Published in final edited form as:

Sex Health. 2015 October ; 12(5): 453–457. doi:10.1071/SH15037.

Estimating antiretroviral treatment coverage rates and viral suppression rates for homosexual men in Australia

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Abstract

Gay and other men who have sex with men (GMSM) are disproportionately affected by the HIV epidemic in Australia. The study objective is to combine a clinical-based cohort with a community-based surveillance system to present a broader representation of the GSM community to determine estimates of proportions receiving antiretroviral therapy (ART) and/or with an undetectable viral load. Between 2010 and 2012, small increases were shown in ART uptake (to 70.2%) and proportions with undetectable viral load (to 62.4%). The study findings highlight the potential for significantly increasing ART uptake among HIV-positive GSM to reduce the HIV epidemic in Australia.

Additional keywords

ART coverage; gay men; HIV; proportion; time trends; viral load

Introduction

The uptake of combination antiretroviral therapy (ART) is increasing and is now recommended earlier for the treatment of HIV infection, with newer antiretroviral (ARV) regimens more effective, convenient and better tolerated than past regimens.¹ Many studies have shown that the use of ART leads to substantial decreases in HIV viral load and a significant decrease in the risk of HIV transmission.^{2,3} Recently, there has been a shift in guidelines that increasingly support the initiation of ART for all HIV-positive individuals, irrespective of immunological and virological indicators, which enables the promotion of treatment as prevention (TasP) as a means of reducing population HIV incidence.¹ The

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Conflicts of interest

The authors do not have any competing interests to declare.

ability of ART to suppress HIV viral load and, hence, the infectiousness of HIV-infected persons, underscores its substantial potential role in effective HIV prevention, in combination with other approaches to better control the HIV epidemic.⁴

In Australia, HIV predominantly affects gay and other men who have sex with men (GMSM), who are estimated to account for 80% of people living with HIV (PLHIV).⁵ To date, there is no national surveillance data available regarding the number of diagnosed people on ART. ART uptake can, however, be estimated from existing data sources, and the aim of this study is to strengthen current estimates by combining data from different sources. The primary aim of this study is to contribute to refining national estimates of ART uptake and viral suppression in Australia, by estimating the proportion of HIV-positive GSM receiving ART and/or with a suppressed HIV viral load. A secondary aim is to compare the demographic characteristics, extent of ART uptake and HIV clinical markers among HIV-positive GSM in a clinical-based and a community-based source.

Methods

The Australian HIV Observational Database (AHOD) commenced in 1999 and is a prospective cohort study of HIV-positive patients. Key patient data collected in the AHOD include patient sociodemographic characteristics, treatment history and laboratory-based HIV clinical markers (e.g. CD4 cell counts, HIV viral load results). A more detailed description of the AHOD has previously been published.⁶

The Gay Community Periodic Surveys (GCPS) are repeated, anonymous, cross-sectional, community-based, self-report surveys, which commenced in 1996. The GCPS recruit GSM aged 18 years or older from gay community venues and events, as well as from clinics serving large numbers of GSM in most metropolitan areas of Australia. A description of GCPS methods and measures is available elsewhere.⁷ For participants who reported being HIV-positive in the GCPS, data collected includes sociodemographic characteristics, sexual practices, ART use and HIV clinical markers.

The AHOD patients were included in these analyses if they indicated homosexual contact as the mode of HIV infection and were in active follow up between 1 January 2010 and 31 December 2012. All HIV-positive GCPS participants recruited between 1 January 2010 and 31 December 2012 were included. To reduce overlap in recruitment, HIV-positive GCPS participants who were recruited from a clinical setting were excluded from the combined sample. The combined sample consisted of the eligible AHOD patients and GCPS participants, retaining the following variables for each cohort: age, state of residence, ethnicity, recruitment source (e.g. hospital, sexual health clinic, high HIV-caseload general practice or community site), year of HIV diagnosis, ART use, CD4+ T-cell count and HIV viral load.

AHOD patients were 'on treatment' if they were receiving ART for more than 14 days in the respective calendar year. GCPS participants were 'on treatment' if they indicated they were receiving ART at the time of the survey. In the AHOD, HIV viral load was defined as undetectable if the median HIV viral load for the given calendar year was <50 copies mL⁻¹,

while in the GCPS, participants self-report HIV viral load as undetectable, detectable or unknown based on their most recent test result.

Rates of ART coverage and proportions with an undetectable viral load, and their 95% confidence intervals (95% CIs), were estimated for each sample separately and for the combined sample. Direct age standardisation was applied to the combined sample, using the age distribution of Australian men reported by the Australian Bureau of Statistics (ABS) as the reference value. The inclusion of age standardisation is recommended, particularly with the use of cross-sectional survey data, as changes in trends may reflect sampling variation in key demographics rather than a true change. We further adjusted the combined datasets by applying a set of sampling weights, as determined by the total amount of AHOD patients and GCPS participants included in our analysis.⁸ The use of weight adjustment accounts for the differences in sample size between the AHOD and GCPS.⁹

Results

Over the 2010–2012 study period, 5251 AHOD records and 2050 GCPS responders were eligible to be included in the analyses. There were two marked differences in the sociodemographic characteristics of AHOD patients and GCPS participants (Table 1). First, AHOD patients were significantly older than GCPS participants (mean = 50.6 years, s.d. = 10.7 vs mean = 44.0 years, s.d. = 10.4; $P < 0.001$). Second, 66% of AHOD patients were diagnosed with HIV before 2000, while 57% of GCPS were diagnosed after 2000 (Table 1).

The combined sample included 6877 records, comprising 5251 AHOD records and 1626 GCPS participants. Four hundred and twenty-four GCPS participants were excluded from the combined sample as these responders were recruited from a clinical setting. As there is no available data to determine whether AHOD patients had participated in the GCPS, this exclusion criterion is aimed to reduce the chance of overlapping records between the samples. From 2010 to 2012, the proportion of HIV-positive GSM on ART increased in the AHOD and GCPS, with a somewhat higher ART coverage rate in the AHOD (from 90% to 92%) compared with that in the GCPS (from 76% to 82%). CD4 counts in the samples could only be directly compared as of 2012, and at that time were similar; more than half of HIV-positive GSM had a CD4+ T-cell count above 500 cells μL^{-1} (AHOD: 62%, GCPS: 51%). Over the 3-year period, the proportion of HIV-positive GSM on treatment with an undetectable viral load slightly increased in the AHOD and GCPS samples, from 82% in 2010 to 88% in 2012, and from 92% in 2010 to 95% in 2012, respectively.

In the combined sample, there was a slight increase in ART coverage; adjusted proportions of GSM on ART increased from 67.8% (95% CI 65.9–69.7%) in 2010 to 70.2% (95% CI 68.2–72.2%) in 2012 (Fig. 1). In the combined sample, the number of individuals who had a HIV viral load test decreased over the 3-year period; however, as the combined sample size also decreased, the proportion who had a HIV viral load test remained relatively stable. The adjusted proportions of all HIV+ GSM who had an undetectable viral load increased from 56.9% (95% CI 54.8–59.0%) in 2010 to 62.4% (95% CI 60.2–64.6%) in 2012; the adjusted proportions of GSM on ART who had an undetectable viral load increased from 85.1% (95% CI 83.4–86.8%) in 2010 to 89.6% (95% CI 88.1–91.0%) in 2012 (Fig. 2).

Discussion

In our analyses, we examined the rates of ART coverage and undetectable viral load in HIV-positive GSM individuals from the AHOD and GCPS. We found the proportion of GSM on ART was higher in the AHOD than in the GCPS. These differences are likely due to the fact that AHOD represents only individuals in care while the GCPS is a community-based sample and may include individuals not in care and/or receiving treatment. Importantly, in both samples, the uptake of ART increased over time, as did the proportion of HIV-positive GSM receiving treatment with an undetectable viral load. Somewhat surprisingly, a higher proportion of participants in the GCPS reported an undetectable viral load compared with patients in the AHOD; this may reflect biases that differentially affect self-report and patient record data.

The consistency between external sources for estimating ART and viral suppression rates among individuals with diagnosed HIV in Australia and our adjusted results is encouraging, although expected, as some estimates regarding ART use and viral suppression rates are based on the AHOD and GCPS. Recent treatment cascades for the Australian HIV-positive population have estimated that treatment rates are higher than in the past.¹⁰ In 2012, it was estimated that 50–70% of people diagnosed with HIV in Australia were receiving treatment, of which 85–95% had a suppressed viral load.¹¹ From the Australian treatment cascade, which uses data from the AHOD, GCPS and other sources including iPharmacy, it is estimated that 47–75% of people living with HIV are on treatment and 54–87% of HIV-positive individuals have viral suppression.^{10,12} Overall, these data in combination provide sufficient evidence to suggest an increasing trend in ART coverage and viral suppression rates for HIV-positive individuals in Australia.

Our findings have shown disparity across the two studies as well as between the combined adjusted and unadjusted estimates. The adjusted proportion receiving ART and, receiving ART with an undetectable viral load, is ~15% and 20% lower than the unadjusted proportions, respectively. The combined sample consisted of HIV-positive GSM mainly aged 40 years and above; however, the wider HIV-positive GSM population also consists of younger aged HIV-positive GSM, which have much lower proportions receiving ART.¹³ As such, the crude rates will tend to overestimate proportions while the inclusion of age standardisation and weighting adjustments have yielded lower estimates than the unadjusted estimates, and therefore a likely closer approximation of the proportions of the true population of HIV-positive GSM. Nevertheless, the adjusted and unadjusted proportion receiving ART with an undetectable viral load was similar and indicates the efficacy of ART to suppress the HIV viral load.

A key limitation of this study is the extent to which the adjusted proportions can be projected to a population level. Previous surveys conducted among the Australian HIV-positive population, such as the HIV Futures 4, have reported rates of ART coverage similar to our estimates. However, our findings are not estimated to reflect the rates of ART coverage and undetectable viral load in the entire Australian HIV-positive population. The combination of the AHOD and GCPS is only intended to provide a more representative framework of the GSM community and better insight into ART coverage.¹⁴ Finally, the

studies included in these analyses have very different modes of data collection, whereby the AHOD relies on clinical biomarker results data while the GCPS is based on self-report, which may affect the validity of our findings.

Currently, there are limited estimates on ART uptake among HIV-positive GSM in Australia. This study provides greater detail and offers new insight into recent trends in two major Australian studies. The differences in ART coverage between the AHOD and GCPS samples highlight the importance of engaging HIV-positive GSM, outside of the clinical setting, to receive care and achieve higher rates of ART coverage. The results also highlight the scope for further increasing ART uptake among HIV-positive GSM and the extent to which increased uptake of HIV treatment may contribute to prevention. Furthermore, it demonstrates the need to engage HIV-positive GSM aged 30 years and below in future potential studies and, in ART uptake and care. The findings of this study encouragingly suggest that progress is being made in achieving the target of the seventh National HIV Strategy to increase the proportion of people living with HIV receiving ART.¹⁵

Acknowledgments

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AHOD reviewers: D. Sowden, J. Hoy, L. Wray, I. Woolley, K. Morwood, N. Roth, K. Choong, C.C. O'Connor, M.A. Boyd.

Funding: The Australian HIV Observational Database is funded as part of the Asia-Pacific HIV Observational Database, a program of The Foundation for AIDS Research, amfAR, and is supported in part by a grant from the USA National Institutes of Health's National Institute of Allergy and Infectious Diseases (NIAID) (Grant No. U01-AI069907) and by unconditional grants from Merck Sharp & Dohme; Gilead Sciences; Bristol-Myers Squibb; Boehringer Ingelheim; Janssen-Cilag; and ViiV Healthcare. The Kirby Institute is affiliated with the Faculty of Medicine, UNSW Sydney, NSW Australia.

The Centre for Social Research in Health and the Kirby Institute are supported by the Australian Government Department of Health and Ageing. The GCPS has been funded by each participating state/territory health department. This paper is part of a collaborative project funded by the National Health and Medical Research Council (NHMRC ID1021790). Recruitment is conducted through AIDS councils and HIV community organisations nationally (co-ordination) and state/territory wide (execution). We value the ongoing trust, input and support from our participants. The views expressed in this publication do not necessarily represent the position of the Australian Government.

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Fig. 1.

Proportion of HIV-positive gay and other men who have sex with men (GMSM) on antiretroviral therapy (ART), with 95% confidence intervals, for the Australian HIV Observational Database (AHOD), Gay Community Periodic Surveys (GCPS), combined and adjusted-combined* samples, obtained from the period 2010–2012. *Includes weighting and age standardisation of the combined data.

Fig. 2.

Proportion of HIV-positive gay and other men who have sex with men (GMSM) by treatment status who had an undetectable viral load, with 95% confidence intervals, for combined and adjusted-combined* samples, obtained from the period 2010–2012. *Includes weighting and age standardisation of the combined data.

Table 1

Overview of characteristics of the Australian HIV Observational Database (AHOD) and Gay Community Periodic Surveys (GCPs) samples, obtained from the period 2010–2012

	AHOD				GCPs			
	2010	2011	2012	2010	2011	2012	2010	2012
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Age (years)	1868 (–)	1729 (–)	1654 (–)	725 (–)	693 (–)	632 (–)		
<25	13 (1)	14 (1)	7 (0)	16 (2)	15 (2)	21 (3)		
25–29	44 (2)	37 (2)	31 (2)	44 (6)	49 (7)	35 (6)		
30–39	247 (13)	220 (13)	187 (11)	183 (25)	162 (23)	125 (20)		
40–49	678 (36)	588 (34)	534 (32)	300 (42)	272 (39)	262 (42)		
50	886 (47)	870 (50)	895 (54)	176 (24)	193 (28)	185 (29)		
Unknown	– (–)	– (–)	– (–)	6 (–)	2 (–)	4 (–)		
Median [IQR]	49.3 [42.8–56.6]	50.0 [43.4–57.2]	51.1 [44.4–58.2]	43.0 [37.0–49.0]	44.0 [37.0–50.0]	44.0 [38.0–50.5]		
State								
NSW	839 (45)	832 (48)	780 (47)	287 (40)	352 (51)	314 (50)		
Vic.	553 (30)	550 (32)	542 (33)	217 (30)	163 (24)	157 (25)		
Qld	385 (21)	263 (15)	249 (15)	125 (17)	125 (18)	97 (15)		
Other	91 (5)	84 (5)	83 (5)	93 (13)	53 (8)	64 (10)		
Ethnicity								
Aboriginal or Torres Strait Islander	30 (2)	26 (2)	24 (2)	28 (4)	23 (3)	17 (3)		
Anglo-Australian	1145 (76)	1043 (77)	995 (77)	563 (78)	518 (76)	471 (75)		
European	137 (9)	127 (9)	114 (9)	97 (13)	91 (13)	77 (12)		
Non-European	195 (13)	165 (12)	156 (12)	37 (5)	47 (7)	59 (9)		
Not stated	361 (–)	368 (–)	365 (–)	– (–)	14 (–)	8 (8)		
Patient care								
Clinic	1481 (79)	1358 (79)	1311 (79)	146 (20)	162 (23)	116 (18)		
Hospital	387 (21)	371 (21)	343 (21)	– (–)	– (–)	– (–)		
Community	– (–)	– (–)	– (–)	579 (80)	531 (77)	516 (82)		
CD4 count (cells μL^{-1})								

	AHOD						GCPS					
	2010		2011		2012		2010		2011		2012	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
200	66	(4)	53	(3)	49	(3)	–	(–)	–	(–)	50	(8)
201–350	184	(10)	167	(10)	123	(7)	–	(–)	–	(–)	53	(8)
351–500	406	(22)	310	(18)	295	(18)	–	(–)	–	(–)	129	(20)
>501	957	(51)	1037	(60)	1027	(62)	–	(–)	–	(–)	325	(51)
Missing	255	(–)	162	(–)	160	(–)	–	(–)	–	(–)	71	(–)
Year diagnosed												
<1990	440	(25)	401	(24)	378	(24)	134	(19)	118	(18)	107	(18)
1990–1999	780	(43)	699	(42)	658	(42)	211	(31)	177	(27)	153	(25)
2000–2012	576	(32)	555	(34)	543	(34)	342	(50)	361	(55)	349	(57)
Missing	72	(–)	74	(–)	75	(–)	38	(–)	37	(–)	23	(–)
Receiving ART	1673	(90)	1568	(91)	1522	(92)	530	(76)	521	(79)	504	(82)
Clinic	1308	(78)	1217	(78)	1198	(79)	117	(22)	138	(26)	100	(20)
Hospital	365	(22)	351	(22)	324	(21)	–	(–)	–	(–)	–	(–)
Community	–	(–)	–	(–)	–	(–)	413	(78)	383	(74)	404	(80)
Unknown	–	(–)	–	(–)	–	(–)	32	(–)	36	(–)	19	(–)

IQR, interquartile range; ART, antiretroviral therapy