

Predictors of recent HIV testing in homosexual men in Australia

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Objectives

To describe time trends and other predictors of recent HIV testing among homosexual men enrolled in behavioural surveillance studies in Australia.

Methods

Repeated cross-sectional studies during the period 1996–2001 in Australian capital cities. Men were recruited from a variety of community-based settings, including gay community outdoor events, sex on premises venues, and social venues. They underwent a brief self-administered questionnaire in which they reported their HIV status, HIV-testing history, sexual behaviour and demographic information.

Results

Questionnaires were returned for 22 161 HIV-negative or status-unknown participants. While 85.3% had ever tested for HIV, 57.6% had tested in the last 12 months. Recent testing was greater in those living in Sydney, in younger men, in gay-identified men, in gay community-attached men, in those who reported unprotected anal intercourse and a higher number of sexual partners, and in partners of HIV-positive men. Although recent testing declined from 1996 to 2001, this trend was no longer significant when adjusted for other testing predictors.

Conclusions

In Australia, HIV testing among gay men decreased slightly from 1996 to 2001, but the trend was not significant when adjusted for other predictors. Testing levels were highest among those at highest risk of HIV infection, and lowest among non gay-identified and non gay-community attached homosexual men.

Keywords: HIV, homosexuality, male, prevention, serological test

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Introduction

Voluntary HIV testing and counselling is a key element in HIV prevention. In Australia, 85% of HIV infections occur among gay and other homosexually active men [1]. Encouraging regular HIV testing among homosexual men remains an important, explicit part of HIV prevention policy [2], and HIV testing plays a central role in gay men's strategies to reduce harm to themselves and their partners.

HIV testing rates among homosexual men in Australia are high compared with other major industrialized countries. In

a 1996 national survey, 77% of 3039 homosexually active men reported ever being tested [3], and testing rates of close to 90% have been described in the gay communities of Melbourne and Sydney [4]. Reported ever testing rates were 60% in a national survey of homosexual men in the United States of America [5], 63% in a Canadian survey [6], 63% in London [7] and 50% in Scotland [8].

Increasing HIV risk behaviour among homosexual men, and some evidence of an association between HIV treatment optimism and reporting unprotected anal intercourse has been described since the mid-1990s [4, 9]. Recently, a slight decrease over time both in the percentage of men ever HIV tested and in the frequency of testing in Sydney has been reported [10]. This study further examines trends in recent HIV testing in homosexual men in Australia and explores possible reasons for these trends.

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Methods

The Gay Community Periodic Survey was first conducted in Sydney in 1996, and since then this behavioural surveillance survey has been repeated regularly and extended to all other large mainland capital cities of Australia. All cities in which the survey had been conducted on more than one occasion were included in this study.

The questionnaire

The questionnaire is a short self-administered instrument that takes approximately 10 min to complete. Questions are asked regarding sexual intercourse, condom use, sexual relationships, HIV testing (including recency) and serostatus, aspects of gay community social attachment, sexual identity and a range of demographic items including age, occupation and ethnicity [4].

The sample

Subjects are recruited from a range of gay community venues in each of the five cities. These recruitment sites can be categorized into four broad categories: large gay community outdoor events (e.g. Mardi Gras fair day in Sydney), sex-on-premises venues, sexual health clinics, and social and other gay community venues. Diverse venues are selected to obtain a broad sample of gay men in each city. Each time the survey is conducted, similar venues are selected, but the turnover in community events and businesses means that it is not possible to sample at precisely the same sites each year. To be eligible, a participant must have had sex with another man within the previous five years and lived in the city where the survey was conducted or to have participated regularly in that city's gay community.

In Sydney, the survey is conducted twice yearly, in February and August. The survey has been conducted three times since 1998 in Melbourne and Brisbane, and twice in Perth and Adelaide. During the recruitment period, all men attending the various venues and clinics are approached, with the aim of recruiting all of those attending. Approximately 77% of eligible men participated [4].

Data analysis

We examined trends and predictors of self-reported HIV testing in the previous 12 months ('recent HIV testing'). Two groups of participants were excluded from this analysis. First, participants who reported that they were HIV positive were excluded as they have no reason for continued HIV testing. Second, as participants recruited from medical clinics may have been attending those clinics to seek HIV

testing, and an exploratory analysis showed that the proportion of men who were recently HIV tested was much higher at clinics (74.9%) than elsewhere (57.6%), participants recruited from clinics were excluded.

The relationship between recent HIV testing and demographic factors, sexual identity, gay community attachment, and sexual behaviour was examined. Unprotected sex was defined as having any instance of unprotected anal intercourse (UAI), with or without ejaculation, in the previous six months. χ^2 -tests were conducted to examine the significance of univariate relationships between recent testing and the above predictors. As it had been previously hypothesized that trends may be specific to age groups, cities and sexual risk behaviour, some analyses are presented stratified by age, city and report of UAI, and the interaction of these terms with year of survey examined. Mantel-Haenszel tests were performed to explore linear trends in recent HIV testing over time and to examine linear trends for ordinal variables. Subsequently, a multiple logistic regression analysis was conducted to determine which of these factors were independently associated with recent HIV testing after controlling for all potential confounders.

Results

Nationwide, a total of 29 073 questionnaires were returned over 6 years (1996–2001). After excluding men recruited through clinics (3851) and men who reported they were HIV positive (4064) the sample size for analysis of testing trends was 22 161. Of these men, 57.6% reported they had been HIV tested recently, and 85.3% had ever been tested for HIV.

Univariate analysis

Factors which were associated with recent HIV testing are presented in Table 1. The proportion of men reporting recent HIV testing declined from 62.8% in 1996 to 54.7% in 2001 (P trend < 0.001).

Sydney men were more likely to report a recent HIV test than men from other cities. Factors associated with higher likelihood of being recently tested included, younger age, self-identification as gay/homosexual/queer, having more gay friends, spending more time with gay men, having more sex partners in the last six months, not being in a regular relationship, or recently beginning a regular relationship. Having a safe sex agreement with the regular partner (defined as no unprotected anal sex outside the relationship and unprotected anal sex only with a HIV-negative regular partner), and knowing the partner's HIV status, were also associated with higher probability of being recently tested. Reporting UAI was associated with a higher rate of recent testing.

Table 1 Factors associated with having been tested for HIV in the previous 12 months (univariate)

Variable	n	HIV tested in last 12 months (%)	P-value
Year			< 0.001*
1996	1606	62.8	
1997	1698	61.5	
1998	5979	56.5	
1999	3788	59.5	
2000	5386	56.8	
2001	3704	54.7	
City			< 0.001
Sydney	11671	60.4	
Melbourne	4645	51.6	
Perth	1701	52.9	
Brisbane	3238	59.5	
Adelaide	906	54.4	
Recruitment sites			< 0.001
Outdoor event	11996	55.3	
Sex venues	4793	59.0	
Social/other	5372	61.4	
Age			< 0.001*
< 25	3474	59.4	
25–29	4384	62.6	
30–39	8278	58.9	
40–49	3910	51.4	
> 50	1718	49.7	
Occupation			0.056
Managerial/professional	7784	57.4	
Paraprofessional	2364	58.6	
Clericals & sales	6306	58.8	
Trade	1241	57.6	
Plant operation & labour	895	58.2	
Unemployed	3492	55.5	
Sexual identity			< 0.001
Gay/homosexual/queer	19712	58.1	
Bisexual/heterosexual/other	2429	53.6	
How many gay friends			< 0.001*
None	277	32.9	
Few	2901	48.3	
Some	7036	55.3	
Most to all	11832	61.9	
How much free time spend with gay men			< 0.001*
None	158	31.0	
A little	2777	48.5	
Some	8101	56.8	
A lot	11060	60.9	
Number of men had sex with during last 6 months			< 0.001*
None	1621	42.3	
One	4733	48.5	
2–10 men	9483	59.4	
11–50 men	4947	64.9	
More than 50	1226	69.2	
Current relationship with other men			< 0.001
No sex with man	2994	51.6	
Monogamous	6068	53.7	
Several regulars	755	68.9	
Regular plus casual	6484	60.6	
Casual only	4947	60.1	
Length of current relationship			< 0.001*
No regular relationship	9459	58.2	
Less than 6 months	2833	67.9	

6 months to 1 year	1674	66.7
1 year to 2 years	1765	61.5
More than 2 years	5564	47.4
Safe sex agreement within the relationship		< 0.001
No agreement	7175	55.3
Has agreement	4841	60.5
No regular partner	10 145	58.3
Safe sex agreement outside the relationship		< 0.001
No agreement	3707	55.0
Has agreement	7882	59.1
No regular partner	10572	57.4
Knowledge of regular partner's serostatus		< 0.001
No test/Don't know	2777	44.7
Negative	7985	60.6
Positive	823	72.9
No regular partner	10576	57.6
UAI		< 0.001
No UAI at all	13418	55.5
UAI with regular partner only	5440	57.7
UAI with casual partner only	1950	64.5
UAI with regular and casual	1353	68.4

*Trend P-value. UAI, unprotected anal intercourse.

Time trends stratified by age, city and UAI

Time trends in HIV testing were examined by strata of age and city, and by report of UAI in the last 6 months. A decrease in recent HIV testing occurred over time in all age groups but was greater in the young (67.7% to 53.7% in those aged less than 25 and 69.4% to 56.8% in those aged 25–29) than other age groups. Declining testing rates were seen in Perth and Sydney, but not in other cities, and were seen in men regardless of report or not of UAI (Figs 1–3).

Multivariate analysis

All variables listed in Table 1 were entered into the analysis as predictors for reporting recent HIV testing, and eliminated by forward step-wise regression. Terms for the interaction between age, city and report of UAI and year of survey were introduced, but none were significant (data not shown). The resulting model is outlined in Table 2. The strongest multivariate predictors of recent testing, with odds ratios of more than 3, were having a regular HIV-positive partner, and reporting that most friends were gay. Moderate predictors (odds ratios 2–3) included having a known regular HIV-negative partner, and having sex with more than 50 men in the last 6 months. Other significant predictors included city (recent testing was most common in Sydney and least common in Melbourne), type of recruitment venue, age, relationship status and length of relationship, and reporting UAI. After adjustment for the above variables, the trend over time was no longer significant.

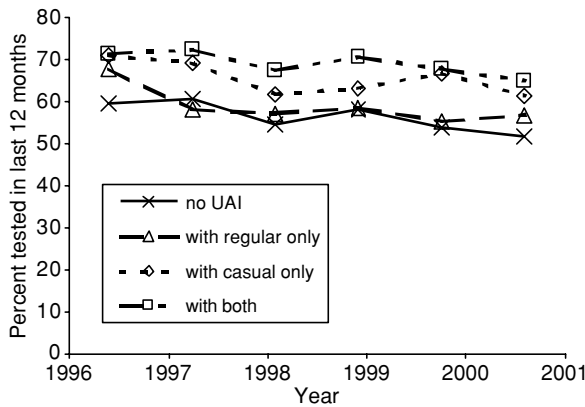


Fig. 1 Recent HIV testing by report of UAI and year.

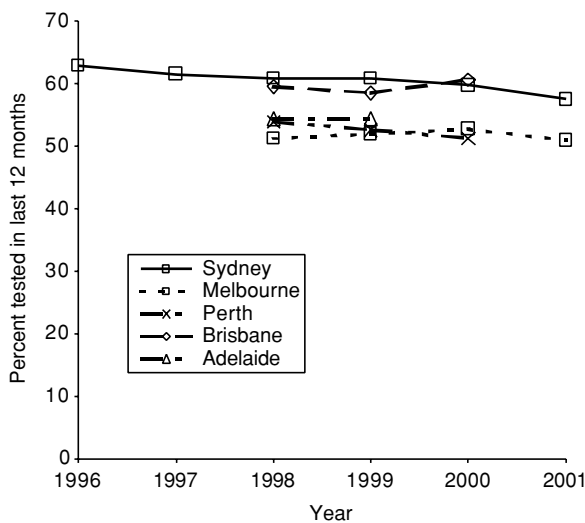


Fig. 2 Recent HIV testing by city and year.

Discussion

This study confirms a decline in recent HIV testing among homosexual men participating in behavioural surveillance in Australia between 1996 and 2001, from 62.8% to 54.7%, but it suggests that the reasons for this decline have been complex, and may be related to changes in the sample over time, or to broader changes in the gay community. In the sample, there was a change over time towards factors which predicted less recent testing such as less gay community attachment, older age, having no sexual partners, being monogamous, the mix of cities, and having a relationship of more than 2 years duration. Only a few factors predictive of more recent HIV testing increased, including UAI in the last 6 months. After adjusting for all of these factors, time trends in HIV testing were no longer significant.

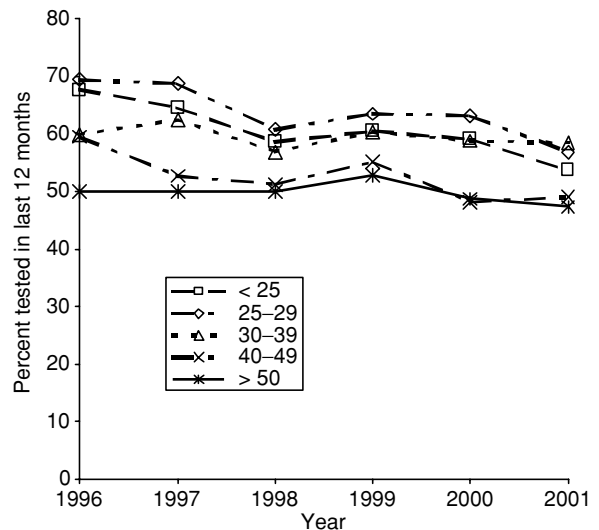


Fig. 3 Recent HIV testing by age and year.

Apart from the time trend, we found a variety of strong predictors of HIV testing. These related to perceptions of heightened HIV risk (UAI in the last 6 months, more sexual partners in last 6 months, having an HIV-positive partner) and attachment to the gay community (proportion of friends who are gay). In addition, demographic factors such as younger age and residence in Sydney were associated with a higher likelihood of being tested. This paints a picture of informed and reasoned choice about the need for HIV testing, particularly in gay community-attached men.

This study highlights some of the limitations of a longitudinal analysis of repeated cross-sectional surveys for behavioural surveillance. There are difficulties in interpreting time trends because of differences in sampling over time, but the collection of contextual data, allowing a multivariate analysis, at least partially defrays this criticism. The Gay Community Periodic Surveys covered the large capital cities of Australia, which account for more than half of the population of this country. These samples were designed to recruit large and heterogeneous samples of gay and homosexually active men recruited from gay communities. However, the sample is likely to over-represent those in the population who are socially attached to the gay community, because only those who were present at gay venues could be included. A possible statistical limitation of this analysis is that, in different survey rounds, some respondents will have participated several times. In this analysis, each returned questionnaire was treated as a discrete individual response.

Levels of HIV testing in this study were similar to those found in other Australian samples of gay community-attached men. In a 1996 national phone-in survey of

Table 2 Factors associated with having been tested for HIV in the previous 12 months (univariate and multiple logistic regression analysis)

Variable	Univariate analysis			Multivariate analysis		
	Odds ratio	95% CI	P-value	Adjusted odds ratio	95% CI	P-value
City			< 0.001			< 0.001
Sydney	1.00			1.00		
Melbourne	0.70	0.65–0.75		0.77	0.71–0.83	< 0.001
Perth	0.74	0.67–0.82		0.84	0.75–0.94	0.002
Brisbane	0.96	0.89–1.04		0.89	0.81–0.97	0.010
Adelaide	0.78	0.68–0.90		0.93	0.81–1.08	0.343
Recruitment site			< 0.001			< 0.001
Outdoor events	1.00			1.00		
Sex venues	1.16	1.09–1.24		1.08	0.99–1.07	0.091
Social/other	1.28	1.20–1.37		1.17	1.09–1.27	< 0.001
Age group			< 0.001*			< 0.001
< 25	1.00			1.00		
25–29	1.14	1.04–1.25		1.12	1.01–1.24	0.027
30–39	0.98	0.90–1.06		0.96	0.88–1.06	0.427
40–49	0.72	0.66–0.79		0.73	0.65–0.81	< 0.001
> 50	0.67	0.60–0.76		0.77	0.67–0.88	< 0.001
Gay friends			< 0.001*			< 0.001
None	1.00			1.00		
A few	1.91	1.47–2.48		2.05	1.54–2.73	< 0.001
Some	2.53	1.96–3.26		2.61	1.97–3.46	< 0.001
Most to all	3.32	2.58–4.28		3.30	2.49–4.37	< 0.001
Men had sex with			< 0.001*			< 0.001
None	1.00			1.00		
One	1.29	1.15–1.44		1.03	0.90–1.17	0.670
2–10 men	2.00	1.80–2.23		1.61	1.42–1.83	< 0.001
11–50 men	2.53	2.26–2.84		2.01	1.73–2.32	< 0.001
More than 50 men	3.06	2.62–3.58		2.36	1.96–2.86	< 0.001
Current relationship			< 0.001			0.007
No relationship	1.00			1.00		
Monogamous	1.08	0.99–1.18		1.03	0.91–1.16	0.690
Several regular	2.07	1.75–2.46		1.41	1.17–1.71	< 0.001
Regular and casual	1.44	1.32–1.57		1.11	0.99–1.24	0.084
Casual only	1.41	1.29–1.54		1.07	0.95–1.20	0.266
Length of relationship			< 0.001*			< 0.001
No regular partner	1.00			1.00		
Less than 6 months	1.52	1.39–1.66		1.38	1.22–1.56	< 0.001
6 months to 1 year	1.44	1.29–1.61		1.33	1.16–1.54	< 0.001
1 year to 2 years	1.15	1.03–1.27		0.97	0.84–1.11	0.624
More than 2 years	0.65	0.60–0.69		0.51	0.45–0.57	< 0.001
Safe sex agreement (in regular relationship)			< 0.001			0.022
No agreement	1.00			1.00		
Have agreement	1.24	1.15–1.34		1.12	1.02–1.22	0.032
No regular partner	1.11	1.05–1.18		1.24	1.01–1.52	0.043
Safe sex agreement (out of regular relationship)			< 0.001			0.048
No agreement	1.00			1.00		
Have agreement	1.18	1.09–1.28		1.11	1.01–1.21	0.032
No regular partner	1.11	1.03–1.19		0.96	0.80–1.15	0.652
Regular partner's HIV status			< 0.001			< 0.001
Not test/Not know	1.00			1.00		
Yes-negative	1.90	1.74–2.08		2.46	2.22–2.72	< 0.001
Yes-positive	3.33	2.80–3.95		4.18	3.46–5.05	< 0.001
No regular partner	1.68	1.54–1.83		1.42	1.20–1.68	< 0.001
UAI			< 0.001			< 0.001
No UAI	1.00			1.00		
UAI, regular only	1.10	1.03–1.17		1.20	1.10–1.31	< 0.001
UAI, casual only	1.46	1.32–1.61		1.23	1.10–1.38	< 0.001
UAI with both	1.73	1.54–1.95		1.31	1.15–1.50	< 0.001

CI, confidence interval; NS, not significant; UAI, unprotected anal intercourse. *Trend *P*-value.

homosexually active men, 83.0% of gay community-attached men and 58.4% of non-gay community-attached men had been tested, and in a survey included in sex video catalogues in 2000, these figures were 84.6% and 66.1%, respectively [10].

Most of the predictors for HIV testing in this analysis appear to be related to a reasoned decision making regarding HIV risk, and attachment to gay community. In the multivariate analysis, Sydney men remained more likely to be tested. Similar geographical differences in testing behaviour have been described in Canada [6]. Such variations may reflect basic differences in the individuals who choose to live in a given location or, on the other hand, they may also reflect the differences in gay community cultures in different areas, or perception of HIV risk. It may also reflect the higher visibility of gay community and gay community organizations in Sydney. An association between more frequent HIV testing and young age has been previously reported in Australian gay men [11]. It has also previously been described that young men are more likely to be in short-term relationships, and more likely to be in regular relationships of undetermined seroconcordance [12]. It is reassuring to see that young gay men, who were not exposed to the prevention campaigns of the 1980s, are still seeking HIV testing at high levels. Our finding of an association between gay community attachment and testing is also consistent with other research results [6,13,14]. Men who knew their regular sexual partner's HIV serostatus were more likely to be recently tested, and others have also reported that testing for HIV is associated with inquiring about the HIV serostatus of, and having unprotected with, sexual partners [15,16].

This study clearly indicates that Australian gay men are using informed strategies in their testing behaviour. Those who are at highest risk are most likely to be tested. Perhaps the most concerning aspect of this analysis is that testing occurs less frequently among non-gay community attached men. Innovative strategies may be necessary to ensure that those men are well informed with respect to risk practice and HIV testing.

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