ACCESS TO ORAL HEALTH SERVICES FOR LOW INCOME ADULTS

Building on our policy position

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1. INTRODUCTION

There is growing public and political interest in the affordability of oral health care for adults. The Minister of Health is on public record stating he believes there is an unmet need for oral health care in the adult population and would like to see this addressed in the next term of Government.

NZDA's position is that all New Zealanders have the right to good oral health. The association membership consists of over 98 percent of NZ dentists and represents dentists working across the entire range of settings (public, private, academic and Defence) and with patients from all walks of life. Our members have first hand insight into the consequences of poor oral health, and are active in advocating for evidence-based policy that provides the best opportunity for oral health to be shared by all communities.

In 2017, NZDA published a policy statement calling for measures to improve access to oral health care for low income New Zealanders. NZDA would like to strengthen the analysis and ideas that underpin this statement so that our spokespersons and members are equipped to participate more effectively in policy shaping discussions ahead of the 2020 general election. This project was commissioned to assist in meeting these needs. PricewaterhouseCoopers (PwC) were engaged to provide advice to the project.

T**his report summarises the conclusions from the project. Specifically, it sets out:**

- a narrative for why action is needed to alleviate out-of-pocket costs for vulnerable adults
- potential costs and benefits for government and society of addressing financial barriers to oral health services
- a roadmap of activities to help improve access to oral health services for vulnerable New Zealanders.

2. APPROACH, LIMITATIONS & KEY TERMS

2.1 APPROACH

The project comprised four phases, summarised in Table 1 (below).

Table 1 Project phases

Phase		Activities
1	**Discovery**	Desk-based document review and research, including: • review of documents provided by NZDA • rapid review of published and grey literature on barriers and enablers of access to oral health care for disadvantaged adults • scan of international oral health systems (Appendix A) • examination of available cost and spending information for adult oral health care. Desk-based work was supplemented with input from a small advisory group of NZDA members and discussion with key NZDA staff.
2	**Cost-benefit analysis**	A cost-benefit analysis, using the Treasury's CBAx model, was carried out to explore the potential impacts from funding dental services for low-income adults in New Zealand. Further information about the analysis and model is provided in Section 3.
3	**Options and analysis**	Ideas for reducing costs of accessing dental services were generated, drawing on insights from the previous two phases, and PwC's knowledge of policy design and Budget processes in New Zealand. These were considered against criteria including: • Addresses need • Fiscal impact • Timeframe and ease of implementation • Alignment with key principles for NZDA e.g. services provided by a team led by dentists, provision in community-based settings. From this phase we developed a suggested roadmap of initiatives.
4	**A3 and report**	The analysis and ideas from Phases 1-3 were brought together into recommendations for NZDA, and translated into visual materials. This report, slide deck and accompanying A3 are the key deliverables for this project.

2.4 LIMITATIONS

The scope for this project was defined by NZDA's current policy position on 'access to oral health services for low-income adults'. The analysis and ideas provided are therefore limited by the framework and principles provided by the position statement. Key parameters were:

- The Community Oral Health Service (COHS) should be protected (i.e. solutions should not reallocate funds from child and adolescent services to adults)
- Population strategies are critical for disease prevention and should be prioritised
- Working with the private dental sector is important for designing long-term solutions to financial barriers
- Adult oral health services are best provided by an oral health team led by dentists.

2.5 ELIGIBILITY FOR TARGETED SERVICES

A key objective for NZDA in undertaking this project was to understand how eligibility for an income-based oral health scheme could be practically determined, other than the Community Services Card.

A number of alternative approaches, and how they could be applied, are set out in Table 2.

It should be noted that income-based targeting of support comes with inherent risks and challenges. These are canvassed extensively in economics and welfare literature and are beyond the scope of this report. Examples include ‘gaming’ of the system whereby people manipulate their apparent income to become eligible for a public programme, and effective marginal tax rates – where a person is disadvantaged by earning a dollar of extra income because of a consequent loss in eligibility for social assistance. Modelling the possible consequences of introducing a dental service or support package targeted to people based on incomes would be important for understanding whether the programme would achieve its objectives.

Moreover, income is a blunt tool to assess need, as non-income factors are also important for day-to-day living conditions and the ability to afford essential items. Material deprivation or hardship, for example, has been incorporated into measures of child poverty introduced in 2018. It refers to ‘a person or family lacking essential consumption items because they cannot afford them’. Material hardship provides a more nuanced picture of the choices that people make when facing multiple deprivations (e.g. deprioritising oral health), and therefore better reflects that ‘low-income’ households are not a homogenous group. As yet, there is a not a simple way to operationalise material hardship for the purposes of determining service eligibility.

Table 2 Mechanism for determining eligibility of 'low-income' population

Mechanism	Description	Considerations	Example	Appropriate for dental?
Geographic targeting	NZDep quintiles highlight where there is a higher concentration of low-income adults. One approach is to target funding to services operating in these areas. Mesh block data could also identify highly deprived communities for the purposes of piloting.	Inequalities within regions	• School deciles • Warm Homes Initiative	• Yes, if services funded through local level commissioning
Special purpose cards	An advantage to the Community Services Card is its simplicity. To achieve a similar effect, a 'Dental Access' card could be developed to verify eligibility for a funded programme. Eligible adults could be proactively sent a card on the basis of other factors (e.g. benefit status).	Not everyone who is eligible for a card has one. Current trends favour integration across Government services, rather than unique eligibility criteria.	• SuperGold Card • High User Health Card	• Yes
Disclosed annual income / tax codes	Inland Revenue (IR) has the Government's best information on the population's income. Much like how MSD and IR collaborate to administer Working for Families tax credits, there is potential to work with IR or MSD to support dental service access for individuals based on their income, reducing the administrative burden for patients and service providers.	Predominantly used for benefits and entitlements paid directly rather than in exchange for services, for large populations.	• Working for Families • Best Start	• No
Referral pathways	Working with social agencies or programmes, other criteria could be used as a proxy for financial hardship and trigger a referral for dental care e.g. eligibility for housing assistance, eligibility for specific benefits, referral from other agencies.	Requires a clear rationale for choosing the eligible group, risks unconscious biases if referral decisions made by individuals without clear criteria or pathways	• Referrals from Work and Income case managers or Whānau Ora navigators	• Yes

2.6 KEY TERMS

Table 3 Key terms

Term	Definition
Basic dental care	Oral health services that focus on alleviating pain and promoting good oral hygiene including fillings, extractions and chairside education. Cosmetic dental treatments are out of scope.
Combined Dental Agreement	The Service Agreement for the Provision of Oral Health Services for Adolescents and Special Dental Services for Children and Adolescents[1] to be applied between DHBs and dental providers.
Emergency dental services	Emergency dental treatment that is immediately necessary for the relief of pain and infection.
Fee-for-service	A service contract where payment is made by the funder based on what services have been provided at rates set out in the agreement.
Low-income adults	Adults with below median income that are not eligible for adolescent services. For the analysis used in this project, this group is assumed to be 20+ year olds from the 40% most deprived communities in New Zealand.
Oral health	The World Health Organization defines oral health as; "a state of being free from chronic mouth and facial pain, oral and throat cancer, oral infection and sores, periodontal (gum) disease, tooth decay, tooth loss, and other diseases and disorders that limit an individual's capacity in biting, chewing, smiling, speaking, and psychosocial wellbeing"[2].
Primary dental services	Services provided by general dental practices, excluding emergency services.
Vulnerable	People at risk of poor oral health outcomes because cost or other challenges prevents them from accessing services when needed.
Work & Income grants	A payment up to $300 (or more depending on the client's situation) to help meet the costs for dental services for those below an income and means threshold.

[1] Manatu Hauora, New Zealand Ministry of Health. Nationwide Service Framework Library. 2019. https://nsfl.health.govt.nz/service-specifications/current-service-specifications/oral-health-service-specifications
[2] World Health Organization. Oral health - Key Facts. 2018. https://www.who.int/news-room/fact-sheets/detail/oral-health

3. THE PROBLEM

Oral health is integral for wellbeing...

Oral health is a fundamental part of wellbeing. Our teeth and mouth help shape our identity. Good oral health enables us to speak, eat, chew and smile.

When oral health is bad, there are social and economic consequences[3]. Poor oral health can result in unremitting pain, chronically impaired sleep, avoidable admissions to hospital, and heightened risks of other chronic conditions[4]. Stigma associated with missing or decayed teeth has an effect on employability[5] and relationships[6]. Research shows that chronic pain leads to a productivity loss of nine days a year through absenteeism and 36.5 days through presenteeism[7]. School and the workplace are hubs for human interaction – being unable to fully participate affects social wellbeing, as well as the ability to learn and earn.

...**but is out of reach for vulnerable New Zealanders...**

New Zealanders do not share the same access to oral health. Māori, Pacific Peoples and New Zealanders living in the most deprived communities have the highest prevalence of poor oral health and lowest uptake of dental services[8]. As oral diseases are largely preventable, this means already disadvantaged groups suffer disproportionately from the social and economic consequences of pain, shame, and stigma, and time lost from family, whānau, education and employment.

...because we treat oral health differently from other kinds of health...

In New Zealand, more than three-quarters of health care costs are financed by Government from general taxation. Hospital and secondary services in the public system are provided free of charge, and primary and community-based services are either free or subsidised, including oral health care from birth to age 18. Community Services Card holders are eligible for a range of additional subsidies, including lower cost GP visits and prescriptions for themselves and dependents.

Dental care for adults sits outside of this system. Adult oral health care makes up only small portion of Government's health spending – less than 0.5 per cent of Vote Health in 2018/19 – of which more than half goes towards secondary services and ACC[9].

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[3] Richardson, B., & Richardson, J. (2011). *End the decay: the cost of poor dental health and what should be done about it*. Australia: Brotherhood of St Laurence.
[4] Moore, D., & Poynton, M. (2015). *Review of the benefits and costs of water fluoridation in New Zealand*. Report prepared for the Ministry of Health: Sapere Research Group.
[5] Mojon-Azzi, S. M., & Mojon, D. S. (2009). Strabismus and employment: the opinion of headhunters. *Acta Ophthalmologica, 87*(7), 784-788.
[6] Kaur, P., Singh, S., Mathur, A., Makkar, D. K., Aggarwal, V. P., Batra, M. Sharma, A., & Goyal, N. (2017). Impact of Dental Disorders and its Influence on Self Esteem Levels among Adolescents. *Journal of Clinical and Diagnostic Research, 11*(4), ZC05–ZC08.
[7] van Leeuwen, M. T., Blyth, F. M., March, L. M., Nicholas, M. K., & Cousins, M. J. (2006). Chronic pain and reduced work effectiveness: the hidden cost to Australian employers. *European Journal of Pain, 10*(2), 161-161
[8] Manatu Hauora, New Zealand Ministry of Health. (2010). *Our Oral Health: Key findings of the 2009 New Zealand Oral Health Survey*. Wellington. Retrieved from: https://www.health.govt.nz/publication/our-oral-health-key-findings-2009-new-zealand-oral-health-survey
[9] Ministry of Health, email communication (June 13, 2019).

When adults go to the dentist here, they almost always bear the cost themselves. It is estimated that New Zealanders spend around $1.2 billion out-of-pocket on dental services each year[10]. In some countries, access to insurance – through public or private schemes – helps meet the costs of dental care. In New Zealand, there is no public insurance scheme for illness, and only around a third of the population has private health insurance. Of those that do, an even smaller proportion have cover for dental services[11]. There are no public figures available, but it can be assumed that this contributes towards only a small portion of total out-of-pocket spending, and would be skewed towards people with higher incomes.

...**so those who most need treatment are also most likely to avoid it....**

Cost is not the only barrier to accessing oral health services, but evidence internationally and within New Zealand consistently suggests it is a significant factor[12]. If people cannot afford to pay, they avoid seeking treatment altogether, or delay until infection or disease requires more invasive and painful intervention.

In the most recent New Zealand Health Survey, adults from all income groups reported avoiding visiting a 'dental health care worker'[13] due to cost in the preceeding 12 months. However, the figures are significantly higher for those from the most deprived neighbourhoods. Around 348,000 people in Quintile 5 neighbourhoods – 51.5 percent – had avoided dental care in the previous year due to cost, compared to about one-third of adults in the least deprived group. As 72.2 percent of adults in the most deprived communities report only visiting a dental health worker when they have a problem (compared with 36.3 percent of adults in least deprived areas), cost may be preventing a proportion of this group from seeking treatment even when it is acutely needed.

The figures are a stark contrast with those for subsidised services. Only 18.8 percent of the most socioeconomically deprived adults deferred seeing a GP for cost reasons in the 12 months prior to the survey, and only 11.5 percent did not fill a prescription[14].

...because assistance is limited and hard to access.

People who routinely go to the dentist have better oral health outcomes. However, there are limited options for adults who are unable to afford the cost of services. The current 'safety net' comprises emergency dental services – providing usually only relief of pain and only in some DHBs – and hardship assistance offered through Work and Income. The latter, a maximum $300 grant, has not been increased in value for many years. Publicly released figures suggest this falls well short of what is needed. In the 12 months to 30 September 2018, just over $11 million was allocated in non-recoverable grants, while another $16.7 million paid out in benefit advances to meet additional dental costs.

Neither emergency dental services nor hardship assistance address underlying problems or prevent the need for future treatment.

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[10] A figure of $1 billion is frequently cited in media. A possible source is the 2016 Household Expenditure Statistics, which reported that average weekly expenditure on dental services is $8 per person. Assuming an adult population of around 3 million, the total cost is approximately $1.2 billion.
http://archive.stats.govt.nz/browse_for_stats/people_and_communities/Households/HouseholdExpenditureStatistics_HOTPYeJun16/Commentary.aspx
[11] Source: Ibisworld Pty Ltd (Nov 2018)
[12] Ministry of Health. 2010. Our Oral Health: Key findings of the 2009 New Zealand Oral Health Survey. Wellington; Listl S, Moeller J, Manski R. (2014). A multi-country comparison of reasons for dental non-attendance. *European Journal of Oral Science, 122*(1):62–9.
[13] Ministry of Health. 2018. Annual Data Explorer 2017/18: New Zealand Health Survey. Retrieved from: https://minhealthnz.shinyapps.io/nz-health-survey-2017-18-annual-data-explorer/
[14] Ibid.

3.1 THE OPPORTUNITY

Adult oral health has been largely ignored in New Zealand health and social policy, despite the body of evidence demonstrating that oral health is important for health and wellbeing, and that stark inequalities exist.

We would not accept vulnerable New Zealanders unable to have a broken bone set, or an infection go untreated, because they could not afford it. Similarly, with evidence pointing to high unmet need for oral health care amongst low-income New Zealanders and clear inequities in access, we need to ask why as a society we do not view oral diseases as just as important.

The priority for public funding has been our universal programme of child and adolescent oral health care. As childhood lays the foundation for good oral health throughout life, NZDA strongly supports this investment and believes it must be protected. Yet, adults are parents, whānau, friends, leaders and role models. Their wellbeing matters too.

Alleviating the out-of-pocket costs of dental services for adults and families facing the greatest hardship would help address a known barrier to oral health for this group. As Māori and Pacific peoples are disproportionately represented in disadvantage, making adult oral health more accessible would also make a bigger difference to the wellbeing of both populations.

Recent discussions with the Minister of Health and Opposition health spokesperson suggest an appetite for revisiting public support for adult oral health care. The time is right to work together to find a solution to cost barriers and to achieve equitable oral health for our communities.

4. EXPLORING COSTS & BENEFITS OF SUBSIDISED ORAL HEALTH SERVICES

The cost of introducing public funding for adult dental services has long been assumed to be prohibitively high. There is broad consensus that shifting to a universal service for adults would be out of reach for New Zealand without an extraordinary shift towards prioritising oral health and/or introduction of a different financing mechanism (e.g. an ACC-style social insurance scheme). This has led politicians on both sides of the spectrum to contemplate targeted funding for oral health services as a more affordable option to improve access for those facing the greatest barriers to access.

To equip NZDA to participate in discussions of costs, cost-benefit analysis using the Treasury's CBAx model was used to estimate the impact of basic dental care for a low-income population. The model calculates whether the activity provides value for money for Government and society. The analysis shows what potential benefits there would be for society and Government, assuming certain costs, and whether it could make economic sense to pursue this investment.

We note that the analysis explored the value of oral health supported through dental services generally, and does not reflect a particular delivery model. To inform the cost inputs we used an example 'basket of services' and three different per-person cost scenarios based on the NZDA member fee survey, Combined Dental Agreement fee schedule and ACC fee schedule. In all scenarios these were intended as a proxy of the average services a person might receive, to provide an indication of the average cost per person per year over 50 years. In reality, patients would require different degrees of intervention over the course of a lifetime, with different cost implications.

Further, the actual total cost would depend on the implementation approach, any fees charged to patients and service uptake over time. For the purposes of this analysis, it is assumed that there is workforce capacity and willingness to provide the services required.

Further information about the CBAx model, methodology and assumptions used in the analysis is provided in Appendix B.

Results

Overall, the analysis found that investing in basic dental services for a cohort of approximately 380,000 low-income adults can have a positive return-on-investment for Government and societal wellbeing.

For Government, there are benefits and cost savings as a result of reduced benefit payment and increased tax income from gained employment, as well as avoided health sector costs e.g. from compromised physical health, and lesser demand for secondary services.

Based on this initial analysis, Government could invest $900 per eligible person annually (over 50 years) towards reducing the cost barrier and still 'break even' with the benefits returned. As the cost per patient lowers, the return on investment for government increases, assuming the cohort size remains constant. For example, at $590 per person per year[15], the return to Government is $1.60 for every dollar invested. Conversely, at $1,183 per person per annum[16], the return to Government was only 80 cents for each dollar invested. Lowering the cost to government by transferring part of the cost to patients can increase the return for government, but would need to be balanced against flow-on disbenefits to society that would, for example, reduce service uptake.

[15] Fees based on Combined Dental Agreement (2019)

[16] Fees based on NZDA member fee survey (2018)

For individuals, the benefits of good oral health stem from reduced pain, improved perceptions and reduced risk of disease. For clients and society, this is expected to increase quality of life, improve productivity, and increase employability and social connectedness as a result of no longer being in pain, avoiding bias against visibly missing or decayed teeth, and being able to connect with others through speech and over food. Through chairside education and improved oral health, patients may also be empowered to take better care of their wider health through smoking cessation or timelier help-seeking when they are in pain.

The analysis showed positive societal returns in all three cost scenarios. At a cost of $590 per person, the return to society is $4.50 for every dollar invested. This reduced to $2.20 for every dollar invested under the highest cost scenario.

Implications

While the CBAx findings are encouraging, it is important to recognise that for Government, the fiscal impact of funding services at these costs would be considered very high: between $187 million and $450 million per annum for a cohort of the size and costs included in this analysis, or $748 million to $1.8 billion over four years (the unit of time used within Government for Budget purposes).

Although initiatives of this size are not entirely without precedent, it would be far outside the norm for recent Government spending on single initiatives within the health sector. As a comparison, the Government's flagship Wellbeing Budget 2019 initiative to expand access to primary mental health and addiction services, came with an investment of $455 million over four years.

Given that spending of this magnitude may be unlikely in the short term, the following section sets out a roadmap of ideas that require more modest investment of public funds, while also helping build a stronger case for investment over the longer term.

5. ROADMAP TO IMPROVE ACCESS TO ORAL HEALTH SERVICES

Securing public funding for a new programme is a fine balance between vision and pragmatism. With operating allowances planned for future Budgets relatively small and many calls on spending, the challenge is not just to demonstrate that oral health is a priority, but that a proposal is affordable within a likely Budget envelope and offer sufficient benefit to displace other opportunities for investment.

5.1 ROADMAP: QUICK WINS, INTERMEDIATE STEPS, ASPIRATIONAL GOALS

This section sets out a suggested roadmap for incrementally improving access to primary dental services for low-income New Zealanders, which could be scaled as budget and Government priorities allow. Each stage along the roadmap is designed to be practical and affordable. The roadmap includes ideas to improve access to services only, it is intended to sit alongside NZDA's other proposed strategies for improving oral health including action on sugar, and extending community water fluoridation.

The roadmap has three stages:

1. Quick wins – can improve access to services within 0-12 months and modest investment
2. Intermediate steps – achievable within a term of Government and scalable investment
3. Longer-term goals – requires significant design work and greater investment, minimum of three to five years for implementation at a national scale.

To inform the road map, we asked the question, *'how might we reduce out-of-pocket costs for low-income adults in New Zealand*' and then assessed the results against the following criteria:

- Fit with goal to "reduce out-of-pocket costs of access to primary dental services for low-income adults"
- Scalability
- Affordability for Government
- Ease of implementation, including administratively feasible to determine eligibility
- Potential to quantify impacts
- Alignment with NZDA position

Ideas considered but excluded were scaling up emergency dental services, universal grants towards dental costs, capping patient fees for dental costs above a certain level (part payment or, like insurance, paying an 'excess') and introducing a social insurance scheme where everyone pays a levy and then has access to funded dental care. Affordability for Government and ease of implementation were the primary reasons for exclusion, however these ideas could be explored further at NZDA's request.

Step 1: Extend Urgent Dental Grants

Work & Income currently provides three mechanisms for adults facing financial hardship to meet the costs of necessary dental work:

- Urgent dental grants (maximum of $300 within a 52 week period)
- Advance payment of benefit
- Recoverable special needs grants.

Recent figures from the Ministry of Social Development indicate that demand for this assistance is high, and that the current grant level is often insufficient to cover costs. The Welfare Expert Advisory Group's 2019 report,

Whakamana Tāngata: Restoring Dignity to Social Security in New Zealand, also recommended that the grant level be reviewed and increased[17].

Spending on non-recoverable grants for dental work between 1 October 2017 and 30 September 2018 was just over $11.25 million. Increasing this spend could provide a quick and concrete way for Government to take action to alleviate an immediate need, with modest investment and easily communicated benefits. The additional funding could be used to increase the value of the grant (e.g. doubling to $600 per person) or increase the number of grants awarded.

Further improvements that could be made include:

- Simplifying the application process for the grant
- Addressing variability in grant approvals around the country
- Negotiating a fee-schedule with participating primary dental services to further simplify access by removing the need for a quote before the grant is approved.

Expanding access to dental grants does not shift the 'ambulance to the top of the cliff'. However, it would go some way towards addressing an already identified gap in current assistance, meet the goal of assisting adults facing the greatest financial hardship, and be administratively feasible.

Step 2: Funded Dental Care for Vulnerable Young Adults

At present, access to funded dental care is available up to a young person's 18th birthday. Once free access ceases, use of dental services declines sharply. The effect is most pronounced amongst young adults from socioeconomically disadvantaged families, with an associated impact on oral health status.

Extending eligibility for funded dental services beyond the 18th birthday could help address the rapid decline by reducing barriers to accessing routine and preventive oral health care. Whilst affordability would pose a barrier to maintaining universal access, public funding could instead be prioritised to young people facing socio-economic disadvantage.

One such cohort are young adults receiving welfare assistance. Ministry of Social Development figures indicate that around 45,000 18-24 year olds were in receipt of a main benefit (e.g. Jobseeker or Sole Parent support) in the June Quarter of this year. Māori comprised around 40 percent of this group. Young people who are on a benefit are often experiencing a range of complex life circumstances and can be dealing with multiple disadvantages. Maintaining access to free oral health care during this period may therefore support wider goals for the wellbeing of this group, as well as ensuring public funding for adult oral health care is directed toward the most vulnerable in the first instance.

To that end, Step 2 of the roadmap is to work with the Ministries of Health and Social Development to extend the entitlement to free basic oral health services to 18-24 year olds in receipt of a main benefit. As with the existing model of adolescent oral health care, services could be provided by participating dentists in private or Community Oral Health Service settings. Eligibility for this service could be progressively phased in over time, and the model evaluated to determine a case for further expansion. Total cost would depend on service inclusions, uptake and implementation model, but for a population of this size could be approximately $10m-$25 million per annum.

Step 3: Service Design and Testing Across Sectors

Low-income adults are not a homogenous group. Individuals and households face material deprivation for different reasons and behave in different ways. Cost is not the only barrier to accessing oral health services,

[17] Welfare Expert Advisory Group. Whakamana Tāngata: Restoring dignity to social security in New Zealand. 2019. http://www.weag.govt.nz/weag-report/whakamana-tangata/

and the role that affordability of dental services plays in decisions to prioritise oral health is not the same for everyone.

New Zealand has a narrow range of service delivery models for adult oral health care. In considering a shift to greater public funding for specific groups of New Zealanders, there is a need to better understand which services will work best for who, how, how much and to what effect, before Government could confidently invest. A narrow focus on oral health outcomes may not be sufficient to make a compelling case for investment.

Service Design is an umbrella term for an increasingly important set of methodologies being used to generate fresh ideas to address complex social issues. These principles and practices, including design thinking and Human Centred Design, are tools to better understand and empower people who use, fund and deliver services. These approaches are used widely in Australia and the United Kingdom, and now in New Zealand by agencies including the Ministries of Health, Social Development and Education, Te Puni Kokiri, New Zealand Police, and District Health Boards.

A series of demonstrator projects is suggested as the third step in the roadmap. Demonstrators can form part of a Service Design process at an early stage of system maturity. Through small-scale design and testing of different services with different groups, using real world data, the aim would be to disentangle the cause and effect relationships underlying use of oral health services by disadvantaged populations and identify how funding could be best targeted to support access to oral health. Promising concepts could then be piloted on a larger scale.

It is envisaged that these service design sites would be few in number, small and highly targeted, at a total cost of less than $500,000 per annum, plus evaluation costs. A comprehensive and independent evaluation, comparing control and intervention groups, would be an essential component of this stage. For each demonstrator, it is suggested that NZDA and local dentists would play an important role in the governance and design of the demonstrators, as well as leading delivery of services.

Four examples of demonstration projects are described below. These align to NZDA's position statement and framework for this project and therefore generally assume a pathway that better connects people with primary dental services. However, a true Service Design process would be open to different solutions also emerging.

To initiate this process, seek support from key government stakeholders and show willingness to think differently, NZDA could convene a small symposium or roundtable with a mix of cross-agency stakeholders, consumer groups and dentists with the goal of establishing (and ultimately securing funding for) a demonstrator programme.

Demonstrator 1: Oral health and employment

Amongst adults with low-incomes and poor oral health, some people will present with other risks, needs and goals who may benefit from targeted oral health interventions to meet specific goals. This demonstrator would work with a cohort characterised by needs other than oral health, and explore the place of oral health care in improving these outcomes. For example, there is good evidence linking poor oral health with employment barriers, including lost productivity, lack of confidence and stigma associated with missing and decayed teeth.

Working with the Ministry of Social Development and local Work & Income services, a cohort of people actively looking for work could be identified and a limited but targeted schedule of funded oral health care provided to help address the goals of this group. This demonstrator could build on expanded eligibility for dental services for vulnerable young people, outlined in Step 2.

Demonstrator 2: Integrating oral health across agency boundaries

Demonstrator 2 suggests introducing primary dental services into an existing cross-agency initiative which has established design frameworks and data collection systems in place. The purpose would be to assess the value of oral health care within a collaborative model for health and social wellbeing, where oral health services are one input of many, and where total societal outcomes are being tracked. Opportunities for alignment could include:

- Place-based programmes e.g. the Southern Initiative, *Tāmaki Herehere ki te Tonga* is an urban regeneration programme in South Auckland. The programme includes a focus on whānau and families, and includes the Healthy Families South Auckland initiative that works across sectors in a coordinated effort to address the determinants of poor health and wellbeing.

- Whānau Ora services e.g. Kāinga Whānau Ora is an iwi, community and Government-led initiative that works intensively with a small number of families and whānau living in Housing New Zealand homes in Palmerston North, and is currently being expanded to Whanganui.

Demonstrator 3: Primary care referral pathways

Two concerns in the move towards funding oral health care for low-income adults, are identification of eligible people, and the priority and extent of treatment required. Utilising a primary care-based referral partner, such as through general practice, would mitigate these factors by leveraging existing systems for identification of financial need relating to health care, and by requiring a clinical pre-assessment of patients. This process would also allow for a more individualised identification of need, by taking into consideration the current situation of each patient in the holistic context of their health and social circumstances.

This demonstrator would explore the role of oral health as an essential primary health care service, including as a basic requirement of primary care services. The approach would allow dentists to leverage data sets and contextual knowledge of client needs through a partnered Primary Health Organisation; and to link information about interventions and risks back to primary care.

Demonstrator 4: Intensive wrap-around services

International experiences highlight the risks associated with providing a restricted schedule of funded services, when often more is required for individuals with specific or complex oral health needs. In recognising that NZDA has a focus on best practice and patient-centred care, and that achieving oral health can involve a multi-factorial approach, an intensive wrap-around service of both restorative and preventative interventions for some patients may be considered as a demonstration.

These interventions could provide insights on:

- The range and magnitude of impacts of poor and good oral health on individuals, including as yet unknown value sets

- The value of comprehensive oral health intervention compared to rudimentary schedules and emergency services

- Disparities between the current availability of services to low-income adults vs. the expected impact of a basic schedule of services, vs. parity with those who can afford the full recommended course of interventions.

Having individualised case study examples of the benefits of good oral health could also build case studies and examples to support a case for change.

Step 4: Developing and Implementing the Adult Oral Health Care Programme

The long-term goal is to design and implement a programme which is bespoke for the needs of New Zealanders. The service design process needs to begin now, recognising that the current system is at a very early stage of maturity, and that future programmes will likely look significantly different to the current state.

Gathering information through the intermediate stage of service design and testing will support the development of targeted interventions for measurable outcomes. Understanding the control and intervention groups and metrics of interest, will assist in the choice of specific projects within the programme and longer-term service design and implementation plan.

The goal remains a strategy to improve adult oral health that is a mixture of population-level disease prevention, and targeted initiatives for vulnerable populations.

6. CONCLUSIONS

NZDA wishes to contribute effectively to policy development for oral health ahead of the 2020 election. This project supports this goal by providing a clearer narrative, indication of costs and benefits, a roadmap of ideas for discussion with stakeholders, and a picture of some of the challenges and opportunities to navigate.

New Zealand's current approach to funding adult oral health services means that some people miss out on the opportunity for good oral health. At the same time, the current safeguards are at such a low level of maturity as to offer little New Zealand specific input data to inform a cost benefit analysis on the impact of change.

NZDA has chosen to focus on reducing out-of-pocket costs, however, findings suggest the cost of doing so from a primarily financial perspective could be prohibitively high. While the return on investment may be promising, an even more targeted approach would realistically be needed or other service models considered.

A staged approach would allow these factors to be teased out and independently evaluated, while also requiring more modest investment in the medium-term.

Meeting the oral health needs of people facing material hardship is a concern of many health systems around the world, with no comprehensive or directly applicable solution available in a single model. The answer will be found in the development of initiatives which target the specific needs of New Zealanders beyond just financial barriers. Reflection on international examples can give both inspiration and healthy caution in the design of adult oral health policy.

The proposed roadmap guides the progression towards equitable access to adult oral health through short-term "quick wins", and intermediate steps, towards a longer-term plan for action. From early on, this journey will require:

- engaging with stakeholders interested in adult oral health, and committed to equitable health outcomes;
- further strengthening of NZDA's narrative through patient stories;
- connecting with health and social development portfolio holders and/or officials from key departments;
- refreshing the full NZDA position statement and subsequent launch within 12 months as part of pre-election activity.

NZDA is in a unique position to guide this important work, collecting information and describing the magnitude of the issues, and guiding and leading from an informed position as health professionals, patient advocates, and as members of New Zealand communities.

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Appendix A: International Perspectives of Publicly Funded Adult Oral Health Care

There are a range of international examples which New Zealand can learn from in considering funded oral health care for low income adults. A selection of examples have been collated to highlight various models which claim to provide a level of equitable access.

A comprehensive comparison and evaluation describing models of oral health care provision and outcomes was not identified[1]. The Australian Parliamentary Library Report on adult oral health options[2] identified two sources attempting to consolidate and evaluate models; from an OECD report, and Council of European Dentists manual on dental practice in the EU. These sources identified different countries and different outcomes. The Commonwealth Fund also presented a summary of country-level models and effects, but again, presented different countries and different outcomes. Systems of interest were derived primarily from these sources and summarised from a number of sources.

Of the examples noted, there does not appear to be a model which would be directly applicable in the New Zealand context due to significant differences in the health system structure overall, the target populations of interest, or upon reflection of the outcomes of the model. However, the models detailed here can collectively provide insights into the intended and unintended consequences of various models or adult oral health care provision.

High-level trends

- Countries which had a large number of dentists and widely accessible training programmes had better coverage across the population.
- Cross-border dental “tourism” was seen to occur when a better option was available, for example, across the European Union.
- There were always subsets of a population who were better served or missed out, but this differed in each example.
- A schedule of essential basic services were always identified and responded to in some way.

Not included

Some of the common system comparators for New Zealand have been omitted from this list, such as Australia and Canada. In the case of Australia, this is because the current model does not adequately address the concerns of inequitable oral health for adults, and is now under review[3]. This process should remain in focus as the New Zealand model is developed. The Canadian example has also been omitted from this review due to both the heavy reliance on insurance-based schemes, which does not translate well to the New Zealand context, and due to the variation between provinces in how low-income adult and other vulnerable populations are supported, often with separate health services for indigenous peoples, with varying degrees of efficacy.

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[2] Parliament of Australia. Dental reform: an overview of universal dental schemes. 2012. https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/BN/2011-2012/DentalSchemes#_Toc317660282
[3] Grattan Institute. Filling the gap - A universal dental scheme for Australia. 2019. https://grattan.edu.au/wp-content/uploads/2019/03/915-Filling-the-gap-A-universal-dental-scheme-for-Australia.pdf

Country	Type of funding system	Low-income adults get extra support?	Nature of the programme	What is covered?	What is the payment arrangement for providers?	How well is it working?
Denmark	Publicly funded health care system, primarily free to users, with universal access to health care as the goal. Some private insurance supplements aspects of pharmaceuticals and dental care.	Cost-sharing caps, and means-tested social assistance is provided to older people, the chronically and terminally ill. Municipalities may grant financial assistance to individuals certified as otherwise unable to pay for needed medicine.	Most adult dental services are subsidised but not fully funded (coinsurance of 35% to 60% of total cost for over 18 years). Complementary voluntary insurance, purchased on an individual basis, covers statutory co-payments for dental care[iv]. There are cost caps on co-payments for people eligible for subsidised services, but no limits exist for those who are not eligible. A system of subsidies for dental healthcare is available through an agreement between the Regions in collaboration with the Danish Dental Association. In general, the subsidy is higher for preventive care and essential treatment and for expensive treatment such as oral surgery it is lower. Subsidies for 18-25 year-olds are higher too[v].	Municipalities decide on the service level for most other welfare services, within a framework of national regulation. There is no defined benefit package for health care, but very few restrictions exist for treatments that are evidence-based and clinically proven. Subsidies are paid for examination, diagnosis, fillings, oral surgery, periodontology and endodontics. For most adults, orthodontics, crown and bridges and removable prosthetics have to be paid in full by the patient.	Under this system, the patient pays a part of the fee to the dentist (average about 80%) and the rest is claimed from the Region. The full bill is claimed from the region in the case of low-income adults who meet the criteria of their region.	The Dental Health Monitoring System (DHMS) was introduced in Denmark in 2000. It was designed to monitor the dental health of adult users of the dental care service system. Data from dental services and other registries were combined to describe dental health levels and development in dental health, and also to study associations between dental health, socioeconomic status and dental care services. Every year, the Danish regional authorities receive 30,000 requests for public subsidies for dental treatment abroad. On top of that, there are an unknown number of Danes who go abroad for treatment without realising they can claim any money. Germany is the favoured destination, where Danish patients can make savings of around 33 percent. If a patient comes from Denmark, the clinic tries to complete the treatment in one day[vi].
United Kingdom	User part-payment at rates determined by the “banding” of care package. Charges vary in different countries of the UK. As of April 2019 there were three standard charges for all NHS dental treatments in England and Wales.	Part-payments are waived for those who meet criteria for the NHS Low-Income Scheme (LIS). The rules governing who's eligible are broadly the same as those for a means-tested benefit. But the assessment also takes into account council tax and housing costs[vii]. Other eligible cohorts include; people who get some means-tested benefits, women who are pregnant or have had a	"All the treatment that your dentist believes is necessary to achieve and maintain good oral health is available on the NHS. This means that the NHS provides any treatment you need to keep your mouth, teeth and gums healthy and free of pain."	Band 1 course of treatment – covers an examination, diagnosis (including X-rays), advice on how to prevent future problems, a scale and polish if needed, and application of fluoride varnish or fissure sealant. Band 1 also covers emergency care such as stopping bleeding, trauma, teeth knocked out, severe pain or swelling, even if more than one visit is required. Band 2 course of treatment – covers everything listed in Band	Dentists are contracted to complete a specified number of units of dental activity (UDAs) per year, and have targets to meet these. If they do not meet targets, they are subject to NHS “clawback”[x]. Dental practices are paid in advance based on assumed UDAs, then reconciliation occurs monthly with dentists providing treatment reports and financial data[xi].	A dentist is allowed to refuse to provide treatment under the NHS and then offer to perform the same treatment privately. NHS dentistry has often struggled to see 55% of the population in a one-year period. Patients with learning difficulties and with dementia have been issued with penalties because they made honest mistakes ticking the wrong box in complex forms. This has caused stress for the patients and extra work for the dentists trying to sort out the problem. 90% of fines are overturned on appeal[xii]. People on low incomes are deterred from seeking dental

Country	Type of funding system	Low-income adults get extra support?	Nature of the programme	What is covered?	What is the payment arrangement for providers?	How well is it working?
		baby in the previous 12 months and have a valid maternity exemption certificate (MatEx) when they start a course of treatment people in custody. There is a capital limit of £23,250 for those permanently in a care home and £16,000 for everyone else. An HC3 limited help certificate reduces payment required, without full exemption. A patient is only required to pay three times the amount their income exceeds the free treatment level. All charges paid within a three-week period are added together and count as one charge[viii].		1, plus fillings, root canal work or removal of teeth. Band 3 course of treatment – covers everything listed in Bands 1 and 2, plus crowns, dentures and bridges[ix].		care that they need because they fear being fined. Dental visits by people on low incomes fell 23% during the four years to 2018. New models are being trialled[xiii].
Austria	Compulsory health insurance schemes provide health cover to around 99% of the population. The remaining 1% are covered by local authority schemes[xiv]. All Austrian citizens have access to publicly funded care, and have the option to purchase supplementary insurance allowing "comfort class" benefits above the basic entitlements[xv].	Enrolment in the public health care system is generally automatic and is linked to employment, however insurance is also guaranteed to co-insured persons (i.e. spouses and dependents), pensioners, students, the disabled, and those receiving unemployment benefits.	Public insurance organisations also employ salaried dentists to provide care. Public insurance organisations compete with, and are subject to the same standards as the other dentists contracted with the insurance scheme[xvi]. The care provided is therefore available to the same client groups, and provides the same range of treatments. Patients have a free choice to go to these clinics or a private dentist, but there is a political intention of the Austrian Dental Chamber to increase the numbers of patients seen in general practice, rather than the public dental service.	The cost of basic restorative and conserving dental treatments are generally covered by these schemes, although benefits vary across schemes. Public compulsory health insurance provides cover for 41 conservative and surgical items, and 11 removable orthodontic and prosthodontic treatments.	Oral health services are provided mainly in General Practice, both in the public and private sectors. They claim fees from the public insurance organisations and directly from patients. Generally, standard items attract an insurance subsidy of 100%, or 80% with small funds, which is claimed by the dentist and the patient pays the remainder where appropriate. There is a prescribed fee scale for all dentists who are contracted to the major public insurance organisations. Free or subsidised treatment is provided by any dentist in exchange for the e-card	

Country	Type of funding system	Low-income adults get extra support?	Nature of the programme	What is covered?	What is the payment arrangement for providers?	How well is it working?
					issued by the sick funds. If the e-card is valid, the dentist can claim fees from the insurance scheme quarterly.	
Czech Republic	Compulsory health insurance system, covering most standard services (prescribed by law). Part payment contributions for anything beyond this, but with generally reasonable prices.	The State pays health insurance contributions for specific groups of residents, including; dependent children up to the age of 26; old-age pensioners and beneficiaries of invalidity pension; women on maternity or family leave, parental allowance beneficiaries; persons providing full-time care for a child up to the age of 7 or two children up to the age of 15; jobseekers registered with the Labour Office; persons receiving social welfare benefits due to social needs; completely disabled persons and their caregivers; persons in custody or in prison[xvii].	Utilisation of dental services is one of the highest in Europe, with the average citizen visiting the dentist twice per year, and an overall good quality of oral health care. Dental services such as prophylaxis, check-ups and fillings are covered by statutory health insurance, with no additional payments for standard services. Overall, the share of private contribution is comparatively low at 53%, and this is likely to be one of the reasons for the high utilisation of dental services by the population.	Basic dental care is covered through insurance based on the decree, with premium or cosmetic dental procedures requiring private payment. The full schedule is included in the 'Decree on the List of Procedures Paid by Health Insurance' (in Czech)[xviii].	Payments are made via claims from insurance funds, and from part-payment supplements directly from patients, depending on the treatment required and whether it is fully or partly covered.	The density of dentists in the 14 Czech Kraj (administrative regions) is at times extremely high when compared with other European countries, and focus on training and development of dentists is high. The Czech Republic is seeking to counter the shortage of dentists in rural and remote regions and is offering funding. Alongside other criteria, 10% of registered patients must be children or pensioners if the dentist is to avail of financial support.
France	Mixed public-private insurance, with mostly no out of pocket expenses for general dental services. Statutory health insurance-based system, which covers some dental services in part. Cost sharing is through co-insurance, co-payments, and balance billing[xix].	Safety net for low-income adults with fully funded dental care, applying to approximately 10% of the population. Exemptions from coinsurance apply to individuals with any of 32 specified chronic illnesses (13% of the population, with exemption limited to treatment for those conditions); individuals who benefit from either complete state-sponsored medical coverage (3%) or means-tested vouchers for complementary health	Reimbursement from the social security system at 70% of official rates and your voluntary health insurance policy will pay for balance. However, it is estimated that around 50% of the French population has periodontitis, 75% of which is not treated because treatment costs cannot be covered[xx].	Comprehensive schedule not available.	Collective agreements between representatives of the health professions and SHI, signed at the national level, apply to all but those professionals who expressly opt out. These agreements set the fee schedule as well as coordination and quality incentives.	Official fees for dental services are low, however, often billed by private dentists at significantly higher than this, with balance billing resulting in high out of pocket costs without the safety net. Strikes from dentists in 2017 over price ceilings, lack of funding for preventative services. Lack of robust epidemiological data for dental health and care across France[xxi].

Country	Type of funding system	Low-income adults get extra support?	Nature of the programme	What is covered?	What is the payment arrangement for providers?	How well is it working?
		insurance (6%); and individuals receiving invalidity and work-injury benefits (2%).				
Germany	Compulsory health insurance applies to most German citizens, with employers often paying half the contribution, and the employee paying the other half. Many German citizens also have supplementary private health insurance[xxii]. Statutory and private health insurance funds covering about 70% of dental services[xxiii].	Social welfare beneficiaries are also enrolled in statutory health insurance, and municipalities pay contributions on behalf of them. Having a European Health Insurance Card, as most German citizens do, gives access to any necessary and unplanned health care, including dental, and can be used across the European Economic Community (EEC).	Patients are advised to visit the dentist for a cost estimate prior to gaining treatment, which they can get approval from their insurer for first.	Statutory health insurance provides full coverage for adults for: two prophylactic examinations per year, necessary conservative and surgical treatments (including in the home environment and nursing homes if necessary). There is partial cover for more involved work such as crowns or dentures. The full schedule is not available.	Payments are made via claims from insurance funds, and from part-payment supplements directly from patients, depending on the treatment required and whether it is fully or partly covered.	
Brazil	Universal health system (the “Sistema Único de Saude”), funded by federal, state, and municipal budgets[xxiv]	The Smiling Brazil "Brasil Sorridente" programme has been in action since 2004, and covers all citizens of Brazil, without requirement for financial contribution. However, there is evidence of disparities in the type of treatment provided, which may affect low-income and vulnerable adults more. There is regional variation in access, correlated with disparities in socioeconomic status[xxv].	Oral health services are provided through the public or private services providers; the latter directly paid by the users or by health insurance companies. Public dental services are mainly provided through oral health primary care teams (OHT). OHT are publicly funded healthcare providers offering care free of charge to prevent diseases and promote oral health[xxvi].	Dental Specialty Centres registered in the National Register of Establishments free dental services including the following activities: Oral diagnosis, with emphasis on diagnosis and detection of oral cancer, Specialised periodontics, Minor oral surgery of soft and hard tissues, Endodontics, Care for patients with special needs.[xxvii]	Entitled to 50% more over the monthly cost values The Ministry of Health can also donate a chair and kit.	Current criticisms of the programme are focused on; lack of robust record-keeping and data sharing towards meaningful activity tracking[xxviii]; regional and rural inequities; and the focus on low-level “essential” dental services without adequate screening for advanced disease or treatment of complex needs[xxix]. It appears that the reputation of Brazil’s universal dental programme is enhanced by the high numbers of dentists across the country, increasing competition and industry activity. Dental tourism is increasing as such.

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APPENDIX B: TECHNICAL DOCUMENT – POLICY COST-BENEFIT ANALYSIS

Approach

We have undertaken cost-benefit analysis to show the potential impact of funding dental services for low-income adults in New Zealand. This analysis is conducted using Treasury's CBAx model – a publicly available tool that includes a standard set of impacts used across Government to assess the value of an intervention.

This is the first step in an iterative process for designing, costing, delivering and evaluating a policy to improve low-income adult oral health through subsidised dental services. The analysis shows what potential benefits there would be for society and Government, and a range of costs where the policy makes economic sense to pursue.

Like all models, CBAx is limited by the trade-off of detail for simplicity. The quality of outputs depends on the quality of inputs as it approximates the expected impact of a policy. As the initiative is yet to be designed, the CBAx shows the value of oral health supported through dental services generally, not reflecting any particular delivery model which would impact reach, costs and benefits. Both costs and benefits are at a per person level. Costs reflect full funding (not cost contribution). This initial analysis assumes that there is capacity to provide any services required.

CBAx is a spreadsheet model that provides a consistent approach to assessing the broad, long-term costs and benefits. There are four input sheets:

- Primary inputs (cohort) – people expected to be reached by the intervention.
- Cost inputs – annual cost expected to deliver the intervention.
- Impacts database – a list of impacts and their assumed value that can be added to.
- Impact inputs – likelihood and timing of benefits for the intervention from the impacts database.

From these inputs, the model calculates whether the activity is value for money for Government and society. The underlying model is owned by the Treasury and has been used by us in good faith – we have not reviewed the underlying calculations.

The approaches used for the different CBAx inputs are discussed below.

Cohort modelling

The people potentially engaging with the services are assumed to be adults aged 20[18] and above living in the fourth and fifth national deprivation quintiles[19] (dep 4 and 5). The oral health survey shows that 58% of dep 4 and 65% of dep 5 have not visited a dentist in the past 12 months[20]. It is assumed that adults aging in and exiting the cohort balance out. Any adult population growth is further assumed to be offset by an increase in oral health outcomes from those who have received adolescent services. Those cohort then assumes only a portion will be successfully reached through a reduction or removal of the service cost barrier as there are further challenges limiting the uptake of dental services.

Target cohort

[18] StatsNZ 2018 population estimates by DHB.
[19] StatsNZ 2013 census population by meshblock and deprivation quintile.
[20] Ministry of Health 2014-17 pooled data – used as West Coast is excluded in more recent updates to the oral health survey.

There are a number of deprivation indexes within New Zealand. The University of Otago's NZDep2013 scores have been used in this instance as mesh block level data highlights variances at a District Health Board (DHB) level. These deprivation quintiles are calculated based on nine socio-economic measures, each with a different weighting[21]:

- People ages <65 with no access to the internet at homes (12.4%)
- People aged 18-64 receiving a means tested benefit (12.2%)
- People living in households with equivalised income below an income threshold (11.9%)
- People aged 18-64 unemployed (11.3%)
- People aged 18-64 without any qualification (11.1%)
- People not living in own home (10.8%)
- People aged <65 living in a single parent family (10.6%)
- People living in households below an equivalised bedroom occupancy threshold (10.1%)
- People with no access to a car (9.6%)

Each quintile is equal to 20% of the national population, highlighting areas where there is more or less deprivation. Of the 40% of New Zealanders living in dep 4 and 5 there is over representation in a number of DHBs, including:

- Tairawhiti (67%)
- Northland (62%)
- Whanganui (62%)
- Lakes (55%)
- Hawke's Bay (51%).

In contrast, there is under representation in other DHBs including:

- Waitematā (25%)
- Capital and Coast (27%).

Cost modelling

Costs are estimates only for economic analysis. The actual total cost will depend on the implementation approach, fee per client and service uptake over time. In order to assess the relative value for money of low-income adult oral health services, we have assumed an average annual cost of $590 per person over their lifetime. This is based on fees from the Combined Dental Agreement[22], including:

- Examination, clean and panoramic radiograph
- Treatment of periodontal disease
- Filling, simple extraction of a single permanent tooth, permanent denture
- 1.5 hours of dentist time.

We also tested a higher and lower cost scenario:

- Higher: $1,183 p.a. / client (based on NZDA member fee survey)

- Lower: $492 p.a. / client (using the ACC fee-schedule)

For a cost-benefit analysis, the costs should reflect the average cost to deliver the targeted outcomes. While the final policy will likely include a range of services eligible for funding, **these services are used as a proxy of what a client might receive**. As we are looking at the average cost over the client's lifetime, this is equal to

[21] Atkinson, J., Salmond, C, & Crampton, P. (2014). '*NZDep2013 Index of Deprivation*'. Department of Public Health, University of Otago, Wellington.
[22] The adolescent service contract sets out a range of standard services and fee bands by school decile, implicit that lower income areas have poorer oral health and on average require more services.

a biannual cost of $1,180. Put in context, this is slightly more than 100 Healthy Smiles average cost of $1,122 per client (inclusive of oral surgery and laboratory fees) when providing services to beneficiaries.

Comparing treatment costs in the adolescent services contract with the ACC emergency contract there are some services with higher fees, and others with lower fees. The emergency contract pays more for extractions, fillings and crowns, but pays less for consultations (including examination), bite splints, posts and dentures.

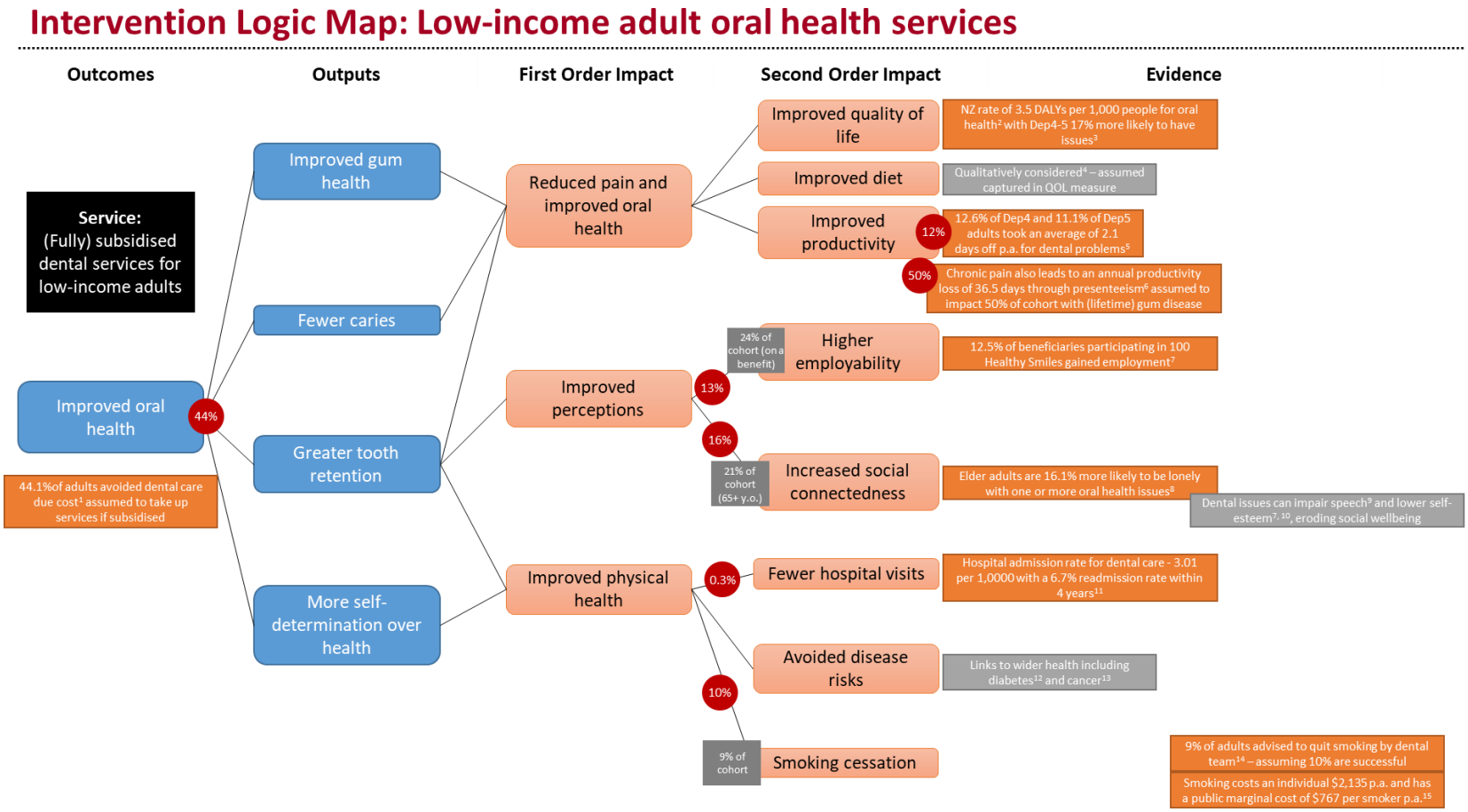
Through reverse analysis, the cost of delivery could be as high as $900 annually per client for it to be at least cost neutral to Government (for this cohort), or $2,500 before cost exceeds the societal wellbeing gains.

It is worth noting that the cost of dental service provision is significantly higher than preventative programmes, such as water fluoridation. Water fluoridation has the potential for a significantly higher return on investment based on the 2015 Sapere report ‘Review of the benefits and costs of water fluoridation in New Zealand’, but there are behaviour factors not considered, such as substituting tap water for bottled drinks to avoid the perceived taste or sensationalised misinformation, potentially limiting the benefits.

All amounts exclude GST. A key assumption for these costs is that there is capacity to service any additional clients without further capital investment.

Impact modelling

Impact inputs estimate a broad range of impacts associated with good oral health, including savings and income for Government, societal economic gains and client wellbeing gains. The intervention logic map (ILM) below visually shows the expected results for a programme based on benefits identified in the research, including those quantified in the CBAx and those that are qualitatively considered. The ILM captures key inputs for the impacts database (end impacts) and impact inputs (success and timing of impacts).



Note: This is neutral to the policy delivery mechanism. Under a cost contribution model, the client fee would be a disbenefit not included in this ILM.

The policy's successful reach rate is how many in the target cohort could be reached through a cost reduction mechanism. The Ministry of Health found 44.1% of adults had avoided dental care due to cost in the previous year. Research shows the rate of people impacted by the cost barrier could range from 20% to 59%, and is present regardless of household income[23,24]. The Ministry of Health rate is assumed to be the success rate for good oral health from a reduced cost barrier.

Improved oral health in the research is measured in terms of improved gum health, fewer caries, greater tooth retention and more self-determination over health. The ILM shows the links between these results and subsequent impacts, particularly through reduced pain, improved perception and improved physical health.

Specific benefits are discussed in the results below.

Results

The CBAx output sheet shows a number of measures that show the impact and value for money from an intervention.

Absolute measures – Net present values **(NPVs)**

NPVs are the total dollar value for costs and benefits. Future amounts are discounted to reflect the impact of inflation and other risks over time. NPVs shift with the cohort as costs and benefits are driven by clients.

	Net present value (50 year, 6% discounting)
Total marginal impact (50 year NPV of all benefits)	$16,308m
Total cost of initiative	-$3,652m
Net economic benefits	$12,657m

The net economic benefits are positive, highlighting that the benefits of the initiative exceed the costs when both have been considered over a 50 year timeframe. The cost profile assumes an average service mix over this timeframe. It would be reasonable to see high costs in the short term and then decreasing over time as oral health in New Zealand improves.

The total marginal impact is made up of seven different types of impacts.

Impact summaries

Impact description	How big?	Evidence base
Productivity gains Being better able to engage with life as a result of reduced pain	$8,879m pv *Sensitivity* At 50% of the assumed success rate: $4,439m pv	Chronic pain is a barrier to engaging with tasks at work and home, leading to an **annual productivity loss of 36.5 days through presenteeism** – a hard to notice loss to productivity assumed to impact the 50% of the cohort with (lifetime) gum disease. More noticeably, **12.6% of dep 4 and 11.1% of dep 5 adults took an average of 2.1 days off per annum** for dental problems. These represent a loss of outputs for New Zealand employers and homes, represented

[23] Hill, K. B., Chadwick, B., Freeman, R., O'sullivan, I., & Murray, J. J. (2013). Adult Dental Health Survey 2009: relationships between dental attendance patterns, oral health behaviour and the current barriers to dental care. *British Dental Journal, 214*(1), 25.
[24] Vujicic, M., Buchmueller, T., & Klein, R. (2016). Dental care presents the highest level of financial barriers, compared to other types of health care services. *Health Affairs, 35*(12), 2176-2182.

	ROI, soc: 3.3 ROI, gov: 1.6	by 100% of minimum wage after tax for the time lost.
Improved physical health Reduced risk of coronary heart disease from treated / avoided gum disease	$4,176m pv *Sensitivity* At 50% of the assumed success rate: $2,088m pv ROI, soc: 3.9 ROI, gov: 1.0	Sikka et al show there is a **19% increased risk in CHD** from periodontal disease. The Ministry of Health's oral health survey shows a lifetime gum disease rate 49.6% for the dep 4 and 5 cohort that are assumed to be impacted by this reduced risk. Research shows wider physical health gains from good oral health that are qualitatively considered in the Government ROI section below.
Gained employment Increased employment income and tax, reduced benefit payments	$2,248m pv *Sensitivity* At 50% of the assumed success rate: $1,124m pv ROI, soc: 4.2 ROI, gov: 1.4	Mojon-Azzi and Mojon[25] found that having a viably missing tooth has the second strongest negative impact out of seven facial anomalies on finding employment. The Hundred Health Smiles evaluation report showed **12.5% of beneficiaries receiving dental services successfully gained employment** as clients reported positive outcomes including enhanced job prospects, a more positive attitude at work, improved physical appearance, and increased confidence and self-esteem. 207,503 of the long term beneficiaries in New Zealand are assumed to equal 24% of the low-income adult cohort.
Improved quality of life Reduced burden of disease directly associated with poor oral health	$737m pv *Sensitivity* At 50% of the assumed success rate: $368m pv ROI, soc: 4.4 ROI, gov: 1.6	All oral health conditions are **associated with 3.5 disability adjusted life years (DALYs) per 1,000 people in New Zealand**, or which dep 4 and 5 are **17.5% more likely to be impacted**. Avoided DALYs are assumed to reflect the quality of gains to the client from direct medical outcomes.
Smoking cessation Reduced smoking rates as a result of chairside education	$264m *Sensitivity analysis* At 50% of the	Research by Hill et al showed that **9% of adults receiving services were advised to quit smoking by the dental team**. The role of advice and information on the personal impact of smoking can supporting quitting rates. Research shows brief advice from a physician can increase the quit rate by 66% compared with no advice[26]. When advice in put in

[25] Mojon-Azzi, S. M., & Mojon, D. S. (2009). Strabismus and employment: the opinion of headhunters. *Acta Ophthalmologica, 87*(7), 784-788.
[26] Stead, L. F., Buitrago, D., Preciado, N., Sanchez, G., Hartmann-Boyce, J., & Lancaster, T. (2013). Physician advice for smoking cessation. *Cochrane database of systematic reviews*, (5).

	assumed success rate: $132m pv ROI, soc: 4.4 ROI, gov: 1.6	context of a patient's personal health state, research found quit rates of 13.6%[27]. For analysis, 10% of the clients are assumed to successfully quit if advised. The private economic gain for smokers that successfully stop is equal to the average spend of $2,135 p.a. The gain to Government is the avoided health sector costs in excess of the tax revenue foregone – $767 p.a.
Avoided public dental treatment costs	$6m *Sensitivity analysis* At 50% of the assumed success rate: $3m pv ROI, soc: 4.5 ROI, gov: 1.6	Addressing oral health issues early on will avoid the escalation of issues to the public health system. **Dental care has a 0.3% admission rate with a 6.7% readmission rate within 4 years**. As the average stay for dental caries is 1.3 days in New Zealand, the outpatient value is used to measure savings from avoided admission.
Improved social connectedness Wellbeing gain from improved perceptions, less pain, and being more able to connect with others through speech and over food	$-m pv (excluded in base case) *Sensitivity* At 50% of the assumed success rate: $1,733m pv ROI, soc: 4.9 ROI, gov: 1.6	Dental issues can impair speech and lower self-esteem, eroding social wellbeing as food and communication play a large role in social connectedness. Majority of research in this space is focused on elderly groups. Elder adults are **16.1% more likely to be lonelier with one or more oral health issue**. This link, theoretically driven by poor self-esteem and lack of self-confidence, remained significant after adjusting for other risk factors of loneliness such as depressive symptoms. Wu et al[28] also found that better self-reported oral health was related with having a higher number of friends among adults aged 60 and over. 21% of the cohort is estimated to be 65 and over, applied to a one point change in feeling lonely in CBAx. Other research highlights social challenges associated with oral issues for children and adolescents[29,30].

[27] Parkes, G., Greenhalgh, T., Griffin, M., & Dent, R. (2008). Effect on smoking quit rate of telling patients their lung age: the Step2quit randomised controlled trial. *British Medical Journal, 336*(7644), 598-600.
[28] Wu, B., Plassman, B. L., Liang, J., Remle, R. C., Bai, L., & Crout, R. J. (2011). Differences in self-reported oral health among community-dwelling black, Hispanic, and white elders. *Journal of aging and health, 23*(2), 267-288.
[29] Hitchcock, E. R., Harel, D., & Byun, T. M. (2015). Social, Emotional, and Academic Impact of Residual Speech Errors in School-Aged Children: A Survey Study. *Seminars in Speech and language, 36*(4), 283–294.
[30] Kaur, P., Singh, S., Mathur, A., Makkar, D. K., Aggarwal, V. P., Batra, M., … Goyal, N. (2017). Impact of Dental Disorders and its Influence on Self Esteem Levels among Adolescents. *Journal of Clinical and Diagnostic Research, 11*(4), ZC05–ZC08.

Relative measures

CBAx also calculates three relative measures that show the value for money from an initiative, neutral to the scale of the initiative. These allow Treasury and other decision makers to compare the expected impact of a vast range of programmes.

Return on Investment, Societal

$$= \frac{Total\ societal\ benefit}{Total\ govt.cost}$$

Represents the returns from Govt. investment to New Zealand as a whole

Return on Investment, Govt.

$$= \frac{Total\ govt.benefit}{Total\ govt.cost}$$

Represents the returns from Govt. investment to the govt.

Treasury's main fiscal focus is this ratio

Benefit cost ratio

$$= \frac{Total\ societal\ benefit}{Total\ societal\ cost}$$

Represents the returns from total societal spending to New Zealand as a whole

Indicative cost-benefit modelling gives the following relative measures.

Measure	What this represents	Result
Return on Investment, Government only	Returns from Government investment to Government	1.6
Return on Investment, Societal total	Returns from Government investment to NZ as a whole	4.5
Benefit cost ratio, Societal total	Returns from societal spending to NZ as a whole	4.5

Note: The benefit cost ratio (BCR) is different to the societal return on investment (ROI) when there are social costs / disbenefits. This analysis shows the split of Government and Societal benefits based on a fully subsidised service with no cost to the client. The BCR would be different from the Societal ROI under a cost-contribution model as the portion of the investment privately covered becomes a disbenefit for society

Benefits to Government

The Government ROI over one shows that even under a fully funded model there is value in providing oral health services to low-income adults. The key cost savings for Government are the other avoided health costs, tax revenue and reduced benefits from increased employment, and avoided dental issues being addressed by the DHBs.

The avoided health costs looks at the increased risk of coronary heart disease from periodontal disease. Research highlights a number of health issues associated with poor oral health (diabetes[31], ischemic stroke[32], chronic obstructive pulmonary disease[33], pregnancy complications[34, 35], cancer[36]) but it is not clear whether dental services would successfully reduce these or if it is correlation driven by lifestyles.

[31] Demmer, R. T., Jacobs, D. R., & Desvarieux, M. (2008). Periodontal disease and incident type 2 diabetes: results from the First National Health and Nutrition Examination Survey and its epidemiologic follow-up study. *Diabetes Care*, *31*(7), 1373-1379.
[32] Grau, A. J., Becher, H., Ziegler, C. M., Lichy, C., Buggle, F., Kaiser, C., ... & Dörfer, C. E. (2004). Periodontal disease as a risk factor for ischemic stroke. *Stroke, 35*(2), 496-501.
[33] Prasanna, S. J. (2011). Causal relationship between periodontitis and chronic obstructive pulmonary disease. *Journal of Indian Society of Periodontology, 15*(4), 359.

Research also highlights the association between smoking and poor oral health and the higher smoking rates among low-income adults. As part of chairside education, it is assumed that some clients will be advised to stop smoking which some may successfully do. The benefit to Government from this is equal to the average health care costs in excess of tax revenue from a person's cigarette purchases, reflecting the marginal benefit for Government.

The Government benefits from increased employability are unique to this cohort which is assumed to hold New Zealand's beneficiaries population. For more well off cohorts, employment impacts will likely be through increased value of their employment by being able to work more and being empowered to pursue higher-paying roles through avoided pain and improved perceptions.

Societal benefits

The Societal ROI of 4.5 shows high wellbeing gains for low-income adult clients. Despite there being significant potential gains from good oral health, there are a number of barriers that prevent people from using dental services. These barriers include fear, system navigation, health literacy, transport, work hours, language and poor oral health being normalised in New Zealand.

Sensitivity analysis

Cohort changes

As costs and benefits are calculated on a per person basis for the average client, relative measures do not change when reach is scaled up or down at a national level. When the 'average' client changes, for example with a different population base in different regions, this will affect the impacts. In this analysis, the relative benefit of gained employment changes in response to the proportion of the working age population.

Per client costs are dependent on there being capacity to service any associated volume increase. Benefits are modelled for a low-income cohort and are not applicable to dep 1, 2 or 3.

For a programme targeting the cohort based in the three most deprived DHBs (Tairawhiti, Northland and Whanganui) regardless of whether they have visited a dentist in the past 12 months, still assuming 44.1% take up the service when the cost barrier is removed, this would reach 59,000 adults have the following impact on results:

Measure	National reach	Targeting high deprivation DHBs
Total marginal impact (50 year NPV)	$16,308m	$1,588m
Total cost of initiative (50 year NPV)	-$3,652m	-$359m
Net economic benefits (50 year NPV)	$12,657m	$1,229m
Return on Investment, Government only	1.6	1.6
Return on Investment, Societal total	4.5	4.4
Benefit cost ratio, Societal total	4.5	4.4

Targeting low-income adult clients in the three most deprived DHBs could cost around $35m per year compared with $225m for a more passive national programme.

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[36] Shi, J., Leng, W., Zhao, L., Deng, C., Xu, C., Wang, J., Wang, Y., Peng, X. (2018). Tooth loss and cancer risk: a dose-response meta analysis of prospective cohort studies. *Oncotarget, 9*(19), 15090-15100

The decrease in Societal ROI and BCR are driven by the lower working age population in these areas, decreasing the quantified impact of increased employment from good oral health.

Cost changes

Different service costs, holding the cohort size constant, would impact relative measures:

Measure	$590 p.a. / client Adolescent prices	$492 p.a. / client ACC prices	$1,183 p.a. / client Member fees
Return on Investment, Government only	1.6	1.9	0.8
Return on Investment, Societal total	4.5	5.4	2.2
Benefit cost ratio, Societal total	4.5	5.4	2.2

As the annual cost per client for a comparable suite of services changes, the return on costs changes. As the costs to achieve the benefits from good oral health, so too does the value for money. Under the ACC contract, prices for an examination, filling, extraction and dentists time is slightly lower[37]. As a result, the ROI (Government and Societal) and the BCR are higher.

When the annual cost per client increases to $1,183 in the member fees survey the benefits are relatively lower. At the current market rate for services, the benefits to Government are outweighed by the cost of a full subsidy. However, at this price there are still benefits to society (such as productivity gains) which Government may see worth investing in from a wellbeing perspective. Transferring part of this cost to clients through a cost contribution model would increase the ROI for Government, but would have flow-on disbenefits to society that would reduce service uptake and economic value of good oral health.

[37] The initial examination has a lower fee than a decile 1-3 consultation. Dentist time is not separately priced in the ACC contract so minor surgical operations not otherwise covered by the ACC schedule is assumed.

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