

Rates of new HIV diagnoses among Indigenous peoples in Canada, Australia, New Zealand, and the United States: 2009–2017

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Objective: To compare rates and trends of HIV diagnoses among Indigenous peoples in Canada (First Nations, Métis, Inuit, and other non-specified), Australia (Aboriginal and Torres Strait Islanders), the USA (American Indian, Alaska Native, Native Hawaiian, and Other Pacific Islanders), and New Zealand (Māori).

Design: We employed publicly available surveillance data from 2009 to 2017 to estimate the rate per 100 000 of HIV diagnoses. Estimated annual percentage change (EAPC) in diagnosis rates was calculated using Poisson regression.

Setting: The four countries have passive population-based HIV surveillance programs.

Participants: Population estimates from respective census programs were used as rate denominators.

Main outcome measures: Estimated annual HIV diagnosis rate per 100 000 and EAPC were calculated for total Indigenous peoples, women, and men.

Results: As of 2017, rates of HIV were highest in Canada (16.22, 95% confidence interval (CI): 14.30–18.33) and lowest in New Zealand (1.36, 95% CI: 0.65–2.50). Australia had a rate of 3.81 (95% CI: 2.59–5.40) and the USA 3.22 (95% CI: 2.85–3.63). HIV diagnosis rates among the total Indigenous population decreased in Canada (–7.92 EAPC, 95% CI: –9.34 to –6.49) and in the USA (–4.25 EAPC, 95% CI: –5.75 to –2.73) but increased in Australia (5.10 EAPC, 95% CI: 0.39–10.08). No significant trends over time were observed in New Zealand (2.23 EAPC, 95% CI: –4.48 to 9.47).

Conclusion: Despite limitations to conducting cross-national comparisons, there are substantial differences in HIV diagnosis rates in these four countries that may be reflective of divergent national policies and systems that affect the health status of Indigenous peoples.

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Introduction

Indigenous peoples of Canada, Australia, New Zealand, and the USA are highly diverse, yet share similar relationships with land, community, and understandings of wellness. *Nekultimuk* [Mi'kmaq (Canada): *Nekultimuk* means 'I know', referring to collective knowledge that comes from ancestors]; *ehara taku toa i te takitahi, he toa takitini kē* (Māori (New Zealand): *Ehara taku toa i te takitahi, he toa takitini kē* translates to strength that is not in being alone, rather strength as many' [1]; or *kanyini* [Pitjantjatjara (Australia): *Kanyini* refers to the connectedness of *tjukurrpa* (knowledge of creation or Dreaming), *ngura* (place), *walytja* ('kinship') and *kurunpa* ('spirit') [2]) are examples of concepts used by different nations to describe the strength Indigenous peoples draw from knowledge that spans generations. These regions are connected through colonial policies of genocide employed to eradicate or assimilate Indigenous populations and cultures, including forced displacement from land, prohibition of ceremonies, residential, and day school systems in Canada and the USA, and Stolen Generations in Australia [3]. Enduring colonialism creates far-reaching sociostructural inequities for Indigenous peoples [4,5], including disproportionate impacts from health challenges like HIV [6].

Despite similar colonial experiences, few cross-national comparisons assessing HIV diagnoses among Indigenous peoples have been conducted. The studies that exist focus on differences between Indigenous and non-Indigenous peoples [6,7] and attribute elevated rates of HIV among Indigenous peoples to intergenerational trauma [4] and lack of culturally safer healthcare services [6]. Further, it is thought that increased rates of HIV testing occur because of perceptions that Indigenous peoples are 'at-risk' [4]. Although such comparisons between Indigenous and non-Indigenous populations in a region are useful in some contexts, measuring the health of Indigenous peoples using non-Indigenous populations as a benchmark perpetuates the othering of Indigenous people, a definition of health that centers whiteness, and the narrative that Indigenous people suffer a health deficit in settler states. One alternative to this comparison is to examine divergences between Indigenous peoples at the international level. Such divergences may indicate progress towards equity, reconciliation (reconciliation in this context is used broadly to describe different national efforts to take responsibility for enduring colonialism and make reparations for the harms perpetrated against Indigenous peoples) and HIV destigmatization within healthcare systems [8,9], and could

inform policy direction and development within nations. We compared rates and trends of HIV diagnoses among Indigenous peoples in Canada, Australia, New Zealand, and the USA between 2009 and 2017 using publicly available HIV surveillance data.

Methods

Data sources

Details of data sources employed in this descriptive study can be found in Table S1, <http://links.lww.com/QAD/C192>. Indigenous peoples in this analysis include First Nations, Inuit, Métis, and Other Indigenous Nonspecified (Canada); Aboriginal and Torres Strait Islanders (Australia); American Indian, Alaska Native, Native Hawaiian, and Other Pacific Islanders (USA); and Māori (New Zealand). All countries had mandatory HIV reporting over the study period except New Zealand, which only had mandatory reporting since January 2017. Information on Indigenous identity is collected through HIV notification forms. In Canada, the provinces of British Columbia and Quebec do not report ethnicity to the national surveillance body; we have supplemented our data with provincial-level British Columbia reports, and excluded Quebec, which constitutes 11% of Indigenous peoples in Canada.

National census data was used for population denominators. Canada and Australia have separate questions asking whether a person identifies with their respective Indigenous groups, whereas the USA and New Zealand include standard ethnicity questions (i.e. the Indigenous identifier is in the same list as the other ethnicities, instead of as a separate question). For consistency, we used nonmutually exclusive population counts (i.e. a person could identify as Indigenous in addition to other ethnicities). In Canada, where intercensal estimates are not publicly available, we assumed a linear population increase between census years.

Analysis

We calculated annual estimates and 95% confidence intervals (CI) of rates per 100 000 of HIV diagnoses for Indigenous peoples overall and for Indigenous women and men. Estimated annual percentage change (EAPC) between 2009 and 2017 was calculated using Poisson regression with no covariates and logarithms of population denominators as offsets [10]. All analyses were conducted with RStudio, version 1.2.1335 (R Foundation for Statistical Computing, Vienna, Austria).

Results

Table 1 and Fig. 1 show the rate per 100 000 for HIV diagnoses among the total and sex-stratified Indigenous population in each country. As of 2017, rates of HIV were highest in Canada (16.22, 95% CI: 14.30–18.33) and lowest in New Zealand (1.36, 95% CI: 0.65–2.50). Australia had a rate of 3.81 (95% CI: 2.59–5.40) and the USA 3.22 (95% CI: 2.85–3.63).

The EAPC of HIV diagnoses between 2009 and 2017 can be found in Table 1. In Canada, HIV diagnosis rates decreased among Indigenous peoples (–7.92 EAPC, 95% CI: –9.34 to –6.49), men (–7.62 EAPC, 95% CI: –9.51 to –5.69), and women (–8.33 EAPC, 95% CI: –10.45 to –6.17). In Australia, rates increased among Indigenous peoples (5.10 EAPC, 95% CI: 0.39–10.08) and men (5.91 EAPC, 95% CI: 0.67–11.50) but did not change significantly among women. In the USA, rates decreased among Indigenous peoples (–4.25 EAPC, 95% CI: –5.75 to –2.73), men (–3.75 EAPC, 95% CI: –5.45 to –2.02) and women (–6.32 EAPC, 95% CI: –9.48 to –3.05). In New Zealand, no significant trends over time were observed.

Discussion

Our study revealed elevated but decreasing rates of HIV diagnoses among Indigenous peoples in Canada compared to the USA, Australia, and New Zealand. Past research shows how reconciliation efforts impact the health of Indigenous peoples [1,8], and Canada's trailing progress may indicate challenges implementing the Truth and Reconciliation Commission (TRC) Calls to Action to redress harms done by Canada's Indian Residential School system [11]. Despite the relatively elevated rates among Indigenous people in Canada, our analysis found a conservative estimate compared with past studies [6,7]. We included individuals who self-report their status rather than limiting the population estimate to those who are considered 'Indians' by Registered/Treaty status within the *Indian Act* (1876) [12], in order to include those who are legally restricted from acquiring government status and align closer to self-reporting standards in other countries. Our analysis also estimated conservative USA diagnosis rates compared with what is reported by the USA CDC [10] as we included those who reported American Indian/Alaska Native or Native Hawaiian/Other Pacific Islander alone or in combination, regardless of Hispanic origin. Similarly, this population estimate was chosen to improve comparability to countries where individuals can report Indigenous ethnicity in addition to other ethnic backgrounds.

Consistent with recent studies, our analysis revealed an increasing rate of HIV diagnoses among the total Indigenous population and Indigenous men in Australia

Table 1. HIV case rate per 100 000 and estimated annual percentage change among Indigenous peoples in Canada, Australia, USA, and New Zealand (2009–2017).

	2009	2010	2011	2012	2013	2014	2015	2016	2017	EAPC (95% CI)
Canada^{a,b}										
Total CI	30.06 (27.01–33.35)	24.84 (22.12–27.80)	25.98 (23.24–28.95)	19.23 (16.93–21.76)	16.94 (14.82–19.29)	14.81 (12.86–16.97)	15.44 (13.48–17.60)	17.71 (15.64–19.98)	16.22 (14.30–18.33)	–7.92 ^d (–9.34 to –6.49)
Men CI	34.46 (29.82–39.61)	26.97 (22.95–31.48)	30.07 (25.88–34.74)	23.03 (19.45–27.08)	20.28 (16.98–24.03)	16.67 (13.74–20.04)	17.44 (14.48–20.82)	19.12 (16.07–22.59)	19.95 (16.94–23.34)	–7.62 ^d (–9.51 to –5.69)
Women CI	25.89 (22.00–30.27)	22.82 (19.23–26.88)	22.11 (18.63–26.04)	15.64 (12.79–18.94)	13.80 (11.18–16.85)	13.05 (10.55–15.97)	13.56 (11.05–16.48)	16.38 (13.64–19.50)	12.59 (10.26–15.30)	–8.33 ^d (–10.45 to –6.17)
Australia^a										
Total CI	3.49 (2.23–5.19)	3.12 (1.96–4.73)	3.33 (2.14–4.96)	4.48 (3.09–6.30)	3.46 (2.26–5.07)	4.30 (2.96–6.04)	4.98 (3.54–6.81)	5.76 (4.22–7.69)	3.81 (2.59–5.40)	5.10 ^d (0.39–10.08)
Men CI	6.12 (3.79–9.36)	4.27 (2.39–7.05)	5.02 (2.97–7.93)	7.36 (4.85–10.71)	5.87 (3.68–8.89)	6.54 (4.23–9.65)	8.96 (6.24–12.47)	10.29 (7.38–13.96)	5.65 (3.58–8.48)	5.91 ^d (0.67–11.50)
Women CI	0.87 (0.18–2.54)	1.98 (0.80–4.08)	1.66 (0.61–3.61)	1.63 (0.60–3.54)	1.06 (0.29–2.72)	1.82 (0.73–3.75)	1.02 (0.28–2.61)	1.00 (0.27–2.56)	1.72 (0.69–3.54)	0.81 (–11.13 to 10.76)
USA^{a,c}										
Total CI	5.36 (4.68–6.12)	4.18 (3.71–4.69)	3.80 (3.37–4.26)	3.96 (3.53–4.43)	3.62 (3.21–4.07)	3.50 (3.10–3.93)	3.54 (3.15–3.98)	3.53 (3.14–3.96)	3.22 (2.85–3.63)	–4.25 ^d (–5.75 to –2.73)
Men CI	7.88 (6.72–9.19)	6.45 (5.63–7.36)	6.07 (5.31–6.90)	6.47 (5.69–7.32)	5.63 (4.91–6.42)	5.49 (4.79–6.27)	5.50 (4.80–6.27)	5.77 (5.06–6.55)	5.06 (4.40–5.79)	–3.75 ^d (–5.45 to –2.02)
Women CI	2.82 (2.15–3.64)	1.93 (1.50–2.45)	1.54 (1.17–1.99)	1.44 (1.09–1.87)	1.62 (1.25–2.07)	1.42 (1.08–1.84)	1.55 (1.19–1.98)	1.31 (0.98–1.71)	1.36 (1.03–1.76)	–6.32 ^d (–9.48 to –3.05)
New Zealand^d										
Total CI	1.83 (0.95–3.20)	2.25 (1.26–3.72)	1.63 (0.81–2.91)	1.17 (0.50–2.30)	1.44 (0.69–2.66)	3.28 (2.08–4.92)	2.53 (1.50–3.99)	2.49 (1.47–3.93)	1.36 (0.65–2.50)	2.23 (–4.48 to 9.47)
Men CI	2.81 (1.29–5.34)	4.61 (2.58–7.61)	3.03 (1.46–5.58)	1.50 (0.49–3.50)	2.37 (1.02–4.68)	6.15 (3.80–9.39)	4.61 (2.63–7.48)	4.82 (2.81–7.71)	2.23 (0.96–4.40)	2.79 (–4.42 to 10.61)
Women CI	0.90 (0.18–2.62)	0.00 (0.00–1.08)	0.29 (0.01–1.61)	0.85 (0.18–2.50)	0.56 (0.07–2.03)	0.56 (0.07–2.01)	0.55 (0.07–1.98)	0.27 (0.01–1.50)	0.53 (0.06–1.92)	–1.40 (–18.63 to 19.49)

^aGroups included in this analysis: First Nations, Inuit, Métis, and Other Indigenous Nonspecified (Canada); Aboriginal and Torres Strait Islanders (Australia); American Indian, Alaska Native, Native Hawaiian and Other Pacific Islanders (USA); and Māori (New Zealand).

^bCanada HIV cases and population denominators exclude Quebec as they do not report data on Indigenous status.

^cUSA cases and population denominators exclude California, Delaware, Hawaii, Maryland, Massachusetts, Montana, Oregon, Rhode Island, Vermont, and Washington for 2009 and Hawaii, Maryland, Massachusetts, and Vermont for 2010. CDC reporting is absent for these states as they did not have mature mandatory reporting systems in place at the time of the annual surveillance report.

^dStatistically significant at 5% alpha level – confidence interval does not cross zero.

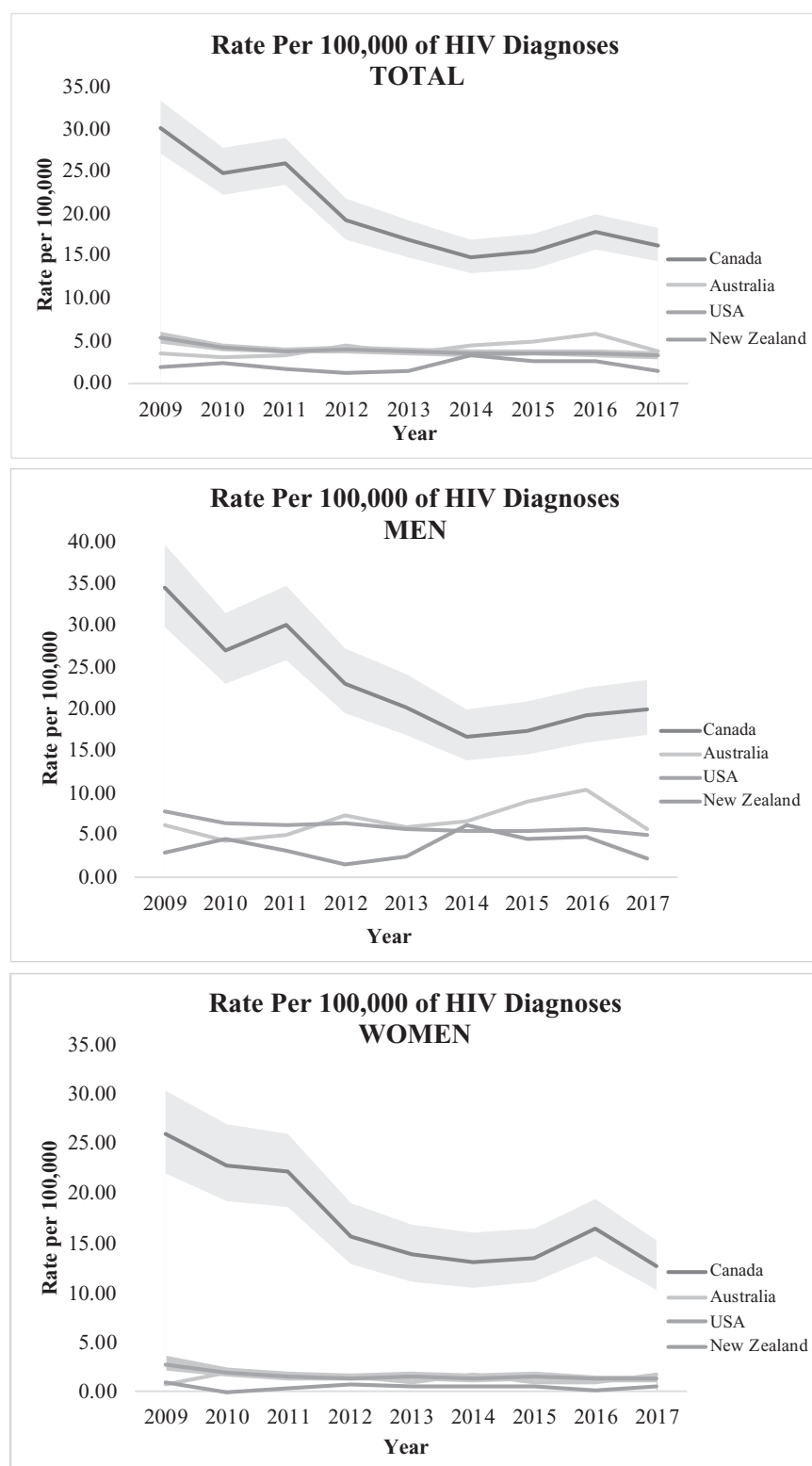


Fig. 1. HIV case rate per 100 000 (95% confidence interval) among Indigenous peoples, men and women in Canada, Australia, USA, and New Zealand (2009–2017)^{a,b}. ^aGroups included in this analysis: First Nations, Inuit, Metis, and Other Indigenous Nonspecified (Canada, excludes Quebec); Aboriginal and Torres Strait Islanders (Australia); American Indian, Alaska Native, Native Hawaiian, and Other Pacific Islanders (USA); Māori (New Zealand). ^bValues can be found in Table 1.

[13]. A 2018 commentary on Australian national surveillance trends attributed this increase to sociocultural determinants of health, poorer outcomes in all aspects of the HIV diagnosis and treatment cascade and both lower and later uptake of preexposure prophylaxis, and elevated heterosexual rates of transmission [13]. In the USA, associations between racial/sexual discrimination and unprotected sex, and between-community participation and protected sex have been demonstrated among American Indian/Alaska Native MSM [14]. Further research is needed to determine driving factors of differential trends in HIV diagnoses worldwide. Associations between racial/sexual discrimination and unprotected sex and between-community participation and protected sex have been demonstrated among American Indian/Alaska Native MSM in the USA, which may also be relevant in the Australian context [15].

Overall, further research is needed to determine what factors are driving differential trends in HIV diagnoses in these four countries. In conducting this analysis, we found a large amount of incomplete data on HIV among Indigenous peoples in Canada. Indeed, a 2013 review article of HIV and STI surveillance among Indigenous peoples worldwide highlighted the urgent need for more reliable and comprehensive data [14]. We recommend that efforts are made to collect and standardize robust data on Indigenous peoples worldwide. Without such data, changes in the epidemic may occur before Indigenous-led positive action can be taken, and ongoing work of Indigenous communities in preventing HIV may be overlooked at the population-level [9].

Limitations

Our results are impacted by country-level variation in census classifications, HIV surveillance methods, and reporting completeness. For example, in 2017, 50.8% of Canadian HIV data on ethnicity was missing, likely underestimating the rate of HIV diagnoses among Indigenous peoples observed in this study [16]. A 2013 review of HIV and STI surveillance among Indigenous peoples globally highlighted the urgent need for more reliable and comprehensive data worldwide [14]. Additionally, we were unable to calculate age-adjusted rates, as publicly available data on age at diagnosis was limited.

Cross-national comparisons risk overgeneralizing the experiences of Indigenous peoples; however, a strength of this analysis is demonstrating the differential impact of HIV in four countries with similar colonial experiences. We recommend that efforts are made to collect and standardize robust data on Indigenous peoples worldwide. Without such data, changes in the epidemic may occur before Indigenous-led positive action can be taken, and ongoing HIV prevention work of Indigenous communities may be overlooked at the population-level.

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Conflicts of interest

There are no conflicts of interest.

References

1. King M, Smith A, Gracey M. **Indigenous health part 2: the underlying causes of the health gap.** *Lancet* 2009; **374**:76–85.
2. Franks C, Curr B. Keeping company: an inter-cultural conversation. centre for indigenous development education and research. University of Wollongong. 1996
3. Armitage A. *Comparing the policy of aboriginal assimilation.* Australia, Canada, and New Zealand: UBC Press; 1995.
4. Jongbloed K, Pooyak S, Sharma R, Mackie J, Pearce ME, Laliberte N, et al. **Experiences of the HIV cascade of care among Indigenous Peoples: a systematic review.** *AIDS Behav* 2019; **23**:984–1003.
5. Reyhner J, Singh NK. **Cultural genocide in Australia, Canada, New Zealand, and the United States.** *Indig Policy J* 2010; **21**:1–26.
6. Negin J, Aspin C, Gadsden T, Reading C. **HIV among Indigenous peoples: a review of the literature on HIV-related behaviour since the beginning of the epidemic.** *AIDS Behav* 2015; **19**:1720–1734.
7. Shea B, Aspin C, Ward J, Archibald C, Dickson N, McDonald A, et al. **HIV diagnoses in Indigenous peoples: comparison of Australia, Canada and New Zealand.** *Int Health* 2011; **3**:193–198.
8. Archibald L. *Decolonization and healing: Indigenous experiences in the United States, New Zealand, Australia and Greenland.* Ottawa Canada: The Aboriginal Healing Foundation Research Series; 2006.
9. Oliver V, Flicker S, Danforth J, Konsmo E, Wilson C, Jackson R, et al. **‘Women are supposed to be the leaders’: intersections of gender, race and colonisation in HIV prevention with Indigenous young people.** *Cult Health Sex* 2015; **17**:906–919.
10. Johnson AS, Hall HI, Hu X, Lansky A, Holtgrave DR, Mermin J. **Trends in diagnoses of HIV infection in the United States, 2002–2011.** *J Am Med Assoc* 2014; **312**:432–434.
11. Truth and Reconciliation Commission of Canada. Calls to action. 2015.
12. Joseph B. *21 Things you may not know about the Indian Act.* Ottawa, Canada: Indigenous Relations Press; 2018.
13. Ward JS, Hawke K, Guy RJ. **Priorities for preventing a concentrated HIV epidemic among Aboriginal and Torres Strait Islander Australians.** *Med J Aust* 2018; **209**:56.
14. Minichiello V, Rahman S, Hawkes G, Pitts M. **STI epidemiology in the global older population: emerging challenges.** *Perspect Public Health* 2012; **132**:178–181.
15. Town MA, Walters KL, Orellana ER. **Discriminatory distress, HIV risk behavior, and community participation among American Indian/Alaska Native men who have sex with men.** *Ethn Health* 2018 Dec 18;1–13. doi: 10.1080/13557858.2018.1557115. [Online ahead of print].
16. Haddad N, Li J, McGuire M. **HIV in Canada - Surveillance Report, 2017.** *Can Commun Dis Rep* 2018; **44**:324–332.