# **CORRECTIONAL SERVICE** CANADA

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# **RESEARCH REPORT**

# Comorbid Mental Disorders: Prevalence and Impact on Institutional Outcomes

# **2017** Nº R-379

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This report is also available in French. Should additional copies be required, they can be obtained from the Research Branch, Correctional Service of Canada, 340 Laurier Ave. West, Ottawa, Ontario K1A 0P9.



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# **Comorbid Mental Disorders: Prevalence and Impact on Institutional Outcomes**

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&

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Correctional Service of Canada

May 2017

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#### **Executive Summary**

**Key words:** offenders with a mental disorder, prevalence of comorbidity, impact of comorbid mental health disorders, misconducts, segregation.

The results of a Correctional Service of Canada (CSC) national mental health survey (N = 1,108) were used to determine prevalence rates of comorbid disorders among incoming federal male offenders and to examine outcomes associated with patterns of comorbidity during their incarceration. Results indicated that few male offenders with mental disorders in our population suffer from a single disorder. Nearly 70% with a mental disorder met criteria for at least one other diagnosis. For example, offenders with personality disorders comprise at least 48% of the incoming male population and 66% of these men have a co-occurring substance use disorder (SUD). Similarly, over 50% of the incoming male population had a current substance use disorder, and of these, two-thirds (68%) also met criteria for a co-occurring personality disorder.

Findings indicated instigating assault related incidents were most prevalent among offenders comorbid with SUD and personality disorders (PD), and placements in segregation were most common among offenders with PD. Offenders with an Axis I disorder only (without SUD or PD) were no more likely to be involved in misconducts, to be instigators in assault related incidents, or to be placed in segregation than offenders with no diagnosed mental disorder. This suggests that it is the symptoms of impulsivity, aggression, and emotional lability associated with personality disorders that largely drive the negative outcomes for many offenders with a mental disorder. A key consideration, therefore, in the monitoring of offenders with a mental disorder is to assess the extent to which the mental disorder is associated with PD and SUD and to address these conditions as part of a complete intervention plan. An examination of the rates of completion of correctional programs suggests that offenders have good participation and completion rates regardless of the types of mental disorders they may have.

The study also examined factors related to transfers to treatment centres. Two main factors emerged. Offenders with lower Global Assessment of Function (GAF) scores and those with a history of involvement in institutional incidents were most likely to be transferred to a treatment centre. Among the individual diagnoses associated with the greatest degree of impairment were mood disorders due to a general medical condition, psychotic disorders and bipolar disorders. Offenders with the highest degree of impairment met criteria for Axis I disorders in combination with SUDs and PDs. The diagnoses of offenders in this sample who had a history of suicidal or self-injurious behaviour were also examined. Men with a current panic disorder, SUD, PD, or depression had somewhat higher rates of suicidal and self-injurious behaviour than those with other diagnoses.

In summary, federal male offenders with a mental disorder typically have at least two other concurrent disorders. These results suggest that the outcomes for offenders with a mental disorder as well as their treatment needs cannot be fully understood without consideration of the high rates and impact of comorbid personality and substance abuse disorders.

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#### Introduction

Both Canadian and international studies indicate that offenders with major mental disorders constitute a significant proportion of the prison population (Brown, Hirdes, & Fries, 2015; Diamond, Wang, Holzer, Thomas, & Cruser, 2001; Fazel & Danesh, 2002; Magaletta, Diamond, Faust, Daggett, & Camp, 2009). Reported prevalence rates vary depending on the definition of mental disorder adopted and the methodology used. Several studies involving offenders in the Canadian federal system have estimated rates of over 70% when personality and substance abuse disorders are included (Brink, 2005; Brink, Doherty, & Boer, 2001; Beaudette & Stewart, 2015; Motiuk & Porporino, 1991). Addressing mental health concerns of inmates is further complicated by high rates of comorbid disorders; in particular, high rates of co-occurring substance abuse and mental health diagnoses have been identified (Beaudette & Stewart, 2015; Brink et al., 2001; Ogloff, 2002; Wilton & Stewart, 2012).

The term comorbid diagnosis describes a condition in which a person is diagnosed concurrently with more than one mental health disorder. While experiences vary across individuals, comorbid disorders have the potential to impede individuals' ability to perform a variety of daily tasks, develop healthy relationships, and lead productive lives (Palmer, Jinks, & Hatcher, 2010; Urbanoski, Cairney, Adlaf, & Rush, 2007). Evidence suggests that comorbid disorders put people at increased risk of suicide, homelessness, family conflict, social marginalization, violent and disruptive behaviour, victimization, physical health problems, and criminal involvement (Urbanoski et al., 2007). Furthermore, comorbidity is not atypical of individuals with a mental disorder. The American National Comorbidity Study found that about 40% of affected youth reported more than one class of lifetime disorder, with mood disorders being the most likely to co-occur with other classes. In the correctional settings, comorbidity of Axis I and Axis II conditions are commonly found among offenders; frequently these include substance use disorders, personality disorders and mood disorders (Brink, Doherty, & Boer, 2001).

Recent research within the Correctional Service of Canada (CSC) has noted that the correctional outcomes of offenders with any mental disorder are poorer than for offenders without these disorders (Stewart & Wilton, 2014), and the outcomes for offenders with co-occurring mental health and substance abuse disorders are poorer still (Wilton & Stewart, 2012). Other research, however, has indicated that a diagnosis of a mental disorder may not contribute meaningfully to correctional outcomes. For instance, Porporino and Motiuk (1995) found that a sample of severely mentally

disordered and non-mentally disordered Canadian offenders had similar rates of institutional misconducts and a similar volume of criminal history, but, on release, were actually less likely to return to custody with any new offence or with a violent new offence than offenders without mental disorders. Bonta and colleagues' early meta-analysis found that clinical factors related to mental disorder did not predict recidivism whereas the risk/need factors did (Bonta, Law, & Hanson, 1998). These findings were replicated in a more recent meta-analysis (Bonta, Blais, &Wilson, 2013). Differences in research results examining the impact of mental disorder could be due to the prevalence of combinations of co-occurring disorders, particularly if one of the diagnoses includes substance abuse or personality disorders. For example, a study of juvenile offenders found that comorbidity for externalising disorders (i.e., negative behaviours directed toward the external environment) was associated with higher rates of failure on release, while the presence of internalising disorders (those that are turned inwards, including depression, worry, fear, self-injury, and social withdrawal) buffered the detrimental effects of externalizing disorders for this group (Randall, Henggeler, Pickrel, & Brondino, 1999).

In prison, seriously mentally ill offenders may have a greater challenge adhering to the institutional regimes with security regulations that impose strict regimes with sanctions for non-compliance. In the US, for example, studies have shown higher disciplinary rates among those with mental illness (Wallace, Mullen, & Burgess, 2004), and in the Canadian federal system, two studies found that offenders with mental disorders were more likely to have experienced a prison misconduct over a given time period than those with no disorder (Stewart & Wilton, 2014; Wilton & Stewart, 2012). Research in this area, however, has indicated that though major mental disorders contribute to risk for institutional misconducts and violent misconducts, offender characteristics associated with age and a strong antisocial orientation such as the extent of the criminal history, substance abuse and criminal thinking (Schenk & Fremouw, 2012; Walters, 2011) were stronger risk factors predicting these outcomes.

A major concern in any institutional correctional setting is the vulnerability of offenders with a mental disorder to potential victimization by other inmates (Silver, 2002). In one American study of adult prisoners in six Californian prisons, young age and a history of mental illness were associated with being a victim of unwanted sexual acts (Jenness, Maxson, Matsuda, & Sumner, 2007). Another large scale study (N = 7,528) found that male inmates who indicated that they had been treated for a mental disorder were 1.6 times more likely to report being physically victimized while in prison than inmates without a disorder (Blitz, Wolff, & Shi, 2008). The methodology of the studies, however, did not allow an analysis of the impact of individual or comorbid diagnosis on these results.

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Prison regimes have also been criticised for disproportionately high rates of placement of offenders with a mental disorder into segregation or solitary confinement, a practice that can exacerbate psychiatric problems (Metzner & Fellner, 2010; Toch, 1982). The contribution of a diagnosis of a mental disorder to placement in segregation has been examined in the Canadian federal context but a clear picture did not emerge. Although several studies have found that rates of inmate placement in voluntary and involuntary segregation in CSC were higher among offenders with a mental disorder, it appeared that substance abuse may have been the major driver of these results. Two studies of federal offenders found that offenders who had histories of a substance abuse disorder, in combination with a mental disorder, and offenders with substance abuse disorders only both had higher rates of placements in segregation than offenders with a mental disorder only (Stewart & Wilton, 2014; Wilton & Stewart, 2012; Wilton, Stewart, & Mossière, 2014).

Left unexamined in these studies is the role a specific diagnosis or combinations of diagnoses plays in contributing to outcomes. An understanding of the impact of comorbidity on key measures like placements in segregation and treatment centres or rates of misconducts would help to plan for appropriate treatment services and guide supervision strategies focused on institutional and public safety goals. Addressing the mental health needs of offenders in CSC promotes their improved quality of life, reduces suffering, respects basic human rights, and meets legislative requirements to provide essential health care services (Correctional Service of Canada, n.d.)

#### **The Present Study**

The purpose of the present study was to assess the prevalence of combinations of disorders in CSC's male offender population and to determine which patterns of comorbidity would be linked to key outcomes during the offenders' incarceration. More specifically, we were interested in examining which disorders would be linked to misconducts, placements in segregation, and transfers to treatment centres. It was hypothesized that outcomes for offenders with mental disorders that include combinations of substance abuse and personality disorders would be most frequently implicated in misconducts and placements in segregation, but that transfers to treatment centres would be more frequent among offenders with psychoses, depression, bipolar disorders, and Borderline Personality Disorder (BPD) who have high rates of impairment as measured by the Global Assessment of Functioning (GAF).

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### Method<sup>1</sup>

#### **Participants**

All men admitted to CSC on new warrants of committal were approached to obtain their consent to participate in structured clinical interviews. Interviews were conducted between March 26, 2012 and September 12, 2014. Admission dates for participating offenders ranged from January 3, 2012 to July 25, 2014. Outcome data were collected on June 15, 2015. Thus follow-up time ranged from 14-39 months.

Only those providing their consent were included in this study. The national consent rate was 78%. To determine the representativeness of the sample, the profiles of study participants were compared to the refusers. Participants were more likely to be lower risk (as assessed by criminogenic need and static risk) and to be convicted of a sexual offence ( $\chi^2 = 9.18$ , df = 1, p < .01). There was no difference in the mean age between the participants and decliners (35.6 years vs. 35.2 years, respectively).

#### **Measures/Material**

**Structured Clinical Interview for DSM Axis I Disorders (SCID-I)**. The SCID-I is a semistructured interview designed to determine major DSM-IV Axis I diagnoses (First, Gibbon, Spitzer et al., 1995). The Research Version of the SCID, which was used here, is considerably longer than the Clinician Version given it is designed to include most of the information that is diagnostically useful to researchers. Compared to the Clinician Version, the Research Version contains more disorders, subtypes, severity, longitudinal disorder course trajectories, and provisions for coding the specific details of past mood episodes, allowing the researcher to modify the interview to fit the specific needs of a particular study (biometric). The following Axis I disorders were assessed for this study: (1) mood; (2) psychotic; (3) substance use; (4) anxiety; and (5) eating. Pathological gambling was also including from the optional model. The SCID-I is widely considered to be the "gold standard" for assessing psychiatric diagnoses (e.g., Shear et al., 2000; Steiner, Tebes, Sledge, & Walker, 1995), and has been used with men and women in the community, as well as psychiatric and offender samples (Fennig, Craig, Lavelle, Kovasznay, & Bromet, 1994; Steadman, Robbins, Islam & Osher, 2007; Trestman, Ford, Zhang, & Wiesbrock, 2007; Zanarini & Frankenburg, 2001; Zanarini et al., 2000).

<sup>&</sup>lt;sup>1</sup> The Methods section describing the survey measures and the protocol is extracted from Beaudette and Stewart (2015).

Research suggests that the reliability for the SCID-I is good to excellent for most modules (Lobbestael, Leurgans, & Arntz, 2010; Segal, Kabacoff, Hersen Van Hasselt, & Ryan, 1995; Skre, Onstad, Torgersen, & Kringlen, 1991; Williams et al., 1992; Zanarini & Frankenburg, 2001; Zanarini et al., 2000). Its validity is also good to excellent, with the SCID-I comparing favourably to diagnoses made by psychiatrists in terms of sensitivity, specificity, and agreement (Fennig et al., 1994).

**Structured Clinical Interview for DSM Axis II Personality Disorders (SCID-II)**. The SCID-II is a semi-structured interview developed for the assessment of DSM Axis II Personality Disorders (First et al., 1995). It is considered the "gold standard" in assessing personality disorders, and has been used with offenders (Guy, Poythress, Douglas, Skeem, & Edens, 2008; Komarovskaya, Loper, & Warren, 2007; Ullrich et al., 2008). Only the portions of the SCID-II that assess BPD and Antisocial Personality Disorder (APD) were administered in this study.

Reliability is reported as excellent for the BPD assessment (Zanarini & Frankenburg, 2001) and the inter-rater reliability of the BPD and APD assessments of the SCID-II is also good to excellent (Dreessen & Arntz, 1998; First et al., 1995; Fogelson, Neuchterlein, Asarnow, Subotnik, & Talovic, 1991; Lobbestael et al., 2010; Maffei et al., 1997). Compared to other measures and psychiatric diagnoses, it has good sensitivity (0.74 - 0.84), specificity (0.82) and convergent validity (r = 0.80) in men and women psychiatric patients (Grilo et al., 2001; Ryder, Costa, & Bagby, 2007; Skodol, Rosnick, Kellman, Oldham, & Hyler, 1988). A study that compared the SCID diagnoses to longitudinal diagnoses found strong validity for the APD module for male psychiatric patient, with an agreement at 0.95 diagnostic power (Skodol et al., 1988).

**Modified Global Assessment of Functioning – Revised (GAF).** The GAF is included in the DSM-IV-TR as the measurement for Axis V and is the most widely used measure of global functioning in psychiatric patients (Bodlund, Kullgren, Ekselius, Lindstrom, & von Knorring, 1994; Piersma & Boes, 1997). The scale measures global severity of psychiatric illness by considering a patient's social, psychological, and occupational functioning. The modified GAF with its detailed criteria and more structured scoring system provides better interclass correlations than the original GAF (Hall, 1995). Ratings are associated with the following levels of function due the impact of symptoms:

81-90 absence of symptoms
71-80 some transient mild symptoms
61-70 some persistent mild symptoms
51-60 moderate symptoms
41-50 some serious impairment
31-40 major impairment
21-30 inability to function
0-20 danger to self and others

The descriptors for each 5-10-point bracket make the distinction between criteria easier for raters for this version of the GAF. Although limited research on the reliability and validity of the revised tool has been conducted, the GAF has been used by the World Health Organization (WHO) to estimate degree of impairment across their large scale international studies (WHO, 2004) and is regarded as a useful tool that can be easily administered with little training or clinical expertise. While the psychometrics of the tool in clinical settings have been criticised, excellent reliability and validity are reported with more structured assessment protocols such as the SCID and with brief training of raters (Bates, Lyons, & Shaw, 2002; Vatnaland, Vatnaland, Friis, & Opjordsmoen, 2007).

**Profiling information**. Demographic information, static risk factors ratings, dynamic risk factors ratings, institutional incidents, assault related incidents, placements in segregation and transfers to treatment centres and information on participation in correctional programs were extracted from the Offender Management System (OMS), CSC's official electronic record of offenders. Criminal risk variables were drawn from the Offender Intake Assessment (OIA), which is a comprehensive evaluation conducted on all incoming federal offenders. One component of the OIA, the static risk factor, rates offenders as low, moderate, or high based on consideration of previous youth and adult court offences, the current offence, the number, type and severity of the offences, crime-free periods, and sexual offences (Correctional Service of Canada, 2014). The Dynamic Factors Identification and Analysis (DFIA) component of the OIA assesses seven domains of dynamic criminogenic risk factors. Each domain consists of multiple indicators (Brown, & Motiuk, 2005). The domains include employment and education, marital and family, associates and social interaction, criminal attitudes and values, personal and emotional orientation, substance abuse, and community functioning. The fivepoint rating scale for each domain includes asset to community functioning, no immediate need for improvement, low, moderate and high need for improvement. Ratings of moderate or high need for improvement were combined to indicate a need in each of the dynamic factor domains. In addition, a final assessment provides an overall rating of low, moderate or high dynamic risk (Correctional Service of Canada, 2014).

**Institutional outcomes.** The adjustment of offenders during incarceration was assessed through an examination of rates of institutional incidents, assault related incidents, admissions to segregation, correctional program participation, rates of transfer to regional treatment centres, and incidents and historical indicators of suicide and self-injury behaviours.

Institutional incidents and assault related incidents were identified and counted when offenders' roles were either instigators or victims from the incidents databases in OMS. Institutional incidents include disciplinary problems, intelligence, possession of contraband, assaults on other offenders, possession of unauthorized items, self-inflicted injuries, etc. These are distinct from institutional charges, in part, because the offender can play any role in the incident. Offenders may be instigators, associates, or victims in an incident.

Admissions to segregation included two types of segregation placement: voluntary and involuntary. For the purposes of these analyses the two types were combined. Data on placements in segregation were taken from the administrative segregation database of OMS.

Information on program participation was drawn from the database in OMS on program assignments. Information on completions and reasons for non-completion of correctional programs is also provided in this database. Participation in all programs listed as nationally recognized correctional programs with an intensity level of low, moderate or high while the offenders were incarcerated was counted in the analysis. Some offenders had enrolled in more than one program during the defined study period.

Incidents indicating suicide or self-injurious behaviour from the incidents database and a responsivity indicator<sup>2</sup> from the OIA were combined to create a dichotomous indicator of any indication of suicide or self-injury history. While those included in this group had a verifiable history of suicidal or parasuicidal behaviour, other offenders who could also have had this history may not have had the incidents recorded.

#### **Procedure/Analytic Approach**

The study employed a continuous intake methodology, meaning that all eligible offenders were approached to participate in the order in which they were admitted to the institution over a six-month period. Due to logistical difficulties and lower than usual admission rates in some regions, data

 $<sup>^{2}</sup>$  This responsivity indicator was available for 147 offenders. The indicator suggested a history of suicide or self-injury for 37 of them.

collection exceeded six months in some regions if a larger sample size was required. All interviews that comprise the data for the study were conducted between March 2012 and September 2014. Results were disaggregated by Aboriginal ancestry where the numbers allow for meaningful analysis. For this study, the number of offenders in other ethnic groups was too small for analysis by sub-group.

Assessor training. Research Assistants (RAs) were hired to work at the reception centres in each of CSC's five regions (i.e., Atlantic, Quebec, Ontario, Prairies, and Pacific regions) and trained on the administration of the SCID-I and SCID-II. Assessor training was comprised of five days of self-directed learning using the training materials provided by the authors of the SCID (i.e., two user's manuals, two written case examples, eight instructional DVDs). Upon completion of the training, a session with the first author was held to discuss any issues or questions that arose and to practice cases to ensure consistency. In instances where the RAs were unsure of a rating, they would consult the SCID manual and with the first author before coming to a consensus. Coding decisions were shared with all RAs.

**Participant recruitment**. All incoming offenders on new warrants of committal were recruited at the reception units on a continuous basis. Offenders who were admitted because of revocations, breaches, or suspensions of a previous release were not included. It should be noted that a small percentage of offenders who would have met the referral criteria were not approached to participate for various reasons (e.g., they were immediately placed in segregation, were receiving treatment in hospital, were assessed as a security risk, or were a high-profile offender<sup>3</sup>). Their information was documented and notes were taken indicating the reason the interview was not conducted. If an offender was approached and declined for personal reasons, the RA documented the reason. All interviews were conducted in a private room to ensure confidentiality. If an offender had been violent with staff or displayed behaviours that were considered unsafe, the interview was postponed or cancelled.

**Informed consent and data management**. No compensation or incentive was provided to participants. A verbal summary of the informed consent form was provided to the participant, followed by an opportunity to ask questions about the procedure and the consent form. A hardcopy of the signed informed consent form was required for the interview to proceed. A debriefing form was given to the participant following the completion of the interview. All interviews were conducted in English or in French. As the structured interview was used for research, not diagnostic purposes, results were not

<sup>&</sup>lt;sup>3</sup> Had received media coverage and were placed in protective custody.

shared with participants. In the event an offender stated that he was concerned about his mental health or the RA felt the offender required follow-up services, he was referred to the psychology department at the institution.

After the interview was completed, data were entered into an electronic spreadsheet in a protected file on a secure network and the hardcopy SCIDs were locked in a cabinet in a secure room at the institution. Offender names were kept separate from their participant numbers as a measure to further protect their identity. As a quality control measure, data on the electronic spreadsheet were periodically compared to the results recorded on the hardcopy SCID files.

**Analyses**. Chi-square analyses were conducted to determine whether any statistically significant differences existed between the men who agreed to participate and those who did not. Student's t-tests were also performed to establish if any mean differences existed among the groups.

Using three major categories of disorders assessed during the SCID interviews (i.e., substance use disorders, Axis I disorders, and personality disorders), eight mutually exclusive and collectively exhaustive combinations of comorbidity patterns were identified. Offenders with any of the 23 current mood, anxiety and eating disorders assessed were counted as having an Axis I disorder. Offenders with a current alcohol abuse or dependence or drug abuse or dependence disorder were determined to have a substance use disorder. Note that due to the prevalence of substance use disorders and their importance in correctional outcomes, they constituted their own category separate from other Axis I disorders. Offenders assessed as having antisocial personality disorder (APD) or borderline personality disorder (BPD) were described as having a personality disorder (PD). The presence of these three types of disorders determined offenders' placement into one of the eight comorbid categories. When the analyses permitted a more specific examination of types of disorders, the classes of disorders including substance use, mood, anxiety, psychotic, compulsive gambling, APD, and BPD were used.

Analyses examined the strength of association between groups of comorbidity and outcomes by using odds ratios, areas under the curve (AUCs), Cohen's d and by comparing percentages. An AUC of .5 indicates no association. Cohen's d values of .2, .5 and .8 are generally considered to be small, medium and large effects (Rea & Parker, 1992).

Comparisons of the occurrence of offenders' involvement in incidents and admissions to segregation across comorbidity groups controlled for variable time at risk of these events by holding the time constant to the first six months of incarceration when frequencies of these events permitted. Other variables included in the analysis of correctional outcomes were correctional program enrolments that resulted in completions and drop outs.

Logistic regression analysis was used to determine which factors, including types of diagnoses or clusters of comorbid diagnoses, were related to transfers to treatment centres. A forward stepwise entry method was used to build the statistical model with an entry criterion of p < .05 and a removal criterion of p > .10.

#### Results

National prevalence rates of individual disorders for the incoming male population were presented in a previous report (Beaudette, Power, & Stewart, 2015) but are also presented in Appendix A (Table A1) for reference. The focus of the current report is on rates of patterns of comorbidity among these disorders. Presented in Table 1 is the frequency with which incoming men met criteria for one or more of the following classes of disorders: substance abuse or dependence, mood, anxiety, psychotic, compulsive gambling, APD, and BPD. Clearly, among offenders with a mental disorder, comorbidity is not unusual. Two-thirds of those with a diagnosis (547/807) met criteria for at least one other disorder across the categories examined.

#### Table 1

- · · · · · · · · · · · · · · · · · · ·		
Number of disorders	n	%
0	301	27.1
1	260	23.5
2	261	23.6
3	155	14.0
4	73	6.6
5	52	4.7
6	6	0.5

Frequencies of the Number of Comorbid Categories of Current Disorders (N = 1,108)

Note: The seven categories included current diagnoses of: a) alcohol or drug abuse or dependence, b) mood, c) anxiety, d) psychotic, e) compulsive gambling, f) antisocial personality disorder (APD), and g) Borderline Personality Disorder (BPD).

The prevalence of each combination of the three major categories for the population of incoming male offenders included in the study is displayed in Table 2. For a complete list of comorbid patterns across the seven categories of disorders see Appendix B. Findings revealed that combinations of disorders with substance abuse disorders and personality disorders were the most frequent. In fact, 66% of offenders with any type of current substance abuse disorder had a personality disorder as well (364/551). Likewise, 68% of offenders with a personality disorder were found to have at least one current alcohol or drug abuse or dependence disorder (364/532).

Table 2

Disorders	п	%
Substance use, Axis I MD, and either APD or BPD	199	18.0
Substance use and Axis I MD	76	6.9
Substance use and either APD or BPD	165	14.9
Axis I MD and either APD or BPD	76	6.9
Substance use only	111	10.0
Axis I MD only	88	7.9
Either APD or BPD only	92	8.3
No disorders	301	27.2

Prevalence of Current Mental Disorders and Comorbid Patterns for Incoming Male Offenders (N = 1.108)

Note: Substance use disorders are not included among the Axis I disorders. These are assessed separately as their own category. Axis I disorders include psychotic disorders (e.g., schizophrenia, schizophreniform, schizoaffective, delusional disorder), mood disorders (e.g., bipolar disorders, major depression), anxiety disorders (e.g., generalised anxiety, panic disorders), and eating disorders (e.g. anorexia, bulimia, binge eating disorders). Substance use disorders include alcohol abuse or dependence and drug abuse or dependence.

APD = Antisocial Personality Disorder; BPD = Borderline Personality Disorder; MD = mental disorder.

We examined the rates of disorders across self-reported ancestry groups (Table 3). Of note, First Nations offenders had the highest rates of comorbid substance use, personality disorders and an Axis I disorder among the groups. Métis offenders had the highest rate of comorbid substance use and personality disorders, while Black men and men from 'Other' ancestries were more likely to have no mental health disorder than White, First Nations and Métis offenders. Rates of Axis 1 disorders only are low, particularly for the First Nations and Métis offenders; for these offenders, Axis 1 disorders are more likely to be found in combination with substance abuse disorders.

#### Table 3

Self-reported Racial Backgrounds of Offenders across Types of Disorders (N = 1,108)

	W	hite	First 1	Nations	В	lack	М	létis	Ot	ther <sup>a</sup>	
Mental Disorders Group	( <i>n</i> =	( <i>n</i> = 662)		( <i>n</i> = 173)		( <i>n</i> = 99)		( <i>n</i> = 56)		( <i>n</i> = 118)	
	n	%	n	%	п	%	п	%	п	%	
1. Substance use & Axis I & PD	114	17.2	50	28.9	10	10.1	11	19.6	14	11.9	
2. Substance use & Axis I (no PD)	47	7.1	17	9.8	4	4.0	5	8.9	3	2.5	
3. Substance use & any PD (no	00	12.2	20	22.5	Q	Q 1	20	25 7	10	85	
Axis I)	88	15.5	39	22.3	0	0.1	20	55.7	10	0.5	
4. Axis I & PD (no SUD)	48	7.3	6	3.5	8	8.1	4	7.1	10	8.5	
5. Substance use (no Axis I & no	50	80	27	15.6	10	10.1	7	12.5	8	6.8	
PD)	59	0.9	21	15.0	10	10.1	/	12.5	0	0.8	
6. Axis I only (no PD, no SUD)	64	9.7	4	2.3	8	8.1	1	1.8	11	9.3	
7. PD only (no SUD no Axis I )	56	8.5	13	7.5	8	8.1	2	3.6	13	11.0	
8. No Disorder	196	201	17	0.0	12	12 1	6	10.7	40	41.5	
(PD, SUD or Axis I)	100	20.1	1 /	9.0	43	43.4	0	10.7	47	41.3	

Note: Axis I disorders include all disorder except personality disorders and mental retardation: mood disorders, psychotic disorders, anxiety disorders and eating disorders. For the purposes of this analysis substance use disorders were not included as Axis I disorders but are considered on their own. Personality Disorder (PD) includes Antisocial Personality Disorder (APD) and Borderline Personality Disorder (BPD).

SUD = Substance Use Disorder.

<sup>a</sup> Other' includes: Arab/West Asian, South East Asian, South Asian, Chinese, Filipino, Latin American, etc.

Table 4 shows the association of types of disorder with the current index offence category. The results indicate that offenders serving their current offence for robbery and assault were most likely to have mental health disorders - most frequently comorbid substance use and personality disorders. Offenders whose current sentences were for a sexual or drug offence were the least likely to have a mental disorder.

## Table 4

	Substance	Substance	Substance	Axis I MD	Substance use	Axis I MD	PD (no	No disorder
Offenee	use <sup>1</sup> & Axis I	use & Axis I	use & PD (no	& PD (no	(no Axis I MD,	(no SUD,	Axis I, no	(no SUD, PD,
Onence	MD & PD	MD (no PD)	Axis I MD)	SUD)	no PD)	no PD)	SUD)	or Axis I)
	%	%	%	%	%	%	%	%
Homicide $(n = 66)$	19.7	6.1	16.7	1.5	15.2	13.6	4.6	22.7
Sexual ( $n = 174$ )	12.1	5.8	7.5	10.9	8.1	16.1	6.3	33.3
Robbery $(n = 151)$	26.5	11.9	22.5	5.3	12.6	4.0	6.6	10.6
Assault ( $n = 124$ )	30.7	8.1	18.6	5.7	9.7	5.7	8.9	12.9
Other violent	164	0.0	12 /	75	75	6.0	12 4	26.0
(n = 67)	16.4	9.0	13.4	1.5	7.3	0.0	15.4	20.9
Drug ( <i>n</i> = 293)	9.9	4.8	13.7	6.1	9.2	6.1	9.9	40.3
Property ( $n = 125$ )	24.0	6.4	17.6	8.8	6.4	8.8	7.2	20.8
Other non-violent	15.0	5 (	12.2	( 5	15.0	47	0.4	20.0
( <i>n</i> = 107)	15.9	3.6	12.2	0.3	15.0	4./	9.4	30.8

Percentage of Offenders within Index Sentence Offence Types with Combinations of Comorbid Disorders (N = 1,107)

Note: <sup>1</sup>Substance use disorders are not included among the Axis I disorders in this table. These are assessed separately as their own category. Axis I disorders include psychotic disorders (e.g., schizophrenia, schizophreniform, schizoaffective, delusional disorder), mood disorders (e.g., bipolar disorders, major depression), anxiety disorders (e.g., generalised anxiety, panic disorders), and eating disorders (e.g. anorexia, bulimia, binge eating disorders). Substance abuse disorders include alcohol abuse or dependence and drug abuse or dependence.

MD = Mental Disorder; PD = Personality Disorder; SUD = Substance Use Disorder.

#### **Institutional Outcomes**

The following section presents the results analysing the impact of the combinations of current substance use, current Axis I, and personality disorders on institutional adjustment. Some analyses applied a fixed follow-up to account for differences in times at risk.

**Institutional incidents.** The proportion of offenders within each diagnostic category who were involved in security incidents (as an instigator or a victim) is presented in Table 5. For this analysis, the time frame was fixed over their first six months of incarceration. Offenders with comorbid substance use, current Axis I disorders and a personality disorder, and offenders with comorbid substance use and a personality disorder were most at risk of being an instigator in incidents. Offenders with comorbid substance uses and a personality disorder, and offenders with comorbid current Axis I and a personality disorder, and offenders with comorbid current Axis I and a personality disorder were most likely to be involved in incidents as a victim. Offenders with the highest rates of involvement in incidents are those who had a current diagnosis for a personality disorder, a substance abuse disorder, and a current Axis I disorder. Offenders with an Axis I disorder not combined with other disorders actually had a lower probability of being a victim or an instigator in security incidents than offenders with no mental disorder. A rate analysis examining incidents over the total study period controlling for time at risk confirmed these observations (see Appendix C).

Table 5

Combination of Disorders	п	%
At least one incident as an instigator during the first 6 months of incarceration		
Substance use, Current Axis I MD, and either APD or BPD	62	31.2
Substance use and Current Axis I MD	12	15.8
Substance use and either APD or BPD	51	30.9
Current Axis I MD and either APD or BPD	14	18.4
Substance use	27	24.3
Current Axis I MD	14	15.9
Either APD or BPD	23	25.0
No disorders	49	16.3
At least one incident as a victim during the first 6 months of incarceration	n	%
Substance use, Current Axis I MD, and either APD or BPD	10	5.0
Substance use and Current Axis I MD	4	5.3
Substance use and either APD or BPD	14	8.5
Current Axis I MD and either APD or BPD	6	7.9
Substance use	3	2.7
Current Axis I MD	3	3.4
Either APD or BPD	6	6.5
No disorders	17	5.7

Percentage of Offenders within each Combination of Comorbid Disorders with at Least One Incident as an Instigator or a Victim in the First 6 Months Following Admission

Note: APD = Antisocial Personality Disorder; BPD = Borderline Personality Disorder; MD = Mental Disorder. Note: These percentages represent the offenders in each category who have a period of at least 6 months of incarceration and had been involved in an incident during this 6 month period.

A secondary analysis examined the relationship of mental diagnosis to offenders' involvement in assault related incidents. Across the entire period of incarceration, the cohort of 1,108 offenders were involved in a total of 224 violent incidents committed by 152 offenders; 120 (53%) were inmate fights; 89 (40%) were assaults on an inmate; 14 (6%) were assaults on staff, and 1 was a sexual assault. There were an additional 97 incidents in which 85 offenders were the victims. Most of these incidents, 90 of the 97, were assaults on inmates, while 4 were inmate fights and 3 were sexual assaults. Table 6 illustrates that offenders with comorbid personality and substance abuse disorders, with or without a current Axis I disorder, were more likely to be involved in assault related incidents while incarcerated. Offenders with an Axis I disorder only were less likely to be involved in assault related misconducts as an instigator than offenders with no disorders and were about equally as likely to be a victim as those with no disorders.

#### Table 6

Percentage of Offenders within Each Combination of Comorbid Disorders Involved in Assault Related Incidents

Combination of Disorders	п	%	
At least one assault related incident as the instigator			
Substance use, Current Axis I MD, and either APD or BPD	48	24.1	
Substance use and Current Axis I MD	11	14.5	
Substance use and either APD or BPD	35	21.2	
Current Axis I MD and either APD or BPD	7	9.2	
Substance use only	10	9.0	
Current Axis I MD only	3	3.4	
Either APD or BPD only	11	12.0	
No disorders	27	9.0	
At least one assault related incident as the victim			
Substance use, Current Axis I MD, and either APD or BPD	22	11.1	
Substance use and Current Axis I MD	7	9.2	
Substance use and either APD or BPD	19	11.5	
Current Axis I MD and either APD or BPD	7	9.2	
Substance use only	8	7.2	
Current Axis I MD only	3	3.4	
Either APD or BPD only	10	10.9	
No disorders	9	3.0	

Note: APD = Antisocial Personality Disorder; BPD = Borderline Personality Disorder; MD = Mental Disorder. Note: These percentages represent the offenders in each diagnostic category who have at least a 6 months period of incarceration and had been involved in an institutional incident that was an assault during this 6 month period.

**Relationship of GAF scores to individual and comorbid diagnoses.** GAF scores reflect the overall level of function of individuals. The median score for the total population in the study was 71 and the mean was 67 (SD = 20). Further detail on the percentage of offenders at varying levels of GAF scores is presented in Table D1. For offenders with no disorder the mean GAF was 81.8 (SD = 10). Of note, 13% of the incoming sample was found to have scores below 40, which indicates a level of impairment that typically requires inpatient treatment.

The GAF scores of offenders by comorbidity group are presented in Table 7 and additional comparisons across specific diagnoses appear in Table D2 in Appendix D. Offenders with Axis 1 disorders in combination with substance use and a personality disorders had the lowest GAF scores (i.e., the most impaired level of function). Table E1 confirms the high needs for offenders with mental disorders, particularly with those in this group.

Table 7

Mean GAF Scores within Combinations of Disorders

Mental Disorders	n	М	SD
Substance use, Current Axis I MD, & either APD or	199	48.5	17.4
BPD			
Substance use & Current Axis I MD	76	60.5	17.3
Substance use & either APD or BPD	165	64.6	18.0
Current Axis I MD & either APD or BPD	76	55.8	18.2
Substance use only	111	73.6	15.7
Current Axis I MD only	88	69.4	17.4
Either APD or BPD only	92	71.0	17.3
No disorders	301	81.8	10.0

Note: APD = Antisocial Personality Disorder; BPD = Borderline Personality Disorder; MD = Mental Disorder.

*GAF scores relationship to assault related incidents*. Findings revealed that GAF scores were reliable predictors of assault related incidents (Wald  $\chi^2$  (1) = 28.2, *p* < .001, AUC = .63). More specifically, the odds ratio of 0.98 (95% CI from 0.97 to 0.99) indicated that for every one point increase in GAF score, the odds of committing an assault related incident decreased by between 1%-3%.

**Placement in Segregation**. The proportion of offenders placed in segregation within 6 months of admission by cormorbid group is presented in Table 8<sup>4</sup>. For example, 200 offenders who had at least a 6 month period of incarceration fell within the comorbidity group that included a diagnosis for substance use, and current Axis I MD, and either APD or BPD disorder. Of these 200 men, 35 (17.6 %) were placed in segregation during the first 6 months. The pattern was similar to that of institutional incidents. Once again, offenders with personality disorders in combination with other disorders had the highest rates of placement in any type of segregation. Rates of placements for offenders with an Axis I disorder without co-occurring personality disorders or substance use disorders were not significantly different from offenders with no mental disorders.

<sup>&</sup>lt;sup>4</sup> Rates presented in the Appendix F confirm these results.

#### Table 8

Percentage of Offenders by Comorbid Disorders Placed in Administrative Segregation

Combination of Disorders	п	%
Involuntary Segregation		
Substance use, Current Axis I MD, and either APD or BPD	35	17.6
Substance use and Current Axis I MD	9	11.8
Substance use and either APD or BPD	23	13.9
Current Axis I MD and either APD or BPD	14	18.4
Substance use only	11	9.9
Current Axis I MD only	4	4.6
Either APD or BPD only	10	10.9
No disorders	19	6.3
Voluntary Segregation		
Substance use, Current Axis I MD, and either APD or BPD	14	7.0
Substance use and Current Axis I MD	1	1.3
Substance use and either APD or BPD	5	3.0
Current Axis I MD and either APD or BPD	5	6.6
Substance use only	2	1.8
Current Axis I MD only	2	2.3
Either APD or BPD only	2	2.2
No disorders	5	1.7

Note: At least 1 placement in involuntary and voluntary segregation in first 6 months of incarceration. APD = Antisocial Personality Disorder; BPD = Borderline Personality Disorder; MD = Mental Disorder. Note: These percentages represent the offenders in each diagnostic category who have at least a 6 months period of incarceration and had been placed in segregation during this period.

*GAF scores relationship to admission to involuntary segregation.* GAF scores were weakly predictive of admission to involuntary segregation during the first six months of incarceration (Wald  $\chi^2$  (1)=15.3, p < .001, AUC = .61). The odds ratio indicates about a 3% decrease in the odds of an offender having an involuntary segregation admission with every unit change in GAF score. Similarly, GAF scores were weakly associated with at least one admission to voluntary segregation during the first six months of incarceration (Wald  $\chi^2$  (1)=10.2, p = .001, AUC = .64). There were 252 offenders with at least one incident as an instigator during their first 6 months of incarceration. GAF scores significantly but weakly predicted these offenders (Wald  $\chi^2$  (1) = 5.2, p = .022, AUC = .55). GAF scores were not significantly predictive of involvement in incidents as a victim during the first six

months of incarceration (Wald  $\chi^2$  (1) = 0.16, *p* = .688, AUC = .52), suggesting that the most impaired offenders were not among those most likely to be the victim of an incident.

**Transfers to treatment centres.** Transfers to regional treatment centres with this sample were infrequent over the time period examined. All offenders could have been observed for this analysis for a minimum of 14 months. Only 5.6% (n = 62) of the offenders in the cohort had at least one transfer to a treatment centre between admission and the end of the study period. The men who went to treatment centres had a mean GAF score of 49 and a median score of 43. Those who did not go to a treatment centre (n = 1,046) had a mean GAF score of 68, and a median of 74 (SD = 19). An analysis of what degree of impairment was critical for triggering a transfer to treatment centre indicated that a GAF cut-off score of 45 or lower had the greatest average of sensitivity (59) and specificity (83).

The largest group of offenders sent to treatment centres was the one comprising offenders who were comorbid for an Axis I disorder in combination with substance abuse or dependence, and a personality disorder (Table 9). The number of comorbid disorders among offenders in this group suggests a high degree of pathology. Their GAF scores confirm that this group had the highest rates of impairment with scores averaging below 50. Scores in this range are associated with serious to severe impairment in psychological, social, and occupational functioning. Among individual diagnoses that had the greatest likelihood of offenders being transferred to treatment centres were psychotic disorders, depression and mood disorders, bipolar disorders, and BPD (see Appendix G).

To determine which factors best predicted admissions to treatment centres we conducted a logistic regression controlling for time incarcerated.<sup>5</sup> <sup>6</sup> A complete list of the variables entered in the exploratory model is presented in Appendix H. Results of the final regression indicated that GAF score was the strongest single predictor of admission to a treatment, the count of the number of institutional incidents while incarcerated was the next strongest predictor and age at admission was the third. The final model, displayed in Table 10, was statistically reliable ( $\chi^2$  (4, N = 1,105) = 77.2, *p* < .001).<sup>7</sup> The

<sup>&</sup>lt;sup>5</sup> Three offenders were excluded from the analysis. One had missing offence type. One was an outlier on incidents as a victim (7 incidents as victim) and one was an outlier on days in segregation (712 days

<sup>&</sup>lt;sup>6</sup> There were 61 offenders of the 1,105 cohort for whom we had data to include in the modeling. A forward stepwise entry method was used with an entry criterion of p < .05 and a removal criterion of p > .10. Variables considered for the model included a) either a APD or BPD, b) APD, c) BPD, d) total days in segregation, e) a current Axis I disorder other than substance use, f) a current mood disorder, g) a current psychotic disorder, h) a current substance use disorder, i) a current anxiety disorder, j) the number of the seven groups of disorders, k) the number of the 23 current disorders, l) the eight-group comorbidity categorization, m) age at admission, n) time incarcerated in years, o) the number of incidents while incarcerated, p) violent index offence, and q) GAF score

<sup>&</sup>lt;sup>7</sup> The Hosmer Lemeshow test indicated an acceptable fit of the data to the model ( $\chi 2$  (8) = 4.04, p = .85).

sensitivity of the model – its ability to correctly identify offenders who actually had treatment centre admissions – was 77% (47/61).<sup>8</sup>

Table 9

Percentage of Offenders with Transfers to Treatment Centres within Each Comorbidity Group

Disorders		<i>N</i> = 62		
	n	%		
At least 1 transfer to a treatment centre between admission and release or data				
collection				
Substance use, Current Axis I MD, and either APD or BPD	26	41.9		
Substance use and Current Axis I MD	7	11.3		
Substance use and either APD or BPD	8	12.9		
Current Axis I MD and either APD or BPD	5	8.1		
Substance use only	1	1.6		
Current Axis I MD only	2	3.2		
Either APD or BPD only	5	8.1		
No disorders	8	12.9		

Note: APD = Antisocial Personality Disorder; BPD = Borderline Personality Disorder; MD = Mental Disorder.

<sup>&</sup>lt;sup>8</sup> However, this was achieved at the expense of a low positive predictive value; only 47 out of 289 (16%) offenders who were predicted to have an admission to a treatment centre were correctly predicted by the model. The specificity of the model – its ability to correctly identify offenders who did not have admissions to treatment centres – was 77% (803/1,045). The negative predictive value was 98% (803 true negatives out of 817 predicted negatives).

Table 10

Parameter	DF	Estimate	Standard Error	Wald $\chi^2$	р	Odds Ratio	95%	6 CI	
Age at admission	1	0.034	0.013	7.20	.007	1.04	1.01	1.06	
Time incarcerated in years	1	0.661	0.207	10.20	.001	1.94	1.29	2.90	
Incidents count	1	0.131	0.034	14.72	<.001	1.14	1.07	1.22	
GAF score	1	-0.048	0.007	41.49	<.001	0.95	0.94	0.97	
Note: CI = Confidence Interval; GAF = Global Assessment of Functioning.									

Final Logistic Regression Model Predicting Admissions to Treatment Centre (N = 1,105)

**Diagnoses associated with suicide attempts/self-harm**. In this study group of incoming male offenders, there were 54 offenders with a file indication of a history of suicidal or self-injurious behaviour. Most of these men (85%) had two or more of the seven groups of disorders (SUD, mood disorders, anxiety disorders, psychotic disorders, compulsive gambling, APD and BPD), compared to 49% of the sample as a whole who had these disorders but had not file indication of suicidal behaviour. Curiously, 27% who had such a history had no disorder at all. Psychological problems for these offenders may have developed during their incarceration after their initial reception period when they were assessed on the SCID. The prevalence of virtually every current disorders, the odds of having a suicide or self-injury history was at least two times higher if the disorder was present. Not surprisingly, offenders with no disorders had much lower odds of having a suicide or self-injury history than offenders (see Appendix I).

**Participation in correctional programs**. Despite limitations that might be expected due to their mental disorders, offenders with mental disorders in CSC participate in, and complete, correctional programs. Table 11 displays the percentages of offenders within each group of disorders with correctional program enrollments, and the proportion of offenders who completed and dropped out of at least one program. Not surprisingly, offenders with substance use disorders, either alone or in combination with Axis I or personality disorders, were more likely to have enrollments in correctional programs. Most offenders with at least one program enrollment had at least one complete correctional

program. Furthermore, the drop-out rates across groups of combinations of disorders were not high, suggesting that offenders with a variety of mental disorders can successfully complete correctional programs.

#### Table 11

Participation in Correctional Programs by Current Diagnosis (N = 1, 108)

	Enrollment $(n = 674)$		Comp	letion*	Dropout*	
Combination of Disorders			( <i>n</i> =	613)	( <i>n</i> = 103)	
-	п	%	п	%	n	%
Substance abuse/dependence, Axis I MD, and PD	158	79.4	145	91.8	28	17.7
Substance abuse/dependence and Axis I MD	55	72.4	52	94.6	6	10.9
Substance abuse/dependence and PD	128	77.6	113	88.3	26	20.3
Axis I MD and PD	44	57.9	33	75.0	8	18.2
Substance abuse/dependence	87	78.4	82	94.3	11	12.6
Axis I MD	42	47.7	38	90.5	3	7.1
PD	49	53.3	47	95.9	7	14.3
No disorders	111	36.9	103	92.8	14	12.6

\*Note: Percentages of offenders with complete programs and dropouts were calculated from the population of offenders with enrollments. However, 42 offenders had at least one complete program and at least one dropout. These offenders contributed to the both the percentages of offenders with complete programs and those with dropouts.

APD = Antisocial Personality Disorder; BPD = Borderline Personality Disorder; MD = Mental Disorder. PD = either APD or BPD.

#### Discussion

Understanding the risk for negative outcomes for offenders with various types of mental disorders is an important component in the process of ensuring effective correctional supervision and intervention strategies for this notable proportion of the offender population.

Previous research has produced conflicting results on the role of mental disorders in the risk for general criminal offending. This may be related to variation in the recruitment of subjects. Studies that recruit subjects from a population of offenders, some of whom have mental disorders, are likely to find that the impact of mental disorder on criminal recidivism is outweighed by the impact of well-established criminal risk factors common to offender populations. Recent research in CSC suggests that poorer outcomes among federal offenders with mental disorders may be related to the impact of co-occurring substance disorders (Stewart & Wilton, 2014; Wilton & Stewart, 2012). Related to this, research on juvenile offenders in the US found that offenders with disorders that include symptoms of externalizing conditions (which would include APD, BPD and SUDs) had poorer outcomes on release than offenders who had internalizing conditions such as depression and anxiety (Randall et al., 1999). Externalizing conditions are more commonly found within a correctional population. Within CSC, more refined research, examining various outcomes for specific disorders and combinations of comorbid disorders, was required to better understand the conflicting research findings.

The results of the current study indicated that the majority of offenders with mental disorders in our population suffer from more than one disorder; with over 67% having a diagnosis for at least one other disorder. For example, offenders with personality disorders comprise over 48% of the entire incoming male population and 66% of these will have a co-occurring substance use disorder. Similar results were found when we examine comorbidity among offenders with a substance abuse disorder. About 50% of the incoming male population met criteria for at least one current DSM-IV substance use disorder and, of these most (66%) also had a co-occurring personality disorder. This rate of comorbidity is much higher than those noted in the general Canadian population where an estimate of under 2% was calculated based on the 2002 Community Health Survey (Rush et al., 2008) and higher than among substance abusers outside the criminal justice system where one study found a pooled prevalence of 'any' mental health problems among substance abuse treatment patients of 43% (Goldner, Lusted, Roerecke, Rehm, & Fischer, 2014).). Another study found that, among people treated for mental disorders in Ontario, one in five had co-occurring SUD and mental disorders (Rush & Koegl, 2008). These researchers also noted that having a co-occurring disorder was strongly associated

with antisocial and challenging behaviour.

It is interesting to note the differences between patterns of comorbidity among different ethnic groups. Fewer than 10% of offenders have an Axis 1 disorder alone. In particular, Aboriginal offenders rarely (about 2% for either First Nations or Métis offenders) have an Axis I disorder that is not combined with a Substance Abuse or Personality Disorder. Men who self identified as Black or 'Other' ethnicity were much more likely to be in the no disorder group than the White or Aboriginal men (i.e., over 40% of offenders in both the Black and Other groups had no disorder compared to 28% of the White and 10% of the two Aboriginal groups). First Nations men had the greatest likelihood of all the ethnic groups examined to suffer from multiple disorders.

Our study found that correctional outcomes characterized by antisocial behaviour such as institutional misconducts, involvement in violent incidents, and transfers to segregation are most prevalent among offenders with a personality disorder in combination with a substance use disorder and an Axis I disorder. Offenders with an Axis I disorder only were no more likely to be involved in misconducts or to be placed in segregation than offenders with no diagnosed disorder. This suggests that it is largely the symptoms of impulsivity, aggression, and emotional lability associated with APD and BPD that drive the negative results. A key consideration therefore in monitoring risk among offenders with a mental disorder is to assess the extent to which the mental illness is also associated with PD and SUD. These results support the early findings from the influential MacArthur Risk Assessment Study that examined the relationship between criminality, violence, and mental disorders. The researchers found that substance abuse and personality disorder (particularly the criminal history aspect of psychopathy) were the strongest factors contributing to risk for violence among this population (Monahan et al., 2001). Similarly, a large scale study that examined a sample of 10,059 adult residents from Epidemiologic Catchment Area (ECA) study sites in the US (Eaton & Kessler, 1985), found that having a diagnosis of schizophrenia increased the chance of future violence from 2% for those without a diagnosis to 8% of those with a diagnosis, but comorbidity with substance abuse further increased this percentage of adults committing acts of violence to 30%.

One explanation for association between antisocial behaviours with serious Axis I disorders is that Axis I disorders frequently co-occur with personality disorders. In one study, APD was found to be 5 to 11 times more prevalent among persons with schizophrenia than among age- and gender-matched individuals in the general population (Hodgins, Toupin, & Côté, 1996). Adults with APD and schizophrenia, like adults with APD but without schizophrenia, begin abusing alcohol and drugs at a young age and continue to do so through adolescence and adulthood (Hodgins & Janson, 2002). Offenders with a serious mental disorder who begin committing crimes in adulthood are more likely to be those whose criminality originates at the time of their first diagnosis, suggesting that they can pose a risk under some conditions such as when they are under the influence of organized delusional systems with violent content. When the negative symptoms of the illness predominate (such as social isolation, and depression) there is evidence that they may be less risk for criminal and violent offending than among those without a disorder.

Two meta-analytic studies by Bonta and colleagues (Bonta, Blais, &Wilson, 2013; Bonta, Law, & Hanson, 1998) found that key factors contributing to risk of violent reoffending among offenders with mental disorders were APD, previous criminal history, and substance abuse. These researchers concluded that the risk factors for criminal and violent recidivism among offenders with mental disorders are the same as for offenders without a mental disorder; namely, factors related to the extent of the criminal history, antisocial personality, substance abuse, unstable employment, and family dysfunction.

A concern within correctional institutions is for the security and safety of the most vulnerable inmates. The current study therefore examined the link of mental disorders with incidents of victimization while incarcerated and rates of a history of suicidal or self-injuring behaviour. We found that incidents of victimization were low and that there was little difference between rates for men with an Axis I disorder and those with no mental disorder. Offenders with comorbid substance use and personality disorders and those with comorbid Axis I and personality disorders were somewhat more likely to be victims in these incidents. The proportion of the sample with a history of suicidal or self-injurious behaviours was also low. Although there was no clear pattern related to specific types of diagnoses, suicidal and self-injurious behaviours were elevated among offenders with mental disorders relative to those with no disorder and there was a slight trend for these behaviours to be more frequent among offenders who had a current panic disorder, SUD, PD, or depression.

Another concern among administrators responsible for the mental health care of offenders is the provision of the appropriate type of treatment. In CSC, treatment centres provide the highest intensity mental health treatment. We examined the profile of offenders transferred to a regional treatment centre with respect to types of diagnoses and degree of impairment. Men with diagnoses for substance induced mood disorder, depression, other mood disorders, psychotic disorders, BPD, bipolar, and current specific phobia were more frequently sent to these facilities, but the diagnosis was less important as a predictor than the degree of impairment as assessed on the GAF. Men with lower GAF scores (signally more impairment) were more likely to have transfers to treatment centres. They were more likely to

have a diagnosis for a mood disorder due to a general medical condition, a psychotic or bipolar disorder, or a diagnosis of BPD. When we included all the variables related to at least one transfer to a treatment into a predictive model the two variables that accounted for the transfers were the GAF score and involvement in institutional incidents. Offenders transferred to treatment centres had median GAF scores of 43. These results are consistent with guidelines provided by one of the editors of the DSM that suggest in-patient treatment is generally not required for individuals with a GAF score above 40 (First et al., 2007).

The psychiatric community is currently debating the value of applying categorical diagnostic labels to individuals for a number of reasons, including the observation that many individuals meet criteria for several disorders and many diagnoses are not stable over time (Trull & Durrett, 2005). Alternative strategies have been proposed to replace the current categorical model used in DSM with a dimensional approach that would capture the degree and severity of impairment on several spheres (e.g., Coyne, 2013). Using such a system, individuals meeting criteria for multiple disorders such as federal offenders with personality disorders, serious Axis I disorders, and substance use disorders would be more likely to be among those classified with significant impairment across functional domains.

Research is pointing to the likelihood that antisocial behaviours and symptoms of many mental disorders are associated with varying degrees of neurological impairment that may have similar genetic underpinnings (Baker, Bezdjian, & Raine, 2006; Blair, 2003; Cross-Disorder Group of the Psychiatric Genomics Consortium, 2013; Moffitt, 2005; Serretti, & Fabbri, 2013; Silva, 2007). Typically, these impairments involve executive processing deficits that pose serious problems for an individual's ability to self-regulate, avoid self-defeating behaviours, and attain prosocial goals (Morgan & Lilienfeld, 2000). Research that examines how biological explanations can be incorporated into the development of both medical and psychological interventions that address these issues is a promising area for future study.

#### Limitations

One of the limitations of the study is the diagnoses were derived from offenders during the period of reception to federal custody who are on new warrants of committal. The prevalence rates may differ from those of offenders in the general CSC population. For individual offenders, adjustment to the stress of recent incarceration could increase the likelihood of experiencing a current disorder. On the other hand, when rates are examined across incarcerated samples, offenders who had more mental

health problems appear to face challenges earning discretionary release (Stewart & Wilton, 2014). In addition, offenders who return to custody on a current sentence also tend to have higher risk and need profiles and may therefore have higher rates of mental disorder. A previous study analyzing the CSC mental health indicators found that offenders in the general population self-reported higher rates of psychiatric problems than those at reception (Stewart, Harris, Archambault, Wilton, Cousineau, Varrette, & Power, 2009). In addition, in the current study, some offenders deferred from assessment interview may have been among those most likely to have a diagnosis (i.e., those sent to treatment centres or were segregated on arrival to custody). The number of offenders lost to the sample for these reasons was very low and therefore unlikely to have substantially affected the overall estimates. These considerations, however, could suggest that the rates of mental disorder and comorbidity provided here may have been underestimated the rates in the incarcerated male federal population.

Although these results point to the link between problematic institutional behaviours and comorbid mental health disorders during the period of incarceration, future research should determine if similarly negative outcomes are mirrored in the offenders' outcomes on release.

#### Conclusions

In summary, most federal male offenders with a mental disorder typically have at least two disorders, most frequently, a substance abuse and a personality disorder. Some forms of mental illness are associated with poor adjustment during incarceration. Offenders who are comorbid for multiple mental health disorders are among those with the poorest outcomes. Altogether, these results suggest that a complete understanding of offenders with a mental disorder, their risk, and their treatment needs must consider of the high rates of comorbidity for personality disorder and substance abuse and their negative impact on many aspects of function and increased risked for antisocial behaviours during the period of incarceration.

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## **Appendix A: National Prevalence Rates of Mental Disorders**

Table A1

National Prevalence Rates of Mental Disorders in Newly Admitted Offenders (N = 1, 110)

	Lifetime	Current
	% ( <i>n</i> )	% ( <i>n</i> )
Mood disorders	30.2 (335)	16.9 (188)
Bi-polar I disorder	2.8 (31)	1.7 (19)
Bi-polar II disorder	1.3 (14)	0.8 (9)
Other bi-polar disorders	2.1 (23)	1.4 (15)
Major depressive disorder	18.0 (200)	7.4 (82)
Dysthymic disorder (current only)		3.3 (37)
Depressive disorder (NOS)	4.1 (46)	2.5 (28)
Mood disorder due to a general medical condition	0.9 (10)	0.5 (5)
Substance-induced mood disorder	2.9 (32)	1.1 (12)
Psychotic disorders <sup>a</sup>	4.7 (52)	3.3 (37)
Alcohol and substance use disorders	<b>66.0</b> (733)	49.6 (551)
Alcohol abuse or dependence	43.7 (485)	26.0 (288)
Non-alcohol substance abuse or dependence	52.0 (577)	38.6 (428)
Anxiety disorders	34.1 (378)	29.5 (328)
Panic disorder	12.6 (140)	9.1 (101)
Agoraphobia without history of panic	2.6 (29)	2.3 (25)
Social phobia	5.8 (64)	5.1 (57)
Specific phobia	5.1 (56)	4.3 (48)
Obsessive-compulsive disorder	3.3 (37)	3.0 (33)
Posttraumatic stress disorder	13.4 (149)	11.0 (122)
Generalized anxiety disorder	7.6 (84)	7.2 (80)
Anxiety disorder due to a general medical condition	0.1 (1)	0
Substance-induced anxiety disorder	1.8 (20)	0.9 (10)
Anxiety disorder not otherwise specified	4.2 (47)	4.1 (45)
Eating disorders	1.4 (15)	0.8 (9)
Anorexia Nervosa	0.1 (1)	0
Bulimia Nervosa	0.2 (2)	0.1 (1)
Binge-eating disorder	1.2 (13)	0.8 (9)
Pathological gambling	9.9 (110)	<b>5.9</b> (65)
Borderline personality disorder (lifetime only)	15.9 (176)	
Antisocial personality disorder (lifetime only)	44.1 (490)	

Note: From Beaudette, Power, and Stewart (2015).

"0" indicates no participant received a rating for that category. Percentages may not add to 100% as participants could meet the diagnostic criteria for more than one disorder.

NOS = Not Otherwise Specified.

<sup>a</sup> Psychotic disorders included are: schizophrenia, schizophreniform, schizoaffective, delusional disorder, brief psychotic disorder, substance abuse or general medical condition causing psychotic symptoms, substance induced psychotic disorder, and psychotic disorder not otherwise specified.

# Appendix B: Observed and Expected Frequencies of the Combinations of the Seven Types of Disorders

## Table B1

*The Observed and Expected Frequencies of the Combinations of the Seven Types of Disorders (N* = 1,108)

Types of Disorders	%	n	E(%)*	$E(n)^*$	Under/over-rep
No disorders	27.2	301	12.5508	139.063	Over-rep
One Disorder Only					
BPD only	0.4	4	2.35337	26.0753	Under-rep
APD only	7.2	80	9.91349	109.842	Under-rep
Gambling only	0.3	3	0.78126	8.65634	Under-rep
Psychotic only	0.3	3	0.43368	4.80519	Under-rep
Anxiety only	4.3	48	5.34057	59.1736	Under-rep
Mood Disorder only	1	11	2.56154	28.3819	Under-rep
Substance Abuse only	10	111	12.3912	137.294	Under-rep
Two Concurrent Disorders					
APD and BPD	0.7	8	1.85885	20.5961	Under-rep
Gambling and BPD	0.1	1	0.14649	1.62313	
Gambling and APD	0.3	3	0.61709	6.83738	Under-rep
Psychotic and BPD	0	0	0.08132	0.90101	
Psychotic and APD	0.1	1	0.34255	3.79547	
Psychotic and Gambling	0	0	0.027	0.29911	
Anxiety and BPD	0.5	6	1.0014	11.0955	Under-rep
Anxiety and APD	1.5	17	4.21836	46.7394	Under-rep
Anxiety and Gambling	0.3	3	0.33244	3.68342	Approximate
Anxiety and Psychotic	0	0	0.18454	2.04469	
Mood and BPD	0	0	0.48031	5.32181	Under-rep
Mood and APD	0.4	4	2.02328	22.418	Under-rep
Mood and Gambling	0.1	1	0.15945	1.76671	
Mood and Psychotic	0.1	1	0.08851	0.98071	
Mood and Anxiety	1.5	17	1.08998	12.077	Over-rep
Substance Abuse and BPD	0.5	5	2.32344	25.7437	Under-rep
Substance Abuse and APD	12.1	134	9.7874	108.444	Over-rep
Substance Abuse and Gambling	0.4	4	0.77132	8.54625	Under-rep

Table B1 Continued

Types of Disorders	%	n	E(%)*	E(n)*	Under/over-rep
Substance Abuse and Psychotic	0.1	1	0.42817	4.74408	Under-rep
Substance Abuse and Anxiety	3.2	35	5.27265	58.421	Under-rep
Substance Abuse and Mood	1.8	20	2.52896	28.0209	Under-rep
Three Concurrent Disorders					
Gambling, APD and BPD	0	0	0.11571	1.28206	
Psychotic, APD and BPD	0	0	0.06423	0.71168	
Psychotic, Gambling and BPD	0	0	0.00506	0.05609	
Psychotic, Gambling and APD	0	0	0.02132	0.23626	
Anxiety, APD and BPD	0.3	3	0.79097	8.76398	Under-rep
Anxiety, Gambling and BPD	0	0	0.06234	0.69067	
Anxiety, Gambling and APD	0.3	3	0.26258	2.90942	Approximate
Anxiety, Psychotic and BPD	0.2	2	0.0346	0.38339	
Anxiety, Psychotic and APD	0.3	3	0.14576	1.61504	Over-rep
Anxiety, Psychotic and Gambling	0	0	0.01149	0.12728	
Mood, APD and BPD	0.2	2	0.37938	4.20354	Under-rep
Mood, Gambling and BPD	0	0	0.0299	0.33127	
Mood, Gambling and APD	0	0	0.12595	1.39547	
Mood, Psychotic and BPD	0.1	1	0.0166	0.18389	
Mood, Psychotic and APD	0	0	0.06991	0.77463	
Mood, Psychotic and Gambling	0	0	0.00551	0.06105	
Mood, Anxiety and BPD	0.5	6	0.20438	2.26452	Over-rep
Mood, Anxiety and APD	0.8	9	0.86094	9.53922	Approximate
Mood, Anxiety and Gambling	0.1	1	0.06785	0.75176	
Mood, Anxiety and Psychotic	0	0	0.03766	0.41731	
Substance Abuse, APD and BPD	2.35	26	1.83521	20.3341	Over-rep
Substance Abuse, Gambling and BPD	0	0	0.14463	1.60249	
Substance Abuse, Gambling and APD	1.2	13	0.60924	6.75042	Over-rep
Substance Abuse, Psychotic and BPD	0	0	0.08028	0.88955	
Substance Abuse, Psychotic and APD	0.2	2	0.3382	3.7472	
Substance Abuse, Psychotic and Gambling	0	0	0.02665	0.29531	
Substance Abuse, Anxiety and BPD	0.6	7	0.98866	10.9544	Approximate
Substance Abuse, Anxiety and APD	4.1	45	4.1647	46.1449	Approximate
Substance Abuse, Anxiety and Gambling	0	0	0.32821	3.63657	Under-rep
Substance Abuse, Anxiety and Psychotic	0.3	3	0.18219	2.01868	Approximate

Table B1 Continued

Types of Disorders	%	n	E(%)*	E(n)*	Under/over-rep
Substance Abuse, Mood and BPD	0.2	2	0.4742	5.25413	Under-rep
Substance Abuse, Mood and APD	1.4	16	1.99755	22.1329	Under-rep
Substance Abuse, Mood and Gambling	0	0	0.15742	1.74424	
Substance Abuse, Mood and Psychotic	0	0	0.08739	0.96824	
Substance Abuse, Mood and Anxiety	1	11	1.07612	11.9234	Approximate
Four Concurrent Disorders					
Psychotic, Gambling, APD and BPD	0	0	0.004	0.0443	
Anxiety, Gambling, APD and BPD	0.3	3	0.04924	0.54554	Over-rep
Anxiety, Psychotic, APD and BPD	0.1	1	0.02733	0.30283	
Anxiety, Psychotic, Gambling and BPD	0	0	0.00215	0.02387	
Anxiety, Psychotic, Gambling and APD	0	0	0.00907	0.10053	
Mood, Gambling, APD and BPD	0.1	1	0.02362	0.26166	
Mood, Psychotic, APD and BPD	0	0	0.01311	0.14525	
Mood, Psychotic, Gambling and BPD	0	0	0.00103	0.01145	
Mood, Psychotic, Gambling and APD	0	0	0.00435	0.04822	
Mood, Anxiety, APD and BPD	0.5	6	0.16143	1.78868	Over-rep
Mood, Anxiety, Gambling and BPD	0	0	0.01272	0.14096	
Mood, Anxiety, Gambling and APD	0	0	0.05359	0.5938	
Mood, Anxiety, Psychotic and BPD	0	0	0.00706	0.07825	
Mood, Anxiety, Psychotic and APD	0	0	0.02975	0.32962	
Mood, Anxiety, Psychotic and Gambling	0	0	0.00234	0.02598	
Substance Abuse, Gambling, APD and BPD	0.4	4	0.11424	1.26575	Over-rep
Substance Abuse, Psychotic, APD and BPD	0.2	2	0.06341	0.70263	
Substance Abuse, Psychotic, Gambling and BPD	0	0	0.005	0.05537	
Substance Abuse, Psychotic, Gambling and APD	0	0	0.02105	0.23326	
Substance Abuse, Anxiety, APD and BPD	1.6	18	0.78091	8.65252	Over-rep
Substance Abuse, Anxiety, Gambling and BPD	0.1	1	0.06154	0.68188	
Substance Abuse, Anxiety, Gambling and APD	0.5	6	0.25924	2.87242	Over-rep
Substance Abuse, Anxiety, Psychotic and BPD	0.1	1	0.03416	0.37852	
Substance Abuse, Anxiety, Psychotic and APD	0.1	1	0.14391	1.5945	
Substance Abuse, Anxiety, Psychotic and Gambling	0	0	0.01134	0.12566	
Substance Abuse, Mood, APD and BPD	0.6	7	0.37456	4.15007	Over-rep
Substance Abuse, Mood, Gambling and BPD	0	0	0.02952	0.32706	

Table B1 Continued

Types of Disorders	%	n	E(%)*	E(n)*	Under/over-rep
Substance Abuse, Mood, Gambling and APD	0.1	1	0.12434	1.37772	
Substance Abuse, Mood, Psychotic and BPD	0.2	2	0.01639	0.18155	
Substance Abuse, Mood, Psychotic and APD	0	0	0.06902	0.76478	
Substance Abuse, Mood, Psychotic and Gambling	0.1	1	0.00544	0.06027	
Substance Abuse, Mood, Anxiety and BPD	0.5	5	0.20178	2.23572	Over-rep
Substance Abuse, Mood, Anxiety and APD	1.1	12	0.84999	9.4179	Over-rep
Substance Abuse, Mood, Anxiety and Gambling	0.1	1	0.06699	0.7422	
Substance Abuse, Mood, Anxiety and Psychotic	0	0	0.03718	0.412	
Five Concurrent Disorders					
Anxiety, Psychotic, Gambling, APD and BPD	0.1	1	0.0017	0.01885	
Mood, Psychotic, Gambling, APD and BPD	0	0	0.00082	0.00904	
Mood, Anxiety, Gambling, APD and BPD	0	0	0.01005	0.11134	
Mood, Anxiety, Psychotic, APD and BPD	0.2	2	0.00558	0.06181	
Mood, Anxiety, Psychotic, Gambling and BPD	0	0	0.00044	0.00487	
Mood, Anxiety, Psychotic, Gambling and APD	0	0	0.00185	0.02052	
Substance Abuse, Psychotic, Gambling, APD and BPD	0	0	0.00395	0.04374	
Substance Abuse, Anxiety, Gambling, APD and BPD	0.5	6	0.04861	0.5386	Over-rep
Substance Abuse, Anxiety, Psychotic, APD and BPD	0.2	2	0.02698	0.29898	
Substance Abuse, Anxiety, Psychotic, Gambling and BPD	0	0	0.00213	0.02356	
Substance Abuse, Anxiety, Psychotic, Gambling and APD	0	0	0.00896	0.09925	
Substance Abuse, Mood, Gambling, APD and BPD	0.1	1	0.02332	0.25833	
Substance Abuse, Mood, Psychotic, APD and BPD	0	0	0.01294	0.1434	
Substance Abuse, Mood, Psychotic, Gambling and BPD	0	0	0.00102	0.0113	
Substance Abuse, Mood, Psychotic, Gambling and APD	0	0	0.0043	0.04761	
Substance Abuse, Mood, Anxiety, APD and BPD	3	33	0.1594	1.7659	Over-rep
Substance Abuse, Mood, Anxiety, Gambling and BPD	0	0	0.01256	0.13917	
Substance Abuse, Mood, Anxiety, Gambling and APD	0.3	3	0.05291	0.58624	Over-rep
Substance Abuse, Mood, Anxiety, Psychotic and BPD	0	0	0.00697	0.07725	
Substance Abuse, Mood, Anxiety, Psychotic and APD	0.4	4	0.02937	0.32543	Over-rep

Table B1 Continued

Types of Disorders	%	n	E(%)*	E(n)*	Under/over-rep
Substance Abuse, Mood, Anxiety, Psychotic and Gambling	0	0	0.00232	0.02565	
Six Concurrent Disorders					
Mood, Anxiety, Psychotic, Gambling, APD and BPD	0.1	1	0.00035	0.00385	
Substance Abuse, Anxiety, Psychotic, Gambling, APD and BPD	0	0	0.00168	0.01861	
Substance Abuse, Mood, Psychotic, Gambling, APD and BPD	0	0	0.00081	0.00893	
Substance Abuse, Mood, Anxiety, Gambling, APD and BPD	0.3	3	0.00992	0.10993	Over-rep
Substance Abuse, Mood, Anxiety, Psychotic, APD and BPD	0.2	2	0.00551	0.06102	
Substance Abuse, Mood, Anxiety, Psychotic, Gambling and BPD	0	0	0.00043	0.00481	
Substance Abuse, Mood, Anxiety, Psychotic, Gambling and APD	0	0	0.00183	0.02026	
Seven Concurrent Disorders					
Substance Abuse, Mood, Anxiety, Psychotic, Gambling, APD and BPD	0	0	0.00034	0.0038	

# Appendix C: Rates of Incidents by Diagnosis

# Table C1

Rates of Incidents as an Instigator and as a Victim by Types of Disorders (N = 1,108)

Combination of Disorders	Events	Years	Rate						
Incidents as an Instigator									
Substance abuse/dependence, Current Axis I MD, and either APD or BPD	625	358.4	1.74						
Substance abuse/dependence and Current Axis I MD	86	121	0.71						
Substance abuse/dependence & either APD or BPD	405	284.3	1.42						
Current Axis I MD & either APD or BPD	106	113.2	0.94						
Substance abuse/dependence	179	177.5	1.01						
Current Axis I MD	81	137.7	0.59						
Either APD or BPD	187	152.6	1.23						
No disorders	320	449.4	0.71						
Incidents as a Victim									
Substance abuse/dependence, Current Axis I MD, & either APD or BPD	63	358.4	0.18						
Substance abuse/dependence & Current Axis I MD	19	121	0.16						
Substance abuse/dependence & either APD or BPD	51	284.3	0.18						
Current Axis I MD & either APD or BPD	16	113.2	0.14						
Substance abuse/dependence	17	177.5	0.10						
Current Axis I MD	12	137.7	0.09						
Either APD or BPD	24	152.6	0.16						
No disorders	48	449.4	0.11						
Note: APD = Antisocial Personality Disorder; BPD = Borderline Personality Disorder; MD = Mental Disorder.									

## **Appendix D: Supplemental GAF Score Analyses**

Table D1

GAF Interval	п	0⁄0
81 or higher*	384	35
71 to 80	188	17
61 to 70	136	12
51 to 60	115	10
41 to 50	148	13
31 to 40	91	8
21 to 30	40	4
20 or lower	6	1

Frequencies of Offenders at Different Intervals of GAF Scores (N = 1,108)

Note: Individuals with scores below 40 are typically in need of inpatient treatment.

\*No offenders were assessed as having a GAF score higher than 90. GAF = Global Assessment of Functioning.

# Table D2

Comparative GAF Scores of Offenders with, and without, Current Disorders (N = 1, 108)

Type of Disorder	Disorder Present	М	SD	<i>t</i> *	р	Cohen's d
Fither ADD or DDD	Yes	58	20	16.0	<.001	0.97
Entiter AFD of BFD	No	76	16			
	Yes	59	20	13.2	<.001	0.81
APD	No	74	17			
סתת	Yes	50	20	14.1	<.001	1.16
BPD	No	71	18			
Avia I (aval aubatanaa abuaa)	Yes	56	19	16.9	<.001	1.08
Axis I (excl. substance abuse)	No	75	16			
Substance use disorder	Yes	60	20	13.2	<.001	0.80
Substance use disorder	No	75	17			
Mood	Yes	51	19	13.2	<.001	1.06
WIOOd	No	71	18			
	Yes	56	20	13.0	<.001	0.89
Anxiety	No	72	18			
Dread at it	Yes	42	17	8.1	< .001	1.36
Psychotic	No	68	19			
	Yes	60	20	7.1	< .001	0.49
Alconol abuse or dependence	No	70	19			
	Yes	59	20	11.5	< .001	0.72
Drug abuse or dependence	No	72	18			
	Yes	44	18	8.0	< .001	1.28
Bipolar	No	68	19			
	Yes	53	18	7.0	< .001	0.81
Major Depression	No	68	19			
	Yes	53	16	4.5	< .001	0.76
Dysthymia	No	68	20			
	Yes	52	19	4.1	< .001	0.79
Depression NOS	No	68	19			
	Yes	53	20	5.0	< .001	0.76
Other Mood	No	68	19			
	Yes	40	18	3.2	.001	1.43
Mood GMC	No	67	20			
~	Yes	61	21	1.1	.263	0.33
Substance Induced Mood	No	67	20			
	Yes	51	19	9.0	< .001	0.94
Panic	No	69	19			
	Yes	55	20	6.9	< .001	0.69
Phobia	No	69	19			
	Yes	58	19	2.4	< .001	0.49
Agoraphobia	No	67	20			0.19
	Yes	52	19	6.3	< .001	0.86
Social Phobia	No	68	19			
	Yes	54	21	5.0	< .001	0.73
Specific Phobia	No	68	19			

## Table D2 Continued

Type of Disorder	Disorder Present	М	SD	<i>t</i> *	р	Cohen's d
OCD	Yes	54	23	4.1	< .001	0.72
OCD	No	68	19			
DTSD	Yes	52	18	9.7	< .001	0.93
FISD	No	69	19			
Company American	Yes	51	18	7.8	< .001	0.90
General Anxiety	No	69	19			
Other Anviety	Yes	60	21	3.0	< .001	0.41
Other Alixiety	No	68	19			
Dingo Esting	Yes	49	23	2.8	.005	0.93
Binge Eating	No	67	20			
Commutations Consulting	Yes	54	20	5.6	< .001	0.72
Compulsive Gamoing	No	68	19			

Note: t statistics are replaced by Satterthwaite t when the Folded F test indicates a violation of the assumption of homogeneity of variance.

APD = Antisocial Personality Disorder; BPD = Borderline Personality Disorder; GAF = Global Assessment of Functioning; GMC = General Medical Condition; NOS = Not Otherwise Specified; OCD = Obsessive Compulsive Disorder; PTSD = Post-traumatic Stress Disorder.

# Appendix E: Criminogenic Needs by Types of Disorders

Table E1

Frequencies and Percentages of Offenders within each Type of Mental Disorder Combination with Moderate or High Need on a Domain (N = 1.108)

with	Mode	erate	or Higl	ı Need	on a L	<i>Jomain</i> .	(N =	= 1,10	18)
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DFIA-R Domain	Combination of Disorders	п	%
Employment			
	Substance use, Current Axis I MD, and either APD or BPD	144	72.7
	Substance use and Current Axis I MD	35	46.1
	Substance use and either APD or BPD	102	61.8
	Current Axis I MD and either APD or BPD	37	48.7
	Substance use	55	49.6
	Current Axis I MD	35	39.8
	Either APD or BPD	52	56.5
	No disorders	103	34.6
Marital/Family			
	Substance use, Current Axis I MD, and either APD or BPD	88	44.4
	Substance use and Current Axis I MD	21	27.6
	Substance use and either APD or BPD	52	31.5
	Current Axis I MD and either APD or BPD	30	39.4
	Substance use	31	37.9
	Current Axis I MD	22	25.0
	Either APD or BPD	29	31.5
	No disorders	47	15.8
Associates			
	Substance use, Current Axis I MD, and either APD or BPD	145	73.2
	Substance use and Current Axis I MD	40	52.6
	Substance use and either APD or BPD	129	78.2
	Current Axis I MD and either APD or BPD	53	69.7
	Substance use	70	63.1
	Current Axis I MD	31	35.2
	Either APD or BPD	69	75.0
	No disorders	153	51.3
Substance Abuse			
	Substance use, Current Axis I MD, and either APD or BPD	181	91.4
	Substance use and Current Axis I MD	65	85.5
	Substance use and either APD or BPD	138	83.6
	Current Axis I MD and either APD or BPD	33	43.4
	Substance use	91	82.0
	Current Axis I MD	25	28.4
	Either APD or BPD	38	41.3
	No disorders	70	23.5

## Table E1 Continued

Community			
Functioning			
	Substance use, Current Axis I MD, and either APD or	78	39.4
	BPD		
	Substance use and Current Axis I MD	22	29.0
	Substance use and either APD or BPD	54	32.7
	Current Axis I MD and either APD or BPD	19	25.0
	Substance use	20	18.0
	Current Axis I MD	12	13.6
	Either APD or BPD	17	18.5
	No disorders	28	9.4
Personal/Emotional			
	Substance use, Current Axis I MD, and either APD or	171	86.4
	BPD		
	Substance use and Current Axis I MD	53	69.7
	Substance use and either APD or BPD	125	75.8
	Current Axis I MD and either APD or BPD	61	80.3
	Substance use	68	61.3
	Current Axis I MD	65	73.9
	Either APD or BPD	62	67.4
	No disorders	148	49.7
Attitudes			
	Substance use, Current Axis I MD, and either APD or	167	84.3
	BPD		
	Substance use and Current Axis I MD	53	69.7
	Substance use and either APD or BPD	139	84.2
	Current Axis I MD and either APD or BPD	59	77.6
	Substance use	78	70.3
	Current Axis I MD	55	62.5
	Either APD or BPD	77	83.7
	No disorders	177	16.0

Note: APD = Antisocial Personality Disorder; BPD = Borderline Personality Disorder; MD = Mental Disorder.

# Appendix F: Admissions to Administrative Segregation

Table F1

Rates of Admissions to Administrative Segregation by Types of Mental Disorders (N = 1,108)

Admissions to Involuntary Administrative Segregation	Events	Years	Rate
Substance abuse/dependence, Current Axis I MD, and either APD or BPD	154	358.4	0.43
Substance abuse/dependence and Current Axis I MD	30	121	0.25
Substance abuse/dependence and either APD or BPD	123	284.3	0.43
Current Axis I MD and either APD or BPD	35	113.2	0.31
Substance abuse/dependence	45	177.5	0.25
Current Axis I MD	22	137.7	0.16
Either APD or BPD	50	152.6	0.33
No disorders	73	449.4	0.16
Admissions to Voluntary Administrative Segregation			
Substance abuse/dependence, Current Axis I MD, and either APD or BPD	51	358.4	0.14
Substance abuse/dependence and Current Axis I MD	5	121	0.04
Substance abuse/dependence and either APD or BPD	28	284.3	0.10
Current Axis I MD and either APD or BPD	8	113.2	0.07
Substance abuse/dependence	5	177.5	0.03
Current Axis I MD	2	137.7	0.01
Either APD or BPD	8	152.6	0.05
No disorders	17	449.4	0.04
Admissions to Administrative Segregation			
Substance abuse/dependence, Current Axis I MD, and either APD or BPD	205	358.4	0.57
Substance use and either APD or BPD	35	121	0.29
Current Axis I MD and either APD or BPD	151	284.3	0.53
Substance use	43	113.2	0.38
Substance use and Current Axis I MD	50	177.5	0.28
Current Axis I MD	24	137.7	0.17
Either APD or BPD	58	152.6	0.38
No disorders	90	449.4	0.20

Note: APD = Antisocial Personality Disorder; BPD = Borderline Personality Disorder; MD = Mental Disorder.

### **Appendix G: Admissions to Treatment Centres**

Table G1

Type of Disorder	% with the disorder	% with the disorder transferred to TC	Odds ratio of transfer to TC	95% CI	
Either APD or BPD	48.0	8.3	2.8	1.6	4.9
APD	44.1	8.4	2.6	1.5	4.5
BPD	15.8	12.6	3.2	1.9	5.6
Axis I (excl. SUD)	39.6	9.1	2.9	1.7	5.0
Substance Use	49.7	7.6	2.2	1.3	3.8
Mood	16.9	11.2	2.7	1.6	4.7
Anxiety	29.9	8.2	1.9	1.1	3.2
Psychotic	3.2	18.9	4.3	1.8	10.3
Alcohol abuse or dependence	26.0	8.3	1.9	1.1	3.2
Drug abuse or dependence	38.6	7.2	1.6	1.0	2.7
Bipolar	3.6	15.0	3.2	1.3	7.9
Major depression	7.4	8.5	1.6	0.7	3.7
Dysthymia	3.3	5.4	1.0	0.2	4.1
Depression NOS	2.5	21.4	5.0	1.9	12.8
Other mood	4.1	20.0	4.8	2.2	10.4
Panic	9.1	8.9	1.8	0.8	3.7
Phobia	10.0	8.1	1.6	0.8	3.3
Social phobia	5.1	5.3	0.9	0.3	3.1
Specific phobia	4.3	14.6	3.1	1.3	7.3
OCD	3.0	9.1	1.7	0.5	5.8
PTSD	11.0	12.3	2.8	1.5	5.2
General anxiety	7.2	5.0	0.9	0.3	2.5
Other anxiety	4.9	13.0	2.8	1.2	6.3
Compulsive gambling	5.9	9.2	1.7	0.7	4.3

Admissions to Treatment Centres (TC) by Current Disorder (N = 1,108)

Note: APD = Antisocial Personality Disorder; BPD = Borderline Personality Disorder; CI = Confidence Interval; GMC = General Medical Condition; NOS = Not Otherwise Specified; OCD = Obsessive Compulsive Disorder; PTSD = Post-traumatic Stress Disorder; SUD = Substance Use Disorder; TC = Treatment Centre. Binge Eating, Mood GMC, Agoraphobia, and Substance Abuse Mood were omitted due to very low numbers.

## **Appendix H: List of Variables for the Prediction of Transfers to Treatment Centres**

- Global Assessment of Functioning (GAF) score (range 7 to 90)
- Either Antisocial Personality Disorder (APD) or Borderline Personality Disorder (BPD) (yes/no, 48% yes)
- APD (yes/no, 44% yes)
- BPD (yes/no, 16% yes)
- Days in segregation across admissions to segregation (0 to 401)
- At least one current Axis I disorder (yes/no, 40% yes)
- At least one current mood disorder (yes/no, 17% yes)
- At least one current psychotic disorder (yes/no, 3% yes)
- At least one current substance abuse or dependence disorder (yes/no, 50% yes)
- At least one current anxiety disorder (yes/no, 30% yes)
- The number of disorders among current substance abuse or dependence, mood, anxiety, psychotic, gambling, APD and BPD (0 to 6 with a possibility of 7)
- The number of disorders among current alcohol abuse or dependence, substance abuse or dependence, bipolar, major depression, dysthymia, depression not otherwise specified, other mood disorders, mood disorder due to general medical condition, substance induced mood disorder, panic disorder, agoraphobia, social phobia, specific phobia, Obsessive Compulsive Disorder (OCD), Post-traumatic Stress Disorder (PTSD), general anxiety disorder, other anxiety disorder, psychotic disorder, anorexia, bulimia, binge eating disorder, compulsive gambling, APD or BPD, (0 to 11 of a possible 24) and
- The eight categories of combinations of disorders (current substance abuse or dependence, any current Axis I disorder, and any personality disorder).
- Age at admission (18 to 81)
- Time incarcerated (0.08 to 3.23 years or 29 to 1,180 days)
- Incident count (0 to 27)
- Violent index offence on sentence (yes/no)

# Appendix I: Prevalence of Current Disorders among Male Offenders with Histories of Suicide, Suicide Attempts or Self-Injury

## Table I1

Prevalence of Current Disorders among Male Offenders with Histories of Suicide, Suicide Attempts or Self-Injury Compared to Men without the Disorder

Type of Disorder	Offenders with suicidal or self-injury history (N = 54)		Odds Ratio	95% CI	
	n	%			
Either APD or BPD	40	74	3.3	1.8	6.1
APD	38	70	3.2	1.7	5.8
BPD	18	33	2.9	1.6	5.2
Axis I (no SUD)	39	72	4.3	2.3	7.8
Substance Use Disorder	43	80	4.2	2.1	8.2
Mood	20	37	3.1	1.8	5.6
Anxiety	30	56	3.1	1.8	5.4
Psychotic	4	7	2.5	0.8	7.3
Alcohol Abuse or Dependence	24	44	2.4	1.4	4.2
Drug Abuse or Dependence	33	61	2.6	1.5	4.6
Bipolar	4	7	2.3	0.8	6.6
Major depression	9	17	2.7	1.3	5.7
Dysthymia	3	6	1.8	0.5	5.9
Depression NOS	4	7	3.4	1.1	10.3
Other mood disorder	5	9	2.6	1.0	6.8
Panic disorder	15	28	4.3	2.3	8.2
Phobia	11	20	2.4	1.2	4.9
Agoraphobia	3	6	2.8	0.8	9.5
Social phobia	4	7	1.5	0.5	4.3
Other specific phobia	5	9	2.4	0.9	6.3
OCD	3	6	2.0	0.6	6.8
PTSD	11	20	2.2	1.1	4.3
General anxiety	7	13	2.0	0.9	4.6
Other anxiety	5	9	2.1	0.8	5.5
Compulsive gambling	6	11	2.1	0.9	5.1
No disorder	4	7	0.2	0.1	0.6

Note: APD = Antisocial Personality Disorder; BPD = Borderline Personality Disorder; CI = Confidence Interval; GMC = General Medical Condition; NOS = Not Otherwise Specified; OCD = Obsessive Compulsive Disorder; PTSD = Post-traumatic Stress Disorder; SUD = Substance Use Disorder. Note: Mood disorder due to GMC, Substanace Abuse Mood Disorder and Binge eating disorder were omitted due to very low numbers.