Fulfilling prophecy? Sexually transmitted infections and HIV in Indigenous people in Western Australia

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ABSTRACT

Objective: To compare trends and rates of HIV and sexually transmitted infections in Indigenous and non-Indigenous people of Western Australia.

Design and setting: Analysis of WA notification data for chlamydia, gonorrhoea, and primary and secondary syphilis in 2002, and for HIV infections from 1983 to 2002.

Main outcome measures: Rates of HIV and sexually transmitted infection by Indigenous status.

Results: In 2002, there were 3046 notifications for chlamydia, 1380 for gonorrhoea and 64 for syphilis. When information on Indigenous status was available, Indigenous people accounted for 41% of chlamydia and 76% of gonorrhoea notifications, with Indigenous : non-Indigenous age-standardised rate ratios of 16 (95% CI, 14–17) and 77 (95% CI, 67–88), respectively. Indigenous people accounted for 90.6% of syphilis notifications (age-standardised Indigenous : non-Indigenous rate ratio, 242 [95% CI, 104–561]). From 1985 to 2002, HIV notification rates for non-Indigenous people in WA declined and rates for Indigenous people increased. From 1994 to 2002, there were 421 notifications of HIV infection in WA residents, 52 (12.4%) in Indigenous people and 369 (87.6%) in non-Indigenous people. Indigenous people accounted for 39% and 6.2% of all notifications in WA females and males, respectively. The Indigenous : non-Indigenous rate ratios were 18 (95% CI, 12–29) for females and 2 (95% CI, 1–3) for males.

Conclusions: Indigenous Western Australians are at greater risk of HIV transmission than non-Indigenous people. Strategies to prevent further HIV infection in Indigenous Australians should include control of sexually transmitted infections.

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Controversy often accompanies prophecy. In 1992, when Fred Hollows drew attention to the potential for an epidemic of HIV infection in the Indigenous community, he confronted the nation.[1] To date, HIV infection in Australia has primarily affected men who have sex with men.[2] However, there is renewed concern about the potential for an HIV epidemic of a different type — affecting Indigenous Australians — in Western Australia.[3]

We report an analysis of WA notification data for HIV and other sexually transmitted infections (STIs), examining infection rates by Indigenous status. STIs have many sequelae, and biological and epidemiological evidence links STIs with HIV:[4] ulcerative and non-ulcerative STIs both increase the risk of HIV by about 3–5-fold.[5] Indigenous Australians in WA have high rates of both types of STIs. STIs also increase shedding of HIV, further increasing the risk of transmission and the risk of an HIV epidemic occurring in the wider population.[6]

In 2005 we ask: has Australia escaped the epidemic that Professor Hollows feared?

METHODS

Under the *Health Act 1911* (WA) and subsequent regulations, all the diseases described in this article are notifiable to the WA Department of Health. Gonorrhoea, genital chlamydia and infectious syphilis (primary and secondary) are initially reported to regional Population Health Units, and aggregated data are stored in the Western Australian Notifiable Infectious Diseases Database (WANIDD). Clinicians are prompted to report the Indigenous status of patients (ie, whether an Australian Aboriginal or Torres Strait Islander), but notifications from laboratories lack this information. HIV is notified to the Communicable Disease Control Directorate, and data are maintained in a specific HIV/AIDS database. HIV exposure categories are reported by the notifying doctors using a nationally agreed hierarchical classification.

We extracted de-identified STI (genital chlamydia, gonorrhoea and primary and secondary syphilis) and HIV notification data from the WANIDD and HIV databases, and analysed these data using the Statistical Package for the Social Sciences (SPSS) version 11 (SPSS Inc, Chicago, Ill, USA). Detailed descriptive analysis of demographic variables was undertaken for STIs notified in 2002, and for initial diagnoses of HIV notified in WA residents from 1994 to 2002. National HIV notification data reported by the National Centre in HIV Epidemiology and Clinical Research were compared with the WA data.[2]

Crude, age-specific and age-standardised rates were calculated with the Rates Calculator version 9.1 (WA Department of Health, Perth), which uses population data derived from the Australian Bureau of Statistics census data. Age-standardised rates for each disease were calculated using the direct method, taking the Australian 2001 population as the standard.[7] Population data for 2002 were used for calculating rates of STIs in 2002, and population data for 1994–2002 were used for calculating average annual age-standardised HIV notification rates over this period. Rate ratios and associ-

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ated confidence intervals for Indigenous versus non-Indigenous populations were calculated according to the method described by Greenland and Rothman.[7] Period trends for HIV rates were modelled using Poisson regression.

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RESULTS

Sexually transmitted infections

Chlamydia and gonorrhoea

Of 3046 chlamydia notifications, Indigenous status was available for 1582 (51.9%), and Indigenous people accounted for 40.8% of these notifications, with an overall male : female (M : F) ratio of 0.55 for Indigenous people and 0.74 for non-Indigenous people (Box 1). For the 48.1% of notifications where Indigenous status was missing, the M : F ratio was 0.75, suggesting many of the cases with missing Indigenous status were in non-Indigenous people. The overall Indigenous : non-Indigenous age-standardised rate ratio for chlamydia was 16; however, if the missing data were for the most part non-Indigenous, the rate ratio would be around 5.

Of 1148 notifications for gonorrhoea in 2002 where Indigenous status was known, Indigenous people accounted for 76.0%, with an Indigenous : non-Indigenous age-standardised rate ratio of 77 (Box 1). The M : F ratio was 1.0 for Indigenous cases, and 2.2 for non-Indigenous cases. It was 0.9 for the 16.8% of cases with missing Indigenous status, suggesting many of these infections were in Indigenous people.

Notification rates, by age group, for both chlamydia and gonorrhoea were much higher in Indigenous people than in non-Indigenous people (Box 2). For both Indigenous and non-Indigenous people, those aged 15–24 years had the highest notification rates. The Indigenous : non-Indigenous rate ratio was particularly high in the 10–14 years age group.

Syphilis

There were 64 notifications for primary and secondary syphilis in 2002: 91% in Indigenous people and 9% in non-Indigenous people (Box 1). There were no notifications in non-Indigenous females; among Indigenous people the M : F rate ratio was 0.91. The Indigenous : non-Indigenous age-standardised rate ratio was 242. Infectious syphilis in Indigenous people occurred in all age groups.

1 Notifications for chlamydia, gonorrhoea and syphilis (primary and secondary) by Indigenous status and sex, Western Australia, 2002

	Indigenous	Non-Indigenous	Missing	Total	Rate ratio (95% CI)
Chlamydia					
Total	646 (21.2%)	936 (30.7%)	1464 (48.1%)	3046	
Age-standardised rate	795.5	50.5			16 (14–17)
M:F ratio	0.55	0.74	0.75	0.70	
Males	229 (18.3%)	399 (31.8%)	626 (49.9%)	1254	
Age-standardised rate	581.7	42.5			14 (12–16)
Females	417 (23.3%)	537 (30.0%)	837 (46.7%)	1791	
Age-standardised rate	1010	59.1			17 (15–19)
Gonorrhoea					
Total	873 (63.3%)	275 (19.9%)	232 (16.8%)	1380	
Age-standardised rate	1140.1	14.8			77 (67–88)
M:F ratio	1.0	2.2	0.9	1.19	
Male	446 (59.7%)	189 (25.3%)	112 (15.0%)	747	
Age-standardised rate	1228.0	20.2			61 (51–72)
Female	427 (67.8%)	85 (13.5%)	118 (18.7%)	630	
Age-standardised rate	1061.3	9.3			114 (90–143)
Infectious syphilis					
Total	58 (91%)	6 (9%)	0	64	
Age-standardised rate	78.4	0.3			242 (104–561)
M:F ratio	0.73	—	—	0.91	
Male	25 (81%)	6 (19%)	0	31	
Age-standardised rate	75.1	0.6			117 (48–286)
Female	33 (100%)	0	0	33	
Age-standardised rate	79.2	0.0	—		Undefined (170–∞)

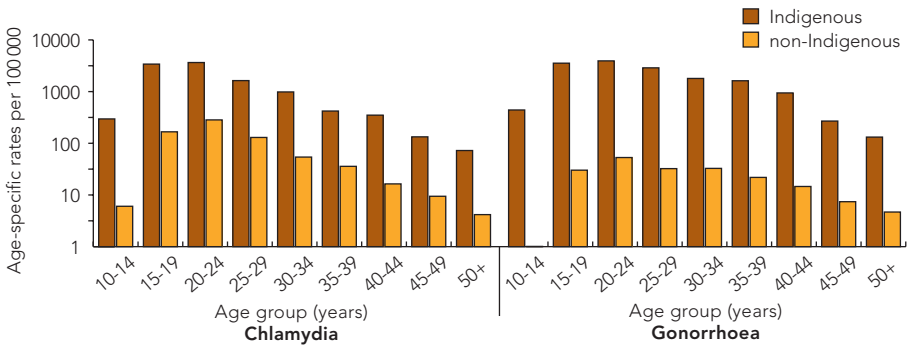
Total includes cases with unknown sex status. Rate ratio = Indigenous : non-Indigenous rate ratio. Age-standardised rates are per 100 000 population. For syphilis, where there were zero female non-Indigenous cases, 95% confidence intervals were calculated for the risk in the Indigenous and non-Indigenous groups (assuming an underlying Poisson distribution) and these were used to get a lower bound on the risk ratio. This estimate would be conservative, but illustrates that the risk ratio is very different from 1. ◆

HIV

From 1994 to 2002, there were 421 HIV notifications in WA residents: 52 (12.4%) in Indigenous people and 369 (87.6%) in non-Indigenous people (Box 3). Average annualised age-standardised rates in Indigenous women were much higher than in non-Indigenous women, with a rate ratio of 18.

Notifications of HIV in non-Indigenous people in WA peaked in the mid-1980s and have since been declining (Box 4). The same cannot be said for Indigenous people. Initially, there were few and sporadic notifications of HIV in Indigenous people, with only eight occurring before 1994. Since 1994, notifications in Indigenous people in WA have occurred in higher numbers; the Indigenous HIV crude notification rate has fluctuated considerably, with peaks in 1998 and 2002. Contact tracing did not identify

2 Age-specific notification rates for genital chlamydia and gonorrhoea, Western Australia, 2002

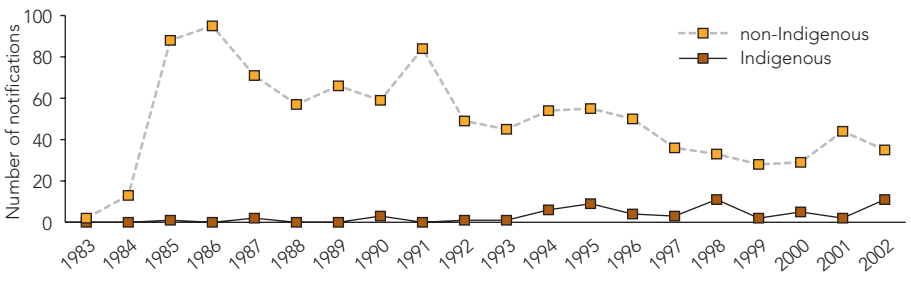


3 HIV notifications by Indigenous status and sex, Western Australia, 1994–2002

	Indigenous	Non-Indigenous	Total	Rate ratio (95% CI)
Total	52 (12.4%)	369* (87.6%)	421	
Male : female ratio	0.68	6.47	4.23	
Age-standardised rate	9.7	2.3		4 (3–6)
Male	21 (6.2%)	317 (93.8%)	338	
Age-standardised rate	8.0	3.9		2 (1–3)
Female	31 (38.8%)	49 (61.2%)	80	
Age-standardised rate	11.4	0.6		18 (12–29)

Total includes cases with unknown sex status. Rate ratio = Indigenous : non-Indigenous rate ratio. Age-standardised rates are per 100 000 population. * Three transsexual non-Indigenous people are included in the total. ◆

4 HIV notifications by Indigenous status, Western Australia, 1983–2002



a source of infection for all the 11 HIV infections diagnosed in 2002, suggesting that further unidentified infections may exist.

Non-Indigenous notifications have trended slowly downwards in WA, with some increase since 2001 (Box 4). For 1994 to 2002, although the rates in non-Indigenous people in WA were lower than the national rate, the rates in Indigenous Western Australians exceeded those in Indigenous people nationally. One-third of Indigenous HIV infections notified nationally over this period were from WA.[2]

Box 5 shows notifications by exposure category, highlighting differences in the epidemiology of HIV between Indigenous and non-Indigenous Western Australians. Men who have sex with men (MSM) account for nearly three-quarters of all non-Indigenous notifications since 1983, while heterosexual transmission accounts for 16%. In contrast, 68% of infections in Indigenous people since 1983 were attributed to heterosexual exposure and 20% to MSM with or without injection drug use (IDU). IDU was the source of infection for 8% of notifications in Indigenous people and 5.1% for non-Indigenous people.

Box 6 shows some similarity as well as marked differences in the age and sex distribution of HIV infection in Indigenous and non-Indigenous populations for 1994–2002. For example, the modal age group for diagnosis and notification for both Indigenous and non-Indigenous men and women was 30–39 years. However, Indigenous men aged 30–39 years had more than four times the rate of non-Indigenous men in this age group (38 per 100 000 compared with 8 per 100 000). There were several notifications of HIV in Indigenous females aged 16–19 years (and none in Indigenous males of this age). Notifications in children younger than 10 years resulted from vertical transmission.

DISCUSSION

Since 1994, notification rates for HIV infection in Indigenous people have been higher than in non-Indigenous people.

Between 1994 and 2002, more than half of all Indigenous HIV infections were in women and most were heterosexually acquired. Indigenous females were 18 times more likely to be infected than non-Indigenous females, and three times more likely than non-Indigenous males. Indigenous males were twice as likely as non-Indigenous males to be infected with HIV. We also found that the proportion of infections occurring in people who inject drugs is higher in Indigenous people.

Our findings relied upon surveillance data that have some limitations in completeness and accuracy. Since 2000, voluntary laboratory reporting of notifiable diseases has increased the numbers of STIs reported, improving completeness in reporting of diagnosed cases, but increasing the proportion of notifications for which Indigenous status is missing. This makes calculation of rates and comparisons between subgroups problematic; however, the patterns of rates are reasonably consistent over time. For example, although information on Indigenous status was missing for 48% of chlamydia notifications in 2002, the Indigenous : non-Indigenous rate ratio was almost identical to that in 2000, when Indigenous status was missing for 27% of notifications.

HIV surveillance has been essentially unchanged since 1994, with all cases followed up to complete demographic information. Some misclassification of exposure is possible, but the high proportion of female Indigenous infections supports heterosexual transmission. Although there has

5 Number (%) of notified HIV infections by exposure category and Indigenous status, Western Australia, 1983–2002

Exposure category	Indigenous			Non-Indigenous			Total
	Male (*n* = 28)	Female (*n* = 32)	Total (*n* = 60)	Male (*n* = 917)	Female (*n* = 85)	Total (*n* = 1002)	(*n* = 1062)
MSM	6 (21%)	0	6 (10%)	682 (74.3%)	0	682 (68.1%)	688 (64.8%)
MSM/IDU	6 (21%)	0	6 (10%)	55 (6.0%)	0	55 (5.5%)	61 (5.7%)
IDU	3 (11%)	2 (6%)	5 (8%)	37 (4.0%)	14 (16%)	51 (5.1%)	56 (5.3%)
Heterosexual	11 (39%)	30 (94%)	41 (68%)	95 (10.4%)	63 (74%)	158 (15.8%)	199 (18.7%)
Vertical	1 (4%)	0	1 (2%)	3 (0.3%)	1 (1%)	4 (0.4%)	5 (0.5%)
Unknown/ other	1 (4%)	0	1 (2%)	17 (1.9%)	3 (4%)	20 (2.0%)	21 (2.0%)
Blood-recipient	0	0	0	28 (3.1%)	4 (5%)	32 (3.2%)	32 (3.0%)

IDU = injection drug use. MSM = men who have sex with men. ◆

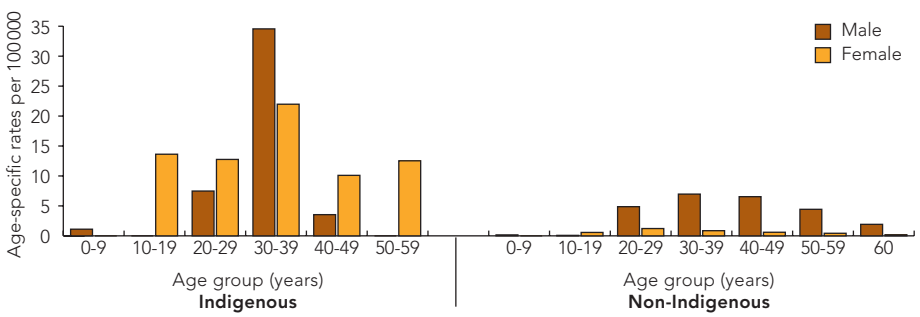
been an increase in propensity to identify as Indigenous in Census collections,[8] the increase in HIV notification rates in Indigenous people appears to be real, with those infected unambiguously connected with the Indigenous community.

Previous analyses of national HIV surveillance data by Indigenous status have been limited. A report that compared HIV/AIDS by Indigenous status for 1992–1998 concluded that HIV incidence was similar in Indigenous and non-Indigenous people for that period.[9] However, some differences existed: Indigenous Australians did not show the decline in HIV that occurred among non-Indigenous Australians; homosexual exposure, although the single predominant source of exposure, was lower for Indigenous (46%) than non-Indigenous cases (75%); and there was more heterosexual transmission and a greater proportion of women with HIV among Indigenous people. Subsequently, a report in 2004 stated that the per capita rate of HIV and AIDS diagnosis among Indigenous people was similar to that among non-Indigenous people.[2] Notwithstanding the limitations of our study, we are concerned that our analysis foreshadows a potentially more ominous situation in WA than previously acknowledged.

We believe there are similarities between the epidemiology of HIV infection in Indigenous Australians in WA and that observed in sub-Saharan Africa. Heterosexual intercourse is the main route for HIV transmission, and women have greater vulnerability for acquiring HIV.[10] There is a strong relationship between poverty and HIV, with young people living in poverty highly vulnerable to infection.[11] Poverty and marginalisation affect many of the HIV-infected Indigenous people in WA, with health providers reporting that many people diagnosed with HIV in recent years have been homeless, unemployed, and had other chronic health issues, including mental illness and alcohol dependency.[12]

We report that surveillance data identified that 18% of Indigenous people in WA infected with HIV reported a history of IDU.

6 Average annualised age-specific rates for HIV notifications by Indigenous status and sex, WA, 1994-2002



Globally, IDU is a major risk factor for HIV transmission. The low prevalence of HIV among people who inject drugs in Australia (< 3%)[13] is attributed primarily to harm reduction measures. However, there are indications of increasing IDU among Indigenous people living in WA. For example, towards the end of the twentieth century the prevalence of IDU among Aboriginal people aged over 15 years residing in urban and some major regional areas was estimated, conservatively, to be between 4.5% and 6%.[14] There was also evidence among this group of an inadequate understanding of blood-borne viruses, and more risky behaviour for their transmission.[14] It seems that the potential for "explosive" epidemics of HIV to occur among subpopulations such as injection drug users, with the potential for secondary transmission to sexual partners, warrants particular concern for Indigenous Australians.[15]

Insight into the history of STI control measures in Indigenous people and the relationship of STIs to other health issues has been documented elsewhere, but may be poorly appreciated by health service providers.[16] The risk of HIV infection should not be the sole consideration catalysing action, as there are many sequelae of STIs for women of child-bearing age. We believe our report warrants a reinvigoration of primary prevention efforts. Australia has appropriately adopted national strategies that promote STI control as a foundation for HIV control.[17,18] International studies have shown that assertive intervention to reduce the prevalence of STIs in an affected population can decrease the incidence of HIV infection.[19] The Mwanza randomised controlled trial showed that improved STI treatment services integrated into an existing health system reduced HIV transmission. Intervention was more effective where STI prevalence was high but HIV prevalence was low to medium.[19] We believe this is similar to the current circumstances of Indigenous Western Australians — and more vigorous and effective efforts are needed to control STIs.

Access for Indigenous Australians to quality primary care is essential.[20] Periodic mass screening to reduce hyperendemic STIs in remote Aboriginal communities has shown some success, and since 1995 there have been major reductions in the prevalence of ulcerative and non-ulcerative STIs.[20,21] Confidential STI testing and condom availability, access to male and female health workers, systematic population-based screening, and community-wide strategies such as education, improved access to diagnosis and treat-

ment, and incentives for individuals to change behaviour are all important in STI control.[21]

However, STIs and HIV can be relatively invisible because of concerns about shame, stigma and confidentiality — particularly salient issues for people in small communities.[12,22] Getting the prevention and treatment of STIs high on the agenda for both service providers and Indigenous people has been difficult, given the many health, socioeconomic, environmental, legal and political factors that affect the lives of Indigenous people. Further compounding the difficulties, we believe that in WA information on STI rates has not been readily available in ways easily understood, or accessed, by Indigenous people, thus precluding their effective engagement.

It is imperative that STIs are acknowledged as a health priority across all health services and that effective partnerships for action are developed with Indigenous community members involved in designing, promoting and implementing STI and HIV prevention and treatment programs.[9,23] WA is still well-positioned to prevent an HIV epidemic occurring among its Indigenous population, but the clock is ticking.

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COMPETING INTERESTS

None identified.

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