Willingness to Participate in Future HIV Prevention Studies Among Gay and Bisexual Men in Scotland, UK: A Challenge for Intervention Trials

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Abstract This article examines willingness to participate in future HIV prevention research among gay and bisexual men in Scotland, UK. Anonymous, self-complete questionnaires and Orasure™ oral fluid samples were collected in commercial gay venues. 1,320 men were eligible for inclusion. 78.2% reported willingness to participate in future HIV prevention research; 64.6% for an HIV vaccine, 57.4% for a behaviour change study, and 53.0% for a rectal microbicide. In multivariate analysis, for HIV vaccine research, greater age, minority ethnicity, and not providing an oral fluid sample were associated with lower willingness; heterosexual orientation and not providing an oral fluid sample were for microbicides; higher education and greater HIV treatment optimism were for behaviour change. STI testing remained associated with being more willing to participate in microbicide research and frequent gay scene use remained associated with being more willing to participate in behaviour change research. Having an STI in the past 12 months remained significantly associated with being willing to participate in all three study types. There were no associations between sexual risk behaviour and willingness. Although most men expressed willingness to participate in future research, recruitment of high-risk men, who have the potential to benefit most, is likely to be more challenging.

Keywords Men who have sex with men · HIV prevention · Vaccines · Microbicides · Behaviour change · Trial participation

Introduction

A resurgence in diagnosed HIV has been noted among men who have sex with men (MSM) in North America, Western Europe and Australia [1], and MSM remain the group most at risk of acquiring HIV in the UK, with estimated prevalence of 5% [2]. New HIV prevention strategies are needed and current policy initiatives set prevention as key to efforts to combat the epidemic among MSM in the UK [2, 3].

A recent review of randomized controlled trials (RCTs) of interventions to reduce the sexual transmission of HIV infection found only five of 37 had positive effects (all biomedical—three male circumcision, one STI treatment and care and one vaccine trial), and only one, non-biomedical intervention, targeted MSM [4]. Evidence of the potential effectiveness of behavioural HIV prevention interventions for MSM is growing, but few have included biological endpoints to measure HIV or sexually transmitted infection (STI) acquisition [5]. Although male circumcision has been shown to reduce the risk of HIV acquisition among heterosexual men [6], there is not the same evidence for MSM [7]; a finding recently supported by our own data [8]. In addition, it appeared unlikely that a RCT of male circumcision would be viable in this population, with only 14% reporting that they would be willing to participate in a research study on circumcision and HIV prevention [8]. So far, the Preexposure Prophylaxis Initiative (iPrEx) Study is the only biomedical intervention with biological endpoints to have demonstrated efficacy in...
MSM [9]. The lack of effect in most RCTs is argued to be partly the result of design and implementation problems; an issue requiring consideration in future studies [4]. Indeed, assessing the acceptability and feasibility of future prevention efforts prior to initiating interventions is an important part of their development [10–13].

Since 1996, we have surveyed the HIV-related sexual behaviour of MSM in Scotland [14–22]. In 2008, we examined men’s current and potential future contact with HIV prevention efforts and this article describes the extent to which MSM were willing to participate in future HIV prevention research, the factors associated with this, and the implications for future interventions with this population.

Methods

The 2008 Medical Research Council (MRC) Gay Men’s Survey collected anonymous, self-complete questionnaires and (Orasure™) oral fluid specimens. Time and location sampling was used to recruit a representative sample of men from commercial gay venues (12 bars and 2 saunas) in Glasgow and Edinburgh, Scotland’s two largest cities. Bars were surveyed over a 2-week period in the early (7:00–9:00 p.m.) and late (9:00–11:00 p.m.) evening, and no bar was visited twice in the same evening. At the end of the 2-week period, each bar had been visited at both time points on each day of the week. Saunas were surveyed over two early evening periods (5:00–7:00 p.m.) and two weekend late afternoon periods (4:00–6:00 p.m.). Temporary fieldworkers were employed to distribute questionnaires and all men present or entering the venues were invited to participate. Of 2,138 men approached, 1,514 men participated in the survey (70.8% response rate [RR]); 1,508 completed questionnaires (70.5% RR) and 1,277 provided oral fluid samples (59.7% RR). 54 (3.6%) heterosexual men who reported no sexual contact with men in the previous 12 months were excluded from the sample.

The questionnaires included tried and tested measures of demographics, HIV testing history and sexual risk behaviour in the past 12 months used in our surveys since 1996 [14–22]. New questions were pilot tested with the target population, and amended as necessary, prior to initiating the survey. The question on willingness to take part in future research was “We are looking for new ways to prevent HIV. Should the following research studies take place, which would you be willing to take part in?” with participants asked to select ‘yes’, ‘no’ or ‘don’t know’ for behaviour change programme (e.g. support using condoms); using rectal microbicides (e.g. special lube to prevent HIV); HIV vaccine; and circumcision (surgical removal of foreskin). The four categories were chosen to reflect prevention methods either available (behaviour change and circumcision) or under continuing development (vaccines and microbicides) [4]. Willingness to participate in circumcision research was particularly low (13.9%), as has been reported elsewhere [8], and is excluded from the analyses in this article.

Oral fluid specimens were analysed at the West of Scotland Specialist Virology Centre (screened for anti-HIV using an enzyme immunoassay; positives re-screened, and repeat reactives confirmed using Western Blot). Data were analysed with SPSS 15.0. Logistic regression was used to estimate odds ratios and 95% confidence intervals (CI). Ethical approval was granted by University of Glasgow, Faculty of Medicine Ethics Committee.

Men with missing data on any of the willingness to participate variables are excluded from these analyses (N = 134). In multivariate analysis, when compared to the 1,320 men included in the analyses, men who did not answer the willingness questions were significantly more likely to have been surveyed in saunas (12.7% of men who did not answer the questions vs. 5.5% of men who did, adjusted odds ratio [AOR] = 2.33, 95% CI 1.24–4.39, \( P = 0.009 \)), more likely to be aged 26 years or over (81.4% vs. 70.5%, AOR = 1.79, 95% CI 1.09–2.95, \( P = 0.023 \)), less likely to have further (29.0% vs. 38.6%, AOR = 0.43, 95% CI 0.24–0.76, \( P = 0.004 \)) or higher (40.9% vs. 46.0% AOR = 0.46, 95% CI 0.26–0.78, \( P = 0.005 \)) education, more likely to believe that ‘new drug therapies make people with HIV less infectious’ (33.3% vs. 16.0%, AOR = 1.76, 95% CI 1.02–3.05, \( P = 0.042 \)), and were more likely to have not provided an oral fluid sample (29.1% vs. 14.4%, AOR = 2.13, 95% CI 1.36–3.34, \( P = 0.001 \)). There were no other significant differences in sexual health service use, perceived HIV status, or sexual risk behaviour.

Results

Sample Characteristics

Sample characteristics are shown in Table 1. The majority of the sample were surveyed in bars and identified as gay. The median age of participants was 33 years (range 16–73 years); 76.6% lived in the Glasgow or Edinburgh areas. Only 3.1% reported being from a minority ethnic group. Approximately half reported degree or post-graduate education; 47.9% visited the gay scene at least once a week. Just under half had been tested for HIV or other STIs in the past 12 months; 3.6% had an HIV-positive oral fluid sample (4.2% of those who provided samples). Most men (96.2%) reported some sexual contact in the past 12 months; 26.9% reported 10 or more partners; 12.4% reported UAI with 2 or more partners; 25.2% reported UAI...
A majority (1,032; 78.2%) of men reported willingness to participate in future HIV prevention research studies, with most being willing to participate in research for an HIV vaccine (64.6%); 20.4% were not willing and 15.0% did not know. Rectal microbicide studies were less popular, with 53.0% reporting willingness to take part in these; 28.9% were not willing and 18.2% did not know. Overall, 935 men (70.8%) reported that they were willing to take part in biomedical (either vaccine or microbicide) research studies.

Table 1 Sample characteristics (N = 1,320)

| Demographics | n   | %   |
|--------------|-----|-----|
| Survey location |     |     |
| Edinburgh    | 545 | 41.3|
| Glasgow      | 775 | 58.7|
| Survey venue |     |     |
| Bar          | 1,247 | 94.5|
| Sauna        | 73  | 5.5 |
| Sexual orientation |     |     |
| Gay          | 1,187 | 90.5|
| Bisexual     | 108  | 8.2 |
| Straight     | 16   | 1.2 |
| Age          |     |     |
| 16–25 years  | 385  | 29.5|
| 26–35 years  | 381  | 29.2|
| 36–45 years  | 379  | 29.0|
| 46+ years    | 160  | 12.3|
| Area of residence |     |     |
| Glasgow      | 549  | 42.7|
| Edinburgh    | 436  | 33.9|
| Rest of Scotland | 208  | 16.2|
| Rest of UK   | 66   | 5.1 |
| Overseas     | 28   | 2.2 |
| Ethnicity    |     |     |
| White (UK, Irish or other) | 1,276 | 96.9|
| Minority ethnic groupa | 41  | 3.1 |
| Qualifications |     |     |
| Secondary (statutory school level) | 190  | 15.4|
| Further/vocational | 475  | 38.6|
| Degree/post-graduate | 567  | 46.0|
| Frequency of gay scene use |     |     |
| Once month or less | 323  | 24.9|
| 2/3 times a month | 354  | 27.3|
| 1/2 times a week | 444  | 34.2|
| 4/5 times a week | 178  | 13.7|
| HIV treatment optimism 1 |     |     |
| Disagree     | 944  | 74.6|
| Agree        | 321  | 25.4|
| HIV treatment optimism 2 |     |     |
| Disagree     | 1,063 | 84.0|
| Agree        | 202  | 16.0|
| Sexual health |     |     |
| HIV test in the past 12 months |     |     |
| No           | 675  | 52.4|
| Yes          | 614  | 47.6|
| Other STI test in the past 12 months |     |     |
| No           | 713  | 54.5|
| Yes          | 595  | 45.5|

Table 1 continued

| HIV status (oral fluid specimen result) | n   | %   |
| HIV-negative       | 1,080 | 82.1|
| HIV-positive       | 47    | 3.6 |
| Did not provide oral fluid specimenb | 189  | 14.4|

Sexual risk behaviour in the past 12 months

| Number of sexual partners | n   | %   |
| Less than 10             | 932  | 73.1|
| 10 or more               | 343  | 26.9|

| Number of anal sex partners | n   | %   |
| Less than 10               | 1,126 | 89.2|
| 10 or more                 | 136  | 10.8|

| Number of unprotected intercourse (UAI) partners | n   | %   |
| 0/1 partner         | 1,126 | 87.6|
| 2 or more partners  | 160   | 12.4|

| UAI with casual partners | n   | %   |
| No                      | 1,013 | 78.8|
| Yes                     | 273   | 21.2|

| UAI with partners of unknown/discordant HIV status | n   | %   |
| No              | 962   | 74.8|
| Yes             | 324   | 25.2|

| STI | n   | %   |
| No  | 1,198 | 91.4|
| Yes | 113   | 8.6 |

*HIV treatment optimism 1 ‘I am less worried about HIV infection now that treatments have improved’, HIV treatment optimism 2 ‘I believe that new drug therapies make people with HIV less infectious’

a Black African, Black Caribbean, Indian, Pakistani, Chinese, Arab, Latin American & Other/Mixed

b An additional 4 samples were not returned from the laboratory

with partners of unknown/discordant HIV status; and 8.6% had had an STI in the past 12 months.

Willingness to Participate in Future HIV Prevention Research Studies

A majority (1,032; 78.2%) of men reported willingness to participate in future HIV prevention research studies, with most being willing to participate in research for an HIV vaccine (64.6%); 20.4% were not willing and 15.0% did not know (Table 2). Again, most men (758; 57.4%) reported being willing to participate in a behaviour change study; 26.6% were not and 16.0% did not know. Rectal microbicide studies were less popular, with 53.0% reporting willingness to take part in these; 28.9% were not willing and 18.2% did not know. Overall, 935 men (70.8%) reported that they were willing to take part in biomedical (either vaccine or microbicide) research studies.
Factors Associated with Willingness to Participate in Future HIV Prevention Research Studies

Table 3 shows the factors associated with willingness to participate in future HIV prevention studies (‘no’ and ‘don’t know’ responses were combined in these analyses as the comparison group). The odds of willingness to participate in each of the future HIV prevention research studies were higher among men who had had an HIV or other STI test, and men who reported having had an STI, in the past 12 months. Willingness to take part in HIV vaccine or microbicide research was lower among older men and men who did not provide oral fluid samples. Willingness was lower for men who resided out with the UK and in men from minority ethnic groups for vaccine research, and among straight men for microbicide research. The likelihood of being willing to take part in a behavioural research study was lower among men with degree or post-graduate education and among men who agreed with the HIV treatment optimism statement ‘I am less worried about HIV infection now that treatments have improved’. It was higher among men who visited the gay scene once or twice a week and men reporting 10 or more anal sex partners in the past 12 months. Among HIV-positive men, 72.3% reported being willing to take part in a behavioural research study, compared with 57.9% of HIV-negative men. There were no differences in the proportions of HIV-positive and HIV-negative men reporting willingness to participate in biomedical research, nor between diagnosed and undiagnosed HIV-positive men in willingness to participate in any of the research studies.

Factors significant at the bivariate level were entered into a multivariate model for each of the HIV prevention research studies (Table 4). Having an STI in the past 12 months remained significantly associated with being willing to participate in all three study types. For HIV vaccine research, greater age, minority ethnicity, and not providing an oral fluid sample were associated with lower willingness, while heterosexual orientation and not providing an oral fluid sample were for microbicide research. Higher education level and greater HIV treatment optimism were associated with not being willing to take part in behaviour change research. STI testing remained associated with being more willing to participate in microbicide research and frequency of gay scene use remained associated with being more willing to participate in behaviour change research.

Discussion

This is the first study to assess future willingness to participate in prevention research studies among community-based surveys of gay and bisexual men in Scotland. First, there are some limitations to note when considering these results. This was a bar and sauna sample so only men who visit the venues surveyed have the opportunity to participate, and our findings should be interpreted within this context. Willingness to participate in prevention research could be different among men who did not answer these questions and in the wider population of gay men who do not frequent the commercial gay scene. Participants were only asked if they would be willing to participate in future research studies, not why this may or may not be the case. As the question was hypothetical, we cannot assume that willingness would equal actual participation. No description of what could be involved in taking part in such research was provided. However, the results provide interesting insight into men’s willingness to participate in such studies and this is important for planning future interventions and HIV prevention efforts.

Just over three quarters of the men surveyed reported that they were willing to participate in future HIV prevention research studies, with greater willingness to participate in biomedical than behavioural studies. It is particularly interesting to note that willingness to participate in these studies was considerably higher than the level of willingness to participate in male circumcision research in this population [8]. The former have to date, for the most part, not shown a positive effect on reducing HIV transmission [4], while the latter is the biomedical intervention with, arguably, the greatest effect on (albeit hetero) sexual transmission [4]. This raises the query of whether men are aware of male circumcision as HIV prevention, and its limited potential as an intervention for MSM [7], or whether there is some other reason that such an intervention is unattractive to them. It is also interesting to note that willingness to participate in biomedical research was lower among men who did not provide oral fluid samples to be tested for HIV. When men who did and did not provide oral specimens were compared only age was significantly different, with men aged 26 + years less likely to provide samples [8]. It is possible that men who did not provide
## Table 3: Factors associated with willingness to take part in future HIV prevention research studies (N = 1,320)

| Sample characteristics | Willing to take part in HIV vaccine study | Willing to take part in rectal microbicide study | Willing to take part in HIV prevention behaviour change study |
|------------------------|------------------------------------------|-----------------------------------------------|----------------------------------------------------------|
|                        | N  | %     | OR (95% CI)  | P value | n  | %     | OR (95% CI)  | P value | n  | %     | OR (95% CI)  | P value |
| **Survey location**    |    |       |              |         |    |       |              |         |    |       |              |         |
| Edinburgh              | 343 | 62.9  | 1            | 0.283   | 285 | 52.3  | 1            | 0.687   | 305 | 56.0  | 1            | 0.368   |
| Glasgow                | 510 | 65.8  | 1.13 (0.90–1.42) |         | 414 | 53.4  | 1.05 (0.84–1.30) |         | 453 | 58.5  | 1.11 (0.89–1.38) |         |
| **Survey venue**       |    |       |              |         |    |       |              |         |    |       |              |         |
| Bar                    | 812 | 65.1  | 1            | 0.122   | 660 | 52.9  | 1            | 0.934   | 718 | 57.6  | 1            | 0.640   |
| Sauna                  | 41  | 56.2  | 0.69 (0.43–1.11) |         | 39  | 53.4  | 1.02 (0.64–1.64) |         | 40  | 54.8  | 0.89 (0.56–1.44) |         |
| **Sexual orientation** |    |       |              |         |    |       |              |         |    |       |              |         |
| Gay                    | 781 | 65.8  | 1            | 0.58    | 640 | 53.9  | 1            | 0.53    | 689 | 58.0  | 1            | 0.417   |
| Bisexual               | 61  | 56.5  | 0.68 (0.45–1.01) | 0.053   | 52  | 48.1  | 0.79 (0.54–1.18) | 0.251   | 54  | 50.0  | 0.72 (0.49–1.07) | 0.107   |
| Straight               | 7   | 43.8  | 0.66 (0.21–1.09) | 0.041   | 3   | 18.8  | 0.20 (0.06–0.70) | 0.012   | 8   | 50.0  | 0.72 (0.27–1.94) | 0.519   |
| **Age**                |    |       |              |         |    |       |              |         |    |       |              |         |
| 16–25 years            | 276 | 71.7  | 1            | 0.001   | 469 | 51.0  | 0.73 (0.58–0.93) | 0.011   | 520 | 56.5  | 0.88 (0.69–1.12) | 0.284   |
| 26+ years              | 570 | 62.0  | 0.64 (0.50–0.83) |         | 301 | 54.8  | 1            | 0.64    | 330 | 60.1  | 1            | 0.421   |
| **Area of residence**  |    |       |              |         |    |       |              |         |    |       |              |         |
| Glasgow                | 361 | 65.8  | 1            | 0.616   | 231 | 53.0  | 0.93 (0.72–1.20) | 0.564   | 251 | 57.6  | 0.90 (0.70–1.16) | 0.421   |
| Edinburgh              | 280 | 64.2  | 0.94 (0.72–1.22) | 0.023   | 103 | 49.5  | 0.81 (0.59–1.11) | 0.192   | 118 | 56.7  | 0.87 (0.63–1.20) | 0.399   |
| Rest of Scotland       | 136 | 65.4  | 0.98 (0.70–1.38) | 0.923   | 36  | 54.5  | 0.99 (0.59–1.65) | 0.965   | 32  | 48.5  | 0.63 (0.37–1.04) | 0.072   |
| Rest of UK             | 42  | 63.6  | 0.91 (0.54–1.55) | 0.732   | 36  | 54.5  | 0.99 (0.59–1.65) | 0.965   | 32  | 48.5  | 0.63 (0.37–1.04) | 0.072   |
| Overseas               | 13  | 46.4  | 0.45 (0.21–0.97) | 0.041   | 12  | 42.9  | 0.62 (0.29–1.33) | 0.219   | 14  | 50.0  | 0.66 (0.31–1.42) | 0.290   |
| **Ethnicity**          |    |       |              |         |    |       |              |         |    |       |              |         |
| White (UK, Irish or other) | 834 | 65.4  | 1            | 0.006   | 469 | 51.0  | 0.76 (0.41–1.42) | 0.387   | 31  | 51.2  | 0.77 (0.42–1.44) | 0.417   |
| Minority ethnic groupa | 18  | 43.9  | 0.42 (0.22–0.78) | 0.008   | 19  | 46.3  | 0.76 (0.41–1.42) | 0.387   | 21  | 51.2  | 0.77 (0.42–1.44) | 0.417   |
| **Qualifications**     |    |       |              |         |    |       |              |         |    |       |              |         |
| Secondary (statutory school level) | 133 | 70.0  | 1            | 0.054   | 264 | 55.6  | 1.01 (0.72–1.42) | 0.941   | 271 | 57.1  | 0.74 (0.52–1.05) | 0.090   |
| Further/vocational     | 313 | 65.9  | 0.83 (0.58–1.19) | 0.309   | 290 | 51.1  | 0.85 (0.61–1.18) | 0.326   | 310 | 54.7  | 0.67 (0.48–0.94) | 0.022   |
| Degree/post-graduate   | 355 | 62.6  | 0.72 (0.50–1.02) | 0.066   | 290 | 51.1  | 0.85 (0.61–1.18) | 0.326   | 310 | 54.7  | 0.67 (0.48–0.94) | 0.022   |
| **Frequency of gay scene use** | |     |              |         |    |       |              |         |    |       |              |         |
| Once month or less     | 199 | 61.6  | 1            | 0.054   | 161 | 49.8  | 1            | 0.054   | 175 | 54.2  | 1            | 0.054   |
| 2/3 times a month      | 225 | 63.6  | 1.09 (0.80–1.48) | 0.006   | 183 | 51.7  | 1.08 (0.80–1.46) | 0.631   | 185 | 52.3  | 0.93 (0.68–1.25) | 0.617   |
| 1/2 times a week       | 295 | 66.4  | 1.23 (0.92–1.66) | 0.008   | 246 | 55.4  | 1.25 (0.94–1.67) | 0.128   | 282 | 63.5  | 1.47 (1.10–1.97) | 0.009   |
| 4/5 times a week       | 123 | 69.1  | 1.39 (0.94–2.06) | 0.095   | 100 | 56.2  | 1.29 (0.89–1.86) | 0.175   | 107 | 60.1  | 1.28 (0.88–1.85) | 0.200   |
Table 3 continued

| HIV treatment optimism 1 | Willing to take part in HIV vaccine study | Willing to take part in rectal microbicide study | Willing to take part in HIV prevention behaviour change study |
|--------------------------|-------------------------------------------|--------------------------------------------------|--------------------------------------------------|
|                         | N  | %  | OR (95% CI) | P value | n  | %  | OR (95% CI) | P value | n  | %  | OR (95% CI) | P value |
| Disagree                | 616 | 65.3 | 1          |         | 515 | 54.6 | 1          |         | 561 | 59.4 | 1          |         |
| Agree                   | 203 | 63.2 | 0.92 (0.70–1.19) | 0.514 | 163 | 50.8 | 0.86 (0.67–1.11) | 0.241 | 168 | 52.3 | 0.75 (0.58–0.97) | 0.027 |
|                           | HIV treatment optimism 2                |                                                   |                                                   |
| Disagree                | 688 | 64.7 | 1          |         | 563 | 53.0 | 1          |         | 613 | 57.7 | 1          |         |
| Agree                   | 131 | 64.9 | 1.01 (0.73–1.38) | 0.972 | 115 | 56.9 | 1.17 (0.87–1.59) | 0.300 | 116 | 57.4 | 0.99 (0.73–1.34) | 0.949 |
|                           | Sexual health                           |                                                   |                                                   |
| HIV test in the past 12 months | No   | 412 | 61.0 | 1          |         | 328 | 48.6 | 1          |         | 355 | 52.6 | 1          |         |
|                           | Yes                                       | 417 | 67.9 | 1.35 (1.07–1.70) | 0.010 | 355 | 57.8 | 1.45 (1.16–1.81) | 0.001 | 381 | 62.1 | 1.47 (1.18–1.84) | 0.001 |
| Other STI test in the past 12 months | No   | 431 | 60.4 | 1          |         | 337 | 47.3 | 1          |         | 384 | 53.9 | 1          |         |
|                           | Yes                                       | 416 | 69.9 | 1.52 (1.21–1.92) | <0.001 | 357 | 60.0 | 1.67 (1.34–2.09) | <0.001 | 367 | 61.7 | 1.38 (1.11–1.72) | 0.004 |
| HIV status (oral fluid specimen result) | HIV-negative | 718 | 66.5 | 1          |         | 586 | 54.3 | 1          |         | 625 | 57.9 | 1          |         |
|                           | HIV-positive | 32  | 68.1 | 1.08 (0.58–2.01) | 0.820 | 28  | 59.6 | 1.24 (0.69–2.25) | 0.475 | 34  | 72.3 | 1.90 (0.99–3.65) | 0.052 |
| Did not provide oral fluid specimen | 100 | 52.9 | 0.57 (0.42–0.77) | <0.001 | 82  | 43.4 | 0.65 (0.47–0.88) | 0.006 | 97  | 51.3 | 0.77 (0.56–1.05) | 0.094 |
| Sexual risk behaviours in past 12 months | Number of sexual partners | Less than 10 | 598 | 64.2 | 1          |         | 483 | 51.8 | 1          |         | 529 | 56.8 | 1          |         |
|                           | 10 or more | 226 | 65.9 | 1.08 (0.83–1.40) | 0.568 | 190 | 55.4 | 1.15 (0.90–1.48) | 0.258 | 197 | 57.4 | 1.03 (0.80–1.32) | 0.829 |
| Number of anal intercourse partners | Less than 10 | 714 | 63.4 | 1          |         | 587 | 52.1 | 1          |         | 630 | 56.0 | 1          |         |
|                           | 10 or more | 97  | 71.3 | 1.44 (0.97–2.12) | 0.070 | 82  | 60.3 | 1.39 (0.97–2.00) | 0.073 | 90  | 66.2 | 1.54 (1.06–2.24) | 0.024 |
| Number of unprotected anal intercourse (UAI) partners | 0/1 partner | 717 | 63.7 | 1          |         | 585 | 52.0 | 1          |         | 646 | 57.4 | 1          |         |
|                           | 2 or more partners | 113 | 70.6 | 1.37 (0.96–1.97) | 0.087 | 96  | 60.0 | 1.39 (0.99–1.94) | 0.057 | 89  | 55.6 | 0.93 (0.67–1.30) | 0.676 |
| UAI with casual partners | No   | 649 | 64.1 | 1          |         | 523 | 51.6 | 1          |         | 584 | 57.7 | 1          |         |
|                           | Yes                                         | 181 | 66.3 | 1.10 (0.83–1.46) | 0.494 | 158 | 57.9 | 1.29 (0.98–1.69) | 0.067 | 151 | 55.3 | 0.91 (0.70–1.19) | 0.488 |
| UAI with partners of unknown/discordant HIV status | No   | 611 | 63.5 | 1          |         | 503 | 52.3 | 1          |         | 559 | 58.1 | 1          |         |
|                           | Yes                                         | 219 | 67.6 | 1.20 (0.92–1.57) | 0.185 | 178 | 54.9 | 1.11 (0.86–1.43) | 0.408 | 176 | 54.3 | 0.86 (0.67–1.11) | 0.234 |
samples have concerns about participating in any kind of biomedical research.

A review of (mainly North American) HIV vaccine preparedness studies found willingness to participate in vaccine trials ranged from 23% to 94% among MSM [23]. Here, almost two-thirds of men expressed willingness to participate in HIV vaccine research studies. This is considerably higher than the proportion reported in the only other UK study of this topic among MSM; 23% reported likelihood of participating in an HIV vaccine trial in a London gym-based survey of MSM [24]. It is possible that men see these as having the greatest potential benefits to themselves and their community, and both personal and altruistic reasons have been identified as motives for participating in previous trials [25]. However, a US study of MSM’s knowledge and acceptability of biomedical interventions found vaccines were the most commonly known intervention types [26], so it could be that men are simply more likely to have heard of these. Half of the men surveyed said that they were willing to participate in a rectal microbicide research study. This compares to a previous American study, in which around two-thirds of gay men reported they would be willing to participate in microbicide trials [27].

Although one vaccine trial has reported (limited) positive results [28], it is unlikely that a vaccine will become available in the immediate future, with considerable further research required [28, 29]. So far, all of the microbicide candidates are for vaginal rather than rectal use [4], and few acceptability research studies have been conducted among MSM [30]. If HIV vaccine and rectal microbicide trials were to be initiated with MSM in the UK, further research would be required to assess the factors that could facilitate or prevent participation in this population. Education and community mobilisation could increase willingness to participate in such studies [31], and consideration should be given to describing trial protocols to potential participants as part of assessing willingness to join research projects.

There is continuing interest in the potential for behavioural interventions among MSM in Scotland [3], and over half of the men surveyed indicated willingness to participate in this type of research. However, men who were treatment optimistic, and less worried about HIV now treatments had improved, were less likely to be willing to do so. Although only a minority of MSM are optimistic (see Table 1 and as noted elsewhere [32, 33]), associations between treatment optimism and sexual risk behaviour have been recognised [32–34]. Increases in sexual risk behaviour cannot be fully accounted for by increasing treatment optimism [35–37], but this issue nevertheless remains a challenge and something to consider during recruitment for a behaviour change research study.

Table 3 continued

| STI | Willing to take part in HIV vaccine study | Willing to take part in rectal microbicide study | Willing to take part in HIV prevention behaviour change study |
|-----|------------------------------------------|-----------------------------------------------|----------------------------------------------------------|
|     | N  | %  | OR (95% CI) | P value | n  | %  | OR (95% CI) | P value | n  | %  | OR (95% CI) | P value |
| STI |   |    |             |        |    |    |             |        |    |    |             |        |
| No  | 758 | 63.3 | 1 |        | 615 | 51.3 | 1 |        | 668 | 55.8 | 2.15 (1.35–3.43) | 0.001 |
| Yes | 89  | 78.8 | 2.15 (1.35–3.43) | 0.001  | 79  | 69.9 | 2.20 (1.45–3.35) | <0.001 | 85  | 75.2 | 2.41 (1.55–3.75) | <0.001 |

OR odds ratio, 95% CI 95% confidence interval. HIV treatment optimism 1 ‘I am less worried about HIV infection now that treatments have improved’. HIV treatment optimism 2 ‘I believe that new drug therapies make people with HIV less infectious’.

- Black African, Black Caribbean, Indian, Pakistani, Chinese, Arab, Latin American & Other/Mixed

- Black African, Black Caribbean, Indian, Pakistani, Chinese, Arab, Latin American & Other/Mixed
### Table 4  Factors associated with willingness to take part in future HIV prevention research studies: multivariate logistic regression (N = 1,320)

|                        | Willing to take part in HIV vaccine study | Willing to take part in rectal microbicide study | Willing to take part in HIV prevention behaviour change study |
|------------------------|------------------------------------------|-------------------------------------------------|---------------------------------------------------------------|
|                        | AOR  95% CI | P value | AOR  95% CI | P value | AOR  95% CI | P value |
| Sexual orientation     |                                             |                                                  |                                                              |
| Gay                    | 1                                           |                                                  |                                                              |
| Bisexual               | 0.82 0.55–1.23 | 0.334                                            |                                                              |
| Straight               | 0.22 0.06–0.79 | 0.020                                            |                                                              |
| Age                    |                                             |                                                  |                                                              |
| 16–25 years            | 1                                           |                                                  |                                                              |
| 26+ years              | 0.69 0.53–0.90 | 0.007                                            | 0.78 0.61–1.00 | 0.052 |
| Area of residence      |                                             |                                                  |                                                              |
| Glasgow                | 1                                           |                                                  |                                                              |
| Edinburgh              | 0.95 0.72–1.24 | 0.680                                            |                                                              |
| Rest of Scotland       | 0.95 0.67–1.34 | 0.759                                            |                                                              |
| Rest of UK             | 1.03 0.59–1.78 | 0.925                                            |                                                              |
| Overseas               | 0.55 0.25–1.20 | 0.132                                            |                                                              |
| Ethnicity              |                                             |                                                  |                                                              |
| White (UK, Irish or other) | 1                     |                                                  |                                                              |
| Minority ethnic group<sup>a</sup> | 0.39 0.20–0.74 | 0.004                                            |                                                              |
| Qualifications         |                                             |                                                  |                                                              |
| Secondary (statutory school level) | 1                     |                                                  |                                                              |
| Further/vocational     | 0.73 0.51–1.04 | 0.080                                            |                                                              |
| Degree/post-graduate   | 0.64 0.45–0.91 | 0.013                                            |                                                              |
| Frequency of gay scene use |                                             |                                                  |                                                              |
| Once month or less     | 1                                           |                                                  |                                                              |
| 2/3 times a month      | 0.95 0.70–1.29 | 0.737                                            |                                                              |
| 1/2 times a week       | 1.45 1.07–1.95 | 0.016                                            |                                                              |
| 4/5 times a week       | 1.13 0.77–1.66 | 0.536                                            |                                                              |
| HIV treatment optimism 1 |                                             |                                                  |                                                              |
| Disagree               | 1                                           |                                                  |                                                              |
| Agree                  | 0.75 0.57–0.97 | 0.030                                            |                                                              |
| HIV test in the past 12 months |                                             |                                                  |                                                              |
| No                     | 1                                           |                                                  | 1                                                            |
| Yes                    | 1.09 0.78–1.52 | 0.609                                            | 1.02 0.74–1.39 | 0.915 | 1.30 0.95–1.80 | 0.105 |
| Other STI test in the past 12 months |                                             |                                                  |                                                              |
| No                     | 1                                           |                                                  |                                                              |
| Yes                    | 1.29 0.92–1.80 | 0.138                                            | 1.46 1.06–2.01 | 0.020 | 0.98 0.71–1.36 | 0.911 |
| HIV status (oral fluid specimen result) |                                             |                                                  |                                                              |
| HIV-negative           | 1                                           |                                                  | 1                                                            |
| HIV-positive           | 1.04 0.54–2.00 | 0.912                                            | 1.09 0.59–2.02 | 0.775 |
| Did not provide oral fluid specimen | 0.62 0.45–0.86 | 0.004                                            | 0.70 0.51–0.96 | 0.029 |
| Number of anal intercourse partners in past 12 months |                                             |                                                  |                                                              |
| Less than 10           | 1                                           |                                                  |                                                              |
| 10 or more             | 1.27 0.85–1.88 | 0.239                                            |                                                              |
| STI in past 12 months  |                                             |                                                  |                                                              |
| No                     | 1                                           |                                                  | 1                                                            |
| Yes                    | 1.85 1.14–3.03 | 0.014                                            | 1.82 1.18–2.82 | 0.007 | 2.22 1.39–3.53 | 0.001 |

<sup>a</sup> Black African, Black Caribbean, Indian, Pakistani, Chinese, Arab, Latin American & Other/Mixed

OR odds ratio, 95% CI 95% confidence interval, HIV treatment optimism 1 'I am less worried about HIV infection now that treatments have improved'
Future willingness to participate in vaccine, microbicide or behaviour change research studies was greater among service users, particularly among men who reported having had an STI in the past 12 months. This suggests existing services may be appropriate venues within which to recruit men for future research. Intervention delivery in these settings has previously been identified as a characteristic of successful interventions among people living with HIV [38], though a wider range of recruitment settings may be necessary to recruit sufficient numbers, and relevant risk groups, of MSM [39]. Willingness to participate in behaviour change was also higher among HIV-positive men, a group for whom, to date, behavioural interventions have proven largely ineffective [38].

Previous research found men at higher risk of HIV were more likely to be willing to take part in HIV vaccine trials [23]. Here, the lack of association between sexual risk behaviours (other than having had an STI in the past 12 months) and such willingness suggests it may be difficult to recruit adequate numbers of men at higher risk of HIV (particularly beyond the clinical setting); a finding that has implications for the design (and cost) of such future research. Sherr et al. estimated that a minimum of 15,000 HIV-negative men would need to be approached to recruit 1,000 high-risk HIV-negative men into a vaccine trial (based on a willingness to participate rate of 6.9%) [24]. Our study identified 189 men (12.5% of the total survey sample) who tested HIV-negative, reported UAI with partners of unknown or discordant HIV status in the past 12 months and were willing to participate in an HIV vaccine research study. With a 70.5% survey RR, over 10,000 men would have to be approached to achieve a sample size of 8,000 men in order to recruit 1,000 such high-risk HIV-negative men into a trial.

To be adequately powered to show effect on HIV incidence, trials require large sample sizes. A definitive phase III trial with 95% power to detect an effect with a 60% effective vaccine would require approximately 6,000 participants from a population with annual 2% HIV incidence [40]. Based on the figures noted above, 60,000 men would have to be approached to achieve this sample size, requiring large multi-centre (and even multi-country) studies.

Combination prevention, which incorporates biomedical and behavioural, as well as social and structural, interventions has been argued as the way forward for HIV prevention [41]. The detailed assessment of the acceptability and feasibility of such interventions is vital [10–13], particularly to avoid the flaws that can lead to ‘flat’ results [4]. Our findings suggest recruitment of high-risk men, who have the potential to benefit most from such interventions, is likely to be challenging, time consuming, and hence costly. The best means of facilitating this should be examined through feasibility studies, prior to initiating intervention trials.

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References

1. Sullivan PS, Hamouda O, Delpech V, Geduld JE, Prejean J, Semaine C, et al. Re-emergence of the HIV epidemic among men who have sex with men in North America, Western Europe, and Australia, 1996–2005. Ann Epidemiol. 2009;19(6):423–31.
2. Health Protection Agency. HIV in the United Kingdom: 2009 Report. London: Health Protection Agency; 2009.
3. Scottish Government. HIV action plan in Scotland December 2009–March 2014. Edinburgh: Scottish Government. http://www.scotland.gov.uk/Publications/2009/11/241054260/ (2009). Accessed 22 Mar 2010.
4. Padian NS, McCoy SI, Balkus JE, Wasserheit JN. Weighing the gold in the gold standard: challenges in HIV prevention research. AIDS. 2010;24:621–35.
5. Johnson WD, Diaz RM, Flanders WD, Goodman M, Hill AN, Holgrave D, et al. Behavioural interventions to reduce risk for sexual transmission of HIV among men who have sex with men. Cochrane Database Syst Rev. 2008;(3):Art. No. CD001230.
6. Weiss HA, Halperin D, Bailey RC, Hayes RJ, Schmid G, Hankins CA. Male circumcision for HIV prevention: from evidence to action? AIDS. 2008;22:567–74.
7. Templeton DJ, Millett GA, Grulich AE. Male circumcision to reduce the risk of HIV and sexually transmitted infections among men who have sex with men. Curr Opin Infect Dis. 2010;23:45–52.
8. McDaid LM, Weiss HA, Hart GJ. Circumcision among men who have sex with men in Scotland: limited potential for HIV prevention. Sex Transm Infect. 2010;86:404–6.
9. Grant RM, Lama JR, Anderson PL, McMahan V, Liu AY, Vargas L, et al. Preexposure chemoprophylaxis for HIV prevention in men who have sex with men. New Eng J Med. 2010;363(27):2587–99.
10. Imrie J, Elford J, Kippax S, Hart GJ. Biomedical HIV prevention—and social science. Lancet. 2007;370:10–1.
11. Campbell NC, Murray E, Darbyshire J, Emery J, Farmer A, Griffiths F, et al. Designing and evaluating complex interventions to improve health care. BMJ. 2007;334:455–9.
12. Craig P, Dieppe P, Macintyre S, Mitchie S, Nazareth I, Petticrew M. Developing and evaluating complex interventions: the new Medical Research Council guidance. BMJ. 2008;337:a1655.
13. Prestage GP, Gray R, Down I, Hoare A, McCann PD, Wilson D. The development of Australia’s national syphilis action plan is base in interdisciplinary research findings. Int J Interdiscip Soc Sci. 2011;5(11):239–62.
14. Hart G, Flowers P, Der G, Frankis J. Homosexual men’s HIV-related sexual risk behaviour in Scotland. Sex Transm Infect. 1999;75:242–6.
15. Williamson L, Hart G, Flowers P, Frankis J, Der G. The gay men’s task force: the impact of peer education on the sexual health behaviour of gay men in Glasgow. Sex Transm Infect. 2001;77:427–32.
16. Flowers P, Hart GI, Williamson LM, Frankis JS, Der GJ. Does bar-based, peer-led sexual health promotion have a community-level effect amongst gay men in Scotland? Int J STD AIDS. 2002;13(2):102–8.

17. Hart GI, Williamson LM, Flowers P, Frankis JS, Der GJ. Gay men’s HIV testing behaviour in Scotland. AIDS Care. 2002;14(5):665–74.

18. Hart GI, Williamson LM. Increase in HIV sexual risk behaviour in gay men in Scotland, 1996–2002: prevention failure? Sex Transm Infect. 2005;81:367–72.

19. Williamson LM, Dodds JP, Mercey DE, Johnson AM, Hart GJ. Increases in HIV-related sexual risk behaviour among community samples of gay men in London and Glasgow: how do they compare? J Acquir Immune Defic Syndr. 2006;42:238–41.

20. Williamson LM, Hart GJ. HIV prevalence and undiagnosed infection among a community sample of gay men in Scotland. J Acquir Immune Defic Syndr. 2007;45:224–30.

21. Williamson LM, Dodds J, Mercey DE, Hart GJ, Johnson AM. Sexual risk behaviour and knowledge of HIV status among community samples of gay men in the UK. AIDS. 2008;22:1063–70.

22. Williamson LM, Flowers P, Knussen C, Hart GJ. HIV testing trends among gay men in Scotland, UK (1996–2005): implications for HIV testing policies and prevention. Sex Transm Infect. 2009;85:550–4.

23. Dhall S, Woods R, Strathdee SA, Patrick DM, Hogg RS. HIV vaccine preparedness studies in the organisation for economic co-operation and development (OECD) countries. AIDS Care. 2007;19:1118–27.

24. Sherr L, Bolding G, Elford J. Recruiting London gay men into an HIV vaccine trial: is it feasible? AIDS Care. 2004;16(5):565–71.

25. Colfax G, Buchbinder S, Yamshidar G, Celum C, McKinnan D, Neidig J, et al. Motivations for participating in an HIV vaccine efficacy trial. J Acquir Immune Defic Syndr. 2005;39:359–64.

26. Nodin N, Carballo-Diéguez A, Ventuneac AM, Balan IC, Remien R. Knowledge and acceptability of alternative HIV prevention bio-medical products among MSM who bareback. AIDS Care. 2008;20(1):106–15.

27. Gross M, Buchbinder SP, Celum C, Heagerty P, Seage GR, for the HIVNET vaccine preparedness study protocol team. Rectal microbicides for US gay men: are clinical trials needed? Are they feasible? Sex Transm Dis. 1998;25(6):296–302.

28. Rkers-Ngarm S, Pitsutittham P, Nitayaphan S, Kaewkungwal J, Chiu J, Paris R, et al. Vaccination with ALVAC and AIDSVAX to prevent HIV-1 infection in Thailand. New Eng J Med. 2009;361:2209–20.

29. Dolin R. HIV vaccine trial results—an opening for further research. New Eng J Med. 2009;361:2279–80.

30. Mantell JE, Myer L, Carballo-Diéguez A, Stein Z, Ramjee G, Morar NS, et al. Microbicide acceptability research: current approaches and future directions. Soc Sci Med. 2005;60:319–30.

31. Koblin BA, Holte S, Lenderking B, Heagerty P, for the HIVNET vaccine preparedness study protocol team. Readiness for HIV vaccine trials: changes in willingness and knowledge among high-risk populations in the HIV network for prevention trials. J Acquir Immune Defic Syndr. 2000;24:451–7.

32. International Collaboration on HIV Optimism. HIV treatments optimism among gay men: an international perspective. J Acquir Immune Defic Syndr. 2003;32(5):545–50.

33. Elford J. Changing patterns of sexual behaviour in the era of highly active antiretroviral therapy. Curr Opin Infect Dis. 2006;19:26–32.

34. Crepaz N, Hart T, Marks G. Highly active antiretroviral therapy and sexual risk behaviour. JAMA. 2004;292:224–36.

35. Elford J, Bolding G, Sherr L. High-risk sexual behaviour increases among London gay men between 1998 and 2001: what is the role of HIV optimism? AIDS. 2002;16(11):1537–44.

36. Williamson LM, Hart GJ. HIV optimism does not explain increases in high-risk sexual behaviour among gay men in Scotland. AIDS. 2004;18(5):834–5.

37. Elford J. HIV treatment optimism and high-risk sexual behaviour among gay men: the attributable population risk. AIDS. 2004;18:2216–7.

38. Crepaz N, Lyles CM, Wolitski RJ, Passin WF, Rama SM, Herbst JH, et al. Do prevention interventions reduce HIV risk behaviours among people living with HIV? A meta-analytic review of controlled trials. AIDS. 2006;20:143–57.

39. Barresi P, Husnik M, Camacho M, Powell B, Gage R, LeBlanc D, et al. Recruitment of men who have sex with men for large HIV intervention trials: analysis of the Explore study recruitment effort. AIDS Educ Prev. 2010;22:28–36.

40. Rida W, Fast P, Hoff R, Fleming T. Intermediate-size trials for the evaluation of HIV vaccine candidates: a workshop summary. J Acquir Immune Defic Syndr. 1997;16(3):195–203.

41. Coates T, Richter L, Caceres C. Behavioural strategies to reduce HIV transmission: how to make them work better. Lancet. 2008;372:669–84.