


In Australia, Most HIV Infections Among Gay and Bisexual Men are Attributable to Sex with ‘New’ Partners

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Abstract It has been estimated that the majority of global HIV infections among gay and bisexual men (GBM) can be attributed to sex within a committed relationship. In Australia, however, negotiated safety, whereby HIV-negative regular partners agree to discard condoms with each other but commit to consistent condom use with other partners, has been promoted as a key component of the HIV prevention response. We asked GBM recently diagnosed with HIV to describe their relationship to the person they believed to be the source of their infection (‘source person’). The majority (66.1%) ascribed their infection to a casual partner. A further 23.3% ascribed their infection to a non-committed and non-romantic partner (or ‘fuckbuddy’). Only 10.6% believed they had acquired their HIV from a ‘boyfriend’ in the context of a committed romantic relationship, and 51.7% of these occurred within the first 3 months following their first sexual contact. Most men (61.5%) believed they had acquired their HIV infection on the first occasion they had sex with the source person. In the Australian context, negotiated safety appears to have minimised infections between regular partners. However, many HIV infections between regular partners may not be in the context of a romantic committed relationship, and yet this distinction between types of regular partners has been all but ignored. Furthermore, in this sample, most infections occurred on the occasion of first meeting, suggesting that the most useful indicators of risk may be the

characteristics, contexts, and lengths of sexual partnerships and how sex is negotiated, rather than how GBM categorize their partner. Findings suggest more new HIV infections occur in new partnerships, than in established relationships.

Keywords HIV transmission · Gay men · Relationship categories · Familiarity

Introduction

Sex between men accounts for a disproportionate number of new HIV infections globally [1]. In many developed countries with significant HIV epidemics among gay and bisexual men (GBM), a large proportion of HIV transmissions have been found to occur within the context of a regular relationship [2–6]. In Australia, however, regular partnerships have accounted for lower proportions of HIV infections among GBM [7–9]. This paper considers the role of different partnership types in how Australian GBM account for the circumstances of their HIV infection and whether the category of regular partner is sufficient for interpreting HIV infections among GBM.

In the United States, more than two-thirds of new HIV infections among GBM are ascribed to sex with a regular, or ‘main’ partner [3]. In Amsterdam in 2003, as many as 86% of new infections were attributed to sex with a ‘steady’ partner [4]. Modelling conducted in the United Kingdom has suggested that HIV transmission within repeat sexual partnerships accounts for most infections among GBM, with as many as half of infections occurring through sex with an ongoing steady partner [5]. A study of recently diagnosed GBM in Lisbon found that recent adoption of condomless anal intercourse (CLAI) with

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steady partners was associated with incident HIV [10]. In Australia, however, studies of GBM recently diagnosed with HIV have previously found that the proportion of infections attributed to regular partners was 42% during the 1990s [7], 38% in 2002–2003 [8], and 34% in 2003–2006 [9]. Indeed, CLAI with casual partners, rather than with regular partners, has been found to be the most reliable predictor of trends in HIV infections among Australian GBM [11].

Behavioral research among GBM generally distinguishes sexual practices according to two distinct categories of sex partner—casual and regular partners [6]. The definition of regular, steady, main or primary partner usually implies emotional commitment between the two [12], while other sex partners not considered a main partner are usually defined as casual partners, being primarily sexual rather than romantic partnerships [13]. Casual partners are sometimes defined as a single encounter, or ‘one-night stand’, partner [14]. The proportion of transmissions attributable to regular versus casual partners depends on these different definitions of partner categories. Australian research has found that the category of regular partner in particular includes at least two very different types of partnership (‘fuckbuddies’ and ‘boyfriends’) that can be distinguished by the degree of romantic involvement and emotional commitment invested in them [15].

It is likely that study participants also understand these partnerships in different ways. Not all casual partners are anonymous, or unknown, or single encounter partners. Though they may not consider themselves to be in a ‘regular relationship’, men do report repeat occasions of sexual contact with casual partners [16–18]. On the other hand, some men do not always consider themselves to be ‘in a relationship’ with men they might otherwise define as ‘regular partners’ [15]. Regardless, though, men are more likely to engage in CLAI with partners they are familiar with [16–18]. Consistently, GBM have been found to be more likely to report CLAI with a partner who is known to them, than with new or anonymous sexual partners [19–21]. Indeed, most GBM use condoms for anal sex with casual partners most of the time [22]. Importantly, these issues are likely to have been affected by the emergence of HIV treatment as prevention (TasP) and pre-exposure prophylaxis (PrEP).

In response to findings in Australia that GBM often ceased condom use in the context of a regular relationship, ‘negotiated safety’ was developed as an HIV prevention intervention aimed at assisting GBM to safely negotiate CLAI with their regular partner [23]. For almost two decades, the majority of Australian GBM in a regular relationship have been found to have a negotiated safety agreement with their partner [24], though more recently this proportion may be decreasing [25]. Australian GBM

practicing negotiated safety correctly have not been found to be at elevated risk of acquiring HIV [26]. However, if not supported by community-level education, negotiated safety-type arrangements are less effective [27].

There appear to be substantial differences in the attribution of HIV infections to regular partners among GBM between Australia and other locations. Also, the categorization of partnership types among GBM has been varied, inconsistent, and possibly far more simplistic than is warranted. It is therefore unclear to what extent recent HIV infections among GBM can be ascribed to men in romantic committed relationships or whether they reflect a lack of careful distinction between discrete and complex partnership categories. In this paper we determined the proportion of recent HIV infections attributable to sex with different categories of partner, by self-report, and the nature of the relationships between these partner types in the context of HIV transmission. We also assess the usefulness of the types of partnership categories that have been applied to analyses of HIV risk behaviors.

Methods

The HIV Seroconversion Study included an online survey of people in Australia who had recently been diagnosed with HIV. Ethics approval for online informed consent was obtained from the University of New South Wales and La Trobe University research ethics committees. Eligibility criteria for the study included being aged 16 years and over, living in Australia and having been diagnosed HIV-positive within the 2 years prior to enrolment. Participants enrolled into the study through referrals from community-based HIV organisations or clinical staff in medical practices, or through direct enrolment via internet postings. Eligible participants were directed to the study website, which provided information and the opportunity to enrol into the study through the completion of an online questionnaire. The methods have been described in more detail elsewhere [28].

Survey Questionnaire

The questionnaire included demographic characteristics, details of participants’ diagnosis with HIV, such as when and where their diagnosis was given, and their sexual and drug-taking behaviors both prior to and since their diagnosis. Participants were asked if they could identify the high-risk event (HRE) at which they believe they acquired their infection, and if they could identify the sex partner they believed to be the source of their HIV infection (the Source Person). Those who could identify a Source Person were asked: ‘Would you describe the person you believe gave you HIV as: a casual partner, a fuckbuddy, a regular

partner (boyfriend), or other?'. Responses were limited to these four options. Those who could identify such a partner were then asked about their relationship with that partner, their prior knowledge and previous sex with that partner, and what they believed the partner's HIV status to be at the time.

Participants and Sample

These analyses are restricted to men in the Seroconversion Study, who acquired their HIV infection from another man. From December 2007 to August 2015, 707 male respondents recently diagnosed with HIV and reporting that their HIV-infection was due to homosexual contact had enrolled into the study, herein defined as GBM. Most of the men ($n = 561$, 79.3%) were able to identify an individual they believed to be the source of their infection. Of these, 545 (77.1% of the overall sample) provided responses to key variables about their relationship to that person and were included in the analyses. We compared these 545 men with the remaining 162 men on key demographic and behavioral variables. The men who were excluded were slightly younger than the men included in the analyses (with a mean age of 33.0 years, SD 8.72, compared to 35.3 years, SD 9.73 among those included in the sample). Otherwise, there were no differences between the two groups.

Analysis

The quantitative data were analysed with SPSSTM software (IBM SPSS Statistics ver. 23.0, IBM Corporation, Armonk, NY). We report demographic data, as well as characteristics of participants' relationship to the partner they believed to be the Source Person. The men were then compared, based on their relationship to the partner from whom they acquired their infection, in order to determine any factors associated with risk of acquiring HIV from specific partner-types.

For univariate analyses, categorical variables were analysed using Pearson's χ^2 test and ordinal variables were analysed using Spearman's correlation test. We used type I error of 5% for these analyses. To estimate statistical associations with the likelihood of men reporting the source of their infection as being a 'boyfriend' or 'fuckbuddy' compared to those reporting a 'casual partner' as the Source Person, we used binomial logistical regression models and presented odds ratios (ORs) and 95% confidence intervals (CIs).

Results

About half ($n = 278$, 49.0%) of the 545 men in our sample had been diagnosed with HIV infection within 6 months prior to enrolment. They had a mean age of 35.3 years (SD

9.73), were mostly gay-identified, had high levels of education, and were mostly Australian-born (Table 1). When asked to describe their relationship to the Source Person, two-thirds ($n = 360$, 66.1%) reported that partner to be a casual partner, just under a quarter ($n = 127$, 23.3%) described him as a fuckbuddy, while the remaining 58 men (10.6%) reported their boyfriend as the source of their infection.

The men who believed the Source Person to be a casual partner had a mean age of 35.8 years (SD 9.79). Just under three quarters ($n = 259$, 71.9%) had met that casual partner for the first time on the occasion of the transmission event, with a further 19.2% having only met him recently (Table 1). More than three quarters had no prior sexual contact with that casual partner, and more than half did not know his HIV status.

Men who believed that the Source Person was a 'fuckbuddy' had a mean age of 35.5 years (SD 9.46). One in five of those who believed that the Source Person was a 'fuckbuddy' reported having met that partner for the first time at the HRE, with almost half having met him recently; just over a third reported he was previously well known to them (Table 1). A third had no prior sexual contact with the Source Person, and almost half had their first sexual contact with him in the 12 months prior to the HRE. Almost two-thirds did not know his HIV status at the time of the HRE.

The mean age of the men who believed the Source Person to be their boyfriend was 31.6 years (SD 9.31). Most described this partner as 'previously well known to them'; though almost one in five had only met him recently before the HRE. Six had not previously had sex with him. Of those reporting prior sex, almost half report their first sex as being within 3 months of the HRE.

Demographically, there was little difference between the men, according to their relationship to the Source Person, except that those reporting the Source Person to be their boyfriend were younger. Those who reported the Source Person to be a fuckbuddy were more likely to know his HIV status than those reporting a casual partner as the Source Person (believed HIV-negative: OR 2.47, 95% CI 1.31–4.66, $p = 0.005$; and believed HIV-positive: OR 2.23, 95% CI 1.20–4.16, $p = 0.012$) (Table 2).

In multivariate analyses, younger age and knowledge of partner's HIV status were independently associated with the Source Person being their boyfriend. Compared to men who were infected by a casual partner, those who reported their boyfriend to be the Source Person were more likely to be under 30 years old (Table 2). They were also more likely to know the HIV status of that partner, both when they believed him to be HIV-negative (OR 5.68, 95% CI 2.65–12.16, $p < 0.001$) and when they believed him to be HIV-positive (OR 5.86, 95% CI 2.83–12.52, $p < 0.001$).

Table 1 Characteristics of the sample, by their relationship to the Source Person

<i>N</i> = 545 <i>N</i> (%)	Casual partner <i>N</i> = 360 (66.1%)	Fuckbuddy <i>N</i> = 127 (23.3%)	Boyfriend <i>N</i> = 58 (10.6%)
Age at diagnosis (years)			
Mean (SD)	35.8 (9.79)	35.5 (9.46)	31.6 (9.31)**
Under 30	101 (28.1)	31 (24.4)	29 (50.0)*
30–39	134 (37.2)	51 (40.2)	16 (27.6)*
40–49	81 (22.5)	29 (22.8)	10 (17.2)*
50 and over	31 (8.6)	10 (7.9)	2 (3.4)
Not provided	13 (3.6)	6 (4.7)	1 (1.7)
Sexual identity			
Gay/homosexual	331 (91.9)	116 (91.3)	56 (96.6)
Other	24 (6.7)	11 (8.7)	2 (3.4)
Not provided	5 (1.4)	–	–
Education			
Less than university level	154 (42.8)	61 (48.0)	30 (51.7)
University undergraduate level	133 (36.9)	36 (28.3)	18 (31.0)
University postgraduate level	69 (19.2)	29 (22.8)	10 (17.2)
Not provided	4 (1.1)	1 (0.8)	–
Country of birth			
Australia	262 (72.8)	84 (66.1)	39 (62.7)
Other	95 (26.4)	42 (33.1)	19 (32.8)
Not provided	3 (0.8)	1 (0.8)	–
In a relationship at time of HRE			
Yes	217 (60.3)	71 (55.9)	45 (77.6)
No	121 (33.6)	41 (32.3)	7 (12.1)
Not provided	22 (6.1)	15 (11.8)	6 (10.3)
Familiarity with Source Person			
Met for first time at HRE	259 (71.9)	25 (19.7)	1 (1.7)
Someone met recently	69 (19.2)	58 (45.7)	10 (17.2)
Previously well known	28 (7.8)	44 (34.6)	47 (81.0)
Not provided	4 (1.1)	–	–
Prior sex with Source Person, time between first sex and HRE			
Never	286 (79.4)	43 (33.9)	6 (10.3)
Less than 1 month	25 (6.9)	14 (11.0)**	9 (15.5)**
2–3 months	18 (5.0)	15 (11.8)**	15 (25.9)**
4–6 months	8 (2.2)	15 (11.8)**	6 (10.3)**
7–12 months	9 (2.5)	16 (12.6)**	5 (8.6)**
More than 1 year	10 (2.8)	24 (18.9)	16 (27.6)
Not provided	4 (1.1)	–	1 (1.7)
Disclosure by Source Person			
Hadn't been told at time of HRE	284 (78.9)	78 (61.4)	25 (43.1)
Told before event—HIV-positive	31 (8.6)	19 (15.0)	16 (29.1)
Told before event—HIV-negative	28 (7.8)	19 (15.0)	14 (24.1)
Not provided	17 (4.7)	11 (8.7)	3 (5.2)

* $p < 0.05$ ** $p < 0.005$

Two-fifths of the men reported being in an ongoing regular relationship at the time of the HRE (Table 3). Of those men in a relationship, just over a quarter ascribed

their infection to their boyfriend. Those who believed their boyfriend to be the Source Person were younger, more likely to report their boyfriend being HIV-positive at the

Table 2 Univariate and multivariate analyses with those reporting a casual partner as the Source Person being the reference category

	Predict fuckbuddy versus casual partner				Predict boyfriend versus casual partner			
	Univariate		Multivariate		Univariate		Multivariate	
	Odds ratio	P value	Adjusted odds ratio	P-value	Odds ratio	P-value	Adjusted odds ratio	P-value
Age at diagnosis (years)								
Under 30	Ref		Ref		Ref		Ref	
30–39	1.24 (0.74–2.10)	0.414	1.30 (0.75–2.27)	0.349	0.42 (0.21–0.81)	0.009	0.42 (0.20–0.86)	0.018
40–49	1.17 (0.65–2.09)	0.606	1.27 (0.69–2.36)	0.446	0.39 (0.17–0.86)	0.020	0.43 (0.18–1.00)	0.050
50 and over	1.05 (0.46–2.38)	0.905	1.05 (0.44–2.51)	0.909	0.23 (0.51–1.00)	0.049	0.31 (0.07–1.43)	0.133
Knowledge of partner’s HIV status								
Didn’t know	Ref		Ref		Ref		Ref	
Believed HIV-positive	2.23 (1.20–4.16)	0.012	2.38 (1.27–4.46)	0.007	5.86 (2.83–12.52)	<0.001	5.11 (2.41–10.83)	<0.001
Believed HIV-negative	2.47 (1.31–4.66)	0.005	2.81 (1.47–5.36)	0.002	5.68 (2.65–12.16)	<0.001	6.26 (2.84–13.78)	<0.001

Significance test conducted using binomial logistic regression, using ‘casual partner’ as the reference category

Table 3 Men in relationships, their age, knowledge of boyfriend’s status, and the length of that relationship

	N = 220	Boyfriend was not the Source Person N = 162 (73.6%)	Boyfriend was the Source Person N = 58 (26.4%)
Age at diagnosis (years)			
Mean (SD)		36.1 (9.64)	31.6 (9.31)**
Under 30		42 (25.9)	29 (50.0)*
30–39		61 (37.7)	16 (27.6)
40–49		37 (22.8)	10 (17.2)
50 years and over		15 (9.3)	2 (3.4)
Not provided		7 (4.3)	1 (1.7)
Knowledge of partner’s HIV status			
Didn’t know		13 (8.0)	3 (5.2)**
Believed HIV-positive		11 (6.8)	15 (25.9)
Believed HIV-negative		123 (75.9)	14 (24.1)
Not provided		15 (9.3)	26 (44.8)
Length of relationship at time of HRE			
Less than 1 month		6 (3.7)	2 (3.4)**
1–3 months		15 (9.3)	11 (19.0)
3–6 months		6 (3.7)	1 (1.7)
6–12 months		7 (4.3)	5 (8.6)
1–2 years		21 (13.0)	12 (20.7)
More than 2 years		99 (61.1)	13 (22.4)
Not provided		8 (4.9)	14 (24.1)

* $p < 0.05$

** $p < 0.005$

time, and more likely to report their relationship as being relatively recent compared to men who did not believe their boyfriend was the Source Person. Only sixteen infections (2.9% of this sample) were reported from known serodiscordant partnerships.

Discussion

In this sample, most HIV infections were reported as occurring between partners who had little prior knowledge of each other. Few HIV infections were transmitted

between men in regular, ongoing committed relationships. Moreover, among men who were in a relationship with a regular male partner at the time of their HIV infection, only a minority attributed their infection to that partner. Indeed, for the majority who believed they were infected by regular partners, these partners were not in fact their boyfriends, but the less committed category of a fuckbuddy. These findings contrast with data collected in other settings where the proportion of new infections among GBM that are ascribed to regular partners is often considerably higher [3–5, 10]. These discrepancies between Australian and international findings suggest further research be carried out, to identify the relationships categories that represented the greatest risk for HIV.

Known serodiscordant partnerships accounted for very few infections in this sample. In the Australian context, most men diagnosed with HIV are on antiretroviral treatment, and have undetectable viral load [29]. They are likely to present little risk for HIV transmission [30]. The greater risk appears to be due to unknown serodiscordancy, as has also been found in previous estimates of the proportion of new infections accounted for by undiagnosed infection [31].

As has been found previously in Australia's HIV Seroconversion Study [7–9], about two-thirds of HIV infections were attributed to sex between casual male partners. Previously, the remaining third of infections were attributed to sex between 'regular' partners, and usually within the first year of these relationships. In Australia, as elsewhere, these regular partnerships have been characterized as committed and romantic relationships. However, our data suggest that this may not be the case, and that many such partnerships may be less committed or stable than has been assumed. The finding that those men who believed their boyfriend to be the Source Person were significantly younger may reflect that these men were practicing what has been described elsewhere as 'serial monogamy' [25].

Overall, there was a preponderance of men who were infected by partners they knew little about and who they had only just met, or at least had only met recently. Within each of the partnership categories there are differing levels of familiarity, trust, and knowledge-communication, suggesting that the categories themselves are permeable. Knowledge of partners' HIV status depended on how well these partners were known to the respondents. Most often among those who reported the source of their infection as having been a boyfriend, these were, in fact, relatively recent relationships, including some that, on the occasion of their likely infection, they had only met for the first time.

The integration of negotiated safety into HIV prevention among GBM in Australia could account for the relative absence of men in established committed relationships being infected by their boyfriend. An earlier cohort study

of HIV-negative GBM in Sydney found that negotiated safety was not significantly associated with increased risk of HIV incidence, compared to no CLAI [26]. Although our data cannot clearly demonstrate the efficacy of negotiated safety, they do appear to support that conclusion, suggesting that at least in the Australian context, negotiated safety has been a successful method of risk reduction among GBM.

Previous work has suggested that CLAI with casual partners, in the context of greater familiarity with that partner represents increased HIV risk [17, 18]. At one time, when men were observed to be engaging in CLAI with regular partners, this was described as 'complacency' and categorized as 'risk behavior' [32], until the practice was properly understood, and endorsed as negotiated safety, and arguably found to carry no risk [20, 26]. Our findings suggest that familiarity between known partners in general may be somewhat protective, perhaps presenting further opportunities for risk reduction. Adapting the principles of negotiated safety to emphasize the importance of familiarity and trust accompanied by accurate knowledge in ways that are applicable to the different partnership categories may help men better negotiate sexual behaviors regardless of partnership type. However, negotiated safety has been effective while it was reserved for boyfriend-type relationships, with high levels of familiarity and trust. Broadening its application to include multiple concurrent arrangements would need to account for negotiating trust in the context of non-committed, primarily sexual partnerships.

On the other hand, though, the fundamental problem highlighted by our data is that most HIV infections occur between partners who have only just, or recently met. Negotiating trust and improving communication between new partners cannot entirely remove the risks involved. Recent sexual risk behavior, other sexual partners, length of time since previous test, testing technologies and window periods are all factors that are exacerbated by the recency of first meeting. Negotiated safety style arrangements may be able to mitigate against these problems for more familiar partnerships, but for new partners it may not be feasible to negotiate away sufficient risk. Advocating condom use for all new partners is one possible option, although, presumably, most men in this study had already been exposed to this advice, and had acted otherwise.

Overall, our findings suggest that a greater proportion of new infections may be due to non-established or new partnerships than previously recognized. This may be partly due to how data are collected and to how partnership types are categorized. Describing sexual partnerships between GBM as a simple regular versus casual binary opposite conceals a far greater complexity [15]. Length of

relationship, prior sexual and social contact, degree of trust and commitment, and the relative reliability of knowledge of each other's HIV status need to be considered. Failing to consider such factors in the classification of partnership types may account for at least some of the discrepancies between Australian data and those from comparable international settings in the attribution of the source of infection by partner type. The use of three relationship categories provided some contextual detail that is useful. However, ultimately the most important data appear to be not how the men themselves categorize the partner type of the Source Person, but what were the characteristics of their relationship to that partner. This suggests that certain fundamental and key components of sexual behavior data collection among GBM may require substantial reconsideration. Also, the attribution of HIV infection by partnership type that has become increasingly common in HIV surveillance in many jurisdictions may have concealed some key elements of the social and personal contexts of HIV transmission. While additional categories of partner type may reveal more nuance, further research is needed to identify the key characteristics that distinguish reliably familiar partners from partners with whom negotiation of sexual risk behavior may be problematic.

In the meantime, health promotion materials need to educate men about reducing HIV risk with their fuckbuddies. Such material does not currently exist, with educational messages either targeting men in relationships, or men who have casual sex partners.

There are a number of limitations to these findings. This was an online, volunteer cross-sectional sample, and may not be representative of all recently HIV-diagnosed GBM in Australia. Participants were asked to nominate and describe the partner they believed most likely to be the Source Person, but it was not possible to determine whether the partner they identified was in fact the partner from whom they acquired their infection. For some men, they may have been reluctant to attribute blame for their infection to a regular partner with whom they had a close emotional bond. On the other hand, some men may have been reluctant to acknowledge that they had taken undue risk with partners with whom they had little or no relationship. Those men who completed the survey soon after their HIV diagnosis may have had better recall of the Source Person, and the occasion of their infection than those completing the survey up to 2 years following their diagnosis. Individuals may have interpreted the partner categories in different ways. It is also important to note that enrolment to the study occurred during a time when PrEP and TasP have changed the culture of HIV and sex among GBM.

Conclusions

In contrast to what is found in many settings, most new HIV infections in Australia appear to occur between 'new' partners. The endorsement of negotiated safety as an HIV-prevention strategy may account for some of this difference. Nonetheless, the binary opposite categories of regular and casual partner types are insufficient to determine HIV risk, and may conceal factors critical to understanding the contexts of HIV infection among GBM. The characteristics of men's partnerships, such as relationship duration, prior sexual contact, and knowledge of HIV status would provide a better focus for data collection. As the implementation of PrEP and TasP further complicate sexual negotiations among GBM, a better understanding of their partnerships is key to ensuring that such negotiations are effective. Research and harm reduction among GBM needs to account for the diversity in gay male relationships in a more nuanced way that neither over-romanticizes all sexual partnerships, nor ignores the role of emotional connections in how men negotiate risk.

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Compliance with Ethical Standards

Conflict of interest None declared.

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