

Chronic health conditions reported by male inmates newly admitted to Canadian federal penitentiaries

Lynn A. Stewart PhD C Psych, Amanda Nolan MA, Jeremy Sapers BA, Jenelle Power PhD, Linda Panaro MD CM, Jonathan Smith MSc

Abstract

Background: International health studies have shown that inmates have higher rates of infectious diseases, chronic diseases and psychiatric disorders relative to the general population. We conducted a systematic collection of data on chronic physical health conditions reported by newly admitted inmates in Canadian federal penitentiaries.

Methods: Over a 6-month period from April to September 2012, we collected and analyzed data from a standardized health interview routinely conducted with consenting incoming male inmates ($n = 2273$). Prevalence rates of health conditions were determined and disaggregated by age (< 50 yr and ≥ 50 yr) and by Aboriginal status.

Results: The most common health conditions reported by respondents were head injury (34.1%), back pain (19.3%), asthma (14.7%) and hepatitis C virus (HCV) infection (9.4%). Rates of many health conditions were higher among inmates 50 years of age or older than among younger inmates. Compared with their non-Aboriginal counterparts, Aboriginal inmates had higher rates of head injury and HCV infection.

Interpretation: Our study provides a benchmark that can be used to examine health trends within Canada's federal penitentiaries over time and points to subgroups of newly admitted inmates for whom health services may need to be concentrated.

International studies have shown that inmates have higher rates of infectious diseases, chronic diseases and psychiatric disorders relative to the general population.¹⁻⁶ Several factors could explain this difference. Inmates engage in more high-risk health behaviours (e.g., intravenous drug use, tattooing, smoking, physical aggression, sexual activity with multiple partners and alcohol abuse) than members of the general population.^{1,5} Inmates' higher rates of brain injury also suggest an increased likelihood of being involved in activities that can result in physical injury.⁷ Socioeconomic factors known to be associated with poorer health (e.g., poverty, low education, substandard housing and unemployment or underemployment) are also more common among inmate populations.^{8,9} In some cases, incarceration itself, with the increased exposure to individuals with higher rates of infection and continued risky behaviours while in correctional facilities, may contribute to the generally poorer health status of inmates.^{1,5,10}

Correctional Service Canada (CSC) is responsible for all adult offenders receiving sentences longer than 2 years. There is reason to be concerned that rates of chronic health conditions of federal inmates may be increasing because of demographic shifts in the incarcerated population. For example, the proportion of incoming offenders aged 50 years or older has grown over the last 10 years, from 7.5% in 2003/04 to 13.3% in 2012/13.¹¹ Among incarcerated offenders in 2012/13, 21.5%

were 50 years or older.¹¹ Older inmates generally require more health care services than younger inmates because they are more likely to have chronic diseases and disabilities and consequently have more specialized needs for care and assistance with mobility and daily living.^{12,13} Despite the increase in the proportion of older inmates, the overall inmate population is younger than the general Canadian population: based on the latest census, 15% of the general population is 65 years and older,¹⁴ as compared with 3.5% of federal inmates.¹¹

Another factor that could affect the overall prevalence of health conditions among federal inmates is the increased proportion of inmates who are of self-reported Aboriginal ancestry. From 2003/04 to 2012/13, the Aboriginal federal inmate population increased by 47.2%, and in 2012/13, 23% of federal inmates were of self-reported Aboriginal ancestry.¹¹ Overall, Aboriginal populations in Canada face a higher prevalence of health con-

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Correspondence to: Lynn Stewart, stewartla@csc-scc.gc.ca

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ditions and a lower life expectancy than the non-Aboriginal population.^{15–17} Evidence suggests that many of the health conditions seen in the general population of Aboriginal Canadians (e.g., diabetes, obesity, and drug and alcohol abuse) are more prevalent in Aboriginal inmate populations.¹⁸ Other areas that affect the relatively lower life expectancy of Aboriginal inmates are the higher rates of suicide and injury from violence.¹⁵

Canada is a signatory to the United Nations Basic Principles for the Treatment of Prisoners,¹⁹ which declares that all prisoners shall have access to the same health services available in their country without discrimination on the grounds of their legal status. The Corrections and Conditional Release Act²⁰ legislates CSC to deliver essential health care to federal inmates. CSC policy requires that federal correctional institutions provide access to essential medical, public health, dental and mental health services, and specifies the requirement for informed consent.

A comprehensive profile of the health needs of federal inmates in Canada was compiled in 2004.²¹ However, estimates of chronic diseases were tentative because of limitations owing to the lack of reliable data sources. The report's recommendation to examine inmates' health data more systematically was the basis for our current study. Although health problems present a challenge to officials mandated to provide health services for incarcerated populations, investment in this area can reap dividends for the management of infectious and chronic diseases. Identifying and treating inmates while they are in one location, have access to testing and treatment and can be monitored for adherence could improve the health outcomes of this high-risk group, many of whom may have erratic contact with health services when they are in the community.⁴ It has been noted that assessing offenders in the correctional system is a public health opportunity to promote health in this vulnerable population and to decrease the risk of infectious diseases being transmitted by untreated offenders once released in the community.²²

Methods

Study setting and population

We conducted a descriptive study of the prevalence of chronic physical health conditions reported by newly admitted federal male inmates over a 6-month period from Apr. 1 to Sept. 30, 2012. A chronic health condition was defined as a long-lasting condition that can be controlled or treated but not cured. We disaggregated the results by age (< 50 and ≥ 50 yr) and by self-reported Aboriginal ancestry. Participants included all consecutive male inmates admitted to federal penitentiaries across the 5 CSC regions (i.e., Atlantic, Quebec, Ontario, Prairies and Pacific) who consented to a health assessment interview during the 6-month period. The physical health status of newly admitted female inmates is also being examined; however, the relatively low number of women in the federal correctional system requires a longer period of data collection for a sufficient sample size. Hence, those results are not provided here. In addition, a separate study of mental health conditions among federal inmates is being conducted with the use of a standardized clinical diagnostic interview format.

Data sources

Within the first 24 hours after admission to CSC custody, all inmates are routinely seen by a nurse to attend to immediate medical needs, explain the health assessment process and seek informed consent for medical services. At this time, the nurse completes section I of the intake health status assessment form, which includes questions on current medical health requiring immediate attention. Within 2 weeks after admission, a comprehensive nursing assessment is offered to consenting inmates. This includes section II of the intake health status assessment, which records current vital signs and inmates' self-reported current and past health issues, and a separate form on infectious disease screening, which documents inmates' HIV and hepatitis C virus (HCV) infection screening results. All of the forms have been developed specifically for CSC health services (Appendix 1, available at www.cmajopen.ca/content/3/1/E97/suppl/DC1). Questions are generally formatted using Yes or No checkboxes to reflect whether there is a health condition. Further information on health assessments at intake is available in the Commissioner's Directive on Health Services.²³

Statistical analysis

We determined prevalence rates of health conditions and lifestyle risk factors among the inmates and disaggregated them by self-identified Aboriginal ancestry and by age (< 50 v. ≥ 50 yr). We used only 2 age groups to allow an adequate number in each group for analysis. Based on research indicating that the physical effects of aging become evident earlier in groups where substance abuse and an unhealthy lifestyle are common, age 50 has been identified as the threshold to examine age effects among offenders.¹¹ Given that a specific subpopulation of male inmates was examined rather than a sampling, we interpreted results where practical differences existed and assessed the magnitude of these differences using effect sizes (i.e., Cramér's phi, denoted as ϕ_c ; ϕ_c values range from 0 to 1, with values between 0.10 and 0.20 indicating a weak association, between 0.21 and 0.39 a moderate association, between 0.40 and 0.60 a strong association and above 0.60 a very strong association.²⁴

Ethics approval

All inmates included in this study provided informed consent to participate in the intake health assessment. The resulting health data are routinely collected under the Treasury Board of Canada's Info Source Personal Identification Bank 060 (www.csc-scc.gc.ca/info-source/007007-0004-eng.shtml). Under the Privacy Act paragraph 8(2)(j), CSC is permitted to compile health data for statistical use without additional consent from offenders as long as the presentation of the information guarantees confidentiality and the information is used in a manner consistent with the purpose for which the data were collected. An ethics review board for research in the CSC is not required.

Results

We collected health data from 2273 male inmates, representing 96% of newly admitted inmates during the study period. The

mean age of the participants was 35.5 years (standard deviation 12.0, range 18.2–82.4). The mean age of the 496 men (21.9%) who self-identified as being of Aboriginal ancestry was 32.8 years, as compared with 36.3 years for the non-Aboriginal men. A higher proportion of Aboriginal inmates than of non-Aboriginal inmates were less than 50 years old (94.4% v. 84.6%; $\phi_c = 0.12$).

The proportion of inmates with self-reported chronic health conditions is presented in Table 1. Over one-third of the inmates reported having had a head injury. Back pain, asthma,

HCV infection, hypertension and arthritis were the other conditions most commonly reported.

Rates of many of the chronic health conditions, especially those affecting the cardiovascular system, were substantially higher among inmates 50 years of age or older than among younger inmates (Table 1). Notably, we found meaningful differences ($\phi_c > 0.10$) indicating higher rates of hypertension, high cholesterol, angina, arthritis, diabetes, prostate problems and history of cancer among older inmates.

With the exception of head injury ($\phi_c = 0.10$) and HCV

Table 1: Prevalence of self-reported chronic health conditions among 2273 male inmates newly admitted to federal penitentiaries, overall and by age group and Aboriginal status

Health condition	Total, no. (%) <i>n</i> = 2273	Age group, no. (%) [*]			Aboriginal ancestry, no. (%) [*]		
		< 50 yr <i>n</i> = 1970	≥ 50 yr <i>n</i> = 302	ϕ_c value	Aboriginal <i>n</i> = 496	Non-Aboriginal <i>n</i> = 1774	ϕ_c value
Central nervous system							
Head injury	738 (34.1)	648 (34.6)	90 (30.7)	0.03	193 (43.0)	543 (31.7)	0.10†
Seizures	92 (4.3)	75 (4.0)	17 (5.8)	0.03	23 (5.1)	68 (4.0)	0.02
Spinal injury	56 (2.6)	47 (2.5)	9 (3.1)	0.01	13 (2.9)	43 (2.5)	0.01
Musculoskeletal system							
Back pain	411 (19.3)	332 (18.0)	79 (27.5)	0.08	73 (16.4)	338 (20.0)	0.04
Arthritis	177 (8.3)	122 (6.6)	55 (19.2)	0.16†	36 (8.1)	140 (8.3)	0.003
Osteoporosis	9 (0.4)	6 (0.3)	3 (1.1)	0.04	2 (0.5)	7 (0.4)	0.002
Respiratory system							
Asthma	318 (14.7)	284 (15.1)	34 (11.6)	0.03	57 (12.7)	261 (15.2)	0.03
Bronchitis	63 (2.9)	55 (2.9)	8 (2.7)	0.004	14 (3.1)	49 (2.9)	0.01
Other pulmonary disease	38 (1.8)	23 (1.2)	15 (5.1)	0.10†	3 (0.7)	35 (2.0)	0.04
Cardiovascular system							
Hypertension	184 (8.5)	114 (6.1)	70 (23.8)	0.22†	35 (7.8)	149 (8.7)	0.01
Elevated cholesterol	114 (5.3)	64 (3.4)	50 (17.1)	0.21†	11 (2.4)	103 (6.0)	0.06
Heart attack	44 (2.0)	24 (1.3)	20 (6.8)	0.13†	9 (2.0)	35 (2.0)	0.001
Arrhythmia	34 (1.6)	26 (1.4)	8 (2.7)	0.04	6 (1.3)	28 (1.6)	0.01
Angina	30 (1.4)	12 (0.6)	18 (6.1)	0.16†	5 (1.1)	25 (1.5)	0.01
Stroke	16 (0.7)	8 (0.4)	8 (2.7)	0.09	2 (0.4)	14 (0.8)	0.02
Blood-borne virus							
HIV/AIDS	27 (1.3)	23 (1.3)	4 (1.5)	0.005	10 (2.4)	17 (1.1)	0.05
HCV	191 (9.4)	156 (8.8)	35 (12.7)	0.05	66 (15.5)	124 (7.7)	0.11†
Endocrine system							
Diabetes	88 (4.2)	54 (2.9)	34 (11.9)	0.15†	16 (3.6)	72 (4.3)	0.01
Gastrointestinal system							
Ulcers	69 (3.2)	56 (3.0)	13 (4.4)	0.03	12 (2.7)	57 (3.3)	0.02
Reproductive system							
Prostate problems	60 (2.8)	26 (1.4)	34 (11.8)	0.21†	11 (2.5)	49 (2.9)	0.01
Any cancer history	39 (1.8)	19 (1.0)	20 (6.8)	0.15†	4 (0.9)	35 (2.0)	0.04

Note: HCV = hepatitis C virus.

^{*}The denominator varies by condition owing to missing data.

†Value indicates a meaningful effect size (i.e., at least a weak association). Cramér's phi (denoted as ϕ_c) values between 0.10 and 0.20 indicate a weak association, between 0.20 and 0.40 a moderate association, between 0.40 and 0.60 a strong association and above 0.60 a very strong association.

infection ($\phi_c = 0.11$) being higher among inmates of Aboriginal ancestry than among non-Aboriginal inmates, there were no meaningful differences in rates of chronic health conditions between these 2 groups (Table 1).

Table 2 shows the prevalence of lifestyle risk factors among the inmates that may have contributed to some of the chronic health conditions. Overall, 64.5% of the inmates were overweight or obese (as measured by their body mass index), 52.6% reported drinking alcohol, and 20.8% reported a history of injection drug use. As noted in Table 2, the rate of self-reported alcohol use was higher among Aboriginal inmates than among non-Aboriginal inmates ($\phi_c = 0.10$).

Interpretation

We found that head injury, back pain, asthma and HCV infection were the most prevalent chronic health conditions reported by male inmates newly admitted to federal penitentiaries during the 6-month study period in 2012. Not surprisingly, older inmates (≥ 50 yr) reported generally higher rates of most physical health conditions than the younger inmates. There were no meaningful differences, however, between older and younger inmates in the most frequently reported conditions (i.e., head injury, back pain, asthma and HCV infection). Compared with non-Aboriginal inmates, those of Aboriginal ancestry had similar rates of most conditions except head injury and HCV infection. Aboriginal inmates had a lower mean age and a lower representation among older inmates, which is consistent with CSC admission data in 2011/12.¹¹ This may explain why we did not find meaningful differences in many of the health conditions between the Aboriginal and non-Aboriginal groups.

The rates of self-reported health conditions in our study cohort do not appear to be higher than rates reported among inmates in most other countries. In a review of the prevalence of some of the major physical and psychiatric diseases reported among prisoners, the rate of HIV infection in US jails and prisons was 1.5%, and the estimated prevalence of HCV infection based on antibody screening in US state prison systems ranged from 23% (Rhode Island) to 34% (California).¹ Re-

ported rates of hypertension and asthma were higher in the US prisons than in our inmate population, and rates of diabetes appeared to be comparable. A survey of Australian inmates in New South Wales prisons³ using a similar methodology to ours found much higher rates of self-reported health conditions than we did. The general health of underprivileged individuals in the US, with their restricted access to affordable or insured health care, may have contributed to the reported poorer health of American offenders relative to Canadian offenders, who benefit from universal health care. The high rates of reported health problems in Australia may have been due to the disproportionate sampling of indigenous people, who experience material and social deprivation related to poorer health outcomes.²⁵ The higher rates may also have been because the Australian inmates had already been incarcerated for a period of time, whereas the offenders in our study were newly admitted into custody.³

With the exception of asthma and blood-borne viruses, most chronic health conditions were not more prevalent in our study cohort than in the adult Canadian male population based on estimates provided through the 2011 Canadian Community Health Survey.²⁶ Indeed, rates for hypertension and arthritis were lower in our study. However, the comparison with the Canadian general population is not age-adjusted.

Most of the inmates newly admitted during the study period participated in the medical assessment at intake, so our estimates of self-reported chronic health conditions are likely representative of the incoming federal inmate population. Further research could clarify the extent to which chronic health conditions among inmates are associated with lifestyle risk factors, and therefore which conditions are expected to be more prevalent in certain subpopulations of inmates and what interventions could be appropriate to address them. For example, newly admitted inmates report engaging in high-risk lifestyle behaviours such as drinking and injection drug use at rates higher than those reported in the general Canadian population.²⁷ Correctional programs designed to reduce substance abuse have been proven to reduce criminal recidivism for a diverse range of offenders.²⁸ Furthermore, the presence of chronic health condi-

Table 2: Prevalence of lifestyle risk factors among the inmates, overall and by Aboriginal status

Lifestyle risk factor	Group; no. (%) [*]			ϕ_c value
	Total <i>n</i> = 2273	Aboriginal <i>n</i> = 496	Non-Aboriginal <i>n</i> = 1774	
Alcohol use	1049 (52.6)	257 (62.1)	786 (49.8)	0.10‡
History of injection drug use	415 (20.8)	114 (27.6)	299 (18.9)	0.09
Cigarette smoking	453 (21.1)	89 (19.7)	364 (21.5)	0.02
No physical exercise	407 (21.1)	61 (15.1)	346 (22.7)	0.08
Overweight or obese†	1164 (64.5)	243 (67.9)	919 (63.6)	0.04

^{*}The denominator varies by condition owing to missing data.
[†]Overweight = body mass index (BMI) 25–29.9, obese = BMI ≥ 30 .
[‡]Value indicates meaningful effect size (i.e., at least a weak association). Cramér's phi (denoted as ϕ_c) values between 0.10 and 0.20 indicate a weak association, between 0.20 and 0.40 a moderate association, between 0.40 and 0.60 a strong association and above 0.60 a very strong association.

tions may differ between specific groups of Aboriginal inmates; we did not disaggregate Aboriginal inmates by First Nations, Métis or Inuit ancestry. Based on recent Statistics Canada reports compiling the results of the Canadian Community Health Survey,^{16,26} there is evidence that the higher rates of diabetes relative to the general Canadian population applies to First Nations people and less so to the Métis.^{16,17}

Limitations

A limitation of our study is that height and weight were the only objectively measured health indicators; all other data were reported by the inmates. This methodology is the same as that used for the Canadian Community Health Survey to collect data on the Canadian population. However, incarcerated populations are known to underuse health services in the community,⁴ and therefore some chronic health conditions may not be known to the individuals until they are diagnosed in prison. Incoming inmates are younger on average than those who are already incarcerated; therefore, relying on their responses to determine rates of chronic health conditions could underestimate the prevalence in the total incarcerated population.

A substantial proportion of the inmates reported having a blood-borne virus, but it is unknown whether the self-reported rates represent reliable estimates of the true prevalence of HIV and HCV infections on admission. Testing for HIV and HCV infection is offered by CSC to all consenting inmates at intake and upon request throughout incarceration. The latest infectious disease surveillance report from CSC for 2007/08 reported a 58% uptake of HIV testing at intake and found that 1.7% of these inmates had laboratory-confirmed infection.²⁹ It is not clear, however, whether those who agreed to the testing are representative of newly admitted inmates; therefore, we cannot determine whether self-reported data underestimate the true prevalence of blood-borne viruses. Both a previous CSC inmate survey³⁰ and routine infectious disease surveillance data concur that virtually all infected inmates were infected before their current incarceration.³¹

Although most of the incoming inmates participated in our study, some did not provide data on certain conditions; however, the large sample ($n = 2273$) provides confidence that the rates represent accurate estimates for the study period.

Because our study was designed to provide a simple descriptive analysis, we did not conduct advanced statistical modelling. Future research would benefit from a more in-depth analysis of how age, Aboriginal ancestry, lifestyle risk factors and social determinants are related to chronic health conditions.

Conclusion

This study provides a systematic estimate of the prevalence of chronic health conditions among male inmates newly admitted to federal penitentiaries in Canada. The results point to inmate subgroups who may require a higher concentration of health services (e.g., inmates of Aboriginal ancestry, older inmates and those with a history of intravenous drug use). Our research also provides a benchmark from which trends in the prevalence of chronic health conditions in Canada's penitentiaries can be monitored over time and can help to inform

the design of primary and preventative health programs. CSC continues to address infectious diseases by education, tobacco-cessation counselling, harm reduction policies and offering testing and treatment to infected inmates. Future research should investigate whether these programs also have a beneficial effect in reducing related chronic health conditions among federal offenders. A systematic method for tracking the health status of offenders while incarcerated would provide evidence of the impact of these initiatives during the course of their incarceration. It would also contribute to our understanding of the extent to which incarceration itself can affect physical health.

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Affiliation: Correctional Service of Canada, Ottawa, Ont.

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