

## **Supplemental Digital Content 1: Appendix**

### *Recruitment methods and survey administration*

To recruit participants, we placed banner and text-based pop-up advertisements in English and Spanish on social media, male-male geosocial networking, and general LGBTQ-interest apps and websites. Advertisements on all platforms were targeted based on location in Washington, and advertisements on social media were additionally targeted to males who reported an interest in relationships with men or expressed an interest in LGBTQ-related topics or groups. The design and content of the advertisements were informed by feedback from MSM visiting the Public Health—Seattle & King County STD clinic and from the University of Washington/Fred Hutch Center for AIDS Research Community Action Board. Example advertisements are presented in Figure 1S, below.

**Figure 1S:** Example survey advertisements



*Example pop-up ad:*

**Help improve sexual health in Washington**

Share your experiences and opinions to help improve sexual health and HIV prevention programs in Washington. Your responses will be confidential, and you will have an opportunity to see how your answers compare to others in Washington at the end of the project. Click below for more information and to get started.

The survey was open to all individuals who clicked on posted advertisements between January 1<sup>st</sup> and February 28<sup>th</sup>, 2017. Upon clicking on an ad, individuals were linked to a webpage hosted by SurveyGizmo (Boulder, CO). The landing page stated that the survey was designed to collect information to improve efforts to prevent HIV and other sexually transmitted infections (STIs) in Washington State, with a focus on learning about awareness, interest in, and use of HIV pre-exposure prophylaxis (PrEP). This page additionally stated that the project was developed and conducted by the Washington State Department of Health, Public Health—Seattle & King County, and the University of Washington, and was not sponsored by or connected to any pharmaceutical company or private enterprise.

Individuals who clicked past this page were shown an informed consent page, which stated that the survey would take approximately 10 minutes to complete, participation is voluntary, and responses would be completely confidential. We informed participants that we would record their computer or device's Internet Protocol (IP) address, but that this would be used only to detect and screen out duplicate responses, would be deleted upon removal of duplicates, and no attempts would be made to identify individuals. We did not use web cookies to block repeat responses from the same browser.

The survey was programmed to randomly show one of three consent pages that differed only in the stated incentive. These pages stated either that individuals would receive a \$10 Amazon gift certificate, could choose from one of five charitable organizations<sup>1</sup> to which we would donate \$10, or would receive no monetary incentive. All individuals were informed that we would provide them with a link at the end of the survey where we would post a summary of results upon completion of the project, and they could request to have these results emailed to them. Email addresses for \$10 Amazon gift certificates and communication of results were collected upon completion of the survey through separate electronic forms that were not linked to survey responses.

After nine days of data collection, we noticed a pattern of responses that led us to discontinue the \$10 gift certificate incentive. Through monitoring of IP addresses and timestamps, we observed that individuals appeared to be clicking the advertisements repeatedly and providing consent only when presented with the \$10 gift certificate incentive, and many individuals completed the survey for this incentive multiple times. We found no evidence that information

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<sup>1</sup> Human Rights Campaign, the Latino Commission on AIDS, the It Gets Better Project, Equal Rights Washington, and the Northwest Network of Bi, Trans, Lesbian, and Gay Survivors of Abuse (The NW Network)

about the survey and the opportunity to earn \$10 had been posted on any websites other than those on which we posted advertisements, and we decided to drop this incentive. We removed duplicate entries according to the protocol described below, and for the remainder of the recruitment period, participants were randomized to the \$10 donation or no monetary incentive. In sensitivity analyses, we excluded participants who completed the survey for the \$10 gift certificate before this incentive was discontinued. The proportion of men who reported current (20%) and past (4%) PrEP use was comparable to findings from the full sample (19% and 4%). Among men for whom PrEP is recommended, a higher proportion reported current use (37% vs. 31% in the full sample) and a lower proportion reported interest (40% vs. 56%). The findings from analyses of time on PrEP, correlates of PrEP, and the comparison with the Seattle Pride survey were not meaningfully different.

Upon clicking to indicate consent, participants answered a set of screening questions. Persons were ineligible if they were female sex at birth, less than 16 years of age, reported residence outside of Washington State or did not provide a valid Washington zip code, did not have oral or anal sex with a man in the past 12 months, reported ever testing positive for HIV, or completed the survey from a device with an Internet Protocol (IP) address outside the United States. Eligible individuals were asked about their social and demographic characteristics, healthcare utilization, drug use, sexual behavior, and awareness, interest, and use of PrEP. Survey items were informed by review of the literature and adapted from existing measures,<sup>1-6</sup> and the instrument was tested and refined through cognitive interviewing with MSM attending the Public Health—Seattle & King County (PHSKC) STD clinic. All questions were required, though participants could indicate that they prefer not to answer for any question they were not comfortable with. The survey had an average of three questions per page. To minimize response

burden, we used adaptive questioning to skip questions and pre-fill domains based on participants' previous responses. We programmed the survey to flag implausible or inconsistent responses and prompt participants to correct flagged entries. Participants could not otherwise go back to change answers on previous pages, and we did not ask them to review their answers prior to submission. An open text field was included at the end of the survey in which participants could clarify or correct previous responses and provide feedback. Respondents took a median of 11 minutes to complete the survey.

#### *Protocol to remove invalid and duplicate responses*

We used a modified version of a published protocol<sup>7</sup> to define four patterns of responses suggestive of invalid or duplicate entries. The first pattern identified responses from individuals who appeared to have clicked the link to open the survey repeatedly and consented only when they were randomized to receive a higher incentive. Observations that accessed the survey from the same recruitment platform, matched on the first three quadrants of the IP address, and were submitted for a higher incentive within 10 minutes of a previous entry were flagged, and all but the first entry were dropped. The second pattern of responses indicated a change in answers to screening questions to satisfy eligibility criteria. We flagged observations submitted within two hours of a disqualified response that matched on recruitment platform and the first three quadrants of the IP address. Through manual review, we excluded from analysis responses with similar answers to screening questions apart from one or two answers that may have been changed to meet eligibility criteria. Responses for which the survey language was changed were considered valid, and preceding responses were discarded. The two-hour window was defined after reviewing the distribution of time intervals between flagged responses and selecting the window that captured

most of the entries that appeared invalid. Third, we flagged and removed duplicate responses. As above, we flagged responses for manual review if they matched on recruitment platform and the first three quadrants of the IP address and were submitted within two hours of a previous entry. We considered responses with matching or similar data to be duplicates and retained only the first or most complete response. Fourth, to identify respondents who appeared to have clicked through without reading questions or contemplating their responses, we removed entries submitted in less than half the median time to completion.

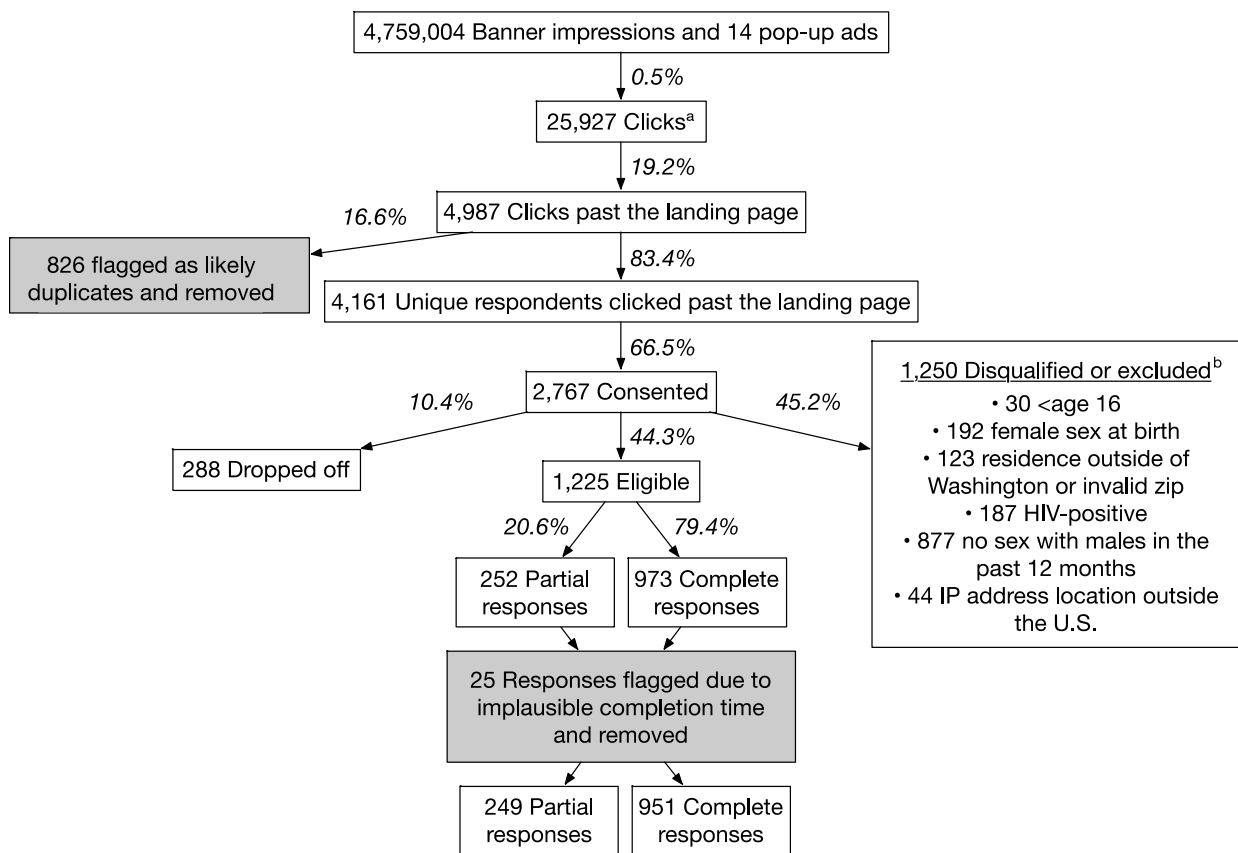
### *Recruitment and response rates*

From January 1 to February 28, 2017, we delivered 4,759,004 advertisement impressions and 14 broadcast ads, which generated 25,927 clicks to the survey, 4,987 of which (19%) proceeded past the landing page (Figure 2S). Of these, 826 (17%) were flagged as duplicate entries and removed, leaving 4,161 unique visits past the landing page. Seventy-nine percent of eligible, consenting participants completed the survey, and after removing responses with implausible completion times, 951 complete and 249 partial responses were recorded. Recruitment costs totaled \$11.24 per complete response; accounting for incentives, survey administration, and translation of the instrument and advertisements into Spanish, expenses totaled \$23.69 per complete response (Table 1S).

To assess response bias, we compared the characteristics of respondents who completed the survey to those who dropped off, using chi-square tests to assess statistical significance. Among the 1,157 eligible cisgender males who started the survey, drop-off was associated with not identifying as gay or homosexual ( $p < 0.001$ ), reporting less than a 4-year college degree ( $p = 0.003$ ), residence outside of King County ( $p = 0.002$ ), and accessing the survey in Spanish

( $p=0.015$ ). Eligible respondents assigned to receive the \$10 gift certificate were the most likely to complete the survey (126/140; 90%), followed by those assigned to the \$10 donation incentive (413/507; 81%;  $p=0.016$  for comparison with the gift certificate group), and those assigned to receive no monetary incentive (385/510; 75%;  $p=0.021$  for comparison with the donation group).

**Figure 2S: Recruitment and response rates**



To identify and remove duplicate and invalid responses, we flagged entries based on IP address, recruitment platform, time stamp, and answers to screening and basic demographic questions. Responses removed using this protocol are presented in grey boxes.

<sup>a</sup>One advertising platform, which delivered 1,096,094 impressions, recorded clicks that opened a pop-up display within the app, rather than clicks to the survey; <sup>b</sup>An additional 4 responses were wrongfully disqualified due to a programming error. Reasons for disqualification are not mutually exclusive.

<b>Table 1S: Survey expenses</b>			
	Expenses <sup>a</sup>	Complete responses <sup>b</sup>	Cost per complete response
<b>Recruitment</b>			
Advertisement design	\$364.00		
Advertisement placement			
Social media	\$3,925.65	722	\$5.44
Geosocial networking <sup>c</sup>	\$4,000.00	172	\$23.26
General LGBTQ interest	\$2,400.00	57	\$42.11
<b>RECRUITMENT TOTAL</b>	<b>\$10,689.65</b>	<b>951</b>	<b>\$11.24</b>
<b>Incentives</b>			
Amazon gift certificate	\$2,970.00		
Donation	\$5,170.00		
<b>INCENTIVES TOTAL</b>	<b>\$8,140.00</b>		
<b>Translation services<sup>d</sup></b>			
	\$2,621.00		
<b>Survey administration<sup>e</sup></b>			
	\$1,080.00		
<b>TOTAL</b>	<b>\$22,530.65</b>	<b>951</b>	<b>\$23.69</b>
<sup>a</sup> Expenses do not include staff time developing or programming the survey instrument; <sup>b</sup> Excluding responses flagged as invalid. This does not account for the 163 partial responses that provided data at least through questions about current or past use of PrEP; <sup>c</sup> One of the geosocial networking platforms placed ads at no cost, but contributed only 30 complete responses; <sup>d</sup> Costs of translating the survey instrument and advertisements into Spanish; <sup>e</sup> Includes the costs of staff time to set up contracts with advertising partners, manage advertisements, and monitor survey performance.			



## References

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