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## Corrections and connection to the community: A diagnostic and service program for incarcerated adult men with FASD



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## ABSTRACT

Previous research has demonstrated that impaired social and adaptive behavior due to prenatal alcohol exposure can be associated with severe conduct disorders in adolescence, mental health concerns, school failure, employment difficulties, substance abuse, difficulty with the law, and incarceration. The Corrections and Connections to the Community research and service program was established to examine adult male offenders with frequent contact with the provincial corrections system. Individuals who participated in the program received neuropsychological testing, a functional assessment and a psychiatric interview. Results indicated that 90% of the participants identified within the spectrum of FASD. The functional profile indicated that many participants had impaired social functioning. A natural dichotomy emerged from the data which reflected those who connected early with the criminal justice system (65%) and those who did not connect within the 18 month project period. Significant differences emerged between those individuals who reconnected with the justice system and who also possessed a juvenile record and those who did not. Further analysis also indicated significant differences between scores on the Finger Tapping Test, Trail Making Test A, ILS and California Verbal Learning Test. Findings of this study highlight the importance of appropriate programming and services for incarcerated men with FASD.

### 1. Introduction

Fetal Alcohol Spectrum Disorder (FASD) is a term used to describe an array of impairments from exposure to alcohol in utero. Individuals with FASD experience life-long deficits in attention and executive function, impulse control, memory, hyperactivity, internalizing and externalizing behaviour problems and social impairments (Paley & O'Connor, 2009; Streissguth et al., 2004). Disabilities associated with FASD are permanent and associated functional problems vary dependent upon which area of the brain is affected. Resulting brain damage caused by prenatal exposure to alcohol includes cognitive disabilities and decreased functional ability. Due to the irreversibility of the brain impairments, screening, diagnosis and provision of appropriate services are imperative to support and enhance an individual's ability to function within society.

According to Brown, Connor, and Adler (2012), impaired social and adaptive behavior due to prenatal alcohol exposure can be associated

with severe conduct disorders in adolescence. Secondary disabilities associated with FASD have also been identified, including mental health concerns, school failure, employment difficulties, substance abuse, difficulty with the law, and incarceration (Fast & Conry, 2009; MacPherson & Chudley, 2007; Paley & O'Connor, 2009; Streissguth et al., 2004). FASD has been found to be a significant predictor of involvement in the justice system. Adults with FASD typically display both primary and secondary disabilities including, cognitive and behavioural brain deficits, gullibility, poor judgment, substance abuse and mental illness, all which contribute to contact with the criminal justice system. In general, the judicial and correctional systems are not equipped to address and manage the offenders with FASD. Screening and assessment is lacking in Canadian adult correctional system (Chapman, 2008). Presently, the needs of offenders with FASD are not being adequately addressed in the correctional system (Boland, Chudley, & Grant, 2002; Chapman, 2008; McLachlan, 2017; Miller, 2005).

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The prevalence of FASD in Canada remains difficult to determine due to limited population level research (Cook et al., 2015; Popova, Lange, Probst, Gmel, & Rehm, 2017). Estimates by the Public Health Agency of Canada calculate the prevalence in the general population to be approximately 1% (2005). Recent research on the prevalence of FASD in the Yukon Correctional System found the estimated rate to be 17.5% (McLachlan, 2017). Prevalence of FASD in the United States ranges from 2% to 5% (May et al., 2009; May et al., 2014). It is estimated that the annual cost associated with FASD in Alberta ranges from \$48 – \$143 million (Thanh, Moffatt, Jacobs, Chuck, & Jonsson, 2012). Several studies have examined the cost of FASD in Canada. Stade et al. (Sterling, Chi, & Hinman, 2011) reported the adjusted lifetime cost for an individual with FASD from birth to 53 years equals %21, 645 (95% CI: 19,842–24,041), which translates into a total of \$5.3 billion (94% CI: \$4.1–6.4 B) per annum. A recent cost-of-illness study on FASD conducted by Popova, Lange, Burd, & Rehm estimated that the Canadian national cost of FASD to be in the range of \$1.3 billion to \$2.3 billion. It is likely that these estimates are underreporting the true cost of FASD in Canada due to the lack of comprehensive FASD assessment and surveillance (McLachlan, 2017).

Given the estimated prevalence of FASD in the correctional system, it is imperative that the needs of offenders with FASD are appropriately addressed while incarcerated. The Corrections and Connections to the Community (3C) research and service program was established to examine adult male offenders with frequent contact with the provincial corrections system. The project was an 18-month service model that included diagnosis and functional assessments, life skill building and referral, and follow-up. Services received by participants included, initial screen, the diagnostic process, the identification and exploration of the presenting complex needs in the adult with FASD through lifestyle review (Mind, Body & Spirit) and responsive transition supports and services. Upon completion of the program, all participants were eligible for transition support and follow-up. The 3C program took an assertive community transition approach, that is each participant would receive intense support, monitoring, and follow-up. In addition to the support provided through the program, an external community partner was assigned to the project to undertake the transition supports component.

The aims of the project were threefold: 1) to develop an efficient and effective approach to screening and diagnosing FASD in male adult offenders; 2) to develop and strengthen the offender's ability to make the transition from correctional facility to community prior to release and 3) to develop and document a transitional support system in the community for adult men with FASD post-release.

Research protocols were submitted to and approved by to the University Research Ethics Board for ethical review of the research project and processes, as required for all projects involving research with humans. The project was also approved by the provincial Solicitor General and Public Security (SGPS) research review process.

## 2. Methods

### 2.1. Participants

A purposive sampling technique identified possible participants from the provincial corrections system based on Fetal Alcohol Spectrum Disorder (FASD) behavioural characteristics and the individuals meeting the 3C program inclusion criteria.

The inclusion criteria included:

- All sentenced male offenders suspected of having an FASD who entered one provincial correctional site (PCC) before November 2009, who volunteered and signed the consent form, who spoke functional English, and who were within 3–6 months of release.

The exclusion criteria included:

- Inmates who were on remand and/or not been sentenced were excluded; these inmates may be transferred, reducing the chances for program completion and follow-up.
- Inmates who were psychologically unstable enough, as assessed by the Psychology Department at PCC, that they could not safely participate.

A total of 260 referrals were received, 52 men were selected to participate in the program; 49 individuals completed the program.

### 2.2. Description of the mind, body and spirit program (MBS)

The MBS program focused on three concepts of health: mental, physical and spiritual. Participants were invited to explore their beliefs and values that guide personal behaviours. Topics explored included communication, boundaries, relationships, personal assets, instrumental skills, fitness, nutrition, hygiene, sexuality, and conflict resolution. MBS also highlighted various cultural manifestations of spirituality, including First Nations and Metis traditional teachings. All sessions were sequential, with concepts being repeated, used an activity-based format, and presented at grade 6 language level. Nonverbal expression through creative media was encouraged.

The weekly program design was as follows: Day 1 was dedicated to concepts related to *Mind*, Day 2 was dedicated to concepts related to *Body*, Day 3 was dedicated to concepts related to *Spirit*, and Day 4 included an evaluative activity to reinforce concepts discussed on Day 1, Day 2, and Day 3. Topics were repeated throughout the duration of the program to address the known learning needs identified in the literature of individuals with FASD.

The MBS program also included a regular exercise component. This component was built on the existing evidence that exercise can be beneficial for addressing a number of FASD symptoms. These include building self-efficacy (Meehan, O'Connor, Berry, Morrison, & Acampora, 1996; Cripps, 2008); influencing biological changes that impact on mental health, such as releasing serotonin, which can have direct mood enhancing effects (Harvey, Hotopf, Overland, & Mykletun, 2010); and improved functional performance (Bhambhani, Roland, & Farag, 2003). The exercise schedule alternated between individual weight training sessions and more interactive physical team sports in the gymnasium. In the community, an exercise environment was seen to provide opportunities for healthy social interactions and for building a revised social network.

A minimum cohort of 10 inmates was selected for each of four cycles of 3C. Each 10-week program was interspersed with the formal testing of participants and individual meetings with the Transitional Advocates (TA). The internal day program ran four days per week, with Fridays reserved for individual diagnostic assessment, functional testing, and the community information sessions. At the end of this period, a diagnostic formulation session was held before the participant was released, at which time the results were shared with the participant. A personalized short diagnostic report was available to the participant on release.

### 2.3. Diagnostic process

The Canadian FASD Guidelines (2005) outline the process for the six diagnostic areas in FASD assessment, including: screening and referral, physical examination and differential diagnosis, neurobehavioural assessment, treatment and follow-up, maternal alcohol history during pregnancy, and the criteria that distinguish between diagnoses on the FASD spectrum (FAS, partial FAS and alcohol-related neurobehavioural disorder). This approach allows for the collection of Canadian data to estimate the incidence and prevalence of FASD (Chudley et al., 2005). The Canadian Guidelines are adapted from the 4-Digit Diagnostic Code for the criteria determining the deficit in brain impairment. Each specialist individually assessed each participant. The assessments address

the following areas: 1) screening and referral, 2) the physical examination and differential diagnosis 3) neurobehavioural assessment, and 4) treatment and follow-up.

The FASD diagnostic process for this project was interdisciplinary in formulation; it included contributions of Provincial Correctional Centre (PCC) caseworkers, observations by 3C staff (nurse, occupational therapists, program facilitators, and psychologist) and the community partner's Transitional Advocates (TAs), testing by neuropsychologists, occupational therapists (OTS), physicians (general practitioner) for physical and dysmorphia ratings, psychiatrists (for the clinical mental status examination) and exercise physiologists. Specific mental and developmental disorders can be difficult to distinguish from others with similar symptoms; thus, the experience and understanding from a multi-disciplinary team of health professions is vital in teasing out the differences and identifying affected people in a reliable and reproducible manner. The Canadian Guidelines related to brain function strongly emphasizes the importance of the experienced clinical judgment used by the multidisciplinary team (Chudley et al., 2005). The staff observations of the participants during their involvement with the day program also provided the diagnostic team with relevant feedback on the individuals' behaviour. Since all participants had been sentenced, the criminal record became an important consideration in the discussion of brain function/dysfunction coding. The diagnostic team was approved to receive criminal record status.

The maternal alcohol history in pregnancy information was collected separately from available family members prior to the formulation clinic. The diagnostic clinic compiled the medical information, health records, maternal alcohol consumption history, psychiatric clinical interview, and testing results for each participant. The formulation session determined the relevant diagnostic code (Streissguth et al., 2004) based on the entire FASD umbrella of disorders for each participant. A final summative report documented the diagnosis, components findings and recommendations. The report was accessible to the transitional advocate (TA) to assist in the personalization of community services on release.

Health records containing birth details are a source of information sought by the Canadian Guidelines. The physical measurements taken at birth can relate the birth weight, length and head circumference to percentiles based on normative values. In some cases, these records also provide information on childhood health status and family social factors. Accessing health and school records of the 3C participants was challenging. Many variations exist in the holding and storage policies of health records by facility, region and province across Canada and some records could not be located. This affected the pre- and post-natal data requirements of the FASD diagnostic process. School records were not located for any of the 3C participants.

The assessment protocol for the 3C neuropsychological testing process complied with the Canadian criterion for FASD diagnoses (Chudley et al., 2005), but also considered the constraints of the prison environment. For the purposes of this project, domains measured include sensory-motor function (via the Halstead Reitan motor tests), cognition/IQ (Wechsler Abbreviated Scale of Intelligence or WASI), receptive and expressive language (Peabody Picture Vocabulary Test 4th Edition, and Controlled Oral Word Association Test), academic achievement (Woodcock Johnson Tests of Achievement 3rd Edition), memory (California Verbal Learning Test 2nd Edition), executive functioning (Booklet Category Test), attention (Trail Making Test and Brief Test of Attention) and impulse control (Trenerry Version of the Stroop Test). The neuropsychological assessment evaluates cognitive functioning and learning styles which assist in individual service planning (Sparrow, Grant, Connor, & Whitney, 2013). The Allen Cognitive Levels Screen (ACLS) (Lindstedt, Soderlund, Stalenheim, & Sjoden, 2005; Allen, Earhart, & Blue, 1992) and the Independent Living Scales (ILS) (Loeb, 1996) addresses the deficiencies in predicting functional outcomes using only a standard neuropsychological assessment battery. These functional behavioural assessments administered

by OTs use a more naturalistic perspective to identify challenged areas of daily living performance and their associated cognitive disabilities.

#### 2.4. Data analysis

Descriptive statistics created the participant profiles. Given the small sample size, the data was segmented into themes: demographic, neuropsychological, psychiatric and functional. Each test performance across the different subtests was examined to determine if a unique profile or pattern emerged. A focus was placed on data analysis of factors which would illuminate the profile on participant's functioning and connecting with the justice system.

Chi-square tests were calculated on the functional profile from the ILS and ACLS test scores and all twelve of the neuropsychological variables. In order to correct for running multiple statistical tests on the data set we set a p value for significance that exceeded the minimum criteria of  $p \leq .05$ .

### 3. Results

The 3C participants represented a heterogeneous group, reflective of the spectrum acknowledged within the fetal alcohol disorders (Chudley, Kilgour, Cranston, & Edwards, 2007). The IQ range was extremely low to average. A high percentage of participants demonstrated psychiatric phenomena; in combination with FASD, which increased their vulnerability to negative life events. 69.4% of the 3C participants scored in the moderate range of life events with negative impacts and controlling for incarceration. The employment history was broad, ranging from no formal work experience but a great deal of illicit commerce to steady employment in a trade. The limited data available made it impossible to tell how stable the periods of employment were. A natural dichotomy emerged from the data reflecting those who connected early with the justice system on release (Connectors) and those who did not connect (Non-connectors).

#### 3.1. Demographics

The men who participated in the 3C project came from across Canada and were born in Alberta, British Columbia, Northwest Territories, Saskatchewan, Manitoba, Ontario and Newfoundland. All participants were incarcerated in a provincial correctional facility and were sentenced for two years less a day. The mean age of the participants ( $N = 49$ ) was 29.61 years, the median was 26 years old, with a range of 19 to 50 years of age. 65.3% of participants reported their marital status as single, 32.7% reported being in common-law relationships and 2% (1 person) was legally married. Ethnicity was divided between Caucasian (37%) and Indigenous (57%), with 12% of Indigenous participants identified with specific First Nation groups, and 6% whose ethnicity was unknown. The majority of 3C participants had excellent to good physical fitness across all Canadian Physical Activity and Lifestyle Approach measures. The mean weight for the participants was 82.8 kg (182 lbs) and mean height was 178.5 cm (5'10") both of which fall in the 75th percentile of weight and height for men at age 20. The average length of sentence was 221 days for the most recent incarceration, and 41% of the charges resulting in the current incarceration related to breaches of probation conditions.

#### 3.2. Health and education

Health records with medical information were requested for each participant based on the participant's recall of the community and/or hospital where they were born. Medical records with birth information were located for 36.7% of the participants. Partial records (which did not include birth information) were located for 22.4% of the participants. There were no medical records located for 40.8% of the participants. A majority of the participants (51%) had sustained one or more

reported post-natal head injuries. The head injury status was unknown for 28.6%, and approximately 20% of the participants did not sustain a head injury during the post-natal period. The men self-reported post-natal brain trauma (involving loss of consciousness) in motor vehicle events and fights (often alcohol related) and this was a frequent finding of post-natal injury.

Most of the participants (43%) reported a high school education or less. 55% of the participants reported some senior high school education; 26.5% reported a grade 10 level of education or less, 14.3% reported a grade 11 education and 14.2% reported a grade 12 or equivalent (GED) education. Only 2% of the participants (1 person) reported some post-secondary schooling.

### 3.3. FASD diagnostics assessment

The Canadian Guidelines considers four primary measures in the final determination of FASD status: Facial features, growth deficiency, brain domain function, and prenatal alcohol exposure. The facial features of FAS have been restricted to short palpebral features, smooth or flattened philtrum, and thin vermilion border (Chudley et al., 2005). 66% of the participants did not display any of the characteristic facial features of Fetal Alcohol Syndrome, while 33% displayed mild facial features and 2% (1 person) displayed moderate facial features. Many of the participants (96%) did not display any of the characteristic growth deficiency associated with Fetal Alcohol Syndrome, while 2% displayed moderate growth deficiency and 2% displayed severe growth deficiency.

Prenatal alcohol exposure is based upon the maternal alcohol history, measured in four clinically meaningful categories, and given a number reflecting the “risk of exposure” ranging between 1 and 4. The highest rank at 4 represents confirmed exposure to high levels of alcohol early in pregnancy. High exposure is considered to involve a pattern of excessive intake of alcohol, substantial regular intake or heavy episodic drinking (Chudley et al., 2007). The risk of pre-natal alcohol exposure was determined to be high in the majority of 3C participants. However, the risk of pre-natal alcohol exposure was unknown in a substantial percentage of the participants, for reasons related to several factors that are characteristic of disenfranchised populations: health records were not accessible. There was insufficient historical information (lack of accessible or living family members) to describe the pre-natal period and confirm maternal alcohol history. Given the general history of the participants, they can be considered at risk for impairments.

### 3.4. Post-natal risk

Environmental post-natal risks have been shown to have significant adverse effects on individual development. Post-natal risks are assessed as part of the Canadian Guidelines for diagnosis, these include the presence of child physical abuse, neglect, attachment disorders (Breidenstine, Bailey, Zeanah, & Larrieu, 2011), sexual abuse, witnessing violence, multiple disrupted child welfare placements, housing instability, serious head injury, and neglect resulting in failure to thrive (Gilbert et al., 2009; Olson, Oti, Gelo, & Beck, 2009). This information is obtained through health records, from secondary family sources, or from information gathered during the assessment process and groups. The presence of post-natal risks was identified in the majority of 3C participants (57%). There was insufficient historical information to identify the presence of post-natal risks for 41% of the participants. Only 1 person (2%) experienced ‘no risk’ in the post-natal environment.

### 3.5. FASD diagnosis

The most frequent diagnosis under the FASD umbrella was neuro-behavioural disorder (57%); the second most frequent was static encephalopathy (32%).

### 3.6. Cognition/IQ

IQ was determined to be within the average range of intelligence. The full scale IQ scores ranged from 65 to 115 with the mean being 94.9 (SD 12.3) and the median being 97, with 35% of the participants having a below average IQ (< 90) and 55% in the average range (90–110). The average IQ scores of the 3C participants were similar to the findings of other studies (Brown et al., 2012) and were consistent with literature indicating that IQ is not an effective proxy measure for adaptive function (Boulding & Brooks, 2010; Mattson, Crocker, & Nguyen, 2011; Sparrow et al., 2013).

### 3.7. Psychiatric assessment

A psychiatrist conducted the clinical mental status workup using the then-current DSM-IV-TR multi-axial criteria, which assesses mental status on five axes. A total of 73.2% of the 3C participants examined received one or more diagnoses on Axis I, excluding the substance abuse disorders because these disorders were essentially universal in the participants. One individual refused to participate in the psychiatric examination. A dual diagnosis was confirmed with FASD and one or more codes on Axis I for the majority of 3C participants. Personality disorders (Axis II) were also confirmed for 67.3% of participants, with 65% diagnosed in Cluster B (dramatic, emotional or erratic).

### 3.8. Functional profile

The Allen Cognitive Level Screen (ACLS-5) assessment is a visual-motor task that provides an estimate of the client's capacity to learn (Allen et al., 1992). The ACLS-5 assesses a person's ability to follow instruction and perform an activity. The scores are reported on a range from 3.0 to 6.6. The 3C participants' mean scores on the ACLS-5 were 5.5, with a range from 5.0 to 5.8. The individual's performance on the Independent Living Scales (ILS) (Loeb, 1996) was used to help determine which support services were needed, the most appropriate living arrangements, and whether instructions were needed for community living. Standard Scores are placed into three categories: Low, Moderate and High. The full-scale standard ILS scores of the 3C participants were predominately Low (< 85) to Moderate ( $\leq$  100), with almost 40% of the participants receiving a Low score (range 55–84) and 35% receiving a Moderate score (range 85–100). The ILS mean scores across all subscale measures were Low (criterion score < 40, actual scores ranged from 20 to 39) to Low-Moderate (criterion score  $\leq$  50, actual scores ranged 41–50), which means that most participants require support services to enable successful independent community living.

### 3.9. Fitness testing

The fitness levels of the 3C participants were measured according to the Canadian Physical Activity, Fitness and Lifestyle Approach assessments (CPAFLA). These assessments measure body composition (composed of the body mass index, waist circumference and the sum of 5 skin-folds), aerobic fitness (stepping stage and heart rate), musculoskeletal fitness (grip strength, push-ups, sit and reach, partial curl-ups, vertical jump, peak leg power and back extensor endurance) and composite back fitness.

The majority of participants had excellent to good physical fitness across all CPAFLA measures. 6 participants did not pass the initial fitness screen (PAR-Q) due to medical contraindications and thus were not tested for fitness.

### 3.10. Documented criminal history

Juvenile criminal record sources were either in the correctional facility reports or by self-report. 67% (33/49) participants had juvenile

criminal records. It is probable that some of the youth history is incomplete and the actual juvenile record rate could be higher. There were a number of participants who were not residents of Alberta during the juvenile period no criminal information from outside of Alberta was available for any offender.

The types of offenses the participants were sentenced for at the time of entry into the 3C program were categorized in the following manner: acquisitive offenses (e.g. theft, break and enter), criminal damage, driving/motor vehicle related, breach of bail/conditions and violations offenses (breaches), drug offenses, offenses against persons, nuisance, weapons offenses and justice system related (e.g. unlawfully at large). An accepted formal system for grading the severity of offenses was not identified.

### 3.11. Connection with the justice system

As of the 3-month post-release date follow up 10 people had connected, representing 20% of the total number of participants. As of the 6 month post-release date follow up 20 people had connected, 41% of the total number of participants. After the period of 6 months post release date, an additional 13 participants connected with the system. A total of 33 (65%) participants connected with the justice system after release for the duration of the project. There were similarities and differences between the connectors and non-connectors including, age started drinking alcohol, educational attainment, and IQ. However, the connectors were far more likely to have a juvenile record and the non-connectors had a higher rate of offenses against persons.

An important consideration in understanding the criminal history of adult offenders with FASD is the incidence of frequent re-offenders in the 3C participants. Frequency of re-offending was defined as 6 cases or more in the past 3 years. Each “case” represents a sentence, which may include more than one charge. There was a total of 485 cases for the 3C participants, with a range between 1 and 47. A majority of the 3C participants may be considered frequent offenders, because 55% ( $N = 27/49$ ) had > 6 cases in the past three years.

### 3.12. Characteristics of the 3C connectors

The functional and neuropsychological variables were examined to determine if any relationships existed to the independent variable of reconnection to the system (see Table 7). Statistical significance was set at  $p < 0.05$ . A chi-square test of independence was performed to examine the relationship between the presence of a juvenile record and re-connection with the justice system. The relation between these variables was statistically significant,  $X^2(1, N = 49) = 5.894$   $p = .015$ . Individuals who with a juvenile record were more likely to reconnect with the justice system. Chi-square test of independence was conducted to determine if there was a relationship between a juvenile record and reconnection at 3 and 6 months post intervention, a significant relationship was only found at 6 months,  $X^2(1, N = 49) = 3.878$   $p = .049$  and not 3 months  $X^2(1, N = 49) = 2.513$   $p = .113$ . Further relationships between reconnecting with the correctional system and other standardized measures were examined, including Finger Tapping Test Right Hand, California Verbal Learning Test, ILS, and the, Trail Making Test A. A Chi-square test of independence was used to determine statistical significance. Results of the analyses indicate a statistically significant relationship between the Finger Tapping Test (right hand) scores-above 85 and below 85 and reconnecting with the justice system (18 months post intervention),  $X^2(1, N = 49) = 5.800$   $p = .016$ . Individuals who scored below 85 on the finger tapping test were more likely to reconnect with the justice system. Statistically significant results were also found at 3 months,  $X^2(1, N = 49) = 10.566$   $p = .001$  and 6 months post intervention,  $X^2(1, N = 49) = 7.603$   $p = .006$ . A significant relationship was also found between the California Verbal Learning Test- scores above 85 and below 85 and whether or not individuals reconnected with the justice

system 6 months post-intervention,  $X^2(1, N = 48) = 8.571$   $p = .003$ . Individuals who scored below 85 on the CVLTC were more likely to reconnect with the justice system six months after completing the 3C program, than those who scored above 85. Scores below 85 on the ILS were found to have a significant relationship to reconnecting with the justice system 3 months post-intervention  $X^2(1, N = 49) = 12.582$   $p = .000$  and 6 months post-intervention  $X^2(1, N = 49) = 5.148$   $p = .023$ . Individuals who participated in the 3C program and scored lower than 85 on the ILS were more likely to reconnect with the justice system 3 and 6 months post-intervention. A significant relationship between the Trail Making Test A and reconnection with the justice system 6 months post-intervention was found  $X^2(1, N = 48) = 3.884$   $p = .049$ , indicating that individuals who score below 85 on the TMTA were most likely to reconnect 6 months post intervention.

### 3.13. Follow-up

The ultimate indicator of a person's ability to transition into the community would be recidivism rates. Limitations in the research design restricted community follow-up to 6 months after the day of release. The community partner program, which included the 3C participants, was intended to maintain contact beyond the proscribed 6 month period. Very few participants (10%) were in contact with the Transition Advocates (TAs) at 6 months after release.

Benefits of the 3C program, as reported by the participants include: better anger management, improved stress management, better self-esteem, increased self-awareness and insight into patterns of behaviour, reduced feelings of aggression, improved coping skills, caused self-reflection of past lifestyle choices in a systematic way, changing patterns of relationship with family, and encouraging contact with their children. 41% of participants have reported improved relationships with family and their children along, in addition to improvements in the areas noted above.

Participants reported that they learned about the holistic benefits of exercise, and a small number noted at follow up that they were involved in healthier activities such as gym attendance (14%). 27% of participants reported that they were employed, including temporary or unofficial employment. A number of family members mentioned that there had been a noticeable improvement in the participants' ability to relate to family and others and hence stay out of jail (17%). Several participants reported that they were unemployed and spending most of their time at home, without engaging in community outreach activities. Regarding the experience of participation, the men reported that during the group sessions the engagement in activities promoted more spontaneity between members and reduced the pressure of talking.

### 3.14. Community

The focus of TA efforts was measured based on the recorded time spent with each participant. Most of the efforts and activities recorded were related to basic needs and personal support. The categories were grouped into seven basic categories for analysis: 1) basic needs (housing, financial, transportation, legal), 2) personal support (contacting other professionals, follow up, coaching/mentoring, advocacy), 3) personal development support (community resources, programs/education, assessing skills, life skills, cultural), 4) health issues (mental health, medical, addictions, hospital), 5) family related (family, family/relationships), 6)employment and 7) “blank” (time recorded by the TA for a participant without any information on the nature of the effort or support). After a review of the community partner's case notes and the narrative report, a list of agencies was developed which were accessed by or recommended to the participants through referral or assistance by the TAs.

Social networks in the 3C participants were limited. Transition from a correctional facility to the community is known to be difficult. The continuity of medical and mental health treatment into the community

**Table 1**  
Fetal Alcohol Spectrum Disorder (FASD) identified in 3C participants (N = 49)

FASD categories	Frequency	Percentage
Neurobehavioural disorder (alcohol exposed)	18	37%
Static encephalopathy (alcohol exposed)	10	20%
Neurobehavioural disorder (alcohol exposure unknown)	9	18%
Static encephalopathy (alcohol exposure unknown)	4	8%
Sentinel physical findings/Static encephalopathy (alcohol exposed)	1	2%
Sentinel physical findings/Static encephalopathy (alcohol exposure unknown)	1	2%
Sentinel physical findings/Neurobehavioural disorder (alcohol exposed)	1	2%
No brain impairments no FASD findings	5	10%
Total	49	100%

**Table 2**  
Percentage breakdown of connectors and non-connectors across ACLS scale points

ACLS Scale points	5.0	5.2	5.4	5.6	5.8	6.0–6.6
Connector	9.1%	9.1%	33.3%	9.1%	39.4%	0%
Non-connector	6.3%	6.3%	25%	12.5%	50%	0%

is challenging as is access to affordable, safe and sober housing outside of the inner city area. In addition, some participants left the greater Edmonton area so they were unable to access direct transition supports [Tables 1–6, 8 and 9](#).

#### 4. Discussion

Prenatal alcohol exposure is shown to have a great impact on adaptive and social functioning ([Howell, Lynch, Platzman, Smith, & Coles, 2006](#)). Previous research on youth from this particular demographic has found that this population has multiple profiles and great difficulty with the shifting, balancing and comparing information, which is a prerequisite for good decision making and, most importantly, for behavioural self-regulation ([Brown et al., 2012](#)).

The profile of abuse in childhood seen in the 3C participants, along with other post-natal risk factors such as witnessing violence was highly prevalent at 57%. Experiencing child abuse has been identified in other research as a contributing factor to a lack of social integration and difficulties in community living ([Clark, Thatcher, & Martin, 2010](#); [Gilbert et al., 2009](#)). The content themes from the MBS groups reflect childhood and early-life histories which can be linked to the social determinants of health, including poverty, housing instability, poor access to healthcare, and school failure. For some of the men, their narratives speak to being disadvantaged in rural and in some cases First Nations communities.

Participants' scores on the ACLS reflect the persons' ability to learn, problem solve in task context, situational awareness, and their ability to follow instructions and perform an activity consistently. As reported,

**Table 3**  
ILS subscales and full scale scores<sup>a</sup> averages, medians and range of all participants (N = 49)

ILS Scale	Memory	Money manage	Home & transport	Health & safety	Social adjustment	Performance information	Problem solving	Full scale
Range	20–63	20–63	20–63	20–63	20–63	20–63	20–63	55–121
Mean	51	41	50	46	36	48	43	89
Median	54	41	53	47	32	47	46	92
Minimum	25	20	23	20	20	29	20	55
Maximum	60	56	59	63	59	59	62	118

<sup>a</sup> All expressed as Standard Scores.

**Table 4**  
ILS full scale placement of connectors vs. non-connectors (N = 49)

ILS placement range	Low (55–84)	Moderate (85–100)	High (101 – 121)
Connector	45.5%	30.3%	24.2%
Non-connector	25%	43.8%	31.3%

the 3C mean result on the ACLS-5 at 5.5 is slightly higher than the ACLS scores reported in other research. The functionality implied by these scores reflects many of the lifestyle patterns of the 3C participants. These men can have periods where their environment precipitates impulsivity, while their general lack of judgment causes situations that result in criminal charges. Individuals, who score a Level 5, can learn a safety procedure but are unable to consistently follow it and they may act impulsively without considering the consequences. Their learning is focused on immediate effects of actions, and secondary effects are not anticipated ([Allen et al., 1992](#)). The scores are predictive of individual treatment plan needs, but are not definitive in predicting behavioural outcomes ([Lee et al., 2003](#)).

The ILS is an assessment of the ability of people with cognitive impairments to live in the community and was developed to determine legal competency. The scores on the ILS were primarily low (40%) and moderate (35%), which is reflective of the impaired social function of the 3C participants and the need for supported community living services. 3C participants showed low ILS subscale scores on social adjustment. The social adjustment scale has 7 items and a number of them are sensitive to despondency, which may overlap with mood disorders. The mean score of the aggregate group was 35 and any score below 40 is considered low. The latter scores also reflect the lack of social networking connections in the 3C participants, and speak to the importance of establishing supportive social networks in this population. Healthier social networks may help to keep individuals actively engaged and reduce reconnection with the justice system, especially in people with substance abuse issues ([Brown, Herrick, & Long-McGie, 2014](#); [Wallace, Fahmy, Cotton, et al., 2016](#)).

In administration of the ILS with adults with traumatic brain injury, those with severe or profound brain injury did most poorly (moderate to low functioning) on the managing money, problem solving and health and safety subscales ([Loeb, 1996](#)). In comparison, the 3C participants were also low on problem solving and money management, but were higher on health and safety (46.1) than the adults with profound traumatic brain injury. However, the health and safety items tap into very practical living issues that cover subjects that many of the participants received some training in while in the correctional setting; these may have influenced the results.

The ILS scores were different for Connectors and Non-connectors. Although the numbers are small, these results give some indication that the ILS can discriminate on a functional level between those at greater risk to reconnect early with justice systems and those who do not. The functional skill of estimating numbers and calculating costs (e.g. groceries) is a noted weakness for community living in the 3C sample, as represented in the skills required in the money management subscale of the ILS. In some, negative income generation activities (e.g. drug sales),

**Table 5**  
CPAFLA testing percentage ratings of participants across tested areas (N = 43)

Area tested	Excellent (%)	Very good (%)	Good (%)	Fair (%)	Needs improvement (%)	Not tested (%)
Body composition	40.8	24.5	8.2	10.2	4.1	12.2
Aerobic fitness	6.1	20.4	30.6	20.4	8.2	14.3
Musculoskeletal		16.3	49	22.4		12.2
Back fitness	2	14.3	36.7	30.6	4.1	12.2

**Table 6**  
Type of charges all cohorts (N = 49)

Breaches	Acquisitive	Driving	Offenses against persons	Nuisance	Criminal damage	Weapons	Drugs	Justice system related
41%	25%	24.6%	8%	7%	4%	3%	3%	1%

**Table 7**  
Tests of significance based on standard scores of variables controlling for connections

Variable	Connect within 3 months post-release (N = 10)	Connect within 6 months post-release (N = 20)	Connectors final total (18 months post-release) (N = 33)
Juvenile Record	26.5%	50%*	76.5%*
Independent Living Scales Full Scale score	47.4%*	63.2%*	78.9%*
Finger Tapping Test (right hand)	50%*	71.4%*	92.9%*
California Verbal Learning Test long delay free	29.2%	62.5%*	75%
Trail Making Test A	19%	23.8%*	61.9%

\* Significant  $p < 0.05$ .

**Table 8**  
Measures of functional differences between connectors within 3 months (N = 10), additional connectors within 6 months (N = 10) and non-connectors (N = 16)

Functional Measure Independent Living Scales	ILS memory (mean)	ILS money mgmt (mean)	ILS home transport (mean)	ILS health safety (mean)	ILS social adjust (mean)	ILS prob. solving (mean)	ILS perf info (mean)	ILS full (mean)
Connectors 3 months N = 10	40.4	34.7	48.2	36.4	28.9	34.1	43.6	74.3
Connectors 6 months N = 10	46.9	37.9	49.2	41	34	37.8	46.1	83.1
Non connectors N = 16	54	43.6	51.3	50.3	36.1	48	48.5	94.2

**Table 9**  
Number of participants in contact with the TA at 3 months and 6 months after release

In contact with TA 3 months post release	Number of participants (%) N = 49	In contact with TA 6 months post release	Number of participants (%) N = 49
No	27 (55%)	No	44 (90%)
Yes	22 (45%)	Yes	5 (10%)

people tend to deal in round numbers rather than in percentages and fractions.

The functional assessments further illuminate the dependent or semi-dependent living abilities of the 3C participants. The FASD diagnostic criteria call for neuropsychological testing to determine the impact of impairments and the brain scores needed for the diagnostic formulation. The scores of the individual tests of the neuropsychological battery are used to determine the functional implication for community living and are made based on the score of the domain being measured. Individuals when performing a task in context identify with the relevance and the meaning which stimulates performance (Goldberg, Brintnell, & Goldberg, 2002) and can enhance performance. The functional assessments incorporate the in-task context of an individual's performance in a manner that provides more complete information about the existence or void of contributing life experiences and explores the environmental relevance of the participants' abilities in the various domains (Bell-McGinty, Podell, Franzen, Baird, & Williams, 2002).

The rate of co-morbidity for substance abuse in the 3C sample is substantially higher than those reported in the literature for non-incarcerated adults with FASD. This finding is especially relevant if the

profile is more common among adults who are in jail, and speaks to the presence of secondary disabilities in the 3C participants. It is also a strong indicator for the need of intense and prolonged programming on substance abuse for recovery (Sterling et al., 2011). The research involving individuals with long standing substance abuse disorders indicates that many have repeated cycles of abstinence followed by periods of relapse to substance use (McKay & Hiller-Sturmhofel, 2011). Exposing the brain to high amounts of alcohol can interfere with the development of mature cognitive and behavioural functioning. Moreover, addictive behaviour can be fixed in the brain because the adolescent period is critical for brain plasticity; brain plasticity, in turn, is moulded by environmental interactions (Witt, 2010).

Many of the 3C participants initiated substance abuse at a very early age. People who begin drinking at an early age may develop biological reward mechanisms associated with alcohol or use drinking as a coping method for social deficits (Grant, Brown, Dubovsky, Sparrow, & Ries, 2013). Prenatal alcohol exposure is a risk factor for alcohol use and problems with alcohol in adolescence and adulthood, while people with FASD may also be at increased risk for substance use disorders due to early age of first use (Grant et al., 2013). In addition, substance abuse treatment programs frequently require multiple attempts for success,

and the interventions are not usually designed to address and accommodate the known learning disabilities in people with FASD (Grant et al., 2013).

Substance use among inmates is linked with re-offending. There is increasing evidence demonstrating the high prevalence of mental health and substance use disorders in the Canadian offender population (Beaudette, Power, & Stewart, 2015; Sapers, 2016). Further, evidence demonstrating the significant occurrence of FASD and other mental health issues, with rates of comorbidities estimated to be as high as 90% (Famy, Stressiguth, & Unis, 1998; O'Connor et al., 2002; Pei, Denys, Hughes, & Rasmussen, 2011; Streissguth, Barr, Kogan, & Bookstein, 1996.) The inmates' substance abuse history, job skills and work history, mental health, and the intensity of conventional ties and behaviour both predict recidivism and influence post-prison reintegration (Visher & Travis, 2003). It is important to note that there are a variety of definitions for recidivism: the most typically used identification of recidivism is re-arrest, re-conviction or re-incarceration (Visher & Travis, 2003). Promising approaches to reducing recidivism by addressing substance abuse treatment and community support are important avenues to explore, particularly for people with FASD.

Researchers are increasingly developing interventions to reflect the chronic nature of addiction disorders and to extend the course of treatment. Interventions that contribute to effectiveness include a longer duration of care (e.g. 12 months or more), active efforts to reach and retain patients in treatment, and the use of incentives to retain patients in continuing care (McKay & Hiller-Sturmhofel, 2011). Given the captive nature of the inmate's environment, incorporating the option to participate in extended rehabilitation programs seems to make sense. These programs would start while the person is incarcerated and would flow into the community. The literature notes that a lack of continuity increases the probability of relapse (Hammett, Roberts, & Kennedy, 2011). The availability of such substance abuse programming may be challenging due to regional resources, but would be more cost effective in the long term due to the potential reduction in recidivism caused by substance use (Castillo & Alarid, 2011). In addition substance abuse treatment can act as a vehicle for lifestyle change (Bahr, Harris, Fisher, & Harker Armstrong, 2010).

The criminal history patterns of the 3C participants were not complete; thus, the longitudinal effect of the participant's criminal record history on family and personal networks was not available. This sample of offenders with FASD confirmed a juvenile record as a risk factor for connecting to justice system. Certainly, access to a more comprehensive record of contact with the federal and provincial justice systems would have presented a fuller picture of youth and adult types of offenses. In the 3C participants, the dominant type of offense /charges accounting are breaches of conditions. While, empirical evidence is limited, clinician and legal professionals suggest that offenders with FASD tend to have trouble following legal supervision orders, exhibit poor response to treatment, and have higher rates of recidivism in part due to the lack appropriate identification of cognitive deficits and clinical needs (Fast & Conry, 2009; Gagnier, Moore, & Green, 2011; McLachlan, 2012; Roach & Bailey, 2009). The dominance of the breach charges is in keeping with other reports in the literature addressing this population (Roach & Bailey, 2009). Some of the participants self-reported gang membership or association with gang members. This information was not collected in a systematic manner and was not included in the analysis. Nonetheless, gang membership alone is predictive of poor outcomes in adulthood including higher rates of illegal behaviour, poorer educational and occupational attainment and poor health (Gilman, Hill, & Hawkins, 2014). Compounded with the FASD gang membership outcomes in adulthood are unlikely to be improved.

There is some research to suggest that a causal connection between finger tapping, poor self-awareness and poor impulse control (and therefore a potentially higher risk of problematic behaviours) exists. Specifically, the early research on finger tapping (Halstead, 1947; Reitan, 1955) noted that the task could differentiate between controls

and those with frontal lobe dysfunction or brain injuries. Previous research has shown links between stronger finger tapping scores and various outcomes, such as the chances of being employed after a brain injury (Heaton, Chelune, & Lehman, 1978). As well, poor finger tapping has also been shown to be associated with poor self-awareness (Prigatano & Altman, 1990); this poor self-awareness could also be a mediating factor for the population of 3C adults in our study which could somehow predispose them to reconnect with the justice system. Various forms of brain dysfunction can affect complex sensorimotor neuro-circuitry (including frontal-basal ganglia-cerebellar connections), slowed finger tapping speeds have proven to be quite sensitive to this dysfunction. More recent research has shown some offenders have struggles with processing speed, but that finger tapping was not able to discriminate between criminal populations (Suchy, Eastvold, Strassberg, & Franchow, 2014). Continued explorations of the utility of finger tapping in predictions of recidivism may be very useful for those with underlying brain dysfunction, such as people with FASD in the correctional system. Further research may also be useful to determine whether the speed of index finger tapping (as a possible measure of brain dysfunction) could be predictive of the risk of re-offending.

The Connection rate for 3C participants demonstrated results consistent with that found in the general offender population and reflect a progressive increase with time. This was consistent with the literature except that the 3C sample has brain dysfunction and there was a very rapid connection of 32% of the connector sample (N = 31) within 99 days. When considering the costs of incarceration, alternative strategies such as the diversion courts may be more appropriate for this population who have organic brain impairments affecting their impulse control and judgment. Offenders with FASD frequently return to the community without the necessary tools to be successful and traditional methods of community supervision are not effective and may lead to unintentional violations (Brown et al., 2014). Sentences that place more emphasis on conditions and/or community sanctions may be a better approach (Roach & Bailey, 2009) as more comprehensive services and supports are designed for the complex case needs of individuals, particularly for adult men with FASD.

#### 4.1. Limitations

One of the limitations was the sample size, and the behaviourally-based purposive sampling method. Other individuals with potential FASD may have been at the correctional facility but not identified or included in the study. Some of the measures used in the study are based on self-report, so the actual rates of experiences of abuse and substance abuse may be higher.

The 3C project demonstrated that an externally administered diagnostic and intervention program focusing on FASD can run successfully within a provincial correctional site. However, a great deal of planning and collaborative effort between project and Corrections' administration is necessary to ensure that such a program is clearly understood by correctional site staff and designed to be compatible with the institutional requirements for safety and within their basic daily schedule. Establishing the 3C project model required detailed preparation long before operating the 12-month program at PCC. A pre-review of the human research ethics considerations for recruitment and informed consent was conducted, and the program procedures were tested to ensure that the rights of this vulnerable group of participants were protected. Ethical clearance was lengthy and involved two separate institutions. The high number of positive diagnoses may speak to the selection and screening process. The Solicitor General and Public Security department had at the time a provincial FASD coordinator conducting in-service training and educating correctional site staff on FASD. This training could be a factor in the high number of positive identifications. Clinical observations are noted to be effective in diagnostic formulations (Reaven, Hepburn, & Ross, 2008).

The delivery of the project model was influenced by multiple

external agencies and forces not usually associated with research projects. The philosophy of 3C operated under a rehabilitation framework of enabling, while the provincial correctional centre's philosophy necessarily focused on institutional safety and security with consequences for rule infractions. Nevertheless, both sides adjusted and the project ran without major disrupting issues, which is attributed to an effective daily communication process design as the program was operationalized.

To adjust to correctional facility activities and programming, the diagnostic assessment method incorporated parallel sessions of multiple participants rather than using a one-day one-offender approach. The on-site diagnostic clinic was held at the end of each of the 4 cohorts to incorporate the evaluations and assessment results from each of the specialists. There were some daily living tasks that could not be enacted because of institutional restrictions related to personal safety of staff and offenders.

The fact that the project included 5 major partners created challenges: three separate provincial ministries, the community partner, and the University, in addition to subcontractors. Administrative and communication demands were high, and recruiting qualified staff was difficult. In addition, the community partner funding contract for the TAs was separate from the 3C contract and began ten months before 3C. Their approach to transition was different than that envisioned by the research team and already established by the time the 3C project became operational at the correctional site after a four-month delay. This resulted in making some changes to expected data collection, which impacted data analysis and had several ramifications.

However, other confounding matters were related to the participants themselves. The life consequences of being an adult with long undiagnosed FASD, and few if any supports, are reflected in the lifestyle profiles of the 3C participants. The establishment of new, healthier habits requires the opportunity to practice. The shortened attention spans of participants required pacing the sessions to allow for maximum learning. This was done and individual monitoring of specific participants was needed to assist those individuals that could keep up with the modified pace and those that could progress more quickly. Lack of access to a variety of records that provide essential health and educational historical information and were expected to be available was another limitation.

## 5. Conclusion

The Correction and Connections into the Community (3C) project identified a group of inmates that have a Fetal Alcohol Spectrum Disorder and was able to provide an enriched description of their diagnostic and functional profile. The participant diagnostic findings indicate that the limitations in executive function interact with the recognized secondary disabilities experienced by the majority of the men with FASD in this project. The disjunction between the resulting functional ability of the men and the supports and interventions available to sustain them in the community was illuminated to some degree.

Over the last decade the literature on programs to reduce recidivism of offenders has given much attention to rehabilitation using forms of cognitive behavioural techniques (CBT) and sessions using CB approaches. In people with brain impairments the focus must be on learning and cognitive strategies that use high degrees of bimanual motor engagement (doing) and not just talking about behaviours, assigning homework and reviewing events. The use of traditional CBT is inappropriate for most persons with FASD who respond better to a behavioural approach. Building on the results from youth and adolescent studies, affected people need to be active participants, use visible cues, get immediate feedback and see and examine results (Chandrasena, Mukherjee, & Turk, 2009). The literature indicates that the cognitive restructuring for people with FASD occurs through a complex interaction of the psychomotor circuitry, such as in apprentice style learning. There also is a use of sensory stimuli such as smell, taste,

feel, sense and experience over extended periods of time. In other words, short interventions are less likely to be effective for adults with FASD.

The understanding of what factors contribute to reconnecting to the correctional systems has had some illumination by this research, but so much more is yet to be learned about adult males with FASD. The assessment process for this particular group of adults frequently lacks the presence of corroborating significant others. Adults who have been living in the community alone with a particular lifestyle require the use of tools that use more situational and real-world assessments and observations. The person's actual performance in-situ brings dimensions to the assessment process not found in paper and pencil tests, and incorporating the functional assessments into the diagnostic process was beneficial in understanding the participants and their abilities.

The general literature on offenders discusses the need to address criminogenic beliefs and attitudes as an important element in reducing recidivism. The known profiles of 3C participants favour an expectation of a lack of impulse control, impaired judgment, and a long history of frequent use of alcohol and, for some, illegal drugs. These factors create the conditions for reconnecting with the justice system and a failure to desist from criminal activity. The presence of organic (irreversible) cognitive impairment(s) cannot be forgotten in this group because it is the etiology of the impulsivity and judgment problems, unlike in other groups of offenders. (Brown et al., 2014; Fast & Conry, 2009). Moreover, many of the participants have a history of abuse and neglect, used alcohol in early adolescence and had secondary trauma to the head with loss of consciousness; this project indicates that many adults with FASD must be considered complex cases.

The structural determinants of daily life and the inequitable distribution of power, money and resources have received international research attention; in part, this is due to the disparity in health equity for certain populations between and within countries around the world. A review of the participants' psychosocial profiles and personal narratives with regard to the social determinants of health lends support to the view that these factors are negatively present in a majority of the participants' histories. The 3C participants frequently experienced post-natal risks. These issues also require more long-term and intensive interventions (Blas & Sivasankara Kurup, 2010; Witt, 2010; World Health Organization, 2010) and are a societal consideration that will require concerted effort and investment utilizing a multi-sectoral approach.

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## References

- Allen, C., Earhart, C., & Blue, T. (1992). *Occupational therapy treatment goals for the physically and cognitively disabled*. Bethesda: American Occupational Therapy Association.
- Bahr, S. J., Harris, L., Fisher, J. K., & Harker Armstrong, A. (2010). Successful re-entry: What differentiates successful and unsuccessful parolees? *International Journal of Offender Therapy and Comparative Criminology*, 54, 667–692.
- Beaudette, J. N., Power, J., & Stewart, L. A. (2015). *National prevalence of mental disorders among incoming federally-sentenced men offenders (Research Report, R-357)*. Ottawa: ON: Correctional Service of Canada.
- Bell-McGinty, S., Podell, K., Franzen, M., Baird, A., & Williams, M. (2002). Standard measures of executive function in predicting instrumental activities of daily living in older adults. *International Journal of Geriatric Psychiatry*, 17, 828–834.
- Bhambhani, Y., Roland, G., & Farag, M. (2003). Reliability of peak cardiorespiratory responses in patients with moderate to severe traumatic brain injury. *Archives of Physical Medicine and Rehabilitation*, 84(11), 1629–1636.
- Blas, E., Sivasankara Kurup, A., & World Health Organization (2010). Equity, social determinants and public health programmes. *Erik Blas and Anand Sivasankara Kurup (eds)*. Geneva: World Health Organization.
- Boland, F. J., Chudley, A. E., & Grant, B. A. (2002). The challenge of fetal alcohol syndrome in adult offender populations. *Forum on Corrections Research*, 14(3).
- Boulding, D. M., & Brooks, S. L. (2010). Trying differently: A relational-centred approach to presenting clients with cognitive challenges. *International Journal of Law and Psychiatry*, 33, 448–462.
- Breidensteyne, A. S., Bailey, L. O., Zeanah, C. H., & Larrieu, J. A. (2011). Child exposure

- and developmental variables attachment and trauma in early childhood: A review. *Journal of Child and Adolescent Trauma*, 4, 274–290.
- Brown, J., Herrick, S., & Long-McGie, J. (2014). Fetal alcohol spectrum disorders and offender reentry: a review for criminal justice and mental health professionals. *Behavioral Healthcare*, 1–19.
- Brown, N. N., Connor, P. D., & Adler, R. S. (2012). Conduct disordered adolescents with FASD intervention in secure treatment settings. *Criminal Justice and Behavior*, 39, 770–793.
- Castillo, E., & Alarid, L. (2011). Factors associated with recidivism among offenders with mental illness. *International Journal of Offender Therapy and Comparative Criminology*, 55, 98–117.
- Chandrasena, A. N., Mukherjee, R. A., & Turk, J. (2009). Fetal alcohol spectrum disorders: An overview of interventions for affected individuals. *Child and Adolescent Mental Health*, 14, 162–167.
- Chapman, J. (2008). *Fetal Alcohol Spectrum Disorder (FASD) and the criminal justice system: An exploratory look at current treatment practices*. Burnaby, B.C: Simon Fraser University Master of Arts Thesis.
- Chudley, A., Conroy, J., Cook, J., Looock, C., Rosales, T., & Leblanc, N. (2005). Fetal alcohol spectrum disorder: Canadian Guidelines for diagnosis. *Canadian Medical Association Journal*, 172, 1–21.
- Chudley, A., Kilgour, A., Cranston, M., & Edwards, M. (2007). Challenges of diagnosis in fetal alcohol syndrome and fetal alcohol spectrum disorder in the adult. *American Journal of Medical Genetics Part C (Seminars in Medical Genetics) Clinical Child Psychology and Psychiatry*, 145C, 261–272.
- Clark, D. B., Thatcher, D. L., & Martin, C. S. (2010). Child abuse and other traumatic experiences, alcohol use disorders and health problems in adolescence and young adulthood. *Journal of Pediatric Psychology*, 35, 499–510.
- Cook, J. L., Green, C. R., Lilley, C. M., Anderson, S. M., Baldwin, M. E., Chudley, A. E., ... Rosales, T. (2015). Fetal alcohol spectrum disorder: A guideline for diagnosis across the lifespan. *Canadian Medical Association Journal*, 188, 191–197.
- Cripps, F. (2008). Exercise your mind: Physical activity as a therapeutic technique for depression. *International Journal of Therapy and Rehabilitation*, 15(10).
- Famy, C., Stressiguth, A., & Unis, A. (1998). Mental illness in adults with fetal alcohol syndrome or fetal alcohol effects. *The American Journal of Psychiatry*, 155, 552–554.
- Fast, D., & Conroy, J. (2009). Fetal alcohol spectrum disorders and the criminal justice system. *Developmental Disabilities Research Reviews*, 15, 250–257.
- Gagnier, K. R., Moore, T. E., & Green, M. (2011). A need for closer examination of FASD by the criminal justice system: Has the call been answered. *Journal of Population Therapeutics and Clinical Pharmacology*, 18, e426–e439.
- Gilbert, R., Widom, C. S., Browne, K., Fergusson, D., Webb, E., & Janson, S. (2009). Burden and consequences of child maltreatment in high-income countries. *Lancet*, 373, 68–81.
- Gilman, A. B., Hill, K. G., & Hawkins, J. D. (2014). Long-term consequences of adolescent gang membership for adult functioning. *American Journal of Public Health*, 104, 938–945.
- Goldberg, B., Brintnell, E. S., & Goldberg, J. (2002). The relationship between engagement in meaningful activities and quality of life in persons disabled by mental illness. *Occupational Therapy in Mental Health*, 18, 17–44.
- Grant, T. M., Brown, N. N., Dubovsky, D., Sparrow, J., & Ries, R. (2013). The impact of prenatal alcohol exposure on addiction treatment. *Journal of Addiction Medicine*, 7, 87–95.
- Halstead, W. C. (1947). *Brain and intelligence. A quantitative study of the frontal lobes*. Chicago, IL: University of Chicago Press.
- Harvey, S. B., Hotopf, M., Overland, S., & Mykletun, A. (2010). Physical activity and common mental disorders. *British Journal of Psychiatry*, 197(5), 357–364.
- Hammitt, T., Roberts, C., & Kennedy, S. (2011). Health-related issues in prisoner re-entry. *Crime & Delinquency*, 47, 390–409.
- Heaton, R. K., Chelune, G. J., & Lehman, R. A. (1978). Using neuropsychological and personality tests to assess the likelihood of patient employment. *Journal of Nervous and Mental Disease*, 166, 408–416.
- Howell, K. K., Lynch, M. E., Platzman, K. A., Smith, G. H., & Coles, C. D. (2006). Prenatal alcohol exposure and ability, academic achievement, and school functioning in adolescence: A longitudinal follow-up. *Journal of Pediatric Psychology*, 31, 116–126.
- Lee, S., Gargiullo, A., Brayman, S., Kinsey, J., Jones, H., & Shotwell, M. (2003). Adolescent performance on the Allen Cognitive Levels Screen. *American Journal of Occupational Therapy*, 57, 342–346.
- Lindstedt, H., Soderlund, A., Stalenheim, G., & Sjoden, P. O. (2005). Personality traits as predictors of occupational performance and life satisfaction among mentally disordered offenders. *Nordic Journal of Psychiatry*, 59, 357–364.
- Loeb, P. A. (1996). *Independent living scales (ILS) manual*. San Antonio: The Psychological Corp.
- MacPherson, P., & Chudley, A. E. (2007). Fetal Alcohol Spectrum Disorder (FASD): Screening and estimating incidence in an adult correctional population. *2nd international conference on fetal alcohol spectrum disorder* Victoria BC: Research, Policy, and Practice around the World. March 7–10, 2007 events.onlinebroadcasting.com/fas/09707/ppts/correctional.ppt (October 6th, 2011).
- Mattson, S., Crocker, N., & Nguyen, T. (2011). Fetal alcohol spectrum disorders: Neuropsychological and behavioral features. *Neuropsychology Review*, 21, 81–101.
- May, P. A., Baete, A., Russo, J., Elliott, A. J., Blankenship, J., Kalberg, W. O., ... Hoyme, H. E. (2014). Prevalence and characteristics of fetal alcohol spectrum disorders. *Pediatrics*, 134, 855–866.
- May, P. A., Gossage, J. P., Kalberg, W. O., Robinson, L. K., Buckley, D., Manning, M., & Hoyme, H. E. (2009). Prevalence and epidemiologic characteristics of FASD from various research methods with an emphasis on recent in-school studies. *Developmental Disabilities Research Reviews*, 15, 176–192.
- McKay, J., & Hiller-Sturmhofel, S. (2011). Treating alcoholism as a chronic disease. *Alcohol Research & Health*, 33, 356–370.
- McLachlan, K. (2012). *An examination of the abilities, risks, and needs of adolescents and young adults with fetal alcohol spectrum disorder (FASD) in the criminal justice system*. Dissertation Abstracts International: The Humanities and Social Sciences.
- McLachlan, K. (2017). *Fetal alcohol spectrum disorder in yukon corrections: Final report to Yukon Justice: Estimating the prevalence of FASD, mental health, and substance use problems in the justice system*. Canada: Yukon.
- Meehan, W., O'Connor, L. E., Berry, J. W., Morrison, A., & Acampora, A. (1996). Guilt, shame and depression in clients in recovery from addiction. *Journal of Psychoactive Drugs*, 28(2), 125–134.
- Miller, A. (2005). Fetal Alcohol Spectrum Disorder and the incarceration of Metis and other Aboriginals. *Vancouver Metis Community Association*. Retrieved from <http://www.walkbravelyforward.com/FASD.pdf>.
- O'Connor, M. J., Shah, B., Whaley, S., Cronin, P., Gunderson, B., & Graham, J. (2002). Psychiatric illness in a clinical sample of children with prenatal alcohol exposure. *The American Journal of Drug and Alcohol Abuse*, 28, 743–754.
- Olson, H., Oti, R., Gelo, J., & Beck, S. (2009). 'Family matters': Fetal alcohol spectrum disorders and the family. *Developmental Disabilities Research Reviews*, 15, 235–249.
- Paley, B., & O'Connor, M. (2009). Intervention for individuals with fetal alcohol spectrum disorders: Treatment approaches and case management. *Developmental Disabilities Research Reviews*, 15, 258–267.
- Pei, J., Denys, K., Hughes, J., & Rasmussen, C. (2011). Mental health issues in fetal alcohol spectrum disorder. *Journal of Mental Health*, 20, 473–483.
- Popova, S., Lange, S., Probst, C., Gmel, G., & Rehm, J. (2017). Estimation of national, regional, and global prevalence of alcohol use during pregnancy and fetal alcohol syndrome: A systematic review and meta-analysis. *The Lancet Global Health*, 5, e290–e299.
- Prigatano, G. P., & Altman, I. M. (1990). Impaired awareness of behavioural limitations after traumatic brain injury. *Archives of Physical Medicine and Rehabilitation*, 71, 1058–1064.
- Reitan, R. M. (1955). The relation of the Trail Making Test to organic brain damage. *Journal of Consulting Psychology*, 19(5), 393–394.
- Reaven, J. A., Hepburn, S. L., & Ross, R. G. (2008). Use of the ADOS and ADI-R in children with psychosis: importance of clinical judgement. *Clinical Child Psychology and Psychiatry*, 13(1), 81–94.
- Roach, K., & Bailey, A. (2009). The relevance of fetal alcohol spectrum disorder in Canadian Criminal law from investigation to sentencing. *UBC Law Review*, 42, 1–58.
- Sapers, H. (2016). *Annual Report of the office of the correctional investigator 2015–2016*. Ottawa, ON: The Correctional Investigator of Canada.
- Sparrow, J., Grant, T., Connor, P., & Whitney, N. (2013). The value of the neuropsychological assessment for adults with fetal alcohol spectrum disorders: A case study. *International Journal of Alcohol and Drug Research*, 2, 79–86.
- Sterling, S., Chi, F., & Hinman, A. (2011). Integrating care for people with co-occurring alcohol and other drug, medical and mental health conditions. *Alcohol Research & Health*, 33, 338–34953.
- Streissguth, A. P., Barr, H. M., & Bookstein, F. L. (1996). *Understanding the occurrence of secondary disabilities in clients with fetal alcohol syndrome (FAS) and fetal alcohol effects (FAE): Final report to the Centers for Disease Control and Prevention*. Seattle: University of Washington, Fetal Alcohol and Drug Unit.
- Streissguth, P., Bookstein, F., Barr, H., Sampson, P., O'Malley, K., & Young, J. (2004). Risk factors for adverse life outcomes in fetal alcohol syndrome and fetal alcohol effects. *Journal of Developmental and Behavioral Pediatrics*, 25, 228–238.
- Suchy, Y., Eastvold, A., Strassberg, D., & Franchow, E. (2014). Understanding processing speed weaknesses among pedophilic child molesters: Response style vs. neuropathology. *Journal of Abnormal Psychology*, 123, 273–285.
- Thanh, N. X., Moffatt, J., Jacobs, P., Chuck, A. W., & Jonsson, E. (2012). Potential impacts of the Alberta fetal alcohol spectrum disorder service networks on secondary disabilities: A cost-benefit analysis. *Journal of Population Therapeutics and Clinical Pharmacology*, 20, 193–200.
- Visher, C., & Travis, J. (2003). Transitions from prison to community: Understanding individual pathways. *Annual Review of Sociology*, 29, 89–113.
- Wallace, D., Fahmy, C., Cotton, L., et al. (2016). Examining the role of familial support during prison and after release on post-incarceration mental health. *International Journal of Offender Therapy and Comparative Criminology*, 60, 3–20.
- Witt, E. D. (2010). Research on alcohol and adolescent brain development: Opportunities and future directions. *Alcohol*, 44, 119–124.