

REFERENCES

1. Doll R, Bradford Hill A. The mortality of doctors in relation to their smoking habits. *Br Med J* 1954; 228: 1451–5. Reprinted 2004; 328: 1529–33.
2. Doll R, Peto R, Boreham J, Sutherland I. Mortality in relation to smoking: 50 years' observations on male British doctors. *Br Med J* 2004; 328: 1519–33.
3. Australian Institute of Health and Welfare 2005. 2004 National Drug Strategy Household Survey: First Results. AIHW cat. no. PHE 57. Canberra: AIHW (Drug Statistics Series No. 13).
4. Doll R, Hill AB. Smoking and carcinoma of the lung: preliminary report. *Br Med J* 1950; 2: 739–48.
5. Doll R, Peto R, Wheatley K, Gray R, Sutherland I. Mortality in relation to smoking: 40 years' observations on male British doctors. *Br Med J* 1994; 309: 901–11. ☒

EPIREVIEW

EPIDEMIOLOGY OF NEWLY DIAGNOSED HIV INFECTION IN NEW SOUTH WALES, 1994–2003

Marshall Tuck

*NSW Public Health Officer Training Program
NSW Department of Health*

Mohammad Habib, Mark Bartlett and

Jeremy McAnulty

*Communicable Diseases Branch
NSW Department of Health*

Human immunodeficiency virus (HIV) infection is caused by a retrovirus transmitted from person to person via infected blood and body fluids such as semen and vaginal fluids. Most persons infected with HIV develop detectable antibodies within one to three months of infection. People with this disease are able to transmit HIV throughout their life.¹ The control of HIV remains an important public health challenge with an estimated 38 million persons infected worldwide.² NSW has approximately 57 per cent of all newly diagnosed HIV infections in Australia.³ Surveillance for new HIV infections enables health departments to identify groups at risk and to monitor long-term trends in the disease, which in turn informs the development of prevention policies and programs.

This review presents an analysis of new notifications of HIV infections among NSW residents for the period January 1994 to December 2003.

METHODS

In NSW there are seven HIV reference pathology laboratories. These laboratories confirm HIV infections and notify positive clinical specimens. Under the *NSW Public Health Act 1991*, all HIV reference pathology laboratories in NSW are required to notify the NSW Department of Health of persons newly diagnosed with HIV infection.

A nationally standardised case definition is applied. The definition requires the detection of HIV by a repeatedly reactive result on screening test and a positive western blot and/or virological assay. Laboratories send a standard notification form with the HIV positive result to the treating medical practitioner, seeking detailed demographic information about the case and information about clinical history, health status and HIV risk exposure. De-identified information is forwarded to the NSW Department of Health and entered on a secure database, the NSW HIV/AIDS Database.

De-identified data, comprising cases defined by the HIV and AIDS protocol for NSW public health units⁴, were extracted from the database and analysed. We undertook a descriptive analysis of cases by age group (based on date of first positive HIV diagnosis), country of birth, place of residence and HIV risk exposure category. 'Place of residence' is described according to 2003 NSW area health service boundaries. 'Country of birth' and countries with high prevalence of HIV, were defined according to the Joint United Nations Programme on HIV/AIDS (UNAIDS).⁵ Annual crude notification rates were calculated using Australian Bureau of Statistics population estimates for NSW (accessed through HOIST, the Health Outcomes Indicator Statistical Toolbox).

As described above, risk exposure category information is obtained by the treating medical practitioner through consultation with the case. For surveillance purposes, where there was more than one reported risk exposure, a hierarchy of risk is used to designate a case's primary risk exposure and one or more secondary risk exposure/s, as defined according to the *Rules for Risk Exposure Assignment*.⁶ The primary risk exposure is that most strongly associated with

transmission of HIV. Where male-to-male sex is reported, this is always considered the primary risk exposure. For this analysis, notifications for males who reported homosexual exposure and males who reported bisexual exposure were combined. Where a case cannot accurately report his/her HIV risk exposure history, the risk exposure category assigned is 'undetermined'. If a case reported a sexual contact history with only person(s) of the opposite sex, further information regarding the case's sexual partner(s) is sought.

RESULTS

From 1994 to 2003, some 4171 new notifications of HIV infection were reported in NSW, representing a crude incidence rate of 6.6 per 100,000 population for each year. There was a gradual decline in HIV infections from 1995 to 2001. The rates of HIV notifications increased 15 per cent between 2001 and 2002 and by six per cent between 2002 and 2003 (Figure 1 and Table 1).

Males represented 91 per cent of all people notified with HIV infections from 1994 to 2003. The proportion of females notified with HIV infection during this period has remained stable. The number of HIV notifications in males, however, increased by 14 per cent from 2001 to 2002, and

by a further seven per cent between 2002 and 2003.

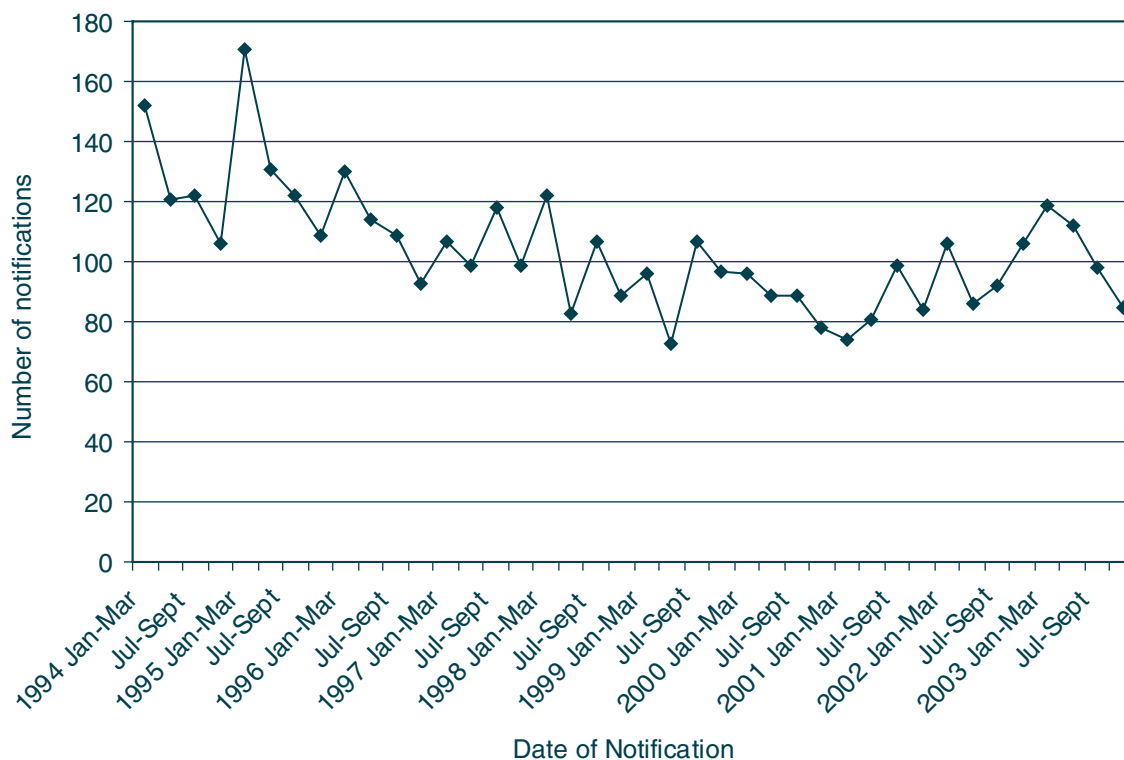
Exposure risk factors

Male-to-male sexual contact was the major primary risk exposure for HIV infection reported in the study period, with the majority of these men (93 per cent) reporting no other risk factor. An increase in the number of notifications reporting the risk exposure of male-to-male sexual contact has been observed since 2002 and reflects the increase in HIV notifications overall (Figure 2, Table 1). Heterosexual contact was the primary risk exposure reported in 15 per cent of notifications and 42 per cent of these cases were female. Forty five percent of cases (n=293) had heterosexual contact with a person from a country with a high HIV prevalence and 10 per cent had sexual contact with a person known to have a HIV infection. A third of cases that had heterosexual contact did not specify a secondary risk factor. Injecting drug use was the primary risk exposure reported in four per cent of notifications. Approximately 17 per cent of notifications that cited injecting drug use as the primary risk exposure were female. Half (51 per cent) of these cases did not report a secondary risk factor.

People aged 30–39 years had the highest average annual notification rate (16.6 cases per 100,000), followed by people aged 20–29 years (13.2 per 100,000) and 40–49

FIGURE 1

NUMBER OF NEW HIV NOTIFICATIONS IN NSW RESIDENTS, PER QUARTER, 1994–2003



Source: NSW HIV / AIDS database 2003

TABLE 1

DEMOGRAPHIC AND PRIMARY SOURCE OF RISK EXPOSURE FOR PEOPLE NEWLY NOTIFIED WITH HIV IN NSW FOR EACH YEAR, 1994–2003

	1994		1995		1996		1997		1998		1999		2000		2001		2002		2003		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Sex																						
Male	459	91.6	495	92.9	408	91.5	390	92.2	357	89.0	344	92.2	313	88.9	305	90.2	349	89.5	372	89.9	3792	90.9
Female	34	6.8	34	6.4	34	7.6	26	6.1	40	10.0	28	7.5	28	8.0	31	9.2	30	7.7	32	7.7	317	7.6
Transgender	1	0.2	1	0.2	2	0.4	1	0.2	1	0.2	1	0.3	0	0.0	0	0.0	4	1.0	0	0.0	11	0.3
Not stated	7	1.4	3	0.6	2	0.4	6	1.4	3	0.7	0	0	0	0.0	2	0.6	7	1.8	10	2.4	51	1.2
Age group (in years)																						
0–2	5	1	2	0	1	0.22	1	0.2	2	0.5	1	0.3	2	0.6	0	0.0	1	0.3	0	0.0	15	0.4
3–12	1	0.2	3	0.6	1	0.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	7	0.2
13–19	10	2.0	9	1.7	8	1.8	5	1.2	9	2.2	7	1.9	4	1.1	7	2.1	3	0.8	9	2.2	71	1.7
20–29	188	37.5	169	31.7	134	30.0	130	30.7	111	27.7	108	29.0	86	24.4	98	29.0	111	28.5	99	23.9	1234	29.6
30–39	171	34.1	206	38.6	186	41.7	157	37.1	156	38.9	145	38.9	140	39.8	137	40.5	164	42.1	170	41.1	1632	39.1
40–49	83	16.6	94	17.6	75	16.8	87	20.6	88	21.9	73	19.6	75	21.3	66	19.5	76	19.5	82	19.8	799	19.2
50–59	24	4.8	31	5.8	22	4.9	31	7.3	27	6.7	30	8.0	29	8.2	16	4.7	23	5.9	39	9.4	272	6.5
60+	17	3.4	15	2.8	14	3.1	9	2.1	8	2.0	7	1.9	7	2.0	8	2.4	12	3.1	13	3.1	110	2.6
Missing	2	0.4	4	0.8	5	1.1	3	0.7	0	0.0	2	0.5	9	2.6	6	1.8	0	0.0	0	0.0	31	0.7
Place of residence																						
Metropolitan Sydney	410	81.8	431	80.9	346	77.6	333	78.7	324	80.8	311	83.4	300	85.2	298	88.2	333	85.2	319	77.1	3405	81.6
Per 100 000 population	12		12		9		9		9		8		8		8		9		8		9	
Rural NSW	44	8.8	66	12.4	49	11.0	44	10.4	44	11.0	36	9.7	44	12.5	37	10.9	39	10.0	62	15.0	465	13.7
Per 100 000 population	2		3		2		2		2		1		2		1		1		2		2	
Unknown	47	9.4	36	6.8	51	11.4	46	10.9	33	8.2	26	7.0	8	2.3	3	0.9	18	4.9	33	8.0	301	4.7
Primary exposure																						
MSM	345	68.9	363	68.1	292	65.5	285	67.4	244	60.8	243	65.1	232	65.9	214	63.3	248	63.6	282	68.1	2856	65.2
Heterosexual	59	11.8	64	12.0	58	13.0	60	14.2	89	22.2	57	15.3	59	16.8	55	16.3	56	14.4	63	15.2	651	14.9
Undetermined	39	7.8	53	9.9	59	13.2	47	11.1	41	10.2	41	11.0	24	6.8	24	7.1	47	12.1	42	10.1	473	10.8
MSM & injecting drug user	25	5.0	24	4.5	15	3.4	17	4.0	16	4.0	15	4.0	8	2.3	18	5.3	13	3.3	9	2.2	162	3.7
Injecting drug user	19	3.8	20	3.8	16	3.6	11	2.6	9	2.2	12	3.2	19	5.4	18	5.3	8	2.1	12	2.9	153	3.5
Blood-tissue recipient	7	1.4	2	0.4	4	0.9	1	0.2	0	0.0	1	0.3	0	0.0	0	0.0	0	0.0	0	0.0	18	0.4
Vertical (ie mother-to-child)	7	1.4	5	0.9	2	0.4	1	0.2	2	0.5	1	0.3	2	0.6	0	0.0	1	0.3	2	0.5	23	0.5
Haem-coag disorders*	0	0.0	1	0.2	0	0.0	1	0.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.0
Not stated	0	0.0	1	0.2	0	0.0	0	0.0	0	0.0	3	0.8	8	2.3	9	2.7	17	4.4	4	1.0	43	1.0
Country of birth																						
Australia	106	21.2	100	18.8	60	13.5	59	14	62	15.5	50	13.4	197	55.9	194	54.4	199	51.0	232	56.0	1259	30.2
High HIV prevalence country	9	1.8	11	2.1	17	3.8	15	3.6	30	7.5	18	4.8	38	10.8	32	9.5	25	6.4	26	6.3	221	5.3
Other overseas country	46	8.2	40	7.5	39	8.7	39	9.2	25	6.2	38	10.2	66	18.8	77	22.8	94	24.1	95	22.9	559	13.4
Unknown	340	67.9	383	85.9	330	74.0	310	73.2	284	70.8	267	71.2	51	14.5	35	10.4	72	18.5	61	14.7	2133	51.1
Total	501		533		446		423		401		373		352		338		390		414		4171	
Crude incidence rate	8.3		8.7		7.2		6.7		6.3		5.8		5.4		5.2		5.9		6.2		6.6	

MSM: men who have sex with men

*Haemophilia-coagulation disorders

Source: NSW HIV / AIDS database 2003

years (8.7 cases per 100,000) (Figure 3, Table 1). History of male-to-male sexual contact amongst 30–39 year old men represented 41 per cent of all HIV notifications, a rate of 12.3 cases per 100,000 population. The rate of HIV infection due to heterosexual contact in people of this age group was 2.2 cases per 100,000.

Place of residence

The HIV notification rate of people resident in metropolitan Sydney was higher than for rural NSW (nine per 100,000 compared with two per 100,000). Between 1995 and 2001, the rate of notifications declined steadily in metropolitan Sydney but remained stable in rural NSW (Table 1). Between 2002 and 2003 an increase in notifications was reported among residents of the Central Sydney, South Eastern Sydney, Hunter and Illawarra area health services. The highest annual crude rate of HIV cases in metropolitan Sydney were among residents of the South Eastern Sydney (21.0 cases per 100,000), Central Sydney (16.9 cases per 100,000) and Western Sydney (3.1 cases per 100,000) area health services. In rural NSW, the Hunter Area Health Service recorded the highest crude rate (2.4 cases per 100,000 population), followed by the Illawarra (1.8 cases per 100,000) and Northern Rivers (1.4 cases per 100,000) area health services.

Country of birth

For thirty eight per cent of HIV notifications, where the country of birth was provided (n=2039), the person was born overseas. Of these people, 28 per cent were born in countries of high HIV prevalence.

Notifying practitioners

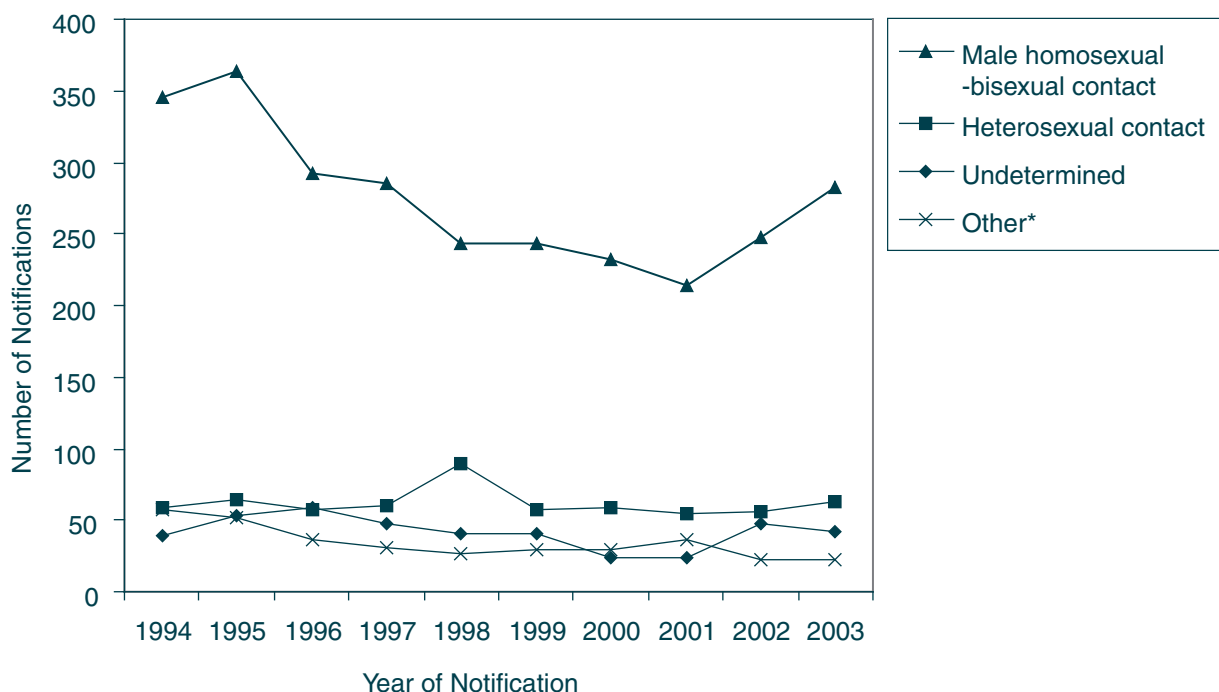
Medical practitioners provided detailed information for 71 per cent of notifications (n=3096). Of these notifications, 1411 were by medical practitioners with an interest in HIV medicine: 881 (28 per cent) by general practitioners with a high proportion of gay men as patients, and 530 notifications (17 per cent) by specialist sexual health physicians. Notifications from other general practitioners represented 54 per cent.

DISCUSSION

In NSW the number of people with a newly diagnosed HIV infection decreased between 1995 and 2001. However, in 2002 and 2003 the number increased, with most of these cases reported in males aged between 25 and 49 years who lived in metropolitan Sydney. The proportion of new HIV diagnoses in females fluctuated between 6 and 10 per cent over the period 1994–2003. The increase in the number of notifications since 2001 represents the first sustained

FIGURE 2

NUMBER OF NEW HIV NOTIFICATIONS IN NSW RESIDENTS BY THEIR PRIMARY HIV RISK EXPOSURE, 1994–2003



*Other: men who have sex with men & IDU (injecting drug user); IDU; blood tissue recipient; haemophilia/coagulation disorder; vertical (mother-to-child transmission)

Source: NSW HIV / AIDS database 2003

increase since the late 1980s.

More than half of the people notified with HIV reside in metropolitan Sydney, principally within inner Sydney. However increasing numbers of HIV notifications have been observed since 2001 in the residents of the Illawarra and Hunter area health services. The analysis by age group reflects previously published epidemiological information showing that the majority of cases are aged between 20 and 49 years.⁷ Approximately 65 per cent of people with HIV reported primary exposure through male-to-male sexual contact and 15 per cent reported primary exposure through heterosexual contact.

The decrease in cases during the 1990s was most likely due to the effectiveness of health promotion activities that consistently reinforced messages of condom use and regular HIV testing for homosexually active men who have unprotected sex with casual partners.^{8,9,10,11} Since 1996 the introduction of highly active antiretroviral therapy (HAART) is likely to have contributed to reducing HIV morbidity.^{3,12} The subsequent increase in notifications since 2001 may have been due to various factors, including the cumulative impact of increases in sexually transmitted infections facilitating HIV transmission^{7,13} and the increased seroprevalence of HIV.³ An upward trend in occasions of unprotected sex among gay men since 1999 was observed; however, rates of unprotected sex appear to have now plateaued.¹⁴ This reveals a point of vulnerability

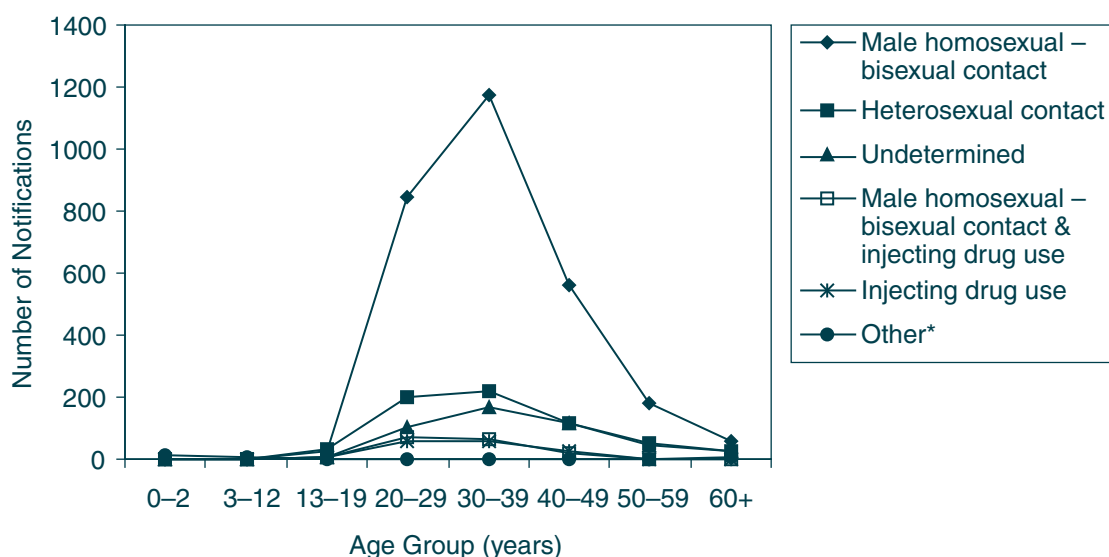
in the NSW response to HIV and suggests a strengthening of health promotion activities is needed.

In NSW over the review period, a third of people with HIV who reported their country of birth were born in countries other than Australia. Notification patterns suggest the need for continued monitoring of notifications among people from some culturally and linguistically diverse communities, particularly those from countries with high HIV prevalence. Intervention such as promotion of health knowledge and safe practices and access to services has been undertaken over the review period to increase the understanding of HIV in various communities. Ongoing intervention, however, is needed to address existing barriers to information about HIV transmission and access to health services.¹⁵

As with all surveillance systems, the quality of the data and its completeness is an ongoing issue within the NSW HIV/ AIDS Database. Protocols exist for repeated follow-up with those who notify cases in order to maximise data completeness. Regular audits are also undertaken with the NSW reference laboratories and the National Centre in HIV Epidemiology and Clinical Research to ensure data capture and to obtain additional information. There are discrepancies between NSW HIV reports and the National Centre in HIV Epidemiology and Clinical Research reports due to the different reporting parameters used and the timing of the snapshots taken of the database.

FIGURE 3

NUMBER OF NEW HIV NOTIFICATIONS IN NSW RESIDENTS BY THEIR AGE AT TIME OF FIRST POSITIVE TEST AND HIV RISK EXPOSURE, 1994–2003



Other: blood tissue recipient, haemophilia/ coagulation disorder, vertical (mother-to-child transmission)

Source: NSW HIV / AIDS database 2003

CONCLUSION

This review used surveillance data from the NSW HIV/AIDS Database to describe newly diagnosed HIV infections in NSW and reported risk exposures for the period 1994 to 2003. The analysis supports previous epidemiological evidence from NSW and Australia about patterns of HIV infection and highlights the finding that male-to-male sexual contact was the most frequently reported category of primary exposure.⁷ The review provides a longitudinal picture of HIV infection in NSW and supportive evidence of the success of public health initiatives to reduce HIV infection transmission over the past decade. The recent increase in notifications, however, emphasises the need for continued public health action targeting groups who are at risk.

REFERENCES

1. Chin J (editor). *Control of communicable diseases manual*. 17th edition. Washington, DC: American Public Health Association, 2000.
2. UNAIDS. *2004 report on the global Aids epidemic*, Geneva: Joint United Nations Programme on HIV/AIDS, June 2004.
3. National Centre in HIV Epidemiology and Clinical Research. *2004 annual surveillance report. HIV/AIDS, viral hepatitis and sexually transmissible infections in Australia*. Sydney, Australia: University of New South Wales, 2004.
4. Communicable Diseases Branch, NSW Health. HIV and AIDS protocol for NSW Public Health Units. At www.health.nsw.gov.au/living/aidshiv.pdf, accessed February 2006.
5. Joint United Nations Programme on HIV/AIDS (UNAIDS). At www.unaids.org, accessed February 2006.
6. Griggs E. 'Rules for Risk Exposure Assignment'. Unpublished paper. Population Health Division, NSW Health Department, 2005.
7. National Centre in HIV Epidemiology and Clinical Research. *Australian HIV surveillance report*, Vol 20, No 1, January 2004. Sydney, Australia: University of New South Wales, 2004.
8. National Centre in HIV Social Research. *HIV/AIDS, hepatitis C and related diseases in Australia. Annual report of behaviour, 2003*. Sydney, NSW: National Centre in HIV Social Research, 2003.
9. National Centre in HIV Social Research. *HIV/AIDS, hepatitis C and related diseases in Australia. Annual report of behaviour, 2002*. Sydney, NSW: National Centre in HIV Social Research, 2002.
10. National Centre in HIV Social Research. *HIV/AIDS, HIV/AIDS, hepatitis C and related diseases in Australia. Annual report of behaviour, 2001*. Sydney, NSW: National Centre in HIV Social Research, 2001.
11. National Centre in HIV Social Research. *HIV/AIDS and related diseases in Australia. Annual report of behaviour, 1999*. Sydney, NSW: National Centre in HIV Social Research, 1999.
12. Correll PK, Law MG, McDonald AM, Cooper D, Kaldor J. HIV disease progression in the time of combination antiretroviral therapies. *Med J Aust* 1998; 169: 469–72.
13. McAnulty J, Delpech V, Habib M. Notifiable sexually transmissible diseases NSW 1991–1999. *N S W Pub Health Bull* 2001; 12 (1) 16–18.
14. National Centre in HIV Social Research. *HIV/AIDS, hepatitis C and related diseases in Australia. Annual report of behaviour, 2004*. Sydney: National Centre in HIV Social Research, 2004.
15. National Centre in HIV Social Research. *Annual Report 2003*. Sydney, NSW: National Centre in HIV Social Research, 2004. ☒