

NSW PUBLIC HEALTH BULLETIN

HIV in NSW in 2010

HIV in NSW in 2010: sustaining success in an evolving epidemic

GUEST EDITORS

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Abstract: NSW has been recognised internationally for achieving a sustained, stable rate of HIV infection since 2000. An early mobilisation by communities initially at risk of HIV – gay men, sex workers and injecting drug users – resulted in rapid behaviour change and provided the basis for a continuing cooperative partnership with government, health service providers and researchers.

This special issue of the *NSW Public Health Bulletin* describes the current response to HIV in NSW. Experts from diverse disciplinary and professional fields offer perspectives on the epidemiology, morbidity and impacts of HIV, current prevention challenges including with Aboriginal communities and people from culturally and linguistically diverse backgrounds, models for the diagnosis, care and treatment of HIV, and the legislative protection of public health and those who are living with HIV. The NSW experience demonstrates that the sustained cooperation of those affected, together with the efforts of government, health service providers and researchers, can achieve HIV control.

In October 1986, Ross Duffin, a community activist who would later become Australia's foremost human immunodeficiency virus (HIV) educator, declared acquired immune deficiency syndrome (AIDS) the medical news story of the 1980s.¹ From 1982, media reporting of what would ubiquitously become known as the AIDS crisis had both reflected and engendered hysteria and panic across the Australian community. Duffin's declaration was prescient, coming six months before the 1987 Grim Reaper AIDS Campaign. Within its first decade AIDS had emerged as a public health emergency.²

While AIDS burst into the public consciousness, the easing of anxiety has taken a slower, steadier path. In what ways has the response to HIV remained constant, and in what ways has it been transformed? What might people with newly-acquired infection expect today of their illness? Does HIV remain a personal crisis? Where is HIV treatment and prevention headed?

Enduring principles

There remain some notable points of continuity between the AIDS crisis of the 1980s and today's response to HIV.

Working in partnership

The principle of partnership has underpinned both the rhetoric and practice of Australia's response to HIV.

Commonwealth-state cooperation to secure the blood supply lead then Commonwealth Minister for Health, Dr Neal Blewett, to comment in 1986 on the 'goodwill and excellent cooperation of state and territory governments'.³ 'Partnership' would later become an aspirational principle of each successive *National HIV/AIDS Strategy*, denoting the desirability for 'an effective, cooperative effort between all levels of government, community organisations, the medical, health care and scientific communities and people living with or affected by HIV/AIDS'.⁴ The application of this principle is formalised in New South Wales (NSW) through the composition of the NSW Ministerial Advisory Committee on HIV and Sexually Transmissible Infections. It is also evident in the composition of the guest editorial group for this special issue of the *Bulletin*, in the supporting commentary to this editorial offered by Rob Lake of Positive Life NSW, and in the paper by James Ward and colleagues on HIV and Aboriginal communities.

While now a familiar concept in many health domains, the principle of partnership in relation to HIV reflects the nature of the disease, stemming from an early recognition by government that it had limited understanding of or access to the marginalised communities most affected by HIV, and that changes in intimate and private risk behaviours would best occur through the voluntary decisions and cooperation of those at risk. In effect, the HIV partnership acknowledges a mutual interdependence between governments and those at risk if the goal of minimising HIV transmission is to be realised. With this recognition, principles of personal action, shared responsibility, community centrality and cooperation were also enshrined within national HIV/AIDS policy alongside that of partnership. Coercive approaches were considered likely to result in those at risk placing themselves 'beyond the reach of policies designed to assist them and to stem the spread of infection'.⁵ NSW has also benefitted from an early and continuing political non-partisanship, wherein successive governments and oppositions, have supported the sensitive, pragmatic measures necessary to maintain effective control of HIV.

Evolution of an epidemic

In the almost 30 years since it was first described, the morbidity and expected epidemic spread of HIV in Australia have been radically altered by advances in scientific enquiry, clinical research and practice (both preventive and treatment), and through the sustained behaviour change of affected communities.

Initial expectations of a generalised epidemic that extended from early-affected populations to heterosexuals have not been realised in Australia, although it has certainly occurred in many other locations with poorer HIV control. McPherson and Ward report in this issue on the epidemiology of HIV in NSW in 2010. Three features make the current epidemiology of HIV in NSW unique

in industrialised settings and have attracted national and international public health attention: the effective containment of HIV among gay men, sustained low HIV incidence among gay men, and low HIV incidence and prevalence in all other populations including injecting drug users and sex workers.

Hales presents in this issue the findings of an epidemiological and economic analysis of public health measures for HIV in NSW.⁶ He reports that, in the period to 2005, 45 000 cases of HIV had been avoided through NSW public health efforts, representing an estimated 80% reduction in new cases that would otherwise have occurred. The Needle and Syringe Program, providing injecting drug users access to the means to directly prevent HIV infection, represents 75% of total cases avoided. HIV prevalence rates in countries such as Spain and the United States of America that are more than five-fold higher than in Australia also point to cases avoided.⁷ The economic effectiveness of such immediately effective public health intervention is notable: for every \$1 invested in HIV prevention, the NSW Government alone saved \$13 in clinical care costs.⁶ This benefit excludes indirect costs and costs accruing to the Australian Government through the Pharmaceutical Benefits Scheme and Medicare.

Despite these achievements HIV is endemic among Sydney gay men with prevalence estimated at 9%.⁸ With greatly improved prognosis, even low sustained rates of incident infection will increase the number of people with HIV in this population. The Darlinghurst 2010 postcode remains Australia's HIV epicentre, although there is a steady drift of new diagnoses to Sydney's inner western suburbs, reflecting the changing demographic of Sydney's gay community and the increasing age of those receiving a diagnosis of HIV (37 years in men in Australia in 2008).⁷ Inner Sydney's concentrated HIV prevalence should not however be allowed to obscure the needs of those living with HIV in greater Sydney and regional and rural NSW and the challenges presented by dispersal and distance.

HIV prevention with gay communities remains the highest priority for NSW efforts to control HIV.⁹ De Wit, Prestage and Duffin in this issue describe the 'continuous adaptation' of gay men to HIV. The early adoption of protective sexual and testing behaviours continues to be sustained. Indeed the continuing responsiveness of gay men to HIV is evident in the significant upward trend in testing for HIV since at least 1998 and in testing for other sexually transmissible infections since at least 2003.^{10,11} While rates of condom use with casual sexual partners continue to be high, the authors suggest that gay men's HIV risk-reduction practices may now also be characterised by seroadaptive behaviours in which knowledge of HIV status is used to inform sexual practice with partners based on seroconcordance and the likelihood of transmission in a

given risk event. Grulich, O'Donnell and de Wit describe in this issue the work of a partnership-based committee that functions as a reflexive broker of HIV research, policy and practice in directing gay men's and other HIV health promotion efforts in NSW.

Wodak and Maher report on transformation in the Needle and Syringe Program; there is now overwhelming evidence of the effectiveness of the program in preventing HIV infection among injecting drug users. The authors also note that gains can be fragile to sustain, and even seemingly small changes in the availability of injecting equipment can lead to rapid and dramatic rises in acquisition of HIV infection and consequent onward sexual transmission within heterosexual populations.

Ward, Akre and Kaldor in this issue note that injecting drug use and heterosexual transmission contribute disproportionately to HIV infection within NSW Aboriginal communities. Currently, HIV rates in NSW Aboriginal communities are stable at levels similar to that reported among non-Aboriginal people – a significant outcome achieved in difficult circumstances. Disadvantage, poorer access to primary health care, higher rates of sexually transmissible infections, and increased injecting drug use indicate a need for strengthened action by health services, Aboriginal communities and their partners to prevent HIV.

Donovan and colleagues report low rates of HIV and sexually transmissible infections among brothel-based sex workers but note the diversity of the sex industry in NSW and the high annual turnover within this workforce. McMahon, Moreton and Luisi observe the variability of HIV prevalence within the communities that constitute NSW's culturally diverse society, and the inevitability of steady increases in HIV infection associated with high international population mobility.

Together, these articles capture the distinctive ways in which HIV has affected populations prioritised for prevention activities. While the principles of health promotion remain the same across these populations, the implementation of HIV prevention programs offered by area health services and community organisations is closely targeted to each community. Targeting recognises the different patterns and effects of HIV infection within each community, as well as their different strengths. It also reflects the pragmatic imperative for sensitive programs that necessarily address sexual and drug-using behaviours to reach the intended audience.

The death of AIDS – HIV morbidity in 2010

In the evolution of the HIV epidemic, it is arguably in the treatment and care of those living with HIV that rapid and transformative change is most evident. Dwyer in this issue

reports that, while reliable laboratory assays to detect HIV have been available since 1985, new generation combination assays now allow detection of HIV approximately two weeks after infection. For people with HIV and their clinicians, nucleic acid testing for quantifying HIV viral load and detecting antiretroviral drug resistance, together with CD4+ T lymphocyte cell counts, provide essential prognostic and antiretroviral management guidance.

Cowdery and Cooper report on the early availability in NSW of combination antiretroviral therapy (cART) which from the mid-1990s has made the control of viral replication and disease progression the goal of HIV management. Since that time, simpler, more effective and better tolerated cART regimens have become available. For most people with HIV in industrialised countries, cART has rendered HIV a chronic, manageable condition with many people achieving sustained viral suppression and, in those with immune suppression, partial reconstitution of immune function.

Improvements in mortality and morbidity for people with HIV have been profound. A large multinational cohort study showed that a 20-year-old person starting successful HIV treatment could now expect to live to 63 years on average.¹² Those with a CD4+ cell count above 200 cells/mm³ could expect to live to 70 years on average, pointing to the importance of early detection of HIV infection while also highlighting that life expectancy remains shortened even in optimal circumstances.¹³

Gains have also been achieved for those living long-term with HIV through the use of drug-resistance testing, addressing co-morbidities, managing side-effects of cART, and persistence where necessary with multiple changes of cART regimens.

Improvements in treatment have not come without cost. Clinical trials have shown conclusively that treatment interruptions are significantly detrimental to people with HIV. In 2010, people with HIV face lifelong treatment and close clinical monitoring to ensure sustained treatment efficacy and to manage complications related to long-term HIV infection and treatment. The optimism that followed the introduction of cART is today softened by concern for the effects of long-term cART use, with accelerated ageing, metabolic disorders, neurological complications, malignancies, cardiovascular disease and kidney dysfunction all presenting as novel sources of morbidity.¹⁴ Patients with co-morbidities such as hepatitis B and C, drug and alcohol misuse, mental illness or social disadvantage that interferes with the effective and routine management of their HIV infection, also experience poorer outcomes.¹⁵

Garcia in this issue charts the changing clinical profile of HIV infection in the service arrangements of primary, allied and tertiary health services. Clinical care arrangements have

proved responsive to the changing needs of people with HIV with substantial service re-development evident since the mid-1990s. Declining inpatient activity and concomitantly increasing demand for outpatient services has been seen at all major tertiary sites. A workforce of primary-care providers authorised to prescribe highly specialised HIV treatment continues to allow many people with HIV to receive their routine treatment and care in community settings. Demand has increased significantly for flexible care arrangements and case support that allow people with complex clinical and behaviour needs to remain in the community.

Where service change has been insufficient, the NSW Department of Health has triggered reviews and funding reforms to align HIV resources with need. Recent reforms to HIV supported accommodation arrangements, pathology charging and statewide services have contemporised service delivery and unlocked resources required to meet the demands of increased HIV prevalence and life expectancy. The reform of HIV program funding has also enabled expansion of the dedicated investment in hepatitis C prevention, treatment and care.

Something old, something new

In NSW in 2010, the early fears of AIDS have eased. The aetiology of HIV is known. New HIV infections continue, but at a low rate. Members of the gay community are generally well informed of their personal risk. Importantly, they understand that infection is preventable. Improved diagnostic tests are available. The prognosis for those diagnosed early is excellent.

Yet HIV continues to be a serious, preventable and potentially fatal infection with the capacity for rapid spread within already-affected populations and more broadly. The promise of near normal life expectancy can only be realised with early detection, daily treatment and good clinical management. Stigma associated with the infection remains high, and people with HIV report too frequent experiences of discrimination including within health-care settings.¹⁶ An HIV diagnosis remains in 2010 an experience of personal crisis, with those diagnosed being required to reconcile deeply ingrained perceptions of HIV with a more contemporary reality.

For public health professionals, relative success in containing HIV infection at low rates within the gay community can obscure a more unsettling, underlying picture. In 2007 an expert think tank concluded that the stability of HIV notifications in NSW when examined against growth in the numbers elsewhere could be attributed to very small differences across a range of HIV transmission variables.¹⁷ Since that time, NSW behaviour surveillance points to a rapid increase in the most significant of these contributing transmission variables – unprotected anal intercourse by

gay men with casual partners. The imperative to maintain control of HIV in NSW is all the greater because, unlike infections such as chlamydia, proven models for population-level HIV control exist. HIV is a disease shown to be amenable to programmatic intervention and, as described in this issue, the economic effectiveness of prevention is well established.

In 2010, concern about HIV in the public consciousness remains exceptional. This is evident in circumstances which give rise to the spectre of uncontrolled HIV transmission such as media reporting of community needle-stick injury (a situation that presents negligible HIV risk) or the investigation of infection control incidents. HIV transmission offences – with implied recklessness or intent in the behaviour of people with HIV and a suspicion of public health failure – stimulate similar fears. Clayton, in this issue, points to the legislative context for HIV transmission in NSW, with public health and crimes provisions variously regulating HIV disclosure, behaviour, exposure and infection. HIV continues to be subject to legislative sanction in excess of comparable communicable diseases, and the increased use of criminal laws in Australia and elsewhere make it unlikely that HIV will be legislatively normalised in the near future.

Conclusion

HIV control in Australia is a hard-won success story. While increases in HIV notifications in some Australian jurisdictions in recent years have re-ignited commentary about the sufficiency and adequacy of existing arrangements, the appropriateness of community-driven prevention programs, and whether more coercive approaches may be required, the extreme early fears associated with HIV are now tempered. Hopes for the early identification of a vaccine have faded confirming the need for control measures based on the Needle and Syringe Program, education about safe sex, and partnership and cooperation with affected communities. As described in this issue of the *Bulletin*, these measures have been demonstrated to be both effective and cost-effective however they require sustained effort.

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Rhythm of life: choices, challenges and change

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Life with human immunodeficiency virus (HIV) in 2010 is life with a future, a different situation to that in 1989 or even 1999. Conclusive evidence of the success of combination antiretroviral therapy was first presented at the 1996 World AIDS Conference. Subsequent treatments and combinations of treatments have, for most people with HIV, achieved better results. These improved treatment outcomes translate as the achievement and long-term maintenance of undetectable HIV viral load, greatly increased CD4 cell counts and fewer side-effects from therapy.

For people with HIV like me, treatment consists of twice-daily tablets and regular monitoring, a bit too much time in hospital pharmacies and more optimism about my future health than in 1995 when I was first diagnosed. Life with HIV for me is about work, family, friends, good health and wellbeing. I am lucky that I can be open about my HIV status at home, at work and to family: many people are not so fortunate as demonstrated by 57% of respondents to Futures 6 reporting that they had not disclosed their HIV status to their employers.¹

My experience differs from that of other men and women, particularly older people, who have lived long-term with HIV. Their experience is tempered by: unpredictable, uncertain interactions between the impacts of HIV on the body; the premature experience of ageing-related health; physiological and sometimes cognitive impairments; and the psychosocial impact of long-term debilitating illness.

Poverty and social exclusion are recognised as important social determinants of health. Discrimination and stigma arise from judgmental attitudes about HIV and how it is acquired, homophobia, and fear of transmission. Women and men with HIV experience this discrimination: in the workplace; among family and other relationships; and from health-care providers. It has been identified through research including the Futures studies and Men and Women Living Heterosexually with HIV.^{1,2}

To be optimistic about future health and wellbeing for people with HIV we need: ongoing improvements to treatments; the uptake and availability of these treatments; and a better understanding of the impact and management of co-infections and the implications of mental illness and heart, kidney and similar diseases. People with HIV, including those who migrate to Australia, need to be included, valued citizens. Those with the highest need must be assisted with clinical and other support services to ensure early interventions and comprehensive, coordinated care, some of which will be HIV specific. They also need services such as aged care, oncology and treatment for other conditions. The contemporary experience of HIV diagnosis now incorporates improved treatment outcomes and reduced side-effects from treatment. Timely access to relevant support and information continues to be a key factor in determining how well someone integrates HIV into their life.

HIV prevention has two aspects for us:

- preventing transmission
- and better health for people with HIV through the good management of HIV-related and preventable conditions.

Individually and as part of HIV organisations, we have a role to play. We share a responsibility to prevent HIV transmission, to care for ourselves, our partners and our communities in the same way we expect them to care for us. That care includes identifying and addressing stigma and discrimination.

This is a time for reflection, a time to prepare for the future with the goal of achieving the best possible health and quality of life for women and men with HIV. It's a future some didn't think they'd see and it's worth fighting for.

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How does the HIV epidemic in NSW compare to other Australian jurisdictions and internationally?

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Abstract: Aim: To review the epidemiology of HIV in NSW and compare HIV rates in NSW with those of other comparable jurisdictions. **Method:** The rate of newly diagnosed cases of HIV reported in NSW was compared with those published from other Australian and comparable international jurisdictions. **Results:** Until recent years, NSW has consistently reported the highest rate of newly diagnosed HIV infections in Australia with a peak of 29.1 per 100 000 population in 1987. Since then the notification rate has decreased significantly and has been stable since 2000 at an average annual rate of 5.6 per 100 000. Rates in NSW and in other Australian states and territories are lower than most comparable international jurisdictions, although stability in rates has been observed elsewhere. Between 1984 and 2008, 82% of infections that reported a risk exposure occurred among men who have sex with men. **Conclusion:** Rates of HIV infection in NSW have been stable over the last decade, remaining among the highest in Australia but lower than those in other comparable industrialised jurisdictions. In NSW, the majority of cases continue to occur among men who have sex with men.

Human immunodeficiency virus (HIV) has been a notifiable disease in New South Wales (NSW) since 1985, shortly after laboratory testing for HIV became available. The purpose of HIV surveillance in NSW is to monitor the epidemiology of HIV infections in NSW to inform the development of better prevention strategies. By 2008, there had been 28 330 diagnoses of HIV in Australia, with 54% occurring in NSW, with the most common risk

behaviour being men who have sex with men.¹ Previous studies have shown that, since the late 1990s, NSW, which has stable rates of newly diagnosed HIV in men who have sex with men, is unique compared with other industrialised countries.^{2,3} In this paper we describe the HIV epidemic in NSW and compare NSW rates to those of other Australian jurisdictions and those of comparable international industrialised jurisdictions.

Methods

HIV epidemiology in NSW

Six HIV reference laboratories confirm newly diagnosed HIV infections in NSW. Under the *Public Health Act 1991*, these laboratories are required to report all confirmed HIV infections to the NSW Department of Health, using a nationally standardised case definition.⁴ Laboratories must send a standard notification form with the HIV-positive result to the treating medical practitioner seeking detailed demographical, clinical and HIV risk behaviour information about the patient. The completed form is then forwarded to the NSW Department of Health and the information entered in a secure database.

NSW residents diagnosed with their first positive HIV test in NSW were the subject of this analysis and defined as cases. As a person remains HIV positive for life and can have more than one confirmatory test performed, all new HIV diagnoses were matched against those already on the database. People were excluded from the analysis if they were already on the database, were not NSW residents or reported a previous positive-HIV test outside NSW. A case of newly acquired HIV infection was defined as a person with either a negative or indeterminate HIV antibody test or a seroconversion illness in the 12 months prior to HIV diagnosis. A case of late-diagnosed HIV was defined as having an acquired immune deficiency syndrome (AIDS)-defining illness within three months of HIV diagnosis and/or a CD4 count less than 200 cells/mm³ in the absence of a seroconversion illness. Information to determine the stage of diagnosis has only been collected in NSW since 2000 and is thus reported from 2000 onwards.

Risk exposure information was provided by the treating medical practitioner using the notification form. Where more than one risk exposure was reported, a hierarchy of risk was used to designate the case's primary risk exposure –

that most strongly associated with transmission of HIV. Homosexually acquired infection was always considered the primary risk exposure if it was reported. High prevalence countries or regions are those where the prevalence of HIV in the population is more than 1% and included Sub Saharan Africa, Thailand, Burma, Cambodia, the Caribbean and Papua New Guinea. Since 1996 the category of heterosexual risk exposure has included cases who have been exposed to these high prevalence countries and other heterosexual exposures, most of which were not further defined.

National and international comparisons

The numbers of newly diagnosed HIV cases in other Australian jurisdictions were obtained from the National Centre for HIV Epidemiology and Clinical Research (NCHECR) 2009 Australian HIV Public Access Dataset⁵ (which includes those individuals who have previously been diagnosed overseas) and rates were calculated using estimated resident populations from the Australian Bureau of Statistics.⁶ HIV notifications by number, rate and proportion acquired by men who have sex with men were also sought from comparable international jurisdictions that had data publicly available from 2000, including Canada,⁷ the United Kingdom (UK),⁸ New Zealand,⁹ the European Union countries,¹⁰ the United States of America including San Francisco¹¹ and New York.¹² Rates for the USA only included those from states with confidential name-based HIV infection reporting for 2004 to 2007.^{13–16} Where rates were not provided in these reports, they were calculated using reported population estimates.^{17,18} The case definitions used in these jurisdictions all include laboratory confirmation of HIV infection.

Results

Since 1984, 15 106 NSW residents have been newly diagnosed in NSW. The rate of newly diagnosed HIV infections peaked in NSW in 1987 at 29.1 per 100 000 population (Figure 1). Since then the notification rate has decreased significantly and has been stable since 2000 with an average annual rate of 5.6 per 100 000 population.

Risk exposures in NSW

The most common risk behaviour for newly diagnosed HIV since the beginning of the epidemic in NSW was men who have sex with men who included 64% of all cases between 1984 and 2008, or 82% of those with a risk exposure reported. This rate has been consistent over the epidemic and stable since 2000.

Heterosexual transmission is the second most commonly reported risk factor in NSW. Since 1996, HIV acquisition in people from high prevalence countries increased from a low of 13 in 1997 to a high of 32 in 2004, with an average of 22 cases per year. Notifications in other heterosexually acquired HIV infections have fluctuated between a low of 29 cases in 2000 and a high of 50 cases in 1998 with an average of 40 cases per year. The number of cases reporting injecting drug use as their risk exposure decreased over the epidemic from a high of 53 in 1988 to a low of 5 in 2006, with an average of 21 cases per year since the beginning of the epidemic and 13 per year since 2000 (Figure 2).

Risk exposures through receipt of blood or tissue, and haemophilia and coagulation disorders were highest in 1985 at 28 and 50 cases respectively. Since the mid 1990s

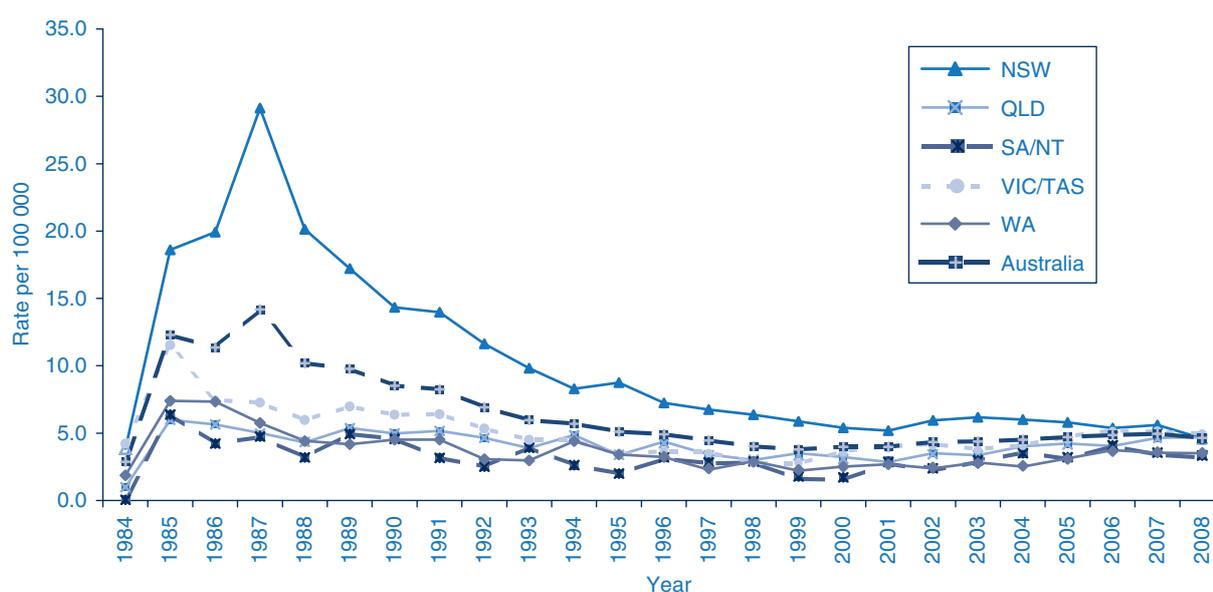


Figure 1. Rate of newly diagnosed HIV notifications in Australia by jurisdiction, 1984 to 2008.

Source: National Centre in HIV Epidemiology and Clinical Research. 2009 Australian Public Access Datasets on newly diagnosed HIV infection and AIDS.

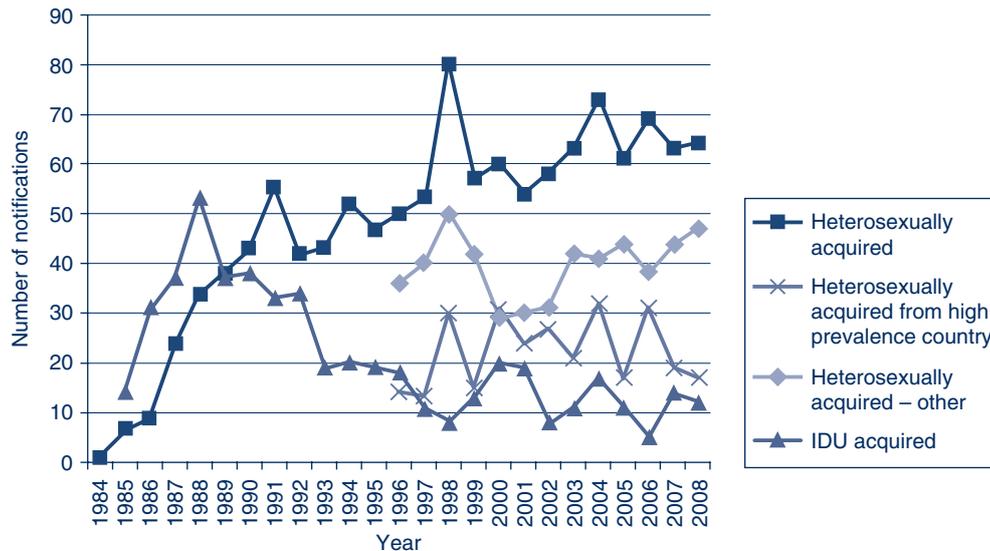


Figure 2. Number of cases of newly diagnosed HIV acquired heterosexually compared with the number acquired through injecting drug use (IDU) in NSW, 1984–2008.

Source: NSW Department of Health. Notifiable Diseases Database. NSW HIV/AIDS database.

there have been no reported cases of HIV transmission through the receipt of a blood or tissue product, except for one case where the exposure occurred in the early 1980s. Vertical transmission (from mother to child) was reported as the risk exposure for an average of two cases per year since the beginning of the epidemic, with the highest number reported in 1991 at five cases. Where country of birth was reported ($n = 29$), most cases acquired through vertical transmission (76%) were born in Australia. The percentage of cases with unreported risk exposures ranged from 44% in 1986 to 1% in 2008 with an average of 17% per year.

Stage of infection at HIV diagnosis

Between 2000 and 2008, 25% to 39% of newly diagnosed cases each year were classified as newly acquired, and 11% to 21% as late-diagnosed infections per year. In 2008, when only 4% of cases had an unknown stage of diagnosis, almost half (45%) of homosexually acquired cases had evidence of newly acquired infection and 10% (24 cases) had evidence of late diagnosis. Of the heterosexually acquired cases associated with high prevalence countries, 24% presented early and 24% presented late in the infection. Of the remaining people with heterosexually acquired HIV infections, 19% were diagnosed early and 23% late.

National comparisons

NSW has consistently reported the highest notification rates although in 2008 the notification rate for NSW was similar to those of Victoria and Tasmania (combined), and Queensland (Figure 1). NSW has reported stable rates of newly diagnosed HIV infections in men reporting homosexual contact since 2000 at an average of 7.9 per 100 000

men. Stable rates, albeit at lower levels, have also been reported in other Australian jurisdictions except for Victoria where the notification rate increased between 2004 and 2006 with a subsequent decline (Figure 3).

International comparisons

The rate of people newly diagnosed with HIV since 2000 in NSW and the rest of Australia was lower than in other similarly developed jurisdictions reviewed, except for New Zealand. Like NSW, the rates of newly diagnosed HIV in most of these other jurisdictions have remained stable over the last few years (Figure 4), except in New York City and San Francisco, where the rates, although much higher than NSW, have decreased (Figure 5).

Discussion

NSW has consistently had the highest rates of newly diagnosed HIV in Australia since the beginning of the HIV epidemic in the early 1980s. The rate of newly diagnosed HIV has stabilised in the last decade in NSW, which was not observed in other Australian jurisdictions until more recent years. Notification rates nationally have converged.¹⁹ The apparent decline in NSW in 2008 was likely due in part to improved identification of people who had previously tested positive for HIV infection. The NSW epidemic has occurred predominately in men who have sex with men, although there has been a modest increase in the number of cases reporting heterosexual acquisition since the mid 1990s. Acquisition through injecting drug use has been minimal in the latter half of the epidemic with the other risk exposures, such as blood products, rarely occurring since early in the epidemic.

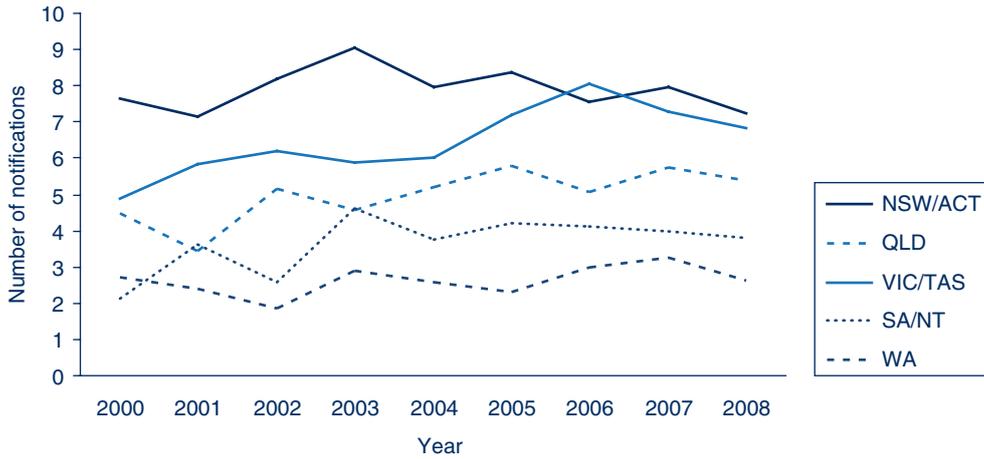


Figure 3. Rate of newly diagnosed HIV infections for men reporting homosexual contact, by Australian jurisdiction, 2000–2008. Source: National Centre for HIV Epidemiology and Clinical Research. 2009 Australian Public Access Datasets on newly diagnosed HIV infection and AIDS.

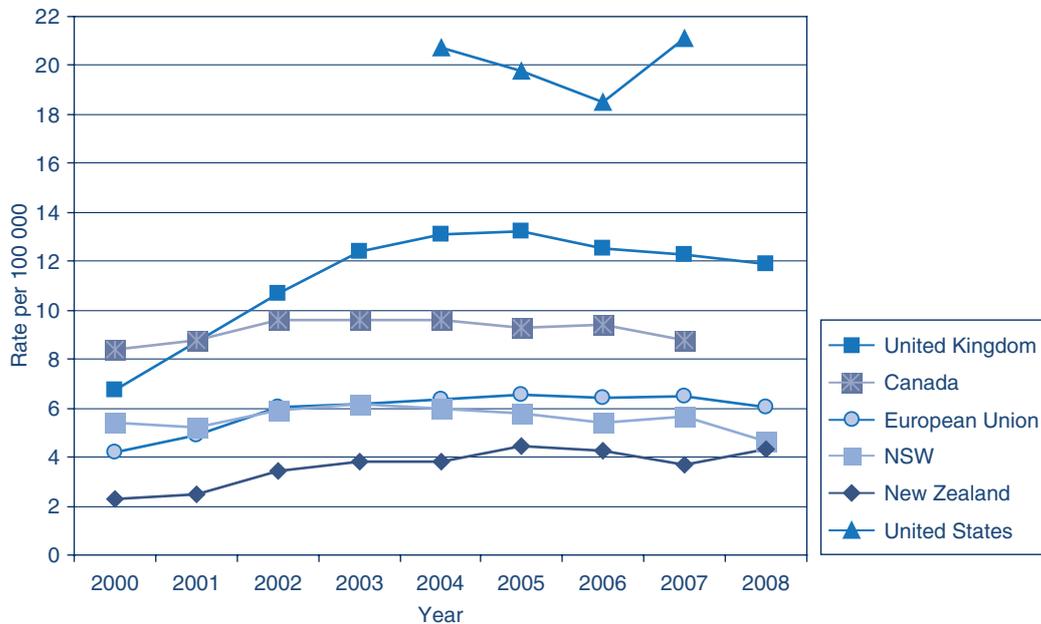


Figure 4. Comparison of HIV notification rates in NSW with those of comparable international jurisdictions, 2000–2008. Source: NSW Department of Health. Notifiable Diseases Database. NSW HIV/AIDS database and specific country data.^{7–10}

NSW has lower rates of newly diagnosed HIV than other comparable international jurisdictions except New Zealand, and is not alone in reporting stable rates in the last decade, particularly for men who have sex with men.^{2,3} Canada reported that a fifth of its cases were exposed through injecting drug use; the peak number of HIV notifications for men who have sex with men, 581, in 2004 has decreased each year to 515 for 2007.⁷ San Francisco reported similar proportions of men who have sex with men as NSW of between 62% and 70% each year between 2002 and 2008; the decline in the total rate of HIV over the last decade corresponds to a decrease in the rate of HIV in men who have sex with men.¹¹ New York, for the three years of data available, had similar annual numbers of

cases of HIV diagnosed in men who have sex with men.¹² In contrast, in the UK, half the HIV cases are reported as being heterosexually acquired, mostly in migrants from Sub-Saharan Africa. There are also reports of increasing numbers of cases occurring among men who have sex with men.²⁰ New Zealand and the European Union countries also reported higher proportions of heterosexual acquisition compared with NSW, and also a doubling of the number of men who have sex with men since 2000.^{10,17}

The use of notification data for reporting the HIV epidemic has its limitations as these data neither represent the total number of people with HIV infection (prevalence) or the number of people with newly acquired infection each year

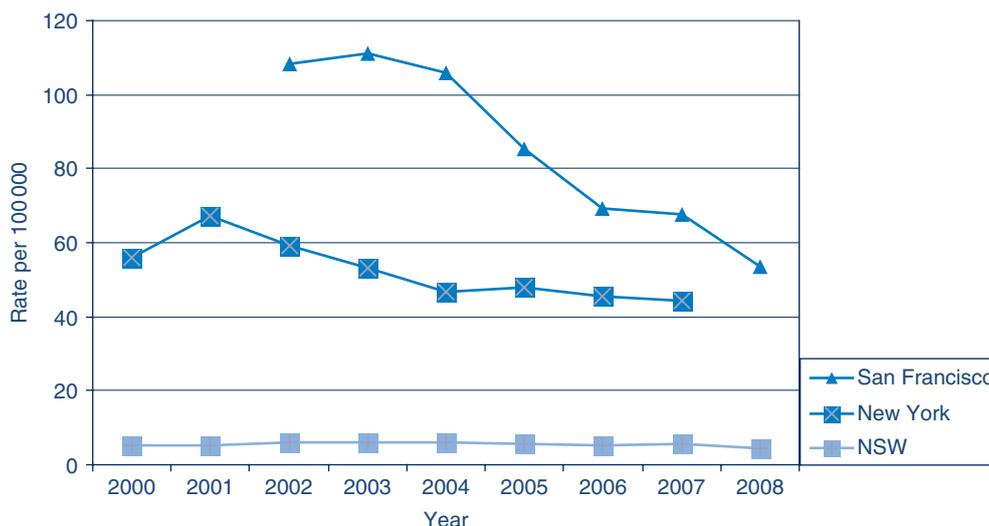


Figure 5. Comparison of HIV notification rates in NSW, New York and San Francisco, 2000–2008. Source: NSW Department of Health. Notifiable Diseases Database. NSW HIV/AIDS database and specific city data.^{11,12}

(incidence). Notification data reflect only those who have been tested and diagnosed with HIV. Given that HIV is a chronic infection with a long latent period and that routine laboratory testing does not distinguish newly acquired cases of HIV from other cases it is impossible to accurately determine the timing of disease acquisition for many newly diagnosed infections. Newly diagnosed people who test more frequently are more likely to be identified as newly acquired thus comparisons between risk behaviours and countries with different testing practices should be made with caution.

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The economics of HIV prevention strategies in NSW

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Abstract: HIV in Australia was first diagnosed in NSW in the early 1980s, and has had a significant effect on public health. The NSW Government commenced its investment in HIV/AIDS in 1984 and the investment now encompasses research, primary and secondary prevention, and care, treatment and support for people living with HIV/AIDS. A recent study examined the historical impact of the HIV/AIDS epidemic and projected its future impact in NSW. The analysis indicates that the NSW HIV/AIDS investment program has been highly effective in reducing HIV transmission, and has also been cost effective in: avoiding future health-care costs; life years saved; and quality of life benefits. The analysis also indicates that any scaling back of prevention initiatives would result in an increase in the number of people living with HIV.

Human immunodeficiency virus (HIV) in Australia was first diagnosed in New South Wales (NSW) in the early 1980s. Since then, it has had a significant effect on public health; by the end of 2008, there had been 28 330 diagnoses of HIV infection, 10 348 diagnoses of acquired immunodeficiency syndrome (AIDS) and 6765 deaths following AIDS in Australia.¹ Within Australia, approximately 56% of total HIV diagnoses have been reported in NSW.¹

The NSW Government commenced its investment in HIV/AIDS in 1984² and it now encompasses research, primary and secondary prevention, and care, treatment and support for people living with HIV and AIDS. The investment program identifies priorities for reducing future infections among those populations considered at highest risk: gay men, people from culturally and linguistically diverse (CALD) backgrounds, Aboriginal people, people who inject drugs and sex workers. It also identifies priorities for improving the health of people living with HIV/AIDS,

through population-level programs, individual clinical services, research and service development.

A recent study, funded by the NSW Department of Health, examined the historical impact of the HIV/AIDS epidemic and projected its future impact in NSW.³ This encompassed an analysis of the NSW investment in the public health response to HIV/AIDS, the morbidity and mortality arising from HIV/AIDS, and the economic impact of the epidemic in regard to clinical care costs, life years saved and quality of life outcomes. The National Centre in HIV Epidemiology and Clinical Research (NCHECR) undertook the epidemiological analysis, and Health Outcomes International (HOI) undertook the economic analysis. The methodology was based on that used in a previous cost-effectiveness study of needle and syringe programs in Australia.⁴ This article introduces some of the findings of the study. Copies of the full study are available on the NSW Department of Health website at: http://www.health.nsw.gov.au/resources/public_health/sexualhealth/ImpactStatement_pdf.asp.

Epidemiological model

The study examined four identified population groups: homosexual men, injecting drug users, the general heterosexual population, and sex workers. For each group, historical trends in HIV transmission and the risk factors that affect transmission were studied. Models were then developed that compared a baseline scenario that reflected HIV transmission rates to date with preventive strategies in place with modelled alternative scenarios that assumed that no intervention strategies were in place other than antiretroviral therapy. Projections were then made that estimated the number of people living with HIV/AIDS under each scenario from 2005 to 2090, by which time those having HIV were estimated to have died. In scenarios where intervention measures for sexual transmission of HIV were absent, it was assumed that the absence of intervention measures accounted for 50% of the estimated change in levels of risk. For injecting drug users, the model assumed only the presence or absence of needle and syringe programs for its estimation of effect. Results of this analysis are presented in Table 1.

The total number of cases of HIV avoided between 1980 and 2005 was estimated at approximately 44 500 cases. This number represents an estimated 80% reduction in the number of new cases of HIV that would otherwise have occurred during this period. Injecting drug users comprised

Table 1. Total number of HIV cases avoided, HIV/AIDS program, NSW 1980–2005

Group	Baseline <i>n</i>	No intervention <i>n</i>	Cases avoided <i>n</i>	Reduction %
Male homosexual contact	9843	19 479	9636	49.5
Injecting drug use	439	33 633	33 193	98.7
Heterosexual contact	1186	2806	1620	57.7
Clients of female sex workers	24	120	95	79.2
Total	11 492	56 038	44 545	79.5

Table 2. Projected number of people living with HIV/AIDS, by exposure category, NSW 2005 and 2016

Year	People living with HIV/AIDS				Total <i>n</i>
	Male homosexual contact <i>n</i>	Injecting drug use <i>n</i>	Heterosexual contact <i>n</i>	Clients of female sex workers <i>n</i>	
Baseline model					
2005	6230	340	1000	17	7587
2016	8360	430	1370	24	10 184
No intervention since 1980					
2005	14 670	33 040	2460	97	50 267
Stop intervention from 2006					
2016	11 140	5890	2180	53	19 263

Note: Total is sum of the four exposure groups only, and excludes other subpopulations and those for whom exposure is unknown/undetermined.

75% of the total cases avoided, with homosexual men comprising 22%.

Separate projections were prepared for the period between 2006 and 2016 to assess the likely impact of terminating prevention initiatives from 2005 (Table 2). In these projections, it was assumed that 50% of the estimated benefits in terms of changes in levels of sexual risk behaviour still occur without the intervention.

Under the assumptions regarding the impact of cessation of these initiatives on risk behaviours among the various population groups, HIV incidence increased among all groups, particularly injecting drug users. In these projections, an additional 9100 cases of HIV were estimated to occur from 2006 to 2016 if the current prevention initiatives were to cease at the end of 2005. This would result in an additional 9000 people living with HIV in 2016, with an associated increase in clinical care costs for the remainder of their lifetimes.

Economic model

The economic analysis examined the investment made in HIV/AIDS by the NSW Department of Health since 1981, including funds allocated to preventive and clinical care services, together with the direct clinical care costs

Table 3. Funds allocated under the NSW HIV/AIDS program, 1981/82 to 2005/06

Allocation	Original value \$	2005/06 dollars \$	%
Clinical care	885 338 616	1 122 299 444	69.9
Prevention	373 376 125	483 698 791	30.1
Total	1 258 714 741	1 605 998 235	100

avoided as a result of the reduced incidence of HIV associated with the preventive activities.

The NSW Department of Health provided data on funds allocated under the program from 1981/82 to 2005/06. Total program funding was then apportioned between clinical care and prevention (where the category was the primary function of the funding) (Table 3).

In total, an estimated \$1259 million was allocated under the program from 1981/82 to 2005/06 (\$1606 million in 2005/06 prices), with 70% allocated to clinical care and 30% to prevention activities. Prevention funds were then apportioned to the various target populations, based on analyses undertaken by the NSW Department of Health, with \$355 million (2005/06 prices) allocated across the four study population groups.

The analysis of the return on the investment in preventive activities considered two aspects:

- The financial value of the direct lifetime costs of clinical care of HIV avoided by the NSW Department of Health. The model applied standard unit clinical care costs to the 44 545 cases estimated as having been avoided to the end of 2005, until that cohort died. Direct clinical care costs were based on the previous study by Health Outcomes International and NCHECR, adjusted to 2005/06 prices.⁴ The analysis included a Net Present Value analysis which compared the funds invested with the returns from that investment, and applied a common discount rate to the various cashflows that relate to the activities associated with the investment. Under this approach, a project is potentially worthwhile (or viable) if the Net Present Value is greater than zero; i.e. the total

discounted value of benefits is greater than the total discounted costs.

- The life years and quality adjusted life years saved as a result of the preventive activities. The values used in this study were based on those used in the previous study of needle and syringe programs by Health Outcomes International and NCHECR, which were drawn from the extant literature.⁴⁻⁶

For an investment of \$355 million between 1981 and 2005, a total of \$18 027 million in clinical care costs would be avoided over the lifetime of those people who did not acquire HIV because of the preventive programs. The Net Present Value of these savings at a discount rate of 3% is \$4629 million for the program as a whole. The Net Present Value is positive for three of the four components

Table 4. Net Present Value of the investment in NSW HIV/AIDS program to 2005 (\$ million)

Group	Investment in prevention (undiscounted) \$	Clinical care costs avoided (undiscounted) \$	Net Present Value	
			Undiscounted \$	Discount rate 3% \$
Male homosexual contact	78.2	3872.9	3794.7	1171.9
Injecting drug use	203.7	13 454.6	13 250.9	3288.1
Heterosexual contact	52.9	661.4	608.5	169.8
Clients of female sex workers	20.6	37.7	17.1	-0.8
Total	355.4	18 026.6	17 671.2	4628.9

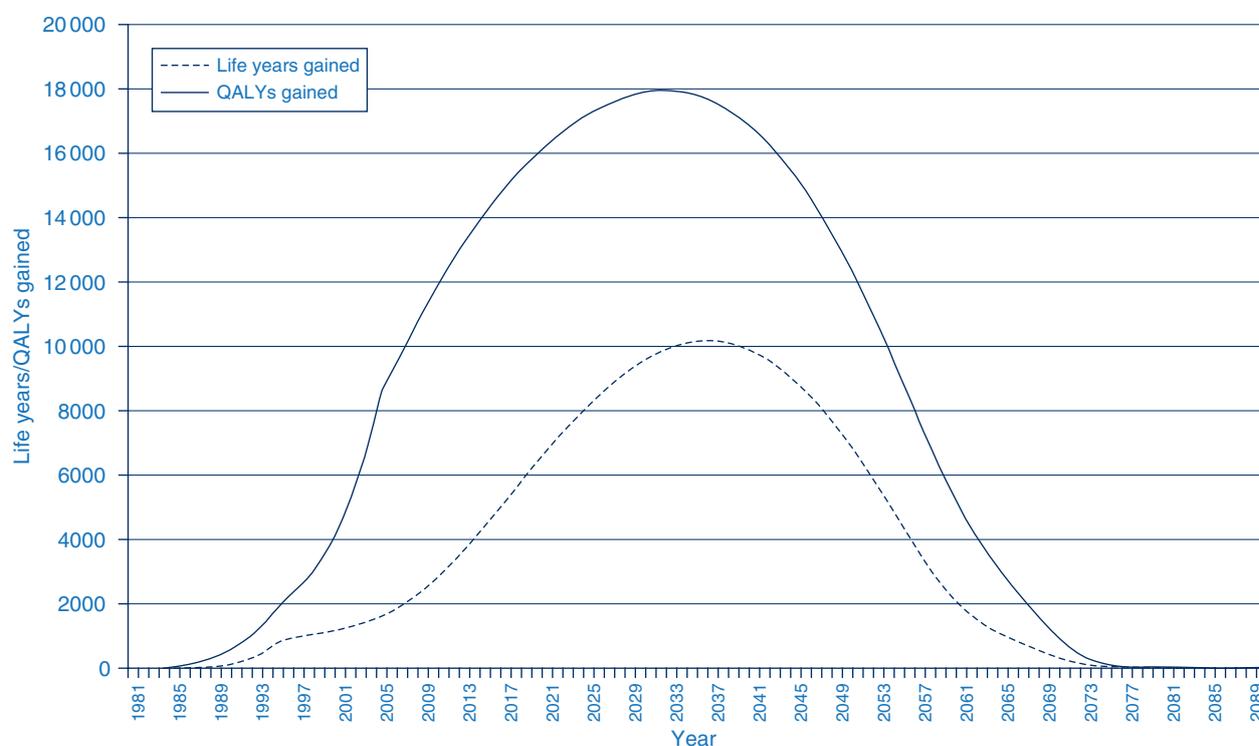


Figure 1. Life years and quality-adjusted life years (QALY) gained by persons avoiding HIV in NSW, 1980–2090. Source: Health Outcomes International in association with National Centre in HIV Epidemiology and Clinical Research. The impact of HIV/AIDS in NSW: mortality, morbidity and economic impact. Sydney: NSW Department of Health; 2007.

(homosexual contact, injecting drug use and heterosexual contact), but is negative (−\$0.8 million) for sex worker contact. The negative result for sex worker contact is due to the relatively small number of cases avoided (Table 4). These results also hold true for alternative discount rates of 5% and 7%.

The second component of the economic model examined the life years and quality-adjusted life years saved as a result of the investment in preventive initiatives. A total of approximately 394 000 life years were expected to be gained over the lifetime of people avoiding HIV. Of the total life years saved, 55% relate to injecting drug users, with 38% attributed to homosexual men. Life year gains among heterosexual people account for a further 6%.

In regard to the impact on quality of life, an estimated 863 000 quality-adjusted life years (QALYs) are expected to be gained over the lifetime of people who would otherwise have acquired HIV. The distribution of these two outcomes over the lifetime of people avoiding HIV is illustrated in Figure 1.

A rudimentary comparison of these results with those for several other public health preventive initiatives aimed at reducing tobacco consumption and reducing coronary heart disease indicates that the HIV/AIDS investment program compares very favourably in regard to direct health care costs saved and total benefits derived relative to the funds invested.⁷ For example, the ratio of clinical care costs saved to funds invested in the HIV/AIDS program is estimated at 13:1 compared to 2:1 for tobacco reduction strategies, while the ratio of total benefits to funds invested for HIV/AIDS is 189:1 compared to 49:1

Box 1. Key findings from *The impact of HIV/AIDS in NSW: mortality, morbidity and economic impact*³

- A reduction in the number of cases of HIV avoided (45 000 cases avoided)
- A reduction in the number of deaths from HIV (2750 deaths avoided by 2010)
- Avoidance of significant clinical care costs of HIV and AIDS over the lifetime of the cases avoided (estimated at \$18 000 million, undiscounted)
- A positive Net Present Value in respect of the investment in preventive initiatives and the clinical care costs avoided
- An increase in life-years survived by persons who would otherwise have contracted HIV (394 000 life years saved)
- An improvement in the quality of life among persons who would otherwise have contracted HIV (863 000 QALYs saved).

for tobacco reduction strategies. These results are also consistent with the recent study on the cost effectiveness of needle and syringe programs in Australia.⁸

Conclusion

The NSW Government investment program in HIV/AIDS has been a major public health initiative, and has been in place since the early 1980s. It has sought to achieve a balance in funding allocations between clinical care and treatment services and preventive activities. The analysis of the effectiveness of the program indicates that it has been highly successful (see Box 1). The analysis also indicates that continued investment in the preventive initiatives of the program can be expected to continue to provide benefits in each of these areas into the future.

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Gay men: current challenges and emerging approaches in HIV prevention

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Abstract: While the HIV epidemic is resurging in gay communities worldwide, HIV notification rates remain stable in NSW. This outcome demonstrates the success of a well-funded partnership approach to preventing HIV infection in gay men in NSW. However, population rates of new diagnoses of HIV are similar to those seen in comparable countries and sexual risk-taking may be increasing. As the HIV epidemic has evolved, prevention in gay men has become more complex and must effectively engage with an increasing diversity of risk reduction strategies. These strategies reflect the continual adaptation of the gay community to evolving understandings of the HIV epidemic and the diverse ways in which gay men balance pleasure and prevention.

The early responses of gay communities to HIV are widely seen as outstanding examples of effective disease prevention. However, the current situation is one of resurgent epidemics of human immunodeficiency virus (HIV) and other sexually transmissible infections in gay communities in post-industrial countries worldwide,¹⁻⁴ including Australia.⁵ This re-emergence has led some commentators to suggest that HIV prevention in gay men is faltering.⁶ Rather than suggesting an HIV prevention failure, this review of the state of the HIV epidemic and prevention in gay men in New South Wales (NSW) recognises the complexities of HIV prevention in gay men. In the absence of a tradition of condom use informed by the prevention of pregnancy or sexually transmissible infections, the uptake

of condom use by gay men in the first decade of the HIV epidemic remains a major community prevention success. However, as HIV treatments improved dramatically, some gay men saw less reason to maintain consistent condom use. There are now gay men who are making informed (and not so informed) decisions to engage in sexual practices which they know may put them at increased risk of HIV. HIV educators and health promoters need to collaborate with these men to find effective ways to minimise risk, without estranging the gay men who continue to use condoms for many if not all acts of anal sex. This article describes current trends in HIV infection in Australia and the challenges to supporting effective HIV prevention strategies in NSW.

Evolving HIV epidemic in gay men in Australia and NSW

Since 2000 the annual number of new diagnoses of HIV in Australia has increased by 38%.⁷ Gay men continue to be the most affected, accounting for 64% of people who were newly diagnosed as having HIV infection in 2004–2008, and 82% of the infections that were determined to have been acquired no more than a year before they were diagnosed. Recent trends in new HIV diagnoses differ across Australian jurisdictions. While the population rate of HIV diagnosis doubled in Victoria between 1999 and 2006, increased markedly in South Australia and Western Australia in that period and steadily increased in Queensland since 1999, in NSW over the past decade the rate has remained relatively stable.^{7,8} Historically, NSW has had the highest infection rate per capita of Australian jurisdictions,⁷ but in recent years infection rates in Victoria have caught up (Figure 1). HIV infection rates in NSW are also in the range of those seen in comparable countries where the HIV epidemic mainly affects gay men, in particular Canada and The Netherlands,¹ while in the USA infection rates are markedly higher.^{1,9}

Differing epidemiological trends have initiated reflection on the factors that promote success in responding to the HIV epidemic in gay men in Australia.¹⁰ This process has identified partnerships between community organisations, policy makers and researchers, grounded in an adequate funding base and political support, as factors in the successful NSW response to HIV.^{11,12} Nevertheless, while HIV notifications in NSW have been stable over the past decade, an increase in rates of newly-acquired HIV infections was observed between 1998 and 2003, which may however

have been at least partly due to changes in the methods of notification.¹³ Importantly, while national and state HIV strategies aim to contribute to a reduction in infections, this has not been achieved since the mid 1990s.^{5,7,8}

In the past decade, rates of sexual risk behaviour in gay community-attached men, as reflected in particular by rates of unprotected anal intercourse with casual partners in Sydney, have also been relatively stable or even declining, but nonetheless appear to remain higher than was the case in the early to mid 1990s.^{14,15} Of concern is the possibility of increasing rates of unprotected anal intercourse with casual partners in HIV-negative men, as suggested by the 2009 Sydney Gay Community Periodic Survey (Table 1). Recent years have also brought steeply increased rates of sexually transmissible infections, in particular syphilis, in HIV-positive men.^{16,17}

The potential for HIV transmission among gay men in NSW continues to be high and increases in HIV notification rates seen in other jurisdictions and overseas caution that sustained stable rates of HIV notifications in gay men

require continued vigilance and effective responses. The apparent stability of the current HIV epidemic in gay men in NSW may reflect testing patterns, HIV status knowledge and disclosure and the well-reasoned use of risk-reduction strategies that this enables. This stability in the epidemic could be undermined by the loss of prevention programs that balance support for effective risk-reduction practices and continued use of condoms.

Evolving prevention responses and approaches

From the days of the outbreak of acquired immune deficiency syndrome (AIDS) in the early-mid 1980s, gay men have continually found ways to adapt their prevention responses to the evolving HIV epidemic. Since the early 1990s, the gay community in NSW in particular has led the way in developing an increasingly sophisticated and complex array of risk-reduction strategies other than condom use.^{18,19} The massive uptake of HIV testing, and the resulting widespread knowledge of one's HIV status, have enabled many gay men to develop sexual practices that simultaneously reduce the likelihood of HIV transmission while also ensuring that sex remains about more than preventing HIV transmission.^{20,21} Notably, seroadaptive behaviours,²² such as negotiated safety (i.e. unprotected anal intercourse in a stable relationship of two men who have tested negative for HIV and established agreements regarding sex and protection outside their relationship); serosorting (i.e. unprotected anal intercourse with a (casual) sex partner of similar HIV status); strategic positioning (i.e. an HIV-positive man taking the receptive role or an HIV-negative man taking the insertive role in unprotected anal intercourse); planned withdrawal and unprotected sex with HIV-positive partners with undetectable viral load, have allowed some men to lead more satisfying sex lives.

Social research in NSW and Australia has been instrumental in documenting these community risk-reduction responses and has been pivotal in showing that not all unprotected anal sex is risky.^{18,19,23} These insights also provide a counterpoint to discourses that see HIV prevention in gay men as failing because of complacency within the community.²⁴ The practice of risk-reduction strategies

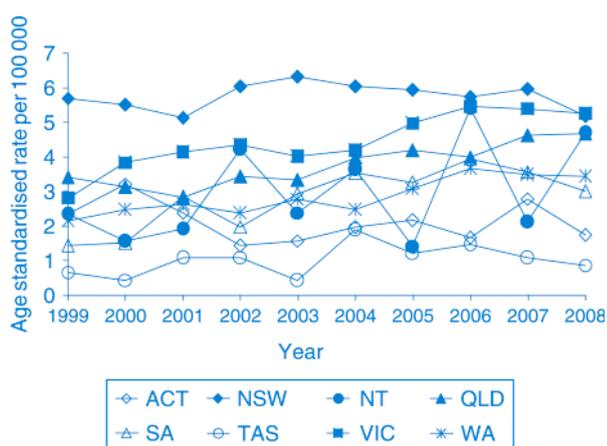


Figure 1. Newly diagnosed HIV infection, 1999–2008, by year and state and territory, Australia. Source: HIV/AIDS, viral hepatitis and sexually transmissible infections in Australia Annual Surveillance Report 2009. National Centre in HIV Epidemiology and Clinical research, The University of New South Wales.

Table 1. Proportion of men participating in the Sydney Gay Community Periodic Survey who had engaged in unprotected anal intercourse with casual partners in the six months prior to the survey, by HIV status of respondent

	2008 February n (%)	2008 August n (%)	2009 February n (%)	2009 August n (%)
HIV-positive	117 (54.4)	42 (45.2)	120 (59.1)	74 (48.7)
HIV-negative	287 (24.9)	106 (23.1)	345 (29.5)*	185 (30.6)*
HIV status unknown	18 (20.2)	14 (25.0)	46 (33.1)*	37 (34.6)
Total	422	183	511	349

*Significant change compared with same time previous year (Feb-Feb or Aug-Aug). Source: Sydney Gay Community Periodic Survey August 2009. National Centre in HIV Social research, The University of New South Wales.

reflects the continued importance gay men attach to HIV prevention and illustrates a culture of care that values HIV prevention. Risk-reduction strategies reflect gay men's extensive knowledge and understanding of HIV-treatment efficacy and can be understood as rational and sophisticated ways to balance risk and pleasure in times when the threat of HIV is reduced. The communities of gay men engaging with these evolving risk-reduction strategies may no longer have the goal of fully eliminating new HIV infections and accept that their behaviours carry some risk of HIV transmission and infection. Bridging the gap with the public health goal of eliminating new HIV infections will benefit from the increased use of technologies such as rapid HIV (antigen) testing and early treatment for prevention.

The National Gay Men's Syphilis Action Plan

A testing-and-treatment approach is the cornerstone of the National Gay Men's Syphilis Action Plan, which responds to the increased notifications of syphilis that is seen worldwide, in particular in HIV-positive gay men. This action plan underscores the importance of promoting regular testing for syphilis, and treatment if needed, in ways that reflect men's level of sexual activity and potential exposure. When successfully implemented, this approach may not only be effective in curbing the syphilis epidemic,²⁵ but it is also acceptable to large parts of the gay community, including sexually adventurous men who engage in sex with substantial numbers of partners and who have moved away from consistent condom use. While the current evidence base for a direct impact of the control of syphilis and other sexually transmissible infections on HIV prevention is limited and discouraging,²⁶ when embedded in an appropriate, comprehensive approach to HIV prevention, regular testing for sexually transmissible infection offers additional opportunities to address and support HIV prevention, including for gay men living with HIV (positive prevention).

Contemporary HIV prevention

HIV prevention today is perhaps more complex than it has ever been before and involves implementing responsive services and messages that support gay men with increasingly diverse prevention needs, preferences and practices. The daunting task of contemporary HIV prevention in gay men benefits from a sound understanding of the factors that shape men's sexual and risk-reduction practices in different situations. This understanding remains limited and patchy. While it has been important to show that risk-reduction strategies are rational and informed responses, current theorising and research acknowledge that risk-reduction practices are not always enacted in reasoned ways, are influenced by a range of motivations and desires that play out in a specific situation and can be supported by advance planning.²⁷ These conceptual developments in health promotion theory hold substantial promise for a new generation of HIV-prevention

programs for gay men, as do evolving health promotion and communication technologies.

The normalisation of 'gay', the decentering of gay identity in favour of the adoption of multiple identities, the change from community to more individualised responses and the transfer of social connections and meeting new people to the internet and away from physical venues suggest that traditional media and venue-outreach approaches can no longer ensure adequate coverage of HIV prevention for gay men. To be effective, HIV prevention will now have to use highly targeted and tailored offline and online strategies that reach specific communities and combine these targeted strategies with broader ones to reach the wider audience of gay men, as well as other men who have sex with men. This approach not only increases the costs of HIV prevention in gay men, but may also require the effective use of non-gay media for HIV-prevention messages.

The increased reliance on risk-reduction strategies and the social changes that have occurred in the gay community also underscore the continued importance of other foundational aspects of community-based HIV prevention in gay men, such as preventing HIV-related stigma and supporting community-wide engagement with HIV prevention. Risk-reduction strategies based on HIV status and viral load have an important place in contemporary prevention, as they can jointly enable men to have pleasurable sex and prevent HIV. However rational these responses may be from an individual perspective, they also bear the potential risk of contributing to at least a sexual divide in the gay community.²⁸ Gay men's HIV-prevention practices no longer occur within the context of the same sense of 'community in adversity' that existed in the past. A conversation is needed regarding the ethics of HIV prevention, sexual practices and relationships²⁹ that shape how gay men live when HIV is endemic and no longer carries the risks that it once did.

Current challenges to gay-community-based HIV prevention

Since the advent of the HIV epidemic in gay men in the early 1980s, its meaning has evolved substantially, as have gay men's adaptive responses. Prevention, surveillance and social and behavioural research have often struggled to keep up with the pace of change and to remain relevant and useful. The key to the success in NSW has been partnership and reflection, informed by strong research. Thirty years after the HIV epidemic in gay men was recognised, NSW has achieved a stable yet potentially fragile rate of HIV notifications, in contrast to resurgent epidemics seen internationally. The major challenge for the future is to reduce the rates of new infections in a context of increasingly diverse and complex prevention responses. The development of the new NSW HIV Strategy provides an

opportunity to develop a blue print for the NSW response to HIV prevention into the future and to define the surveillance and research agendas to inform and support successful HIV prevention in gay men.

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The effectiveness of harm reduction in preventing HIV among injecting drug users

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Abstract: There is now compelling evidence that harm reduction approaches to HIV prevention among injecting drug users are effective, safe and cost-effective. The evidence of effectiveness is strongest for needle and syringe programs and opioid substitution treatment. There is no convincing evidence that needle and syringe programs increase injecting drug use. The low prevalence (~1%) of HIV among injecting drug users reflects the early adoption and rapid expansion of harm reduction in Australia. Countries that have provided extensive needle and syringe programs and opioid substitution treatment appear to have averted an epidemic, stabilised or substantially reduced the prevalence of HIV among injecting drug users. However, despite decades of vigorous advocacy and scientific evidence, the global coverage of needle and syringe programs and opioid substitution treatment falls well short of the levels required to achieve international HIV control.

In response to the newly recognised threat of human immunodeficiency virus (HIV) among and from injecting drug users (IDUs), needle and syringe programs (NSPs) were first established in the mid-1980s in the Netherlands and the United Kingdom, followed by Australia.¹ At the time, there was no evidence that NSPs or any other measures would be effective, safe or cost-effective in controlling HIV in this population. However, it appeared highly plausible that a package of prevention measures might be effective. This combination included educating drug users about the

risks that they faced from sharing injecting equipment, providing IDUs with sterile injecting equipment while removing used injecting equipment from circulation, increasing access to drug treatment, particularly methadone maintenance, and the meaningful involvement of drug users in responding to the epidemic. This package of measures came to be known as 'harm reduction'.²⁻⁴

A quarter century later, we have accumulated evidence of the effectiveness, safety and cost-effectiveness of the harm reduction approach to HIV prevention among IDUs. Harm reduction is one of the most effective and cost-effective measures in the entire HIV prevention repertoire. This article explores the evidence.

Effectiveness of needle and syringe programs

A 2004 review of the evidence of the effectiveness of NSPs commissioned by the World Health Organization (WHO) found that a conservative interpretation of the published data fulfilled at least six of the nine criteria described by Bradford Hill for causality (strength of association, replication of findings, temporal sequence, biological plausibility, coherence of evidence, and reasoning by analogy) and all six additional criteria (cost-effectiveness, absence of negative consequences, feasibility of implementation, expansion and coverage, unanticipated benefits, and application to special populations).⁵ The principal finding of the WHO review, that there was compelling evidence of effectiveness, safety and cost-effectiveness of NSPs, was consistent with eight reviews of the evidence conducted by or commissioned by the United States of America (USA) government agencies.⁶⁻¹³ The WHO review recommended that authorities in countries affected or threatened by HIV among IDUs should rapidly establish and expand NSPs to the scale of the affected population.

The three Bradford-Hill criteria that were not met were specificity of association, biological gradient and experimental evidence. The lack of specificity of association arises from the fact that NSPs also reduce infection with hepatitis C. NSPs have not had the same dramatic impact on the hepatitis C epidemic because of the higher viral infectivity and parenteral transmission efficacy of hepatitis C¹⁴ and because NSPs were established decades after hepatitis C became prevalent among IDUs in Australia.¹⁵

Since the WHO review, evidence of a biological gradient for NSPs has become available, with HIV incidence in New York found to be inversely correlated with the number of sterile needles and syringes provided.¹⁶

Experimental evidence for NSPs in the form of a randomised-controlled trial, considered the highest level of evidence in the ranking scheme, has not been possible because of the logistical and ethical problems of randomly assigning NSP access to individual or groups of IDUs.¹⁷ While the hegemony of the evidence-based medicine framework now extends into all areas of health,^{18–20} there is increasing debate regarding its appropriateness for using these forms of evidence for assessing some public health interventions.^{21,22}

After two decades there is still no evidence that NSPs reduce the age of initiation, increase the frequency of injecting or prolong the duration of drug injecting careers.⁵

Cost-effectiveness of needle and syringe programs

An analysis of 778 years of data from 103 cities around the world found that cities that had ever had NSPs had an average annual decrease in HIV prevalence of 18.6%, compared with an average annual increase of 8.1% in cities without NSPs.²³ A subsequent study estimated that, between 2000 and 2009, NSPs had directly averted over 32 000 new HIV infections in Australia. During 2000–2009, gross funding for NSPs was \$AUD243 million. Savings of health-care costs were estimated to be \$AUD1.28 billion. For every dollar invested in NSPs, more than four dollars was returned in direct health-care cost-savings within ten years. If the costs and productivity gains and losses of individual IDUs are considered, then the net present saving of NSPs is \$AUD5.85 billion. This means that for every dollar invested in NSPs between 2000 and 2009, \$AUD27 was returned in cost savings.²⁴

Effectiveness of opioid substitution treatment

The best evidence of the effectiveness of drug dependence treatment in preventing HIV transmission among IDUs is for opioid substitution treatment programs using methadone and buprenorphine.^{25–27} The evidence is much stronger for methadone than for buprenorphine treatment.^{27,28} Methadone substantially reduces drug injecting and thereby the sharing of injecting equipment.^{26,29} Seroprevalence studies suggest that reductions in injecting risk behaviour can result in reductions in HIV infection but relatively few (expensive and difficult) seroincidence studies have been published.^{30–32} However, little is known about any impact of abstinence-based treatment on risk behaviour or HIV prevalence and incidence. Most countries provide a range of options even though there is much better evidence for opioid substitution treatment. Countries

that have provided extensive NSPs and opioid substitution treatment appear to have averted an epidemic, stabilised or substantially reduced the prevalence of HIV among IDUs.

Health education of injecting drug users

There is no rigorous evidence that educating IDUs about the risks of HIV or community development approaches per se helps to reduce the spread of the infection. However, the effectiveness of these interventions is plausible and they are inexpensive. Moreover, evidence from recent US randomised-controlled trials indicates that behavioural interventions, including peer-driven interventions, reduce the risk of HIV and hepatitis C acquisition by encouraging safer behaviours and increasing access to health services.^{33,34}

Effectiveness of drug law enforcement

The effectiveness, cost-effectiveness and lack of serious unintended negative consequences of harm reduction^{5,35} stands in stark contrast to the relative ineffectiveness, cost-ineffectiveness and serious unintended negative consequences of drug law enforcement.³⁶ Yet drug law enforcement is the mainstay of the response to illicit drugs by governments in Australia and other countries and the major beneficiary of government resources.³⁷ An increasing number of studies suggest that vigorous drug law enforcement can inadvertently increase the potential for transmission of HIV and other bloodborne infections among IDUs.^{38–43}

Adoption of harm reduction approaches

The scientific debate about harm reduction is now over. Harm reduction approaches to HIV prevention among IDUs have faced relentless international and national opposition and criticism. But they are now accepted as mainstream global drug policy. Almost all agencies of the United Nations with responsibility for drug policy now support harm reduction. NSPs have been established in 70 countries and opioid substitution treatment is available in 82 countries including 66 countries which provide both interventions.⁴⁴

However there is no room for complacency. Globally, IDUs are estimated to account for 10% of people living with HIV.⁴⁴ In Australia, approximately 30–40 HIV notifications each year are attributed solely to injecting drug use.⁴⁵ Mathematical modelling suggests that while HIV remains low and stable among IDUs, even relatively minor reductions in current levels of NSP coverage could result in a significant increase in incident infections.⁴⁶ Moreover, if an HIV epidemic were to eventuate among IDUs in Australia, it is likely that this would involve one or more vulnerable populations with poor HIV prevention access and coverage. This includes IDUs from Aboriginal and Torres Strait Islander communities²⁴ and culturally and linguistically diverse backgrounds, especially ethnic

Vietnamese,⁴⁷ and incarcerated IDUs.⁴⁸ Despite evidence of major benefits of prison NSPs in the absence of significant negative consequences and ample documentation of injecting drug use in Australian prisons, repeated efforts to establish these facilities have proved unsuccessful.⁴⁹ Moreover, as in other settings, the success in changing injecting risk behaviour has not been matched by changes in sexual risk behaviour among IDUs in Australia. Harm reduction has had little impact on the sexual transmission of HIV among and from IDUs. Particular attention is required for the provision of harm reduction strategies to bridge populations (such as men who have sex with men and sex workers who are also IDUs).

The evidence-based medicine framework emerged after the international community began to deal with the threat of an HIV epidemic among IDUs. This experience should remind public health practitioners and policy makers of the risks of applying this framework too mechanistically. Evidence-based medicine provides little guidance when dealing with newly emerging major health threats where there has been insufficient time to evaluate a range of options. However, after more than two decades of advocacy and a robust body of evidence supporting the effectiveness of harm reduction in preventing HIV among IDUs, global coverage remains grossly inadequate.⁴⁴ While Australia has the second highest rate of needle and syringe coverage in the world (213 clean needles per IDU per year), globally only 8% of IDUs have had access to NSPs in the previous year with less than half the countries with known IDU populations providing access to opioid substitution treatment.⁴⁴ The global average is still only 22 needles and syringes per IDU per year.⁴⁴ Globally, only 8% of IDUs receive opioid substitution treatment while only 4% of HIV-positive IDUs receive antiretroviral treatment. Funding for global harm reduction amounts to \$US 180 million per year of an estimated annual requirement of \$US 2.13 billion.⁵⁰ These disparities are particularly apparent in some countries in South East Asia where HIV prevention for IDUs is further hampered by repressive legal and policy environments.⁵¹ At the current rate of expansion, adequate coverage of harm reduction will probably take another 20 to 30 years.

Conclusion

The highly efficacious HIV prevention interventions for IDUs known as 'harm reduction' urgently need to be expanded to scale internationally after compelling evidence that harm reduction approaches to HIV prevention among IDUs are effective, safe and cost-effective.

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Improving the health of sex workers in NSW: maintaining success

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Abstract: NSW has a diverse sex industry that is limited in its size by modest demand. There is no evidence that decriminalisation in 1995 increased the frequency of commercial sex in NSW. Though the largest sector, female brothels, is now mainly staffed by Asian women, condom use for vaginal and anal sex exceeds 99% and sexually transmissible infection rates are at historic lows. These gains are attributable to the long-term support of the NSW Department of Health in collaboration with the community-based Sex Workers Outreach Project and sexual health services, facilitated by the removal of criminal sanctions without the expense and access barriers of licensing systems.

Just a generation ago sex work in New South Wales (NSW) had been criminalised for many years, linking the sex industry to criminal subcultures and fuelling corrupt behaviour.¹ In Sydney, both community-based² and clinic-based³ studies of brothel workers reported rates of sexually transmissible infections that were comparable to many resource-poor countries. And acquired immune deficiency syndrome (AIDS) was looming. This article describes how the NSW Department of Health in collaboration with the community-based Sex Workers Outreach Project and sexual health services in the area health services have worked to improve the health of sex-workers in NSW and thereby minimise the potential public health threat posed by commercial sex.

Community responses

Sex workers had begun to organise themselves from around 1981, and in 1983 they formed the first Australian Prostitutes Collective (APC). By 1986 the APC was the first community-based sex-worker organisation in Australia, and possibly the first such community-based organisation in the world, to receive government funding. This funding enabled the APC to mobilise and manage teams of volunteers to provide peer education and support services to sex workers throughout NSW for the first time.⁴

Though the Australian Prostitutes Collective dissolved in 1989, the NSW Department of Health recognised the highly-effective public health model that the Collective had pioneered. The Department was quick to assist the foundation of a new organisation, the Sex Workers Outreach Project (SWOP) in 1990, which is administered by the AIDS Council of NSW. As one of the few truly community-based sex worker organisations remaining in Australia, SWOP enjoys the trust of every part of the NSW sex industry and has unique access to virtually every establishment and a close working relationship with public health services.⁵

Policy responses

NSW took its first steps toward reform of the laws affecting sex workers in 1979 in the context of the reform of public order offences and 'victimless' crimes that was promised by the Wran opposition in 1976. However prostitution laws were deeply embedded into the statutes, so it was not until *The Disorderly Houses (Amendment) Act* in 1995 that all forms of adult sex work were effectively decriminalised.⁶ Remarkably, by 1997 a survey of the most vulnerable of NSW sex workers, drug-affected street workers, found an uncomfortable relationship between the workers and police but no evidence of corruption.⁷

Decriminalisation of sex work enabled NSW to become a global leader in other policy areas, including the first published work-place standards for brothels⁸ and accreditation of the formal training of peer educators toward a diploma in community education.

In response to HIV/AIDS, direct intervention by the then Commonwealth Health Minister, Dr Neal Blewett, resulted in sex workers' screening consultations for sexually transmissible infections (but not the pathology testing) being

rebated by Medicare after 1985. Because they were usually anonymous, HIV tests were free of charge. As sex workers' main risk of other sexually transmissible infections now stems from their non-commercial sexual behaviour,⁹ Medicare's persistent policy of not rebating testing for sexually transmissible infections for this group is questionable. In practice the policy is rarely enforced and about half of Sydney female brothel-based sex workers access the private sector for testing for sexually transmissible infections.

With the removal of the criminal laws, brothels effectively became subject to planning laws that are administered by local governments. This remains a problem in NSW as many local politicians believe that their constituents want them to refuse development applications for brothels. Moreover, local governments have not been provided with any resources to administer brothels to ensure that proper occupational health and safety standards are being met. In a recent survey of local councils in Sydney development applications were not being approved at a rate sufficient to keep up with demand.

Health service responses

From the beginning of the 1990s, NSW Health adopted a policy that every area health service in the state should provide a free and confidential specialist sexual health service, and sex workers were among the key populations that were to be targeted. Within sexual health services sex workers receive periodic testing for sexually transmissible infections (depending on their individual level of risk), hepatitis vaccination, and culture-specific health education including instruction in the use of condoms and strategies for negotiating with clients that are reluctant to use condoms. In addition, the advent of Medicare in 1984 enabled the general population to access general practitioners for sexually transmissible infection testing and care: this greatly relieved the clinical burden and enabled sexual health services to move toward a proactive population health approach with an emphasis on health education.

Challenges

Injecting drug use

A majority of street-based sex workers and a minority of indoor sex workers in NSW report injecting illicit drugs.⁷ Due to the sustained success of the NSW harm reduction policy around drug use (see article by Wodak and Maher in this issue), sex workers have been largely spared exposure to HIV through contaminated injecting equipment, eliminating them as a potential 'bridging' population for HIV transmission between drug users and the general population.¹⁰ SWOP, sexual health services, and the Kirketon Road Centre, Sydney, have been active participants in the needle and syringe program from the outset.

Asian migrant sex workers

From the late 1980s, Sydney brothels witnessed a substantial influx of women from east and south-east Asian countries. Many were indebted to agents, few were competent in English, most were unable to consistently require their clients to use condoms, and the prevalence of sexually transmissible infections was unacceptably high. As most were from Thailand, they were also beginning to present with HIV infection.¹¹

In response, the NSW Department of Health provided funding and an alliance between the Department, the Sydney Sexual Health Centre and SWOP developed the Multicultural Health Promotion Program that was launched in 1991. The Program employed staff that was proficient in Thai and, later, Mandarin and Korean. Educational resources, including videos and instructive comic books in appropriate languages, were distributed on outreach to Asian brothels and in clinics. Well-attended Asian language clinics were established in several sexual health services around Sydney, with a focus on health education.¹¹

The Multicultural Health Promotion Program has been successful. Condom use by the Asian women is now similar to resident sex workers (Figure 1) and the prevalence of sexually transmissible infections is at an historic low; for example, the incidence of gonorrhoea has fallen from 440 per 100 woman years in 1980–1981² to 0.24 per 100 woman years in 2004–2006¹² among brothel-based workers in Sydney. Less than 1% of these women arrive with HIV infection and to date there are no documented cases of HIV transmission to or from these women resulting from their work in Australia.¹⁰

As Asian women now constitute the majority of the women working in Sydney's brothels¹³ the Program remains

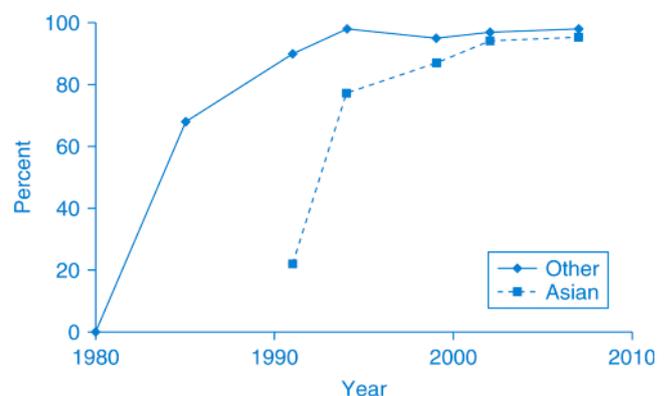


Figure 1. The proportions of Asian and non-Asian brothel-based sex workers in Sydney NSW that reported condom use for vaginal or anal sex with all clients, 1980–2007.

Source: References 2, 11, 12 in this paper.

important. Over time, at presentation to a clinic, this group of women has been older, better educated and more proficient in English, and they are increasingly working in Australia with legitimate student visas or resident status. Few have worked as sex workers before they came to Australia. Long ago these women effectively displaced the market for the higher-risk 'trafficked' women of the 1990s, and they are more in control of their working lives.¹⁴

Male sex workers

Surveillance of male sex workers is more difficult. They are a smaller part of the sex industry and rely more on electronic communication with clients (mobile phones and the internet) that has replaced conventional worksites (brothels) (anecdotal evidence suggests that the female sex industry is developing in a similar way). In a community-based cohort of gay men in Sydney, one in five men reported having been paid for sex at some time and, for one in 20 of these men, this had occurred in the previous six months. However, for more than half the men, this had only been on one or two occasions.¹⁵ Although condom use by clients of male sex workers was high, male sex workers were more likely to practise unsafe sex with non-paying partners and more likely to use illicit drugs than female brothel workers and non-sex-working homosexual men. In a clinical setting in Sydney, male sex workers were less likely to be HIV positive and more likely to report sex with women than non-sex-working men who have sex with men.¹⁶ The vulnerability of male sex workers to sexually transmissible infections and HIV (and their potential for onward transmission) appeared to be more related to their non-commercial sex or injecting behaviours than their paid sexual behaviour.^{15,16}

Transgender sex workers

Six of 48 (12.5%) street-based sex workers in a NSW state-wide survey were transgendered; most of these street workers were working in inner Sydney. While transgender street workers were somewhat less likely to be drug dependent than their female counterparts they had fewer alternative employment options.⁷ Outreach health promotion officers also report occasional transgender workers in female brothels. As almost half of transgendered people have a history of sex work resulting from limited employment alternatives,¹⁷ services dealing with this population are experienced in dealing with this issue. From the outset, SWOP has addressed the special issues raised by male and transgendered sex work that typically extend beyond immediate STI/HIV risk.

Clients of sex workers

Australian men are among the least frequent consumers of commercial sexual services in the world. In a large representative national survey in 2001–2002, 2.3% of

NSW men reported paying for sex in the last year, similar to the national average,¹⁸ and less than half the rate reported by New Zealand men before that country decriminalised sex work.¹⁹ Such a low proportion means that commercial sex would be unlikely to sustain a widespread heterosexual HIV epidemic in Australia and that decriminalisation has not resulted in an increase in the incidence of sex work. Clinic-based and population-based studies determined that the male clients of female sex workers reported more sexual partners than other men and they were more likely to report having injected drugs.^{18,20}

Conclusion

NSW maintains highly effective programs that have minimised the public health threat posed by commercial sex. The NSW Department of Health has worked cooperatively with SWOP for over 20 years aided by a decriminalised legal climate without the unnecessary expense²¹ and access barriers²² created by regulation. However, the NSW sex industry turns over half of its workforce every year¹³ so the potential for rapid change and the need for ongoing health promotion programs are not diminished.

Acknowledgment

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Guarding against an HIV epidemic within an Aboriginal community and cultural framework; lessons from NSW

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Abstract: The rate of HIV diagnosis in the Aboriginal and Torres Strait Islander population in Australia has been stable over the past 5 years. It is similar to the rate in non-Indigenous people overall, but there are major differences in the demographical and behaviour patterns associated with infection, with a history of injecting drug use and heterosexual contact much more prominent in Aboriginal people with HIV infection. Moreover there are a range of factors, such as social disadvantage, a higher incidence of sexually transmitted infections and poor access to health services that place Aboriginal people at special risk of HIV infection. Mainstream and Aboriginal community-controlled health services have an important role in preventing this epidemic. Partnerships developed within NSW have supported a range of services for Aboriginal people. There is a continuing need to support these services in their response to HIV, with a particular focus on Aboriginal Sexual Health Workers, to ensure that the prevention of HIV remains a high priority.

For over two decades, Aboriginal and Torres Strait Islander people have been recognised through national and jurisdictional level strategic documents as being potentially at increased risk of human immunodeficiency virus (HIV) infection.^{1,2} The risk factors for this include poorer access to health services, and higher rates of numbers of other health conditions, particularly bacterial sexually transmissible infections (STIs).²⁻⁸

Aboriginal people of New South Wales (NSW) represent 29% of the national Indigenous population, the largest proportion of any jurisdiction.⁴ Within NSW, Aboriginal people are recognised as experiencing much of the same social and health disadvantages as the rest of Indigenous Australia.⁴ These include, but are not limited to, lower life expectancy, more underlying and complex health needs, higher unemployment levels, lower education attainment and a higher proportion of the population resident in outer regional and remote locations.⁴ Furthermore the Aboriginal population is younger and its overall size is growing faster than the non-Aboriginal population.^{3,4}

In this paper we: review the national epidemiological status of HIV in Aboriginal communities as well as the factors that may increase the risk of HIV infection within this population; discuss the NSW strategic response, with particular reference to health service providers; and describe the opportunities for enhancing the response to guard against a HIV epidemic in Aboriginal communities.

National epidemiological situation

Each year since 2007, a comprehensive report has been produced on the epidemiological status of bloodborne viral and sexually transmissible infections, including HIV, in Aboriginal and Torres Strait Islander people.^{7,9,10} The report is largely based on routine notifiable disease reports, but also includes data from a range of other sources.

The rate of HIV notification in the Aboriginal population nationally has remained relatively stable at around 4.0 per 100 000 over the last 5 years, similar to the non-Indigenous community (Figure 1).⁸ Each year, nationally around 20 diagnoses of HIV are reported among Aboriginal and Torres Strait Islander people, compared to around 1000 in Australia as a whole. Of all HIV diagnoses in the Indigenous community in Australia, 30.1% have been notified in NSW.⁸

Over the last 5 years, the rate of HIV diagnoses in Aboriginal and non-Aboriginal Australians has been similar. However, there are some important differences between the two populations in terms of demographics and how people have acquired HIV. Compared with non-Indigenous Australians,

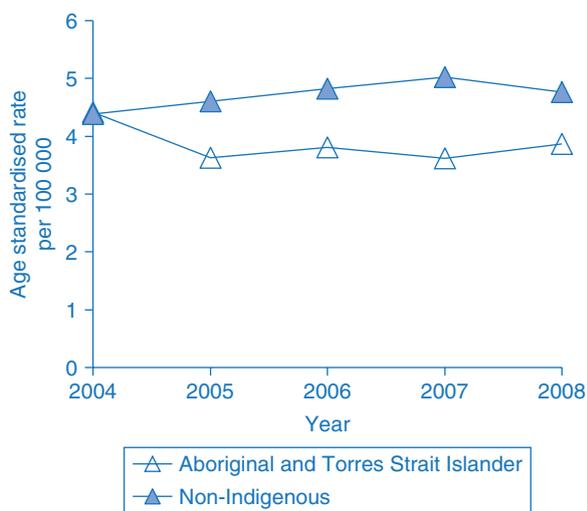


Figure 1. Newly diagnosed HIV infection by Aboriginal and Torres Strait Islander status, 2004–2008.

Source: Bloodborne viral and sexually transmitted infections in Aboriginal and Torres Strait Islander People: Surveillance and Evaluation Report 2009.

HIV is diagnosed more often in women (22% versus 6%), and is diagnosed at a younger age (median age 33 years versus 37 years).

With regards to transmission patterns (Figure 2), male-to-male sex is reported at lower rates in the Indigenous diagnoses (48% versus 75%), while heterosexual transmission is reported more frequently (23% versus 12%), and a history of injecting drug use is recorded at seven times the rate among the Indigenous cases (22% versus 3%).⁷ When injecting drug use and sexual transmission risk factors are combined, there is a sharp contrast between Indigenous and non-Indigenous cases. Among Indigenous cases, heterosexual contact inclusive of injecting drug users are reported among 45% of cases (compared to 15% of non-Indigenous cases), while homosexual contact and injecting drug users in the Aboriginal population is reported among 54% of cases compared to 80% of cases in the non-Indigenous population. This highlights the potential for escalated transmission within the Aboriginal community.

The higher proportion of cases that are related to injecting drug use could indicate that unsafe injecting is more common among Aboriginal people, or that Indigenous people who inject drugs have poorer access to harm reduction services (Figure 3). A higher per capita rate of hepatitis C notification supports both possibilities, as there is a very strong association between hepatitis C infection and injecting drug use. The annual survey of people attending needle and syringe programs recruits a high proportion of Aboriginal people (around 10%, compared to 2.5% in the population of Australia as a whole), perhaps due in part to the location of survey sites.⁸ For people who inject drugs, harm reduction has been highly effective

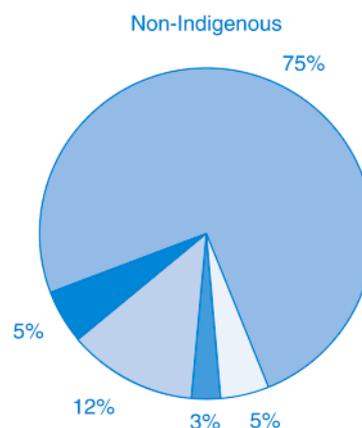
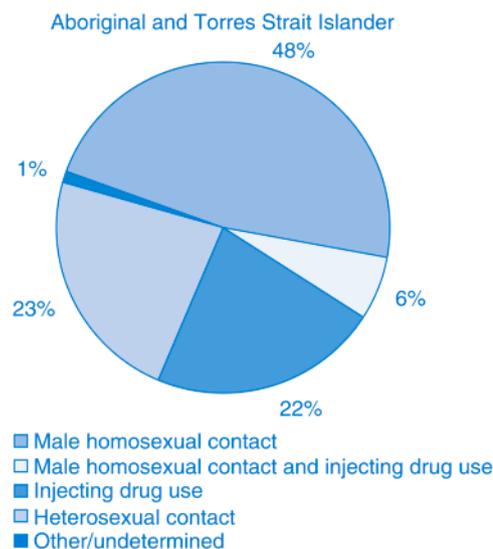


Figure 2. HIV diagnoses in Australian-born cases, 2004–2008, Aboriginal and Torres Strait Islander people compared with non-Indigenous people by HIV exposure category.

Source: Bloodborne viral and sexually transmitted infections in Aboriginal and Torres Strait Islander People: Surveillance and Evaluation Report 2009.

as a means of preventing HIV infection,¹¹ but needs to be strengthened for Aboriginal people.

Men who have sex with men represent just under 50% of all notifications in Aboriginal and Torres Strait Islander people in the last 5 years.^{7,8} This group is also the most affected by HIV infection in non-Indigenous Australians.^{7,8} The public health response to HIV in this group has been sophisticated and sustained over several decades, largely facilitated through the AIDS Councils in the jurisdictions.

Within the Aboriginal population, several other groups are at risk of HIV infection but do not benefit from such a comprehensive prevention framework. The higher proportion of HIV acquired through heterosexual sex in the Aboriginal population indicates the potential for increased transmission to a much larger group.^{7,8,12}

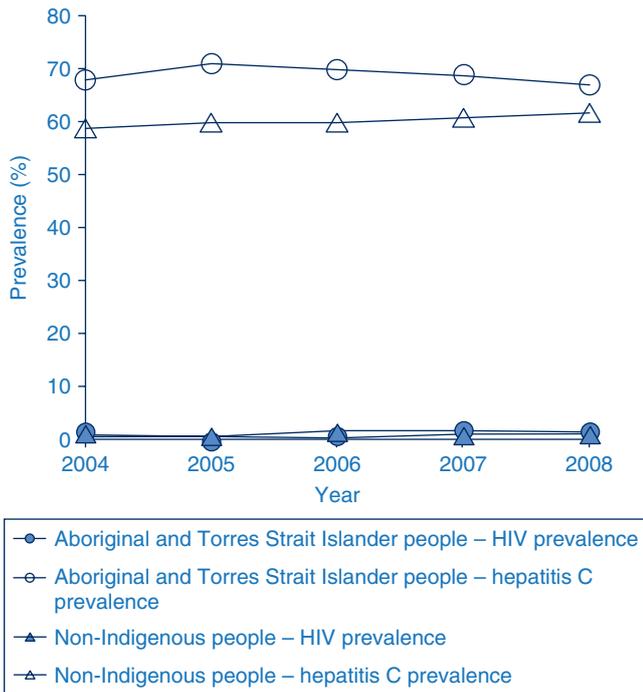


Figure 3. HIV and hepatitis C prevalence in people participating in the needle and syringe program survey for both Aboriginal and Torres Strait Islander and non-Indigenous Australians, 2004–2008.

Source: Bloodborne viral and sexually transmitted infections in Aboriginal and Torres Strait Islander People: Surveillance and Evaluation Report 2009.

Risk factors for HIV transmission in Aboriginal and Torres Strait Islander communities

A number of factors have the potential to substantially increase HIV transmission rates within the Indigenous population of Australia. Elevated rates of bacterial sexually transmissible infections are well documented,^{3,5–8} and evidence is emerging of high rates of viral sexually transmissible infections such as HSV-2.¹³ Both bacterial and viral sexually transmissible infections are known to potentiate the transmission of HIV.^{14,15} Chlamydia, gonorrhoea and infectious syphilis are reported at rates that are respectively 5, 34 and 4 times greater than those in non-Indigenous communities, with the differential particularly pronounced in remote communities (Figure 4).^{7,8} The evidence to support sexually transmissible infections treatment as a means of reducing HIV infection rates is not strong, but the converse is clear: populations with high sexually transmissible infection rates are vulnerable to HIV transmission, because these infections are either markers of risk, or potentiators of disease.^{14,15}

As HIV infection can remain asymptomatic for years, people at risk need to be actively engaged with health services to ensure that they have access to services for prevention, diagnosis and treatment if needed.³ However several factors work to compromise Aboriginal

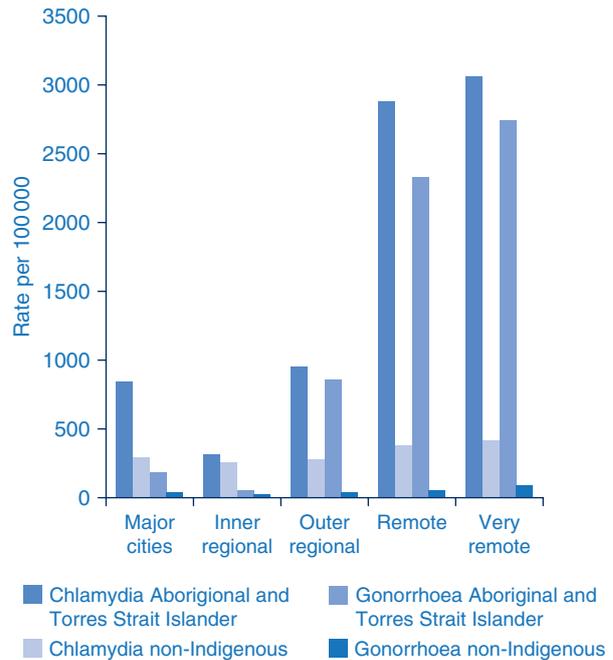


Figure 4. Incidence of chlamydia and gonorrhoea for both Aboriginal and Torres Strait Islander and non-Indigenous Australians by area of residence, 2008.

Source: Bloodborne viral and sexually transmitted infections in Aboriginal and Torres Strait Islander People: Surveillance and Evaluation Report 2009.

populations' access to sexual health and HIV-related services.¹⁶ These factors include the perceived loss of confidentiality and privacy, the stigma associated with HIV, absence of relevant services in parts of NSW, the lack of availability of transport to specialist services, and the cultural appropriateness of services and service delivery.^{3,17} Other factors that increase the vulnerability of the Aboriginal population include the higher proportion of youth, alcohol and other drug use, higher levels of imprisonment; and lower levels of health literacy.^{1,3}

Strategic response to HIV among Aboriginal people in NSW: roles and responsibilities

Responding to HIV in Aboriginal people is not simple. The response demands a comprehensive partnership between Aboriginal and Torres Strait Islander communities and government, taking particular account of emerging epidemiological trends.

This collaborative approach is exemplified by the NSW Aboriginal Health Partnership between the Aboriginal Health and Medical Research Council of NSW (AH&MRC), the peak organisation for Aboriginal community-controlled health services and the NSW Department of Health. Through this partnership, the AH&MRC and its member services have played a central role in the planning and delivery of key initiatives related to HIV,

sexual health and bloodborne viral infections. Among the most significant programs have been the: establishment of the Aboriginal Sexual Health Advisory Committee (ASHAC); conduct of two major social marketing campaigns in sexual health; implementation of a research project to investigate young people's access to health services related to bloodborne viral and sexually transmissible infections, and; support and development of Aboriginal Sexual Health Workers as key front-line clinical health personnel in this area.³

Another outcome of the partnership has been the development of a comprehensive policy response within the NSW HIV, Sexually Transmissible Infections and Hepatitis C Strategies so that Aboriginal people are explicitly recognised as a priority population.

In 2007, the NSW Department of Health released the *NSW HIV/AIDS, Sexually Transmissible Infections and Hepatitis C Strategies: Implementation Plan for Aboriginal People*. This document described the ways in which both national and state level strategies would be implemented to ensure the full participation of Aboriginal people.² The Implementation Plan, which covered the period 2006 to 2010, set out the underlying principles of implementing these strategies in Aboriginal communities, starting with community ownership and participation. It then covered the priority focus areas for the strategies, which included workforce development, research and evaluation.²

The Implementation Plan highlights the need for a supported specific workforce to address HIV and community issues associated with stigmatisation, discrimination, low levels of health literacy and low levels of access to primary health-care services. Essential to the Plan and response in NSW are the 40 dedicated Aboriginal Sexual Health Workers placed in Aboriginal community-controlled health services, area health services and non-government organisations (NGOs).³ Aboriginal Sexual Health Workers have a crucial role in the implementation, delivery and evaluation of HIV, sexually transmissible infections and viral hepatitis treatment, care and prevention programs within the Aboriginal community.³ They actively conduct education and prevention programs for Aboriginal families, injecting drug users, inmates, schools, youth and others through workshops, camps, home visits and counselling sessions.³ Furthermore, they play an important role in liaising between various stakeholders such as Aboriginal organisations, non-Aboriginal health services, other health workers, community members and others.³ The Implementation Plan also focuses on the roles and responsibilities of health-service providers. In NSW Aboriginal community-controlled health services provide over 250 000 episodes of care annually to NSW Aboriginal people. The philosophy underpinning this service is one of Aboriginal community

Box 1. References to online support and materials for Aboriginal HIV-related health services

- www.naccho.org.au
- www.ahmrc.org.au
- www.healthinonet.ecu.edu.au
- www.acon.org.au
- www.nuaa.org.au

control and self determination. These organisations provide culturally-appropriate services based on principles of holistic care and are governed by the local Aboriginal community.¹⁸ They play a significant role in the prevention and management of sexually transmissible and bloodborne viral infections, including HIV,³ and many participate in NSW Aboriginal Sexual Health Workers' projects, through health promotion, community education, and clinical management of HIV infection, as well as social and other welfare needs of people living with HIV.³

Responsibility for the implementation of mainstream health services in NSW falls to eight area health services. Recognising the difficulties for some Aboriginal people in accessing Aboriginal community-controlled health services, it is a priority of the area health services that Aboriginal people are able to make full use of mainstream services.³ NSW has the most comprehensive network of sexual health services in Australia, providing care and management for people living with HIV, as well as an extensive Needle and Syringe Program.^{2,3} Both groups of services play a central role in HIV prevention. Many of the area health services have developed strategies to prioritise Aboriginal people in service delivery and responses³ including the development and implementation of Local and Area Aboriginal Health Partnerships with Aboriginal community-controlled health services and other Aboriginal health services.^{3,19}

Furthermore, both Aboriginal community-controlled health services and the area health services in NSW support and collaborate with NGOs, such as the AIDS Council of NSW, Hepatitis Council of NSW and the NSW Users and AIDS association.^{1-3,20} These organisations have a special place in reaching out to and providing health promotion and support services to marginalised groups such as gay men, injecting drug users, sex workers and people living with HIV and viral hepatitis, and have dedicated Aboriginal staff to cater to the needs of these populations.^{3,19-21}

Conclusion

While HIV infection rates in the Aboriginal population remain comparable to those in the non-Aboriginal population, there is a window of opportunity to act to prevent

further transmission. As was the case twenty years ago, the conditions for a substantial HIV epidemic among Aboriginal people are still present but now there is an improved understanding of where the risks lie. Perhaps the biggest challenge is the number of tailored responses that are required. Continued efforts to prevent transmission among men who have sex with men are as important as improving responses to address the higher rates of infection among heterosexuals and people who inject drugs. These tailored responses must be combined with addressing the ongoing issues related to lower access to health services and more general social and health disadvantage. Aboriginal Sexual Health Workers, in collaboration with Aboriginal community-controlled health services, area health services and NGOs, have come to play a crucial role in reaching out and providing sexual health services to the Aboriginal community. Continued support for these services, including the Aboriginal community-controlled health service workforce, is required to keep HIV at the highest level of Aboriginal health priorities.

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Guarding against emerging epidemics: addressing HIV and AIDS among culturally and linguistically diverse communities in NSW

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Abstract: In Australia, people from culturally and linguistically diverse backgrounds, largely born in low- and middle-income countries, accounted for 24% of HIV notifications in the period 2004–2008. NSW has one of the most culturally diverse communities in Australia and is also the most popular destination for both permanent and temporary migrants. Consequently people from culturally and linguistically diverse backgrounds have recently been recognised as a priority in the NSW HIV/AIDS Strategy. The National Health and Medical Research Council provides a cultural competency framework for re-orienting public health and health promotion programs to better meet the needs of these communities. It is being applied to re-orientate the HIV response in NSW. Examples of how this framework can be implemented are provided.

New South Wales (NSW) has one of the most culturally diverse communities in Australia, and people from culturally and linguistically diverse (CALD) backgrounds have recently been recognised as a priority in the NSW HIV/AIDS Strategy. This diversity presents challenges and opportunities for the human immunodeficiency (HIV) and acquired immunodeficiency syndrome (AIDS) sector in re-orienting health promotion, treatment and care services to better reach CALD communities in NSW. This paper will outline how cultural competency provides a framework for the re-orientation of the HIV response in NSW and provides specific examples of how this framework can be implemented.

Global population mobility and accelerating international migration to high-income countries¹ has transformed

the demography of most industrialised countries over the past 50 years.² Population mobility and migration are historically some of the forces associated with the emergence and spread of infectious diseases by bringing populations with disparate prevalence rates into closer proximity with each other.³ This disparity is acute in the global incidence of HIV with more than 95% of annual HIV infections occurring in low- and middle-income countries.⁴ Migrants and mobile populations, especially those from low- and middle-income countries, may also have specific social vulnerabilities to HIV including social isolation, poverty, limited access to health services and information – all of which can be compounded by cultural and linguistic barriers in the destination country.⁵

Migration to Australia

Australia's annual migrant intake of about 150 000 permanent settlers is mostly made up of skilled and family migration with humanitarian entrants accounting for about 10 000 settlers.⁶ Since the mid 1980s all applicants for permanent migration to Australia undergo HIV testing as part of the health requirements.⁷ In addition, temporary migration, mostly made up of students and temporary skilled entrants, is on the rise, with NSW the most popular destination for both permanent settlers and temporary entrants.⁶

HIV among people from CALD backgrounds

In Australia, people from CALD backgrounds, largely born in low- and middle-income countries, accounted for 24% of HIV notifications in the period 2004–2008.⁸ In 2008, people born in Asia and Sub-Saharan Africa made up 21% of all HIV notifications, with the highest age-standardised incidence rate among people born in Sub-Saharan Africa.⁸ This pattern of HIV among immigrants in Australia is broadly in line with trends seen in the European Union,⁹ the USA,^{10,11} and Canada.¹²

The dominant modes of HIV transmission among people from CALD backgrounds in NSW tend to mirror epidemics in their regions of birth, with higher proportions of heterosexual transmission of HIV, and consequently higher proportions of women with HIV.¹³ Information describing 'Country of birth' and 'language spoken at home' has been collected with HIV notifications in NSW since the mid-1990s with reliable data available since 2000.¹³ An unpublished analysis of NSW HIV surveillance data from

2000–2007 indicated that homosexual and heterosexual transmission each account for about half of HIV notifications in NSW among people from CALD backgrounds.¹³ Overall, people from CALD backgrounds accounted for 53.4% of heterosexual transmission and 15.3% of homosexual transmission in NSW from 2000–2007.¹³ The analysis also found that, while HIV is spread across multiple CALD communities, notifications are predominantly drawn from low- and middle-income countries in Asia and Sub-Saharan Africa, with these two regions accounting for 15% of overall notifications from 2000–2007.¹³ The priority CALD populations for HIV health promotion, treatment and care in NSW are predominantly drawn from these two regions.

Epidemiological and social research points to underlying differences in the social and cultural dimensions of HIV for people from CALD backgrounds in NSW. Epidemiological data indicate higher rates of late presentation with HIV.⁸ Rates of HIV testing have been found to be much lower in surveys of Asian gay men in Sydney.^{14,15} Surveys among wider CALD communities point to high levels of HIV knowledge and awareness but variable practice to prevent HIV and limited use of health services despite being eligible for Medicare.¹⁶ Living with HIV also has a different impact for people from CALD backgrounds. Research indicates that they are often faced with negotiating two major life disruptions simultaneously: an HIV diagnosis and the stressors of migration.⁷ These underlying differences underscore the need for a targeted and tailored response to HIV in CALD communities.

Emerging challenges

There is an increasing trend of temporary migration to Australia alongside a largely stable permanent immigration intake. Over the past 5 years, temporary migration accounted for an annual average of more than 600 000 people residing temporarily in Australia, dwarfing the permanent immigration intake.⁶ Temporary entrants, mostly students and skilled workers, typically reside in Australia for up to 4 years at a time. In addition to the large numbers of temporary migrants, the mobility of the general population is unprecedented today in volume, speed and reach,¹⁷ focussing attention on travel and mobility, particularly to and from high HIV prevalence countries, as a potential driver of HIV transmission.

These factors combine to raise important public health practice and policy challenges in NSW, in particular, how to identify and engage in HIV health promotion with large, long-term transient populations. Immigrant health policy in this context of increasing temporary migration and population mobility should be guided by a greater recognition of the dynamics of population migration and mobility, background prevalence rates of HIV between destination and source countries, and implementing measured strategies to manage threats based on actual and significant risks to public health.¹⁸

Addressing challenges through a cultural competency framework

The National Health and Medical Research Council (NHMRC) provides a cultural competency framework for re-orienting public health and health promotion programs to better meet the needs of CALD communities.¹⁹ The four dimensions of the framework – systemic, organisational, professional and individual – interrelate ‘so that cultural competence at an individual and professional level is underpinned by systemic and organisational commitment and capacity’.¹⁹ Cultural competence within the health system is more than awareness of cultural differences and is best viewed as a developmental process for individual workers, the agency where they work and the health system in which they work.²⁰

Systemic approaches

The HIV response in NSW has been well served by targeted primary and secondary interventions with the most affected communities; an approach that can also be employed with priority CALD communities. A systemic culturally competent approach along the lines proposed by the NHMRC would continue to work towards ensuring that we can capture, enumerate and measure diversity in surveillance to inform planning and prioritising programs for CALD communities in NSW.¹⁹ This systemic approach to HIV prevention is central to the identification of priority populations. An example of this approach undertaken in NSW has been targeted work with Thai-born gay men to increase regular testing for HIV and other sexually transmitted infections. A partnership of HIV-sector stakeholders planned and implemented a social marketing campaign which was placed in both the Thai and gay media to maximise its reach and coincided with an annual Thai cultural milestone to maximise its salience.

Organisational approaches

An organisational approach requires agencies to reflect on and review current practices, policies and planning as a step towards delivering more culturally competent programs and services. The need for an organisational approach was highlighted in an HIV-sector needs analysis commissioned by the Multicultural HIV/AIDS and Hepatitis C Service in 2007.²⁰ It found that HIV agencies perceived they lacked the knowledge, skills and self-efficacy to work with CALD communities.²⁰ A cultural competence training program subsequently developed by the Multicultural HIV/AIDS and Hepatitis C Service for the HIV sector focused on the development of an agency-level response to CALD populations. An evaluation of the training indicated that this model was effective in supporting organisations to identify and commit resources to future strategies to deliver a sustained response with priority CALD populations.²⁰

Professional and individual approaches

These approaches build the skills of individuals and professionals to work with cultural diversity, including understanding cultural dynamics and enhancing communication skills. Skills developed at this level build upon, and are supported by, systemic and organisational approaches.¹⁹ An example of this approach in NSW was recent work undertaken by the NSW CALD HIV Interagency which identified HIV and tuberculosis co-infection as a clinical priority affecting CALD populations. A revised HIV and tuberculosis policy directive was the systemic change that provided the impetus for workforce development initiatives with HIV, sexual health and tuberculosis services to enhance screening and improve the management of HIV and tuberculosis in CALD patients.

Conclusion

Guarding against the emerging epidemic of HIV in CALD communities will require proportionate and culturally-competent activity across the spectrum of the public health response to HIV in NSW in health promotion, treatment and care. This spectrum of activity should continue to refine HIV policy frameworks; build more detailed epidemiological profiles of homosexual and heterosexual transmission of HIV in CALD communities to better identify priority populations; and research the social contexts and understandings of HIV and AIDS in these populations. At the same time, efforts to enhance the cultural competence of HIV sector agencies and their staff will support the building of relationships, trust and partnerships with the most affected CALD communities to ensure that HIV interventions are culturally appropriate and less likely to stigmatise people with, or at risk of, HIV and AIDS.

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Advances in HIV laboratory testing

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Abstract: Laboratory tests are readily available for the diagnosis of HIV infection. These are based on the detection of HIV-specific antibodies and HIV p24 antigen in combination screening assays, followed by confirmation by Western blot. Managing established HIV infection, including the use of antiretroviral drugs, has been facilitated by the use of nucleic acid tests that measure HIV RNA load in plasma or detect mutations associated with drug resistance. Quality assurance programs ensure high-level performance of HIV assays.

Underpinning the successful management of human immunodeficiency virus (HIV) infection in Australia is a national laboratory system employing a suite of serological and molecular assays. Use of these assays allows the reliable and early diagnosis of HIV infection, assists with determining the prognosis of infection and guides antiretroviral therapy.

The laboratory approach using screening and confirmatory assays to obtain close to 100% reliability in HIV diagnosis has not changed significantly since the first HIV-specific antibody assays became available in 1985. However, there have been dramatic increases in the sensitivity and specificity of the tests used to diagnose and confirm infection. All Australian laboratories now operate using instrument-based assays, under quality management systems monitored with quality assurance programs to regularly check their performance.

Nucleic acid testing (NAT) has been introduced to measure HIV levels in plasma, detect HIV in cells, and determine the presence of antiretroviral drug-resistance mutations. More recently, specific assays have become available that help clinicians predict whether antiretroviral-specific adverse effects will occur or whether the viral phenotype predicts response to certain antiretroviral drugs. Increasing

complexity in antiretroviral therapies and new discoveries relating to HIV pathogenesis mean that patient management remains, logically, in the hands of clinicians with experience in managing HIV infection.

This article introduces the laboratory assays (Box 1) and explains their application in the diagnosis and treatment of HIV.

HIV screening assays

The keystone of HIV management relies initially on the correct diagnosis of infection, usually by the detection of specific anti-HIV antibodies. Screening programs demand assays that not only identify the presence of HIV antibody reliably, but also have the sensitivity to detect them as early as possible during or after seroconversion. Consent for HIV testing is always needed. The range of items required to be canvassed through pre-test discussion has been relaxed in the Australian Government's *National HIV Testing Policy 2006* (available at: <http://www.health.sa.gov.au/PEHS/PDF-files/hiv-testing-policy-2006.pdf>).

Box 1. HIV-specific laboratory tests used in diagnosis and treatment in NSW

1. Screening assays for HIV antibodies
 - a. HIV antibody or antigen/antibody combination assays
2. Confirmatory assays
 - a. Western blot
3. Nucleic acid testing
 - a. Quantitative HIV RNA plasma load
 - b. HIV DNA on peripheral blood mononuclear cells (PBMC) testing
 - c. Nucleic acid testing to screen blood donations
4. Guiding therapy
 - a. Antiretroviral drug-resistance genotyping
 - b. Coreceptor usage
 - c. Pharmacogenomic assays
5. Epidemiological and forensic studies
 - a. HIV subtyping
 - b. HIV sequencing and phylogenetic analysis
 - c. Detuned HIV antibody assays
6. Less commonly used assays in Australia
 - a. Rapid HIV antibody
 - b. Antiretroviral drug-resistance phenotyping.

Various generations (denoting significant advancements) in HIV antibody tests, usually based on the enzyme-linked immunosorbent assay (ELISA) format, have evolved over the last two decades, moving from early prototype assays that were neither adequately specific nor sensitive (and time consuming to perform), to the presently used automated, highly sensitive and specific chemiluminescent assays. Commercial assays were refined from 1990 onwards to detect antibodies to HIV-2 or unusual HIV-1 strains. The major recent advance has been the addition of HIV p24 antigen detection to the HIV antibody assays. These 'combination' or 4th generation assays reduce the seroconversion window period to approximately two weeks. Automated combination assays are now used widely in Australia, and have generally replaced screening tests that detect HIV antibody alone, and HIV p24 antigen assays. Interestingly, in the USA and some other countries, combination HIV antibody/antigen assays are not yet routinely available.

HIV confirmatory assays

The approach to confirmation of a positive anti-HIV screen has not changed significantly in Australia over recent years. Confirmation is still performed by the western blot assay, a test that is technically more difficult and more expensive than the screening ELISA, but when appropriate interpretative criteria are used is still the most specific confirmatory immunoassay. Laboratories that perform HIV screening assays refer reactive samples to reference laboratories for western blot confirmation. In resource-limited countries where western blot confirmatory testing may be unavailable, sequential use of immunoassays yields reliable positive results.

Rapid (point-of-care) assays that detect HIV-specific antibodies require less technical expertise to perform and are more commonly used in resource-limited settings. They have lower sensitivity and specificity compared with standard assays. They are not used in Australia except in urgent clinical situations such as postexposure prophylaxis management or pre-transplantation screening. Retesting with standard immunoassays is required by the *National HIV Testing Policy* (available at: <http://www.health.sa.gov.au/PEHS/PDF-files/hiv-testing-policy-2006.pdf>). Assays are available (but rarely used in Australia) that allow HIV antibodies to be identified in saliva or other body fluids, and are designed to allow people to self-sample. For surveillance purposes, ELISA HIV-antibody tests can be 'detuned' to detect more recent infection.

HIV isolation from blood or other clinical samples is definitive evidence of infection. However, it takes between 2 and 4 weeks, and is diagnostically insensitive. It was useful before the development of NAT in detecting infection in babies born to mothers with HIV infection. It is still

used for research purposes, and sometimes as part of epidemiological investigations.

Nucleic acid testing (NAT) in HIV

The development of assays for reliable quantitative NAT for measuring levels of HIV RNA (viral load) in plasma or other body fluids has revolutionised clinical management. Viral load assays, along with CD4+ T lymphocyte cell counts, provide crucial prognostic information to clinicians and patients. Plasma NAT assays are used to monitor the efficacy of antiretroviral drugs, aimed at maintaining viral loads below detectable levels. Along with rising CD4+ T cell counts, low plasma HIV loads demonstrate successful antiretroviral therapy. A significant rise in plasma HIV load suggests treatment failure, but does not determine whether the cause is antiretroviral drug resistance, or problems with treatment compliance. Qualitative NAT is used for screening of the blood supply in Australia.

NAT to detect HIV DNA in peripheral blood mononuclear cells is the first test to become positive (at approximately one week) in HIV seroconversion. It is also in the test of choice in babies born to mothers with HIV infection. HIV DNA testing is highly sensitive and specific, and, along with the commercial viral load assays, has improved the ability to detect and quantify unusual HIV subtypes.

Guiding therapy

Genotypic HIV drug resistance testing and subtyping

NAT is also used to determine when specific mutations for antiretroviral drug resistance are present in a person's circulating HIV. Genotyping is performed by sequencing the relevant antiretroviral drug target sequences (e.g. reverse transcriptase or protease) in the circulating HIV genome. Sequences are then compared with large international HIV sequence databases and specific mutations are defined and reported to the clinician with comments about whether these mutations are consistent with clinical resistance. As new drug classes are developed, genotyping has expanded to include new antiretroviral targets e.g. integrase or envelope gp41.

The analysis of reverse transcriptase and protease sequences for antiretroviral drug resistance also generates a HIV subtyping result. This has replaced older subtyping methods. HIV subtyping serves epidemiological purposes, determining if uncommon HIV strains are emerging.

Phenotypic HIV drug-resistance testing

A virtual phenotype can be generated by comparing a genotype with databases that have information on specific sequences and their associated phenotypes. True phenotypic

testing is expensive and is currently only available in Australia in clinical trials. Phenotyping generally involves the amplification of reverse transcriptase or protease, insertion of the sequences into a plasmid vector, then culturing a hybrid virus containing that vector in comparison with wild-type HIV. Phenotypic resistance assays are most valuable in the management of highly antiretroviral therapy-resistant patients.

Other HIV assays used in antiretroviral therapy

The development of drugs that target HIV coreceptors has led to the development of assays that measure tropism of a person's virus for either (or both) coreceptors, CCR5 and CXCR4. CCR5 antagonists are only effective if the virus dominantly uses CCR5 as its coreceptor. These assays are needed only when coreceptor antagonists are planned as part of combination antiretroviral therapy. A NAT-based pharmacogenomic assay that detects the HLA-B5701 allele is now routinely used in anyone starting abacavir to avoid severe hypersensitivity.

HIV epidemiological and forensic investigations

HIV sequencing can be used in epidemiological investigations, for example in detecting nosocomial transmission or unusual HIV clusters. These involve sequencing parts of, or the entire, HIV genome, followed by phylogenetic analysis to determine HIV strain relatedness. Such

investigations are carried out in conjunction with public health or forensic specialists.

Laboratory quality assurance for HIV testing

Another key to the reliability of HIV testing is the required participation by laboratories in ongoing quality assurance programs. The obligatory programs are administered by the National Serology Reference Laboratory which also evaluates commercial assays for the Therapeutics Goods Administration. Participation in the National Serology Reference Laboratory's quality assurance programs does not preclude participation in the quality assurance programs of the Royal College of Pathologists of Australasia or international bodies. Quality assurance programs have a fundamental role in ensuring high-level performance of HIV assays.

Conclusion

The detection of early HIV infection has improved with the application of combination HIV antibody/antigen assays. Reactive screening ELISA tests still require confirmation by western blot and/or other assays. The development of HIV plasma load and other laboratory tests that detect antiretroviral drug resistance have improved patient and antiretroviral treatment management. Quality management and quality assurance programs are pivotal in assuring the ongoing high reliability of HIV assays in Australia.

HIV treatment, care and support in NSW: a work necessarily still in progress

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Abstract: A diverse range of services were developed in NSW in response to the emerging HIV epidemic. These services included innovative multidisciplinary service models of care most of which have been durable. Allied health teams and ancillary services funded by non-government organisations have played a vital role in delivering care and support in the community. A consistency of approach to treatment across the health sector has been reinforced through continuing education activities and credentialing of antiretroviral-drug prescribers. This investment in care and treatment has resulted in reduced hospital bed use. High levels of treatment uptake over many years are likely to have a favourable impact on transmission rates thus contributing to the stability of the epidemic in NSW.

Over the last 25 years, human immunodeficiency virus (HIV) has challenged those planning and delivering health care in Australia. New South Wales (NSW) has been the most severely and disproportionately affected by HIV with the highest absolute numbers of HIV/AIDS diagnoses, deaths, hospital admissions and, until 2009, annual new HIV diagnoses per capita.¹ Responding to this situation, from the earliest awareness of acquired immune deficiency syndrome (AIDS) in Sydney residents^{2,3} until the present, the health-care system in NSW has been innovative and has consistently delivered state of the art diagnostic, medical and nursing care. NSW has arguably led best practice in many domains. While the state's well documented record in prevention has been widely lauded,⁴ less well known is the approach to care and treatment which, combined with the success in primary HIV prevention, has resulted in extremely low rates of AIDS in recent years.¹ This article describes how treatment and care, like prevention strategies, evolved in response to developments

in treatment and the subsequent changes in patterns of illness.

Development of dedicated HIV services in NSW

In a public health-focused response to the AIDS epidemic in 1989,⁵ Australia was the first country to publish a comprehensive HIV/AIDS strategy. The first strategy and its five revisions have been informed by a diverse group of stakeholders. NSW Government responses and operational plans for combating HIV were similarly developed through the collaborative efforts of multiple tiers of government, medical and scientific practitioners and non-government organisations (NGOs) with broad constituencies. These plans have embodied the principles enunciated in the national strategies in addressing the demography, behaviour characteristics and sensitivities displayed in the NSW population.⁶ Moving from ad hoc supplementary funding in the early 1980s during the initial phase of the HIV epidemic, formal health-care planning processes and research funding rapidly ensued. A strong laboratory base in microbiology and immunology, available through the tax-funded universal health-care system, provided a sound foundation for HIV care across both public and private sectors.

The NSW Health-administered funding stream aimed to support centres of excellence in clinical care and research, and to ensure provision of high quality statewide, decentralised and accessible testing and treatment at sexual health centres and designated clinics linked to, or sited at, the principal referral hospitals. Looking back, the roll-out of enhanced capacity in infectious diseases and microbiology, immunology, sexual health and in the supporting allied-health disciplines was achieved quite rapidly. Designated hospital and hospice beds were nominated and specialist positions in the above disciplines were expanded, adequately increasing the capacity to deal with the most urgent and severe problems in hospital.⁷ With the help of a small group of somewhat overburdened general practitioners (GPs), the shared-care model of care was able to operate, with GPs referring those needing hospital care and providing high-quality follow-up care in the community. Subsequently, much effort went into building a broader, community-based, primary-care capacity and enhancing the allied health and nursing support for those people with HIV experiencing physical and mental disability and suffering the effects of grief, poverty and social dislocation. 'Hospital-in-the-home' models of care were

explored and nursing expertise in all aspects of HIV care was fostered. Specialist HIV clinics and services, including in some cases palliative care, have been durable and remain extremely multidisciplinary.

The suite of services which emerged across area health services differed, not only between area health services but also within them.⁷ These still reflect HIV service needs dictated by demography, geography and the availability of expertise. The planning documents on which the current configuration of services were initially based assumed that the increasing demand on services would continue and that decentralised HIV care in all tertiary hospitals would be necessary to cater for the projected expanding workload.

Successful treatment regimens

At the peak of the incidence of AIDS in NSW in the mid-1990s and prior to the widespread uptake of combination antiretroviral therapy (cART), life expectancy after a diagnosis of AIDS was generally less than 2 years. The need to prepare for diminishing health and a shortened working life was evident.⁸ The success of cART regimens in containing viral load and enabling immunological reconstitution led to sustained survival. Consequently care and treatment needs changed dramatically from the mid 1990s.⁹ Evidence of this change could be seen in reduced bed use, rising demands on ambulatory care services as numbers on treatment rose, and fewer referrals to physicians experienced in end-of-life care.^{10,11} Ageing-related morbidity, complex medication regimens needed to deal with antiviral drug resistance and dysregulated metabolism from treatment side-effects increasingly became the dominant issues in HIV management of the long-time survivors of HIV.¹⁰

Statewide services

As the epidemic of HIV evolved and reached beyond those populations initially most affected, new services with a statewide role were encouraged to develop or expand to meet the specific needs of various groups. The Paediatric HIV Service at Sydney Children's Hospital, the Transfusion-Related HIV/AIDS Service at Westmead Hospital, the NSW Haemophilia referral service at Royal Prince Alfred Hospital and the Multicultural HIV Education Service in Central Sydney are examples of the diversity of early statewide services that emerged.

The role of statewide services has been periodically reviewed. Following the most recent review, reconfigurations have been recommended and implemented for some services. Review, renewal and refocusing of resources, the latter partly through HIV program-specific resource distribution formula mechanisms, has been a strength of the NSW HIV service planning and

governance process. Good use has been made of the interest and expertise of stakeholders brought together in the NSW Ministerial Advisory Committee on HIV and Sexually Transmissible Infections and its associated committee which advises on hepatitis.

Practicalities of shared care

If we reflect on the decades of care of HIV, the severity of illness faced by the first wave of AIDS patients necessitated tertiary level care in most cases, whereas people acquiring HIV more recently are likely to have most of their monitoring and management in primary-care settings, reflecting their encouraging long-term prognosis on treatment.¹² It is pertinent that soon after antiretroviral drugs were registered, NSW was proactive in credentialing primary-care and hospital-based specialists in the prescription of antiretroviral therapy. Those and other subsidised Section 100 drugs involved in HIV care were therefore accessible from public hospital pharmacies. Credentialing courses and assessments were initially undertaken in-house and then by the Australasian Society for HIV Medicine for NSW. Experienced practitioners from hospital and primary-care practices helped to prepare manuals and lecture, tutor, supervise and mentor colleagues as they upgraded their skills in the management of HIV. These courses facilitated system-wide consistency in the delivery of HIV treatment and were delivered through a multidisciplinary approach to continuing education.

NSW clinicians were also fortunate in having abundant expertise in the diverse aspects of HIV management due to their proximity to the HIV geographical epicentre, their historical involvement in dealing with the onset of the HIV epidemic and their awareness of ongoing scientific advances in the basic and applied sciences at the National Centres of HIV research (clinical, epidemiological, social and virological).

Nonetheless there remains in NSW geographical patchiness in the availability of GPs who are expert in HIV management.⁷ The issues facing primary-care practitioners with low HIV caseloads, many operating out of large multimember practices, are mirrored in some low caseload tertiary centres. Here, due to the welcome impact of cART, specialist trainees see little of the complex management required to treat some of the less frequent complications of HIV. Recently, in an effort to better encourage continuity of patient care in the community and sustain contact with the diagnosing practitioner, a formal trial of mentoring began under the auspices of the NSW Department of Health and the Australasian Society for HIV Medicine. This initiative aims to link HIV inexperienced practitioners making a new HIV diagnosis with more experienced clinicians who are able to provide them with advice and information.

In the hospital sector, a strategy of decentralised specialist HIV referral services may not be sustainable beyond the next decade. Fortunately at present there are sufficient numbers of highly-experienced personnel and a willing group of trainees aware of the issues. These trainees are working to broaden their experience both locally and internationally and are well placed to continue to deliver high-level expertise in treating HIV well into the future.

Innovation in-service delivery

AIDS Dementia and HIV Psychiatry Service

Novel collaborations based around the neurology unit at Sydney's St Vincent's Hospital and the psychiatry unit at Royal Prince Alfred Hospital developed a new model of care. It involved three arms:

- community support for those with mild HIV neurocognitive decline
- full time nursed residential support for those with more severe forms at The Bridge, a residential city-fringe dementia service for HIV
- expansion of hospice dementia services at the inner city Sacred Heart Hospice for those with advanced dementia.

The AIDS Dementia and HIV Psychiatry Service provides statewide outreach which has been an innovative and successful means of case managing and brokering support for many HIV patients living in their own or their carers' residences.

Coordinated community health support

NSW has also been innovative in promoting coordinated community health support for those with HIV in the community. Pilot services based on allied health workers providing nursing, counselling, physiotherapy, occupational therapy, dietary advice, drug and alcohol support and psychiatric care are still being expanded according to need. Volunteer organisations supporting the Ankali project, Bobby Goldsmith Foundation and various faith-based services are still frequently called on to provide practical assistance beyond that provided by health services. The larger NGOs, principally ACON (AIDS Council of NSW), Positive Life NSW and the NSW Users and AIDS Association, partly supported by NSW government grants, have been dynamic, important and vigorous participants in support service provision to their respective client bases.

Planning for change

With the benefit of hindsight, one can question whether the hybrid models which evolved in NSW were in all cases the most appropriate ones for the scale and nature of the epidemic. To explore that issue contemporaneously a series of care and treatment reviews has been undertaken

independently, funded by NSW Department of Health, to gather and analyse views from health-care professionals and the community. No strong recommendations for radical change in the pattern of service development emerged from those reviews and, although gaps were identified in service provision, largely emanating from federal-state responsibility overlap issues (for example dental care), no major flaws with the current model of care have been identified. Following recent reviews, service performance monitoring has been enhanced and a better documentation and understanding of service delivery has flowed from consistent reporting of activity and more reliable recording of basic aggregated demographics of the clientele and activity of these services.

Looking into the future

The decline in bed use experienced through the 1990s probably reached its nadir early in the 2000s and there is a strong suggestion that the current overall HIV-related health service use has reached a stable level. The challenges ahead are numerous and involve adjusting to the changing pattern of HIV disease in NSW and internationally.¹² Late presentation, which is not diminishing, makes for ongoing challenges in care and treatment.¹³ Each new pharmaceutical agent elicits a new range of patient management issues; recent release of additional antiretroviral agents acting on the HIV-driven chromosomal integration process and viral entry blockers may contribute to even greater impact on HIV disease¹⁴ and interruption of transmission than achieved through previous cART regimens. Thus service needs may further change if these agents achieve widespread use and prove to have both sustained potency and lower levels of metabolic and other unwanted side-effects than their predecessors.

Conclusion

The success of care and treatment programs in NSW over the last 25 years is now a matter of record.¹⁵ There are strong grounds for expecting the pattern of HIV treatment and care to be stable into the next decade. In NSW the experience of most treated patients in 2010 is one of health maintenance and chronic disease management with an expectation of relatively low levels of medium-term morbidity and a lifespan approaching normal.¹² For that outcome, following 25 years of intervention at a population level, everyone involved over the years can be both grateful and proud. For those now at the coalface there are many issues to confront such as the current needs of older HIV-positive patients, the management of HIV-associated malignancies, the dilemmas in treatment initiation timing for those who have more recently acquired the infection, treatment of co-infection for those people with HIV and hepatitis

viruses and catering for the support needs of HIV patients with disadvantaged social circumstances.

The times ahead will undoubtedly provide new and ongoing challenges well into the current decade and beyond. Hopefully success in the past will provide the impetus and the confidence necessary for successful innovation in the future.

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Clinical research in NSW: its role in HIV care and prevention

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Abstract: Clinical research in NSW has contributed to some important breakthroughs in the understanding of many aspects for HIV transmission, pathogenesis and treatment. Researchers in NSW have played an important role in understanding the progression of HIV disease, the development and use of antiretroviral therapies and have continued to be involved in the understanding, management and prevention of HIV infection. National and international collaboration are essential in identifying and managing the complex factors required for the current management of HIV and the potential mechanisms for the future elimination of HIV.

Clinical research is fundamental in informing the public health response to any emerging disease. This is demonstrated by the role clinical research has played in influencing public health responses to human immunodeficiency virus (HIV). The first confirmed acquired immune deficiency syndrome (AIDS) diagnosis in Australia was made at St Vincent's Hospital, Sydney, in 1983 but it was not unexpected. With an emerging epidemic in North America, a taskforce had been established at the hospital in anticipation of the arrival of the disease in Australia. From the outset, a clinical and research framework was used to identify and study HIV/AIDS. This framework resulted in several important breakthroughs that have improved the understanding and treatment of HIV infection. New South Wales (NSW), as the state with a major proportion of Australian HIV diagnoses (54% over the course of the epidemic),¹ has remained at the front of the clinical response in Australia. This article describes the contribution that clinical research in NSW has made to the understanding of the HIV epidemic and the optimal treatment of these patients.

Identification of HIV-related seroconversion illness

In the early years of the epidemic, clinical research and vigilance in NSW was responsible for identifying and describing several important conditions associated with HIV pathogenesis and treatment. Clinical researchers based at St Vincent's Hospital in Sydney provided the first detailed description of HIV-related seroconversion illness. This mononucleosis-like illness was identified in a group of recent seroconverters.²

The identification of seroconversion illness as a marker of early infection was an important finding that created opportunities in several areas of research and patient management. Acute seroconversion illness can be a useful marker leading to early diagnosis or to providing an indication of the duration of HIV infection. From a clinical perspective, a marker for early infection allowed for more stringent patient monitoring and prophylaxis against opportunistic infection in asymptomatic patients prior to severe immunological impairment and the onset of AIDS. From a research perspective, the recognition of seroconversion illness and the identification of early HIV infections provided the opportunity to study the pathogenesis of HIV infection from pre-seroconversion through to the development of AIDS, greatly enhancing the understanding of HIV infection and disease progression. In relation to public health, the identification of a previous seroconversion-related illness in a newly diagnosed HIV patient indicates the duration of HIV infection and may narrow the timeframe in which other people may have been exposed to HIV. This makes contacting and testing potentially exposed people more accurate and timely. The identification and evaluation of patients around the time of seroconversion has also been valuable in more accurately identifying specific risk factors associated with the transmission of HIV. The identification and description of seroconversion illness were therefore important breakthroughs in the understanding and management of HIV/AIDS early in the epidemic.

Introduction of antiretroviral therapy

Researchers and clinicians in NSW have been involved in the development and clinical trials of all the previous and currently available antiretroviral drugs. This has meant that HIV patients in NSW have had access to new treatments very early, through recruitment to clinical trials. The experience gained by clinicians during these trials has

resulted in the rapid and informed use of new drugs in their patients as soon as they are approved for use.

The introduction of combined antiretroviral therapy has made it possible to control viral replication and elicit a partial reconstitution of immune function in HIV patients. However, the widespread availability of antiretroviral therapy has also created new challenges such as the long-term management of antiretroviral therapy use, treatment-related toxicity and the development of drug resistance.

Ongoing research is focused on the combinations of drugs and dosing that are most efficacious for different patient groups as well as on accurately determining the ideal time to commence treatment and whether to maintain treatment in the face of side effects. The international SMART (Strategies for Management of Anti-Retroviral Therapy) trial demonstrated that interruption to treatment was detrimental to patients, with significant increases in morbidity and all-cause mortality.³ This study conclusively ended the long-running debate as to whether treatment interruption was a safe and effective strategy in HIV patients. The ongoing START trial is designed to determine whether early or deferred initiation of antiretroviral therapy results in better outcomes for patient.⁴

In addition to the improved outcomes for people with HIV that have resulted from the introduction of antiretroviral therapy, widespread antiretroviral therapy use has the added benefit of decreasing the overall viral load in the HIV-positive population which also reduces infectivity. The results from the SMART study have led to a shift away from intermittent therapy to constant suppressive therapy which results in a lower overall viral load and infectivity within the community.

In the area of treatment-related toxicity, researchers in NSW have provided significant contributions. Antiretroviral-related lipodystrophy, generally characterised by a loss of fat from the face and limbs and an increase in abdominal obesity, was first identified and described by clinicians at St Vincent's Hospital, Sydney.⁵ Further work identifying the specific drugs responsible, elucidating the mechanisms that lead to lipodystrophy and evaluating methods for alleviating or reversing lipodystrophy have been a priority of NSW research in the antiretroviral treatment era.

The antiretroviral therapy era

HIV infection may now be managed as a chronic condition in the developed world. However this does not mean that there is a reduced role for clinical research. The main challenge in clinical research has been shifting the focus from managing opportunistic infections and the progression of AIDS to identifying and managing complications

related to long-term HIV infection, such as non-AIDS related morbidity and mortality. A major focus of current research is the management and understanding of ageing in the context of HIV infection. Despite efficient viral suppression with antiretroviral treatment, the life expectancy of HIV-positive people is still reduced compared to the general population. Research is now focused on alleviating the cardiovascular disease, kidney dysfunction, neurological complications and cancers seen in HIV patients.

Factors related to HIV transmission, disease progression and immune responses to the virus have not been neglected due to the introduction of antiretroviral therapy. Several observational cohorts have been established to monitor disease progression and treatment trends in HIV-positive populations with access to antiretroviral therapy. The Australian HIV Observational Database was created in 1999 to monitor the patterns of antiretroviral therapy use relating to demographic factors and markers of HIV disease stage.⁶ The database is primarily focussed on collecting information about how often antiretroviral treatments are changed and the reasons for treatment changes, including adverse events. The database has allowed the trends in antiretroviral therapy usage and related adverse events to be mapped and considered in relation to demographic factors.

Future directions – the development of a vaccine

Since HIV was first identified, considerable effort and resources has been directed towards the development of a vaccine to prevent transmission of the virus. The availability of a HIV vaccine to prevent or treat infections, representing a relatively brief intervention that provides long-term protection, is clearly preferable from a medical, financial and personal perspective to the current situation of long-term continuous therapy with antiretroviral drugs. Research into vaccine development has greatly increased the knowledge of HIV pathogenesis and disease progression but unfortunately an efficacious vaccine has not been developed. Recently presented results from two international vaccine trials have influenced thinking about the progress and validity of a HIV vaccine. The first was the STEP trial: an interim analysis suggested that this vaccine enhanced rather than prevented HIV transmission and the study was subsequently stopped early in November 2007.⁷ This created some pessimism around the potential for a future HIV vaccine. More recently, a vaccine trial in Thailand involving a dosing strategy with two separate vaccine candidates (a canary pox vector and a subunit vaccine) demonstrated an approximate 30% reduction in HIV transmission in the participants who received the vaccine compared to placebo.⁸ Further research is required to determine the immunological factors induced by this vaccine combination, in order to enhance this response and further reduce transmission. This highlights the need for an

improved understanding of HIV pathogenesis and immune responses, to identify not only the key mechanisms required to interrupt HIV transmission but also interventions that may induce immune responses that control HIV progression in those who already have the infection.

The recent vaccine trials also demonstrate that intensive instruction on prevention of HIV transmission, which was incorporated in these studies, does not prevent continued transmission of the virus. This adds to the argument that biomedical interventions, such as vaccines, are required in addition to education to control the HIV epidemic.

Conclusion

Clinical research will continue to contribute to the understanding of many aspects for HIV transmission, pathogenesis and treatment. National and international collaborations, established and nurtured during the course of the HIV epidemic, remain an essential part in identifying and managing the complex factors required for the current management of HIV and the potential mechanisms for the future elimination of HIV.

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Surveillance, epidemiology and behavioural research to guide HIV prevention policy

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Since 2000, HIV prevention in NSW has been overseen by a Health Promotion Sub-Committee of the Ministerial Advisory Committee on HIV and Sexually Transmissible Infections. The Sub-Committee meets quarterly, and its ongoing work demonstrates how reflexive interactions between researchers, community-based and public-sector educators and policy makers can enable the development and implementation of effective evidence-based policy. This facility is highlighted by the following two initiatives led by the Committee.

2002: Is HIV on the rise in NSW?

In 2002, after approximately 15 years of declining HIV rates in NSW, the annual number of new HIV diagnoses increased in NSW; at the same time it also increased in some other Australian states and internationally. Consequently in 2003, the Sub-Committee convened a forum to examine HIV notifications surveillance with the aim of reaching a consensus among researchers, community organisations, health promotion workers, clinicians and policy makers about the meaning and implications of this increase. Disease surveillance officers, as well as social, behavioural and epidemiological scientists were asked to review their data, and to present their findings at the forum. The findings were clear: that HIV diagnoses had increased in NSW, and that the most likely explanation was a true increase in incidence in 2002 related to increasing rates of unprotected anal intercourse. These findings led to increased investment and more focused community-education campaigns alerting the gay community that HIV rates were increasing.

2007: Why are HIV notifications in NSW flat?

By 2007, HIV diagnoses had been increasing in homosexual men for almost a decade in many developed countries. Rates had doubled since the nadir in the late

1990s in some Australian jurisdictions. In contrast, apart from the brief increase in 2002, HIV diagnoses in homosexual men in NSW had remained stable. There was discussion about whether this exceptional pattern was real, or whether diagnoses were increasing and the surveillance system in NSW had not recorded this. In response the Sub-Committee decided that a comprehensive review of the HIV epidemic in NSW was required. This took the form of a Think Tank entitled *Why are HIV notifications in NSW flat?*¹ Scientists from across the spectrum of HIV public health were assembled and undertook a six month process of enquiry and review to ensure that all possible explanations for the lack of increase in HIV diagnoses in NSW were considered. The Think Tank assembled scientists, the leadership of community-based organisations, clinicians, public-sector health promoters and those responsible for the Government's policy response to consider the evidence. The result was clear: sustained and sufficient investment in NSW had provided the capacity for health promotion efforts to decrease HIV risk behaviour, which meant that NSW had avoided the increases in HIV rates seen in almost every other epidemic in homosexual men where long-term data were available.

These results, published as a series of 17 articles in the peer-reviewed journal *Sexual Health*, establish the public health business case for both continued investment in HIV prevention in NSW and the re-investment in HIV prevention in some other Australian jurisdictions. The editorial for the issue which summarised the findings, was entitled *Investment in HIV prevention works: a natural experiment*, and concluded that between 1999 and 2006 over 1500 cases of HIV had been prevented by sustained investment in HIV prevention in NSW, at a cost per case prevented of around \$30 000.²

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Public health law, human rights and HIV: a work in progress

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Abstract: Australia has been a global leader in balancing public health law, human rights and HIV. The first National HIV/AIDS Strategy launched in 1989 set the agenda for law reform. The Intergovernmental Committee on AIDS subsequently established a legal working party with one of its key tasks to formulate public health legislation that would protect public health and human rights. The *NSW Public Health Act 1991* has provided the framework for managing HIV in NSW over the subsequent decades. Recent changes to criminal law in NSW and opportunities to redefine public health law may affect how HIV transmission risks are managed in the future.

From early in the human immunodeficiency virus (HIV) epidemic, governments in Australia recognised that an effective response to HIV required strategies that went beyond the traditional public health remedies of abatement, control, notification or isolation. This is in part due to the leadership provided by the then Federal Minister for Health, and then Community Services and Health, Dr Neal Blewett, in shaping an effective public health response over the period 1983 to 1990.

Key elements in the Australian response were the partnerships established with affected communities and the recognition given to the rights of marginalised people at risk of HIV, including the need to strengthen these rights, to enable community members to make healthier life choices. Of particular importance was the early recognition that public health objectives would be most effectively realised if human rights are respected, a principle that holds public health and human rights issues as complementary rather than oppositional. Respect for human rights protects those who are vulnerable and marginalised, establishes trust for

efforts to access populations that are hard-to-reach, promotes confidence in health services, and secures the cooperation necessary for preventing further transmission. This article describes the role of law reform in supporting HIV prevention and care in Australia since the beginning of the 1980s.

Law reform was recognised as essential to the strengthening of rights and was taken up as a key element in the agenda of the First National HIV/AIDS Strategy released in November 1989.¹ The Government's commitment to law reform to protect public health was articulated by then Deputy Prime Minister, Mr Brian Howe: 'This Government recognises the high priority of AIDS law reform in eliminating transmission of HIV through the removal of legal impediments to prevention efforts ... and [to] minimise the personal and social impacts of HIV'.²

National legislative response to HIV

The law reform agenda was subsequently progressed through a Legal Working Party established under the Intergovernmental Committee on AIDS. A key task of the Legal Working Party was to formulate '... public health legislation which would balance individual human rights with the need to protect the wider community'.² A reform program was developed which included HIV-specific laws such as: notification of cases; confidentiality of information; and sanctions for transmission but also reforms to help create an enabling environment for HIV prevention.

NSW legislative response to HIV

In New South Wales (NSW), the *Public Health Act 1991* includes provisions based on the same principles as adopted on a national basis by the Legal Working Party and provides the legislative framework for the notification of HIV, the key protections for and obligations of people with HIV and powers for public health management. The legislation had an important enabling function in the state's response to HIV. For example, sections 14–16 require the notification of all new HIV diagnoses to the NSW Department of Health. The resulting surveillance information identifies transmission risks and enables health promotion interventions to be directed to populations with the greatest need.

Box 1. Key legislation in NSW

Crimes Act 1900

Section 33	Wounding or grievous bodily harm with intent
Section 35	Reckless grievous bodily harm or wounding
Section 54	Causing grievous bodily harm

The Public Health Act 1991

Section 11	Offence not to take precautions against spread of scheduled condition
Section 12	Medical practitioner obliged to provide information to patient with sexually transmitted infection as soon as practicable
Section 13	People with a sexually transmitted infection must disclose the infection before sex and their partner must accept the risk
Section 14	Medical practitioners must notify certain scheduled medical conditions including AIDS
Section 15	It is an offence not to comply with section 14
Section 16	Laboratories required to notify HIV test result
Section 17	Offence to disclose the identity of a person with HIV in provision of a health service
Section 18	The Director-General may apply to the District Court for permission to disclose identity
Section 19	The Director-General may require a medical practitioner to provide a patient's name
Section 22	Power to require a medical examination including HIV testing
Sections 21–36	Deals with the power to make public health orders
Schedule 1	Provides the categories of scheduled medical conditions

Section 17 of the Act protects the identity of people with HIV by prohibiting the inclusion of the name or address of a patient on these notifications and by making it an offence for a person providing a service to disclose HIV status without consent, except to others also providing care, treatment or counselling, or where required by law. With the concerns about stigma and discrimination associated with HIV, protection of personal information has supported access to testing for HIV by risk populations. Testing and diagnosis of HIV are essential with approximately one-third of HIV infections among gay men estimated to involve a person with undiagnosed HIV infection.³

The *Public Health Act 1991* is supported by other legislation including the *Health Records and Information Privacy Act 2002*, and by NSW Department of Health Policy Directives including PD2005_593: *NSW Health Privacy Manual*⁴ and PD2009_023: *Management of people with HIV who risk infecting others*.⁵ This latter policy provides a framework for the management of people with HIV whose behaviours represent a risk to public health and establishes an expert Assessment Panel to provide advice to treating clinicians and the NSW Chief Health Officer in circumstances of HIV-related public health risk. Box 1 provides a list of the relevant sections in the *Crimes Act 1900* and the *Public Health Act 1991* that are relevant to the management of HIV.

While the NSW Policy Directive for managing cases of HIV-related public health risk is consistent with the national framework (agreed by all jurisdictions in 2009),⁶ the *Public Health Act 1991* differs from all other

jurisdictions except Tasmania in that section 13 requires people with a sexually transmissible medical condition (including HIV) to disclose their infection to potential sexual partners before intercourse and for the sexual partner to voluntarily accept the risk. There is no provision for a defence of safe sex.

Application of the legislation

Even though section 13 has been infrequently used (only one person was charged and convicted in NSW during the period 2000 and 2008),⁷ it can be argued that the requirement to disclose builds community expectations that people with HIV are aware of their infection and will disclose that information to others. Potentially the requirement also discourages testing, places the emphasis on disclosure rather than on safe sex, and shifts the responsibility for prevention disproportionately onto people with HIV.⁸

A small number of people with HIV face difficulty making informed choices due to mental illness, intellectual disability, drug dependence, socioeconomic conditions or other factors. People in this group are more likely to be identified and labelled as 'people with HIV who risk infecting others' and their behaviours managed through public health officers in area health services, the expert Assessment Panel that advises the Chief Health Officer, and by Public Health Orders made under the Act. Even so, public health is about protecting and enhancing every human's rights, as individuals and as members of their community. In cases where the rights of the individual are in conflict with the rights of others decisions must be made

on the basis of the least harsh option.⁹ Despite these safeguards, constant vigilance is required to ensure socially vulnerable people are not disadvantaged.

In NSW, people with HIV who risk passing the infection to others due to difficulties in making informed choices are generally not managed through the extremities of the Act or the Policy Directive. Considerable resources from both public agencies and community-based organisations are directed as required for the prevention of HIV public health risks in these circumstances. In particular, case management including behaviour management delivered through specialised HIV services and with advice from the Assessment Panel, generally enables those with HIV risks to enter a stable, ongoing medical-care system with supported prevention goals.¹⁰

This approach to management has provided a balance of individual human rights, needs for health and other support, and the need to protect the wider community.

Emerging issues

From 1997, the federal and state governments, through the National Public Health Partnership, committed significant resources to redefining public health law.⁹ It resulted in new legislation in Victoria, Tasmania and the Australian Capital Territory.¹¹ Draft bills are under consideration in South Australia and Western Australia.¹² In February 2010, the NSW Government released for consultation the *NSW Public Health Bill 2010*.

The words ‘human rights’ are not used in contemporary public health legislation. A new underlying theme in public health law is, instead, the identification and management of risk with a clear statement about evidence-informed decision making; the primacy of prevention; proportionality and equity (see in particular: ss5-10 Public Health and Wellbeing Act 2008 [Vic.] and ss5-13 Public Health Bill 2009 [SA]). This is further reinforced by a set of principles. This shift has occurred in parallel with a growth in the health and human rights movement.¹³ As a ‘human rights approach requires a fair balance to be achieved between the interests of people who are, may be, or are not infected with diseases such as HIV/AIDS’,¹⁴ the requirements of risk management and proportionality of the newer legislation may ultimately be in conflict with the objectives of the health and human rights movement.

In addition, there has been an apparent increase in Australia in the number of people with HIV charged with HIV-transmission offences. Although the number of court cases occurring in NSW remains relatively low (the National Association of People Living with HIV/AIDS cites the 2004 Kanengele-Yondjo case¹⁵ and the 2008 Montgomery case as being of note),¹⁶ this trend may change.

Until recently the NSW *Crimes Act 1900* included specific provisions for dealing with a person who ‘maliciously caused another person to contract a grievous bodily disease’.¹⁷ When tested in practice, the provision was found to be unworkable because ‘the requirement to prove the actions were carried out “maliciously” was too onerous to prove, particularly when the accused had had sex on other occasions with women who did not contract the virus’.¹⁵ The response of the NSW government was to amend the definition of grievous bodily harm in section 4 of the Act to include infliction of a grievous bodily disease, making the general grievous bodily harm sections 33, 35 and 54 the relevant offences.

With these changes, the criminal law in NSW is now consistent with the *UNAIDS International Guidelines on HIV/AIDS and Human Rights* which state that no country should have criminal laws targeting people with HIV as general laws should be adequate.¹⁸ There is however increased opportunity afforded in the legislation to criminalise HIV transmission. Should increased criminalisation occur, individuals ultimately are stigmatised and blamed: a shift away from shared responsibilities – a key health promotion message of HIV interventions to date.

Unfinished business

With the groups most affected by HIV – gay men, people who inject drugs and sex workers – being marginalised in society, any consideration of public health law and human rights must also include policy, legislation and social vulnerabilities that impact on access to health services and the adoption of healthy behaviours. For this reason the final Legal Working Party Report recommended changes such as recognition of same-sex relationships, national decriminalisation of the sex industry, and repeal of drug self-administration offences.

While some progress was made, including the 1995 decriminalisation of the NSW sex industry, not all recommendations of the Legal Working Party have been implemented. Further, with a changing epidemic, issues have arisen that were not previously contemplated. Stigma and discrimination remain ever present for people with HIV; gay men do not yet have equality; the sex industry needs consistent national regulation and changes are needed to better allow the distribution of new injecting drug equipment.

Conclusion

In 2010, there are no longer structures to coordinate HIV legal policy or legislative reform at a state or national level. The sense of crisis that drove initial efforts to ensure the law served public health was lost as, with improvements in combination antiretroviral therapy during the 1990s, HIV increasingly became considered a chronic, manageable

condition. However, changes in the state of the epidemic have seen a movement away from a rights-based approach towards a medical management model.¹⁹ The health and human rights movement may need to re-invigorate the debate on rights and HIV.

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Refugee health

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At the end of 2008 there were approximately 42 million people around the world who had been forcibly displaced from their homeland.¹ As a signatory to the United Nations Refugee Convention, Australia resettles over 13 000 refugees each year,² with 4000 settling in New South Wales (NSW). In 2007–2008, most of these people originated from Burma, Iraq, Afghanistan, Sudan and Liberia. The majority coming to NSW settled in the greater west of Sydney, with smaller numbers settling in Wollongong, Newcastle, Coffs Harbour, Wagga Wagga and Goulburn.

Many refugees and asylum seekers have experienced physical and psychological trauma as a result of human rights abuses and protracted conflict. Their displacement can result in loss of family, friends, land and other possessions, disruption of education, employment and erosion of community structures and traditions. Their experiences, combined with anxiety, uncertainty and the lengthy resettlement process, can have long-lasting, detrimental effects on their physical, emotional and mental health.

Public health issues

The Migration Regulation Act stipulates that all people entering Australia must be free of active tuberculosis and refers generally to diseases that pose a threat to public health. Human immunodeficiency virus (HIV) infection and hepatitis B and C are not considered to be a public health risk and do not preclude migration to Australia from a public health perspective. Cases of active tuberculosis must be treated before migrating to Australia. Once treatment is considered complete, people can travel to Australia, having signed a Health Undertaking which is an agreement by the person migrating to report to the relevant state chest clinic for ongoing monitoring and further treatment if required.

Departure checks and arrival checks

Pre-departure medical screening is a voluntary check offered to refugee and humanitarian applicants around 72 hours before departure to Australia. The aim of the screening is to identify health concerns which may affect the individual's

fitness to travel to Australia and to ensure follow up of those health needs upon arrival. A full pre-departure medical screen includes a physical examination, tuberculosis evaluation for those at risk, malaria test and treatment if required, treatment for intestinal parasites and measles, mumps and rubella (MMR) immunisation for refugees aged nine months to thirty years. Information is documented on a Health Manifest form which is sent to the Department of Immigration and Citizenship. Health issues that need follow-up are flagged on the manifest. In 2008–09, 3800 humanitarian entrants to NSW, 80% of all refugee entrants to NSW that year, underwent a pre-departure medical screen.

Common health problems

Screening of 220 refugee children settling in NSW has detected vitamin D deficiency, schistosomiasis, positive Mantoux tests, anaemia, parasitic diseases, malaria and chronic hepatitis B.³ Poor oral health, chronic conditions including diabetes and hypertension, injuries from war and torture that have been inadequately treated, psychological disorders and delayed growth and development in children are not uncommon. Guidelines published by the Australasian Society for Infectious Diseases entitled *Diagnosis, management and prevention of infections in recently arrived refugees* can assist practitioners in their management of refugee health care.⁴ Catch-up immunisation may be required. Specialised services in NSW exist for trauma counselling (STARTTS and the Transcultural Mental Health Centre) as well as the Multicultural HIV/Hep C service and an obstetric service at Auburn Hospital for women affected by female genital mutilation.

Services

Refugees, and asylum seekers who are successful in their claim for refugee status, are eligible for Medicare. Health services are provided by mainstream general practitioners and a number of specialised clinics. Barriers in accessing health services include language, cultural differences, knowledge of available services, transport, and financial costs (particularly for specialist assessments, allied health, dental care and some medications). Many health-care providers in Australia may lack the knowledge and cultural awareness required when providing health care to people from backgrounds of war and trauma.

Policy directions

In the recent past, many asylum seekers were not eligible for Medicare. National policy initiatives in 2009 included

increased access for asylum seekers to Medicare, free access to telephone interpreters for all pharmacists, and inclusion within the Pharmaceutical Benefits Scheme (PBS) of some medications (for malaria and schistosomiasis). NSW has developed a policy addressing access to hospital care for asylum seekers without Medicare, and is developing a state refugee health plan for release in 2010.

Conclusion

Refugees migrating to Australia are screened for tuberculosis and active cases are treated off-shore. Individuals are placed on Tuberculosis Undertakings when they are fit to travel to Australia. Most refugees are also screened for other conditions within 72 hours before travelling. People from refugee and asylum-seeker backgrounds experience physical, emotional and mental health problems that can pose a challenge to Australian health-care workers. Guidelines and training can assist in providing high quality, comprehensive care that is culturally sensitive. National and state policy initiatives can assist in

promoting better access to health services for all humanitarian arrivals.

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Communicable Diseases Report, NSW, January and February 2010

Communicable Diseases Branch NSW Department of Health

For updated information, including data and facts on specific diseases, visit www.health.nsw.gov.au and click on **Public Health** and then **Infectious Diseases**. The communicable diseases site is available at: <http://www.health.nsw.gov.au/publichealth/infectious/index.asp>.

Figure 1 and Tables 1 and 2 show reports of communicable diseases received through to the end of January and February 2010 in New South Wales (NSW).

Meningococcal disease

In January, 8 cases of meningococcal disease were reported in NSW and in February, 4 cases were reported. Of these 12 cases, 9 were due to serogroup B infection, none were due to serogroup C infection and 3 were not able to be typed. The ages of these people ranged from 2 months to 24 years; 67% were males and 10 lived in regional NSW. Twelve cases were reported for the same period in 2009. In NSW in 2009, 80% of cases of meningococcal disease (where the serogroup was known) were caused by serogroup B, for which there is no vaccine.

For national guidelines for the early clinical and public health management of meningococcal disease, please see: <http://www.health.gov.au/internet/main/publishing.nsf/Content/cda-pubs-other-mening-2007.htm>.

Hepatitis A cluster

In January and February, the Population Health Unit of Hunter New England Area Health Service investigated 9 cases of hepatitis A with links to a primary school. Four children from the same class appear to have acquired their infection from an unidentified source. Five further cases of hepatitis A were reported from close contacts of these cases. None of the children have reported travel overseas and household contacts of these children have received

hepatitis A vaccination as a precaution. The Population Health Unit provided advisory letters to families with children in the class, and advice was also provided to other families at the school through the school newsletter.

Hepatitis A is a virus transmitted almost entirely by the faecal-oral route (e.g. eating contaminated food, drinking contaminated water, or direct transfer or direct contact with a person with the infection). The incidence of hepatitis A infection has declined in the last few decades in most parts of Australia, possibly related to improved water supplies, safer food handling practices, improved hygiene and availability of a vaccine. Most cases in NSW are acquired overseas in countries where there is poor sanitation and hygiene. A safe and effective vaccine is available that provides long-term protection against hepatitis A infection.

Salmonellosis

In January, the Population Health Unit of Greater Southern Area Health Service, in collaboration with the NSW Food Authority (NSWFA), investigated an outbreak of *Salmonella* infection involving people who ate food from a fast food outlet in Albury. Over 170 people reported gastroenteritis and were interviewed about food consumption. Ninety-eight had confirmed *Salmonella* infection. All cases had eaten food from the outlet between 14 and 19 January 2010. The NSW Food Authority and Albury Council inspected the outlet, examined food safety practices and sampled foods and the environment for laboratory testing. *Salmonella* was isolated from aioli (a sauce) and a cutting board located at the premises. The NSW Food Authority issued a prohibition order that prevented the premises from operating until the NSW Food Authority determined that it had met all requirements for a clearance certificate to be issued.

In February, NSW Health began epidemiological investigations into increases in notifications of infection with two distinct types of *Salmonella* – *S. Infantis* (20 cases in January and 28 in February) and of *S. Potsdam* (9 cases in January and 2 in February). The people affected are widely geographically distributed and there is also no significant clustering by age or sex. Investigations are ongoing.

Salmonellosis is caused by infection with *Salmonella* bacteria. In Australia, most salmonellosis is caused by eating contaminated food or sometimes through contact

with another person with the infection. Symptoms commonly include headache, fever, stomach cramps, diarrhoea, nausea and vomiting that start 6–72 hours after infection and last for 4–7 days, although sometimes much longer.

Measles

In January, a case of measles was reported in an unimmunised child returning from travel overseas. The child was infectious during the international flight and passengers seated in the surrounding rows were contacted by public health staff to help contain further transmission. Passengers who were identified as not immune to measles were advised to receive a second dose of measles-containing vaccine – MMR.

In February, 4 new cases of measles were reported. Three of these people were unimmunised siblings of the child who first developed measles in January. These children had been quarantined at home since January. Another case was reported in a child who sat in the row behind the index case on the plane.

In addition, the Department of Health in Victoria notified NSW of a case of measles in a tourist who had visited NSW and Queensland during his infectious period. The person visited a youth hostel and a restaurant in Sydney. No secondary cases were reported.

Most cases of measles in NSW are seen in travellers who return with the infection from countries where measles is endemic after having been exposed to a known case. Many people who were born since 1966 and before the mid 1980s are not immune to measles because they have neither been infected with measles nor received two doses of a measles vaccine. Measles vaccine is now routinely given to infants at 12 months and at 4 years of age, and this confers long-lasting immunity.

Chickenpox and shingles surveillance

Chickenpox is a viral illness caused by the herpes zoster virus (also known as the Varicella-Zoster virus). Shingles is caused by the reactivation of the virus that causes chickenpox, usually in adulthood and many years after the initial chickenpox illness. The virus can be spread by direct contact with the skin rash of people with the infection. This causes chickenpox in people who are not immune. Shingles develops more commonly in people who are immunosuppressed.

Before routine childhood vaccination began in 2006, chickenpox was a very common illness. In NSW, the incidence of infection is monitored through the number

of patients attending emergency departments with chickenpox or shingles. Updated data are now routinely available for emergency department visits of NSW residents assigned a diagnosis of chickenpox or varicella infection (see: <http://www.health.nsw.gov.au/data/diseases/chickenpox.asp> and <http://www.health.nsw.gov.au/data/diseases/shingles.asp>).

In January, an increase in presentations for shingles was reported by some emergency departments in NSW. The median age of people presenting and assigned a diagnosis of shingles or herpes zoster disease was 59 years (range 4–97 years). Of these, 53% were female. In the same period, a slight increase was reported for presentation of chickenpox. The median age of people presenting and diagnosed with varicella or chickenpox was 8 years (range 0–83 years). Of these people, 48% were female.

Anthrax

In February, a case of cutaneous anthrax was reported in a farmer who worked on a sheep property in south western NSW located in NSW's anthrax belt, an area stretching down the middle third of the state where anthrax spores are present in the soil. In the days prior to onset, a farmer reported doing some fencing work on the property that most likely disturbed the soil that contained anthrax spores. The diagnosis was suspected on clinical grounds and was confirmed by laboratory tests.

Cutaneous anthrax is very rare in NSW. Bacterial spores in affected soil get into small skin cuts or wounds where they germinate and cause skin ulceration and surrounding swelling. The skin ulcer develops a characteristic black area of dead tissue. With treatment, patients generally make a full recovery.

Gonorrhoea

Notifications of gonorrhoea increased in January, when 239 cases were notified in NSW; of these, 85% were men. Based on previous epidemiological patterns, a large proportion of these people are likely to be men who have sex with men. NSW Health worked with partner agencies to publicise safer sex messages to high-risk communities during the Mardi Gras festival. In 2009, 1658 cases were notified in NSW, an average of 138 cases per month.

Influenza activity

Little influenza activity was reported in NSW in January and February. The weekly number of patients presenting to emergency departments with influenza-like illness remains steady at near baseline levels.

Figure 1. Reports of selected communicable diseases, NSW, January 2004 to February 2010, by month of onset.
 Preliminary data: case counts in recent months may increase because of reporting delays.

Laboratory-confirmed cases only, except for measles, meningococcal disease and pertussis.

BFV, Barmah Forest virus infection; RRV, Ross River virus infections; lab conf, laboratory confirmed; Men Gp C and Gp B, meningococcal disease due to serogroup C and serogroup B infection; other/unk, other or unknown serogroups.

NB: Multiple series in graphs are stacked, except gastroenteritis outbreaks.

NB: Outbreaks are more likely to be reported by nursing homes & hospitals than by other institutions.

NSW Population	
Male	50%
<5 y	7%
5–24 y	27%
25–64 y	53%
65+ y	13%
Rural	46%

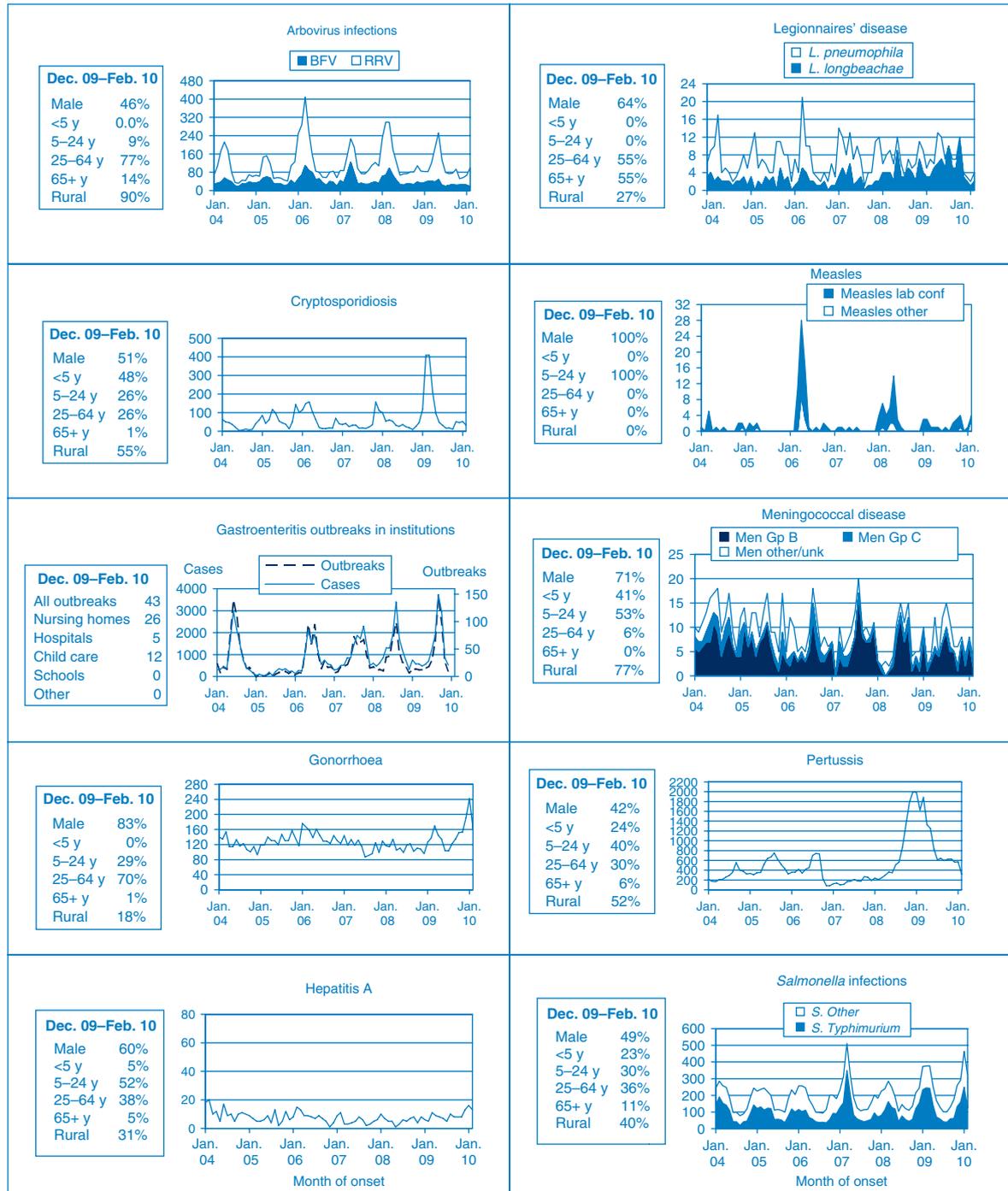


Table 1. Reports of notifiable conditions received in January 2010 by area health services

Condition	Area Health Service (2010)												Total For January ^b	Year to date ^b					
	Greater Southern GMA	SA	Greater Western FWA	MAC	MWA	HUN	Hunter New England NEA	North Coast MNC	NRA	North Sydney Central Coast CCA	NSA	ILL			SES	Sydney Eastern Illawarra	CSA	Sydney West WEN	WSA
Bloodborne and sexually transmitted																			
Chancroid ^a	43	24	3	24	41	147	18	49	63	56	110	58	221	146	121	57	108	16	1328
Chlamydia (genital) ^a	1	-	-	1	-	12	1	7	5	2	20	6	98	47	20	4	23	-	251
Gonorrhoea ^a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
Hepatitis B – acute viral ^a	1	-	3	1	3	3	2	2	-	1	31	-	40	34	38	12	64	7	246
Hepatitis B – other ^a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Hepatitis C – acute viral ^a	16	15	1	8	11	33	11	14	29	18	20	24	51	40	23	16	33	27	392
Hepatitis C – other ^a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hepatitis D – unspecified ^a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lymphogranuloma venereum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Syphilis	-	1	-	-	2	2	-	-	2	2	5	1	31	14	10	2	6	1	80
Vectorborne																			
Barmah Forest virus ^a	-	1	1	2	-	2	2	2	10	2	-	2	-	-	-	-	-	-	24
Ross River virus ^a	9	1	4	1	-	6	3	5	8	1	3	1	1	1	1	1	2	-	44
Arboviral infection (other) ^a	-	-	-	-	-	-	-	-	1	-	2	1	1	1	-	-	-	-	8
Malaria ^a	-	1	-	-	-	-	-	-	-	-	1	-	1	2	-	-	-	-	5
Zoonoses																			
Anthrax ^a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brucellosis ^a	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1
Leptospirosis ^a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lyssavirus ^a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Psittacosis ^a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Q fever ^a	1	2	-	1	1	-	1	-	5	1	-	-	-	-	-	-	-	-	12
Respiratory and other																			
Blood lead level ^a	-	-	-	1	-	-	-	1	1	1	1	6	-	2	5	1	-	-	14
Invasive pneumococcal infection ^a	2	-	-	-	-	2	-	-	-	1	1	4	2	-	5	1	3	-	23
Legionella longbeachae infection ^a	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	1	-	3
Legionella pneumophila infection ^a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Legionnaires' disease (other) ^a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leprosy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Meningococcal infection (invasive) ^a	-	-	-	-	-	1	-	1	-	1	-	2	-	2	2	-	-	-	7
Tuberculosis	-	-	-	-	-	2	-	-	-	-	6	3	6	2	2	2	7	-	30
Vaccine-preventable																			
Adverse event after immunisation	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	1	-	-	4
H. influenzae b infection (invasive) ^a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Measles	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
Mumps ^a	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
Pertussis	35	16	1	31	13	78	25	21	37	14	40	32	75	17	36	27	46	544	
Rubella ^a	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	2
Tetanus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Enteric																			
Botulism	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cholera ^a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cryptosporidiosis ^a	1	-	2	3	9	6	3	5	2	4	4	1	2	4	2	2	4	-	50
Giardiasis ^a	4	2	3	9	16	2	2	1	5	30	10	10	42	14	13	10	23	-	186
Haemolytic uraemic syndrome	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	2
Hepatitis A ^a	-	-	1	-	-	6	-	-	-	-	-	-	1	-	1	-	3	-	12
Hepatitis E ^a	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
Hepatitis E ^b	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Listeriosis ^a	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	2
Salmonellosis ^a	64	5	1	4	12	27	12	15	31	18	51	9	55	34	35	15	42	-	432
Shigellosis ^a	1	-	-	-	-	-	1	-	-	1	1	-	1	-	-	-	2	-	7
Typhoid ^a	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	4	-	8
Verotoxin producing E. coli ^a	-	-	-	-	-	3	-	-	2	4	-	-	-	-	-	-	-	-	9
Miscellaneous																			
Creutzfeldt-Jakob disease	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1
Meningococcal conjunctivitis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

^aLaboratory-confirmed cases only. ^bIncludes cases with unknown postcode. NB: Data are current and accurate as at the preparation date. The number of cases reported is, however, subject to change, as cases may be entered at a later date or retracted upon further investigation. Historical Area Health Service configurations are included for continuity/comparison purposes and to highlight regional differences. NB: Influenza data is not provided here since May 2009 and refer to web link. NB: From 1 January 2005, Hunter New England AHS also comprises Great Lakes, Gloucester and Greater Taree LGAs (LGA, Local Government Area). Sydney West also comprises Greater Lithgow LGA. NB: HIV and AIDS data are reported separately in the Public Health Bulletin quarterly. GMA, Greater Murray Area; MAC, Macquarie Area; NEA, New England Area; CCA, Central Coast Area; SES, South Eastern Sydney Area; WEN, Wentworth Area; SA, Southern Area; MWA, Mid Western Area; MNC, North Coast Area; NSA, Northern Sydney Area; CSA, Central Sydney Area; FWA, Far West Area; HUN, Hunter Area; WSA, Western Sydney Area; WSA, Western Sydney Area; NRA, Northern Rivers Area; ILL, Illawarra Area; SWS, South Western Sydney Area; JHS, Justice Health Service.

Table 2. Reports of notifiable conditions received in February 2010 by area health services

Condition	Area Health Service (2010)														Total For February ^b	Total Year to date ^b
	Greater Southern GMA	Greater Western FWA	Greater Western MAC	Greater Western MMA	New England HUN	Hunter NEA	North Coast MNC	North Coast NRA	Northern Sydney CCA	Northern Sydney NSA	Sydney Illawarra SES	Sydney South West SWS	Sydney West WEN	Sydney West WSA		
Bloodborne and sexually transmitted																
Chancroid ^a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlamydia (genital) ^a	51	40	7	20	34	201	30	38	78	84	112	162	134	63	149	3
Gonorrhoea ^a	1	-	-	-	-	25	1	2	3	10	24	41	11	4	16	1
Hepatitis B - acute viral ^a	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hepatitis B - other ^a	2	1	2	1	1	4	-	6	1	3	33	49	43	9	56	2
Hepatitis C - acute viral ^a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hepatitis C - other ^a	19	9	2	9	4	36	7	19	22	19	24	51	37	21	37	7
Hepatitis D - unspecified ^a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lymphogranuloma venereum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Syphilis	2	1	1	-	-	4	-	3	4	2	8	20	8	-	-	-
Vectorborne																
Barmah Forest virus ^a	-	1	2	-	1	5	2	8	3	1	-	-	-	-	-	-
Ross River virus ^a	21	3	1	18	5	5	8	4	3	1	3	1	1	2	2	-
Arboviral infection (other) ^a	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Malaria ^a	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
Zoonoses																
Anthrax ^a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brucellosis ^a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leptospirosis ^a	-	-	-	-	-	-	3	-	1	-	-	-	-	-	-	-
Lyssavirus ^a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Psittacosis ^a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Q fever ^a	-	-	3	-	1	1	2	3	3	1	-	-	-	-	-	-
Respiratory and other																
Blood lead level ^a	1	-	-	-	-	1	1	-	-	-	-	-	1	-	-	-
Invasive pneumococcal infection ^a	-	-	-	-	-	2	-	-	-	5	3	1	5	1	1	-
<i>Legionella longbeachae</i> infection ^a	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
<i>Legionella pneumophila</i> infection ^a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Legionnaires' disease (other) ^a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leptosy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Meningococcal infection (invasive) ^a	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Tuberculosis	2	1	-	-	-	-	-	1	2	-	6	2	1	4	3	-
Vaccine-preventable																
Adverse event after immunisation	1	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-
<i>H. influenzae b</i> infection (invasive) ^a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Measles	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
Mumps ^a	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Pertussis	30	13	-	15	6	60	28	16	25	20	44	28	32	19	63	-
Rubella ^a	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Tetanus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Enteric																
Botulism	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cholera ^a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cryptosporidiosis ^a	14	3	-	3	4	25	8	5	4	14	37	4	3	2	7	-
Giardiasis ^a	-	-	-	-	-	-	-	-	-	-	-	23	19	13	18	-
Haemolytic uraemic syndrome	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hepatitis A ^a	1	-	-	-	-	2	-	-	2	1	1	2	3	1	10	-
Hepatitis E ^a	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Listeriosis ^a	-	-	-	1	-	1	-	2	-	2	2	1	1	-	-	-
Salmonellosis ^a	20	13	-	5	6	31	7	10	39	14	36	33	49	22	55	-
Shigellosis ^a	-	-	-	-	-	3	1	-	1	-	-	1	-	-	-	-
Typhoid ^a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Verotoxin producing <i>E. coli</i> ^a	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-
Miscellaneous																
Creutzfeldt-Jakob disease	-	-	-	-	-	-	-	1	-	2	-	-	-	-	1	-
Meningococcal conjunctivitis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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 NB: Full data is available from the NSW Health website (http://www.health.nsw.gov.au/).
 NB: HIV and AIDS data are reported separately in the Public Health Bulletin Quarterly.
 GMA, Greater Murray Area; MAC, Macquarie Area; NEA, New England Area; CCA, Central Coast Area; SES, South Eastern Sydney Area; WEN, Wentworth Area; WSA, Western Sydney Area; WEN, Hunter Area; HUN, Hunter Area; FWA, Far West Area; WSA, Western Sydney Area; CCA, Central Sydney Area; MNC, Northern Sydney Area; MWA, Mid Western Area; WEN, Western Area; MWA, Mid Western Area; WSA, South Western Sydney Area; JHS, Justice Health Service.

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