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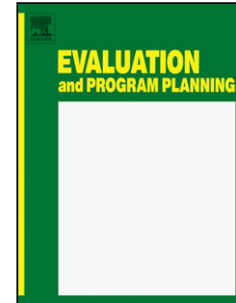
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Authors: N. Stormon, A. Pradhan, A. McAuliffe, P.J. Ford

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## Does a facilitated pathway improve access to dental services for homeless and disadvantaged adults?

Stormon N<sup>1</sup>, Pradhan A<sup>1</sup>, McAuliffe A<sup>2</sup>, Ford PJ<sup>1</sup>

1. The University of Queensland, School of Dentistry, UQ Oral Health Centre, Herston Rd, Brisbane, QLD 4006, Australia
2. Oral Health Service, Metro North Hospital and Health Service, Herston, QLD 4029, Australia

\*Corresponding author:

Nicole Stormon  
Oral Health Centre  
288 Herston Road, Herston  
Brisbane, 4006  
Email: [n.stormon@uq.edu.au](mailto:n.stormon@uq.edu.au)  
Tel: +61733658116

### Highlights

- A system integration model for oral health care for clients of homeless services in Brisbane
- By providing adults experiencing disadvantage a facilitated pathway to accessing dental appointments, attendance to the subsequent appointments at the public dental clinic was high
- Distance and transport did not appear to influence attendance to the dental facility but fear may have been a barrier experienced

### Abstract

Access to dental care is poorer for people experiencing homelessness and disadvantage due to barriers such as lengthy waiting lists, lack of transport, lack of information and fear of authorities and treatment. This study aimed to evaluate a system integration model for oral health care for clients of homeless services in Brisbane, Australia. This model aimed to provide a facilitated access pathway between homeless community organisations and a public dental service to improve access to dental care. Participants were adult ( $\geq 18$  years) clients Brisbane homeless community organisations. Those who participated in the intervention evaluation completed a questionnaire, had their oral health screened and followed up for feedback at their dental appointment. Seventy-six clients of community organisations in Brisbane participated in the intervention and its evaluation. Fear was a barrier to

accessing dental services for 23% (n= 18). Attendance to the subsequent appointments at the public dental clinic was high, with 85% (n= 64) attending their first appointment. A higher proportion of participants who had surgical and prosthodontic treatment needs at the screening did not attend their appointment compared to those with other needs. Overall the model piloted in this study had positive outcomes; with high attendance rates to the dental facility and positive experiences by participants.

**Keywords:** homeless, disadvantaged, intervention, oral health, public dental facility, access

## **Introduction**

Homelessness is a complex social disadvantage that is the result of many factors including a shortage of affordable housing, unemployment, drug and alcohol use, mental illness and more (Shelton, Taylor, Bonner, & van den Bree, 2009). In the 2011 Australian census, approximately 105,000 people were identified as homeless (Australian Bureau of Statistics, 2012). The relationship between homelessness and health outcomes is complex. Diverse interlinked risk factors such as unemployment, low income, substance abuse and poor access to care contribute to poorer general and oral health at population and individual levels (Australian Health Ministers' Advisory Council, 2015; Australian Institute of Health and Welfare, 2009). In comparison to the general population, people with socioeconomic disadvantage have higher rates of decayed, missing and filled teeth (DMFT) and poorer oral health related quality of life (Australian Health Ministers' Advisory Council, 2015; Ford, Cramb, & Farah, 2014; Jamieson, Parker, Steffens, & Logan, 2011; Kisely et al., 2011).

The Australian Health Ministers' Advisory Council has identified specific population groups as in need of targeted intervention in relation to oral health, including people experiencing homelessness or disadvantage. Described as 'priority populations', these groups are those experiencing the greatest burden of poor oral health and facing the most significant barriers to accessing oral health care (Australian Health Ministers' Advisory Council, 2015). There is substantial overlap in these populations as people in these groups often experience multiple disadvantage such as mental illness, disability and complex medical conditions (Australian Health Ministers' Advisory Council, 2015).

Restricted access to dental care is a factor in poor outcomes for these groups (Australian Health Ministers' Advisory Council, 2015). Barriers to access include costs of care, lengthy waiting lists for publicly funded services, lack of transport, lack of information and fear of authorities and treatment (British Dental Association, 2003; Daly, Tim Newton, & Batchelor, 2010; Ford et al., 2014; A Pradhan, Slade, & Spencer, 2009; Quilgars & Pleace, 2003). Stigma and discrimination have also been described as hindering access (British Dental Association, 2003; Daly et al., 2010; Quilgars & Pleace, 2003). National Australian data indicates dental attendance rates were poorest for the lowest

income brackets and this finding has been consistent over the last 10 years (Ellershaw, 2014; Slade GD, 2007).

Access to health care is a complex concept and services must be acceptable, available and effective for a population to gain access (Aday & Andersen, 1974; Gulliford et al., 2002; Jezewski, 1995; Levesque, Harris, & Russell, 2013). Internationally, different approaches have been suggested to improve access to social and health services for people at risk of homelessness and include legislative intervention, system integration, service integration and enhanced service models (Black C, 2011). Legislative intervention requires political and community action to elicit change through funding and policy. System integration refers to coordination and collaboration between mainstream services and homelessness support services (Black C, 2011). Similarly, service integration is where services are integrated into homeless services. Enhanced service models use innovation to adapt existing services to improve access (Black C, 2011).

In line with these approaches, it has been recommended access to dental care for those accessing homeless services would be enhanced by integrating dental care, referral pathways to fixed dental clinics and information within existing community support services (Ford et al., 2014). Targeted services have been identified as important for this population with flexible modes of delivery and outreach clinics suggested as ways of overcoming barriers and enabling access to screening and treatment (Daly et al., 2010). Targeted dental services are often ad-hoc and not evaluated.

Dental services currently available in Australia mostly include facilities that are private fee-paying and public subsidised facilities (for eligible patients). The majority of people with socioeconomic disadvantage are eligible to access public dental facilities. To access an appointment for public dental services in Brisbane, Australia patients call a central hotline to make an appointment and may be subject to waiting lists depending upon the facility and service required. In 2017, a collaborative project was developed between the University of Queensland School of Dentistry and Metro North Hospital and Health Service. This project aimed to evaluate an innovative system integration model for clients of homeless services. The model aimed to provide a facilitated access pathway incorporating the provision of community-based oral health screenings and referral for dental treatment an appointment at a public dental facility within the same week.

## **Methods**

### **Intervention**

A collaborative project was developed between The University of Queensland School of Dentistry and Metro North Hospital and Health Service in October 2017. The intervention assisted eligible disadvantaged adults to access public dental services.

A number of community organisations (n= 10) offering a variety of services to disadvantaged people (including housing, employment and food) were contacted by the first author to gauge their interest in participating in this intervention. These community organisations were within 5km of the CBD of Brisbane. After the organisations expressed their interest in participating the researcher arranged a face-to-face meeting with the organisations and a site visit to assess the facility for appropriateness for the intervention. The facility was required to have a private space or room with a chair for oral examinations to be undertaken. Following the assessment of the facilities, dates were set at four organisations for the intervention to take place. Volunteer dental practitioners (including dentists, oral health therapists and dentistry students) were recruited through the School of Dentistry and promotion by local dental associations.

During October 2017, volunteer dentists, oral health therapists and dentistry students visited four community organisations in Brisbane to screen client's onsite. Participants of the intervention were assessed for dental treatment needs (i.e diagnostic, periodontal, restorative). The volunteer practitioner and students then provided the participant with information on how to care for their mouths, an explanation of potential treatment needs and offered a dental appointment in the same week at the Oral Health Centre (OHC) in Brisbane. Participants were provided with written information on where the dental clinic was located. The community organisations ranged from 1 to 4km away from the OHC.

### **Evaluation**

Participants were clients of four community organisations, aged  $\geq 18$  years and residing in Brisbane. Those who participated in the intervention were invited to participate in its evaluation. An initial questionnaire was completed by participants prior to their dental screening and scheduling of appointment. The questionnaire collected demographic data which included: age, gender, Aboriginal/Torres Strait Islander status, education level, smoking status, government concession cards, private health insurance, employment, residence type and transport method. Participants were also asked to rate their oral health overall and its function (ie the ability to speak, swallow and chew), usual reason for visiting a dental professional, barriers to receiving dental care in the last 12 months and method of transport for that day. Participants were asked if in the last 12 months they had visited a dental professional in the last 12 months or if they had accessed a dental specialist, doctor/GP, nurse, emergency department or other non-dental professional for their teeth, mouth or dentures. Oral health questions were adapted from the 2004-06 National Survey of Adult Oral Health and the 2013 National Dental Telephone Interview Survey (Chisopoulos, Harford, & Ellershaw, 2016).

Following the questionnaire, dental students and practitioners undertook the oral screening. Volunteers were briefed by researchers on the protocol for the questionnaire and dental screening. The screenings were conducted using a dental mirror (Mirror Lite- mirror head with a LED light) and a toothbrush and gauze to remove debris if needed. Screenings were undertaken with the participant sitting upright in a chair with their head tilted back for the volunteer to examine their mouth. Dental practitioners conducted oral assessments and collected data on: number of decayed, missing and filled teeth (DMFT), periodontal health (gingivitis, calculus and plaque scores); and treatment needs (diagnostic, periodontal, restorative, endodontic, surgical and prosthodontic need). The Periodontal Disease Index (PDI) were used to assess oral hygiene and gingival health (Ramfjord, 1967). The PDI was modified to assess gingivitis, plaque and calculus visually without a periodontal probe, to reduce the risk to all including medically compromised patients. Each sextant was assessed and scored between 0 and 3, with a scores  $\geq 2$  indicating poorer oral health.

Data was also collected by researchers regarding subsequent appointment attendance (attended, cancelled on the day of the appointment and did not attend without any notice) at the dental clinic and the type of treatment received. Participants were given the opportunity to give feedback about the program via an electronic survey after their appointment. They were asked to describe their experience with the program, whether the service was helpful, what worked well and any suggestions for improvement.

### **Statistical analysis**

A descriptive analysis (proportions and means) of the data was performed using IBM SPSS (IBM Corp, 2016). Where the data was not normally distributed medians and inter-quartile ratios were calculated. Demographics and dental data were compared with data available for the general and homeless Australian population (Australian Bureau of Statistics, 2011, 2016; Australian Institute of Health and Welfare, 2015; Ford et al., 2014; Slade GD, 2007). The prevalence of a poor score (a score in any sextant  $\geq 2$ ) for gingivitis, plaque and calculus was calculated. Mean DMFT scores were reported and the prevalence of treatment needs, subsequent appointment attendance (attended and did not attend) at the dental clinic and the type of treatment received was also determined. Open-ended questions regarding participant experience of the intervention were analysed using a simplified framework approach (Gale, Heath, Cameron, Rashid, & Redwood, 2013). Categories were developed according to the experience described in responses.

### **Ethics**

This study was reviewed and approved by the Royal Brisbane & Women's Hospital Human Research Ethics Committee (project no. HREC/17/QRBW/475) and the University of Queensland Human

Research Ethics Committee (project no. 2017001407). All participants provided informed consent. Participants completed questionnaires independently or with assistance from researchers.

## Results

### Demographics

Seventy-six clients of community organisations in Brisbane participated in the intervention and its evaluation. The most frequent characteristics of the participants were aged 41-60 years; male; not of Aboriginal or Torres Strait Islander background; born in Australia; current smoker; unemployed; and living alone in private residences (Table 1). The most commonly used form of transport to the screening by the participants was walking.

### Oral health and behaviours

The participants' self-reported oral health, dental service attendance and barriers to accessing care are reported in Table 2. Overall, the majority of participants (76%) reported fair/poor oral health and almost three quarters (72%) reported tooth brushing frequency of at least daily (Table 2). A similar proportion reported (75%) usually visiting a dental professional when there is a problem, rather than for preventive reasons, and 33% visited a dental professional in the last 12 months. Almost a fifth of participants (20%) had visited a non-dental health practitioner for an oral problem in the past year, with 9% visiting a GP/doctor and 8% the emergency department for problems with their teeth, mouth or dentures. The average number of times participants reported visiting services in the last 12 months were; 2.2 ( $\pm 1.4$ ) general dental professional, 2.4 ( $\pm 2.0$ ) GP and 1.7 ( $\pm 1.2$ ) times to the emergency department. The most frequently cited (55%) barrier to accessing dental services was the cost.

From the oral health screenings, 59% (n= 45) participants had an unhealthy plaque score (a score  $\geq 2$  in any sextant), 50% (n= 38) unhealthy gingivitis score and 63% (n= 48) unhealthy calculus score. Mean DMFT scores were decay 4.4 ( $\pm 6.3$ ), missing 8.1 ( $\pm 7.2$ ), filled 5.2 ( $\pm 5.3$ ) and total DMFT 17.6 ( $\pm 7.8$ ). Participants were assessed for potential treatment needs and 92% (n= 70) required diagnostic, 71% (n= 54) periodontal, 62% (n= 47) restorative, 41% (n= 31) prosthodontic and 32% (n= 24) extraction/ surgical treatment.

### Intervention outcomes

Attendance to the subsequent appointments at the dental clinic was high, with 85% (n= 64) attending their first appointment (Table 3). One of the appointments made in the community organisation was cancelled by the participant, however for the remainder 15% (n= 10) missed the appointment with no

notice provided by the participant. There was no association between appointment attendance and participant demographics or oral health. Attendance rates varied across the community organisations (Table 3). A higher proportion of participants who had surgical and prosthodontic treatment needs at the screening did not attend their appointment compared to those with other needs (Table 3). Slightly more participants did not attend their appointment in the afternoon (19.5%, n= 8), compared to the morning (8.8%, n=3). All the participants at their first appointment had diagnostic treatment (100%, n= 75), followed by preventive (31.3%, n= 20), periodontal treatment (18.8%, n= 12) and less than five percent received restorative (n= 3), prosthodontic (n= 2), endodontic (n= 2) and surgical (n= 1) treatment.

### **Participant feedback**

Twenty-four (38%) participants who attended their first appointment provided feedback. Participants believed what was helpful and worked well with the service were the dental students and clinical staff (n= 9), the information provided (n= 6), the calm/positive environment (n= 5) and the timing/flexibility of the appointment (n= 3).

*“I'm very thankful. I haven't seen the dentist for 20 years because of fear and finances. Everyone has been very professional and lovely and very considerate and thoughtful.”  
Female participant.*

*“Very helpful... The student I was with explained as she went along and explained what was happening with my teeth.” Male participant.*

Suggestions that were provided were for more direction on how to get to the dental clinic, access to parking and something interesting on the ceiling (for treatment). Almost all (95% n= 23) participants said they would use the facilitated access pathway again.

### **Discussion**

This study evaluated a system integration model for access to oral health care for clients of homeless services in Brisbane, Australia. In this intervention coordination and collaboration between a public dental facility and homelessness support services was trailed with the aim of improving access to dental services for homeless and disadvantaged adults. Our findings highlight this group were previously accessing dental services less frequently, with approximately one third having visited a dental professional in the last 12 months opposed to 46% of the general population (Ellershaw, 2014). This group who were previously infrequent attenders of dental services, had a higher attendance rate to the appointments offered through the intervention. With over 85% of participants keeping their



appointments this indicates that for majority, this method of scheduling appointments via community organisations was appropriate. The facilitated access pathway piloted may be an effective way to increase access to public dental services for disadvantaged adults and improve oral health related outcomes such as quality of life (Pradhan, Keuskamp, & Brennan, 2016).

The pathway to access dental care offered to participants overcame barriers to attendance for the majority. Despite this, there was a small proportion of participants who did not attend that may have experienced barriers. This study is limited in evaluating the barriers of non-attendance to appointments due to the methods and difficulty in following up participants from this population. Cost was the most frequently reported barriers for accessing dental services, but as patients do not incur a fee for public dental services it can be assumed in this instance this barrier was reduced. Distance from the community organisation to the dental facility did not appear to affect attendance rate. Walking was the most commonly used form of transport for this group and may have had a positive impact on attendance due to the central location of the dental facility and may have been familiar due to its location adjacent to a public hospital. More participants did not attend their appointments in the afternoon. Morning appointments may have been more suitable for this group of disadvantaged adults.

Fear was another frequently reported barrier to accessing dental services. Interestingly, in this group a higher proportion of participants did not attend appointments who required surgical or prosthodontic treatment needs. Fear of treatment and anticipation of pain is often reported as a barrier to attending dental appointments (Armfield, Stewart, & Spencer, 2007; Erten, Akarslan, & Bodrumlu, 2006; Schuller, Willumsen, & Holst, 2003). Studies have recommended methods for reduction of fear such as psychological counselling and teaching distraction techniques for coping (Bernson, Elfström, & Berggren, 2007; Jöhren, Jackowski, Gängler, Sartory, & Thom, 2000). Future studies should investigate if integrating methods of reducing fear and phobias into an intervention like this model is feasible and positively influences attendance.

Alarmingly, one fifth of the participants in this study had visited a non-dental practitioner such as a doctor or the emergency department for problems with their teeth or mouth. Doctors and emergencies departments are often utilised for dental problems when access to dental services is not possible (Darling, Singhal, & Kanellis, 2016; Lee, Lewis, Saltzman, & Starks, 2012; Lewis, McKinney, Lee, Melbye, & Rue, 2015; Walker, Probst, Martin, Bellinger, & Merchant, 2014). Vulnerable populations are often the most frequent groups utilising general health and hospital services for dental problems (Sun et al., 2015). A high proportion of this population reported only accessing care when there is a problem and this may result in the progression of dental diseases and the need to seek care from non-dental services. Often medical and non-dental practitioners feel inadequately trained in the management of oral health problems (Barnett, Hoang, Stuart, Crocombe, & Bell, 2014). This highlights the importance of the collaboration of general medical and dental services to prevent

avoidable hospitalisations and the expenses associated (DeLia, Lloyd, Feldman, & Cantor, 2016; Sun et al., 2015). Future population studies are needed on dental presentations to non-dental practitioners to further understand the extent of this issue in an Australian context.

Overall this intervention had positive outcomes; with high attendance rates to the dental facility and positive experiences by participants. Although the long term sustainability of this intervention was not formally evaluated, in the short term the use of volunteer dental practitioners and minimal equipment provides a relatively low-cost model for the initial engagement stage of the intervention. The development and implementation of this intervention was labour intensive in terms of administration. While this is a limitation to this model, a strength of a systems integration model is the potential for longevity and sustainability. The continued collaboration between universities, health services and community organisations can provide an effective and sustainable way to improve access to health services for disadvantaged populations (Black C, 2011).

## **Conclusion**

This study evaluated a system integration model for oral health care for clients of homeless services in Australia. The intervention aimed to visit community organisations for the homeless and undertake oral health screenings and to offer those who require dental treatment an appointment at a public dental facility within the same week. Overall the model piloted in this study had positive outcomes; with high attendance rates to the dental facility and positive experiences by participants. Distance and transport did not appear to influence attendance to the dental facility but fear may have been a barrier experienced. One fifth of the participants in this study had visited a non-dental practitioner such as a doctor or the emergency department for problems with their teeth or mouth. Future population studies are needed on dental presentations to non-dental practitioners to further understand the extent of this issue in the Australian context.

## **Acknowledgements**

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## Author biography

Nicole is an Oral Health Therapist and PhD Candidate at the University of Queensland. Nicole's research interests are in public health and special needs dentistry. She has published work on smoking cessation, hyperpalatable beverages (or sweet drinks) and disadvantaged population's oral health. Currently, she is working on research investigating the oral health of different special needs population groups including the elderly population, people living with multiple sclerosis, mental illness and homeless people. Her research highlights the diverse interlinked risk factors such as poor diet, employment, education, substance abuse, poor access to dental care and more that influence overall oral health. In addition to this, the findings inform intervention studies where we implement programs that help these populations' access oral health information and dental services.

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Table 1. Demographics of disadvantaged adults participating in the intervention (n= 76)

		Total n (%)
Age (years)	18-40	23 (31.9)
	41-60	34 (47.2)
	61+	15 (20.8)
Gender	Female	29 (38.7)
	Male	46 (61.3)
Indigenous Australian	No	66 (89.2)
	Yes	8 (10.8)
Country of Birth	Australia	58 (77.3)
	New Zealand	6 (8.0)
	other	11 (14.6)
Education	Primary school or less	23 (31.1)
	Secondary school	22 (29.7)
	Trade or technical	17 (23.0)
	University	12 (16.2)
Smoking status	Never smoked	16 (21.3)
	Former smoker	16 (21.3)
	Current smoker	43 (57.3)
Private health insurance (for dental)		4 (5.4)
Employment	Unemployed	64 (85.3)
	Full/part time	3 (4.0)
	Volunteer/unpaid work	8 (10.7)
Residence	Alone	30 (41.7)
	With a friend/family	11 (15.3)
	Government supported/hostel	21 (29.2)
	On the street/emergency accommodation	10 (13.9)
Transport to get to community organisation	Personal car/taxi	14 (19.2)
	Public transport	26 (35.6)
	Walked	33 (45.2)

Table 2. Self-reported oral health, dental service attendance and barriers to accessing care (n= 76)

		n (%)
Self-report oral health rating	Fair/poor	58 (76.3)
	Good/very good/excellent	18 (23.7)
Self-report oral function rating	Fair/poor	37 (48.7)
	Good/very good/excellent	39 (51.3)
Brushing frequency	When I remember	9 (11.8)
	Less than once a day	12 (15.8)
	Once a day	28 (36.8)
	Twice a day or more	27 (35.5)
Usual reason for visiting a dental professional	When there is a problem	56 (74.7)
	Check-up	10 (13.3)
	Other	9 (12.0)
Last visit to a dental professional	In the last 12 months	25 (32.9)
	Over 12 months ago	46 (60.5)
	I can't remember/ don't know	5 (6.6)
Accessed in the last 12 months for your teeth, mouth or dentures*	Dental specialist	1 (1.3)
	GP/doctor	7 (9.2)
	Nurse	0 (0.0)
	Emergency department	6 (7.9)
	Other non-dental professional	2 (2.6)
Barriers experiences in the last 12 months to accessing dental services*	None	14 (18.2)
	Fear	18 (23.4)
	Lack of suitable facilities	6 (7.8)
	Transport	3 (3.9)
	Cost	42 (54.5)

\*Participants were able to choose more than one response, therefore column percentages do not equal 100%



Table 3. Attendance rate to a public dental facility using a facilitated pathway and type of treatment received (n= 75)

		Did not attend	Attended
		n (%)	n (%)
Total		11 (14.7)	64 (85.3)
Community organisation distance from Oral Health Centre	4.5km	2 (8.7)	21 (91.3)
	1.3km	2 (13.3)	13 (86.7)
	1.1km	2 (13.3)	13 (86.7)
	1.8km	5 (22.7)	17 (77.3)
Treatment need assessed at screening	Diagnostic	10 (14.5)	59 (85.5)
	Periodontal	9 (16.7)	45 (83.3)
	Restorative	8 (17.4)	38 (82.6)
	Surgical	6 (25.0)	18 (75.0)
	Prosthodontic	7 (22.6)	24 (77.4)
Appointment time	AM	3 (8.8)	31 (91.2)
	PM	8 (19.5)	33 (80.5)

ACCEPTED MANUSCRIPT