



Comorbid substance and non-substance mental health disorders and re-offending among NSW prisoners

Nadine Smith and Lily Trimboli

Aim: To examine whether released prisoners with mental health disorders (including substance, non-substance, and comorbid substance and non-substance disorders) are at increased risk of re-offending when compared with released prisoners without mental health disorders.

Method: Data for 1,208 NSW prisoners who participated in the 2001 Mental Health Survey (conducted by NSW Justice Health) were linked to the NSW re-offending database to track their criminal history for five years prior to entering prison and 24 months following their exit from prison. Mental health diagnoses were obtained using the Composite International Diagnostic Interview and a number of other mental health screening measures. To control for demographic and prior offending differences between mental health groups, weighted re-offending rates for each of the mental health groups (substance only, non-substance only, comorbid substance and non-substance, and no disorders) were calculated.

Results: Within 24 months of their release from prison, 65 per cent of the total sample had re-offended, and their rate of re-offending was related to their mental health disorder/s. The weighted rate of re-offending was greater in prisoners who had comorbid substance and non-substance mental health disorders (67%) compared with prisoners who had: only a substance disorder (55%), a non-substance mental health disorder (49%), and no mental health disorders (51%).

Conclusion: These results suggest that an effective way of reducing re-offending is to treat prisoners who have comorbid substance and non-substance mental health disorders. Investing in evidence-based programs and court or prison alternatives could result in numerous benefits for both the community and the individual offender.

Keywords: mental health, substance disorders, comorbidity, prisoners, re-offending

INTRODUCTION

Some forms of mental illness are associated with criminal offending. Not only are people with mental health problems more likely than non-mentally ill persons to have a criminal history, but offenders also tend to have more mental health problems than people in the general community.

An association between mental illness and offending has been demonstrated when psychiatric patients living in the community are the focus of investigation and researchers examined their patterns of criminal convictions or arrests (e.g. Fisher et al., 2006; Wallace, Mullen, & Burgess, 2004). For example, in a Victorian study, Wallace et al. (2004) found that, compared with a community group matched for age, gender and place of residence, persons clinically diagnosed with schizophrenia were significantly more likely to have been convicted of a criminal offence (7.8% of the community group vs 21.6% of persons with schizophrenia). Moreover, they were significantly more likely to

have been convicted of an offence involving violence, such as robbery or grievous bodily harm (1.8% of the community group vs 8.2% of persons with schizophrenia).

An association between mental illness and criminal offending has also been demonstrated when researchers link offenders' higher court convictions with their psychiatric service contacts (e.g. Wallace et al., 1998); and when the focus of investigation is on patterns of mental illness among prisoners (e.g. Fazel & Danesh, 2002).

Furthermore, mental illness and substance use disorders are significant health problems among prisoners. This is true of male (e.g. Cote & Hodgins, 1990) and female prisoners (e.g. Jordan, Schlenger, Fairbank, & Caddell, 1996; Teplin, Abram, & McClelland, 1996; Tye & Mullen, 2006); adult and juvenile prisoners (e.g. Dembo & Schmeidler, 2003; Fazel, Doll, & Langstrom, 2008; Steadman, Osher, Robbins, Case, & Samuels, 2009; Teplin, Abram, McClelland, Dulcan, & Mericle,

2002; Teplin et al., 2006); young offenders in adult prisons (e.g. Murrie, Henderson, Vincent, Rockett, & Mundt, 2009); Australian prisoners (e.g. Butler, Allnutt, Cain, Owens, & Muller, 2005; Butler et al. 2006; Kinner, 2006) and prisoners in other western countries (e.g. Brinded, Simpson, Laidlaw, Fairly, & Malcolm, 2001; Brink, Doherty, & Boer, 2001; Fazel & Danesh, 2002).

MENTAL HEALTH PROBLEMS: PRISONERS COMPARED WITH THE COMMUNITY

Mental illness and substance use disorders are more prevalent amongst prisoners than the general population. In a meta-analysis of 62 studies on the prevalence of serious mental disorders in prison populations in western countries (including Australia, New Zealand, Canada, Spain, Sweden and the USA), Fazel and Danesh (2002, p. 548) found that:

about one in seven prisoners in western countries have psychotic illnesses or major depression...about one in two male prisoners and about one in five female prisoners have antisocial personality disorders... Compared with the general American or British population of similar age, prisoners have about two-fold to four-fold excesses of psychotic illnesses and major depression, and about a ten-fold excess of antisocial personality disorder.

In Australia, high rates of mental illnesses and substance use problems amongst prisoners have been found at both the national and the state level. The 2007 National Survey of Mental Health and Wellbeing (Australian Bureau of Statistics, 2008) found that, among individuals who reported having ever been incarcerated, the 12-month incidence of anxiety, affective or substance disorder was more than twice that for people who reported that they had never been incarcerated (41.1% vs 19.4%). When specific mental disorders were analysed, individuals who reported having ever been incarcerated had almost five times the 12-month incidence of substance use disorders compared with those who had never been incarcerated (22.8% vs 4.7%), more than three times the incidence of an affective disorder (19.3% vs 5.9%) and twice the incidence of an anxiety disorder (27.5% vs 14.1%) (Australian Institute of Criminology, 2009).

In NSW, Butler et al. (2006) found that 80.3 per cent of adult prisoners in reception centres met the diagnostic criteria for at least one psychiatric disorder in the previous year. In this study, psychiatric disorders included anxiety, affective, substance and personality disorders. The corresponding figure for a community sample¹ was substantially lower, at 30.5 per cent. Among the prisoner sample, 65.7 per cent met the criteria for substance use disorder (compared with 18.0% of the community sample), 43.1 per cent met the criteria for any personality disorder (compared with 9.2% of the community sample), 23.2 per cent met the criteria for any affective disorder (compared with 8.5% of the community sample) and 7.0 per cent met the criteria for a psychosis (compared with 0.7% of the community sample). One possible explanation for the higher prevalence estimate of

mental health disorders in NSW prisoners compared with the national prisoner estimate is whether the offender was in prison at the time of the interview. The offenders in the state survey were all in prison at the time of the interview (Butler et al., 2006). By contrast, respondents to the national survey were not in prison at the time of the interview; they reported whether they had ever been incarcerated (Australian Institute of Criminology, 2009). Another explanation may be that the state survey (Butler et al., 2006) included personality disorders while the national survey (Australian Institute of Criminology, 2009) did not include these disorders.

It is clear that mental health problems, both substance and non-substance related, are over-represented amongst offenders in custodial settings. These problems are compounded by the fact that prisoners with mental health problems also have higher rates of other problems, including histories of physical and sexual abuse, family members who have been imprisoned, family histories of drug and/or alcohol abuse, binge drinking, homelessness and unemployment (e.g. James & Glaze, 2006). The health consequences of incarceration can further compound prisoners' problems (Massoglia, 2008).

There is also evidence that people diagnosed with comorbid substance and non-substance mental health disorders are at increased risk of offending. Wallace et al. (2004), for example, found that people with comorbid diagnoses of schizophrenia and substance use disorder had significantly higher rates of criminal conviction (68.1%) than those diagnosed with schizophrenia but no substance use disorder (11.7%) and also non-mentally ill people in the community (7.8%). Using both self-reported acts of violence and criminal convictions, other researchers have confirmed that comorbidity with substance disorders substantially increases the risk of violence (e.g. Baxter, Rabe-Hesketh, & Parrott, 1999; Elbogen & Johnson, 2009; Fazel, Gulati, Linsell, Geddes, & Grann, 2009a; Fazel, Langstrom, Hjern, Grann, & Lichenstein, 2009b; Juninger, Claypoole, Laygo, & Crisanti, 2006; Maden, Scott, Burnett, Lewis, & Skapinakis, 2004; Soyka, 2000; Steadman et al. 1998; Swartz & Lurigio, 2007). In their longitudinal, nationwide, case linkage study in Sweden, Fazel et al. (2009b) found that the rate of conviction for violent crime in individuals diagnosed with comorbid schizophrenia and substance use disorder was significantly higher than in those with schizophrenia but no comorbidity (27.6% vs 8.5%) and also in an unaffected comparison group (27.6% vs 6.1%).² Furthermore, in their systematic review and meta-analysis of 20 studies reporting on the associations between violence and schizophrenia and other psychoses among 18,423 individuals with these disorders, Fazel et al. (2009a) found that schizophrenia and other psychoses did not appear to add any additional risk of violence to that conferred by the substance use disorder alone. These findings suggest that substance disorders, either alone or comorbid with other mental health disorders, are significant contributors to the risk of offending and violence.

MENTAL HEALTH PROBLEMS AND RE-OFFENDING

While there is little doubt that mental health problems are associated with becoming involved in the criminal justice system, particularly where there is a comorbid substance disorder, the relationship between mental health problems and the likelihood of returning to the criminal justice system is much less clear. Some studies have found that offenders with major psychiatric disorders have an increased risk of re-offending or re-incarceration (Baillargeon, Binswanger, Penn, Williams, & Murray, 2009; Cloyes, Wong, Latimer, & Abarca, 2010; Grann, Danesh, & Fazel, 2008; Stadtland, Kleindienst, Kroner, Eidt, & Nedopil, 2005), while others have found that mentally ill offenders are no more likely to be reconvicted or re-arrested than those who are not mentally ill (e.g. Feder, 1991; Harris & Koepsell, 1998; Lovell, Gagliardi, & Peterson, 2002; Teplin, Abram, & McClelland, 1994).

In a large retrospective study of 79,211 prisoners in correctional facilities throughout Texas, Baillargeon et al. (2009) found that, compared with prisoners without a serious mental illness, those with major psychiatric disorders (such as, major depressive disorder, bipolar disorders, schizophrenia, and non-schizophrenic psychotic disorders) had substantially increased risks of multiple incarcerations over a six-year study period. Prisoners with a bipolar disorder had the greatest risk, being 3.3 times more likely to have had four or more previous incarcerations compared with prisoners who had no major psychiatric disorder. The increased risk was somewhat lower for other disorder groups: any major psychiatric disorder, non-schizophrenic psychotic disorder, schizophrenia, and major depressive disorder.

Several studies have found a relationship between re-offending and mental illnesses when analysing specific sub-groups of prisoners, such as sexual offenders (e.g. Langstrom, Sjostedt, & Grann, 2004) and homicide offenders (e.g. Putkonen, Komulainen, Virkkunen, Eronen, & Lonqvist, 2003); or specific re-offences, such as homicide (e.g. Tiihonen & Hakola, 1994). For example, in their nationwide cohort of 1,215 male sexual offenders released from prison in Sweden between 1993 and 1997, Langstrom et al. (2004) found that a diagnosis of alcohol use disorder, drug use disorder, personality disorder and psychosis all increased the risk for sexual recidivism. A diagnosis of alcohol use disorder and personality disorder also predicted violent non-sexual recidivism. Langstrom et al. found that these associations between psychiatric conditions and recidivism were retained when controlling for potential confounding socio-demographic variables, such as age.

By contrast, some studies that have compared mentally ill offenders with matched samples of offenders who are not mentally ill have found no differences between the two groups in their risk of re-arrest or reconviction. For example, Feder (1991) found that, in an 18-month follow-up period, 64 per cent of 147

male mentally ill offenders were re-arrested at least once and 27 per cent were re-incarcerated for a new offence, compared with 60 per cent and 32 per cent, respectively, of 400 offenders randomly selected from the general prison population.

Similarly, Harris and Koepsell (1998) found no effect over a 12-month follow-up period, with 54.3 per cent of mentally ill offenders (n=127) randomly drawn from the admissions to a prison psychiatric unit in Washington being re-arrested, compared with 51.2 per cent of prisoners who were not in the psychiatric unit (n=127) and who were matched on age, gender, year of arrest, and severity and type of crime at the index arrest. More recently, Lovell et al. (2002) found that, over a follow-up period of 27 to 55 months, the reconviction rate for felonies for 337 mentally ill offenders was very similar to that for all offenders who did not suffer from a mental illness and who were released from Washington prisons during the same period (41% vs 37%).

A fairly consistent finding is that the major predictors of recidivism are comparable for mentally disordered and non-disordered offenders (e.g. Bonta, Law, & Hanson, 1998; Coid, Hickey, Kathtan, Zhang, & Yang, 2007; Feder, 1991; Phillips et al. 2005; Rice, Harris, Lang, & Bell, 1990). This applies to re-arrest or reconviction for both general offences (i.e. any new criminal offence) and violent offences. In their meta-analysis drawn from 64 samples, Bonta et al. (1998) found that criminal history variables, such as the number of prior convictions, were the best predictors of recidivism among mentally disordered offenders. With the exception of anti-social personality, clinical or psychopathological variables were found to be some of the least important predictors of both general and violent recidivism among this group. In fact, compared with non-disordered offenders, those with a severe mental disorder (e.g. psychosis) were less likely to re-offend either violently or non-violently.

It is not clear why some studies have found a relationship between psychiatric disorders and recidivism while other studies have found no relationship. It may be partly due to the fact that studies vary widely in terms of the sample sizes involved, the length of the follow-up period, the number of episodes of re-incarceration examined and the samples examined (including mentally ill offenders, mentally ill offenders admitted to psychiatric units within correctional facilities, offenders referred by court for psychiatric assessment but given non-custodial sentences, and all offenders). Another possible explanation is that studies that have found a relationship between psychiatric disorders and recidivism have not adequately controlled for factors that could be driving the apparent relationship. For example, given the strong relationship between substance use and offending, it is possible that studies have not adequately investigated comorbid substance disorder diagnoses when estimating the relationship between mental health disorders and recidivism. Given the relative paucity of research on this issue, this is still an open question.

AIM

The aim of the current study was to examine whether released prisoners with mental health diagnoses (including substance, non-substance, and comorbid substance and non-substance diagnoses) are at an increased risk of re-offending compared with released prisoners without mental health diagnoses.

The specific research question investigated in this study is – what is the comparative risk of re-offending upon release from prison for those with:

- a non-substance mental health disorder;
- a substance disorder;
- a comorbid substance and non-substance disorder; and
- no mental health disorders.

METHOD

STUDY SAMPLE

The study sample comprised the prisoners who participated in the 2001 NSW Prisoner Mental Health Survey. This survey was conducted by NSW Justice Health (formerly NSW Corrections Health Service; Butler & Allnutt, 2003) and consisted of both sentenced and reception cohorts.

Prisoner Mental Health Survey

(a) Sentenced cohort

The sentenced cohort consisted of prisoners stratified by sex, age and Indigenous status, who had been recruited into the NSW Inmate Health Survey conducted in 28 correctional centres across NSW between July and December 2001 (Butler & Milner, 2003).³ Several weeks after their participation in the Inmate Health Survey, prisoners were invited to participate in a subsequent assessment of their mental health. A combination of mental health nurses and post-graduate psychology students interviewed the sentenced prisoners. A total of 557 sentenced prisoners completed the Mental Health Survey, comprising 60.9 per cent of the 914 participants in the 2001 Inmate Health Survey.⁴ Butler et al. (2005, p. 408) report that, for the sentenced sample, both male and female survey participants were similar to non-participants in terms of age (males: 33.8 years vs 32.2 years, respectively, $p = .07$; females: 32.7 years vs 33.9 years, respectively, $p = .42$), the proportion of Indigenous prisoners (males: 30% vs 30%, respectively, $p = .94$; females: 16% vs 19%, respectively, $p = .83$), incarceration for violent offences, and a self-reported history of receiving psychiatric treatment at the point of prison intake. However, male survey participants had slightly longer median sentences than male non-participants (males: 2.2 years vs 1.5 years, respectively, $p = .001$; females: 1.5 years vs 0.91 years, respectively, $p = .18$).

Butler et al. (2005) also report that the offence profile and the median age of the sentenced group was comparable to that of the NSW prisoner population (males: 31 years vs 30 years,

respectively; females: 32 years vs 29 years, respectively). However, there were differences between the survey sample and the NSW prisoner population in the proportion of Indigenous offenders (males: 30% vs 15%; females: 16% vs 25%, respectively).

(b) Reception cohort

The prisoners in the reception cohort had been either remanded into custody pending a court appearance or had been sentenced to a period of incarceration and were going through the reception process on their entry into the prison system. The sample consisted of 921 prisoners who had been admitted into a number of reception sites across NSW over a four-month period in 2001.⁵ Mental health nurses assessed the reception prisoners within 24 hours of their admission. Although it had been intended to assess a consecutive sample of prisoners, this was not always possible as some were released or transferred before they could be interviewed. As a result, the sample was a 'consecutive convenience sample' (Butler et al., 2005, p. 408). Butler et al. (2005, p. 408) report that, in the reception sample, both male and female survey participants were similar to non-participants in terms of age (males: 29.6 years vs 29.8 years, respectively, $p = .57$; females: 29.1 years vs 29.5 years, respectively, $p = .70$). However, male survey participants differed from male non-participants in terms of the proportion of Indigenous prisoners (12% vs 15%, respectively, $p = .02$); this was not the case for female participants and non-participants (29% vs 22%, respectively, $p = .21$).

Linkage to the Re-Offending Database

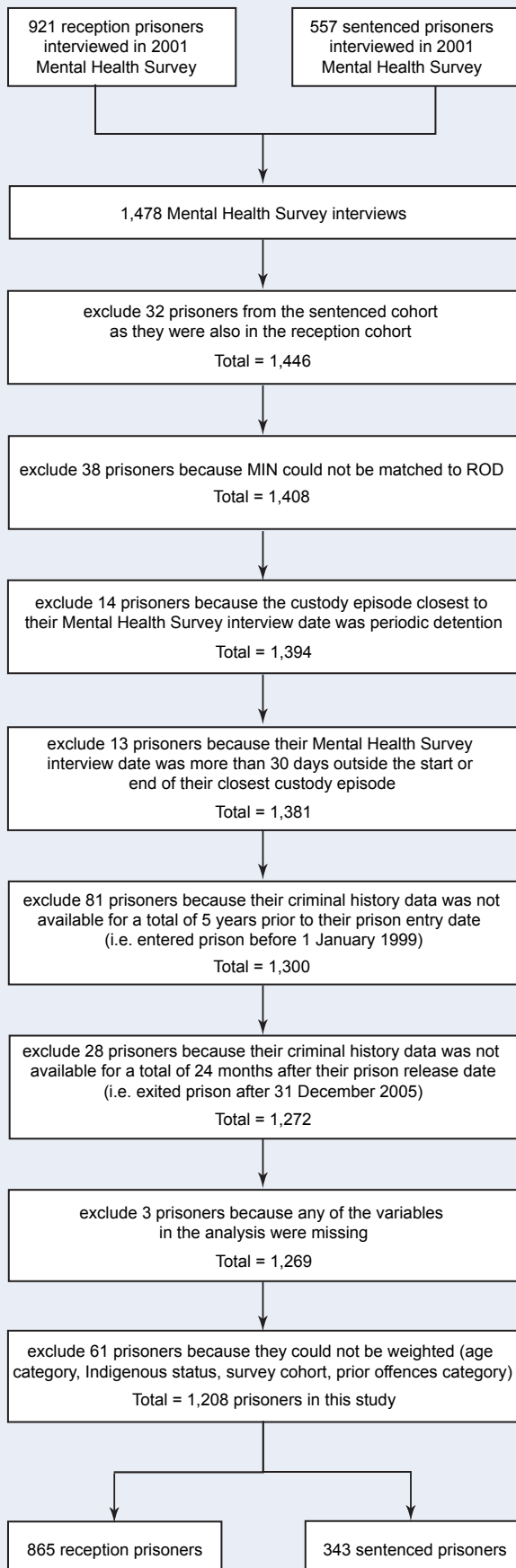
Data from all 1,478 Mental Health Survey interviews were linked to ROD, the Re-Offending Database developed and maintained by the NSW Bureau of Crime Statistics and Research (Hua & Fitzgerald, 2006). This database links all finalised court appearances and movements in and out of custody by the same individual from 1994 to the present in NSW.

Ethics approval to conduct this linkage was obtained from the Human Research and Ethics Committee, NSW Justice Health. The linkage was conducted using the offender's name, date of birth and Master Index Number (MIN, the unique identifier used by Corrective Services New South Wales).⁶ Once records in the Mental Health Survey had been linked to records in ROD, the Mental Health Survey interview date was used to identify the ROD prison custody episode that was closest to the interview date. The entry and release dates for the custody episode closest to the interview date were then used to identify offending that occurred before and after this custody episode.

Prisoners were excluded from the analyses if they could not be matched to ROD or did not meet other inclusion criteria. Figure 1 shows the study's exclusion criteria and the number of prisoners affected.

As Figure 1 shows, in total, 1,208 prisoners were included in the analysis, representing 83.5 per cent of the 1,446 unique prisoners who participated in the Mental Health Survey.⁷

Figure 1. Number of prisoners in this study by the study exclusion criteria



The percentage of unique prisoners who met the inclusion criteria was higher for the reception cohort (93.9%) than for the sentenced cohort (65.3%). Within the sentenced cohort prisoners who did not meet the inclusion criteria, 44.5 per cent were excluded because their period of incarceration started before January 1, 1999 (and thus a five-year criminal history could not be obtained from ROD which starts in 1994). As a result of this differential inclusion rate, the survey cohort from which participants were drawn was included as a covariate in all analyses.

Across the entire sample of prisoners, the median number of months from the survey interview date until release from prison was 3.7 months (range: 0.1 to 58.7 months). For the reception cohort, the median number of months from the survey interview date until release from prison was 2.8 months (range: 0.1 to 58.7 months). For the sentenced cohort, the median number of months from the survey interview date until release from prison was 7.1 months (range: 0.1 to 51.7 months).

VARIABLES

Outcome variable: re-offending

The outcome variable examined in these analyses was re-offending; this was considered to have occurred if the prisoner had any new finalised court appearances (irrespective of outcome) in the 24 months following their prison release date.⁸ Data were obtained from ROD. It is important to note that re-arrests or reconvictions are likely to undercount the actual offending because they depend on detected activity; these official data are therefore only a proxy for re-offending.

Primary explanatory variable

The Composite International Diagnostic Interview-Auto (CIDI-A; World Health Organization, 1993) was the assessment instrument used in the 2001 Mental Health Survey to identify anxiety, affective and substance dependence/abuse disorders. This instrument yields diagnoses based on the Diagnostic and Statistical Manual of Mental Disorders-4th edition (DSM-IV) and the International Statistical Classification of Diseases and Related Health Problems-10th revision (ICD-10) for both one-month and 12-months prior to assessment. Only 12-month ICD-10 diagnoses are examined in this bulletin. The International Personality Disorders Examination Questionnaire was used to assess the presence of personality disorders in the past 12 months (Loranger, Janca, & Sartorius, 1997). A psychosis screener was also incorporated into the survey to assess the symptoms of psychosis in the previous 12 months.⁹

These assessment tools yielded diagnoses that can be broadly categorised as follows:

- **substance disorders:** alcohol, cannabis, opioid, sedative, stimulant; and
- **non-substance disorders:**
 - **anxiety disorders:** post-traumatic stress disorder, generalised anxiety disorder, panic disorder, agoraphobia, obsessive compulsive disorder, social phobia;

- **affective disorders:** depression, dysthymia, manic episode;
- **personality disorders:** cluster A (paranoid, schizoid), cluster B (impulsive, borderline, histrionic, dissocial), cluster C (anxious, anancastic,¹⁰ dependent); and
- **symptoms of psychosis.**

These specific diagnoses were grouped to create the **primary independent variable**, mental health disorder group, which could take one of four values:

1. no mental health disorder;
2. substance disorder only (that is, no comorbid non-substance mental health disorder);
3. non-substance mental health disorder only (that is, no comorbid substance disorder); and
4. comorbid substance and non-substance mental health disorders.

If substance disorders are, in fact, related to re-offending, it would be useful to identify which substance(s) make the greatest contribution to the increased risk of re-offending. However, due to the small sample size of some groups in the current study, it is not possible to directly examine interactions such as the three-way interaction between alcohol disorders, substance (other than alcohol) disorders and non-substance mental health disorders. For example, only 20 prisoners had both an alcohol disorder and a substance (other than alcohol) disorder but no non-substance mental health disorders.

Control variables

In order to control for other offender characteristics that might affect¹¹ the relationship between mental health disorders and recidivism, the following variables were also extracted from ROD or from information collected as part of the 2001 Mental Health Survey:

- **Age:** Age, in years, of the prisoner at the time of the survey.
- **Sex:** Sex of the prisoner.
- **Indigenous status:** Whether, at the time of the survey, the prisoner identified as being of Aboriginal or Torres Strait Islander descent.
- **Cohort:** Whether the prisoner was part of the sentenced or reception cohort of the Mental Health Survey.¹²
- **Number of prior offences:** Number of finalised court appearances (irrespective of outcome) in the five years prior to entry to prison.

STATISTICAL ANALYSIS

Characteristics of the sample

To examine the characteristics of the sample, chi-square tests of association were carried out to explore the bivariate relationships between each of the control variables and mental health disorder group, and between each of the control variables and re-offending.

Bivariate analysis of mental health and re-offending

Chi-square tests of association were carried out to determine if mental health disorder group was associated with re-offending.

Adjusted analysis of mental health and re-offending

Adjusted prevalence estimates were calculated using a weighting method. Each of the three groups with a mental health disorder was weighted to have the same age, sex, Indigenous status, survey cohort and prior offences distribution as the group with no mental health disorders. Weighted estimates reflect the percentage of re-offending expected if the distribution of the group with mental health disorders was the same as those with no mental health disorders. Separate weights were obtained for each mental health disorder group (that is, substance only, non-substance only, comorbid substance and non-substance diagnoses).¹³

For each mental health disorder group, the 95 per cent confidence interval around the weighted percentage re-offending was obtained using the normal approximation to the binomial distribution.

To ensure that the weighted estimates were not biased by missing values due to observations that could not be weighted (from Figure 1, this was 61 prisoners or 4.8% of the 1,269 prisoners who met all other selection criteria), a logistic regression model was also fitted by regressing the outcome variable against the mental health variable, while adjusting for each of the control variables.¹⁴

RESULTS

MENTAL HEALTH CHARACTERISTICS OF THE SAMPLE

This section of the results describes the characteristics of the 1,208 prisoners in this sample. The subsequent three sections address the research questions by examining the relationship between re-offending and mental health disorder group (classified as substance disorder, non-substance mental health disorder and comorbid substance and non-substance mental health disorder) using bivariate analysis, weighted analysis and logistic regression.

Mental health disorders were prevalent amongst this sample:

- 41.2 per cent of offenders had comorbid substance and non-substance mental health disorders;
- 17.9 per cent had at least one substance disorder and no non-substance disorders;
- 17.1 per cent had at least one non-substance mental health disorder and no substance disorders; and
- 23.8 per cent had no disorders.

Table 1 provides descriptive statistics for offenders included in the study by these mental health disorder groups. The proportion

Table 1. Offender characteristics by mental health disorder group for prisoners in the current study (n=1,208)

Offender characteristic		Total N (%)	Mental health disorder group			
			% comorbid substance and non-substance	% substance only	% non-substance only	% no disorders
Gender	Male	986 (81.6)	38.5	18.7	17.2	25.6
	Female	222 (18.4)	53.2	14.4	16.7	15.8
						< .001^a
Age (years)	18 - 24	435 (36.0)	43.5	20.0	13.3	23.2
	25 - 34	480 (39.7)	46.5	19.6	14.6	19.4
	35+	293 (24.3)	29.4	12.0	27.0	31.7
						< .001
Indigenous status	Non-Indigenous	970 (80.3)	39.7	17.4	17.4	25.5
	Indigenous	238 (19.7)	47.5	19.8	16.0	16.8
						0.022
Reception or sentenced cohort of survey	Sentenced	343 (28.4)	32.7	12.0	23.0	32.4
	Reception	865 (71.6)	44.6	20.2	14.8	20.4
						< .001
Number of court appearances in 5 years prior to prison entry date	0 - 1	266 (22.0)	22.9	13.5	23.7	39.9
	2 - 4	377 (31.2)	45.6	13.8	17.5	23.1
	5+	565 (46.8)	46.9	22.7	13.8	16.6
						< .001

^a p-value for chi-square test of association between offender characteristic and mental health disorder group. Bold indicates a significant association at the .05 level of significance.

of prisoners with both a substance and a non-substance mental health disorder was higher among offenders who were female, young (aged ≤34 years), Indigenous, in the reception cohort of the survey or had multiple prior court appearances.

Appendix Table A1 shows the prevalence of each specific type of non-substance mental health disorder and the proportions of offenders who also had comorbid disorders. Appendix Table A2 provides the prevalence of each specific type of substance disorder and the proportions of prisoners who had comorbid disorders.

RE-OFFENDING CHARACTERISTICS OF THE SAMPLE

Offenders with a substance disorder were more likely to re-offend than those without a substance disorder (Table 2). Recidivism rates were higher among offenders who were young, Indigenous, in the reception cohort of the survey and prisoners who had multiple prior court appearances.

Adjusted analysis of mental health and re-offending

(a) Weighted estimates

Figure 2 presents the weighted rates of re-offending and the 95 per cent confidence intervals around these estimates.

These are the rates of re-offending that would be expected if prisoners in each of the three categories of mental health disorder had exactly the same characteristics as prisoners with no mental health disorders. The characteristics used for this weighting were: age category, Indigenous status, survey cohort and number of prior court appearances (as categorised in Table 1).

The weighted rate of re-offending was significantly greater in prisoners who had comorbid substance and non-substance mental health disorders (66.8%) compared with prisoners with:

- only a substance disorder (55.2%);
- a mental health disorder other than a substance disorder (48.6%); and
- no mental health disorders (51.2%).

Rates of re-offending were similar in prisoners who had:

- only a substance disorder;
- a disorder other than a substance disorder; or
- no mental health disorders.

Small samples sizes in the current study prevent examination of the three-way interaction between alcohol disorders, substance (other than alcohol) disorders and non-substance mental health disorders.¹⁵

(b) Logistic regression

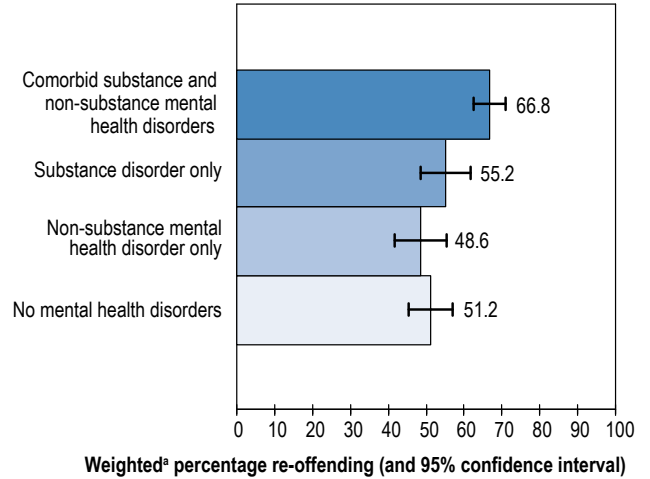
The results of the adjusted logistic regression model (that accounted for offender characteristics including priors) were similar to those of weighted analysis of mental health and re-offending (see Figure 2 for weighted analysis, see Table 3 for logistic regression).¹⁶ The rate of re-offending was greater for prisoners with a comorbid substance and non-substance mental health disorder when compared with prisoners with no mental health disorders and when compared with prisoners with a mental health disorder other than a substance disorder. However, in contrast to the weighted estimates, the results of the logistic regression with priors included as a control variable did not show a difference in the rate of re-offending between prisoners with a comorbid substance and non-substance mental health disorder and prisoners with only a substance disorder. Appendix Table A3 gives the odds ratios for the unadjusted logistic regression model and the adjusted model that accounted for offender characteristics other than priors, that is, the only control variables included are age, Indigenous status and survey cohort.

Table 2. Re-offending by offender characteristics for prisoners in the current study (n=1,208)

Offender characteristic		Per cent re-offending
Mental health disorder group	Comorbid substance and non-substance	75.7
	Substance only	70.4
	Non-substance only	53.6
	No disorders	51.2
		< .001^a
Gender	Male	64.4
	Female	68.5
		0.251
Age (years)	18 - 24	73.1
	25 - 34	68.8
	35+	47.4
		< .001
Indigenous status	Non-Indigenous	60.9
	Indigenous	82.4
		< .001
Reception or sentenced cohort of survey	Sentenced	60.6
	Reception	66.9
		0.038
Number of court appearances in 5 years prior to prison entry date	0 - 1	32.7
	2 - 4	63.4
	5+	81.6
		< .001

^a *p*-value for chi-square test of association between offender characteristic and re-offending. Bold indicates a significant association at the .05 level of significance.

Figure 2. Weighted percentage of sample re-offending by mental health disorder group for prisoners in the current study (n=1,208)



^a The mental health disorder groups were weighted to have the same age, Indigenous status, survey cohort and prior offences distribution as the group with no mental health disorders.

Table 3. Odds of re-offending by mental health disorder groups for prisoners in the current study (n=1,269)

Reference category	Risk category		
	Odds ratio (95% confidence interval)		
	Comorbid substance and non-substance	Substance only	Non-substance only
Comorbid substance and non-substance	1.00		
Substance only	1.30 (0.89, 1.90)	1.00	
Non-substance only	1.88 (1.30, 2.72)^a	1.45 (0.94, 2.24)	1.00
No disorders	1.81 (1.30, 2.54)	1.40 (0.93, 2.10)	0.96 (0.66, 1.41)

Note. Adjusted for age, Indigenous status, survey cohort and number of priors. Prisoners who could not be weighted were included in this analysis.

^a Bold indicates an association between re-offending and mental health disorder at the .05 significance level.

SUMMARY OF RESULTS

Of the 1,208 prisoners who participated in the 2001 Mental Health Survey and met the inclusion criteria for this study, 23.8 per cent did *not* have a mental health disorder. In the sample of prisoners:

- 41.2 per cent had comorbid substance and a non-substance mental health disorders;
- 17.9 per cent had at least one substance disorder and no non-substance disorders; and
- 17.1 per cent had at least one non-substance mental health disorder and no substance disorders.

Re-offending characteristics of the sample

Within 24 months of their release from prison, 65.2 per cent of the total sample had re-offended. Furthermore, their rate of re-offending was related to their mental health disorder. The rate of re-offending was substantially higher in prisoners with a substance disorder, either alone (70.4%) or comorbid with a non-substance mental health disorder (75.7%) when compared with prisoners with a mental health disorder other than a substance disorder (53.6%) and prisoners with no mental health disorder (51.2%).

Adjusted analysis of mental health and re-offending

(a) Weighted estimates

If prisoners with mental health disorders (substance only, non-substance only, comorbid substance and non-substance) had the same demographic and criminal history characteristics as prisoners with no mental health disorders, then the rate of re-offending would be significantly greater for prisoners with comorbid substance and non-substance mental health disorders (66.8%) when compared with other prisoners. The weighted rate of re-offending was not significantly different between prisoners with:

- at least one substance disorder and no non-substance disorders (55.2%);
- at least one non-substance disorder and no substance disorders (48.6%); and
- no disorders (51.2%).

(b) Logistic regression

Similar effects were found using logistic regression adjusted for prisoners' age, Indigenous status, survey cohort and number of prior offences, but the difference between the rate of re-offending for prisoners with a substance disorder (with or without a comorbid non-substance mental health disorder) was no longer significant. Non-substance mental health disorders seemed to add little additional risk of re-offending unless they co-occurred with substance disorders.

DISCUSSION

Two key points emerge from this study as far as the weighted prevalence estimates are concerned. Firstly, the rate of re-offending is higher among those prisoners who have comorbid substance and non-substance mental health disorders than among those with no disorder at all or those with a non-substance mental health disorder or those with a substance disorder only. The second key point is that there is no significant difference in re-offending rates between three groups – those with no mental health disorder at all, those with a non-substance mental health disorder only, and those with a substance disorder only. Similar results emerged from the logistic regression analyses except that these analyses revealed no difference between those with a substance disorder alone and those with comorbid substance and non-substance mental health disorders.

Taken as a whole, these findings suggest that rates of re-offending are substantially elevated among those with a mental health disorder only where it involves comorbid substance and non-substance mental health disorders. Unlike some re-offending risk factors which are static and thus cannot be changed (such as the offender's age, gender and criminal history), an offender's mental health status and substance misuse are 'dynamic risk factors' and therefore more amenable to change with effective treatment.

There is considerable evidence that various programs or strategies can reduce the re-offending rates of mentally ill offenders, drug misusing offenders and offenders with comorbid substance and non-substance mental health disorders. Such strategies include providing drug treatment programs, such as methadone and other opioid maintenance treatment, therapeutic communities and post-release supervision (Holloway, Bennett, & Farrington, 2006), referring mentally ill offenders to alternatives to the traditional court systems, perhaps in the form of specialised mental health courts (e.g. McNeil & Binder, 2007; Sarteschi, 2009) or drug courts. For example, McNeil and Binder (2007) found that, 18 months after enrolling in a mental health court, the likelihood of participants being charged with any new crime and with new violent crimes was, respectively, 26 per cent and 55 per cent lower than that of comparable individuals who received treatment-as-usual. Drug courts have been found to achieve, on average, a statistically significant 10.7 per cent reduction in recidivism rates of participants relative to treatment-as-usual comparison groups (Aos, Phipps, Barnoski, & Lieb, 2006). NSW drug court participants have achieved even more substantial reductions (Weatherburn, Jones, Snowball, & Hua, 2008). Compared with another group of offenders,¹⁷ NSW drug court participants were 17 per cent less likely to be reconvicted for any offence, 30 per cent less likely to be reconvicted for a violent offence and 38 per cent less likely to be reconvicted for a drug offence at any point during the follow-up period (which averaged 35 months).

Diverting individuals from prison to community-based treatment and support services is also effective in reducing re-offending.

These services include the NSW Statewide Community and Court Liaison Service (Bradford & Smith, 2009) which refers offenders to mental health services, the NSW Magistrates Early Referral into Treatment Program or MERIT (Lulham, 2009) which provides a three-month treatment program to defendants with a drug problem, and jail diversion programs (Steadman & Naples, 2005). The jail diversion programs are either pre-booking programs which divert individuals at initial contact with law enforcement officers before they are formally charged, or post-booking programs which divert individuals after arrest and are either court-based or prison-based.

Another effective mechanism is to provide in-prison 'therapeutic community' programs, that is, programs for drug-involved offenders in a prison setting which contain separate residential units (Aos et al., 2006; Mitchell, Wilson, & MacKenzie, 2006). Aos et al. (2006) found that the average therapeutic community can reduce recidivism by 5.3 per cent, and a community aftercare component slightly increases the program's effectiveness to 6.9 per cent.

Robbins, Martin, and Surratt (2009) recently examined recidivism and drug relapse experiences of substance-abusing female prisoners as they re-enter the community. They found that, compared with women who did not receive treatment, women who completed a six-month work-release therapeutic community program were significantly more likely to remain arrest-free and to engage in less extensive drug use.

Treatment programs which are well-planned, co-ordinated, intensive and provide integrated attention to both substance and non-substance mental health disorders are particularly relevant to reducing re-offending (and psychiatric hospitalisations) among offenders with comorbid substance and non-substance mental health disorders when they are released from prison (e.g. Mangrum, Spence, & Lopez, 2006; Theurer & Lovell, 2008). For example, Theurer and Lovell (2008) found that recidivism rates can be significantly reduced for mentally ill offenders by combining pre-release planning and intensive case management services that dealt with both their mental health and substance abuse problems and by providing offenders with a treatment program based on interagency collaboration (across criminal justice and health settings). The researchers compared the reconviction rates of two groups of mentally ill offenders released from prison. A group of 64 offenders¹⁸ who participated in an intensive case management program were compared with a group of offenders matched on a number of variables that predict recidivism, including number of prior convictions, age at release and gender. Two years following their release from prison, the felony reconviction rate for program participants was half the rate of the matched controls (23% vs 42%).

In practice, however, individuals with both substance and non-substance mental health disorders experience difficulties receiving treatment as each service system requires that the other problem be addressed first (Australian Government Department of Health and Ageing, 2007); the result being that the individual 'falls between the cracks' of the two service systems.

Investing in evidence-based programs and court or prison alternatives such as these could result in numerous benefits for both the community and the individual offender. Reductions could be expected in re-offending; in admissions to psychiatric institutions; and in police, court, prison administration and hospitalisation costs. Perceptions of public safety would increase. The health and welfare of the offenders themselves could improve.

STUDY STRENGTHS AND LIMITATIONS

This study has a number of strengths but also a number of limitations; in some cases, the same study attribute is both a strength and a limitation. One of the major strengths of this study was the ability to link, via the Bureau's Re-Offending Database (ROD), the court and incarceration records from 1994 to 2007 of the prisoners who had participated in the 2001 Mental Health Survey. It was therefore possible to track court appearances and periods of re-imprisonment of the same individuals over time. However, using these official data is also a limitation of the study as they are only a proxy to re-offending and are likely to undercount the actual offending because they depend on detected activity. They are also subject to variations in police enforcement activity over time.

Another strength of this study, in comparison to some of the past research in other jurisdictions, was the relatively large sample size (N=1,208 prisoners), thus allowing analysis of at least the broad mental health diagnostic groups. However, a study limitation is that some group sizes were relatively small. For example, because the cell size was small, it was not possible to conduct a three-way comparison of alcohol disorders, non-alcohol substance disorders and non-substance mental health disorders. If these groups were larger, further analyses could have been conducted. Future research could perhaps investigate such interactions.

The current study had additional limitations. The first set of limitations relates to the fact that the sample involved in the current study may not be representative of all NSW prisoners. This could be due to the selection of prisoners in the 2001 Mental Health Survey. Also the measures used to assess prisoners' mental health disorders were all based on self-report and this raises questions about reliability of the responses. Other limitations of the survey were identified by Butler and his colleagues (Butler & Allnutt, 2003; Butler et al., 2005; Butler et al., 2006), for example, that prisoners with severe, acute mental illnesses may have been unable to participate in the survey due to their illness. In addition, there were differences between prisoners who did or did not meet the selection criteria of the current study in terms of demographic characteristics, prior criminal history and rates of re-offending (if they were able to be matched to ROD).

The second limitation of the study relates to the time period which elapsed between the date of assessment of the prisoners' mental health status in 2001 and their release from prison. For

over 50 per cent of the sample, more than three months elapsed between the survey interview date and their release from prison, with this period ranging from 0.07 to 58.67 months (or almost five years). Prisoners' mental health status on release from prison is not known, and it may differ from their mental health status at the time of the survey in 2001. This leads to potential misclassification of mental health status. While it is anticipated that the misclassification of prisoners as not mentally ill at release when, in fact, they were mentally ill, and misclassification of prisoners as mentally ill at release when, in fact, they were not mentally ill, may cancel each other, the implications of misclassification are not known.

Another limitation is the inability to control completely for an offender's time at risk. Information was available on ROD regarding offenders' periods of incarceration in NSW, and all prisoners were followed for 24 months outside of prison. However, information was not available regarding any time which an offender may have spent incarcerated in other jurisdictions or in other institutions, for example, a psychiatric institution. Obviously, if an offender was institutionalised for part of the follow-up period, he/she would have had less opportunity to commit crimes than a person who was free for the entire follow-up period.

CONCLUSION

The implications of the current study are clear. Among a relatively large sample of NSW prisoners who participated in the 2001 Mental Health Survey and who were matched to the NSW Re-Offending Database, the rate of re-offending was related to having comorbid substance and non-substance mental health disorders. There is substantial evidence that treating mental health disorders, particularly substance disorders, can reduce re-offending. This has obvious benefits for the community. Furthermore, treatment would benefit the prisoners in terms of improved health and social outcomes. Investment in well-designed and well-implemented programs appears to be warranted.

ACKNOWLEDGEMENTS

The contribution made by a number of people to the preparation of this bulletin is greatly appreciated: Dr Devon Indig, NSW Justice Health, for providing constructive feedback on the ethics application and for assisting in providing the data from the 2001 prisoner Mental Health Survey; Associate Professor Tony Butler, National Drug Research Institute, for advice on the 2001 prisoner Mental Health Survey data; Mark Ramsay, BOCSAR, for linking the survey data to the Re-Offending Database (ROD) and extracting the relevant data; BOCSAR researchers for advice on statistical methodology; Craig Jones, Dr Don Weatherburn and Clare Ringland for feedback on drafts; the independent peer reviewers for their useful feedback; and Florence Sin for desktop publishing.

NOTES

1. The community sample was weighted to have the same sex, age and education distribution as the prisoner sample (Butler et al., 2006, Table 2, p. 275); data for this sample was obtained from the 1997 Australian National Survey of Mental Health and Wellbeing (Ibid, p. 273). Both samples were assessed for various disorders using the same screening instruments to enable comparisons to be made.
2. The comparison group consisted of individuals who had never been hospitalised for schizophrenia and who had been randomly selected from the general population; 10 individuals were matched by birth year and sex to each individual with schizophrenia.
3. For a more detailed description of the 2001 Inmate Health Survey, see Butler and Milner (2003).
4. Butler et al. (2005, p. 411) note that 'for the sentenced group, release to freedom and internal transfers to other prisons were the main reason for loss to follow-up'.
5. The main site for processing reception prisoners is the Metropolitan Remand and Reception Centre (MRRC) in western Sydney. Other sites include Bathurst, Cessnock and Goulburn. Female reception prisoners are processed at Mulawa Correctional Centre.
6. MIN and name were used to link all prisoners in the sentenced cohort. For the reception cohort, name and/or date of birth were not available for a number of prisoners and the majority in this cohort were linked using MIN only. Of the 880 prisoners analysed in the reception cohort, 16 per cent were linked using MIN and date of birth, 5 per cent were linked using MIN and name, and the remaining 79 per cent were linked using MIN only.
7. There were significant differences between prisoners who met the inclusion criteria and those who did not. Compared to prisoners who met the inclusion criteria, prisoners who were excluded from the analysis were more likely to be aged 35 years or more (52.1% compared to 24.3% for prisoners who met the inclusion criteria), Indigenous (40.3% compared to 19.7%), from the reception cohort of the survey (76.5% compared to 28.4%), had neither a substance nor a non-substance mental health disorder (44.1% compared to 23.8%), had either no prior offences or only one prior offence (51.3% compared to 22.0%; however, 81 of the prisoners were excluded because they did not have a full five year criminal history available prior to release from prison) and did not re-offend (67.8% compared to 34.9%; however, 28 of these prisoners were excluded because 24 months of data were not available following their release from prison).
8. Non-proven offences were counted as re-offending because some offences may have been dismissed under mental health legislation.
9. This assessment instrument does not differentiate between psychosis due to mental illness and psychosis from other

causes, such as the acute effects of substance use (Scott, Chant, Andrews, & McGrath, 2006).

10. This is a form of repetitive stereotype behaviour.
11. A number of factors are known to influence the risk of re-offending, including age, Indigenous status and prior criminal record (e.g. Bonta et al., 1998; Smith & Jones, 2008). The apparent relationship between mental health disorders and recidivism could be due to differences in these other offender characteristics and hence it is necessary to control for offender characteristics when examining the relationship between mental health and recidivism. For example, those with mental health disorders may also be younger than those without such disorders. Because age is strongly related to recidivism risk, it is necessary to adjust for differences in age to identify the true relationship between mental health and recidivism.
12. This variable was considered for analysis for two reasons: (a) the rate of mental health disorders was found to vary greatly between sentenced and reception prison samples (mental health disorders were identified in the previous 12 months in 78% of males in the reception cohort and only 61% of the sentenced cohort, Butler & Allnut, 2003); and (b) the proportion who met the inclusion criteria for the two cohorts differed.
13. The first step in obtaining weights is to determine, for each set of characteristics being weighted on, whether there is at least one individual in each group, that is, the group with no mental health disorders and the three groups with a mental health disorder. In the current study, an example of a set of characteristics being weighted on is a released prisoner “aged 18-24 years, non-Indigenous, from the reception cohort of the Mental Health Survey and with either no prior offences or one prior offence”. If, for a set of characteristics, there is not at least one individual in each mental health group, then any released prisoners with that set of characteristics are not weighted and their weight is set to ‘missing’. The second step in obtaining weights is to calculate the weights for all individuals who can be weighted. For all individuals in the group with no disorders who can be weighted, the weights are one. For each individual in the groups with a mental health disorder with a certain set of characteristics, the weight is calculated with the following formula:

$$\frac{\text{Number of offenders in the group with no disorders with the specific set of characteristics}}{\text{Total number of offenders in the group with no disorders}} \times \frac{\text{Total number of offenders in the group with a mental health disorder}}{\text{Number of offenders in the group with a mental health disorder with the specific set of characteristics}}$$

14. One of the strongest predictors of re-offending is the offender’s prior criminal history (e.g. Bonta et al., 1998). However, if mental health problems influence the risk of re-offending, they would be expected to influence the extent of an individual’s prior criminal history. To include prior criminal record as a control when analysing the influence of mental health variables on the risk of re-offending could therefore

mask the true influence of mental health on re-offending. To ensure that the relationship between re-offending and mental health was not hidden by including prior offences as a control variable, a logistic regression model was also fitted without prior offences as a control variable.

15. Bivariate analysis is suggestive of an increased risk of re-offending for prisoners with non-alcohol related substance disorders (either with or without comorbid alcohol problems) compared to those with no substance disorders and compared to those with an alcohol disorder but no other substance disorders. For example, the re-offending rate for the:
 - 494 prisoners with no substance disorders was 52.2 per cent;
 - 98 prisoners with an alcohol disorder and no other substance disorders was 61.2 per cent;
 - 471 prisoners with a comorbid alcohol and substance (other than alcohol) disorder was 79.3 per cent; and
 - 145 prisoners with a substance (other than alcohol) disorder and no alcohol disorders was 75.2 per cent.

However, these results are not definitive as they do not control for other non-substance mental health disorders or for demographic and prior offending characteristics. Furthermore, small sample size in some groups prevents formal statistical testing.

16. Time to re-offend analysis produced similar results to the logistic regression.
17. The comparison group consisted of offenders who were balloted onto the drug court program but then removed either because they lived outside the catchment area or they were convicted of a violent offence (Weatherburn et al., 2008).
18. Of the 64 program participants with a mental illness, 57 (89%) had a comorbid substance dependency or abuse disorder (Theurer et al., 2007, Table 1, p. 393).

REFERENCES

Aos, S., Phipps, P., Barnoski, R., & Lieb, R. (2006). *Evidence-based adult corrections programs: What works and what does not*. Retrieved from Washington State Institute for Public Policy website: <http://www.wsipp.wa.gov/rptfiles/06-01-1201.pdf>

Australian Bureau of Statistics. (2008). *National survey of mental health and wellbeing: Summary of results* (Cat. no. 4326.0). Retrieved from <http://www.abs.gov.au/ausstats/abs@.nsf/Latestproducts/4326.0Main%20Features32007?opendocument&tabname=Summary&prodno=4326.0&issue=2007&num=&view=>

Australian Government Department of Health and Ageing. (2007). Barriers and incentives to treatment for illicit drug users with mental health comorbidities and complex vulnerabilities. *National Drug Strategy Monograph Series* (No. 61). Retrieved from [http://www.nationaldrugstrategy.gov.au/internet/drugstrategy/publishing.nsf/Content/87388A80B499F44BCA25739B000A2DF2/\\$File/mono61.pdf](http://www.nationaldrugstrategy.gov.au/internet/drugstrategy/publishing.nsf/Content/87388A80B499F44BCA25739B000A2DF2/$File/mono61.pdf)

- Australian Institute of Criminology. (2009). Mental disorders and incarceration history. *Crime Facts Info* (No. 184). Retrieved from <http://www.aic.gov.au/documents/6/0/5/%7B605C6B58-B60B-4A0C-8B49-C1372A9CBCE6%7Dcf184.pdf>
- Baillargeon, J., Binswanger, I. A., Penn, J. V., Williams, B. A., & Murray, O. J. (2009). Psychiatric disorders and repeat incarcerations: the revolving prison door. *American Journal of Psychiatry*, *166*, 103-109.
- Baxter, R., Rabe-Hesketh, S., & Parrott, J. (1999). Characteristics, needs and reoffending in a group of patients with schizophrenia formerly treated in medium security. *Journal of Forensic Psychiatry*, *10*(1), 69-83.
- Bonta, J., Law, M., & Hanson, K. (1998). The prediction of criminal and violent recidivism among mentally disordered offenders: a meta-analysis. *Psychological Bulletin*, *123*(2), 123-142.
- Bradford, D., & Smith, N. (2009). *An evaluation of the NSW court liaison services*. Sydney: NSW Bureau of Crime Statistics and Research. Retrieved from [http://www.bocsar.nsw.gov.au/lawlink/bocsar/ll_bocsar.nsf/vwFiles/R58_CLS.pdf/\\$file/R58_CLS.pdf](http://www.bocsar.nsw.gov.au/lawlink/bocsar/ll_bocsar.nsf/vwFiles/R58_CLS.pdf/$file/R58_CLS.pdf)
- Brinded, P. M. J., Simpson, A. I. F., Laidlaw, T. M., Fairly, N., & Malcolm, F. (2001). Prevalence of psychiatric disorders in New Zealand prisons: a national study. *Australian and New Zealand Journal of Psychiatry*, *35*, 166-173.
- Brink, J. H., Doherty, D., & Boer, A. (2001). Mental disorder in federal offenders: a Canadian prevalence study. *International Journal of Law and Psychiatry*, *24*, 339-356.
- Butler, T., & Allnutt, S. (2003). *Mental illness among New South Wales prisoners*. Retrieved from NSW Justice Health website: http://www.justicehealth.nsw.gov.au/publications/Mental_Illness_Among_NSW_Prisoners_2003.pdf
- Butler, T., & Milner, L. (2003). *2001 inmate health survey*. Retrieved from NSW Justice Health website: http://www.justicehealth.nsw.gov.au/publications/Inmate_Health_Survey_2001.pdf
- Butler, T., Allnutt, S., Cain, D., Owens, D., & Muller, C. (2005). Mental disorder in New South Wales prisoner population. *Australian and New Zealand Journal of Psychiatry*, *39*(5), 407-413.
- Butler, T., Andrews, G., Allnutt, S., Sakashita, C., Smith, N.E., & Basson, J. (2006). Mental disorders in Australian prisoners: a comparison with a community sample. *Australian and New Zealand Journal of Psychiatry*, *40*, 272-276.
- Cloyes, K.G., Wong, B., Latimer, S., & Abarca, J. (2010). Time to prison return for offenders with serious mental illness released from prison: a survival analysis. *Criminal Justice and Behavior*, *37*(2), 175-187.
- Coid, J., Hickey, N., Katthan, N., Zhang, T., & Yang, M. (2007). Patients discharged from medium secure forensic psychiatry services: reconvictions and risk factors. *British Journal of Psychiatry*, *190*, 223-229.
- Cote, G., & Hodgins, S. (1990). Co-occurring mental disorders among criminal offenders. *Bulletin of the American Academy of Psychiatry and the Law*, *18*, 271-281.
- Dembo, R., & Schmeidler, J. (2003). A classification of high-risk youths. *Crime and Delinquency*, *49*(2), 201-230.
- Elbogen, E. B., & Johnson, S. C. (2009). The intricate link between violence and mental disorder: results from the National Epidemiologic Survey on alcohol and related conditions. *Archives of General Psychiatry*, *66*(2), 152-161.
- Fazel, S., & Danesh, J. (2002). Serious mental disorder in 23,000 prisoners: a systematic review of 62 surveys. *Lancet*, *359*, 545-550.
- Fazel, S., Doll, H., & Langstrom, N. (2008). Mental disorders among adolescents in juvenile detention and correctional facilities: a systematic review and metaregression analysis of 25 surveys. *Journal of the American Academy of Child and Adolescent Psychiatry*, *47*(9), 1010-1019.
- Fazel, S., Gulati, G., Linsell, L., Geddes, J. R., & Grann, M. (2009a). Schizophrenia and violence: systematic review and meta-analysis. *PLOS Medicine*, *6*(8).
- Fazel, S., Langstrom, N., Hjern, A., Grann, M., & Lichenstein, P. (2009b). Schizophrenia, substance abuse and violent crime. *Journal of American Medical Association*, *301*(19), 2016-2023.
- Feder, L. (1991). A comparison of the community adjustment of mentally ill offenders with those from the general prison population: an 18-month followup. *Law and Human Behavior*, *15*(5), 477-493.
- Fisher, W. H., Roy-Bujnowski, K. M., Grudzinskas, A. J., Clayfield, J. C., Banks, S. M., & Wolff, N. (2006). Patterns and prevalence of arrest in a statewide cohort of mental health care consumers. *Psychiatric Services*, *57*, 1623-1628.
- Grann, M., Danesh, J., & Fazel, S. (2008). The association between psychiatric diagnosis and violent re-offending in adult offenders in the community. *BMC Psychiatry*, *8*, 92-98.
- Harris, V., & Koepsell, T. D. (1998). Rearrest among mentally ill offenders. *Journal of the American Academy of Psychiatry and the Law*, *26*, 393-402.
- Holloway, K. R., Bennett, T. H., & Farrington, D. P. (2006). The effectiveness of drug treatment programs in reducing criminal behavior: a meta-analysis. *Psichothema*, *18*(3), 620-629.
- Hua, J., & Fitzgerald, J. (2006). Matching court records to measure reoffending. *Crime and Justice Bulletin* (No. 95). Sydney: NSW Bureau of Crime Statistics and Research. Retrieved from [http://www.bocsar.nsw.gov.au/lawlink/bocsar/ll_bocsar.nsf/vwFiles/CJB95.pdf/\\$file/CJB95.pdf](http://www.bocsar.nsw.gov.au/lawlink/bocsar/ll_bocsar.nsf/vwFiles/CJB95.pdf/$file/CJB95.pdf)
- James, E. J., & Glaze, L. E. (2006). Mental health problems of prison and jail inmates. *Bureau of Justice Statistics Special Report* (September 2006, NCJ 213600). Retrieved from US Department of Justice, Office of Justice Programs website: <http://bjsdata.ojp.usdoj.gov/content/pub/pdf/mhppji.pdf>
- Jordan, K., Schlenger, W., Fairbank, J., & Caddell, J. (1996). Prevalence of psychiatric disorders among incarcerated women: II. Convicted felons entering prison. *Archives of General Psychiatry*, *53*, 513-519.

- Juninger, J., Claypoole, K., Laygo, R., & Crisanti, A. (2006). Effects of serious mental illness and substance abuse on criminal offenses. *Psychiatric Services, 57*(6), 879-882.
- Kinner, S. (2006). Continuity of health impairment and substance misuse among adult prisoners in Queensland, Australia. *International Journal of Prisoner Health, 2*(2), 101-113.
- Langstrom, N., Sjostedt, G., & Grann, M. (2004). Psychiatric disorders and recidivism. *Sexual Abuse: A Journal of Research and Treatment, 16*(2), 139-150.
- Loranger, A. W., Janca, A., & Sartorius, N. (1997). *Assessment and diagnosis of personality disorders: The ICD-10 International Personality Disorder Examination (IPDE)*. Cambridge: Cambridge University Press.
- Lovell, D., Gagliardi, G. J., & Peterson, P. D. (2002). Recidivism and use of services among persons with mental illness after release from prison. *Psychiatric Services, 53*(10), 1290-1296.
- Lulham, R. (2009). The Magistrates Early Referral Into Treatment Program: impact of program participation on re-offending by defendants with a drug use problem. *Crime and Justice Bulletin* (No. 131). Sydney: NSW Bureau of Crime Statistics and Research. Retrieved from [http://www.bocsar.nsw.gov.au/lawlink/bocsar/ll_bocsar.nsf/vwFiles/CJB131.pdf/\\$file/CJB131.pdf](http://www.bocsar.nsw.gov.au/lawlink/bocsar/ll_bocsar.nsf/vwFiles/CJB131.pdf/$file/CJB131.pdf)
- Maden, A., Scott, F., Burnett, R., Lewis, G. H., & Skapinakis, P. (2004). Offending in psychiatric patients after discharge from medium secure units: prospective national cohort study. *BMJ, 328*, 1534.
- Mangrum, L. F., Spence, R. T., & Lopez, M. (2006). Integrated versus parallel treatment of co-occurring psychiatric and substance use disorders. *Journal of Substance Abuse Treatment, 30*, 79-84.
- Massoglia, M. (2008). Incarceration as exposure: the prison, infectious disease, and other stress-related illnesses. *Journal of Health and Social Behavior, 49*(1), 56-71.
- McNeil, D. E., & Binder, R. L. (2007). Effectiveness of a mental health court in reducing criminal recidivism and violence. *American Journal of Psychiatry, 164*, 1395-1403.
- Mitchell, O., Wilson, D. B., & MacKenzie, D. L. (2006). The effectiveness of incarceration-based drug treatment on criminal behavior. *Campbell Systematic Reviews* (No. 11). Retrieved from <http://www.campbellcollaboration.org/lib/download/98/>
- Murrie, D. C., Henderson, C. E., Vincent, G. M., Rockett, J. L., & Mundt, C. (2009). Psychiatric symptoms among juveniles incarcerated in adult prison. *Psychiatric Services, 60*, 1092-1097.
- Phillips, H. K., Gray, N. S., MacCulloch, S. I., Taylor, J., Moore, S. C., Huckle, P., & MacCulloch, M. J. (2005). Risk assessment in offenders with mental disorders: relative efficacy of personal demographic, criminal history, and clinical variables. *Journal of Interpersonal Violence, 20*(7), 833-837.
- Putkonen, H., Komulainen, E. J., Virkkunen, M., Eronen, M., & Lonnqvist, J. (2003). Risk of repeat offending among violent female offenders with psychotic and personality disorders. *American Journal of Psychiatry, 160*, 947-951.
- Rice, M. E., Harris, G. T., Lang, C., & Bell, V. (1990). Recidivism among male insanity acquittees. *Journal of Psychiatry and Law, 18*, 379-403.
- Robbins, C. A., Martin, S. S., & Surratt, H. L. (2009). Substance abuse treatment, anticipated maternal roles, and reentry success of drug-involved women prisoners. *Crime and Delinquency, 55*(3), 388-411.
- Sarteschi, C. M. (2009). *Assessing the effectiveness of Mental Health Courts: a meta-analysis of clinical and recidivism outcomes* (Doctoral dissertation, University of Pittsburgh). Retrieved from <http://etd.library.pitt.edu/ETD/available/etd-08272009-143525/unrestricted/CMSarteschiAug2009Dissertation.pdf>
- Scott, J., Chant, D., Andrews, G., & McGrath, J. (2006). Psychotic-like experiences in the general community: the correlates of CID-I psychosis screen items in an Australian sample. *Psychological Medicine, 36*, 231-238.
- Smith, N. E., & Jones, C. (2008). Monitoring trends in re-offending among offenders released from prison. *Crime and Justice Bulletin* (No. 117). Sydney: NSW Bureau of Crime Statistics and Research. Retrieved from [http://www.bocsar.nsw.gov.au/lawlink/bocsar/ll_bocsar.nsf/vwFiles/CJB117.pdf/\\$file/CJB117.pdf](http://www.bocsar.nsw.gov.au/lawlink/bocsar/ll_bocsar.nsf/vwFiles/CJB117.pdf/$file/CJB117.pdf)
- Soyka, M. (2000). Substance misuse, psychiatric disorder and violent and disturbed behaviour. *British Journal of Psychiatry, 176*, 345-350.
- Stadtland, C., Kleindienst, N., Kroner, C., Eidt, M., & Nedopil, N. (2005). Psychopathic traits and risk of criminal recidivism in offenders with and without mental disorders. *International Journal of Forensic Mental Health, 4*(1), 89-97.
- Steadman, H. J., & Naples, M. (2005). Assessing the effectiveness of jail diversion programs for persons with serious mental illness and co-occurring substance use disorders. *Behavioral Sciences and the Law, 23*, 163-170.
- Steadman, H. J., Mulvey, E. P., Monahan, J., Clark Robbins, P., Applebaum, P. S., Grisso, T., Roth, L. H., & Silver, E. (1998). Violence by people discharged from acute psychiatric inpatient facilities and by others in the same neighbourhoods. *Archives of General Psychiatry, 55*, 393-401.
- Steadman, H. J., Osher, F. C., Robbins, P. C., Case, B., & Samuels, S. (2009). Prevalence of serious mental illness among jail inmates. *Psychiatric Services, 60*, 761-765.
- Swartz, J. A., & Lurigio, A. J. (2007). Serious mental illness and arrest: the generalized mediating effect of substance use. *Crime and Delinquency, 53*(4), 581-604.
- Teplin, L., Abram, K. M., & McClelland, G. M. (1994). Does psychiatric disorder predict violent crime among released jail

detainees? a six-year longitudinal study. *American Psychologist*, 49(4), 335-342.

Teplin, L., Abram, K. M., & McClelland, G. M. (1996). Prevalence of psychiatric disorders among incarcerated women: I. pretrial jail detainees. *Archives of General Psychiatry*, 53, 505-512.

Teplin, L., Abram, K. M., McClelland, G. M., Dulcan, M. K., & Mericle, A. A. (2002). Psychiatric disorders in youth in juvenile detention. *Archives of General Psychiatry*, 59, 1133-1143.

Teplin, L., Abram, K. M., McClelland, G. M., Mericle, A. A., Dulcan, M. K., & Washburn, J. J. (2006). Psychiatric disorders of youth in detention. *Office of Juvenile Justice and Delinquency Prevention Bulletin* (April 2006). Retrieved from <http://www.ncjrs.gov/pdffiles1/ojdp/210331.pdf>

Theurer, G., & Lovell, D. (2008). Recidivism of offenders with mental illness released from prison to an intensive community treatment program. *Journal of Offender Rehabilitation*, 47(4), 385-406.

Tiihonen, J., & Hakola, P. (1994). Psychiatric disorders and homicide recidivism. *American Journal of Psychiatry*, 151, 436-438.

Tye, C. S., & Mullen, P. E. (2006). Mental disorders in female prisoners. *Australian and New Zealand Journal of Psychiatry*, 40, 266-271.

Wallace, C., Mullen, P. E., & Burgess, P. (2004). Criminal offending in schizophrenia over a 25-year period marked by deinstitutionalization and increasing prevalence of comorbid substance use disorders. *American Journal of Psychiatry*, 161(4), 716-727.

Wallace, C., Mullen, P. E., Burgess, P., Palmer, S., Ruschena, D., & Browne, C. (1998). Serious criminal offending and mental disorder: case linkage study. *British Journal of Psychiatry*, 172, 477-484.

Weatherburn, D., Jones, C., Snowball, L., & Hua, J. (2008). NSW Drug Court: a re-evaluation of its effectiveness. *Crime and Justice Bulletin* (No. 121). Sydney: NSW Bureau of Crime Statistics and Research. Retrieved from [http://www.bocsar.nsw.gov.au/lawlink/bocsar/ll_bocsar.nsf/vwFiles/CJB121.pdf/\\$file/CJB121.pdf](http://www.bocsar.nsw.gov.au/lawlink/bocsar/ll_bocsar.nsf/vwFiles/CJB121.pdf/$file/CJB121.pdf)

World Health Organization. (1993). *The ICD-10 classification of mental and behavioral disorders: diagnostic criteria for research*. Retrieved from <http://www.who.int/classifications/icd/en/GRNBOOK.pdf>

APPENDIX

Appendix Table A1 shows that comorbidity was overwhelmingly prevalent. For example, among the 293 prisoners (comprising 24.3% of the total sample) with post-traumatic stress disorder, 6.1 per cent (n=18) had *no* other disorders. By contrast:

- 61.1 per cent had more than one non-substance mental health disorder and a substance disorder;
- 19.5 per cent had more than one non-substance mental health disorder; and
- 13.3 per cent also had a substance disorder.

Table A1. Prevalence of non-substance mental health disorders and the proportions of these offenders with comorbid mental health disorders for prisoners in the current study (n=1,208)

	Total		Percentage of offenders with:			
	N	(%)	A substance disorder ^a and more than one non-substance disorder	A substance disorder	More than one non-substance disorder	No other disorders
Non-substance disorder	705	(58.4)	50.4	20.3	17.5	11.9
Symptom of psychosis	117	(9.7)	68.4	6.0	17.1	8.6
Affective disorders	253	(20.9)	62.9	5.1	27.3	4.7
Depression	188	(15.6)	63.3	4.3	26.6	5.9
Dysthymia	80	(6.6)	66.3	3.8	28.8	1.3
Mania	39	(3.2)	74.4	5.1	20.5	0.0
Anxiety disorders	430	(35.6)	58.6	12.8	22.3	6.3
Post-traumatic stress disorder	293	(24.3)	61.1	13.3	19.5	6.1
Generalised anxiety disorder	168	(13.9)	60.1	3.6	31.6	4.8
Panic disorder	105	(8.7)	68.6	7.6	22.9	1.0
Agoraphobia, OCD or social	61	(5.1)	80.3	3.3	16.4	0.0
Personality disorders	507	(42.0)	63.3	13.4	16.4	6.9
Cluster A	308	(25.5)	73.4	4.2	19.2	3.3
Cluster B	358	(29.6)	70.7	11.2	14.5	3.6
Cluster C	304	(25.2)	73.4	4.9	17.8	4.0

^a Substance disorders include: alcohol, cannabis, opioid, sedative and stimulant disorders.

Appendix Table A2 again shows that comorbidity was overwhelmingly prevalent. For example, among the 417 prisoners (comprising 34.5% of the total sample) with an opioid disorder, 13.9 per cent had *no* other disorders. By contrast:

- 54.7 per cent had more than one substance disorder and a non-substance mental health disorder;
- 15.6 per cent had more than one substance disorder; and
- 15.8 per cent also had a non-substance mental health disorder.

Appendix Table A3 show that the substantive results of both the unadjusted logistic regression model and the adjusted model that accounted for offender characteristics other than priors were consistent with the bivariate analysis of mental health and re-offending presented in Table 1. That is, all analyses showed that the rate of re-offending was greater for prisoners with comorbid substance and non-substance mental health disorders and for prisoners with only a substance disorder, when compared to both prisoners with no mental health disorders and when compared to prisoners with only a disorder other than a substance disorder.

Table A2. Prevalence of substance disorders and the proportions of these offenders with comorbid mental health disorders for prisoners in the current study (n=1,208)

	Total		Percentage of offenders with:			
			A non-substance disorder and more than one substance disorder	A non-substance disorder	More than one substance disorder	No other disorders
	N	(%)				
Substance Disorders	714	(59.1)	44.0	11.6	25.8	18.6
Alcohol disorder	243	(20.1)	51.4	8.2	23.9	16.5
Non-alcohol substance disorder	616	(51.0)	51.0	13.5	20.5	15.1
Opioids	417	(34.5)	54.7	15.8	15.6	13.9
Stimulants	352	(29.1)	67.3	18.5	9.4	4.8
Cannabis	245	(20.3)	70.2	13.5	9.8	6.5
Sedatives	164	(13.6)	81.1	15.2	2.4	1.2

Table A3. Odds ratios (95% confidence interval) of re-offending by mental health disorder groups, unadjusted and adjusted for offender characteristics other than prior convictions for prisoners in the current study (n=1,269)

Reference category	Risk category		
	Odds ratio (95% confidence interval)		
	Comorbid substance and non-substance	Substance only	Non-substance only
Unadjusted model			
Comorbid substance and non-substance	1.00		
Substance only	1.23 (0.86, 1.74)	1.00	
Non-substance only	2.75 (1.98, 3.82)^b	2.25 (1.52, 3.32)	1.00
No disorders	3.00 (2.23, 4.03)	2.45 (1.70, 3.52)	1.09 (0.77, 1.54)
Adjusted model without prior convictions^a			
Comorbid substance and non-substance	1.00		
Substance only	1.25 (0.88, 1.79)	1.00	
Non-substance only	2.29 (1.62, 3.23)	1.83 (1.22, 2.75)	1.00
No disorders	2.56 (1.88, 3.50)	2.05 (1.40, 2.99)	1.12 (0.79, 1.60)

Note. Prisoners who could not be weighted were included in this analysis.

^a Adjusted for age, Indigenous status and survey cohort.

^b Bold indicates an association between re-offending and mental health at the .05 significance level.