



THE UNIVERSITY
of ADELAIDE



ORAL HEALTH OF INDIGENOUS AUSTRALIANS AND NEW ZEALANDERS

Colgate Dental Education Programs
Special Topic No. 17

arcpoh.adelaide.edu.au/dperu



INDIGENOUS ORAL HEALTH

ORAL HEALTH STATUS OF INDIGENOUS POPULATIONS IN AUSTRALIA AND NEW ZEALAND: INFORMATION FOR DENTAL PRACTITIONERS

Indigenous people – Who? Where? When?

It has been estimated that over 370 million Indigenous people live across the world in nearly 90 countries.¹ In Australia, people of Aboriginal and/or Torres Strait Islander descent are referred to as Indigenous Australians who represent 3% of the Australian population.² The 2016 census estimated 649,200 Indigenous Australians, an increase of 18% from 2011.² While 49% and 51% of Indigenous Australians were males and females, respectively², nearly one third of the Northern Territory population was Indigenous and 36% of all Indigenous Australians were aged less than 15 years.³ On the contrary, New Zealand, boasting the largest proportion of Indigenous persons among high-income economies³, considers people of Māori ethnicity and/or Māori descent as Indigenous New Zealanders who comprise nearly 15% of the New Zealand population.⁵ According to the same report, there were 598,605 Māori in 2013, an increase of 6% from 2006. While the proportion of male and female Māori were 49% and 51%, respectively, just over one third were aged below 15 years and almost a quarter of all Māori live in the Auckland (top of the North Island) region.⁵ These reports indicate that Indigenous populations in both Australia and New Zealand, as opposed to their non-Indigenous counterparts, are rapidly growing and relatively younger.

This information sheet aims to focus mainly on the oral health status, in particular dental caries and periodontal disease experience of Indigenous Australians and New Zealanders.

Oral health of Indigenous Australians and Māori New Zealanders

Notwithstanding the paucity of studies on oral health of representative samples of Indigenous populations, both at national and local/regional levels, in Australia and New Zealand they all indicate that oral health of Indigenous children and adults is overall poorer on all indicators compared with their non-Indigenous counterparts.⁶⁻¹⁸ For example, the levels of untreated coronal caries among Indigenous child and adult populations, respectively, were 1.7 and 2.3 times greater in Australia, and 2.0 and 1.5 times greater in New Zealand than those among

corresponding non-Indigenous populations⁶⁻⁸. Likewise, adult Indigenous Australians and New Zealanders had 1.4 and 1.5 times higher levels of periodontal pockets (4mm or more) than their non-Indigenous counterparts.^{7,8} Indigenous Australians and New Zealanders were 1.6 and 1.7 times as likely as their non-Indigenous counterparts to report their oral health as fair/poor.^{7,8} A similar pattern was seen in regards to the prevalence of complete tooth loss in adults with the relative differences between Indigenous and non-Indigenous populations in Australia and New Zealand with regard to complete tooth loss being 1.2-fold and 1.1-fold, respectively.^{7,8} Moreover, the emerging evidence suggests that the magnitude of oral health inequalities between Indigenous and non-Indigenous populations in both these countries is increasing.^{4,14-18}

The latest national level data for oral health of child and adult Indigenous populations in Australia are available from National Child Oral Health Study (NCOHS 2012-14)⁶ and National Survey of Adult Oral Health (NSAOH 2004-06)⁷ while those for New Zealand counterparts are available from 2009 New Zealand Oral Health Survey (NZOHS 2009).⁸ Oral health status of Indigenous child and adult populations for each country is discussed separately in this information sheet because of the different time periods as well as age groups involved and also due to some potential methodological variations among the surveys.

Indigenous children

Dental caries is the most prevalent chronic infectious disease in childhood, with gingivitis being an emerging concern. Accordingly, the information on dental caries and gingivitis experience by Indigenous children is discussed below while making comparisons with the corresponding data for non-Indigenous children and/or all children in the same age group where available.

Australia

The information below is based on NCOHS 2012-14, which was a cross-sectional study of 24,664 Australian children aged 5 to 14 years, 5.5% of them were identified as being Indigenous, from 841 participating schools⁶. Employing a multistage stage stratified sampling design and a sophisticated weighting

procedure to minimise potential selection and response variations enabled the NCOHS 2012-14 to produce nationally representative estimates pertaining to oral health of both Indigenous and non-Indigenous child populations in Australia⁶.

Dental caries experience in the primary dentition

The prevalence of dental caries in the primary dentition of Australian children aged 5-10 years in regards to untreated dental decay, missing and filled teeth due to dental caries and total caries experience, as denoted by dmft is presented in Table 1. Indigenous children as opposed to their non-Indigenous counterparts had experienced higher levels of dental caries in relation to all these indicators. For example, the prevalence of untreated dental decay and total caries experience was 1.7 and 1.5 times greater in Indigenous than in non-Indigenous children while the proportions of Indigenous children with at least one tooth missing and filled due to dental caries were 1.8 and 1.4 times greater than those of non-Indigenous children.

Table 1. Dental caries experience in the primary dentition of Australian children aged 5-10 years by Indigenous identity

Indicator	Indigenous (95% CI)	Non-Indigenous (95% CI)
≥ 1 teeth with untreated decay (%)	44.0 (37.6-50.7)	25.9 (24.5-27.4)
≥ 1 teeth missing due to caries (%)	9.7 (7.1-13.0)	5.3 (4.6-5.9)
≥ 1 teeth filled due to caries (%)	36.1 (31.4-41.0)	25.7 (24.3-27.0)
Total caries experience (DMFT ≥1)	60.6 (54.5-66.3)	40.5 (38.9-42.1)

CI= confidence interval DMFT = number of decayed, missing and filled primary teeth

Dental caries experience in the permanent dentition

Table 2 shows the prevalence of dental caries experience in the permanent dentition of Australian Indigenous and non-Indigenous children aged 6-14 years with respect to untreated decay, missing and filled teeth due to caries and total caries experience as denoted by DMFT. Resembling the pattern in primary dentition Indigenous children had experienced higher dental caries levels in their permanent teeth than non-Indigenous children in regards to all these indicators. For example, there was more than a two-fold difference between the proportions of Indigenous children and non-Indigenous children with regard to untreated decay while it was 1.6-fold in respect to total caries experience.

Table 2. Dental caries experience in the permanent dentition of Australian children aged 6-14 years by Indigenous identity

Indicator	Indigenous (95% CI)	Non-Indigenous (95% CI)
≥ 1 teeth with untreated decay (%)	22.9 (18.8-27.7)	10.1 (9.3-11.0)
≥ 1 teeth missing due to caries (%)	1.4 (0.8-2.5)	0.7 (0.6-0.9)
≥ 1 teeth filled due to caries (%)	20.0 (16.9-23.4)	15.4 (14.4-16.3)
Total caries experience (DMFT ≥1)	36.0 (31.8-40.4)	22.7 (21.6-23.9)

CI= confidence interval DMFT = number of decayed, missing and filled permanent teeth

Gingivitis experience of Australian children

The percentage of Indigenous children aged 5-14 years with gingivitis (denoted by gingival index score of 2+) was 34.4% which was 1.6 times greater than that of non-Indigenous children (21%).

New Zealand

Oral health information below is based on the NZOHS 2009, which was a cross-sectional study of 4906 New Zealanders, including 1431 children aged 2-17 years and 3475 adults aged 18+ years, with nearly a quarter identifying as Māori⁸. The dentally examined included 3196 with 987 children and 2209 adults of whom 2048 were also periodontally examined. Using a multi-stage, stratified, probability-proportional-to-size sample design and a complex weighting process ensured the NZOHS to yield nationally representative estimates for oral health among all population groups in New Zealand⁸. The NZOHS 2009 assessed only the dental caries experience in children and hence the national data for gingivitis levels for children are not available. Moreover, the NZOHS 2009 presented both the unadjusted and adjusted data. As such the unadjusted prevalence of dental caries in both primary and permanent dentitions in Māori children in comparison to the overall national data and adjusted data, where available, are discussed below.

Dental caries experience in the primary dentition

The level of dental caries in the primary dentition of Māori versus all New Zealand children aged 2-11 years in regards to untreated dental decay, missing and filled teeth due to dental caries and the total caries experience denoted by dmft is presented in Table 3. Māori children experienced a greater level of dental caries compared with all children in the same age group. For example, the level of untreated decay was 1.6 times higher in Māori children than in all children. After adjusting for age and sex, Māori children had 2 and 1.5 times higher levels of untreated decay and mean dmft, respectively, than non-Māori children.⁸

Table 3. Dental caries experience in the primary dentition of Māori versus all children aged 2-11 years

Indicator	Māori (95% CI)	All (95% CI)
≥ 1 teeth with untreated decay (%)	26.6 (19.9-33.4)	16.6 (12.7-20.5)
≥ 1 teeth missing due to caries (%)	5.7 (3.4-8.9)	3.9 (2.6-5.7)
Mean number of filled teeth (%)	1.4 (1.0-1.7)	1.1 (0.9-1.4)
Mean DMFT	2.1 (1.7-2.5)	1.6 (1.2-1.9)

CI= confidence interval DMFT = number of decayed, missing and filled permanent teeth

Dental caries experience in the permanent dentition

Table 4 shows the experience of dental caries in the permanent dentition by Māori children aged 5-17 years compared with all New Zealand children in the same age group with regards to untreated decay, filled teeth and total caries experience as indicated by DMFT. There were no data available for teeth missing due to caries. It is apparent that the pattern of dental caries in permanent teeth followed that of the primary dentition with Māori children having overall higher levels of dental caries in regards to all the indicators. For example, both the prevalence of untreated decay and the mean DMFT were 1.4-fold higher in Māori compared with those of all children. These ratios increased after adjusting for age and sex with the corresponding figures being 1.7 and 1.8.⁸

Table 4. Dental caries experience in the permanent dentition of Māori versus all children aged 5-17 years

Indicator	Māori (95% CI)	All (95% CI)
≥ 1 teeth with untreated decay (%)	10.5 (6.4-14.6)	7.6 (5.1-10.2)
Mean number of filled teeth (%)	1.5 (1.1-1.9)	1.1 (0.9-1.3)
Mean DMFT	1.7 (1.3-2.2)	1.2 (1.0-1.4)

CI= confidence interval DMFT = number of decayed, missing and filled permanent teeth

Indigenous adults

Oral health information pertaining to Indigenous populations with respect to dental caries and periodontal disease, the two most common oral diseases of adults, are discussed in detail below while making comparisons with the corresponding non-Indigenous and/or overall adult data.

Australia

The national level data for oral health in adult Australians are mainly obtained from the NSAOH 2004-06, which was a cross-sectional study of 14,123 Australians aged 15+ years, of whom 5505 were dentally examined⁷. There were 1.4% of the participants identified as being Indigenous but employing a 3-stage sampling design and a sophisticated weighting procedure made certain that the survey estimates were representative of the underlying Australian population⁷.

Dental caries

The experience of dental caries of Australian adults aged 15+ years by Indigenous identity is shown in Table 5 with respect to four indicators including untreated coronal decay and root decay, filled teeth and the mean DMFT. While a lower proportion of Indigenous adults had filled teeth all other indicators were higher, indicating that Indigenous adults experienced greater levels of dental caries than their non-Indigenous counterparts. This was most obvious in regards to the prevalence of untreated coronal caries where the relative difference was 2.3-fold between Indigenous and non-Indigenous adults.

Table 5. Dental caries experience of Australian adults aged 15+ years by Indigenous identity

Indicator	Indigenous (95% CI)	Non-Indigenous (95% CI)
≥ 1 teeth with untreated coronal decay (%)	57.0 (40.3-72.2)	25.1 (23.3-26.9)
≥ 1 teeth with untreated root decay (%)	7.7 (2.2-23.6)	6.7 (5.9-7.6)
≥ 1 teeth filled teeth (%)	82.5 (62.9-92.9)	83.9 (81.9-85.7)
Mean DMFT	14.8 (12.2-17.3)	12.8 (12.4-13.3)

CI= confidence interval DMFT = number of decayed, missing and filled permanent teeth

Periodontal disease

The prevalence of periodontal disease, as indicated by the presence of gingivitis, moderate or severe periodontitis, deep periodontal pockets and clinical attachment loss of ≥4mm among Australian adults aged 15+ years is shown in Table 6. Gingivitis was defined as the presence of gingival index score of 2 or more while moderate periodontitis as the presence of either two sites between adjacent teeth with attachment loss of 4mm or more or at least 2 sites with periodontal pockets of 5mm or more.⁷ Severe periodontitis was defined as having at least two sites between adjacent teeth with 6+ mm attachment loss plus at least one pocket of 5+ mm.⁷ The prevalence of periodontal disease was higher in Indigenous Australians than in non-Indigenous Australians with respect to all four indicators.

Table 6. Periodontal disease experience of Australian adults aged 15+ years by Indigenous identity

Indicator	Indigenous	Non-Indigenous
	(95% CI)	(95% CI)
Gingivitis	26.8 (13.7-45.8)	19.6 (17.7-21.7)
Moderate or severe periodontitis	29.0 (16.7-45.5)	22.9 (21.2-24.6)
≥1 sites with periodontal pockets of ≥4mm	21.4 (11.8-35.7)	19.7 (17.9-21.8)
≥1 sites with CAL of ≥4mm	52.0 (33.4-70.1)	42.3 (40.0-44.8)

CI= confidence interval CAL= clinical attachment loss

New Zealand

National oral health data for New Zealand adults are derived from the NZOHS 2009.⁸

Dental caries

Table 7 presents the dental caries experience of Māori adults aged 18+ years as opposed to all adults of the same age group, with regard to the prevalence of untreated coronal and root decay as well as the mean number of filled teeth and mean DMFT. While the prevalence of untreated coronal decay and root decay was 1.4 and 1.2 times higher in Māori adults the mean numbers of filled teeth and mean DMFT were 1.3 and 1.1 times lower than the corresponding figures for all adults. However, after adjustment for age and sex Māori adults had 1.1 times higher mean DMFT than their non-Māori counterparts.⁸

Table 7. Dental caries experience of Māori adults aged 18+ years compared with all adults

Indicator	Māori	All
	(95% CI)	(95% CI)
≥1 teeth with untreated coronal decay (%)	50.0 (44.2-55.7)	35.3 (32.5-38.2)
≥1 surfaces with untreated root decay (%)	11.1 (8.0-14.3)	9.5 (8.1-11.0)
Mean number of filled teeth	6.4 (5.9-6.9)	8.5 (8.1-8.8)
Mean DMFT	12.3 (11.5-13.1)	13.9 (13.5-14.2)

CI= confidence interval DMFT= number of decayed, missing and filled permanent teeth

Periodontal disease

Given that gingivitis levels were not ascertained in NZOHS 2009 the prevalence of periodontal disease in Māori adults aged 18+ years is presented in regards to the presence of periodontal pockets (≥4mm and ≥6mm) and clinical attachment loss (≥4mm and ≥6mm) in Table 8. The prevalence of periodontal disease in Māori adults was higher than that of all adults with respect to all four indicators. This was particularly obvious in regards to the presence of periodontal pockets ≥4mm where the relative difference between Māori and all adults was

1.4-fold. After adjusting for age and sex this difference increased with Māori adults 1.5, 1.6 and 1.9 times more likely to have pocketing of ≥4mm, ≥6mm and CAL of ≥6mm, respectively, compared with their non-Māori counterparts.⁸

Table 8. Periodontal disease experience of Māori versus all adults aged 18+ years

Indicator	Māori	All
	(95% CI)	(95% CI)
≥1 sites with periodontal pockets of ≥4mm	46.2 (41.1-51.2)	33.5 (30.7-36.3)
≥1 sites with periodontal pockets of ≥6mm	7.3 (5.5-9.2)	5.1 (3.9-6.4)
≥1 sites with CAL of ≥4mm	53.9 (48.9-59.0)	49.9 (47.0-52.7)
≥1 sites with CAL of ≥6mm	18.3 (14.3-22.4)	13.4 (11.5-15.2)

CI= confidence interval CAL= Clinical Attachment Loss

Conclusions and recommendations:

- Overall, the oral health status including the levels of dental caries and periodontal disease among child as well as adult populations of Indigenous Australians and Māori New Zealanders is worse than that of the corresponding non-Indigenous populations while there are obvious Indigenous-related oral health inequalities existing in both these countries.
- The poorer oral health levels alongside marked oral health inequalities corroborates the evidence that Indigenous Australians and Māori New Zealanders are a disadvantaged group hindered by access and availability barriers to preventive and rehabilitative oral health services.
- The findings warrant a collective effort from policy makers and dental practitioners to reduce such barriers among the Indigenous people as well as to develop culturally sensitive and appropriate oral health promotion and preventive programs.
- Dental practitioners should recognize that the Indigenous people are at a higher risk for oral diseases than non-Indigenous people and as such provide them with appropriate preventive and rehabilitative oral health services to cater to their need. This might include flexible appointment times and a willingness to allow family members to observe in the clinic.
- Further studies with representative samples of Indigenous people would shed more light on the oral health status as well as oral health inequalities among these socially vulnerable groups.

Najith Amarasena, Lisa Jamieson.
Australian Research Centre for Population Oral Health (ARCPHO), Adelaide Dental School, The University of Adelaide.

References:

1. United Nations 2009. State of the world's Indigenous peoples. ST/ESA/328. United Nations publication. New York, 2009.
2. Australian Bureau of Statistics 2017. Census of Population and Housing: Characteristics of Aboriginal and Torres Strait Islander Australians, 2016. <http://www.abs.gov.au/ausstats/abs@.nsf/mf/2076.0> Accessed 17 Aug 2018.
3. Australian Institute of Health and Welfare 2015. The health and welfare of Australia's Aboriginal and Torres Strait Islander peoples 2015. Cat. no. IHW 147. Canberra: AIHW.
4. Tiwari T, Jamieson L, Broughton J, et al. 2018. Reducing Indigenous Oral Health Inequalities: A Review from 5 Nations. J Dent Res 2018;97:869-877.
5. Statistics New Zealand (2013). 2013 Census QuickStats about Māori. Available from www.stats.govt.nz.
6. Do LG, Spencer AJ. Oral health of Australian children: the National Child Oral Health Study 2012-14. Adelaide: University of Adelaide Press.
7. Slade GD, Spencer AJ, Roberts-Thomson KF. Australia's dental generations: the National Survey of Adult Oral Health 2004-06. AIHW cat. no. DEN 165. Canberra: Australian Institute of Health and Welfare (Dental Statistics and Research Series No. 34). 2007.
8. Ministry of Health. 2010. Our Oral Health: Key findings of the 2009 New Zealand Oral Health Survey. Wellington: Ministry of Health.
9. Kapellas K, Skilton MR, Maple-Brown LJ, et al. Periodontal disease and dental caries among Indigenous Australians living in the Northern Territory, Australia. Aust Dent J 2014;59:93-99.
10. Amarasena N, Kapellas K, Skilton M, et al. Oral health behaviours and perceptions reported by Indigenous Australians living in Darwin, Northern Territory. Community Dent Health 2014;31:57-61.
11. Amarasena N, Kapellas K, Skilton M, et al. Associations with dental caries experience among a convenience sample of Aboriginal Australian adults. Aust Dent J 2015;60:471-478.
12. Jamieson LM, Sayers SM, Roberts-Thomson KF. Clinical oral health outcomes in young Australian Aboriginal adults compared with national-level counterparts. Med J Aust. 2010;192:558-561.
13. Gowda S S, Thomson W, Foster Page LA, Croucher NA. Dental caries experience of children in Northland/Te Tai Tokerau. N Z Dent J. 2009;105:116-20.
14. Foster Page LA, Thomson W. Dental caries in Taranaki adolescents: a cohort study. NZ Dent J 2011;107:91-96.
15. Parker EJ, Jamieson LM, Broughton J, Albino J, Lawrence HP, Roberts-Thomson K. The oral health of Indigenous children: a review of four nations. J Paediatr Child Health 2010;46:483-486.
16. Mejia GC, Parker EJ, Jamieson LM. An introduction to oral health inequalities among Indigenous and non-Indigenous populations. Int Dent J 2010;60:212-215.
17. Schuch HS, Haag DG, Kapellas K, et al. The magnitude of Indigenous and non-Indigenous oral health inequalities in Brazil, New Zealand and Australia. Community Dent Oral Epidemiol 2017;45:434-441.
18. Jamieson LM, Elani HW, Mejia GC, et al. Inequalities in Indigenous Oral Health: Findings from Australia, New Zealand, and Canada. J Dent Res 2016;95:1375-1380.

FOR FURTHER ENQUIRIES

Dental Practice Education Research Unit
ARCPHO, Adelaide Dental School
The University of Adelaide, SA 5005

A joint program by
Colgate Oral Care and The University of Adelaide

ENQUIRIES dperu@adelaide.edu.au

TELEPHONE +61 8 8313 3291

WEB adelaide.edu.au/arcpoh/dperu

© The University of Adelaide. Published December 2018.
CRICOS 00123M

DISCLAIMER The information in this publication is current as at the date of printing and is subject to change. You can find updated information on our website at adelaide.edu.au or contact us on 1800 061 459. The University of Adelaide assumes no responsibility for the accuracy of information provided by third parties.

