Free HIV self-testing: Best practices, positivity rates, and associated costs

Question

What are the different approaches to providing free HIV self-testing to reach different groups of population?
What are the program costs associated with providing free HIV self-testing?
What are the positivity rates for HIV self-testing?

Key Take-Home Messages

- HIV self-testing is highly acceptable but could be cost prohibitive, especially for individuals at high risk of acquiring HIV and communities with high rates of poverty, HIV infection, and limited access to screening and care services (1–4).
- Subsidizing and implementing HIV self-testing programs in communities with high rates of infection may present a public health opportunity, particularly among individuals reporting condomless sex with multiple partners, concurrent sexual partnerships, and those with incarceration and substance use histories (1, 5). By removing the barrier of cost and tailoring delivery methods with community input, HIV self-test programs can engage individuals not reached by other testing programs (6, 7). HIV self-testing strategies may be adapted to different jurisdictions to supplement routine testing and traditional outreach testing (6).
- The distribution of HIV self-tests to social network members increases access to other at-risk persons and significantly increases yield of new diagnoses (8–10).
- HIV self-testing, through internet recruitment and the distribution of tests by mail, could be a promising new strategy to reach more at-risk persons at a relatively low cost (11).

Rapid Response: Evidence into Action

The OHTN Rapid Response Service offers quick access to research evidence to help inform decision making, service delivery, and advocacy. In response to a question, the Rapid Response Team reviews the scientific and grey literature, consults with experts if required, and prepares a review summarizing the current evidence and its implications for policy and practice.

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- The costs associated with free HIV self-testing programs may vary widely depending on many factors. A large study in the U.S. calculated the cost per self-test completed, cost per person tested at least once, and incremental cost per new HIV diagnosis as USD 61, USD 145 and USD 9,365 respectively, which was considered to be cost-saving (11). Public Health England's National HIV Self-Sampling Service indicates GBP 949 as a cost per reactive self-sampling test (12).

- Positivity rates of HIV self-testing and self-sampling vary widely between 0.3% and 6.14% depending on study and program design, self-testing types, population groups, risk behaviours, length of observation, jurisdictions, measuring methodologies, and other factors.

The Issue and Why it's Important

HIV self-testing provides an at-home option to counter the barriers that people may face with testing performed in health care settings (13). The full potential of self-testing could be realized as it is incorporated into larger testing programs, especially if carefully planned implementation science assessments are built into the program designs (13).

The potential benefits of HIV self-testing have been studied extensively:

The results from a meta-analysis show that HIV self-testing increased HIV test frequency for men who have sex with men by one additional test in a 6-month period (14) and the proportion of first time testers in high income countries was around 10% (14).

The Frequency of Oral Rapid Testing at Home (FORTH) study, a randomized-controlled trial conducted in Australia among 362 men who had condomless anal intercourse with more than five male sexual partners in the past three months, reported that when provided with free HIV self-test kits, men tested twice as often (15). Among those with more than two years without an HIV test or who had never had a test, there was a nearly four-fold increase in testing (15). Encouragingly, there was no reduction in the frequency of facility-based testing and no decline in testing for other sexually transmitted infections (15).

A large randomized clinical trial of 2,665 U.S. participants called Evaluation of Rapid HIV Self-testing Among MSM Project (eSTAMP) investigated whether provision of free HIV self-tests to internet-recruited men who have sex with men increased HIV testing and diagnosis over a 12-month period (9). More participants in the arm that was mailed HIV self-tests reported testing for HIV three or more times during the trial compared with control participants, with 12 infections identified in the self-testing arm in the first three

References

1. Nunn A, Brinkley-Rubinstein L, Rose J, Mayer K, Stopka T, Towey C, et al. Latent class analysis of acceptability and willingness to pay for self-HIV testing in a United States urban neighbourhood with high rates of HIV infection. Journal of the International AIDS Society. 2017;20(1):21290.

2. Udeagu CN, Shah S, Molochevski M. Men who have sex with men seek timely human immunodeficiency virus confirmation and care after rapid human immunodeficiency virus self-test: Data from partner services program, New York City. Sexually Transmitted Diseases. 2017;44(10):608–12.

3. Myers JE, El-Sadr Davis OY, Weinstein ER, Remch M, Edelstein A, Khawja A, et al. Availability, accessibility, and price of rapid HIV self-tests, New York City pharmacies, summer 2013. AIDS and Behavior. 2017;21(2):515–24.

4. Estem KS, Catania J, Klausner JD. HIV self-testing: A review of current implementation and fidelity. Current HIV/AIDS Reports. 2016;13(2):107–15.

5. Mathews A, Conserve D, Mason H, Alston L, Rennie S, Tucker J. 'Informed and empowered': A mixed-methods study of crowdsourcing contests to promote uptake of HIV self-testing kits among African Americans. Journal of Virus Eradication. 2020;6(2):74–80.

months compared with two infections in the control arm (9). The cumulative number of newly identified infections during the trial was twice as high in the self-testing participants as the control participants (25 of 1325 [1.9%] vs. 11 of 1340 [0.8%]), with the largest difference in HIV infections identified in the first 3 months (12 of 1325 [0.9%] vs. 2 of 1340 [0.1%]) (9). In addition, participants who shared the study self-tests with their social network members reported 34 infections among them (9). The authors concluded that providing free HIV self-tests helped increase awareness of infection among participants and their social network members, and distribution of free HIV self-tests provides a worthwhile mechanism to increase awareness of HIV infection and prevent transmission among men who have sex with men (9).

Similar results were obtained from another randomized-controlled trial from Seattle, involving 230 high-risk HIV-negative men who have sex with men (16). Access to free HIV self-testing increased testing frequency among high-risk men who have sex with men and did not impact sexual behavior or acquisition of sexually transmitted infections (16).

According to a study of 8,032 HIV-positive men who have sex with men in New York City, higher proportions of self-tested (91%) than non–self-tested persons (81%) were linked to care within three months of diagnosis. In addition, significantly more persons who self-tested positive (39 of 44, 89%) than persons who self-tested negative (14 of 36, 39%) sought laboratory-based HIV testing within one month of last self-testing (2).

Rather than replacing clinic-based testing, HIV self-testing should be viewed as a supplement to clinical care that can reach individuals who otherwise may not have previously tested (13, 14). Although in recent years HIV self-testing kits became available for purchase throughout many high-income countries (U.S., UK, France, other EU countries, Australia, etc.), HIV self-testing is usually not a part of publicly funded HIV testing programs, and financial barriers could be significant (2-4, 13). Overlap in the epidemics of HIV and poverty could mean that those in greatest need of a test might be least able to afford one (3). For example, nearly 90% of respondents were willing to use HIV self-testing in a 2017 survey of 1,535 individuals in a predominantly African-American neighborhood of Philadelphia with 3% HIV seroprevalence, yet only 23% of respondents were willing to pay the estimated retail price of USD 40 (1). Assuming that stated willingness to pay in a health research survey likely overestimates actual self-test purchasing behaviors, market uptake of HIV self-tests is almost certain to be far from optimal (13).

A U.S. nationwide study of men who have sex with men found offering free HIV self-testing kits to be a facilitator to secondary distribution of kits because of cost barriers associated with purchase. In total, 32% (n=49) identified cost as a factor influencing future use. Consistently reported, young men who have sex with

6. Edelstein ZR, Hubbard SJ, Myers JE. Implementation of HIV self-testing program in New York City. JAMA Internal Medicine. 2020;180(4):616.

7. Bjornshagen V, Moseng BU, Ugreninov E. Who do you reach? A Norwegian pilot project on HIV self-testing that targeted men who have sex with men. AIDS and Behavior. 2020;24(2):568–79.

8. MacGowan RJ, Chavez PR, Mermin JH. Implementation of HIV self-testing program in New York City – Reply. JAMA Internal Medicine. 2020;180(4):616–7.

9. MacGowan RJ, Chavez PR, Borkowf CB, Owen SM, Purcell DW, Mermin JH, et al. Effect of internet-distributed HIV self-tests on HIV diagnosis and behavioral outcomes in men who have sex with men: A randomized clinical trial. JAMA Internal Medicine. 2019;180(1):117–25.

10. Wesolowski L, Chavez P, Sullivan P, Freeman A, Sharma A, Mustanski B, et al. Distribution of HIV self-tests by HIV-positive men who have sex with men to social and sexual contacts. AIDS and Behavior. 2019;23(4):893–9.

11. Shrestha RK, Chavez PR, Noble M, Sansom SL, Sullivan PS, Mermin JH, et al. Estimating the costs and cost-effectiveness of HIV self-testing among men who have sex with men, United States. Journal of the International AIDS Society. 2020;23(1):e25445.

men mentioned "getting test kits for free could help me give them to my sexual partners" as well as "ease of getting one" and "making it convenient" (17). Similar concerns about the cost and affordability of self-tests were expressed by participants of other studies as well (5). In a qualitative study of men who have sex with men and transgender women in New York City and Puerto Rico, a prominent theme was the preference for utilizing free community resources instead of purchasing HIV self-testing kits (18). A Canadian study of a sexual clinic clients in Montreal mainly consisting of men who have sex with men found that for the half of the participants (206 of 421, 48.8%) CAD 10-20 was an acceptable cost for an HIV self-test, whereas 27.4% (115 of 421) preferred a price less than CAD 10 (19).

Given the high acceptability but low affordability of HIV self-testing for a wide range of populations, public funding for HIV self-testing programs would likely improve uptake, especially among key populations with low or suboptimal levels of recent HIV testing (13). The HIV in Europe Initiative, a pan-European initiative to improve early diagnosis and enrolment in care, recommends: making HIV self-test kits affordable and widely available to ensure real access across Europe for key populations among which the HIV epidemic is concentrated and where HIV testing rates remain low; and supporting community and other organizations to offer free HIV self-tests to members of the most vulnerable communities (20).

This review summarizes recent evidence on different approaches to providing free HIV self-testing to various population groups, rates of HIV positive results, and costs associated with HIV self-testing programs and interventions.

What We Found

Several programs across various jurisdictions have evaluated different approaches to providing free HIV self-testing kits:

The New York State Department of Health administered the HIV Home Test Giveaway (HHTG) program through social media and popular mobile applications to promote HIV screening among men who have sex with men, transgender, and gender queer/gender nonconforming individuals who have sex with men, and to identify individuals with undiagnosed HIV infection (21). In total, 6,190 individuals participated and 3,197 (52%) were eligible and received a coupon for the test manufacturer's web-site for a free HIV self-test (21). Of the eligible, 2,022 (63%) redeemed the coupons (21). Of the 922 participants who reported having used the kit for themselves, 7 (0.8%) reported HIV reactive results. Of these, six reported that they had taken a confirmatory test: five self-reported they confirmed to be HIV positive and were linked to medical care; one was waiting for the confirmatory test results at the time of the follow-up survey (21). The study concluded that providing the HIV self-testing kit at no cost was particularly crucial to encourage the priority population

12. Public Health England. National HIV self-sampling service. November 2017 to October 2018. 2019. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/789793/national_HIV_self_sampling_service_november_2017_to_october_2018.pdf. Accessed June 10, 2020.

13. Steehler K, Siegler AJ. Bringing HIV self-testing to scale in the United States: A review of challenges, potential solutions, and future opportunities. Journal of Clinical Microbiology. 2019;57(11):e00257.

14. Zhang C, Li X, Brecht ML, Koniak-Griffin D. Can self-testing increase HIV testing among men who have sex with men: A systematic review and meta-analysis. PLoS ONE. 2017;12(11):e0188890.

15. Jamil MS, Prestage G, Fairley CK, Grulich AE, Smith KS, Chen M, et al. Effect of availability of HIV self-testing on HIV testing frequency in gay and bisexual men at high risk of infection (FORTH): A waiting-list randomised controlled trial. The Lancet HIV. 2017;4(6):e241–e50.

16. Katz DA, Golden MR, Hughes JP, Farquhar C, Stekler JD. HIV self-testing increases HIV testing frequency in high-risk men who have sex with men: A randomized controlled trial. Journal of Acquired Immune Deficiency Syndromes. 2018;78(5):505–12.

to be tested (21). Of those who reported having previously thought about purchasing a home test kit but did not do so, 62% reported the cost as a barrier (21). Also, the study sample overrepresented lower-income earners (six of the seven participants who tested HIV reactive earned less than USD 40,000 in the past year) (21). An important aspect of the study findings was that the percentage of the participants who had never been tested for HIV before was 34% among the total 6,190 participants, 31% among the 3,197 eligible participants, and 22% among the 922 participants who used the free test kit for themselves (21). Overall, more than two-thirds of the eligible participants had not been tested for HIV for more than six months. It is also noteworthy that the percentage of having never been tested for HIV greatly varied by the social media source where participants were recruited and was highest among the Black Gay Chat users 79.2%, followed by 48.5% among the Twitter users, 46.4% among the Scruff users, and 37.8% among the Jack'd users, whereas it was about 26% to 29% among the participants from Grindr, Facebook, and Instagram (21). Initially participants reporting a positive result were offered assistance with linkage to HIV medical care, partner notification, and other prevention and supportive services (21). In later phases of the project, assistance was expanded to all participants regardless of their self-reported HIV status to include assistance with further testing for HIV, PrEP referrals, linkage to care, partner notification, and other prevention and supportive services (21).

Since 2015, the New York City Health Department has conducted five waves of an online Home Test Giveaway for men who have sex with men and transgender and gender-nonconforming individuals (22). There were 28,921 responses to the eligibility questionnaire: 17,383 were eligible, 12,182 redeemed a code for a free HIV self-test, and 7,935 responded to the follow-up survey (46% of eligible responses) (22). Among eligible responses, approximately half were Latino/a (32%) or Black (17%). Mean report of never testing before was 16% (22). Among 5,903 follow-up survey responses that reported test use, 32 reported reactive results with no known previous diagnosis (0.54%), of whom 78% reported receiving confirmatory testing (22). Report of likelihood of recommending the Home Test Giveaway to friends was high at 96% (22).

The Virginia Department of Health also launched a centrally-administered free home HIV testing program using a web-based platform, and began shipping home test kits to clients across the state (23). Between December 2016 and June 2018, 819 requests for a home test kit were received from men who have sex with men living in Virginia. Thirty-five percent of tests were sent to localities with a population fewer than 10,000, 57% of clients were less than 30 years old, and 36% were Black or Latino (23). Twenty-one percent of clients reported more than ten sexual partners in the last 12 months, and 26% reported never using condoms (23). Forty-five percent of clients had not been tested in more than a year, or had never been tested, and 79% of clients indicated that confidentiality

17. John SA, Lopez-Rios J, Starks TJ, Rendina HJ, Grov C. Willingness to distribute HIV self-testing kits to recent sex partners among HIV-negative gay and bisexual men and an examination of free-response data from young men participating in the nationwide cohort. Archives of Sexual Behavior. 2020. (Epub ahead of print).

18. Iribarren S, Lentz C, Sheinfil AZ, Giguere R, Lopez-Rios J, Dolezal C, et al. Using an HIV self-test kit to test a partner: Attitudes and preferences among high-risk populations. AIDS and Behavior. 2020. (Epub ahead of print).

19. Pant Pai N, Smallwood M, Desjardins L, Goyette A, Birkas KG, Vassal AF, et al. An unsupervised smart app-optimized HIV self-testing program in Montreal, Canada: Cross-sectional study. Journal of Medical Internet Research. 2018;20(11):e10258.

20. Jakobsen SF, Raben D, Sperle I, Lazarus JV, James C, Mendao L, et al. Scale-up of HIV self-testing. HIV Medicine. 2018;08:08.

21. Johnson MC, Chung R, Leung SJ, Edelstein Z, Yuan Y, Flavin SM. Combating stigma through HIV self-testing: New York State's HIV Home Test Giveaway Program for sexual minorities. Journal of Public Health Management and Practice. 2020. (Epub ahead of print).

22. Edelstein ZR, Wahnich A, Purpura LJ, Salcuni PM, Tsoi BW, Kobrak PH, et al. Five waves of an online HIV self-test giveaway in New York City, 2015 to 2018. Sexually Transmitted Diseases. 2020;47(5S Suppl 1):S41–S7.

was the reason they wanted a home HIV test (23). Surveillance records indicated that 1.9% of clients received a positive diagnosis after participating in the home testing program (23). Interestingly, the program data suggest that for men who have sex with men, a primary barrier to maintaining an up-to-date HIV status may not be lack of access to a test site, but rather clients' anxiety about accessing testing through traditional means (23).

There are some other jurisdictions where residents have access to free HIV self-testing. For example, Florida offers free self-testing to its residents via online orders (24). Terrence Higgins Trust in the UK currently provides HIV self-test kits free to eligible users in certain areas (25). For those that fall outside of this area, it can be mailed to any UK address for a special price of GBP 15, i.e. 50% off the standard retail price (25).

As a result of COVID-19 pandemic, and to counter its disruptive effect on traditional HIV testing, some jurisdictions have introduced free self-testing services:

HIV Self Test Scotland is a new national self-testing service, mailing out free self-tests as well as providing dedicated support with the test, regardless of the result (26). This service has been rapidly developed to give people in Scotland a way to get a HIV test during COVID-19 (26). HIV self-tests can be ordered for free (26). The test is produced and delivered by BioSURE (26).

ACON in Sydney, Australia, funded by the NSW Ministry of Health of New South Wales, started free distribution of HIV self-tests as a response to COVID-19 in June 2020 (27). This program, called you[TEST], aims to provide men with a new option to get a HIV test during the time of COVID-19 (27). You[TEST] is run by peer educators who determine eligibility via a virtual appointment (28). Those eligible for testing are offered either a HIV self-test kit or a dried blood spot (DBS) kit (28). In addition, as part of a study called Preference and Usability of Self-test Kits for HIV (PUSH), residents of Sydney and Melbourne are currently eligible to receive free HIV self-tests (an oral option or a finger prick option) (29).

Community-based organizations have also been used to implement free HIV self-testing programs. To support increased access to self-tests, the New York City Health Department launched a partnership with select organizations to pilot distribution of free HIV self-testing in two phases among priority populations across New York City (30). The program initially launched with 10 organization partners with 75 test kits distributed; as the pilot continued, partners identified necessary revisions to the program and launched a second phase in year two with 252 test kits distributed (30). Both phases included outreach to priority populations, test kit distribution, and a follow-up survey (30). Respondents reported liking HIV self-testing because it did not require a visit to a clinic (84%) and preferred a self-test to testing in a clinic (92%) (30). No reactive HIV test results were

23. Collins B. "Discreet": Characteristics of MSM in a Virginia home testing program and reasons for requesting a home test kit. National HIV Prevention Conference. Atlanta, GA 2019. Available from: https://www.cdc.gov/nhpc/pdf/NHPC-2019-Abstract-Book.pdf. Accessed June 10, 2020.

24. Free at-home HIV testing for Florida residents. Order your free at-home HIV test kit. Available from: https://knowyourhivstatus.com/get-a-free-home-testing-kit/. Accessed June 10, 2020.

25. Terrence Higgins Trust. Fastest. Test yourself for HIV. 2020. Available from: https://test.tht.org.uk/. Accessed June 10, 2020.

26. HIV Self test Scotland. 2020. Available from: https://www.hivtest.scot/. Accessed June 10, 2020.

27. ACON (AIDS Council of NSW). New at-home HIV testing service to put 'You' in control of testing. June 2020. Available from: https://www.acon.org.au/about-acon/latest-news/#new-at-home-hiv-testing-service-to-put-you-in-control-of-testing. Accessed June 10, 2020.

28. YOU[TEST]. Helping you test for HIV. 2020. Available from: https://endinghiv.org.au/test-often/book-a-test-at-youtest/. Accessed June 10, 2020.

obtained in this study (30).

A randomized controlled trial of 272 men who have sex with men and transgender women called "I'll show you mine" evaluated the use of HIV self-test to screen potential sexual partners in New York City and San Juan, Puerto Rico (31). There were 24 (out of 870 who were asked) potential partners who received HIV positive test results in this study (31), and four participants (3%) received HIV positive test results while testing themselves (31).

A study from Alameda County, California, tested a social network–based strategy to distribute HIV self-test kits to Black and Latino men who have sex with men (32). Peers distributed self-tests to 143 members of their social and sexual network (32). Compared with men who have sex with men who use the county's sponsored testing programs, individuals reached through the peer-based self-testing strategy were significantly more likely to have never tested for HIV (3.51% vs. 0.41%) and to report a positive test result (6.14% vs. 1.49%) (32). Findings suggested that a network-based strategy for free self-test distribution is a promising intervention to increase testing uptake and reduce undiagnosed infections among Black and Latino men who have sex with men (32).

Another study from the U.S. investigated whether the provision of free HIV self-tests to HIV-positive men who have sex with men resulted in their distribution and use among persons in their sexual and social networks (10). In this pilot study, 80 self-tests were given to participants recruited from Facebook and Poz.com; 59 (74%) tests were distributed, and results were reported from 31 distributed tests (10). Even in this small sample, two previously unrecognized infections were identified through the distribution and use of free self-tests (10).

Other approaches and aspects of providing free HIV self-testing have been investigated in various studies. For example:

A study in Los Angeles has investigated preferred delivery methods of free self-tests for Black and Latino men who have sex with men (33). The campaign consisted of 300,000 banner ad impressions and three broadcast notifications targeting Grindr™ users in high HIV incidence geographic areas in Los Angeles County. The website received 4,389 unique visitors and 333 test requests, of which 247 (74%) were requests for mailed tests, 58 (17%) were for pharmacy vouchers and 28 (8%) were for vending machine codes (33). Among the 56 follow-up survey participants, all of whom reported using the test, two (4%) participants reported testing positive for HIV infection (33).

Another Los Angeles study of a similar design (using Grindr™ ad impressions) identified 122 test requests from Black and Latino men who have sex with men (34). Among 57 participants who completed the follow-up survey, 53 (93%) received a test by mail and 4 (7%)

29. PUSH (Preference and Usability of Self-Test Kits for HIV). Get a HIV self-test in Sydney or Melbourne through the PUSH study. 2020. Available from: https://endinghiv.org.au/blog/get-a-hiv-self-test-in-sydney-or-melbourne-through-the-push-study/. Accessed June 10, 2020.

30. Hubbard SJ, Ma M, Wahnich A, Clarke A, Myers JE, Saleh LD. #Testathome: Implementing 2 phases of a HIV self-testing program through community-based organization partnerships in New York City. Sexually Transmitted Diseases. 2020;47(5S Suppl 1):S48–S52.

31. Carballo-Dieguez A, Giguere R, Balan IC, Brown W, 3rd, Dolezal C, Leu CS, et al. Use of rapid HIV self-test to screen potential sexual partners: Results of the ISUM study. AIDS and Behavior. 2020;24(6):1929–41.

32. Lightfoot MA, Campbell CK, Moss N, Treves-Kagan S, Agnew E, Kang Dufour MS, et al. Using a social network strategy to distribute HIV self-test kits to African American and Latino MSM. Journal of Acquired Immune Deficiency Syndromes. 2018;79(1):38–45.

33. Rosengren AL, Huang E, Daniels J, Young SD, Marlin RW, Klausner JD. Feasibility of using Grindr™ to distribute HIV self-test kits to men who have sex with men in Los Angeles, California. Sexual Health. 2016;13:389–92.

redeemed a pharmacy voucher for a test (34). Two (3.5%) participants reported newly testing HIV positive, and they both reported seeking confirmatory testing or medical care (34).

A pilot trial in Baltimore offered home testing to those patients who declined HIV testing in emergency departments (35). This significantly improved engagement of HIV testing among the test decliners in the emergency departments (35).

Another pilot trial in the Northeastern U.S. compared self-testing kits by mail, equipped with devices that detected when kits were opened and prompted a follow-up call from a counselor (eTEST) with regular self-testing (36). The trial results showed that mailing self-testing kits directly to high-risk men who have sex with men with a history of infrequent HIV testing improved their testing rates and offering follow-up counseling and referral over the phone within 24 hours of kit use also helped connect more men with HIV risk reduction counseling, safe sex supplies, and referrals for PrEP than standard HST kits and clinic testing referrals alone (36).

In a pilot study among Black man who have sex with men in Los Angeles, 53 (19.3%) of 274 distributed pharmacy vouchers for HIV self-tests were redeemed (37). Three (6%) of 50 survey respondents reported newly testing HIV-positive of whom all reported seeking medical care, and two withheld their results, both of whom also sought medical care (37).

Community-based organizations have distributed vouchers for HIV tests redeemable in pharmacies to Black communities in Indianapolis: 315 vouchers were distributed and 47 were redeemed for a 14.9% redemption rate, but this study did not follow up with those who redeemed the vouchers to learn whether tests were actually taken following voucher redemption (38).

In addition to free HIV self-tests, some jurisdictions provide free HIV self-sampling services. Free self-sampling HIV test kits are available to anyone in England through the National Health Service. Unlike self-testing kits discussed throughout this review, in case of self-sampling blood samples are returned to the lab and results are provided via text messages. The test kits can be ordered online (39).

Public Health England provides detailed reports for this service (12, 40):

Its two-year report (November 2015 to October 2017) states that 81,761 kits were ordered of which 45,350 (55.5%) were returned (40). Of those returned, 1.04% (467) of specimens were reactive which translates to a cost per reactive of GBP 933 (40). The service has been successful at engaging first time testers (40). A total of 13,356 kits were tested and 134 reactives were identified from users who had never had an HIV test before. Demand for the HIV self-sampling service was highest among MSM who made up 71% of kits tested.

34. Huang E, Marlin RW, Young SD, Medline A, Klausner JD. Using Grindr, a smartphone social-networking application, to increase HIV self-testing among Black and Latino men who have sex with men in Los Angeles, 2014. AIDS Education and Prevention. 2016;28(4):341–50.

35. Patel AV, Abrams SM, Gaydos CA, Jett-Goheen M, Latkin CA, Rothman RE, et al. Increasing HIV testing engagement through provision of home HIV self-testing kits for patients who decline testing in the emergency department: A pilot randomisation study. Sexually Transmitted Infections. 2019;95(5):358–60.

36. Wray TB, Chan PA, Simpanen E, Operario D. A pilot, randomized controlled trial of HIV self-testing and real-time post-test counseling/referral on screening and preventative care among men who have sex with men. AIDS Patient Care and STDs. 2018;32(9):360–7.

37. Marlin RW, Young SD, Bristow CC, Wilson G, Rodriguez J, Ortiz J, et al. Piloting an HIV self-test kit voucher program to raise serostatus awareness of high-risk African Americans, Los Angeles. BMC Public Health. 2014;14:1226.

38. Meyerson BE, Carter G, Lawrence C, Jimison L, Rush N, Carter C, et al. Expanding HIV testing in African American communities through community-based distribution of home-test vouchers. AIDS Patient Care and STDS. 2016;30(3):141–5.

Of these 1.07% were reactive (40). A total of 3,238 kits were tested from black African service users which represented 7.25% of all kits tested (40).

The subsequent (latest) one-year report (November 2017 to October 2018) states that 40,681 kits were ordered of which 24,558 (60.37%) were returned (12). Of those returned, 0.98% (241) of specimens were reactive - this translates to a cost per reactive specimen of GBP 949. The service has been successful at engaging first time testers and those who have not tested for more than a year: a total of 6,416 (26.09%) kits were tested from users who had never had an HIV test before, of these 84 (1.31%) specimens were reactive (12). A total of 7,814 (31.78%) users reported that they last tested more than 12 months prior to this test, of those 79 (1.01%) were reactive (12). Demand for the HIV self-sampling service was highest among gay and bisexual men who made up 67.79% of kits tested, of these 0.98% were reactive. A total of 1,868 kits were tested from Black African service users which represented 7.60% of all kits tested with a reactivity rate of 1.82% (12).

A large study in the U.S. called "Scaling Up HIV Testing among African American and Hispanic Men Who Have Sex with Other Men: The MSM Testing Initiative" (MTI) compared various testing approaches (clinical settings, non-clinical venues or community settings, and at home) based on 68,185 test results (41). For at-home testing, kits to collect a dried blood spot specimen were used (a type of self-sampling), which was shipped to the laboratory for testing (41). Test results were returned to the individual through a medical call center, and those with positive test results were connected with a linkage-to-care coordinator (41). At-home tests were nearly five times as likely to be associated with first-time testing compared to venue-based tests (41). Among HIV tests with first-time testers, 3.9% (212 of 5,474) had confirmed positive HIV test results, and the positivity rate in the at-home testers subgroup was 2.2% (42).

Costs of free HIV self-testing programs

There is a scarcity of information about: implementation costs of both publicly-funded programs; and costs of individual research studies:

The eSTAMP randomized-controlled trial described above in detail identified 59 participants and social network associates with newly diagnosed HIV infection in the self-testing arm, whereas 11 control participants were newly diagnosed with HIV (11). The implementation cost of the HIV self-testing program was USD 449,510 (11). The cost per self-test completed, cost per person tested at least once, and incremental cost per new HIV diagnosis was USD 61, USD 145, and USD 9,365 respectively (11). The study estimated that the self-testing program potentially averted 3.34 transmissions, saved 14.86 QALYs and nearly USD 1.6 million lifetime HIV treatment costs (11).

39. Public Health England. Test Now. Beat HIV. Order self-sample kit now. Available from: https://freetesting.hiv/. Accessed June 10, 2020.

40. Public Health England. National HIV Self-Sampling Service. Two year service report. November 2015 to October 2017. 2018. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/789814/HIV_self_sampling__service_2_year_service_report.pdf. Accessed June 10, 2020.

41. Clark HA, Oraka E, DiNenno EA, Wesolowski LG, Chavez PR, Pitasi MA, et al. Men who have sex with men (MSM) who have not previously tested for HIV: Results from the MSM Testing Initiative, United States (2012–2015). AIDS and Behavior. 2019;23(2):359–65.

42. DiNenno E, Shouse L, Martin T, Nasrullah M, Baytop C, Orr A, et al. The MSM Testing Initiative (MTI): Innovative approaches for HIV testing and linkage to medical care. National HIV Prevention Conference. Atlanta. 2015. Available from: https://www.researchgate.net/publication/287201580_The_MSM_Testing_Initiative_MTI_Innovative_approaches_for_HIV_testing_and_linkage_to_medical_care. Accessed June 20, 2020.

The study authors concluded that the HIV self-testing program identified persons with newly diagnosed HIV at low cost and the program was cost-saving (11).

Public Health England's National HIV Self-Sampling Service indicates GBP 949 as a cost of a reactive self-sampling test in 2018 and GBP 933 in 2017 (12).

Positivity rates of HIV self-testing

The rates of new HIV diagnoses (positivity rate) vary depending on study and program design, self-testing types, population groups, risk behaviours, length of observation, jurisdictions, measuring methodologies and other factors. Table 1 provides a brief overview of HIV positivity rates identified in various publications.

Currently there is a large randomized controlled trial being conducted in England and Wales called An HIV Self-Testing Public Health Intervention (SELPHI) (44, 45). It is enrolling over 10,000 gay and other men who have sex with men (including trans men) (44, 45). The study examines if providing free HIV self-tests increases early diagnosis of HIV (45), and its results will help the NHS decide if self-tests for HIV should be available for free (44). SELPHI is funded by the UK's National Institute for Health Research (NIHR) (44, 45). BioSURE, the manufacturer of the self-test kits, is providing kits for SELPHI (44, 45). The recruitment strategy utilizes adverts placed in geo-location social-sexual networking apps (Grindr, Growlr, Scruff and Hornet) as well as targeted Facebook advertising (46). Preliminary results (presented in March 2020) showed that there was low overall HIV prevalence and no significant difference in HIV diagnoses between men who have sex with men randomized to receive an HIV self-testing kit and those randomized to no kit (43). Reflecting national declines in men who have sex with men in the UK, which occurred after the study was planned, new HIV diagnoses were low in both arms by three months after enrolment, with no significant difference between men randomized to receive an HIV self-testing kit and those who were not (43). However, 34 previously undiagnosed HIV infections were detected across both groups (19 and 14 respectively), and men randomized to no kit may have been motivated to HIV test through other routes in the three months after enrolment (43). In addition, HIV testing rates were overall higher in the three months after enrolment in those offered HIV self-testing (43).

43. Rodger A, McCabe L, Phillips AN, Lampe F, Burns F, Ward D, et al. Does provision of free HIV self-testing kits increase HIV diagnosis in MSM? Conference on Retroviruses and Opportunistic Infections. Boston, MA. March 2020. Available from: https://www.croiconference.org/abstract/does-provision-of-free-hiv-self-testing-kits-increase-hiv-diagnosis-in-msm/. Accessed June 20, 2020.

44. SELPHI – A study of free self-tests for HIV in England & Wales. About SELPHI. 2019. Available from: http://www.selphi.org/about. Accessed June 20, 2020.

45. Gabriel MM, Dunn DT, Speakman A, McCabe L, Ward D, Witzel TC, et al. Protocol, rationale and design of SELPHI: A randomised controlled trial assessing whether offering free HIV self-testing kits via the internet increases the rate of HIV diagnosis. BMC Infectious Diseases. 2018;18(1):531.

46. Witzel TC, Gabriel MM, McCabe L, Weatherburn P, Gafos M, Speakman A, et al. Pilot phase of an internet-based RCT of HIVST targeting MSM and transgender people in England and Wales: Advertising strategies and acceptability of the intervention. BMC Infectious Diseases. 2019;19:699.

Table 1. Positivity rates of HIV self-testing identified in various publications

Study or program, publication year	Population	HIV positivity rate (as reported by the publication)
RCT, Seattle, 2018 (16)	230 high-risk men who have sex with men	3.4% overall (4 in self-testing arm and 2 in standard testing arm) Incidence of HIV diagnosis 2.75 per 100 person-years, no statistical difference between arms
RCT, FORTH, Australia, 2017 (15)	362 high-risk gay and bisexual men	3 men, overall incidence of 0.9 per 100 person-years (95% CI 0.2–2.6). All 3 in self-testing arm
RCT, SELPHI, UK, 2020 (43)	10,111 men who have sex with men (6,049 in self-testing arm, 4,062 non-self testing arm)	0.3%
RCT, "I'll show you mine", testing self and/or sexual partners, New York City and San Juan, Puerto Rico, 2020 (31)	272 men who have sex with men and transgender women: 870 partners were asked to test. 100 participants tested themselves	2.76% (among potential partners) 3% (among study participants)
New York State Department of Health, the HIV Home Test Giveaway (HHTG) program, 2020 (21)	Men who have sex with men, transgender, and gender queer/gender non-conforming individuals who have sex with men. 2,022 redeemed coupons	0.8%
New York City Health Department, Home Test Giveaway, 2020 (22)	Men who have sex with men and transgender and gender-nonconforming individuals, 12,182 redeemed a code; 7,935 responded to the follow-up survey	0.54%
Virginia Department of Health, self-testing program, 2019 (23)	Men who have sex with men, 819 requests for home test kits	1.9%
Social network–based strategy (peers), Alameda county, California, 2018 (32)	Black and Latino men who have sex with men	6.14%
Distribution by HIV-positive men who have sex with men to social and sexual contacts, U.S., 2019 (10)	Men who have sex with men, 59 tests distributed, 31 results reported	3%
Public Health England, Self-sampling program, 2018 (40)	45,350 self-sampling specimens returned for testing within 2 years	1.04%
Public Health England, Self-sampling program, 2019 (12)	68,185 test results, men who have sex with men	0.98%
MTI study, U.S. Various testing approaches including at-home dried blood spot testing, 2015 (41, 42)	Black and Latino men who have sex with men, 333 test requests	2.2% (for at-home testing)
Grindr™ ads of a website where free self-tests can be requested, Los Angeles, 2016 (33)	Black and Latino men who have sex with men, 122 test requests	4%
Grindr™ ads of a website where free self-tests can be requested, Los Angeles, 2014 (34)	Black men who have sex with men, 274 vouchers distributed, 53 redeemed	3.5%
Community-based organizations distributing pharmacy vouchers, Los Angeles, 2014 (37)	Black men who have sex with men, 274 vouchers distributed, 53 redeemed	6%

Factors That May Impact Local Applicability

Only studies and data from high-income countries examining factors associated with free HIV self-testing have been included in this review. The availability of HIV oral fluid or blood self-tests for free and their approval status by regulatory authorities varies across countries and settings. Furthermore, studies from the U.S. mainly investigated oral fluid self-tests whereas in most other countries only blood-based self-tests have been approved. HIV self-sampling available in the UK and also reported in some studies differs from self-testing as it requires mailing of the collected sample to a lab for testing. The availability of HIV self-tests as well as their price also varies across manufacturers and products. The body of the available evidence may not be directly applicable to Ontario's and Canada's health care or legal systems and the findings may not be generalizable.

What We Did

We searched Medline (including Epub Ahead of Print, In-Process & Other Non-Indexed Citations) using text terms HIV and (self-test* or HIVST or home test*). Searches were conducted on June 10, 2020 and results limited to English articles published from 2010 to present. Google searches using various combinations of the word "free" with HIV self-test or HIV home-test were also conducted. Reference lists of identified articles were also searched. The searches yielded 584 references from which 46 were included.