Increasing HIV Treatment Optimism but No Changes in HIV Risk Behavior Among Men Who Have Sex With Men in Vancouver, Canada

Moore, D. M., Cui, Z., Lachowsky, N. J., Rich, A. J., Roth, E. A., Raymond, H. F., Sereda, P., Montaner, J., Wong, J., Armstrong, H. L., Hall, D., & Hogg, R. S.

2017

HHS Public Access

Author manuscript

J Acquir Immune Defic Syndr. Author manuscript; available in PMC 2018 December 01.

Published in final edited form as:

J Acquir Immune Defic Syndr. 2017 December 01; 76(4): e98–e101. doi:10.1097/QAI.0000000000001542.

Increasing HIV treatment optimism but no changes in HIV risk behaviour among men who have sex with men (MSM) in Vancouver, Canada

David M. Moore[1,2,*], **Zishan Cui**[1], **Nathan J Lachowsky**[1,3], **Ashleigh J. Rich**[1], **Eric A. Roth**[3], **Henry Fisher Raymond**[4], **Paul Sereda**[1], **Julio Montaner**[1,2], **Jason Wong**[5], **Heather L. Armstrong**[1,2], **David Hall**[6], **Robert S. Hogg**[1,7], and **the Momentum Study Team**

[1]BC Centre for Excellence in HIV/AIDS, Vancouver, British Columbia

[2]Faculty of Medicine, University of British Columbia, Vancouver, British Columbia

[3]University of Victoria, Victoria, British Columbia

[4]University of San Francisco, California, San Francisco, United States

[5]British Columbia Centre for Disease Control, Vancouver, British Columbia

[6]Vancouver Coastal Health, Vancouver, British Columbia

[7]Simon Fraser University, Burnaby, British Columbia

Background

Antiretroviral therapy (ART) has dramatically reduced mortality among HIV-positive individuals and has been associated with declining HIV incidence[1–3]. Numerous guidelines now recommend ART for all HIV-positive individuals irrespective of CD4 counts[4–6]. These approaches are supported by randomized trials demonstrating the benefits of early ART on improved clinical outcomes for HIV-positive individuals[7], as well as reductions in onward transmission[8].

However, concerns remain that changes in HIV risk behaviour could undermine “treatment as prevention” (TasP) effectiveness. Previous research has found associations between HIV sexual risk behaviour and positive attitudes towards ART’s preventive value[9], particularly among men who have sex with men (MSM)[10, 11]. Most of this research pre-dates any formal adoption of TasP as policy, but relied on knowledge acquired from peers or healthcare providers.

Several jurisdictions have recently adopted and are actively promoting TasP[12–14]. In British Columbia (BC), Canada, TasP was introduced in 2010 through a pilot project in Vancouver and expanded province-wide in 2012[15]. Thus, MSM in Vancouver have been exposed to TasP messages for several years through clinicians, the media, and likely discussions with peers and community leaders[16]. A previous cross-sectional analysis from our group

*Corresponding author: Dr. David Moore, 608-1081 Burrrard Street, Vancouver, BC, V5Y 2N4, dmoore@cfenet.ubc.ca.

demonstrated that indeed, higher HIV treatment optimism was associated with risky sex and that HIV-positive MSM had much higher HIV treatment optimism scores than that of HIV-negative/unknown MSM[17]. In order to explore temporal changes in these relationships, we used data from the prospective cohort of the same study of Vancouver-based MSM to examine trends in attitudes regarding the benefits of ART and risky sex over a 3-year period while TasP policy was actively implemented across BC.

Methods

We enrolled sexually active MSM aged ≥16 years in a longitudinal study from February 2012 to February 2015, using respondent driven sampling (RDS) as a recruitment strategy[18]. Enrollment of HIV-negative participants concluded in February 2014, but we continued to enroll HIV-positive participants for an additional year. Seed participants were recruited through community contacts, mobile phone applications, and websites catering to Vancouver-based MSM[19].

After providing informed consent, participants completed a self-administered computer-based survey and nurse-administered clinical questionnaire. We collected, sexual risk, and drug using behavior using a 6-month recall timeframe. The survey included the HIV treatment Optimism-Skepticism Scale (HOSS), a 12-item validated instrument for measuring attitudes towards HIV and ART[20]. Higher HOSS scores indicate increased agreement with benefits of ART. Participants completed follow-up visits every six months using a modified version of the enrollment questionnaire. This analysis included data collected until August 31, 2015. The study received approval from the University of British Columbia, Simon Fraser University, and the University of Victoria.

We performed descriptive statistics and bivariate analyses of data collected at enrollment, using Wilcoxon Rank Sum and Chi-square tests. We examined trends in HOSS scores, the proportions of participants reporting risky sex (defined as condomless anal sex (CAS) with a serodiscordant/unknown serostatus partner in the previous six months), and the proportions agreeing or strongly agreeing with a statement in the HOSS known as the TasP statement (“a person with an undetectable viral load cannot pass on the virus”) in each 6-month period using univariable generalized mixed-effect modeling. In these analyses, calendar time was used as a co-variate. We used mixed-effects modelling to examine associations with risky sex and time, with separate models using the full HOSS scores or only TasP statement responses forced into separate models. Final models were determined using backwards selection method, where variables with the highest Type-III p-value at each step were excluded until QIC was minimized. All variables included in final models were checked for collinearity and interactions. All analyses were stratified based on self-reported HIV status and conducted using SAS (version 9.4; SAS Corporation Cary, NC).

Results

We enrolled 774 participants in the cross-sectional survey; 556 (71.8%) self-reported as HIV-negative/unknown and 218 (28.2%) as HIV-positive. Of these 181 (83.0%) were receiving ART at enrollment and 167 (92.3% of those on ART) had a VL<200 copies/ mL.

None of the HIV negative participants were receiving PrEP at enrollment and only eight reported using it by the end of follow-up. The median age was 34 years; 585 (75.6%) identified as White, 74 (9.6%) Asian, 50 (6.5%) Aboriginal, 35 (4.5%) Latino, and 30 (3.9%) other. A total of 655 (85.6%) identified as gay, 73 (9.4%) as bisexual, and 46 (5.9%) as other sexual orientations.

Compared to HIV-negative/unknown participants, HIV-positive participants were more likely to be >40 years (74.5% vs. 21.6%; p<0.001) and White (78.4% vs. 74.5%; p=0.019), and report an income ≥$30,000 CAD (28.0% vs. 41.0%; p=0.001). HIV-positive participants reported more anal sex partners in the previous six months (median 4 vs. 3; p<0.001), were less likely to report always using condoms during anal sex (33.5% vs. 64.0%; p<0.001), and more likely to report any risky sex (46.5% vs. 35.4%; p=0.005). HIV-positive men had higher HOSS scores (median 28 vs. 24; p<0.001), and were more likely to have heard of TasP (73.3% vs. 43.1%, p <0.001) and to agree with the TasP statement (45.4% vs. 22.8%; p<0.001).

A total of 698 participants (90.2%) agreed to participate in the cohort study and 575 (82.4%) completed at least one follow-up visit. The median follow-up time was 1.98 years. Among HIV-positive participants, median HOSS scores increased over time (Figure 1a), from 28 (Q1–Q3: 26–32) in July – December 2012 to 31 (Q1–Q3: 27–35) in January – June 2015 (test of trend p<0.001). From Periods 1–6, the proportions of HIV-positive participants agreeing with the TasP statement and reporting risky sex increased non-significantly from 46% to 55% (p=0.111) and 29% to 41% (p=0.656), respectively. Among HIV-negative/unknown participants, HOSS scores also increased (Figure 1b), from 24 (Q1–Q3: 20–26) to 26 (Q1–Q3: 24–29) in Periods 1–6 (p<0.001), as did TasP statement agreement (20%–36%, Periods 1–6; p<0.001). However, proportions of HIV-negative men reporting risky sex were unchanged (30% in Period 1, 27% in Period 6; p=0.104).

In multivariate mixed-effects models, adjusted for age, income, partner number, sexual sensation seeking scores, substance-use, and other HIV prevention behaviours, HOSS scores were associated with risky sex for HIV-positive [aOR]= 1.08; 95% CI 1.03–1.12), and for HIV-negative/unknown MSM (aOR=1.03; 95%CI 1.00–1.06). TasP statement agreement was not associated with risky sex for either HIV-positive (aOR=1.24; 95% CI 0.85 – 1.81) or HIV-negative participants (aOR=0.77; 95% CI 0.77–1.32) in adjusted models.

Discussion

We observed increasing awareness regarding the preventive value of ART among HIV-negative MSM and increases in HOSS scores among both HIV-negative and HIV-positive MSM prospectively followed from July 2012 to June 2015 in Vancouver. These attitude changes occurred over a period when TasP was actively promoted by the BC Ministry of Health. However, we did not observe proportional changes in MSM reporting risky sex over the same period for either HIV-negative or HIV-positive men, suggesting that TasP promotion in BC is not undermining other HIV prevention measures, such as condom promotion.

TasP agreement was low (20%) among HIV-negative/unknown participants in 2012, but reached 43% by the second-half of 2015, suggesting that diffusion of this knowledge among HIV-negative MSM is approaching that of HIV-positive MSM (54% in last period). This level of TasP agreement among HIV-positive MSM is similar to that recently reported in Australia (46.2 %), using a slightly different TasP knowledge assessment[21], but much higher than was reported for HIV-negative MSM (10.0%).

This study has a number of limitations. Firstly, CAS with a serodiscordant/unknown serostatus partner may not be an accurate measure of risk behaviour, given the increasing availability of pre-exposure prophylaxis (PrEP) for MSM in industrialized countries and that virologically suppressed HIV-positive individuals are very unlikely to transmit HIV[22]. However, we have found that CAS with a known HIV-positive partner is associated with a greater incident HIV risk[23]. Further, there was no PrEP-use reported at enrollment[24], and only 8 participants reported any use during follow-up[25], suggesting validity of this measure of risky sex in our setting. Secondly, our primary outcome measure of risky sex over a 6-month period did not include a frequency component. Lastly, individuals retained in the cohort may differ from those lost to follow-up, potentially affecting trends we did or did not observe.

In conclusion, we found proportional increases of HIV-positive and HIV-negative MSM in Vancouver reporting agreement with the preventive benefit of ART over time, during a timeframe when TasP policy was actively implemented. We found no proportional changes of MSM reporting sexual acts putting them at risk for transmitting or acquiring HIV during the same period. This study offers some reassurance that risk compensation may not inevitably occur as TasP is promoted.

Acknowledgments

We thank our study participants, office staff, community advisory board, community partners (Health Initiative for Men, YouthCO HIV & Hep C Society, and Positive Living Society of BC) and Erin Ready for her assistance in revising the manuscript. We also thank Biolytical Laboratories for providing HIV test kits. Momentum Health Study is funded through NIDA (R01DA031055-01A1) and CIHR (MOP-107544). NJL was supported by a CANFAR/CTN Postdoctoral Fellowship Award. DMM is supported by the Michael Smith Foundation for Health Research.

References

1. Montaner JS, Lima VD, Harrigan PR, Lourenco L, Yip B, Nosyk B, et al. Expansion of HAART coverage is associated with sustained decreases in HIV/AIDS morbidity, mortality and HIV transmission: the “HIV Treatment as Prevention” experience in a Canadian setting. PLoS ONE. 2014; 9(2):e87872. [PubMed: 24533061]
2. Fang CT, Hsu HM, Twu SJ, Chen MY, Chang YY, Hwang JS, et al. Decreased HIV transmission after a policy of providing free access to highly active antiretroviral therapy in Taiwan. The Journal of infectious diseases. 2004; 190(5):879–885. [PubMed: 15295691]
3. Das M, Chu PL, Santos GM, Scheer S, Vittinghoff E, McFarland W, et al. Decreases in community viral load are accompanied by reductions in new HIV infections in San Francisco. PLoS ONE. 2010; 5(6):e11068. [PubMed: 20548786]
4. Panel on Antiretroviral Guidelines for Adults and Adolescents. Guidelines for the use of antiretroviral agents in HIV-1-infected adults and adolescents. Washington, USA: Department of Health and Human Services; 2016.

5. Gunthard HF, Aberg JA, Eron JJ, Hoy JF, Telenti A, Benson CA, et al. Antiretroviral treatment of adult HIV infection: 2014 recommendations of the International Antiviral Society-USA Panel. JAMA. 2014; 312(4):410–425. [PubMed: 25038359]
6. British HIV Association. British HIV Association guidelines for the treatment of HIV-1-positive adults with antiretroviral therapy 2015. London, England: British HIV Association; 2015.
7. Lundgren JD, Babiker AG, Gordin F, Emery S, Grund B, Sharma S, et al. Initiation of Antiretroviral Therapy in Early Asymptomatic HIV Infection. The New England Journal Of Medicine. 2015; 373(9):795–807. [PubMed: 26192873]
8. Cohen MS, Chen YQ, McCauley M, Gamble T, Hosseinipour MC, Kumarasamy N, et al. Prevention of HIV-1 infection with early antiretroviral therapy. The New England Journal Of Medicine. 2011; 365(6):493–505. [PubMed: 21767103]
9. Crepaz N, Hart T, Marks G. Highly active antiretroviral therapy and sexual risk behavior: a meta-analytic review. JAMA. 2004; 292(2):224–236. [PubMed: 15249572]
10. Katz MH, Schwarcz SK, Kellogg TA, Klausner JD, Dilley JW, Gibson S, et al. Impact of Highly Active Antiretroviral Treatment on HIV Seroincidence Among Men Who Have Sex With Men: San Francisco. Am J Public Health. 2002; 92(3):388–394. [PubMed: 11867317]
11. Schwarcz S, Scheer S, McFarland W, Katz M, Valleroy L, Chen S, et al. Prevalence of HIV Infection and Predictors of High-Transmission Sexual Risk Behaviors Among Men Who Have Sex With Men. Am J Public Health. 2007; 97(6):1067–1075. [PubMed: 17463384]
12. San Francisco Department of Public Health. San Francisco HIV Prevention Plan. San Francisco, CA, USA: San Francisco Department of Public Health; 2010.
13. Department of Health, District of Columbia. DC Jurisdictional HIV Prevention Plan for 2012–2015: Situational Analysis. Washington, DC, USA: Department of Health, District of Columbia; 2012.
14. Department of Health, Government of New South Wales. New South Wales HIV Strategy 2016–2020. North Sydney, NSW, Australia: Department of Health, Government of New South Wales; 2015.
15. British Columbia Ministry of Health. From Hope to Health: Towards and AIDS-free Generation. Victoria, BC, Canada: British Columbia Ministry of Health; 2012.
16. Carter A, Lachowsky N, Rich A, Forrest JI, Sereda P, Cui Z, et al. Gay and bisexual men's awareness and knowledge of treatment as prevention: findings from the Momentum Health Study in Vancouver, Canada. J Int AIDS Soc. 2015; 18:20039. [PubMed: 26268817]
17. Forrest, JI., Cui, Z., Sereda, P., Rich, A., Roth, EA., Patterson, TL., et al. Factors associated with HAART optmism among men who have sex with men in the era of expanded access to antretroviral therapy in Vancouver, Canada. 22nd Canadian Conference on HIV/AIDS Research; St. John’s, Canada. 2014.
18. Heckathorn DD. Respondent-Driven Sampling II: Deriving Valid Population Estimates from Chain-Referral Samples of Hidden Populations. Social Problems. 2002; 49(1):11–34.
19. Moore DM, Cui Z, Lachowsky N, Raymond HF, Roth E, Rich A, et al. HIV community viral load and factors associated with elevated viremia among a community-based sample of men who have sex with men (MSM) in Vancouver, Canada. Journal of acquired immune deficiency syndromes. 2016
20. Van de Ven P, Crawford J, Kippax S, Knox S, Prestage G. A scale of optimism-scepticism in the context of HIV treatments. AIDS Care. 2000; 12(2):171–176. [PubMed: 10827857]
21. Holt M, Lea T, Schmidt HM, Murphy D, Rosengarten M, Crawford D, et al. Increasing Belief in the Effectiveness of HIV Treatment as Prevention: Results of Repeated, National Surveys of Australian Gay and Bisexual Men, 2013–15. AIDS and Behavior. 2016; 20(7):1564–1571. [PubMed: 26803613]
22. Rodger AJ, Cambiano V, Bruun T, Vernazza P, Collins S, van Lunzen J, et al. Sexual Activity Without Condoms and Risk of HIV Transmission in Serodifferent Couples When the HIV-Positive Partner Is Using Suppressive Antiretroviral Therapy. JAMA. 2016; 316(2):171–181. [PubMed: 27404185]
23. Lachowsky, N., Cui, Z., Sereda, P., Stephenson, K., Rich, A., Brown, J., et al. HIV Incidence Rate and Predictors Among Gay and other Men Who Have Sex With Men (MSM) in Vancouver:

Additional Benefit of an Administrative Health Data Linkage. 25th Annual Canadian Conference on HIV/AIDS Research; Winnepeg, Canada. 2016.

24. Lachowsky NJ, Lin SY, Hull MW, Cui Z, Sereda P, Jollimore J, et al. Pre-exposure Prophylaxis Awareness Among Gay and Other Men who have Sex with Men in Vancouver, British Columbia, Canada. AIDS and Behavior. 2016; 20(7):1408–1422. [PubMed: 26884310]
25. Khaketla, M., Lachowsky, N., Armstrong, HL., Cui, Z., Hull, M., Sereda, P., Hogg, RS., Montaner, J., Roth, E., Moore, DM. 4-year trend in awareness and use of HIV PrEP among gbMSM in Vancouver, Canada. Conference on Retroviruses and Opporunistic Infections; Seattle, USA. 2017.

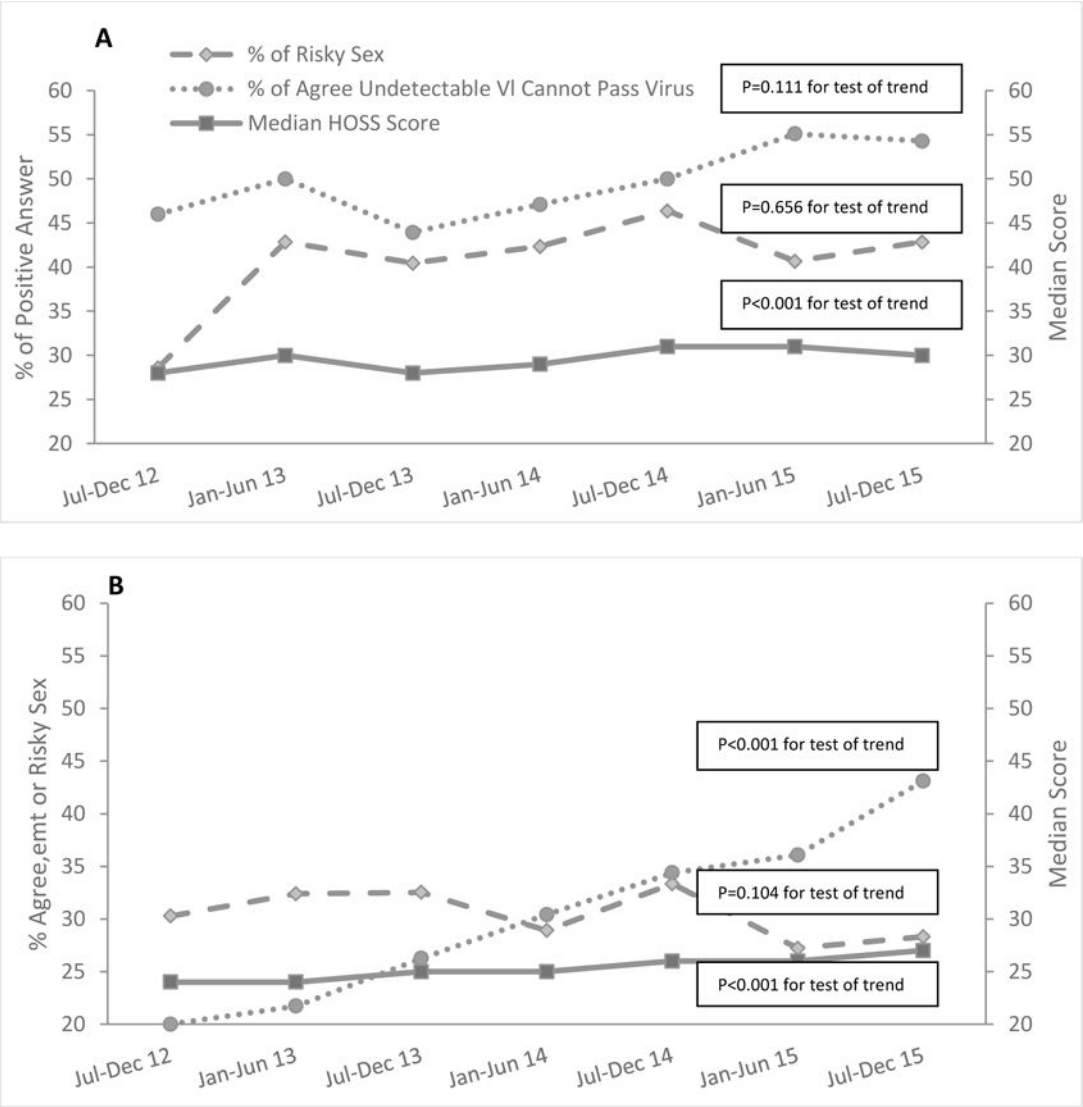

Figure 1.

Trends in Risky Sex, HIV Treatment Optimism-Skepticism Scale (HOSS) scores and agreement with the TasP statement ("a person with an undetectable viral load (VL) cannot pass on the virus"), among study participants 2012 – 2015

1A: SELF-REPORTED HIV POSITIVE PARTICIPANTS; 1B: SELF-REPORTED HIV NEGATIVE OR UNKNOWN SEROSTATUS PARTICIPANTS