

## Background

Oral diseases, predominantly dental caries (tooth decay), periodontal disease (gum disease), and oral cancers, are a leading cause of disease burden worldwide, despite their preventable nature (1, 2). Poor oral health has significant ongoing consequences, such as poor sleep and physical and mental functioning, more days off school or work, impacts on gaining employment, and an overall reduced quality of life (2, 3). Poor oral health also places substantial burdens on health, economic and social systems. Oral health has a reciprocal relationship with important, common comorbidities such as diabetes, cardiovascular disease, and pregnancy complications. Furthermore, links to other systemic disease are also emerging (4, 5).

Nevertheless, medical and oral health systems worldwide often operate in separate realms despite the inextricable link between the two (2, 6). This is problematic given that, typically, access to oral health care is poorer and the cost of it higher primary medical care (general practice). In New Zealand, primary health care for general practice services and prescriptions are subsidised, whereas the majority of oral health care for those aged 18 and over is privately-funded (7, 8). Jatrana and Crampton (8) found that 22% of New Zealanders deferred from visiting a dentist when indicated due to cost. In addition to cost, other barriers to accessing oral health care in New Zealand includes lack of subsidies and resources, opening hours, location of practices, oral health inequities and culturally-inappropriate services(9). Consequently, general practice is likely to be the first port of call for a proportion of dental complaints (10). People are more likely to be enrolled in a general medical practice and they may feel more comfortable attending their regular and familiar medical centre than an unknown dental practitioner. Yet, general practice staff (doctors and nurses) report receiving little, if any, oral health training and therefore may not have the knowledge or confidence to address their patients' oral health conditions (11, 12). Practitioners are also unlikely to engage in or initiate conversations regarding oral health (13).

Given the prevalence of comorbidities in our ageing population are expected to rise, natural tooth retention to improve (14), and there being no financial support on the horizon, it is likely that complaints of oral health origin to general practice will increase. Consequently, it is important that practitioners are familiar with oral health presentations.

Worldwide, recommendations are that oral health be integrated into primary medical care (15, 16). Primary health care by definition encompasses all areas of health (6). General practice is an ideal setting to promote oral health and prevention. Doctors and nurses in a general practice setting have more contact with populations' most vulnerable than oral health practitioners. General practice staff are not able to replace the role of oral health practitioners, who are highly skilled and trained in

diagnosing and treating oral disease, but rather provide a potential contact to screen for oral disease risk, increase awareness about oral health care, provide preventive advice, and refer when necessary.

Little is known in New Zealand about general medical practitioners' knowledge and confidence in addressing oral health presentations. To address this gap and inform further investigations this study aimed to determine the current level of knowledge and confidence among general medical practice workers. We also sought advice from health care professionals on potential avenues in which to address this situation, and how to improve engagement and collaboration between general medical and oral health care practitioners.

## **Methods**

A cross-sectional, self-administered electronic survey was created using REDCap (Research Electronic Data Capture) hosted by the University of Otago. Requests were sent to the Royal New Zealand College of General Practitioners, the New Zealand College of Primary Health Care Nurses and all the Primary Health Organisations in New Zealand asking them to distribute the questionnaire through their newsletters, website bulletins, or direct emails to primary care practices. Practitioners were advised that participation was voluntary, all information collected was anonymous, and that consent was implied by completion of the survey. The project was granted ethical approval from the University of Otago Human Ethics Committee [D18/015]. Prior to data collection, the questionnaire and information sheet were piloted with primary care doctors and fellow researchers and their feedback was incorporated into the final survey. Data were collected between 1 December 2020 and 4 January 2021 and analysed descriptively using SPSS.

The questionnaire (Appendix 1) was created by the authors informed by literature (3, 11, 17-21) and designed to take approximately ten minutes to complete. Questions gathered information on participants' views on the importance of oral health in overall wellbeing, their knowledge of oral health risk factors and linkages with general health conditions, their confidence in managing oral health presentations, previous training in managing oral health presentations, their engagement with oral health practitioners, and their desire for and preferences on the mode of delivery of further training on oral health. An open-ended question gathered participants' suggestions on how to improve collaboration between oral and primary health care. Participants' demographic information was also collected; they were also asked if they had received any prior oral health care training.

## Results

### *Participant characteristics*

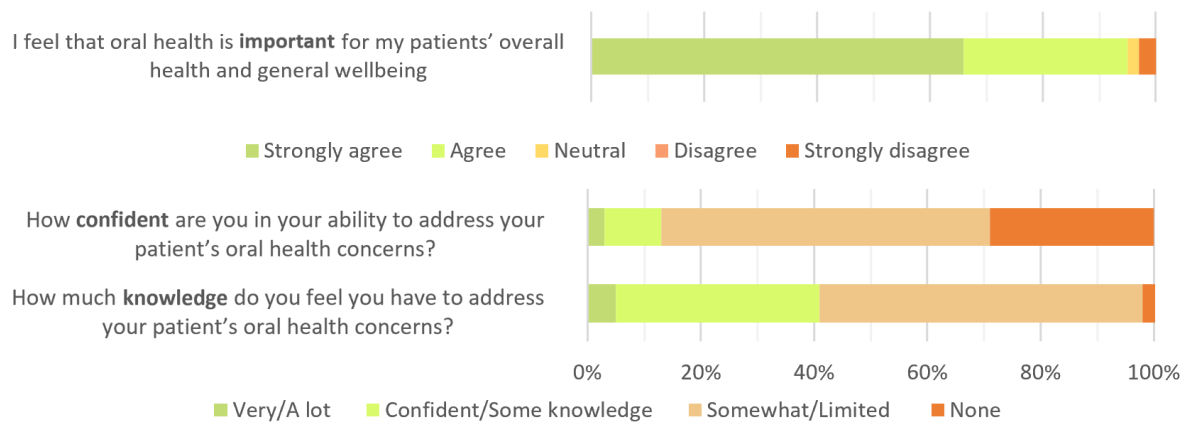
Eighty-three people clicked on the survey link; twenty-one responses provided insufficient data and were removed. In total, responses from 62 participants were analysed. The sample comprised almost equal proportions of doctors and nurses, 1-40 years of general practice experience (Table 1). One in ten participants identified as Māori, the remainder being predominantly NZ European. Responses were received from 15 (75%) of New Zealand's District Health Board (DHB) regions.

*Table 1 Participant characteristics (N=62)*

	N	%	
Discipline			
Nurse	25	40	
GP	34	55	
Other	3	5	
Previous oral health training			
Yes	15	24	
No	47	76	
<i>If yes, how much previous training</i>			
A lot	1	7	
Some	2	13	
A little	12	80	
Gender			
Male	10	16	
Female	51	84	
Ethnicity			
NZ European	50	81	
Māori	7	11	
Pacific	0	0	
Other	15	24	
	Mean	SD	Range
Years worked in general practice	14.45	10.48	1-40

### *Oral health knowledge and confidence in addressing oral health presentations*

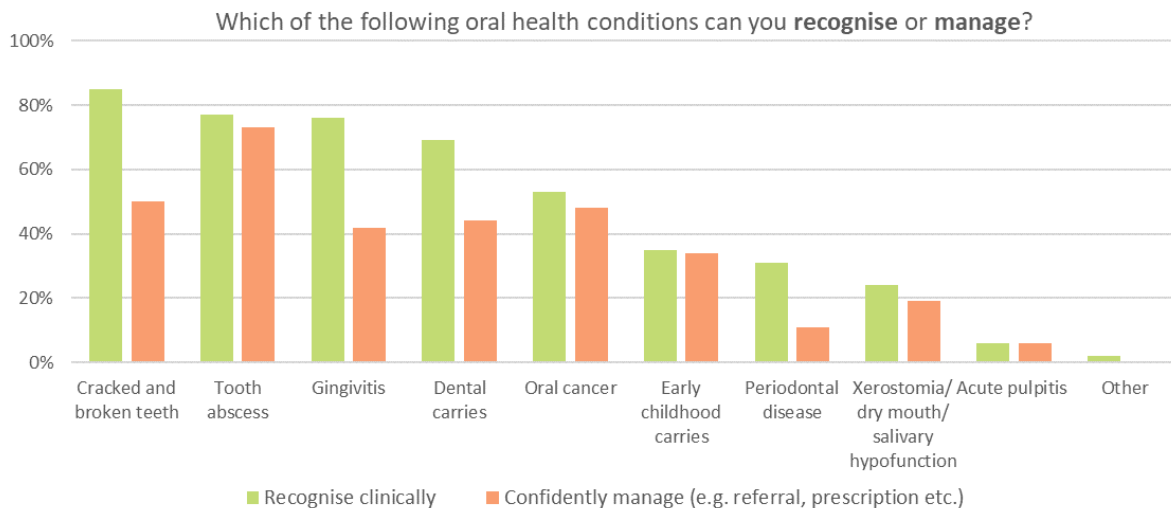
Almost all (95%) of participants agreed that oral health was important for their patient's overall health and wellbeing (Figure 1). However, 29% said they had no confidence when it came to addressing their patients' oral health concerns and over half (58%) said they had no or limited knowledge about oral health. Overall, participants who had previous training in oral health reported higher levels of knowledge and confidence.



**Figure 1. Participants' views on the importance of oral health and, their confidence and knowledge of oral health. N=62.**

Responses to all questions to determine knowledge of oral health risk factors were predominantly 'rarely' or 'never'. Of those questions, the most asked were about diet, and the least asked were about acid reflux and dry mouth. When participants reported conducting an oral examination, it was most commonly when a patient presented with oral symptoms (77% always), although almost one in ten (8%) said they would perform an examination less than of half the time for this. Almost one in three (31%) participants reported having no confidence to examine a patient's mouth for oral disease.

When participants were asked about their level of knowledge of oral disease risk factors, tobacco (98%) and high sugar diet (97%) were highly rated, while pregnancy (68%), obesity (52%), and methadone (37%) were less so. Participants were asked to indicate if they could clinically recognise a range of common oral conditions and if they could confidently manage them (Figure 2). Overall, management of oral conditions were low. Almost three-quarters (73%) reported being able to manage a 'tooth abscess' Conditions that were poorly rated for both recognition and management included oral cancer (53%, 48%, respectively) and dry mouth (24%, 19%, respectively).



**Figure 2. Recognition and management of oral health conditions.**

### ***Referral and health services***

Nine in ten (91%) participants reported asking their patients less than half of the time if they are enrolled at an oral health practitioner and four in five (79%) did not commonly check if children were enrolled with a dentist. Some participants wrote that they chose not to ask of their adult patients' oral health as they considered treatment would be too expensive for their patients.

One in four participants (26%) were not aware of referral pathways for oral health treatment for their patients who were having oral health problems (Table 2). Of those who were aware, almost one in three (31%) did not use them. Likewise, almost one in three (31%) never communicated with an oral health practitioner or service. When asked about modes of communication with these services, electronic messaging (61%) was the most preferred, followed by email (37%), phone (35%) or written letter (31%). Similarly, when asked how participants' engagement with these services could be improved, the most common strategies were continuing professional development (CPD) sessions (71%), followed by a structured referral system (66%), e-learning programmes (58%), presentations from oral health practitioners (56%) and integrated practices (39%).

**Table 2. Referrals and oral health services**

	Yes		No		
Are you aware of referral pathways for patients with oral health needs ( <i>e.g. when to refer to a dentist or specialist</i> )	46(74%)		16(26%)		
If yes, Do you use them?	43(69%)		19(31%)		
	Daily	Weekly	Monthly	Yearly	Never
Other than when clinically indicated ( <i>e.g. toothache or dental infection</i> ), how often do you tell patients to “go and see a dentist”?	0(0%)	8(13%)	18(29%)	22(36%)	14(23%)
How often do you communicate with an oral health practitioner or service?	0(0%)	2(3%)	8(13%)	32(53%)	19(31%)

### **Future practice**

The final section of the survey focused on future practice ([Appendix 3](#)). Besides wanting more funding and resources (90%), participants wanted to know more about clinical signs of disease (79%), managing dry mouth (66%), referral pathways (63%), oral examinations (61%), local services in their area (53%), oral disease pathophysiology (53%), then oral disease consequences, screening and prevention (each 35%). Most responses to the open questions for suggestions to improve collaboration between sectors and additional feedback, were concerns about funding. Other responses are exemplified:

Participant 1: *“We have little practical knowledge or useful clinical pathways available in general practice. ... Having guidance on managing simple oral health issues would be great.”*

Participant 2: *“I do not feel confident addressing oral health issues ... due to lack of training... but because of access issues to dental care I need to be able to provide basic oral health advice.”*

### **Discussion**

Even though the majority of participants in this study agreed that oral health care was important to their patient’s overall health and wellbeing, their knowledge and confidence were very low. This finding is consistent with those in the previous literature (11, 21). Participants identified they would like further training, increased funding, and structured referral pathways for their future practice.

Participants' low confidence was reflected in how infrequently participants would ask, and engage in conversations with, their patients about their oral health. A low level of knowledge was further emphasised through the low numbers of risk factors and oral conditions participants were aware of and could manage. Despite a current low level of confidence and knowledge of oral health care, most participants of the survey wanted to learn more, preferably through a CPD session. The participants with previous training rated higher in their confidence and knowledge, affirming that training is beneficial.

That participants recognised oral health as being important to general health and wellbeing indicates an understanding of how oral health can affect a person's functioning and quality of life. It is positive that our participants recognised this importance, and is contrast to previous literature in which participants rated it low until they received training on the subject (19). Despite this, it is obvious the two sectors of health are disconnected, with one in three participants saying they never communicate with their local oral health practitioners or service.

As expected, and consistent with previous investigations, oral health screening questions were not commonly asked in general practice (13). 'Diet' was the most frequently enquired factor in this study, likely due to diet and nutrition being a well-recognised and common risk factor for other noncommunicable diseases (e.g. cardiovascular disease, type 2 diabetes mellitus). Oral examinations were also rarely performed, and this is accompanied with a very low confidence level for this procedure (31% no confidence).

An interesting area highlighted in the survey was dry mouth, which could be relatively easily managed in general practice, yet less than one-quarter of participants could recognise or confidently manage the condition. Dry mouth is a key risk factor for dental caries and can substantially impact a person's eating and nutrition, speech, and quality of life. Dry mouth is most commonly caused by a range of xerostomic medications including antihistamines, antihypertensives and diuretics (22), but is also the consequence of radiation therapy for head and neck cancers, and a feature of some medical conditions such as Sjogren's syndrome. Encouragingly, the majority of participants wanted to learn more about dry mouth and how to manage.

Generally, clinical recognition of oral conditions was low, and their management was even more so. This is again unsurprising due to the lack of oral health care training in the professional training programmes for nurses and doctors. It should be emphasised that management was particularly low even though we included referrals as a management option, reflecting the lack of communication between general medical and oral health care practitioners. Knowledge to recognise and manage oral

cancer was also lowly rated, which is significant considering the rising epidemic rates due to HPV (11, 23).

To our knowledge, this is the first such investigation in New Zealand. We had relatively equal proportions of doctors and nurses, a wide range of experience, and a good spread across almost all DHBs despite our small sample size. We had proportionally a higher number of females (84%). One in ten participants identified as Māori, which is higher than the proportion of the general practice workforce. Maori have poorer access to and use of oral health services and interest in our survey likely reflects an increased concern about oral health services for Māori. Our data was remarkably consistent in our analysis.

The study has some limitations. Given of our smaller sample size, our findings are not generalisable to the general practice workforce. Also, participants were likely to have some knowledge and awareness of the topic, demonstrated by one in four having some previous oral health training. Despite this, only one in eight had confidence in addressing oral health presentations, and there were clear gaps of knowledge identified throughout the survey. Thus, it is probable that the confidence and knowledge of those who did not respond is lower.

### ***Implications for future practice***

Funding for oral health care is obviously an area of concern, being frequently voiced by participants throughout the survey. For action, awareness and knowledge of oral health needs to be raised within general practice. For now, other strategies to improve oral health care need to be utilised such as integrating the two sectors of health through education and improving referral systems.

Most participants in our survey indicated an interest to learn more about signs of oral disease, dry mouth, and oral examinations through a CPD session. A CPD module is being planned as part of a bigger project relating to this survey, so it is encouraging that participants endorsed this strategy. Knowledge and confidence among practitioners will likely improve with greater education and training in oral health and management of oral conditions.

To integrate the general medical and oral health care, structured referral systems are needed. There are pathways in place currently, although limited, and one-quarter of participants were not aware of these. Canterbury DHB has already designed hospital and community HealthPathways for a range of dental conditions. The findings of our survey indicate that other areas would benefit from similar systems. Most participants said their engagement with oral health would be improved with structured referral systems. Electronic messaging was the most endorsed method of communication, and so this would need to be included in future systems.



## Conclusion

Despite a consensus that oral health is important for overall health and wellbeing, general practice workers do not feel confident nor have the knowledge to address their patients' oral health concerns. Furthermore, they are unlikely to engage in conversations regarding the topic or perform oral examinations. However, participants from this survey are interested in learning more about oral health through a CPD session and is an area for future development. Further education should be structured around gaps in knowledge identified by this survey. Increased collaboration between general medicine and oral health care will help to improve patient-centred oral health, and by extension, their overall health and quality of life.

## References

1. Petersen PE, Bourgeois D, Ogawa H, Estupinan-Day S, Ndiaye C. The global burden of oral diseases and risks to oral health. *Bull World Health Organ.* 2005;83(9):661-9.
2. Peres MA, Macpherson LMD, Weyant RJ, Daly B, Venturelli R, Mathur MR, et al. Oral diseases: a global public health challenge. *The Lancet.* 2019;394(10194):249-60.
3. Phillips KE, Hummel J. Oral Health in Primary Care: A Framework for Action. *JDR Clin Trans Res.* 2016;1(1):6-9.
4. Winning L, Linden GJ. Periodontitis and systemic disease. *BDJ Team.* 2015;2(10).
5. Cervino G, Terranova A, Briguglio F, De Stefano R, Famà F, D'Amico C, et al. Diabetes: Oral Health Related Quality of Life and Oral Alterations. *BioMed Research International.* 2019;2019:5907195.
6. Atchison KA, Rozier RG, Weintraub JA. Integrating oral health primary care and health literacy. 2017.
7. Jatrana S, Crampton P, Filoche S. The case for integrating oral health into primary health care. *The New Zealand Medical Journal (Online).* 2009;122(1301).
8. Jatrana S, Crampton P. Primary health care in New Zealand: Who has access? *Health Policy.* 2009;93(1):1-10.
9. Robson B, Koopu P, Gilmour J, Rameka R, Stuart K, Simmonds S, et al. Oranga- Waha - Oral Health Research Priorities for Māori low-income adults, kaumātua, and Māori with disabilities, special needs and chronic health conditions. Wellington: Te Rōpū Rangahau Hauora a Eru Pōmare; 2011 2011.
10. Bater MC, Jones D, Watson MG. A survey of oral and dental disease presenting to general medical practitioners. *Quality in Primary Care.* 2005;13:139-42.
11. Ahluwalia A, Crossman T, Smith H. Current training provision and training needs in oral health for UK general practice trainees: survey of General Practitioner Training Programme Directors. *BMC Med Educ.* 2016;16:142.

12. Yimenu DK, Adelo ES, Siraj EA, Kassie TA, Hammeso WW, Demeke CA, et al. Health Professionals Oral Health Knowledge and Practice: Unleashing the Hidden Challenges. *J Multidiscip Healthc*. 2020;13:459-69.
13. Cope AL, Wood F, Francis NA, Chestnutt IG. General practitioners' attitudes towards the management of dental conditions and use of antibiotics in these consultations: a qualitative study. *BMJ Open*. 2015;5(10):e008551.
14. Watt RG, Daly B, Allison P, Macpherson LMD, Venturelli R, Listl S, et al. Ending the neglect of global oral health: time for radical action. *The Lancet*. 2019;394(10194):261-72.
15. Office of the Surgeon General (US). National Call To Action To Promote Oral Health. National Institute of Dental and Craniofacial Research (US). 2003.
16. Donoff RB, Daley GQ. Oral health care in the 21st century: It is time for the integration of dental and medical education. *Journal of Dental Education*. 2020;84(9):999-1002.
17. Dwiel K, Hesketh MA, Alpert JL, Cellini J, Goodell K, Phillips RS, et al. The Impact of Oral Health Training for Primary Care Clinicians: A Systematic Review. *Fam Med*. 2019;51(3):251-61.
18. Harnagea H, Couturier Y, Shrivastava R, Girard F, Lamothe L, Bedos CP, et al. Barriers and facilitators in the integration of oral health into primary care: a scoping review. *BMJ Open*. 2017;7(9):e016078.
19. Park SE, Donoff RB, Saldana F. The Impact of Integrating Oral Health Education into a Medical Curriculum. *Med Princ Pract*. 2017;26(1):61-5.
20. Recommended Oral Health Screening Questions: Safety Net Medical Home Initiative; [Available from: <http://www.safetynetmedicalhome.org/sites/default/files/Oral-Health-Screening-Questions.pdf>].
21. Geriatric Medicine Research C. A nationwide survey of confidence and knowledge of assessment and management oral conditions amongst a sample of physicians, United Kingdom. *BMC Res Notes*. 2019;12(1):348.
22. Wolff A, Joshi RK, Ekström J, Aframian D, Pedersen AML, Proctor G, et al. A Guide to Medications Inducing Salivary Gland Dysfunction, Xerostomia, and Subjective Sialorrhea: A Systematic Review Sponsored by the World Workshop on Oral Medicine VI. *Drugs R D*. 2017;17(1):1-28.
23. Mehanna H, Beech T, Nicholson T, El-Hariry I, McConkey C, Paleri V, et al. Prevalence of human papillomavirus in oropharyngeal and nonoropharyngeal head and neck cancer—systematic review and meta-analysis of trends by time and region. *Head & Neck*. 2013;35(5):747-55.