

Acceptability of self-collecting oropharyngeal swabs for sexually transmissible infection testing among men and women

Derek T. Dangerfield I^{A,E}, Jason E. Farley^{A,B}, Jeffrey Holden^C, Mathilda Barnes^C, Perry Barnes Jr^C, Mary Jett-Goheen^C and Charlotte Gaydos^{C,D}

^AJohns Hopkins School of Nursing, 525 N Wolfe Street, Baltimore, MD 21205, USA.

^BThe REACH Initiative, Johns Hopkins School of Nursing, 855 N Wolfe Street, Suite 601, Baltimore, MD 21205, USA.

^CDivision of Infectious Diseases, Johns Hopkins School of Medicine, 733 N Broadway, Baltimore, MD 21205, USA.

^DDepartment of Emergency Medicine, Johns Hopkins School of Medicine, 733 N Broadway, Baltimore, MD 212105, USA.

^ECorresponding author. Email: ddanger2@jhu.edu

Abstract. In 2016, the rate of USA gonorrhoea and chlamydia cases increased by 18.6% and 6.9% respectively. Most people infected are asymptomatic and are not treated immediately, which negatively affects sexually transmissible infection (STI)/HIV rates. Men and women were asked to provide self-collected oropharyngeal specimens for STI testing ($n = 79$). Over 75% reported the collection of the swab was ‘easy’ or ‘very easy’ to use; 90% were willing to test for STIs at home in the future. Self-collecting oropharyngeal swabs for STI testing is acceptable among men and women. Future research should test the effect of self-collecting pharyngeal swabs on STI testing behaviours and results.

Additional keywords: chlamydia, gonorrhoea, screening, self-test.

Received 5 November 2018, accepted 1 February 2019, published online 22 March 2019

Introduction

In 2016, the rate of reported USA gonorrhoea and chlamydia cases increased by 18.6% and 6.9% respectively.^{1,2} Gonorrhoea cases have increased by 75.2% since 2009.² Most people infected with these pathogens are asymptomatic and do not always seek medical attention,^{2,3} therefore, many individuals are untreated and this can negatively affect sexually transmissible infection (STI) and HIV rates.^{2,4–6} Managing oropharyngeal infections is crucial to preventing drug-resistant gonorrhoea.^{5,7,8}

While oropharyngeal screening is recommended annually for sexually active men who have sex with men (MSM)⁹ and more often for MSM using PrEP,¹⁰ some patients are improperly screened due to stigma, discomfort discussing sexual behaviours with providers, and provider knowledge and discomfort.^{11–13} Routine screening for oropharyngeal infections is not recommended for men and women in the general population.⁹ Self-collected swabs could circumvent barriers to STI detection; however, the US Food and Drug Administration (FDA) does not approve nucleic acid amplification tests (NAATs) for oropharyngeal screening,

requiring laboratories to validate screening tools for NAATs on oropharyngeal specimens before use. Therefore, this study explores the acceptability of self-collecting pharyngeal swabs for STI testing among men and women as part of a larger goal to validate the effectiveness of testing patient-collected swabs compared with clinician-collected swabs for gonorrhoea and chlamydia.

Methods

Men and women aged ≥ 18 years who were seen for routine clinical visits at Johns Hopkins University Bartlett Speciality Clinic and the Baltimore City Health Department (BCHD) STD clinics were asked if they would provide oropharyngeal specimens for STI testing. Upon providing oral informed consent, clinicians used a Copan FLOQswab® (Copan Flock Technologies, Brescia, Italy) to collect a specimen first. Participants were then given a Copan FLOQswab kit®, instructions on how to self-collect a pharyngeal specimen and were asked to self-swab their throat and complete a brief survey. Clinicians observed participants self-collecting swabs for technique and accuracy. Volunteers were given a US\$10 gift

Table 1. Characteristics and attitudes towards providing self-collected swabs for the detection of sexually transmissible infections (STIs, n = 69)

	n (%)
Age (years)	
18–24	10 (14.5)
25–29	13 (18.8)
30–39	16 (23.2)
40–49	9 (13.0)
≥50	21 (30.4)
Condom use for oral sex in the past 3 months	
Always	7 (10.1)
Most of the time	21 (30.4)
Sometimes	22 (31.9)
Never	18 (26.1)
How would you rate your past STI testing experience?	
Very satisfied	18 (26.1)
Satisfied	34 (49.3)
Neutral	16 (23.2)
Not satisfied	1 (1.4)
How would you rate the ease of using the collection swab for your throat? ^A	
Very easy to use	23 (33.3)
Easy to use	30 (43.5)
Neutral	11 (15.9)
Hard to use	3 (4.3)
Very hard to use	1 (1.4)
How would you rate being able to understand the collection instructions? ^A	
Very easy to understand	36 (52.3)
Easy to understand	30 (43.5)
Neutral	2 (2.9)
Hard to understand	0 (0)
Very hard to understand	0 (0)
In the future, would you be willing to test for STIs at home using a device you could use to test yourself? ^A	
Yes	64 (92.8)
No	2 (2.9)
Not sure	2 (2.9)
Which type of specimen would you prefer to self-collect for STI testing?	
Penile swab	32 (46.4)
Urine	47 (68.1)
Rectal swab	9 (13.0)
Throat swab	33 (47.8)
Vaginal swab	12 (17.4)
Would you be willing to self-collect a blood sample from a finger stick for HIV and/or syphilis testing?	
Yes	63 (91.3)
No	3 (4.3)
Not sure	3 (4.3)
Would you prefer to test yourself for an STI at home, or would you prefer that a healthcare provider collect and perform your test?	
Prefer self-testing	45 (65.2)
Prefer healthcare provider	17 (24.6)
No preference	6 (8.7)
Not sure	1 (1.4)

Table 1. (continued)

	n (%)
Would you be willing to take a medication that could prevent you from contracting an STI such as syphilis?	
Yes	46 (66.7)
No	7 (10.1)
Maybe	11 (15.9)
Don't know	5 (7.2)

^ADue to missing responses, some totals are less than 69.

card. Both specimens were tested at Johns Hopkins University International STD Research Laboratory. Gonorrhoea and chlamydia tests were performed on the Hologic Panther System® (Hologic, Inc., Marlborough, MA, USA) using the Hologic Aptima Combo 2 Assay® (Hologic, Inc., Marlborough, MA, USA). Study procedures and research ethics were approved by the Johns Hopkins School of Medicine’s Institutional Review Board and the BCHD.

Results

Seventy-nine men and women provided self-collected oropharyngeal swabs. Two (2.5%) were positive for gonorrhoea; one was positive for chlamydia. Results from self-collected and clinician-collected swabs were 100% congruent. Sixty-nine participants provided survey responses (87.3% response rate). A total of 14.5% of respondents were aged 18–24 years, 18.8% were aged 25–29 years, 23.2% were aged 30–39 years and 30.4% were aged ≥50 years. Eighteen (26.1%) reported never using condoms for oral sex in the past 3 months. Over 75% of respondents reported collection of the swab was ‘easy to use’ or ‘very easy to use’. More than half (52.3%) reported that the collection instructions were very easy to understand and ~65% noted that they preferred self-testing for STIs at home (Table 1).

Discussion

Most men and women reported inconsistent condom use for oral sex and rated self-collecting throat swabs as ‘easy’ or ‘very easy’ to use. Most also indicated their willingness to self-screen for STIs at home. Self-collecting oropharyngeal swabs for STI testing is acceptable among men and women. Other studies have found similar results.^{14,15} Additionally, self-collected swabs are as accurate as clinician-collected swabs. Providing patients with self-collection pharyngeal swabs could increase screening for asymptomatic individuals, test more people who are reluctant to visit a clinic and reduce healthcare costs.^{14,16} Some programs use self-sampling kits for STI testing through mail-in collection kits.^{17–19} Future research should explore sexual practices with male, female and transgender partners, and test the relative effect of self-collecting pharyngeal swabs on STI testing behaviours and results among men and women.

Conflicts of interest

The authors declare that they have no conflicts of interest.

Acknowledgements

This work was supported by the National Institute of Biomedical Imaging and Bioengineering, National Institutes of Health (U54EB007958), the National Institutes of Health (NIH) National Institute of Allergy and Infectious Diseases (AI06861) and Gilead Sciences (grant number IN-US-2764422). This publication also resulted (*in part*) from research supported by the Johns Hopkins University Center for AIDS Research, a NIH-funded program (P30AI094189), which is supported by the following NIH Co-Funding and Participating Institutes and Centers: NIAID, NCI, NICHD, NHLBI, NIDA, NIMH, NIA, FIC, NIGMS, NIDDK, and OAR. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH.

References

- Centers for Disease Control and Prevention. Chlamydia – 2017 sexually transmitted diseases surveillance. Atlanta: US Department of Health & Human Services; 2018. Available online at: <https://www.cdc.gov/std/stats17/chlamydia.htm> [verified 16 October 2018].
- Centers for Disease Control and Prevention. Gonorrhoea – 2017 sexually transmitted diseases surveillance. Atlanta: US Department of Health and Human Services; 2018. Available online at: <https://www.cdc.gov/std/stats17/gonorrhoea.htm> [verified 16 October 2018].
- Pinsky L, Chiarilli DB, Klausner JD, Kull RM, O'Keefe R, Heffer C, Seward Jr SL. Rates of asymptomatic nonurethral gonorrhoea and chlamydia in a population of university men who have sex with men. *J Am Coll Health* 2012; 60(6): 481–4. doi:10.1080/07448481.2012.690465
- Bernstein KT, Marcus JL, Nieri G, Philip SS, Klausner JD. Rectal gonorrhoea and chlamydia reinfection is associated with increased risk of HIV seroconversion *J Acquir Immune Defic Syndr* 2010; 53(4): 537–43. doi:10.1097/QAI.0b013e3181c3ef29
- Deguchi T, Yasuda M, Ito S. Management of pharyngeal gonorrhoea is crucial to prevent the emergence and spread of antibiotic-resistant *Neisseria gonorrhoeae*. *Antimicrob Agents Chemother* 2012; 56(7): 4039–40. doi:10.1128/AAC.00505-12
- Torpy JM, Lynn C, Golub RM. Gonorrhoea. *JAMA* 2013; 309(2): 196. doi:10.1001/2012.jama.10802
- Bolan GA, Sparling PF, Wasserheit JN. The emerging threat of untreatable gonococcal infection. *N Engl J Med* 2012; 366(6): 485–7. doi:10.1056/NEJMp1112456
- Unemo M, Nicholas RA. Emergence of multidrug-resistant, extensively drug-resistant and untreatable gonorrhoea. *Future Microbiol* 2012; 7(12): 1401–22. doi:10.2217/fmb.12.117
- Centers for Disease Control and Prevention. 2015 Sexually Transmitted Diseases Treatment Guidelines – screening recommendations and considerations referenced in treatment guidelines and original sources. Atlanta: US Department of Health & Human Services; 2015. Available online at: <https://www.cdc.gov/std/tg2015/screening-recommendations.htm> [verified 16 October 2018].
- Centers for Disease Control and Prevention. Preexposure prophylaxis for the prevention of HIV infection in the United States – 2017 update: a clinical practice guideline. Atlanta: US Department of Health & Human Services; 2018. Available online at: <https://www.cdc.gov/hiv/pdf/risk/prep/cdc-hiv-prep-guidelines-2017.pdf> [verified 30 October 2018].
- Patton ME, Kidd S, Llata E, Stenger M, Braxton J, Asbel L, Bernstein K, Gratz B, Jespersen M, Kerani R, Mettenbrink C, Mohamed M, Pathela P, Shchumacher C, Stirland A, Stover J, Tabidze I, Kirkcaldy RD, Weinstock H. Extragenital gonorrhoea and chlamydia testing and infection among men who have sex with men—STD Surveillance Network, United States, 2010–2012. *Clin Infect Dis* 2014; 58(11): 1564–70. doi:10.1093/cid/ciu184
- Bernstein KT, Liu K-L, Begier EM, Koblin B, Karpati A, Murrill C. Same-sex attraction disclosure to health care providers among New York City men who have sex with men: implications for HIV testing approaches. *Arch Intern Med* 2008; 168(13): 1458–64. doi:10.1001/archinte.168.13.1458
- Barbee LA, Dhanireddy S, Tat SA, Marrazzo JM. Barriers to bacterial STI testing of HIV-infected men who have sex with men engaged in HIV primary care. *Sex Transm Dis* 2015; 42(10): 590–4. doi:10.1097/OLQ.0000000000000320
- Paudyal P, Llewellyn C, Lau J, Mahmud M, Smith H. Obtaining self-samples to diagnose curable sexually transmitted infections: a systematic review of patients' experiences. *PLoS One* 2015; 10(4): e0124310. doi:10.1371/journal.pone.0124310
- Purcell HN, Gaydos C, Widdice L. Preference for and acceptability of self-collection of pharyngeal swabs for sexually transmitted infection testing. *J Adolesc Health* 2018; 62(2): S81. doi:10.1016/j.jadohealth.2017.11.164
- Huang W, Gaydos CA, Barnes MR, Jett-Goheen M, Blake DR. Cost-effectiveness analysis of *Chlamydia trachomatis* screening via Internet-based self-collected swabs compared to clinic-based sample collection. *Sex Transm Dis* 2011; 38(9): 815–20. doi:10.1097/OLQ.0b013e31821b0f50
- Patel AV, Abrams SM, Gaydos CA, Jett-Goheen M, Latkin CA, Rothman RE, Hsieh YH. 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. *Sex Transm Infect* 2018. doi:10.1136/sextrans-2018-053592
- Buhrer-Skinner M, Muller R, Bialasiewicz S, Sloots TP, Debattista J, Gordon R, Buettner PG. The check is in the mail: piloting a novel approach to *Chlamydia trachomatis* testing using self-collected, mailed specimen. *Sex Health* 2009; 6(2): 163–9. doi:10.1071/SH08076
- Gaydos CA, Jett-Goheen M, Barnes M, Dize L, Hsieh Y-H. Self-testing for *Trichomonas vaginalis* at home using a point-of-care test by women who request kits via the Internet. *Sex Health* 2016; 13(5): 491–3. doi:10.1071/SH16049