The five-year impact of an evolving global epidemic, changing migration patterns, and policy changes in a regional Canadian HIV population

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\textbf{A B S T R A C T}

\textbf{Objectives:} To evaluate the impact of policy changes to Canada’s Immigration Act and changing migration patterns on a regional HIV population.

\textbf{Methods:} All HIV-positive individuals enrolled in care at the Southern Alberta Cohort between 2001 and 2007 were included and subdivided by self-reported country of birth. Demographic, clinical, and health utilization data were collected at each visit. We compare data and outcomes for each group and analyze changes since policy implementation.

\textbf{Results:} The proportion of immigrants/refugees increased significantly over the past five years. They present with lower CD4 counts, different HIV-subtypes, and previously rare co-morbidities. Management of disease progression necessitates more clinical visits and laboratory testing. Immigrants/refugees require greater social support to engage in, and to continue to access health care. Outcomes in HIV care were, however, equivalent to the Canadian-born population.

\textbf{Conclusions:} The impact of changes to immigration policies is evident five years after implementation. Immigrant medical screening identifies increasing numbers of immigrants diagnosed with HIV. Immigrants require engagement in health care to achieve the full benefits of HIV management. Developed countries with increasing immigrant populations should be aware of how policy changes affect HIV prevalence rates, modes diagnosis and presentation, future clinical demands, and health care utilization.

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1. Introduction

In December 2007, UNAIDS\textsuperscript{[1]} stated an estimated 33.2 million persons were living with HIV infection worldwide, with the majority (22.5 million) living in Sub-Saharan Africa. Canada has been fortunate in avoiding much of the epidemic; current estimates\textsuperscript{[2]} suggest approximately 58,000 individuals were living with HIV infection at the end of 2005. Although the direct medical care cost of an HIV-infected individual is high\textsuperscript{[3,4]} the health care systems in Canada have, so far, had the capacity and resources to accommodate both HIV treatment and prevention within routine budgetary systems and without excessive restrictions. Canadian public health approaches to reduce HIV transmission have focused on the prevention of needle sharing and promotion of safer sex activity. Less attention has been spent on the needs of the increasing number of immigrants/refugees landing in Canada with known HIV. The size of the global epidemic, changing migration patterns, and changes to Canada’s national immigration...
policy can affect the size and characteristics of this emergent immigrant/refugee community living with HIV within Canada.

On 1 November 2001, the Immigration and Refugee Protection Act (IRPA) [5] replaced the Immigration Act. Like its predecessor, the IRPA excludes potential immigrants from coming to Canada if their health condition is likely to pose a threat to public health or safety, or if their condition would place an “excessive burden on Public Health Services”. The overall health burden in 2004 was defined as ‘use of over $4078 per year in health costs over the five years following entry’. The dollar figure was derived from average health care costs of Canadians at that time. To determine if any applicant will incur such costs, all applicants must undergo an Immigration Medical Exam which includes a broad array of laboratory tests, including, from 2002 onwards, an HIV test. Unlike the old act, the new IRPA exempts sponsored spouses; common-law (i.e. unmarried) partners; children of Canadian citizens or permanent residents; and refugees from exclusion based on excessive-cost demand.

Immigrants applying for permanent residency status in Canada are reviewed and accepted within three broad classes: (1) Family Class – designed to reunite families such as parents, grandparents, spouses, children and related orphans; (2) Economic Class – immigrants selected abroad from applications based on a points system derived from Canada’s national need for skilled labor; (3) Refugees – selected abroad in recognition of Canada’s humanitarian tradition of helping those in need and in accordance with Canada’s international commitments. Refugees may be sponsored by government or private groups, and usually come from countries with recognized deprivations.

The IRPA does not specifically mention HIV/AIDS as a criterion for exclusion. In a policy decision in 1992, it was decided that having HIV infection does not “per se” pose a public health threat [5]. A positive HIV test may, however, exclude Economic Class immigrants under the excessive-cost clause. In the new act, and distinct from the old act, diseases and conditions causing excessive costs (such as HIV) are not considered as exclusionary for Family Class immigrants and refugees. Although discouraged, some individuals who are accepted into Canada for temporary residence may apply for permanent residence status through a refugee application claim after entering Canada.

In 2003, the year following the implementation of the new policy, only 0.15% (n=932) of all accepted immigrant and refugee applicants tested positive for HIV [6]. By December 2005, however, the Public Health Agency of Canada reported that persons born outside of Canada, primarily from endemic area countries, were overrepresented in the Canadian HIV/AIDS epidemic [7]. Immigrants and refugees accounted for an increasing proportion of both positive HIV tests and new AIDS diagnoses, climbing from 2.9% and 9.7% of all cases in 1998 to 7.7% and 16.3% respectively in 2006. Most immigrants were likely infected prior to immigration, although increasing proportions may be becoming infected after their arrival [8,9]. While most immigrants and refugees initially enter Canada through the large urban areas (Montreal, Toronto, or Vancouver), more recently many immigrants have come directly to or have secondarily migrated to Alberta. Between 2001 and 2006, the proportion of all recent immigrants to the total population in Calgary increased from 3.8% to 5.2%. However, there has been an increase in the number of immigrants living with HIV in the province. In 2006, for example, 38% of all of the newly reported cases of HIV in Canada (excluding Quebec) in individuals migrating from HIV-endemic countries lived in Alberta, a province that contains only 10% of the Canadian population [10]. The majority of these individuals were from Sub-Saharan African countries. Preliminary studies have shown that between 2000 and 2005 the proportion of patients initiating HIV care at the regional Southern Alberta HIV Clinic in Calgary who are immigrant/refugees from endemic countries of Sub-Saharan Africa increased from 6% to 26% [11].

Delivering optimal standard care and maintaining the health of HIV-infected immigrants and refugees poses unique challenges to the health care system. Language barriers, differing perceptions of illness and disease, different social and educational backgrounds, as well as a lack of familiarity in the use of a sophisticated health care system may be of critical importance in the social context of care delivery [12–17]. The biologic context may also differ from that of the Canadian-born population; immigrants may present with different HIV viral subtypes and host genetics, potentially predisposing them to different rates of disease progression, drug metabolism and toxicities, as well as a higher prevalence of co-morbidities such as latent toxoplasmosis and tuberculosis, but fewer addiction-related infections such as hepatitis C (HCV) [11,18–21]. Few studies, however, have examined how the changes in immigration policy have affected demographic, clinical, and health care utilization issues.

This study examines the impact of the evolving HIV epidemic, its associated shifts in migration patterns, and the change in Canada’s immigration policy on a regional HIV population. We compare population trends, demographic and clinical characteristics, and health outcome characteristics between HIV-infected individuals born in Canada and those born elsewhere. We examine health care utilization rates between foreign- and Canadian-born HIV-infected patients. We discuss the implications of these changes on our regional population and on health care services during the five years following the introduction of the screening program.

2. Materials and methods

2.1. Study population

All HIV-positive individuals referred for HIV assessment and care are enrolled in the Southern Alberta Cohort (SAC). The cohort includes all HIV–infected persons living anywhere in Southern Alberta. All HIV services within the region are centralized through the regional HIV care program. Access to free provincially funded HIV care, including HIV-specific laboratory tests and all antiretroviral drugs, is provided exclusively through this program. Patients registered with SAC are followed until they move, die, or are lost to follow-up. Demographic, clinical, inpatient, and outpatient data are routinely collected on all patients at all visits, and are maintained within the SAC database.
We include all individuals initiating HIV care between January 2001 and January 2007. Temporary visitors were excluded from the study. Patients were categorized by their self-reported country of birth: (1) Canadian-born (CAN) including individuals born aboard to Canadian parents; (2) Sub-Saharan African-born (SSA); and (3) foreign-born (FB) other than Sub-Saharan Africa. Documentation of immigration status at time of entry to Canada was obtained directly from the patient and verified by Immigration Canada as part of an internal check on health insurance eligibility. Although five categories of immigrants — economic, family, refugees (overseas), refugee claimants (in Canada), and other (e.g., visitors, workers, students) — are used in Canada [5], for the sake of clarity, we label economic and family migrants as ‘immigrants’, and combine both categories of refugees into a broader ‘refugee’ category.

2.2. Data collection

Sociodemographic characteristics including gender, age, most likely HIV risk factor, marital status, education level, languages spoken, and residence are routinely collected at the initial clinic visit. Clinical characteristics including date and place of original HIV diagnosis, baseline or initial CD4 count, and presence of an AIDS diagnosis were also collected. CD4 and Viral Load counts were recorded at each subsequent clinic visit. HIV-1 subtype and exposure status to tuberculosis, toxoplasmosis, and hepatitis B and C were routinely collected. The date and composition of all antiretroviral treatments are recorded on an ongoing basis. Disease progression was defined as the number of new opportunistic infections (i.e. AIDS diseases) occurring during the study period. The date and likely cause of death was obtained from the patient’s medical records and confirmed with the death certificate obtained from the Office of the Medical Examiner and/or Alberta Public Health.

Health care utilization data were collected directly from the SAC database, which contains detailed information on all clinical encounters including regular clinic visits; visits with social workers, nutritionists, and nursing specialists; referral visits to specialists (e.g., psychiatry, neurology, gastroenterology); and self-reported visits to physicians for non-HIV-related care and laboratory testing. Inpatient visits, including emergency room visits, are obtained directly from the Calgary Health Region’s Patient Activity and Costing System (PACS). Data on all patients were collected from their initial entry into SAC until they moved, died, or 1 January 2007.

2.3. Data analysis

All data were collected and merged into a single database where the data were cleansed of duplicate entries. Missing data were rechecked and reentered if the missing data could be found. Descriptive statistics are used to describe the cohort and the sub-populations. Simple univariate analysis including Pearson’s chi-square and Fisher’s exact test statistics for group comparison were used to compare subgroups. Rates for health care utilization are based on the mean number of visits per patient per year or per 1000 patient days followed where appropriate. All statistical analysis was conducted using SPSS Version 13 with \( p < 0.05 \) as the level of significance.

2.4. Ethics

Ethics approval was obtained from the Office of Medical Bioethics, Faculty of Medicine, University of Calgary, for use of non-nominal data. Patients accessing care at SAC also sign a consent form stating that administrative data can be used for research purposes. Data were collected and stored in a secured, limited-access database.

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**Fig. 1.** Proportion of HIV-infected patients initiating care within the Southern Alberta Cohort by country of birth: Canada (CAN); Sub-Saharan Africa (SSA); all other countries (FB).
3. Results

3.1. Sociodemographic issues

Between January 2001 and January 2007, 692 patients with HIV initiated care at SAC; five were temporary visitors and eight did not continue with HIV care. 452 were born in Canada, 126 in Sub-Saharan Africa, 67 were born elsewhere, and 34 did not report country of birth. 66% were diagnosed in Southern Alberta. In 2001, the year prior to the new immigration policy, 83% of HIV-infected patients entering the cohort were born in Canada. This proportion decreased to 68% in 2002 and to 52% in 2006 as shown in Fig. 1. Patients from SSA increased from 6% in 2001 to 31% in 2006. Approximately 75% of SSA patients were born in East and Central Africa, a representation that has remained constant for the last decade; however, 21 countries are represented in total. Immigrants from non African countries are equally distributed between Central and South America, the Caribbean, India, Asia, Europe, and Australia.

Immigration status was documented in 98% of SSA and in 92% of FB patients. 32% of SSA patients are immigrants while 68% are refugees. Among FB patients, 86% are immigrants and 14% are refugees.

Multiple markers known to be of potential importance in affecting health outcomes such as gender, age at HIV diagnosis, highest educational level, fluency in official languages, marital status, residence, and risk for HIV acquisition were different in the SSA and CAN populations (Table 1). FB patients were more similar to CAN populations in proportion of males, mean age of diagnosis, MSM (males having sex with males) as dominant risk factor, proportion ever married, language skills, and residency. In contrast, SSA patients were more likely to be female, younger, with heterosexually acquired HIV (all p < .01). 74% of SSA patients completed high school in contrast to 65% of CAN patients (p < 0.05). The majority of SSA patients (75%) spoke English only as a second language while 19% spoke French; over 80% could read some English although 1/4 of SSA patients reported that language was a serious barrier to understanding their care. SSA patients are more likely to be or have been married, or living in a common law relationship (either opposite or same sex) than are CAN or FB patients (p < 0.01).

3.2. Clinical issues

CD4 count is a commonly used, albeit crude, measure of HIV health status, with lower counts indicating poorer health. The median CD4 count at initial clinic visit was 359/mm$^3$ [180–521] in CAN, 343/mm$^3$ [205–481] in FB, and 254/mm$^3$ [IQR 122–382] for SSA patients (Table 1). There was no statistical difference in the length of time between HIV diagnosis and initial CD4 test. The lower initial CD4 count among SSA patients suggests that these immigrants are diagnosed at a later disease stage than are non-immigrants. In addition, whereas nearly 40% of SSA patients had an initial CD4 count of <200/mm$^3$ (i.e. ‘late presenters’) only 28% of CAN and FB patients fall into this category (p < .05).

HIV viral subtype may affect disease progression and management. Only 2% of CAN patients had HIV-1 non-B subtype virus while 97% of SSA patients had non-B subtypes. Subtypes C (56%), A1 (9%), G (9%), D (6%), and AG (6%) were the most common strains among SSA patients. 76% of FB patients are subtype B.

| Table 1 | Sociodemographic and clinical characteristics of Canadian (CAN), Sub-Saharan Africa (SSA), and other foreign-born (FB) patients with HIV followed within the Southern Alberta Cohort (SAC) (2001–2007). |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                      | CAN                  | SSA                  | FB                    | p-value               |
| N                     | 455                  | 126                  | 72                    | <0.001                |
| %Male                 | 83                   | 47                   | 81                    | <0.001                |
| Mean age (S.D.)*      | 35 (9.6)             | 33.1 (8.4)           | 35.9 (9.6)            | <0.05                 |
| HIV risk factor       |                      |                      |                       |                       |
| %MSM                  | 48                   | 2                    | 52                    | <0.0001               |
| %MSW                  | 15                   | 96                   | 35                    | <0.001                |
| %IVDU                 | 36                   | 1                    | 9                     | <0.0001               |
| %Ever married         | 37                   | 60                   | 44                    | <0.01                 |
| % ≥ High school       | 65                   | 74                   | 76                    | <0.05                 |
| %Primary              | 56                   | 69                   | 52                    | <0.05                 |
| Median CD4*           | 359/mm$^3$ [180–521] | 254/mm$^3$ [122–382] | 343/mm$^3$ [205–481] | <0.01                 |
| (IQR)                 | 4.6                  | 4.7                  | 7.6                   | n.s.                  |
| %AIDS                 | 7.0                  | 26                   | 5                     | <0.001                |
| %+ for toxoplasmosis* | 8.0                  | 33                   | 4                     | <0.001                |
| %HBV carrier          | 1.5                  | 7.8                  | 2.5                   | <0.01                 |
| %HCV+                 | 17.5                 | 1.6                  | 6.3                   | <0.01                 |

* At initial clinic visit.

b Men having sex with men.

c Men having sex with women.

d Intravenous drug use.

e ‘Ever married’ refers to married, divorced, separated, common-law, widowed.

f Primary – Southern Alberta is the first site of HIV care.

g Tuberculin skin test positivity.
SSA patients had higher rates of tuberculin skin test positivity (26% vs 7%), Toxoplasma-positive serology (33% vs 8%), and hepatitis B infection (8% vs 2%) (all \( p < 0.001 \)) but a much lower rate of hepatitis C infection (2% vs 18%) than did CAN patients (\( p < 0.001 \)) (Table 1).

### 3.3. Health care utilization

#### 3.3.1. Treatment regimens

Both SSA (66%) and FB (63%) patients were more likely to begin highly active antiretroviral treatment (HAART) than were CAN patients (50%) within the first year of their HIV diagnosis. A slightly higher proportion of CAN patients (88%) with initial CD4 counts of <200/mm\(^3\) began HAART than did SSA patients (74%) (\( p < .10 \)). SSA (61%) and FB (60%) patients are more likely to start HAART with CD4 counts >200/mm\(^3\). Recently, a small but increasing number of SSA patients (\( n < 10 \)) have been seen who started a HAART regimen in Africa prior to moving to Canada.

#### 3.3.2. Outpatient care

SSA patients, especially refugees, have more clinical encounters per year than CAN or FB patients. SSA immigrants and SSA refugees average 6.7 and 8.1 clinical encounter per year, whereas CAN and FB patients have a mean of 5.9 and 6.1 per year respectively. Regular clinic visit rates are only slightly higher among SSA patients (2.9 vs. 2.5; \( p < .10 \)) compared with CAN patients; however, numbers of visits with social workers are almost double among SSA refugees (3.1 vs. 1.6; \( p < .01 \)) compared with CAN patients. Laboratory visits were more frequent (3.5 vs. 2.4; \( p < .05 \)) among SSA patients. Appointments with in-house HIV specialists are lower for psychiatric (0.04 vs. 0.21) and gastrointestinal (0.0 vs. 0.1) issues but higher for neurologic (0.24 vs. 0.11) issues for SSA patients. There is no significant different in the proportions of ‘no-shows’ or missed appointments between the groups.

#### 3.3.3. Inpatient care

One hundred and twenty-four study patients (20%) were hospitalized resulting in 203 admissions and 2164 days in hospital. Although the rate of admission was slightly higher for CAN compared with SSA or FB patients (0.20 vs. 0.13 vs. 0.11 per patient per year), the differences were not significant (\( p > 0.20 \)). Hospitalizations surrounding pregnancy and childbirth were higher among SSA patients, but there was no significant difference in HIV-related hospitalizations among the groups. Thirty-eight percent of non-HIV-related hospitalizations for SSA patients were due to pregnancy and childbirth-related events. One hundred and fifty-one admissions (of 93 patients) were made to emergency room departments during the study period. Over 88% of these were made by CAN patients; SSA and FB patients are underrepresented with only 3% and 9% of ER visits respectively (\( p < .05 \)).

#### 3.3.4. Disease progression

Responses to HAART after 12 months for patients initiating their first regimen were similar in both SSA and CAN patients. Over two-thirds remained on HAART with over 80% achieving viral suppression (i.e. VL <40 for two consecutive tests). Of interest, the rate of new opportunistic infections or AIDS defining events was higher for SSA patients, albeit the actual number of cases was low. The rate per 1000 patient days followed was 0.10 for SSA patients and 0.06 for CAN patients, although the lower CD4 counts at initial visit may account for the difference. Two SSA patients died during the study period, both of HIV-related conditions. Cause is known for 82% of the 13 deaths of CAN patients; of these, 31% (\( n = 4 \)) were attributable to HIV while 69% (\( n = 9 \)) were non-HIV causes. The crude overall mortality rate per 1000 patient months followed was 0.80 for SSA patients compared with 3.35 for CAN patients, but this rate decreases to 1.20 when considering just HIV-related deaths.

### 4. Discussion

Beginning in 2002, the number of foreign-born patients with HIV infection increased significantly within the region, accounting for >50% of patients initiating care by 2006. Thirty-three percent were initially diagnosed and received HIV care outside of Alberta, but most (66%) were diagnosed locally. This increase may be partially explained by shifting migration patterns within Canada but may also be due to the policy-driven HIV testing mandatory for all immigrants/refugees arriving in Canada as required by the IRPA. HIV testing identifies applicants at an earlier stage in their immigration process. It may exclude economic class immigrants who pose an excessive economic burden as before the new policy was implemented, but now it may also identify HIV-infected refugees or sponsored spouses, common-law partners, and children who are exempted from exclusion under the clause. We found that 32% of migrants from SSA were immigrants rather than refugees, compared with <10% prior to the IRPA, suggesting that they were sponsored family members with known positivity. Earlier testing should also lead HIV-infected immigrants/refugees to being connected to health care services more effectively than might have occurred prior to the policy change.

The resulting increase in HIV-infected immigrants/refugees into the region requires changes by health care professionals, policy makers, community AIDS organization and others on how people are educated about HIV, how resources are accessed, where prevention services are targeted, and how health and social services are utilized. As the number of HIV-infected immigrants/refugees will likely continue to increase in upcoming years, educational programs need to be started now to accommodate these needs.

Immigrants possess distinct demographic and clinical characteristics requiring focused and different resources, as well as different approaches compared with Canadian-born patients. Similar to trends seen in other developed countries [22–29], our immigrant/refugee population, especially those from Sub-Saharan Africa, is diagnosed at a later stage in their HIV infection, with lower CD4 counts, a larger percentage of females, different HIV subtypes, and a different array of co-morbidities previously rare for Canada, such as tuberculosis and toxoplasmosis. We found that management and monitoring of disease progression is more
intense, requiring more clinic al visits and laboratory testing to anticipate the different responses to treatment by the various non-B subtypes as discussed in Spira et al. [18].

Immigrants and refugees continue to require greater social support to first, engage in and have access to health care system and second, continue to maintain treatment. In our study, most SSA patients, once they have initially engaged with health care, do well with regular clinic follow-ups and with both accepting and tolerating antiretroviral therapies. As part of the Swiss HIV Cohort Study, Bassetti et al. [30] found adherence to treatment was generally good among foreign-born residents. We also found good adherence within our foreign-born patients both to HAART treatments and to regular clinic visits. Immigrants and refugees in our study did not utilize emergency rooms or hospitals in greater frequencies than did Canadian patients. They were referred more often to neurological services than to psychiatric or gastrointestinal specialists.

Given the high proportion of the SSA population that is currently being diagnosed with lower CD4 counts and with more co-morbidities, the policy changes identifying HIV infection earlier and enhanced efforts to facilitate earlier engagement for HIV care could be beneficial in reducing both morbidity and HIV-related hospital costs [31]. Understanding the reasons behind late diagnosis and presentation may be critical to achieving such benefits in this population. Levy et al. [32] found that the factors for delayed HIV presentation among Hispanic immigrants in California include a lack of knowledge regarding HIV risk, social stigma, secrecy, and symptom-driven health care behaviour. Similar but not identical reasons were found among HIV-infected immigrants in Ontario in studies conducted by the HIV Endemic Task Force [33]. Further study is needed among SSA patients in Alberta to determine if these or other reasons may be responsible for late presentation.

Importantly, the outcomes in HIV care were equivalent to those seen in the CAN population once the SSA patient was engaged. Our preliminary data, which show acceptance of HIV treatments and care along with increased use of clinic social work, may be a key component to achieve such results. Language barriers do not seem to have a major effect on health care utilization in the majority of patients after the initial contact has been established and follow-up care is properly supported.

Our study is one of the first in Canada to examine the impact of mandatory immigrant medical screening on clinical characteristics and outcomes, and on health care utilization among HIV-infected immigrants/refugees in a regional population. The study does have some limitations. We examine only immigrants/refugees who have moved either directly or secondarily to Alberta. Immigrants/refugees are very heterogeneous in numerous characteristics, and thus the composition of our study population may vary significantly from that of other centres in Canada. We did not investigate the reasons why these immigrants/refugees moved to Southern Alberta. Economic reasons may account for an increased number of immigrants moving into the region, and thus these immigrants/refugees may reflect higher socioeconomic and educational levels than those of immigrants living in other Canadian centres. Some may have already adapted to the Canadian health care system. We also did not determine the living conditions and access to health care prior to immigration. This may affect accessing health care as well as health care outcomes. Our intent here, however, was to report on an emergent HIV population with unique characteristics rather than to provide a comprehensive examination of all immigrant/refugees in Canada. Future study of this population is important and warranted.

Emergent clinical issues relatively unique to this population such as the immune reconstitution disease seen commonly with patients who have tuberculosis and initiate HAART [34], toxicities seen for some drugs such as efavirenz and nevirapin in subgroups such as blacks [35], different rates of HIV disease progression with different HIV strains [36], and the impact of host genetics [37] will all require close consideration when managing HIV in this population.

5. Conclusions

Policy changes can have significant effects at both the national and the local level. Immigrant medical screening has identified HIV-infected individuals before or soon after entry into Canada, leading to an increase in the number of immigrants known to be diagnosed with HIV. Exempting certain categories of immigrants/refugees allows for greater inclusion of individuals who may be infected with HIV. These immigrants require engagement in health care to achieve the full benefits of medical management of HIV. The results described in our study suggest that despite presenting substantially later for HIV care with different HIV subtypes and a more extensive list of co-morbidities, SSA patients, and foreign-born immigrants in general, can do as well as Canadian-born patients once they have engaged with the health care system. Utilization is, however, more intense, with higher rates of clinical encounters and social work support but underrepresentation in other areas such psychiatric services. The late presentation of many immigrants and refugees offers a substantial opportunity for care to be enhanced by the earlier diagnosis and engagement into HIV care as well as supporting ongoing connection to care.

The impact of changing immigration policy for HIV is already evident five years after implementation and will continue to be felt for the foreseeable future. Other developed countries with increasing immigrant populations should be aware of how changes in policy will directly or indirectly affect HIV prevalence rates, the mode of HIV diagnosis and presentation, future clinical demands, and health care utilization within their medical systems.

Acknowledgements

Brenda Beckthold, Nel Borroughs, Krista Boulstridge, Darcia Latimer, Guy Milner for contributing data and Karen Kluge for reviewing the manuscript.

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