

_____ **Research Report** _____

**The Aboriginal Offender Substance
Abuse Program (AOSAP): Examining the
effects of successful completion
on post-release outcomes**

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**The Aboriginal Offender Substance Abuse Program (AOSAP): Examining the effects of
successful completion on post-release outcomes**

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Executive Summary

Over 90% of the Aboriginal men in federal custody require substance abuse intervention. In response to this need, CSC introduced the Aboriginal Offender Substance Program (AOSAP) in 2004. The first version (V-1) of the program consisted of 31 sessions and was field-tested from November 2004 to June 2005. As a result of feedback from field staff and program participants, a restructured and improved second version (V-2), comprising 53 sessions, was delivered to participants from June 2005 to October 2006. The final version of the program (V-3), 65 sessions in length, was launched in November 2006. All versions of the program were designed to reduce the Aboriginal offender's risk of relapse to substance abuse and recidivism through a holistic process that examines the impact of substance abuse through the physical, mental, emotional and spiritual dimensions of the Aboriginal offender. Contemporary best-practices approaches in substance abuse treatment are also interwoven throughout the program.

A cohort of AOSAP participants, who were released to the community on day parole, full parole, or statutory release, were studied for a period not exceeding the warrant expiry date to evaluate the effects of the program on post-release outcomes. If AOSAP reduced the likelihood of revocation and/or testing positive for drugs following conditional release to the community, then the program's effectiveness with respect to mitigating the risk of revocation and/or relapse to substance abuse was confirmed. The methodology that was employed to investigate the effectiveness of AOSAP is particularly notable because it compared Aboriginal offenders who participated in AOSAP to other Aboriginal offenders who participated in the moderate (M) and high (H) intensity National Substance Abuse Programs (NSAP). Including comparisons of this nature was important because it provided a more conservative estimate of AOSAP's effect on post-release outcomes.¹

A total of 94 (3.5%) of the Aboriginal men in the release cohort fully or partially participated in AOSAP, and 79 (2.9%) and 344 (12.8%) fully or partially participated in the NSAP high and moderate intensity interventions, respectively. The remaining 2,178 (81%) of the Aboriginal men did not participate in institutionally-based AOSAP or NSAP interventions.

Main Findings:

1. Generally, Aboriginal offenders who participated in AOSAP were returned to custody at a lower rate during the follow-up period than the groups of Aboriginal offenders who participated in NSAP-H, NSAP-M, failed to complete a substance abuse program, or did not participate in a substance abuse program prior to release from custody. Aboriginal offenders who participated in versions 2 or 3 of AOSAP were returned to custody at the same rate as Aboriginal offenders who participated in version 1 of AOSAP. There was no statistical difference between versions of AOSAP. Advanced statistical analysis, which allow for the control of offender characteristics associated with criminal behaviour, confirm these results.
2. Only 5% of the successful participants of AOSAP- V 2&3, and 6% of the participants of AOSAP version 1 were returned to custody because of a new offence or charge compared to

¹ Generally, comparisons of treatment with other (alternative) treatments yield smaller estimates of treatment effect than comparisons between treatment and no treatment.

16% and 20% of the successful participants of NSAP-H and NSAP-M, respectively.

3. Exposure to substance abuse treatment prior to release from custody was a relatively weak predictor of relapse to substance abuse. Nevertheless, there was some evidence suggesting that successful participants of AOSAP and NSAP-M were less likely to incur a positive urinalysis result while on release than successful participants of NSAP-H. The result emerged after adjusting for the effects of other offender characteristics that are known to be associated with criminal behaviour.
4. There was some evidence that Aboriginal offenders who participated in AOSAP were less likely than Aboriginal offenders from the other program exposure categories to test positive for drugs that are considered dangerous because of the physical harms they cause the individual (e.g., cocaine, opioids) and the effects they have on significant others and the broader community.

Implications:

These findings add weight to the evidence in support of traditional approaches to treating substance abuse problems in Aboriginal men. Aboriginal scholars have consistently argued that the role of traditional teachings and culture in the facilitation of wellness for, and resiliency of Aboriginal peoples must be regarded as the foundation on which treatment is grounded. The fact that AOSAP outperformed mainstream substance abuse programs is consistent with contemporary best practices in effective correctional intervention. Offering content and a mode of service delivery that is responsive to the offender's attributes will facilitate active participation and engagement of the offender in treatment and lead to better outcomes. In the case of Aboriginal offenders, programs and interventions that are grounded in Aboriginal traditions, spirituality and culture that strive to heal the individual in holistic terms, will facilitate rehabilitation efforts and enhance engagement and participation of the offender in treatment.

When this research study was initiated, AOSAP was still in its demonstration phase. Given the research findings, it is recommended that national implementation of the program take place so that Correctional Service Canada can more fully meet the needs of Aboriginal men who require a high intensity substance abuse program.

Table of Contents

Acknowledgements	ii
Executive Summary	iii
List of Tables	vii
List of Figures	viii
Introduction	1
The Burden of Need among Aboriginal Peoples	1
Addressing Substance Use and Criminality through Effective Programming	2
Traditional Approaches to Healing and Recovery	4
Building Capacity to Address the Needs of Aboriginal Offenders	6
The Aboriginal Offender Substance Abuse Program	7
Holistic Model of Recovery	7
AOSAP Program Content	9
Method of Program Delivery	11
Quality Review Process	12
Hypotheses	13
Study Design	15
Cohort	15
Data Sources	16
Potential Covariates of Post-release Outcome	17
Indicators of Outcome	22
Procedures	23
Statistical Analyses	27
Results	32
Introduction	32
1. Measures of Association between Covariates	33
Need and Risk for Recidivism	33
Substance Abuse, Need and Program Exposure	34
Substance Abuse Program Exposure and Risk	37
Age Quartiles, Risk for Recidivism and Need Rating	38
Age Quartiles and Substance Abuse Program Status	40
2. Predictors of Revocation	40
The Effects of Other Covariates	44
Model Diagnostics	45
3. Community-based Indicators of Performance	45

Revocation Type.....	45
Community-based Urinalysis.....	46
Discussion.....	52
The Predictors of Revocation.....	53
Predictors of Relapse to Substance Abuse.....	55
Limitations of the Study	57
Future Research Possibilities	58
Conclusion	59
References	60
Appendix 1: Survival Analysis Model Diagnostics.....	68
Appendix 2: The Parameter Estimates, Standard Errors (SE), Wald χ^2 , p-values and Hazard Ratios (HR) and Confidence Intervals for each significant covariate of Revocation (Successful completers of AOSAP versions combined into one group)	70
Appendix 3: Analysis of Influential observations	71
Appendix 4: The Proportion of Release Cohort who were Tested, Percentage of Offenders who Tested Positive, Percentage of Tests that were Positive, Mean Number of Days to First Positive Test, Mean Number of Days to First Test, Mean Days at Risk, Total Number of Offenders and Tests Distributed Across Potential Covariates of the Outcome.....	73

List of Tables

Table 1	<i>Distribution of Release Cohort by Substance Abuse Program Exposure Category, Ancestral Background, and Type of Release from Custody</i>	16
Table 2	<i>OMS Program Referral Matrix</i>	21
Table 3	<i>Data Layout for Recurrent Community-based Urinalysis Testing.....</i>	30
Table 4	<i>Distribution of Dynamic Factor Ratings for the Aboriginal Release Cohort (N=2683)</i>	33
Table 5	<i>Distribution of CASA-derived Treatment Recommendations across Program Exposure Categories and the Severity of Drug and Alcohol Problems as Defined by the DAST, ADS and PRD.....</i>	37
Table 6	<i>Percentage of Offenders with Need Identified Within Each of the Seven Domain Areas Distributed by Age Quartile.....</i>	40
Table 7	<i>The Parameter Estimates, Standard Errors (SE), Wald χ^2, p-values and Hazard Ratios (HR) (With Confidence Intervals) for each significant covariate of Revocation.....</i>	42
Table 8	<i>Covariate Adjusted Parameter Estimates, Robust Standard Errors (SE), Wald χ^2, p-values and Hazard Ratios (HR) (With Confidence Intervals) for the Program Exposure Categories and each Significant Covariate of the Hazard of a Community-based Positive Urinalysis Result, Stratified by the Number of Positive Test Results.....</i>	51

List of Figures

<i>Figure 1.</i> AOSAP Holistic Model of Healing and Recovery	9
<i>Figure 2.</i> Hypothetical causal diagram examining the effects of AOSAP and other predictors on post-release outcomes.....	26
<i>Figure 3.</i> Proportion of the Aboriginal Release Cohort with Need Identified Within Each of the Seven Domain Areas by Ratings on Risk for Recidivism.....	34
<i>Figure 4.</i> Proportion of Offenders with Need Identified Within Each of the Seven Domain Areas Distributed across Substance Abuse Program Exposure Categories	35
<i>Figure 5.</i> The Proportion of Aboriginal Offenders with Ratings of Low, Moderate, and High, across Substance Abuse Program Exposure Status.....	38
<i>Figure 6.</i> Distribution of Risk Ratings for Recidivism across Age Quartiles for the Aboriginal Cohort of Releases.....	39
<i>Figure 7.</i> Adjusted Survival Curves Representing the Estimated Probabilities of Survival for Aboriginal Offenders from the Program Exposure Categories (Successful Participants of AOSAP Combined into One Group).....	44
<i>Figure 8.</i> Distribution of Revocations across Program Exposure Categories	46
<i>Figure 9.</i> Types of Drugs that were Detected and the CASA-derived Severity Rating of Drug and Alcohol Problems for the Release Cohort of Aboriginal Offenders who Produced a Positive Urinalysis Result, Distributed Across Program Exposure Categories	48

Introduction

[Dr. Joseph E. Couture (2001) wrote that] Aboriginal tradition mirrors a salutary humanism and humaneness, a forever expanding awareness of all that is. It is the source of criteria and standards and expresses the characteristic features of *healing processes and meanings* [italics added]. Tradition proposes an operational, balanced model [of treatment], anchored in historically shaped priorities. It deliberately addresses strengths as well as weaknesses and outright dysfunction (p. 158).

The Burden of Need among Aboriginal Peoples

In 2006, approximately 1,172,790 Canadians reported Aboriginal ancestry, representing approximately 3.8% of the total Canadian population (Statistics Canada, 2008). The majority, 60% reported First Nations (North American Indian) ancestry; while 33% and 4% self identified as Métis and Inuit, respectively. The remaining 3% were individuals who identified with more than one Aboriginal group or part of the group of registered Indian or Band members who did not identify Aboriginal ancestry (Statistics Canada, 2008). The size of the Aboriginal population is on the rise. Between 1901 and 2006, the Aboriginal population increased tenfold, while the total population of Canada rose by a factor of only six. As a group, Aboriginals are younger, have a higher than average child and aged dependency ratio² (66% compared to 48% for the general Canadian population), and have a birthrate twice the Canadian rate (Health Canada, 2003). The overall Aboriginal birth rate is expected to increase by 3% annually for the next several years (Health Canada, 2003).

Canada's growing Aboriginal population has experienced a disproportionate burden of health problems compared to the national average (Smylie, 2000). It has been argued that the groups' shared experiences of colonization, and the resultant poverty and social stressors have contributed to poorer outcomes across the life span (Frideres & Gadacz, 2001; Meadows, Lagendyk, Thurston & Eisener, 2003; Mussell, 2005). Particularly prevalent in Aboriginal communities are the conditions that factor into crime, such as poverty, poor education,

²Higher ratio indicates that the working-age population has a greater burden of caring for children and the aged.

unemployment, marginalization, substance abuse, violence, and dysfunction within the family home (Canadian Criminal Justice Association [CCJA], 2000; Frideres & Gadacz, 2001; Mussell, 2005). These conditions, in combination with limited rehabilitative services and interventions aimed at prevention, and a judicial system that has had difficulty considering the Aboriginal worldview (e.g., avoidance of confrontation and adversarial positions) have invariably led to disproportionate levels of Aboriginal incarceration (CCJA, 2000; La Prairie, 1992; Ross, 1992).

Incarceration statistics from the Prairie Provinces are particularly illustrative of Aboriginal over-representation. In 1999, 76%, 59% and 38% of admissions to provincial facilities in Saskatchewan, Manitoba and Alberta were Aboriginal, while, only 8%, 9% and 4% of the general, non-offender, adult population within the provinces were of Aboriginal ancestry, respectively (Statistics Canada, 2001). Over-representation is also evident within Canada's federal institutions (Correctional Service Canada [CSC]) with approximately 18% of the population identified as Aboriginal – roughly six times the size of the Canadian Aboriginal population. As is the case with provincial admissions, over-representation of Aboriginal offenders is markedly higher within federal institutions located in the Prairie Region. Over-representation within Correctional Service Canada's (CSC) institutions persists and is expected to increase over the next several years (Boe, 2000; Treasury Board Secretariat, 2008).

As with Aboriginal peoples in the Canadian population, Aboriginal offenders share a disproportionate burden of problems in all life areas. They are more likely than the general population of offenders to have needs identified within the domains of family, education, employment, community functioning, social interaction, personal and emotional orientation, attitude and substance abuse (Rugge, 2006). No more true is this than in the area of substance abuse, where almost all (94%) of the Aboriginal offenders have an identified substance abuse problem at admission to federal custody compared to 70% of the general correctional population (Moore & Trevethan, 2002). The proportion of federally incarcerated Aboriginal offenders requiring substance abuse programming is high within each of the Aboriginal groups, with 93% of First Nations and Inuit, and 91% of Métis offenders identified as requiring a considerable or high level of intervention in the area of substance abuse (Motiuk & Nafekh, 2000).

Addressing Substance Use and Criminality through Effective Programming

There is general agreement in the literature that substance use is a robust predictor of

recidivism among adult and adolescent offenders (Andrews & Bonta, 1998; Bonta, Law & Hanson, 1998; Brown & Motiuk, 2005; Cartier, Farabee & Prendergast, 2006; Gendreau, Goggin & Little, 1996; Gjeruldsen, Myrvang & Opjordsmoen, 2004; Kinlock, O'Grady & Hanlon, 2003; Stoolmiller & Blechman, 2005; Zamble & Quinsey, 1997). Among CSC's offender population, those with an alcohol dependency problem are more likely to commit a violent crime than offenders with an identified drug dependency problem. Conversely, drug dependent offenders are more likely to commit crimes of a property nature (e.g., robberies, break and enters, thefts, fraud) (Pernanen, Cousineau, Brochu & Sun, 2002). It has been argued that where alcohol use is associated with criminal behaviour, the intoxicating effects of alcohol often result in cognitive disruption and exacerbated physical aggression, which consequently leads to violent behaviour (Brochu, et. al, 2001). In contrast, where drug use is linked to criminal behaviour, the offences are often property or theft related and motivated by financial gain to finance the high price of illicit drugs (Brochu, et. al, 2001). Brown and Motiuk (2005) have found that drug abuse is a relatively stronger predictor of readmission than alcohol use for men, women and Aboriginal offenders. Research stemming from Canada has also shown that one of the major determinants of recidivism (i.e., criminal re-offending) is an existing substance abuse problem, with offenders with a "moderate" to "substantial" substance abuse problem returning to custody at higher rates than offenders with a "low" level problem (Lightfoot, 1999).

Substance abuse treatment programs, however, often mitigate the risk of recidivism and relapse to substance abuse by effectively targeting behaviours and cognitions that are related to criminal offending (i.e., addressing criminogenic need) (Andrews, 2001; Andrews & Bonta, 2006; Grant, Kunic, MacPherson, McKeown and Hansen, 2003). The approach of targeting criminogenic need is supported by the general personality and social learning perspective on criminal conduct (i.e., psychology of criminal conduct) (Andrews and Bonta, 2006). The perspective holds that an offender's risk and need factors, of a personal and interpersonal nature, are tied to immediate situations that exist within an array of behavioural settings. Once identified, the risk and need factors are matched to, and targeted by effective treatment services that aim to facilitate behaviour change and reduce the risk of re-offending (Andrews & Bonta, 2006). Improvements in post-release outcomes often occur through these specialized treatment programs, especially for higher risk offenders who actively participate in the full course of treatment (Wormith & Olver, 2002).

Moreover, research has shown that the most effective treatment services are those that are multi-modal or consider the ability, learning style and strengths (i.e. responsivity) of the participant such as “personality, ability, motivation . . . age, gender, ethnicity/race, language, and various barriers to successful participation in service[s]” because they facilitate active participation and engagement by the offender (Andrews, 2001, p. 11). In the case of Aboriginal offenders, programs and interventions that are grounded in Aboriginal traditions, spirituality and culture that strive to heal the individual in holistic terms, may facilitate rehabilitation efforts and enhance engagement, participation and retention of the participant in treatment.

Traditional Approaches to Healing and Recovery

Since the 1970’s, a variety of models and combinations of treatment approaches have been used to deliver wellness programs to Aboriginal peoples, particularly in the area of substance abuse treatment. Over the years, programs have relied on disease and genetic models; biopsychosocial, social learning and behavioural models; and environmental and moral approaches to facilitate treatment and the process of recovery with Aboriginal peoples. Some researchers suggest that the diversity of approaches reflected the need to reach a wider clientele (Hodgson, Hanki, Paul, Toulouse, & Jock, 1998). More recently, however, research and practice has begun to focus on the importance of incorporating cultural traditions and healing into treatment services for Aboriginal peoples (Aboriginal Healing Foundation, 2004).

In 2002, the ‘Creating Capacity & Skill for Therapeutic Safety in Healing Programs’ project - funded through the Aboriginal Healing Foundation, and sponsored by the Association of British Columbia First Nations Treatment Programs and the Nechi Training, Research and Health Promotion Institute - signalled the arrival of a comprehensive review of the literature on healing and wellness among Aboriginal peoples.³ Within their review it was noted that a number of studies underscored the importance of incorporating Aboriginal activities and traditions in the healing process for Aboriginal peoples. More (1985), for instance, found that individuals responded favourably to knowledge of traditional Aboriginal culture during the process of personal recovery and healing, including the acquisition and maintenance of Aboriginal language. Similarly, in a detailed examination of the process of healing, McCormick (1995)

³ For those wishing to read the literature review in its entirety should consult Chapter 2 of the Report on the Research Project exploring: The facilitation of healing for survivors of sexual and physical abuse in residential schools, including the intergenerational impacts and the cycle of abuse that began in residential schools or the original studies therein.

observed that healing generally reflected the strength of traditional approaches as evidenced by: participation in ceremony; expression of emotion; learning from a role model; establishing a connection with nature; engaging in exercise; involvement in challenging activities; establishing a social connection; gaining an understanding of the problem; establishing a spiritual connection; obtaining help and support from others; focussing on self care; setting goals; anchoring one's self in tradition; and helping others. McCormick's (1995) preliminary examination of healing outcomes (i.e., amelioration of severe problems and/or evidence of embarking on a healing journey) for Aboriginal peoples revealed an important connection between empowerment, cleansing, balance, discipline, and belonging. What is more, the study acknowledged that Aboriginal peoples share a different worldview, which must be understood before effective counselling services can be provided.

The concept of resiliency is closely tied to Aboriginal tradition and is of significant importance in the healing process (Dell, Dell, & Hopkins, 2005). Resiliency within an Aboriginal context can best be described as holistic, consisting of a balance between one's own ability to cope with stress and the community's capacity to support the individual's coping. The Spirit, which is central to the indigenous worldview and at the core of each individual, is what gives the individual strength to recover (Dell, Dell, & Hopkins, 2005). In turn, the community reinforces and sustains the wellness and strength (resiliency) of the individual through a number of processes and mechanisms, such as nurturing a strong sense of community and aboriginal identity; maintaining cultural traditions; contributing to the well-being of others; enhancing spirituality; living in a holistically healthy way, and surviving hardship (Plouffe, 2001; van Uchelen, Davidson, Quressette, Brasfield, & Demerais, 1997). In this way, Aboriginal traditions and processes recognize the intersecting roles between culture, spirituality, and community in maintaining the health of the individual (Dell, Dell, & Hopkins, 2005). It is through traditional practices that the individual and community members develop resiliency to cope within the mainstream environment (Axelson, 1985; Halfe, 1993).

The Aboriginal worldview is further evidenced in culturally-informed clinical practice. Illnesses, depression, anxiety and alcoholism have long been viewed by Aboriginal service providers (e.g., Aboriginal healers) as having originated from Spirit illness (Halfe, 1993; Hammerschlag, 1988). To heal the individual and the Spirit illness, Elders and Aboriginal healers rely on stories, shared cultural activities and traditional ideology to re-connect the

individual to his or her own culture and to develop in the individual a greater sense of self-understanding. With this formulation, traditional Aboriginal teachings and processes are considered essential in healing the individual in holistic terms.

Other research on effective treatment services for Aboriginals, particularly from the correctional context, has found evidence in support of integrating traditional healing methods with other contemporary treatment approaches to deliver more responsive services (Couture, 2000; Ellerby, 2002; Ellerby & Ellerby, 2000; Heckbert & Turkington, 2002; Trevethan, Moore & Allegri, 2005). It has been shown that the integration of contemporary best practices with culturally appropriate approaches (i.e., a blended approach) promotes healing and general well-being among Aboriginal offenders, and reinforces cultural values, which may later serve to mitigate risk for re-offending and sustain healthy community functioning (Ellerby & Ellerby, 2000; Trevethan, Moore & Allegri, 2005). A blended approach recognizes that addressing family of origin and developmental experiences, and teaching traditional culture are critical to the process of healing and maintaining wellness of Aboriginal peoples (Ellerby & Ellerby, 2000; Ellerby, 2002). It is generally accepted that for western therapies and models to be most effective with Aboriginal peoples, they must examine Aboriginal spirituality, incorporate traditional Aboriginal thinking and practice and understand the Aboriginal worldview (Duran & Duran, 1995; Dell & Lyons, 2007). Aboriginal scholars have consistently maintained that the role of traditional teachings and culture in the facilitation of wellness for, and resiliency of Aboriginal peoples must be regarded as the foundation on which treatment is grounded (Couture, 2000).

Building Capacity to Address the Needs of Aboriginal Offenders

Safe reintegration of Aboriginal offenders to the community through the delivery of effective interventions is one of CSC's priorities (Treasury Board of Canada Secretariat, 2008). Compared to the general population of offenders under CSC's jurisdiction, Aboriginal offenders continue to have higher rates for both violent and non-violent re-offending while on community supervision. A major objective for CSC, then, is to narrow the gap in the rate of re-offending between Aboriginal offenders and non-Aboriginal offenders through the application of effective reintegration services, such as the delivery of culturally-appropriate interventions that aim to address the offence patterns and unique need characteristics of Aboriginal offenders. The

importance of delivering culturally-appropriate programs to offenders is not only an objective espoused in the Strategic Plan for Aboriginal Corrections (CSC, 2006), it is also a law founded in the Corrections and Conditional Release Act which came into effect in 1992.

To date, several programs have been successfully implemented by CSC to address the needs of Aboriginal men and women (CSC, 2004a). The program, “In Search of Your Warrior” was introduced in 2003 to address the needs of Aboriginal men with a history of violent behaviour. The program focuses on the development of self-possession, spiritual self awareness, alertness, caring, endurance, patience, resilience, and discipline in order to assure a responsible way of life. Particular emphasis is placed on the development of self-awareness and cognitive skills so that the participant can identify strategies to better manage aggressive behaviour. Recent evaluative research of this program has confirmed its positive effects on short and intermediate-term outcomes. Program participation obviated the need for further correctional programming, and successful completion resulted in a greater chance for successful release to the community (Trevethan, Moore & Allegri, 2005). The Aboriginal Offender Substance Program (AOSAP) is the latest addition to CSC’s services for Aboriginal offenders and is the subject of this report.

The Aboriginal Offender Substance Abuse Program

Holistic Model of Recovery

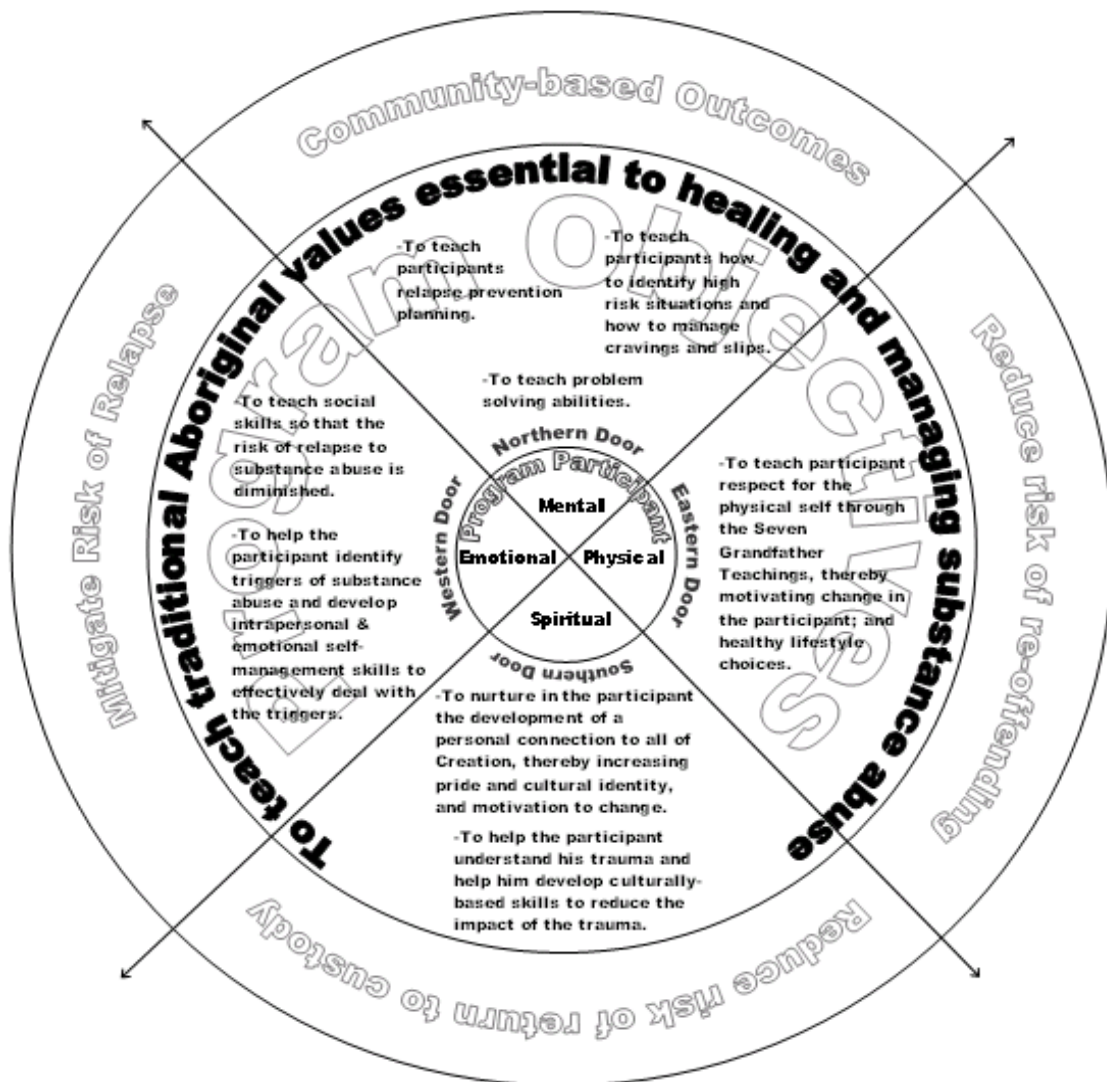
The Aboriginal Offender Substance Abuse Program (AOSAP) is designed to reduce the risk of relapse to substance abuse and recidivism by healing the individual in holistic terms. AOSAP is offered as a high intensity program for male Aboriginal offenders. However, Aboriginal offenders who require a moderate level of intensity may be referred to this program as an alternative to the moderate intensity National Substance Abuse Program.⁴ AOSAP recognizes diversity within Aboriginal cultures so it encourages the use of culturally-appropriate ceremonial traditions specific to First Nations, Métis and Inuit offenders and/or the territory in which the program is delivered.

⁴ Program intensity refers to the scope, sequencing and duration of treatment, and is related to the seriousness and persistence of an offender’s risk and need (CSC, 2003). Therefore, referrals to high, moderate and low intensity substance abuse programs are based on the severity of substance abuse problems as measured by the Alcohol Dependence Scale (ADS) (Skinner & Horn, 1984), the Problems Related to Drinking Scale (PRD), and the Drug Abuse Screening Test (DAST) (Skinner, 1982). Offenders with a substantial to severe problem require treatment in a high intensity program. Offenders with a moderate or low level problem require treatment in respective intensity levels. For a complete description of the referral process, the reader is referred to Kunic & Grant (2006).

Several treatment approaches are integrated into the program design, including a blending of strong cultural and traditional healing with contemporary best-practices, such as social learning (e.g., role modelling) and cognitive behavioural therapies (e.g., relapse prevention). Aboriginal ceremony and healing, protocol, sharing, and teachings of values and principles guide the process of program delivery. Accordingly, AOSAP uses a holistic model of program delivery. The model engages the client to process information experientially through all the senses such as listening, seeing, feeling, thinking, and speaking. The traditional holistic healing approach has as its core principles - connection and mutuality. The interconnectedness of these concepts is essential to the development of an individual within a collective society. It reflects the relationships that are inseparable from sense of identity, personal responsibility and social responsibility, e.g. self-with-self, and self-with-others (Couture, 2000).

The holistic approach used by AOSAP to address treatment targets and key objectives is depicted in Figure 1, the *Holistic Model of Healing and Recovery*. Briefly, the program's approach to healing and recovery is symbolized by the three concentric circles and the four quadrants or “doors” that cross-sect the circles. At the core or the centre, is the individual Aboriginal participant represented by the Physical, Spiritual, Emotional and Mental Aspects of the individual. The program objectives are depicted in the second concentric circle that envelops the core of the individual across the four quadrants symbolized by the Eastern, Southern, Western and Northern Doors. At the periphery are the overall or community-based program goals of reducing the likelihood of return to custody and/or a relapse to substance abuse.

Figure 1. AOSAP Holistic Model of Healing and Recovery



AOSAP Program Content

The first version of the program consisted of 31 sessions and was field-tested from November 2004 to June 2005 (Cycle 1). As a result of feedback from field staff and program participants, a restructured and improved second version, comprising 53 sessions, was delivered to participants from June 2005 to October 2006 (Cycle II). The final version of the program, 65 sessions in length, was launched in November 2006 (Cycle III). The final version, which

incorporated changes suggested by field staff and program participants, was considered an improvement over the previous two versions because it provided significantly more time for the delivery and processing of Aboriginal teachings and self-management concepts. All versions of AOSAP address substance abuse issues and criminal behaviour by blending traditional healing with contemporary best-practices in substance abuse treatment, such as cognitive-behaviourism, social learning theory and relapse prevention (Andrews & Bonta, 2006). The over-arching goal is to prepare the Aboriginal offender for a successful return to family, community, Nation and Canadian society as a law-abiding citizen.

The objectives for the third and final version of AOSAP are grouped within four treatment modules or directions⁵, spanning 65 sessions:

1. Motivation is addressed through Module I. This module, comprised of 12 sessions, presents the foundation of culture with specific emphasis on providing participants with an introduction to the program, the power of the circle of wellness, safety and self-care strategies, the importance of the physical aspects of self and traditional values and goals which are fundamental to Aboriginal cultures and healing.
2. Within the Southern Door (Module II – 24 sessions), Aboriginal spiritual engagement is facilitated through the introduction and exploration of the impact of trauma and how substance abuse was, and still is, a means by which Aboriginal people tried/try to cope with its effects. Participants are introduced to the triggers associated with substance use and other addictions. Issues of shame, anger, and violence are discussed in the context of behaviours that have been borne out of historical trauma and the experiences of Aboriginal peoples. The final session of the module, *Telling our Story through Masks*, is a powerful exercise that allows offenders to safely reflect on their own experiences so that they can establish and maintain healthy responses to trauma symptoms.

⁵ The directions are fundamental to understanding life, its purpose, and how to live. The directions are embedded in the Creation story, the Medicine Wheel teachings, and life lessons. Each direction has particular meaning, individually and collectively, and it is for this reason that the directions or doors play a significant role in the program. For example, the direction of the East represents the rising sun, the place of new beginnings, birth and rebirth, and the physical self. Hence, the directions, and more significantly, the Elders' teachings provide the ideal place to introduce the participants to culture and healing.

3. The Western Door (Module III), which is 14 sessions in length, focuses on the history of consequences and the impact of substance abuse within Aboriginal communities. This module is an essential component of the program because it helps the participant understand the many facets of alcohol abuse, drug abuse and other addictions within an Aboriginal context. The module also explores the devastating effects of substance abuse on Aboriginal individuals, families, and communities, and how changing individual behaviour can result in the restoration of health, pride and culture. Through active participation in this module, participants develop an awareness of the existing relationships between substance abuse and life problems, the linkages between substance abuse and criminal behaviour, and the skills that will diminish the risk of relapse to substance abuse.
4. Lastly, the Northern Door (Module IV), comprised of 15 sessions, delves into relapse prevention and planning. The module uses contemporary best-practices, augmented by traditional teachings and sacred medicines, to help the participant develop and refine the necessary skills that are required for successful community reintegration. Facilitators assist participants with the development of relapse prevention strategies and an individualized plan to effectively manage risk situations. During the final chapter of the journey, entitled “Celebration”, participants celebrate their journey in the program and reaffirm their commitment to healing and personal growth.

Method of Program Delivery

The program is facilitated by an Aboriginal Correctional Program Officer (ACPO) and a traditional Aboriginal Elder or Spiritual Advisor. Together the ACPO and Elder deliver the program material and guide the process. The Elder also prepares for, and conducts, ceremonial activities such as the Sacred Sweat as well as providing a holistic observation of the participant’s progress in treatment. In addition to the 65 group sessions (each lasting 2.25 hours), AOSAP provides for a minimum of four individual sessions (about 45 minutes each). The individual sessions are either conducted by the ACPO, Elder, or both. These sessions ensure that participants are able to understand the material. The individual sessions are also used to help the

participant make further refinements to the relapse prevention or healing/wellness plan, where required. When necessary, participants receive additional supportive counselling.

Traditional spiritual beliefs, practices (i.e., traditional ceremonies) are central to the healing process among Aboriginal cultures (Chansonneuve, 2007). Therefore, ceremonial activities are interwoven at key points including the opening and closing of the program. Offenders participate in a minimum of three additional ceremonial activities above and beyond those described in the program manual. The Elder uses the additional sessions to conduct a *Sacred Sweat* and *Pipe Ceremony* or any other ceremony appropriate to the season, territory, or circumstance. Participants complete homework assignments at frequent intervals throughout the program. These range from creating journal entries of their thoughts and feelings to preparing responses for particular questions. The main purpose of homework assignments is to allow the ACPO another means, in addition to classroom activities and the Elder holistic observation, to gauge an individual's commitment to the program, understanding of the material, and ability to apply the teachings. AOSAP, while subject to the same best-practices guidelines as other core programs offered by the Service, must take into consideration Aboriginal processes and meanings in addressing the needs of aboriginal men (Andrews & Bonta, 2006; Wanberg & Milkman, 1998). Healing is process-driven and requires respect for, and trust of, Aboriginal processes. Tradition dictates that the time must be right for healing to take place. Therefore, engagement and ceremony is dynamic, dependant on group and individual need, and can occur at any time.

Quality Review Process

In September 2004, the five core teams of AOSAP deliverers (Facilitator and Elder) - one team per CSC region - completed a comprehensive two week training and orientation to AOSAP. For the duration of the three year demonstration, an internal quality review process was in place to support program development, program integrity, effective program delivery and the full integration of research activities. Additionally, a management team (MT) was established so that key decisions could be made collectively. MT was comprised of the Addictions Research Centre, the Reintegration Programs Branch, and the Aboriginal Initiatives Directorate. Annual site visits were conducted to ensure effective program implementation, management support, staff awareness, appropriate program referral, and program responsivity. Any deficits were

immediately addressed. Each year, the teams reassembled to review progress and collectively advance research and development as well as program delivery requirements. Following the demonstration, the quality review process, as well as the actual program was transitioned to the Reintegration Programs Branch of CSC.

Hypotheses

A retrospective, closed, single cohort of Aboriginal, male offenders, who were released to the community on either day parole, full parole, or statutory release were examined to evaluate the effects of AOSAP participation on post-release outcomes over an 18 month follow-up period. If AOSAP reduced the likelihood of a return to custody following conditional release to the community, then the program's effectiveness with respect to mitigating the risk of revocation (and recidivism) will be confirmed. Other indicators of program success, such as the proportion of offenders who registered a positive urinalysis result while on release, were also examined to estimate the frequency and rate with which AOSAP participants relapsed to substance abuse once released to the community.

Recall that the demonstration version of AOSAP underwent changes after initial implementation. The first version of AOSAP was shorter in duration (31 sessions in length) than the second and third versions (53 and 65 sessions, respectively). Also, during the delivery of the first version of the program, staff and offender feedback led to refinements to the program content, such as the introduction of additional sessions to augment traditional teachings and the process of healing. Therefore, comparisons were made between the first version of AOSAP and subsequent versions of the program to examine differential effects on post-release outcomes. It was hypothesized that refinements to AOSAP contributed to better post-release outcomes for the participants who completed the second or third version of the program compared to participants who successfully completed the first version.

Because AOSAP considers the learning styles that are appropriate to Aboriginal culture and the strengths and needs of the participant, such as Aboriginal teachings and holistic healing, spirituality and traditional Aboriginal culture, it was hypothesized that AOSAP - irrespective of version - was more effective than the moderate (M) and high (H) intensity National Substance Abuse Programs (NSAP) in addressing need, and therefore more effective in reducing the

likelihood of a return to custody (i.e., revocation with or without an offence).⁶ Similarly, it was believed that Aboriginal offenders who participated in the full course of treatment in either of the AOSAP versions or NSAP were revoked at lower rates than Aboriginal offenders who did not complete the full course of either of the AOSAP versions or NSAP. Where necessary, AOSAP participants were compared to the sixth group, (i.e., the general cohort of Aboriginal releases who did not participate in an institutionally-based substance abuse program) to examine differences in post-release outcomes.

Additionally, it was anticipated that fewer Aboriginal offenders who successfully completed AOSAP were revoked because of a new offence or an outstanding charge when compared to the other groups of Aboriginal offenders.⁷ In contrast, it was predicted that, of the AOSAP participants who were revoked, a larger proportion of them were revoked because of a technical violation instead of a revocation because of a new offence or charge when compared to Aboriginal offenders from the other four groups who were revoked.

Community-based urinalysis results were also examined across the seven groups to determine the effects of program exposure on post-release substance use. It was hypothesized that AOSAP participants who successfully completed versions 1, 2 or 3 tested positive for illicit and licit substances at a lower rate than offenders from the other program exposure categories, after adjusting for the effects of other covariates.

⁶ Both Aboriginal and non-Aboriginal Offenders can participate in the high intensity (H) or moderate intensity (M) National Substance Abuse Programs (NSAP) prior to conditional or statutory release. Both NSAP intensity levels are based on social learning theory, relapse prevention therapy and cognitive behavioural therapy, and are designed to reduce the risk of relapse to substance abuse and re-offending (CSC, 2004b). However, they do not incorporate Aboriginal teachings and processes. The moderate and high intensity programs are delivered over a series of two hour group sessions (26 and 89 sessions, respectively). Both intensity levels offer pre-release maintenance and “booster” (refresher) sessions. Once successful participants of NSAP and AOSAP are released to the community, they can participate in a community-based maintenance program.

⁷ A revocation due to a charge or a new offence is considered more serious than a technical violation of a condition (CSC, 2007 October 11).

Study Design

Cohort

Of the Aboriginal men who were admitted to federal custody and completed the OIA between 2001 and 2005, 2685 were released to the community on day parole, full parole, or statutory release and were available for the follow-up period⁸. The time period spanning 2001 to 2005 was chosen because most of the AOSAP participants were admitted to federal custody and completed the OIA during this time period.

A total of 94 (3.5%) of the Aboriginal men in the release cohort fully or partially participated in AOSAP and 423 (15.6 %) participated in NSAP (see Table 1).⁹ Approximately 80% of the participants who started either version of AOSAP or who started NSAP-H were retained for the full course of treatment. In contrast, about 90% of the offenders who started NSAP-M completed it. The remaining 2,178 (81%) of the Aboriginal men did not participate in institutionally-based AOSAP or NSAP interventions (see Table 1). The average age at the time of admission to federal custody was 30.9 (*Mdn* = 29.0, *SD* = 9.6) with an average sentence length of 1123 days (*SD* = 543). The majority of Aboriginal offenders were released on statutory release (see Table 1). The release cohort was comprised of individuals from the Atlantic (4%), Quebec (6%), Ontario (12%), the Prairie (63%), and Pacific regions (15%) and the majority were of North American Indian ancestry, followed by Métis, and Inuit (see Table 1). Two of the participants who participated in AOSAP were identified as Caucasian within the Offender Management System (described hereinafter).

⁸ For each offender, follow-up was restricted to the period between the release date and the warrant expiry date or between the release date and the end of the study period (July 25, 2007) for the offenders whose warrant expiry date exceeded the end of the study period.

⁹ Recall, that AOSAP was phased-in as a demonstration project in 2004 so fewer offenders had an opportunity to participate in the program. Consequently, fewer offenders who participated in AOSAP were available for post-release follow-up compared to NSAP-H and NSAP-M programs.

Table 1

Distribution of Release Cohort by Substance Abuse Program Exposure Category, Ancestral Background, and Type of Release from Custody

Substance Abuse Program Exposure Categories % (n)					
Status	AOSAP Version 1	AOSAP Version 2&3	NSAP High Intensity	NSAP Moderate Intensity	Other ^a
Full Program Exposure	79.1	80.4	79.2	89.5	
Incomplete Program Exposure: ^b	20.9	19.6	21.8	10.5	
Suspended or Incomplete	16.3	19.6	19.2	8.7	
Transferred or Released	4.7	0	2.6	1.8	
Ancestry					
North American Indian	74.4	72.5	69.4	66.9	70.1
Métis	14.0	23.5	29.0	28.6	26.0
Inuit	9.3	2.0	1.6	4.5	3.9
Caucasian	2.3	2.0	0	0	0
Release Type					
Day Parole	23.3	27.5	19.0	28.8	35.1
Full Parole	4.7	2.0	1.3	2.6	3.9
Statutory Release	72.0	70.5	79.7	68.6	61.0
Total	1.6 (43)	1.9 (51)	2.9 (79)	12.8 (344)	80.7 (2168)

Note. Blanks indicate that estimates were not applicable. ^aCategory is comprised of the release cohort of Aboriginal men who did not participate in AOSAP or NSAP. ^bPercentages for the total number of incomplete exposures represent the proportion of offenders who started the program but did not complete it.

N = 2685

Data Sources

Dynamic factor and static factor ratings from the OIA and other administrative data, such as successful program completion, demographic information, release/readmission information and supervision violations, were extracted from the Offender Management System (OMS). CSC uses OMS to maintain all offender records and to manage offenders from sentence commencement to sentence end. The system captures a wealth of information that includes, but is not limited to the following: demographic information, other offender characteristics across a number of life areas, all admission and release records, assessments for decision-making purposes, reports on offender performance, and related records.

Potential Covariates of Post-release Outcome

OIA Dynamic Factor Rating

The OIA dynamic factor analysis is conducted by the institutional parole officer within the first 90 days after an offender's admission to federal custody. Through interview(s) with the offender and in-depth analyses of information from collateral sources, such as police agencies, family members, professionals from other jurisdictions, the institutional parole officer confirms the presence of specific indicators which relate to the following seven domains of criminogenic needs: education/employment, marital/family relationships, associates/social interaction, community functioning, substance abuse, personal/emotional orientation, and attitude.

The total number of identified need indicators is as follows: education/employment (35 indicators), marital/family (31 indicators), associates/social interaction (11 indicators), substance abuse (29 indicators), community functioning (21 indicators), personal/emotional orientation (46 indicators) and attitude (24 indicators). The indicators are structured as questions with a dichotomous response format ("yes" = presence of a problem; "no" = absence of a problem). This allows for the efficient identification of specific problems within each domain area. The information is electronically stored in an offender record within OMS. For each domain, OMS scores the number of responses and the parole officer ranks the domains in order of priority (the higher the score the higher the priority). For example, the domain of education/employment consists of 35 indicators of instability within the areas of education and employment. A "yes" response to any one of the 35 indicators warrants a score of one for a maximum score of 35 for this domain. The higher the number of yes responses, the more instability within the domain and the higher the priority ranking for the domain.

Parole officers use the results from this exercise and other case specific information to establish an overall need rating for each domain. A total of four possible ratings on need can be assigned for the domains of education/employment, marital/family, associates/social interaction, community functioning and attitude: "asset", "no need for improvement", "some need for improvement" or "considerable need for improvement". Only three of the four need ratings can be assigned for the domains of substance abuse and personal/emotional orientation: "no need for improvement", "some need for improvement" or "considerable need for improvement". Where necessary (for descriptive purposes) need ratings across all dynamic factors were collapsed into two categories: 1) the group of offenders with no need for intervention comprised of the "asset"

and "no need for improvement" groups; and 2) the group with an identified need for intervention consisting of offenders with ratings of "some" or "considerable" need for improvement on the dynamic factors. The original need ratings were used for all modelling procedures.

Considerable research, demonstrating the OIA's validity and reliability, has been conducted since its phase-in during the early 1990s. Motiuk and Brown (1993) examined the ability of the OIA to predict post-release suspensions (i.e., returns to custody on a suspension) in a sample of 604 federally sentenced adult offenders (573 males; 31 females). They found that each of the seven dynamic factors was significantly related to having a suspension warrant issued during the first six months after release from custody. The strongest indicators in terms of predictive validity were: unstable job history, criminal friends and acquaintances, associates with drinkers/drug abusers, relations with others are exploitative, poor financial management, unable to set goals, low empathy, impulsiveness, difficulty controlling temper, copes poorly with stress/frustration, and unable to work towards life goals (Motiuk & Brown, 1993).

Motiuk (1997) presented additional evidence in support of the OIA's validity by demonstrating that the number of positively endorsed indicators within a given domain (i.e., the number of indicators scored as 'yes') was strongly associated with the domain rating. For instance, the number of indicators scored as 'yes' within the substance abuse domain was correlated .78 with the substance abuse domain rating. For all other domains, correlations ranged from a low of .54 for community functioning to .78 for substance abuse. This analysis demonstrated that the OIA was being used in the manner in which it was originally intended. That is, parole officers were using the individual indicator endorsements to guide their overall rating of offenders on a given domain.

Building on previous research, Motiuk (1998) found that all seven OIA domains were significantly associated with a return to prison. The most powerful predictors of post-release outcome (in order of magnitude) were the domains of employment, substance abuse, associates, marital/family and personal/emotional.. Recently, Brown and Motiuk (2005) conducted a meta-analytic, psychometric and consultative review of the OIA indicators and found OIA valid in terms of its ability to predict re-offending. Offenders who were rated with more serious problems across all seven domains were more likely to be returned to custody during a three year follow-up in the community.

Substance Abuse Program Intensity Rating

The Computerized Assessment of Substance Abuse (CASA) is a supplementary assessment to the OIA (Kunic & Grant, 2006). CASA administers the 25-item Alcohol Dependence Scale (ADS) (Skinner & Horn, 1984), the 15-item Problems Related to Drinking Scale (PRD)¹⁰ and the 20-item Drug Abuse Screening Test (DAST) (Skinner, 1982) to establish the severity of substance abuse problems and program intensity. The ADS and DAST have been extensively used with a number of special populations, including offender populations, to assess severity of substance abuse (Boland, Henderson & Baker, 1998; Yudko, Lozhkina & Fouts, 2007).

The Alcohol Dependence Scale (ADS) (Skinner & Horn, 1984) consists of 25 items that are designed to tap into the alcohol dependence syndrome (Edwards & Gross, 1976). The ADS provides a measure of the extent to which the use of alcohol has progressed from psychological involvement to impaired control. Empirically derived severity levels of none (0), low (1-13), moderate (14-21), substantial (22-30) and severe (31-47) are used to differentiate cases for program referral purposes. Case differentiation is supported by previous research with the scale (Skinner & Horn, 1984). The ADS boasts excellent internal consistency and external validity (Skinner & Horn, 1984). Cronbach's alpha values range from 0.85 to 0.94, which indicate excellent reliability (Boland, Henderson & Baker, 1998). External validity is supported by the scale's strong association with other measures of alcohol-related instability including psychological, medical, and legal problems, and subjective feelings of loss of control over alcohol (Skinner & Horn, 1984; Boland et al., 1998). The scale is considered unidimensional. Previous research has supported its clinical utility within a correctional context (Hodgins & Lightfoot, 1988, 1989). The ADS references the "*12 month period prior to arrest*" to establish a severity rating.

The 20 item DAST is used to assess the severity of problems associated with drug use. Quantitatively derived severity levels of none (0), low (1-5), moderate (6-10), substantial (11-15) and severe (16-20) are based on normative data for the scale (Robinson et al., 1991). These severity levels are used to differentiate cases for program-referral purposes. The DAST includes items concerning the frequency of use, symptoms of dependence, extent of drug-related

¹⁰ PRD was derived from the Michigan Alcohol Screening Test (Selzer, 1971). It has been used by CSC since the early 1990s to assess the extent of alcohol-related problems.

problems, feelings of guilt and prior treatment (Boland et al., 1998). A dichotomous response format is used with each "yes" endorsement warranting a score of one. Previous psychometric work has established the reliability and validity of the DAST (Yudko, Lozhkina & Fouts, 2007). Cronbach's coefficient alpha values range from 0.85 to 0.94, which indicates excellent reliability (Boland et al., 1998). External validity is supported by the scale's strong association with other measures of drug-related instability (e.g., frequency of use, psychopathology). Previous research has also supported its clinical utility within a correctional context (Hodgins & Lightfoot, 1988, 1989). The DAST references the "*12 month period prior to arrest*" to establish the severity of drug abuse problems.

The CASA currently uses the same program referral criteria as OMS to match offenders to appropriate program intensity levels. Highest classification level on the ADS, DAST or PRD dictates program intensity level (see Table 2). The five-category case-classification system, which ADS and DAST use, is supported by previous research examining the validity of the ADS and DAST within clinical populations (Skinner, 1982; Skinner & Horn, 1984).

Table 2

OMS Program Referral Matrix

PRD Cut-off Scores	0	1-3	4-6	7-15	
Problems related to drinking	None	Some	Quite a few	A lot	
Recommended Program Intensity based on PRD Levels^a	None	Low		High	
ADS Cut-off Scores	0	1-13	14-21	22-30	31-47
DAST Cut-off Scores	0	1-5	6-10	11-15	16-20
Severity Level based on ADS/DAST cut-offs	None	Low	Moderate	Substantial	Severe
Recommended Program Intensity Level based on ADS & DAST^b	None	Low	Moderate	High	

^aThe PRD dictates program intensity level only when the ADS and DAST suggest a lower program intensity level than the PRD. For example, the PRD determines referral to the high intensity program only when offenders are rated as "a lot" on the PRD *and* moderate or lower on the ADS and DAST. Kunic & Grant (2006) previously found that approximately 2% fit this profile. ^bHighest severity level on the ADS or DAST establishes overall substance abuse severity level of none, low, moderate, substantial or severe. This severity level is then used to establish program intensity.

OIA Static Factor Rating

The OIA static factor rating is used to establish risk of recidivism for Aboriginal offenders (referred to as "risk of recidivism rating" hereinafter). The risk of recidivism rating is based on the criminal history record (CHR), the offence severity record (OSR) and the sex offence history (SOH). The CHR investigates the significant factors related to the offender's involvement with the criminal justice system such as the number of youth and adult court convictions. The OSR measures the nature and degree of psychological and physical harm inflicted on the victim(s) and on society. And the SOH looks at the nature and extent of sexual offending, if any, and the extent of victim harm. It also highlights involvement in any prior sex offender assessment, treatment and/or intervention activities.

Once all questions are completed by the parole officer, OMS automatically scores the number of dichotomous yes/no responses from the CHR, OSR and the SOH and tabulates a rating for each of the three areas. A point is assigned for each "yes" response. Generally, the higher the number of "yes" responses, the greater the risk of recidivism. A level of intervention of either "low", "moderate" or "high" is assigned by the institutional parole officer based on the results from this static factor analysis (i.e., analysis of the CHR, OSR and the SOH). The analysis considers the extent of involvement in the criminal justice system, the degree of harm to

victims and society, and the presence of a sexual offence history.

Age at Admission to Federal Custody

The age category indicator is based on statistically-derived quartile ranges. The first category (i.e., the first 25% of the observations) includes offenders 23 years of age or younger. The second age quartile includes offenders between the ages of 24 and 29 and the third is represented by offenders ages 30 to 37. The fourth quartile is comprised of offenders 38 years of age or older.

Substance Abuse Program Exposure Category

Once an offender completes a substance abuse program, OMS is updated to reflect “successful completion”. If the offender should fail to complete the program, OMS is updated to reflect this same status (e.g., “suspended”, “withdrawn”). Offenders who did not complete the program for administrative reasons (e.g., transfers, releases) or because of offender-specific reasons (e.g., withdrawals, suspensions) were categorized as "unsuccessful" participants for the purposes of this research because of the small number of offenders who did not complete the program due to administrative circumstances. All other offenders who successfully completed NSAP high intensity, NSAP moderate intensity or AOSAP were categorized into their respective groups.

Indicators of Outcome

Release and Revocation

Revocations occur if the offender has failed to meet the conditions of his or her conditional release or statutory release or if a new offence has been committed.¹¹ Failure to meet the conditions of release results in a technical violation when the supervising parole officer and the National Parole Board believe that the offender's behaviour can no longer be managed in a way that ensures the safety of the public and the offender. Offenders who are in violation of

¹¹ Type of release is an indicator of the level of risk the National Parole Board (NPB) perceives the offender to present to the community. Offenders may be granted a conditional release – either day parole or full parole - before they have served two-thirds of their sentence, or a statutory release when they have served two-thirds of their sentence. Full parole may be granted to an offender by the NPB or a provincial parole board which allows the offender to serve a portion of the sentence in the community while under supervision. Statutory release is normally a non-discretionary form of legislated release that the CSC and the NPB are obligated to follow unless there is sufficient evidence to support the custodial detention of the offender.

their conditions are revoked if their risk can no longer be managed in the community. Revocation with a new offence occurs when the offender is charged and convicted of committing a new offence while on discretionary or statutory release. For the purposes of this research, only offenders who were released on day parole, full parole or statutory release were included in the release cohort of Aboriginal men.

Community-based Urinalysis Results

The collection and laboratory testing of urine to detect substances of abuse is a well-established technology that has been used in a variety of settings to monitor and deter drug use (MacPherson, 2004). The collection of urine is supervised to reduce the possibility of an offender's attempt to alter or falsify the urine sample and the dates and times of sample collection are irregular. However, if the sample cannot be collected without prior notification, the offender may be informed no longer than 24 hours in advance of the sample.¹² A positive result for a specific drug usually indicates current or recent use.¹³ Tests that were administered after release from custody, but before re-admission to custody or before the end of the study period - whichever was the case - were analyzed to estimate relapse to substance abuse. For the purposes of this research all post-release urinalysis results were analyzed to look for evidence of substance use and the type of drug(s) found for those offenders who were tested.

Procedures

Predicting Revocations and Relapse to Substance Abuse

Recall that the Aboriginal offenders who were exposed to version 2 or 3 of AOSAP were compared to the Aboriginal offenders who were exposed to version 1 of AOSAP, to NSAP high intensity, NSAP moderate intensity, program non-completers or the group of Aboriginal offenders who were not exposed to substance abuse programs. If AOSAP reduced the likelihood of a return to custody following conditional release to the community, then the program's effectiveness with respect to mitigating risk of recidivism was confirmed. AOSAP version 1 was

¹²Despite precautions, the possibility of cross-reactivity with other licit drugs or compounds that are imbibed for therapeutic purposes can confound the results leading to false-positives or false-negatives. Offenders can also attempt to alter their results by consuming an excess of liquids prior to testing. Dilution through this method potentially reduces drug concentration resulting in false-negatives (MacPherson, 2004).

¹³ A negative urine sample does not necessarily indicate an absence of recent use of some drugs, such as cocaine or opiates, which have relatively fast clearance rates in urine. It can only be stated that the individual has not used in the past 1-3 days. On the other hand, for chronic users of THC, a positive urinalysis for THC is not conclusive evidence of recent use because the detection time in urine is much longer (MacPherson, 2004)

compared to the following six groups within a statistical model to assess program effectiveness:

1. Aboriginal offenders who completed either version 2 or 3 of AOSAP.
2. Aboriginal offenders who participated, but did not complete AOSAP.
3. Aboriginal Offenders who successfully completed NSAP-H.
4. Aboriginal Offenders who successfully completed NSAP-M.
5. Aboriginal offenders who participated, but did not complete NSAP at the moderate or high intensity levels.
6. The group of Aboriginal offenders who did not participate in AOSAP or NSAP prior to release.

An extension of the statistical modelling procedure was also applied to the repeated events, community-based urinalysis data, the details of which are described in a succeeding section.

Modelling Procedure

A multivariable, Cox proportional hazards model was used to determine the effects of AOSAP on the rate of failure. A post-release failure was defined as the first revocation (with or without a new offence) after release from custody. The first release after participation in a substance abuse program was chosen to establish the start of the community-based follow-up period. If a member of the cohort did not participate in a substance abuse program, then the first release after completion of the OIA was chosen.

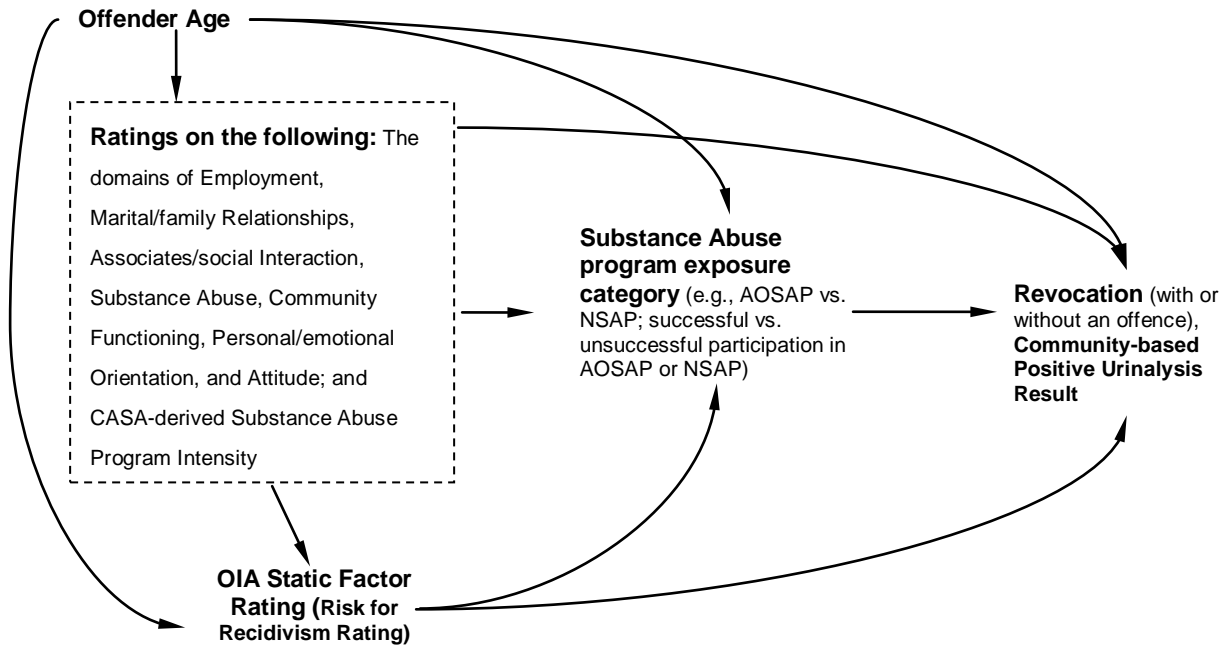
The “hazard ratio”, which the Cox Proportional Hazards model produces, provides a measure of the likelihood of revocation (i.e., the hazard of revocation) for Aboriginal offenders who successfully completed version 1 of AOSAP (considered the reference category) relative to the hazard of revocation for the other six groups of Aboriginal offenders. The hazard ratio provides a measure of program effect, after adjusting for the effects of other covariates on the hazard for failure, such as OIA-derived dynamic factor ratings and risk for recidivism ratings. For example, if the hazard ratio is 2.0, then the rate of failure (e.g., registering a revocation, or a positive urinalysis result) for one group of Aboriginal offenders is twice the rate of the "reference" group of Aboriginal offenders who completed version 1 of AOSAP, after adjusting for the effects of other covariates on the outcome. In other words, one group is twice as likely as

the reference group to fail at any point during the 18 month period. Conversely, a hazard ratio of 1.0 indicates no difference in hazard between the reference category and the comparison category.

The hypothetical causal diagram, which illustrates the potential relationships between covariates and between individual covariates and the outcomes, is presented in Figure 2. Offender age at admission to federal custody, the seven OIA domains and CASA's rating of substance abuse program intensity were believed to be related to risk of recidivism rating, revocation (the outcome), and substance abuse program exposure.¹⁴ Therefore, the multivariable Cox proportional hazards model adjusted for the effects of age, dynamic factor ratings, and CASA's program intensity rating. Similarly, the risk of recidivism rating was believed to be related to substance abuse program exposure and the outcome, so its effect was adjusted by the model to isolate the impact of program participation on the outcome. The same covariates were believed to be related to community-based positive urinalysis results.

¹⁴ CASA's rating of substance abuse severity and program need informs the dynamic factor analysis for the substance abuse domain within OIA. These two potential covariates (i.e., CASA's rating of program need and OIA's rating on the substance abuse domain) provide a duplication of information. Therefore, each covariate was included in the model separately to establish which was more informative in terms of predicting the outcome. The more informative covariate was retained in the final model.

Figure 2. Hypothetical causal diagram examining the effects of AOSAP and other predictors on post-release outcomes



Note. The dashed box which outlines the group of factors is used to simplify the diagram. The unidirectional arrows between the predictors (factors) in the dashed box and other predictors (e.g., static factor rating) indicate that a link may exist between the predictors in the dashed box and other predictors in the causal path diagram.

AOSAP Versions: Comparing Post-release Outcomes

Recall that additional comparisons were made between the first version of AOSAP and subsequent versions of the program. It was hypothesized that refinements to AOSAP contributed to better post-release outcomes for the participants who completed the second or third version of the program compared to participants who successfully completed the first version.¹⁵ Therefore, the Cox proportional hazards model included comparisons between successful participants of the first version of AOSAP and the combined group of successful participants of the second and third versions. If there was no statistical difference between AOSAP versions, program participants from the AOSAP groups were combined into one group and compared to the other groups within a second model.

¹⁵ Second and third versions were collapsed into the same category because both were substantively different from version 1. Also, the small number of offenders who comprised the two groups precluded separate categorizations.

Statistical Analyses¹⁶

Tests of Significance and Strength of Association between Covariates and Outcomes

Where necessary, chi-square and measures of strength of association were used to augment the presentation of descriptive information. To test for significance and strength of association between covariates of a nominal nature, Pearson's chi-square and Cramer's-V statistics were employed. Cramer's *V* coefficients approximating values of 0.10, 0.30 and 0.50 or greater indicated a "weak", "moderate" and "large" effect, respectively (Keppel, Saufley, Kokunaga, 1992). For covariates of an ordinal nature, the Mantel-Haenszel Chi-square and the Spearman's correlation statistics were used to test for significance and strength of association. The same guidelines for the interpretation of Cramer's *V* applied to interpretations of the Spearman's correlation coefficient.

Survival Analysis: Modelling Revocations

SAS's TPHREG and PHREG procedures (SAS, 2004) were employed to model the hazard of post-release failure using Cox proportional hazards modelling.¹⁷ Manual selection was used to determine each covariate's contribution to the model and effect on the outcome because the authors could factor in other considerations in the selection process (e.g., the possibility of one variable masking the effects of another variable). A covariate was retained in the model if its inclusion satisfied one or more of the following criteria:

1. Its coefficient was significant at a liberal p-value of less than .10.
2. If its presence produced changes of 20% or more in another covariate's coefficient, indicating the presence of a confounding effect (Dohoo, Martin & Stryhn, 2003).
3. Its inclusion resulted in significant interactions with the model's main covariate (program exposure status).

¹⁶ All data management, data transformations, and statistical analyses were performed with the SAS Version 9.1 software (SAS, 2004).

¹⁷ A multivariable approach was chosen over *a priori* subject matching (e.g., propensity score matching, exact matching) as a method for controlling confounding and reducing bias because the former produces similar results and also allows for the examination of the effects of other covariates on the outcome. Also, study participants are less likely to be lost because of an inability to find controls who have the same distribution of matching factors as the study participants (Cepeda, Boston, Farrar, & Strom, 2003; Dohoo, Martin, & Stryhn, 2003; Shah, Laupacis, Hux, & Austin, 2005).

The median covariate method of generating adjusted survival curves was used to create predicted probabilities of remaining in the community (survival) for each level of substance abuse program exposure. The method applies the median value of each covariate to the proportional hazards regression equation to estimate covariate-adjusted survival curves/functions (Hosmer, Lemeshow, & May, 2008; L. Rothman, SAS Canada, personal communication, January 21, 2008).¹⁸ With this method each covariate is held constant across program exposure categories, while the procedure produces monthly predicted probabilities of survival for the full follow-up period.

Assessments of the proportional hazards assumption, an examination of the effect of influential observations on parameter estimates, and a goodness of fit test were also conducted to confirm model validity. These model diagnostics procedures are presented in Appendix A.

Survival Analysis: Predicting Community-based Positive Urinalysis Results

In order to investigate the explanatory variables of relapse to substance use, the community-based urinalysis test results were modelled as ordered repeated events data. The method is referred to as the Prentice Williams Peterson (PWP) approach (Hosmer et al., 2008). PWP is considered an extension of the Cox proportional hazards model (Allison, 1995), so the same model-building steps, model diagnostics and interpretations of the parameter estimates apply (see preceding section and Appendix A), except that a goodness-of-fit test for multiple events data does not exist (Hosmer et al., 2008).

The PWP approach treats each time period between successive events (defined as positive urinalysis test) for a given offender as a separate observation in the dataset. Thus, an offender with three events will contribute four observations: time to first event, time from first event to second event, time from second event to third event, and time following the third event to the end of the study period (Woodward, 2005). Consequently, some offenders will contribute more observations to the dataset than others because the actual number of observations will depend on the number of events during the follow-up period.

The PWP model is considered conditional inasmuch as study subjects are not at risk for a subsequent event until a prior event has occurred; and the first, second and third, events, etc., are

¹⁸ The median method was preferred over the mean method because it returned values that were reflective of the typical covariate patterns observed in the study sample.

analyzed in separate strata (Hosmer et al., 2008). The total number of events was restricted to less than 4 and the total number of negative tests was restricted to less than 9 to avoid basing estimates on a few extreme observations in which offenders registered more than 4 and 9 positive and negative results, respectively.¹⁹ Some tests detected more than one type of drug ($n = 355$). A specific test that detected more than one drug was treated as a single positive result for purposes of the modelling procedure. A total of 11 observations were excluded from the modelling procedure because the first test date coincided with the release date (i.e., these observations were considered left truncated because they did not exceed the minimum follow-up time of one day). As a result of the restrictions and exclusions, 86% ($N=5075$) of the observations were retained for the modelling procedure.²⁰ The dataset is structured in a counting-process style format where each data line corresponds to a new risk set for each offender. The offender enters into a new risk set upon an event (see stratification variable, Table 3).

Table 3 provides the data layout for one offender from the study sample who underwent urinalysis testing while on supervision. Offender CNV503 was in the risk set for all tests occurring between 0 and 219 days. This offender contributed positive or negative tests results, which were defined by the risk sets 65, 83, 146, 166, and 196. The start and stop variables refer to when a test was administered from the time of release (as was the case for the first row for each offender) or since the last test was administered (as was the case for all subsequent rows for the same offender). The *start* and *stop* variables define the risk interval. The variable, *number of positives* (stratification variable) includes the number of positives up until, but not including the current risk interval. The *number of negatives* refers to the number of negative tests since the last positive test result (or since release if there were no positive results) up until, but not including the current risk interval. The *number of negatives* and the *number of positives* variables were included in the model, along with the covariates identified in Figure 2, to adjust for their potential effects on the hazard of a positive urinalysis result.

¹⁹ With restriction, the model produced stable estimates for the majority of offenders (85% of the observations), rather than estimates that are based on a few extreme observations (i.e., those with a relatively greater number of negative and/or positive tests).

²⁰ All 5883 observations were retained for all descriptive analyses of the urinalysis data.

Table 3

Data Layout for Recurrent Community-based Urinalysis Testing

Offender ID	Start (days)	Stop (days)	Positive	Number of Positives (stratification variable)	Number of Negatives
CNV503	0	65	1	0	0
CNV503	65	83	1	1	0
CNV503	83	146	1	2	0
CNV503	146	166	0	3	0
CNV503	166	196	1	3	1
CNV503	196	219	0	4	0

In a usual regression model it is assumed that errors for each observation are independent and follow an appropriate distribution (Dohoo et al., 2003). With repeated events data, multiple observations for a given offender are dependent and therefore violate the assumption of independence between observations. To correct for this, a robust sandwich estimate, clustered on offender, was used for the covariance matrix of parameter estimates, which results in robust standard errors for the parameter estimates. The robust sandwich estimate usually produces a larger standard error and a wider confidence interval for the parameter estimate than the usual variance estimates, but has no impact on the point estimate for the parameter (Dohoo et al., 2003). The robust standard error estimate and the associated *p-value* was used to select significant covariates of the hazard of testing positive on a urinalysis test (i.e., relapse to substance use).

Although the authors made every effort to control for sources of bias such as adjusting for the effects of testing (e.g., the number of positive and negative test results), the data from the community-based urinalysis testing may have produced a type of selection bias. Unlike institutionally-based random urinalysis testing in which 5% of offenders in custody are randomly selected for urinalysis each month (MacPherson & Fraser, 2006), offenders are *not* randomly selected for community-based testing. Testing is part of the supervision process and is used to monitor released offenders and to deter drug use if/when there is reason to believe that an offender is at risk of using substances of abuse. Consequently, a greater proportion of higher risk, higher need Aboriginal offenders from the release cohort were tested to monitor and deter

drug use. The greater likelihood of being tested may have had a deterrent effect for the higher risk/higher need Aboriginal offenders, thus reducing the rate of positive urinalysis results for this group. As a result, fewer significant covariates of the outcome may have been identified. Equally, fewer Aboriginal offenders from the release cohort with lower need/lower risk were tested, so estimates were based on relatively fewer Aboriginal offenders, which may have introduced some instability in the estimates.

Results

Introduction

The presentation of results spans three sections and generally parallels the statistical analyses that were performed to address the central hypotheses of the study.

1. The first section presents the results from the descriptive analyses, which highlight some of the characteristics of the Aboriginal cohort of releases, such as level of need identified for each domain, ratings of risk of recidivism, overall need ratings, and the distribution of these covariates across program exposure categories.
2. The second section concentrates on post-release outcomes for the different program exposure categories. Results from two Cox proportional hazards models are presented, which compare post-release revocation rates over the follow-up period for the program exposure categories. Comparisons were made after adjusting for the effects of other covariates on the hazard for failure.
3. The third section examines community-based indicators of performance, such as the frequency of technical violations, the rates of positive urinalysis results, and the kinds of drugs that were detected so as to approximate the effects of program exposure on substance use, specifically, and on post-release performance, generally. Other descriptive information relating to urinalysis testing (e.g., frequency of testing, percentage of positive results, etc., across potential covariates of the outcome) is also presented to augment the results from the PWP Cox proportional hazards model.

1. Measures of Association between Covariates

Need and Risk for Recidivism

Over 90% of the release cohort required intervention within the domain areas of substance abuse and personal/emotional orientation (see Table 4). In contrast, only 37% required intervention with the domain of community functioning. The majority of offenders required intervention within all other domains.

Table 4

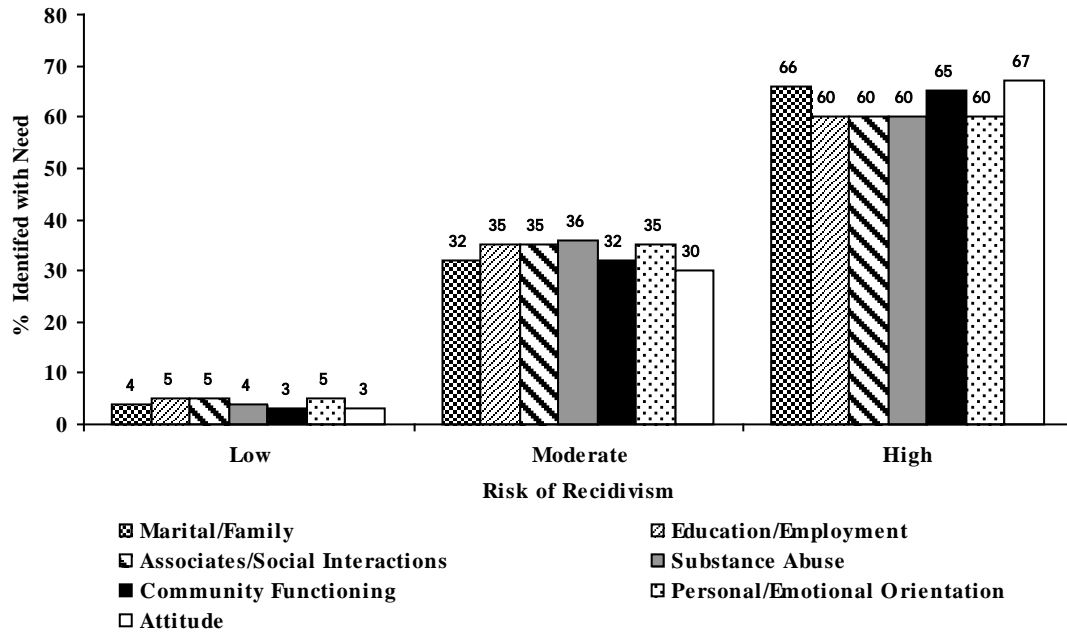
Distribution of Dynamic Factor Ratings for the Aboriginal Release Cohort (N=2683)

Dynamic Factor Rating	Domain Area %						
	Marital & Family	Education & Employment	Associates & Social Interactions	Substance Abuse	Community Functioning	Personal & Emotional Orientation	Attitude
Asset	1.6	2.1	0.9		1.1		1.7
None	41.5	24.4	27.1	9.8	61.8	6.9	39.4
Some	33.0	55.2	46.8	17.5	31.2	28.3	33.5
Considerable	23.8	18.3	25.2	72.7	5.9	64.8	25.4

Note. The personal/emotional orientation and substance abuse domains cannot be rated as an asset. Two observations were lost due to missing values on one or more of the dynamic factors ratings.

Of the 2,683 Aboriginal offenders who were released, approximately 6% ($n=166$) were rated low risk for recidivism, 36% ($n=971$) were identified as moderate risk and 58% ($n=1546$) were identified as high risk. When the distribution of needs were examined across risk categories, significantly more offenders had needs identified across all seven domains as risk for recidivism increased from low to moderate (See Figure 3). Moderately strong associations between risk and need were observed for the domains of attitude and substance abuse, followed by weaker associations for the domains of personal/emotional orientation, marital/family, and community functioning. The weakest associations between risk and need domains were observed for education/employment and associates/social interactions domains.

Figure 3. Proportion of the Aboriginal Release Cohort with Need Identified Within Each of the Seven Domain Areas by Ratings on Risk for Recidivism



Note: A rating of some or considerable on a domain was considered evidence of need within that domain. Two observations were lost due to missing values on one or more of the dynamic factors ratings.

$$\chi^2_{\text{Marital/Family}} (2, N = 2683) = 87.27, p < .0001, V = .18$$

$$\chi^2_{\text{Education/Employment}} (2, N = 2683) = 20.20, p < .0001, V = .09$$

$$\chi^2_{\text{Associates/Social Interactions}} (2, N = 2683) = 21.73, p < .0001, V = .09$$

$$\chi^2_{\text{Substance Abuse}} (2, N = 2683) = 160.55, p < .0001, V = .25$$

$$\chi^2_{\text{Community Functioning}} (2, N = 2683) = 44.50, p < .0001, V = .13$$

$$\chi^2_{\text{Personal/Emotional Orientation}} (2, N = 2683) = 92.94, p < .0001, V = .19$$

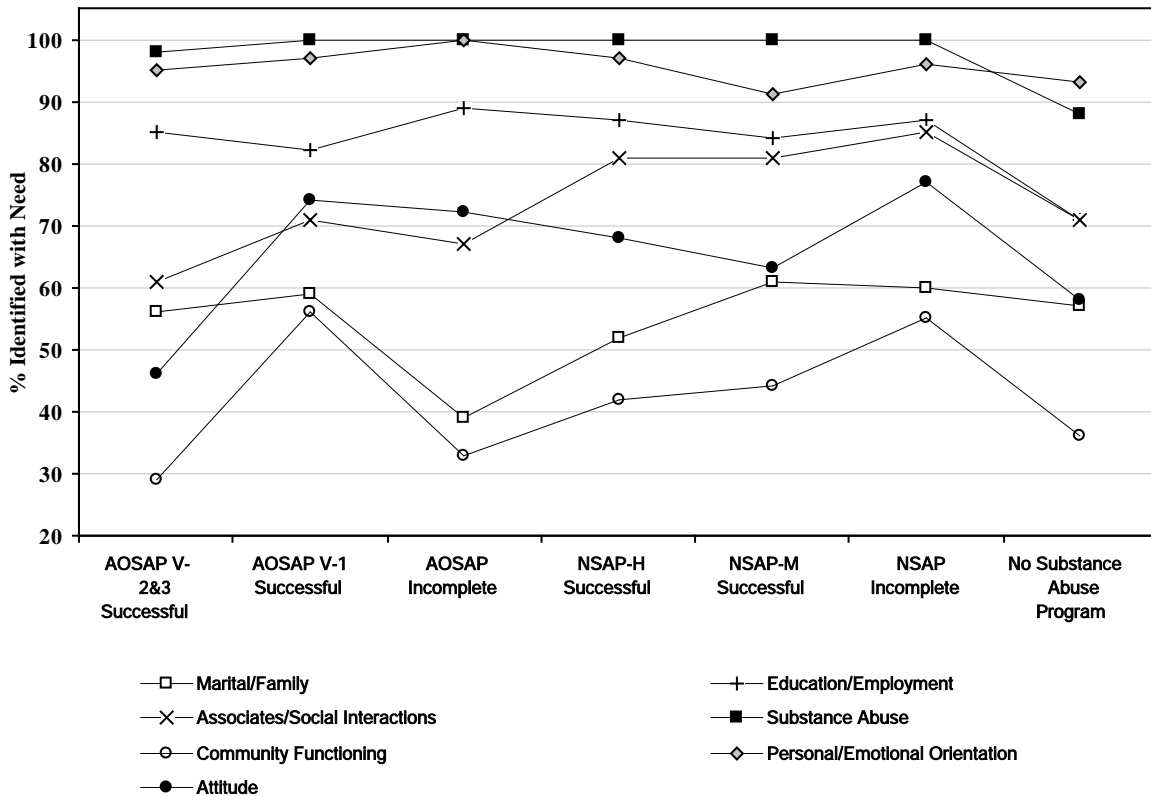
$$\chi^2_{\text{Attitude}} (2, N = 2683) = 178.17, p < .0001, V = .27$$

Substance Abuse, Need and Program Exposure

The distribution of results and summary statistics for all domain areas, distributed across program exposure categories, are presented in Figure 4. Virtually all of the Aboriginal offenders who participated in AOSAP or NSAP had an identified need within the domain of substance abuse. Although fewer offenders in the “no substance abuse program” group were identified with a need in the domain area of substance abuse, the majority (88%) required intervention. Similarly, an overwhelming majority of the cohort across all program exposure categories were identified as requiring interventions within the domains of personal/emotional orientation and education/employment.

Generally, when compared to the three aforementioned domains, successively fewer offenders required intervention within the domains of associates/social interactions, attitude, marital/family, and community functioning. Interestingly, participants of versions 2 or 3 of AOSAP were considerably less likely to be identified as having a need for intervention within the domain of attitude when compared to all other groups (See Figure 4).

Figure 4. Proportion of Offenders with Need Identified Within Each of the Seven Domain Areas Distributed across Substance Abuse Program Exposure Categories



Note: A rating of some or considerable on a domain was considered evidence of need within the domain. Two observations were lost due to missing values on one or more of the dynamic factors ratings. The “No substance abuse program” category includes all Aboriginal offenders who did not participate in an institutionally-based substance abuse program. The chi-square statistic was not reported for the substance abuse and personal/emotional domains because the test was not considered a valid test due to the small number of offenders identified as requiring no intervention in these areas. The expected cell frequencies were less than five for over 20% of the cells for these two domains.

$$\chi^2_{\text{Marital/Family}} (6, N = 2683) = 5.39, p = .50$$

$$\chi^2_{\text{Education/Employment}} (6, N = 2683) = 44.51, p < .0001, V = .13$$

$$\chi^2_{\text{Associates/Social Interactions}} (6, N = 2683) = 23.04, p = .0008, V = .09$$

$$\chi^2_{\text{Community Functioning}} (6, N = 2683) = 21.83, p < .0013, V = .09$$

$$\chi^2_{\text{Attitude}} (6, N = 2683) = 19.90, p = .0029, V = .08$$

The CASA-derived substance abuse program recommendation was also illustrative of the severity of substance abuse problems. Of the total cohort, 40%, 23% and 21% were recommended for treatment in a high, moderate and low intensity program, respectively. Only 8% of cohort did not require intervention.²¹ Table 5 provides the CASA-derived program recommendations, the alcohol severity ratings on the ADS, the extent of problems related to drinking as measured by the PRD, and the drug severity ratings on the DAST, distributed across program exposure categories. Almost all of the offenders (95%) who participated in NSAP-H were recommended for a high intensity substance abuse program. All other program exposure categories had fewer offenders with a CASA-derived treatment recommendation of high. Interestingly, 66% of the AOSAP V-2&3 participants were identified with a substantial to severe drug problem; whereas, relatively fewer offenders from the other program exposure categories were rated as such.

²¹ A total of 201 offenders (7%) of the cohort did not have a CASA result on file. The majority (95%) were from the group of offenders who did not participate in a substance abuse program prior to release.

Table 5

Distribution of CASA-derived Treatment Recommendations across Program Exposure Categories and the Severity of Drug and Alcohol Problems as Defined by the DAST, ADS and PRD

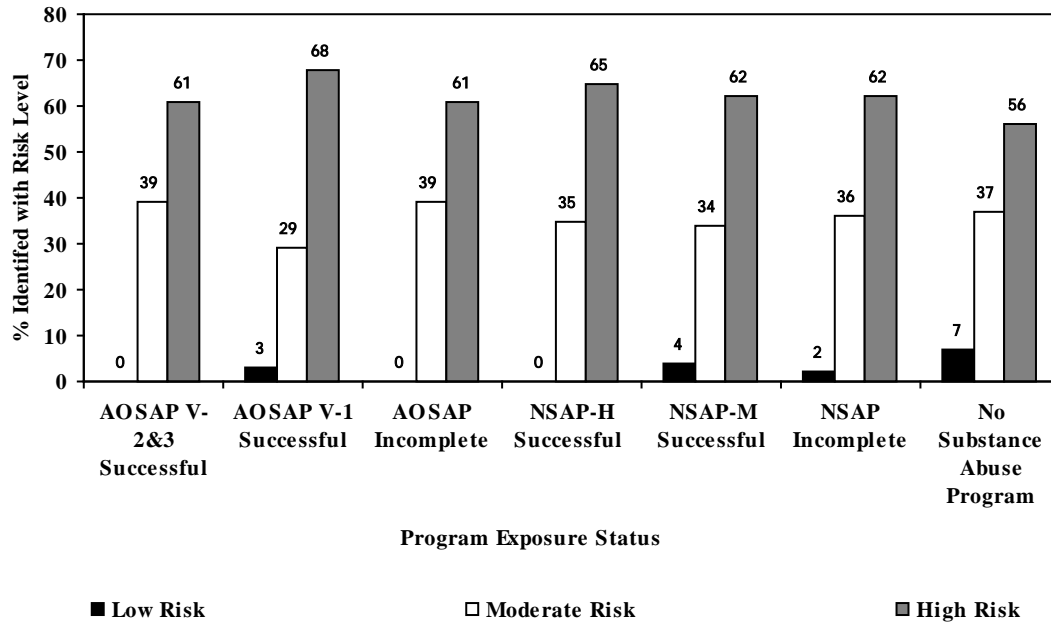
Indicators of Problem	Program Exposure Category %						
	AOSAP V-2&3	AOSAP V-1	AOSAP Incomplete	NSAP-H	NSAP-M	NSAP Incomplete	No Substance Abuse Program
CASA Treatment Recommendation							
None	2.4	3.2	0	0	0.66	0	10.8
Low	7.3	3.2	5.5	0	10.2	5.7	26.5
Moderate	12.2	19.4	16.7	4.9	39.3	24.5	24.0
High	78.1	74.2	77.8	95.1	49.8	69.8	38.8
ADS Severity							
None	26.8	25.8	27.8	11.5	17.8	18.9	28.4
Low	0.8	29.0	44.4	27.9	39.3	39.6	41.0
Moderate	26.8	19.4	16.7	27.9	28.7	15.1	16.9
Substantial to Severe	26.8	25.8	11.1	32.8	14.2	26.4	13.7
PRD							
None	22.0	29.0	44.4	14.8	24.1	24.5	35.5
Some	7.3	9.7	16.7	9.8	14.9	5.7	17.6
Quite a Few	22.0	19.4	22.2	18.0	26.1	22.6	24.9
A Lot	48.8	41.9	16.7	57.4	35.0	47.2	22.1
DAST Severity							
None	7.3	9.7	11.1	9.8	14.5	9.4	29.1
Low	12.2	16.1	22.2	16.4	25.4	15.1	27.3
Moderate	14.6	25.8	16.7	18.0	39.3	35.9	20.4
Substantial to Severe	65.9	48.4	50.0	55.7	20.8	39.6	23.2
Total Cases	41	31	18	61	303	53	1977

Note. Column percentages may not add to 100% due to rounding. A total of 201 offenders did not have a CASA result on file. N = 2484.

Substance Abuse Program Exposure and Risk

Most of the Aboriginal offenders across all program exposure categories were rated moderate to high risk for recidivism (see Figure 5). Although marginally fewer Aboriginal offenders who comprised the “no substance abuse program” group were rated high risk, the distribution of Aboriginal offenders on risk rating was not significantly different across program exposure categories.

Figure 5. The Proportion of Aboriginal Offenders with Ratings of Low, Moderate, and High, across Substance Abuse Program Exposure Status



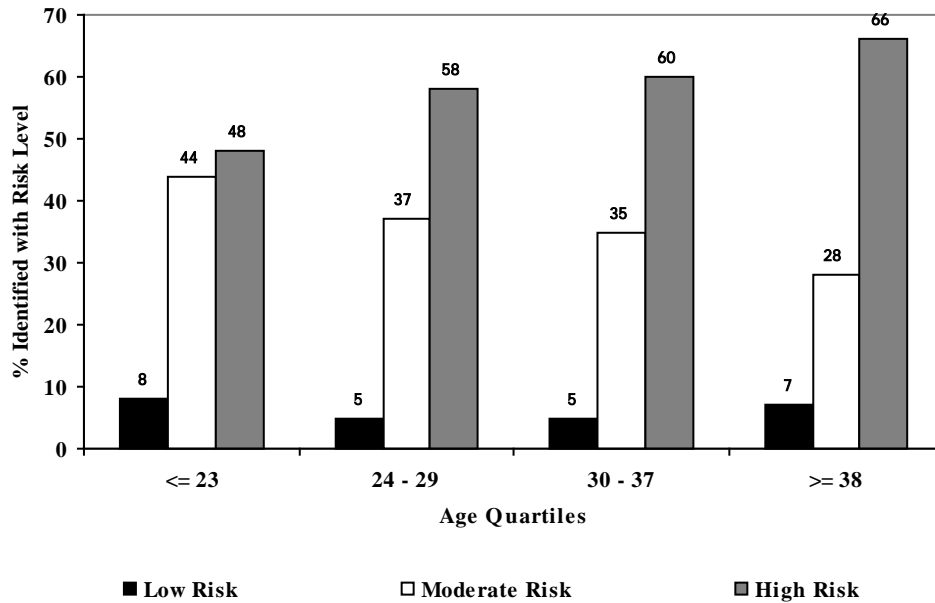
Note. Two observations were lost due to missing values for the risk rating. In order to produce a valid Chi-square statistic, the few Aboriginal offenders with a low rating on risk were combined with offenders with a moderate risk rating. $\chi^2(6, N = 2683) = 6.59, p = .36$

Age Quartiles²², Risk for Recidivism and Need Rating

There was a weak but significant ordinal association between age quartiles and risk, Mantel-Haenszel $\chi^2(6, N = 2683) = 51.19, p < .0001 (r_s = .14)$. Significantly fewer offenders in the youngest age quartile were considered high risk compared to offenders in the three oldest age quartiles; and significantly more offenders in the oldest age quartile were rated high risk compared the other age quartiles. The distribution of results is presented in Figure 6.

²² Age quartiles were used because age did not meet the linearity assumption for its inclusion as a continuous covariate in the statistical models.

Figure 6. Distribution of Risk Ratings for Recidivism across Age Quartiles for the Aboriginal Cohort of Releases



Weak but significant associations between age quartiles and need emerged across the domains of substance abuse, personal/emotional orientation and community functioning (see Table 6). Somewhat stronger associations between age quartiles and need were observed for the domains of associates/social interactions and education/employment, with offenders from the two youngest age quartiles more likely to be identified with a need for intervention across these domains. In general terms, a greater proportion of Aboriginal offenders who were 30 years of age or older required intervention within the domain of marital/family when compared to the younger age quartiles. The association between age quartiles and the attitude and community functioning domains were not significant. The distribution of results and summary statistics are presented in Table 6.

Table 6

Percentage of Offenders with Need Identified Within Each of the Seven Domain Areas Distributed by Age Quartile

Domain ^a	% With Need Identified Across Age Quartiles				Summary Statistics		
	≤ 23	24-29	30-37	≥ 38	χ^2	<i>p</i>	Cramer's <i>V</i>
Marital/Family	43.6	57.1	66.1	62.0	82.5	<.0001	.18
Education/Employment	83.7	78.1	67.1	63.6	91.3	<.0001	.18
Associates/Social Interactions	83.3	75.8	67.5	59.4	106.0	<.0001	.20
Substance Abuse	90.8	91.1	92.3	86.4	14.5	.0023	.07
Community Functioning	36.8	38.8	39.6	32.8	7.60	.0550	-
Personal/Emotional Orientation	94.9	93.7	93.0	90.4	11.12	.0111	.06
Attitude	58.1	60.6	61.0	55.7	4.78	.1889	-
Total Number of Cases	731	652	684	616			

Note. Dash indicates that the statistic was not estimated. ^aA rating of some or considerable on a domain was considered evidence of need for intervention. Two observations were lost due to incomplete information for one or more domains. N=2683

Age Quartiles and Substance Abuse Program Status

The association between age quartile and program status was not significant, $\chi^2(18, N = 2685) = 16.63, p = .55$. However, younger participants of AOSAP and NSAP were less likely to complete either program. Approximately 39% of the unsuccessful participants of AOSAP and NSAP were from the youngest age quartile (23 years of age or younger), while only about 27% of the Aboriginal offenders within other program exposure categories were represented by the youngest age quartile.

2. Predictors of Revocation

The parameter estimates, standard errors, Wald χ^2 , *p*-values and hazard ratios (*HR*) (with confidence intervals) for significant covariates are presented in Table 7. Age quartile, the domains of education/employment, community functioning, attitude, and associates/social interactions, CASA-derived treatment recommendation, risk of recidivism, and program exposure categories were all retained by the final model as significant covariates of the outcome.²³ The domains of marital/family and personal/emotional orientation did not emerge as

²³ The need rating on the substance abuse domain was a significant covariate of the outcome. However, the CASA-derived rating of substance abuse need - on a four category scale of none, low, moderate, and high - was retained in the final model over the substance abuse domain rating

significant covariates of revocation.

The main hypotheses were confirmed. Aboriginal offenders who completed AOSAP, irrespective of versions, were returned at a lower rate over the follow-up period compared to all other program exposure categories (see Table 7). When compared to the successful participants of AOSAP version 1 (i.e., the reference group), the group of Aboriginal offenders who successfully participated in NSAP-H and NSAP-M were revoked at a rate that was 1.79 and 1.89 times higher, respectively. Aboriginal offenders who were partially exposed to AOSAP (AOSAP Incomplete) and NSAP (NSAP Incomplete) were revoked at rates that were 2.20 and 2.66 times higher than the rate of the reference group, while the group of non-exposed Aboriginal offenders (No Substance Abuse Program) were revoked at 1.77 times the rate of the reference group (AOSAP V1 Successful).

Recall that it was hypothesized that the group of Aboriginal offenders who successfully participated in versions 2 or 3 would be less likely to be returned to custody on a revocation compared to the group of Aboriginal offenders who successfully completed version one of the program. The hazard ratio comparing the combined group of successful participants of versions 2 and 3 to successful participants of version 1 was 1.30 (95% *CI*: 0.56 – 3.01; $p = 0.54$). The result was far from statistically significant. There was no differential effect on revocation rates that was attributable to AOSAP version.

because the CASA rating provided a better estimate of programming needs.

Table 7

The Parameter Estimates, Standard Errors (SE), Wald χ^2 , p-values and Hazard Ratios (HR) (With Confidence Intervals) for each significant covariate of Revocation

Predictor	Estimate (β)	SE	Wald χ^2	p-value	HR for Revocation (95% confidence interval)
Age Quartile ^a			108.31	< .0001	
≤ 23	0.90	0.087			2.46 (2.08 – 2.92)
24-29	0.63	0.088			1.88 (1.58 – 2.23)
30-37	0.61	0.087			1.85 (1.56 – 2.19)
Need Domains ^b :					
Education/Employment			12.44	.0060	
Asset	-0.73	0.31			0.48 (0.26 – 0.88)
None	-0.27	0.092			0.76 (0.64 – 0.91)
Some	-0.16	0.072			0.85 (0.74 – 0.98)
Associates/Social Interactions			15.21	.0016	
Asset	-0.95	0.51			0.39 (0.14 – 1.05)
None	-0.28	0.087			0.76 (0.64 – 0.90)
Some	-0.034	0.066			0.97 (0.85 – 1.10)
Community Functioning			12.40	.0061	
Asset	-1.01	0.48			0.36 (0.14 – 0.92)
None	-0.32	0.11			0.73 (0.58 – 0.91)
Some	-0.17	0.11			0.84 (0.68 – 1.05)
Attitude			20.02	.0002	
Asset	-0.16	0.24			0.85 (0.53 – 1.37)
None	-0.32	0.074			0.73 (0.63 – 0.84)
Some	-0.23	0.069			0.80 (0.70 – 0.91)
CASA's Substance Abuse Program Intensity Recommendation ^c			32.25	<.0001	
Low	0.12	0.13			1.12 (0.88 – 1.44)
Moderate	0.43	0.12			1.54 (1.20 – 1.96)
High	0.44	0.12			1.56 (1.23 – 1.98)
Unknown	0.13	0.15			1.14 (0.85 – 1.53)
Risk of Recidivism ^d			58.00	< .0001	
Moderate	0.42	0.14			1.52 (1.15 – 2.01)
High	0.79	0.14			2.20 (1.67 – 2.90)
Substance Abuse Program Status ^e			11.66	.0700	
AOSAP (V-2 & 3) Successful	0.26	0.43		.5434	1.30 (0.56 – 3.01)
AOSAP Incomplete	0.79	0.41		.0511	2.20 (1.00 – 4.87)
NSAP - H Successful	0.56	0.33		.0928	1.74 (0.91 – 3.33)
NSAP - M Successful	0.64	0.28		.0234	1.89 (1.09 – 3.27)
NSAP Incomplete	0.98	0.32		.0023	2.66 (1.42 – 5.01)
No Substance Abuse Program	0.57	0.27		.0354	1.77 (1.04 – 3.01)

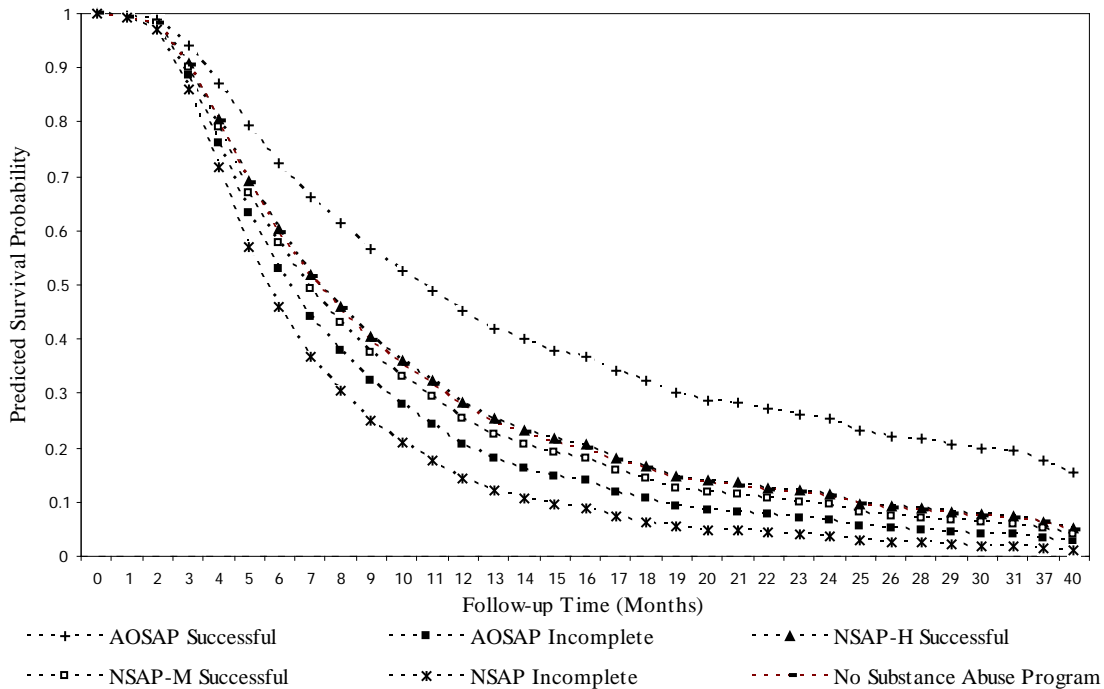
Note. ^aThe reference level is the fourth age quartile (age ≥ 38). ^bFor all domains the reference level was comprised of the group of Aboriginal offenders rated “considerable need for improvement.” ^c“Unknown” category represents the group of individuals who were not assessed by CASA during their current sentence (N=201), of whom 95% belonged to the group of individuals who did not participate in a substance abuse program. The reference category is the rating of “none” on the CASA. ^dThe reference level was comprised of the group of “low” risk Aboriginal offenders. ^eThe reference level was the group of participants who successfully completed version 1 of AOSAP.

The model adequately fit the data, *Goodness of fit* χ^2 (9, N = 2683) = 6.72, p = .67.

Appendix B provides the parameter estimates, standard errors, Wald χ^2 , p-values and hazard ratios (*HR*) (with confidence intervals) for AOSAP (all successful completers of the AOSAP versions combined into one group), other program exposure categories, and all aforementioned significant covariates of revocation. The combined group of successful completers of AOSAP were generally less likely to return to custody during the follow-up period. It is important to note that the hazard ratio comparing the successful participants of NSAP-H to the group of successful participants of AOSAP was 1.59 (95% *CI*: 0.91 – 2.77; $p = 0.1052$), which is suggestive of a higher rate of revocation for the successful participants of NSAP-H. However, the estimate exceeded the threshold for statistical significance. Therefore, the result for the comparison should be interpreted with caution.

Adjusted survival curves for program exposure status were plotted to supplement the results presented in Appendix B (see Figure 7). After adjusting for the effects of the other covariates on revocation rates, Aboriginal offenders who successfully completed AOSAP had an estimated probability of survival that was greater than for the offender from the other program exposure categories. Successively lower estimated probabilities of survival were observed for offenders who completed the high intensity and moderate intensity NSAPs. The lowest probabilities of survival were observed for offenders who failed to complete AOSAP or NSAP.

Figure 7. Adjusted Survival Curves Representing the Estimated Probabilities of Survival for Aboriginal Offenders from the Program Exposure Categories (Successful Participants of AOSAP Combined into One Group)



Note. Predicted probabilities assume an Aboriginal offender who was between the ages of 24 and 29. The offender was rated “high” on the OIA static factor and “some” on the domains of education/employment, associates/social interactions, community functioning, and attitude. The CASA rating suggested the need for a high intensity substance abuse program.

The Effects of Other Covariates

To summarize, after adjusting for the effects of other covariates in the model, the group of Aboriginal offenders in the youngest age quartile (≤ 23) had the highest hazard of revocation ($HR = 2.46$) (see Table 7). The revocation rates for the 24 to 29 year olds and the 30 to 37 year olds were virtually identical. The four domains of education/employment, associates/social interactions, community functioning, and attitude were also predictive of revocation. Generally, Aboriginal offenders with a considerable need identified within the four domains were revoked at higher rates than Aboriginal offenders with no needs identified. There were no significant differences between Aboriginal offenders rated some need and considerable need on the domains of community functioning and associates/social interactions. Aboriginal offenders recommended to a moderate or high intensity substance abuse program by the CASA had a higher rate of revocation and both had approximately the same hazard of revocation compared to the reference

category. Aboriginal offenders who were not administered the CASA (“unknowns”) had approximately the same hazard of revocation as the group of Aboriginal offenders in the reference category. The OIA static factor rating of risk was also predictive of revocation, with Aboriginal offenders rated moderate or high risk more likely to be revoked than Aboriginal offenders rated low risk. The pair-wise comparison examining the hazard of revocation between the moderate risk and high risk ratings was statistically significant, $Wald \chi^2 (1, N = 2683) = 38.67$, $p = <.0001$, $HR = 1.44$, (95% CI : 1.29 – 1.62).

Model Diagnostics

Recall that the Cox proportional hazards model is considered a semi-parametric method (see Appendix A). There is no assumption for the shape and nature of the underlying distribution of survival times; however, the model assumes that the underlying hazard rate is a function of the independent variables and is consistent over time (i.e., satisfying the proportional hazards assumption) (Hosmer et al., 2008). No serious departures from the assumption were observed upon visual inspection of the plots of the log-negative-log of the Kaplan-Meier estimates of the survival functions versus the log of time for each covariate.

Appendix C provides the results from the analysis which examined the impact of influential observations on the overall fit of the model. Briefly, when the 75 influential observations were deleted and additional analyses performed with a subsequent model (i.e., through sensitivity analysis), the parameter estimates for program exposure categories moved further away from the null indicating a stronger effect of AOSAP, irrespective of versions. Notwithstanding, all observations were retained for all analyses and modelling procedures.

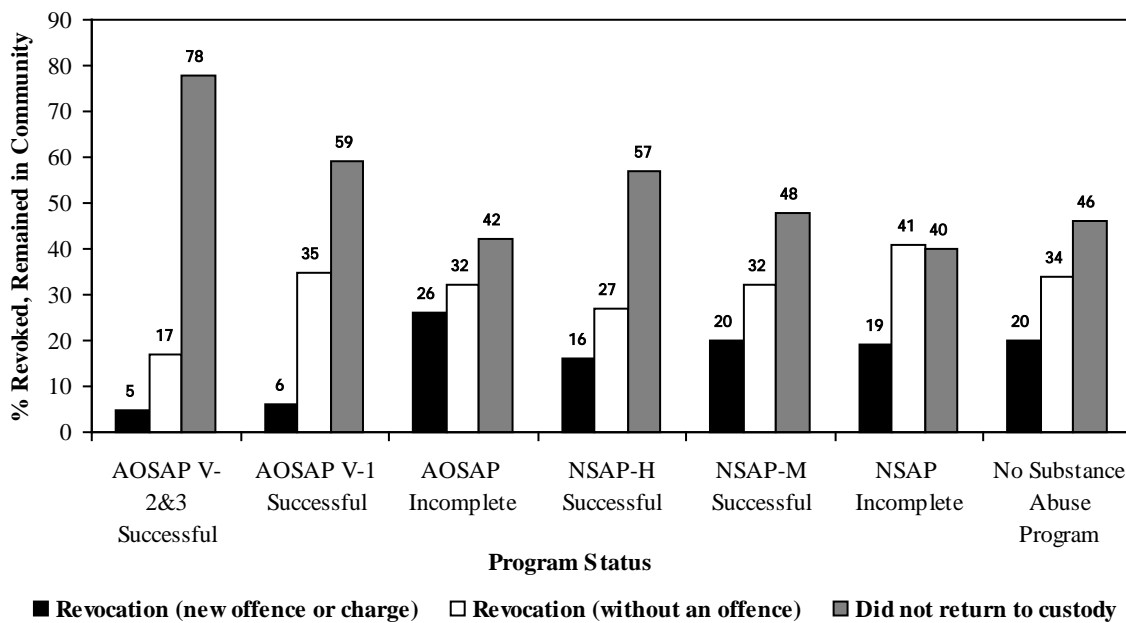
3. Community-based Indicators of Performance

Revocation Type

Significantly fewer Aboriginal offenders, who successfully participated in AOSAP, irrespective of version, were returned to custody when compared to the other groups (see Figure 8). When the proportion of revocations without an offence were examined across program exposure categories, relatively fewer Aboriginal offenders who participated in the first version of AOSAP and the combined group of Aboriginal offenders who participated in versions two or three of AOSAP were revoked for a charge or a new offence compared to Aboriginal offenders

from the other groups. Of the Aboriginal offenders who successfully completed AOSAP (any version) and were returned to custody during the follow-up period, approximately 5% were returned to custody because of a new offence or a charge. Across all other groups, significantly more Aboriginal offenders were returned to custody for a new offence or a charge. This suggests a more serious pattern of re-offending and a more serious deterioration in performance for all other groups when compared to the group of Aboriginal offenders who successfully participated in AOSAP.

Figure 8. Distribution of Revocations across Program Exposure Categories



Note. $\chi^2(12, N = 2685) = 27.17, p = .0101, V = .007$

Community-based Urinalysis

Appendix D presents the proportion of Aboriginal offenders in the release cohort (N=2685) who were urinalysis tested and the total number of tests that were administered, distributed across potential covariates. The table also shows the percentage of Aboriginal offenders who tested positive, the percentage of tests that were positive, the mean number of days since release to first test and first positive result, and the mean number of days at risk. To summarize, of the total release cohort, 47.8% (n = 1284) were tested at least once during the release period, either prior to re-admission or before the end of the study period, whichever occurred first. As a group they were tested a total of 5883 times. A total of 48.9% (n=628) of those who were tested

produced at least one positive urinalysis result while supervised in the community. Of the total number of tests that were administered, 25% produced positive results. The drugs most commonly detected were THC (47.2%), cocaine (22.7%), opiates (17.2%), benzodiazepines (8.6%), amphetamines (2.0%) and alcohol (1.7%). Less than 1% tested positive for methadone and phencyclidine.

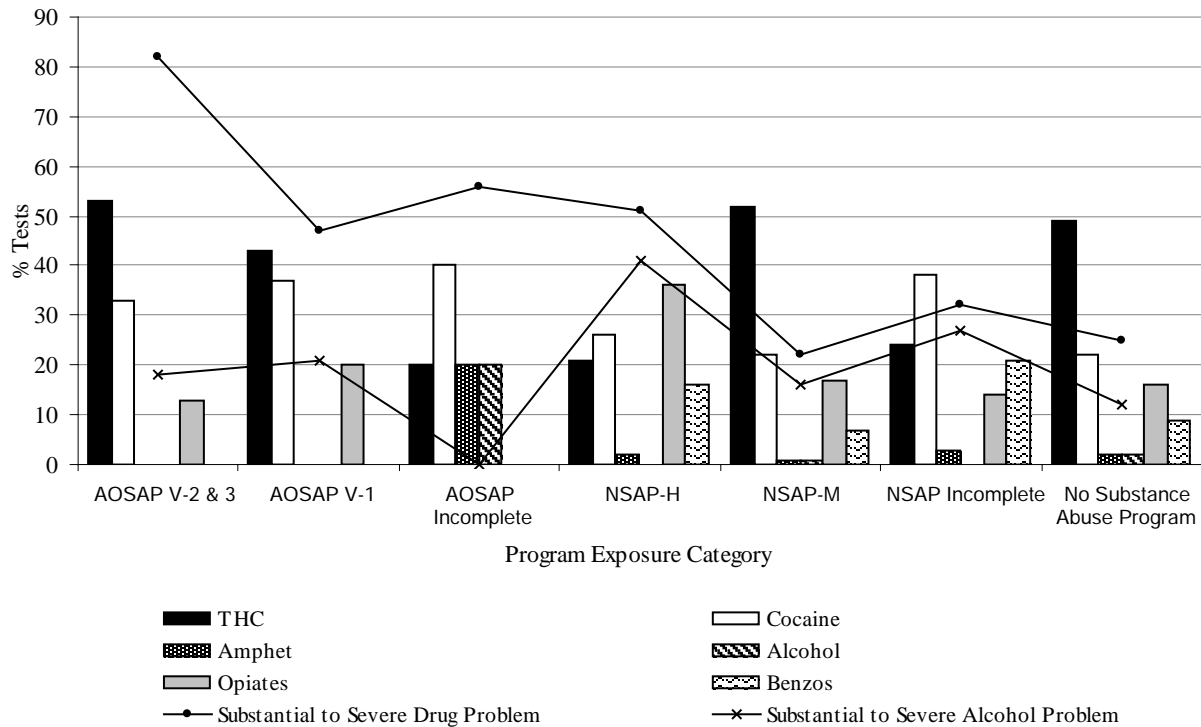
Generally, a greater proportion of urinalysis tests produced a positive result for those identified with a need within the domains education/employment, associates/social interactions, community functioning and attitude; and as the severity rating on the DAST increased from none to severe. Also, when need was identified within a specific domain, the number of days to first positive test was shorter than when there was no need identified within the domain. The number of days to first positive result was also shorter when the DAST suggested a problem with drugs. The proportion of positive tests varied between 23% and 35% across program exposure categories, with NSAP-H completers and NSAP non-completers registering the largest percentages of positive tests. Also, the days since release to the first positive urinalysis result for the Aboriginal offenders who completed NSAP-H and NSAP-M was relatively shorter than for the Aboriginal offenders who completed AOSAP (irrespective of version).

The proportion of Aboriginal offenders from the release cohort who were tested varied across covariate categories (see Appendix D). As part of the supervision process, CSC relies on urinalysis testing to monitor released offenders and to deter drug use if/when there is reason to believe that an offender is at risk of using substances of abuse. Accordingly, a greater proportion of higher risk, higher need offenders from the release cohort were tested to monitor and deter drug use. Interestingly, Aboriginal offenders who completed NSAP-H were considerably more likely to be tested than Aboriginal offenders from the other program exposure categories (see Appendix D).

Figure 9 presents the distribution of drugs that were detected for all urinalysis tests ($N = 5883$) that were administered on the release cohort. The majority (82%) of urine samples that were collected from the AOSAP- V 2&3 group were collected from Aboriginal offenders who were rated substantial to severe on the Drug Abuse Screening Test (DAST) at admission to federal custody, and yet the majority (53%) of the tests detected cannabinoids. The remaining Aboriginal offenders who successfully completed AOSAP – V 2&3 tested positive for cocaine (33%) and opioids (13%). In contrast, 53% of the tests from the NSAP-H group were

administered to Aboriginal offenders who were rated with a substantial to severe drug problem at admission to federal custody, of which the majority produced positive results for opiates (36%), followed by cocaine (26%), cannabinoids (21%), and benzodiazepines (16%).

Figure 9. Types of Drugs that were Detected and the CASA-derived Severity Rating of Drug and Alcohol Problems for the Release Cohort of Aboriginal Offenders who Produced a Positive Urinalysis Result, Distributed Across Program Exposure Categories



Note. The CASA-derived drug abuse and alcohol abuse severity of substantial to severe is based on the DAST and ADS. Both were administered at the time of admission to federal custody. Number of tests = 5883. THC=cannabinoids. Amphet=amphetamines. Benzos=benzodiazepines.

A total of nine variables were retained by the final model as significant covariates of testing positive for substances of abuse. The significant covariates included the number of negative tests (since last positive or since release if the offender did not register a positive result), the number of positive test results since release, ratings on the OIA domains of education/employment, marital/family and attitude, the OIA static factor rating, severity ratings on the ADS and DAST, and participation in institutionally-based substance abuse programs. Age category, the other four OIA domains, and CASA’s treatment recommendation were not predictive of testing positive after adjusting for the effects of the other covariates in the model.

The parameter estimates, robust standard errors, Wald χ^2 , p-values and hazard ratios

(*HR*) (with confidence intervals) for each significant covariate from the multiple PWP Cox regression model (stratified by the number of positive urinalysis tests) are presented in Table 9. There was limited support for the main hypothesis that Aboriginal offenders who successfully completed AOSAP, irrespective of version, tested positive for drugs at a lower rate than Aboriginal offenders who successfully completed NSAP-H. However, the confidence interval for the hazard ratio of 0.65 (comparing AOSAP V 2&3 to NSAP-H) included the hazard ratio of 1.0 so the estimate should be interpreted with some caution. Similarly, successful participants of NSAP-M had a somewhat lower hazard of testing positive compared to successful participants of NSAP-H; however, the confidence interval for the parameter estimate also included the hazard ratio of 1.0. Pair-wise comparisons between versions of AOSAP and NSAP-M did not yield statistically significant differences (i.e., AOSAP was no more effective in reducing the rate of testing positive than NSAP-M).²⁴ Aboriginal offenders who did not complete AOSAP or NSAP tested positive at about the same rate as the Aboriginal offenders who successfully completed NSAP-H. Interestingly, Aboriginal offenders who were not exposed to an institutionally-based substance abuse program had about the same hazard of testing positive as Aboriginal offenders who completed AOSAP (irrespective of version) and NSAP-M.²⁵ Generally, exposure to an institutionally based substance abuse program was a relatively weak predictor of testing positive for substances of abuse ($p \approx .07$)

The OIA domains of education/employment, marital/family, attitude, the OIA static factor, the DAST and ADS, the number of positive tests, and the number of negative tests since the last positive test result were more strongly predictive of testing positive than program exposure status. Aboriginal offenders with ratings of asset and none on the education/employment domain had a lower relative hazard of testing positive than Aboriginal offenders with a considerable rating on the domain ($HR = 0.41$, $HR = 0.69$, respectively). Similarly Aboriginal offenders with ratings of asset, none or some were generally less likely to produce a positive test result than Aboriginal offenders who were rated considerable on the attitude domain ($HR = 0.55$, $HR = 0.77$, and $HR = 0.81$, respectively). Interestingly Aboriginal offenders who received a rating of none or some on the marital/family domain had a higher

²⁴AOSAP – V 2&3 vs. NSAP-M, $Wald \chi^2 (1, N = 5071) = 0.28, p = .59, HR = 0.85, (95\% CI: 0.45 – 1.57)$.
AOSAP – V 1 vs. NSAP-M, $Wald \chi^2 (1, N = 5071) = 0.77, p = .25, HR = 0.77, (95\% CI: 0.49 – 1.20)$.

²⁵AOSAP – V 2&3 vs. No substance abuse Program, $Wald \chi^2 (1, N = 5071) = 0.027, p = .93, HR = 0.97, (95\% CI: 0.54 – 1.76)$.
AOSAP – V 1 vs. No Substance Abuse Program, $Wald \chi^2 (1, N = 5071) = 0.33, p = .57, HR = 0.88, (95\% CI: 0.58 – 1.35)$.
NSAP-M vs. No Substance Abuse Program, $Wald \chi^2 (1, N = 5071) = 1.93, p = .17, HR = 1.15, (95\% CI: 0.94 – 1.41)$.

relative hazard of testing positive than Aboriginal offenders who received a rating of considerable on the domain. The difference between the asset and considerable groups on the marital/family domain was not statistically significant. When DAST and ADS suggested a problem that was restricted to drug abuse, the hazard of testing positive was about 1.5 times the hazard of the group of Aboriginal offenders who did not have a substance abuse problem identified by the ADS and DAST. In contrast, a substance abuse problem that was limited to alcohol abuse did not predict a positive urinalysis result.

Table 8

Covariate Adjusted Parameter Estimates, Robust Standard Errors (SE), Wald χ^2 , p-values and Hazard Ratios (HR) (With Confidence Intervals) for the Program Exposure Categories and each Significant Covariate of the Hazard of a Community-based Positive Urinalysis Result, Stratified by the Number of Positive Test Results

Predictor	Estimate (β)	Robust SE	Wald χ^2	p-value	HR for Positive (95% confidence interval)
Number of Negative Urinalysis Tests	-0.072	0.022	10.68	.0011	0.93 (0.89 – 0.97)
Need Domains ^a					
Education/Employment			20.01	.0002	
Asset	-0.88	0.31			0.41 (0.22 – 0.77)
None	-0.38	0.10			0.69 (0.56 – 0.84)
Some	-0.11	0.083			0.90 (0.76 – 1.05)
Marital/Family			8.90	.0307	
Asset	0.28	0.25			1.33 (0.82 – 2.16)
None	0.27	0.091			1.31 (1.09 – 1.56)
Some	0.21	0.095			1.4 (1.03 – 1.49)
Attitude			11.74	.0083	
Asset	-0.68	0.51			0.55 (0.20 – 1.50)
None	-0.27	0.086			0.77 (0.65 – 0.92)
Some	-0.23	0.082			0.81 (0.69 – 0.95)
Risk of Recidivism ^b			10.73	.0047	
Moderate	0.20	0.20			1.22 (0.83 – 1.81)
High	0.40	0.20			1.49 (1.00 – 2.21)
Substance Abuse Severity ^c			19.99	0.0455	
Alcohol Problem Only					
ADS = Low, DAST = None	-0.053	0.20			0.95 (0.64 – 1.41)
ADS = Moderate, DAST = None	-0.079	0.28			0.93 (0.53 – 1.60)
ADS = Substantial to Severe, DAST = None	0.14	0.24			1.15 (0.72 – 1.83)
Drug Problem Only					
DAST = Low, ADS = None	0.44	0.19			1.55 (1.06 – 2.25)
DAST = Moderate, ADS = None	0.42	0.19			1.52 (1.05 – 2.20)
DAST = Substantial to Severe, ADS = None	0.43	0.19			1.54 (1.06 – 2.25)
Problems with Both					
DAST = Moderate to Severe, ADS = Low	0.23	0.16			1.26 (0.91 – 1.74)
ADS = Moderate to Severe, DAST = Low	0.27	0.19			1.31 (0.90 – 1.90)
DAST and ADS = Low	0.12	0.18			1.13 (0.80 – 1.60)
ADS and DAST = Moderate to Severe	0.12	0.17			1.13 (0.80 – 1.59)
Not administered ADS and DAST	0.15	0.18			1.16 (0.82 – 1.65)
Substance Abuse Program Status ^d			11.74	.0681	
AOSAP V-2 & 3	-0.44	0.31			0.65 (0.35 – 1.19)
AOSAP V - 1	-0.53	0.23			0.59 (0.37 – 0.93)
AOSAP Incomplete	-0.10	0.44			0.91 (0.38 – 2.15)
NSAP - M Successful	-0.27	0.17			0.76 (0.55 – 1.07)
NSAP Incomplete	-0.041	0.25			0.96 (0.58 – 1.58)
No Substance Abuse Program	-0.41	0.15			0.66 (0.49 – 0.90)

Note. ^aFor all domains the reference level was comprised of the group of Aboriginal offenders rated considerable need for improvement. ^bThe reference category is the group of Aboriginal offenders who were rated low risk. ^cThe reference category includes Aboriginal offenders who were rated none on both the ADS and DAST. ^dThe reference level is the group of Aboriginal offenders who completed NSAP-H

Discussion

The theoretical framework that guided this research was based on the general personality and social learning perspective on criminal conduct (i.e., the psychology of criminal conduct) (Andrews & Bonta, 2006). The perspective holds that offenders can be differentiated according to the risk they pose for re-offending and the kinds of interpersonal and personal needs that are linked to crime (i.e. criminogenic needs). Criminogenic needs that are systematically identified and targeted through effective treatment interventions contribute to positive behaviour changes and lead to reductions in recidivism (Andrews & Bonta, 2006). The extent to which treatment is effective will depend on specific processes and links that include: identifying and targeting offender behaviours and cognitions that are linked to criminal offending; matching offenders to program intensity through the assessment of risk and need; managing program delivery and program structure cost-effectively and in a way that promotes positive behaviour change; and offering content and a mode of service delivery that is responsive to the offender's attributes, such as ethnicity/race (Andrews and Bonta, 2006; Wanberg and Milkman, 1998). In the case of Aboriginal offenders, programs and interventions that are grounded in Aboriginal traditions, spirituality and culture may facilitate rehabilitation efforts and enhance engagement, participation and retention of the participant in the full course of treatment. In light of the research evidence on effective correctional intervention, the most effective processes to facilitate behaviour changes and reductions in re-offending among Aboriginal offenders may be those that blend Aboriginal processes with contemporary best-practices that target offender behaviours and cognitions that are linked to criminal offending.

The current study investigated the effectiveness of the high intensity Aboriginal Offender Substance Abuse Program (AOSAP). The program was designed to reduce the Aboriginal offender's risk of relapse to substance abuse and recidivism through a holistic process that examines the impact of substance abuse through the physical, mental, emotional and spiritual dimensions of the Aboriginal offender. Contemporary best-practices approaches in substance abuse treatment are interwoven throughout the program, and include such major theoretical influences as cognitive therapy, social learning theory, harm reduction, stages of change, motivational interviewing, and relapse prevention. The main objective of all versions of the program was to reduce the rate of recidivism and relapse to substance abuse by providing a skills-based, behaviour-oriented program within a safe and supportive environment that is

responsive to the cultural needs of Aboriginal men (First Nations, Inuit and Métis) who require a high intensity program.²⁶

The methodology that was employed to investigate the effectiveness of AOSAP is particularly notable because it compared Aboriginal offenders who participated in AOSAP to other Aboriginal offenders who participated in the moderate (M) and high (H) intensity National Substance Abuse Programs (NSAP). Including comparisons of this nature was important because it provided a more conservative estimate of AOSAP's effect on post-release outcomes. Generally, comparisons of treatment with other (alternative) treatments yield smaller estimates of treatment effect than comparisons between treatment and no treatment (Andrews & Bonta, 2006). Therefore, if the methodology uncovered positive effects of AOSAP on the rates of recidivism and relapse to substance use, the findings would add weight to the conclusions that could be drawn about the effectiveness of AOSAP. As Andrews and Bonta (2006) have argued "... even some forms of 'alternative' treatment (doing something) is better than no treatment (doing nothing)", so including comparisons between alternative programs may strengthen the inferences that can be made about a program's effectiveness (p. 326). Because AOSAP considers the learning styles that are appropriate to culture, it was also important to draw comparisons between AOSAP and other mainstream substance abuse programs (NSAP) to determine if a blended approach was more effective in reducing the likelihood of a return to custody (i.e., revocation with or without an offence) or a relapse to substance abuse than a mainstream approach.

The Predictors of Revocation

The results generally supported the main hypotheses that were proposed. After adjusting for the effects of other covariates of revocation, such as ratings on criminogenic needs (OIA domains), CASA-derived recommendations of substance abuse program intensity, and risk ratings of recidivism, Aboriginal offenders who successfully participated in NSAP-M and NSAP-H had approximately 1.89 times and 1.74 times the hazard of revocation during the follow-up period, respectively, than Aboriginal offenders who successfully participated in AOSAP- V 1. Aboriginal offenders who failed to complete AOSAP or NSAP were revoked at

²⁶ Recall, that soon after the first version of AOSAP (AOSAP- V1) was implemented as a demonstration project, the program underwent changes to the content and duration to improve its effectiveness. As a result two subsequent versions were introduced. Version 2 (53 sessions) and Version 3 (65 sessions) of the AOSAP intervention were longer in duration and both were considered improvements over the 31 session AOSAP-V1 intervention.

rates rate that were over two times the rate of revocation for the successful participants of AOSAP – V 1. These findings provided strong evidence in support of a blended approach to treating substance abuse problems in Aboriginal men. Not only were Aboriginal offenders who participated in AOSAP less likely than NSAP participants to be returned to custody, the AOSAP participants were also significantly less likely to be returned to custody because of a new offence. Only 5% of the successful participants of AOSAP- V 2&3 and 6% of the successful participants of AOSAP-V 1 were returned to custody because of a new offence or charge compared 16% and 20% of the successful participants of NSAP-H and NSAP-M, respectively.

As mentioned previously, subsequent versions of AOSAP were considered improvements over AOSAP – V1. Therefore, comparisons were made between successful participants of AOSAP – V1 and AOSAP – V 2&3 to determine if there were differential effects on the rates of revocation that could be attributed to specific versions of AOSAP. The comparison between AOSAP-V1 and AOSAP – V 2&3 did not yield a statistically significant result ($p = .54$). Successful participants of AOSAP-V 2& 3 were just as likely as successful participants of AOSAP-V 1 to be revoked during the follow-up period.

The identification of other significant predictors of revocation added weight to the evidence from other research which has examined the link between offender characteristics and recidivism (Andrews & Bonta, 2006; Dowden & Brown, 2002; Gendreau, Little & Goggin, 1996; Sioui & Thibault, 2002; Zamble and Quinsey, 1997). After adjusting for the effects of other covariates in the model, Aboriginal offenders who were younger had higher rates of revocation during the follow-up than Aboriginal offenders from the oldest age quartile (> 37 years of age at admission). Aboriginal offenders with ratings of asset, none or some within the domains of education/employment, associates/social interactions, community functioning and attitude were significantly less likely to be revoked than Aboriginal offenders with ratings of considerable on the domains. The risk of recidivism rating was also predictive of revocation with Aboriginal offenders rated moderate or high significantly more likely to be revoked at any point during the follow-up period than the Aboriginal offenders rated low risk. Aboriginal offenders who were rated as requiring a moderate to high intensity treatment program by the CASA had approximately 1.5 times the hazard of revocation than the group of Aboriginal offenders rated as requiring no intervention. The result emerged after adjusting for other predictors of revocation, such as the OIA risk rating.

Predictors of Relapse to Substance Abuse

Community-based urinalysis testing was used to estimate the rates of relapse to substance use for the different programs. It was considered a reliable estimate of relapse because the collection of urine was supervised to reduce the possibility of an offender's attempt to alter or falsify the urine sample (MacPherson, 2004). Also, the unpredictability of testing provided an additional safeguard against potential false positives due to a drug's rate of urinary clearance. Because drug metabolites remain in urine for varying periods of time (MacPherson, 2004), the samples were collected without prior notification and at irregular intervals to circumvent an offender's attempt to alter a test result by abstaining during the days leading to a sample request. Although a positive urinalysis result could not determine when, or how much a drug was used, it provided a measure of drug use during each time interval between tests.

With this study sample, exposure to substance abuse treatment prior to release from custody was a relatively weak predictor of registering a positive urinalysis result ($p \approx 0.07$). Notwithstanding, there was some evidence, albeit weak, of a trend suggesting that successful participants of AOSAP (irrespective of version) and NSAP-M were somewhat less likely to incur a positive urinalysis result while on release than successful participants of NSAP-H after adjusting for the effects of other significant covariates (discussed hereinafter). Additionally, Aboriginal offenders who were not exposed to a substance abuse program prior to release were about as likely to register a positive urinalysis result as the successful participants of AOSAP (either versions) and NSAP-M.

The fact that there was a marginal effect of program exposure on testing positive is consistent with emerging evidence from best-practices in offender reintegration and crime prevention (Griffiths, Dandurand & Murdoch, 2007; World Health Organization, 2008). Increasingly, literature in the area of substance abuse treatment has focussed on aftercare because of concerns that treatment that is provided prior to release may be insufficient to protect the exiting offender against the threat of relapse (Brown et al., 2001). For the Aboriginal offenders who have an identified substance abuse problem, exposure to a community-based intervention may be the best approach to help them manage problems that become relevant only at community re-entry, such as sustaining/re-learning the skills that are necessary to effectively manage the situations that may arise and lead to relapse; learning how to live drug-free in the community; and developing a peer support network that reinforces a drug-free lifestyle (Field,

1998; Kunic, 2008).

While there was limited evidence in support of AOSAP's goal of reducing rates of relapse to substance abuse, there was some evidence suggesting that Aboriginal offenders who successfully completed AOSAP- V 2&3 were less likely than Aboriginal offenders from the other program exposure categories to use drugs that are considered dangerous because of the physical harms they cause the individual and the effects they have on significant others and the broader community (Nutt, King, Saulsbury & Blakemore, 2007; Room, Fischer, Hall, Lenton & Reuter, 2008). The majority (82%) of urine samples that were collected from the AOSAP- V 2&3 group were collected from Aboriginal offenders who were rated substantial to severe on the Drug Abuse Screening Test (DAST) at admission to federal custody, and yet the majority (53%) of the tests detected cannabinoids. The remaining Aboriginal offenders who successfully completed AOSAP – V 2&3 tested positive for cocaine (33%) and opioids (13%). In contrast, 53% of the tests from the NSAP-H group were administered to Aboriginal offenders who were rated with a substantial to severe drug problem at admission to federal custody, of which the majority produced positive results for opiates (36%), followed by cocaine (26%), cannabinoids (21%), and benzodiazepines (16%).

The differences in the kinds of drugs detected through urinalysis testing between AOSAP – V 2&3 and NSAP-H is surprising given previous research on CSC's offender population. In two separate studies using samples of 907 and 3350 offenders, Kunic and Grant (2006) and Kunic (2008) found that a sizeable majority of Aboriginal offenders who used crack cocaine, opioids, and cocaine produced DAST results suggestive of substantial to severe drug problems, while very few of the offenders who used cannabinoids produced DAST results suggestive of the same level of problem. The finding that the more severely DAST-rated AOSAP V - 2&3 participants were more likely to test positive for a less harmful class of drugs (the cannabinoids) than the less severely DAST-rated NSAP-H participants is suggestive of a harm-reduction effect that is possibly attributable to program exposure. Notwithstanding, further research, using methodology that compares pre-program to post-program urinalysis results, will need to be carried out to shed a definitive light on the possible harm reduction effects of program participation.

Other significant covariates of testing positive also emerged and are worth noting. After adjusting for the effects of other covariates in the model, the number of negative tests that an

offender produced predicted a positive test. That is, for each negative test result since the last positive result (or since release if there were no positive results) that an offender produced, the hazard of producing a positive result on a subsequent test decreased by approximately 7%. Additionally, Aboriginal offenders who were identified with need in the OIA domain areas of education/employment and attitude were more likely to test positive. Similarly, the OIA rating of risk of recidivism and the presence of a drug problem also predicted a positive result. These findings support previous research on the predictors of recidivism (Andrews & Bonta, 2006). Interpersonal controls, such as criminal sentiments (i.e., attitude), a history of antisocial behaviour (i.e., OIA's static factor rating), substance abuse problems, and problematic circumstances in the area of education/employment have long been considered part of the "central eight" risk factors of recidivism (Andrews & Bonta, 2006, p. 75). By intervening in the aforementioned need areas, correctional interventions may reduce the risk of relapse, thereby reducing the likelihood of recidivism for those Aboriginal offenders who have substance abuse identified as a criminogenic need.

Limitations of the Study

Despite the fact that AOSAP aims to address the needs of Aboriginal men through a blending of cultural and traditional healing with contemporary best-practices, such as social learning (e.g., role modelling) and cognitive behavioural therapies (e.g., relapse prevention), this study did not investigate the extent to which skills were developed and/or cultural engagement was achieved. Future research should assess how well AOSAP addresses targets, and how treatment performance and the extent of cultural engagement affect post-program outcomes such as institutional adjustment, and community-based performance.²⁷

Another possible limitation was the length of follow-up. As a general rule, there are larger treatment effects in studies with shorter follow-up periods (Lösel, 2008). Frequently, recidivism for program participants is delayed during the first year after the intervention, but approaches the rate of recidivism for the comparison group, which typically stabilizes after 3-4 years (Lösel, 2008). This study, retrospective in design, followed Aboriginal offenders into the community unit the end of the study period (July 25, 2007), or until warrant expiry, whichever came first. Although there was no evidence of non-proportional hazards between versions of

²⁷ An ongoing study is examining the program's impact on skills-based targets and the extent of cultural engagement.

AOSAP and the other program categories over the follow-up period, extending the follow-up in future research may reveal important time-dependent effects of program exposure on rates of revocation and recidivism. Longer periods of follow-up will warrant a close examination of other more proximal (i.e., intermediate) covariates that exist between program exposure and the outcome (e.g., employment status, marital status, health status, changes to accommodations and peer groups, substance use, etc.). Estimating the effects of intermediate variables will necessarily warrant the application of more complex statistical models that take into account the time dependent nature of the intermediate variables. The one drawback of a longer period of follow-up, however, is that the researcher will have less confidence in the estimates of the specific impact of a program on the outcome because the program's effect will become more confounded with "natural developmental factors in the community or other interventions" that cannot be accounted for through existing data/tracking systems (Lösel, 2008, p. 158).

Future Research Possibilities

Increasingly, evaluation research of correctional interventions is focussing on the context in which the interventions are delivered (Liebling & Arnold, 2002; Lösel, 2008). Institutional climate variables, such as staff fairness, regime fairness, staff-prisoner relationships and consistency may impact on the effects of institutional programs and on the rates of recidivism. Unfortunately, the absence of reliable and valid indicators of institutional climate precludes the analyses of institutional effects on program delivery and/or the outcomes of interest. Nevertheless, there are statistical models that can measure the effect of an additional latent variable (unobserved effect) (Dohoo et al., 2003; Duchateau & Janssen, 2008). An extension of the proportional hazards model – known as a frailty model - could be implemented in future evaluations to adjust for the potential effects of institutional climate on program delivery and on post-release outcomes. With frailty models, the unobserved or additional latent effect is viewed as a shared frailty in which a group of observations is assumed to have a common frailty. In this case, Aboriginal offenders who participated in a program within the same institution are assumed to have a common frailty because they shared the same institutional climate. In statistical terms, the unmeasured predictor represents the random effects of a particular grouping variable; in this case, the institution in which the program was delivered. With a frailty model, parameter estimates of a program effect (and the effects of other covariates) are adjusted for unobserved

institutional (random) effects, thereby reducing the likelihood of bias in the estimates.

Conclusion

These findings add weight to the evidence in support of traditional approaches to treating substance abuse problems in Aboriginal men. Aboriginal scholars have consistently argued that the role of traditional teachings and culture in the facilitation of wellness for, and resiliency of Aboriginal peoples must be regarded as the foundation on which treatment is grounded. The fact that AOSAP outperformed mainstream substance abuse programs is consistent with contemporary best practices in effective correctional intervention. Offering content and a mode of service delivery that is responsive to the offender's attributes will facilitate active participation and engagement of the offender in treatment and lead to better outcomes. In the case of Aboriginal offenders, programs and interventions that are grounded in Aboriginal traditions, spirituality and culture that strive to heal the individual in holistic terms, will facilitate rehabilitation efforts and enhance engagement and participation of the offender in treatment.

When this research study was initiated, AOSAP was still in its demonstration phase. Given the research findings, it is recommended that national implementation of the program take place so that Correctional Service Canada can more fully meet the needs of Aboriginal men who require a high intensity substance abuse program.

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Appendices

Appendix 1: Survival Analysis Model Diagnostics

The Cox proportional hazards model is considered a semi-parametric method. There is no assumption for the shape and nature of the underlying distribution of survival times (survivor function); however, the model assumes that the underlying hazard rate is a function of the independent variables (covariates) and is consistent over time (i.e., satisfying the proportional hazards assumption) (Dohoo et al., 2003; Hosmer et al., 2008).

To assess the proportional hazards assumption, the log-negative-log of the Kaplan-Meier estimates of the survival functions versus the log of time were plotted for each covariate. Proportionality was confirmed if the plot of the lines representing the log-negative-log of the survival function for each strata of the covariate were relatively parallel. Because the Cox proportional hazards model is fairly robust, slight violations to the proportionality assumption were not considered a cause for concern (Allison, 1995). Where there was some evidence of non-parallel lines, a statistical test using scaled Schoenfeld residuals was employed to confirm violations of the assumption of proportionality. The residuals are based on the contribution that an observation makes to the partial derivative of the log partial likelihood, which is computed when a Cox model is fitted (Dohoo et al., 2003; Hosmer et al., 2008). The residuals are scaled or adjusted using an estimate of the variance of the residual. If the proportional hazards assumption is satisfied the Schoenfeld residuals should have a slope of zero when plotted against follow-up time. Statistical tests (correlations) were conducted to rule-out significant non-zero slopes.

If there was a clear (i.e., statistically significant) violation of the proportionality assumption for a specific categorical covariate, the covariate was treated as a stratifying variable (Allison, 1995). The advantage of stratification is that it allows for any kind of change in the effect of the stratification variable over time; however, no estimates can be obtained for the variable (Allison, 1995). Therefore, stratification was not applied to the main program exposure covariate or other covariates of subject matter importance. Instead, if there was a clear violation of the proportionality assumption for the program exposure covariate or other (continuous) covariates of importance, an interaction was added to the model between follow-up time and the covariate(s) to allow the effect(s) to vary over time (Dohoo et al., 2003; Hosmer et al., 2008).

Poorly fit observations (e.g., the model suggested a high probability of revocation for a particular observation, but the observation did not experience the event during the study period, or the model suggested a high probability of success, but the offender was revoked) were examined using the likelihood displacement (LD) statistic. The LD statistic measures the change in the partial log likelihood with deletion of a specific observation. The statistic essentially approximates the effect of the deletion of an observation on the overall fit of the model (Allison, 1995). Observations with large values for the LD statistic, relative to the values for other observations, are potentially influential in terms of their impact on the conclusions that can be derived from the model. For these potentially influential observations, additional sensitivity analyses (through their deletion) were conducted to examine their collective impact on the parameter estimates and the overall conclusions. The parameter estimates from the model-based sensitivity analyses were reported if deletion of the influential observations biased the results toward the null. If present, this type of bias was considered potentially problematic because a few influential observations were responsible for the significant findings rather than the actual covariate that was of subject matter importance (Hosmer et al., 2008).

Lastly, an overall goodness of fit test was conducted to assess how well the model fit the data. The test involved creating 10 groups based on the ranked values of the estimated linear covariates (Hosmer et al., 2008). The Likelihood Ratio Test (*LRT*) chi-square compares the observed number of events in each group to the model-based estimate of the expected number of events in each group (i.e., the final model is compared to the model with the nine additional design variables). A non-significant chi-square value indicates adequate model fit.

Appendix 2: The Parameter Estimates, Standard Errors (SE), Wald χ^2 , p-values and Hazard Ratios (HR) and Confidence Intervals for each significant covariate of Revocation (Successful completers of AOSAP versions combined into one group)

Predictor	Estimate (β)	SE	Wald χ^2	p-value	HR for Revocation (95% confidence interval)
Age Quartile ^a			108.32	< .0001	
≤ 23	0.90	0.087			2.46 (2.08 – 2.92)
24-29	0.63	0.088			1.88 (1.58 – 2.23)
30-37	0.62	0.087			1.85 (1.56 – 2.20)
Need Domains ^b :					
Education/Employment			12.52	.0058	
Asset	-0.74	0.31			0.48 (0.26 – 0.88)
None	-0.28	0.092			0.76 (0.63 – 0.91)
Some	-0.16	0.072			0.85 (0.74 – 0.98)
Associates/Social Interactions			15.30	.0016	
Asset	-0.95	0.51			0.39 (0.14 – 1.05)
None	-0.28	0.087			0.76 (0.64 – 0.90)
Some	-0.033	0.066			0.97 (0.85 – 1.10)
Community Functioning			12.32	.0064	
Asset	-1.01	0.48			0.36 (0.14 – 0.92)
None	-0.32	0.11			0.73 (0.58 – 0.91)
Some	-0.17	0.11			0.84 (0.68 – 1.05)
Attitude			19.87	.0002	
Asset	-0.16	0.24			0.85 (0.53 – 1.37)
None	-0.32	0.074			0.73 (0.63 – 0.84)
Some	-0.22	0.069			0.80 (0.70 – 0.91)
CASA's Substance Abuse Program Intensity Recommendation ^c			32.20	<.0001	
Low	0.12	0.13			1.13 (0.88 – 1.44)
Moderate	0.43	0.12			1.54 (1.20 – 1.96)
High	0.44	0.12			1.56 (1.23 – 1.98)
Unknown	0.13	0.15			1.14 (0.85 – 1.53)
Risk of Recidivism ^d			58.12	< .0001	
Moderate	0.42	0.14			1.52 (1.16 – 2.01)
High	0.79	0.14			2.20 (1.67 – 2.90)
Substance Abuse Program Status ^e			11.46	.0429	
AOSAP Incomplete	0.69	0.37		.0591	2.01 (0.98 – 4.13)
NSAP - H Successful	0.46	0.29		.1052	1.59 (0.91 – 2.77)
NSAP - M Successful	0.54	0.22		.0160	1.72 (1.11 – 2.67)
NSAP Incomplete	0.89	0.27		.0013	2.43 (1.42 – 4.16)
No Substance Abuse Program	0.48	0.21		.0254	1.61 (1.06 – 2.45)

Note. ^aThe reference level is the fourth age quartile (age 38). ^bFor all domains the reference level was comprised of the group of Aboriginal offenders rated “considerable need for improvement.” ^c“Unknown” category represents the group of individuals who were not assessed by CASA during their current sentence (N=201), of whom 95% belonged to the group of individuals who did not participate in a substance abuse program. The reference category is the rating of “none” on the CASA. ^dThe reference level was comprised of the group of “low” risk Aboriginal offenders. ^eThe reference level was the group of participants who successfully completed AOSAP, irrespective of version.

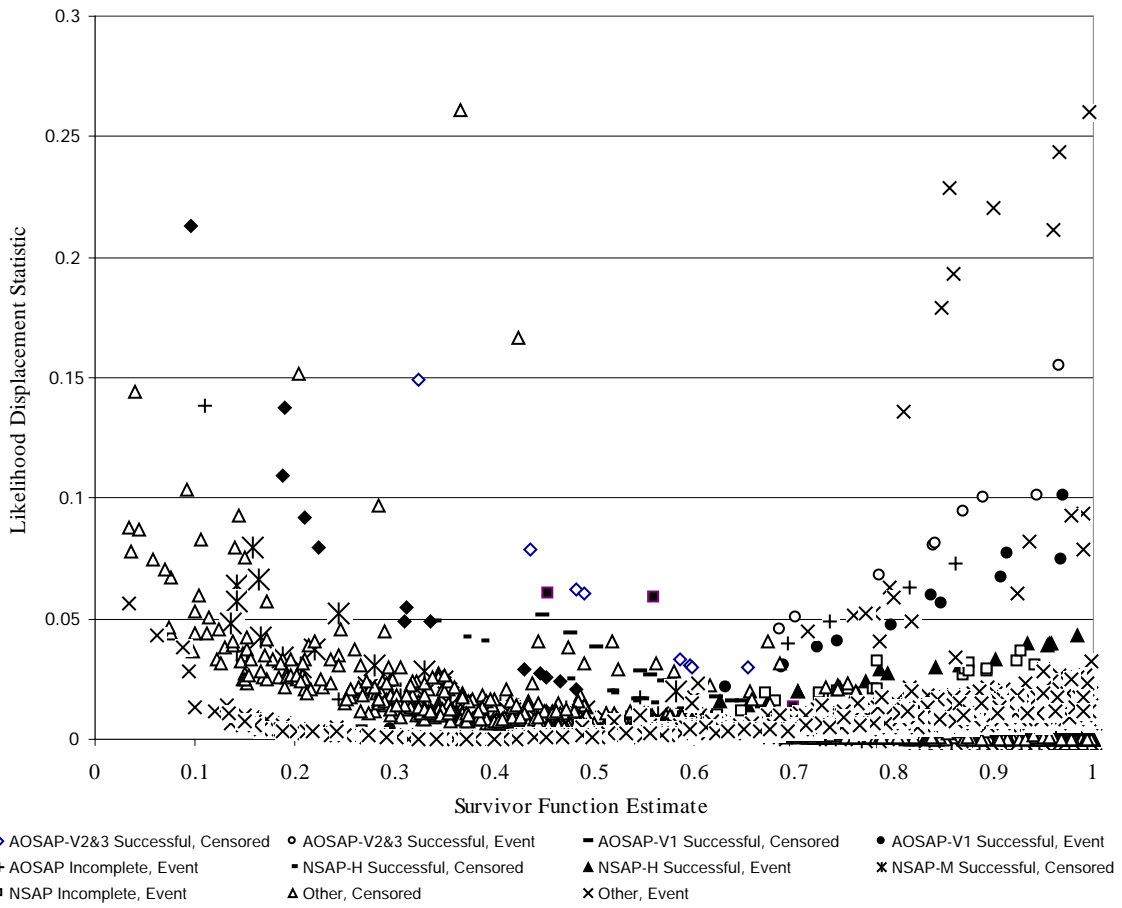
The model adequately fit the data, *Goodness of fit* χ^2 (9, N = 2683) = 5.50, p = .79.

Appendix 3: Analysis of Influential observations

The likelihood displacement statistic approximates the effect of the deletion of an observation on the overall fit of the model (Allison, 1995). Observations with large values for the *LD* statistic, relative to values for other observations, are potentially influential in terms of their impact on the conclusions that can be derived from the model. Based on the *LD* statistic, approximately 75 observations were identified as potentially influential. These were observations that remained in the community, but had a low probability of success (upper left-hand corner) or were returned to custody despite having a high probability of success (upper right-hand corner) (see Figure 3-1). A cut-off of 0.05 for the *LD* statistic was deemed appropriate in terms of identifying observations that were potentially influential on the overall fit of the model because this cut-off identified a sub-sample of extreme cases (i.e., cases that should have either succeeded or failed but did the opposite). Observations approaching the upper left-hand corner or the upper right-hand corner of the plot surface were particularly influential in terms of their effect on the overall fit of the model.

When the 75 influential observations were deleted and additional analyses performed with a subsequent model (i.e., through sensitivity analyses), the parameter estimates for program exposure categories moved away from the null indicating a stronger effect of AOSAP, irrespective of versions. Notwithstanding, all observations were retained for all analyses and modelling procedures.

Figure 3-1. Plot of the Likelihood Displacement Statistic by Survival Probabilities for the Release Cohort of Aboriginal Offenders



Appendix 4: The Proportion of Release Cohort who were Tested, Percentage of Offenders who Tested Positive, Percentage of Tests that were Positive, Mean Number of Days to First Positive Test, Mean Number of Days to First Test, Mean Days at Risk, Total Number of Offenders and Tests Distributed Across Potential Covariates of the Outcome

Variables	Release Cohort Tested %	Tested Positive %	Positive Tests %	Days to 1st Positive <i>M (Mdn)</i>	Days to 1st Test <i>M (Mdn)</i>	Days at Risk <i>M (Mdn)</i>	Total Release Cohort	Number Tests
Program Exposure								
AOSAP V-2 & 3	41.5	47.1	25.9	88 (60)	49 (44)	140 (113)	41	58
AOSAP V-1	55.9	57.9	26.1	81 (50)	32 (25)	266 (262)	34	115
AOSAP Incomplete	47.4	33.3	22.7	91 (111)	36 (33)	197 (175)	19	22
NSAP-H	66.1	56.1	34.7	69 (57)	35 (26)	204 (191)	62	167
NSAP-M	49.4	44.7	27.3	76 (55)	51 (29)	233 (197)	308	626
NSAP Incomplete	41.5	54.6	35.4	70 (39)	43 (24)	178 (147)	53	82
No Substance Abuse Program	47.2	49.1	24.5	119 (62)	84 (32)	314 (246)	2168	4813
Age Quartile								
<23	45.1	49.7	25.4	89 (55)	83 (32)	257 (210)	731	1302
24 – 29	52.2	47.4	24.9	104 (66)	76 (29)	286 (235)	652	1462
30 -37	49.9	52.8	25.7	133 (59)	71 (28)	282 (243)	684	1785
>37	44.2	45.1	25.0	113 (58)	73 (31)	364 (286)	618	1334
OIA Need Domain Identified^a								
Education/Employment - No	50.1	42.7	18.9	139 (68)	73 (29)	350 (274)	711	1908
Education/Employment - Yes	47.0	51.3	28.3	101 (57)	77 (31)	276 (230)	1972	3971
Marital/Family - No	45.2	54.7	26.2	117 (57)	79 (31)	317 (245)	1158	2482
Marital/Family - Yes	49.8	44.9	24.6	104 (61)	74 (29)	278 (243)	1525	3397
Associates/Social Interactions - No	44.6	43.3	18.3	134 (82)	77 (29)	341 (266)	752	1691
Associates/Social Interactions - Yes	49.0	50.9	28.1	103 (54)	75 (30)	277 (230)	1931	4188
Community Functioning - No	45.3	47.3	23.7	122 (68)	81 (29)	323 (254)	1688	3660
Community Functioning - Yes	52.1	51.4	27.9	94 (50)	68 (31)	248 (201)	995	2219
Substance Abuse - No	28.2	43.2	22.9	89 (81)	99 (43)	428 (335)	262	258
Substance Abuse - Yes	49.9	49.3	25.4	111 (57)	74 (29)	281 (243)	2421	5621
Personal/Emotional Orientation - No	37.3	47.8	25.9	175 (55)	98 (29)	384 (319)	185	317
Personal/Emotional Orientation - Yes	48.6	49.0	25.2	106 (58)	74 (30)	289 (244)	2498	5562
Attitude - No	45.6	44.9	20.2	132 (84)	87 (34)	342 (271)	1103	2464
Attitude - Yes	49.3	51.5	28.9	98 (46)	68 (27)	262 (219)	1580	3415
Alcohol Abuse Severity (ADS)								
None	47.8	52.9	29.4	97 (50)	70 (28)	319 (245)	657	1569
Low	49.0	50.5	25.9	108 (60)	75 (29)	282 (244)	993	2201
Moderate	44.2	47.6	23.0	143 (69)	70 (32)	273 (238)	466	927
Substantial	49.0	32.8	16.3	114 (70)	101 (34)	297 (244)	261	529
Severe	44.9	52.1	30.0	47 (30)	55 (28)	226 (209)	107	187
Unknown	50.3	50.5	21.1	128 (87)	86 (34)	369 (266)	201	470
Drug Abuse Severity (DAST)								
None	41.4	38.3	17.3	150 (82)	91 (32)	364 (301)	638	1329
Low	48.5	47.8	24.5	96 (64)	70 (28)	302 (245)	648	1404
Moderate	46.5	52.5	27.5	101 (55)	75 (32)	250 (210)	570	1144
Substantial	54.3	53.1	30.4	98 (53)	66 (27)	251 (210)	444	1163
Severe	53.8	59.6	38.9	111 (49)	70 (32)	198 (169)	184	373
Unknown	50.3	50.5	21.1	128 (87)	86 (34)	369 (266)	201	470
OIA Static Factor Rating (Risk)^a								
Low	37.4	38.7	14.2	155 (99)	100 (43)	468 (431)	289	289
Moderate	49.6	49.6	24.0	120 (71)	83 (31)	336 (264)	2318	2318
High	47.7	49.3	27.1	100 (53)	69 (29)	251 (216)	3272	3272

Note. ^aTwo offenders (four tests) had missing values for the OIA risk and need ratings. Total number of tests = 5883