

## Positive impacts of oral health services provision by a student-led primary care clinic to an Australian rural indigenous community

S March,\*  C Mangoyana,\* P Oakley,†  R Lalloo,\*  LJ Walsh\* 

\*The University of Queensland School of Dentistry, Oral Health Centre, Brisbane, Queensland, Australia.

†Centre for the Business and Economics of Health, The University of Queensland, Brisbane, Queensland, Australia.

### ABSTRACT

**Background:** This study aimed to determine whether oral health services provision by a dental student clinical outplacement embedded within a Community Controlled Health Service positively impacted a rural Indigenous community and to explore the nature of these benefits.

**Methods:** Aggregated and de-identified 2017, 2018 and 2019 student-led clinic services provision data were retrospectively analysed. The change in services mix over time was measured. Rural outplacement clinic operational costs to the university were estimated. Government-funded local public dental clinic waiting list and services provision data were used to identify any student clinic establishment effect.

**Results:** The student-led clinic services mix shifted over time from mainly acute care for toothache towards prevention of disease and tooth restoration, indicating an improvement in patient oral health and correspondingly reduced system costs. Imputed value of 2017–2019 student-led clinic services provision totalled almost AUD\$1 million. Government public clinic waiting list times decreased after full establishment of the student-led clinic, indicating decreased pressure on the public system.

**Conclusion:** The Community Controlled Health Service and university partnership improved community oral health care access, its timely delivery and simultaneously provided valuable human capital development from the student training experience. The student-led clinic's targeted Indigenous community showed oral health improvement over time. © 2023 Australian Dental Association.

**Keywords:** Dental clinical outplacement, indigenous community, oral health services, rural, student led.

**Abbreviations and acronyms:** ADA = Australian Dental Association; ATSI CCHS = Aboriginal and Torres Strait Islander Community Controlled Health Service; FTE = full-time equivalent; GHS = Goondir Health Services; QH = Queensland Health; QHHS = Queensland Hospital and Health Services; WOOS = Weighted Occasions of Service.

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### INTRODUCTION

Clinical outplacement experience enhances dental education by exposing students to clinical operations and practice responsibilities in an authentic workplace and enabling their better understanding of ethics and dental public health principles.<sup>1</sup> Strong partnerships between universities and rural and remote health care providers to develop customized student outplacements can address oral health disparities by enhancing oral health care and improving access.<sup>2</sup> Development and sustained provision of such outplacements require considerable economic and logistical support.<sup>3</sup>

Long-term sustainability of dental rural clinical outplacement programmes hinges on demonstrating their

positive overall benefits. While positive student education outcomes of clinical outplacements are well established,<sup>4</sup> the literature lacks estimation of any economic value to the communities served by them. Analysis of outplacement dental clinic services provision provides a starting point towards a better appreciation of target community impacts.

The University of Queensland (UQ) undergraduate dentistry programme spans five years. All pre-clinical training and clinical patient experiences are delivered on-campus during Years 1–4. Final-year students then complete two extended semester-long clinical outplacements. Such longer outplacements consolidate prior learning and build practical work-ready skills and graduate attributes<sup>5</sup> while decreasing university programme costs.

Queensland Hospital and Health Services (QHHS) maintains government-funded dental clinics state-wide to treat Queensland residents eligible for publicly funded care, that is holders of pensioner, health and seniors' concession cards plus several other groups including refugees. Some metropolitan and regional Queensland Health (QH) dental clinics also host university clinical outplacements, which facilitates access to oral health care for disadvantaged populations.

UQ maintains two additional dental clinical outplacements directly serving Indigenous communities in rural South-East Queensland. These dental clinics are managed in partnership with Goondir Health Services (GHS), an Aboriginal and Torres Strait Islander Community Controlled Health Service (ATSICCHS) funded by the Australian Federal Government. An ATSICCHS is an independent, non-profit organization usually set up through an elected board to provide culturally competent and holistic health care to the population it serves. Such health services have had a significant positive effect on the health of Aboriginal and Torres Strait Islander People.<sup>6</sup>

Within this document hereinafter, we respectfully refer to Aboriginal and Torres Strait Islander Peoples as Indigenous.

In 2013, UQ and GHS jointly established a dental clinic within newly constructed GHS premises in Dalby. Later, in 2017, their second jointly managed dental clinic was established in remote St George. Federal government capital financed building construction for GHS and the federal Dental Training Expanding Rural Placement (DTERP) Scheme funded the university dental clinic infrastructure. Federal funding to UQ via the National Rural Health Multidisciplinary Training (RHMT) Scheme has since contributed towards ongoing dental clinic operational costs.<sup>7</sup>

Evidence supports DTERP's premise that rural outplacement experience exerts a positive influence on the likelihood of future rural workplace participation by dental graduates, in turn expanding oral health services to underserved high-needs rural communities.<sup>8,9</sup>

In addition to the student-led university dental clinic, oral health needs of the Dalby community are served by a small public hospital-based government dental clinic, a government school dental service facility and three private dental practices.

All clients attending the Dalby student-led clinic receive free dental care at the point of delivery. The five-chair clinic is staffed by one full-time equivalent (FTE) supervising dentist supported by two non-chairside administrative staff. Students operate alone or are assisted chairside by fellow students. Four half-semester rotations of eight or eleven weeks each host a student workforce of four or five.

The Goondir Indigenous people have embraced the dental clinic integrated within their health service as

their own and delivery of culturally appropriate oral health care, a known factor key to addressing access disparities is facilitated.<sup>10</sup> Additional evidence of positive Indigenous oral health outcomes generated by this partnership model of care can go further to support the case for long-term government and university investment in sustainability.<sup>11</sup>

This study aimed to explore impacts of the Dalby dental student outplacement clinic on population oral health care provision and access by addressing the following research questions:

- (1) What quantity and mix of services and their imputed value was provided by the university student-led clinic located in Dalby during the 2017–2019 period?
- (2) What is the estimated ongoing annual operational cost incurred by the university for the Dalby student-led outplacement clinic?
- (3) What change in services provision and waiting time for care occurred at the Dalby government-funded public dental clinic between the initial establishment period of the student-led clinic within the ATSICCHS (2014 and 2015) and its subsequent fully operational period (2017 and 2018)?

## METHODS

Data detailing services delivered by the Dalby student-led clinic during 2017, 2018 and 2019 were collated in the form of item codes and aggregated into clinical service types to analyse services quantity and mix (Appendix A). Item codes are three-digit numbers assigned to items or clinical procedures by the Australian Dental Association (ADA) coding system for dental treatment.<sup>12</sup>

Data were analysed for three consecutive years (2017, 2018 and 2019) to track changes in services provision across this period.

As a reference point to impute financial value for services delivered by the student-led clinic, the 2019 Australian Government Department of Veterans' Affairs (DVA) Fees Schedule for Dental Services<sup>13</sup> was applied to the clinic's aggregated item code data. The DVA Fees Schedule designates government rebates to practitioners who provide dental services to members of the veteran community. DVA fees for 56 item codes reported by the student-led clinic were also compared with fees reported by the 2019 ADA Fees Survey, a private membership summary of the level of dental fees charged by practitioners.<sup>14</sup>

For retrospective analysis, total occasions of service (OOS) 2017 and 2018 data were collected from the student-led clinic. At the time of collection, no 2019 OOS data were available. One OOS is counted for each person attending in the capacity of a patient.

Data sourced from the UQ School of Dentistry management and financial records were used to determine operational costs incurred by the university for its Dalby outplacement clinic. Salaries data from 2020 were used to estimate annual direct salary costs for 1.0 full-time equivalent (FTE) Dentist, 1.0 FTE Senior Dental Assistant and 1.0 FTE Dental Assistant. Other operational costs incurred included clinic supplies and consumables, university central management and professional support staff time, and administration cost of 0.2 FTE School Manager.

The Darling Downs Health Human Research Ethics Committee (HREC) issued ethics approval HREC LNR/19/QTDD/58317. QH provided aggregated and de-identified data from the 1.0 FTE Dentist Dalby government clinic for client quantity and Indigenous/non-Indigenous status, OOS delivered, and the proportion of clients served within recommended waiting times by treatment category. For patient confidentiality and privacy reasons, actual services-delivered data were not released. While QH provided data on numbers of clients and OOS for the Dalby government dental clinic for the years 2010–2018, only data for the years 2013–2018 were deemed suitable for analysis due to changes in data reporting formats.

Under QH policy,<sup>15</sup> General Priority patients should be seen within 24 months, Priority 3 patients within 12 months, Priority 2 patients within 3 months and Priority 1 patients within 1 month. The Dalby government clinic provides treatment for all priority level patients except Priority 1 patients who, per QH policy, are referred to other providers at larger regional or metropolitan government clinics. Data on government clinic wait-listed patients by priority level were used to consider whether the development and scaling up of the Dalby student-led clinic to its current “steady state” was associated with an increase in the number of Dalby government clinic patients being seen within the recommended waiting times. Each measure of Dalby government clinic activity was assessed over a two-year period equating the General Priority patient-level wait time of 24 months. The 2014 and 2015 period represented the early establishment phase of the student-led clinic’s influence on the government clinic operations and the 2017 and 2018 period represented full operational phase influence.

## RESULTS

### Student-led clinic quantity, mix of services, imputed value

The number of services delivered by the student-led university dental clinic totalled 2236 in 2017, 3398 in

2018 and 3594 in 2019, a 38% increase in service quantity between the years 2017 and 2019.

Across all three years, services related to diagnostic and preventive activities were the most abundant, totalling 4536 items, 49% of all services. Diagnostic and preventive services increased from 775 in 2017 to 2050 by 2019, an increase of 165%. The number of new patients seen each year by the students remained relatively constant at approximately 62. As a percentage of all services, diagnostic and preventive services increased from 35% in 2017 to 57% in 2019, indicating a greater role for preventive services in the clinic’s services mix.

Over the same period, tooth conservation services increased by 29%, while tooth replacement services fell by 33%. As a share of all services, tooth replacement services fell from 25% in 2017 to 10% in 2019. The percentage of tooth conservation services also fell from 39% to 32% over the same period. However, diagnostic and prevention plus restoration combined increased from 74% in 2017 to 89% in 2019 in its total contribution to all services.

The imputed value of services delivered by the student-led clinic during the three-year period 2017–2019 amounted to just under AUD \$1 000 000, shown in Table 1. Imputed annual value of services delivered increased by 34.7% from 2017 to 2018, and again by a modest 1.0% in 2019 (Table 1).

### Ongoing clinic operational cost to university

University costs incurred for operating the Dalby student-led clinic in 2017 and 2018 are presented in Table 2 together with 2017 and 2018 OOS.

OOS increased by 28% between 2017 and 2018, from 589 in 2017 to 756 in 2018, while at the same time operational costs driven only by increased consumables increased by 5.4%.

Most student-led clinic clients identified as Indigenous; however, the share of total OOS for Indigenous clients fell slightly from 85% in 2017 to 78% in 2018.

**Table 1. Record of imputed value in \$AUD of oral health care services provided by the student-led clinic 2017–19**

Imputed value of services delivered by service type by the student-led clinic 2017–19 (\$AUD)				
Service type	2017	2018	2019	Total
General (\$)	7553	6745	5853	20 151
Diagnostic and preventive (\$)	39 425	90 016	109 738	239 179
Tooth conservation (\$)	107 019	157 462	159 217	423 698
Tooth replacement (\$)	108 057	98 754	81 726	288 537
Grand total (\$)	262 054	352 977	356 534	971 565

**Table 2. University costing estimate for Dalby student-led clinic operation and Occasions of Service**

Year	2017	2018
Estimated costs to university for operating Dalby student-led clinic (\$AUD)		
Clinic-based salary costs (\$)	337 535.00	337 535.00
Central staff costs (\$)	17 030.00	17 030.00
Non-salary expenses (accommodation, consumables etc.)	160 400.31	189 919.31
Total costs (\$)	514 965.31	544 484.31
Occasions of Service Dalby student-led clinic		
Total OOS	589	756
OOS per chair	118	151
Cost per OOS (\$)	874	720
Cost per chair (\$)	102 993.00	108 896.86

### Government clinic services provision and waiting time change

The number of clients treated at the Dalby government clinic decreased as did the OOS between the two periods. Combining these data, the mean number of OOS per client fell following the introduction of the student-led clinic to the area, with the government clinic on average providing one fewer OOS for every three clients seen during the later period. All changes were statistically significant (Table 3).

Impacts of the student-led clinic on activity at the government clinic are shown in Table 3.

General Priority clients, the lowest categorized, were all treated within the guideline 24 months waiting period in both study periods. In the early phase (2014 and 2015) of the student-led clinic, 16% of clients waiting for treatment were Priority 2 and 5% were Priority 3. The corresponding figures for the 2017 and 2018 period were 7% and 2%, respectively. Patients waiting for government care after full establishment of the student-led clinic were less likely to be in higher priority wait categories as there was a shift towards General Priority in the later period.

During the earlier student-led clinic establishment period, 21% of government Priority 3 clients were not treated within the 12 months target time. By the later 2017 and 2018 period, any failure to meet the target time was eliminated, with all Priority 3 clients now being seen “on time”. The proportion of Priority 2 clients seen “on time” also increased, although this increase was only 3%.

### DISCUSSION

The annual imputed value of services delivered increased from AUD\$262 053 in 2017 to AUD \$356 534 in 2019, an increase of 36%. This is less than the 38% increase in total services over the three-year period because the mix of services shifted from higher value services of tooth replacement and conservation towards lower value diagnostic and preventive services.

In 2017, to expose every student in the cohort to a rural Indigenous clinic setting, rural clinical rotations were set very short at only four or five weeks. The high student turnover (nine rotations involving 41 students in total) increased outplacement orientation time and caused notable production inefficiency. In response, in later years, purposefully longer outplacements (four rotations involving only 16 students in total) have better-facilitated patient care. A downside of this situation is the limit placed on numbers of students able to participate in a rural Indigenous outplacement. Some of the 28% increase in student-led clinic OOS between 2017 and 2018 was likely associated with the increased 2018 clinical rotation length and subsequent increased production, as was the case with the 35% increase in imputed value of services delivered in 2018. Total patient numbers treated by the students each year remained almost static, increasing only 5.5% from 1054 in 2017 to 1115 in 2018, then decreasing slightly in 2019 by 7.3% to 1034.

**Table 3. Record of impact of student-led clinic on operation of government clinic**

Impact on Dalby government dental clinic activity resulting from student-led clinic operation					
Number of clients attending government clinic 2014 and 2015 versus 2017 and 2018					
Clients	2014 and 2015	2017 and 2018	Difference	% CI	X <sup>2</sup> (P-value)
Indigenous (%)	251 (7.6%)	318 (10.4%)	+2.8%	1.39% to 4.22%	15.20 (0.0001)
Non-Indigenous (%)	3031 (92.4 %)	2730 (89.6%)	-2.8%	-1.39% to -4.22%	15.50 (0.0001)
Total clients	3282	3084	-7.1%		
Occasions of Service delivered by Dalby government dental clinic 2014 and 2015 versus 2017 and 2018					
Indigenous (%)	592 (6.9%)	609 (8.7%)	+1.84%	+0.99% to +2.69%	18.31 (<0.0001)
Non-Indigenous (%)	8015 (93.12%)	6379 (91.29%)	-1.83%	-0.98% to -2.69%	18.172 (<0.0001)
Total OOS	8607	6988	-18.81%		
Occasions of Service per client delivered by Dalby government clinic 2014 and 2015 versus 2017 and 2018					
OOS per patient	2014 and 2015	2017 and 2018	Difference	95% CI	X <sup>2</sup> (P-value)
Indigenous	2.36	1.92	-0.44	-0.20 to -0.68	0.0003
Non-Indigenous	2.64	2.34	-0.31	-0.23 to -0.39	<0.0001
Total	2.62	2.29	-0.33	-0.25 to -0.41	<0.0001

The percentage of student-led clinic clients identifying as Indigenous varies from year to year; however, it averages approximately 80%.<sup>16</sup> As a referral for an oral examination is integral to GHS's holistic health care model, this approach generates the bulk of the student-led clinic clientele.<sup>17</sup> Goondir new patient referrals numbered 38 in 2017, 50 in 2018 and 61 by August 2019, an indication of the health service's recognition of the importance of oral health connections with chronic systemic diseases and general health. The sense of cultural ownership of the premises felt by the Indigenous community facilitates access. Practically, comparative ease of attendance at the dental clinic enables high appointment uptake. Some GHS clients even travel hundreds of kilometres, bypassing their local government dental clinics to preferentially attend the Dalby student-led clinic. GHS clients can access free transport to Dalby from several neighbouring communities, conveniently combining medical, pharmacy and diabetes support appointments at GHS with their dental visits.

While the partnership agreement between the university and GHS specifies approximately 80% of the clientele be Goondir people, the student-led clinic does not limit clientele solely to the Indigenous community, nor to those eligible for government-funded care.

Discernible change occurred to the services mix delivered to patients by the student-led clinic between 2017 and 2019. A positive community oral health outcome can be inferred from the notable increase in diagnostic and preventive activities and a concomitant decrease in tooth replacement activities performed by students on virtually the same number of patients. Once the university clinic had become well-established and trusted by the Indigenous community, the annual number of new patients being seen was steady while the number of continuing care interactions increased by 52%, and emergency pain relief and tooth replacement services decreased by 67%. Such a move towards greater focus on the maintenance of health and oral function, retention of teeth and prevention of disease indicates positive benefit to oral health at individual and community levels.

Economic value of the university clinic service activity resides principally in easing pressure on an overburdened public oral health sector by freeing up appointment times for other eligible clients. Assigning a monetary value to services provided by the student-led clinic was notional as all treatment provided was free of charge and generated no revenue.

Some 34% of clients of the student-led clinic were Goondir people who did not hold concession cards. They, and those 1.3% non-Indigenous and non-concession card holder clients, who might otherwise have attended a private dental practice for dental care

benefitted financially from this arrangement, having no out-of-pocket expenses. Conversely, local private dental practices might have been disadvantaged by losing paying clientele. DVA Schedule fees used to assign monetary value are approximately 80% of fees usually charged by private dental practitioners.<sup>13,14</sup>

In terms of costs incurred by the university, responsibility for the student-led clinic is shared by the partnership between GHS and the university. GHS provides the premises and covers building and utilities' costs, while the university funds all other ongoing operational costs. A contribution from RHMT programme funds, the majority of which finance medical student placements, covers around half the operational cost of the UQ rural dental clinics, with the shortfall allocated out of UQ School of Dentistry finances. Most university expenditure lies in staff salaries, including higher compensation necessary to attract and retain experienced supervising dentists to rural settings.

The South-West Queensland area served by QH Darling Downs Hospital and Health Service (DDHHS) claims 6% Indigenous residents.<sup>18</sup> In that Western Downs Local Government Area, some 32% of all residents are eligible for public dental care.<sup>19</sup>

Throughout the study timeframe, the one-FTE-dentist-manned Dalby government clinic continued to operate at its full capacity. Government clinic clients in the 2017 and 2018 period required fewer visits on average to have their needs met than in the 2014 and 2015 period, consistent with needs per client being less in the later period. If the university clinic was in fact taking some load from the government clinic, this would imply that clients who had switched to the university clinic had higher than average dental treatment needs.

An all-student clinical workforce imposes logistic and care complexity limitations to provision of dental treatment. Cases outside the scope of student operators must be referred elsewhere. Also, outside of the students' university-mandated schedule, patients in need of care must seek other providers, that is, patients attend the government clinic when the student-led clinic is not operating. The university clinic operation appears to relieve some community oral health care burden from the local government clinic. However, no direct linear relationship can be drawn because, among various factors, many of the student-led clinic's Indigenous clients travel from distant locations.

A buffer between demand for services and capacity of the system to provide those services, waiting lists influence patient satisfaction and pose a significant barrier to accessing timely public dental care for dependent people.<sup>20</sup> Patients waiting less than 3 months experience less inconvenience than those

waiting for longer than 3 months.<sup>20</sup> The establishment and achievement of a steady state for the university clinic in Dalby meant that clients waiting for treatment at the government clinic in Dalby tended to be of lower priority for care, and fewer of them waited for care beyond designated target treatment times. An important intangible benefit of student outplacement for the local community, such waiting list reduction shows a preventive health-promoting “upstream approach” that helps address oral health over the long term as well as providing advantages to a tax-funded health system.<sup>20</sup>

### Limitations

Study limitations relate to study design and data availability. In design terms, a retrospective analysis was undertaken using data made available by the UQ student-led clinic and the Dalby government clinic. These data were from routine clinic operations collected for administrative reporting purposes and suffered from some gaps relating to changes in record-keeping software over time. A prospective study design would have obviated such issues and allowed other measures to be assessed between the two sectors, such as production efficiency by Weighted Occasions of Service (WOOS) per hour per operator, close tracking of the proportion of clients who identify as Indigenous, and the actual waiting times experienced by clients.

Additionally, data obtained for the student-led clinic and the government clinic did not correspond exactly. As a result, analysis undertaken represented separate but parallel studies of the two clinics. One study related to the Dalby student-led clinic and the other to changes in the Dalby government clinic operations over the time between when the student outplacement clinic was established and when it had scaled up to a steady state. The parallel analyses were used to interpolate the impact of the university clinic on delivery of oral health care to the Dalby population.

### Messages

This collaborative partnership model of university with Indigenous community organization was key to achieving the positive stakeholder outcomes of maximizing access and service delivery benefits for the local community. The student-led clinic improved access to dental care for an otherwise underserved population. Services delivered by the university clinic transitioned over time to a more health-focussed approach which resulted in less tooth loss and more tooth preservation. Simultaneously, community oral health and oral health awareness improved.<sup>11</sup> The

non-Indigenous community also experienced improved access to care as waiting times for care at the public dental clinic were reduced because the student-led clinic partly eased the public clinic’s case load.

The study uncovered several areas for improvement in the student outplacement clinical operations.

Utilizing clinic facilities year-round could significantly expand community benefits. Increasing awareness of the link between oral and general health by deeper integration of the dental clinic within the Indigenous holistic care model could potentially improve outcomes for all stakeholders. Respectful collaboration and meaningful communication between the Indigenous community and university clinic staff and students, including hearing Indigenous histories, could assist reconciliation of Indigenous knowing and perceptions with Western health models, thus facilitating the self-led community engagement which leads to better oral health outcomes.<sup>21</sup> Lastly, expansion of existing student outreach could enhance students’ cultural sensitivity, with spill-over benefits for their work in boosting community oral health awareness.

The mutually beneficial outplacement roles of enhancing student learning experience and serving community oral health needs can be pursued without major concern around production-driven outputs because the university retains control of the outplacement clinic as an asset. A student-led clinic operation following a private practice model but without the financial drivers can deliver quality patient-centred care effectively. Having students personally responsible for transport and accommodation during outplacement reduces overall institutional cost. Recognizing higher rural living costs for students, the university does however allocate a portion of third-party education funding it receives to subsidize students’ rural rotation accommodation costs.

We know that: Clinical outplacement programmes expose students to an authentic workplace experience and to patients from lower socioeconomic and disadvantaged communities.<sup>22,23</sup> The continuity of patient care possible during extended clinical outplacements produces known positive oral health outcomes.<sup>5</sup> A positive and satisfying rural experience might translate to students taking up positions within the rural workforce after graduation.<sup>4,8,24</sup> Students can develop tolerance, understanding and cultural awareness and come to a deeper appreciation of cultural diversity while progressing academically and professionally towards meeting required graduate attributes, competencies, and desired normative learning outcomes.<sup>25</sup>

Given the significant cost to universities of providing rural Indigenous outplacements, the case can be made for increased government support for oral

health training in this type of clinical experience, an integral competency for the new practitioner<sup>26</sup> along with continued support for ATSCCHS programmes.

## CONCLUSION

This study documented positive impacts of the UQ/GHS partnership dental student outplacement clinic in Dalby and articulated financial and other local community benefits resulting directly from the clinic's activity. The introduction of the student-led clinic had both direct and indirect impacts on the provision of dental care in Dalby and surrounding communities. An important direct impact was the substantial and increasing quantity and value of oral health services provided pro bono to the community, which over the three-year period from 2017 to 2019 approached AUD \$1 000 000.

The project also established valuable data against which comparisons can be made to other national and international student outplacement programmes.

Positive implications for system costs and for individual and Indigenous community oral health arose from the marked shift over time in student-led clinic services mix away from tooth extraction and rehabilitation towards prevention of disease and tooth conservation. During the same period, average treatment priority of patients attending the local government dental clinic decreased, while the proportion of its patients being treated within target times increased.

Notwithstanding several limitations, the student outplacement clinic drove an improvement in access to and timelier delivery of care for the Indigenous community. Additionally, it provided valuable human capital development from the student training experiences and showed the value of Australian Federal Government funding support for underserved communities via funding of rural university-led initiatives.<sup>2,7</sup> While substantial ongoing financial support is necessary to sustain this partnership model of care, the study's positive findings can inform translation of this successful model to other health practitioner training programmes, with likely further advantageous health care outcomes.

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## REFERENCES

1. Lalloo R, Evans JL, Johnson NW. Dental care provision by students on a remote rural clinical placement. *Aust NZ J Public Health* 2013;37:47–51. <https://doi.org/10.1111/1753-6405.12009>.
2. Shrivastava R, Power F, Tanwir F, *et al.* University-based initiatives towards better access to oral health care for rural and remote populations: a scoping review. *PLoS ONE* 2019;14: e0217658. <https://doi.org/10.1371/journal.pone.0217658>.
3. Lalloo R, Massey W. Simple cost analysis of a rural dental training facility in Australia. *Aust J Rural Health* 2013;21:158–162.
4. Johnson G, Wright FAC, Foster K. A longitudinal evaluation of the Rural Clinical Placement Program at the University of Sydney Dental School. *Eur J Dent Educ* 2019;23:e59–e70. <https://doi.org/10.1111/eje.12401>.
5. Mascarenhas AK, Freilich SR, Henshaw MM, Jones JA, Mann ML, Frankl SN. Evaluating externship programs: impact of program length on clinical productivity. *J Dent Educ* 2007;71:516–523.
6. Australian Institute of Health and Welfare. Indigenous Health and Wellbeing: Canberra: AIHW, 2022. <https://www.aihw.gov.au/reports/australias-health/indigenous-health-and-wellbeing>. Accessed: October 2022.
7. Stewart R, McMillan F. Australia's Rural Health Multidisciplinary Training program: preparing for the rural health workforce that Australia needs. *Aust J Rural Health* 2021;29:617–619. <https://doi.org/10.1111/ajr.12808>.
8. Johnson G, Foster K, Blinkhorn A, Wright FC. Exploration of the factors that influence new Australian dental graduates to work rurally and their perspectives of rural versus metropolitan employment. *Eur J Dent Educ* 2019;23:437–447. <https://doi.org/10.1111/eje.12450>.
9. Johnson G, Foster K, Blinkhorn A, Clive Wright FA. Rural clinical school dental graduates' views on rural and metropolitan employment. *Eur J Dent Educ* 2020;24:741–752. <https://doi.org/10.1111/eje.12564>.
10. Tiwari T, Jamieson L, Broughton J, *et al.* Reducing Indigenous oral health inequalities: a review from 5 nations. *J Dent Res* 2018;97:869–877. <https://doi.org/10.1177/0022034518763605>.
11. Mangoyana C, March S, Lalloo R, Walsh LJ. Positive oral health outcomes: a partnership model improves care in a rural indigenous community. *Aust J Rural Health*. 2022;00:1–12. <https://doi.org/10.1111/ajr.12960>.

12. Australian Dental Association. The Australian Schedule of Dental Services and Glossary. 12th ed. St Leonards: ADA, 2017.
13. Australian Government Department of Veteran's Affairs. Department of Veterans' Affairs Fee Schedule for Dentists and Dental Specialists. Canberra: DVA2019. Available at: <https://www.dva.gov.au/providers/notes-fee-schedules-and-guidelines/fee-schedules/dental-and-allied-health-fee-schedules>. Accessed October 2019.
14. Australian Dental Association. Dental fees survey private practice members: St Leonards: ADA, 2019. Available at: <https://www.ada.org.au/dental-fees>. Accessed September 2020.
15. Queensland Health. Hospital care waiting lists. Brisbane: QHHHCS. 2022. Available at: <https://www.qld.gov.au/health/services/hospital-care/waiting-lists>. Accessed October 2022.
16. Goondir Health Services. Annual Report for Goondir Aboriginal and Torres Strait Islander Corporation for Health 2016/2017. Dalby: GHS. 2017.
17. National Aboriginal Community Controlled Organisation (NACCHO). The Royal Australian College of General Practitioners. National guide to a preventive health assessment for Aboriginal and Torres Strait Islander people: East Melbourne: RACGP, 2018.
18. Queensland Health. The health of Queenslanders 2018. Report of the Chief Health Officer Queensland. Hospital and Health Service profiles. Brisbane: QHHHCS. 2019. Available at: <https://www.health.qld.gov.au/research-reports/public-health/cho-report/current>. Accessed: April 2021.
19. Australian Government Department of Social Services. Payment demographic data. Canberra: DSS,2019. Available at: <https://data.gov.au/data/dataset/dss-payment-demographic-data>. Accessed February 2023.
20. Lalloo R, Kroon J. Impact of National Dental Partnership Agreements on public service dental waiting lists in Queensland. Aust NZ J Public Health 2017;41:199–203. <https://doi.org/10.1111/1753-6405.12575>.
21. Dyson K, Kruger E, Tennant M. A decade of experience evolving visiting dental services in partnership with rural remote Aboriginal communities. Aust Dent J 2014;59:187–192.
22. Mays KA, Maguire M. Care provided by students in community-based dental education: helping meet oral health needs in underserved communities. J Dent Educ 2018;82:20–28. <https://doi.org/10.21815/JDE.018.003>.
23. Abuzar MA, Owens J. A community engaged dental curriculum: A rural Indigenous outplacement programme. J Pub Health Research 2016;5:27–31.
24. Johnson G, Blinkhorn A, Byun R, Foster K, Wright FAC. The workforce outcomes of dental graduates from a metropolitan school 'Rural Clinical Placement Program' versus a 'Rural Clinical School'. Int Dent J 2020;70:214–226. <https://doi.org/10.1111/idj.12541>.
25. Mays K. Community-based dental education models: An analysis of current practices at U.S. dental schools. J Dent Educ 2016;80:1188–1195.
26. Australian Dental Council. Professional competencies of the newly qualified dental practitioner: Melbourne: ADC, 2022.

*Address for Correspondence:*

*Sandra March*

*The University of Queensland School of Dentistry*

*Oral Health Centre*

*288 Herston Road Brisbane*

*Qld. 4006*

*Australia*

*Email: s.march@uq.edu.au*

## APPENDIX A

### ITEM CODES FOR UQ STUDENT-LED CLINIC SERVICES

List of item codes included in the analysis and the groupings used to present the results.

Item code	DVA Fee AUD\$	Domain
011	54.35	Diagnostic & Preventive
012	45.15	Diagnostic & Preventive
013	28.35	Diagnostic & Preventive
014	65.50	Diagnostic & Preventive
015	65.50	Diagnostic & Preventive
018	48.55	Diagnostic & Preventive
019	11.45	Diagnostic & Preventive
022	38.20	Diagnostic & Preventive
037	97.25	Diagnostic & Preventive
072	33.55	Diagnostic & Preventive
111	55.50	Diagnostic & Preventive
113	21.00	Diagnostic & Preventive
114	92.55	Diagnostic & Preventive
115	60.25	Diagnostic & Preventive
121	35.70	Diagnostic & Preventive
122	27.90	Diagnostic & Preventive
123	27.90	Diagnostic & Preventive
131	37.55	Diagnostic & Preventive
141	51.05	Diagnostic & Preventive
151	155.10	Diagnostic & Preventive
161	47.55	Diagnostic & Preventive
165	27.90	Diagnostic & Preventive
171	52.40	Diagnostic & Preventive
213	71.95	Periodontic
221	54.65	Periodontic
222	26.90	Periodontic
250	152.25	Periodontic
311	135.55	Exodontia
314	173.20	Exodontia
323	251.20	Exodontia
324	251.20	Exodontia
331	137.10	Exodontia
341	174.80	Exodontia
387	398.00	Exodontia
411	36.00	Endodontic
412	123.25	Endodontic
414	78.50	Endodontic
415	221.05	Endodontic
416	105.30	Endodontic
417	215.35	Endodontic
418	100.70	Endodontic
419	142.35	Endodontic
445	109.10	Endodontic
455	109.10	Endodontic
511	107.60	Restoration
512	131.90	Restoration
513	157.45	Restoration
514	179.45	Restoration
515	204.85	Restoration
521	119.15	Restoration
522	144.70	Restoration
523	171.35	Restoration
524	198.05	Restoration
525	232.75	Restoration
531	127.30	Restoration
532	159.80	Restoration
533	192.10	Restoration
534	216.45	Restoration

(continued)

Table (continued)

Item code	DVA Fee AUD\$	Domain
535	250.00	Restoration
572	50.35	Restoration
577	31.25	Restoration
578	31.25	Restoration
597	154.65	Restoration
613	1386.65	Prosthodontic
615	1304.50	Prosthodontic
618	1222.35	Prosthodontic
627	136.35	Prosthodontic
642	998.85	Prosthodontic
643	1064.95	Prosthodontic
649	405.85	Prosthodontic
651	106.45	Prosthodontic
655	63.65	Prosthodontic
711	985.00	Prosthodontic
712	985.00	Prosthodontic
719	1746.65	Prosthodontic
721	450.65	Prosthodontic
722	450.65	Prosthodontic
727	1319.50	Prosthodontic
728	1319.50	Prosthodontic
731	45.45	Prosthodontic
732	22.10	Prosthodontic
733	37.30	Prosthodontic
734	45.45	Prosthodontic
736	9.40	Prosthodontic
738	181.95	Prosthodontic
739	9.40	Prosthodontic
741	53.90	Prosthodontic
743	343.75	Prosthodontic
744	293.05	Prosthodontic

(continued)

Table (continued)

Item code	DVA Fee AUD\$	Domain
751	187.30	Prosthodontic
752	156.00	Prosthodontic
753	43.70	Prosthodontic
761	39.25	Prosthodontic
762	155.50	Prosthodontic
763	39.25	Prosthodontic
765	155.50	Prosthodontic
766	155.50	Prosthodontic
767	19.35	Prosthodontic
768	157.45	Prosthodontic
771	71.50	Prosthodontic
776	47.55	Prosthodontic
911	70.55	General
926	163.65	General
927	28.35	General
965	549.85	General
966	78.00	General
968	109.20	General
981	100.00	General
986	72.80	General
022+	38.20	Diagnostic & Preventive
037N/C	97.25	Diagnostic & Preventive
019	11.45	Diagnostic & Preventive
521G	119.15	Restoration
532G	159.80	Restoration
721V	460.55	Prosthodontic
722V	460.55	Prosthodontic
727A	1319.50	Prosthodontic
727B	1319.50	Prosthodontic
728A	1319.50	Prosthodontic
728B	1319.50	Prosthodontic