



JP Wallace  
J Mohammadi  
LG Wallace  
JA Taylor

**Authors' affiliations:**

JP Wallace, J Mohammadi, LG Wallace and  
JA Taylor, The University of Newcastle,  
Ourimbah, NSW, Australia

**Correspondence to:**

Dr J. Wallace  
Faculty of Health and Medicine  
School of Health Sciences  
The University of Newcastle  
PO Box 127  
Ourimbah 2258  
NSW, Australia  
Tel.: + 61 2 43494564  
Fax: + 61 2 43494567  
E-mail: Janet.Wallace@newcastle.edu.au

## Senior Smiles: preliminary results for a new model of oral health care utilizing the dental hygienist in residential aged care facilities

**Abstract:** *Objectives:* The aim of this study was to determine whether a qualified dental hygienist could improve oral health outcomes for residents living in residential aged care facilities on the Central Coast of New South Wales, Australia. *Methods:* A qualified dental hygienist undertook a 24-week oral hygiene intervention in five residential aged care facilities to test the Senior Smiles, oral health model of care. The facilities were invited to take part in the research, which was funded by a grant from NSW Medicare Local, Erina. Residents were asked to consent to having oral health risk assessments, oral healthcare plans and to receiving referrals for treatment where needed. Pre- and post-intervention plaque scores were recorded for residents and *P* values calculated using a paired *t*-test. In addition, the number of residents examined, treated and referred for more complex dental care was recorded. *Results:* The statistical analysis program, SPSS, was used to conduct a paired *t*-test to compare pre- and post-intervention plaque scores on residents from the 5 RACFs. A statistically significant result of  $P < 0.0001$  showed the intervention of the dental hygienist was effective in reducing plaque scores in residents across the 5 RACFs. *Conclusion:* The Senior Smiles model of care provided residents with preventive oral hygiene care, referral pathways for complex dental treatment needs and established a formal management programme for ongoing oral health care within the RACFs. The Senior Smiles model of care is successful and transportable.

**Key words:** dental hygienist; oral health residential aged care facilities; Senior Smiles

### Introduction

The oral healthcare issues of the elderly in Australia mirror the global perspective with the health sector facing a huge challenge in respect to providing timely and appropriate oral hygiene care for older people, especially those living in residential aged care facilities (RACFs) (1). Australia has an ageing population that is growing rapidly with projections from the Australian Bureau of Statistics of more than one in four Australians being over 65 years (7.30 million) by 2050 and an increase in the 85 years plus age group, from 1.5 per cent (295 000) in 2004 to 5.8 per cent (1.62 million) by 2051 (2).

The impact of residential aged care on oral health is well documented (1, 3–6). Frequently minimal oral hygiene care is provided with more urgent needs such as toileting, bathing and feeding taking precedence

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over oral health needs. The maintenance of oral health is important for older people, with medical and dental problems becoming more complex and resource intensive as age increases (7). This ultimately impacts on individuals' quality of life and the national healthcare budget. It is, therefore, imperative that preventive programmes are established to address poor oral health for older people living in RACFs, especially those who require assistance to maintain good oral hygiene practices.

Hopcraft *et al.* (1) reported that residents living in RACFs have high oral disease rates that are directly linked to the inability to access dental services and in particular preventive oral hygiene care. In a more recent study conducted in 2010 on the New South Wales (NSW) Central Coast, Wallace and colleagues (16) interviewed 17 RACF managers who reported that regular oral hygiene care within their facilities was limited and that accessing dental treatment for their residents was often difficult.

As far back as 1999 Chalmers *et al.* (4) suggested that dental hygienists could be a cost effective option for dealing with the oral healthcare problems facing older people in RACFs. Although the concept of using dental hygienists in aged care is well documented in Japan (8–12), Finland (13), Korea (14) and India (15) where dental hygienists were used to reduce the risk of aspiration pneumonia, it would appear that this concept has not been widely adopted in Australia. Studies conducted by Wallace *et al.* (16–20) in 17 RACFs over a period of 4 years found poor oral health, limited or non-existent referral pathways to access dental treatment and insufficient RACF policies to support oral health management still exist.

As a result of these findings (16–20) and supported by the research conducted by Hopcraft *et al.* in 2011 (21), where dentists and qualified dental hygienists both examined 510 older people in residential aged care with an excellent diagnostic agreement rate, Wallace *et al.* (16–20) from the faculty of oral health at the University of Newcastle, Australia, designed and developed a new model of care called Senior Smiles. This project aimed to test the new model of care by placing a qualified dental hygienist in RACFs to provide oral health risk assessments, oral healthcare plans and oral health education and establish referral pathways to manage complex dental treatment. The null hypothesis was that the model of care would improve the plaque scores and oral health status of older people living in these RACFs. A grant from NSW Medicare Local, Erina, was successfully obtained to fund a 12-month research study. The study commenced in January 2014, with the funding used to employ a qualified dental hygienist to work in 5 RACFs on the NSW, Central Coast. This study assessed whether the new model of care improved oral health for older people living in the 5 RACFs involved in this research.

## Study population and methodology

This project was approved by the University of Newcastle Human Research Ethics Committee, Approval No. H-2013-0382.

To enable this study, an expression of interest was sent out to RACFs on the NSW, Central Coast, Australia. The 5 RACFs selected were within a 15-min radius of each other and the dental hygienist travelled to each RACF one day each week, for a period of 12 months. All residents across the selected 5 RACFs were invited to participate in the study.

An information brochure and consent form with a reply paid envelope enclosed was posted to each resident and/or their family/next of kin (NoK). A follow-up letter and phone call were also utilized where necessary. The consent permitted the dental hygienist to conduct oral health risk assessments for residents' onsite at the RACF. Consent for more complex dental treatment was obtained directly by the dental practitioner providing care either onsite or at the local public dental clinic or a local private dental practice.

The study intervention was conducted over 24 weeks, while the dental hygienist continued to be employed beyond the study for a total of 12 months. The core responsibility of the dental hygienist was to increase oral health awareness and practices in the RACFs.

Residents were initially reticent to participate in the study. The dental hygienist spent the early weeks of the project developing rapport with all residents which ultimately facilitated higher participation rates. This communication and trust building is an important part of the methodology.

The dental hygienist conducted oral health risk assessments for residents, developed individualized oral healthcare plans and provided referral pathways for residents who required more complex dental treatment. The residents were referred to the local public oral health clinic and a local private dentist and a dental prosthetist. Those residents who were unable to leave the RACF were visited onsite by the private dentist and the dental prosthetists. The dental hygienist liaised with residents' NoK and provided oral health education training in formal and informal settings for RACF care staff working in each facility.

The dental hygienist used an illuminated mouth mirror to perform visual inspection of the mouth, and plaque index scores were collected at baseline and 24 weeks. The oral health risk assessment detailed natural teeth, xerostomia, infection, periodontal conditions and the presence of caries. This information was used to enable the referral process for residents to the dentist/dental prosthetist. During the 24-week intervention, residents were assisted with brushing, interproximal cleaning, denture cleaning and allocation of oral hygiene products by RACF staff and the dental hygienist on a daily basis. Conditions such as ulcers, xerostomia and candidiasis were managed with appropriate oral hygiene products. The dental hygienist used the Silness and Loe plaque index (22) to assess oral health of the residents' pre- and post-intervention. All pre- and post-intervention plaque index scores were recorded by the dental hygienist to guarantee consistency.

## Results

During the 12-month period that the Senior Smiles model of care was operational in the 5 RACFs on the NSW Central

Coast, 337 residents consented to participate in the study. All residents received an oral health risk assessment and oral healthcare plan by the dental hygienist. Seventeen of the risk assessments had incomplete data and so only 320 records were analysed at baseline. Of the 320 recorded oral health risk assessments, 210 (66%) residents were referred to the hygienist for oral hygiene care. One hundred and ten residents did not require a referral to the hygienist as they were managing their own natural teeth/dentures well, and some residents had no natural teeth/dentures with no oral health problems. Of the 210 residents referred to the hygienist, 84 (40%) were referred to the local health district public dental clinic and 60 (29%) were referred to a local private practice dentist and/or prosthetist and the remaining 66 residents (31%) were reviewed by the dental hygienist and assessed as not requiring any further dental care.

Of the 84 referred to the public dental clinic, 40 residents (48%) completed treatment or were undergoing treatment, 10 residents (12%) remained on the waiting list, 16 (19%) resisted treatment, 6 (7%) experienced transport issues and 1 (1%) was not allowed to leave the facility preventing them from accessing public treatment and were not financially able to seek private treatment, 4 (5%) were not given permission by their next of NoK to seek treatment, 4 (5%) were waiting for NoK approval, 2 (2%) left the RACF and 1 (1%) resident was deceased before being able to receive treatment.

Of the 60 residents referred to the private dental practitioner, 45 residents (75%) completed or were undergoing treatment, 4 (7%) resisted treatment, 1 (2%) had transport issues, 2 (3%) left the RACF, 5 (8%) were not given permission to seek treatment by their NoK, 2 (3%) were awaiting NoK permission to seek treatment, and 1 (2%) resident was deceased before receiving any treatment.

All residents had oral health risk assessments and oral healthcare plans formulated to support improved oral hygiene practices. Residents were provided with complimentary fluoride toothpaste, toothbrushes and products to manage xerostomia, thrush and other minor oral conditions such as ulcers. Of the 320 participants, 204 (64%) were partially dentate with some natural teeth present. The average number of natural teeth across all residents at baseline ( $n = 320$ ) was 9.2 teeth per resident. Of the residents with natural teeth ( $n = 204$ ), the average number of natural teeth was 14.4 teeth per resident.

A paired *t*-test was conducted using SPSS (IBM SPSS Statistics, IBM Corporation, Software Group, Somers, NY, USA) to compare pre-intervention (Table 1) and post-intervention plaque scores (Table 2) on residents across the 5 RACFs. Over the 24-week intervention, 112 residents were lost to follow up with 50 residents deceased, 16 residents had left the aged care facility and 46 resident had not yet reached the end of the 24-week intervention period. Two hundred and eight residents were available for post-intervention analysis.

**Table 1. Pre-intervention plaque scores**

|  |     |
|--|-----|
| Across all residents ( $n = 320$ )                             | 1.8 |
| Across residents with some form of natural teeth ( $n = 204$ ) | 2.0 |

**Table 2. Post-intervention plaque scores**

|  |     |
|--|-----|
| Across all residents ( $n = 208$ )                             | 1.3 |
| Across residents with some form of natural teeth ( $n = 124$ ) | 1.4 |

The plaque index scores pre- and post-intervention showed low correlation ( $r = 0.432$ ) and indicated a significant improvement in plaque ( $P < 0.0001$ ) due to the implementation of model of care using the dental hygienist to monitor and maintain oral hygiene care for residents over the intervention period. The effect size of 0.49 in plaque scores indicates a moderate practical significance (Table 3).

## Discussion

The outcomes of this study provide an insight into the advantages of the Senior Smiles model of care designed for the oral health management of older people living in RACFs. Older people are representative of a vulnerable group who suffer greatly from oral diseases (23). Current literature confirms good oral health is essential to a person's general health and that oral health and disease are closely interconnected to general health and disease. Poor oral health shares links with chronic conditions such as diabetes, cardiovascular disease, respiratory diseases and cerebrovascular diseases and older people in RACFs are particularly at risk due to their frailty, cognitive impairment and dependence upon RACF staff to assist them with their oral hygiene care (5, 24–28).

The management of oral health care in RACFs is complex and there are many barriers to providing appropriate care. RACFs are under pressure to provide the full range of care needs for their residents within a budget that demands value for money. Residents often have limited funds, NoK can be reticent to allow payment for oral and dental care, and dental professionals frequently find providing dental treatment for older people with cognitive impairment in the RACF environment challenging (Table 4).

With these barriers in mind, in 2010 the Australian Government endorsed a RACF oral health plan know as Better Oral Health in Residential Care (BOHRC). This 'train the trainer' initiative provided RACF with resources to support staff training in good oral health practices for residents. BOHRC infiltrated 89% of Australian RACFs and aimed to promote a nationally consistent approach for better oral health in Australian RACFs (29). BOHRC was very successful, with more than 4885 RACF nurses trained in oral health care and a sophisticated package of oral health resources developed and distributed. The training was appropriate, the resources sound, but the reality is that RACF staff are focused on other care needs and oral health continues to be managed poorly in the majority of RACFs.

Disappointingly, the oral health problem in RACFs has changed little since Chalmers commenced her research more than a decade ago (3–7, 23, 28). There is still a desperate need for a collaborative approach to managing this complex problem in a challenging environment. Local knowledge is important, demographic information is relevant, professional relationships

| Paired samples statistics                |       |                 |             |            |         |
|--|-------|-----------------|-------------|------------|---------|
|  | Mean  | N               | SD          | SEM        |         |
| Paired samples correlations              |       |                 |             |            |         |
|  |       | N               | Correlation | Sig.       |         |
| Pair 1                                   |       |                 |             |            |         |
| PI (pre)                                 | 1.837 | 208             | 0.7370      | 0.0511     |         |
| PI (post)                                | 1.346 | 208             | 0.4967      | 0.0344     |         |
|  | n     | Mean difference | SD          | 95% CI     | P-value |
| Pre- and post-intervention plaque scores | 208   | 0.490           | 0.688       | 0.40, 0.58 | <0.0001 |

A statistically significant result of  $P < 0.0001$  showed the intervention of the dental hygienist was effective in reducing plaque scores in residents across the 5 RACFs.

**Table 4. Data relating to status of residents treatment journey**

| Resident   | Public              | Private             |
|--|---------------------|---------------------|
| Currently undergoing or completed dental treatment | 40 (44 not treated) | 45 (15 not treated) |
| Deceased   | 1                   | 1                   |
| Moved facilities or back home                      | 2                   | 2                   |
| NoK did not want dental treatment performed        | 4                   | 5                   |
| Waiting on NoK decision                            | 4                   | 2                   |
| Not allowed to leave RACF                          | 1                   | 0                   |
| Patient did not want/resistive to treatment        | 16                  | 4                   |
| Transport issue/RACF hold up                       | 6                   | 1                   |
| Still on dental waiting list                       | 10                  | 0                   |

between RACF staff and oral health providers are imperative, and finally, a preventive focused model of care is needed.

In this study, prior to the implementation of the Senior Smiles model of care, there was no formal oral health management protocol operating within any of the 5 RACFs included in this project. Able bodied residents for the most part managed their own oral hygiene care, while those with physical and/or cognitive impairments, rendering them incapable of managing their own oral hygiene care, were often overlooked. RACF staff confirmed that oral hygiene care is not a priority, that they don't feel comfortable working in the oral environment and that they are not able to confidently identify oral health conditions requiring referral or urgent dental treatment. The Senior Smiles model of care addresses these inequities and provides RACF management and staff with the opportunity of working in a collaborative and supportive relationship in a model of care that provides a dental hygienist and other oral health practitioners to maximize oral health care for their residents.

Implementation of the Senior Smiles model of care was initially challenging, the hygienist found assimilation into the daily functions of the RACFs difficult, residents and staff were

**Table 3. Pre- and post-intervention plaque scores**

often resistant to oral health practices and oral health was not a focus within the RACFs. This is not specific to Australian RACFs, other countries concur (30) that the RACF is not an easy environment to penetrate, residents with cognitive impairment can refuse to have their oral hygiene managed, and the setting requires consistent, systematic processes to promote good oral hygiene practices and established oral health treatment referral pathways. This model of care provides an oral health champion, a qualified oral health practitioner with a preventive focus to manage oral health in the RACF on a regular basis. The Senior Smiles model of care provides a vital link between prevention and dental treatment needs in a caring and supportive framework. The hygienist develops rapport with the staff, the residents, the dentists and prosthetists and enhances the ethos of good oral health practices within the facility.

## Conclusion

The results of this study indicate that the Senior Smiles model of care was successful in providing oral health care for older people living in residential aged care facilities on the NSW, Central Coast. The hygienists' role is an important part of the success; the collaborative relationships and referral pathways developed by the hygienist enhanced a preventive oral health focus in the RACFs and initiated appropriate and timely dental care for older people living in the 5 RACFs. This model of care is transportable and has been adopted in other RACFs as a direct result of the Senior Smiles model of care initiative.

## Clinical relevance

This study aimed to identify the oral health benefits for older people living in residential aged care facilities on the NSW, Central Coast Australia of providing a qualified dental hygienist to deliver oral health risk assessments, care plans and referral pathways for oral hygiene and dental care.

## Principal findings

Mean data scores showed improvement in residents' plaque scores as a result of the dental hygienists oral health intervention.

## Practical implications

Older people in residential aged care facilities require structured preventive oral health care with referral pathways for timely dental care. This research provides a model of care that can be implemented in any facility or nursing home.

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