

## **Internet-based cohort study of HIV testing over one year among men who have sex with men living in England and exposed to a social marketing intervention promoting testing**

### **Methods in Full (Web only appendix)**

We conducted an online cohort study of MSM who were recruited via the internet and surveyed monthly over a one-year period commencing in January 2011. The study consists of an enrolment survey (month 0) and 13 monthly surveys (months 1-13). All survey tools relevant to this paper are supplied as web-only files. Data were collected through secure online surveys constructed in and hosted by Demographix© ([www.demographix.com](http://www.demographix.com)).

#### *Recruitment*

The enrolment survey was open for 8 weeks, from 20 December 2010 until 14 February 2011. No target sample size calculation was performed as this was an exploratory study using a method not previously used. Inclusion criteria were: male; living in England; aged 16 years or over; sexually attracted to men and/or has sex with men; able to supply an email address. Recruitment was open-access, opportunistic and used multiple channels. Men living in England who had completed, in English, the European MSM Internet Survey [9] during July-August 2010 and who had provided an email address to be contacted for future research were sent an invitation to enrol in the study. Two gay-dating websites, ManHunt and Gaydar, sent instant messages to their users living in England, informing them of the study, endorsing it, and inviting them to complete the enrolment survey. Banner advertising was carried by Gaydar in the last three weeks of recruitment. Advertisements were included in email bulletins by two non-governmental organisations, NAM and the Lesbian and Gay Foundation. Finally, everyone who submitted the enrolment survey was asked to invite, by email, three men they knew who might also wish to take part.

Potential participants were informed at enrolment of the aims of the survey and were asked to give consent to provide online data, including that relating to sexual activity and HIV testing. Each participant provided an email address which was linked to a unique alpha-numeric code that indicated the panel member. The code was also attached to the panel member's data. Emails were stored separately from the data. Names, addresses and post-codes were not requested. Before analysis email addresses were examined for uniqueness and where duplicate submissions were made the second submission was deleted.

Enrolment questions covered only socio-demographic data including age, ethnicity, sexual identity, local authority of residence, highest level of education, employment, income, household

composition and current relationship status). Local authority of residence was grouped into corresponding Strategic Health Authorities (SHA, coterminous with government office regions but with two SHAs - South Central and South East Coast – covering the large South East England office).

The enrolment phase was followed by 13 consecutive monthly online surveys from January 2011 to January 2012 inclusive. Participants were invited via email to complete the questionnaire on the first day of each month, with a reminder sent on the tenth day of each month to study participants who had not yet submitted their responses. The questionnaire asked for information relating to the previous full calendar month. Participants were given 14 days to complete the survey. Participants were invited to complete each questionnaire regardless of whether they had completed all previous ones. They were able to request their removal from the study upon which invitations ceased.

### *Exposures and Interventions*

In two of the surveys we collected data on prompted recognition of three HIV health promotion interventions that were delivered in England over the period of the study. One of these (“I Did It”) was delivered by Terrence Higgins Trust (THT) with the aim of increasing rates of HIV testing by making MSM aware of its ease and convenience and by exposing them to first-hand accounts of good testing experiences. The intervention comprised three static image/text media adverts, a 30 second radio advert and a website, which were in the public domain from December 2010 to April 2011 (with the radio advert played 32 times on Gaydar radio in February). Adverts were displayed in English print and online publications aimed at gay men and as posters on roadside bus shelters in nine English towns as well as on London Underground. The website (which has now been withdrawn) primarily acted as an online “forum” through which gay men could share their experiences of HIV testing. Because the website was aimed both at men who had already tested and those who might, its use was not included in this analysis of factors influencing the decision to take an HIV test.

Two other interventions, named “Clever Dick/Smart Arse” and “Count Me In” and respectively delivered by THT and GMFA, were used in our analysis to assess men’s propensity to be exposed to HIV health promotion interventions, which we hypothesised as a potential confounder when examining associations between reported exposure to the HIV testing intervention and testing behaviour.

“Clever Dick/Smart Arse” aimed to promote condom use and comprised three press advertisements which appeared in publications aimed at gay men from November 2011 to February 2012, and also featured on branded condom packs distributed free at venues popular with gay men in nine English cities during the same period. “Count Me In” used social media to encourage gay men to commit to a five-step action plan that included HIV testing and condom use (see [www.gmfa.org.uk/aboutgmfa/count-me-in](http://www.gmfa.org.uk/aboutgmfa/count-me-in)). This was a longer term intervention and we regarded potential for exposure to it as constant throughout the study period.

Prompted recognition of “I Did It” was assessed in month 7 (August 2011) and of “Clever Dick/Smart Arse” and “Count Me In” in month 13 (January 2012).

Data on the number of lifetime sexual partnerships and the most recent HIV test prior to joining the survey were collected at the month 1 survey. The question and response sets are supplied as web-only appendices.

#### *Outcome measures*

The key outcome was HIV testing during the course of the survey. Each month participants were asked if they had tested for HIV in the previous month and, if so, the result.

#### *Data management and analysis*

Following download from Demographix, data were cleaned using SPSS version 19 (IBM) and analysed using Stata 12 (Stata Corp). Since our focus was on testing, participants who were already diagnosed as HIV-positive on joining the study were excluded from the analyses, as were those who gave no HIV status or who reported inconsistent HIV test results.

Our analysis had five stages. First, we assessed cohort recruitment, retention and the numbers of participants retained at each time point.

Second, we described the socio-demographic characteristics of participants. Additionally, we described prior HIV testing and sexual behaviour and exposure to the interventions among the subgroups of participants who completed surveys in months 1, 7 and 13.

Third, we calculated numbers of HIV tests and rates of HIV testing among the population over the year of follow up. Each completed questionnaire represented a month of follow-up (ie. each calendar month was treated as a period of exposure in which an HIV test could have happened). Only those survey points in which the HIV testing question had been answered were included in

analysis. No data were imputed as no assumptions were made about panel members' HIV testing activity in the months they did not report. Where a questionnaire was not completed for a given month, that month was censored in the data and did not contribute to the total follow up time. Participants who joined the study as HIV-negative or untested but who were diagnosed as HIV-positive during the study period did not contribute follow-up time after reporting their diagnosis, with the month of the positive result contributing two weeks of follow-up time. Participants reporting HIV-negative results during the course of the survey continued to have all their follow-up time included. For untested participants, their last month reporting this and all prior follow-up time prior to that point was included in the analysis, including that from questionnaires which had not been completed. We calculated HIV testing rates, confidence intervals and unadjusted rate ratios using Poisson regression adjusted for individual-level random effects to account for multiple follow-up records per individual. Unadjusted rate ratios were first calculated within the strata of each exposure.

Fourth, we examined HIV testing rates and rate ratios across demographic characteristics to describe patterns of HIV testing in the sample.

Fifth, we assessed the strength of evidence that individuals' exposure to the "I Did It" intervention was associated with HIV testing after adjusting for potential confounding factors. We used random effects Poisson regression to adjust the rate ratio for exposure to the "I Did It" press advert. We adjusted for other exposures separately, and those exposures which seemed potential confounders were included in three multi-level models: the first included awareness of the "I Did It" advert and those socio-demographic exposures which were demonstrated to be associated with rates of testing; the second model added numbers of sexual partnerships and previous HIV testing; and the third model added awareness of the other HIV-related interventions.

To complement our analysis in relation to individual self-reported exposure to the interventions, we also divided the 13-month duration of the survey into three "exposure periods" coinciding with the presence of the health promotion interventions in the public domain. Period 1 (1<sup>st</sup> January 2011 – 30<sup>th</sup> April 2011) represented "I Did It" being active; period 2 (1<sup>st</sup> May 2011 – 30<sup>th</sup> September 2011) was a period in which neither "I Did It" nor "Clever Dick/Smart Arse" were active; and period 3 (1<sup>st</sup> October 2011 – 31<sup>st</sup> January 2012) was the main period of activity for "Clever Dick/Smart Arse". Potential exposure to "Count Me In" was regarded as constant throughout the survey period.

*Ethical approval*

The study was approved by the London School of Hygiene and Tropical Medicine Ethics Committee (Application number 5834).