Younger age, recent HIV diagnosis, no welfare support and no annual sexually transmissible infection screening are associated with nonuse of antiretroviral therapy among HIV-positive gay men in Australia

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Objectives
With the increasing momentum to maximize the benefits of antiretroviral therapy (ART), better understanding of opportunities and challenges in increasing ART coverage and promoting early ART initiation is urgently needed. Key sociodemographic, clinical and behavioural factors associated with Australian HIV-positive gay men’s current nonuse of ART were systematically examined.

Methods
Data were based on 1911 responses from HIV-positive men who had participated in the Australian Gay Community Periodic Surveys (GCPS) between 2010 and 2012. Stratified univariate analysis and multivariate logistic regression were used.

Results
A majority of the participants were recruited from gay community venues and events and self-identified as gay or homosexual. On average, they were 44 years old and had been living with HIV for at least 10 years. Close to 80% (n = 1555) were taking ART, with >90% further reporting an undetectable viral load at the time of the survey. From 2010 to 2012, there had been a moderate increase in ART uptake [adjusted odds ratio (AOR) 1.40; 95% confidence interval (CI) 1.20–1.65]. In addition, younger age (AOR 1.66; 95% CI 1.45–1.92), recent HIV diagnosis (AOR 1.78; 95% CI 1.59–1.98), not receiving any social welfare payments (AOR 2.20; 95% CI 1.05–2.54) and no annual screening for sexually transmissible infections (AOR 1.55; 95% CI 1.03–2.34) were independently associated with ART nonuse.

Conclusions
Current ART coverage among HIV-positive gay men in Australia is reasonably high. To further increase ART coverage and promote early ART initiation in this population, better clinical care and sustained structural support are needed for HIV management throughout their life course.

Keywords: antiretroviral therapy, behavioural surveillance, early treatment initiation, gay men, treatment coverage.

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Introduction
Antiretroviral therapy (ART) has proven clinical benefits for people living with HIV, and is also likely to reduce onward HIV transmission once viral load has been successfully suppressed [1,2]. The HIV epidemic is largely driven
by male-to-male sexual transmission in Australia, where gay men constitute over 80% of cases of newly acquired HIV infection [3]. While the global debate about the potential impact of early ART initiation among gay men is continuing, there has been a growing momentum in Australia to initiate ART for asymptomatic patients once their CD4 cell count approaches 500 cells/μL [4].

Using routinely collected HIV behavioural surveillance data from across Australia, this study examined the trend of ART coverage from 2010 to 2012, described rates of ART nonuse by different subgroups, and identified key sociodemographic, clinical and behavioural factors associated with current ART nonuse. In this study, ART nonuse included noninitiation (for those who were ART naïve) as well as nonadherence or interruptions (for those who were ART experienced).

Methods

Data were obtained for HIV-positive men who participated in the Gay Community Period Surveys (GCPS) in six states and territories between 2010 and 2012. Using a repeated, cross-sectional design, the GCPS has been part of the Australian HIV behavioural surveillance system since 1998. Through a time−location sampling approach, the GCPS consistently recruits homosexually active men at major gay social venues and events, sex-on-premise venues, and clinics with a predominantly gay clientele. The average response rate is about 65%. A detailed description of the GCPS has been published previously [5,6]. The study was approved by the Human Research Ethics Committee of the University of New South Wales.

The self-completed questionnaire is anonymous. Topics typically covered by the GCPS include sociodemographic characteristics, self-reported HIV status, testing for HIV and other sexually transmissible infections (STIs), a range of condom- and non-condom- based anal intercourse practices with regular as well as casual male partners, and the use of recreational drugs [7]. For the analysis, being tested for any STI other than HIV infection in the 12 months prior to the survey refers to having a throat, penile or anal swab, providing a urine sample, or having a blood test for syphilis or other STIs. Anal intercourse that carries a high risk of HIV transmission was defined as any unprotected anal intercourse (UAI) in the 6 months prior to the survey either with an HIV-negative or HIV-status-unknown regular male partner or with any casual male partners (referred to as “risky UAI” hereafter).

For HIV-positive participants, questions further cover year of HIV diagnosis and current use or nonuse of ART [7]. Their latest CD4 cell count, reported as <200, 201–350, 351–500 or >500 cells/μL, was collected in 2012 only.

Stratified analysis with χ² tests was used to describe and compare rates of ART nonuse. Multivariate logistic regression analysis was applied to identify factors independently associated with ART nonuse. P values were set at 0.05. All statistical analysis was performed in Stata 11.2 (Stata Corp, College Station, TX, USA).

Results

A total of 2050 men self-identified as HIV-positive, although some men could have been counted more than once if they had participated in two or more rounds across calendar years. The following analysis was restricted to 1911 men who specified their age, year of HIV diagnosis and current ART status.

Sociodemographic characteristics

The average age of the 1911 HIV-positive men was 44.1 years [standard deviation (SD) 10.2 years], with the range being 16 to 86 years and the median 44 years. About one-fifth of the men (n = 403) were recruited from clinical sites, with the remainder recruited from a range of gay community sources. The majority of the men (n = 1801; 94.2%) identified as gay or homosexual and over three-quarters (n = 1456) were of Anglo-Australian background. Over half of the men were employed in full-time paid jobs (n = 1065). About one in six men (n = 305) received pension or other social welfare payments from the Australian government (e.g. the Disability Support Pension).

Key behavioural indicators

Of the 1222 men (63.9%) who had a regular male partner in the 6 months prior to the survey, 45.4% (n = 555) had a known HIV-positive regular partner; 36.2% (n = 442) had a known HIV-negative regular partner; and the remaining 18.4% (n = 225) had a regular partner whose HIV status was unknown. A comparatively high proportion of men (n = 1412; 73.9%) had casual male partners during the same period. Half of the 1911 men (n = 969; 50.7%) had risky UAI in the 6 months prior to the survey.

About 90% of the men (n = 1728) had at least one STI test in the 12 months prior to the survey. Close to 80% (n = 1510) used recreational drugs, about one-fifth of whom (n = 288) injected drugs, in the 6 months prior to survey.

HIV-related factors

Close to 60% of the men (n = 1138) had been living with HIV for at least 10 years, with the median year of HIV diagnosis being 2000. Over 45% (n = 881) were diagnosed with HIV infection before the age of 30 years. Close to 80%
Gay men not using ART 3

(\(n = 1515\)) were taking ART, while the remainder (\(n = 296; 20.7\%) were not, at the time of the survey. Of those on ART, the majority (\(n = 1402; 92.5\%\)) reported an undetectable viral load.

Analysis of the latest CD4 cell count data was restricted to the 541 men in 2012 (85.6% of the total 632 HIV-positive participants), who specified their age, year of HIV diagnosis, current ART status and latest CD4 cell count. Regardless of their ART status, in close to 60% (\(n = 315\)) of the men the latest CD4 cell count was >500 cells/\(\mu\)L; in another quarter (\(n = 127\)) it was between 351 and 500 cells/\(\mu\)L; in a further 10% it was between 201 and 350 cells/\(\mu\)L (\(n = 51\)); and in the remainder it was <200 cells/\(\mu\)L (\(n = 48; 8.9\%\)).

Rates of ART nonuse: stratified analysis

As shown in Table 1, rates of ART nonuse were highest (85.3%) among those under 25 years old and lowest (6.6%) among those aged 50 years or above (\(P < 0.001\)). Having a more recent HIV diagnosis, particularly within the 3-year survey period (i.e. 2010–2012), was associated with higher rates of ART nonuse (61.5%), while only 7.9% diagnosed prior to 1996 were not taking ART (\(P < 0.001\)). However, receiving any social welfare payments reduced the men’s likelihood of ART nonuse (9.2%) of those receiving social welfare payments were not using ART vs. 22.9% of those not receiving such payments; \(P < 0.001\). Recruitment at clinical sites was associated with ART uptake (14.1%) of those recruited at clinical sites were not using ART vs. 22.5% of those recruited elsewhere; \(P < 0.001\). ART status was not correlated with their regular partner’s HIV status, the men’s engagement in risky UAI or their drug use. Latest CD4 cell counts were not related to ART status in 2012 (\(n = 541\)†) NS

<table>
<thead>
<tr>
<th>Survey calendar year</th>
<th>(n)/(N) (%)</th>
<th>(P)</th>
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<tbody>
<tr>
<td>2010</td>
<td>157/676 (23.2)</td>
<td>NS</td>
</tr>
<tr>
<td>2011</td>
<td>133/639 (20.8)</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>106/596 (17.8)</td>
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Independent factors associated with ART nonuse

Based on multivariate logistic regression, the final reduced model explained 17.6% of the variance (\(n = 1911; P < 0.001\)). As shown in Table 2, ART nonuse was first and foremost associated with a shorter duration of HIV diagnosis [adjusted odds ratio (AOR) 1.78; 95% confidence interval (CI) 1.59–1.98]. This was followed by younger age (AOR 1.66; 95% CI 1.45–1.92). Over the 3-year survey period, there was a significant increase in ART uptake (AOR 1.40; 95% CI 1.20–1.65). Not having any annual STI testing (AOR 1.55; 95% CI 1.03–2.34) or not receiving any social welfare payments (AOR 2.20; 95% CI 1.05–2.54) was moderately associated with ART nonuse. The interaction between age and year of HIV diagnosis was not statistically significant (data not shown). Current ART usage did not differ by the latest CD4 cell count, the regular partner’s HIV status, risky UAI practices or recreational drug use in the previous 6 months (data not shown).

Discussion

Based on routinely collected behavioural data for over 1900 HIV-positive gay men in Australia, the study clearly

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NS, not significant.

*Including swabs at throat, penile and anal sites, urine sample and blood tests for syphilis and other sexually transmitted infections (STIs).

†Latest CD4 cell count range, 2012 data only.

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shows a moderate, yet significant, increase in ART uptake in recent years. It suggests the feasibility of promoting early ART uptake among Australian gay men, which is in line with the latest clinical recommendations [4]. Together with other population-based studies on HIV-positive men in Australia [8,9], it confirms that ART coverage among gay men in Australia is reasonably adequate and equitable [10–12].

In addition to the temporal trend, four key factors, covering sociodemographic, clinical and behavioural characteristics, were identified to be independently associated with current nonuse of ART in this study. Two of them, namely, younger age and shorter duration of HIV diagnosis, have been consistently found to be associated with delayed ART initiation, treatment nonadherence or interruptions in the Australian setting [8,13–18]. Younger gay men and gay men who have recently HIV-seroconverted in Australia are likely to be healthier, are more likely to be free of any HIV symptoms, and are likely to be less immunologically compromised compared with their HIV-positive peers [9,19]. Whether these men should be strongly encouraged to immediately take ART is still a highly contested subject of debate in Australia [10], particularly considering the unfavourable effects of life-long ART on the health of these individuals (e.g. the consequences of long-term toxicity and the availability of future drug options) [20,21].

Even though ART drugs are extensively subsidized by the Australian federal government, a recent clinic-based study in Sydney suggests that increased financial burdens associated with obtaining ART drugs are likely to hinder optimal ART adherence among patients mostly on long-term ART [11]. Our study further complements this previous finding and reveals that HIV-positive gay men are more likely to use ART if they are receiving any social welfare payments at the same time. Such welfare benefits are expected to increase men’s financial affordability particularly in terms of covering the out-of-pocket expenses (co-payment) for prescribed ART drugs, and thus enable them to initiate and continuously adhere to ART. These recent findings highlight the importance of removing structural-level barriers to achieve even higher ART coverage [22,23].

Poor clinical care, which is often accompanied by low patient retention, has been increasingly recognized as a critical service-level barrier to ART initiation and adherence [23,24]. Routine STI screening is recommended for all homosexually active men in Australia, particularly for those who are HIV-positive because of their increased susceptibility to a number of STIs (e.g. syphilis and gonorrhea) [25–27]. More importantly, marked increases in the frequencies and comprehensiveness of regular STI testing have been observed among both HIV-positive and HIV-negative gay men in Australia in recent years [28,29]. It is, therefore, unsurprising that not having any annual STI screening (reported by about 10% of the sample), a proxy of poor clinical care, was associated with ART nonuse. This is also likely to explain the differences in ART usage between men recruited from clinical sites and those recruited from community sites, initially found in our bivariate analysis. Self-reported, latest CD4 cell counts were not associated with gay men’s current use or nonuse of ART in the 2012 data. The true temporal correlation between ART uptake and CD4 cell count is preferably examined using a prospective cohort design.

There are several limitations of this study. It used a convenience sample, although its sociodemographic characteristics were generally representative of Australian HIV-positive gay men who are socially active in the gay community [14,30,31]. Data were entirely based on self-report and reasons for ART nonuse were not collected. As a brief, routine behavioural surveillance study with a moderate sample size, it had a limited capacity to explore other personal, clinical, social and structural factors associated with ART nonuse. As the history of ART use in the past was not collected in the surveys, we were unable to accurately distinguish between men who were ART naïve and those who had used ART in the past, and it is possible that factors associated with nonuse in the former group could differ from those in the latter group.

Limitations notwithstanding, this study highlights both the feasibility of and potential challenges in promoting early ART initiation among HIV-positive gay men in Australia. With more globally concerted efforts to maximize the ART benefits to people living with HIV, their sexual partners and the general public [22], more guidance and support should be provided to HIV-positive people to enable them to access better clinical care and social support through the whole spectrum of their living with HIV and their treatment management [16,32].

<table>
<thead>
<tr>
<th>Factor</th>
<th>AOR 95% CI</th>
<th>P</th>
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<tbody>
<tr>
<td>Earlier survey round</td>
<td>1.40 1.20–1.65</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Younger age group</td>
<td>1.66 1.45–1.92</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Shorter duration of HIV diagnosis</td>
<td>1.78 1.59–1.98</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>No testing for STIs in the 12 months</td>
<td>1.55 1.03–2.34</td>
<td>0.03</td>
</tr>
<tr>
<td>prior to survey*</td>
<td></td>
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<tr>
<td>Not receiving social welfare payments</td>
<td>2.20 1.05–2.54</td>
<td>0.04</td>
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</tbody>
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AOR, adjusted odds ratio; CI, confidence interval.

*Including swabs at throat, penile and anal sites, urine sample and blood tests for syphilis and other sexually transmitted infections (STIs).
Acknowledgements
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References
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