Approaches for adult nursing and residential care homes on promoting oral health, preventing dental health problems and ensuring access to dental treatment

Draft Review 2: Best Practice

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EXECUTIVE SUMMARY

1 Introduction

1.1 Aim

To review the evidence about approaches, activities and interventions that promote oral health, prevent dental problems and ensure access to treatment for adults in care home settings.

1.2 Review question

What methods and sources of information will help care home managers and their staff identify and meet the range of oral health needs and problems experienced by people living in care homes?

1.3 Background

According to Age UK (2014) calculations, in April 2012 there were 431,500 adults in residential care of whom approximately 414,000 (95%) were aged 65 or over. The 2011 Census reported there were 172,000 people aged 85 years or over living in care homes. Of these individuals, 103,000 were living in a care home without nursing and 69,000 in a care home with nursing.

While the majority of care home residents are older people, there is a cohort of those aged 18-65, who are in residential care because their physical or mental health prohibits them living independently. From the Age UK data, it might be assumed that there were 17,500 such individuals in care, but Emerson et al. (2013) stated that the number of people with learning disabilities in residential care in England at 31 March 2012 was over 36,000 of whom just under 6000 were aged 65 or over.

Successive Adult Dental Health Surveys have shown that people are keeping their teeth for longer (Fuller et al. 2011). The ravages of dental decay in the early to mid-twentieth century, together with the then prevailing attitude to oral health meant that many people had all of their teeth extracted when young. However, as attitudes to dentistry changed, the availability of dental care increased, dental technology improved and most importantly fluoridated toothpaste became widely available, the proportion of adults in England who were edentate (no natural teeth) has fallen by 22 percentage points from 28 per cent in 1978 to 6 per cent in 2009 (Fuller et al. 2011). Even amongst those aged 85 years or older, 72% still had some of their own teeth, the average number being 14 teeth (Fuller et al 2011).

Together these trends mean that in the coming years, not only will there be more older people, a proportion of whom will live in care, the vast majority will have some or indeed all of their own teeth. In part, that many have retained their own teeth is as a result of dental treatment and restorative care. Complex and expensive dental work including crowns, prostheses, implants and bridges are likely to become increasingly prevalent in care home residents. This poses a much greater preventive and dental care challenge than that associated with the older person who has lost all their own teeth and who may or may not be wearing a complete denture (British Dental Association, 2012).

Cognitive and physical disabilities may preclude effective mouth care and this is especially so in those in residential care who may be totally dependent on carers to assist with or clean their teeth and/or dentures. As a result the incidence of oral diseases in care home residents tends to increase (Naorungroj 2013). This may happen prior to individuals entering residential care and may be exacerbated by medications that cause dry mouths (SA Dental Service 2009).

The National Institute for Health and Care Excellence (NICE) has been asked by the Department of Health to develop public health guidance on approaches for adult nursing and residential care homes on promoting oral health, preventing dental health problems and ensuring access to dental treatment. This review is the second of three reviews to inform the guidance. It considers best practice. Review 1 examined the effectiveness of interventions and Review 3 will consider barriers/facilitators.

2 Methods

A systematic review of best practice evidence to address the above review question was undertaken. A wide range of databases and websites was searched systematically, supplemented by identification of grey literature[2]. Searches were carried out to identify relevant studies in the English language published between 1995 and September 2014. A range of supplementary methods including a call for evidence by NICE, contacting authors, reference list checking and citation tracking were also utilised to identify additional research.

Guidance developed by governmental bodies and specialist societies, care pathways, tools, toolkits/resource guides, quality improvement projects and UK health directives were included. To ensure a high degree of applicability to UK settings, inclusion was restricted to the following countries/regions: the USA, Canada, Western Europe, Australia and New Zealand.

[2] Technical or research reports, doctoral dissertations, conference papers and official publications.

Study selection was conducted independently in duplicate. Data extraction of all documents were undertaken by one reviewer and checked by a second, with 10% of papers being considered independently in duplicate. As no tools exist to quality assess care pathways, tools, toolkits/resource guides, quality improvement projects and governmental directives, only guidelines were assessed. This assessment was undertaken independently in duplicate using the AGREE II Instrument. [3]

A narrative summary of the evidence was completed and is presented with a table of findings.

3. Results

Twenty seven examples of best practice were identified, reported in thirty three documents. These provided data that met the inclusion criteria for this review.

Guidelines comprised thirteen of the twenty seven examples. These were quality assessed using AGREE II and overall scores ranged from 3 to 7, with all but two guidelines in the range 3-5.

4. Key Summaries

Key Summary 1: Assessment of oral health

Assessment of oral health on entry to care and repeated on a regular basis emerged as a consistent theme.

Assessment on entry was recommended in all 13 guidelines identified (9 UK[1-9], 2 USA[10,11], 1 Australia[12], 1 Canada[13]) This is supported by four toolkits/resource guides (2 UK[14,15], 1 Canada[16] 1 Australia[17]) three validation studies (1 USA[18], 1 Australia[19], 1 Sweden[20]), three audit studies (3 Australia[21-23]), two local care protocols (1 USA[24], 1 Spain[25]) and a strategy document (UK[26]).

The need for regular re-assessment was similarly recommended in eleven guidelines[1-6,8,9,11-13] and three toolkits/resource guides[14,15,17] two validation studies[19,20], two audit studies[22,23], two local care protocols[24,25] and a strategy document[26].

There was less consistency about how often and by whom this assessment should be undertaken.

[3] Brouwers M, Kho ME, Browman GP, Cluzeau F, Feder G, Fervers B, Hanna S, Makarski J on behalf of the AGREE Next Steps Consortium. 2010. AGREE II: Advancing guideline development, reporting and evaluation in healthcare. Canadian Medical Association Journal, 182:E839-842.

The recommended time between assessments varied. All eleven guidelines guidelines[1-6,8,9,11-13] stated that assessment should be repeated regularly but only a few documents specified timing. Two guidelines, one in stroke patients[1] and the other in dependent patients[11] indicated daily monitoring was required in these high risk populations. In general care settings, the recommendation varied between one month (two guidelines[3,12]), up to six months (one resource guide[15]).

In one guideline[1] assessment was the responsibility of a dental health professional. However, in six other guidelines a registered nurse[6,10-12], a suitably trained member of the care home team[3] or any of these[2,7].

A number of oral health assessment tools were identified in the guidelines. Of these, validation studies were identified for three tools designed for use in non-acute care settings:

- Brief Oral Health Status Examination (BOHSE)[18] validated for general use in long term care
- Revised Oral Assessment Guide (ROAG)[20] validated in an elderly stroke rehabilitation setting
- The Oral Health Assessment Tool (OHAT)[19] – also known as the Modified BOHSE – validated for use in long term care.

Both BOHSE and the OHAT are also validated for use in populations that include cognitively impaired adults.

[1] British Society for Gerodontology, 2010 (4)
[2] Fiske & Lewis, 2000 (3)
[3] GAIN, 2012 [5]
[4] Gerodontology Association, 2005 (3)
[5] Gerodontology Association, 2006 (3)
[6] Heath et al, 2011 (3)
[7] Lewis & Fiske, 2009 (3)
[8] QI Scotland, 2011 (5)
[9] SIGN, 2010 (NICE accredited process)
[10] Johnson & Chalmers, 2011 (5)
[11] O'Connor, 2012 (5)
[12] Joanna Briggs Institute, 2004 (5)
[13] Miller et al, 2008 (7)
[14] NHS Health Scotland, 2013
[15] Welsh Assembly Government, 2003
[16] McNally et al, 2011
[17] SA Dental Service, 2009
[18] Kayser-Jones et al, 1995
[19] Chalmers et al, 2005

[20] Andersson et al, 2002
[21] Fallon et al, 2006
[22] Georg, 2006
[23] Rivett, 2006
[24] Dyck et al, 2012
[25] Gil-Montoya et al, 2005
[26] Scottish Government, 2012

Key Summary 2: Daily oral care

Aspects of daily oral care were considered in all 13 guidelines identified (9 UK[1-9], 2 USA[10,11], 1 Australia[12], 1 Canada[13]), five toolkits/resource guides (3 UK[14-16], 1 Canada[17] 1 Australia[18]), three audit studies (3 Australia[19-21]), two local care protocols (1 USA[22], 1 Spain[23]) and a strategy document (UK[24]).

The need for organisations to develop and maintain an oral hygiene care protocol which defines appropriate daily care standards for different oral health needs was highlighted in nine documents (The protocol would also provide tools to ensure recording of care provided by staff and define an appropriate range of products for different oral hygiene needs.

There was consensus across the documentation that, following an oral health assessment (see Key Summary 1) an individualised daily oral hygiene care plan should be developed/updated (13 guidelines[1-13], five toolkits/resource guides[14-18], three audit studies[19-21], two local care protocols[22,23], one strategy document[24]).

Refusal of care which is usually associated with cognitive impairment was discussed in nine documents (5 guidelines[3, 5,6,8,10], 4 resource guides/toolkits[14,16-18]). Seven documents recommended that **refusal of care is documented in daily care plans** (Three guidelines[3,8,10] and four toolkits/resource guides[14,16-18]). Strategies to manage refusal were identified in four documents (3 guidelines[6,8,10], 1 toolkit/resource guide[14]).

Twenty documents highlighted the need for **dentures to be marked or labelled with the name of their owner**. (11 Guidelines[1-8,10,12,13], five toolkits/resource guides[14-18], three audit studies[19-21], one strategy document[24]).

[1] British Society for Gerodontology, 2010 (4)
[2] Fiske & Lewis, 2000a (3)
[3] GAIN, 2012 [5]
[4] Gerodontology Association, 2005 (3)
[5] Gerodontology Association, 2006 (3)
[6] Heath et al, 2011 (3)

[7] Lewis & Fiske, 2009 (3)
[8] QI Scotland, 2011 (5)
[9] SIGN, 2010, (NICE accredited process)
[10] Johnson & Chalmers, 2011 (5)
[11] O'Connor, 2012 (5)
[12] Joanna Briggs Institute, 2004 (5)
[13] Miller et al, 2008 (7)
[14] NHS Health Scotland, 2013
[15] Sweeney et al, 2009
[16] Welsh Assembly Government, 2003
[17] McNally et al, 2011
[18] SA Dental Service, 2009
[19] Fallon et al, 2006
[20] Georg, 2006
[21] Rivett, 2006
[22] Dyck et al, 2012
[23] Gil-Montoya et al, 2005
[24] Scottish Government, 2012

Key Summary 3: Oral hygiene products

The use of a range of oral hygiene products was discussed in seventeen documents: ten guidelines (6 UK[1-6], 2 USA[7,8], 1 Australia[9], 1 Canada[10]) four toolkits/resource guides (2 UK[11,12], 1 Canada[13] 1 Australia[14]), two local care protocols (1 USA[15], 1 Spain[16]) and a strategy document (UK[17]).

The use of fluoride varnish is not widely considered. It's use is recommended in one strategy document[24].

Oral preparation chlorhexidine products were discussed in twelve documents (7 guidelines[1,2,4,7-9,10,], 4 toolkits/resource guides[11-14], 1 local care protocol[16]). A recent regulatory warning of the dangers of anaphylactic reactions is highlighted in one toolkit/resource guide[11]. The product may be helpful where clinically advised.

The use of chlorhexidine to soak dentures containing metal is recommended in six documents (3 guidelines[1,4,5], 3 toolkits/resource guides[11,12,14]).

The use of foam swabs for tooth cleaning has been noted in six documents (2 guidelines[2,10], 3 toolkits/resource guides[11,13,14]). The documents note this may be a choking hazard and two documents[2,11] highlight the UK regulatory warning of this hazard. Swabs may be used for around the mouth area, but the use of lemon & glycerine soaked swabs is not

recommended because they dry the mouth.

Lip lubricants for the purpose of moisturising dry and cracked lips is recommended in eleven documents (6 guidelines[1,4-7,10] , 4 toolkits/resource guides[11-14], 1 local care protocol[16]). Lubricants should be water-based not petroleum gel.

Two products were identified as helpful in the care of people with xerostomia (dry mouth):

- Saliva substitutes in eleven documents (6 guidelines[1,4,5,7,9,10], four toolkits/resource guides[11-14], 1 local care protocol[16]).
- Sugar free gum in eight documents (5 guidelines[1,4,7,9,10], two toolkits/resource guides[11,14], 1 local care protocol[16]).

A range of toothbrushes were discussed and the following was identified:

- The use of soft bristled manual toothbrushes for carer-provided oral hygiene (twelve documents:
- Powered toothbrushes may be helpful to those with physical limitations resulting from eg stroke or arthritis (five documents: 2 guidelines[1,3], two toolkits/resource guides[13,14], 1 local care protocol[16]).
- Suction toothbrushes can assist when providing oral care for dysphagic patients at risk of aspiration pneumonia (four documents: 2 guidelines[1,10], one toolkit/resource guide[13], 1 local care protocol[16]).

[1] British Society for Gerodontology, 2010 (4)
[2] GAIN, 2012 [5]
[3] Gerodontology Association, 2006 (3)
[4] Heath et al, 2011 (3)
[5] QI Scotland, 2011 (5)
[6] SIGN, 2010, (NICE accredited process)
[7] Johnson & Chalmers, 2011 (5)
[8] O'Connor, 2012 (5)
[9] Joanna Briggs Institute, 2004 (5)
[10] Miller et al, 2008 (7)
[11] NHS Health Scotland, 2013
[12] Sweeney et al, 2009
[13] McNally et al, 2011
[14] SA Dental Service, 2009
[15] Dyck et al, 2012
[16] Gil-Montoya et al, 2005
[17] Scottish Government 2012

Key Summary 4 Education and training

There is a general consensus on the need for care home staff to receive education and training that enables them to provide effective oral care. This was identified all 13 guidelines (9 UK[1-9], 2 USA[10,11], 1 Australia[12], 1 Canada[13]), five toolkits/resource guides (3 UK[14-16], 1 Canada[17] 1 Australia[18]), three audit studies (3 Australia[19-21]), two local care protocols (1 USA[22], 1 Spain[23]) and a strategy document (UK[24]).

A requirement for regular update training to reinforce best practice was identified in four guidelines[3,10,11,13], three audit studies[19-21], one toolkit/resource guide[15] and one strategy document[24].

A range of freely available training materials were identified for use with care home staff[14,17,18] and with health professionals working in care settings[6,13,15,18].

[1] British Society for Gerodontology, 2010 (4)
[2] Fiske & Lewis, 2000 (3)
[3] GAIN, 2012 [5]
[4] Gerodontology Association, 2005 (3)
[5] Gerodontology Association, 2006 (3)
[6] Heath et al, 2011 (3)
[7] Lewis & Fiske, 2009 (3)
[8] QI Scotland, 2011 (5)
[9] SIGN, 2010 (NICE accredited process)
[10] Johnson & Chalmers, 2011 (5)
[11] O'Connor, 2012 (5)
[12] Joanna Briggs Institute, 2004 (5)
[13] Miller et al, 2008 (7)
[14] NHS Health Scotland, 2013
[15] Sweeney et al 2009
[16] Welsh Assembly Government, 2003
[17] McNally et al, 2011
[18] SA Dental Service, 2009
[19] Fallon et al, 2006
[20] Georg, 2006
[21] Rivett, 2006
[22] Dyck et al, 2012
[23] Gil-Montoya et al, 2005
[24] Scottish Government, 2012

Key Summary 5: Organisational controls/culture

Mechanisms for assuring appropriate levels of oral care were identified in seventeen documents: eight guidelines (6 UK[1-6], 1 USA[7], 1 Canada[8]), three toolkits/resources guides (2 UK[9,10], 1 Canada[11]) three audit studies (3 Australia[12-14]), two local care protocols (1 USA[15], 1 Spain[16]) and a strategy document (UK[17]).

The need for regular audits of daily oral care records to as a means of assessing the effectiveness of oral health care provided was highlighted in twelve documents (seven guidelines[1,2,4-7,9], one toolkit/resource guide[11], three audit studies[12-14], two local care protocols[15,16]).

In eleven documents the Identification and empowerment of an oral health champion/educator within the residential setting may assist in embedding a culture of good oral health (five guidelines[1,2,4-8], two toolkits/resource guides[9,10], two audit studies[13,15], one local care protocol[15], one strategy document[17]).

[1] British Society for Gerodontology, 2010 (4)
[2] GAIN, 2012 [5]
[3] Gerodontology Association, 2005 (3)
[4] Lewis & Fiske, 2009 (3)
[5] QI Scotland, 2011 (5)
[6] SIGN, 2010, (NICE accredited process)
[7] Johnson & Chalmers, 2011 (5)
[8] Joanna Briggs Institute 2004 (5)
[9] Miller et al, 2008 (7)
[10] NHS Health Scotland
[11] WAG 2003
[12] McNally et al 2011
[13] Fallon et al 2006
[14] Georg 2006
[15] Rivett 2006
[16] Dyck et al 2012
[17] Gil-Montoya et al 2005
[17] Scottish Government 2012

Key Summary 6: Access to dental care

Issues around access to dental care are discussed in eighteen documents: thirteen guidelines (9 UK[1-9], 2 USA[10,11], 1 Australia[12], 1 Canada[13]), one toolkit/resource guide (1 Canada[14]) , two audit studies (2 Australia[15,16]), one local care protocols (1 Spain[17]) and a strategy document (UK[18]).

There is a general consensus of **the need for access to dental care when required by residents to ensure oral health is maintained**. This was identified in all eighteen documents (thirteen guidelines[1-13], one resource guide[14], two audit studies[15,16], 1 local care protocol[17], 1 strategy document[18]).

Regular check-ups at appropriate intervals was highlighted in eleven documents (five guidelines[2-53,4,5,] (Fiske & Lewis 2000, GAIN 2012, Gerodontology Assn 2005, Gerodontology Assn 2006, Heath et al 2012, JBI 2004, less highlighted.

There is little guidance on how this is best achieved. Four guidelines[3,8,12,13] emphasise the need for collaborative working and the role of care home managers in fostering these relationships is highlighted.

[1] British Society for Gerodontology, 2010 (4)
[2] Fiske & Lewis, 2000a (3)
[3] GAIN, 2012 [5]
[4] Gerodontology Association, 2005 (3)
[5] Gerodontology Association, 2006 (3)
[6] Heath et al, 2011 (3)
[7] Lewis & Fiske, 2009 (3)
[8] QI Scotland, 2011 (5)
[9] SIGN, 2010, (NICE accredited process)
[10] Johnson & Chalmers, 2011 (5)
[11] O'Connor, 2012 (5)
[12] Joanna Briggs Institute, 2004 (5)
[13] Miller et al, 2008 (7)
[14] McNally et al 2011
[15] Fallon et al 2006
[16] Georg 2006
[17] Gil-Montoya et al 2005
[18] Scottish Government 2012

5. Discussion

The aims of this review were to identify best practice in promoting oral health, preventing dental problems and ensuring access to dental care (including regular check-ups) for adults in care homes.

In Review 1, identified interventions included education/guideline introduction for care home staff, the use of electric versus manual toothbrushes, chlorhexidine and xylitol use. The review found inconsistent evidence for education or guideline introduction interventions, with no clear indications as to whether education intensity or specific components had an effect on clinical oral health outcomes. However, there was some evidence that education combined with active monitoring of compliance by care home staff or specific guideline introduction within the home, might be more effective. Education was found to increase staff knowledge in the short term but evidence for long term retention of this knowledge was inconsistent. There was some evidence suggestive of greater utility with powered than with manual toothbrushes but it was unclear whether this led to improvement in outcomes. Finally, there was strong evidence for the use of chlorhexidine as an adjunct to other interventions (such as education or tooth brushing). However, it is associated with side effects and its value compared to alternative treatments such as sodium fluoride or xylitol was unclear.

Six themes have emerged from this review that sit alongside the evidence from Review 1. First, the requirement for appropriate assessment of oral health status at entry to residential care and thereafter on a regular basis. Second, arising out of the assessment, the need for a daily care plan personalised to the individual resident. Third, the use of appropriate products to maintain or improve oral health as required. Fourth, the need for education and training for those delivering care both to establish and to reinforce knowledge. Fifth the need for policy and process to be in place and regularly audited. The impact of a local champion (who may also be the local educator) who will take a lead in ensuring this appears important. Finally, the need for a joined up service that ensures appropriate access to dental care and regular dental check-ups for residents.

Issues around implementation of this best practice appear likely to emerge in Review 3 which examines barriers and facilitators.

Strengths and limitations of this review

This review was built on a comprehensive search strategy. The literature search included a thorough attempt to identify relevant published and unpublished best practice documents.

It was only possible to assess the quality of guidelines, which constituted about half of the included papers. There was significant variation in scoring, with only two high quality evidence-based guidelines identified (Miller et al 2008, SIGN 2010). However, there was

significant unanimity across the evidence identified in what constituted good practice and key themes emerged on the fundamentals that underpin good quality oral care in residential settings. This may in part be due to the impact of pioneering work in this area by the late Associate Professor Jane Chalmers and colleagues and to an overlap in membership between the various groups developing guidelines.

The vast majority of available best practice is relevant to all care home population. There are gudelines specifically targeted toward care of special populations: those with a cognitive impairment (JBI 2004, Gerodontology Assn 2006), stroke survivors (BSG 2010) and dysphagic patients (SIGN 2010). However, there appears to be a general consensus about what is required to maintain good oral health across all populations in residential settings. This is likely to be a result of these special groups forming part of the general population in residential and nursing care. For example education and training guides for care of that general population (Heath et al 2011, McNally et al 2011, Miller et al 2008, NHS Health Scotland 2013, SA Dental Services 2009, Sweeney 2009), all include information about oral conditions found in stroke patients such as xerostomia and dysphagia, along with oral care of people with cognitive impairments and those receiving palliative care.

Abbreviations

AGREE	Appraisal of Guidelines for Research and Evaluation (Instrument)
BOHSE	Brief Oral Health Status Examination
BSG	British Society for Gerodontology
DH	Department of Health
F	Fluoride
GAIN	Guidelines and Audit Implementation Unit
GDP	General Dental Practitioner
GP	General Practitioner
JBI	Joanna Briggs Institute
KF	Key findings
MHRA	Medicines and Healthcare Regulatory Agency
MPS	Mucosal Plaque Index
NICE	National Institute for Health and Care Excellence
OAG	Oral Assessment Guide
OHAT	Oral Health Assessment Tool
OHRA	Oral Health Risk Assessment
ONS	Office for National Statistics
ROAG	Revised Oral Assessment Guide
SA	South Australia
SIGN	Scottish Intercollegiate Guideline Network
THROAT	The Holistic and Reliable Oral Assessment Tool
WAG	Welsh Assembly Government

1 Introduction

1.1 Aim

To review the evidence about approaches, activities and interventions that promote oral health, prevent dental problems and ensure access to treatment for adults in care home settings.

1.2 Review question

What methods and sources of information will help care home managers and their staff identify and meet the range of oral health needs and problems experienced by people living in care homes?

1.3 Background and understanding

Care Home Residents - Demographics

The demographics of people living in care homes at any point in time are difficult to quantify precisely. According to Age UK (2014) calculations, in April 2012 there were 431,500 adults in residential care of whom approximately 414,000 (95%) were aged 65 or over. The 2011 Census reported there were 172,000 people aged 85 years or over living in care homes. Of these individuals, described by the Office for National Statistics (ONS) as the "oldest old", 103,000 were living in a care home without nursing and 69,000 in a care home with nursing.

While the majority of care home residents are older people, there is a cohort of those aged 18-65, who are in residential care because their physical or mental health prohibits them living independently. From the Age UK data, it might be assumed that there were 17,500 such individuals in care, but Emerson et al. (2013) stated that the number of people with learning disabilities in residential care in England at 31 March 2012 was over 36,000 of whom just under 6000 were aged 65 or over. A previous report (Emerson et al. 2012) noted that that the proportion of residential care use by learning disabled adults aged 65 or over was increasing (from 11.3% in 2005/06 to 15.8% in 2011/12).

It is therefore apparent that the characteristics of those living in residential care are heterogeneous and their needs, wants and ability, both physical and cognitive, will vary significantly. Policies designed to encourage more independent living for people with learning disabilities in group and halfway houses, and to support older people to live in their own homes mean that numbers of people in residential care have decreased slightly. However, the evidence also suggests higher levels of care are being required by those in residential homes (ONS 2013; ONS 2014).

Care Home Residents – Demographic trends

Successive Adult Dental Health Surveys have shown that people are keeping their teeth for longer (Fuller et al. 2011). The ravages of dental decay in the early to mid-twentieth century, together with the then prevailing attitude to oral health meant that many people had all of their teeth extracted when young. However, as attitudes to dentistry changed, the availability of dental care increased, dental technology improved and most importantly fluoridated toothpaste became widely available, the proportion of adults in England who were edentate (no natural teeth) has fallen by 22 percentage points from 28 per cent in 1978 to 6 per cent in 2009 (Fuller et al. 2011).

The most recent figures from the Office for National Statistics (ONS 2014) indicate that the numbers of people aged 65 or over in the UK continues to rise and is currently 11.1 million or 17.4% of the UK population. The biggest percentage rise is in the population aged 85 or older and the 2011 census (ONS 2013), found 1.25 million people aged 85 or older; almost a 25% increase from the 2001 census. In 2009, some 72% of those "oldest old" still had some of their own teeth, the average number being 14 teeth (Fuller et al 2011).

Together these trends mean that in the coming years, not only will there be more older people, a proportion of whom will live in care, the vast majority will have some or indeed all of their own teeth. In part, that many have retained their own teeth is as a result of dental treatment and restorative care. Complex and expensive dental work including crowns, prostheses, implants and bridges are likely to become increasingly prevalent in care home residents. This poses a much greater preventive and dental care challenge than that associated with the older person who has lost all their own teeth and who may or may not be wearing a complete denture (British Dental Association, 2012).

Oral disease and care home residents

Dental caries and periodontal disease are to a large degree preventable. However, failure to maintain good oral hygiene, a diet rich in sugars and inadequate exposure to fluoride increase disease risk. Poor oral health can have a significant impact on the management of medical conditions, general health status, ability to eat and quality of life (Weening-Verbree et al. 2013). In addition, Azarpazhooh & Leake (2006) undertook a systematic review of associations between oral health and respiratory disease. The presence of oral pathogens, dental decay and poor oral hygiene were all identified as potential risk factors for pneumonia.

A Cochrane review (Brady et al. 2006) looked at the oral health of stroke patients in residential care and identified a lack of rigorous evidence on the topic, but stated that

oral healthcare interventions "can improve staff knowledge and attitudes, the cleanliness of patients' dentures and reduce the incidence of pneumonia."

In a systematic review Miegel & Wachtel (2009) identified a number of barriers to good oral health in care homes. These included lack of oral health education of care providers (including staff training); care provider attitudes to the oral health of residents; oral health policy and documentation; lack of oral health resources in terms of equipment and staff time and a failure to undertake oral health assessments. Wardh et al. (2012) identified dislike or fear of providing oral care particularly when combined with lack of adequate training or time to complete the task to be an issue for caregivers. These problems are exacerbated where the older person has dementia, communication or behaviour difficulties, or resists care (Jablonski et al. 2011).

Cognitive and physical disabilities may preclude effective mouth care and this is especially so in those in residential care who may be totally dependent on carers to assist with or clean their teeth and/or dentures. As a result the incidence of oral diseases in care home residents tends to increase (Naorungroj 2013). This may happen prior to individuals entering residential care and may be exacerbated by medications that cause dry mouths (SA Dental Service 2009).

The National Institute for Health and Care Excellence (NICE) has been asked by the Department of Health to develop public health guidance on approaches for adult nursing and residential care homes on promoting oral health, preventing dental health problems and ensuring access to dental treatment. This review is the second of three reviews to inform the guidance. It considers best practice. Review 1 examined the effectiveness of interventions and Review 3 will consider barriers/facilitators.

2 Methods

The review was conducted using methods outlined in the NICE Manual: *Methods for the development of NICE public health guidance.*[4] The review is informed by 'best practice' encapsulated in the following types of document: guidelines developed by governmental bodies and specialist societies, care pathways, tools, toolkits, quality improvement projects and UK health directives.

2.1 Literature search

A wide range of databases and websites were searched systematically; supplemented by grey literature[5] searches. Searches were carried out to identify best practice in the English language published between January 1995 and September 2014.

The following types of evidence were sought for inclusion: guidelines developed by governmental bodies and specialist societies, care pathways, tools, toolkits/resource guides, quality Improvement projects and UK health directives.

For the search, a strategy was developed in Ovid Medline (see Appendix 1) and was adapted to all other databases listed below.

Databases

AMED (Allied and Complementary Medicine) - Ovid
ASSIA (Applied Social Science Index and Abstracts) - Proquest
CINAHL (Cumulative Index of Nursing and Allied Health Literature) - EBSCO
Embase - Ovid
Health Management Information Consortium (HMIC) - Ovid
MEDLINE and MEDLINE in Process - Ovid
OpenGrey http://www.opengrey.eu/
Social Care Online http://www.scie-socialcareonline.org.uk/

Websites

Australian Research Centre for Population Oral Health
http://www.adelaide.edu.au/arcpoh/
British Society of Gerodontology
British Society for Disability and Oral Health
Clinical trial registers:

- WHO ITCRP http://www.who.int/ictrp/en/

[4] http://publications.nice.org.uk/methods-for-the-development-of-nice-public-health-guidance-third-edition-pmg4
[5] Technical or research reports, doctoral dissertations, conference papers and official publications.

- Clinicaltrials.gov http://www.clinicaltrials.gov/

Electronic Theses Online Service (EThOS) http://ethos.bl.uk
European Association of Dental Public Health http://www.eadph.org/
Health Evidence Canada http://www.healthevidence.org/
International Association of Dental Research (IADR)
National Oral Health Conference
http://www.nationaloralhealthconference.com/
NICE Evidence Search https://www.evidence.nhs.uk/
Public Health England https://www.gov.uk/government/organisations/public-health-england
Public Health Wales http://www.wales.nhs.uk/sitesplus/888/home
Scottish Public Health network http://www.scotphn.net/
Social Care Institute for Excellence (SCIE) http://www.scie.org.uk/
US National Guideline Clearing House http://www.guideline.gov/
Australian Clinical Practice Guidelines Portal http://www.clinicalguidelines.gov.au/
New Zealand Guidelines Group http://www.health.govt.nz/about-ministry/ministry-health-websites/new-zealand-guidelines-group
Public Health Agency of Canada http://www.phac-aspc.gc.ca/dpg-eng.php

In addition a variety of supplementary methods were employed to identify additional research:

- For included documents, reference lists were checked and citation tracking was undertaken in Web of Science and Scopus databases.
- The electronic table of contents of three key journals were searched: *Special Care in Dentistry*, *The Journal of Disability and Oral Health* and *Gerodontology*.
- Experts in the field and authors of included papers were contacted to identify additional research and 'sibling' studies.
- A call for evidence was issued by NICE.

Results of all searches were combined in a Reference Manager 12 database.

2.2 Inclusion and exclusion criteria

The following inclusion criteria were used as a guide when identifying best practice documents including guidelines developed by governmental bodies and specialist societies, care pathways, tools, toolkits, Quality Improvement projects and UK health directives.

Inclusion	**Population** Adults in care homes with or without nursing provision, including people staying for rehabilitation or respite care. The term 'care homes' covers homes that provide 24 hour residential care. This may include adults living in community hospitals that provide long term-care. **Activities:** • Conducting assessments of individual oral health, for example on entry to a care home and in response to changing oral health needs. • Maintaining access to dental services, including those offered by local salaried dental services, general dental practice and coordinating other health care services. For example joining up oral health services with other health initiatives provided in care home settings (such as services offered by GPs, vision testing, social services, podiatry). • Staff training about oral health (including understanding the effect of oral health on general health and wellbeing). • Increasing access to fluoride for people living in care homes. For example, by providing free fluoride toothpaste or gels, providing fluoride supplements, or by dental health care professionals offering fluoride varnish applications in care homes. • Providing oral health education and information about promoting and maintaining oral health (for example the role of diet, techniques for brushing teeth and maintaining healthy dentures). • Providing resources to improve oral hygiene for people living in care homes (as appropriate), for example providing a range of toothbrushes including electric toothbrushes. • Managing transitions if oral function deteriorates or a person's usual diet has to change. • Considering the effect of diet, alcohol and tobacco on the oral health of people living in care homes. **Outcomes:** • Changes in: . The oral health of people living in care homes. For example, by identifying earlier the incidence and prevalence of tooth decay, periodontal disease, oral discomfort including pain and oral cancer. Also, for example, leading to a change in nutritional status among people living in care homes. . Modifiable risk factors, including the use of fluoride toothpaste, fluoride supplements, fluoride varnishes,

	frequency and quality of oral hygiene practices, and access to or visits from dental services. . Policies or procedures in care homes. . Knowledge and attitudes of care home managers and staff, and other health and social care professionals. . Resident's quality of life, including social and emotional wellbeing. . People's knowledge and ability to improve and protect their oral health. . People's oral health behaviours. • Adverse events or unintended consequences • UK, Western Europe, North America and Australia/New Zealand settings
Exclusion	• Adults living independently in the community. • Adults in hospitals providing secondary or tertiary care for example acute hospitals or specialised units. • Adults in prison. • Children and young people under 18 years. • Water fluoridation. • Specialised oral health interventions, including dental clinical procedures, treatments or medicines. • Concentration of fluoride in fluoride products such as toothpastes and supplements. • Specific techniques or instruction for carers to help people with their oral hygiene (for example, techniques to remove dentures, clean the mouth, brush teeth, or perform a range of oral hygiene tasks).

2.3 Document selection

After de-duplication and removal of clearly irrelevant citations (e.g. papers not related to oral health, animal studies), selection at both title/abstract and full text stages was undertaken independently by two reviewers using the inclusion and exclusion criteria. Any disagreements at either stage were resolved by recourse to a third reviewer. Papers and documents excluded at full text are reported in Appendix G with the reason for exclusion.

2.4 Quality assessment

Quality assessment was only possible for guidelines as assessment tools do not exist for assessing the other types of document identified: care pathways, tools, toolkits, Quality Improvement projects and governmental directives.

Guidelines were assessed independently in duplicate using the Appraisal of Guidelines for Research and Evaluation II (AGREE II) Instrument[6]. This instrument evaluates the process of developing the guideline and the reporting process. Using the instrument, reviewers evaluate six domains, giving percentage scores for each domain. They also agree an overall score on a range of 1 to 7 where 1 is the lowest and 7 the highest quality evidence.

Where information providers are accredited under the NICE Accreditation Scheme (NICE 2013) this was considered a sufficient guarantor of quality as the accreditation scheme is based on the AGREE II Instrument.

A clear distinction has been made between evidence based and expert (consensus) based guidelines

2.5 Data extraction – characteristics and methodology

Evidence was extracted directly into a form agreed with NICE.

Where possible, data were selected and characterised using PROGRESS-Plus to identify disadvantaged populations. PROGRESS is an acronym for: Place of Residence, Race/Ethnicity, Occupation, Gender, Religion, Education, Socioeconomic Status, and Social Capital. Plus represents additional categories such as Age, Disability, and Sexual Orientation.[7]

Each data extraction form was completed by one reviewer and checked for accuracy by another. Ten percent of the documents were extracted independently by two reviewers.

Papers were added to an NVivo database and key components of best practice coded including, where available, data specific to populations including stroke patients and those with cognitive impairments.

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[6] Brouwers M, Kho ME, Browman GP, Cluzeau F, Feder G, Fervers B, Hanna S, Makarski J on behalf of the AGREE Next Steps Consortium. 2010. AGREE II: Advancing guideline development, reporting and evaluation in healthcare. Canadian Medical Association Journal, 182:E839-842.

[7] Oliver, S., Kavanagh, J., Caird, J., Lorene, T., Oliver, K., & Harden, A. (2008). Health promotion, inequalities, and young people's health. A systematic review of research. Retrieved from http://eppi.ioe.ac.uk/cms/Default.aspx?tabid=2410

2.6 Data Synthesis

Major themes were identified, discussed and are summarised in Key Statements (KS). The statements indicate particular elements of best practice , the documents in which they were identified and, where quality assessment was possible, an overall score for that documents.

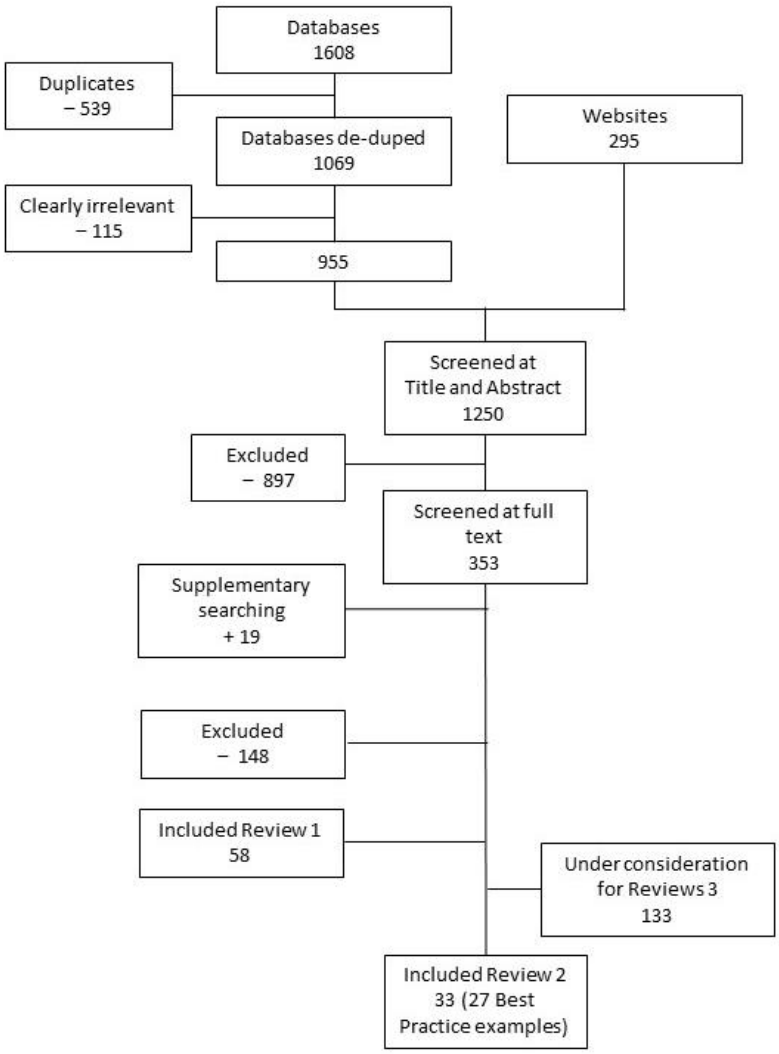
An Evidence Table with brief summaries of the included documents is provided as Appendix A.

3 Results

3.1 Search results

The search strategy identified 1,608 citations from database searching of which 654 were excluded as duplicates or clearly irrelevant (e.g. animal studies or no mention of oral health). 1,250 citations (955 from the database searches and 295 from web site searching) were reviewed in title and abstract and 353 in full text. Full details are provided in the flow diagram below.

Thirty three documents were included in the review. These provided twenty seven elements of best practice in the form of guidelines developed by governmental bodies and specialist societies, tools, toolkits, Quality Improvement projects and UK health directives (some work was described in more than one document).



The documents identified are reported below in their categories: guidelines, toolkits/resource guides, assessment tool validation studies, evaluation/audit of guideline implementation, local care protocols and government

Guidelines (13)	Toolkits/Resource Guide (5)
BSG 2010 Fiske & Lewis 2000 * GAIN 2012 Gerodontology Assn 2005 Gerodontology Assn 2006 Heath et al 2011 JBI 2004 Johnson & Chalmers 2011 Lewis & Fiske 2009 * Miller et al 2008 O'Connor 2012 QI Scotland 2005 SIGN 2010 *for British Society for Disability & Oral Health	McNally et al 2011 NHS Health Scotland 2013 (Caring for Smiles) SA Dental Service 2009 Sweeney 2000 WAG 2003
Assessment tool validation (3)	**Evaluation/Audit (3)**
Andersson et al 2003 Chalmers et al 2005 Kayser-Jones et al	Fallon et al 2006 Georg 2006 Rivett 2006
Local care protocol (2)	**UK health directive/strategy (1)**
Dyck 2012 Gil-Montoya 2005	Scottish Government 2012

When reviewing the documents it became clear that there has been considerable 'cross-fertilisation' of ideas, with contributors often being involved in multiple pieces of work. For example, the late Associate Professor Jane Chalmers was involved in developing guidance and best practice documentation in Australia (JBI 2004, Chalmers et al 2005, SA Dental Services 2009), but also in the USA (Johnson & Chalmers 2010) and Canada (Miller et al 2008).

In the UK, a guideline developed by the British Society for Disability and Oral Health (Fiske & Lewis 2000) has informed and elements have been incorporated into guidelines produced by the Gerodontology Association (2006) and the British Society for Gerodontology (2010). Also, guidelines produced by these organisations and the Royal College of Nursing (Heath et al 2008) share a number of authors in common.

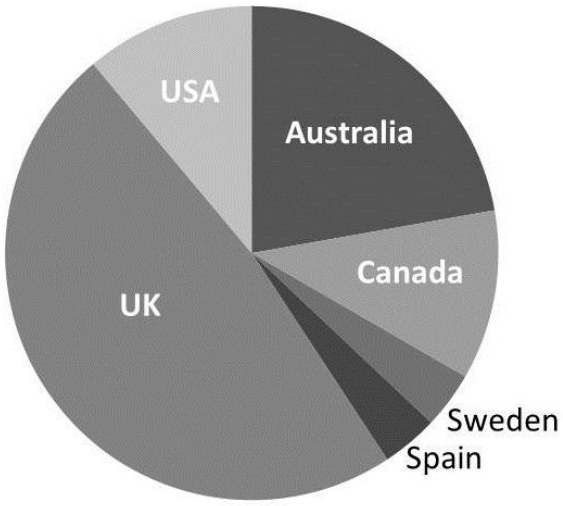
In addition, a number of the documents are inter-related:

- The requirements of the QI Scotland (2005) guideline are reflected in the Scottish Government (2012) strategy and the NHS Health Scotland 2013 resource guide, 'Caring for Smiles'. The guideline also recommends nurses to utilise the educational materials developed by Sweeney et al (2000).
- The three audit/evaluation papers (Fallon et al 2006, Georg 2006, Rivett 2006) consider the implementation of the same guidance (JBI 2004) in Australia. The set of three linked toolkits produced by SA Dental Services (2009) all reference back to this guidance.

3.2 Applicability and quality of studies

Twenty seven pieces of best practice documentation were included in the review. Additional data on the documents are provided in Table 1 on page 30 and in more detail in Appendix A.

Thirteen of the twenty seven were from the UK (BSG 2010, Dickinson et al 2001, Fiske & Lewis 2000, GAIN 2012, Gerodontology Association 2005, Gerodontology Association, 2006, Heath et al 2011, Lewis & Fiske 2009, NHS Health Scotland 2013, QI Scotland 2005, Scottish Government 2012, SIGN 2010, Sweeney et al 2000, Welsh Assembly Government 2003) with the remainder coming from countries applicable to the UK: six from Australia (Chalmers et al 2005, Fallon et al 2006, Georg 2006, JBI 2004, Rivett 2006, South Australia Dental Service, 2009), three each from Canada (Dyck et al 2012, McNally et al 2011, Miller et al 2008) and the USA (Johnson & Chalmers 2011, Kayser Jones et al 1995, O'Connor 2010), with one each from Sweden (Andersson et al 2002) and Spain (Gil-Montoya et al 2005).



Quality of guidelines

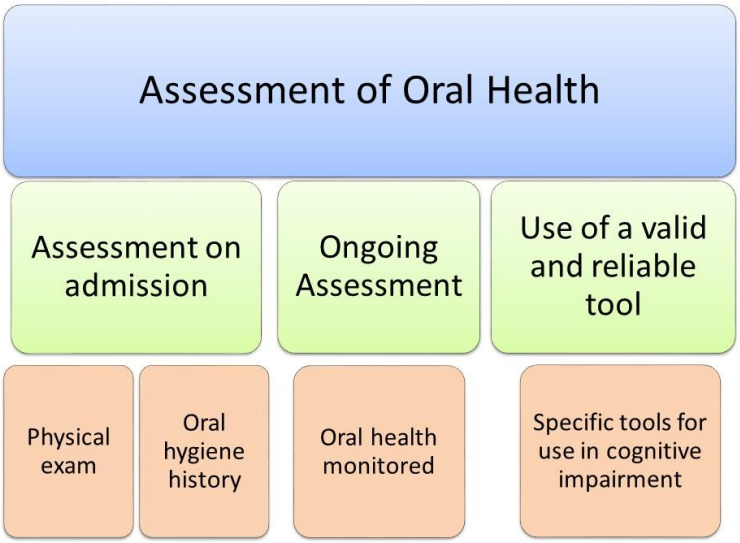
As indicated in the methods section, only guidelines were quality assessed. Of the thirteen, one (SIGN 2010) was developed by a NICE-accredited organisation whose development process meets the highest AGREE standards. Thus twelve documents were appraised using the AGREE II Instrument. Details of the domain scores for each guideline are provided in Appendix B.

An overall score was determined for each guideline on a range of 1 to 7 where 1 is the lowest and 7 the highest quality. Five guidelines scored 3 (Fiske & Lewis, 2000a, Gerodontology Association 2005, 2006, Heath et al 2011, Lewis & Fiske 2009); one scored 4 (British Society for Gerodontology [BSG] 2010,); five scored 5 (GAIN 2012, Joanna Briggs Institute [JBI] 2004, Johnson & Chalmers 2011, O'Connor 2012, Quality Improvement [QI] Scotland 2005); and one (Miller et al 2008) received the highest quality score of 7.

4 Findings

From analysis of the included documents, six overarching themes emerged: assessment of oral health, daily oral care, products used in daily oral care, education of care providers, organisational policies/processes and access to dental care to ensure best practice is embedded.

4.1 Assessment of oral health



4.1.1 Assessment on admission

The UK National Minimum Standards for Care Homes for Older People requires a review of oral health status to be undertaken as part of any initial health evaluation.[8] In the USA, federal government legislation mandates that residents in Medicare- and Medicaid-funded care homes must have a dental evaluation within 14 days of after admission with annual re-evaluations. (Kayser-Jones et al, 1995, Johnson & Chalmers 2011).

The need for a formal oral health assessment performed by an appropriately trained individual on admission to residential care was highlighted in all thirteen guidelines (BSG 2010, Fiske & Lewis 2000, GAIN 2012, Gerodontology Assn 2005, Gerodontology Assn 2006, Heath et al 2011, JBI 2004, Johnson & Chalmers 2011, Miller et al 2008, O'Connor 2012, QI Scotland 2005) and in vitually all other identified documents (Andersson et al 2002, Chalmers et al 2005. Dyck et al 2012, Fallon et al 2006, Georg 2006, Gil-Montoya et al 2005,

[8] Department of Health. 2003. National Minimum Standards for Care Homes for Older People. London, The Stationary Office

Kayser-Jones et al 1995, Rivett 2006, McNally et al 2011, NHS Health Scotland 2013, SA Dental Service 2009, Scottish Government 2012, WAG 2003).

Who should undertake the assessment was less clear as this was not always specified. In some instances this was a dental health professional (BSG 2010); in others a nurse (Heath et al 2011, O'Connor 2012, Miller et al 2008, QI Scotland), or a suitably trained member of the care home team (GAIN 2012). Or it could be any of them (Fiske & Lewis 2000, JBI 2004, SA Dental Services 2009).

A range of tools were identified that could be used for assessment. Validation studies were identified for three tools used in non-acute care settings:

- The Brief Oral Health Status Examination (BOHSE) [Kayser-Jones et al, 1995] was validated for general use in long term care.
- The Revised Oral Assessment Guide (ROAG) [Andersson et al, 2002] was validated in an elderly stroke rehabilitation setting.
- The Oral Health Assessment Tool (OHAT) [Chalmers et al, 2005] – also known as the Modified BOHSE – was validated for general use in long-term care.

Both BOHSE and OHAT were validated in populations that included cognitively impaired adults.

Other tools identified were:

- The Oral Health Risk Assessment (OHRA) which was included in guidelines produced for the Gerodontology Association (2005, 2006), the British Gerodontology Society (2010) and the British Society for Disability and Oral Health (Fiske et al 2000b, Lewis & Fiske 2009).
- A range of general and more specific tools: Oral Assessment Guide (OAG); The Holistic and Reliable Oral Assessment Tool (THROAT) – validated in an acute settings only; the Mucosal Plaque Index (MPS) and the National Cancer Institute Scale were all included in a guideline by Miller et al (2008).

4.1.2 Ongoing Assessment

There is similar unanimity regarding the need for the assessments to be repeated on a similar basis. Eleven of the thirteen guidelines state that assessments should be repeated on a regular basis (BSG 2010, Fiske & Lewis 2000, GAIN 2012, Gerodontology Assn 2005, Gerodontology Assn 2006, Heath

et al 2011, JBI 2004, Johnson & Chalmers 2011, Miller et al 2008, O'Connor 2012, QI Scotland 2005). This is also supported in other best practice documentation (Andersson et al 2002, Chalmers et al 2005. Dyck et al 2012, Fallon et al 2006, Georg 2006, Gil-Montoya et al 2005, Kayser-Jones 1995, Rivett 2006, McNally et al 2011, NHS Health Scotland 2013, SA Dental Service 2009, Scottish Government 2012, WAG 2003).

However, only six documents define 'regular' as a particular timeframe and there is no consensus between them as to what this should be. BSG (2010) for stroke patients and O'Connor (2012) indicates daily monitoring. GAIN (2012) and QI Scotland (2005) both recommend monthly assessment. NHS Health Scotland (2013) advises re-assessment at no more than six monthly intervals whilst JBI (2004) and McNally et al (2011) advocates a maximum of annual assessments.

Key Summary 1: Assessment of oral health

Assessment of oral health on entry to care and repeated on a regular basis emerged as a consistent theme.

Assessment on entry was recommended in all 13 guidelines identified (9 UK[1-9], 2 USA[10,11], 1 Australia[12], 1 Canada[13]) This is supported by four toolkits/resource guides (2 UK[14,15], 1 Canada[16] 1 Australia[17]) three validation studies (1 USA[18], 1 Australia[19], 1 Sweden[20]), three audit studies (3 Australia[21-23]), two local care protocols (1 USA[24], 1 Spain[25]) and a strategy document (UK[26]).

The need for regular re-assessment was similarly recommended in eleven guidelines[1-6,8,9,11-13] and three toolkits/resource guides[14,15,17] two validation studies[19,20], two audit studies[22,23], two local care protocols[24,25] and a strategy document[26].

There was less consistency about how often and by whom this assessment should be undertaken.

The recommended time between assessments varied. All eleven guidelines guidelines[1-6,8,9,11-13] stated that assessment should be repeated regularly but only a few documents specified timing. Two guidelines, one in stroke patients[1] and the other in dependent patients[11] indicated daily monitoring was required in these high risk populations. In general care settings, the recommendation varied between one month (two guidelines[3,12]), up to six months (one resource guide[15]).

In one guideline[1] assessment was the responsibility of a dental health professional. However, in six other guidelines a registered nurse[6,10-12], a suitably trained member of

the care home team[3] or any of these[2,7].

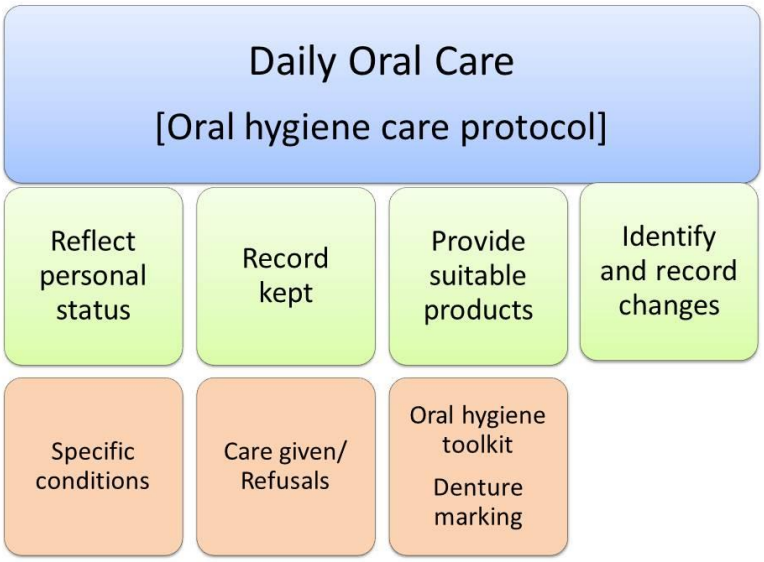
A number of oral health assessment tools were identified in the guidelines. Of these, validation studies were identified for three tools designed for use in non-acute care settings:

- Brief Oral Health Status Examination (BOHSE)[18] validated for general use in long term care
- Revised Oral Assessment Guide (ROAG)[20] validated in an elderly stroke rehabilitation setting
- The Oral Health Assessment Tool (OHAT)[19] – also known as the Modified BOHSE – validated for use in long term care.

Both BOHSE and the OHAT are also validated for use in populations that include cognitively impaired adults.

[1] British Society for Gerodontology, 2010 (4)
[2] Fiske & Lewis, 2000 (3)
[3] GAIN, 2012 [5]
[4] Gerodontology Association, 2005 (3)
[5] Gerodontology Association, 2006 (3)
[6] Heath et al, 2011 (3)
[7] Lewis & Fiske, 2009 (3)
[8] QI Scotland, 2011 (5)
[9] SIGN, 2010 (NICE accredited process)
[10] Johnson & Chalmers, 2011 (5)
[11] O'Connor, 2012 (5)
[12] Joanna Briggs Institute, 2004 (5)
[13] Miller et al, 2008 (7)
[14] NHS Health Scotland, 2013
[15] Welsh Assembly Government, 2003
[16] McNally et al, 2011
[17] SA Dental Service, 2009
[18] Kayser-Jones et al, 1995
[19] Chalmers et al, 2005
[20] Andersson et al, 2002
[21] Fallon et al, 2006
[22] Georg, 2006
[23] Rivett, 2006
[24] Dyck et al, 2012
[25] Gil-Montoya et al, 2005
[26] Scottish Government, 2012

4.2 Daily oral care



The importance of daily oral hygiene care was highlighted in twenty two documents (BSG 2010, GAIN, 2012, Gerodontology Assn 2005, Gerodontology Assn 2006, Heath et al 2011, JBI 2004, Johnson & Chalmers 2011, Lewis & Fiske 2009, Miller et al 2008, O'Connor 2012, QI Scotland 2011, SIGN 2010, McNally et al 2011, NHS Health Scotland 2013, SA Dental Service 2009, Dyck et al 2012, Fallon et al 2006, Georg 2006, Gil-Montoya et al 2005, Scottish Government 2012, Sweeney 2009, WAG 2003). Twelve of those documents specified that this must be undertaken at least twice daily (BSG 2010, GAIN, 2012, Gerodontology Assn 2005, Heath et al 2011, Miller et al 2008, O'Connor 2012, QI Scotland 2011, SIGN 2010, Dyck et al 2012, Fallon et al 2006, NHS Health Scotland 2013, SA Dental Service 2009, Scottish Government 2012).

Some of the guidelines identified are specific to certain populations, such as stroke patients (BSG 2010, SIGN 2010), and individuals with a cognitive impairment (Gerodontology Association 2006, JBI 2004). However, these conditions and aspects of them, including dysphagia (difficulty swallowing), xerostomia (dry mouth), the management of medication-related problems and palliative care needs, are likely to be encountered by staff looking after general care home populations.

Nine documents (GAIN 2012, Johnson & Chalmers 2011, Miller et al 2008, QI Scotland 2005, Dyck et al 2012, Gil-Montoya 2005, McNally et al 2011, SA Dental Service 2009, Scottish Government 2012) indicated the need for the service provider to develop and implement a protocol for the delivery of standards of oral hygiene care that reflects the diversity of oral health in the population of residents (eg dentate, partially dentate or edendate with or without the use of dentures, problems with xerostomia or dysphagia etc).

There was unanimity about the need for the development of an individualised daily oral care plan and formal record keeping of daily oral care provided/supported that shows when care has been carried out and also acts as a reminder. (BSG 2010, Fiske & Lewis 2000, GAIN, 2012, Gerodontology Assn 2005, Gerodontology Assn 2006, Heath et al 2011, JBI 2004, Johnson & Chalmers 2011, Lewis & Fiske 2009, Miller et al 2008, O'Connor 2012, QI Scotland 2011, SIGN 2010, Dyck et al 2012, Fallon et al 2006, Georg 2006, Gil-Montoya et al 2005, McNally et al 2011, NHS Health Scotland 2013, Rivett 2006 SA Dental Service 2009, Scottish Government 2012, Sweeney 2009, WAG 2003).

The protocol would also include a requirement that regular oral health assessments are conducted (as noted in 4.1 above) so that changes in oral health are recorded and managed.

McNally et al (2011) provide examples of a range of care cards for different oral health status:

Pink	Natural teeth
Purple	Natural teeth + partial dentures
Blue	Natural teeth + dentures
Yellow	No natural teeth + dentures
Green	No natural teeth + no dentures
Red	Unable to swallow

The cards provide information related to the particular status, and include space to personalise the cards so that they reflect individual needs.

Several documents (Fiske & Lewis, Gerodontology Association 2005, Heath et al 2011, Johnson & Chalmers, Dyck et al 2012, McNally et al 2011) recommend the provision of a kit in a location convenient for the resident which contain all the products required to manage their oral hygiene care. As McNally et al (2011) indicate, undertaking oral hygiene care is likely to be easier when the equipment needed is at hand.

One specific aspect of the care protocol was identified in twenty documents: the need for dentures to be marked or labelled with their owner's name so that they are less likely to be muddled or lost. (BSG 2010, Fiske & Lewis 2000, GAIN, 2012, Gerodontology Assn 2005, Gerodontology Assn 2006, Heath et al 2011, JBI 2004, Johnson & Chalmers 2011, Miller et al 2008, O'Connor 2012, QI Scotland 2011, SIGN 2010, Fallon et al 2006, Georg 2006, McNally et al 2011, NHS Health Scotland 2013, Rivett 2006 SA Dental Service 2009, Scottish Government 2012, Sweeney 2009, WAG 2003).

Nine documents (GAIN_2012, Gerodontology Assn 2006, Heath et al 2012, Johnson & Chalmers 2011, Miller et al 2008, McNally et al 2011, NHS Health Scotland 2013, SA

Dental Service 2009, WAG 2003) consider the issue of refusal of care, particularly in those with cognitive impairments; although what refusal constitutes is not always clear. Seven documents advise that refusal of care should be recorded in care plans (GAIN_2012, Johnson & Chalmers 2011, Miller et al 2008, McNally et al 2011, NHS Health Scotland 2013, SA Dental Service 2009, WAG 2003). Four documents discuss the assessment of reasons for refusal and possible management strategies (Heath et al 2011, Johnson & Chalmers 2011, Miller et al 2008, NHS Health Scotland 2013).

Key Summary 2: Daily oral care

Aspects of daily oral care were considered in all 13 guidelines identified (9 UK[1-9], 2 USA[10,11], 1 Australia[12], 1 Canada[13]), five toolkits/resource guides (3 UK[14-16], 1 Canada[17] 1 Australia[18]), three audit studies (3 Australia[19-21]), two local care protocols (1 USA[22], 1 Spain[23]) and a strategy document (UK[24]).

The need for **organisations to develop and maintain an oral hygiene care protocol which defines appropriate daily care standards for different oral health needs** was highlighted in nine documents (The protocol would also provide tools to ensure recording of care provided by staff and **define an appropriate range of products** for different oral hygiene needs.

There was consensus across the documentation that, following an oral health assessment (see Key Summary 1) an **individualised daily oral hygiene care plan** should be developed/updated (13 guidelines[1-13], five toolkits/resource guides[14-18], three audit studies[19-21], two local care protocols[22,23], one strategy document[24]).

Refusal of care which is usually associated with cognitive impairment was discussed in nine documents (5 guidelines[3, 5,6,8,10], 4 resource guides/toolkits[14,16-18]). Seven documents recommended that **refusal of care is documented in daily care plans** (Three guidelines[3,8,10] and four toolkits/resource guides[14,16-18]). Strategies to manage refusal were identified in four documents (3 guidelines[6,8,10], 1 toolkit/resource guide[14]).

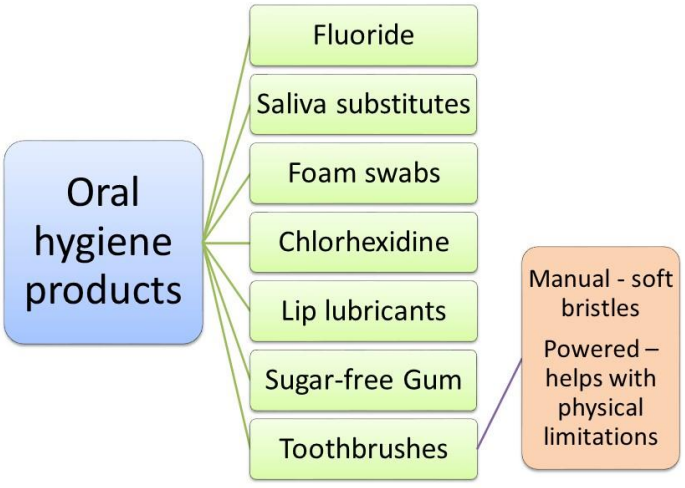
Twenty documents highlighted the need for **dentures to be marked or labelled with the name of their owner**. (11 Guidelines[1-8,10,12,13], five toolkits/resource guides[14-18], three audit studies[19-21], one strategy document[24]).

[1] British Society for Gerodontology, 2010 (4)
[2] Fiske & Lewis, 2000a (3)
[3] GAIN, 2012 [5]
[4] Gerodontology Association, 2005 (3)
[5] Gerodontology Association, 2006 (3)
[6] Heath et al, 2011 (3)
[7] Lewis & Fiske, 2009 (3)

[8] QI Scotland, 2011 (5)
[9] SIGN, 2010, (NICE accredited process)
[10] Johnson & Chalmers, 2011 (5)
[11] O'Connor, 2012 (5)
[12] Joanna Briggs Institute, 2004 (5)
[13] Miller et al, 2008 (7)
[14] NHS Health Scotland, 2013
[15] Sweeney et al, 2009
[16] Welsh Assembly Government, 2003
[17] McNally et al, 2011
[18] SA Dental Service, 2009
[19] Fallon et al, 2006
[20] Georg, 2006
[21] Rivett, 2006
[22] Dyck et al, 2012
[23] Gil-Montoya et al, 2005
[24] Scottish Government, 2012

4.3 Products used in daily oral care

Information was provided on a range of products used in daily oral care that might form part of oral hygiene toolkits



4.3.1 Fluoride varnish

There is little mention of the use of fluoride varnish other than the Scottish Government (2012 p9). This strategy document indicates that older people and

those with special care needs who are at high risk of caries "should have fluoride varnish professionally applied twice yearly (2.2% F)".

4.3.2 Chlorhexidine

As identified in Review 1, chlorhexidine gluconate (0.12% or 0.2%), used as a mouthwash or as a gel for brushing teeth, is an effective antiseptic and also inhibits dental plaque formation. However, as the *British National Formulary* indicates, it does not completely control plaque deposition and is not a substitute for effective tooth-brushing.[9] In the UK, chlorhexidine is available as an over the counter product and has been used in clinical dental practice for many years. There are well recognised side effects – mucosal irritation, altered taste sensation, staining of teeth and restorations, tongue discolouration and parotid gland swelling. Recently, following a death attributed to the use of chlorhexidine, the Medicines and Healthcare Regulatory Agency (MHRA) issued a Medical Device Alert warning of the dangers of anaphylactic reactions with the product.[10]

As the appropriateness of using chlorhexidine for prophylaxis as part of a preventive programme is open to question, all references to it in included documents were captured and are detailed below. Unlike the UK, It should be noted that in the USA and Canada chlorhexidine is a prescription-only product. This is reflected in the documents from these two countries.

Discussion of chlorhexidine adverse events is limited. However, all but one document was published before the MHRA warning was issued. The most recent best practice document (NHS Health Scotland 2013) highlights the warning and notes the need to check the resident's medical history for any previous allergies. Three sources (Johnson & Chalmers 2011, Miller et al 2008, SA Dental Services 2009) recommend that chlorhexidine and fluoride toothpastes containing sodium lauryl sulfate are not used within two hours of each other as the effectiveness of chlorhexidine is reduced. Johnson & Chalmers (2011) also highlight the side effects noted above. The use of oral chlorhexidine preparations is generally indicated to be subject to clinical advice.

Six documents also recommend that dentures containing metal should be soaked in chlorhexidine 0.2% solution (BSG 2010, Heath et al 2011, QI Scotland 2005, NHS Health Scotland 2013, SA Dental Services 2009, Sweeney et al 2009).

[9] http://www.evidence.nhs.uk/formulary/bnf/current/12-ear-nose-and-oropharynx/123-drugs-acting-on-the-oropharynx/1234-mouthwashes-gargles-and-dentifrices/chlorhexidine-gluconate

[10] https://www.gov.uk/drug-safety-update/chlorhexidine-reminder-of-potential-for-hypersensitivity

4.3.3 Foam swabs

The use of foam swabs for tooth cleaning by care givers is not recommended as they are less effective than brushes and the head may detach and constitute a potential choking hazard (Fiske & Lewis 2000, GAIN 2012, McNally et al 2011, Miller et al 2008, Dyck et al 2012, NHS Health Scotland 2013). In two documents the hazard was noted to be the subject of an MHRA Devices Alert in 2012 (GAIN 2012, NHS Health Scotland 2013).

Four documents also highlight problems with the use of lemon and glycerine swabs. The high levels of acidity creates problems for those suffering from xerostomia (dry mouth) and can cause gum irritation (Johnson & Chalmers 2011, Miller et al 2008, McNally et al 2011, SA Dental Services 2009).

4.3.4 Lip lubricants

Lubricants are recommended in a number of documents to minimise the risk of dry or cracked lips (BSG 2010, Heath et al 2011, McNally et al 2011, Miller et al 2008, Gil-Montoya et al 2005, NHS Health Scotland 2013, SA Dental Service 2009).

Gil-Montoya et al (2005) recommend the use of petroleum jelly or lip balm. However, the other documents specifying type of lubricant advise that a water-based preparation should be used. Additionally three specifically recommend against the use of petroleum jelly because of the risk of inflammation, flammability and aspiration pneumonia (McNally et al 2011, NHS Health Scotland 2013, SA Dental Services).

4.3.5 Saliva substitutes

Saliva substitutes are prescribed solutions that have physical properties similar to saliva. They are recommended to manage xerostomia (dry mouth) which may occur as a result of medication use in six documents (BSG 2010, Heath et al 2011, JBI 2004, Miller et al 2008, NHS Health Scotland 2013, SA Dental Service 2009).

4.3.5 Sugar free gum (including xylitol)

Sugar free gum is recommended in eight documents to stimulate saliva production in populations at risk of or suffering from xerostomia (BSG 2010, Heath et al 2011, JBI 2004, Johnson & Chalmers 2011, Miller et al 2008, Gil-Montoya et al 2005, NHS Health Scotland 2013, SA Dental Service 2009).

4.3.6 Toothbrushes

The need for regular tooth brushing is recognised throughout the best practice identified for this review. A range of different types of toothbrush are discussed including manual (including 'backward' toothbrushes for carer use), powered and suction toothbrushes. Which toothbrush is most appropriate appears to be dependent on how oral hygiene is undertaken.

Twelve documents recommend that soft bristled manual toothbrushes are used when a carer is providing oral hygiene to a resident. (BSG 2010, GAIN 2012, Gerodontology Assn 2006, Heath et al 2011, Miller et al 2008, O'Connor 2012; QI Scotland 2005, Dyck et al 2012, McNally et al 2011, NHS Health Scotland 2013, SA Dental Service 2009, Sweeney et al 2009).

Powered toothbrushes are generally discussed in the context of individuals brushing their own teeth. These toothbrushes may be particularly helpful where residents have physical limitations, such as following a stroke or those with arthritis (BSG 2010, Gerodontology Assn 2006, McNally et al 2011, NHS Health Scotland 2013, SA Dental Services 2009). A local protocol (Gil-Montoya et al 2005, p100) states that rotating-oscillating powered toothbrushes are recommended for use by "caregivers working with non-cooperating patients". However, the one guideline that comments on the use of powered toothbrushes by carers (QI Scotland 2005, p7) states that "appropriate training" is required "to reduce risk of damage to gums and oral mucosa".

The use of suction toothbrushes in dysphagic residents at risk of aspiration pneumonia was identified in four documents (BSG 2010, Miller et al 2008, McNally et al 2011, Gil-Montoya et al 2005).

Key Summary 3: Oral hygiene products

The use of a range of oral hygiene products was discussed in seventeen documents: ten guidelines (6 UK[1-6], 2 USA[7,8], 1 Australia[9], 1 Canada[10]) four toolkits/resource guides (2 UK[11,12], 1 Canada[13] 1 Australia[14]), two local care protocols (1 USA[15], 1 Spain[16]) and a strategy document (UK[17]).

The use of **fluoride varnish is not widely considered**. It's use is recommended in one strategy document[24].

Oral preparation chlorhexidine products were discussed in twelve documents (7 guidelines[1,2,4,7-9,10,], 4 toolkits/resource guides[11-14], 1 local care protocol[16]). A recent regulatory warning of the dangers of anaphylactic reactions is highlighted in one

toolkit/resource guide[11]. **Oral chlorhexidine may be helpful where clinically advised**.

The use of **chlorhexidine solutions to soak dentures containing metal** is recommended in six documents (3 guidelines[1,4,5], 3 toolkits/resource guides[11,12,14]).

The use of **foam swabs for tooth cleaning is noted as inadvisable** in six documents (2 guidelines[2,10], 3 toolkits/resource guides[11,13,14]). The documents note this may be a choking hazard and two documents[2,11] highlight the UK regulatory warning of this hazard. Swabs may be used for around the mouth area, but the use of lemon & glycerine soaked swabs is not recommended because they dry the mouth.

Lip lubricants for of moisturising dry and cracked lips is recommended in eleven documents (6 guidelines[1,4-7,10], 4 toolkits/resource guides[11-14], 1 local care protocol[16]). **Lubricants should be water-based not petroleum gel.**

Two products were identified as helpful in the **care of people with xerostomia** (dry mouth):

- **Saliva substitutes** in eleven documents (6 guidelines[1,4,5,7,9,10], four toolkits/resource guides[11-14], 1 local care protocol[16]).
- **Sugar free gum** in eight documents (5 guidelines[1,4,7,9,10], two toolkits/resource guides[11,14], 1 local care protocol[16]).

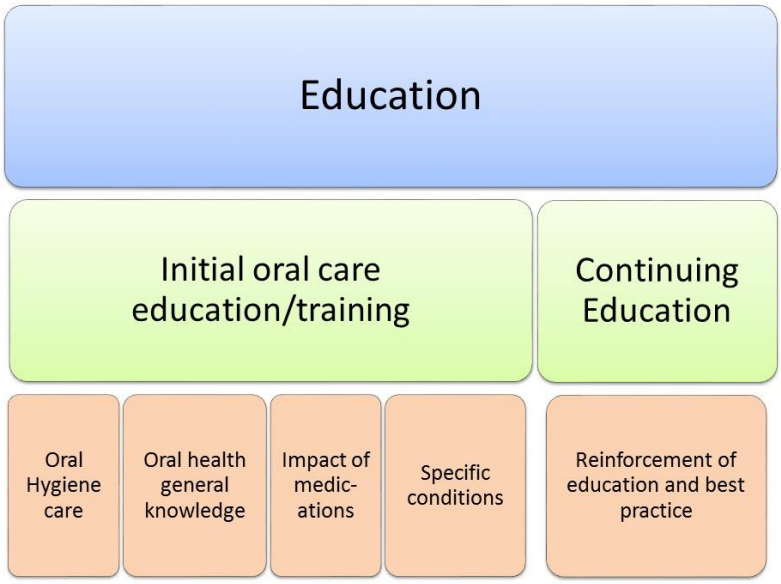
A range of toothbrushes were discussed and the following was identified:

- The use of **soft bristled manual toothbrushes for carer-provided oral hygiene** (twelve documents: 7 guidelines[1-5,8,10], 4 toolkits/resource guides[11-14], 1 local care protocol[15])
- **Powered toothbrushes may be helpful to those with physical limitations** resulting from eg stroke or arthritis (five documents: 2 guidelines[1,3], two toolkits/resource guides[13,14], 1 local care protocol[16]).
- **Suction toothbrushes can assist when providing oral care for dysphagic patients** at risk of aspiration pneumonia (four documents: 2 guidelines[1,10], one toolkit/resource guide[13], 1 local care protocol[16]).

[1] British Society for Gerodontology, 2010 (4)
[2] GAIN, 2012 [5]
[3] Gerodontology Association, 2006 (3)
[4] Heath et al, 2011 (3)
[5] QI Scotland, 2011 (5)
[6] SIGN, 2010, (NICE accredited process)
[7] Johnson & Chalmers, 2011 (5)
[8] O'Connor, 2012 (5)
[9] Joanna Briggs Institute, 2004 (5)
[10] Miller et al, 2008 (7)

[11] NHS Health Scotland, 2013
[12] Sweeney et al, 2009
[13] McNally et al, 2011
[14] SA Dental Service, 2009
[15] Dyck et al, 2012
[16] Gil-Montoya et al, 2005
[17] Scottish Government 2012

4.4 Education of care providers



4.4.1 Initial training

There is a general consensus across the included documents that everyone working in a residential setting who provides care requires education and training in the provision of oral hygiene. (BSG 2010, Fiske & Lewis 2000, GAIN 2012, Gerodontology Assn 2005, Gerodontology Assn 2006, Heath et al 2011, Johnson & Chalmers 2011, JBI 2004, Lewis & Fiske 2009, Miller et al 2008, O'Connor 2012, QI Scotland 2005, SIGN 2010, Dyck et al 2012, Fallon et al 2006, Georg 2006, Gil-Montoya et al 2005, McNally et al 2009, NHS Health Scotland 2013, Rivett 2006, Scottish Government 2012, South Australia Dental Service 2009, Sweeney et al 2009,

Several training programmes were identified for residential care staff, including:

- Caring for Smiles (NHS Health Scotland, 2013)

- McNally et al (2011)
- SA Dental Service (2009) – Staff and Facilitator portfolios

Both Caring for Smiles and SA Dental Service Portfolios include key learning outcomes.

In addition to training programmes for residential care staff, four programmes were identified that provide education and training for health professionals:

- SA Dental Services (2009) – General Practitioners and Registered Nurses
- Miller et al (2008) – Registered Nurses
- Heath et al (2011) – Registered Nurses
- Sweeney et al (2000) – Medical, nursing and dental staff

Content of training programmes includes:

- Oral health assessment
- Oral hygiene care
- General oral health knowledge including oral diseases
- The impact of medications on oral health
- Specific conditions, including
    - Cognitive impairment
    - Stroke patients
    - Oral cancer
    - Dysphagia (difficulty in swallowing)
    - Xerostomia (dry mouth)
    - Palliative care

4.4.2 Ongoing education and training

Several documents highlight that, in order for any effect to be sustained, education and training of care givers needs to be reinforced on a regular basis. (GAIN 2012, Johnson & Chalmers 2011, O'Connor 2012, Miller et al 2008, Fallon et al 2006, Georg 2006, Rivett 2006, Scottish Government 2012, Sweeney 2009). There is no specific timeframe designated in any document. GAIN (2012) notes that all education – initial and follow-up – should be recorded.

Key Summary 4 Education and training

There is a general consensus that **care home staff need to receive education and training to enable them to provide effective oral care**. This was identified all 13 guidelines (9 UK[1-9], 2 USA[10,11], 1 Australia[12], 1 Canada[13]), five toolkits/resource guides (3

UK[14-16], 1 Canada[17] 1 Australia[18]), three audit studies (3 Australia[19-21]), two local care protocols (1 USA[22], 1 Spain[23]) and a strategy document (UK[24]).

A requirement for **regular update training to reinforce best practice** was identified in four guidelines[3,10,11,13], three audit studies[19-21], one toolkit/resource guide[15] and one strategy document[24].

A range of **freely available training materials** were identified for use with care home staff[14,17,18] and with health professionals working in care settings[6,13,15,18].

[1] British Society for Gerodontology, 2010 (4)
[2] Fiske & Lewis, 2000 (3)
[3] GAIN, 2012 [5]
[4] Gerodontology Association, 2005 (3)
[5] Gerodontology Association, 2006 (3)
[6] Heath et al, 2011 (3)
[7] Lewis & Fiske, 2009 (3)
[8] QI Scotland, 2011 (5)
[9] SIGN, 2010 (NICE accredited process)
[10] Johnson & Chalmers, 2011 (5)
[11] O'Connor, 2012 (5)
[12] Joanna Briggs Institute, 2004 (5)
[13] Miller et al, 2008 (7)
[14] NHS Health Scotland, 2013
[15] Sweeney et al 2009
[16] Welsh Assembly Government, 2003
[17] McNally et al, 2011
[18] SA Dental Service, 2009
[19] Fallon et al, 2006
[20] Georg, 2006
[21] Rivett, 2006
[22] Dyck et al, 2012
[23] Gil-Montoya et al, 2005
[24] Scottish Government, 2012

4.5 Organisational controls/culture

The development of a protocol for oral hygiene care and written records of daily care were identified as important compenents of best practice (See Section 4.2 above). The need for regular audit is highlighted in a number of sources to ensure that appropriate levels of are maintained (BSG 2010, GAIN 2012, Johnson & Chalmers 2011, Lewis & Fiske 2009, Miller et al 2008, QI Scotland 2005, SIGN 2010, Fallon et al 2006, Georg

2006, Gil-Montoya et al 2005, Rivett 2006, WAG 2003). Again, what constitutes 'regular' is unclear.

In managing this, the identification and empowerment of an oral health champion within the care setting may provide a means of embedding a culture of good oral care. This individual is responsible for ensuring that oral hygiene standards are set and maintained and may also be the lead educator. (GAIN 2012, Gerodontology Association 2005, JBI 2004, Miller et al 2008, QI Scotland 2005, Dyck et al 2012, Fallon et al 2006, McNally et al 2011, NHS Health Scotland 2013, Rivett 2006, Scottish Government 2012,)

Key Summary 5: Organisational controls/culture

Mechanisms for assuring appropriate levels of oral care were identified in seventeen documents: eight guidelines (6 UK[1-6], 1 USA[7], 1 Canada[8]), three toolkits/resource guides (2 UK[9,10], 1 Canada[11]) three audit studies (3 Australia[12-14]), two local care protocols (1 USA[15], 1 Spain[16]) and a strategy document (UK[17]).

The need for **regular audits to assess the effectiveness of oral health care** provided was highlighted in twelve documents (seven guidelines[1,2,4-7,9], one toolkit/resource guide[11], three audit studies[12-14], two local care protocols[15,16]).

In eleven documents the identification and empowerment of an **oral health champion/educator within the residential setting** may assist in embedding a culture of good oral health (five guidelines[1,2,4-8], two toolkits/resource guides[9,10], two audit studies[13,15], one local care protocol[15], one strategy document[17]).

[1] British Society for Gerodontology, 2010 (4)
[2] GAIN, 2012 [5]
[3] Gerodontology Association, 2005 (3)
[4] Lewis & Fiske, 2009 (3)
[5] QI Scotland, 2011 (5)
[6] SIGN, 2010, (NICE accredited process)
[7] Johnson & Chalmers, 2011 (5)
[8] Joanna Briggs Institute 2004 (5)
[9] Miller et al, 2008 (7)
[10] NHS Health Scotland
[11] WAG 2003
[12] McNally et al 2011
[13] Fallon et al 2006
[14] Georg 2006
[15] Rivett 2006
[16] Dyck et al 2012
[17] Gil-Montoya et al 2005

[17] Scottish Government 2012

4.6 Access to dental care/regular check-ups

There is a general consensus of the importance of access to dental treatment when required which is identified in all guidelines and most other best practice documentation (BSG 2010, Fiske & Lewis 2000, GAIN 2012, Gerodontology Assn 2005, Gerodontology Assn 2006, Heath et al 2012, JBI 2004, Johnson & Chalmers 2011, Lewis & Fiske 2009, Miller et al 2008, O'Connor 2012, QI Scotland 2005, SIGN 2010, Dyck 2012, Fallon et al 2006, Georg 2006, Gil-Montoya et al 2005, McNally et al 2011, Scottish Government 2012, WAG 2003).

Although regular dental check-ups were also identified as important, the requirement was specified in fewer documents (Fiske & Lewis 2000, GAIN 2012, Gerodontology Assn 2005, Gerodontology Assn 2006, Heath et al 2012, JBI 2004, Fallon et al 2006, NHS Health Scotland 2013, SA Dental Services 2009, Scottish Government 2012, WAG 2003).

GAIN (2012), JBI (2004), Miller et al (2008) and QI Scotland (2005) highlight the important of collaborative working with dental health professionals and note the role of the care home manager in building local relationships to ensure that oral care is available for residents. The SA Dental Service (2009) includes a Dental Referral Protocol that provides information on how to support a dentist visiting a residential home.

Key Summary 6: Access to dental care

Issues around access to dental care are discussed in eighteen documents: thirteen guidelines (9 UK[1-9], 2 USA[10,11], 1 Australia[12], 1 Canada[13]), one toolkit/resource guide (1 Canada[14]) , two audit studies (2 Australia[15,16]), one local care protocols (1 Spain[17]) and a strategy document (UK[18]).

There is a general consensus of **the need for access to dental care when required by residents to ensure oral health is maintained**. This was identified in all eighteen documents (thirteen guidelines[1-13], one resource guide[14], two audit studies[15,16], 1 local care protocol[17], 1 strategy document[18]).

Regular check-ups at appropriate intervals was highlighted in eleven documents (five guidelines[2-53,4,5,] (Fiske & Lewis 2000, GAIN 2012, Gerodontology Assn 2005, Gerodontology Assn 2006, Heath et al 2012, JBI 2004, less highlighted.

There is little guidance on how this is best achieved. Four guidelines[3,8,12,13] emphasise the

need for collaborative working and the role of care home managers in fostering these relationships is highlighted.

[1] British Society for Gerodontology, 2010 (4)
[2] Fiske & Lewis, 2000a (3)
[3] GAIN, 2012 [5]
[4] Gerodontology Association, 2005 (3)
[5] Gerodontology Association, 2006 (3)
[6] Heath et al, 2011 (3)
[7] Lewis & Fiske, 2009 (3)
[8] QI Scotland, 2011 (5)
[9] SIGN, 2010, (NICE accredited process)
[10] Johnson & Chalmers, 2011 (5)
[11] O'Connor, 2012 (5)
[12] Joanna Briggs Institute, 2004 (5)
[13] Miller et al, 2008 (7)
[14] McNally et al 2011
[15] Fallon et al 2006
[16] Georg 2006
[17] Gil-Montoya et al 2005
[18] Scottish Government 2012

Table 1: Overview of included documents

First author/date [AGREE score]	Tool/Guidelines	Focus	Country	Additional Information
Andersson 2002	Revised Oral Health Assessment Guide (ROAG)	Elderly patients in stroke rehabilitation	Sweden	Testing/validation study for an oral assessment tool
British Society for Gerodontology 2010 [4]	Guideline for care of stroke patients.	Older people who are stroke patients	UK	Consensus guideline (includes output from Fiske 2000a as Appendices 5-7)
Chalmers 2005	Oral Health Assessment Tool (OHAT)	Older people in residential care	Australia	Testing/validation study for an oral assessment tool
Dyck 2012	Local care protocol	Dependent adults at risk of dysphagia in residential care	Canada	Local protocol developed in a single care setting
Fallon 2006	Audit of care protocol	Cognitively impaired older adults in residential care	Australia	Relates to implementation of Joanna Briggs Institute (2004) guidance
Fiske 2000a [3]	Guideline (British Society for Disability & Oral Health)	Long stay residents/ patients	UK	Expert consensus guideline
GAIN 2012 [5]	Guideline	Older people in nursing/ residential homes	UK (Northern Ireland)	Evidence-based guideline
Georg 2006	Audit of care protocol	Cognitively impaired older adults in residential care	Australia	Relates to implementation of Joanna Briggs Institute (2004) guidance
Gerodontology Assn 2005 [3]	Guideline	Older people in residential care	UK	Expert consensus guideline
Gerodontology Assn 2006 [3]	Guideline	Older people with dementia	UK	Expert consensus guideline
Gil-Montoya 2005	Local care protocol	Dependent institutionalised elderly	Spain	Local protocol developed in a single care setting
Heath 2011 [3] (Royal College of Nursing)	Guideline	Older people	UK	Expert consensus guideline

Joanna Briggs Institute (JBI) 2004 [5]	Best Practice Guidance	Cognitively impaired older adults in residential care	Australia	Based on systematic review Pearson & Chalmers (2004)
Johnson 2011 [5]	Guideline	Functionally dependent and cognitively impaired older adults	USA	Evidence-based guideline
Kayser-Jones 1995	Brief Oral Health Status Examination [BOHSE]	Older people in residential care	USA	Testing/validation study for an oral assessment tool
Lewis 2009 [3] Fiske 2000b	Guideline (British Society for Disability & Oral Health)	Domiciliary dental care	UK	Lewis & Fiske 2009 is an update of Fiske & Lewis 2000b
McNally 2011 McNally 2012a McNally 2012b	Resource Guide Associated research report Associated research paper	Dependent older adults in long-term care	Canada	Brushing up on Mouthcare Project
Miller 2008 [7]	Guideline (Registered Nurses Association of Canada)	Vulnerable populations aged 18+ years needing oral hygiene assistance	Canada	Evidence-based guideline
NHS Health Scotland 2013 Welsh 2012	Resource booklet Research paper	Dependent older people in care homes	UK (Scotland)	Caring for Smiles educational programme
O'Connor 2012	Nursing Guideline	Functionally dependent and cognitively impaired older adults	USA	Evidence-based guideline
Quality Improvement Scotland 2005 [5]	Guideline	Dependent older people	UK (Scotland)	Evidence-based guideline
Rivett 2006	Audit of care protocol	Cognitively impaired older adults in residential care	Australia	Relates to implementation of Joanna Briggs Institute (2004) guidance
SA Dental Service 2009	Toolkit and training materials (Facilitator, dental professionals and carers)	Older adults in residential care	Australia	Educational toolkit. Developed out of the work of Chalmers et al.
Scottish Government	National strategy	Priority groups including	UK	National strategy document

2012		frail older people and people with special needs	(Scotland)	
SIGN 2010 [NICE-accredited process]	Guideline	Stroke patients - dysphagia care	UK (Scotland)	Evidence-based guideline
Sweeney 2009	Multi-media resource pack for training medical/ nursing staff	Hospitalised elderly people	UK (Scotland)	Evaluation study of an educational resource pack. Copy of pack provided by authors.
Welsh Assembly Government (WAG) 2003a and 2003b	Best Practice Booklets x 2 (carers and patients)	Adults in receipt of care	UK (Wales)	Two information/advice booklets developed for different audiences

Overall AGREE Scores (where 1 = the lowest quality and 7 = the highest quality) are given for guidelines only except for organisations whose guideline development process is accredited by NICE. Guidelines are highlighted

5 Discussion

The aims of this review were to identify best practice in promoting oral health, preventing dental problems and ensuring access to dental care (including regular check-ups) for adults in care homes.

In Review 1, identified interventions included education/guideline introduction for care home staff, the use of electric versus manual toothbrushes, chlorhexidine and xylitol use. The review found inconsistent evidence for education or guideline introduction interventions, with no clear indications as to whether education intensity or specific components had an effect on clinical oral health outcomes. However, there was some evidence that education combined with active monitoring of compliance by care home staff or specific guideline introduction within the home, might be more effective. Education was found to increase staff knowledge in the short term but evidence for long term retention of this knowledge was inconsistent. There was some evidence suggestive of greater utility with powered than with manual toothbrushes but it was unclear whether this led to improvement in outcomes. Finally, there was strong evidence for the use of chlorhexidine as an adjunct to other interventions (such as education or tooth brushing). However, it is associated with side effects and its value compared to alternative treatments such as sodium fluoride or xylitol was unclear.

Six themes have emerged from this review that sit alongside the evidence from Review 1. First, the requirement for appropriate assessment of oral health status at entry to residential care and thereafter on a regular basis. Second, arising out of the assessment, the need for a daily care plan personalised to the individual resident. Third, the use of appropriate products to maintain or improve oral health as required. Fourth, the need for education and training for those delivering care both to establish and to reinforce knowledge. Fifth the need for policy and process to be in place and regularly audited. The impact of a local champion (who may also be the local educator) who will take a lead in ensuring this appears important. Finally, the need for a joined up service that ensures appropriate access to dental care and regular dental check-ups for residents.

Issues around implementation of this best practice appear likely to emerge in Review 3 which examines barriers and facilitators.

Strengths and limitations of this review

This review was built on a comprehensive search strategy. The literature search included a thorough attempt to identify relevant published and unpublished best practice documents.

It was only possible to assess the quality of guidelines, which constituted about half of the included papers. There was significant variation in scoring, with only two high quality evidence-based guidelines identified (Miller et al 2008, SIGN 2010). However, there was

significant unanimity across the evidence identified in what constituted good practice and key themes emerged on the fundamentals that underpin good quality oral care in residential settings. This may in part be due to the impact of pioneering work in this area by the late Associate Professor Jane Chalmers and colleagues and to an overlap in membership between the various groups developing guidelines.

The vast majority of available best practice is relevant to all care home population. There are gudelines specifically targeted toward care of special populations: those with a cognitive impairment (JBI 2004, Gerodontology Assn 2006), stroke survivors (BSG 2010) and dysphagic patients (SIGN 2010). However, there appears to be a general consensus about what is required to maintain good oral health across all populations in residential settings. This is likely to be a result of these special groups forming part of the general population in residential and nursing care. For example education and training guides for care of that general population (Heath et al 2011, McNally et al 2011, Miller et al 2008, NHS Health Scotland 2013, SA Dental Services 2009, Sweeney 2009), all include information about oral conditions found in stroke patients such as xerostomia and dysphagia, along with oral care of people with cognitive impairments and those receiving palliative care.

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Appendix A – Evidence Tables

Document details	Methodology	Target	Content	Notes
First author and year: Andersson 2002 **Document title** Inter-rater reliability of an oral assessment guide for elderly patients residing in a rehabilitation ward **Document type:** Revised Oral Assessment guide **Quality score/NICE accreditation:** [*Guidelines* only] Not applicable	**Developed by:** Andersson et al, -Lecturer and Professors in Nursing, and Health sciences department. **Methodology:** A modification of a previous oral assessment guide developed by Eilers et al. Modifications were based on a literature review and suggestions by an expert panel. A registered nurse and a dental hygienist conducted independent assessment on 66 of 140 participants. 528 assessments were used in the evaluation of oral health status.	**Scope and purpose:** Elderly patients in a rehabilitation unit. To determine the inter-rater reliability of an oral assessment guide. **Country:** Sweden **Setting:** Geriatric rehabilitation ward **Proposed audience:** Nurses and dental hygienists	**Content/key recommendations:** Assessment of oral health Ongoing oral health assessment Oral health assessment tools **Tools for implementation:** Revised Oral Health Assessment Tool (ROAG) **Cost implications:** Not stated	**Limitations (author):** Not stated **Limitations (review team):** Independent assessment conducted on only 66 of the 140 participants. Short training period of 3 hours. **Funding sources:** Department of Health Sciences, Kristimstad University, Council for Medical Health Care Research in Southern Sweden, Kristianstad, and the Kristianstad County Public Health Department **Applicable to UK?** Yes
First author and year: British Society of Gerodontology 2010 **Document title** Guideline for the oral healthcare of stroke survivors	**Developed by:** Working party convened by the British Society of Gerodontology. Group comprised: Tim Friel, Janet Griffiths, Vicky Jones, Mark Taylor and Ilona Johnson	**Scope and purpose:** Oral healthcare for stroke survivors **Country:** UK **Setting:** Stroke care settings	**Content/key recommendations:** Assessment of oral health on entry to care Ongoing oral health assessment Oral health assessment tools Daily oral care Twice daily oral hygiene Individualised daily oral care plan Denture marking/labelling Oral chlorhexidine use	**Limitations (author):** Not stated **Limitations (review team):** Criteria for evidence selection not stated, method of guideline formulation not clearly

Document type: Guideline **Quality score/NICE accreditation:** [*Guidelines* only] AGREE: 4 Use as expert consensus guideline	**Methodology:** Advice, materials and guidelines from various experts in the field of special care dentistry, and gerodontology	**Proposed audience:** Health professionals providing oral care to stroke survivors	Chlorhexidine use with metal dentures Use of lip lubricants Use of saliva substitutes Sugar-free gum use Soft bristle manual toothbrush Powered toothbrush for physical limitations Suction brush in dysphagic residents Care providers – education and training Ongoing education and training Regular audit of oral care Access to dental care as required **Tools for implementation:** Appendices include: Oral management of dependent or dysphagic patients Tips for communicating with individuals with aphasia Basic oral health assessment form Specific oral hygiene protocols (for dentate persons, edentulous persons, care of dentures, management of dry mouth) Routine mouth care Oral care for persons on food supplements and sip feeding Nursing atandards for oral health in continuing care Recommendations to develop local standards for oral health in residential and continuing care. **Cost implications:** Not stated	described, no procedure for update, **Funding sources:** British Society of Gerodontology **Applicable to UK?** Yes
First author and year: Chalmers 2005 **Document title** The Oral Health Assessment Tool – Validity and reliability **Document type:**	**Developed by:** Chalmers et al and experts in the field of geriatric dentistry, dementia care, and residential aged care. This included- dentists, registered nurses, directors of nursing, dental hygienists, and personal care attendants	**Scope and purpose:** To determine the reliability and validity of OHAT when used by carers. **Country:** Australia **Setting:**	**Content/key recommendations:** Assessment of oral health Ongoing oral health assessment Oral health assessment tools **Tools for implementation:** Oral Health Assessment Tool (OHAT) also known as Modified BOHSE **Cost implications:**	**Limitations (author):** Concurrent validity was not established for several categories **Limitations (review team):** Selection bias as convenience sample was obtained from high-

Assessment tool **Quality score/NICE accreditation:** [*Guidelines* only] Not applicable	**Methodology:** Modification of the Kayser-Jones Brief Oral Health Status Examination (BOHSE) by eliminating some categories and adding new ones to create the Oral Health Assessment Tool (OHAT). Intra and inter-carer reliability and concurrent validity of the OHAT was assessed at baseline, 3 months and 6 months, using a convenience sample of 21 residential care facilities. The content validity was determined using systematic review and by expert consensus.	Residential aged care facilities **Proposed audience:** Personal Care Attendants and Registered Nurses.	None identified	ranking facilities. **Funding sources:** National Health and Medical Research Council Strategic Research Development Committee and the Australian Dental Research Foundation. The Australian Research Centre for Population Oral Health, Hunter Health Services and Dental Health Services Victoria. **Applicable to UK?** Yes
First author and year: Dyck 2012 **Document title** Improving Oral Care Practice in Long-Term Care **Document type:** Care protocol **Quality score/NICE accreditation:** [*Guidelines* only] Not applicable	**Developed by:** Dyck D. et al. and an interprofessional team comprising a clinical nurse specialist, oral health promotion specialist, clinical educator, clinical resource nurses, infection control practitioner, clinical dietician and speech-language pathologist **Methodology:** Literature review and quality improvement initiative. Initial	**Scope and purpose:** To develop a formal best practice policy relating to oral health. **Country:** Canada **Setting:** Long-term care facility **Proposed audience:** Long-term care staff	**Content/key recommendations:** Assessment of oral health Ongoing oral health assessment Oral health assessment tools Daily oral care Twice daily oral hygiene Develop and implement oral hygiene care protocol Individualised daily oral care plan Oral hygiene kit available to resident/carer Foam swabs use Soft bristle manual toothbrush Care providers – education and training Oral health champion identified within care setting Access to dental care as required	**Limitations (author):** Not stated **Limitations (review team):** Protocol developed based on a literature review. Policy created based on findings from a single study in one facility. **Funding sources:** Not stated **Applicable to UK?**

	oral health assessment performed on all residents. Based on information from literature and clinical experience, participants provided with kit containing 3 antibacterial gel (cetylpyridinium chloride 0.05% in glycerine) and 3 toothbrushes. A before and after study indicated improvement in residents' oral health status (no data from study provided) and increased staff acceptance, so a policy developed.		**Tools for implementation:** Protocol for oral care, based on twice-daily tooth brushing and antibacterial gel. **Cost implications:** None identified.	Yes

First author and year: Fallon 2006 **Document title** Implementation of oral health recommendations into two residential aged care facilities in a regional Australian city **Document type:** Best practice audit **Quality score/NICE accreditation:** [*Guidelines* only] Not applicable **Programme** Relates to Joanna Briggs 2004 guidance	**Developed by:** The Advisory Board of the Australian Centre for Rural and Remote Evidence-Based Practice (ACRREBP)- comprising representatives from the Toowoomba Health Service District (THSD) and the Centre for Rural and Remote Area Health at the University of Southern Queensland **Methodology:** The oral health implementation project utilised best practice evidence from a systematic review, evidence-based guidelines and an educational program. Research approach was based on quality improvement principles using a Plan-Do-Check-Act (PDCA) Approach.	**Scope and purpose:** The introduction of evidenced-based oral health practice and the identification of barriers and facilitators of implementation in residential care setting **Country:** Australia **Setting:** Residential aged care facilities **Proposed audience:** Nurses and carers of dementia patients	**Content/key recommendations:** Assessment of oral health Ongoing oral health assessment Oral health assessment tools Daily oral care Twice daily oral hygiene Individualised daily oral care plan Denture marking/labelling Care providers – education and training Regular audit of oral care Oral health champion identified within care setting Access to dental care as required Regular dental check-ups **Tools for implementation:** Audit of implementation. **Cost implications:** Noted that high cost of direct observation may hinder use of this method.	**Limitations (author):** No direct quantifiable evidence of improvement in patient processes or outcomes in one of the facilities. Low response rate for post educational questionnaires. Bias introduced due to direct observation of behaviours **Limitations (review team):** Not stated why only 2 facilities were selected for the implementation. **Funding sources:** Not stated **Applicable to UK?** Yes
First author and year: Fiske 2000 (a) [British Society for Disability and Oral Health] **Document title** Guidelines for oral	**Developed by:** BSDH Working Group- comprising experts in special care dentistry. **Methodology:** Not stated	**Scope and purpose:** Improvement of oral health and quality of life for residents in continuing care **Country:** UK	**Content/key recommendations:** Assessment of oral health on entry to care Ongoing oral health assessment Oral health assessment tools Individualised daily oral care plan Oral hygiene kit available to resident/carer Denture marking/labelling Care providers – education and training	**Limitations (author):** Not stated **Limitations (review team):** Methodology not stated, cost implication, barriers and facilitators of its

health care for long-stay patients and residents **Document type:** Guideline **Quality score/NICE accreditation:** [*Guidelines* only] AGREE: 3 Expert guideline, but a number of weaknesses		**Setting:** Long-term care facilities **Proposed audience:** Staff in residential and continuing care	Access to dental care as required Regular dental check-ups **Tools for implementation:** Appendix 2: Example of an oral health assessment form Appendix 3: Nursing standards for oral health in continuing care Appendix 4: Standards for oral health in residential homes for older people Appendix 5: Recommendations to develop local standards for oral health in residential and continuing care **Cost implications:** None stated	implementation not considered. **Funding sources:** Not stated **Applicable to UK?** Yes
First author and year: Guidelines and Audit Implementation Network (GAIN) 2012 **Document title** Guidelines for the Oral Healthcare of Older People Living in Nursing and Residential Homes in Northern Ireland **Document type:** Guideline **Quality score/NICE accreditation:** [*Guidelines* only] AGREE: 5	**Developed by:** GAIN Sub-group, Rathcoole Patient and Client Council, Age Sector Platform NI, and Independent Health and Care Providers NI (IHCP). Sub-group comprised: **Methodology:** Two care facilities visited to gain understanding of care services, questionnaires relating to dental clinicians' time sent to all community dental service clinicians in NI. Dental assessment and referral form developed and piloted. Based on the above findings, expert consensus, and a literature review the guideline was developed.	**Scope and purpose:** Improvement of oral health care of care home residents using a standardised approach. **Country:** Northern Ireland **Setting:** Residential and Nursing homes **Proposed audience:** Care home managers and staff, and quality improvement authorities.	**Content/key recommendations:** Assessment of oral health on entry to care Ongoing oral health assessment Oral health assessment tools Daily oral care Twice daily oral hygiene Develop and implement oral hygiene care protocol Individualised daily oral care plan Denture marking/labelling Refusal of care Oral chlorhexidine use Foam swabs use Care providers – education and training Ongoing education and training Regular audit of oral care Regular audit of oral care Oral health champion identified within care setting Access to dental care as required Regular dental check-ups Collaborative working between care home and dental care professionals	**Limitations (author):** Not stated **Limitations (review team):** Criteria for evidence selection not stated, use of literature review, facilitators and barriers of implementation not provided. **Funding sources:** Not stated **Applicable to UK?** Yes – developed in Northern Ireland

			Tools for implementation: Best Practice Model outlined (incorporating on-admission oral health assessment form, dental referral forms and monthly oral health re-assessment form). Generic training program outlined (incorporating information sheets on tooth brushing and denture cleaning). Includes 'Oral Health Information in Care Plans – Minimum Requirements' form plus sample audit tool (in appendices). **Cost implications:** None stated	
First author and year: Georg 2006 **Document title** Improving the oral health of older adults with dementia/ cognitive impairment living in a residential aged care facility **Document type:** Best practice audit **Quality score/NICE accreditation:** [*Guidelines* only] Not applicable **Programme:** Relates to Joanna Briggs 2004 guidance	**Developed by:** Authors and Stakeholders- consisting of clinical nurses and nurse managers **Methodology:** Audit questions were based on a systematic review of current best practice. Audit was managed using the Joanna Briggs Institute, Practical Application Of Clinical Evidence System (JBI PACES). An audit, feedback, re-audit cycle was followed.	**Scope and purpose:** To improve the oral health of care home residents with dementia **Country:** Australia **Setting:** Residential care **Proposed audience:** Nurses and carers of residents with dementia.	**Content/key recommendations:** Assessment of oral health Ongoing oral health assessment Oral health assessment tools Daily oral care Individualised daily oral care plan Denture marking/labelling Oral chlorhexidine use Care providers – education and training Ongoing education and training Regular audit of oral care **Tools for implementation:** Audit conducted to assess caregiver compliance with best practice. Key criteria for best practice identified: dental screening on admission, ongoing dental assessment, staff training, toothbrush and toothpaste availability, documenting of daily cleaning and removal of dentures, individual labelling of dentures. Results of auditing used to develop strategic plan for change management. **Cost implications:** Not reported.	**Limitations (author):** Compliance was not achieved with four of the audit criteria. **Limitations (review team):** Use of only one residential facility. **Funding sources:** Not stated **Applicable to UK?** yes

First author and year: Gerodontology Association 2005 **Document title** Oral Health in Continuing Care **Document type:** Strategic review and Guideline **Quality score/NICE accreditation:** [*Guidelines* only] AGREE – 3	**Developed by:** The Gerodontology Association **Methodology:** Not stated	**Scope and purpose:** To improve oral health of older people **Country:** UK **Setting:** Residential facilities for the elderly **Proposed audience:** Health care providers and their regulatory bodies.	**Content/key recommendations:** Assessment of oral health on entry to care Ongoing oral health assessment Oral health assessment tools Daily oral care Twice daily oral hygiene Individualised daily oral care plan Oral hygiene kit available to resident/carer Denture marking/labelling Care providers – education and training Access to dental care as required Regular dental check-ups **Tools for implementation:** Appendices include outlines for nursing standards, standards for oral health, recommendations to develop local standards and an oral health risk assessment tool. **Cost implications:** None reported.	**Limitations (author):** Not stated **Limitations (review team):** Methodology not stated **Funding sources:** Commissioned by UK Department of Health **Applicable to UK?** Yes
First author and year: Gerodontology Association 2006 **Document title** Oral health of people with dementia **Document type:** Guideline **Quality score/NICE accreditation:** [*Guidelines* only]	**Developed by:** The Gerodontology Association **Methodology:** Not stated, but made references to different documents and articles.	**Scope and purpose:** To assist in the development of local standards of oral healthcare for people with dementia **Country:** UK **Setting:** Hospitals and residential facilities for older adults **Proposed audience:**	**Content/key recommendations:** Assessment of oral health on entry to care Ongoing oral health assessment Oral health assessment tools Daily oral care Individualised daily oral care plan Denture marking/labelling Refusal of care Soft bristle manual toothbrush Powered toothbrush for physical limitations Care providers – education and training Access to dental care as required Regular dental check-ups	**Limitations (author):** Not stated **Limitations (review team):** Methodology not stated **Funding sources:** Not stated **Applicable to UK?** Yes

AGREE – 3		Dental team and carers of older adults.	**Tools for implementation:** Appendices include: Oral Health Risk assessment (OHRA), Joint Assessment Nursing Education Tool (JANET), Principles of Treatment flow diagram, instructions for assisting the individual with tooth brushing, a guide to denture marking and a checklist for use in commissioning oral health care for older people. **Cost implications:** Noted as a factor that may determine oral health treatment site.	
First author and year: Gil-Montoya 2005 **Document title** Oral Health Protocol for the Dependent Institutionalized Elderly **Document type:** Protocol **Quality score/NICE accreditation:** [*Guidelines* only] Not applicable	**Developed by:** Authors who were all dentists, and hospital medical and nursing staff. **Methodology:** Protocol was developed based on the results of a preliminary assessment of the oral health needs of residents. The draft guideline was based on information obtained from staff questionnaire and examination of residents' oral health. A meeting was held with hospital's medical and nursing staff to unify the guideline criteria and to ensure adherence and cooperation for successful implementation.	**Scope and purpose:** Development of an oral care protocol for long stay residents in hospitals. **Country:** Granada, Spain **Setting:** Long-stay unit of an acute care hospital **Proposed audience:** Health caregivers	**Content/key recommendations:** Assessment of oral health Ongoing oral health assessment Oral health assessment tools Daily oral care Develop and implement oral hygiene care protocol Individualised daily oral care plan Oral chlorhexidine use Use of lip lubricants Use of saliva substitutes Sugar-free gum use Powered toothbrush Suction brush in dysphagic residents Care providers – education and training Regular audit of oral care Access to dental care as required **Tools for implementation:** Protocol, developed to systemise care. Included regular examination and daily cleaning of teeth or dentures. **Cost implications:** Paper emphasises that regular implementation of simple and inexpensive procedures can reduce high-cost outcomes associated with poor oral care	**Limitations (author):** Study success was based on staff cooperation and attitude. Disparity in oral health practices reported by staff in questionnaire and residents' oral hygiene. **Limitations (review team):** Use of one hospital to develop protocol which may not be applicable to other residential care settings **Funding sources:** Not stated **Applicable to UK?** yes

First author and year: Heath 2011 **Document title** Promoting older people's oral health **Document type:** Guideline **Quality score/NICE accreditation:** [*Guidelines* only] AGREE 3	**Developed by:** Heath H, Sturdy D. and members of BSG Oral Health Promotion Working Group- comprising experts in special care dentistry and oral health improvement for the Royal College of Nursing **Methodology:** Not stated	**Scope and purpose:** To support nurses and care staff in delivering oral care, promoting and maintaining oral health of older people. **Country:** UK **Setting:** Any older people care setting **Proposed audience:** Nurses and care staff	**Content/key recommendations:** Assessment of oral health on entry to care Ongoing oral health assessment Oral health assessment tools Daily oral care Twice daily oral hygiene Individualised daily oral care plan Oral hygiene kit available to resident/carer Denture marking/labelling Refusal of care Oral chlorhexidine use Chlorhexidine use with metal dentures Use of lip lubricants Use of saliva substitutes Care providers – education and training Ongoing education and training Education and training materials for health professionals Access to dental care as required Regular dental check-ups **Tools for implementation:** Includes information on oral health care standards (assessment on admission, oral hygiene equipment), an Oral Health Risk Assessment Tool, an example of good practice for assisting with tooth-brushing and information on caring for patients with xerostomnia, patients on oral nutrition supplementation and dyspahigic/PEG/NG fed. **Cost implications:** Noted that improvements in care will have cost implications, but less costly than care of oral/systemic diseases that occur as a consequence of poor oral health (Haumschild and Haumschild 2009).	**Limitations (author):** Not stated **Limitations (review team):** Methodology not stated, no external review by experts, procedure for updating the guideline not stated, no monitoring criteria provided. **Funding sources:** Department of Health **Applicable to UK?** Yes – UK guideline
First author and year: Johnson 2011 **Document title**	**Developed by:** University of Iowa College of Nursing group, this comprised experts in oral	**Scope and purpose:** Provision of practical information for healthcare providers and caregivers of	**Content/key recommendations:** Assessment of oral health on entry to care Ongoing oral health assessment Oral health assessment tools	**Limitations (author):** Not stated **Limitations (review**

Oral hygiene care for functionally dependent and cognitively impaired older adults **Document type:** Guideline. **Quality score/NICE accreditation:** [*Guidelines* only] AGREE 5	health. **Methodology:** Literature review and expert consensus. A literature search for identification of relevant documents was conducted; documents were assessed for quality and strength of their evidence by an expert consensus. The research Translation and dissemination core selected experts in subject of the proposed guideline; they examined the available research and wrote the guideline. Guideline was validated using external peer review.	functionally dependent and cognitively impaired older adults **Country:** Iowa, USA **Setting:** Care homes **Proposed audience:** Health care providers and caregivers of functionally dependent and cognitively impaired older adults	Daily oral care Develop and implement oral hygiene care protocol Individualised daily oral care plan Oral hygiene kit available to resident/carer Denture marking/labelling Refusal of care Oral chlorhexidine use Use of lemon and glycerine swabs Use of lip lubricants Use of saliva substitutes Sugar-free gum use Care providers – education and training Ongoing education and training Regular audit of oral care Access to dental care as required **Tools for implementation:** Intervention includes guidance on identification of factors that increase risk, an appropriate Oral Health Assessment Tool (modified BOHSE), an Assessment of Current Oral Hygiene tool, guidance om the development of Oral Hygiene Care Plans (OHCP), a description of practices for preventing oral disease. **Cost implications:** A formal cost analysis was not performed and published cost analyses were not reviewed.	**team):** Facilitators and barriers to application not stated, not stated if views of target population was sort, no cost analysis. **Funding sources:** Grant #P30 NR03979, National Institute of Nursing Research **Applicable to UK?** yes
First author and year: Kayser-Jones J. 1995 **Document title** An Instrument To Assess the Oral Health Status of Nursing Home Residents	**Developed by:** Experts in Nursing, dentistry and statistics **Methodology:** Brief Oral Health Status Examination (BOHSE) developed based on lit	**Scope and purpose:** Development and testing of an oral health assessment tool which can be administered by nursing staff to residents of Nursing homes **Country:**	**Content/key recommendations:** Assessment of oral health Ongoing oral health assessment Oral health assessment tools **Tools for implementation:** (Brief Oral Health Status Examination) BOHSE tool developed	**Limitations (author):** Limited training provided to nursing personnel, only one nursing home used and small sample size. **Limitations (review team):** Small sample size.

Document type: Assessment tool **Quality score/NICE accreditation:** [*Guidelines* only] Not applicable	review of oral assessment guides and expert consensus- using recommendations from American Dental Association and consultation with University of California dental school faculty. Validated using six faculty in UC School of Dentistry. Inter-rater reliability between dentists and nursing staff and between nursing staff). Nursing personnel received training before testing.	USA **Setting:** Nursing homes **Proposed audience:** Nursing personnel in care homes	**Cost implications:** None reported	**Funding sources:** American senate grant **Applicable to UK?** yes
First author and year: Lewis 2009 (Update of Fiske & Lewis 2000) [British Society for Disability and Oral Health] **Document title** Guidelines for the delivery of a Domiciliary Oral Health Care Service **Document type:** Guideline **Quality score/NICE accreditation:** [*Guidelines* only] AGREE: 3 Weak expert guideline	**Developed by:** BSDH Working Group- comprising experts in special care dentistry using a previous publication by the All of Wales Special Interest Group- Special Oral Health Care **Methodology:** Not stated	**Scope and purpose:** To alert healthcare providers to the need for Domiciliary Oral Healthcare Services (DOHCS), and to provide guidance for the commissioning and establishment of high quality DOHCS **Country:** UK **Setting:** Any residential unit with disabled residents **Proposed audience:** Primary care trusts and service providers	**Content/key recommendations:** Assessment of oral health on entry to care Oral health assessment tools Daily oral care Individualised daily oral care plan Care providers – education and training Access to dental care as required **Tools for implementation:** Includes guidance on environmental risk assessment, a decision making process flowchart, domiciliary care pathway, assessment of capacity checklist, and an example of good practice. **Cost implications:** Cost factors noted (domiciliary vs surgery-based care)	**Limitations (author):** Not stated **Limitations (review team):** Methodology not stated, Not stated if views of target population was sought. **Funding sources:** Not stated **Applicable to UK?** yes

First author and year: McNally 2011 McNally 2012a McNally 2012b **Document title** Action Planning for Daily Mouth Care in Long-Term Care: The Brushing Up on Mouth Care Project **Document type:** Resource Guide (McNally 2011) Research Report (McNally 2012a) Research paper – case study (McNally 2012b) **Quality score/NICE accreditation:** [*Guidelines* only] Not applicable **Programme:** Brushing up on Mouth Care Project	**Developed by:** Research team, Health Service Managers and Nurse Managers and Stakeholders. Stakeholders comprised dental professionals, educators and government representatives. Research team comprised experts in dentistry, dental hygiene, geriatric medicine, health promotion and nursing. **Methodology:** Case study was conducted using a program planning cycle (assessment, planning, implementation and evaluation of actions). Assessment undertaken using document reviews, one-on-one interviews and focus groups. Aim: to explore factors influencing oral care provision and oral disease prevention. Action planning workshop also conducted to design actions that would integrate oral care into organisational policy and personal care practices. Resource guide development	**Scope and purpose:** To promote better mouth care in dependent older adults in long-term care homes by informing policies and programs, and to improve staff training and institutional care planning through development of strategies. **Country:** Nova Scotia, Canada **Setting:** Long-term care facilities **Proposed audience:** Caregivers	**Content/key recommendations:** Assessment of oral health Ongoing oral health assessment Oral health assessment tools Daily oral care Develop and implement oral hygiene care protocol Individualised daily oral care plan Oral hygiene kit available to resident/carer Denture marking/labelling Refusal of care Oral chlorhexidine use Foam swabs use Use of lemon and glycerine swabs Use of lip lubricants Use of saliva substitutes Sugar-free gum use Soft bristle manual toothbrush Powered toothbrush for physical limitations Suction brush in dysphagic residents Care providers – education and training Ongoing education and training Education and training for carers Oral health champion identified within care setting Access to dental care as required **Tools for implementation:** Resource guide includes example tool kits (oral care equipment) and daily mouth-care cards, daily and annual assessment forms (modelled around OHAT), oral hygiene care plans, information sheets (common oral conditions, dehydration, dementia, caries and diet, denture care, dry mouth, gingivitis, denture labelling, oral cancer, oral swabs, palliative care, periodontal disease, taste and swallowing disorders), information on oral health products and aids (toothbrushes, mouths rinses, floss, dry mouth products, cold and canker sore products), educational videos.	**Limitations (author):** Not stated **Limitations (review team):** Method of study site selection not stated, **Funding sources:** Nova Scotia Health Research Foundation **Applicable to UK?** Yes

			Cost implications: None reported	
First author and year: Miller 2008 **Document title** Oral Health: Nursing Assessment and Interventions **Document type:** Best practice guideline **Quality score/NICE accreditation:** [*Guidelines* only] AGREE 7	**Developed by:** Panel members which comprised experts in the field of Nursing, speech-language pathology, hygiene, geriatric and special needs dentistry, **Methodology:** Literature search, identification of relevant papers using predefined inclusion criteria, critical appraisal of documents using AGREE II. Review of first draft by panel through discussions and consensus meeting. External stakeholders reviewed draft and fed back. Feedback compiled and reviewed by panel through discussion and consensus. This resulted in revisions to first draft and then publication of recommendations.	**Scope and purpose:** To provide nurses with evidence-based recommendations that will support their provision of oral hygiene care to special needs adult. **Country:** Canada **Setting:** Long-term care **Proposed audience:** Nurses	**Content/key recommendations:** Assessment of oral health on entry to care Ongoing oral health assessment Oral health assessment tools Daily oral care Twice daily oral hygiene Develop and implement oral hygiene care protocol Individualised daily oral care plan Denture marking/labelling Refusal of care Oral chlorhexidine use Foam swabs use Use of lemon and glycerine swabs Use of lip lubricants Use of saliva substitutes Sugar-free gum use Soft bristle manual toothbrush Powered toothbrush for physical limitations Suction brush in dysphagic residents Care providers – education and training Ongoing education and training Education and training materials for health professionals Access to dental care as required Regular dental check-ups Collaborative working between care home and dental care professionals **Tools for implementation:** List of implementation strategies identified. Appoint dedicated individual as best practice champion; conduct organisational needs assessment; establish steering committee; design educational sessions and ongoing support for implementation; ensure access to specialised equipment and treatment materials, adopt an	**Limitations (author):** Not stated **Limitations (review team):** No consideration of cost implications of guideline implementation. **Funding sources:** Government of Ontario **Applicable to UK?** Yes

			interdisciplinary approach. **Cost implications:** None reported. Cost analysis for impact of oral care recommended as priority area for future research.	
First author and year: NHS Health Scotland 2013 Welsh 2012 **Document title:** Caring for Smiles Guide for Care Homes (87pp) **Document type:** Best practice advice for care homes **Quality score/NICE accreditation:** *[Guidelines only]* Not applicable **Programme:** Caring for Smiles	**Developed by:** National Older People's Oral Health Improvement Group in Conjunction with the Care Inspectorate for NHS Scotland. Group comprised: dental public health consultants, clinical dental directors, senior dental officers, and oral health promotion staff from all 14 Scottish geographical health boards; academic staff from University of Glasgow Dental School; associate Chief Dental Officer Scotland and a representative of NHS Health Scotland. (Welsh 2012) **Methodology:** Described as 'an evidence-based' educational resource, but no information provided on methodology. (Welsh 2012) **Links to QI Scotland 2005 and Scottish Government 2012**	**Scope and purpose:** Care of older people in residential care **Country:** Scotland **Setting:** Residential homes **Proposed audience:** Care home managers and staff	**Content/key recommendations:** Assessment of oral health on entry to care Ongoing oral health assessment Oral health assessment tools Daily oral care Twice daily oral hygiene Individualised daily oral care plan Denture marking/labelling Refusal of care Oral chlorhexidine use Chlorhexidine use with metal dentures Foam swabs use Use of lip lubricants Use of saliva substitutes Soft bristle manual toothbrush Powered toothbrush for physical limitations Care providers – education and training Education and training materials for carers Oral health champion identified within care setting Access to dental care as required Regular dental check-ups **Tools for implementation:** Information and training on: procedure for oral care (dentures, natural teeth, soft tissues); risk assessments, care plans and recording daily oral care. Also includes sample documentation (Oral Health Risk Assessment, Oral Care Plan, Daily Oral Care) **Cost implications:** None stated	**Limitations (author):** None stated **Limitations (review team):** No information provided on how this resource was developed **Funding sources:** NHS Scotland **Applicable to UK?** Yes – designed for use in Scotland

First author and year: O'Connor L. 2012 **Document title** Providing oral health care to older adults. In: Evidence-based geriatric nursing protocols for best practice. **Document type:** Guideline **Quality score/NICE accreditation:** [*Guidelines* only] AGREE 5	**Developed by:** Hartford Institute for Geriatric Nursing- Academic Institution- comprising nursing experts **Methodology:** Development of a search strategy to retrieve relevant documents, quality assessment of documents according to a rating scheme, analysis of the evidence using a systematic review and review of published Meta-analyses. Formulation of recommendations using expert consensus. Guideline was validated using internal and external peer review.	**Scope and purpose:** To promote oral health in care homes. **Country:** New York, USA **Setting:** Any facility with older adults **Proposed audience:** Health care providers	**Content/key recommendations:** Assessment of oral health on entry to care Ongoing oral health assessment Oral health assessment tools Daily oral care Twice daily oral hygiene Individualised daily oral care plan Denture marking/labelling Soft bristle manual toothbrush Care providers – education and training Access to dental care as required Regular dental check-ups Collaborative working between care home and dental care professionals **Tools for implementation:** Recommended that RN conducts assessment on admission and every shift (OHAT), sample nursing care strategies provided. **Cost implications:** A formal cost analysis was not performed and published cost analyses were not reviewed.	**Limitations (author):** Not stated **Limitations (review team):** Not stated if views of target population was sort, no cost analysis. **Funding sources:** Hartford Institute for Geriatric Nursing **Applicable to UK?** yes
First author and year: QI Scotland 2005 **Document title** Working with Dependent Older People to achieve Good Oral Health **Document type:** Guideline/Best practice statement	**Developed by:** NHS QIS, Gerontological Nursing Demonstration Project research team, Scottish Gerontological Nursing Community of Practice and staff of Middleton Hall, Glasgow, Ashbourne Healthcare, and Ward 19, Glasgow Royal Infirmary, NHS Greater Glasgow.	**Scope and purpose:** To provide an evidence-based nursing guideline for oral healthcare. **Country:** Scotland **Setting:** Residential units **Proposed audience:** Nursing and care staff	**Content/key recommendations:** Assessment of oral health on entry to care Ongoing oral health assessment Oral health assessment tools Daily oral care Twice daily oral hygiene Develop and implement oral hygiene care protocol Individualised daily oral care plan Denture marking/labelling Oral chlorhexidine use Chlorhexidine use with metal dentures Use of lip lubricants Use of saliva substitutes	**Limitations (author):** Not stated **Limitations (review team):** Criteria for evidence selection and resource implication not stated, **Funding sources:** Not stated

Quality score/NICE accreditation: [*Guidelines* only] AGREE - 5 **Programme:** The Gerontological Nursing Demonstration Project	**Methodology:** Identification of various evidence relating to the topic. Draft of best practice statement made and piloted at a demonstration site with the use of audit, revision of draft based on the audit and external consultation. **Links to Scottish Government 2005 and NHS Health Scotland 2013**		Regular audit of oral care Access to dental care as required Collaborative working between care home and dental care professionals **Tools for implementation:** Includes Best Practice Statement: Working with dependent older people to achieve good oral health. Appendices include: Evidence-based protocol for daily oral care. **Cost implications:** None reported	**Applicable to UK?** yes
First author and year: Rivett 2006 **Document title** Compliance with best practice in oral health: implementing evidence in residential aged care **Document type:** Audit **Quality score/NICE accreditation:** [*Guidelines* only] Not applicable **Programme:** Relates to Joanna Briggs 2004 guidance	**Developed by:** Author - Clinical Nurse consultant and other organisational departments but members not mentioned **Methodology:** Audit and feedback method. Audit criteria identified from a systematic review. Audit carried out and analysed using Practical Application of Clinical Evidence System (PACES). Audit results were reviewed and a Getting Research Into Practice (GRIP) implementation strategy was developed. A follow-up audit was done to determine the effectiveness of GRIP, and results were analysed using PACES program.	**Scope and purpose:** To improve clinical practice of oral hygiene and review processes associated with its implementation. **Country:** Australia **Setting:** Aged care facilities **Proposed audience:** Care home staff and managers	**Content/key recommendations:** Assessment of oral health Ongoing oral health assessment Oral health assessment tools Individualised daily oral care plan Denture marking/labelling Care providers – education and training Ongoing education and training Regular audit of oral care Oral health champion identified within care setting **Tools for implementation:** Audit and feedback process (GRIP – Getting Research Into Practice) implemented in order to develop Evidence-based Best Practice recommendations. **Cost implications:** None reported	**Limitations (author):** Limited implementation time. **Limitations (review team):** Facilities selected based on location. Staff changes at 2 of the sites could have affected results. **Funding sources:** Not stated **Applicable to UK?** yes

First author and year: SA Dental Service 2009 **Document title** Better Oral Health in Residential Care 1.Professional Portfolio 2.Staff Portfolio 3.Facilitator Portfolio **Document type:** Range of toolkits for training **Quality score/NICE accreditation:** [*Guidelines* only] Not applicable **Programme:** Better Oral Health in Residential Care Project	**Developed by:** SA Dental Service and Consortium members **Methodology:** The oral health assessment toolkit was a modification of the Oral Health Assessment Toolkit for Older People for General Practitioners (2005). This was also a modification of Kayser-Jones, Bird, Paul, Long and Schell (1995) and Chalmers (2004). Method of guideline development not stated	**Scope and purpose:** To assist care providers in oral health assessment and care planning **Country:** Australia **Setting:** Residential aged care facilities **Proposed audience:** General Practitioners, Registered Nurses, care workers, and training and educational facilitators	**Content/key recommendations:** Assessment of oral health Ongoing oral health assessment Oral health assessment tools Daily oral care Twice daily oral hygiene Develop and implement oral hygiene care protocol Individualised daily oral care plan Denture marking/labelling Refusal of care Oral chlorhexidine use Chlorhexidine use with metal dentures Foam swabs use Use of lemon and glycerine swabs Use of lip lubricants Use of saliva substitutes Sugar-free gum use Soft bristle manual toothbrush Powered toothbrush for physical limitations Care providers – education and training Education and training materials for carers and health professionals Access to dental care as required Regular dental check-ups **Tools for implementation:** Professional protocol document includes Oral Health Assessment Toolkit for Older People, Oral Health Care Planning and Dental Referral Protocol. Facilitator and staff portfolio documents include Education and Training programs. **Cost implications:** None stated	**Limitations (author):** Not stated **Limitations (review team):** Method for guideline development not stated **Funding sources:** Australian Government **Applicable to UK?** Yes
First author and year: Scottish Government	**Developed by:** National Older People's Oral	**Scope and purpose:** To improve oral health of	**Content/key recommendations:** Assessment of oral health	**Limitations (author):** Not stated

2012 **Document title** National oral health improvement strategy for priority groups: frail older people, people with special care needs and those who are homeless **Document type:** Strategy document **Quality score/NICE accreditation:** [*Guidelines* only] Not applicable **Programme:** Smiles, using the National Oral Health Improvement Strategy for Priority Groups	Health Improvement Group, National Homeless Oral Health Improvement Group, Organisations and individuals. **Methodology:** Stated that the recommendations on preventive care are evidence-based, but methodology not provided.	priority groups. **Country:** Scotland **Setting:** Care homes **Proposed audience:** Care home staff and managers	Ongoing oral health assessment Oral health assessment tools Daily oral care Twice daily oral hygiene Develop and implement oral hygiene care protocol Individualised daily oral care plan Denture marking/labelling Flouride varnish Care providers – education and training Ongoing education and training Oral health champion identified within care setting Access to dental care as required Regular dental check-ups **Tools for implementation:** Recommendations: • Assessment of Need • Evidence-based Prevention • Accessible Information • Staff Training • The Right Services **Links to QI Scotland 2005 and NHS Health Scotland 2013** **Cost implications:** None reported	**Limitations (review team):** Method not stated **Funding sources:** Not stated **Applicable to UK?** Yes
First author and year: Scottish Intercollegiate Guidelines Network (SIGN) 2010 **Document title** Management of patients with stroke: identification and management of	**Developed by:** Guideline development group-comprised: speech and language therapists, Nurse, GP, Information officer, Radiologist, Stroke coordinator, Gastroenterologist, Lecturer, Programme managers in SIGN, Dieticians, Consultant	**Scope and purpose:** Management of patients with stroke: identification and management of dysphagia **Country:** Scotland **Setting:** Any facility with stroke	**Content/key recommendations:** Assessment of oral health on entry to care Use of oral health assessment tools Daily oral care Twice daily oral hygiene Individualised daily oral care plan Denture marking/labelling Use of lip lubricants Care providers – education and training Regular audit of oral care	**Limitations (author):** Not stated **Limitations (review team):** **Funding sources:** Scottish Executive Health Department

dysphagia **Document type:** Guideline **Quality score/NICE accreditation:** [*Guidelines* only] Guideline development process is NICE accredited	Physician, Physiotherapist, Consultant in Geriatric Medicine and Pharmacist. **Methodology:** Update of a previous version SIGN 78. Based on systematic review and expert consensus. Guideline validated by internal and external peer review- using national open meeting, Specialist review and SIGN editorial group.	patients **Proposed audience:** Health care providers	Access to dental care as required **Tools for implementation:** Annex includes Oral Care Protocol (Griffiths and Lewis) for patients with dysphagia. Additional recommendations made: swallow screening for patients with stroke to include observations of oral hygiene. Staff to be trained in good oral care. **Cost implications:** None reported	**Applicable to UK?** Yes
First author and year: Sweeney 2009 **Document title** Development and evaluation of a multimedia resource pack for oral health training of medical and nursing staff **Document type:** Multimedia training pack **Quality score/NICE accreditation:** [*Guidelines* only] Not applicable	**Developed by:** Project team comprising: lecturer, Dental surgeons, dental hygienist, TV producer, and creative director. **Methodology:** 2 Dental surgeons and a dental hygienist wrote the script for the videotape. Poster supplied by Pfizer Ltd. Other than evaluation Specific development method for other components (CD-ROM, booklet) not stated. Scottish Council for Research in Education evaluated pack via questionnaire and telephone interview.	**Scope and purpose:** The development of a multimedia resource pack for the training of non-dentally qualified healthcare workers. **Country:** Scotland **Setting:** Long-term care facilities **Proposed audience:** Health care workers	**Content/key recommendations:** Daily oral care Individualised daily oral care plan Denture marking/labelling Oral chlorhexidine use Chlorhexidine use with metal dentures Use of lip lubricants Education and training materials Use of saliva substitutes Soft bristle manual toothbrush Care providers – education and training Ongoing education and training Training materials for health professionals **Tools for implementation:** DVD and booklet **Cost implications:** None stated	**Limitations (author):** Not stated **Limitations (review team):** Methodology not clear. Long-term effect of the pack not evaluated. **Funding sources:** Grant RDC/961/A from the Scottish Office Oral Health Strategy Fund **Applicable to UK?** Yes

First author and year: Welsh Assembly Government (WAG) 2003 **Document title** Fundamentals of Care Guidelines for Health and Social Care Staff **Document type:** Guidance. (Also available as a booklet) **Quality score/NICE accreditation:** [*Guidelines* only] Not applicable	**Developed by:** WAG Steering group. Group comprised employees of the WAG, Researchers, Members of Wales Racial Equality Council, Welsh Community Health Council, Care Forum Wales, Campaign for care, Council for voluntary action, and Patients Association, Nurse Executives, Directors of Social Services, Independent Medical Advisors, Independent Healthcare Sector, and Chair All Wales Special Interest Group. **Methodology:** Indicators were drawn from national policies and statutory, mandatory and professional requirements. These include: National Service Framework, National Minimum Standards, National Institute of Clinical Excellence documents. Occupational Standards and Professional Codes of Conduct. There was also use of literature review and expert consensus.	**Scope and purpose:** To improve quality of care of adults **Country:** UK **Setting:** **Proposed audience:** Carers, health, and social care providers.	**Content/key recommendations:** Assessment of oral health Ongoing oral health assessment Oral health assessment tools Daily oral care Individualised daily oral care plan Denture marking/labelling Refusal of care Regular audit of oral care Access to dental care as required Regular dental check-ups **Tools for implementation:** Two guides with key information for carers and care for respectively. Carer guide includes Practice Indicators: assessment and care planning, provision of oral care equipment, denture labelling, appropriate referrals made) Practical examples also provided. **Cost implications:** None stated	**Limitations (author):** Not stated. **Limitations (review team):** Specific steps involved in the development of guideline not stated **Funding sources:** Not stated **Applicable to UK?** Yes

Appendix B Quality Summary for Guidelines

Domain 1. Scope and purpose, Domain 2. Stakeholder involvement, Domain 3. Rigour of development, Domain 4. Clarity of presentation, Domain 5. Applicability, Domain 6. Editorial independence. Overall guideline assessment: 1 (Lowest possible quality) – 7 (Highest possible quality)

Guideline and year	Domain 1 (%)	Domain 2 (%)	Domain 3 (%)	Domain 4 (%)	Domain 5 (%)	Domain 6 (%)	Overall guideline assessment
BSG 2010	94	44	10	86	21	8	4
Fiske & Lewis 2000 (British Society for Disability & Oral Health)	89	39	15	78	17	8	3. Lots of weaknesses
GAIN 2012	72	94	40	89	50	0	5
Gerodontology Association 2005	83	89	13	89	48	25	3
Gerodontology Association 2006	100	33	17	72	46	0	3. As an expert consensus guideline
Heath 2011	89	67	14	86	17	25	3. This is an expert consensus guideline, derived from other guidance. However, well written and accessible as an introduction for nurses/carers and useful set of tools.
Joanna Briggs Institute 2004	98	64	67	100	17	8	5. Mainly since out of date but note that this evidence-based guidance drawing on a systematic review (Pearson & Chalmers, 2004)
Johnson 2011	94	50	75	94	25	8	5

Lewis & Fiske 2009 (British Society for Disability & Oral Health)	78	44	14	94	67	0	3. Weak expert guideline
Miller et al 2008	100	100	94	100	88	100	7.
QI Scotland 2005	72	94	69	100	58	8	5
SIGN 2010. NICE accredited process							Process for generating guideline is NICE-accredited

Appendix C – Review Team

Project Director	Dr Alison Weightman
Systematic Reviewers	Weyinmi Agnes Demeyin Mala Mann Fiona Morgan Dr Alison Weightman
Information Specialist	Mala Mann
Topic expertise	Professor Ivor Chestnutt Dr Damian Farnell Dr Ilona Johnson Fiona Morgan
Statistical analysis	Dr Damian Farnell
Presentation	Dr Alison Weightman Professor Ivor Chestnutt Fiona Morgan Dr Ilona Johnson

Appendix D – Search Strategy (Medline)

The search comprises two groups of terms with a mix of indexed terms and keywords. The first group of terms is designed to identify care home residents. This includes a failsafe component (lines 17 to 22) to ensure studies in adults with disabilities are identified. The second group relates to oral health. The strategy was designed to enhance specificity, but testing against a core set of 50 potentially relevant papers indicates that the strategy is well balanced for sensitivity (all papers included in Medline were identified by the search).

	Searches	Results
1	exp nursing homes/	32415
2	Residential Facilities/	4748
3	Homes for the Aged/	11296
4	Assisted Living Facilities/	943
5	Long-Term Care/	22022
6	nursing home*1.tw.	21267
7	care home*1.tw.	1771
8	((elderly or old age) adj2 home*1).tw.	1614
9	assisted living facilit*.tw.	452
10	((nursing or residential) adj (home*1 or facilit*)).tw.	24158
11	(home*1 for the aged or home*1 for the elderly or home*1 for older adult*).tw.	2247
12	residential aged care.tw.	362
13	("frail elderly" adj2 (facilit* or home or homes)).tw.	52
14	(residential adj (care or facilit* or setting*)).tw.	3107
15	or/1-14	69174
16	Disabled Persons/	32526
17	Vulnerable Populations/	6120
18	Intellectual Disability/	47834
19	Learning Disorders/	12832
20	Mentally Disabled Persons/	2344
21	((physical* or learning or mental* or intellectual*) adj (disorder* or disab* or impair*)).tw.	45798
22	or/16-21	130980
23	(residential or home*1 or facilit*).tw.	543808
24	22 and 23	8763
25	15 or 24	75868
26	Preventive dentistry/	3096

27	Oral Hygiene/	10553
28	Dental Care/	15591
29	Toothbrushing/	6206
30	Mouthwashes/	4447
31	Health Education, Dental/	5816
32	Oral health/	10546
33	Dental Care for Chronically Ill/	2708
34	Dental Care for Aged/	1734
35	Geriatric Dentistry/	982
36	Dental Care for Disabled/	3986
37	((access* or availab*) adj2 dentist*).tw.	185
38	((dental health or oral health) adj3 (care or promotion or training)).tw.	3590
39	((oral or dental or mouth or teeth or tooth or gum or periodontal) adj (care or hygiene or health)).tw.	35651
40	(mouthwash* or mouth-wash* or mouth-rins* or mouthrins* or oral rins* or oralrins* or toothpaste* or tooth paste* or dentifrice* or toothbrush* or tooth brush* or fissure sealant* or floss*).tw.	13228
41	exp Dentifrices/	5699
42	(fluorid* adj2 (varnish* or topical or milk)).tw.	1441
43	Fluorides, Topical/	3947
44	Mouth Diseases/pc	899
45	Periodontal diseases/pc	2561
46	Mouth neoplasms/pc	1145
47	Xerostomia/pc	358
48	(dental adj (crown* or implant* or bridge* or denture* or inlay*)).tw.	8345
49	or/26-48	87974
50	(oral disease* or oral neoplasm* or oral cancer* or dental disease* or mouth disease* or dental decay or mouth neoplasm* or mouth cancer* or gum disease* or DMF or caries or gingivitis or periodontal disease* or periodontitis or dental plaque or oral plaque or dry mouth or xerostomia).tw.	84386
51	((tooth or teeth) adj2 (decay* or loss)).tw.	4675
52	(prevent* or control* or reduc*).tw.	4582217
53	50 or 51	86866
54	52 and 53	32141
55	49 or 54	108782
56	25 and 55	1264
57	limit 56 to (english language and humans and yr="1995 - 2014")	742

Appendix E – Included papers

1. Andersson, P., Hallberg, I.R., & Renvert, S. 2002. Inter-rater reliability of an oral assessment guide for elderly patients residing in a rehabilitation ward. *Special Care in Dentistry*, 22, (5) 181-186
2. British Society for Gerodontology 2010. Guidelines for the oral healthcare of stroke survivors.
3. Chalmers, J.M., King, P.L., Spencer, A.J., Wright, F.A.C., & Carter, K.D. 2005. The oral health assessment tool--validity and reliability. *Australian Dental Journal*, 50, (3) 191-199
4. Dickinson, H., Watkins, C. & Leathley, M. (2001). The development of the THROAT: The holistic and reliable oral assessment tool. Clinical Effectiveness in Nursing. 5, 106-110.
5. Dyck, D., Bertone, M., Knutson, K., & Campbell, A. 2012. Improving oral care practice in long-term care. Canadian Nurse, 108, (9) 20-24
6. Fallon, T., Buikstra, E., Cameron, M., Hegney, D., Mackenzie, D., March, J., Moloney, C., & Pitt, J. 2006. Implementation of oral health recommendations into two residential aged care facilities in a regional Australian city. *International Journal of Evidence-Based Healthcare*, 4, (3) 162-179
7. Fiske, J., Griffiths, J., Jamieson, R., Manger, D., & British Society for Disability and Oral Health Working Group. 2000. Guidelines for oral health care for long-stay patients and residents. *Gerodontology*, 17, (1) 55-64 [2000a]
8. Fiske, J. & Lewis.D. 2000. The development of standards for domiciliary dental care services: guidelines and recommendations. *Gerodontology* 17[2], 119-122. 2000. [2000b]
9. GAIN (Guidelines and Audit Implementation Unit). 2012. *Guidelines for the oral healthcare of older people living in nursing and residential homes in Northern Ireland*.
10. Georg, D. 2006. Improving the oral health of older adults with dementia/cognitive impairment living in a residential aged care facility. *International Journal of Evidence-Based Healthcare*, 4, (1) 54-61
11. Gerodontology Association 2005. Oral Health in Continuing Care. *Gerodontology*, 22, 37-39
12. Gerodontology Association 2006. Oral health of people with dementia. *Gerodontology*, 23, 3-32
13. Gil-Montoya, J.A., de Mello, A.L., Cardenas, C.B., & Lopez, I.G. 2005. Oral health protocol for the dependent institutionalized elderly. *Geriatric Nursing*, 95, (2) 95-101
14. Heath, H., Sturdy.D, Edwards, T., Griffiths, J., Hylton, B., Jones, V., & Lewis, D.A. 2011. *Promoting older people's oral health.* Harrow, RCN Publishing Company.
15. Joanna Briggs Institute. 2004. Oral hygiene care for adults with dementia in residential aged care facilities. 8 (4) 1-6. Adelaide: Joanna Briggs Institute.
16. Johnson,V.B. & Chalmers, J. 2011. Oral hygiene care for functionally dependent and cognitively impaired older adults. Iowa City (IA): University of Iowa College of Nursing, John A. Hartford Foundation Center of Geriatric Nursing Excellence. Available at: http://www.guideline.gov/content.aspx?id=34447. Accessed 13 January 2015
17. Kayser-Jones, J., Bird, W.F., Paul, S.M., Long, L., & Schell, E.S. 1995. An instrument to assess the oral health status of nursing home residents. *Gerontologist*, 35, (6) 814-824
18. Lewis,D. & Fiske,J. 2009. Guidelines for the delivery of a domiciliary oral health care service. *Journal of Disability & Oral Health*, 7, (3) 166-172

19. McNally,M., Matthews,D., Clovis,J. et al. 2011. Brushing up on Mouth Care: An oral health resource for those who provide care to older adults. Halifax: Dalhousie University
20. McNally,M., Martin,S., Matthews,D. et al. 2012. Brushing up on Mouth Care: A report on research findings on "Oral Care in Continuing Care Settings" in Nova Scotia. Halifax: The Faculty of Dentistry, Dalhousie University and Atlantic Health Promotion Research Centre. [2012a]McNally, M. 2012. Brushing up on mouth care in long-term care. *Journal of the Canadian Dental Association* 78, c103. [2012b]
21. Miller,T.; Bowers,T.; Chalmers,J et al. 2008. Oral Health:Nursing Assessment and Interventions. Ontario: Registered Nurses Association of Ontario.
22. NHS Health Scotland. 2013. *Caring for Smiles: Guide for Care Homes*. Edinburgh: NHS Health Scotland.
23. NHS Quality Improvement Scotland 2005, *Best practice statement: working with dependent older people to achieve good oral health*. Edinburgh: NHS Quality Improvement Scotland.
24. O'Connor, L. 2012, "Oral health care," In *Providing oral health care to older adults. In: Evidence-based geriatric nursing protocols for best practice*, New York (NY): Springer Publishing Company, pp. 409-418. [Details from AHRQ Guidelines Clearing House]
25. Rivett, D. 2006. Compliance with best practice in oral health: implementing evidence in residential aged care. *International Journal of Evidence-Based Healthcare*, 4, (1) 62-67
26. SA Dental Service 2009. *Better Oral Health in Residential Care: Professional Portfolio*. Adelaide: South Australia Dental Service. [2009a]
27. SA Dental Service. 2009. *Better Oral Health in Residential Care: Staff Portfolio*. Adelaide: SA Dental Services [2009b]
28. Scottish Government 2012. *National oral health improvement strategy for priority groups: frail older people, people with special care needs and those who are homeless* Edinburgh, Scottish Government.
29. SIGN 2010. *Management of patients with stroke: identification and management of dysphagia. A national clinical guideline (SIGN publication; no. 119)* Edinburgh, Scottish Intercollegiate Guidelines Network (SIGN).
30. Sweeney, M.P., Bagg, J., Kirkland, G., & Farmer, T.A. 2000. Development and evaluation of a multimedia resource pack for oral health training of medical and nursing staff. *Special Care in Dentistry*, 20, (5) 182-186
31. Welsh Assembly Government 2003a *Fundamentals of care: guidance for health and social care staff*. Cardiff: Welsh Assembly Government.
32. Welsh Assembly Government 2003b. *Fundamentals of Care*. Cardiff: Welsh Assembly Government
33. Welsh, S., Edwards, M., & Hunter, L. 2012. Caring for smiles--a new educational resource for oral health training in care homes. *Gerodontology*, 29, (2) e1161-e1162

Appendix F – Unpicked systematic reviews

Brady, M.C., Furlanetto, D., Hunter, R., Lewis, S.C., & Milne, V. 2006. Staff-led interventions for improving oral hygiene in patients following stroke. Cochrane Database of Systematic Reviews (4)

Cobban, S. 2012. Improving Oral Health for Elderly Residents of Long-Term Care Facilities. Ph.D. University of Alberta (Canada).

Coker, E., Ploeg, J., & Kaasalainen, S. 2014. The effect of programs to improve oral hygiene outcomes for older residents in long-term care: a systematic review. Research in Gerontological Nursing, 7, (2) 87-100

Lugt-Lustig, K., Vanobbergen, J., Putten, G.J., Visschere, L., Schols, J., & Baat, C. 2014. Effect of oral healthcare education on knowledge, attitude and skills of care home nurses: a systematic literature review. Community Dentistry & Oral Epidemiology, 42, (1) 88-96

Raghoonandan, P., Cobban, S., & Compton, S. 2011. A scoping review of the use of fluoride varnish in elderly people living in long term care facilities. Canadian Journal of Dental Hygiene, 45, (4) 217-222

Pearson & Chalmers

Sjogren, P., Nilsson, E., Forsell, M., Johansson, O., & Hoogstraate, J. 2008. A systematic review of the preventive effect of oral hygiene on pneumonia and respiratory tract infection in elderly people in hospitals and nursing homes: effect estimates and methodological quality of randomized controlled trials. [34 refs]. *Journal of the American Geriatrics Society*, 56, (11) 2124-2130

Appendix G – Papers/documents excluded at full text

ADA Division of Science 2003. The importance of oral health in patients receiving long-term care. *Journal of the American Dental Association*, 134, (1) 109	Product information
Anon 2006. Best practice: evidence based practice information sheets for health professionals. Oral hygiene care for adults with dementia in residential aged care facilities. *Geriaction*, 24, (3) 23-28	News report
Anon 2010. Oral health of disadvantaged groups. British Dental Journal, 208, (4) 151	News report
Allukian, M.J. 2008. Who is helping seniors improve their oral health? What is our responsibility? *Journal of the Massachusetts Dental Society*, 57, (3) 68-69	Opinion/Commentary
Alty, C.T. & Olson, K. 1996. Serving kindness through in-service. *RDH*, 16, (11) 26-28	Opinion/Commentary
Arpin, S. 2009. Oral hygiene in elderly people in hospitals and nursing homes. *Evidence-Based Dentistry*, 10, (2) 46	Opinion/Commentary
Bailit, H. & D'Adamo, J. 2012. State case studies: improving access to dental care for the underserved. *Journal of Public Health Dentistry*, 72, (3) 221-234	Not specific to care homes
Baker, R. 2009. Deplorable care. *British Dental Journal*, 206, (10) 509	Letter
Banting, D.W., Greenhorn, P.A., & McMinn, J.G. 203. Effectiveness of a topical antifungal regimen for the treatment of oral candidiasis in older, chronically ill, institutionalized, adults. *Journal (Canadian Dental Association)*, 61, (3) 199-200	Specific clinical intervention
Banting, D.W. & Hill, S.A. 2001. Microwave disinfection of dentures for the treatment of oral candidiasis. *Special care in dentistry*, 21, (1) 4-8	Microbial outcomes
Barnes, C.M. 2014. Dental hygiene intervention to prevent nosocomial pneumonias. *The Journal of Evidence based Dental Practice*, 14 Suppl, 103-114	Non-systematic review
Bartold, P.M. 2011. Nursing home care - we only have ourselves to blame. *Australian Dental Journal*, 56, (1) 1	Editorial
Beck, A.M., Gogsig Christensen, A., Stenbaek Hansen, B., et al. 2014. Study protocol: cost-effectiveness of multidisciplinary nutritional support for under-nutrition in older adults in nursing home and home-care: cluster randomized controlled trial. *Nutrition Journal*, 13, (1) 86	No oral health component to intervention
Borreani, E., Jones, K., Wright, D., Scambler, S., & Gallagher, J.E. 2010. Improving access to dental care for older people. *Dental Update*, 37, (5) 297-298	Non-systematic review

Brody, R., Touger-Decker, R., Radler, D., Parrott, J., Rachman, S., & Trostler, N. 2014. A Novel Approach to Oral Health Assessment Training for Dietitians in Long-Term Care Settings in Israel. *Topics in Clinical Nutrition*, 29, (1) 57-68	Non applicable country (Israel)
Brady, M.C., Furlanetto, D.L.C., Hunter, R.V., Lewis, S.C., & Milne, V. 2011. Oral health care for patients after stroke. *Stroke*, 42, (12) e636-e637	Paper based on previously identified Cochrane Review
Buchholtz, K.J. & King, R.S. 2012. Policy and proposals that will help improve access to oral care services for individuals with special health care needs. *North Carolina Medical Journal*, 73, (2) 124-127	Opinion/Commentary
Budtz-Jorgensen, E., Chung, J.P., & Mojon, P. 2000. Successful aging--the case for prosthetic therapy. *Journal of Public Health Dentistry*, 60, (4) 308-312	Non-systematic review
Budtz-Jorgensen, E., Chung, J.P., & Rapin, C.H. 2001. Nutrition and oral health. *Best Practice & Research in Clinical Gastroenterology*, 15, (6) 885-896	Non-systematic review
Carmody,S.; Forster,S. 2003. *Nursing older people: a guide to practice in care homes* Oxford, Radcliffe	Textbook
Burtner AP, Smith RG, Tiefenbach S, Walker C. 1996. Administration of chlorhexidine to persons with mental retardation residing in an institution: Patient acceptance and staff compliance. *Special Care Dentistry* 16(2), 53-7	Clinical intervention
Carson, S.J. & Edwards, M. 2014. Barriers to providing dental care for older people. *Evidence-Based Dentistry*, 15, (1) 14-15	Commentary on systematic review (Bots-Vantspijker et al 2013)
Chalmers, J.M. 2000. Behavior management and communication strategies for dental professionals when caring for patients with dementia. *Special Care in Dentistry*, 20, (4) 147-154	Non-systematic review
Chalmers, J.M., Carter, K.D., & Spencer, A.J. 2004. Oral health of Adelaide nursing home residents: longitudinal study. *Australasian Journal on Ageing*, 23, (2) 63-70	Study design: epidemiology
Chalmers, J. & Pearson, A. 2005. Oral Hygiene Care for Residents with Dementia: A Literature Review. *Journal of Advanced Nursing*, 52, (4) 410-419	Paper based on previously identified Joanna Briggs Institute systematic review
Chavez, E.M., LaBarre, E., Fredekind, R., & Isakson, P. 2010. Comprehensive dental services for an underserved and medically compromised population provided through a community partnership and service learning. *Special Care in Dentistry*, 30, (3) 95-98	Report of a dental school programme
Christensen, L.B., Hede, B., & Nielsen, E. 2012. A cross-sectional study of oral health and oral health-related quality of life among frail elderly persons on admission to a special oral health care programme in Copenhagen City, Denmark. *Gerodontology*, 29, (2) e392-e400	Mixed population of community-dwelling and residential-care participants. Not possible to disaggregate data for

	residential care population
Clavero J, Baca P, Junco P, Gonzílez MP. Effects of 0.2% chlorhexidine spray applied once or twice daily on plaque accumulation and gingival inflammation in a geriatric population. Journal of Clinical Periodontology 2003 Sep 1;30(9):773-7.	Clinical intervention
Coker, E., Ploeg, J., Kaasalainen, S., & Fisher, A. 2013. A concept analysis of oral hygiene care in dependent older adults. *Journal of Advanced Nursing*, 69, (10) 2360-2371	2104 systematic review by the same authors identified
Coleman, P. 2005. Opportunities for nursing-dental collaboration: Addressing oral health needs among the elderly. *Nursing Outlook*, 53, (1) 33-39	Non-systematic review
Coleman, P.R. 2004. Promoting oral health in elder care--challenges and opportunities. *Journal of Gerontological Nursing*, 30, (4) 3	Editorial
Connell, B.R., McConnell, E.S., & Francis, T.G. 2002. Tailoring the environment of oral health care to the needs and abilities of nursing home residents with dementia. *Alzheimer's Care Quarterly*, 3, (1) 19-25	Study design: case study
Connick, C.M. & Barsley, R.E. 1999. Dental neglect: definition and prevention in the Louisiana Developmental Centers for patients with MRDD. *Special Care in Dentistry*, 19, (3) 123-127	Study design: epidemiology
Crogan NL. Managing xerostomia in nursing homes: pilot testing of the Sorbet Increases Salivation intervention. Journal of the American Medical Directors Association 2011 Mar;12(3):212-6.	Special population. Drug induced xerostomia
de Mello, A.L.F. & Erdmann, A.L. 2007. Investigating oral healthcare in the elderly using Grounded Theory. *Revista Latino-Americana de Enfermagem*, 15, (5) 922-928	Non-systematic review
De Visschere, L.M. & Vanobbergen, J.N. 2006. Oral health care for frail elderly people: actual state and opinions of dentists towards a well-organised community approach. *Gerodontology*, 23, (3) 170-176	Not specific to care homes
DeBiase, C.B. & Austin, S.L. 2003. Oral health and older adults. [75 refs]. *Journal of Dental Hygiene*, 77, (2) 125-145	Not specific to care homes
Delambo, D.A. 1997. *Assessment of dental care training needs of direct service staff in intermediate care facilities for individuals with mental retardation.* PH.D. Southern Illinois University at Carbondale.	Thesis unavailable
Durgude, Y. & Cocks, N. 2011. Nurses' knowledge of the provision of oral care for patients with dysphagia. *British Journal of Community Nursing*, 16, (12) 604-610	Specific clinical population – patients with dysphagia
Dye, B.A., Fisher, M.A., Yellowitz, J.A., Fryar, C.D., & Vargas, C.M. 2007. Receipt of dental care, dental status and workforce in U.S. nursing homes: 1997 National Nursing Home Survey. *Special Care in Dentistry*, 27, (5) 177-186	Study design: epidemiology

Dyke D, Bertone M, Knutson K, Campbell A. 2012. Improving oral care practice in long-term care. *Canadian Nurse*, 108, (9) 20-24	Special population group (dysphagia); Guidance but small un-replicated UBA in single location. Not relevant to good practice review.
Edwards, M. 2008. Staff training improved oral hygiene in patients following stroke. *Evidence-Based Dentistry*, 9, (3) 73	Summary of Brady et al 2006 Cochrane Review
Ekstrand, K.R., Poulsen, J.E., Hede, B., et al. 2013. A randomized clinical trial of the anti-caries efficacy of 5,000 compared to 1,450 ppm fluoridated toothpaste on root caries lesions in elderly disabled nursing home residents. *Caries Research*, 47, (5) 391-398	Fluoride concentration levels in toothpaste
El-Solh, A.A. 2011. Association between pneumonia and oral care in nursing home residents. *Lung*, 189, (3) 173-180	Non-systematic review
Ellis, A.G. 1999. Geriatric dentistry in long-term-care facilities: current status and future implications. *Special care in dentistry*, 19, (3) 139-142	Non-systematic review of epidemiology studies
Ettinger, R.L. 2012. Dental implants in frail elderly adults: a benefit or a liability? *Special Care in Dentistry*, 32, (2) 39-41	Editorial
Fitzpatrick, J. 2000. Oral health care needs of dependent older people: responsibilities of nurses and care staff. [64 refs]. *Journal of Advanced Nursing*, 32, (6) 1325-1332	Non-systematic review
Foltyn, P. 2011. Nursing home care. *Australian Dental Journal*, 56, (2) 239	Letter
Franchignoni, M., Giordano, A., Levrini, L., Ferriero, G., & Franchignoni, F. 2010. Rasch analysis of the Geriatric Oral Health Assessment Index. *European Journal of Oral Sciences*, 118, (3) 278-283	Analysis amendments to GOHAI assessment tool
Garrido Urrutia, C., Romo Ormazabal, F., Espinoza Santander, I., & Medics Salvo, D. 2012. Oral health practices and beliefs among caregivers of the dependent elderly. *Gerodontology*, 29, (2) e742-e747	Comparison between community- and residential-based carers
Gaskill, D., Isenring, E.A., Black, L.J., Hassall, S., & Bauer, J.D. 2009. Maintaining nutrition in aged care residents with a train-the-trainer intervention and Nutrition Coordinator. *Journal of Nutrition, Health & Aging*, 13, (10) 913-917	No oral health interventions or outcomes
Ghezzi, E.M., Smith, B.J., Manz, M.C., & Markova, C.P. 2007. Comparing perceptions of oral health care resources and barriers among LTC facilities. *Long-Term Care Interface*, 8, (6) 20-25	Paper unavailable. Other papers reporting this study identified.
Glassman, P. & Subar, P. 2010. Creating and maintaining oral health for dependent people in institutional settings. *Journal of Public Health Dentistry*, 70 Suppl 1, S40-S48	Non-systematic review
Glassman, P., Helgeson, M., & Fitzler, S.L. 2010. Protecting the elderly.	Letter

Journal of the American Dental Association, 141, (11) 1298-1299	
Gonzalez, E.E., Nathe, C.N., Logothetis, D.D., Pizanis, V.G., & Sanchez-Dils, E. 2013. Training caregivers: disabilities and dental hygiene. *International Journal of Dental Hygiene*, 11, (4) 293-297	Not residential care - community-based carers
Gornitsky, M., ParadisI, I., Landaverde, G., Malo, A.M., & Velly, A.M. 2002. A clinical and microbiological evaluation of denture cleansers for geriatric patients in long-term care institutions. *Journal (Canadian Dental Association)*, 68, (1) 39-45	Microbial outcomes
Grant, E., Carlson, G., & Cullen-Erickson, M. 2004. Oral health for people with intellectual disability and high support needs: positive outcomes. *Special Care in Dentistry*, 24, (2) 70-79	Not residential care
Guay, A.H. 2005. The oral health status of nursing home residents: what do we need to know? *Journal of Dental Education*, 69, (9) 1015-1017	Opinion/Commentary
Gutkowski, S. 2013. Using xylitol products and MI paste to reduce oral biofilm in long-term care residents. *Annals of Long-Term Care*, 21, (12) 26-28	Microbial outcomes
Habegger, L., Sloane, P.D., Chen, X. et al. 2012. Mouth care without a battle: Designing a training video to individualize mouth care for persons with cognitive and physical impairments. *Journal of the American Geriatrics Society*, Suppl S4	Conference abstract. Main study paper identified.
Hasegawa, T.K.J., Matthews, M.J., & Reed, M. 2004. Ethical dilemma #48. "Who cares for the incompetent patient". *Texas Dental Journal*, 121, (7) 616-619	Opinion/Commentary
Heyes, G. & Robinson, P.G. 2008. Pilot study to assess the validity of the single assessment process as a screening tool for dental treatment needs in older people. *Gerodontology*, 25, (3) 142-146	Mixed population of community-dwelling and residential-care participants. Not possible to disaggregate data for residential care population
Hopcraft, M.S., Morgan, M.V., Satur, J.G., & Wright, F.A.C. 2011. Utilizing dental hygienists to undertake dental examination and referral in residential aged care facilities. *Community Dentistry & Oral Epidemiology*, 39, (4) 378-384	Compares screening by dentists with screening by dental hygienists
Howard, R. 2010. *Survey of oral hygiene knowledge and practice among Mississippi nursing home staff.* Ph.D. University of Mississippi Medical Center	Thesis unavailable
Innes, N. & Evans, D. 2009. Caries prevention for older people in residential care homes. *Evidence-Based Dentistry*, 10, (3) 83-8	Non-systematic review
Ishikawa, A., Yoneyama, T., Hirota, K., Miyake, Y., & Miyatake, K. 2008. Professional oral health care reduces the number of oropharyngeal bacteria. *Journal of Dental Research*, 87, (6) 594-598	Microbial outcomes

Ito, K., Tsuboya, T., Aida, J., & Osaka, K. 2013. Policy impact on employment of dental hygienists in nursing homes in japan. *American Journal of Epidemiology*, 15. 650S	Epidemiology study
Kaiser, C.M., Williams, K.B., Mayberry, W., Braun, J., & Pozek, K.D. 2000. Effect of an oral health training program on knowledge and behavior of state agency long-term-care surveyors. *Special Care in Dentistry*, 20, (2) 66-71	Training of those undertaking surveys in care homes for state agencies
Kasche, I., Schuez, B., Heiden, A., Mallach, N., & Jahn, K. 2006. Evaluation of an oral health program for carers in institutions for adults with disabilities. O2B:I. *Journal of Disability and Oral Health*, 7, (2) 86	Abstract only and not enough data to include as evidence.
Kayser-Jones, J., Bird, W.F., Redford, M., Schell, E.S., & Einhorn, S.H. 1996. Strategies for conducting dental examinations among cognitively impaired nursing home residents. *Special care in dentistry*, 16, (2) 46-52	Intervention to manage resistance to care
Kikutani, T., Enomoto, R., Tamura, F., Oyaizu, K., Suzuki, A., & Inaba, S. 2006. Effects of oral functional training for nutritional improvement in Japanese older people requiring long-term care. *Gerodontology*, 23, (2) 93-98	No oral health outcomes
Kokubu, K., Senpuku, H., Tada, A., Saotome, Y., & Uematsu, H. 2008. Impact of routine oral care on opportunistic pathogens in the institutionalized elderly. *Journal of Medical & Dental Sciences*, 55, (1) 7-13	Microbial outcomes
Lawton, L. 2002. Providing dental care for special patients: tips for the general dentist. *Journal of the American Dental Association*, 133, (12) 1666-1670	Opinion/Commentary
Lemaster, M. 2013. Pilot program provides oral health services to long term care facility residents through service learning and community partnership. *Journal of the American Medical Directors Association*, 14, (5) 363-366	Full text unavailable
Lester, V., Ashley, F.P., & Gibbons, D.E. 1998. Reported dental attendance and perceived barriers to care in frail and functionally dependent older adults. *British Dental Journal*, 184, (6) 285-289	Not specific to care homes
Lim, Y.M. 2003. Nursing intervention for grooming of elders with mild cognitive impairments in Korea. *Geriatric Nursing*, 24, (1) 11-15	Very small study in non-applicable country (Korea).
Lin, M.K. & Kramer, A.M. 2013. The Quality Indicator Survey: background, implementation, and widespread change. *Journal of Aging & Social Policy*, 25, (1) 10-29	Epidemiology survey
Lines, K. & Heyes, G. 2009. Care home health. *British Dental Journal*, 207, (3) 95	Letter
MacEntee, M.I., Pruksapong, M., & Wyatt, C.C.L. 2005. Insights from	Dental student training

students following an educational rotation through dental geriatrics. *Journal of Dental Education*, 69, (12) 1368-1376	
MacEntee, M.I. 2005. Caring for elderly long-term care patients: oral health-related concerns and issues. [97 refs]. *Dental Clinics of North America*, 49, (2) 429-443	Non-systematic review
MacEntee, M.I. 2006. Missing links in oral health care for frail elderly people. *Journal (Canadian Dental Association)*, 72, (5) 421-425	Opinion/Commentary
MacEntee, M.I. 2011. Muted dental voices on interprofessional healthcare teams. *Journal of Dentistry*, 39 Suppl 2, S34-S40	Opinion/Commentary
MacEntee, M.I., Kazanjian, A., Kozak, J.F., Hornby, K., Thorne, S., & Kettratad-Pruksapong, M. 2012. A scoping review and research synthesis on financing and regulating oral care in long-term care facilities. *Gerodontology*, 29, (2) e41-e52	Non-systematic review
Matear, D.W. 1999. Demonstrating the need for oral health education in geriatric institutions. *Probe (Ottawa, Ont*,). 33, (2) 66-71	Non-systematic review
Mello, A.L.S.F.d., Erdmann, A.L., & Brondani, M. 2010. Oral health care in long-term care facilities for elderly people in southern Brazil: a conceptual framework. *Gerodontology*, 27, (1) 41-46	Does not consider barriers/ facilitators
Meurman, J.H., Kari, K., Aikas, A., & Kallio, P. 2001. One-year compliance and effects of amine and stannous fluoride on some salivary biochemical constituents and oral microbes in institutionalized elderly. *Special care in dentistry*, 21, (1) 32-36	Microbial outcomes
Morreale, J.P., Dimitry, S., Morreale, M., & Fattore, I. 2005. Setting up a mobile dental practice within your present office structure. *Journal (Canadian Dental Association)*, 71, (2) 91	Microbial outcomes
Naito, M., Kato, T., Fujii, W., Ozeki, M., Yokoyama, M., Hamajima, N., & Saitoh, E. 2010. Effects of dental treatment on the quality of life and activities of daily living in institutionalized elderly in Japan. *Archives of Gerontology & Geriatrics*, 50, (1) 65-68	Study compares dental treatment by dentist with no dental treatment
Naughton, D.K. 2009. The business of dental hygiene--a practice experience in nursing homes. *Journal of Dental Hygiene*, 83, (4) 193-194	Opinion/Commentary
Nishiyama, Y., Inaba, E., Uematsu, H., & Senpuku, H. 2010. Effects of mucosal care on oral pathogens in professional oral hygiene to the elderly. *Archives of Gerontology & Geriatrics*, 51, (3) e139-e143	Microbial outcomes
Ohno T, Uematsu H, Nozaki S, Sugimoto K. Improvement of taste sensitivity of the nursed elderly by oral care. Journal of Medical & Dental Sciences 2003 Mar;50(1):101-7.	No oral health outcomes. Just taste sensitivity
Pace, C.C. & McCullough, G.H. 2010. The association between oral microorgansims and aspiration pneumonia in the institutionalized elderly: review and recommendations. *Dysphagia*, 25, (4) 307-322	Epidemiology study of associations
Park, Y.H. & Chang, H. 2014. Effect of a health coaching self-	Non applicable country

management program for older adults with multimorbidity in nursing homes. *Patient preference & adherence*, 8, 959-970	(Korea) and resident population/setting not considered sufficiently similar to UK population for inclusion.
Pawlin,J; Carnaby,S (eds). 2009. Profound intellectual and multiple disabilities: nursing complex needs Chichester, Wiley-Blackwell	Textbook
Persson, A., Lingstrom, P., Bergdahl, M., Claesson, R., & van Dijken, J.W.V. 2007. Buffering effect of a prophylactic gel on dental plaque in institutionalised elderly. *Gerodontology*, 24, (2) 98-104	Microbial outcomes
Petelin, M., Cotic, J., Perkic, K., & Pavlic, A. 2012. Oral health of the elderly living in residential homes in Slovenia. *Gerodontology*, 29, (2) e447-e457	Epidemiology study
Philip, P., Rogers, C., Kruger, E., & Tennant, M. 2012. Oral hygiene care status of elderly with dementia and in residential aged care facilities. *Gerodontology*, 29, (2) e306-e311	Epidemiology study
Pino, A., Moser, M., & Nathe, C. 2003. Status of oral healthcare in long-term care facilities. *International Journal of Dental Hygiene*, 1, (3) 169-173	Non-systematic review
Rogers, C. 2009. Dental care in aged care facilities. *Australian Dental Journal*, 54, (2) 178	Letter
Schwartz, M. 2003. Dentistry for the long-term care patient. *Dentistry Today*, 22, (1) 52-57	Opinion/Commentary
Simons, D., Kidd, E.A., & Beighton, D. 1999. Oral health of elderly occupants in residential homes. *Lancet*, 353, (9166) 1761	Letter
Simons, D., Brailsford, S., Kidd, E.A., & Beighton, D. 2001. Relationship between oral hygiene practices and oral status in dentate elderly people living in residential homes. *Community Dentistry and Oral Epidemiology*, 29, (6) 464-470	Epidemiology study
Smith, B.J. & Shay, K. 2005. What predicts oral health stability in a long-term care population? *Special Care in Dentistry*, 25, (3) 150-157	Epidemiology study
Soini, H., Muurinen, S., Routasalo, P., Sandelin, E., Savikko, N., Suominen, M., Ainamo, A., & Pitkala, K.H. 2006. Oral and nutritional status - Is the MNA a useful tool for dental clinics. *Journal of Nutrition, Health and Aging*, 10, (6) 495-499	No oral health outcomes
Stewart, S. 2013. Daily oral hygiene in residential care. *Canadian Journal of Dental Hygiene*, 47, (1) 25-30	Epidemiology study
Sumi, Y., Nakamura, Y., & Michiwaki, Y. 2002. Development of a systematic oral care program for frail elderly persons. *Special Care in Dentistry*, 22, (4) 151-155	Community-dwelling adults
Sumi, Y., Miura, H., Nagaya, M., Nagaosa, S., & Umemura, O. 2009. Relationship between oral function and general condition among Japanese nursing home residents. *Archives of Gerontology and*	No oral health outcomes

Geriatrics, 48, (1) 100-105	
Sumi, Y., Ozawa, N., Miura, H., Michiwaki, Y., & Umemura, O. 2010. Oral care help to maintain nutritional status in frail older people. *Archives of Gerontology & Geriatrics*, 51, (2) 125-128	No oral health outcomes
Sweeney, M.P., Williams, C., Kennedy, C., Macpherson, L.M.D., Turner, S., & Bagg, J. 2007. Oral health care and status of elderly care home residents in Glasgow. *Community Dental Health*, 24, (1) 37-42	Epidemiology study
Tan, H.P. & Lo, E.C.M. 2014. Risk indicators for root caries in institutionalized elders. *Community Dentistry & Oral Epidemiology*, 42, (5) 435-440	Epidemiology study
Terpenning, M. 2005. Prevention of aspiration pneumonia in nursing home patients. *Clinical Infectious Diseases*, 40, (1) 7-8	Opinion/Commentary
Thai, P.H., Shuman, S.K., & Davidson, G.B. 1997. Nurses' dental assessments and subsequent care in Minnesota nursing homes. *Special Care in Dentistry*, 17, (1) 13-18	Epidemiology study
Thean, H., Wong, M.L., & Koh, H. 2007. The dental awareness of nursing home staff in Singapore - a pilot study. *Gerodontology*, 24, (1) 58-63	Epidemiology study
Tramini, P., Montal, S., & Valcarcel, J. 2007. Tooth loss and associated factors in long-term institutionalised elderly patients. *Gerodontology*, 24, (4) 196-203	Epidemiology study
Van Ness, P.H., Peduzzi, P.N., & Quagliarello, V.J. 2012. Efficacy and effectiveness as aspects of cluster randomized trials with nursing home residents: methodological insights from a pneumonia prevention trial. *Contemporary Clinical Trials*, 33, (6) 1124-1131	No oral health outcomes
Vigild, M., Brinck, J.J., & Hede, B. 1998. A one-year follow-up of an oral health care programme for residents with severe behavioural disorders at special nursing homes in Denmark. *Community Dental Health*, 15, (2) 88-92	Psychiatric setting
Vucicevic-Boras, V., Bosnjak, A., Alajbeg, I., Cekic-Arambasin, A., & Topic, B. 2002. Dental health of elderly in retirement homes of two cities in south Croatia--a cross-sectional study. *European journal of medical research*, 7, (12) 550-554	Epidemiology study
Wallace, J.P., Taylor, J.A., Wallace, L.G., & Cockrell, D.J. 2010. Student focused oral health promotion in Residential Aged Care Facilities. *International Journal of Health Promotion and Education* , 48, (4) 111-114	Epidemiology study
Wardh, I. & Sorensen, S. 2005. Development of an index to measure oral health care priority among nursing staff. *Gerodontology*, 22, (2) 84-90	Measurement of attitude not views
Watando, A., Ebihara, S., Ebihara, T., Okazaki, T., Takahashi, H., Asada, M., & Sasaki, H. 2004. Daily oral care and cough reflex sensitivity in	No oral health outcomes

elderly nursing home patients. *Chest*, 126, (4) 1066-1070	
Weijenberg, R.A.F., Lobbezoo, F., Knol, D.L., Tomassen, J., & Scherder, E.J.A. 2013. Increased masticatory activity and quality of life in elderly persons with dementia--a longitudinal matched cluster randomized single-blind multicenter intervention study. *BMC Neurology*, 13, 26	No oral health outcomes
Willumsen, T., Solemdal, K., Wenaasen, M., & Ogaard, B. 2007. Stannous fluoride in dentifrice: an effective anti-plaque agent in the elderly? *Gerodontology*, 24, (4) 239-243	Fluoride concentration levels in toothpaste
Wilson, T. & Gembica, A. 2004. A report of oral screenings of residents of two Nebraska nursing homes. *Journal of Dental Hygiene*, 78, (4) 22	Epidemiology study
Wyatt, C.C.L., So, F.H.C., Williams, P.M., Mithani, A., Zed, C.M., & Yen, E.H.K. 2006. The development, implementation, utilization and outcomes of a comprehensive dental program for older adults residing in long-term care facilities. *Journal (Canadian Dental Association)*, 72, (5)	Dental clinical treatment
Wyatt, C.C.L. 2009. A 5-year follow-up of older adults residing in long-term care facilities: utilisation of a comprehensive dental programme. *Gerodontology*, 26, (4) 282-290	Dental clinical treatment
Yakiwchuk, C.A., Bertone, M., Ghiabi, E., Brown, S., Liarakos, M., & Brothwell, D. 2013. Suction toothbrush use for dependent adults with dysphagia: A pilot examiner blind randomized clinical trial. *Canadian Journal of Dental Hygiene*, 47, (1) 15-23	No oral health outcomes (aspiration pneumonia)
Zimmerman, S., Cohen, L., Barrick, A.L., & Sloane, P. 2012. Implementation of personalized, evidence-based mouth care for persons with cognitive or physical impairment: Mouth care without a battle. *Alzheimer's and Dementia*, 8, (4) Suppl P384	Intervention to manage resistance to care
Zimmerman, S., Sloane, P.D., Cohen, L.W., & Barrick, A.L. 2014. Changing the culture of mouth care: mouth care without a battle. *Gerontologist*, 54 Suppl 1, S25-S34	Intervention to manage resistance to care
Zuluaga, D.J.M., Ferreira, J., Montoya, J.A.G., & Willumsen, T. 2012. Oral health in institutionalised elderly people in Oslo, Norway and its relationship with dependence and cognitive impairment. *Gerodontology*, 29, (2) e420-e426	Epidemiology study