

BMJ Open Non-dental primary care providers' views on challenges in providing oral health services and strategies to improve oral health in Australian rural and remote communities: a qualitative study

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ABSTRACT

Objectives: To investigate the challenges of providing oral health advice/treatment as experienced by non-dental primary care providers in rural and remote areas with no resident dentist, and their views on ways in which oral health and oral health services could be improved for their communities.

Design: Qualitative study with semistructured interviews and thematic analysis.

Setting: Four remote communities in outback Queensland, Australia.

Participants: 35 primary care providers who had experience in providing oral health advice to patients and four dental care providers who had provided oral health services to patients from the four communities.

Results: In the absence of a resident dentist, rural and remote residents did present to non-dental primary care providers with oral health problems such as toothache, abscess, oral/gum infection and sore mouth for treatment and advice. Themes emerged from the interview data around communication challenges and strategies to improve oral health. Although, non-dental care providers commonly advised patients to see a dentist, they rarely communicated with the dentist in the nearest regional town. Participants proposed that oral health could be improved by: enabling access to dental practitioners, educating communities on preventive oral healthcare, and building the skills and knowledge base of non-dental primary care providers in the field of oral health.

Conclusions: Prevention is a cornerstone to better oral health in rural and remote communities as well as in more urbanised communities. Strategies to improve the provision of dental services by either visiting or resident dental practitioners should include scope to provide community-based oral health promotion activities, and to engage more closely with other primary care service providers in these small communities.

INTRODUCTION

In Australia, around one-third of the population resides in rural and remote areas. Residents in these areas have poorer health

Strengths and limitations of this study

- The use of qualitative methods provided opportunities to explore the challenges of providing oral health advice as experienced by non-dental primary care providers.
- This is the first qualitative study to include a wide range of health professionals working in rural areas and explore their views on strategies to improve oral health in rural areas.
- While our findings are limited to data obtained from interested participants who worked in mainstream healthcare facilities in only four communities in one state of Australia, a strength of the study was that these views were triangulated by interviews with dental practitioners who had visited these communities or were from surrounding towns.

outcomes and less access to healthcare services than the people living in major cities.¹ Both Aboriginal and non-indigenous people are also at risk of poorer oral health outcomes², experience higher rates of dental caries than their city counterparts³ and therefore, are more likely to present to dentists for problems, such as pain, than residents of major cities.⁴ There is no single factor that completely explains this; however, access to dental services is a key factor. Australia has a maldistribution of dental practitioners.^{5 6} There are more than three times as many dentists practising per 100 000 population in major cities (59.5) than in remote/very remote areas (17.9).⁵ The proportions of other types of dental practitioners, including dental therapists and prosthetists, are also the lowest in remote/very remote areas.⁵

Towns in many rural and remote areas in Australia are often widely dispersed and lack the population base to warrant a full-time

dentist. In the absence of a resident dentist, patients with an acute oral health problem may present to other primary care providers located in general medical practices,⁷ hospital emergency departments (EDs),^{7–9} pharmacies¹⁰ or to an Aboriginal Health Centre.^{11–12} Non-dental practitioners are usually able to provide only temporary relief for the symptoms and issue a referral rather than provide definitive treatment.^{7 10 13}

Presentations to an ED may result in admission for treatment, especially where there is concern that the patient's condition may deteriorate. During 2012–2013, dental conditions accounted for 63 000 avoidable hospital admissions, the third highest reason for acute preventable hospital admissions in Australia. These admission rates were higher in non-metropolitan areas and highest for very remote areas.¹⁴

Oral health services in Australia are provided by both public (government) and private sectors.¹⁵ In 2010, about 50% of all people aged 5 and over had some level of private health insurance cover for dental services.¹⁶ Public (low cost or fully subsidised) oral health services are provided for children up to 18 years and for adults with healthcare concession cards.¹⁵ In the absence of a dental practice in their own or a nearby community, rural and remote residents' dental needs may be met, in part, by visiting mobile facilities or periodic 'fly-in: fly-out' services.¹² Residents may also access a dental practitioner by travelling to a larger population centre; however, regular attendance can be difficult. This is due to costs associated with travel (which can be hundreds of kilometres), time off work, juggling the responsibilities associated with caring for dependents, and for those with less than adequate health insurance cover, the fees involved, especially when return visits are required for optimal treatment.¹⁷

Limited studies in the literature suggest that rural and remote people presented to non-dental care providers with oral health problems.^{10 12} One study focused on indigenous residents,¹² and the other was limited to the oral health presentations to rural pharmacies.¹⁰ To the best of our knowledge, there is no study investigating challenges that a wide range of non-dental care providers faced in providing oral health advice, and their suggestions to improve rural oral health. Their views on these issues could provide insight to informing rural oral health policy and planning. This study investigated the challenges experienced by the non-dental primary care providers in four outback towns and their views on ways in which oral health and oral health services could be improved for their communities. In this report, the term 'primary care provider' refers to the range of healthcare workers whose role includes being a first point of contact for patients with a health issue or problem.

METHODS

Study design

We conducted a qualitative study with primary and dental care providers who had experience in providing

oral health advice and treatment to patients in rural and remote communities. Semistructured interviews were used to explore their perspectives on oral health in rural areas as they were the main healthcare providers.

Study sites

The chief dental officer who was responsible for the delivery of public oral health services in Queensland, Australia, was invited to identify rural/remote communities (Australian Standard Geographical Classification Remoteness Areas—ASGC RA 4 and 5) in which there were: no resident dentist/dental surgery, at least one general medical (GP) practice, a healthcare facility, and a pharmacy. In total, 10 communities were identified. Two communities did not meet the study criteria. A convenience sample of four communities in the same region was then selected after verification that each met the study inclusion criteria. A public dentist visited two communities to treat eligible patients, for example, children and those with healthcare concession cards (table 1).

Participants

Primary and oral healthcare providers who had experience in providing oral health advice and treatment to patients in the four communities were included in this study. Primary care providers were recruited through the managers of the GP (medical) practice, pharmacy, hospital and other healthcare services of the four communities. The managers were asked to identify staff who had been involved in providing advice to a patient with an oral health problem and forward to them a study information package that included an invitation to contact the research team should they be willing to participate in a semistructured interview. All identified accepted to participate in the interviews. Participants had a choice to attend either an individual interview or a group interview. Group interviews were conducted at different healthcare services. Each group included staff with different occupations such as doctor, pharmacist and nurse from the same healthcare service.

Dental care providers identified by the non-dental participants, were also subsequently recruited through a snow ball sampling technique. They had provided dental services to patients from the communities sampled.

Data collection

The interview guide was developed from our literature review¹³ and after discussions among the team members, these were then piloted with a rural dentist and a pharmacist. Some questions were reworded to make them clearer and some subquestions were added to the interview guide as a result of the piloting. For example, one subquestion 'What kinds of training would up-skill you for the particular needs you face in your community?' was added as suggested by a pilot participant to better explore primary care providers' needs in oral health training.

Table 1 Characteristics of study sites

Town	Population	Nearest dental surgery (km)	ASGC	Visiting dental services
Town A	<2000	199	RA5-very remote	By a private dentist once a month
Town B	<1000	87	RA4-remote	By a private dentist once a month
Town C	<1000	210	RA5-very remote	By a public dentist every 3 months
Town D	<3500	195	RA4-remote	By a public dentist once a month

Source: (ABS, 2014).

ASGC, Australian Standard Geographical Classification; RA, Remoteness Areas.

The guide included items on: the profile of the practice; participants' professional background; information on the number of people who requested oral health advice or treatment; treatment/advice provided and their level of confidence with this; the communication they had with dental practitioners and their views on strategies that could improve oral health in their community. The main questions asked are given below:

- Q1. Can you estimate how many people present to your practice with oral health problems per month?
- Q2. What oral health advice/treatment are these people requesting?
- Q3. How do you respond? What action(s) do you take?
- Q4. How confident are you in providing oral healthcare advice?
- Q5. In your opinion, what strategies and interventions should be taken to improve oral health services to better meet the needs of your local community?
- Q6. To whom do you regularly talk to when you need to solve an oral health problem for your patient/client? (within and/or outside your practice)
- Q7. Could you tell me where the nearest dental surgery is?
- Q8. How often do you contact the dental surgery for advice or refer a patient to that surgery? How do you contact them?
- Q9. What are their availability and their opening times?

Three authors (TB, HH and JS) conducted all the individual and group interviews using the interview guide in the participants' workplace between October 2013 and March 2014. TB and HH had extensive experience in conducting individual and group interviews. JS was trained by TB and HH before joining the team to conduct the interviews.

The individual and group interviews lasted for 30–60 min.

Data analysis

Interviews were audio recorded and transcribed verbatim into Microsoft Word and then cross checked by HH and JS against audio recordings for errors. Each participant was assigned a numerical code to maintain confidentiality. The data were then imported into QSR—NVivo V.10.0 software¹⁸ to assist with the analysis. Two authors (HH and JS) were given formal training in using Nvivo by Nvivo experts. HH had extensive experience in analysing qualitative data using Nvivo software

package. NVivo software assists researchers to store, code, classify and sort qualitative data.

The interview data were analysed by HH and JS using thematic analysis¹⁹ to identify key patterns, trends in the data and recurring themes. HH and JS conducted the analysis independently, which involved coding the transcripts, categorising the codes and the generation of themes. The data was analysed using a combination of a priori ideas from the literature review that were built into the interview guide and the themes that 'emerge' from the data. The results were compared and discussed at regular meetings involving all researchers until consensus was reached.

Ethics considerations

This study was a part of a wider research project investigating the relationship of dental practitioners to primary care networks in three different states in Australia. Participants provided written consent prior to interviews.

RESULTS

In total, 39 participants participated in 25 interviews, including 7 group interviews (ranged from 2 to 8 participants). Out of the 25 interviews, 7 group interviews were conducted with 21 non-dental care providers and 18 individual interviews with 14 non-dental care providers and 4 dental care providers. Of the 39 participants, 24 were females and 15 males. Eighteen participants were aged over 40 years, and 21 participants were 18 to 40 years of age. Nearly half of the participants (19) had been in the current practice for 1–5 years, and six participants had been in the practice for more than 5 years. This is shown in table 2.

A number of themes and subthemes emerged from the interview data as illustrated in table 3 and discussed below.

Challenges faced

Oral health problems presentations: All participants reported they had seen patients with oral health problems, though there was variation in the frequency of presentations across each community and practice site (see online supplementary appendix S1). GP practices reported seeing people with oral health problems from 'everyday' to 'one per month', hospitals from 'very common' to '4 in a month', pharmacies from '10–15 per

Table 2 Characteristics of participants (N=39)

Characteristic	Number (%)
Sex	
Female	24 (61.5)
Male	15 (38.5)
Age groups (years)	
18–30	9 (23.1)
31–40	12 (30.8)
41–50	10 (25.6)
Over 50	8 (20.5)
Primary care provider*	
General practitioner (GP)	12 (30.8)
Pharmacist	6 (15.4)
Practice manager	4 (10.3)
Child health nurse/nurse	3 (7.7)
Manager/director of nursing	3 (7.7)
Receptionist	3 (7.7)
Medical student	3 (7.7)
Speech therapist	1 (2.6)
Dental care provider	
Dentist	3 (7.7)
Dental nurse	1 (2.6)
Years in current practice	
<1 month	5 (12.8)
1–12 months	9 (23.1)
>1–5 years	19 (48.7)
>5 years	6 (15.4)

*Term broadly defined.

week' to '1 a month'. The most common oral health problems were: toothache, abscess, oral/gum infections, sore mouth and trauma.

... We see a lot of adults and children usually with pain, abscesses or broken teeth. They come to us because there is not a dentist and they need pain relief or antibiotics. (Nurse, female, 45 years old)

Recidivism was also apparent. Delay or failure to obtain follow-up treatment with a dentist meant that

Table 3 Common themes and subthemes

Themes	Subthemes (number of responses)
Challenges faced	<ul style="list-style-type: none"> ▶ Oral health problems presentations (35) ▶ Oral health advice (35) ▶ Confidence in providing advice (24) ▶ Travel and cost (15)
Communication and referral pathways	<ul style="list-style-type: none"> ▶ Referral pathways (12) ▶ Lack of communication between primary and dental care teams (24)
Strategies to improve oral health	<ul style="list-style-type: none"> ▶ Oral health promotion (18) ▶ Dental workforce (17) and service provision (13) ▶ Education and training (19)

participants may see the same patient a number of times:

....I see people that have had dental pain again and again on the scripts. I look through their notes and see that they had dental pain here, here and here. So dental care is generally very poor from an individual basis. (GP, male, 42 years old)

Oral health advice. The treatment and/or advice provided by primary healthcare providers was influenced by their professional background. Many (14) included as part of their advice a recommendation that the patient see a dentist. GPs were most likely to provide short-term pain relief (11) and provide prescriptions for antibiotics (8); other participants advised patients to see a doctor (8). Some also provided oral hygiene advice and non-prescription antibacterial medicine.

Confidence in providing advice. Close to half of the primary care providers interviewed indicated that they were 'confident' in providing oral health advice and treatment within their scope of practice.

Yes pretty confident with basic dental emergency relief. (GP, male, 42 years old)

However, some acknowledged that they were sometimes 'not confident enough' (4) and 'not confident' (2) in dealing with oral health presentations.

I must admit, I'm not very knowledgeable; I just think, 'they need painkillers, antibiotics and a dentist'. I certainly don't really know much else, you know? (GP, female, 38 years old)

Travel and cost. Participants (15) were conscious of the difficulty some patients faced when they were advised to see a dentist that necessitated travel to a regional centre, acknowledging that this was 'expensive' and given that travel could be '200 km each way' on occasion 'almost impossible'.

....They don't have a lot of money and a lot of them don't have a vehicle. They will put up with the pain rather than drive for 2 hrs and spend \$400 on a tooth. (GP, female, 38 years old)

...even though there may be a service in [regional town] it might be a low income family, it's driving there and driving back. It's expensive to do that. (Nurse, female, 55 years old)

For residents without their own car and especially for older residents who had to rely on their family and friends for transport, travel to a regional centre could be more difficult when public transport to that place was not available:

...there is no public transport to either of those places. (Nurse, female, 45 years old)

...So if they don't have anybody to take them there is really nothing...(Nurse, female, 55 years old).

Communication and referral pathways

Referral pathways. Twelve participants made mention of a 'central referral unit' in a regional centre for which there was a toll-free number for patients or healthcare providers to call to make appointments to see the public dentist. These participants reported they received no feedback on the patients referred to the centre for treatment and complained that 'phone messages were not returned'. One participant stated that they learned of the treatment outcomes:

Only if I see them [the patient] again or follow-up somehow...It is very unprofessional ...not knowing what's going on. (Nurse, female, 55 years old)

A dental participant explained that there may have been different perceptions of what the central referral unit was about and this would have contributed to the expectations primary care providers had of the system:

It is basically a 1300 number that they ring up. It is a call centre to be precise, not a central referral unit (Dentist, female, 42 years old)

Lack of communication between primary and dental care teams. Although non-dental and visiting/regional dental care providers may have seen the same patients, there was little communication between the two teams. Thirteen non-dental care providers were uncertain or not aware of the availability of oral health services provided to their communities such as visiting dental services, the mobile dental van and school dental services.

...and in that [dental] surgery, we don't know when they come. They don't say ok yes we are in this week so we can ring and say we have a patient here with an abscess or with whatever who needs to be seen. (Nurse, female, 45 years old)

Twenty four non-dental care providers reported that they would 'never' or 'rarely' try to contact the dentists in the regional centre(s) for advice or to make an appointment for the patient when someone presented to them with an oral health problem.

I would never even think of ringing a dentist now, I just tell the patient to ring and make an appointment. (GP, female, 38 years old)

Distance to the nearest dental surgery, and lack of a resident or regular visiting dentist meant that 24 participants did not know who their nearest dentist was or how to contact them.

It would be different if you had a relationship with the dentist like if we had a local dentist here you might ring

them and say could you fit this patient in... but there is no relationship! (GP, female, 38 years old)

In contrast, the three dentists interviewed reported that they did communicate with non-dental care providers. A dentist who had previously serviced one of the communities stated:

Yes I introduced myself to the pharmacist and I knew the doctors from the hospital. I didn't actually meet them all in person but just communicated about patients with various diseases. (Dentist, male, 61 years old).

Strategies to improve oral health

A number of strategies were suggested by the participants to improve oral healthcare services. These, grouped in order of frequency of comments, related to: oral health promotion; dental workforce and service provision; and education and training.

Oral health promotion. Having seen patients with oral health problems, participants observed a lack of oral health knowledge in the community, especially among parents.

.....Also most families don't know that they should be actually cleaning the child's teeth after them till about the age 8 and like you say half of them might not even have toothbrushes. (Nurse, female, 45 years old)

Both primary care and dental participants (18) emphasised the importance of educating people from an early age in schools and the community about oral health, 'regular check-ups' and preventive dental care.

A lot of the people out there don't know the basics. Teach them that and a lot of the bigger dental problems go away. (Dentist, male, 61 years old)

Some participants mentioned water fluoridation as a strategy to improve oral health:

....See most of the people here would only drink tank water so what I was actually asking was is our water fluoridated? Maybe that impacts on our teeth being worse? (Nurse, female, 45 years old)

Dental workforce and service provision. The difficulty in attracting and retaining a dentist to these small communities was widely acknowledged (17). Participants, therefore, recognised the importance of establishing and maintaining regular visiting services by dentists. Preference was for such visits to occur '1 day a week' instead of '3 days every 3 months', and for dental team visits using a mobile dental truck or caravan towed from one community to another. 'Get the van to come' was a common suggestion from participants. A number of participants (6) also commented that more transport options could be provided to offset costs and enable patients to travel more easily to and from the nearest regional centre with a resident dentist.

Four participants from individual interviews, six participants in the group interviews and three dentists commented that a 'mixed' private and public dentistry model could be an attractive option to encourage dentists to work in a rural town. With this arrangement, a dentist would work part time for the public health service while retaining private practice privileges to augment their income.

The dentist should be allowed to work in both public and private practice. (Pharmacist, male, 28 years old)

One dentist, who had previously worked with such an arrangement recalled:

That's not a bad model to work on, to give the dentists the rights to private practice to work out of the same clinic. (Dentist, male, 61 years old)

Education and training: To better manage oral health problem presentations, 18 non-dental primary care providers expressed an interest in further developing their oral health knowledge and skills. Work schedules and competing priorities meant that most GPs and pharmacists preferred shorter courses on practical skills in the management of dental health problems.

... a half day or one day course focusing on practical advice to help buy time until a definite treatment can be done by a dentist is what I'd be interested in. (GP, male, 42 years old)

I would be interested in an online course if it was CPD [continuing professional development]. (Pharmacist, male, 29 years old).

DISCUSSION

Non-dental primary care providers faced a number of challenges in providing oral health services in rural and remote areas. As found elsewhere, in the absence of a resident dentist and irregularity of visiting dental services, people in the four communities did present to GP practices, local hospitals, pharmacies and Aboriginal Health Centres with a range of oral health problems.^{9 10 12} Overall, non-dental care providers were reasonably confident in providing oral health advice/treatment within their limited scope of practice. Most were keen to learn more about basic dental skills, acknowledging that this was often a neglected area in undergraduate training.²⁰⁻²² The regular inclusion of oral health topics in continuing education/professional development,²³ and staff induction programmes may be particularly relevant for those working in rural and remote areas.

The study results indicated that little communication occurred between non-dental primary care providers and visiting or regional dental practitioners. Although patients were often referred to a dental service, knowledge about how the system worked and lack of feedback

was the cause of some frustration among the participants, especially when they observed the same patients making repeat presentations. They reported that transport and cost issues made it difficult for patients to access public dental services in regional centres, and insufficient funding for public oral health services compounded the problem. In contrast to the non-dental participant experience, the three dentist participants reported that they did communicate with doctors in these rural areas to some extent. A similar finding was reported from a European study²⁴ which found that the dentists sampled rated their relationship with doctors as good or excellent, while the doctors rated their relationships with the dentists as non-existent. This suggests that more effective mechanisms could be established to develop a shared understanding of what needs to be communicated and how best to do this in ways that support a more collaborative and holistic approach to oral healthcare.²⁵ For example, there should be regular face to face meetings between the visiting/regional dental practitioners and rural/local primary care providers. The timetables of the visiting dental practitioners to the communities should be circulated to the primary care providers prior to their visits. The contact details of the nearby dental clinics should be available to the small community primary care providers. The establishment and maintenance of effective communication and referral pathways between primary care providers, dental practitioners and the local community would help build confidence in how oral health problems can be more effectively managed and, most importantly, prevented.²⁶ Better oral health training in basic and preventive dental skills for non-dental care providers would facilitate better communication and referral pathways between non-dental and dental care providers. This would help non-dental care providers deal better with oral health problems of rural patients before these become major medical problems. Consequently, this would reduce unnecessary hospitalisations. Better communication and stronger collaborations between mainstream and oral health services may provide additional impetus to reduce the discontinuity/disruptions to oral health service provision and help reduce the frequency of problem presentations.

In the current study, participants detailed a number of strategies that could contribute to better oral healthcare in their communities. First, educating communities on preventive oral health and providing oral health training for primary care practitioners will benefit both public and private patients. Oral health promotion and education might be carried out by existing non-dental primary care providers in the community such as community health nurses, GPs and pharmacists. With proper training in oral health, non-dental care providers could play a role in educating and promoting oral health to their communities. For example, GPs could educate patients on oral hygiene when they come for medical appointments. Pharmacists could have oral health posters

displayed in their stores and hand out oral health brochures to patients.¹⁰ Community health nurses could educate children on oral healthcare at playgrounds and schools. Neumann *et al*²⁷ demonstrated that rural maternal and child health nurses could deliver an oral health intervention by promoting early exposure to fluoridated toothpaste and distributing an oral health starter kit to parents of preschool children. Second, while providing more regular public visiting dental services would better serve public patients, the mixed private–public income model for dentists may also improve services to private patients. Third, providing transport options for rural patients would help improve access to public and private dentists located in larger population centres. However, in the current climate of budget cuts finding funds to support this could be a challenge.

Participants emphasised the importance of oral health promotion and illness prevention. This included water fluoridation, a cost-effective, equitable public health intervention, shown to reduce dental caries across the population.²⁸ Upstream, preventive strategies were seen as critical to improving the oral health status of these communities and the most effective way to reduce problem presentations downstream. A number of these proposed strategies were consistent with the National Oral Health Plan 2014–2023 (The Oral Health Monitoring Group. Australia's National Oral Health Plan 2015–2024 (Consultation Draft). 2014. Unpublished report) a policy document that also emphasises the need for oral health promotion, collaboration between health professionals, and building the capacity of the non-oral health workforce to support clients with their oral health.

Strengths and limitations of the study

The trustworthiness of the study was ensured by establishing credibility, dependability and confirmability.

According to Lincoln and Guba,²⁹ one of most important aspects in establishing trustworthiness is ensuring credibility. In this study, credibility was ensured by triangulation which used different data collection strategies, including field notes, group interviews and individual interviews,³⁰ and involved a range of participants at different sites. Field notes were taken during each interview and then compared with interview transcripts for discrepancies. Viewpoints and experiences of primary care providers were triangulated with that of dental care providers. Site triangulation was achieved where similar results emerged at different sites.³¹ In addition, participants were offered the opportunity to review their interview transcripts to check that their words matched with what they wanted to say. Furthermore, sufficient contextual information on the study sites was provided to help the reader relate to the actual contexts under investigation and make a transfer to similar situations.

Dependability and confirmability of the study were also established. Two researchers (HH and JS) coded the interview data independently for cross-validation

purposes. The coding results were compared and discussed at regular meetings involving all researchers until consensus was reached.

This is the first qualitative study to include a wide range of health professionals working in rural areas and explore their views on strategies to improve oral health in rural areas. The limitation of the study is that our findings are limited to data obtained from interested participants who worked in mainstream healthcare facilities in only four communities and therefore, these might be different in other settings. Another limitation is primary healthcare providers from Aboriginal Health Centres were not specifically recruited. A strength of the study was that these views were triangulated by interviews with dental practitioners who serviced the communities studied.

CONCLUSION

The results highlight the challenges experienced by non-dental primary care providers and their views on how oral health may be improved in rural/remote areas. Regular training should be available to non-dental care providers in rural areas to build their capacity and confidence in managing oral health problem presentations. Rural oral health could be improved by educating communities on preventative oral health; having better communication and referral pathways between non-dental and dental care providers; and better dental service provision.

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REFERENCES

1. AIHW. *Rural, regional and remote health: indicators of health status and determinants of health Canberra*. Australian Institute of Health and Welfare (AIHW), 2008.

2. National Advisory Council on Dental Health. Report of the National Advisory Council on Dental Health Canberra. National Advisory Council on Dental Health (NACDH), 2012 (cited 5 May 2014). <http://www.health.gov.au/internet/main/publishing.nsf/Content/final-report-of-national-advisory-council-on-dental-health.htm>
3. Slade G, Spencer A, Roberts-Thomson K. *Australia's dental generations: the national survey of adult oral health 2004–06*. Canberra: Australian Institute of Health and Welfare, 2007 (cited 10 July 2014). <http://www.aihw.gov.au/publication-detail/?id=6442467953>
4. Brennan D, Ellershaw A. *Insurance and use of dental services: National Dental Telephone Interview Survey 2010*. Canberra: Australian Institute of Health and Welfare, 2012 Contract No.: DEN 219.
5. AIHW. *Oral health and dental care in Australia: Key facts and figures 2011*. Cat. no. DEN 214. Canberra: Australian Institute of Health and Welfare (AIHW), 2011 (cited 15 July 2013). <http://www.aihw.gov.au/publication-detail/?id=10737420710>
6. Tennant M, Kruger E. A national audit of Australian dental practice distribution: do all Australians get a fair deal? *Int Dent J* 2013;63:177–82.
7. Cohen L, Bonito A, Eicheltinger C, *et al*. Comparison of patient visits to emergency departments, physician offices, and dental offices for dental problems and injuries. *J Public Health Dent* 2011;71:13–22.
8. Cohen L, Bonito A, Akin D, *et al*. Toothache pain: a comparison of visits to physicians, emergency departments and dentists. *J Am Dent Assoc* 2008;139:1205–16.
9. Cohen L, Manski R, Magder L. Dental visits to hospital emergency departments by adults receiving Medicaid: assessing their use. *J Am Dent Assoc* 2002;133:715–24.
10. Maunder P, Landes D. An evaluation of the role played by community pharmacies in oral healthcare situated in a primary care trust in the north of England. *Br Dent J* 2005;199:219–23.
11. Tennant M, Kruger E. Turning Australia into a 'flat-land': what are the implications for workforce supply of addressing the disparity in rural-city dentist distribution? *Int Dent J* 2014;64:29–33.
12. Walker D, Tennant M, Short SD. An exploration of the priority remote health personnel give to the development of the Indigenous Health Worker oral health role and why: unexpected findings. *Aust J Rural Health* 2013;21:274–8.
13. Barnett T, Hoang H, Stuart J, *et al*. Utilisation of oral health services provided by non-dental health practitioners in developed countries: a review of the literature. *Community Dental Health* 2014;31:224–33.
14. AIHW. *Australian hospital statistics 2012–13. Health services series no. 54. Cat. no. HSE 145*. Canberra: Australian Institute of Health and Welfare (AIHW), 2014 (cited 2 March 2015). <http://www.aihw.gov.au/publication-detail/?id=60129546922>
15. NACOH. *Healthy mouths, healthy lives: Australia's National Oral Health Plan 2004–2013*. Adelaide: National Advisory Committee on Oral Health, 2004 (cited 8 September 2013). <http://www.healthinfonet.ecu.edu.au/key-resources/bibliography/?lid=3092>
16. AIHW. *Australia's health 2014*. Canberra: Australian Institute of Health and Welfare (AIHW), 2014.
17. Curtis B, Evans R, Sbaraini A, *et al*. Geographic location and indirect costs as a barrier to dental treatment: a patient perspective. *Aust Dent J* 2007;52:271–5.
18. QSR International Pty Ltd. *QSR Nvivo 10 Melbourne*. QSR International Pty Ltd, 2014.
19. Joffe H, Yardley L. *Content and thematic analysis*. In: Marks D, Yardley L, eds. *Research methods for clinical and health psychology*. Thousand Oaks, California: Sage Publications Ltd, 2004:56–68.
20. Cohen L, Bonito A, Akin D, *et al*. Role of pharmacists in consulting with the underserved regarding toothache pain. *J Am Pharm Assoc* 2009;49:38–42.
21. Hocker M, Villani J, Borawski J, *et al*. Dental visits to a North Carolina emergency department: a painful problem. *North Carolina Med J* 2012;73:346–51.
22. McCormick A, Abubaker A, Laskin D, *et al*. Reducing the burden of dental patients on the busy hospital emergency department. *J Oral Maxillofac Surgery* 2013;71:475–8.
23. Skapetis T, Gerzina T, Hu W, *et al*. Effectiveness of a brief educational workshop intervention among primary care providers at 6 months: uptake of dental emergency supporting resources. *Rural Remote Health* 2013;13:2286.
24. Tenenbaum A, Folliguet M, Berdougo B, *et al*. Improving the physician-dental surgeon relationship to improve patient care. *La Presse Médicale* 2008;37(4 Pt 1):564–70.
25. Gussy M, Waters E, Kilpatrick N. A qualitative study exploring barriers to a model of shared care for pre-school children's oral health. *Br Dent J* 2006;201:165–70.
26. Dyson K, Kruger E, Tennant M. Networked remote area dental services: a viable, sustainable approach to oral health care in challenging environments. *Aust J Rural Health* 2012;20:334–8.
27. Neumann AS, Lee KJ, Gussy MG, *et al*. Impact of an oral health intervention on pre-school children <3 years of age in a rural setting in Australia. *J Paediatr Child Health* 2011;47:367–72.
28. Crocombe L, Brennan D, Slade G, *et al*. The effect of lifetime fluoridation exposure on dental caries experience of younger rural adults. *Aust Dent J* 2015;60:30–7.
29. Lincoln YS, Guba EG. *Naturalistic inquiry*. Beverly Hills, CA: Sage, 1985.
30. Brewer J, Hunter A. *Multimethod research: a synthesis of styles*. Sage Publications, Inc, 1989.
31. Shenton AK. Strategies for ensuring trustworthiness in qualitative research projects. *Educ Info* 2004;22:63–75.