarceration	1.42 (1.13-1.78)	0.003	1.17 (0.92-1.50)	0.201
Risky opioid use prior to index incarceration	1.46 (1.18-1.81)	<0.001	1.13 (0.88-1.44)	0.333
Drug-related index incarceration	1.38 (1.12-1.70)	0.002	1.84 (1.34-2.53)	<0.001
IDU resumption following index incarceration[1]	2.13 (1.72-2.64)	<0.001	2.04 (1.60-2.61)	<0.001

[1] Time-varying covariate. AHR, adjusted hazard ratio; CI, confidence intervals; CNS, central nervous system; HR, unadjusted hazard ratio; IDU, injecting drug use

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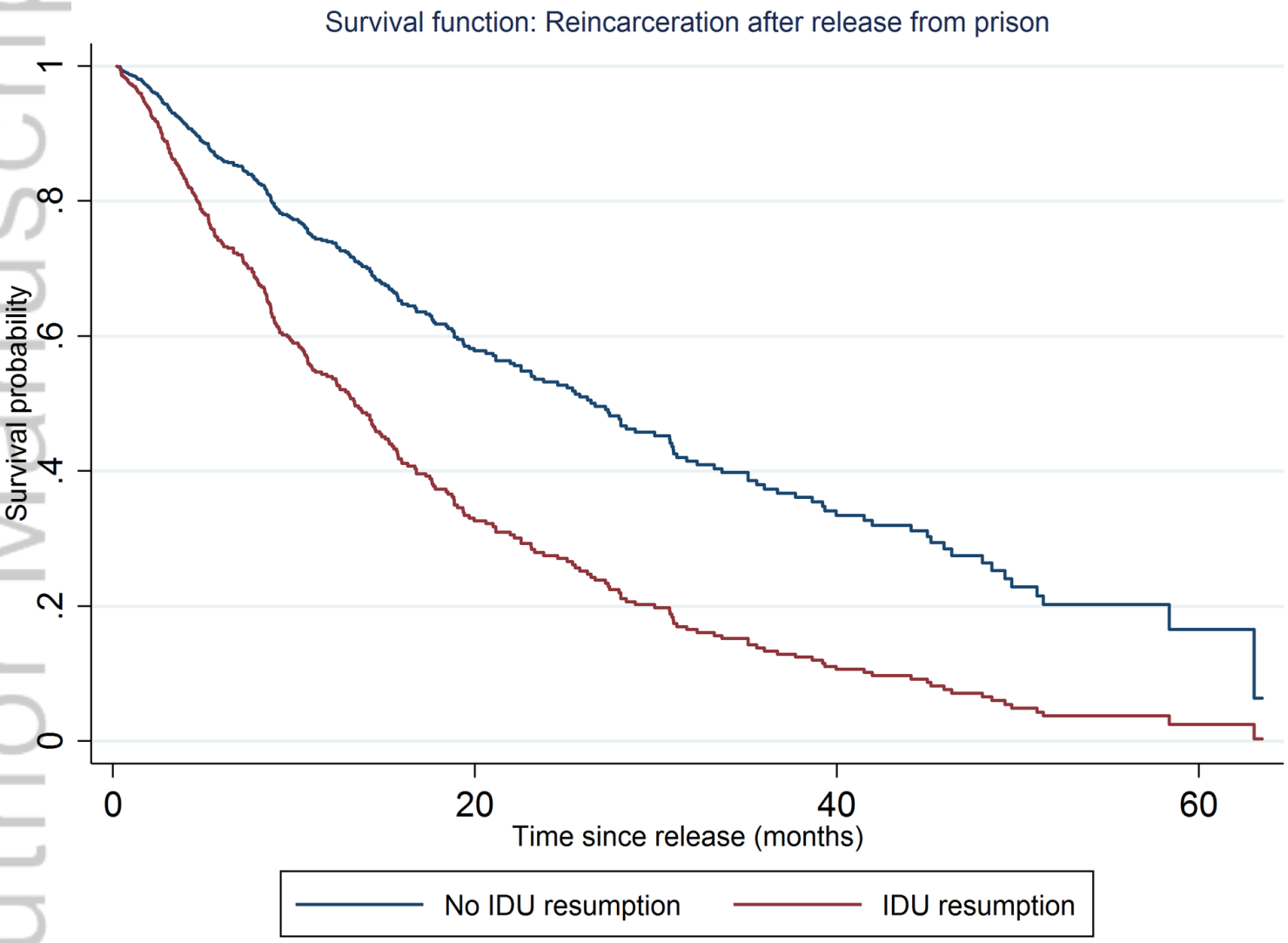

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