

Australian sexually transmissible infection and HIV testing guidelines for asymptomatic men who have sex with men 2014: a review of the evidence

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Abstract. Men who have sex with men (MSM) in Australia and overseas are disproportionately affected by sexually transmissible infections (STIs), including HIV. Many STIs are asymptomatic, so regular testing and management of asymptomatic MSM remains an important component of effective control. We reviewed articles from January 2009–May 2013 to inform the 2014 update of the 2010 Australian testing guidelines for asymptomatic MSM. Key changes include: a recommendation for pharyngeal chlamydia (*Chlamydia trachomatis*) testing, use of nucleic acid amplification tests alone for gonorrhoea (*Neisseria gonorrhoeae*) testing (without gonococcal culture), more frequent (up to four times a year) gonorrhoea and chlamydia testing in sexually active HIV-positive MSM, time required since last void for chlamydia first-void urine collection specified at 20 min, urethral meatal swab as an alternative to first-void urine for urethral chlamydia testing, and the use of electronic reminders to increase STI and HIV retesting rates among MSM.

Additional keywords: chlamydia, first-void urine, gonorrhoea, nucleic acid amplification test, reminders, swabs.

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Introduction

In Australia, men who have sex with men (MSM) continue to be disproportionately affected by sexually transmissible infections (STIs) including HIV.^{1–3} STI and HIV rates have been increasing in recent years among MSM,^{3,4} and have been attributed to several factors, including changes in sexual behaviour such as reductions in condom use for anal intercourse, and HIV risk reduction strategies.^{5,6} Many STIs do not lead to symptomatic presentations; therefore, regular STI testing will identify a large number of infections that would otherwise remain undiagnosed and untreated.⁷

Last year in Australia, there was a 10% increase in new HIV diagnoses,⁴ which mostly occurred among MSM. As other STIs facilitate HIV transmission,⁸ regular testing and management of identified STIs among MSM is also likely to be an important strategy in reducing new HIV infections in Australia.

The Sexually Transmitted Infections in Gay Men Action group (STIGMA) was established in 2000 in response to the

increasing prevalence of STIs among inner Sydney MSM. STIGMA is a collaborative body comprising representation from sexual health and HIV clinical services, public health units, health promotion, community-based organisations, research centres and general practice. The aim of the group is to reduce the community prevalence of STIs through a multifaceted approach including health promotion and education, research and guideline development. A STIGMA working group was formed in early 2013 to review and update the 2010 STI and HIV testing recommendations.⁹ The methods and findings of the comprehensive literature review informing this update are outlined in this paper, including a summary of the new 2014 guidelines in Table 1. Key changes from the 2010 guidelines are outlined in Table 2.

Methods

A PubMed search was performed for articles published between 1 January 2009 and 30 May 2013 using the MESH term 'homosexual, male', and terms specific for each infection as

Table 1. Australian sexually transmitted infection (STI) and HIV testing guidelines for asymptomatic men who have sex with men (MSM), 2014
EIA, enzyme immunoassay; FVU, first-void urine (initial part of the urine stream, not the first urine of the day and not mid-stream urine; specimen collected at least 20 min after last passing urine); HAV, hepatitis A virus; HBV, hepatitis B virus; HCV, hepatitis C virus; IgG, immunoglobulin G; NAAT, nucleic acid amplification test

Who to test:		Frequency of tests listed:	
All men who have any type of sex with another man		At least once per year	
All MSM who meet one or more of the following criteria:		Up to four times per year	
<ul style="list-style-type: none"> • any unprotected anal sex • more than 10 sexual partners in 6 months • participation in group sex • use of recreational drugs during sex • HIV-positive^{A,B} 			

Site/specimen	STI	Technology	Comment
Pharyngeal swab	Chlamydia/gonorrhoea ^A	NAAT	Self-collected or clinician-collected
Anorectal swab	Chlamydia/gonorrhoea ^A	NAAT	Self-collected or clinician-collected
FVU	Chlamydia ^A	NAAT	Alternative: self-collected or clinician-collected penile meatal swab
Serology	Syphilis ^B	EIA	
	HIV	EIA	If HIV-negative
	Hepatitis A	HAV IgG EIA	Test if not vaccinated. Vaccinate if antibody negative
	Hepatitis B	HBV core antibody, surface Antigen EIA	Test if not vaccinated. Vaccinate if no history or documentation of full vaccination course
	Hepatitis C	HCV IgG EIA	Only in HIV-positive or if history of injecting drug use

^AChlamydia/gonorrhoea testing should be considered at each occasion of HIV immune monitoring.

^BSyphilis serology should be conducted at each occasion of HIV immune monitoring.

outlined below. For STIs not previously considered in the guidelines (*Mycoplasma genitalium* and *Trichomonas vaginalis*), all available articles, irrespective of publication date, were considered. All potentially relevant abstracts were reviewed and the reference lists of reviewed full-text articles checked. For each STI, the number of articles retrieved, abstracts reviewed and full-text articles reviewed were as follows: gonorrhoea (*Neisseria gonorrhoeae*) and chlamydia (*Chlamydia trachomatis*): 758, 216, 84; lymphogranuloma venereum (LGV): 168, 74, 32; *M. genitalium*: 17, 12, 9; *T. vaginalis*: 19, 7, 5; hepatitis A virus (HAV): 17, 17, 4; hepatitis B virus (HBV): 57, 57, 17; hepatitis C virus: 236, 22, 22; syphilis: 288, 43, 28; HIV: 534, 86, 16; HIV coinfecting: 454, 76, 15; herpes simplex virus (HSV): 55, 29, 19; human papillomavirus (HPV): 142, 45, 26. References from the 2010 guidelines, relevant national surveillance and public health reports, and international STI or HIV testing guidelines for MSM were also accessed.

Questions addressed by the review panel were:

- Should we be testing asymptomatic MSM for each specific STI?
- If so, should we be testing all MSM or a particular subgroup of MSM?
- Which anatomical sites should be tested (if relevant)?
- Overall frequency of testing and indications for more frequent testing
- What tests or technology should be used for diagnostic testing?
- Should testing recommendations differ depending on HIV status?

Chlamydia and gonorrhoea

Chlamydia and gonorrhoea are among the most common STIs affecting Australian MSM.^{10,11} Testing at nongenital as well as urethral sites is an important component of chlamydia and gonorrhoea control.^{10–14} However, such ‘comprehensive’ STI testing is occurring in less than half of Australian MSM.¹⁵

Recommendations for chlamydia and gonorrhoea testing among MSM in the 2010 STIGMA guidelines were largely based on the community-based Health in Men (HIM) cohort, which identified a variety of receptive nonpenile intercourse practices that were risk factors for anal chlamydia and gonorrhoea infections, including fingering, fisting, toys and rimming.¹⁰ In contrast to syphilis and HIV infection, there have been no published mathematical models assessing the likely impact of more frequent chlamydia and gonorrhoea testing in Australian MSM.

For pharyngeal infections, there was no association of either chlamydia or gonorrhoea with sore throat symptoms in the HIM cohort,^{11,16} while all pharyngeal chlamydia or gonorrhoea identified in a recent Dutch clinic-based study was asymptomatic.¹⁷ Most pharyngeal chlamydia or gonorrhoea infections are isolated to the pharynx^{11,16–18} and there is strong epidemiological evidence that supports transmission of chlamydia and gonorrhoea between pharyngeal and anogenital sites among MSM. The HIM study found an independent association of both urethral and anal chlamydia with receptive oral sexual practices among MSM, while the univariate association of anogenital gonorrhoea with oral sex was no longer significant after adjustment for demographic and behavioural risk factors.¹⁰ Likewise, independent associations were identified in the HIM study between pharyngeal chlamydia

Table 2. Key changes from the 2010 to 2014 guidelines

NAAT, nucleic acid amplification test; FVU, first-void urine (initial part of the urine stream, not first urine of the day and not mid-stream urine; collect specimen at least 20 min after last passing urine); MSM, men who have sex with men

2010 Guidelines	2014 Guidelines
Recommended tests	
Pharyngeal <i>C. trachomatis</i> testing not recommended	<i>C. trachomatis</i> testing now recommended in the pharynx of MSM
Diagnostic tests	
Culture an alternative to NAAT testing for pharyngeal and anal <i>N. gonorrhoeae</i> diagnosis	Culture no longer a recommended diagnostic test for <i>N. gonorrhoeae</i> diagnosis among asymptomatic MSM
No recommendation on time to wait after last passing urine before <i>C. trachomatis</i> FVU collection	Time required since last passing urine for <i>C. trachomatis</i> FVU collection specified as at least 20 min
No alternative to genital <i>C. trachomatis</i> specimen other than FVU	Urethral meatal swab (self-collected or clinician-collected): alternative to FVU for genital <i>C. trachomatis</i> testing
Indications for more frequent testing	
HIV-positive MSM: three-monthly syphilis testing recommended as part of routine HIV monitoring tests	Additionally in sexually active HIV-positive MSM: consideration should be given to <i>N. gonorrhoeae</i> and <i>C. trachomatis</i> testing up to four times per year
Testing reminders	
No recommendation	Electronic reminders for clinicians and MSM themselves to increase frequency, regularity, and yield of STI/HIV testing

and receptive penile–oral sex,¹⁶ and between pharyngeal gonorrhoea and insertive rimming.¹¹ Overseas, the prevalence of both urethral chlamydia and gonorrhoea infections was found to be over 4% among MSM whose only recent exposure was receptive penile–oral sex, and this was similar to urethral chlamydia and gonorrhoea prevalence among MSM who reported recent unprotected insertive anal intercourse.¹⁹ For pharyngeal chlamydia, a high prevalence-to-incidence ratio¹⁶ suggests that chlamydia infection may be long-lasting in the pharynx, in contrast to gonorrhoea, where a high incidence-to-prevalence ratio¹¹ supports frequent spontaneous resolution.^{20,21} More recently, a pharyngeal chlamydia prevalence of up to 2.3% has been reported among MSM overseas^{14,18,22} and these studies have identified a higher prevalence of pharyngeal chlamydia among MSM than previously reported. Thus chlamydia as well as gonorrhoea testing is now recommended in the pharynx of MSM.

There is strong evidence in Australian MSM that nucleic acid amplification testing (NAAT) for gonorrhoea in those without urethral symptoms yields very few positive results. In a large Sydney clinical cohort, the prevalence was only 0.04% among almost 4500 asymptomatic MSM,²³ and prevalence (0.33%) and incidence (0.26 per 100 person-years (PY)) were both low in the predominantly asymptomatic community-based HIM study.¹⁰ Thus, the previous recommendation not to test asymptomatic MSM for urethral gonorrhoea remains.

Commercially available NAAT is substantially more sensitive for anal and pharyngeal chlamydia and gonorrhoea detection among MSM than culture.^{24–27} NAAT is now recommended as the preferred method of chlamydia and gonorrhoea testing at all sites, provided that supplementary laboratory testing for nongenital gonorrhoea occurs^{28,29} and that gonococcal culture for antibiotic resistance surveillance is performed before treatment.²⁹ Among MSM, gonococcal NAAT is particularly more sensitive than culture at extragenital sites and also among those with asymptomatic infections.^{30–32}

Self-collected anorectal and pharyngeal swabs for chlamydia and gonorrhoea detection using commercially available assays

perform equally well as clinician-collected swabs and are acceptable to MSM.^{14,33–37} In addition, self-collected samples remove the need for routine examination among asymptomatic HIV-negative MSM,³⁸ with self-collected penile meatal swabs also performing well if adequate sampling of the urethral meatus occurs.^{39,40} If first-void urine (FVU) is to be used, studies from Australia⁴¹ and overseas⁴² have suggested the sensitivity for chlamydia detection in the male urethra is similar if urine specimens are collected 20 min after the last void, compared with 1 h after the last void.

Anal chlamydia and gonorrhoea infections have been identified as important risk factors for HIV acquisition among MSM in Australia⁴³ and overseas.^{44–46} Irrespective of antiretroviral therapy, urethral chlamydia or gonorrhoea can increase seminal HIV viral load and thus infectiousness among HIV-positive MSM.⁴⁷ Therefore, regular STI testing among HIV-positive MSM is likely to have public as well as individual health benefits.

Given that higher rates of gonorrhoea⁴⁸ and chlamydia^{24,49} have been reported in Australia and overseas among HIV-positive MSM compared with HIV-negative MSM, more frequent chlamydia and gonorrhoea testing should be considered among sexually active HIV-positive MSM.

Lymphogranuloma venereum

Lymphogranuloma venereum (LGV) appears to have been endemic among MSM in the United States (US) since the early 1980s⁵⁰ but, in the last decade, it has re-established itself as an important STI affecting MSM worldwide.⁵¹ The majority of LGV identified among MSM has been anorectal and symptomatic, and has predominantly affected highly sexually active and sexually adventurous core groups of HIV-positive MSM.^{52–54}

A recent systematic review and meta-analysis⁵⁵ found a significant association of LGV with HIV infection in MSM. LGV has also been described in association with incident HCV infections among MSM.⁵² However, it remains

unclear if such associations are due to behavioural factors, biological factors or a combination of both.

Previous investigations in North America^{56,57} and the United Kingdom (UK)⁵⁸ have failed to identify a substantial reservoir of asymptomatic LGV infection among MSM. This contrasts with other European data, where a large proportion of asymptomatic anorectal chlamydia has been identified as LGV.^{59,60} Anorectal LGV has been identified among Australian MSM in both clinic^{61,62} and community-based^{63,64} settings. In common with most overseas reports, Australian cases predominantly affect HIV-positive MSM, with symptoms of proctitis.

LGV was rarely identified on systematic typing of positive pharyngeal and anogenital chlamydia samples in Australian clinic- and community-based studies.^{61,63,65} Although LGV has been identified in the pharynx of MSM overseas,^{60,66} a single Australian study failed to identify any cases.⁶³

Urethral LGV was recently identified in over 2% of MSM with anorectal LGV and almost 7% of their contacts at an Amsterdam clinic,⁶⁷ with around half of these infections being asymptomatic. This report, from a relatively high-LGV prevalence setting contrasts sharply with other European^{58,60} and Australian⁶³ data, where no reservoir of urethral LGV has been found among unselected MSM populations, irrespective of symptoms.

LGV remains comparatively rare among MSM in Australia. Given the low prevalence of LGV, especially in asymptomatic Australian MSM, routine LGV typing of chlamydia infections in asymptomatic MSM is not currently justified.

Mycoplasma genitalium

Anogenital *M. genitalium* appears to be uncommon in community-based Australian MSM. Prevalence at urethral and anorectal sites was <1% and <2%, respectively, in a cross-sectional study of over 500 Melbourne attendees at sex-on-premises venues (SOPV).⁶⁸ There were no demographic or behavioural correlates of infection and site-specific symptoms were rare. The overall prevalence of anogenital *M. genitalium* was substantially lower than chlamydia or gonorrhoea, a pattern consistent with the prevalence of rectal infections among MSM clinic attendees in the US.⁶⁹ This contrasts with findings from a UK clinic-based study,⁷⁰ where the overall prevalence of all three infections was similar (5–8%), but among a subgroup of HIV-positive men, the prevalence of *M. genitalium* was substantially higher (21%) than that of either gonorrhoea (8%) or chlamydia (13%).

There is strong and consistent epidemiological and clinical evidence that *M. genitalium* can cause both acute and chronic nongonococcal urethritis (NGU).⁶⁹ Findings from clinic-based studies suggest that *M. genitalium* is detected significantly more often in men with NGU than in asymptomatic patients.^{70–73} Nonetheless, *M. genitalium*-related NGU appears to be significantly less common among MSM compared with heterosexual men.^{72,74} Evidence for a role of *M. genitalium* in ascending male genital infections is lacking⁷⁵ and there is currently no evidence that *M. genitalium* colonises or infects the pharynx of MSM.⁶⁸

Although anorectal *M. genitalium* was identified in under 2% of Australian SOPV attendees,⁶⁸ a higher anorectal

M. genitalium prevalence (4–6%) has been reported among sexual health clinic attendees overseas.^{70,76} Urethral-to-anal transmission has been reported in MSM,⁷⁷ although no significant association of *M. genitalium* with anorectal symptoms or clinical proctitis has been described.^{68,70,76}

Multiple studies report an association between *M. genitalium* and HIV infection. *M. genitalium* prevalence appears to be significantly higher at both anal and genital sites among HIV-positive MSM compared with HIV-negative MSM in UK and US clinical settings.^{70,76} A 2009 systematic review and meta-analysis⁷⁸ reported a statistically significant association of *M. genitalium* and HIV in 12 of 19 included studies, although only two included MSM. Most importantly, very few included studies were of prospective design and the critical question of temporal relationship remains unanswered. Longitudinal studies are required to address whether *M. genitalium* is a risk factor for HIV in MSM.

Before advocating routine *M. genitalium* testing, further studies to understand the contribution of *M. genitalium* to anogenital disease and its impact on HIV acquisition among MSM are required.

Trichomonas vaginalis

There are few data on *T. vaginalis* among MSM and none have reported its association with site-specific symptoms or clinical syndromes. To date, no studies have been performed among Australian MSM.

A *T. vaginalis* prevalence of 1.1% was found on urine NAAT testing of over 600 community-based MSM in El Salvador.⁷⁹ However, over one-third of these MSM reported sex with a female partner in the past year.⁷⁹ In contrast, a prospective primary care-based US study involving over 350 HIV-positive MSM failed to identify any prevalent or incident genital *T. vaginalis* infections.⁸⁰ In a longitudinal US study comparing STI and HIV incidence between 600 Black and White MSM, no baseline genital *T. vaginalis* infections were identified.⁸¹ These studies, importantly, suggest that the notable racial disparities in *T. vaginalis* prevalence between Black and White heterosexual Americans are not present among MSM.

In two US studies involving a total of 725 MSM clinic attendees reporting recent receptive anal sex, only three NAAT-detected anal *T. vaginalis* infections were identified, with a prevalence of 0.9%⁸² and 0.2%.⁷⁶ Anal *T. vaginalis* prevalence among MSM was almost tenfold lower than among women reporting anal sex⁸² and was substantially lower than the prevalence of all other anal STIs in MSM.⁸²

Pharyngeal *T. vaginalis* has been identified among predominantly asymptomatic STI clinic attendees in the US, although most (>90%) infections were identified among heterosexual men.⁸³

Taken together, these studies suggest that *T. vaginalis* rarely colonises the pharynx or anogenital mucosa of MSM, even in settings where the heterosexual community prevalence of *T. vaginalis* is substantial. Testing for *T. vaginalis* among asymptomatic Australian MSM is therefore not recommended.

Hepatitis A virus

Several sexually transmissible HAV outbreaks among MSM have been reported worldwide.⁸⁴ These outbreaks are usually

confined to subgroups of MSM such as SOPV attendees. Fortunately, most Australian jurisdictions have noted steady reductions in HAV notifications over the last decade, including in New South Wales, where notifications have declined by over 50%.⁸⁵

A retrospective study comparing state HAV notifications with HAV antibody prevalence in MSM tested at Melbourne Sexual Health Centre found that the proportion found to be immune remained unchanged over a 20-year period until 2010, despite more MSM being tested for antibodies. Notably, the number of HAV notifications declined by 85% over this period, and the male-to-female ratio dropped from 4.2 to 0.9. The authors concluded that vaccination rates of 40–50% among MSM are required prevent further outbreaks of HAV.⁸⁶

HAV vaccination rates among MSM remain low internationally,^{86,87} despite being recommended in Australia⁸⁸ and overseas.^{89,90} Once an individual has been vaccinated, however, persistent HAV antibody responses remain in most individuals a decade or more after vaccination, irrespective of HIV status.⁹¹

Hepatitis B virus

Each year in Australia ~7000 people are newly diagnosed with HBV, ~200 of whom have a newly acquired infection.⁴ MSM are at particular risk of HBV, although diagnoses among Australian men under 30 years old have declined since 2002.⁴

The most contemporary data on HBV incidence among Australian MSM comes from a retrospective 10-year Melbourne study.⁹² Encouragingly, despite a fall in immunity via vaccination or past resolved infection from 67% to 50%, this was not accompanied by a rise in HBV surface antigen detection.⁹²

Most overseas studies among MSM are from high-prevalence settings such as Vietnam or China, where HBV prevalence is over 10%.⁴ Chronic HBV prevalence in Australians born overseas largely reflects their country of origin; 10% of newly-acquired HBV cases in Australia occur among people born in Asia.⁴ Therefore, Asian MSM are likely to be at particular risk of HBV infection.

Australia implemented a universal infant HBV vaccination in 2000 with a school-based catch-up program, meaning that many MSM born in Australia after 1986 are likely to have been vaccinated. Australian immunisation guidelines⁸⁸ continue to recommend HBV vaccination for all MSM, as do other international agencies.^{89,90} However, ≤50% of MSM in some other countries have been vaccinated against HBV,^{93,94} with testing for HBV and vaccination of nonimmune HIV-positive individuals occurring in only 52% and 25%, respectively.⁹⁵

Studies in immunocompetent adults continue to support the persistence of immune memory following HBV vaccination despite a fall in hepatitis B surface antibody (anti-HBs) titres, meaning further antibody testing and booster doses of HBV vaccine are unnecessary after completion of a vaccination course.⁹⁶ This contrasts with the situation among those infected with HIV,⁹⁷ in whom a potentially poorer and less longstanding anti-HBs response means that four double-dose vaccinations at 0, 1, 2 and 6 months are recommended, followed by double-dose boosters if annual anti-HBs titres fall below 10 IU mL⁻¹.⁸⁸

Hepatitis C virus

Over 10 000 diagnoses of HCV were made in Australia in 2011, of which ~400 were new infections. Over 80% of these new infections reported a history of injecting drug use (IDU).⁴ Non-IDU HCV acquisition is rarely identified among HIV-negative MSM in Australia and overseas,^{98–100} with an HCV prevalence of under 1% among HIV-negative non-IDU MSM overseas, arguing against routine HCV testing among HIV-negative MSM.^{101–104}

Recently, the US Multicenter AIDS Cohort Study reported an association of incident HCV with higher numbers of receptive unprotected anal intercourse partners, as well as IDU and HIV-positive status. Nonetheless, HCV incidence was only 0.5 per 1000 PY in HIV-negative MSM compared with 4.2 per 1000 PY in HIV-positive MSM.¹⁰⁵ Among HIV-positive MSM in Australia and overseas, there are recent data supporting sexual or permucosal HCV transmission.^{101,106,107} In a recent Australian study, 60% of HIV-positive Australian MSM with acute HCV did not report an IDU history.¹⁰⁶ The exact mechanism of transmission and the reasons for an increased risk of HCV acquisition among HIV-positive MSM remain unclear, but may relate to traumatic sex practices such as fisting or shared sex toys, or to permucosal drug use.^{108,109}

The most cost-effective strategy for HCV testing among asymptomatic HIV-positive MSM appears to be annual HCV antibody tests and 3–6 monthly testing of liver function,^{110,111} as would occur at most HIV monitoring visits.

Herpes simplex virus

Epidemiological data continue to show a variable but generally high prevalence of HSV-1 and HSV-2 among different populations of MSM. Several overseas studies involving MSM from sexual health clinics,¹¹² community-based settings¹¹³ and MSM who recently seroconverted to HIV¹¹⁴ have identified a high seroprevalence of both HSV-1 and HSV-2, which is significantly higher among HIV-positive MSM compared with HIV-negative MSM.^{112,113}

The association between HSV-1 and -2 infections and HIV-1 acquisition has been examined in several studies, both in Australia and overseas. In the STEP HIV-1 vaccine trial, which recruited over 1800 MSM from several sites internationally, including Australia, prevalent HSV-2 infection significantly increased the risk of HIV-1 acquisition.¹¹⁵ Longitudinal data from the Australian HIM cohort provided conflicting data, with no association being demonstrated between prevalent or incident HSV-2 and subsequent HIV infection. Prevalent HSV-1 infection was associated with risk of HIV acquisition; however, this association was no longer statistically significant when adjusted for behaviour.⁴³ Although a transmission synergy between HSV and HIV is generally thought to exist,¹¹⁶ interventions to suppress HSV-2 viral replication with aciclovir have not been shown to reduce the risk of HIV acquisition in two randomised controlled trials.^{117,118}

HSV western blot remains the gold standard for serological diagnosis of HSV.¹¹⁹ Type-specific HSV-2 serology that uses glycoprotein G2 antigen are commercially available, although there are concerns regarding test performance in different

populations with varying HSV-2 prevalence.^{90,120} Some experts have advocated HSV-2 serology testing among those at high risk of acquiring HIV.¹¹⁹ However, the benefits of HSV-2 serological testing remain unclear. Further evaluation of testing asymptomatic MSM in terms of reducing HSV and HIV transmission, impact on sexual behaviour and psychological effects are required before any recommendations can be made for Australian MSM.

Human papillomavirus

The majority of adult MSM are infected with HPV often with multiple HPV types.¹²¹ HPV-related disease such as anogenital warts and malignancies cause substantial morbidity and mortality in these men,^{121–123} although the national introduction of a school-age male HPV vaccination program last year can be expected to have a major impact on HPV-related disease among future generations of Australian MSM.¹²⁴

The majority of research on HPV-related disease in MSM has involved DNA detection of prevalent anal HPV infection. There are fewer prospective data on the frequency of acquisition and duration of anal HPV infection in MSM,^{125,126} and studies of penile and pharyngeal HPV infection in MSM are rare.^{123,127} A small number of studies have assessed HPV seroprevalence in MSM¹²⁵ but this is unlikely to be a useful clinical diagnostic tool due to the low sensitivity of HPV serology as a marker of HPV infection.¹²⁵

Estimated anal HPV prevalence in a recent large meta-analysis of 31 studies was 64% and 93% among HIV-negative and HIV-positive MSM, respectively, whereas the prevalence of high-risk (oncogenic) anal HPV types was 37% and 74%, respectively.¹²⁸ Although the natural history of anogenital HPV in MSM has not been clearly defined, MSM appear to be at risk of both frequent reinfection and persistent infection, which, for high-risk anal HPV types, may explain the substantially elevated risk of anal cancer in this population.¹²¹ Studies that include assessing the utility of anal HPV testing to predict the risk of anal precancerous lesions are ongoing and are expected to guide future recommendations.¹²⁹

There are few data regarding the impact of HPV infection and HIV acquisition.¹³⁰ In a recent meta-analysis of the association of HIV acquisition with HPV infection at a variety of anogenital sites, a significant association was identified.¹³¹ Anal HPV infection was independently associated with HIV acquisition in the single included study that assessed anal infection among MSM.¹³²

Considerable uncertainty surrounds the natural history of HPV infection and clinical utility of testing among MSM at present. Thus regular testing for HPV in MSM is not recommended.

HIV

Globally, HIV incidence, prevalence and the number of undiagnosed infections among MSM remain high.^{133–138} In Australia, an estimated 12–33% of HIV among MSM remains undiagnosed.^{139,140} Despite around two-thirds of gay-community-attached MSM consistently reporting testing,¹⁴¹ less than 40% of high-risk MSM return for HIV testing within 1 year of a previous test.¹⁴²

HIV risk factors identified in Australia and overseas may indicate the need for more frequent testing in MSM and include: receptive unprotected anal intercourse, higher numbers of male sexual partners, IDU and noninjecting drug use during sex (including the use of amphetamines with oral erectile dysfunction medications), engaging in group sex, other (especially anal) STIs, sex with HIV-positive partners and high viral load in those partners.^{133,143–145} However, although identifying risk factors for HIV is important for targeted testing, one in eight HIV diagnoses in Australia may be missed by offering risk-based HIV testing only.¹⁴⁶

Annual HIV testing is recommended for MSM by the US Centers for Disease Control,⁹⁰ although only 60% of US MSM report being tested for HIV in the previous 12 months.¹⁴⁷ British guidelines also recommend yearly HIV testing for MSM and more frequent testing if there are symptoms suggestive of seroconversion or ongoing high-risk exposures.¹⁴⁸ In the US, HIV testing of MSM every 3 months when combined with high engagement in care, immediate initiation of antiretroviral therapy and inexpensive self-testing has recently been shown to be cost-effective compared with annual testing.¹⁴⁹ However, differences in US health care systems and the availability of HIV testing means these modelling data are unlikely to be generalisable to Australian MSM populations.

Australian researchers have assessed the impact and acceptability of increased coverage and frequency of HIV testing on the number of HIV infections averted in MSM.¹⁵⁰ Modelling indicated the single most effective scenario (increasing the frequency of testing among the 70–80% of MSM who already test annually to four times per year) resulted in a relatively modest 14% reduction in HIV incidence over 10 years, provided that other factors such as sexual behaviour and antiretroviral treatment initiation at a CD4 count of 350 cells μL^{-1} remain unchanged. If annual HIV testing coverage was increased to 100% of MSM, there would be a similar (11%) reduction in HIV infections over 10 years. Only one-third of Australian MSM in an online survey¹⁵⁰ reported being 'very likely' to increase their testing frequency from current levels, although men reporting recent unprotected anal intercourse and who were thus at the highest risk of HIV, were more willing to increase HIV testing frequency. Current inflexible and inconvenient clinic-based testing was cited as a barrier to achieving this goal. The availability of clinic-, community- or home-based rapid HIV testing may address some of these concerns, although there are few controlled studies on the impact of such strategies on the coverage or frequency of HIV testing.¹⁵¹

Given that a large proportion of Australian MSM are not willing to test more frequently¹⁵⁰ and that many do not even have annual HIV testing,¹⁴² testing for HIV at least once per year is recommended for all MSM. This recommendation is largely based on models suggesting little difference in the proportion of HIV infections averted between annual HIV testing among all MSM and current HIV testers being tested more often.¹⁵⁰ However, those at highest HIV risk, including those reporting unprotected anal intercourse, more partners, drug use during sex or group sex (Table 1), should be targeted for more frequent HIV testing. This subgroup of the men at highest risk also appear to be the most willing to increase their frequency of HIV testing.¹⁵⁰

Syphilis

The rate of new syphilis infections continue to rise among MSM overseas,^{152–156} whereas rates have plateaued in Australia since 2010.⁴ Syphilis is frequently diagnosed concurrently with new HIV infection.¹¹⁴ Globally, ~50% of infectious syphilis is diagnosed in HIV-positive MSM.¹⁵⁷

Identified risk factors for syphilis in MSM with HIV are fisting, rimming, the use of anal sex toys, unprotected oral sex, multiple sexual partners and group sex.^{158–160} Mathematical modelling in Australia indicates testing high-risk MSM who report more than 10 partners per year and/or group sex (or both) every 3 months will substantially reduce the incidence and, subsequently, the prevalence of syphilis; in fact, more so than increasing the coverage of annual syphilis testing.^{160,161} MSM at are high risk of reinfection following a syphilis diagnosis.¹⁶² However, such men, as well as those having regular asymptomatic syphilis testing, are being tested less frequently than recommended,^{142,163} which is likely to jeopardise syphilis control efforts.

STI testing among HIV-positive MSM

The prevalence and incidence of STIs in MSM with HIV infection remains high in Australia¹⁶⁴ and elsewhere in the world.^{137,158,165–169} Although HCV has emerged as a STI that is largely confined to HIV-positive MSM, and gonorrhoea and chlamydia are frequently identified,¹⁶⁶ syphilis appears to be the most commonly reported STI coinfection among those with HIV.^{159,170} Nonetheless, STI testing rates for nongenital gonorrhoea, chlamydia^{171,172} and syphilis¹⁷³ in MSM with HIV infection remain below recommended levels.

Overseas, among MSM attending clinics for HIV care, a 13–16% prevalence of STI coinfection has been identified,^{158,166,167} with an STI incidence of up to 20 per 100 PY^{166,167} and the majority of chlamydia and gonorrhoea being detected at nongenital sites. Independent risk factors for other STIs in these clinic-based studies included younger age, higher numbers of sexual partners, polysubstance use, sharing of sex toys with a sexual partner and enema use. In addition, syphilis was independently associated with fisting and rimming, whereas chlamydia was independently associated with drug use during sex.

Due to the high prevalence and incidence of STIs among HIV-positive MSM, consideration should be given to testing for gonorrhoea and chlamydia more than once per year, whereas syphilis testing up to four times a year should ideally occur at the same time as HIV monitoring blood tests.

Use of electronic reminders for STI testing

Electronic medical record alerts for clinicians,¹⁷⁴ and short message service and email alerts to MSM themselves^{175,176} have been shown to increase detection of gonorrhoea, chlamydia and syphilis, as well as increasing retesting rates among MSM. Clinician alerts were also found to increase the yield of asymptomatic early syphilis, especially among HIV-positive MSM.^{167,177} Use of such technology, where available, is recommended to increase the frequency, regularity and yield of STI and HIV testing among MSM attending clinical services.

Conclusion

Efforts to improve the rates of comprehensive STI and HIV testing for MSM should focus on STI education, promotion of regular testing and building the sexual health capacity of general practice.^{178,179} To improve access to STI and HIV testing for Australian MSM, strategies such as rapid HIV testing, information technology and the use of social media^{180–182} should be fully utilised. The testing guidelines outlined in Table 1 aim to guide clinicians in their STI and HIV testing practice for MSM and provide an additional clinical tool to assist in reducing the community prevalence of STIs and HIV among Australian MSM.

Conflicts of interest

None declared.

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