Improving linkage to HIV care at low-threshold STI/HIV testing sites: An evaluation of the Immediate Staging Pilot Project in Vancouver, British Columbia

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ABSTRACT

OBJECTIVES: The objective of the Immediate Staging Pilot Project (ISPP) was to improve linkage to human immunodeficiency virus (HIV) care by increasing the number of referrals made to HIV care, and to decrease the time between diagnosis and linkage to care for newly diagnosed HIV clients. This pilot had the potential to decrease HIV transmission at a population level by engaging clients in treatment earlier.

SETTING: The Bute Street Clinic and Health Initiative for Men Clinic on Davie in Vancouver, British Columbia are low-threshold public health facilities providing HIV/STI testing primarily to men who have sex with men (MSM).

INTERVENTION: To improve engagement of MSM in the cascade of HIV care, the BC Centre for Disease Control implemented a 12-month ISPP in 2012 for clients newly diagnosed with HIV. The pilot offered CD4 and viral load testing at the time of diagnosis, implemented improved referral procedures and enhanced nursing support for clients.

OUTCOMES: Comparing linkage to care outcomes between a group that received the standard of care (SOC) and an intervention group that received immediate staging, the median linkage to care time decreased from 21.5 to 14.0 days respectively ($p = 0.053$). The referral rates to HIV care were 56.1% in the SOC group and 94.1% in the intervention group ($p < 0.001$).

CONCLUSION: Creating best practices that include offering CD4 and viral load testing at the time of diagnosis, enhanced nursing support and standardized referral processes has facilitated an improvement in the quality of HIV services provided to MSM clients attending low-threshold clinics.

KEY WORDS: Linkage to care; continuum of care; HIV; men who have sex with men; low-threshold sites; outcome assessment (health care)

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Human immunodeficiency virus (HIV) remains a leading cause of morbidity and mortality in high-income countries among key populations such as gay, bisexual, and other men who have sex with men (MSM).¹ In 2014, 58% of the new HIV diagnoses in British Columbia (BC) were among the MSM population.² Advances in antiretroviral therapy (ART) to reduce the amount of viral replication have made it possible for HIV-infected individuals on ART to achieve an undetectable plasma viral load.³ Not only can ART improve client outcomes by reducing mortality and morbidity from AIDS-defining clinical events,^{4–6} it has the potential to reduce HIV transmission to others at a population level.⁷ However, the effectiveness of ART is limited if HIV-infected individuals are not linked and engaged in HIV care in a timely manner.^{4,8} Delayed linkage to care has been associated with accelerated HIV progression.⁹

Although HIV testing sites are often successful in achieving high testing rates, their capacity to ensure a client is linked to an HIV care provider may be limited.¹⁰ Barriers often exist at the community, organization and client levels that prevent clients from linking to care in a timely manner, such as waiting times, financial barriers, and stigma and discrimination.^{10,11}

The HIV cascade or continuum of care model describes the stages of HIV care, which includes diagnosis with HIV infection, linkage to care, engagement in care, and treatment and adherence to ART with the ultimate goal of achieving viral suppression.¹² By monitoring at which stages in the cascade of care attrition mostly occurs, informed decisions can be made about how to improve treatment outcomes.^{12,13}

In BC, the Seek and Treat for Optimal Prevention of HIV/AIDS (STOP HIV/AIDS) program was initiated to eliminate HIV and to enhance the Treatment as Prevention strategy that suggests that ART may be effective at reducing HIV transmission at a

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population level. This is a coordinated provincial effort that included province-wide testing recommendation to the general population.¹⁴ As part of this program, the Immediate Staging Pilot Project (ISPP) was designed at the BC Centre for Disease Control (BCCDC), and sought to improve linkage to care services. We evaluated the ISPP at two low-threshold HIV/Sexually Transmitted Infection (STI) testing sites primarily serving MSM in Vancouver, BC. Public health nurses from the Bute Street Clinic (Bute) and the Health Initiative for Men clinic on Davie (HIM) in Vancouver ISPP offered CD4 and plasma viral load testing at the time of HIV diagnosis, improved referral procedures that involved following up with clients to determine whether they were linked to care, and provided enhanced nursing support for clients newly diagnosed with HIV. The pilot also facilitated the development of a more robust data collection system and accountability structure that allowed HIV care providers to track clients referred and linked to care. Our evaluation assessed whether the program met its objectives of increasing the number of referrals to HIV care and decreasing the time from initial HIV diagnosis to when a client was linked to care.

PARTICIPANTS, SETTING AND INTERVENTION

Target population

The target population of the ISPP was gay, bisexual, and other MSM (MSM who may not identify as gay or bisexual) seen at the Bute and HIM on Davie clinics in Vancouver. MSM often experience homophobia, stigma and discrimination, which are associated with lower access to HIV treatment and services.^{2,11,15} To overcome these barriers, the ISPP was implemented at these two HIV/STI clinics that offer low-threshold testing services.^{16,17}

Setting

Bute and HIM in Vancouver, BC were selected to pilot the ISPP. Both clinics are public health operated facilities providing HIV/STI testing to primarily gay men and other MSM. These clinics are considered low-threshold facilities because there is no requirement for an appointment, health care coverage or proof of identity to receive care. Both Bute and HIM clinics offer HIV testing services using point of care and serology tests delivered by STI certified nurses from the BCCDC, and make referrals to external providers to deliver HIV care and treatment to newly diagnosed clients. These two clinics diagnosed 18% ($n = 53$) of all new HIV cases in BC in 2011. Between January 1, 2013 and December 31, 2013, there were 12 000 client visits recorded at these two sites with a total of over 5100 HIV serology tests performed.

Intervention

In 2012, the BCCDC implemented the ISPP for a pilot period of 12 months. Prior to implementing the ISPP, the standard of care for clients newly diagnosed with HIV at these clinics involved offering a confirmatory serology HIV test, providing post-test counselling, and suggesting the client see an HIV physician/clinic by offering a referral.¹⁸ The CD4 and viral load test did not occur until the client visited an HIV physician/clinic. For the ISPP, in addition to the standard of care, public health nurses initiated a referral for all clients with client consent, and offered CD4 and viral load testing at the time of diagnosis onsite and processing offsite at a local

laboratory. Clients also had the option to refuse participation in the ISPP.

When the client returned for their CD4 and viral load results, nurses provided interpretation of the results and education related to the staging of the HIV diagnosis. To improve referral procedures, nurses would follow up with clients via phone, e-mail or text at one and three months post-diagnosis to address any outstanding client needs, and to provide additional support and referral to services such as counselling, and community supports if needed. In certain instances, nurses would make the appointments for the clients. If nurses were unable to contact a client, the client's uptake into care was assessed virtually via CareConnect search, or clerical confirmation of the client's appointment attendance. A more robust data collection system was also created that captured data related to HIV care for clients newly diagnosed with HIV. Clinicians were provided guidance related to standard charting, which included recording referrals to clinics and whether clients were linked to care, to monitor the impact of the new pilot. Before implementation of the ISPP, referrals and information about linkage to HIV care may not have been consistently recorded in client charts (Figure 1).

In preparation for the pilot, nurses were enrolled in an online HIV training course that included education related to HIV treatment and the interpretation of CD4 counts and viral load results. In addition, two physicians from the Provincial STI Clinic located at the BCCDC enrolled in a more comprehensive training and preceptorship course related to HIV treatment. New nursing procedures were created to facilitate the referral of newly diagnosed HIV clients to the main HIV physicians/clinics in Vancouver and processes were established to ensure the notification of all new HIV cases to all Vancouver physicians in all clinic and outreach sites.

Evaluation design

To assess the impact of the ISPP, an outcome evaluation was conducted that compared linkage to care outcomes between clients who received the SOC before the ISPP was implemented and those who received care after the ISPP was implemented. Within the intervention group, outcomes were also compared between those who accepted and those who declined additional HIV blood work, and between those who were followed up and those who were not. The outcomes of interest were referral rates to an HIV physician/clinic, the proportion of clients linked to care, and time to link to care. Demographics were compared between groups to ensure that the groups were comparable. CD4 counts and viral load were also compared between groups because knowledge of these measures may influence clients' motivations for linking to care.¹⁹

The SOC group included all clients who received a positive HIV diagnosis at either the Bute or HIM clinic before the ISPP was implemented, between January 1, 2011 and December 31, 2011. The SOC group was identified retrospectively through the internal BCCDC clinical information system, the Provincial Laboratory Information System and a care registry kept by the Bute and HIM clinics Nurse Supervisor. The intervention group included all clients who received a positive HIV diagnosis at either the Bute or HIM clinics after the pilot was implemented, between August 29, 2012 and August 29, 2013.

Figure 1. Flow of care for newly diagnosed HIV-positive clients. (A) Standard of care; (B) Immediate Staging Pilot Project. Bolded boxes indicate the additional services provided through the Immediate Staging Pilot Project.

Data collection

Demographic data such as age, gender and sexual preference, referral information, CD4 counts and viral loads were collected from clients' medical charts. There are varying definitions for linkage to care in the literature.¹¹ For our pilot, a client was considered linked to care when s/he attended a visit with an HIV physician/clinic within three months of an HIV-positive diagnosis. For the intervention group, the client or the HIV physician/clinic was consulted to determine whether the client was linked to care. For the SOC group, linkage to care was determined by accessing the date of the first CD4 count/viral load test from the Provincial Laboratory Information System, and used as a proxy for the date of a client's first visit with an HIV physician/clinic. A Microsoft Access Database was created to document clients' basic demographic, referral, and linkage to care information.

Time to link to care was measured by calculating the number of days from when the client tested positive with HIV to the date of

the first appointment with an HIV physician/clinic. For the intervention group, the time to link to care between clients who were and were not followed up at one and three months post-diagnosis were compared. Under article 2.5 of the Tri-Council Policy Statement, this evaluation was not subject to institutional ethical review because this evaluation of the ISPP is a quality improvement activity to improve the clinical service provided within the Bute and HIM clinics. This work was carried out in accordance with the Code of Ethics of the World Medical Association (Declaration of Helsinki).

Data analysis

Demographic data for the SOC and intervention groups were described using frequency statistics and compared using Mann-Whitney U and chi-square tests. The proportions of clients referred and linked to HIV care were calculated and compared between groups using chi-square tests. The median number of days to link to care, median viral load value, and CD4 counts were compared between groups using a Mann-Whitney U test.

Similar statistical methods were used to compare the outcomes of interest between those who accepted and those who declined blood work among the intervention group. Finally, the time to link care was compared between those who were followed up at one month and three months post-diagnosis and those who were not, using a log-rank test. All analyses were conducted in SPSS ver14.

RESULTS

There were 108 clients diagnosed with HIV at Bute and HIM during the evaluation period. All clients included in this evaluation ($n = 108$) were male, predominantly MSM and had a median age of 32.3 years. Age ($p = 0.78$), gender ($p = 1.00$), CD4 counts ($p = 0.99$) and viral load ($p = 0.99$) did not differ significantly between the SOC ($n = 57$) and intervention ($n = 51$) groups (Table 1).

Table 1. Baseline characteristics of SOC and intervention groups

Baseline characteristic	Total group ($n = 108$)	SOC group ($n = 57$)	Intervention group ($n = 51$)	p value
Age (years)				
Median	32.3	32	30	0.78
Minimum	19	19	19	
Maximum	71	63	71	
Missing	2	2	0	
Gender				
Male	108	57 (100%)	51 (100%)	1.00
Female	0	0 (0%)	0 (0%)	
Gender of sexual partner(s)				
Male	96 (89%)	51 (89%)	45 (88.2%)	N/A
Female	1 (1%)	1 (2%)	0 (0%)	
Both*	8 (7%)	2 (4%)	6 (11.8%)	
No information	3 (3%)	3 (5%)	0	
Median CD4 counts (cells/ μ L)		113 838	84 170.5	0.99
Median viral load (copies/ μ L)		450.0	470.0	0.99

* Variables "Male" and "Female" indicate that gender of sexual partner is only "Male" or "Female", whereas "both" indicates that gender of sexual partner is both male and female.

Referral and linkage to care

The referral rate was significantly higher in the intervention group (48, 94.1%) than in the SOC group (32, 56.1%) ($p < 0.001$). Among the clients in the SOC group who were not referred, 17 (29.8%) did not have a referral to an HIV physician/clinic documented on their chart, and 8 (14%) preferred self-referral. Among the intervention group, 2 clients were not referred because they were out of the country, and 1 was lost to follow-up.

Within the intervention group, 45 (88.2%) clients were linked to HIV care within three months of receiving their HIV-positive diagnosis, compared to only 35 (61.4%) in the SOC group ($p = 0.001$). Between the SOC and intervention group, the median time to link care decreased from 21.5 to 14.0 days respectively ($p = 0.053$) (Table 2).

Analysis within the intervention group

Within the intervention group, 34 clients (67%) consented to HIV staging blood work at the time of diagnosis and 17 (34%) declined. Baseline characteristics of both groups did not differ significantly (Table 3). All clients who chose to have staging blood work were referred to an HIV physician/clinic by a Bute/HIM clinic nurse, whereas only 82.4% of clients who declined staging blood work were referred ($p = 0.03$). Of the clients who declined blood work, 17.6% were not referred because they were lost to follow-up or were leaving the country. The median time to link care did not differ

Table 2. Time to link to care with HIV physician/clinic between control and intervention groups

	No. of days to link to care ($p = 0.053$)	
	SOC group (records available for 61.4% (35/57) of clients)	Intervention group (records available for 88.2% (45/51) of clients)
Median	21.5*	14.00†
Minimum	3*	1†
Maximum	193*	75†

* No. of days between date of first reactive test and date of first CD4.

† No. of days between date of first reactive test and date of first attended appointment.

Table 3. Baseline characteristics of those who consented to and declined blood work

Demographic characteristic	Consented to blood work ($n = 34$)	Declined blood work ($n = 17$)	p value
Age (years)			
Median	32	29	0.22
Gender			
Male	34 (100%)	17 (100%)	1.00
Female	0 (0%)	0 (0%)	
Gender of sexual partner(s)			
Male	29 (85.3%)	16 (94.1%)	N/A
Female	0 (0%)	0 (0%)	
Both*	5 (14.7%)	1 (5.9%)	

* Variables "Male" and "Female" indicate that gender of sexual partner is only "Male" or "Female", whereas "both" indicates that gender of sexual partner is both male and female.

Figure 2. Time to first appointment between those who were and those who were not followed up by a Bute/HIM Nurse at (A) one month and (B) three months.

significantly between clients who consented to staging blood work (17.5 days, IQR: 9.25–29.75) and those who declined (14 days, IQR: 10–29) ($p = 0.971$).

Follow-up analysis

At one-month post HIV diagnosis, 42 (82.4%) clients in the intervention group were contacted by a Bute/HIM clinic nurse, and at three months, 32 (62.7%) clients were contacted for follow-up. Reasons for not being contacted may have been based on client request or the clinic's inability to reach the client. The time to first appointment with an HIV physician/clinic was not significantly different between those who were followed up and those who were not at both follow-up periods (log rank sig 0.718) (Figure 2).

DISCUSSION

This evaluation demonstrated that the ISPP met its objectives of improving referral rates to HIV physicians/clinics and decreasing the time for newly diagnosed HIV clients to link to care among the MSM population. Addressing the first objective, we found that the intervention improved the referral rate from 56.1% among the SOC group to 94.1% among the intervention group ($p < 0.01$).

The proportion of clients newly diagnosed with HIV who were linked to care increased from 61.4% among those who received the SOC to 88.2% among those in the intervention group ($p = 0.001$). Regarding the second objective, our results demonstrated that the ISPP appeared to decrease the number of days for clients to see an HIV physician/clinic (from 21.5 to 14.0 days, $p = 0.053$), although this failed to reach statistical significance. This evaluation has shown that the ISPP has the potential to enhance the Treatment as Prevention strategy by streamlining the process from diagnosis to linkage to care. Population-based studies in BC suggest that greater ART coverage and adherence was associated with decreased AIDS and HIV incidence at a population level.^{20,21}

The findings from our evaluation are consistent with other programs which show that bridging the gap between the testing site and the treatment is important in guiding clients toward HIV care.^{11,22} For example, the Positive Health Access to Services and Treatment (PHAST) intervention at San Francisco General Hospital provided clients with intensive support and education, and performed CD4 cell count, viral load and resistance testing at the time of diagnosis, among other intervention components. This intervention was successful in linking 95% of their MSM clients to care within six months of diagnosis.¹¹ In one study that examined characteristics of programs associated with early linkage to care, having the provider who diagnosed the patient with HIV make the appointment for the client was a significant predictor of earlier linkage to care.²³ Providing referrals at the time of diagnosis is ideal because clients may be more receptive to engaging in the continuum of care, and receiving secondary prevention messages when they first become aware of their diagnosis.²⁴

While a large number of clients get referred to HIV clinics for CD4 testing, many do not actually go to the clinic.²⁵ Delays in CD4 testing and receiving results have been shown to hinder early linkage to HIV care and treatment.²⁶ The ISPP provided CD4 and viral load testing at the time of diagnosis to expedite the process of testing and getting results. However, our evaluation demonstrated that the time to link to care was not significantly improved between those who consented to blood work and those who declined within the intervention group. Incorporating point-of-care CD4 testing into the pilot may increase the impact of the ISPP because this would allow clients to obtain the results immediately after receiving preliminary positive HIV test results instead of only being able to test blood work at the time of diagnosis.²⁷ Studies about point-of-care CD4 testing have been shown to reduce attrition before ART initiation and reduce the time between diagnosis and treatment initiation.^{19,25}

This program evaluation demonstrated that providing post-diagnosis follow-up to clients did not significantly improve the time to link to care when comparing clients who were followed up to those who were not. However, qualitative studies on barriers to HIV care indicate that clients value guidance and follow-up.²⁸ This suggests that the way in which follow-up is conducted may need to be re-examined and may require discussion with clients to determine how to better meet their needs. A benefit of completing follow-up is that it facilitated the development of a valuable accountability structure where referrals and linkage to care information were recorded in a systematic manner. Before the implementation of the ISPP, information about linkage to care was

not consistently recorded, and therefore, it was difficult to target services to improve linkage to care for MSM in the future.

Among all key populations at risk of HIV, MSM have the highest engagement in the cascade of care. However, there are subpopulations of MSM that are experiencing increased rates of HIV and attrition along the cascade, such as young MSM and MSM of colour.^{2,13,29} While this program evaluation did not consider how age, race and injection drug use impact the effectiveness of the ISPP, these factors may be worth considering in the future because they have been shown to affect engagement in the cascade of care.¹³ This information could be used to inform how the ISPP and future initiatives that seek to improve linkage to HIV care could be tailored towards subpopulations among MSM that face intersectional barriers.

Overall, the ISPP has facilitated an improvement in the quality of HIV services provided at the Bute and HIM clinics. Due to its success, the pilot has been continued as a new best practice. Providing HIV staging blood work and following up with clients to determine if they were linked to care were associated with higher referral and linkage to care rates. Additionally, the pilot facilitated the development of a more robust data collection system and accountability structure where information about HIV care and services was recorded in a systematic manner.

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RÉSUMÉ

OBJECTIFS : Le projet pilote ISPP (Immediate Staging Pilot Project ou projet pilote de mise en place immédiate) visait à améliorer le lien vers les soins du virus de l’immunodéficience humaine (VIH) en augmentant le nombre d’orientations vers les soins du VIH, et à réduire le délai entre le diagnostic et le lien vers les soins pour les patients ayant reçu un diagnostic récent de VIH. Le projet pilote pouvait potentiellement réduire la transmission du VIH dans l’ensemble de la population en amorçant le traitement des patients plus tôt.

LIEU : Les cliniques Bute Street Clinic et Health Initiative for Men on Davie de Vancouver (Colombie-Britannique) sont des établissements de santé publique à seuil bas qui offrent le dépistage du VIH et des ITS principalement aux hommes ayant des relations sexuelles avec des hommes (HARSAH).

INTERVENTION : Pour améliorer l’intégration des HARSAH dans le flot des soins du VIH, le BC Centre for Disease Control a mis en œuvre ce projet pilote de 12 mois pour les patients ayant reçu un diagnostic récent de VIH. Le projet pilote offrait la numération des lymphocytes CD4 et la mesure de la charge virale au moment du diagnostic, appliquait une procédure d’orientation améliorée et rehaussait le soutien infirmier des patients.

RÉSULTATS : En comparant les résultats du lien vers les soins entre un groupe ayant reçu la norme de soins (NDS) et un groupe d’intervention ayant reçu la mise en place immédiate des soins, la durée médiane du lien vers les soins a diminué, passant de 21,5 à 14 jours, respectivement ($p = 0,053$). Les taux d’orientation vers les soins du VIH étaient de 56,1 % dans le groupe de la NDS et de 94,1 % dans le groupe d’intervention ($p < 0,001$).

CONCLUSION : La création de pratiques exemplaires incluant la numération des lymphocytes CD4 et la mesure de la charge virale au moment du diagnostic, un soutien infirmier renforcé et des processus d’orientation standardisés a favorisé une amélioration de la qualité des services VIH offerts aux patients HARSAH fréquentant des cliniques à seuil bas.

MOTS CLÉS : lien vers les soins; chaîne des soins; VIH; hommes ayant des relations sexuelles avec des hommes; établissements à seuil bas; évaluation de résultat (soins)