

Immigrants experience oral health care inequity: findings from Australia's National Study of Adult Oral Health

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ABSTRACT

Background: Oral health service utilization contributes to positive oral health and indicates realised access to services. The study aimed to describe patterns of oral health service use among overseas-born and Australian-born populations and assess equity in access to services.

Methods: The study used data from Australia's National Study of Adult Oral Health 2017–2018 and was guided by the Aday and Andersen framework of access to health and Australia's National Oral Health Plan. Descriptive analyses of service use by perceived need, enabling and predisposing factors were compared between four groups: Australian-born and overseas-born who mainly speak English and Australian-born and overseas-born who mainly speak a language other than English.

Results: Overseas-born who mainly speak a language other than English experienced greater oral health care inequity, largely driven by financial difficulty (avoided care due to cost: 42% vs 27%–28%; avoided/delayed visiting due to cost: 48% vs. 37%–38%; cost prevented treatment: 32% vs. 18%–24%). The most favourable visiting patterns were among the Australian-born population who speak a language other than English.

Conclusions: The study shows clear inequity experienced among immigrants in accessibility as measured through indicators of oral health care utilization and factors related to inequity, such as the ability to pay for services.

Keywords: Health monitoring, migrants, oral health care inequalities, oral health service utilization, perceived dental treatment need.

Abbreviations and acronyms: CALD = culturally and linguistically diverse; NSAOH = National Study of Adult Oral Health.

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INTRODUCTION

Equity and access are vital elements in assessing health system performance.^{1–4} Equitable access encompasses the fair distribution of health care and its benefits⁴ and accounts for health care needs and opportunities to access care.⁵ Access to care is associated with the use of health services – although ideally, services would be accessed early to prioritize prevention and early intervention, frequent use of services could indicate more complex dental care needs, and low or lack of use could signal difficulty in gaining access to needed services. Yet, measures of utilization have widely become indicators of access to care.⁶ Population levels of access to health care are influenced by a complex combination of dimensions that include,

among others, acceptability, availability and affordability.⁷ Patients interact with these dimensions through different abilities related to perceiving, seeking, reaching, affording and engaging with health care systems.⁷

The National Oral Health Plan for Australia 2015–2024⁸ recognizes access to health care systems and services as well as the utilization of dental services, as determinants of oral health and sets the goal to reduce inequalities in oral health status. The most recent information on the use of oral health care services in Australia⁹ indicates that 56% of adults aged 15 years and over received care in the last 12 months. Differences by socio-economic factors indicate that people with a school level of year 10 or less were more likely to not have visited a dentist within the last 5 years

compared to people with a school level of year 11 or more (15% and 10%, respectively).⁹ Australians without dental insurance were almost four times more likely to not have visited a dentist for 5 or more years, whereas those with dental insurance reported a higher percentage of visiting for a dental check-up than uninsured people (79% and 49%, respectively).⁹ These differences reflect inequities in access to oral health care when the utilization of services does not reflect the need for care or is determined by a person's ability to obtain needed health care services.

In line with the marked differences between population groups in oral health outcomes and use of dental services, the National Oral Health Plan identifies priority populations: (1) people who are socially disadvantaged or on low incomes, (2) Aboriginal and Torres Strait Islander Peoples, (3) people living in regional and remote areas and (4) people with additional and/or specialized health care needs.⁸

This paper focuses on another key population group, Australian immigrants or Culturally and Linguistically Diverse (CALD) groups,¹⁰ which comprised 30% of the country's population in 2020,¹¹ and of whom very little is known regarding oral health service use. This paper will henceforth use the general term 'immigrant' to refer to foreign-born and second-generation CALD groups residing in Australia.

Prior research has been limited to state-based surveys or small-scale studies, and to date, a comprehensive national analysis is yet to be done.^{12–22} Studies in Melbourne on the utilization of dental health services by Greek, Italian and Chinese immigrants pointed to the heterogeneity of dental care barriers between immigrant groups.^{12,13,16} Difficulties in accessing dental services varied from waiting lists and waiting time in the office to cost of care, language and communication barriers.^{12,13,16} Compared to oral health data for the general population of older adults, Chinese immigrants appeared to have more favourable oral health outcomes and less need for dental treatments.¹⁴

A secondary analysis of the New South Wales Adult Population Health Survey concluded that foreign-born, non-English speaking, culturally and linguistically diverse groups had lower levels of dental utilisation than the comparison population, despite higher levels of education.¹⁹ An analysis of the Longitudinal Study of Australian Children found that, along with mental health, paediatric and emergency ward services, children from non-English speaking immigrant families used fewer dental services than other Australian children.²⁰ Unmet dental care need was evidenced among adolescents from an Indochinese community and people of Vietnamese background.^{17,18} Psychological and behavioural acculturation were related to dental visiting, oral health knowledge and dental caries among a Vietnamese

community in Melbourne.¹⁵ The scarcity of recent information at a national level on nearly one-third of the country's population hampers the ability to plan, develop and implement oral health services that are suitable to meet the needs of all Australians.

This study aims to describe factors related to inequity, such as the ability to pay for services, and patterns of oral health service use of immigrant populations in comparison with non-immigrant Australians, with the hypothesis that Australian immigrants, particularly those who mainly speak a language other than English, face inequitable access to oral health services. In doing so, the study will provide a national baseline on oral health service use of immigrant populations in Australia for future monitoring and evaluation of programmes and policies aimed at improving oral health equity and access to services.

MATERIALS AND METHODS

This cross-sectional study uses data from Australia's National Study of Adult Oral Health (NSAOH) 2017–2018, which aimed to obtain information about the prevalence and severity of dental problems and usage patterns of dental services in the general population.²³

NSAOH used multistage probability sampling to obtain a representative sample of people living in Australia aged 15 years and over. Representative samples of adults were drawn through a three-stage, stratified sample design within metropolitan and regional areas in each state and territory. The first stage selected postcodes, the second stage selected households within the sampled postcodes and the third stage selected one adult aged 15 years and over from each sampled household. Persons selected were invited to respond to a questionnaire either online or through a computer-assisted telephone interview. Detailed information on the sample design, study participation, reliability, sampling variability and development of population weights is reported elsewhere.^{23,24}

The project was reviewed and approved by The University of Adelaide's Human Research Ethics Committee.

Study variables

Indicators of equity and accessibility were defined through dental attendance variables, perceived treatment needs, characteristics of the population and ability to pay for care. Variable selection was based broadly on the Aday and Andersen framework of access to health²⁵ and cross-referenced to Australia's National Oral Health Plan⁸ and its Performance Monitoring Report.²⁶

We conceptualized access as the ability to obtain oral health services when needed, and patterns of dental attendance as the outcome of access. The following two consumer dimensions of accessibility were considered: the perceived need for services and the ability to pay for services.⁸ Characteristics of the population,²⁵ also defined as individual determinants of utilization,²⁷ included predisposing (e.g. socio-demographic factors), enabling (e.g. income, insurance) and need factors (e.g. illness level). Fig. 1 summarizes variables included within these key domains.

Immigrant status

Immigrant status is the stratifying variable and was defined through the country of birth and the main language spoken at home. Four categories were derived as follows: (1) Australian-born, English language; (2) Australian-born, another language; (3) overseas-born, English language (4) overseas-born, another language.

Country of birth

This variable was derived from the question ‘In which country were you born?’ with options grouped into 10 response categories (Australia, New Zealand, rest of Oceania, UK and Ireland, rest of Europe, North Africa and the Middle East, Asia, USA and Canada, rest of Americas, Sub-Saharan Africa).

Main language

This variable stemmed from the question ‘What language do you mainly speak at home?’ and included 10 response options (English, Northern European – excluding English, Southern European, Eastern European, Southwest and Central Asian, Southern Asian, Southeast Asian, Eastern Asian, Australian Indigenous, another language).

Patterns of dental attendance

Patterns of dental attendance were defined through the following variables.

Dental attendance within the last 12 months

This variable is a measure of recent contact and indicates entering the health care system. It stems from the question ‘How long ago did you last see a dental professional about your teeth, dentures or gums?’ and dichotomized options into <12 and 12 months and over (including never visited).

Dental attendance 5 years ago or longer

This variable is also a measure of contact and is derived from the same question, but contrary to the variable above, it indicates essentially not being within the dental care system.

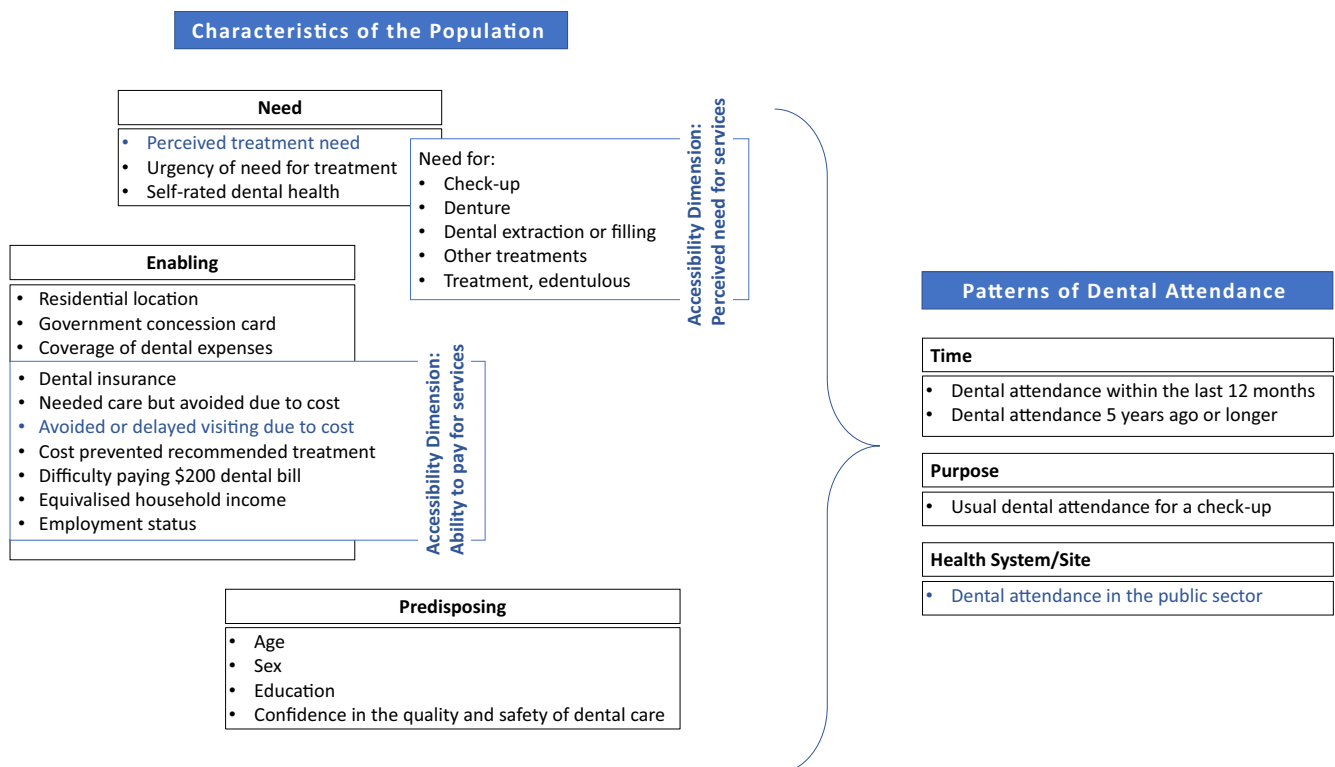


Fig. 1 Variable specification within key domains of population characteristics and patterns of dental attendance. †Blue font indicates alignment with Australia's National Oral Health Plan.

Usual dental attendance for a check-up

This variable defines the intention behind visiting and captures a longer-term view of patterns of visiting. It used the question ‘What is your usual reason for visiting a dental professional?’ (with check-up or problem as the response options).

Dental attendance in the public sector

This variable reflects how users are serviced within the Australian dental care system and is an indicator of the health delivery system and/or site of service. It was derived from the question ‘Where did you make your last dental visit?’ and combined options into Private Practice (including clinics associated with health insurance funds) and Public (including public dental programmes, technician services and others).

Oral health care need

Oral health care need was conceptualized as the perceived need for service, the urgency of need and self-assessed oral health status.

Perceived need

The perception of need was derived from variables in which participants were asked to indicate their need for a check-up, denture, dental extraction or filling, other treatments (including scale and clean, gum treatment, crown or bridge, root canal, other) and perceived treatment need among edentulous people. We assessed overall need, defined as needing any of the above services, and each variable separately.

Urgency of need for dental treatment

This variable was examined from the question ‘How soon do you think you need this dental treatment?’ (with options being (1) <1 week, (2) 1 week to <1 month, (3) 1 to <3 months, (4) 3 to <6 months and (5) 6 or more months as soon as 3 months was considered urgent).

Self-rated dental health

This variable was assessed from the question ‘How would you rate your own dental health?’ and was dichotomized into excellent/very good/good and fair/poor.

Enabling characteristics

Enabling characteristics refer to the resources or attributes that facilitate the use of services and include individual and community factors.^{25, 27}

Residential location

This variable is a potential indicator of the availability of dental services. It was classified as very remote/

remote, outer regional, inner regional or major cities. Classifications were based on the Australian Bureau of Statistics – Greater Capital City Statistical Area (GCCSA) classification and derived from the post-codes used in NSAOH for the selection of individuals.

Government concession card

This variable indicates eligibility for government aid and is a measure of socio-economic resources; for migrants, it might point to migration status. The variable results from the question ‘Do you currently receive a pension or allowance from the Government, or have a pensioner concession card, a Health Care Card or a Department of Veterans Affairs card?’

Coverage of dental expenses

This is a combined indicator of socio-economic resources, risk behaviour and eligibility for government aid. The variable results from the question ‘Did the government or an insurance fund pay any part of the expenses for your last dental visit?’ was categorized into family paid all, insurance paid all or some, government paid all or some and other.

Dental insurance

This is a measure of coverage in access to care as health insurance facilitates entry into the healthcare system. It might also be an indicator of socio-economic standing and/or risk behaviour or aversion. The variable was derived from three NSAOH questions: ‘Do you have a private health insurance other than Medicare?’ if the response was ‘yes’ or ‘don’t know,’ participants were asked ‘What type of private medical insurance do you have?’ – if people reported having extras or responded ‘don’t know,’ they were asked ‘Does your private health insurance provide cover dental services?’ – people who responded ‘yes’ were classified as having private dental insurance.

Needed care but avoided due to cost

This is a measure of the financial burden and unmet dental needs. This is a dichotomous variable from the question ‘During the last 12 months was there a time you needed dental care but did not visit a dental practitioner due to the cost?’

Avoided or delayed visiting due to cost

Similar to the above, but including the delay in dental visiting, this variable results from the question ‘During the last 12 months have you avoided or delayed visiting a dental practitioner due to the cost?’

Cost-prevented recommended treatment

Also a measure of the financial burden and unmet dental care need, this variable results from the question ‘Has cost prevented you from having any dental

treatment that was recommended by a dental practitioner at a visit during the last 12 months?’

Difficulty paying

The variable, difficulty paying a \$200 dental bill, was taken from the question ‘At most times of the year, how much difficulty would you have paying a \$200 dental bill out of your own pocket?’ The response categories were none, some and a lot.

Equivalized household income

Household income was divided by an equivalence factor using the Organisation for Economic Cooperation and Development (OECD) modified scale.²⁸ The equivalence factor is the sum of allocated points to household members (i.e. 1 point for the first adult, 0.5 points to each additional person age 15 years and over and 0.3 to each child under the age of 15 years). Equivalized household income was then grouped into five approximately equal quintiles from lowest to highest.

Employment status

This variable stems from the question ‘How would you describe your current employment status?’ and was classified into full-time, part-time and not employed.

Predisposing characteristics

Predisposing characteristics have been described as the propensity of individuals to use services and categorized as immutable (delineators of groups, not descriptors of access) or mutable (capable of being altered by health policies).^{25,27}

Age

The population was grouped into ‘15–34’, ‘35–54’, ‘55–74’ and ‘75+’ years.

Sex

This variable was classified as male or female.

Education

This variable was derived from the question ‘What is the highest qualification or level of education you have completed?’ It was categorized into secondary school or less (none completed, but currently studying secondary school; no postsecondary qualification and not currently studying), trade to diploma (certificate levels 1, 2, 3 and 4; advanced diploma/diploma/associate degree; non-completed, but currently studying at university; none completed, but currently studying at TAFE/apprenticeship; other qualification – e.g. non-award courses) and university (postgraduate – masters/PhD; graduate diploma/graduate certificate level –

graduate specialization after bachelor degree; bachelor/honours degree).

Confidence in the quality and safety of dental care

This variable came from the question ‘How confident are you that if you had a dental problem, you would get safe and effective dental care?’ and categorized into very confident, somewhat/not very confident, not at all confident and not sure.

Analysis

Data files were managed, and summary variables were computed using SAS software version 9.4 (SAS 9.4, SAS Institute Inc., Cary, NC, USA). All data were stratified by immigrant status. Weights were used to account for the complex sampling methodology of the survey.

Basic descriptive analyses were carried out to ascertain frequencies and proportions with 95% confidence intervals (95% CIs) estimated using SAS-callable SUDAAN procedures. Confidence intervals indicate statistical significance if they do not overlap but importantly, they denote the precision of the estimates.

RESULTS

Participation rates in NSAOH were low and varied across states and territories, ranging between 46% and 36%, which required thorough bias analyses and the development of survey weights to enable the validity and reliability of national population estimates.²³ A detailed description of study participation and weighting has been published and is publicly available.²³ The sample included 15 727 NSAOH participants, of whom roughly one-quarter was born overseas (n = 4193). Aboriginal and Torres Strait Islander people comprised 2.1% (unweighted) of the study sample. The study groups included 11 129 Australian-born English speakers, 405 Australian-born other language speakers, 2556 overseas-born English speakers and 1637 overseas-born other language speakers.

In the sample, the overseas-born population groups originate from Asia (8.4%), the UK and Ireland (7.0%), Europe (excluding the UK and Ireland) (4.2%), New Zealand (2.4%), sub-Saharan Africa (1.6%), North Africa and the Middle East (1.0%), USA/Canada (0.9%), rest of the Americas (0.6%) and the rest of Oceania (0.5%) (unweighted %; results not tabulated).

Among the Australian-born who speak another language group, the languages spoken originate from Southern Europe (33.1%), Eastern Asia (17.0%), Southeast Asia (11.9%), Eastern Europe (10.9%),

Southwest and Central Asia (7.9%), Northern Europe – excluding English (6.7%), Australian Indigenous (4.9%), Southern Asia (4.0%) and other languages (3.7%) (unweighted %; results not tabulated).

Patterns of dental attendance were very similar between population groups when examined separately by country of birth and the main language spoken at home (Table 1). The Australian-born group showed slightly higher proportions of people visiting the dentist in the last 12 months, usually visiting for a check-up, and receiving dental care in the private sector at their last appointment. The differences, though, are of no clinical or statistical significance and could be explained by sampling variability. Regarding language, the only difference is a larger proportion of visiting the private dental sector among people who mainly speak English at home.

When the same variables were examined across four categories combining country of birth and language spoken at home (Table 2), more favourable visiting patterns were observed among the Australian-born population that mainly speaks a language other than English at home. A higher proportion of this population had a dental visit within the past 12 months and usually visited for a check-up. They also had a lower proportion of people not having visited a dental practitioner within the past 5 years. The overseas-born population that speaks another language at home had the lowest proportion of visiting a dental provider in the last 12 months. A larger proportion of this group had their last visit to the dental public sector. The English-speaking groups, both those born in Australia and overseas, had very similar dental visiting patterns.

Table 1. Dental attendance by country of birth and main language spoken at home (weighted proportions and 95% confidence intervals (CIs)), National Study of Adult Oral Health 2017–2018

Outcome variable	Country of birth		Main language spoken at home	
	Australia (n ^a = 11 534) % (95% CI) ^b	Overseas (n ^a = 4195) % (95% CI) ^b	English (n ^a = 13 686) % (95% CI) ^b	Others (n ^a = 2042) (95% CI) ^b
Population distribution	87.0 (86.5–87.5)	13.0 (12.5–13.5)	87.0 (86.5–87.5)	13.0 (12.5–13.5)
Dental attendance in the last 12 months				
Yes	57.0 (55.6–58.4)	55.0 (52.8–57.2)	56.6 (55.3–58.0)	55.3 (52.5–58.1)
No	43.0 (41.6–44.4)	45.0 (42.8–47.2)	43.4 (42.0–44.7)	44.7 (41.9–47.5)
Dental attendance in the last 5 years				
Yes	88.5 (87.6–89.4)	88.7 (87.2–90.2)	88.3 (87.4–89.1)	89.9 (88.1–91.7)
No	11.3 (9.8–12.8)	11.3 (9.8–12.8)	11.7 (10.9–12.6)	10.1 (8.3–11.9)
Usual reason for dental visiting				
Checkup	63.9 (62.4–65.3)	62.0 (59.9–64.2)	63.2 (61.8–64.6)	63.4 (60.3–66.6)
Problem	36.1 (34.7–37.6)	38.0 (34.7–37.6)	36.8 (35.4–38.2)	36.6 (33.4–39.7)
Dental attendance sector				
Public	17.7 (16.6–18.9)	19.1 (17.1–21.0)	17.2 (16.1–18.2)	22.9 (20.0–25.7)
Private	82.3 (81.1–83.4)	80.9 (79.0–82.9)	82.8 (81.8–83.9)	77.1 (74.3–80.0)

^aUnweighted sample size.

^bProportion and 95% CIs.

Table 2. Dental attendance among Australian-born and Overseas-born populations by main language spoken at home (weighted proportions and 95% confidence intervals (CIs)), National Study of Adult Oral Health 2017–2018

Outcome variable	Number (unweighted)	Australian-born		Overseas-born	
		English (n = 11 129) ^a % (95% CI)	Others (n = 405) ^a % (95% CI)	English (n = 2556) ^a % (95% CI)	Others (n = 1637) ^a (95% CI)
Total	15 727	70.8 (70.1–71.5)	2.6 (2.3–2.8)	16.3 (15.7–16.8)	10.4 (9.9–10.9)
Dental attendance in the last 12 months					
Yes	8903	56.3 (54.9–57.8)	69.3 (64.0–74.6)	57.7 (55.0–60.4)	51.7 (48.4–55.1)
No	6757	43.7 (42.2–45.1)	30.7 (25.4–36.0)	42.3 (39.6–45.0)	48.3 (45.0–51.6)
Dental attendance in the last 5 years					
Yes	13 834	88.2 (87.3–89.1)	94.2 (91.2–97.3)	88.6 (86.6–90.7)	88.8 (86.8–90.7)
No	1826	11.8 (10.9–12.7)	5.8 (2.7–8.8)	11.4 (9.3–13.4)	11.2 (9.3–13.2)
Usual reason for dental visiting					
Checkup	9787	63.1 (61.6–64.7)	76.5 (71.2–81.8)	63.5 (60.9–66.1)	60.0 (56.5–63.6)
Problem	5619	36.9 (35.3–38.4)	23.5 (18.2–28.8)	36.5 (33.9–39.1)	40.0 (36.4–43.5)
Dental attendance sector					
Public	2731	17.6 (16.5–18.8)	19.6 (14.6–24.6)	15.5 (13.4–17.6)	23.7 (20.3–27.1)
Private	12 694	82.4 (81.2–83.5)	80.4 (75.4–85.4)	84.5 (82.4–86.6)	76.3 (72.9–79.7)

^aUnweighted sample size.

Oral health care need is described in Table 3 and the supplementary file. Table 3 shows the majority of the population reported having at least one dental need, ranging from 67% in the overseas-born, English-speaking group to 70% in the overseas-born, another language group. A slightly higher proportion of both 'other language' groups reported dental treatment needs in comparison to their English-speaking counterparts. The differences however are minor and likely due to sampling variability. In the analysis by specific treatment needs (supplementary file), the only noteworthy difference was for the perceived need for dentures in which the group with the lowest proportion is the Australian-born who speak another language at home at 1% compared to estimates between 5% and 6% in the other groups. Urgency of treatment need at <3 months was reported between 61% and 65% of the population with no important differences between the groups – the lowest proportion among the overseas-born other language group and the highest proportion for the overseas-born English-speaking group. Table 3 shows over a quarter of the overseas-born populations rated their oral health as fair or poor – slightly higher among those who speak another language (29%) than those who speak English (27%). The Australian-born, other language group had the highest proportion rating their oral health as excellent, very good or good (81%).

Enabling characteristics are presented in Table 3. The greatest concentration of the population was in major cities, particularly participants that speak another language and more so if born overseas. The Australian-born, English-speaking group had larger proportions of people living in inner regional (23%) and outer regional locations (12%). There was an equal distribution of government concession card holders across the four groups (between 30% and 33%). There were, however, observable differences in how dental visiting costs were covered, either in full or in part. A lower proportion of overseas-born English speakers (12%) reported government coverage. A lower proportion of the overseas-born other-language group (39%) reported insurance coverage. The overseas-born other-language group reported a higher proportion of families covering all dental expenses (46%) and a lower proportion with dental insurance (40%). Slightly over half of all other groups reported having dental insurance coverage.

The overseas-born other-language population group reported the highest proportion needing dental care but avoiding due to cost, avoiding or delaying dental visits due to cost and cost of preventing recommended dental treatments. This same group also reported the largest proportion of people reporting difficulty in paying a \$200 dental bill. They had nearly a third of the population in the lowest equivalized income group

(they also had the lowest proportion of people, only 10%, in the highest equivalized income category), but had the largest proportion of people with full-time current employment.

Predisposing characteristics, also presented in Table 3, indicate some differences in age distributions across the four groups. For example, the Australian-born other-language group is younger with 65% of the population in the 15–34 years age range and the overseas-born other-language group had a larger proportion, 43%, in the 35–54 years age range. The other language speakers had slightly higher proportions of males, whereas the English-speaking groups had slightly more females, but differences are likely due to sampling variability. Half of the overseas-born other-language population had a tertiary qualification, the largest proportion among all groups. The same group reported the lowest proportion of people who reported feeling very confident in the quality and safety of dental care if needed (38%) in contrast to the overseas-born English speakers (59%), Australian-born other-language (57%) and Australian-born English speakers (63%).

DISCUSSION

A common goal across health systems is to provide health care that is safe, appropriate, acceptable, accessible and equitable.^{2,29,30} This manuscript has focused on the latter two constructs – health care – accessibility and equity.

It was evident from the study findings that foreign-born populations who mainly speak a language other than English at home experience inequity in access to oral health care, most evident through financial constraints. Despite having higher education and full-time current employment levels than other groups, they report lower incomes, less dental insurance coverage, more difficulty paying \$200 dental bills, more reliance on a family paying dental treatments and more dental care avoidance or visiting delays due to cost. The findings from this study are quite similar to those recently reported for New South Wales.¹⁹ Together, these studies indicate that programmes and policies that enable accessing dental care based on need rather than the capacity to pay for care are pivotal to achieving equity in oral health services and outcomes. Government initiatives that support the inclusion of dental care into the federally funded Medicare would go some way towards ameliorating this.

This group also reports less confidence in the quality and safety of dental care than the other population groups, bringing to the forefront the need to provide culturally respectful health care services and improve health system monitoring and evaluation of both public and private dental services. Nearly, a third of the

Table 3. Perception of need, predisposing and enabling factors among Australian-born and Overseas-born populations by main language spoken at home (weighted proportions and 95% confidence intervals (CIs)), National Study of Adult Oral Health 2017–2018

Variable	N (Unweighted)	Australian-born		Overseas-born	
		English (n = 11 129) % (95% CI)	Others (n = 405) % (95% CI)	English (n = 2556) % (95% CI)	Others (n = 1637) % (95% CI)
Need					
Perceived need for dental treatment					
At least one need	10 082	67.4 (66.2–68.7)	68.7 (62.9–74.6)	66.5 (63.8–69.1)	69.8 (66.7–72.9)
No	5060	32.6 (31.3–33.8)	31.2 (25.4–37.1)	33.5 (30.9–36.2)	30.2 (27.1–33.3)
Urgency of need for dental treatment					
Yes	5700	63.5 (62.0–65.1)	62.3 (54.1–70.4)	64.6 (61.3–68.0)	60.8 (56.8–64.9)
No	3358	36.5 (34.9–38.0)	37.7 (29.6–45.9)	35.4 (32.0–38.7)	39.2 (35.1–43.2)
Self-rated dental health					
Fair/poor	3431	22.3 (21.1–23.5)	19.0 (13.7–24.3)	26.8 (24.2–29.4)	28.5 (25.6–31.5)
Excellent/very good/good	11 438	77.7 (76.5–78.9)	81.0 (75.7–86.3)	73.2 (70.6–75.8)	71.5 (68.5–74.4)
Enabling characteristics					
Residential location					
Very remote/remotely	787	2.1 (0.7–3.4)	1.3 (0.3–2.3)	1.4 (0.5–2.2)	0.9 (0.3–1.6)
Outer regional	2198	11.7 (8.3–15.1)	4.2 (1.5–7.0)	5.6 (3.8–7.5)	3.2 (1.8–4.5)
Inner regional	3373	22.7 (18.4–26.9)	4.7 (1.6–7.8)	12.8 (9.5–16.0)	3.1 (2.0–4.2)
Major cities	9369	63.6 (59.6–67.5)	89.7 (85.5–93.9)	80.3 (77.0–83.6)	92.7 (91.0–94.5)
Government concession card					
Yes	5361	32.3 (30.9–33.6)	29.7 (23.7–35.8)	33.0 (30.5–35.6)	30.6 (27.0–34.3)
No	10 331	67.7 (66.4–69.1)	70.3 (64.2–76.3)	67.0 (64.4–69.5)	69.4 (65.7–73.0)
Coverage of dental expenses					
Other	110	0.7 (0.5–0.9)	0.8 (0.0–1.6)	0.7 (0.3–1.1)	1.7 (0.7–2.6)
Government all or some	1858	15.0 (13.8–16.2)	20.0 (13.7–26.3)	11.7 (9.9–13.5)	13.6 (10.5–16.7)
Insurance all or some	7170	52.8 (51.2–54.5)	49.6 (42.3–56.8)	52.8 (49.9–55.7)	39.0 (35.4–42.5)
Family all	4406	31.4 (30.0–32.8)	29.7 (23.8–35.5)	34.9 (32.2–37.5)	45.8 (42.0–49.7)
Dental insurance					
Dental insured	8236	53.3 (51.6–55.0)	51.3 (43.7–58.9)	52.4 (49.4–55.3)	39.8 (36.1–43.5)
Dental uninsured	7204	46.7 (45.0–48.4)	48.7 (41.1–56.3)	47.6 (44.7–50.6)	60.2 (56.5–63.9)
Needed dental care but avoided due to cost					
Yes	4172	26.6 (25.4–27.8)	27.2 (21.2–33.2)	28.6 (26.1–31.2)	41.5 (37.7–45.3)
No	11 469	73.4 (72.2–74.6)	72.8 (66.8–73.9)	71.4 (68.8–73.9)	58.5 (54.7–62.3)
Avoided or delayed visiting due to cost					
Yes	5778	37.0 (35.7–38.4)	36.5 (29.4–43.6)	37.7 (35.1–40.4)	48.6 (44.8–52.5)
No	9888	63.0 (56.4–70.6)	63.5 (56.4–70.6)	62.3 (59.6–64.9)	51.4 (47.5–55.2)
Cost prevented recommended treatment					
Yes	1889	20.5 (19.0–22.1)	18.2 (11.7–24.7)	24.1 (21.3–26.9)	31.7 (27.2–36.2)
No	6786	79.5 (77.9–81.0)	81.8 (75.3–88.3)	75.9 (73.1–78.7)	68.3 (63.8–72.8)
Difficulty paying \$200 dental bill					
None	4824	29.4 (28.2–30.5)	26.2 (20.9–31.5)	29.4 (27.0–31.8)	21.1 (18.2–23.9)
Some	7320	46.8 (45.4–48.1)	52.0 (46.0–57.9)	49.1 (46.3–51.9)	50.4 (47.0–53.7)
A lot	3408	23.9 (22.6–25.1)	21.8 (16.6–27.0)	21.5 (19.0–23.9)	28.6 (25.3–31.8)
Equivalent household income					
Lowest	2504	23.7 (22.2–25.1)	33.9 (24.3–43.4)	22.2 (19.5–24.8)	31.9 (27.8–36.0)
Lower	2520	18.3 (17.1–19.4)	15.7 (8.8–22.7)	20.1 (17.8–22.3)	19.7 (16.4–23.1)
Medium	2520	21.9 (20.5–23.3)	19.9 (14.2–22.7)	18.5 (16.2–20.8)	22.7 (19.2–26.2)
Higher	2479	19.3 (18.0–20.6)	18.5 (12.3–24.6)	18.9 (16.7–21.2)	15.6 (12.9–18.2)
Highest	2500	16.9 (15.7–18.1)	12.0 (7.5–16.5)	20.4 (17.7–23.0)	10.1 (8.3–12.0)
Employment status					
Not employed	6110	39.7 (38.3–41.1)	40.9 (33.8–48.0)	41.8 (39.1–44.5)	37.4 (33.8–40.9)
Part-time	3245	21.7 (20.6–22.8)	20.7 (15.0–26.4)	17.2 (15.2–19.1)	16.2 (13.9–18.4)
Full-time	6309	38.6 (37.2–39.9)	38.4 (31.6–45.1)	41.0 (38.2–43.8)	46.5 (42.8–50.1)
Predisposing characteristics					
Age group (years)					
15–34	3300	38.4 (37.2–39.7)	65.2 (57.7–72.8)	19.4 (17.0–21.7)	29.2 (26.3–32.2)
35–54	3225	30.2 (29.0–31.3)	25.6 (19.0–32.2)	34.3 (31.6–37.0)	42.8 (39.6–45.9)
55–74	3483	24.1 (23.1–25.0)	8.0 (4.8–11.2)	33.8 (31.4–36.2)	20.8 (18.5–23.2)
75+	1121	7.4 (6.9–8.0)	1.2 (0.2–2.1)	12.5 (11.0–14.1)	7.2 (5.6–8.8)
Sex					
Male	6778	48.1 (46.8–49.4)	54.1 (47.5–60.7)	48.9 (46.1–51.7)	53.2 (49.7–56.7)
Female	8949	51.9 (50.6–53.2)	45.9 (39.3–52.5)	51.1 (48.3–53.9)	46.8 (43.3–50.3)
Education					
Secondary school or less	3194	28.0 (26.6–29.4)	24.3 (17.4–31.3)	18.7 (16.4–21.0)	17.4 (14.3–20.5)
Trade to diploma	6389	51.8 (50.4–53.3)	47.2 (40.1–54.3)	50.1 (47.2–53.1)	32.3 (28.5–36.2)
University	5833	20.1 (18.7–21.4)	28.5 (23.8–33.1)	31.2 (28.4–34.0)	50.3 (46.4–54.2)

(continued)

Table 3 (continued)

Variable	N (Unweighted)	Australian-born		Overseas-born	
		English (n = 11 129) % (95% CI)	Others (n = 405) % (95% CI)	English (n = 2556) % (95% CI)	Others (n = 1637) % (95% CI)
Confidence in quality/safety of dental care					
Very confident	9275	62.9 (61.6–64.3)	57.3 (50.3–64.2)	59.1 (56.4–61.9)	38.1 (35.0–41.1)
Somewhat/not very confident	5284	32.1 (30.8–33.4)	36.4 (28.7–44.0)	35.3 (32.8–37.9)	49.4 (46.0–52.8)
Not at all confident	357	2.1 (1.7–2.5)	2.0 (0.0–4.0)	2.2 (1.4–3.0)	3.7 (2.4–5.0)
Not sure	516	2.8 (2.4–3.3)	4.4 (1.3–7.4)	3.4 (2.5–4.3)	8.9 (6.7–11.0)

rest of the population expressed feeling somewhat or not very confident in the quality and safety of care, if needed. This result highlights the importance of further examining the issue of safety, appropriateness, acceptability, equity and accessibility of the oral health care system in Australia.

Oral health service utilization contributes to positive oral health status through preventive care, early intervention and restorative care to maintain good oral health, potentially reverse initial disease processes and minimize the harmful effects of oral disease. We found notable similarities in dental visiting and usual reason for visiting between Australian-born English speakers and overseas-born English speakers, whereas there were substantial differences with the Australian-born population who mainly speaks another language at home and who showed more favourable outcomes than all other groups. This finding points to differences within the Australian-born population and, in particular, the role that language, a possible proxy for cultural background, has on indicators of access to care. The recent New South Wales population study also points to the role of language and culture in facilitating and hindering dental utilisation.¹⁹

Among the Australian-born group, it must be noted that Aboriginal and Torres Strait Islander study participants would be distributed between the group who mainly speak English at home (0.1% – weighted estimate) and people who mainly speak a language other than English (3.3% – weighted estimate). Potential future research could examine differences in health outcomes between the two groups. This aligns with current research into the effects of reconnecting to culture and language and initiatives to revive Aboriginal languages. Our study, however, underestimates the proportion of Aboriginal and Torres Strait Islander people in the population and more so, the proportion who speak a language other than English at home. Findings from the 2016 Census show that approximately 10% of the Aboriginal and Torres Strait Islander population speak an Australian Indigenous language at home.³¹ The proportion of Aboriginal and Torres Strait Islander Australians who speak English as their main language at home increased

from 79% to 84% between 1991 and 2016, whereas the inverse was observed for non-Indigenous Australians (a decrease from 84% to 77%). Indigenous languages represent a core component of Indigenous cultures, identity and sovereignty. Speaking or reclaiming a traditional Indigenous language has been linked to better mental health, sense of cultural pride and stronger connections with community, country, ancestors and emotions.^{32,33}

Group membership in the Australian-born, other language speakers, would also be composed of second-generation immigrants who by definition would be born in Australia, but with at least one immigrant parent, and linguistic ties to other cultures. The group might include others such as Australian-born English speakers who live in a household where a second language is mainly spoken (e.g. partner and/or children speak another language). Although with the data at hand, it is not possible to continue exploring the role of language, culture and immigrant generation, these relationships merit further inquiry.

These same results also show the heterogeneity of immigrant populations and that the broad categorization of overseas-born does not provide the necessary detail to identify differences in dental service pattern use, predisposing and enabling characteristics. This study's inclusion of language for a more nuanced classification of immigrant groups points to the need to define and better understand the research and policy implications of the use of different immigrant categorizations. This issue was raised in a recent discussion on terminology and a call for consistent standards for the classification of immigrant populations to aid in addressing healthcare inequalities.¹⁰ Further discussions are encouraged on the use of CALD terminology for immigrant populations in Australia while recognizing and accounting for Aboriginal and Torres Strait Islander people as a culturally and linguistically diverse group.

The study did not find differences in the perception of need between immigrant and Australian-born populations. This finding does not imply equal clinical needs across groups and points to a limitation of our study – complementing need perceptions with

normative needs through clinical assessment is encouraged to aid in health monitoring and planning. Immigrants might come with different perceptions of treatment needs which could lead to differential reporting of needs. Discrepancies between self-reported and clinically determined dental care need have been shown among immigrant populations in Australia, with underreporting of treatment need among people born in Europe, the United Kingdom and Australia (i.e. a lower perception of need relative to examiner-determined need).²² It has been argued that the reduced perception of need could be seen as a barrier to oral health care access because the process of seeking care is not initiated, leading to unmet dental care needs.²² A similar argument could be proposed for self-rated oral health, whereby an assessment of fair or poor oral health would trigger dental visits. Our findings, however, do not support this suggestion – the group with less access (overseas-born who mainly speak another language) had a larger proportion reporting fair or poor oral health, whereas a greater proportion of the group with more favourable patterns (Australian-born who mainly speak another language) reported excellent, very good or good oral health. One consideration is the direction of the effect, that is, rather than poor health perceptions triggering visiting, visiting leads to better health perception. Another consideration is the need to improve needs assessment questions to account for cultural and linguistic differences. Self-rated oral health is a complex measure that sums objective and subjective observations in relation to self and others, including function, pain, known health conditions or perceived vulnerability to illness, and health expectations.^{34–36} It was beyond the scope of this study to further examine these issues, but points to the importance of designing future research equipped to respond to causal questions of this type.

This secondary analysis of cross-sectional data relied on self-reported information from the questionnaire component of NSAOH. The information gathered by NSAOH was not designed to respond to the specific research aims of this study and therefore, there are limitations in the availability of variables that could better identify the target population and factors related to their dental visiting patterns. For example, we had limited information on migration history and cultural and contextual differences among the groups studied. There are variations in dental services covered by the public system by state and territory, therefore, misclassification might have occurred, particularly in the categorization of dental visits by public vs private sectors. Categories, such as ‘other,’ in original variables are prone to lead to classification error. Our assessment of private vs public estimates that <4% of the sample could have been misclassified

(those in the category other and ‘dental technician/prosthetist’). Information bias could also be present if language differentially affected the information provided by the target population. Although based on national data, foreign-born populations and particularly groups who mainly speak a language other than English, are likely to be underrepresented in population studies and therefore, non-participation bias cannot be excluded from these results. Given the large sample size, random error is less likely to be an issue – this is evidenced by the precision of the estimates reported in this study. These limitations could affect the generalisability of the results, nonetheless, the study has provided baseline information on dental visiting patterns for a large sample of Australian adults, highlighting knowledge gaps and potential areas for future research.

CONCLUSION

Population health monitoring, including oral health, contributes to identifying necessary resources, supporting the continuity and quality of health services, informing decision-making and proposing policy solutions. The study shows clear population differences in accessibility as measured through indicators of oral health care utilization and factors related to inequity, such as the ability to pay for services.

This study recommends that first-generation immigrant Australians should be included as a priority population in regional, state and national oral health plans. Ongoing collaborations across the dental sector – including academia, research, policy, clinical practice and funding organizations – are key to providing sound evidence for the development of national oral health plans and subsequent translation and implementation. Strengthening monitoring and evaluation capacity, aligned with the strategies of the National Oral Health Plan, is a fundamental step in enabling actions that will promote equity, accountability and confidence in Australia’s oral health care system.

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CONFLICT OF INTEREST

The authors have no conflict of interest to declare.

SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article:

Table S1. Perception of treatment needs among Australian-born and overseas-born populations by the main language spoken at home (weighted proportions and 95% confidence intervals), National Survey of Adult Oral Health 2017–2018

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