

**Corrections, Health
and Human Services:**
EVIDENCE-BASED
PLANNING AND EVALUATION

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I EXECUTIVE SUMMARY

Corrections, Health, and Human Services: Evidence-Based Planning and Evaluation

1 Executive Summary

1.1 Background

The present Report is the product of an Inter-Ministry initiative within British Columbia's Provincial Government, and is designed to promote integrated planning, delivery, and evaluation of services to reduce the risk that people with substance use and mental disorders become unnecessarily involved with the corrections system.

Among those people who are sentenced through Provincial courts, many have attendant needs relating to their health, including substance use and mental disorders. The same individuals may also have income or employment-related needs, and thus require services under a variety of publicly administered program areas. This concentration of needs within the corrections population is widely recognized by front line staff, among administrators, and in published reports. The fact that there are high levels of health and human service needs within the corrections population presents a strong rationale for inter-agency collaboration and planning. There is particular value in understanding how various health, justice, and social services can be most effectively allocated in order to reduce adverse outcomes, including the risk of contact with the corrections system. This requires longitudinal knowledge about how services interact, and about subgroups that might differ in their respective risks and needs. Information relevant to this type of integrated longitudinal planning is rare. Within Canada and internationally there are no known examples of longitudinal population-level information spanning corrections, health, and social services.

1.2 An Integrated Perspective

Building on previous work completed in British Columbia, an anonymous extract of information was generated including records of services provided by three Provincial Ministries: Public Safety and Solicitor General, Employment and Income Assistance, and Health. The resulting information system contains no personal identifiers, but includes records of health services as well as employment and income assistance for all members of the corrections population sentenced in the fiscal years 1997/98 to 2003/04 (n=95,797).

The present Report constitutes the initial presentation of findings from the new information system. Specific areas of inquiry were identified by an Inter-Ministerial Steering Committee, which worked in collaboration with diverse stakeholders and scientific advisors. Major findings presented in this Report are summarized below.

1.3 Results and Discussion

RATES OF TREATED PREVALENCE. Diagnosed mental health problems, including substance use and mental disorders, are the norm among Provincial offenders. Over 30% of the corrections population had been medically diagnosed with a substance use disorder within the seven-year period surveyed. An additional 26% were diagnosed with a mental disorder unrelated to substance use. Among those people diagnosed with a substance use disorder, more than three quarters were also diagnosed with a non drug-related mental disorder (concurrent disorders). It must be emphasized that the range of psychiatric disorders represented in this report, although large, is likely an under-estimate of the true prevalence and burden of these disorders in the corrections population. Alcohol-related problems were, for example, identified less frequently than problems with other substances. This finding is at odds with epidemiological studies of the corrections population and suggests that alcohol-related problems may be under-diagnosed (and under-treated) in the corrections population. In addition, there is virtually no diagnostic information available on a range of conditions, including low IQ, developmental disorders, or fetal alcohol syndrome/effects. Abundant literature attests to the pervasiveness and impact of these conditions within the corrections population, but in the absence of any diagnostic data their prevalence in the BC corrections population must be estimated using different methodologies than the ones employed here.

PAN-MINISTRY SERVICE UTILIZATION. In general, offenders with substance use or mental disorders make greater use of diverse publicly funded services, underscoring the need for collaboration and coordination between justice, health, and human services. Levels of contact with employment and income assistance were greatest for those with concurrent disorders, followed by those with substance use only, non drug-related mental disorders, and those with no psychiatric diagnosis. Among the three Ministries represented, Employment and Income Assistance services accounted for the greatest portion of costs associated with the corrections population. Health costs for those with substance use disorders *only* and those with mental disorders *only* were about 2.5 times greater than those for people with no psychiatric diagnosis.

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VARIABILITY WITHIN THE BC CORRECTIONS POPULATION. Enhancements in services, including the coordination of existing resources, can be guided by differing needs and inequities within the corrections population. A high degree of variation was observed between the rates of substance use and mental disorders among offenders sentenced through various BC courts. In addition, those courts with the highest rates of substance use disorders did not necessarily have the highest rates of mental disorders or co-occurring disorders.

Members of the corrections population in different parts of BC used health and human services in varying degrees. On a regional basis, the overall utilization of corrections, health and human services varied widely, with higher levels of utilization in urbanized regions. Across health regions, the level of involvement with correctional services was relatively consistent. However, health and human service utilization had a high degree of variability. Aboriginal people were associated with significantly higher levels of corrections involvement, and lower levels of health services utilization than others.

CORRECTIONS CONTACTS AND MENTAL HEALTH. Substance use disorders have a significant impact on corrections involvement as well as on other service utilization (health and human services). Compared to those with no mental health or substance-related diagnoses, substance use disorders were strongly associated with markedly higher levels of involvement with the corrections system. Substance use disorder diagnoses were also associated with higher levels of health and social services utilization. In contrast, mental disorders (without substance use) appear to present a very different level of risk. Compared to those with no mental health or substance-related diagnoses, mental disorders were associated with *no increase* in the level of involvement with the corrections system.

CO-MORBIDITY AND COMPLEXITY. The combination of substance use and another mental disorder (concurrent disorders) is particularly hazardous, resulting in significantly higher health and human service costs, as well as greater involvement with corrections. Health costs for those with concurrent disorders were over 9 times higher than those with no psychiatric diagnosis. Compared to the general population, Aboriginal people are over-represented in the corrections population and exhibit disproportionately high rates of concurrent disorders, suggesting the need for strategies that are specific to the needs of Aboriginal sub-populations. Improved management of these complex disorders has the potential to reduce corrections recidivism and lessen impacts on other services.

GENDER. In comparison to the general population, men were overrepresented in the corrections population and were associated with significantly higher rates of corrections activity than women. Males were associated with significantly lower utilization of health and human services than females. Health expenditures for male offenders were on average less than half those for female offenders. Psychiatric diagnoses were significantly more common among females, accounting for a subset of health costs. Females were also significantly more likely than males to be diagnosed with concurrent disorders. In many courts, over 80% of female offenders had received a psychiatric diagnosis, which is up to 30% higher than the corresponding percentage among males. Considerably higher levels of health and human services utilization by females combined with high rates of substance use disorders, mental disorders, and concurrent disorders suggests that court liaison activities might warrant a focus on the specific needs of women within the corrections population.

EDUCATION. Educational achievement was strongly and inversely related to corrections involvement as well as to substance use problems. Education is a well-established determinant of health and social well-being that must also be considered in any truly systemic effort to reduce the risk of corrections contact among people who are also vulnerable to substance use and mental disorders.

RIVERVIEW HOSPITAL DISCHARGES. Patients discharged from Riverview Hospital directly to the community were no more likely to enter corrections over a subsequent period of observation than a comparison group of offenders (matched on age, gender, ethnicity, and prior corrections involvement). However, patients discharged from Riverview Hospital to another hospital were significantly more likely to have correctional involvement following discharge. Patients who were discharged to the community had relatively long lengths of stay at Riverview Hospital, while those discharged to community hospitals typically had much shorter lengths of stay. These patients likely present diverse psychiatric and medical needs that challenge local community resources.

1.4 Summing Up

There is compelling evidence that a significant number of offenders present complex psychiatric needs, particularly involving substance use, and that despite the deployment of health and human services to these individuals, they remain at risk for elevated rates of contact with corrections. The establishment of closer links between courts and community health and human services is strongly indicated. The treated prevalence of psychiatric disorders varied

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greatly among different courts, and between males and females, suggesting that the particular needs of individual courts might vary in relation to the design and implementation of integrated service models.

The initiative that is responsible for this initial report represents an innovative collaboration among diverse partners who provide complementary services to citizens with complex needs. The integration of anonymous information is a valuable resource for planning and evaluation, and has utility that extends well beyond the few analyses presented in this document. Further analyses will focus on improving understanding of services for Aboriginal peoples, and the manifestation and treatment of chronic illnesses within the corrections population. In addition to supporting planning in select areas, the integrated information will be used to evaluate the impact of innovative services, such as Vancouver's Drug Treatment Court, in order to assess changes in health, corrections, and human services utilization among people who are sentenced and treated through this specialized court. A separate but related initiative is designed to examine the relationship between public housing and many of the services described in this report (e.g., improved health outcomes, reduced contact with corrections).

These initiatives tangibly illustrate the understanding that diverse publicly supported services must interact concertedly in order to best meet the needs of individuals. By taking an integrated view of evidence, they also create important mechanisms for accountability and the evaluation of services. This is particularly meaningful in cases where the likely impacts of services are beyond the immediate purview of the sponsoring agency (e.g., housing).

The process of collaboration is advanced through inclusion. Readers who play a role in the planning and delivery of services may wish to consult the composition of the Project Advisory Committee, and express feedback or suggestions to an appropriate representative.



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2 Introduction

2.1 Project Background

This report focuses on improving understanding of people who have mental disorders (including substance use) and who have been sentenced through the Provincial corrections system. The analyses presented here are the product of a multi-faceted collaboration, with the goal of improving the efficiency and effectiveness of services to one of British Columbia's most challenging and complex sub-populations.

Incontrovertible evidence exists to show that the prevalence of mental disorders among those in the corrections system (prisoners and offenders on community orders) is significantly greater than the corresponding rates in the general population. Despite the prevalence of mental disorders in the corrections system, and the difficulties that surround them, few services exist either in prisons or in the community to help identify and prevent these people from entering or remaining in the criminal justice system.

However, the foregoing point does not mean that this population does not access public services. Individuals with mental disorders are likely to benefit from the provision of health services, employment services, or income assistance both before and after a period of sentencing. But the timing and coordination of these services is poorly understood. Various committees have been struck in BC and other jurisdictions, consisting of representatives from health, corrections, and human services, often labelled as Mentally Disordered Offenders (MDO) committees. The members of these committees would invariably have recognized that diverse Ministries or agencies were providing services to the same individuals. But two overarching questions loom: Is the sum total of their resources being applied to the greatest possible effect? And, apart from maximizing the degree of integration and coordination across existing services, what is missing?

The accounts of individuals can provide vivid insights into the complexity of needs borne by people with substance use and mental disorders who are at risk of becoming involved with the corrections system. Anecdotally we learn of the misery of drug overdose, the spread of infectious disease, child maltreatment and neglect, substandard housing, and the significant burden on family members and friends. We learn that some people with substance use and mental disorders can become ensnared in a "revolving door" of crime and punishment, in a

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cycle that defies attenuation, despite the accumulation of witnesses and costs, until resolution comes in the form of death.

The circumstances of an individual can powerfully illuminate the operations of particular services and policies (e.g., Gove, 1995). But what do we know of the corrections population in general? What proportions of BC's corrections population are diagnosed with substance use or mental disorders? What proportion has both a substance use and mental disorder (termed co-occurring disorders)? Are there regional differences in the prevalence of mental disorders within the BC corrections system? Is the likelihood of offending higher following discharge from a tertiary psychiatric hospital compared to other members of the corrections population? Are people with mental disorders more likely than others in the corrections system to utilize health and human services?

Answers to these types of questions are required before we can meaningfully analyse the degree of coordination and the combined effectiveness across our publicly administered services and supports. But in order to produce quantitative answers it is necessary to amalgamate information across administrative systems that historically have functioned independently.

As background to the current report, a literature review was completed focussing on people with mental disorders who were within, or at risk of entering, the criminal justice system (see: Ogloff, Davis & Somers, 2005). The information included in the literature review was limited to scholarly articles, chapters, and reports that pertain to the subject matter. The review showed that the prevalence rates of a wide variety of mental disorders are disproportionately high in the criminal justice system. It was observed that rates of certain mental disorders, such as schizophrenia and depression, are between three and five times higher than that expected in the general community. The number of offenders with mental disorders also appeared to have increased substantially during the period of time in which facilities for the treatment of severe mental disorders were reduced in size or closed. It must be noted, though, that the increase in the number of mentally ill people in the criminal justice system may be as much or more a product of the increase in the use of substances by people with mental illnesses as it is due to the deinstitutionalization of mentally ill patients.

Substance use disorders were noted as being amongst the most prevalent mental disorders in the criminal justice system. Indeed, it can be stated without exaggeration that substance use problems are endemic among prisoners, and co-occurring disorders appear to be the rule rather than the exception.

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For the purposes of our literature review, the term “mentally disordered offender” (MDO) pertained to those people who had a mental disorder and/or substance use disorder (other than anti-social personality disorder), developmental disabilities (IQ below 70), low functioning (IQ above 70 with limited adaptive abilities), brain injury (organic or acquired) and Fetal Alcohol Syndrome/Effects. In addition to our focus on mental disorders, we concentrated on people who were accused or convicted of committing offences or at high risk of involvement in the justice system.

Research regarding the prevalence of developmental disabilities (IQ below 70) and low functioning (IQ above 70 with limited adaptive abilities) in offenders was riddled with methodological problems, primarily the absence of valid IQ measures to identify those with an intellectual disability. Nevertheless, it would appear that the rate of intellectual disability is substantially higher than that in the general population in the community. Co-morbid psychiatric disturbances were also very common among intellectually disabled offenders, and of a similar prevalence to that found among offenders in general.

There was minimal research concerning rates of brain injury among offenders; however, published literature indicated that head injuries are clearly related to subsequent aggressive behaviour. The limited research available suggested that the prevalence of head injuries is higher than in the community for not only violent criminals (where head injuries are astonishingly commonplace) but also among non-violent criminals. Despite the high prevalence of head injuries experienced by offenders, the prevalence of abnormal neurological features was even higher, suggesting that various forms of brain injury are widely prevalent in the criminal justice system.

When offence rates or violence between non-mentally ill people in the community (i.e., non-offenders) are compared with people with mental illnesses, the research has typically shown that those with mental illnesses have higher offence rates and higher rates of violence. While major mental illness is a risk factor for criminal violence, the fact remains that most people with mental illness are not offenders. Thus, there exists a plethora of research regarding risk factors for offending, which must be applied to people with or without an attendant mental disorder.

Unfortunately, research confirmed that a relatively poor job is done adequately identifying the needs of mentally disordered offenders prior to the time they enter the criminal justice system.

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Then, due to the multiple and complex needs of different subgroups of offenders, services are fragmented, and both costs and inefficiencies escalate.

There is an absolute dearth of published work pertaining to effective interventions with the various groups of people that comprise the “mentally disordered” population in the criminal justice system. Diversion of offenders with mental disorders is a necessary element of the criminal justice system as research generally shows that a majority of these individuals commit only low-level, non-violent offences. While a positive concept, diversion may have relatively little benefit unless appropriate community-based services are made available. Historically, the innovation of diversion programs has preceded the introduction of these community services.

A variety of court programs exist that serve to reduce the number of mentally ill people going to prison, particularly when they have not committed serious offences. Some of these programs are essentially court diversion programs where courts have in place systems to identify and divert people with mental disorders and/or substance use disorders from the criminal justice system. In addition, courts have implemented programs in which mental health staff are employed or housed in the courts to expedite liaison with services required by defendants. Finally, there has been a movement to develop specialized courts to deal with mentally ill defendants. Generally the research shows that these programs successfully identify mentally ill offenders, but little outcome research has been conducted. Typically, as well, there is a problem finding appropriate services. Although similar to court diversion programs, court liaison programs essentially act as service brokers to identify and provide appropriate mental health services. In such programs, while diversion from the criminal justice system to the mental health system may occur, the focus of the program is on the identification of mentally ill accused and the provision of appropriate health and human services to them. There has been a trend internationally to develop court-based liaison programs for individuals with mental disorders. As with other programs reviewed, though, very few if any such programs have been adequately evaluated.

The advent of mental health courts and other specialty courts, including drug courts, has been one of the most dramatic developments in the area of mentally disordered offenders in recent times. The first mental health court was established in Los Angeles some 30 years ago. Since that time, mental health courts have been established in several jurisdictions around the United States and in other countries, including Canada (i.e., Toronto). Although perceived by some as a panacea, the reality is that relatively little is known about the efficacy

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of the alternative court programs. Despite their promise, authors have pointed out that many important questions – including their efficacy, however measured – are still unknown.

Drug courts have proliferated, particularly in the United States. The first drug court was established in Dade County, Florida in 1989. Overall, relatively little good outcome data are available for either mental health courts or drug courts, even as the number of programs has increased. Moreover, virtually no data exist to compare mental health courts to other alternative service systems. Finally, the available information on mental health treatment and mental health courts suggests the importance of assertive case management of accused who participate in mental health court systems.

A major shortcoming in the mentally disordered offender field is the general lack of systematic staff education and professional training available. Correctional officers have been found to view mentally disordered offenders as being more difficult to work with than other inmates, and feel the need for training in identifying and managing them. As the number of inmates with significant mental health problems and other mental disorders is so large, it is critical that front-line correctional staff and community corrections staff be well informed and skilled in the area of communicating with and caring for inmates. The only successful correctional mental health programs are those that have collaboration between correctional staff and mental health staff. In addition to corrections officers, all other staff, particularly chaplains, teachers, and others should be drawn upon to assist with monitoring inmates who have been identified with mental disorders. Similarly, police officers require complementary training and experience.

The purpose of cost-effectiveness analysis and cost-benefit analysis is to develop an evaluative framework to ensure the most efficient delivery of human services. Generally speaking, few scholarly articles exist to sustain the cost-benefit analysis and cost-effective analysis of therapeutic programs in prisons and, to our knowledge, no such published articles exist examining the economic analysis of services for mentally disordered offenders. The analyses that have been published show that there is good evidence that in-prison and community-based offender programs are cost-effective and have a relative cost-benefit. Such analyses are necessary for programs directed toward mentally disordered offenders.

The literature review confirmed that there is an overwhelming rationale to integrate mental health and human services with the corrections system, both to enable diversion and to promote rehabilitation. Such integration includes the physical co-location of professionals and

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the introduction of mechanisms to facilitate access to complementary services. Integration also involves the sharing of information. Individuals with mental disorders may have relevant information recorded by correctional services, hospitals, physicians, employment and income assistance (e.g., housing), community mental health, and addictions services. We are aware of no jurisdiction (including BC) in which these various records are routinely integrated in order to facilitate concerted planning.

The integration of information about publicly administered services has value beyond planning for an individual. At the population level, this same information provides quantitative insights into the resource needs and patterns of service utilization by people with mental disorders within the corrections system. Integrated information spanning a number of years would enable the monitoring of trends, and evaluation of the impact of particular events (e.g., discharge from hospital) on subsequent services (e.g., likelihood of offending). Multi-year or longitudinal information also would allow for the evaluation of strategic innovations that involve collaborations between different agencies (e.g., mental health courts) and that are intended to produce improvements that may transcend institutional boundaries (e.g., reduced criminal recidivism, improved health, more stable housing, employment, etc.).

Guided by abundant research and experience, the Province of BC committed to the integration and analysis of administrative information in order to improve understanding of persons with mental disorders who are involved with correctional services. This administrative information consisted of the records of services provided to individuals under the auspices of different Ministries. It could be argued that the activities of diverse Provincial Ministries influence the likelihood that persons with mental disorders will enter the corrections system, including Education, Economic Development, Children and Family Development, Aboriginal Relations and Reconciliation, and others. The present initiative begins with a subset of Ministries whose activities are undeniably central to the population in question, and who likely provide services within the same period of time to the same subgroups of individuals. These Ministries are: Public Safety and Solicitor General; Health; and Employment and Income Assistance.

The goals, methodology, and results of this inter-Ministry initiative are presented in the following sections of this report. The results presented here represent the first effort to analyse and interpret a unique information resource. There are abundant additional analyses that may be of value, some of which have already been identified, and others that may be stimulated by reflection on this report.

2.2 Project Goals

The overarching goal of the present initiative is to reduce the risk that individuals with mental disorders will be unnecessarily involved with the corrections system. A critical first step toward fulfilling this goal is to improve understanding of the prevalence and distribution of substance use and mental disorders within the Provincial corrections system.

Estimating the prevalence of mental disorder in the criminal justice system is a somewhat inexact practice as the population is inconsistently defined and markedly heterogeneous (Cohen & Eastman, 1997, 2000; Harris & Rice, 1997; Rice & Harris, 1997). Differences may exist on the basis of age, gender, diagnosis, or culture. Further, being classified as a “mentally ill offender” requires that several interacting criteria be met. The mental disorder limb of such criteria requires a diagnosis by a mental health professional, a practice that requires a great deal of personal opinion by the clinician (i.e., clinical judgment). Despite contemporary improvements in psychiatric nosology (e.g., American Psychiatric Association, 2000; World Health Organisation, 1992), the reliability of such diagnoses in actual clinical settings remains relatively unknown (Harris & Rice, 1997; Regier, Kaelber, Roper, Rae, & Sartorius, 1994). In addition, contact with the criminal justice system is, to a considerable extent, a product of the attitudes and practices of law enforcement agencies and legal institutions, which can differ markedly across jurisdictions (Drewett & Shepperdson, 1995; Harris & Rice, 1997). Therefore, research regarding the prevalence of mentally disordered offenders is likely to refer to a truncated sample of such individuals. This caveat must be kept in mind when reviewing the results presented in this report.

In addition, any consideration of prevalence rates within the criminal justice system must take into account the increasing population within jails and prisons. The greater number of inmates over the past 20 years has included a large proportion of people with mental disorders. Ogloff (2002) reviewed population data for prison inmates and psychiatric patients in Canada and the United States from the years 1940 to 1995. He showed that as the population of psychiatric patients was dramatically reduced following deinstitutionalization, the number of prison inmates more than tripled. Similar results were found in Canada and the United States.

Analysis of the prevalence and distribution of substance use and mental disorders is a precursor to improving the efficiency, effectiveness, and completeness of services in association with the corrections system. As noted above, there are numerous models of innovation designed to promote diversion and rehabilitation of at-risk offenders. Can we quantify the need for various

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services such as mental health courts, drug treatment courts, court liaison services, etc? Is the need for these services uniform throughout the justice system (e.g., urban/rural, north/south)? Is there evidence that specific sub-populations are in particular need of services (e.g., gender, ethnicity)?

An immediate goal of this initiative is to support evidence-based service planning. However, it is essential to monitor innovations in services following their implementation in order to evaluate their impact. The partners to the present initiative have created an information resource that is capable of addressing the immediate objectives summarized above, and that can also be applied prospectively to the evaluation of services into the future. The following section describes the partners to this initiative, followed by a detailed outline of the project methodology.

3 Methodology

3.1 Population Selected

The methodology employed in this initiative consisted of numerous stages, beginning with the identification of the population and span of time that would be studied. The time period was established around the feasibility of linking information across collaborating Ministries. Through discussion between ministry representatives it was determined that records could be linked with a high degree of confidence beginning with the fiscal year 1997/98. It was also determined that 2004 was the latest complete year of data available at the outset of planning. The interval between 1997-2004 (seven fiscal years) was therefore selected as the timeline for this initiative. The population of interest consisted of all individuals who were sentenced or put on probation or parole through Provincial Corrections anytime in these years.

3.2 About the Linked Database

In order to support the information needs established through this initiative, a database was constructed consisting of recorded episodes of service utilization but without any individual identifying information. The anonymous linked database was built through a collaborative effort on the part of Simon Fraser University, the Ministry of Health, the Ministry of Public Safety and Solicitor General (responsible for the Provincial corrections system), and the Ministry of Employment and Income Assistance (MEIA).

The methodology for linking the data from the three ministries was developed by the Centre for Applied Research in Mental Health and Addiction (CARMHA). The methodology represented an advancement of methods developed and tested previously by CARMHA. The goal of the linking process was to create a database containing no personal identifiers but retaining all of the services received by each individual from each ministry over the research time period. Once the time period and cohort had been identified, the matching process was undertaken. The matching process followed by Health was based on that used when the proof-of-concept database was created. MEIA, on the other hand, made use of existing probabilistic record linkage software (Link Plus).

Identifying information was replaced with a non-identifying study number (“Study ID”) before securely transferring data to Simon Fraser University. The Study ID variable was then used as the basis for matching files across Ministries.



In general, the data elements reflect the core services provided by the contributing Ministries. A list of the data resources included in this initiative is provided in Appendix 1.

3.3 Database Confidentiality

A series of formal procedures was observed relating to the amalgamation and analysis of administrative data. These procedures are designed to help ensure the minimization of risks relating to the management of information. Relevant procedures included the completion of privacy impact assessments within each Ministry, the development and implementation of information sharing agreements between the Province and SFU, the stipulation that no identifying information be included in the database (i.e., strictly anonymous), and approval by SFU's Research Ethics Board.

3.4 Committees and Their Roles

This initiative represents a joint undertaking of organizations and individuals, constituted in the form of three committees: Steering Committee; Scientific Advisory Committee; and Data Working Group. The Steering Committee provided overall guidance and stewardship including the development of research priorities, and was represented by the Ministry of Health (MoH), Public Safety and Solicitor General (PSSG), Ministry of Employment and Income Assistance (MEIA), Ministry of Forests and Range (MFR), the six health authorities, and the Centre for Applied Research in Mental Health & Addiction (CARMHA).

The Steering Committee consisted of the following members:

Ministry of Health

Responsible for guiding and enhancing the province's mental health and addictions services to ensure British Columbians are supported in their efforts to maintain and improve their health.

- Ann Marr
- Gerrit van der Leer
- Ian Rongve

Ministry of Public Safety and Solicitor General

Responsible for maintaining and enhancing public safety in all communities across the province.



METHODOLOGY

- Robert Watts
- Tricia Ratel
- Ron Crawford (Inter-Ministry Project Manager)

Ministry of Forests and Range – Housing Policy Branch

Devoted to improving access to safe and stable housing for all British Columbians, and responsible for provincial housing policy.

- Greg Steves
- Amy Jordan

Ministry of Employment and Income Assistance

Committed to providing assistance to those most in need, and helping people who are able to work achieve sustainable employment.

- Alison Bath
- Robert Bruce

Centre for Applied Research in Mental Health and Addiction (CARMHA)

CARMHA is a research centre within the Faculty of Health Sciences at Simon Fraser University. Its mandate is to conduct research that can be applied to enhance the effectiveness, efficiency, and quality of mental health and addiction services in British Columbia.

- Julian Somers
- Lydia Cartar
- Joan Russo
- Keith Reynolds
- Wayne Jones
- Michelle Patterson

The Ministry of Health sets province-wide goals, standards and performance agreements for health service delivery by the **Health Authorities**, each of which was represented on the Project Advisory Committee:

Fraser: Denyse Houde

Interior: Dave Harry

North: Julie Kerr

Vancouver Coastal: Lorna Howes; Heather Hay; Cori Ross



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Vancouver Island: Ken Moselle; Hendrik Roelants

Provincial Health Services Authority: Patrick Smith; Deborah Ross

The Data Working Group consisted of representatives from CARMHA, MoH, Corrections, and MEIA. This group was responsible for building the linked database, including refinement of linkage methodology, establishment of information sharing agreements, preparation of data for transmittal, matching of individual data records to research subject numbers (including resolving multiple-match situations), and the resolution of related problems.

3.4.1 Acknowledgements

The creation of this report would not have been possible without the combined efforts of the above listed individuals. The authors are deeply grateful for the opportunity to work with such a richly diverse yet consistently superb group of collaborators. The strengths of the report are a testament to their expertise and shared visions.

3.5 Development and Analysis of Research Questions

An inter-Ministry Project Manager provided direct support to Steering Committee, and completed a series of consultations with committee members and their respective organizations in order to determine the highest priority information needs relating to the administrative database. These information needs were then converted into research questions in consultation with CARMHA, ensuring that data were available to address the various information requests.

The analysis of data consisted primarily of descriptive statistics and tests of significance. Specific methods employed in the generation of results are presented in the relevant sections of the Results section.

3.6 Limitations

The data utilized in this study represent a relatively complete account of the overlapping public services and resources relating to health, employment & income assistance, and correctional services in BC. However, not all relevant services are represented in these data. For example, emergency room services are provided directly by regional Health Authorities and are not currently included in the administrative data maintained by the Ministry of Health. Similarly, forensic psychiatric services are provided through the Provincial Health Services Authority (PHSA), and are not represented in the present analyses. Additional highly relevant services are provided through community mental health and community addictions agencies. However, complete Province-wide data relating to these services are not currently available. The omission of these important services from our analyses results in underestimates of the complexity and costs associated with substance use and mental disorders within the corrections population.

A separate but similarly important class of omissions relates to the under-representation of specific conditions in BC's Provincial administrative data. For example, there are no diagnostic records corresponding directly to Fetal Alcohol Syndrome/Effects (FAS/E), developmental disabilities, low IQ, or brain injuries (organic and acquired). Abundant research has confirmed



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the high rates of prevalence of these conditions in the corrections population (see Ogloff, Davis, and Somers, 2005). Moreover, these conditions present significant management challenges to diverse public services. Hence their omission constitutes an important “blind spot” in these analyses.

Despite these important omissions, the present initiative preserves a number of strengths. Foremost, this is the first and only initiative that we are aware of that integrates health, corrections, and other human services information at the population level and spanning multiple years. The data included in this initiative constitute the recorded history of major services administered on behalf of the corrections population. In addition, each service event is associated with an established cost. In some cases the administrative data included the cost of particular services (e.g., amount paid for rent or housing). In other cases it was necessary to add costs of services based on schedules of fees provided by the relevant Ministry (e.g., costs for various hospital services). In all cases these cost data were converted into 2006-dollar equivalents.

4 Results of Research

4.1 Introduction to Results

A total of 95,797 records were included in the study population, each corresponding to a single anonymous individual sentenced through Provincial corrections. This number represents over 73% of the total number of matched across all three contributing Ministries. Approximately 35,000 individuals were excluded from consideration because their contact with corrections did not include a sentence in either community or custody settings (e.g., bail). The total number of matched records (131,269) was compared to unmatched records (6,179) on several demographic variables (age, gender, ethnicity, education) and appeared to be representative of the sentenced corrections population on these measures.

Results are organized around a series of thematic areas, beginning with several high-level analyses concentrating on the relationship between different levels of service utilization and characteristics of the corrections population. A series of results focuses on regional differences in levels of service utilization and psychiatric diagnoses. Regional results are presented in relation to the Health Authorities (HA) as well as their constituent Health Service Delivery Areas (HSDA). Additional regional analyses are presented reflecting the prevalence of psychiatric disorders across sentencing courts in BC.

We present a series of analyses addressing the costs of services provided to members of the corrections population. Statistical modelling is utilized in order to examine characteristics of the population that are associated with higher and lower levels of costs.

Finally, analyses are presented concentrating on two sub-populations of specific interest: Aboriginal Peoples; and individuals discharged from Riverview Hospital.

Diagnostic information concerning substance use disorders (SUD) and mental disorders (MD) is of central importance to many of the analyses presented. We will briefly introduce the analysis of psychiatric diagnoses before presenting a more general description of the study population.

Records of health service utilization include diagnostic information associated with episodes of hospitalization or outpatient physician services throughout the seven-year study period. An individual may have been diagnosed more than once within seven years, with the same individual disorder or with multiple psychiatric disorders. The range and type of disorders

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contributing to the SUD and MD categories is presented in Table 4-1, alongside the number and proportion of people associated with these diagnoses. The disorders listed are based on the International Classification of Diseases, Ninth Edition (ICD9).

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Table 4-1 ICD9 Diagnoses in the Substance Use Disorder (SUD) and Mental Disorder (MD) Categories

DIAGNOSTIC CATEGORY	ICD9 DIAGNOSIS	DESCRIPTION	NUMBER OF INDIVIDUALS	PROPORTION OF TOTAL COHORT 1997 - 2004 (N = 95,979)	PROPORTION OF SUBGROUP WITH ANY PSYCHIATRIC DIAGNOSIS* (N = 54,012)
SUD	304	Drug dependence	19,167	20%	35%
	303	Alcohol dependence syndrome	13,745	14%	25%
	305	Nondependent abuse of drugs	11,345	12%	21%
	292	Drug psychoses	3,127	3%	6%
	291	Alcoholic psychoses	2,029	2%	4%
MD	311	Depressive disorder, not elsewhere classified	25,657	27%	48%
	50B	Anxiety/depression	23,962	25%	44%
	300	Neurotic disorders	22,125	23%	41%
	308	Acute reaction to stress	12,398	13%	23%
	309	Adjustment reaction	7,960	8%	15%
	296	Affective psychoses	6,954	7%	13%
	301	Personality disorders	6,476	7%	12%
	307	Special symptoms or syndromes, not elsewhere classified	3,930	4%	7%
	295	Schizophrenic disorders	3,599	4%	7%
	312	Disturbance of conduct, not elsewhere classified	2,723	3%	5%
	298	Other nonorganic psychoses	2,870	3%	5%
	302	Sexual deviations and disorders	1,655	2%	3%
	310	Specific nonpsychotic mental disorders due to organic brain damage	1,384	1%	3%
	314	Hyperkinetic syndrome of childhood	1,328	1%	2%
	306	Physiological malfunction arising from mental factors	1,137	1%	2%
	297	Paranoid states	1,275	1%	2%
	293	Transient organic psychotic conditions	983	1%	2%
	294	Other organic psychotic conditions (chronic)	752	1%	1%
	290	Senile and presenile organic psychotic conditions	516	1%	1%
	313	Disturbance of emotions specific to childhood and adolescence	440	0%	1%
V61	Other family circumstances	265	0%	0%	
299	Psychoses with origin specific to childhood	229	0%	0%	
04A	General psychiatric examination - no care required	109	0%	0%	
V62	Other psychosocial circumstances	51	0%	0%	

Note: Individuals can appear under more than one ICD9 category.
*Of the 95,977 individuals in the total population, 54,012 (56%) had at least one psychiatric diagnosis.

As mentioned, Table 4-1 summarizes the number of individuals within the corrections system who were diagnosed with various psychiatric disorders sometime within the seven-year study period. As a basis for comparison we can review these rates in relation to other prevalence rates in the published literature, focussing on three disorders which each have been relatively thoroughly investigated in correction populations: schizophrenia, depression, and substance use disorders.

The results from various studies indicate that the prevalence of schizophrenia and other psychotic disorders is much higher within the criminal justice system than the general population. A large Australian national study estimated that up to 8% of male and 14% of females in Australian prisons had a major mental disorder with psychotic features (Mullen et al., 2003). In regard to schizophrenia itself, Mullen and colleagues estimated that the prevalence was between 2-5% for prisoners, and was likely to be similar for those on community orders.

Using data from 49 worldwide studies of psychotic illness (19,011 prisoners), Fazel and Danesh (2002) reported an overall prevalence rate of 4% of prisoners having psychotic illnesses. When this was broken down, 4% of male detainees and 3% of male sentenced prisoners were diagnosed with psychotic illnesses (as the preceding discussion would suggest). There was some variability across studies, some (but not all) of which was explained by differences between research that used validated diagnostic procedures (3.5%) and those that did not (4.3%). Studies from the USA also showed higher prevalence rates than elsewhere (4.5% c.f. 3.3%). As may also be expected from the previous discussion, psychosis among female prisoners was slightly higher than that in males (4.0% c.f. 3.7%).

The present results appear to be consistent with a Canadian study by Roesch (1995), which estimated that 4.9% of admissions to the Vancouver Pre-trial Services Centre were diagnosed with schizophrenic disorders. Additionally, a New Zealand study by Brinded and colleagues (2001) found prevalence rates for schizophrenia and related disorders within the last month to be 4.2% for women, 3.4% for remanded men, and 2.2% for sentenced men. The results are therefore relatively consistent across settings. Considering that the estimated lifetime prevalence rate for the general population is up to 1% (American Psychiatric Association, 1994, 2000), it is clear that the current (i.e., within the past month) prevalence of schizophrenia among prisoners is several times higher. The present data report that 4% of the BC corrections population were diagnosed with schizophrenia, a rate that is consistent with the international literature.

Fazel and Danesh (2002) also analysed 31 studies involving major depression and found higher rates among females (12%) than males (10%). Marked heterogeneity existed between the studies, particularly among those involving males, where rates of depression were as low as 5% and as high as 14% in some individual studies. Roesch (1995) reported a prevalence of 10.1% for major affective disorders, and a further 7.1% for dysthymic disorders. Ogloff (1996) found that 15.7% of admissions to the Surrey Pre-trial Services Centre were diagnosed with major depression. Brinded and colleagues' (2001) New Zealand study estimated a point prevalence for major depression of 11.1% for women, 10.7% for remanded men, and 5.9% for sentenced men.

Mullen and colleagues (2003) estimated that depressive disorders in Australian prisons were somewhat lower, approximately 5% in males and 7% in females. They acknowledged that these estimates (based in part on "severe" total scores on the Beck Depression Inventory-II) were perhaps pertaining to a more restricted range of affective disorders than that described by Fazel and Danesh (2002). They also surmised that their estimates did not take account of the "chronically miserable who...are relatively common in prisons" (p. 27).

Nevertheless, the figures from this range of studies are considerably higher than what would be expected in the general population. The point prevalence of major depression is estimated to be 5-9% for females and 2-3% for males (American Psychiatric Association, 2000). The meta-analytic results of Fazel and Danesh (2002) are 2-3 times higher. The current data include a code for depression (296, which includes bipolar disorders) and a corresponding rate of 7%. In addition, major depressive disorder may be represented in the current data under the codes for 311 (Depressive Disorder NOS) and 50B (Anxiety/Depression). Collectively these rates are much higher than those reported above, and are undoubtedly inflated by virtue of taking a seven-year sampling period, and by virtue of including a number of additional disorders besides major depression. By contrast, the seven-year sampling method is less likely to bias the resulting rates for schizophrenia, due to the relatively stable course of that disorder.

Substance use disorders are among the most prevalent psychiatric disorders in research on the corrections population. Roesch (1995) found that 85.9% of admissions to the Vancouver Pre-trial Services Centre in British Columbia received a substance use disorder diagnosis (77.6% alcohol abuse/dependence, 63.7% drug use disorders). Ogloff (1996) reported a prevalence of 60.9% of admissions to a similar correctional centre (Surrey Pre-trial Services Centre). Alcohol disorders were the most prevalent in Ogloff's study (24%), followed by cannabis (16.5%) and cocaine (10.2%). Poly-drug use disorders were also relatively common (15%).

Brinded and colleagues' (2001) study of New Zealand inmates also found high rates of substance-related disorders. Lifetime rates of alcohol abuse and dependence (39% and 35.6% respectively) and cannabis abuse (32.2%) were quite prevalent among remanded men. Among sentenced men substance use was also high (alcohol abuse, 40.6%; alcohol dependence, 35.3%; cannabis abuse, 33.2%). The rates of substance use disorders observed in this study are roughly commensurate with the international literature. Of note, virtually all major epidemiological studies have produced rates of alcohol dependence that exceed the corresponding estimates of dependence to other (i.e., illicit) drugs. It is unclear whether the relatively low rate of alcohol dependence in the current population is reflective of a truly low rate of problems or a propensity among alcohol-dependent members of the corrections population to avoid medical attention for this disorder.

Having completed this summary comparison between a selection of our observed rates and those published internationally, we turn now to analyses of the Provincial corrections population. We utilized diagnostic information spanning the available seven-year period in order to construct four groups as follows: those with no psychiatric diagnosis (No SUD or MD); those diagnosed only with a mental disorder (MD Only); those diagnosed only with a substance use disorder (SUD Only); and those diagnosed with both a mental disorder and a substance use disorder (SUD And MD).

These analyses include all individuals who had contact with the corrections system during the seven-year period extending from April 1997 to March 2004. Involvement with corrections was defined as either a custody sentence or a community contact of the following three types: probation, BC parole, National parole. Thus individuals who were administered bail or alternative measures were excluded from this analysis. The total number of individuals included was 95,797.

Each individual was classified into one of 4 diagnostic groups based on his/her contact with the healthcare system over the selected seven-year period. Groups were formed using the ICD9 diagnoses (mental disorders & substance use disorders) associated with all MSP claims and hospitalizations that occurred within these years. From the hospitalization data, diagnoses were included regardless of the type (e.g., 'most responsible', 'primary' and 'secondary'). Diagnoses were classified as either being related to substance use disorders (SUD) or to other mental disorders (MD), following the categorization outlined previously. Using these diagnoses, individuals were classified into the following mutually exclusive groups:

1. No MD or SUD
2. MD Only
3. SUD Only
4. MD And SUD

We acknowledge that in large population cohort studies such as this one, increases in the statistical significance of the test statistics are a function of the reduction in variance due to sample size. Therefore, pragmatic interpretations with respect to statistical significance must be undertaken in order to determine whether the observed statistically significant results are meaningful in relation to matters of policies and services.

We also acknowledge that the process of analysing these data will evolve over time, with refinements that build upon the results presented below. In subsequent analyses the form of the models might change due to the distributional characteristics of the observed data, and their pattern of inter-correlations. The current analyses constitute the first step in an analytic process, which may subsequently involve recoding the data to focus attention on the role of chronic diseases, and disease specific indices based on encounter and treatment data. In addition, longitudinal cohort designs will allow us to examine the prediction of costs over time.

4.2 Statistical Tests

Demographic and clinical variables were stratified by the 4 diagnostic groups and are presented in Table 4-2 and Table 4-3. Global Chi Square analyses were used to examine the relationships between the categorical factors (e.g., gender, race) and the diagnostic groups. Univariate Analyses of Variance (ANOVAs) were used as global statistics to determine if the four groups differed on continuous characteristics such as age at first visit and number of corrections admissions. If any of the global tests were statistically significant, then a set of 6 planned pair-wise post hoc analyses were conducted to understand which group differences were contributing to the global significance.

Overall, about 85% of the cohort was male. About 44% had no MD or SUD, 26% had MD alone, 7% had SUD alone, and 24% are dually diagnosed with both SUD and MD. The four groups differed significantly in the global tests for all study variables ($p < .001$). Paired comparisons showed that more men have no disorder or SUD Only in comparison to having MD Only or being dually diagnosed (MD And SUD). The proportion of women in the dually diagnosed group (25%)

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is three times that of the no disorder group (8%). The diagnostic groups did not differ in the proportions of individuals who are Black, Caucasian or East Indian.

It can be noted that the proportion of individuals in the other racial ethnicity groups are dependent upon the diagnostic status. The proportion of Aboriginals in the SUD Only group is about twice that of Aboriginals in the MD Only and No MD Or SUD groups while for the Hispanic, Asian and Unknown categories the percentage of individuals in the SUD Only group is roughly equal to or lower than the corresponding percentages in the MD Only and no diagnosis groups. In order to give more power to this important analysis, racial ethnicity was recoded into Caucasians, Aboriginals or Other (all other groups including unknown). These proportions are presented in Table 4-2.

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Table 4-2 Demographic Characteristics of the 1997 – 2004 Cohort

Characteristics	DIAGNOSTIC GROUPS				Total Cohort N=95,797 [100%]
	No MD or SUD N=41,785 [43.6%]	MD Only N = 24,985 [26.1%]	SUD Only N = 6,377 [6.7%]	SUD and MD N=22,650 [23.6%]	
GENDER					
Male	38,423 (92.0%)	19,823 (79.3%)	5,782 (90.7%)	17,211 (76.0%)	81,239 (84.8%)
Female	3,362 (8.0%)	5,162 (20.7%)	595 (9.3%)	5,439 (24.0%)	14,558 (15.2%)
AGE [*] Mean (SD)	31.7 (11.4)	33.6 (12.0)	32.5 (11.0)	33.6 (10.6)	32.7 (11.4)
ETHNICITY					
Aboriginal	5,888 (14.1%)	2,742 (11.0%)	1,597 (25.0%)	4,066 (18.0%)	14,293 (14.9%)
Black	708 (1.7%)	323 (1.3%)	93 (1.5%)	220 (1.0%)	1,344 (1.4%)
Caucasian	28,576 (68.4%)	18,583 (74.3%)	4,114 (64.5%)	16,744 (73.9%)	68,017 (71.0%)
East Indian	1,382 (3.4%)	1,078 (4.3%)	232 (3.7%)	803 (3.5%)	3,495 (3.7%)
Hispanic	509 (1.2%)	142 (0.6%)	39 (0.6%)	71 (0.3%)	761 (0.8%)
Asian	2,679 (6.4%)	969 (3.9%)	159 (2.5%)	297 (1.3%)	4,104 (4.3%)
Unknown	2,043 (4.9%)	1,148 (4.6%)	143 (2.2%)	449 (2.0%)	3,783 (3.9%)
ETHNICITY RE-GROUPED					
Aboriginal	5,888 (14.1%)	2,742 (11.0%)	1,597 (25.0%)	4,066 (18.0%)	14,293 (14.9%)
Caucasian	28,576 (68.4%)	18,583 (74.3%)	4,114 (64.5%)	16,744 (73.9%)	68,017 (71.0%)
Other	7,321 (17.5%)	3,660 (14.6%)	666 (10.4%)	1,840 (8.1%)	13,487 (14.1%)
[*] Age in years at the first contact with Corrections in the 7 fiscal years from 1997/98 to 2003/04. [] represents % of total cohort (i.e., of 95,797) () represents % of the column total (i.e., of 41,785 or 24,875, etc)					

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Table 4-3 Education Level and Corrections Status of the 1997–2004 Cohort

Characteristics	DIAGNOSTIC GROUPS				Total Cohort N=95,797 [100%]
	No MD or SUD N=41,785 [43.6%]	MD Only N = 24,985 [26.1%]	SUD Only N = 6,377 [6.7%]	SUD and MD N=22,650 [23.6%]	
EDUCATION*					
< = 6	1,225 (2.9%)	616 (2.5%)	257 (4.0%)	700 (3.1%)	2,798 (2.9%)
7 - 8 Grade	3,617 (8.7%)	2,155 (8.6%)	676 (10.6%)	2,611 (11.5%)	9,059 (9.5%)
9 - 10 Grade	11,299 (27.0%)	6,716 (26.9%)	1,952 (30.6%)	6,799 (30.0%)	26,766 (27.9%)
11 - 12 Grade	20,372 (48.8%)	11,912 (47.7%)	3,048 (47.8%)	10,514 (46.5%)	45,846 (47.9%)
University	2,588 (6.2%)	2,100 (8.4%)	248 (3.9%)	1,318 (5.8%)	6,254 (6.5%)
Unknown	2,684 (6.4%)	1,486 (5.9%)	196 (3.1%)	708 (3.1%)	5,074 (5.3%)
Education* <11th Grade or Unknown	18,825 (45.1%)	10,973 (43.9%)	3,081 (48.3%)	10,818 (47.8%)	43,697 (45.6%)
VOCATIONAL TRAINING*					
Had any	2,497 (6.0%)	1,816 (7.3%)	321 (5.0%)	1,322 (5.8%)	5,956 (6.2%)
CORRECTIONS STATUS*					
Custody only	6,215 (14.9%)	2,165 (8.7%)	839 (13.2%)	1,685 (7.4%)	10,904 (11.4%)
Community only	28,528 (68.3%)	19,129 (76.6%)	3,055 (47.9%)	13,325 (58.8%)	64,037 (66.8%)
Custody & Community	7,042 (16.9%)	3,691 (14.8%)	2,483 (38.9%)	7,640 (33.7%)	20,856 (21.8%)
# OF CORRECTIONS ADMITS* Mean (SD)	1.4 (1.4)	1.4 (1.26)	2.6 (2.9)	2.4 (2.6)	1.7 (1.9)
<p>* At the first contact with Corrections in the 7 fiscal years from 1997/98 to 2003/04.</p> <p>+ In the 7 fiscal years from 1997/98 to 2003/04.</p> <p>[] represents % of total cohort (i.e., of 95,797)</p> <p>() represents % of the column total (i.e., of 41,785 or 24,875, etc)</p>					

The global tests for education were statistically significant ($p < .001$) indicating differences in educational attainment among the diagnostic groups. Only a limited number of these differences, however, may have any clinical or policy related significance. In particular, among those with the lowest level of education (i.e., $\leq 6^{\text{th}}$ Grade), rates of substance use disorders were over 1.5 times those of mental disorders while among those with a high level of education (i.e., University), rates of mental disorders were more than double those of substance use disorders.

It is clear that the location to which an individual was sentenced (custody or community) is related to diagnostic groupings. In general those with No MD or SUD and the SUD Only group were twice as likely to be sentenced to custody. Those diagnosed with MD Only were the most likely to be sentenced in the community. Those with any SUD involvement were twice as likely as the other diagnostic groups to have been sentenced in *both* custody and community settings.

Interestingly, although the whole cohort has an average of 1.7 correction admits, the mean is significantly lower for those with MD Only and significantly higher for those with any SUD involvement. The results indicate that presence of a mental disorder on its own is not associated with increased risk of repeat offending relative to those people with no psychiatric diagnosis of any kind. In contrast, a substance use disorder (with or without a co-occurring psychiatric disorder) is associated with a significantly greater risk of corrections recidivism.

Table 4-4 presents the Aboriginal sub sample analyses ($N = 14,293$ or about 15% of the sample). Additional analyses (not tabulated) showed that in comparison to the rest of the cohort, this sub sample was more likely to be female, younger, and have lower levels of educational achievement than other members of the corrections cohort. Diagnostically, the pattern of this sub sample differs from the overall cohort. Aboriginal people were more likely to be grouped diagnostically into the SUD Only and SUD And MD categories than the rest of the cohort. These sub groups were more likely to have been sentenced to both custody and community settings, and had a significantly higher number of overall sentences during the study period.

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Table 4-4 Characteristics of Aboriginal Group		
CHARACTERISTICS	NUMBER OF ABORIGINALS (N=14,293)	% OF ABORIGINALS
GENDER		
Male	10,962	76.7%
Female	3,331	23.3%
AGE^o	Mean=31.0	SD=10.5
EDUCATION[*]		
<11th Grade or Unknown	8,717	61.0%
VOCATIONAL TRAINING⁺		
Had any	514	3.6%
DIAGNOSTIC GROUPINGS		
No MD or SUD	5,888	41.2%
MD Only	2,742	19.2%
SUD Only	1,597	11.2%
MD and SUD	4,066	28.5%
CORRECTIONS STATUS ⁺		
Custody only	1,484	10.4%
Community only	8,386	58.7%
Custody & Community	4,423	31.0%
# OF CORRECTIONS ADMITS⁺	Mean=2.1	SD=2.4
^o Age in years at first contact with Corrections in the 7 fiscal years from 1997/98 to 2003/04. [*] Education at first contact with Corrections in the 7 fiscal years from 1997/98 to 2003/04. ⁺ In the 7 fiscal years from 1997/98 to 2003/04.		

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This analysis modestly augments the widely appreciated plight of Aboriginal peoples in Canada's corrections system. Our results suggest that there is reason to focus further attention on interventions and services addressing substance use (and co-occurring disorders) among Aboriginal peoples. In addition, these analyses suggest the need for particular attention on the health needs of female Aboriginal offenders. Education level and vocational achievement are important determinants of the risk of involvement with Corrections. The present results reinforce that efforts to reduce Aboriginal corrections risks must include attention to distal factors such as education.

4.3 Annual per Person Costs in 2006 Dollars

A series of detailed analyses were undertaken examining the costs associated with services provided through Health, MEIA, and PSSG (referred to here as "corrections"). Previous results indicated that there are significant differences in the costs of services associated with different diagnostic subgroups. But what are the annual costs per individual for all Ministries? What are the costs per person per year associated with each Ministry separately? What is the pattern of total costs (and costs per Ministry) associated with each of the four diagnostic subgroups (No MD or SUD, MD Only, SUD Only, co-occurring MD And SUD)? Finally, are there any differences in costs when comparing between Health Authorities (HA) or Health Service Delivery Areas (HSDA)?

Table 4-5 provides annual per person costs per ministry and includes all individuals in the seven-year cohort (n=95,797). Subsequent tables (See Appendix 3) are organized based on the location in which Health services were received, and therefore include only those individuals for whom location information was available (e.g., health location information was not available for those individuals who received no health services within the seven-year study period). Location information was available for 89% (84,918 of 95,797) of the seven-year cohort. Appendix 2 outlines how per person costs were calculated.

4.3.1 Statistical Testing

We tested whether the mean costs of services for the four diagnostic subgroups were the same when all Ministries were combined and for each Ministry separately. Due to the extremely skewed nature of the distribution of costs, the non-parametric Kruskal-Wallis test was used to compare diagnostic groups. This test compared the rank ordering of costs of the four diagnostic groups. All of the overall Kruskal-Wallis tests

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were significant at $p < .001$ - by Ministry, by HA and by HSDA. As a result, post-hoc Kruskal-Wallis tests were performed to compare each pair of diagnostic groups (i.e., six pair-wise tests).

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Table 4-5 Annual Costs per Person per Ministry (in 2006 Dollars)

Ministry		Total Cohort 1997–2004 N=95797	DIAGNOSTIC GROUPS			
			No MD or SUD N=41785	MD Only N=24985	SUD Only N=6377	SUD and MD N=22650
Health	Mean	1,271	212	1,102	1,105	3,458
	SD [†]	3,582	786	2,775	2,728	5,972
	Median	244	41	390	344	1,485
MEIA	Mean	2,189	1,038	2,245	2,342	4,207
	SD [†]	3,246	2,139	3,337	2,866	3,872
	Median	467	0	480	1,246	3,348
Corrections	Mean	1,206	952	818	2,427	1,759
	SD [†]	2,871	2,405	2,040	4,687	3,521
	Median	297	288	289	475	428
All 3 Ministries	Mean	4,666	2,202	4,165	5,874	9,424
	SD [†]	6,359	3,477	5,132	6,483	8,561
	Median	1,985	720	2,050	3,695	7,502

[†] SD=Standard deviation, a measure of variability about the mean

4.4 Analyses by Ministry

The mean ranks for the diagnostic groups were found to differ significantly within each Ministry, indicating that cost differences exist between the groups. All comparisons were significant at the .001 level, with one exception (Corrections’ “No MD or SUD” and “MD Only” groups differed significantly at $p < .05$). The discussion that follows focuses on the median costs presented in Table 4-5.¹

Beginning with Corrections costs, it is clear that despite the presence of statistically significant differences between each of the four groups, there are in fact two clusters of costs: one level of cost for those with an SUD (regardless of whether the person has an associated mental disorder); and another level of cost for those without an SUD (regardless of whether the person has a mental disorder or no diagnosis). This observation reinforces that it is substance use (rather than the presence of a mental disorder per se) that increases the risk of repeat involvement with the corrections system. Individuals with a mental disorder only (MD Only)

¹Overall analyses used the Kruskal-Wallis test which compares mean ranks. Testing of the differences between medians showed the same pattern of results as those from the Kruskal-Wallis tests.

were associated with the same levels of corrections services as people with no diagnosis. The term “mentally disordered offender” (MDO) is sometimes invoked in reference to the broad overlap between psychopathology and the justice system. The current findings suggest that this term may be a misnomer, unduly emphasizing (and perhaps further stigmatizing) mental disorders rather than concentrating efforts on the more evident challenges associated with substance use.

Proceeding to MEIA costs, there is an apparent ordinal progression from zero (those with No MD or SUD) followed by a gradual increase in costs for those with MD, then higher costs for those with an SUD, and finally the highest levels of costs associated with those with an MD And SUD. Although the pattern of increases differs between corrections and MEIA, the highest costs to both Ministries are associated with the two groups diagnosed with substance use disorders. Previous research confirms that substance use is a strong predictor of corrections involvement and a significant contributor to personal disability. The present data confirm these findings, and suggest that interventions designed to reduce substance use disorders in the present population may achieve benefits in the form of reduced impacts on corrections and MEIA.

Health costs associated with the four diagnostic groups have a distribution that differs from that of the other two Ministries. As before, the lowest level of cost is associated with the group having no psychiatric diagnosis in the seven-year period. However, Health is the only Ministry associated with *lower* median costs for the SUD group in comparison with the MD group. Meanwhile the corresponding Health cost for co-occurring SUD and MD is several times the cost of SUD alone. Diverse factors might contribute to this pattern of costs. Individuals with substance use problems may access care in forms that are not included in the present dataset (e.g., self-help, 12 step, community addictions services). Nevertheless, recent reviews of mental health and addictions services in Canada have emphasized that, overall, there are insufficient levels of service available for the treatment of substance use disorders, and that those resources that do exist are not adequately integrated with other health and human services (Kaiser Youth Foundation, 2001; Standing Senate Committee on Social Affairs, Science and Technology, Senate of Canada, 2006). Moreover, individuals with co-occurring disorders have been poorly served by systems of healthcare that segregate mental health, addiction, primary healthcare, and other services (Health Canada, 2002). Our results are consistent with the observation that substance use treatment services must be closely integrated with the population at risk of entering corrections. The dramatic increase in health

costs associated with co-occurring disorders may reflect appropriate spending on the needs of complex patients. Alternatively, the results might suggest that greater overall health costs are a consequence of insufficient treatment of substance use and co-occurring disorders.

When all three Ministries are combined there appears to be a step-wise increase in the median costs of services as follows: those with no diagnosis (\$720); MD Only (\$2050); SUD Only (\$3695); and SUD and MD (\$7502). As described above, the appearance of an ordinal increase across the groups is sustained by differing cost implications for each diagnostic group within the scope of services provided by each individual Ministry. The present results suggest that the overall costs associated with substance use are disproportionately borne by corrections and MEIA. Individuals with co-occurring disorders make greatest use of the services provided by all three Ministries, and therefore represent a common focus of concern. These results support the rationale for coordinated planning across these Ministries, to ensure that there is a concerted benefit to their separate interactions with the same individuals.

4.5 Analyses by Health Authority

The following section details the regional pattern of service costs associated with Health, MEIA, and PSSG/corrections. Information is presented for all five regional Health Authorities, and each of the 16 Health Service Delivery Areas (see Appendix 3). In general, the pattern of costs within each Health Authority emulated the distribution of costs at the Provincial level, as summarized in Table 4-5. The division of the population into regional groups had a predictable impact on statistical tests. Namely, many small differences between groups did not cross the threshold of statistical significance. At the Health Authority level, nearly all of the median costs per Ministry differed *highly* significantly from each other ($p < .001$).

However, it is necessary to look beyond the test statistics in order to understand the meaningfulness of these data. It is apparent, for example, that within both Health and MEIA, costs associated with the MD And SUD groups are similar (and in fact these costs were not significantly different in all HAs). Within Corrections, costs appear comparable for the No MD or SUD and MD Only groups. Similarly, Corrections costs are comparable between the SUD Only and the combined MD And SUD groups. These observations reiterate that pattern described above, but these relationships are borne out more clearly by statistics at the regional level. The pattern of significance tests is further replicated when conducted at the HSDA (not presented here due to repetition of results).

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The characteristics of the population differ between each HA (and HSDA). The variation in population characteristics can have an influence on the prevalence of health conditions, including substance use and mental disorders. Table 4-6 summarizes the demographic characteristics of the population within each HA, and Table 4-7 within each HSDA. These factors should be taken into account when interpreting regional rates and differences between regions.

Table 4-6 Demographic and Clinical Characteristics of the 1997- 2004 Cohort by HA

Health Authority	Male N (%)	Ethnicity			Age [*] Mean (SD)	Education	Diagnostic Groups			
		Caucasian N (%)	Aboriginal N (%)	Other N (%)			No MD or SUD N (%)	MD only N (%)	SUD only N (%)	SUD and MD N (%)
Interior	13,632 (83.8%)	12,906 (79.3%)	2,577 (15.8%)	793 (4.9%)	32.8 (11.8)	<11th Grade ⁺ N (%)	6,402 (39.3%)	4,846 (29.8%)	1,024 (6.3%)	4,004 (24.6%)
Fraser	22,911 (85.2%)	20,324 (75.6%)	1,763 (6.6%)	4,811 (17.9%)	32.4 (11.0)	11,631 (43.2%)	9,629 (35.8%)	8,274 (30.8%)	1,852 (6.9%)	7,143 (26.6%)
Vancouver Coastal	13,548 (86.0%)	9,647 (61.2%)	2,171 (13.8%)	3,938 (25.0%)	33.3 (11.0)	6,610 (42.0%)	5,822 (37.0%)	4,120 (26.2%)	1,297 (8.2%)	4,517 (28.7%)
Vancouver Island	13,194 (83.7%)	12,341 (78.3%)	2,378 (15.1%)	1,051 (6.7%)	32.6 (11.6)	7,365 (46.7%)	5,501 (34.9%)	4,653 (29.5%)	1,128 (7.2%)	4,488 (28.5%)
Northern	8,451 (82.7%)	5,858 (57.3%)	3,971 (38.9%)	389 (3.8%)	32.0 (11.1)	5,614 (54.9%)	4,447 (43.5%)	2,634 (25.8%)	844 (8.3%)	2,293 (22.4%)
Unknown	9,503 (87.4%)	6,941 (63.8%)	1,433 (13.2%)	2,505 (23.0%)	33.3 (12.2)	4,968 (45.7%)	9,984 (91.8%)	458 (4.2%)	232 (2.1%)	205 (1.9%)
Total	81,239 (84.8%)	68,017 (71.0%)	14,293 (14.9%)	13,487 (14.1%)	32.7 (11.4)	43,697 (45.6%)	41,785 (43.6%)	24,985 (26.1%)	6,377 (6.7%)	22,650 (23.6%)

^{*} Age at first contact with Corrections in the 7 fiscal years from 1997/98 to 2003/04.

⁺ Education at first contact with Corrections in the years 1997/98 to 2003/04 and includes those with unknown education.

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Table 4-7 Demographic and Clinical Characteristics of the 1997- 2004 Cohort by HSDA

Health Service Delivery Area	Male N (%)	Ethnicity			Age [°] Mean (SD)	Education <11 th Grade+ N (%)	DIAGNOSTIC GROUPS			
		Caucasian N (%)	Aboriginal N (%)	Other N (%)			No MD or SUD N (%)	MD only N (%)	SUD only N (%)	SUD & MD N (%)
East Kootaney	1,248	1,261	149	69	31.4	749	742	402	84	251
	(84.4%)	(85.3%)	(10.1%)	(4.7%)	(11.5)	(50.6%)	(50.2%)	(27.2%)	(5.7%)	(17.0%)
Kootenay Boundary	1,533	1,634	87	77	33.1	794	753	486	109	450
	(85.3%)	(90.9%)	(4.8%)	(4.3%)	(12.1)	(44.2%)	(41.9%)	(27.0%)	(6.1%)	(25.0%)
Okanagan	5,526	5,552	600	412	33.0	2,936	2,322	2,096	365	1,781
	(84.2%)	(84.6%)	(9.1%)	(6.3%)	(11.9)	(44.7%)	(35.4%)	(31.9%)	(5.6%)	(27.1%)
Thompson Cariboo	5,325	4,459	1,741	235	32.7	3,030	2,585	1,862	466	1,522
	(82.8%)	(69.3%)	(27.1%)	(3.7%)	(11.7)	(47.1%)	(40.2%)	(28.9%)	(7.2%)	(23.7%)
Fraser East	5,458	4,933	762	709	32.7	3,004	2,301	2,004	389	1,710
	(85.2%)	(77.0%)	(11.9%)	(11.1%)	(11.4)	(46.9%)	(35.9%)	(31.3%)	(6.1%)	(26.7%)
Fraser North	7,684	6,849	514	1,754	32.3	3,805	3,293	2,663	679	2,482
	(84.3%)	(75.1%)	(5.6%)	(19.2%)	(10.9)	(41.7%)	(36.1%)	(29.2%)	(7.5%)	(27.2%)
Fraser South	9,769	8,542	487	2,348	32.4	4,822	4,035	3,607	784	2,951
	(85.9%)	(75.1%)	(4.3%)	(20.6%)	(10.9)	(42.4%)	(35.5%)	(31.7%)	(6.9%)	(25.9%)
Richmond	1,291	951	30	496	33.4	545	584	519	68	306
	(87.4%)	(64.4%)	(2.0%)	(33.6%)	(11.6)	(36.9%)	(39.5%)	(35.1%)	(4.6%)	(20.7%)
Vancouver	8,975	5,919	1,455	3,064	33.4	4,464	3,698	2,407	1,007	3,326
	(86.0%)	(56.7%)	(13.9%)	(29.4%)	(10.5)	(42.8%)	(35.4%)	(23.1%)	(9.7%)	(31.9%)
North Shore / Coast Garibaldi	3,282	2,777	686	378	32.8	1,601	1,540	1,194	222	885
	(85.5%)	(72.3%)	(17.9%)	(9.8%)	(11.8)	(41.7%)	(40.1%)	(31.1%)	(5.8%)	(23.0%)
South Vancouver Island	5,858	5,835	619	486	32.2	2,902	2,333	2,094	467	2,046
	(84.4%)	(84.1%)	(8.9%)	(7.0%)	(11.3)	(41.8%)	(33.6%)	(30.2%)	(6.7%)	(29.5%)
Central Vancouver Island	4,864	4,244	1,199	390	32.8	3,007	2,091	1,722	398	1,622
	(83.4%)	(72.8%)	(20.6%)	(6.7%)	(11.7)	(51.6%)	(35.9%)	(29.5%)	(6.8%)	(27.8%)
North Vancouver Island	2,472	2,262	560	175	33.1	1,456	1,077	837	263	820
	(82.5%)	(75.5%)	(18.7%)	(5.8%)	(11.9)	(48.6%)	(35.9%)	(27.9%)	(8.8%)	(27.4%)
Northwest	2,595	1,233	1,718	130	32.3	1,729	1,352	805	270	654
	(84.2%)	(40.0%)	(55.8%)	(4.2%)	(11.2)	(56.1%)	(43.9%)	(26.1%)	(8.8%)	(21.2%)
Northern Interior	3,967	3,101	1,581	142	32.0	2,611	1,951	1,299	368	1,206
	(82.2%)	(64.3%)	(32.8%)	(2.9%)	(11.2)	(54.1%)	(40.4%)	(26.9%)	(7.6%)	(25.0%)
Northeast	1,889	1,524	672	117	31.5	1,274	1,144	530	206	433
	(81.7%)	(65.9%)	(29.1%)	(5.1%)	(10.9)	(55.1%)	(49.5%)	(22.9%)	(8.9%)	(18.7%)
Unknown	9,503	6,941	1,433	2,505	33.3	4,968	9,984	458	232	205
	(87.4%)	(63.8%)	(13.2%)	(23.0%)	(12.2)	(45.7%)	(91.8%)	(4.2%)	(2.1%)	(1.9%)
Total	81,239	68,017	14,293	13,487	32.7	43,697	41,785	24,985	6,377	22,650
	(84.8%)	(71.0%)	(14.9%)	(14.1%)	(11.4)	(45.6%)	(43.6%)	(26.1%)	(6.7%)	(23.6%)

[°] Age at first contact with Corrections in the 7 fiscal years from 1997/98 to 2003/04.

^{*} Education at first contact with Corrections in the years 1997/98 to 2003/04 and Includes those with unknown education.

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Appendix 3 presents a series of tables specifying the annualized per person costs of All Ministries and Each Ministry separately for the population at the levels of Health Authority and Health Service Delivery Area. The reader will observe that there are large differences in costs between regions. There are myriad factors influencing the levels of service utilization through each Ministry in different parts of the Province. Potential explanatory factors would eclipse the list of demographic characteristics summarized in Table 4-6 and Table 4-7, including local rates of employment, cost of living, access to health and human services, etc. The interpretation of these data requires careful consideration of local issues, exceeding the scope and capabilities of the current report. However, it is hoped that this information may be of benefit to planners of services within various regions, and that local insights will be channelled back to this initiative in order to assist with the further analysis and interpretation of regional differences over time.

4.6 Cost Modelling Analyses

4.6.1 Method

In order to conduct the cost modelling analyses, several analytic steps were undertaken in order to validate the statistical tests and ensure the most conservative estimates. In this regard, we decided to remove 3,996 individuals. These individuals were in all analyses up to this point. However, they were removed from the cost modelling analyses because we had no health or MEIA data for these people, and could thus not confirm that they were indeed matched and had zero costs (versus appearing to have no costs because they were not matched successfully in the first place). For that reason, rather than giving these people “0” costs and biasing towards finding lower costs in those with no disorders (we have no health data), we decided to utilize a more conservative approach by eliminating this sub-sample, amounting to a 4% reduction in cohort size.

We examined statistical differences between those 3,996 and the remaining population who are used in the cost studies ($n = 91,801$). The excluded group is more likely to be the “Other” ethnicity group, is 2 years older on average, is more often in the “Community only” group, and has fewer admits to Corrections on average. Despite their statistical significance, these variations in characteristics do not meaningfully bias the analysis of the remaining large number of people with matched data. We adjusted all our cost models for those demographic characteristics in lieu of calculating non-response or other types of sample weights.

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We employed the two-part cost model (Diehr, et al., 1999; Ciechanowski, Katon & Russo, 2000) to examine the relationship between cost outcomes and demographic and clinical characteristics. This model allows us to examine the factors relating to *who* uses a given service, and then, for those who *do use* a given service, the second part of the model lets us robustly estimate the *median cost ratio* for our variables of interest. That is, the estimate is independent of any actual dollars, and has little relation to the annualized costs presented in Table 4-5 or in the tables in Appendix 3. This median cost ratio can be interpreted as the *relative percentage* of cost difference. Therefore, a cost ratio of 1.00 is null, that is, both groups have the same costs. If the ratio is statistically significantly greater than 1, then that number is the ratio of median costs. For example, a 1.20 would mean that one group has 20% greater costs, while a 2.4 would mean that one group has 140% greater costs. Alternatively, these ratio estimates can be less than 1 and statistically significant. For example, a ratio of .80 means 20% less costs in one group and is essentially the same as 1.2 because these indices are dependent upon their coding.

Prior to any analyses we examined ratios of the variances of the costs for the diagnostic groups for heteroscedasticity. For part 1 of the model, where we predict usage of services, it is necessary to have variance in utilization. For our sample, everyone had health costs, correction costs and therefore total costs. However, not all individuals had MEIA costs. Therefore we will only examine a part 1 model for utilization of MEIA services. In this model an indicator was constructed which indicated if the individual had any non-zero cost (=1) or 0 cost (= 0). A multivariable logistic regression model was constructed using the demographic and clinical characteristics. All variables were entered into the equation simultaneously and no outliers were observed.

Table 4-8 presents Part I of the Cost Model for MEIA benefits during the 7-year period. The table contains the betas, their standard errors, test statistics, odds ratios for the demographic and clinical variables, and their 95% confidence intervals. We adjusted this model for HSDA using dummy coding adjustments. This adjustment was statistically significant. The relationship between diagnostic groups and MEIA benefits is very strong statistically and is clinically meaningful. In comparison to those with no disorders, there was a clear step pattern of positively increasing odds of service with psychiatric severity: Those with MD Only were 1.4 times more likely to receive MEIA benefits within those 7 years; those with SUD Only were more than twice as likely; and those with dual

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diagnoses were 3.8 times more likely to receive MEIA benefits. Not only are the two SUD groups more likely to receive MEIA benefits, but previous analyses showed that the annual amount of these benefits is considerably higher than the amount received by the other two groups.

Women were significantly more likely to receive MEIA benefits, as were Caucasian individuals. Each year of age significantly decreases by about 2% the likelihood of receiving benefits. People with lower levels of educational completion (i.e., less than grade 11) were 1.5 times more likely to receive benefits. Those who had vocational training were 1.2 times less likely to have received MEIA benefits than those who did not. MEIA benefits were also related to the number of corrections sentences during the 7 years. For every additional sentence there was a 1.4 times increase in the odds of receiving MEIA benefits.

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**Table 4-8 Part 1 of Two Part Cost Model –
Prediction of Whether Or Not MEIA Benefits Were Received***

Variables	B	Std. Error	Wald Test	df	Significance	Odds Ratio	95% C.I. for Odds Ratio	
							Lower	Upper
Diagnostic Groups			3661.02	3	p < .001			
No MD or SUD vs. MD Only	0.33	0.02	329.25	1	p < .001	1.39	1.34	1.44
No MD or SUD vs. SUD Only	0.78	0.03	563.74	1	p < .001	2.17	2.04	2.31
No MD or SUD vs. SUD & MD	1.32	0.02	3475.36	1	p < .001	3.75	3.59	3.92
Male	-0.70	0.02	948.70	1	p < .001	0.50	0.47	0.52
Ethnicity			1443.19	2	p < .001			
Caucasian vs. Aboriginal	-0.09	0.02	13.35	1	p < .001	0.92	0.88	0.96
Caucasian vs. Other	-0.86	0.02	1439.5	1	p < .001	0.43	0.41	0.44
Age[°]	-0.02	0.001	770.31	1	p < .001	0.98	0.98	0.98
Education < 11th Grade or Unknown	0.37	0.02	575.67	1	p < .001	1.45	1.41	1.5
Had vocational training	-0.20	0.03	44.22	1	p < .001	0.82	0.77	0.87
# of Corrections Admits⁺	0.35	0.01	2545.05	1	p < .001	1.42	1.41	1.44
HSDA			3910.65	16	p < .001			

[°] Age at first contact with Corrections in the 7 fiscal years from 1997/98 to 2003/04.
⁺ In the 7 fiscal years from 1997/98 to 2003/04.

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Table 4-9 and Table 4-10 present the results for Part II of the Cost Model. This analysis contains only those individuals who have a non-zero cost. That includes the whole cohort for all but the MEIA model. Our four cost outcomes are total costs and health, MEIA and corrections costs broken out. These costs may be further divided into additional categories for more in depth analyses. For example, further analyses could focus separately on pharmacy-related costs compared to other health costs.

4.6.2 Total Costs (All Ministries Combined)

After controlling (adjusting) simultaneously for all available demographic and clinical characteristics, we found a very strong relationship between costs and psychiatric disorders. In comparison to individuals with No MD or SUD, those with MD Only had 84% greater overall costs; those with SUD Only had 109% greater costs and incredibly, those with both MD And SUD have almost 300% higher costs across all Ministries combined.

Confidence intervals relating to these values are relatively narrow, reinforcing the robustness of the observed differences. The findings for the rest of the study variables are also interesting: Men have 42% lower total costs in comparison to women. Those with lower levels of educational completion (i.e., below grade 11) have 18% higher costs than those with higher levels of education. Vocationally trained individuals have lower total costs by 15%. Race and age, although statistically significant, have a limited effect on costs in their current coded form. Note however that costs for the “Other” ethnic group are 26% lower than those for Caucasians, reflecting primarily lower corrections costs. Compared to Caucasians, Aboriginal total costs were slightly greater.

The number of admissions to corrections (i.e., sentences) increases total costs substantially. For each additional sentence, the total cost (and of course this includes corrections costs) increases 28%.

4.6.3 Corrections Costs

The current model confirms and quantifies several of the trends reported previously in this report. Correctional services were considerably more likely to be used by males (27%). Of note, Corrections is the only Ministry that provided services to males in greater proportion (i.e., higher per person costs) than females. Correctional costs were significantly higher for the diagnostic groups with substance use disorders, while those with no diagnosis had only 2% higher costs than those with no psychiatric diagnosis.

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4.6.4 MEIA Costs

Females received a much greater level of support through MEIA than males (34% higher). A portion of this difference may be attributed to increased levels of support relating to childcare or the provision of support for other dependents. Compared to those with no psychiatric diagnosis, those with substance use disorders only received 12% more support, those with mental disorders only received 22% more, and those with concurrent disorders received 70% more.

4.6.5 Health Costs

The gap between males and females in relation to health costs is considerable, with females having 54% higher health costs than males. Health-related costs for those with mental disorders were 164% higher than those with no diagnosis (i.e., No MD or SUD). Those with substance use disorders registered 152% higher costs than the no diagnosis group. Of note, those with concurrent disorders (Both MD And SUD) had 803% higher Health costs than those with no diagnosis. This amount is greater than the sum of the MD And SUD groups separately, and is worryingly high. Health costs increased by 2% for each additional year of age within the corrections population.

4.6.6 Regional Differences in Costs

Finally, the model was used to compare the costs of services in all the Health Service Delivery Areas. A single reference point is required to run the model and Vancouver was selected. Results illustrate that all other HSDAs have significantly lower overall costs when compared to Vancouver, with more urbanized HSDAs reflecting higher rates of service utilization (i.e., higher costs). For example, compared to Vancouver, the rate of corrections costs in the Northern Interior did not differ significantly. However, the Northern Interior had significantly lower costs for both Health and MEIA (by about 20%). There is further variability in costs across HSDAs in total costs and within individual Ministries. Health costs appear suppressed in HSDAs where patients can access care in Alberta (e.g., Northeast and East Kootenay).

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Table 4-9 Part II of Two Part Cost Model (Median cost ratio (95% CI))

	Costs			
	Overall	Health	MEIA	Corrections
Male	0.58 *** (0.57 - 0.60)	0.46 *** (0.45 - 0.48)	0.66 *** (0.65 - 0.68)	1.27 *** (1.25 - 1.30)
Age	1.01 *** (1.01 - 1.01)	1.02 *** (1.02 - 1.02)	1.01 *** (1.01 - 1.01)	1.00 *** (1.00 - 1.00)
Ethnicity				
Caucasian vs. Aboriginal	1.09 *** (1.06 - 1.11)	0.96 ** (0.94 - 0.99)	1.04 *** (1.02 - 1.06)	1.10 *** (1.07 - 1.12)
Caucasian vs. Other	0.74 *** (0.72 - 0.75)	0.99 (0.96 - 1.01)	1.02 (1.00 - 1.04)	0.91 *** (0.89 - 0.93)
Education < 11th Grade or Unknown	1.18 *** (1.16 - 1.20)	1.05 *** (1.03 - 1.07)	1.08 *** (1.06 - 1.09)	0.97 *** (0.95 - 0.98)
Had Vocational Training	0.85 *** (0.82 - 0.87)	0.94 ** (0.91 - 0.98)	0.96 ** (0.94 - 0.99)	0.90 *** (0.87 - 0.92)
Diagnostic Groups				
No MD or SUD vs. MD Only	1.84 *** (1.80 - 1.87)	2.64 *** (2.58 - 2.69)	1.22 *** (1.20 - 1.24)	1.02 *** (1.01 - 1.04)
No MD or SUD vs. SUD Only	2.09 *** (2.02 - 2.15)	2.52 *** (2.43 - 2.61)	1.12 *** (1.10 - 1.15)	1.19 *** (1.15 - 1.22)
No MD or SUD vs. MD and SUD	3.78 *** (3.71 - 3.87)	9.03 *** (8.83 - 9.25)	1.70 *** (1.67 - 1.73)	1.14 *** (1.12 - 1.16)
# of Corrections Admits*	1.28 *** (1.27 - 1.28)	1.01 *** (1.01 - 1.02)	1.03 *** (1.02 - 1.03)	1.56 *** (1.56 - 1.57)
* In the 7 fiscal years from 1997/98 to 2003/04. ** p < .01; *** p < .001				

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**Table 4-10 Part II of Two Part Cost Model (Median cost ratio (95% CI))
(Continuation of Table 4-9)**

HSDA	Costs			
	Overall	Health	MEIA	Corrections
Vancouver vs. E. Kootenay	0.62 *** (0.58 - 0.66)	0.76 *** (0.71 - 0.82)	0.75 *** (0.71 - 0.79)	0.93 * (0.88 - 0.99)
Vancouver vs. Kootenay Boundary	0.80 *** (0.76 - 0.85)	0.88 *** (0.82 - 0.94)	0.86 *** (0.82 - 0.91)	0.98 (0.93 - 1.04)
Vancouver vs. Okanagan	0.74 *** (0.71 - 0.77)	0.82 *** (0.79 - 0.86)	0.79 *** (0.77 - 0.82)	1.03 (0.99 - 1.06)
Vancouver vs. Thompson Cariboo	0.76 *** (0.73 - 0.78)	0.85 *** (0.82 - 0.89)	0.81 *** (0.79 - 0.84)	0.98 (0.95 - 1.02)
Vancouver vs. Fraser East	0.69 *** (0.66 - 0.71)	0.86 *** (0.82 - 0.89)	0.82 *** (0.80 - 0.85)	0.94 ** (0.91 - 0.97)
Vancouver vs. Fraser North	0.70 *** (0.68 - 0.72)	0.87 *** (0.84 - 0.90)	0.79 *** (0.77 - 0.81)	0.97 (0.94 - 1.00)
Vancouver vs. Fraser South	0.67 *** (0.64 - 0.69)	0.87 *** (0.84 - 0.90)	0.83 *** (0.81 - 0.85)	0.94 *** (0.91 - 0.97)
Vancouver vs. Richmond	0.60 *** (0.57 - 0.64)	0.86 *** (0.80 - 0.93)	0.80 *** (0.76 - 0.84)	0.97 (0.92 - 1.03)
Vancouver vs. North Shore/Coast Garibaldi	0.57 *** (0.55 - 0.60)	0.89 *** (0.85 - 0.94)	0.76 *** (0.74 - 0.79)	0.89 *** (0.85 - 0.92)
Vancouver vs. South Vancouver Island	0.83 *** (0.80 - 0.86)	1.00 (0.96 - 1.04)	0.91 *** (0.89 - 0.94)	0.89 *** (0.86 - 0.92)
Vancouver vs. Central Vancouver Island	0.85 *** (0.82 - 0.88)	0.84 *** (0.81 - 0.88)	0.95 *** (0.92 - 0.99)	0.92 *** (0.89 - 0.95)
Vancouver vs. North Vancouver Island	0.75 *** (0.71 - 0.79)	0.81 *** (0.77 - 0.85)	0.84 *** (0.81 - 0.88)	0.98 (0.93 - 1.02)
Vancouver vs. Northwest	0.73 *** (0.70 - 0.77)	0.8 *** (0.76 - 0.85)	0.88 *** (0.85 - 0.92)	0.94 ** (0.90 - 0.98)
Vancouver vs. Northern Interior	0.73 *** (0.70 - 0.76)	0.8 *** (0.76 - 0.84)	0.81 *** (0.78 - 0.84)	0.97 (0.93 - 1.01)
Vancouver vs. Northeast	0.58 *** (0.55 - 0.61)	0.76 *** (0.71 - 0.80)	0.66 *** (0.63 - 0.69)	1.03 (0.98 - 1.08)
Vancouver vs. Unknown HSDA	0.29 *** (0.29 - 0.30)	1.26 *** (1.21 - 1.31)	0.83 *** (0.81 - 0.85)	0.93 *** (0.91 - 0.96)

** p < .01; *** p < .001

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4.7 Mental Health Status of Corrections Cases by Sentencing Court

Several of the foregoing results describe regional variability in the levels of service utilization associated with different diagnostic groups within the corrections population. It is also possible to examine regional variability by comparing the rates of psychiatric diagnosis between the courts through which offenders were sentenced. There are 117 courts in BC, compared to 16 HSDAs. Therefore, analyses at the court level are somewhat more fine-grained, and may expose variability in the clinical features of the corrections population between courts in the same HSDA.

In addition, analyses of court-level variation may have relevance to service planning in ways that HA or HSDA results do not. In many jurisdictions, courts are introducing innovative and promising programs to improve the management and rehabilitation of offenders with substance use and mental disorders. These programs often have some core components in common (e.g., mental health courts), but are also customized in order to meet the unique needs of each particular locale. Despite the need for customization, it is important to consider at the outset what the needs of a given court might be, and whether a particular locale would be better served by emphasizing mental disorders per se (e.g., with a mental health court) or whether emphasis should instead be placed on substance use issues (e.g., via a drug treatment court). Alternatively, problems of all kinds might aggregate in the same courts. If a court has a high prevalence of substance use disorders does it also tend to have a high prevalence of mental disorders or co-occurring disorders when compared to other courts? Alternatively, is the prevalence of substance use and mental disorders consistently high across all courts, suggesting an equivalent need for diversionary, rehabilitative, or other resources?

In this section we present results that are relevant to these questions.

4.7.1 Cohort

These analyses incorporate methods described previously, and include all individuals who had contact with the corrections system during the seven-year period extending from April 1997 to March 2004. As described elsewhere in the Results (see Section 3.1), each individual was classified into one of 4 diagnostic groups based on his/her contact with the healthcare system over the selected seven-year period. Diagnoses were classified as either being related to substance use disorders (SUD) or to other mental disorders (MD), following the categorization outlined previously. Using these diagnoses, individuals were classified into the following mutually exclusive groups:

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1. No MD or SUD
2. MD Only
3. SUD Only
4. MD And SUD

We also included an aggregate column of results corresponding to the number of individuals who had either a mental disorder or substance use disorder (i.e., any psychiatric diagnosis).

5. MD or SUD

4.7.2 Results

4.7.2.1 Sentencing Courts

The database reflects a total of 117 different sentencing courts in BC (including the category labelled “Unknown”). Over the seven-year period, the vast majority of individuals (82%) were processed by only one court (see Table 4-11). The other 18% were processed by at least 2 (and up to 11) different courts. In order to assign these individuals to just one court, the court associated with an individual’s first corrections contact in the seven-year period was used. In the event that this court was “Unknown”, the first known court was used instead. If there was no known court, then the court remained as “Unknown”. 166 individuals were associated with only “Unknown” courts.

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Number of Different Sentencing Courts	N	%
1	78,635	82%
2	11,899	12%
3	3,278	3%
4	1,242	1%
5	484	1%
6	178	0%
7	54	0%
8	16	0%
9	7	0%
10	3	0%
11	1	0%
Total	95,797	100%

4.7.2.2 Psychiatric Diagnosis by Sentencing Court

A large number of courts processed relatively few individuals. In order to ensure adequate sample sizes for our proposed comparisons, we restricted analyses to those courts that processed at least 400 individuals over the seven-year period. A total of 42 courts were therefore selected. These 42 courts represented 36% of the total of 117 courts, but accounted for 88% of the total number of individuals.

Results for both genders combined are presented in Table 4-12, while results for men are presented separately in Table 4-13 and results for women are presented separately in Table 4-14. Diagnostic groups are listed in columns with courts in rows. Five diagnostic groupings are provided: those with no diagnosis (No MD or SUD); those with a mental disorder diagnosis only (MD Only); those with

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a substance use disorder diagnosis only (SUD Only); those with both mental disorder and substance use disorder diagnoses (MD And SUD); and the aggregate total of those who had either a mental disorder or a substance use disorder diagnosis (MD or SUD). Courts are listed in order from the highest to lowest number of sentences within the seven-year period. We highlighted the figures in each column that correspond to the eight highest prevalence rates within each of the diagnostic groups. This may aid the reader who is interested in scanning across columns to assess the degree of overlap between high rates of different diagnostic groups in the same court(s).

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Table 4-12 Proportion of Individuals with MD and/or SUD Diagnoses per Court

Sentencing Court	DIAGNOSTIC GROUPS										Total
	No MD or SUD		MD Only		SUD Only		MD and SUD		MD or SUD		
	N	%	N	%	N	%	N	%	N	%	
1	4,882	41	2,458	21	1,070	9	3,444	29	6,972	59	11,854
2	3,657	41	2,653	30	529	6	2,135	24	5,317	59	8,974
3	2,156	37	1,643	28	376	6	1,666	29	3,685	63	5,841
4	1,535	41	1,149	30	210	6	895	24	2,254	59	3,789
5	1,460	42	948	27	189	5	851	25	1,988	58	3,448
6	1,358	42	925	29	170	5	791	24	1,886	58	3,244
7	1,379	44	764	24	210	7	771	25	1,745	56	3,124
8	1,221	41	773	26	217	7	778	26	1,768	59	2,989
9	1,167	40	778	27	171	6	785	27	1,734	60	2,901
10	1,017	40	636	25	173	7	691	27	1,500	60	2,517
11	955	40	679	29	131	6	612	26	1,422	60	2,377
12	878	41	644	30	128	6	512	24	1,284	59	2,162
13	987	46	646	30	103	5	411	19	1,160	54	2,147
14	999	51	577	29	65	3	323	16	965	49	1,964
15	748	42	559	31	119	7	368	21	1,046	58	1,794
16	649	37	540	31	71	4	473	27	1,084	63	1,733
17	692	41	498	29	112	7	394	23	1,004	59	1,696
18	623	42	425	29	108	7	330	22	863	58	1,486
19	517	39	383	29	96	7	345	26	824	61	1,341
20	507	39	330	25	112	9	351	27	793	61	1,300
21	492	40	335	27	82	7	320	26	737	60	1,229
22	700	57	233	19	102	8	188	15	523	43	1,223
23	539	45	290	24	118	10	248	21	656	55	1,195
24	454	38	385	32	77	6	271	23	733	62	1,187
25	455	41	260	24	100	9	285	26	645	59	1,100
26	408	39	297	28	79	8	263	25	639	61	1,047
27	428	45	281	29	55	6	193	20	529	55	957
28	516	55	200	21	69	7	155	16	424	45	940
29	426	46	215	23	101	11	191	20	507	54	933
30	402	45	258	29	74	8	166	18	498	55	900
31	370	45	247	30	30	4	168	21	445	55	815
32	396	53	186	25	40	5	125	17	351	47	747
33	306	47	166	26	31	5	143	22	340	53	646
34	244	39	174	28	36	6	167	27	377	61	621
35	278	46	153	25	41	7	129	21	323	54	601
36	296	53	126	23	28	5	107	19	261	47	557
37	217	42	123	24	62	12	111	22	296	58	513
38	208	45	116	25	27	6	107	23	250	55	458
39	193	43	128	28	29	6	102	23	259	57	452
40	218	50	113	26	28	6	78	18	219	50	437
41	140	33	114	27	22	5	146	35	282	67	422
42	192	47	111	27	22	5	87	21	220	53	412

Note: Within each diagnostic group, greyed figures represent those 8 courts (of 42) which processed the highest percentage of individuals.

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Table 4-13 Proportion of Males with MD and/or SUD Diagnoses per Court

Sentencing Court	DIAGNOSTIC GROUPS										Total
	No MD or SUD		MD Only		SUD Only		MD and SUD		MD or SUD		
	N	%	N	%	N	%	N	%	N	%	
1	4,522	44	2,058	20	939	9	2,818	27	5,815	56	10,337
2	3,395	44	2,194	28	487	6	1,649	21	4,330	56	7,725
3	1,993	41	1,306	27	341	7	1,278	26	2,925	59	4,918
4	1,451	44	943	29	200	6	705	21	1,848	56	3,299
5	1,337	47	712	25	177	6	626	22	1,515	53	2,852
6	1,240	46	723	27	154	6	576	21	1,453	54	2,693
7	1,279	50	590	23	184	7	521	20	1,295	50	2,574
8	1,108	44	608	24	197	8	595	24	1,400	56	2,508
9	1,080	45	618	26	157	6	567	23	1,342	55	2,422
10	924	44	508	24	154	7	491	24	1,153	56	2,077
11	886	45	519	26	119	6	444	23	1,082	55	1,968
12	809	45	488	27	124	7	366	20	978	55	1,787
13	910	49	507	28	96	5	328	18	931	51	1,841
14	902	52	490	28	61	4	270	16	821	48	1,723
15	697	45	454	29	113	7	301	19	806	52	1,565
16	596	41	442	30	63	4	356	24	861	59	1,457
17	631	45	387	27	102	7	294	21	783	55	1,414
18	572	45	341	27	99	8	255	20	695	55	1,267
19	479	42	304	27	92	8	265	23	661	58	1,140
20	465	44	243	23	103	10	244	23	590	56	1,055
21	459	45	261	25	74	7	236	23	571	55	1,030
22	633	63	172	17	89	9	117	12	378	37	1,011
23	493	51	199	21	96	10	180	19	475	49	968
24	422	41	324	31	73	7	216	21	613	59	1,035
25	429	44	213	22	94	10	236	24	543	56	972
26	372	44	218	26	70	8	180	21	468	56	840
27	395	49	209	26	53	7	141	18	403	51	798
28	470	60	149	19	61	8	101	13	311	40	781
29	397	50	161	20	89	11	140	18	390	50	787
30	376	50	190	25	68	9	118	16	376	50	752
31	343	50	196	29	27	4	121	18	344	50	687
32	363	57	134	21	36	6	99	16	269	43	632
33	286	50	137	24	30	5	118	21	285	50	571
34	223	43	141	27	33	6	124	24	298	57	521
35	252	51	118	24	38	8	90	18	246	49	498
36	274	56	104	21	25	5	89	18	218	44	492
37	194	47	95	23	55	13	71	17	221	53	415
38	189	48	96	25	25	6	81	21	202	52	391
39	174	46	98	26	25	7	80	21	203	54	377
40	208	55	87	23	27	7	57	15	171	45	379
41	135	38	94	27	20	6	104	29	218	62	353
42	185	52	92	26	20	6	59	17	171	48	356

Note: Within each diagnostic group, greyed figures represent those 8 courts (of 42) which processed the highest percentage of individuals.

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Table 4-14 Proportion of Females with MD and/or SUD Diagnoses per Court

Sentencing Court	DIAGNOSTIC GROUPS										Total
	No MD or SUD		MD Only		SUD Only		MD and SUD		MD or SUD		
	N	%	N	%	N	%	N	%	N	%	
1	360	24	400	26	131	9	626	41	1,157	76	1,517
2	262	21	459	37	42	3	486	39	987	79	1,249
3	163	18	337	37	35	4	388	42	760	82	923
4	84	17	206	42	10	2	190	39	406	83	490
5	122	21	236	40	12	2	225	38	473	79	595
6	118	21	202	37	16	3	215	39	433	79	551
7	100	18	174	32	26	5	250	45	450	82	550
8	113	23	165	34	20	4	183	38	368	77	481
9	87	18	160	33	14	3	218	46	392	82	479
10	93	21	128	29	19	4	200	45	347	79	440
11	69	17	160	39	12	3	168	41	340	83	409
12	68	18	156	42	4	1	146	39	306	82	374
13	76	25	139	46	7	2	83	27	229	75	305
14	96	40	87	36	4	2	53	22	144	60	240
15	51	22	105	46	6	3	67	29	178	78	229
16	53	19	98	36	8	3	117	42	223	81	276
17	61	22	111	39	10	4	100	35	221	78	282
18	51	23	84	38	9	4	75	34	168	77	219
19	38	19	79	39	4	2	80	40	163	81	201
20	41	17	87	36	9	4	107	44	203	83	244
21	33	17	74	37	8	4	84	42	166	83	199
22	67	32	61	29	13	6	71	33	145	68	212
23	46	20	91	40	22	10	68	30	181	80	227
24	32	21	61	40	4	3	55	36	120	79	152
25	26	20	47	37	6	5	49	38	102	80	128
26	36	17	79	38	9	4	83	40	171	83	207
27	33	21	72	45	2	1	52	33	126	79	159
28	46	29	51	32	8	5	54	34	113	71	159
29	29	20	54	37	12	8	51	35	117	80	146
30	26	18	68	46	6	4	48	32	122	82	148
31	27	21	51	40	3	2	47	37	101	79	128
32	33	29	52	45	4	3	26	23	82	71	115
33	20	27	29	39	1	1	25	33	55	73	75
34	21	21	33	33	3	3	43	43	79	79	100
35	26	25	35	34	3	3	39	38	77	75	103
36	22	34	22	34	3	5	18	28	43	66	65
37	23	23	28	29	7	7	40	41	75	77	98
38	18	27	20	30	2	3	26	39	48	73	66
39	19	25	30	40	4	5	22	29	56	75	75
40	10	17	26	45	1	2	21	36	48	83	58
41	5	7	20	29	2	3	42	61	64	93	69
42	7	13	19	34	2	4	28	50	49	88	56

Note: Within each diagnostic group, greyed figures represent those 8 courts (of 42) which processed the highest percentage of individuals.

The results confirm that there is significant variability between courts in the proportions of diagnosed psychiatric disorders for both genders combined (from 45%-67%). Variability between courts is apparent in each of the diagnostic categories as well. Hence it appears that rates of psychiatric diagnosis differ to a large degree between courts in BC. In addition, it does not appear that diagnostic groups tend to cluster in the same courts. Among those eight courts with the highest rates of mental disorders (MD Only), none were amongst the eight courts with the highest rates of substance use disorders (SUD Only). Similarly, five of the eight courts with the highest rates of co-occurring disorders (SUD and MD) did not overlap with either the top eight courts for SUD or MD separately. These differences between courts are subsumed by the overall rates of psychiatric diagnoses (MD or SUD), which tend to suggest that substance use and mental disorders are ubiquitous in the court system.

The analysis of courts highlights a number of concerns relating to females. As noted previously, females represent a minority of offenders, but are considerably more likely than males to have a psychiatric diagnosis. The highest rate of co-occurring disorders among females (61%) is more than double the highest rate for males (29%) in any individual court. The rate of any psychiatric diagnosis (MD or SUD) among females is as high as 93% in any single court, with many courts associated with rates of substance use and mental disorders exceeding 80% for female offenders. Among males the corresponding rates are about 30% lower (only one court exceeds 60% in the combined rate of SUD or MD among males).

Despite the degree of variability in diagnoses between courts, it is clear that the overall prevalence of psychiatric disorders is very high. In most courts the clear majority of offenders have been diagnosed with some type of mental disorder (MD or SUD). We have seen previously that mental disorders alone (MD Only) do not increase the risk of criminal recidivism to the same extent as substance use disorders (SUD with or without an additional MD). We have also seen that high rates of MD within a particular court are not indicative of high rates for other disorders, such as SUD in the same court. This pattern of results might suggest that court-affiliated programs for people with *only* mental disorders may have a different rationale and different objectives than similarly situated programs for offenders with substance use disorders, where the goal of reduced offending is strongly indicated. It also appears that the relative need for programs emphasizing MD services or SUD services varies between courts.

Finally, the fact remains that most offenders with a substance use disorder have also been diagnosed with an additional mental disorder (MD And SUD). Therefore, those programs that

aim to address the needs of offenders with substance use disorders must anticipate the likely need to address these problems in the context of co-occurring disorders.

4.8 Tertiary Patients with Correctional System Involvement

An inverse relationship has been observed between the number of psychiatric hospital beds and the prevalence of psychiatric patients in prisons (Penrose, 1939; Gunn, 2000). It is difficult to determine whether psychiatric deinstitutionalization is responsible for the observed rates of substance use and mental disorders currently in the corrections system. Nevertheless, it is apparent that some people who might otherwise be treated for substance use and mental disorders in psychiatric facilities are concentrated in correctional settings. Few sources of information document the natural history of psychiatric patients following discharge from tertiary care institutions. Some of the patients admitted to tertiary care facilities are discharged after a few days or weeks, while others can remain hospitalized for years. These individuals are often vulnerable and in need of various supports. Many important questions have been raised regarding the outcome of these patients, including their access to appropriate treatment, housing, social and vocational supports, and involvement with corrections.

The present section focuses on tertiary psychiatric patients who were involved with the correctional system in BC, and presents a limited examination of outcomes following their discharge from hospital. We present levels of service utilization and costs associated with this group. In addition, we report the rate of involvement with the corrections system following discharge from tertiary care. A distinction is made between those patients who were discharged directly to community and those discharged to another hospital facility.

4.8.1 Methods

The available data included information corresponding to one tertiary psychiatric hospital – Riverview Hospital. The hospital began reporting data to the Discharge Abstract Database (DAD) on April 1, 2002. As a result, the tertiary psychiatric population available for this analysis was defined as those individuals who were discharged from Riverview Hospital in the fiscal years 2002/03 and 2003/04 and who were not serving a corrections sentence at the time of their discharge.² A total of 180 individuals met these criteria and form the group included in these analyses.

² Three individuals, not in the 180, were found to have started a community based sentence during their stay in Riverview, a sentence which also extended beyond their discharge date.

4.8.1.1 Separation into Discharge Groups: Community and Hospital

Each individual could either have been discharged (a) to another hospital or (b) into the community. If the individual had a hospital admission on the day of discharge from Riverview then the individual was assigned to the “discharged to hospital group”. Otherwise they were assumed to have been “discharged to community”, and were included in the latter group. If an individual had more than one Riverview hospitalization in the 2-year period, the first one was used as the basis for grouping and subsequent analysis.

4.8.1.2 Creation of Comparison Group for Survival Analysis

A comparison group of 180 individuals was selected from the overall corrections population. Members of the comparison group were matched with the tertiary psychiatric group on the basis of age, gender, ethnicity and the number of contacts with Corrections in the 5-year period from 1997/98 to 2001/02. In addition, eligibility for inclusion in the comparison group was restricted to individuals who were not serving a corrections sentence (custody or community) on April 1, 2002.

4.8.2 Results

Table 4-15 provides a description of both the overall tertiary population as well as for the population subdivided into the two groups defined by where an individual was discharged to after a stay in Riverview.

Chi-square tests were performed to compare the “Discharge” groups on categorical outcomes. Significant differences were found for ethnicity ($p < .001$) and corrections status ($p < .05$). In particular, the group discharged directly to the community consisted of more Caucasians and fewer of the non-Caucasian, non-Aboriginal group. The community discharge group was also more likely to have served community sentences over the 7-year period of observation.

Wilcoxon Mann-Whitney tests were used to compare the “Discharge” groups on continuous outcomes due to the skewed nature of these outcomes. Significant differences were found between the groups for length of stay in Riverview ($p < .001$). In particular, those discharged to the community had considerably longer stays at

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Riverview Hospital (mean of 34 versus 268 days) compared to those discharged to another hospital. It should be noted that the length of the stay for those discharged directly to another hospital is an underestimate of the total length of stay because it only includes the duration of hospitalization at Riverview.

4.8.2.1 Service Utilization of the Tertiary Cohort from 1997/98 to 2003/04

Table 4-16 provides annual per person costs for each member of the tertiary cohort, expressed in 2006 constant dollars and corresponding to services provided by Health, MEIA, and PSSG (i.e., Corrections). Note that the relatively much greater health costs in 2002/03 and 2003/04 reflect the influence of Riverview Hospital costs. In the years prior to 2002 patients may also have been admitted to Riverview Hospital, but the available records do not enable examination of this possibility. Of the 183 individuals originally identified as having been discharged from Riverview Hospital, 174 (or 95%) had records of involvement with corrections prior to their Riverview hospitalization.

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Table 4-15 Characteristics of Tertiary Cohort

Characteristics		Discharged to Hospital (N = 66) [37%]	Discharged to Community (N = 114) [63%]	Total (N = 180) [100%]
Gender				
	Male	57 (86%)	97 (85%)	154 (86%)
	Female	9 (14%)	17 (15%)	26 (14%)
Ethnicity				
	Aboriginal	5 (8%)	11 (10%)	16 (9%)
	Caucasian	45 (68%)	95 (83%)	140 (78%)
	Other	16 (24%)	8 (7%)	24 (13%)
Education^o				
	<= Grade 6	1 (2%)	8 (7%)	9 (5%)
	7 - 8 Grade	8 (12%)	12 (11%)	20 (11%)
	9 - 10 Grade	19 (29%)	31 (27%)	50 (28%)
	11 - 12 Grade	31 (47%)	49 (43%)	80 (44%)
	University	4 (6%)	11 (10%)	15 (8%)
	Unknown	3 (5%)	3 (3%)	6 (3%)
Diagnostic Status⁺				
	MD Only	10 (15%)	18 (16%)	28 (16%)
	MD and SUD	56 (85%)	96 (84%)	152 (84%)
Corrections Status⁺				
	Custody Only	1 (2%)	5 (4%)	6 (3%)
	Community Only	46 (70%)	95 (83%)	141 (78%)
	Custody and Community	19 (29%)	14 (12%)	33 (18%)
Age[*] (years)	Mean	30	32	31
	SD	10	14	13
	Median	28	30	29
	Range	18 - 59	18 - 80	18 - 80
Length of stay (days)	Mean	34	268	182
	SD	61	383	326
	Median	19	102	42
	Range	5 - 361	1 - 1520	1 - 1520
^o Education at first contact with Corrections in the 7 fiscal years from 1997/98 to 2003/04. ⁺ In the 7 fiscal years from 1997/98 to 2003/04. [*] Age on Oct 1, 2002. [] represents % of the entire tertiary cohort (i.e., of 180) () represents % of the column total (i.e., of 66 or 114)				

Table 4-16 Annual per Person Costs per Ministry for the Tertiary Cohort (N = 180)

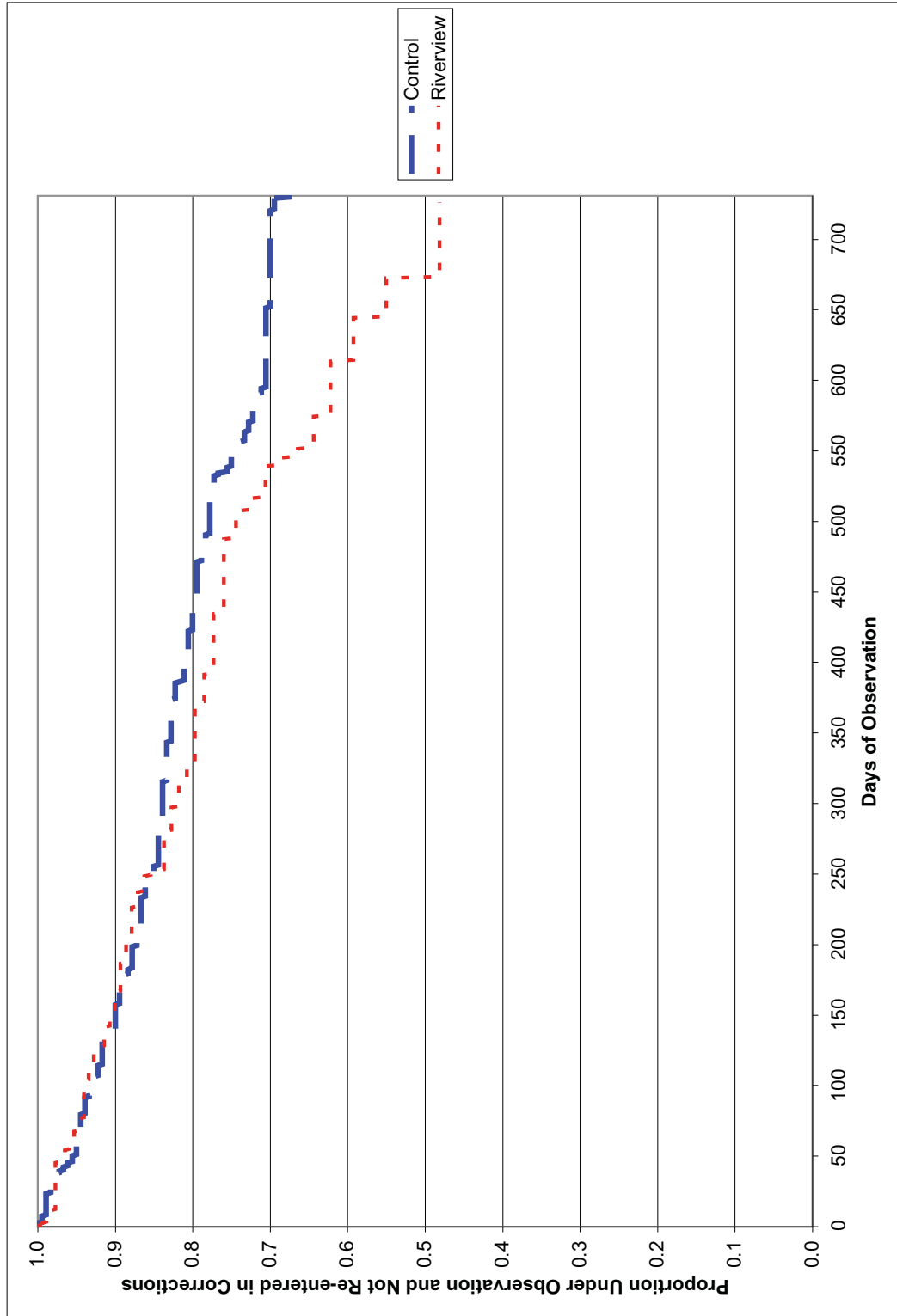
Ministry	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	1997/98-2003/04
Health	Mean	10,563	11,020	14,904	15,662	15,250	70,488	27,019
	SD	19,666	20,701	31,488	24,185	23,628	72,718	17,823
	Median	1,284	1,905	3,375	3,506	4,485	54,214	24,426
	Range	0 - 113090	0 - 127808	0 - 304530	0 - 157700	0 - 146814	0 - 343160	1684 - 89738
MEIA	Mean	4,383	4,449	4,439	4,606	4,963	5,197	4,685
	SD	5,108	4,990	4,666	4,615	4,903	4,293	3,645
	Median	1,669	1,980	2,794	3,151	3,839	5,666	4,122
	Range	0 - 18647	0 - 17863	0 - 17412	0 - 18335	0 - 18740	0 - 12698	0 - 15481
Corrections	Mean	1,563	1,225	904	1,101	1,203	906	1,215
	SD	5,536	3,864	3,910	3,842	3,304	3,548	2,436
	Median	0	0	0	0	0	0	342
	Range	0 - 50334	0 - 31446	0 - 43029	0 - 33552	0 - 19922	0 - 44323	4 - 14582
All 3 Ministries	Mean	16,509	16,694	20,247	21,369	21,416	76,591	32,919
	SD	21,542	22,524	32,658	25,355	24,787	71,358	18,034
	Median	9,135	10,191	10,502	13,201	13,688	59,787	30,637
	Range	0 - 114444	0 - 139215	0 - 306309	0 - 157700	0 - 157314	0 - 343673	2525 - 95950

4.8.2.2 Survivor Functions

Kaplan Meier survivor functions were produced to compare the entire Riverview population and the comparison group on the number of days following discharge before they had contact with the corrections system. A corrections contact was defined as either a custody sentence or as a community contact of any type (i.e., probation, BC parole, national parole, bail or alternative measures). The curves are depicted in Figure 4.8-1. For the comparison group, the survival timeline started on April 1, 2002 while for the Riverview group, the survival timeline started either with their discharge from Riverview, or for those discharged to another hospital, their discharge from that second hospital. A log-rank test was performed to test for the equality of survivor functions. No statistically significant difference was found.

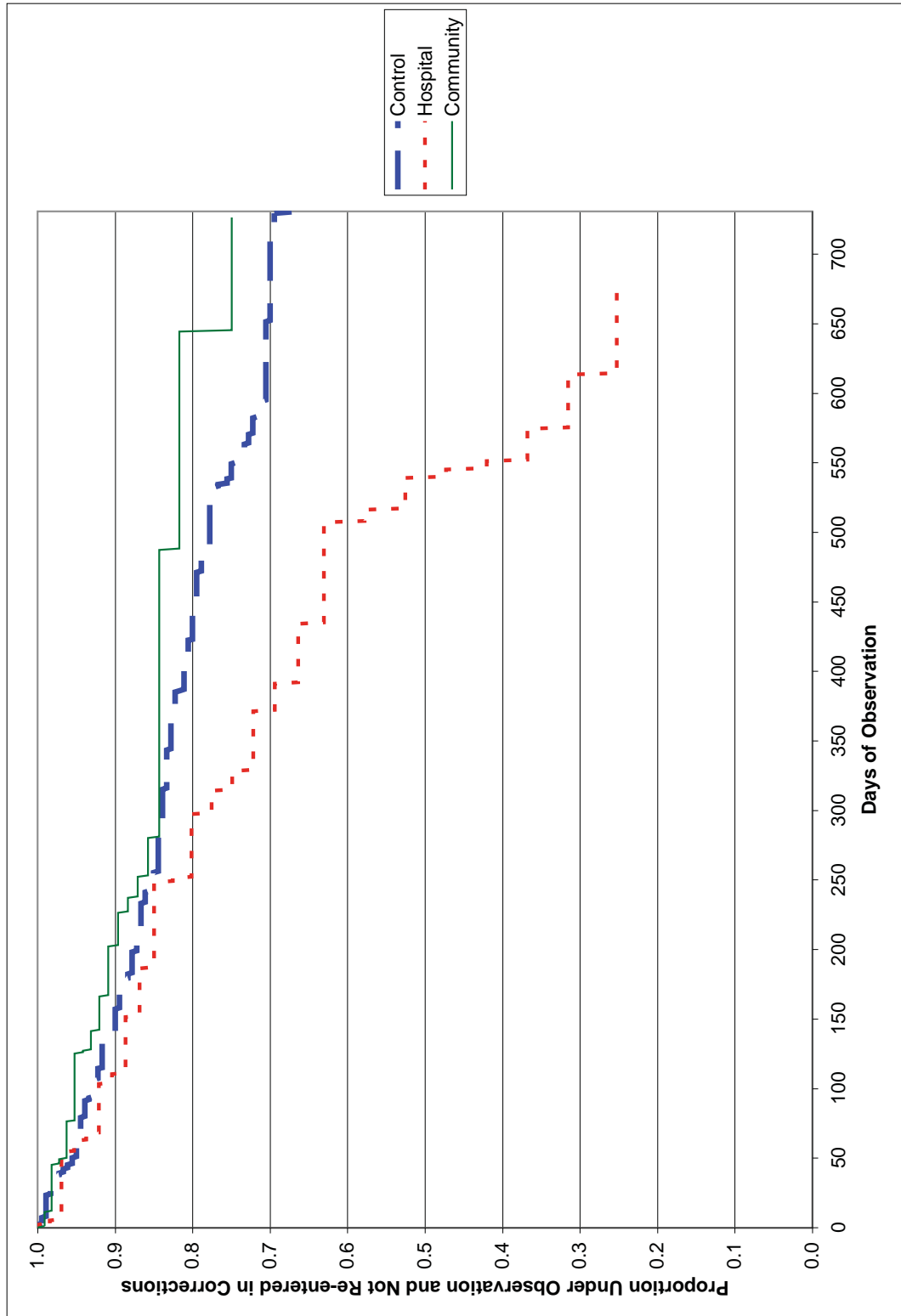
Survivor functions were then produced using the “Discharge” breakdown of the Riverview cohort, comparing the resulting two groups to the controls. In this case, a different pattern emerged (see Figure 4.8-2). Specifically, the group discharged to another hospital (Hospital) were, over time, more likely than the other two groups to have contact with the Corrections system. Log-rank tests revealed that the comparison group and the group discharged to the community did not differ significantly from one another in relation to the latency to contact with corrections, whereas both of these groups did differ significantly from the group discharged to another hospital.

Figure 4.8-1 Time to Corrections Encounter [Controls, Riverview Cohort]



IV RESULTS OF RESEARCH

Figure 4.8-2 Time to Corrections Encounter: [Controls, Riverview discharged to: Hospital, Community]



These results indicate that Riverview hospital patients are discharged directly to the community, typically following a significant period of hospitalization. Nevertheless, following discharge these patients do not appear to be at high risk for sentencing through the corrections system. Their average timeline prior to contact with corrections was no different than that of a matched sample from the general corrections population. This “null” finding undoubtedly is a reflection of the discharge process undertaken by Riverview Hospital staff, including patient stabilization, community liaison regarding follow-up care, and related post-discharge planning.

In contrast, those patients discharged to another hospital were at significantly greater risk of contact with corrections. As noted, this group experienced a significantly shorter length of stay at Riverview Hospital, and likely represents a distinct sub-group within the overall tertiary psychiatric population. For example, members of this group may have been referred to Riverview during an acute episode of severe symptoms, and then discharged to another hospital following the stabilization of symptoms and a period of observation and assessment. Our findings suggest that increased community resources may be necessary in order to reduce the risk that some of these patients may be abruptly involved with the corrections system. These resources might include assertive community treatment teams, and liaison between health and the corrections system (e.g., local probation office) for those individuals who have a history of involvement with corrections. Note that a very high percentage of the overall tertiary care group (95%) had correctional records that preceded their known admission to Riverview Hospital. Therefore the risk among the current tertiary care population is primarily one of re-offending rather than a risk of first contact with corrections. Additional community resources appear to be indicated in order to reduce the risk of future offending, particularly among those directed from Riverview to local hospitals prior to eventual discharge to the community.

5 Appendix 1: Data Elements Contained in the Linked Information System

5.1 Corrections Data

- Offender
 - o Study ID
 - o Gender
 - o Ethnic status
- Event
 - o Date of Event
 - o Type of Event: Admission, Capture, Discharge, Escape, Transfer
 - o Type of Offence
 - o Offender's age at time of offence
 - o Offender's education level at time of offence
 - o Previous contact with corrections at time of offence
 - o Whether offender has a history of
 - sex offences
 - violent offences
 - escapes
 - o Sentence Length
 - o Actual Number of Days in Jail
 - o Custody or Community Event
 - o Location of Sentencing Court
 - o Account type (Legal status)
 - Custody
 - Bail
 - BC parole
 - Alternative measures (e.g. Diversion program)
 - National parole (rare)
 - Probation

5.2 Health Data

Registration Data

- Study ID
- Gender
- Local Health Authority (LHA)

Medical Services Plan (MSP) Data

- Date of Service
- Practitioner Number
- Practitioner's Specialty Code
- Practitioner Number of Practitioner who Gave Referral
- Service Code (e.g., consultation, home visit, complete examination)
- Diagnosis (ICD9 code)
- Fee Item – the insured service for which the practitioner was paid
- Service Units Paid – the number of payments made for the fee item
- Amount Paid to the practitioner for the fee item

Hospitalization Data

- Admission Date
- Separation Date
- Hospital Code
- Most Responsible Physician
- Most Responsible Physician-Service/Specialty
- Diagnoses associated with admission (up to 25)
- Diagnosis Type (for each diagnosis; e.g., most responsible)
- Procedure Codes (up to 20)
- Level of Care (e.g., acute care, day care surgery, extended care)
- Acute Rehab Days
- Alternate Level of Care Days
- Total Days of Care (length of stay)
- Patient Service Code – the service most responsible for the care of the patient
- Exit Code – type of discharge (e.g., transferred to another facility, discharged home)

Addiction Information Management System (AIMS) Data

- AIMS admit date
- AIMS discharge date

Client Patient Information System (CPIM) Data (Community Mental Health)

- Care Episodes
 - o First Contact Date
 - o End Date
 - o Referral source code
 - o Axis 1 diagnosis
 - o Axis 2 diagnosis
 - o Axis 4 diagnosis
 - o Axis 5 diagnosis
 - o Location code of Mental Health Centre
- Service Events (multiple service events per care episode are possible)
 - o Care episode key
 - o Location code
 - o Service event code
 - o Service event date

Vital Stats Data

- o Date of death
- o Ucode

Pharmacare Data (Plans A, B, C, and/or G)

- Date of prescription
- Plan Type
- Drug Number
- Therapeutic code
- Pharmacy code
- Practitioner number
- Ingredient cost paid
- Professional fee paid
- Total amount paid

Long Term Care Data

- Start Date
- End Date
- Service Type (e.g., home support, mental health residential care, residential care)

5.3 MEIA Data

- Case or family unit identifier
- Client level ID (represents a person)
- Date client became involved with the MEIA case
- Date client ceased to be involved with the MEIA case
- Relationship the client has with the case
 - o i.e., head of the case, spouse, son, daughter
- Client status
 - o Over 65, Less than 10 Years Residence
 - o GAIN for Handicapped
 - o Age 60 – 64
 - o Not in School
 - o OAS/GIS, Spouse Allowance
 - o Over 65, more than 10 Years Residence
 - o In School
- Program type of the case
 - o Training
 - o Age 60 to 64
 - o Child in Home of Relative
 - o Expected to Work
 - o Temporarily Excused from Work
 - o Continuous - Persons with Disabilities
 - o Persons With Disabilities
 - o Persistent Multiple Barriers
 - o Long-Term Care
 - o Expected to Work - Medical Condition
 - o Under Age 19
 - o Old Aged Security (OAS)
 - o Relocation
 - o Seniors
 - o Transition
 - o Welfare to Work
 - o Youth Works

- Family type of the case
 - Single Men
 - Single Women
 - Couples
 - Two Parent Families
 - Single Parent Families
- Demographic region of B.C. where the case resides
- Type of Shelter for the MEIA case
 - Room and Board (Private)
 - Room and Board (Parent/Child)
 - Owned
 - Rent Shared
 - Rented
 - No Cost
 - Utilities Only
- Dollar amount of shelter that the client(s)/case claims they are paying for shelter. (i.e., self-reported)
- Maximum allowable dollar amount to be paid for shelter given the family type of the case
- Total amount of benefits paid to the MEIA case for a particular benefits month
- Dollar amount for the case paid for support
- Dollar amount for the case paid for shelter
- Dollar amount for the case paid for hardship support
- Dollar amount for the case paid for hardship shelter
- Dollar amount for the case paid for shelter – crisis grant
- Dollar amount for the case paid for clothing – crisis grant
- Dollar amount for the case paid for hydro – crisis grant
- Dollar amount for the case paid for utilities – crisis grant
- Dollar amount for the case paid for furniture – crisis grant
- Dollar amount for the case paid for home repair – crisis grant

6 Appendix 2: Calculation of Per Person Costs

Per person costs were calculated for each Ministry and then summarized across Ministries. Health costs consisted of the sum of 3 components: MSP costs, Pharmacare costs, and hospitalization costs. While MSP and Pharmacare costs were already represented as dollar values in the linked database, hospitalization costs were computed using the length of stay information in the database together with hospital per diem rates provided by the Ministry of Health. Per diem rates were provided per B.C. hospital and for each of the seven fiscal years from 1997/98 to 2003/04. MEIA costs were calculated by summing the dollar value of total benefits received by a “case” from MEIA. A case in MEIA refers to a family unit and thus can include an individual’s dependents. Corrections costs were calculated using the length of each individual’s community or custody sentence together with the per diem rates associated with a community or custody sentence. Community and custody per diem rates per fiscal year were provided by Corrections.

Costs were translated to 2006 constant dollars using the British Columbia Consumer Price Index (CPI) as tabulated by Statistics Canada on the BC Stats website (see www.bcstats.gov.bc.ca/DATA/dd/handout/cpi_spec.pdf).

7 Appendix 3: Tables of Annualized Per Person Costs by Health Authority & Health Service Delivery Area for Health, MEIA, Corrections, and All Ministries Combined

Definition of Terms Used in Appendix 3:

N = The number of individuals in a group

Mean = The average annual cost per person in a group

SD = Standard Deviation – a measure of variability around the mean

Median = The middle annual cost in a group.

HA	HA Name		Total Cohort 1997- 2004	DIAGNOSTIC GROUPS			
				No MD or SUD	MD Only	SUD Only	SUD and MD
1	Interior	N	16,276	6,402	4,846	1,024	4,004
		Mean	1,190	287	1,038	970	2,874
		SD	2,792	921	2,205	2,663	4,297
		Median	302	79	401	313	1,414
2	Fraser	N	26,898	9,629	8,274	1,852	7,143
		Mean	1,375	268	1,070	933	3,337
		SD	3,597	868	2,634	2,006	5,743
		Median	317	86	382	297	1,373
3	Vancouver Coastal	N	15,756	5,822	4,120	1,297	4,517
		Mean	1,907	261	1,308	1,653	4,649
		SD	5,094	831	3,682	3,526	7,896
		Median	351	69	410	492	1,951
4	Vancouver Island	N	15,770	5,501	4,653	1,128	4,488
		Mean	1,510	278	1,199	1,124	3,439
		SD	3,744	830	3,054	2,664	5,590
		Median	359	89	419	395	1,613
5	Northern	N	10,218	4,447	2,634	844	2,293
		Mean	1,054	284	947	1,018	2,682
		SD	2,973	972	2,028	3,065	5,056
		Median	277	77	386	370	1,206
Total	Total	N	84,918	31,801	24,527	6,145	22,445
		Mean	1,425	275	1,115	1,138	3,472
		SD	3,761	881	2,793	2,772	5,967
		Median	322	81	398	361	1,501

Note: All costs are given in 2006 dollars.

Table 7-2 Annual MEIA Costs per Person per HA

HA	HA Name		Total Cohort 1997- 2004	DIAGNOSTIC GROUPS			
				No MD or SUD	MD Only	SUD Only	SUD and MD
1	Interior	N	16,276	6,402	4,846	1,024	4,004
		Mean	2,320	1,199	2,369	2,033	4,127
		SD	3,262	2,152	3,333	2,682	3,909
		Median	767	176	757	977	3,147
2	Fraser	N	26,898	9,629	8,274	1,852	7,143
		Mean	2,105	997	1,946	2,050	3,798
		SD	3,180	2,045	3,196	2,637	3,776
		Median	422	0	132	1,048	2,758
3	Vancouver Coastal	N	15,756	5,822	4,120	1,297	4,517
		Mean	2,655	1,270	2,216	3,070	4,722
		SD	3,438	2,315	3,309	3,078	3,827
		Median	998	29	328	2,328	4,210
4	Vancouver Island	N	15,770	5,501	4,653	1,128	4,488
		Mean	2,852	1,432	2,784	2,739	4,690
		SD	3,555	2,367	3,601	3,119	3,974
		Median	1,282	249	1,175	1,721	4,066
5	Northern	N	10,218	4,447	2,634	844	2,293
		Mean	2,221	1,280	2,345	2,208	3,908
		SD	3,190	2,285	3,389	2,818	3,814
		Median	658	116	714	894	2,944
Total	Total	N	84,918	31,801	24,527	6,145	22,445
		Mean	2,401	1,202	2,277	2,411	4,233
		SD	3,330	2,214	3,356	2,889	3,875
		Median	752	70	507	1,343	3,393

Note: All costs are given in 2006 dollars.

Table 7-3 Annual Corrections Costs Per Person Per HA

HA	HA Name		Total Cohort 1997- 2004	DIAGNOSTIC GROUPS			
				No MD or SUD	MD Only	SUD Only	SUD and MD
1	Interior	N	16,276	6,402	4,846	1,024	4,004
		Mean	1,169	991	846	1,877	1,663
		SD	2,711	2,396	2,087	3,829	3,336
		Median	297	287	290	432	433
2	Fraser	N	26,898	9,629	8,274	1,852	7,143
		Mean	1,238	1,050	756	2,712	1,667
		SD	2,960	2,638	1,914	5,156	3,378
		Median	298	290	289	512	422
3	Vancouver Coastal	N	15,756	5,822	4,120	1,297	4,517
		Mean	1,371	1,071	778	2,675	1,923
		SD	3,136	2,663	1,880	4,874	3,728
		Median	301	291	290	562	450
4	Vancouver Island	N	15,770	5,501	4,653	1,128	4,488
		Mean	1,334	1,050	875	2,553	1,852
		SD	3,223	2,794	2,242	5,084	3,779
		Median	293	280	285	419	390
5	Northern	N	10,218	4,447	2,634	844	2,293
		Mean	1,172	1,031	776	1,822	1,664
		SD	2,609	2,325	1,869	3,536	3,261
		Median	302	297	291	450	438
Total	Total	N	84,918	31,801	24,527	6,145	22,445
		Mean	1,259	1,039	802	2,414	1,754
		SD	2,960	2,582	2,005	4,696	3,516
		Median	298	289	289	469	428

Note: All costs are given in 2006 dollars.

**Table 7-4 Annual Costs Per Person Per HA
Across All 3 Ministries**

HA	HA Name		Total Cohort 1997- 2004	DIAGNOSTIC GROUPS			
				No MD or SUD	MD Only	SUD Only	SUD and MD
1	Interior	N	16,276	6,402	4,846	1,024	4,004
		Mean	4,679	2,476	4,254	4,881	8,664
		SD	5,743	3,549	4,840	5,509	7,346
		Median	2,367	1,040	2,317	3,010	7,021
2	Fraser	N	26,898	9,629	8,274	1,852	7,143
		Mean	4,718	2,315	3,772	5,695	8,802
		SD	6,347	3,589	4,915	6,494	8,348
		Median	2,021	807	1,594	3,316	6,784
3	Vancouver Coastal	N	15,756	5,822	4,120	1,297	4,517
		Mean	5,934	2,603	4,302	7,399	11,294
		SD	7,806	3,803	5,727	7,249	10,142
		Median	2,902	943	1,988	5,192	9,203
4	Vancouver Island	N	15,770	5,501	4,653	1,128	4,488
		Mean	5,695	2,761	4,857	6,416	9,981
		SD	6,775	3,940	5,514	6,819	8,324
		Median	3,096	1,088	2,833	4,367	8,385
5	Northern	N	10,218	4,447	2,634	844	2,293
		Mean	4,447	2,595	4,068	5,048	8,254
		SD	5,589	3,547	4,648	5,670	7,534
		Median	2,269	1,059	2,232	3,370	6,458
Total	Total	N	84,918	31,801	24,527	6,145	22,445
		Mean	5,085	2,516	4,194	5,963	9,459
		SD	6,557	3,681	5,149	6,526	8,560
		Median	2,431	950	2,080	3,799	7,541

Note: All costs are given in 2006 dollars.

**Table 7-5 HSDAs within Interior HA:
Annual Health Costs per Person**

HSDA		Total Cohort 1997 - 2004	DIAGNOSTIC GROUPS			
			No MD or SUD	MD Only	SUD Only	SUD and MD
East Kootenay	N	1,479	742	402	84	251
	Mean	802	233	859	645	2,444
	SD	1,907	536	1,575	824	3,571
	Median	206	76	387	251	1,115
Kootenay Boundary	N	1,798	753	486	109	450
	Mean	1,203	294	1,085	700	2,975
	SD	2,816	649	2,602	1,179	4,333
	Median	316	91	449	291	1,513
Okanagan	N	6,564	2,322	2,096	365	1,781
	Mean	1,314	273	1,058	907	3,054
	SD	3,090	903	2,311	2,316	4,712
	Median	319	73	381	294	1,465
Thompson Cariboo Shuswap	N	6,435	2,585	1,862	466	1,522
	Mean	1,150	312	1,043	1,141	2,705
	SD	2,624	1,078	2,084	3,300	3,857
	Median	309	85	412	349	1,380

Note: All costs are given in 2006 dollars.

**Table 7-6 HSDAs within Interior HA:
Annual MEIA Costs per Person**

HSDA		Total Cohort 1997 - 2004	DIAGNOSTIC GROUPS			
			No MD or SUD	MD Only	SUD Only	SUD and MD
East Kootenay	N	1,479	742	402	84	251
	Mean	1,758	939	2,133	2,107	3,461
	SD	2,878	1,911	3,168	2,715	3,799
	Median	354	71	554	990	2,148
Kootenay Boundary	N	1,798	753	486	109	450
	Mean	2,538	1,417	2,554	2,351	4,441
	SD	3,399	2,494	3,475	2,638	3,921
	Median	925	219	825	1,398	3,675
Okanagan	N	6,564	2,322	2,096	365	1,781
	Mean	2,364	1,135	2,319	2,042	4,083
	SD	3,261	1,989	3,289	2,732	3,853
	Median	884	196	755	1,030	3,156
Thompson Cariboo Shuswap	N	6,435	2,585	1,862	466	1,522
	Mean	2,344	1,267	2,429	1,939	4,195
	SD	3,294	2,241	3,377	2,649	3,977
	Median	751	185	764	735	3,159

Note: All costs are given in 2006 dollars.

**Table 7-7 HSDAs within Interior HA:
Annual Corrections Costs per Person**

HSDA		Total Cohort 1997 - 2004	DIAGNOSTIC GROUPS			
			No MD or SUD	MD Only	SUD Only	SUD and MD
East Kootenay	N	1,479	742	402	84	251
	Mean	784	674	809	724	1,089
	SD	2,154	1,635	2,817	1,126	2,496
	Median	291	278	297	364	419
Kootenay Boundary	N	1,798	753	486	109	450
	Mean	1,017	838	722	1,399	1,541
	SD	2,386	2,020	1,859	2,865	3,127
	Median	296	281	288	423	437
Okanagan	N	6,564	2,322	2,096	365	1,781
	Mean	1,175	1,009	831	1,946	1,638
	SD	2,655	2,353	1,932	4,020	3,250
	Median	299	289	290	449	433
Thompson Cariboo Shuswap	N	6,435	2,585	1,862	466	1,522
	Mean	1,293	1,109	903	2,143	1,823
	SD	2,947	2,691	2,127	4,135	3,597
	Median	298	291	290	438	437

Note: All costs are given in 2006 dollars.

**Table 7-8 HSDAs within Interior HA:
Annual Costs per Person across All 3 Ministries**

HSDA		Total Cohort 1997 - 2004	DIAGNOSTIC GROUPS			
			No MD or SUD	MD Only	SUD Only	SUD and MD
East Kootenay	N	1,479	742	402	84	251
	Mean	3,343	1,845	3,802	3,477	6,993
	SD	4,702	2,774	4,771	3,174	6,906
	Median	1,352	734	1,743	2,576	5,010
Kootenay Boundary	N	1,798	753	486	109	450
	Mean	4,758	2,549	4,361	4,450	8,957
	SD	5,739	3,519	5,112	4,153	7,257
	Median	2,460	1,028	2,394	2,773	7,488
Okanagan	N	6,564	2,322	2,096	365	1,781
	Mean	4,852	2,418	4,208	4,895	8,776
	SD	5,973	3,444	4,902	5,530	7,611
	Median	2,511	1,044	2,244	3,145	7,086
Thompson Cariboo Shuswap	N	6,435	2,585	1,862	466	1,522
	Mean	4,787	2,688	4,375	5,224	8,723
	SD	5,683	3,818	4,706	6,043	7,096
	Median	2,521	1,159	2,494	3,061	7,114

Note: All costs are given in 2006 dollars.

**Table 7-9 HSDAs within Fraser HA:
Annual Health Costs per Person**

HSDA		Total Cohort 1997 - 2004	DIAGNOSTIC GROUPS			
			No MD or SUD	MD Only	SUD Only	SUD and MD
Fraser East	N	6,404	2,301	2,004	389	1,710
	Mean	1,276	266	1,062	764	3,005
	SD	3,135	743	2,398	1,601	4,928
	Median	318	89	402	286	1,413
Fraser North	N	9,117	3,293	2,663	679	2,482
	Mean	1,457	256	1,196	983	3,460
	SD	3,933	829	3,256	2,147	6,101
	Median	309	76	368	312	1,373
Fraser South	N	11,377	4,035	3,607	784	2,951
	Mean	1,366	278	982	974	3,426
	SD	3,558	960	2,208	2,058	5,864
	Median	322	95	381	293	1,351

Note: All costs are given in 2006 dollars.

**Table 7-10 HSDAs within Fraser HA:
Annual MEIA Costs per Person**

HSDA		Total Cohort 1997 - 2004	DIAGNOSTIC GROUPS			
			No MD or SUD	MD Only	SUD Only	SUD and MD
Fraser East	N	6,404	2,301	2,004	389	1,710
	Mean	2,242	1,015	2,217	1,851	4,013
	SD	3,294	1,998	3,452	2,486	3,834
	Median	544	0	398	781	3,141
Fraser North	N	9,117	3,293	2,663	679	2,482
	Mean	2,096	946	1,947	2,080	3,787
	SD	3,140	2,009	3,113	2,714	3,718
	Median	493	0	239	1,128	2,762
Fraser South	N	11,377	4,035	3,607	784	2,951
	Mean	2,035	1,029	1,794	2,122	3,684
	SD	3,145	2,099	3,098	2,642	3,787
	Median	307	0	0	1,084	2,608

Note: All costs are given in 2006 dollars.

HSDA		Total Cohort 1997 - 2004	DIAGNOSTIC GROUPS			
			No MD or SUD	MD Only	SUD Only	SUD and MD
Fraser East	N	6,404	2,301	2,004	389	1,710
	Mean	1,235	1,050	832	2,376	1,695
	SD	2,802	2,567	1,967	4,354	3,311
	Median	298	291	288	512	410
Fraser North	N	9,117	3,293	2,663	679	2,482
	Mean	1,271	1,121	742	2,861	1,605
	SD	3,116	2,880	1,912	5,695	3,279
	Median	298	291	290	491	407
Fraser South	N	11,377	4,035	3,607	784	2,951
	Mean	1,213	992	724	2,750	1,702
	SD	2,917	2,464	1,886	5,028	3,496
	Median	298	290	290	534	433

Note: All costs are given in 2006 dollars.

**Table 7-12 HSDAs within Fraser HA:
Annual Costs per Person across All 3 Ministries**

HSDA		Total Cohort 1997 - 2004	DIAGNOSTIC GROUPS			
			No MD or SUD	MD Only	SUD Only	SUD and MD
Fraser East	N	6,404	2,301	2,004	389	1,710
	Mean	4,753	2,330	4,111	4,991	8,713
	SD	6,009	3,460	5,070	5,611	7,604
	Median	2,217	855	2,030	3,062	7,146
Fraser North	N	9,117	3,293	2,663	679	2,482
	Mean	4,825	2,323	3,885	5,925	8,852
	SD	6,527	3,704	5,185	6,871	8,413
	Median	2,068	799	1,665	3,408	6,782
Fraser South	N	11,377	4,035	3,607	784	2,951
	Mean	4,613	2,299	3,499	5,847	8,811
	SD	6,384	3,566	4,599	6,551	8,699
	Median	1,854	790	1,351	3,460	6,516

Note: All costs are given in 2006 dollars.

**Table 7-13 HSDAs within Vancouver Coastal HA:
Annual Health Costs per Person**

HSDA		Total Cohort 1997 - 2004	DIAGNOSTIC GROUPS			
			No MD or SUD	MD Only	SUD Only	SUD and MD
Richmond	N	1,477	584	519	68	306
	Mean	1,261	247	1,106	1,006	3,517
	SD	3,969	635	3,036	2,511	7,163
	Median	282	90	402	392	1,305
Vancouver	N	10,438	3,698	2,407	1,007	3,326
	Mean	2,226	252	1,457	1,834	5,095
	SD	5,637	901	4,258	3,766	8,269
	Median	397	57	418	618	2,193
North Shore/Coast Garibaldi	N	3,841	1,540	1,194	222	885
	Mean	1,291	290	1,095	1,033	3,362
	SD	3,637	711	2,474	2,404	6,384
	Median	299	90	406	330	1,373

Note: All costs are given in 2006 dollars.

**Table 7-14 HSDAs within Vancouver Coastal HA:
Annual MEIA Costs per Person**

HSDA		Total Cohort 1997 - 2004	DIAGNOSTIC GROUPS			
			No MD or SUD	MD Only	SUD Only	SUD and MD
Richmond	N	1,477	584	519	68	306
	Mean	1,455	694	1,307	1,928	3,051
	SD	2,764	1,888	2,620	2,723	3,622
	Median	0	0	0	617	1,618
Vancouver	N	10,438	3,698	2,407	1,007	3,326
	Mean	3,225	1,605	2,787	3,560	5,242
	SD	3,608	2,540	3,606	3,129	3,763
	Median	1,913	376	1,005	2,865	4,983
North Shore/Coast Garibaldi	N	3,841	1,540	1,194	222	885
	Mean	1,568	684	1,459	1,200	3,346
	SD	2,747	1,635	2,647	1,932	3,628
	Median	0	0	0	85	2,135

Note: All costs are given in 2006 dollars.

**Table 7-15 HSDAs within Vancouver Coastal HA:
Annual Corrections Costs per Person**

HSDA		Total Cohort 1997 - 2004	DIAGNOSTIC GROUPS			
			No MD or SUD	MD Only	SUD Only	SUD and MD
Richmond	N	1,477	584	519	68	306
	Mean	898	689	640	2,100	1,467
	SD	2,449	2,274	1,718	4,091	3,101
	Median	295	287	291	380	376
Vancouver	N	10,438	3,698	2,407	1,007	3,326
	Mean	1,594	1,253	872	2,914	2,097
	SD	3,408	2,907	2,085	4,965	3,894
	Median	349	296	292	662	509
North Shore/Coast Garibaldi	N	3,841	1,540	1,194	222	885
	Mean	946	779	649	1,767	1,431
	SD	2,465	2,082	1,451	4,568	3,197
	Median	290	281	286	301	379

Note: All costs are given in 2006 dollars.

**Table 7-16 HSDAs within Vancouver Coastal HA:
Annual Costs per Person across All 3 Ministries**

HSDA		Total Cohort 1997 - 2004	DIAGNOSTIC GROUPS			
			No MD or SUD	MD Only	SUD Only	SUD and MD
Richmond	N	1,477	584	519	68	306
	Mean	3,614	1,630	3,053	5,034	8,035
	SD	6,042	3,110	4,889	5,849	9,051
	Median	1,172	552	1,216	2,668	5,129
Vancouver	N	10,438	3,698	2,407	1,007	3,326
	Mean	7,045	3,110	5,116	8,308	12,434
	SD	8,410	4,140	6,342	7,389	10,387
	Median	4,197	1,370	2,799	6,499	10,384
North Shore/Coast Garibaldi	N	3,841	1,540	1,194	222	885
	Mean	3,804	1,752	3,202	4,000	8,138
	SD	5,811	2,858	4,300	5,671	8,535
	Median	1,376	626	1,391	1,957	5,707

Note: All costs are given in 2006 dollars.

**Table 7-17 HSDAs within Vancouver Island HA:
Annual Health Costs per Person**

HSDA		Total Cohort 1997 - 2004	DIAGNOSTIC GROUPS			
			No MD or SUD	MD Only	SUD Only	SUD and MD
South Vancouver Island	N	6,940	2,333	2,094	467	2,046
	Mean	1,822	291	1,405	1,445	4,080
	SD	4,464	1,038	3,832	3,602	6,358
	Median	399	81	438	445	1,947
Central Vancouver Island	N	5,833	2,091	1,722	398	1,622
	Mean	1,291	270	1,053	920	2,953
	SD	3,125	666	2,262	1,746	4,917
	Median	336	92	417	359	1,380
North Vancouver Island	N	2,997	1,077	837	263	820
	Mean	1,213	268	982	862	2,801
	SD	2,866	569	2,097	1,581	4,532
	Median	337	101	385	378	1,336

Note: All costs are given in 2006 dollars.

**Table 7-18 HSDAs within Vancouver Island HA:
Annual MEIA Costs per Person**

HSDA		Total Cohort 1997 - 2004	DIAGNOSTIC GROUPS			
			No MD or SUD	MD Only	SUD Only	SUD and MD
South Vancouver Island	N	6,940	2,333	2,094	467	2,046
	Mean	2,855	1,289	2,663	2,839	4,841
	SD	3,559	2,182	3,437	3,294	4,025
	Median	1,318	196	1,174	1,631	4,178
Central Vancouver Island	N	5,833	2,091	1,722	398	1,622
	Mean	3,028	1,676	3,120	2,765	4,737
	SD	3,642	2,585	3,826	2,981	4,010
	Median	1,482	415	1,491	1,884	4,144
North Vancouver Island	N	2,997	1,077	837	263	820
	Mean	2,501	1,269	2,397	2,520	4,220
	SD	3,342	2,269	3,466	3,002	3,739
	Median	862	83	603	1,380	3,396

Note: All costs are given in 2006 dollars.

**Table 7-19 HSDAs within Vancouver Island HA:
Annual Corrections Costs per Person**

HSDA		Total Cohort 1997 - 2004	DIAGNOSTIC GROUPS			
			No MD or SUD	MD Only	SUD Only	SUD and MD
South Vancouver Island	N	6,940	2,333	2,094	467	2,046
	Mean	1,297	1,047	797	2,818	1,747
	SD	3,205	2,824	2,145	5,444	3,637
	Median	295	282	284	442	395
Central Vancouver Island	N	5,833	2,091	1,722	398	1,622
	Mean	1,389	1,112	929	2,495	1,962
	SD	3,314	2,884	2,282	5,151	3,975
	Median	291	277	283	364	367
North Vancouver Island	N	2,997	1,077	837	263	820
	Mean	1,313	938	956	2,171	1,894
	SD	3,085	2,538	2,388	4,239	3,726
	Median	295	280	288	371	417

Note: All costs are given in 2006 dollars.

**Table 7-20 HSDAs within Vancouver Island HA:
Annual Costs per Person across All 3 Ministries**

HSDA		Total Cohort 1997 - 2004	DIAGNOSTIC GROUPS			
			No MD or SUD	MD Only	SUD Only	SUD and MD
South Vancouver Island	N	6,940	2,333	2,094	467	2,046
	Mean	5,974	2,626	4,865	7,102	10,669
	SD	7,354	3,920	5,977	7,873	8,882
	Median	3,084	1,051	2,757	4,409	8,906
Central Vancouver Island	N	5,833	2,091	1,722	398	1,622
	Mean	5,708	3,058	5,102	6,180	9,652
	SD	6,397	4,052	5,172	6,277	7,934
	Median	3,377	1,272	3,185	4,414	8,275
North Vancouver Island	N	2,997	1,077	837	263	820
	Mean	5,027	2,475	4,334	5,553	8,915
	SD	6,003	3,722	4,926	5,330	7,449
	Median	2,593	934	2,355	4,251	7,317

Note: All costs are given in 2006 dollars.

**Table 7-21 HSDAs within Northern HA:
Annual Health Costs per Person**

HSDA		Total Cohort 1997 - 2004	DIAGNOSTIC GROUPS			
			No MD or SUD	MD Only	SUD Only	SUD and MD
Northwest	N	3,081	1,352	805	270	654
	Mean	1,029	258	1,049	920	2,644
	SD	2,888	538	2,245	1,737	5,239
	Median	288	92	428	381	1,158
Northern Interior	N	4,824	1,951	1,299	368	1,206
	Mean	1,118	322	900	963	2,689
	SD	3,092	1,193	1,919	3,446	4,983
	Median	300	77	389	370	1,242
Northeast	N	2,313	1,144	530	206	433
	Mean	952	250	907	1,244	2,722
	SD	2,824	949	1,936	3,654	4,987
	Median	207	65	336	366	1,250

Note: All costs are given in 2006 dollars.

**Table 7-22 HSDAs within Northern HA:
Annual MEIA Costs per Person**

HSDA		Total Cohort 1997 - 2004	DIAGNOSTIC GROUPS			
			No MD or SUD	MD Only	SUD Only	SUD and MD
Northwest	N	3,081	1,352	805	270	654
	Mean	2,445	1,499	2,632	2,645	4,090
	SD	3,417	2,588	3,627	3,165	4,031
	Median	701	78	777	1,187	2,955
Northern Interior	N	4,824	1,951	1,299	368	1,206
	Mean	2,394	1,373	2,436	2,157	4,071
	SD	3,253	2,285	3,435	2,569	3,830
	Median	941	280	915	1,170	3,206
Northeast	N	2,313	1,144	530	206	433
	Mean	1,562	862	1,689	1,728	3,179
	SD	2,606	1,797	2,766	2,686	3,326
	Median	257	0	365	259	2,100

Note: All costs are given in 2006 dollars.

**Table 7-23 HSDAs within Northern HA:
Annual Corrections Costs per Person**

HSDA		Total Cohort 1997 - 2004	DIAGNOSTIC GROUPS			
			No MD or SUD	MD Only	SUD Only	SUD and MD
Northwest	N	3,081	1,352	805	270	654
	Mean	1,036	913	781	1,614	1,366
	SD	2,310	2,203	1,846	2,748	2,730
	Median	300	296	288	506	366
Northern Interior	N	4,824	1,951	1,299	368	1,206
	Mean	1,250	1,095	755	1,885	1,840
	SD	2,828	2,468	1,914	4,036	3,531
	Median	302	295	293	412	453
Northeast	N	2,313	1,144	530	206	433
	Mean	1,192	1,061	817	1,982	1,622
	SD	2,502	2,208	1,792	3,502	3,185
	Median	320	300	290	543	482

Note: All costs are given in 2006 dollars.

**Table 7-24 HSDAs within Northern HA:
Annual Costs per Person across All 3 Ministries**

HSDA		Total Cohort 1997 - 2004	DIAGNOSTIC GROUPS			
			No MD or SUD	MD Only	SUD Only	SUD and MD
Northwest	N	3,081	1,352	805	270	654
	Mean	4,510	2,670	4,462	5,179	8,100
	SD	5,501	3,540	4,917	4,734	7,594
	Median	2,320	1,054	2,443	3,622	6,046
Northern Interior	N	4,824	1,951	1,299	368	1,206
	Mean	4,762	2,791	4,091	5,005	8,600
	SD	5,816	3,690	4,629	5,954	7,610
	Median	2,699	1,261	2,359	3,378	6,950
Northeast	N	2,313	1,144	530	206	433
	Mean	3,707	2,174	3,413	4,954	7,524
	SD	5,140	3,262	4,186	6,267	7,175
	Median	1,601	799	1,821	2,577	5,859

Note: All costs are given in 2006 dollars.

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