Incidence and risk factors for mortality after release from prison in Australia: A prospective cohort study

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Abstract

Aims: To estimate the incidence and identify risk factors for mortality in adults released from prisons in the state of Queensland, Australia.

Design: Prospective cohort study, linking baseline survey data with a national death register.

Setting: Selected prisons within Queensland, Australia.

Participants: Adults (N=1320) recruited in Queensland prisons within 6 weeks of expected release, between August 2008 and July 2010, followed for up to 4.7 years in the community.

Measurements: Participants completed a comprehensive baseline survey covering psychosocial circumstances, physical and mental health, substance use, and health risk behaviours. Clinical data were abstracted from prison medical records and obtained through probabilistic linkage with state-based, community health records. Dates of prison release and reincarceration were obtained from correctional records. Deaths were identified through probabilistic linkage with the National Death Index. Adjusted hazard ratios (AHR) were calculated using proportional hazards regression models. Standardised mortality ratios (SMR) were calculated using the population of Queensland as the reference. General population data were obtained from the Australian Bureau of Statistics.

Findings: The rate of mortality in the cohort was higher than in the age-sex matched general population of Queensland for all causes (SMR=4.0, 95%CI=2.9-5.4) and drug-related causes (SMR=32, 95%CI=19-55). In a multivariable model, adjusting for age, sex and Indigenous status, factors associated with increased mortality risk included expecting to have average or better funds available on release (AHR=2.9, 99%CI=1.2-7.1), poor mental health (AHR=2.6, 99%CI=1.1-6.1), and self-reported lifetime history of overdose (AHR=2.5, 99%CI=1.04-6.2).

Conclusions: People released from prison in Queensland, Australia are at increased risk of death, particularly due to drug-related causes. Those at greatest risk of death are characterised by poor physical and mental health and a history of risky substance use.

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Introduction

People with a history of incarceration are a high-risk group for mortality, particularly in the period immediately after release from prison. The majority of deaths in this period are preventable and due to drug-related causes, suicide or injury (1, 2). A recent meta-analysis of this literature estimated that the rate of death within one year of release from prison was around 20 times higher than in age- and sex-matched peers, although the degree of elevation in risk varied markedly between studies (1). Another meta-analysis found that the risk of drug-related death was between three and eight times higher in the first two weeks post-release than in the subsequent ten weeks (3).

Although it is now well established that people released from prison are at increased risk of death, most studies have relied on retrospective linkage of routinely collected data that typically provide narrow demographic and criminogenic information on those at risk, limiting the capacity to inform preventive efforts. One data linkage study of 47,326 ex-prisoners in Sweden linked correctional records and death records with a National Patient Register and found that a history of diagnosed substance use disorder was an independent risk factor for all-cause death (4).

Two studies have used a nested case-control design to study death after release from prison. In these studies, correctional and mortality records are linked, then data from prison medical records for identified cases (deaths) and matched controls are abstracted and analysed. In a study of 699 cases and 699 matched controls in the United States, identified risk factors for all-cause mortality included a history of homelessness, injecting drug use, tobacco use, cirrhosis, and use of psychiatric medications before release from custody. Substance use disorder treatment in prison was protective (5). In a similar study of 286 cases and 286 matched controls in Australia, risk factors for external causes of death included use of heroin and other opioids before incarceration, risky drinking before incarceration, use of antidepressants in prison, and having served two or more prison sentences. Being married was protective (6).

A few studies have examined deaths after release from custody prospectively. In a prospective study of 1829 youth detained in Illinois, USA, from 1995 to 1998 and followed for a median of 14.7 years, those at greatest risk of death were male, black or Hispanic, gang members, and had an alcohol use disorder at baseline (7). In a similar prospective study of 515 juvenile justice clients in Australia, surveyed at baseline and followed for a median of 8.9 years, weekly use of opioids, sleeping pills or painkillers, polydrug use and injecting drug use predicted all-cause death (8). Among 382 heroin users in a randomised trial of in-prison methadone treatment in Australia, followed for an average of 4.2 years, 17 died while out of treatment and none died while in treatment (9). Most recently, in a prospective observational study of 12,260 people with an opioid use disorder released from prisons in England, 24 deaths were observed (18 drug-related) within 4 weeks of release; the risk of death was lower in those receiving opioid substitution treatment (OST) at release (10).

These studies suggest that those with a history of poor mental health, risky substance use and social marginalisation are at greatest risk of death after release from custody. However, most studies have been retrospective in design, and have relied exclusively on administrative data which typically suffer from crude ascertainment of risk and protective factors, and may be vulnerable to ascertainment bias. As such, the evidence base remains thin and further research, focussing on identification and characterisation of modifiable risk factors, is required to inform targeted prevention. The aim of this study was to identify risk and protective factors for all-cause mortality, in a cohort of adults followed prospectively from prison into the community in the state of

Queensland, Australia. A secondary aim was to calculate the all-cause and drug-related mortality rates in the cohort, and compare these with the general population of Queensland.

Methods

This is a prospective cohort study with data linkage, in which participants completed a baseline survey prior to release from prison, and were followed prospectively until death or censoring. The original study was a randomised controlled trial (RCT) of a case management intervention for adults transitioning from prison to the community in the state of Queensland, Australia. The trial design and outcomes are described in detail elsewhere (11-13). Those eligible for participation were sentenced prisoners within six weeks of expected release from custody who were able to provide informed, written consent. Of those approached and eligible, 80% consented to participate. The cohort is representative of adults released from prison in Queensland during the study period, on measured demographic and criminal justice variables, except that women were intentionally over-sampled (11). All participants from the original RCT were included in the analyses presented here.

Approval for the study was provided by the University of Queensland's Behavioural and Social Sciences Ethical Review Committee, the Queensland Corrective Services (QCS) Research Committee, the Queensland Health Human Research Ethics Committee, and the Australia Institute of Health and Welfare (AIHW) Ethics Committee.

Baseline characteristics

Baseline interviews took place from August 2008 to July 2010. Interviews were conducted in a private location within the prison, by trained interviewers not affiliated with corrections. The interview covered socio-demographic characteristics, physical and mental health, substance use and health risk behaviours.

Selection of baseline variables for analysis was informed by the literature (14) and included variables that may have a causal relationship with mortality, and those that could be construed as markers for mortality risk. We categorised variables into five broad domains: socio-demographic, criminal justice system exposure, mental health, physical health, and substance use.

Demographic variables included age in years at release, sex, Indigenous status, years of education, and current relationship status. Participants reported whether they had been taken away from their family as a child, any arrangements for stable accommodation after release from prison, whether they had any outstanding debts, available money after release from custody, and whether they had accessed any sort of transitional support in prison. Perceived social support was assessed using the ENRICHD Social Support Inventory (ESSI) (15). Criminal justice system history included juvenile detention, prior incarceration as an adult, and number of subsequent incarcerations between interview and censoring.

Physical health-related functioning was assessed using the Physical Component Summary (PCS) score from the Short Form Health Survey version 2 (SF36v2) using Australian population standards (16, 17). Participants also self-reported diagnosis of asthma, diabetes, and heart disease, responding to questions sourced from Australia's National Health Survey (18). Waist to height ratio (WHR) was measured objectively by the interviewer, and was used to classify individuals as overweight or obese using standard cut-offs (19).

Mental health-related functioning was assessed using the Mental Component Summary (MCS) score from the SF36v2. Psychological distress in the past four weeks was measured using the Kessler Psychological Distress scale (K10) (20). We screened for intellectual disability using the Hayes Ability Screening Index (HASI) (21). Participants also indicated whether they were currently suffering from a mental disorder that had been diagnosed by a mental health professional, and whether they had ever attempted suicide.

Risky alcohol use was measured using the Alcohol Use Disorders Identification Test (AUDIT) (22). High risk use of heroin and other opiates, methamphetamine, and cannabis were assessed using the WHO Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) (23). Nicotine dependence was assessed using the Fagerström Test (24). Participants also reported on drug use history, and whether they had ever experienced a drug overdose.

Self-report data were supplemented by a review of prison medical records. We obtained information on current prescribed medications, which were grouped into those acting on the central nervous system (CNS, a proxy for psychiatric medications) and those used primarily to treat physical health conditions (non-CNS medications). We also obtained information on hepatitis C infection (anti-HCV+) where prison-based test results had been recorded.

We also undertook retrospective, probabilistic linkage (25) with state-based, electronic health records to identify evidence of historical morbidity from 1999 onwards. From hospital records we identified instances of psychiatric hospital admission. From ambulatory alcohol, tobacco and other drug treatment records we created a binary variable reflecting any history of treatment for a substance use problem before incarceration. From a state-wide notifiable diseases register we identified instances of hepatitis C infection (anti-HCV+), and combined these with prison medical records into a single binary variable reflecting any medically verified record of hepatitis C infection.

Participant identities were probabilistically linked with mortality data from Australia's National Death Index (NDI). The linkage added up to nine ICD-10 coded causes of death, with dates of death having a possible range of 18 August 2008 to 31 May 2013. There were no deaths in custody reported for the study sample during the study period. Causes of death were not available for deaths occurring in the year 2013.

Statistical analysis

We calculated person time starting from the date of the first release after baseline interview, and censored on 31 May 2013 or death, with any time in prison removed from follow-up time at risk.

We calculated the all-cause crude mortality rate (CMR) per 1000 person years during follow-up, and calculated indirectly standardised mortality ratios (SMRs) comparing participants to the 10 year age group and sex matched general population in Queensland (26, 27).

To describe the causes of death we categorised ICD codes into groups proposed by Randall et al (28). Due to the low number of deaths, we constructed three overlapping cause of death groups based on previous literature, and then calculated the CMR and SMR for those groups. These groups include (a) unnatural deaths, (b) drug-related deaths, and (c) alcohol and other drug-related deaths (supplementary table S1).

To identify risk and protective factors for death we constructed a series of proportional hazards models to generate hazard ratios for each potential risk factor. The majority of variables were

collected in binary form; others were dichotomised using common cut-offs found in the literature, or a variation of means/medians as appropriate (supplementary table S2). Each model was adjusted for Indigenous status, sex and age in decades at release, with the confidence interval reported at the 99% level to account for the large number of variables tested.

Next, we assessed those variables that were significant (p<.01) that we suspected as being highly associated, and selected the best explanatory covariate using a stepwise approach (supplementary note S5). The remaining significant covariates were then entered into a multivariable model, into which we forced the inclusion of sex and Indigenous status to be consistent with the standard covariates used previously. Records having covariates with missing values were removed from the models.

All analyses were carried out using SAS version 9.4 (29).

Results

Of the 1325 participants, five were excluded because there was no valid date of release from prison during the follow-up period, leaving 1320 participants for this analysis. Participants contributed from 7 days to 4.7 years of person-time in the community, with a median follow-up of 3.3 years (Q1-Q3=2.6-3.9) and total follow-up of 4154 person years in the community (Table 1). There were 706 (53.5%) participants who returned to prison up to 21 times during the follow-up period, with a total of 784 person years spent in prison during follow-up that were excluded from analysis. At the end of the study follow-up period there were 217 (16.4%) participants in prison.

INSERT TABLE 1

Mortality

We observed 42 deaths (3.2%) during follow-up, giving a crude mortality rate of 10 (95%CI=7.5-14) deaths per 1000 person years. The age and sex adjusted all-cause standardised mortality rate was 4.0 (95%CI=2.9-5.4) times higher for ex-prisoners than for the general population of Queensland (Table 2).

INSERT TABLE 2

There were 4 deaths in 2013 that were not assigned a cause of death at the time of data extraction. Of the 38 participants with known causes of death, 22 included unnatural causes. The mortality rate for unnatural deaths was 5.3 (95%CI=3.5-8.0) deaths per 1000 person years, which was 7.3 (95%CI=4.8-11) times higher than in the general population of Queensland when adjusted for age and sex.

Nineteen deaths were alcohol or other drug-related and of these, 14 were classified as an overdose. Of the overdose deaths, one involved alcohol only, three involved alcohol and other drugs including benzodiazepines and/or an opioid, and the remaining 10 were non-alcohol, opioid-related overdoses, with three of these mixed with a benzodiazepine. The drug-related mortality rate was 3.4 (95%CI=2.0-5.7) deaths per 1000 person years, which was 32 (95%CI=19-55) times higher than in the age-sex matched general population of Queensland. The combined alcohol and other drug-related mortality rate was 4.6 (95%CI=2.9-7.2) deaths per 1000 person years, which was 22 (95%CI=14-35) times that of the age and sex matched general population of Queensland.

Risk factors for all-cause mortality

Table 3 presents the hazard of all-cause mortality as a function of selected risk factors, adjusted for age, sex and Indigenous status. We found no association between sex or Indigenous status and death. After adjusting for sex and Indigenous status, each decade of age was associated with a 65% increase in the hazard of all-cause mortality. We identified five other variables that were significantly associated with mortality, spanning socio-demographic, physical health, mental health and substance use domains.

INSERT TABLE 3

We examined the significant variables noting pairs that were highly correlated: "History of psychiatric hospitalisation" with "SF36 Mental health summary score", and "Hepatitis C positive" with "Ever overdosed". We used a stepwise removal process (supplementary table S5) to remove the least explanatory variable of each pair, then combined the remaining significant covariates, plus sex and Indigenous status, into a multivariable proportional hazards model to predict all-cause mortality (Table 4). The model yielded four factors that were significantly (p<.01) associated with all-cause mortality: age (AHR=1.7 per decade older), expected money on release being average or greater (AHR=2.9), low mental-health-related functioning (AHR=2.6), and lifetime history of overdose (AHR=2.5).

INSERT TABLE 4

Discussion

We examined the incidence and risk factors for mortality in a representative cohort of adults followed prospectively from prison into the community in Australia. We observed an all-cause crude mortality rate of 10 deaths per 1,000 person-years, which is similar to that reported in a recent national report on the health of Australia's prisoners (30). We estimated that this rate of death is 4 times greater than in the age-sex matched general population of Queensland; this is consistent with the findings of previous studies within and outside of Australia (1). People released from prison are at dramatically increased risk of death, typically due to preventable causes.

We identified a number of factors that were associated with mortality, across multiple health and social domains. While the leading causes of death were alcohol and other drug-related, the risk factors associated with all-cause mortality also included poor physical and mental health. Two measures of mental health were associated with mortality: history of psychiatric hospitalisation, and poor mental health-related functioning prior to release from prison. Previous data linkage studies have documented an association between history of psychiatric illness and all-cause mortality (4), and between in-prison psychiatric hospitalisation and suicide (31). Our findings, informed by careful assessment of mental health status at the point of release from prison, add to the growing body of international evidence highlighting the vulnerability of people with a history of mental illness as they transition from prison to the community (32). In addition to careful history taking, there is a clear need for routine assessment of mental health status prior to release from prison, and for evidence-based re-entry support for those identified as vulnerable (33).

In our study over 40% of deaths were substance-related, and the rate of substance-related death was more than 20 times that of age and sex matched community peers. Consistent with evidence that nonfatal overdose increases the risk of subsequent fatal overdose (34), we found that participants who reported a lifetime history of overdose had two and a half times the hazard of

death after release from prison. Routine assessment of overdose history at prison reception, and again prior to release, may assist in identifying those at greatest risk of death. People who inject drugs are dramatically over-represented in prison settings, and are at high risk of substance-related morbidity and mortality after release from custody (35, 36). Critical, evidence-based preventive measures include opioid substitution treatment (OST) in prison and after release from prison, and provision of naloxone for peer administration at release (37-40). Neither of these measures was available to prisoners in the jurisdiction where this study was conducted (with the exception of a minority of women receiving OST).

Although fewer than one in ten deaths was due to liver disease, in unadjusted analyses we found that hepatitis C infection was associated with an increased risk of all-cause mortality. One possible explanation for this finding, consistent with the fact that almost half of all deaths were substance related, is that hepatic dysfunction associated with chronic hepatitis C infection slowed drug metabolisation, increasing the risk of overdose (41). However, HCV infection was also strongly associated with injecting drug use in our cohort (RR=6.3, 95%CI=4.4-9.0) and lifetime overdose history (RR=3.3, 95%CI=2.7-4.0), suggesting that it may have served as a marker for prolonged or high-risk injecting drug use. The association between injecting drug use and mortality is well documented (42).

In contrast to some previous studies that have found a dose-response relationship between episodes of incarceration and mortality risk (43), none of the criminal justice system factors we examined was independently associated with mortality. Although a study with more statistical power may have produced different results, these findings nevertheless highlight the importance of assessing and responding to the health and social needs of people transitioning from prison to community in order to reduce mortality in this population (44).

Unexpectedly, we found that participants who expected to have access to more money than average on release from prison were at increased risk of death. This finding contrasts with evidence from general population studies, where social disadvantage and relative deprivation are associated with increased mortality risk (45). One possible explanation for this finding is that individuals with more disposable income on release from prison engaged in more extensive and risky substance use after release. Although we have no data to support this hypothesis, previous cohort studies of regular illicit drug users have documented a positive association between income and intensity of drug use (46). This finding will require replication and further exploration in future studies.

Our study is among only a handful internationally to examine mortality outcomes after release from prison using a prospective design. Important strengths include the large, representative sample, rich baseline data obtained from surveys, clinical records and retrospectively linked health data, accounting for subsequent episodes of incarceration, and linkage with a national death register. Although many of our findings are consistent with previous research that has relied on linked administrative data, our rich ascertainment of risk and protective factors provides important confirmation of these associations.

The study had two notable limitations. First, like most studies in this literature, our findings relate to only one jurisdiction. Second, because death is a rare event and our period of follow-up was comparatively short, we identified only a small number of deaths, and had modest statistical power. However, the number of deaths observed in our study is larger than in some previous prospective

studies of mortality after release from prison (9, 10), and our estimates of both mortality rates and risk factors for death are consistent with previous research.

Future studies linking prison records with not only mortality records but also morbidity data should provide new insights into the health-related trajectories of those who die prematurely after release from prison. Furthermore, with growing adoption of electronic health records in prison settings, future studies may be able to combine the advantages of this study (rich baseline data) with the advantages of population data linkage (power and generalisability).

Conclusions

People released from prison are at markedly increased risk of death, particularly due to drug-related causes. Those at greatest risk of death are characterised by social disadvantage, poor physical and mental health, and a history of risky substance use. Given that complex health and social needs are normative among people released from prison in most countries, preventive efforts in custody and after return to the community must be commensurately comprehensive and coordinated, and delivered at a scale proportionate to need.

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Table 1. Baseline characteristics of participants, according to age at release.

Characteristic	<25 years	≥25 years	Total
N (%)	331 (25.1%)	989 (74.9%)	1320 (100%)
Indigenous, N (%)	106 (32.0%)	229 (23.2%)	335 (25.4%)
Male, N (%)	263 (79.5%)	778 (78.7%)	1041 (78.9%)
Re-imprisonments [A], mean (min-max)	1.0 (0-10)	1.3 (0-21)	1.2 (0-21)
Person time in community			
Sum years (range per person)	950 (0.21-4.7)	3,204 (0.02-4.7)	4,154 (0.02-4.7)
Median years [A] (IQR)	3.1 (2.1-3.7)	3.4 (2.7-4.0)	3.3 (2.6-3.9)
Deaths, N (%)	3 (1.2%)	39 (3.6%)	42 (3.2%)
Crude mortality rate [B] (95%CI)	3.2 (1.0-9.8)	12 (8.9-17)	10 (7.5-14)

[A] Per participant after index release and prior to end of follow up.

[B] Crude mortality rate is deaths per 1000 person years.

Table 2. Crude mortality rates and indirectly standardised mortality ratios for selected causes of death.

Cause of death	Deaths Observed	Deaths Expected	CMR[A] (95%CI)	SMR[B] (95%CI)
All cause	42	11	10 (7.5-14)	4.0 (2.9-5.4)
Unnatural	22	3.0	5.3 (3.5-8.0)	7.3 (4.8-11)
Drug related	14	0.43	3.4 (2.0-5.7)	32 (19-55)
Alcohol or drug related	19	0.85	4.6 (2.9-7.2)	22 (14-35)

[A] Crude mortality rate (CMR) is measured as deaths per 1000 person years.

[B] Standardised mortality ratio (SMR) is standardised by sex and 10 year age group to the Queensland general population.

Table 3. Cox proportional hazards models for all-cause mortality, adjusted for age, sex and Indigenous status.

Measure	N (%)[A]	Deaths[B]	AHR[C] (99% CI)	P value
STANDARD COVARIATES [D]				
Indigenous	335 (25.4%)	8	0.96 (0.32-2.9)	0.916
Sex is male	1041 (78.9%)	36	1.4 (0.44-4.3)	0.462
Age by decade (continuous)			1.7 (1.3-2.1)	<.0001
SOCIO-DEMOGRAPHIC				
7 or fewer years of education	124 (9.4%)	9	2.4 (0.88-6.5)	0.024
Not married or in stable relationship	783 (59.1%)	27	1.3 (0.56-3.0)	0.425
Unstable accommodation after release	159 (12.0%)	10	2.2 (0.87-5.7)	0.029
Lack of social support (ESSI <= 16)	116 (8.8%)	7	1.5 (0.56-3.9)	0.295
Taken away from family as child	263 (19.9%)	12	2.0 (0.84-4.7)	0.039
Expected money on release >= $420 (Median)	691 (52.2%)	32	2.6 (1.04-6.4)	0.007
Any outstanding debts to be settled	865 (65.3%)	25	1.2 (0.50-2.7)	0.653
CRIMINAL JUSTICE SYSTEM EXPOSURE				
Prior adult incarcerations	885 (66.8%)	27	1.2 (0.48-3.1)	0.588
1 or more extra releases during follow up (time varying)	670 (50.6%)	17	1.8 (0.76-4.3)	0.080
Juvenile detention history	365 (27.6%)	14	1.9 (0.81-4.6)	0.052
Transitional support service accessed	316 (23.9%)	11	0.92 (0.37-2.3)	0.824
MENTAL HEALTH				
Any mental health hospitalisation before prison	263 (19.9%)	14	2.5 (1.1-5.8)	0.006
SF36 Mental Summary score < 31 (Mean-SD)	202 (15.3%)	12	2.6 (1.1-6.1)	0.004
Very high psychological distress (K10 >=30)	122 (9.2%)	6	1.7 (0.53-5.2)	0.255
Ever attempted suicide	278 (21.0%)	11	1.5 (0.62-3.7)	0.230
Possible intellectual disability (HASI < 84.5)	309 (23.3%)	8	0.86 (0.31-2.4)	0.690
Taking CNS medications according to prison medical records	370 (27.9%)	14	1.2 (0.52-2.9)	0.534
Mental illness current	312 (23.6%)	9	0.98 (0.37-2.6)	0.959
PHYSICAL HEALTH				
Taking non-CNS medications recorded in prison medical records	345 (26.1%)	18	1.3 (0.53-3.0)	0.472
Hepatitis C positive	450 (34.0%)	20	2.4 (1.02-5.9)	0.009
SF36 Physical Summary score < 45 (Mean-SD)	177 (13.4%)	14	2.1 (0.83-5.5)	0.039
Overweight waist-height ratio (M>58, F>54)	379 (28.6%)	15	1.1 (0.43-2.7)	0.831
Blood pressure >=140/90	302 (22.8%)	13	0.95 (0.39-2.3)	0.893
Diagnosed with asthma ever	448 (33.8%)	17	1.6 (0.68-3.6)	0.165
Diagnosed with heart disease past 12 months	33 (2.5%)	5	3.1 (0.91-10)	0.017
Diagnosed with diabetes ever	71 (5.4%)	8	2.4 (0.69-8.4)	0.070
SUBSTANCE USE				
Possible alcohol dependence (AUDIT >=20)	372 (28.1%)	13	1.9 (0.67-5.4)	0.112
Contact with community drug & alcohol services before prison	498 (37.6%)	18	1.9 (0.75-4.6)	0.077
High risk cannabis use (ASSIST > 26)	123 (9.3%)	1	0.36 (0.03-4.9)	0.309
High risk methamphetamine use (ASSIST > 26)	162 (12.2%)	3	0.75 (0.16-3.5)	0.623
High risk heroin or other opiate use (ASSIST > 26)	121 (9.1%)	7	2.8 (0.9-8.3)	0.015
Ever injected any drug	735 (55.5%)	24	2.0 (0.76-5.0)	0.066
Injected any drug in the past 12 months	169 (12.8%)	8	2.4 (0.8-7.0)	0.035
Ever overdosed	303 (22.9%)	15	2.5 (1.04-6.1)	0.007
Nicotine dependent (Fagerström score >= 5)	616 (46.5%)	23	2.1 (0.9-4.9)	0.018

[A] N is the number of participants exposed. Denominator for percentages is all participants.

[B] The number of deaths within the exposed group.

[C] AHR is the Adjusted Hazard Ratio. Each row is a separate Cox proportional hazards model, adjusted for age, sex and Indigenous status.

[D] Each variable listed in the "Standard Covariates" section is used in all of the models.

Table 4. Multivariable Cox proportional hazards model of all-cause mortality after release from prison (N=1276).

Parameter	AHR (99% CI)	P value
Indigenous	1.1 (0.38-3.1)	0.849
Sex is male	1.5 (0.52-4.5)	0.310
Age (in decades) at start of follow up	1.7 (1.3-2.3)	<0.0001
SF36 Mental health score < 31 (Mean-SD)	2.6 (1.1-6.1)	0.003
Expected money on release >= $420 (Median)	2.9 (1.2-7.1)	0.003
Ever overdosed	2.5 (1.04-6.2)	0.007