High HIV-TB Co-infection Rates in Marginalized Populations: Evidence from Alberta in Support of Screening TB Patients for HIV

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ABSTRACT

Heretofore we have not seen strong evidence of synergy between HIV and tuberculosis (TB) in Canada. This may simply reflect a lack of concurrent surveillance for the two diseases. To date, the goal of universal HIV testing of TB patients (>80% tested) in Canada has not been achieved, despite the existence of two national advisories recommending universal HIV testing of TB patients. In response to these advisories, we recently undertook to demonstrate the feasibility of using an 'opt-out' approach to achieve universal HIV testing of TB patients in Alberta – see the *Canadian Journal of Public Health* 2009;100(2):116-20. In the present commentary, we add two more years of data (2007-2008) to our earlier report and demonstrate for the first time that HIV co-infection is significantly greater in middle-aged (35-64 years) compared to young adult (15-34 years) TB patients and in Aboriginal and sub-Saharan African, compared to Canadian-born non-Aboriginal and foreign-born 'other' TB patients. Our findings underscore the need for universal concurrent testing as well as greater interaction between TB and HIV programs.

Key words: Tuberculosis; HIV

La traduction du résumé se trouve à la fin de l'article.

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As experience from HIV-endemic countries has taught us, HIV and TB go hand in hand. HIV infection is a powerful risk factor for the reactivation of latent tuberculosis infection (LTBI) and a major contributor to the global resurgence of TB. Heretofore we have not seen strong evidence of this synergy in Canada, although this may simply reflect a lack of concurrent surveillance for the two diseases. To date, the goal of universal HIV testing of TB patients in Canada remains elusive (27.2% of TB patients were reported as HIV tested in 2006) despite the existence of two national advisories, one in 1992 and another in 2002, recommending universal HIV testing of TB patients.¹⁻³ In response to these advisories, we recently undertook to demonstrate the feasibility of using an 'opt-out' approach to achieve universal HIV testing (>80% tested) of TB patients in Alberta. The 'opt-out' approach we used was patterned after an established program of 'opt-out' HIV testing in prenatal women.⁴ It is akin to the 'provider-initiated' HIV testing program now promoted by the World Health Organization.^{5,6} In it, patients are briefly informed about HIV's connection to TB and the routine testing of TB patients in Alberta for HIV unless they choose not to be tested. 'Opt-out' testing was extremely well received; by 2003 and every year thereafter, over 80% of TB patients were routinely tested for HIV. We first reported our findings in the March/April 2009 issue of the *Canadian Journal of Public Health*.⁷ In the present commentary, we add two more years of data (2007-2008) to our earlier report and demonstrate for the first time that HIV co-infection is significantly greater in certain age and population groups of TB patients. Our findings underscore the need for universal concurrent testing as well as greater interaction between TB and HIV programs.⁸

In 2003-2006 and 2007-2008, respectively, the proportion of TB patients who were HIV tested in Alberta was 81.9% and 94.6%; 87.4% and 99.5% in the age group 15-64 years where all of the HIV co-infected patients were situated (Table 1). In the two time periods combined, the proportion was 86.4%; 91.8% in the age group

15-64 years. In 2003-2006 and 2007-2008, respectively, the proportion of HIV-tested patients who were HIV positive was 5.4% and 7.6%; 7.4% and 10.4% in the age group 15-64 years. In the two time periods combined, the proportion was 6.3%; 8.5% in the age group 15-64 years.

Over the two time periods combined and within the age group 15-64 years, age and population group were significant predictors of HIV co-infection (Table 2). In exact multivariate logistic regression analysis (SAS), HIV co-infection was found to be significantly higher in patients aged 35-64 years than in patients aged 15-34 years (10.2% versus 6.5%, respectively, $p < 0.005$), and similarly in Aboriginal peoples and immigrants to Canada from sub-Saharan Africa (14.7% and 20.9%) compared to Canadian-born non-Aboriginal peoples and immigrants to Canada from other regions combined (2.9%, $p < 0.003$ and $p < 0.001$). Higher HIV co-infection rates in middle-aged versus young adult TB patients may reflect not only age at HIV infection but years of living with HIV (and therefore immune status) at diagnosis of TB.⁹ Prevalence rates were derived from institutional databases and did not control for the determinants of health. In Canadian-born persons in particular, comorbidity differentials may relate less to being a Canadian-born Aboriginal person than to socio-economic, cultural or behavioural conditions. The generalizability of these results to other jurisdictions in Canada is not known, but is likely to be similar.

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Table 1. HIV Status of TB Patients in Alberta by Demographic Group 2003-06 (previous report)*, 2007-08 (present report)

	2003-2006			2007-2008		
	TB Cases	HIV Tested n (%)	HIV Positive n (%)	TB Cases	HIV Tested n (%)	HIV Positive n (%)
Total	496	406 (81.9)	22 (5.4)	278	263 (94.6)	20 (7.6)
Age (yrs)						
0-14	19	10 (52.6)	0 (0.0)	17	14 (82.4)	0 (0.0)
15-34	144	131 (91.0)	6 (4.6)	87	86 (98.9)	8 (9.2)
35-64	198	168 (84.9)	16 (9.5)	107	107 (100.0)	12 (11.2)
>64	135	97 (71.9)	0 (0.0)	67	56 (83.6)	0 (0.0)
Sex						
Male	251	210 (83.7)	14 (6.7)	145	139 (95.9)	12 (8.3)
Female	245	196 (80.0)	8 (9.5)	133	124 (93.2)	8 (6.0)
Population Group†						
CBO	61	52 (85.3)	0 (0.0)	32	29 (90.6)	0 (0.0)
CBA	66	58 (87.9)	5 (8.6)	31	28 (90.3)	5 (16.1)
FBO	293	231 (78.8)	6 (2.6)	157	149 (94.9)	3 (1.9)
FBSSA	76	65 (85.5)	11 (16.9)	58	57 (98.3)	12 (20.7)

* See reference #7

† Abbreviations: CBO=Canadian-born 'other'; CBA=Canadian-born Aboriginal; FBO=Foreign-born 'other'; FBSSA=Foreign-born sub-Saharan African

Table 2. Demographic Features of HIV-negative and HIV-positive TB Patients, Aged 15-64 Years, Alberta, 2003-08

	HIV-negative n=450	HIV-positive n=42	Univariate OR (95% CI)	Multivariate OR (95% CI)
Age (yrs)				
15-34	203	14	1.00	1.00
35-64	247	28	1.64 (0.81, 3.47) †	3.12 (1.36, 7.51)
Sex				
Male	228	26	1.00	1.00
Female	222	16	0.63 (0.31, 1.26)	0.75 (0.35, 1.56) ¶
Population Group*				
CBO	48	0	1.00	1.00
FBO	257	9		
CBA	58	10	5.84 (2.02, 16.93)‡	4.96 (1.72, 14.52)**
FBSSA	87	23	8.96 (3.80, 22.69)§	13.03 (5.17, 35.79)‡

* Abbreviations: CBO=Canadian-born 'other'; FBO=Foreign-born 'other'; CBA=Canadian-born Aboriginal; FBSSA=Foreign-born sub-Saharan African

Note: The combination of CBO and FBO is the reference group for comparison to CBA and FBSSA.

† p=0.15

‡ p<0.001

§ p<0.0001

|| p<0.005

¶ p<0.51

** p<0.003

A high rate of HIV co-infection among Aboriginal TB patients aged 15-64 years, a rate that is not dissimilar (though the numbers are small) to the one we report in sub-Saharan African TB patients ($p=0.25$), is deeply troubling, especially in a developed country with ample resources. The steadily rising proportion of positive HIV test reports among Aboriginal persons in recent years and the data presented here suggest that HIV has the potential to further exacerbate what is already an unsatisfactory state of TB control in Aboriginal peoples.^{9,10} Within Aboriginal groups, heterosexual contact and injection drug use are the main HIV exposure categories.⁹ Rates of all sexually transmitted infections (STIs), including an ongoing outbreak of syphilis, are high and rising in Alberta, with disproportionately high rates among Aboriginal persons.¹¹ STIs, in particular ulcerative infections such as syphilis, facilitate the spread of HIV. Integrating STI treatment services into an existing health care system has been demonstrated to reduce HIV transmission, particularly in jurisdictions where STI prevalence is high but HIV prevalence is low to medium.¹² Making a timely diagnosis of HIV and providing treatment of LTBI to co-infected Aboriginal persons are a high priority.

While the increased HIV co-infection rate among the sub-Saharan African group is concerning, it is not as surprising. Sexual behaviour patterns are determined by cultural and socio-economic contexts. In the developing countries of sub-Saharan Africa, where heterosexual contact is the main HIV exposure category, certain of these contexts have been identified as contributing to the extensive

spread of HIV. These include the subordinate position of women, impoverishment and decline of social services, rapid urbanization and modernization, and wars and conflicts.¹³ According to Citizenship and Immigration Canada data, between 2002 and 2003 at least 50% of all HIV diagnoses detected among persons applying to immigrate to Canada were in individuals born in the World Health Organization's 'sub-region 1', an epidemiologic grouping of African countries with both high HIV prevalence and TB incidence.^{14,15} Our findings among this population in Alberta reinforce the importance of collaboration among Citizenship and Immigration Canada, the Public Health Agency of Canada and the provinces and territories and between HIV and TB programs. HIV-infected immigrants and refugees ought to be tuberculin tested and if positive offered treatment of LTBI.

At least two criticisms of our commentary come to mind, one directed at publicizing our results, the other at universal HIV testing of TB patients. First, as has been pointed out by others, there is a danger in overemphasizing sero-prevalence research to the exclusion of studies on the social determinants of health.^{16,17} Negative stereotypes end up being reinforced as does discrimination against minority groups both within and beyond their own community.^{16,17} No doubt the reasons for the significantly higher co-morbidity rates in minority groups herein reported are complex and intertwined with many confounding issues (economic, historic, and social) that also disproportionately affect those groups – e.g., poverty, substance

and alcohol abuse, unequal access to health care, etc.^{18,19} Superimposed on these factors are the unique cultural beliefs and contexts that influence behaviour, health beliefs in general and HIV infection in particular.^{16,18} This notwithstanding, there is very little if any comprehensive data on HIV co-infection of TB patients in Canada and without such data little can be expected in the way of concerted action. Second, one might question the need to HIV test TB patients outside the age group 15-64 years, no co-infection having been found in those under 15 or over 64 years of age. Here we would argue, as we did in our earlier report, that anything other than truly universal HIV testing will fail to identify some individuals who are HIV infected, that universal HIV testing does not discriminate, is less likely to be perceived as stigmatizing, and if HIV co-infection is discovered, determines the patient to have AIDS.^{7,20,21} Already in 2009, one child under the age of 15 has been reported to be co-infected; other jurisdictions have reported patients in the age group >64 years to be co-infected.

Alberta's experience with universal HIV testing of TB patients has proven feasible and salutary. First, it was of immediate benefit to the patients, many of whom were not known to be HIV-infected and had low CD4 cell counts.⁷ Second, it reinforced the need for targeted tuberculosis preventive therapy in HIV-TB co-infected persons. Third, it identified the need for greater STI prevention and control, particularly in Aboriginal peoples, and greater emphasis on contextually and culturally appropriate HIV and AIDS prevention in both Aboriginal peoples and immigrants to Canada from sub-Saharan Africa.²² Fourth, it added weight to the argument that all immigrants and refugees with HIV infection ought to be referred for medical surveillance for both HIV and TB as a condition of entry to Canada.¹⁰ Currently, HIV is not under medical surveillance and TB referral is only required for patients with a history of TB or evidence of old healed TB on chest radiograph.¹⁰ And fifth, it underscores the need for a much greater provincial/territorial and national response to what are unacceptably high rates of TB and HIV in Aboriginal peoples and the need for a strong and sustained international response to TB and HIV in developing countries, particularly those of sub-Saharan Africa.

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RÉSUMÉ

Nous n'avons pas eu jusqu'à maintenant de preuves solides de l'existence d'une synergie entre le VIH et la tuberculose au Canada. Cela pourrait simplement s'expliquer par l'absence d'une surveillance parallèle des deux maladies. On n'a pas encore atteint au Canada l'objectif du dépistage universel du VIH chez les patients atteints de tuberculose (>80 % de sujets dépistés), malgré deux avis nationaux recommandant le dépistage universel du VIH chez les patients tuberculeux. En réponse à ces avis, nous avons décidé dernièrement de démontrer la faisabilité d'une « approche d'abstention » pour obtenir le dépistage universel du VIH chez les patients atteints de tuberculose en Alberta – voir notre article dans la RCSP, vol. 100, no 2 (2009), p. 116-120. Dans le présent commentaire, nous ajoutons deux autres années de données (2007-2008) à notre rapport antérieur et nous démontrons pour la première fois que la co-infection par le VIH est significativement plus élevée chez les patients tuberculeux d'âge moyen (35 à 64 ans) que chez les jeunes adultes (15 à 34 ans), et chez les patients tuberculeux autochtones et originaires d'Afrique sub-saharienne que chez les patients non-autochtones nés au Canada ou ailleurs qu'en Afrique sub-saharienne. Ces résultats soulignent le besoin d'un dépistage universel parallèle et d'une plus grande interaction entre les programmes de lutte contre la tuberculose et le VIH.

Mots clés : tuberculose; VIH