An investigation into clinical preventive care provided to adolescents accessing Public Oral Health Services New South Wales, Australia

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Statement of originality

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. I give consent to this copy of my thesis, when deposited in the University Library, being made available for loan and photocopying subject to the provisions of the Copyright Act 1968.

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Angela Vaetoefaga Talamaivao Masoe
Acknowledgment of authorship

I hereby certify that this thesis is in the form of a series of published and submitted papers of which I am the first author. The co-authors of the papers were supervisors of the thesis and provided direction and support for each of the publications.

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Abstract

Background
Despite water fluoridation and well established media promotion of the use of fluoride toothpaste twice a day, many adolescents are still at risk of dental caries and periodontal disease due to poor dietary and toothbrushing behaviours. However, these oral health problems can be moderated by providing individuals with preventive care and advice. In New South Wales (NSW) dental therapists and oral health therapists (Therapists) working in the public health system can help this vulnerable group by providing free dental care including advice on preventing dental caries and periodontal disease. This study used both quantitative and qualitative methodology to investigate the provision of preventive care by Therapists to adolescents who chose to attend NSW Public Oral Health Services.

Methods/Methodology
The quantitative studies undertaken included: (i) obtaining clinical and preventive data from the NSW Health Information System of Oral Health database for all Therapists across all the Local Health Districts (LHDs) for interrogation and analysis; (ii) a reliability study of Therapists clinical and preventive care data as recorded in the electronic health record and paper record; and (iii) two cross-sectional postal questionnaire surveys; with one survey using three clinical vignettes to ascertain how Therapists structure their preventive care health plans for adolescents. The questionnaire survey also included items which explored Therapists’ patterns of participation in continuing professional development on clinical preventive care for adolescents.

The qualitative studies included: (i) three two hour structured focus group sessions with 16 Therapists; and (ii) two separate studies using in-depth face to face interviews with clinical directors and health service managers; and Senior Therapists. The qualitative studies
explored the participants’ perceptions and views on the influencing factors that enable or inhibit Therapists offering clinical preventive care to adolescents; and what strategies they used to enhance Therapists’ ability to facilitate preventive care in their day to day care for patients.

**Results**

Preventive care provided for adolescents accessing NSW Public Oral Health Services across all the Local Health Districts varied considerably from approximately 32% to 55% of Therapists clinical activity over a one year period.

The reliability study demonstrated that the current dual system using the electronic health record and paper records to record and account for Therapists’ clinical and preventive care activities for adolescents had deficiencies, indicating an area for infrastructure improvement.

The cross-sectional surveys using the clinical vignettes demonstrated that there were considerable variations noted in Therapists recommendations for stabilising and managing dental disease for their adolescent patients, suggesting a need for Clinical Directors to improve models of preventive care delivery based on scientific evidence.

Therapists responded to the continuing professional development items in the survey and noted that they received most of their education from the Local Health District, suggesting opportunities for interprofessional learning from visiting dental paediatric specialists, dentists and supported by health service managers.

The qualitative studies provided common themes at multiple levels of the oral health organisation, highlighting the factors that can enhance and assist Therapists operationalise scientific based preventive care into their day to day clinical practice. These include resourcing efficient clinical access pathways to preventive care; adequate workforce mix; efficient and effective administrative processes to support preventive clinical care activities;
provision of oral health products and age appropriate information to support adolescents’
homecare regimes.

**Conclusion**

Therapists in this study stated it was their professional clinical ethos to embed scientific
based preventive care into day to day clinical practice to improve adolescents’ long term oral
health outcomes. To improve preventive models of care for adolescents requires the
overarching administrative authority, NSW Health to accept that the scientific evidence
relating to dental care has changed, and that management monitoring information should be
incorporated into health reforms; thus assisting clinical directors, Therapist clinical leaders
and health service managers to collaborate more effectively with sponsored support ‘pillars’
in the redesign of sustainable, cost effective evidenced based care pathways for all
adolescents.
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List of Abbreviations

CAMBRA  Caries Management by Risk Assessment
CMS  Caries Management System
COHS  Centre for Oral Health Strategy
CPD  Continuing Professional Development
CPP-ACP  Casein phosphopeptide-amorphous calcium phosphates
DMFT  Decayed, Missing and Filled Teeth
DT  Dental therapist
EHR  Electronic health record
ICDAS  International Caries Detection and Assessment System
ISOH  Information System for Oral Health
LHD  Local Health District
MID  Minimal intervention dentistry
NSW  New South Wales
OHPC  Oral health promotion coordinator
OHT  Oral health therapist
POHP  Priority Oral Health Program
UK  United Kingdom
USA  United States of America
WSL  White spot lesion
Chapter 1

Introduction
1.1 Overview

This thesis describes an investigation into the provision of clinical preventive care to adolescents by dental therapists and oral health therapists (Therapists\(^1\)) working in the Public Oral Health Services, of New South Wales (NSW), Australia. Prevention is one of the key performance indicators for Therapists so they are well placed to engage and support adolescents’ self-care to maintain and improve their oral health.

Therapists have a pivotal role in the prevention and control of the two common diseases namely dental caries and periodontal disease. Despite the academic rhetoric and NSW Health policies, very little is known about the prevention advice and care that Therapists offer their patients.

Indeed one very important group requiring care are adolescents whose lifestyle may be changing in the transition from childhood and parental control to adulthood and self-control, to the detriment of both their general and oral health. Given this issue of the potential decline in the oral health of adolescents, it would seem to be a valuable research initiative to collate and assess how Therapists advise and help this group of patients. This is particularly important as most patients attending the Public Oral Health Service are disadvantaged and this social profile is accompanied by a higher prevalence of dental disease.

The research study design used quantitative and qualitative methods to collect information for data analyses in seven key phases as depicted in Figure 1.1.

\(^1\) The term ‘Therapists’ will be used here forth to describe both professionals, unless otherwise indicated.
This thesis is organized in ten chapters, enabling readers to follow the progress of the research in a logical manner. The topics covered are:

- Chapter 1: introduction to the research
- Chapter 2: a critique of the literature pertaining to public oral health systems, provision of preventive care and management of oral diseases in relation to adolescents;
- Chapter 3: an analysis of the levels and types of clinical preventive care provided by Therapists to adolescents across NSW Local Health Districts;
- Chapter 4: a report on the reliability of the electronic oral health record data collected by NSW Health to inform research and clinical quality improvement activities;
- Chapter 5: reporting on enablers and constraints for Therapists which may facilitate clinical preventive care offered to adolescents;
- Chapter 6: an assessment of perceived factors which clinical directors and health service managers believed could influence the development and delivery of preventive care offered by Therapists to adolescents;
- Chapter 7: two reports of how Therapists structure preventive treatment plans for adolescents presenting to NSW Public Oral Health Services;
- Chapter 8: a report mapping Therapists’ participation in continuing professional development activities focused on preventive care for adolescents;
- Chapter 9: an account of the views of senior Therapist clinicians as to the facilitators and strategies which enhance the scientific based preventive clinical care offered to adolescents by Therapists working under their supervision; and
- Chapter 10: an overview of the thesis conclusions and implications for future action and research.
Eight papers that detail the findings of this investigation and are associated with key strategies of the research are shown in Table 1.1. The results should inform NSW Public Oral Health Policy and clinical quality improvement activities for Therapists, enabling them to provide appropriate preventive care for adolescents choosing to access public health services.
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Figure 1.1 Overview of the research design for this thesis

<table>
<thead>
<tr>
<th>Phase One</th>
<th>An analysis of Therapists levels and types of clinical diagnostic and preventive care provided to adolescents accessing NSW Local Health Districts for the year 2011</th>
<th>Quantitative analysis</th>
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<td>Phase Two</td>
<td>An assessment of the agreement levels between electronic oral health records and paper records of the diagnostic and preventive care provided by Therapists to adolescents for the year 2011</td>
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Table 1.1 Publications associated with key research objectives

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<th>Publication 1 (Chapter 3)</th>
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<td><strong>Research Strategy:</strong></td>
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<td>To assess and evaluate levels and type of clinical and preventive care provided by Therapists to adolescents choosing to access NSW Public Oral Health Services.</td>
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<tr>
<td><strong>Angela V Masoe, Anthony S Blinkhorn, Jane Taylor, Fiona A Blinkhorn</strong></td>
</tr>
<tr>
<td>Preventive and clinical care provided to adolescents attending public oral health service New South Wales, Australia: a retrospective study.</td>
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<td>BioMed Central Oral Health 2014;14:(142)1-9</td>
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<th>Publication 2 (Chapter 4)</th>
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<tr>
<td><strong>Research Strategy:</strong></td>
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<td>To evaluate the reliability of Therapists’ clinical and preventive data captured on the Information System for Oral Health for re-use in research and patient care quality improvement initiatives.</td>
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<tr>
<td><strong>Angela V Masoe, Anthony S Blinkhorn, Jane Taylor, Fiona A Blinkhorn</strong></td>
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<tr>
<td>Reliability study of clinical electronic records with paper records in the NSW Public Oral Health Service.</td>
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<td>Public Health Research &amp; Practice Journal 2015;25:(2)1-6</td>
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<td><strong>Research Strategy:</strong></td>
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<td>To identify factors that influence frontline Therapist’s provision of preventive care to adolescents.</td>
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<tr>
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<th>Publication 4 (Chapter 6)</th>
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<td><strong>Research Strategy:</strong></td>
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<td>To explore NSW Local Health Services clinical directors and health service managers perceptions of the factors that could support the delivery of preventive care to adolescents; and to record the strategies they have utilised to assist Therapists provide clinical preventive care to adolescents.</td>
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<td><strong>Angela V Masoe, Anthony S Blinkhorn, Jane Taylor, Fiona A Blinkhorn</strong></td>
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<tr>
<td>Assessment of the management factors that influence the development of preventive care in the New South Wales public dental service.</td>
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Publication 1 (Chapter 3)

**Research Strategy:**
To assess and evaluate levels and type of clinical and preventive care provided by Therapists to adolescents choosing to access NSW Public Oral Health Services.

**Angela V Masoe, Anthony S Blinkhorn, Jane Taylor, Fiona A Blinkhorn**
Preventive and clinical care provided to adolescents attending public oral health service New South Wales, Australia: a retrospective study. BioMed Central Oral Health 2014;14:(142)1-9

Publication 2 (Chapter 4)

**Research Strategy:**
To evaluate the reliability of Therapists' clinical and preventive data captured on the Information System for Oral Health for re-use in research and patient care quality improvement initiatives.

**Angela V Masoe, Anthony S Blinkhorn, Jane Taylor, Fiona A Blinkhorn**

Publication 3 (Chapter 5)

**Research Strategy:**
To identify factors that influence frontline Therapist's provision of preventive care to adolescents.

**Angela V Masoe, Anthony S Blinkhorn, Jane Taylor, Fiona A Blinkhorn**

Publication 4 (Chapter 6)

**Research Strategy:**
To explore NSW Local Health Services clinical directors and health service managers perceptions of the factors that could support the delivery of preventive care to adolescents; and to record the strategies they have utilised to assist Therapists provide clinical preventive care to adolescents.

**Angela V Masoe, Anthony S Blinkhorn, Jane Taylor, Fiona A Blinkhorn**

Publication 5 & 6 (Chapter 7):

**Research Strategy:**
To determine how Therapists planned clinical preventive oral health care for adolescent patients.

**Angela V Masoe, Anthony S Blinkhorn, Jane Taylor, Fiona A Blinkhorn**
Preventive management plans recorded using clinical vignettes for adolescents accessing public dental services NSW, Australia

**Research Strategy:**
To ascertain how Therapists planned clinical preventive care for an adolescent patient undergoing orthodontic treatment.

**Angela V Masoe, Anthony S Blinkhorn, Jane Taylor, Fiona A Blinkhorn**
An assessment of preventive care offered to an orthodontic patient by oral health therapists in NSW Australia
International Dental Journal, 2015;doi: 10.1111/idj.12169

Publication 7 (Chapter 8)

**Research Strategy:**
To explore Therapists’ participation patterns for continuing professional development in clinical preventive oral health for adolescents.

**Angela V Masoe, Anthony S Blinkhorn, Jane Taylor, Fiona A Blinkhorn**
Mapping professional development activities involving clinical preventive care for adolescents by Oral Health Therapists working in NSW Public Oral Health Services

Publication 8 (Chapter 9)

**Research Strategy:**
To investigate facilitating factors and strategies used by senior Therapists to encourage and enhance Therapists ability to offer clinical preventive care to adolescents.

**Angela V Masoe, Anthony S Blinkhorn, Jane Taylor, Fiona A Blinkhorn**
Factors that influence the preventive care offered to adolescents accessing Public Oral Health Services, NSW, Australia.
Journal of Adolescent Health, Medicine and Therapeutics 2015;6:101-113
1.2 Background

Dental caries and periodontal disease may be controlled and are preventable.\textsuperscript{1-5} There are population and individual measures to aid in the prevention and control of these diseases.\textsuperscript{6, 7} The main population measure to reduce dental caries is water fluoridation, and mass media campaigns by toothpaste manufacturing companies encourage people to brush, thereby disrupting the plaque biofilm, reducing gingival inflammation and dental caries.\textsuperscript{7-9} Smoking cessation will also reduce periodontal disease. In terms of individual preventive oral health care this is usually obtained in New South Wales (NSW) by either private practice or for a smaller proportion of the population the Public Oral Health Services.\textsuperscript{10} The individual care to reduce/prevent caries focuses on diet advice, tooth brushing instruction, topical fluorides and regular recall for assessment. Controlling periodontal disease is mainly focused on adolescents and adults, and concentrates on teaching effective plaque control and encouraging smokers to ‘quit’.

The Public Oral Health Service in NSW is charged not only with providing dental treatment but also having a focus on offering preventive care.\textsuperscript{11, 12} The majority of this preventive care is provided by Therapists.\textsuperscript{13} However, there is little evidence on just how these groups of health care professionals structure or monitor their preventive care.

The oral health of the Australian population has improved but not uniformly and it appears that adolescents in particularly have major dental health problems.\textsuperscript{1, 7} We therefore have a group of health professionals (dental therapists and oral health therapists) who have prevention as one of their key performance indicators and a well-defined group of people for whom dental ill health is an issue.

The primary focus of any system of oral health care must be towards the prevention of oral disease including addressing the social determinants of health and considering the common
A range of oral health services are provided through the NSW public health system. These include dental services to children, adolescents and eligible adults according to criteria that prioritise emergency situations, as well as those in most need and at highest risk of disease. The NSW Health is the purchaser and system administrator of the Public Oral Health Services whilst Local Health Districts (LHDs) are responsible for utilising the funds to deliver services to address local needs.

New South Wales Public Oral Health Services have two policies to reduce inequalities in access to oral health care, namely the Priority Oral Health Program (POHP) and the Oral Health Fee For Service Scheme. The Priority Oral Health Program enables NSW staff in the Public Oral Health Service to prioritise all patients (children and adults) according to the urgency of their dental problems. The Oral Health Fee For Service Scheme enables eligible clients to seek treatment with a private practitioner if the LHD diverts funds to vouchers which pay for private care. The Priority Oral Health Program provides a fair and efficient system to access Public Oral Health Services in NSW. However, information from NSW Population Health Survey Reports and clinical data provides evidence of the low impact current clinical and preventive practices have on reducing inequalities in oral health outcomes.

A paper prepared by Blinkhorn compared the dental health status of adults and children living in NSW, the United States of America (USA) and the United Kingdom (UK) and demonstrated that NSW fared favourably in terms of oral health, however, he cautioned that “any improvements are fragile and need nurturing”. Reference was made to the differences in dental health systems, with the UK system providing a model of care linked to government funding, whereas Australia and the USA have a predominantly private sector system of care. Blinkhorn asserted that those private care systems tend to marginalize many people from receiving oral health care. He also highlighted the fact that Australia and the USA do not
provide sufficient resources to provide continuous oral health care to patients. This impacts on an oral health professional’s clinical practices and often only allows them to be: “emergency-only operators rather than highly trained and skilled clinicians”.¹⁹ Therapists employed by NSW Public Oral Health Services operate within this emergency treatment structure; nonetheless, by highlighting this issue it does create opportunities for reflection on possible improvements and opportunities for change.

The NSW Prioritised Oral Health Program allows clinicians to make decisions regarding the need for follow-up, and to offer preventive care according to individual assessed risks, as well as addressing emergency demands on the local oral health services.¹⁸ Proponents of the concept of health promoting oral health services advocate that only through high clinical standards in conjunction with effective oral health promotion will the population achieve good oral health and general health.²⁰, ²¹ Thus, evidence from the literature recommends NSW Public Oral Health Services should shift towards a ‘health promoting service’ approach to achieve improved health outcomes.

A recent qualitative study undertaken in NSW by Cashmore et al²² explored the potential value of reorientating primary care dental services towards prevention as a way of improving the oral health of children with extensive dental caries. The findings from this research suggested that implementation of change processes which encouraged prevention, effective communication and engagement should be encouraged with oral health teams at all levels.²² The authors thought it was feasible to include health promotion interventions into established clinical structures and processes, and offered useful information for the delivery of an oral health preventive program.²² Whilst Cashmore et al’s²² program focussed on young children; the overall approach suggests that a similar prevention program for adolescents could be introduced. The program would be helped by the establishment of inter-professional links
with agencies such as the NSW Centre for Adolescents Advanced Health and Division of General Practitioner’s Adolescent Health Programs\textsuperscript{23} a point highlighted by Cashmore et al.\textsuperscript{22} The concept of ‘health promoting oral health services’ would be possible for NSW Public Oral Health Services with simple adaptations to service delivery. The engagement of relevant stakeholders, clinicians, specialists and supporting staff to improve communication with parents regarding re-orientation towards prevention approaches according to Cashmore et al is achievable within current oral health structures.\textsuperscript{22} However, there is a lack of information on how Therapists deliver preventive clinical care, particularly for adolescents. In order to ensure continuous quality care for patients and long term health outcomes, research is required to assist with reorientating service delivery.

This requirement for a clearer picture on the activities undertaken in the NSW Public Oral Health Service was highlighted by Wright et al\textsuperscript{12} who asserted that:

“no single method provides the full picture of a population’s needs, expectations or priorities, but each approach contributes significantly to providing more comprehensive evidence to underpin public policies and decision-making”.\textsuperscript{12}

Clinical quality improvement strategies to assist NSW Public Oral Health Services towards a holistic prevention and health promoting service, could be enhanced by ensuring Therapists incorporate scientific based preventive care consistently for their adolescent patients. This premise will form the basis of my PhD thesis investigation.

The research will investigate preventive care provided for adolescents as a sub-population accessing NSW Public Oral Health Services in order to assist the future development of a Model of Preventive Oral Health Care for Adolescents within the current infrastructure to support Therapists in their day to day clinical preventive practices.
Chapter 2

Literature Review
Literature Review

This Literature Review will consider four broad themes:

- The oral health promotion and prevention role of Therapists working in Public Oral Health Services: Section 2.2;
- Identification of the key oral health issues for adolescents: Section 2.3;
- Scientific rational for preventive care approaches offered to adolescents: Sections 2.4 to 2.6; and
- Key barriers and enablers for Therapists to provide evidenced based preventive care for adolescents: Section 2.7.

The literature review concludes with a discussion and an outline of the objectives for the proposed research.

2.1 Literature review methodology

Online searches were conducted on CINAHL, OVID (Medline R), EMBASE, and Advanced Google Scholar in five different stages using initial key words then built onwards: dental therapist, oral health therapist, evidence based practice, adolescence, barriers, knowledge, attitude, and clinical practice. Continuing professional development, public dental health, dentists, and dental auxiliary were added. This was followed by oral health promotion and education, diet counselling, prevention, fissure sealants, fluoride, dental products, mouth rinsing, remineralisation, demineralisation, motivational interviewing. Other key words provided were dental clinical practice audits, organisational/educational leadership, clinical guidelines, and oral health/dental models of care. Methodology search words included research study design methodology, quantitative and qualitative, Grounded Theory, Delphi Technique, auditing, and mixed methods.
On-line searches of government (national and international) reports were also undertaken and relevant reports obtained. Other literature in the form of conference papers, relevant text books and journals were sourced.

Articles and references located, transferred and scrutinised for various sections of the literature review using the Endnote system amounted to 2,035. This was further reduced to 375 relevant articles for in-depth analysis.

2.2 The role of therapists in prevention

Globally, the utilisation and acceptance of Therapists to provide primary care for children has increased because of the inability of many governments to provide access for children, especially those from disadvantaged backgrounds, to receive basic oral health care. Many studies have recognized that the quality of care provided by Therapists for children in terms of diagnostic, preventive, and clinical skills are comparable to that of general primary care dentists.13, 24, 25

In many States and Territories in Australia a considerable proportion of oral health care for children under the age of 18 is provided by Therapists. NSW does not have a dedicated Public Oral Health Service for disadvantaged adolescents but many individuals from disadvantaged backgrounds can access free care at the point of delivery.26 Interestingly there is little information regarding the volume of clinical preventive services provided for adolescents in NSW Public Oral Health Services or whether clinical approaches are effective. Nonetheless, information from the New South Wales Child Dental Health Survey Report 2007 provided insight into preventive practices of clinicians. For example the placement of fissure sealants in permanent molars is a proven preventive procedure, but it is under-utilised in NSW.27 According to Schwarz10 of the 1.7 million children in NSW eligible for public dental care in 2003, only 7.3% received care from NSW Public Oral Health Services, and
65% accessed dental care with private dental practitioners. However, this 7.3% has the poorest oral health and this must be acknowledged in any policy plan. Hence, the Chief Dental Officer for NSW “urged” the Area Health Services and individual oral health clinicians to focus their clinical efforts on providing fissure sealants, as they are evidence-based practice for the prevention of dental caries. What is worth exploring is the profile of the 7.3% of NSW child population that accessed NSW Public Health Services, how many were adolescents, and importantly how many received preventive care within their course of care. This information is not currently available and furthermore, what are the barriers and enablers within the current system that impact on the delivery of evidenced-based preventive care by Therapists to improve oral health outcomes?

Therapists in Australia have provided the majority of clinical oral health care for children and adolescents in a “collaborative and referral relationship” with dentists for over forty years. In addition, Therapists provide oral health promotion and education for individuals and community groups. Recent findings on the status of dental auxiliaries reported that there is a projected 61% decline of qualified dental therapists in Australia from 1,171 in 2006 to 443 by 2025; but the number of university training places in the newly introduced Oral Health degree program will increase the proportion of oral health therapists by over 400% from 372 in 2006 to 2,117 by 2025. Therefore the Public Oral Health Services, the Australian Dental Association and Health Workforce Australia will need to have policies in place to ensure this major training investment is a success.

The Profile of Auxiliary Workforce in NSW Report stated that the majority of registered Therapists are employed in public health service and operate from various settings such as

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2 The Bachelor of Oral Health practitioners was introduced with the move from Dental Therapy Training Colleges to University Institutions.
school clinics, primary community health centres, dental hospitals and other (most probably mobile dental clinics), and a small number working in Aboriginal Health.

The NSW Health Policy Directive for ‘Practice Oversight of Dental Therapists, Dental Hygienists & Oral Health Therapists in NSW’ provides a framework for the practice of dentistry by dental therapists, dental hygienists and oral health therapists. It acknowledges the team approach to the provision of oral health services recognising the dental officer as the clinical team leader. The Chief Dental Officer has ultimate responsibility for the Practice Oversight or an authorised delegated registered staff dentist. For the purpose of clarity, the policy’s general principles pertaining to dental therapists and oral health therapists employed with the NSW Health scope of practice are outlined in Figure 2.1 and 2.2. The oral health therapist is defined as a person who holds qualifications for registration as both a dental hygienist and a dental therapist of which one is a bachelor’s degree. The general principles provided for an oral health therapist are outlined in Figure 2.2. Note that patient age limitation is not stated for oral health therapist as outlined for dental therapists in Figure 2.1.

Researchers have suggested that if dental teams are to be effective in promoting self-care for their patients, then a practice policy of agreement needs to be in place for all team members. Orientation for new staff and regular reviews of the policy must be undertaken. Additionally, the importance of training staff in providing effective health education messages, and the provision of appropriate supportive dental health resources should form part of the policy.

There is a lack of information on how Therapists provide care for adolescents in terms of the health education messages utilised or the use of supportive oral health education resources.
“Dental Therapists are part of a highly trained oral health team. They play an important role in the prevention, early identification and treatment of dental disease and the promotion of good oral health to individuals and the community in collaboration with other dental health professionals, allied health professionals and community agencies. Dental Therapists perform those oral health services in which they have been educated and trained to provide to children who are under the age of 18 years.
“An oral health therapist is a registered primary health care professional, oral health educator and clinician who provides services for the control of oral diseases and the promotion of oral health care, including: (i) preventive services-methods employed to promote and maintain oral health and prevent oral and general diseases; (ii) educational services-strategies developed for education on oral disease and general oral health and to encourage healthy behaviours; and (iii) therapeutic services-clinical treatments designed to stop or control disease and maintain healthy oral tissues”.
A study conducted by Satur et al\textsuperscript{13} explored the changes to Therapists’ practices since the introduction of legislation in the state of Victoria which allowed them to move from the public dental service into private practice. In addition, they were allowed to provide care for adults up to 25 years of age. The study discussed the potential range of clinical services that dental therapists and hygienists could provide and how they could contribute to the care of patients in different settings; plus their potential value in both metropolitan and rural locations. Satur et al reported that irrespective of where Therapists practiced, 76.3% regularly provided preventive care that included dental health education, 74.6% dietary counselling and 69.5% prophylaxis.\textsuperscript{13} Also, more than half of the participants reported applying pit and fissure sealants. However, those Therapists working in rural areas were more likely to provide restorative care such as pulpotomies, restorations and emergency treatment and were less likely to offer the preventive treatment type services when compared with their metropolitan colleagues. In areas where there was a shortage of dentists, Therapists took on more ‘substitute-type’ roles, were more self-reliant in treatment planning, including addressing emergency care requirements. Satur et al also raised the point that due to greater demand in rural areas for treatment, including emergencies, less preventive care was recorded.\textsuperscript{13} These practices are also common in most public health settings in NSW where there is a shortage of dentists.

Satur et al\textsuperscript{13} further discussed variations in clinical approaches for Therapists, their acceptance into the private sector and their potential contribution to a team approach to improve a patient’s oral health care. Crucial to the discussion is the recognition of the different settings in which Therapists practice and how local oral health demands are met. It is pleasing to note the volume of preventive services provided by Therapists, however, differentiation of age groups has not been published to determine the recipients of preventive services. The authors acknowledged the need to monitor Therapists future working practices
in order to provide information for health service managers on the scope and range of the services offered to different age groups of patients.\textsuperscript{13}

A report of the activities of dentists working in private practice noted a trend of increased rates of diagnostic services, radiographs and preventive care for patients aged 12 to 17.\textsuperscript{31} This provided a further snapshot of preventive efforts for the adolescent population across Australia.\textsuperscript{31} Again, information regarding the provision of preventive services offered by Therapists was not part of the research, nonetheless, Brennan and Spencer’s\textsuperscript{31} findings could be used to inform planning and clinical decision making for Therapists.

A review by Ford and Farrah\textsuperscript{11} examined the role of the Therapist in contemporary Australia and argued against the expansion of the scope of practice for Therapists to provide selective clinical treatment for adults. Instead they suggested that Therapists should be focusing their efforts on prevention and health promoting services. However this would require a restructure of the Australian health system. They requested there should be improved models of care utilising Therapists for prevention, oral health promotion programs particularly for disadvantaged groups, but clinical care would not be part of the model within the eligible age ranges. However, prevention, oral health promotion and clinical care simultaneously underpin each other, thus Ford and Farrah’s suggestions may be considered as a protectionist approach.\textsuperscript{11} Conversely, Schwarz\textsuperscript{10} highlighted political influences and factors that create major barriers for Australian oral health systems to progress beneficially towards ‘health promoting systems’. Ford and Farrah\textsuperscript{11} cited Tomar and Cohen’s\textsuperscript{32} essential elements for an ‘ideal’ oral health system as: (i) integration with general health care system, (ii) emphasis on health promotion and disease prevention, (iii) monitoring of population oral health status and needs, (iv) evidence-based, (v) effective (vi) cost-effective, (vii) sustainable, (viii) equitable, (ix) universal, (x) comprehensive, (xi) ethical (xii) include continuous quality assessment and
assurance, (xii) culturally competent, and to (xiv) empower communities and individuals to create conditions conducive to health.

The role of the Therapist fits in well with the majority of these ideals, but are often shut out by antagonism from within the dental profession, as well as the public oral health sectors inertia to embrace and capitalise on their potential as a cost effective workforce strategy to meet the populations’ high dental demands. Therefore, Tomar and Cohen’s 32 elements should be viewed broadly, in terms of their practicality and affordability within the NSW public health context, bearing in mind Blinkhorn’s19 caution of systems that may potentially marginalise disadvantaged people from receiving dental care.

The Chief Executive Officer33 for Consumers Health Forum Australia in her 2012 editorial provided a brief on the advocacy efforts for an improved oral and dental health system within Australia, which included expanding of Therapists’ service provision capacity, contrary to Ford and Farrah’s stance, and increased funding to improve patient access to services.

However information is very limited regarding the clinical preventive practices of Therapists providing care in the NSW Public Oral Health Service, especially for different age groups. This study proposes to include the collection of appropriate baseline data to inform preventive care interventions for Therapists. Most researchers, government agencies and dental professional organisations agree that Therapists have a pivotal role in public health systems to provide enhanced and well organised preventive oral health care for specific groups within the population. Adolescents are a population group who require dedicated preventive oral health care and Therapists can provide this. A well-structured evidence based preventive care program delivered by Therapists to adolescents may yield long term positive health outcomes.
2.3 Adolescents’ oral health

The Australian National Oral Plan provided an overarching framework for oral health promotion, prevention and early intervention strategies to improve the oral health and general health of the Australian population. It recommends that provision of services for prevention and treatment address the specific needs and culture of the adolescent age group, including providing them with the skills and incentives to maintain oral health as they progress into adulthood. Researchers have emphasized that public oral health services recognise the importance of providing regular and timely check-ups including preventive focused oral health care to improve the oral health of children (including adolescents) thereby contributing to better oral health for “tomorrow’s adults”.

The terms ‘adolescent’, ‘teenager’ and ‘young people/person’ are used interchangeably in health literature. The term ‘teenagers’ according to Armfield et al is used to identify children who are aged between 13 and 19 years, and at times 12 year olds may be included in this category. In Australia, 18 and 19 year olds are often not included as they are considered young adults. The World Health Organisation defines adolescents as:

“a person between 10 and 19 years of age, with high self-esteem and good social skills who is clear about her/his values and has access to relevant information and likely to make positive decisions about their health”.

The terms adolescent/adolescence will be used for this research study, a personal developmental stage that is opportunistic for Therapists to engage with those who choose to access oral health services to promote and sustain good overall health.

Whilst young people’s health has improved in Australia in recent times, 20 per cent still experience health problems, some of which may be life threatening. Adolescents’ experiences include rapid emotional, physical and intellectual changes, as they advance from
childhood into adulthood. A number of factors including substance misuse, pregnancy, behavioural and mental issues may impact on young people’s health and wellbeing. Adolescents are influenced by external factors which alter the way they think and behave and peers may have more influence on their values and behaviours, more than parents and other members of the family. It is a period when young people strive for independence and begin to leave structures that previously maintained their health and well-being. Current epidemiological data suggests that overall caries rates are declining; however it remains highest during adolescence. Adolescence marks a period of significant caries activity for many individuals.

Adolescents that decide to indulge in risky behaviours such as inappropriate diet, poor oral hygiene, smoking, drug and alcohol use, and have poor attendance for preventive oral health care are placed at higher risk of experiencing dental caries and periodontal disease. Researchers articulate that dental decay is rarely associated with mortality, however, it may cause considerable morbidity with long term social impacts.

2.3.1 Epidemiology of dental caries among adolescents in NSW

Globally, dental caries remains the most common chronic disease among children and adolescents, with low-to-middle income countries reporting that the majority of dental caries remains untreated. Perez et al’s study in Sao Paulo, reported that 25 per cent of Brazilian adolescents reported dental pain, with a higher prevalence among those living in less developed areas of the city. Bernabe and Sheiham reported marked differences of dental caries in permanent teeth between childhood and adulthood in 26 countries, with significant differences in DMFT between 12 year olds and 35 year olds to 44 years of over 500 per cent, and in seven other countries of more than 1,000 per cent. Australian researchers have reported steady increases in caries experience of adolescents in South Australia. Armfield et al reported that the mean average DMFT per child increased from
1.07 per child at age 12 years to 2.01 teeth per child at age fifteen years (Figure 2.3). Their findings provide evidence of the need for focused preventive oral health programs to control dental caries for long term health gain.
Figure 2.3 Average number of decayed, missing and filled teeth (DMFT) for 12 to 15 year old children, Australia 2003-04 as reported by Armfield et al. 36
Skinner et al\textsuperscript{45} in their summary paper of The NSW Teen Dental Survey 2010, found that 45.4\% of 14 and 15 year olds had dental caries with a DMFT of 1.17, but with only 5.2\% of them requiring immediate treatment. Variations in caries experience were attributed to rural and remoteness, water fluoridation and socio-economic status including household income levels. Skinner et al stated that the DMFT score for 14 to 15 year olds has been stable over the last ten years compared to DMFTs of teenagers reported by Armfield et al\textsuperscript{36}, and the authors\textsuperscript{45} purported that it may be due to the increased ‘coverage’ of water fluoridation in the NSW State over this time period.\textsuperscript{45}

One hundred and seventy five schools were invited to participate in the NSW Teen Dental Survey 2010; however, only 84 took up the offer, a 48 per cent response rate. A total of 1,256 teenagers were examined giving a 24 per cent student participation rate. The reasons for the low school participation rates were given as “crowded curriculum timetable and prior commitments to other surveys”. Reasons for low student participation rates were “poor timetabling, students not returning consent forms or refusing to participate on the day”. Additionally, parents did not like the long complex questionnaire included with the consent form.\textsuperscript{45} The survey design methodology for the NSW Teen Dental Survey and use of modern equipment for data collection improved research processes such as dental recording and the scanning of data for analysis.

Skinner et al\textsuperscript{45} stated that although the survey was compromised by the poor response rate, it did show marked differences in the oral health of teenagers. For example adolescents in Hunter New England had a mean DMFT score of 0.52, compared with Mid North Coast where the mean DMFT was 2.97. The NSW Centre for Oral Health Strategy’s recently released Teen Dental Survey 2010\textsuperscript{46} report stated that teenagers with the highest 30 per cent of DMFT scores had on average 3.45 teeth with dental caries (Table 2.1); and reported that
teenagers who consumed one or more sugary drinks per day had 50 per cent more decayed, missing and filled permanent teeth than teenagers who didn’t drink any sugary drinks.

The dental caries prevalence for non-fluoridated areas and fluoridated districts included in the NSW Teen Survey showed similar epidemiological trends to other studies in Australia (fluoridated areas DMFT of 1.09 versus non-fluoridated areas DMFT of 1.68), giving further evidence of the effectiveness of water fluoridation as a population health strategy for the control of dental caries.37, 39, 43, 46 47
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Table 2.1 NSW Centre for Oral Health Strategy reported significant caries indices by age

<table>
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<th>Age (years)</th>
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<td>14</td>
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<td>15</td>
<td>3.52</td>
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SIC: Significant caries indices
The ‘Child Dental Survey for Australia 2003-2004 was somewhat compromised methodologically as the large States of NSW and Victoria were not included however, it did provide valuable information on teenagers’ oral health status in Australia, namely:

- “Teenage children were identified as being at increased risk of dental disease. Between 40% and 57% of 12–15 year old teenagers had some history of decay in their permanent teeth—that is, one or more decayed, missing and filled permanent teeth.
- On average 12 year old children had a mean DMFT of 1.07, while 15 year old children had 2.01 decayed, missing and filled permanent teeth on average.
- The 10% of teenagers with the most extensive history of permanent tooth decay had between five and eight permanent teeth affected, which was about 4.5 times the national average of decayed, missing and filled teeth.”

This section has highlighted that dental caries prevalence among adolescents increases with age. Bernabe and Sheiham in their study of 26 countries further highlighted that the burden of dental disease increases with age, and alluded to the importance of addressing the determining factors such as high consumption of sugars and low use of fluoride modalities for dental caries control.

Bernabe and Sheiham also recommended that organised oral health prevention programs should be directed at children and that high fluoride products should be used across the lifespan for all individuals to prevent dental caries; this is aligned with the Common Risk Factor Approach.

Although the NSW Teen Dental Survey 2010 reported a lower prevalence of dental caries when compared to South Australian teenagers, the NSW Public Oral Health managers should not be complacent, as there is a need to sustain and maintain the oral health care services for this age group. This section has provided information which indicates that there are
opportunities for Therapists in the NSW Public Oral Health Services to focus on preventive approaches and endeavour to achieve a ‘health promoting service’ for the NSW children and adolescents. Thus, suites of intervention programs including promotion of fluoride therapies to complement water fluoridation are definitely warranted, and could be delivered by Therapists at different community levels and maximising current resource allocations. In terms of clinical preventive care, a paradigm shift towards a ‘prioritised preventive clinical health care service’ as opposed to a ‘pain relief public dental service’ should be further investigated.

2.3.2 Diet, dental caries, white spot lesions (WSL) & tooth erosion
Inappropriate diet is identified as a major risk factor for the development of dental caries, white spot lesions (WSL) and erosion in adolescents. White spot lesions have been reported as an increased concern for adolescents in orthodontic treatment. Further, researchers have identified an increase of erosion in association with inappropriate dietary factors which is also of major concern. White spot lesions of the enamel are defined as the early stages and signs of the decay process. However with early detection by dental professionals and the provision of appropriate oral health therapies it is possible to prevent progression to tooth cavitation. Dental erosion is defined as the loss of dental hard tissue by a chemical process not involving the impact of bacteria, explained as little demineralised areas. For the purpose of clarity, white spot lesions are indicative of caries activity, are a critical component of the demineralisation process of tooth enamel and, if not managed and controlled progresses to dental caries. Adolescents are a high risk group for WSLs, erosion and dental decay and this section discusses the reasons why this is the case.

Adolescents tend to suffer from dental caries as teeth are at their most susceptible to caries just after they erupt into the mouth. It was highlighted during Dental Health Week 2006 in Australia that both male and female adolescents ingest large amounts of food that are high in
sugar, fat, salt and insufficient food that is high in fibre and vitamins. There is overwhelming evidence regarding the role of diet in the aetiology of dental caries. Risk factors which increase the chances of demineralisation of the dental enamel and dentine include frequent exposure to refined sugars, cariogenic bacteria and reduced saliva flow. Evidence that diets high in sugar with an increased intake of carbonated soft drinks contribute to high levels of dental decay and tooth erosion amongst adolescents have been reported in a number of studies.

According to Johansson et al the principal factor responsible for erosion evident in today’s children and adolescents is the consumption of soft drinks. Evidence of increased consumption of carbonated drinks by adolescents has demonstrated the deleterious effects resulting in enamel erosion and increased risk of dental caries. A review paper on current fluid intake and dental caries in Australian children indicated the increased harmful impacts of urbanisation and globalisation, the increase in promotion and availability of processed foods and sweet foods on altering children’s diets, placing them more at risk of poorer general and oral health.

Fluoridated drinking water is available in many areas of Australia providing a caries preventive effect on health at a population level, irrespective of age and socio-economic status. However, carbonated drinks are a popular choice of beverage among Australians with the highest levels of intake in adolescents, particularly males who consume up to 1 litre a day. A media report highlighted that almost 80% of 12 - 17 year olds consumed sugar-containing soft drink weekly, with 10% drinking over one litre daily and 35% drinking 750 mL (two cans) daily. A further study established that drinking one carbonated drink a day significantly increased the risk of adolescents developing tooth decay.
Both ‘regular’ and ‘diet’ soft drinks have a low pH (generally 2.4-3-5), high titratable acidity and low calcium and phosphate concentrations all of which increase the potential for enamel erosion and cariogenicity. Lee and Brearley-Messer highlighted that the cariogenic potential of diet soft drinks (containing sugar substitutes) decreased significantly due to lack of sugar. A study adding 0.2% w/v casein phosphor-peptide-amorphous calcium phosphate (CPP-ACP) to acidic drinks demonstrated a reduction in erosivity, however, Lee and Brearley-Messer cautioned that the effect on cariogenicity needed further exploration.

The review by Lee and Brearley-Messer provided recent Australian evidence to support current challenges of caries development in children and adolescents due to sugar intake from foods and drinks. The habit of drinking sugar containing carbonated drinks by the adolescent population significantly increases their risk of developing dental caries.

Lussi and Jaeggi suggested that in children and adolescents extrinsic and intrinsic factors or combinations of them are possible reasons for tooth erosion. They further stated that other similar factors such as regular and extensive consumption of ‘erosive’ food and drinks, included medicaments for asthma and gastro-oesophageal reflux or vomiting. Lussi and Jaeggi indicated other challenging factors such as unusual eating and drinking behaviours common in adolescence, including the consumption of designer drugs being of importance.

Moynihan & Petersen drew attention to the reliance of researchers on cross-sectional surveys in measuring dental caries, as caries developed over time, highlighting that real-time measurements of disease levels and diet may not provide an accurate reflection of the role of diet in the development of the disease. The authors highlighted the fact that diet and several other factors from previous years may be responsible for current caries levels. Long term cohort studies are required to monitor dental caries development over time.
There are few reports available on the role of diet and nutrition in the aetiology of periodontal disease; however, tobacco use, alcohol, and stress are contributors to chronic diseases which include dental disease, diabetes mellitus, cardiovascular disease, cancers and obesity. Research into the role diet and nutrition play in the aetiology of periodontal disease continues.

Challenges for Therapists as oral health care providers in the public health system are to engage adolescents in effective oral health strategies for the prevention of white spot lesions, dental decay and tooth erosion in relation to diet and nutrition.

2.3.3 Oral hygiene practices, gingivitis & periodontal disease

Researchers have stated that children and adolescents are not exempt from periodontal diseases such as gingivitis, the manifestations of systemic diseases, aggressive periodontitis and incidents of necrotizing periodontitis diseases. The American Academy of Pediatric Dentistry reported gingivitis of varying severity is more prevalent in adolescence and tends to level off in older age groups. Epidemiological studies indicated that gingivitis is nearly universal in children and adolescents. Although some investigators have suggested that periodontal disease is age related and more prevalent in adults, it is not uncommon for severe forms of periodontitis to be detected in adolescents. The literature identifies dental plaque as the dominant causative factor of gingivitis and periodontal disease. Adolescents with poor oral hygiene practices are at risk of disease progression. Chronic gingivitis is the most common periodontal disease, affecting more than 70% of children over the age of seven years of age. It is characterised by inflammation of the marginal gingiva without detectable loss of bone or connective tissue attachment. Clinical indications of gingivitis include redness and swelling of the marginal gingiva and bleeding upon probing. During adolescence, gingivitis and periodontitis may increase with hormonal changes suspected to be an important aetiological factor. Oh et al undertook an analysis of the literature
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Children [including adolescents] with overt gingival inflammation, subgingival calculus, and initial signs of alveolar bone loss are potentially ‘periodontitis-risk patients’ and are recommended to be prioritised for a preventive program. Researchers also identified smoking and stress as a risk factor among adolescents which increased the risk of developing gingivitis, and advocated the importance of smoking cessation education in conjunction with oral hygiene preventive education.

2.3.4 Tobacco use

Among adolescents aged 14 to 19 years, 14% of boys and 16% of girls smoke. This behaviour commences early, with 7% of 12 year olds smoking cigarettes increasing to 20% by 18 years of age. There are growing concerns regarding chronic illnesses as a result of smoking, it is a causative factor for periodontal disease, oral cancer and a risk factor for other oral mucosal lesions. Although there is scarcity of information on the extent of tobacco use in adolescents, smoking cessation advice at the dental chair side by Therapists in the public health service is supported by researchers and current NSW Health policies.

2.3.5 Access to care

Although in NSW, all adolescents aged 12 to 17 are eligible for free dental care, it is not possible to provide such a universal service because the Public Oral Health Service is under resourced, and many families cannot afford to seek care for their children from a private practitioner, so their oral health in adulthood is compromised. This will translate to poor
dental health in adulthood. Therefore the Australian Government’s response to the concerns regarding the future oral health status of adults was to concentrate on adolescents through the Medicare Teen Dental Program Plan. This program enabled means tested adolescents to access annual dental preventive check-ups in either the private or public sectors. The program demonstrated a gradual increase in the number of adolescents accessing NSW Health Public Oral Health Services since its inception. However, there are limitations to this program, as it is not known what type of clinical preventive services, if any, are provided for adolescents eligible for this program. Little information is available on the services provided by the NSW Public Oral Health Service, especially the input from Therapists. Levine and Stillman-Lowe emphasized the importance of individuals irrespective of age and oral health status having an oral health examination regularly, preferably every 12 months for those less than 18 years of age. Their rationale being that oral diseases could be detected early and treated. Another study demonstrated that the levels of caries during early childhood were strongly related to prevalence of approximal caries in adolescence. Thus, it is important to manage high risk pre-school children across their school lifespan, and have an effective public oral health care plan for those over the age of 18 years.

Effective partnerships of the home, schools, oral health professionals and community organisations are necessary in order to control risks to the oral health of adolescents and young people. Researchers refer to this approach as an ecological ‘multi-component’ intervention, including community health development approaches. Further strategies such as Ottawa Charter principles and Common Risk Factor Approaches are part of the NSW Oral Health Promotion Strategies that underpin NSW Therapists’ oral health promotion and clinical work practices. The principles recommended provide a sound foundation for Therapists to reflect upon whilst focusing on clinical preventive individual approaches. Watt and Wright et al advocate for multi-level health promotion strategies.
and evidenced based preventive interventions to combat community oral health issues; sub-population focused clinical preventive approaches for the adolescent group being one.

North\textsuperscript{82} stated that adolescents often do not respond positively to current models of care that are used in Paediatrics or in Medicine settings, neither are they ‘controllable’ or ‘compliant’, yet all these behaviours such as tobacco use, poor diet, physical inactivity and mental health issues often stem from and are initiated during adolescence.\textsuperscript{82} According to North, the wellbeing of our young people is critical to the health and wellbeing of our society and our future, reiterating Spencers and Harford’s\textsuperscript{34} stance to prioritise adolescents as future adults. North further claims that adolescents’ health problems are mostly preventable and provides a way forward:

“Recognise the problems early; develop the expertise to deal with it, or better yet prevent them and implement interventions that have been demonstrated to be successful”. \textsuperscript{82}

North\textsuperscript{82}, echoed Truman et al’s\textsuperscript{92} and Watt’s\textsuperscript{15} solution to the issue emphasising that although time consuming and potentially costly, the problems encountered with adolescent health need to be recognised and addressed as ‘public health problems’ with a focus on ‘early identification, early intervention and education’ as a more effective approach with a broader scope.

Currently in NSW Public Oral Health Service there is no age specific guidance on evidence-based clinical preventive approaches for dentists and Therapists, however, the Handbook of Pediatric Dentistry by Cameron and Widmer\textsuperscript{95} does provide useful advice on preventive care.\textsuperscript{95} North\textsuperscript{82} stated that most models of care either address paediatric health issues or adult concerns with adolescents falling into a gap. The NSW Centre for the Advancement of Adolescent Health\textsuperscript{23} produced a document titled ‘GP Strategy, Advancing Adolescent Health through General Practice’ where it acknowledged the need to assist ‘training
providers’ plan and devise quality youth-health-related professional education for General Practitioner’s by developing a General Practitioner training delivery guide; including rendering on-going technical support.23

The NSW Centre for the Advancement of Adolescent Health used the report findings to implement strategies to address growing health concerns for adolescents across NSW within clinical and community settings and specifically for those that are expected to provide high quality effective health care.23 NSW Public Oral Health Therapists may benefit from adapting the specific adolescent guidelines for training, continuing professional development and clinical practice. Nevertheless, specific research to explore evidenced-based oral health preventive approaches for adolescents and the development of appropriate resources to support Therapists is indicated.

The evidence demonstrates the increased risk of adolescents to dental disease, and Therapists are pivotal to the prevention and education of adolescents in the clinical setting for the prevention of dental caries and periodontal disease.

2.4 Clinical preventive oral health care for adolescents

For NSW Public Oral Health Services to aspire towards delivering quality health care encompassing clinical preventive interventions, it will require a review of the current theories and scientific-based clinical interventions. This section scopes the literature on how preventive oral health care may be integrated more efficiently and effectively into Therapists’ clinical practices ensuring quality care for adolescents within the current health system. Patient focused ethical clinical decision-making processes should be practiced to provide quality preventive care in the public health setting. Cashmore et al 22 recommend provision of realistic timeframes for preventive activities, and should be acknowledged as a priority within the NSW Public Oral Health Service.
2.4.1 Clinical diagnosis and preventive management care

Researchers state that proper disease management commences with a correct diagnosis.\textsuperscript{96} Patients accessing services have the right to receive a thorough examination of the mouth, teeth and supporting structures and not just identification of dental decay.\textsuperscript{75} Blinkhorn\textsuperscript{97} recommends that clinicians should make a specific preventive care diagnosis for the patient who has oral health problems and this practice should be adopted as an essential and pivotal element of the comprehensive examination phase. The preventive diagnosis therefore informs a patient as to why they need preventive care, and their oral health problems that indicate a need for change of behaviour. This should be in the initial stages of their course of care; not as an afterthought after restorative treatment plans have been decided.

Patient risk assessments tend not to be transparent and defined adequately in current preventive clinical policies. The significance of this process is emphasized by researchers.\textsuperscript{98-101} However, considering different settings it is critical to consider appropriate, practical and realistic approaches with clinical administrative support for their application.

Various evidence-based caries risk assessment protocols have been developed for different children and adults.\textsuperscript{102,103} Clinical protocols for Caries Management by Risk Assessment (CAMBRA) provided by Jenson et al \textsuperscript{101} for ages 6 to adults are comprehensive.\textsuperscript{101} The authors assigned patients risk into four levels: Low, Moderate, High and Extreme Risk.

Eight major clinical activities were identified to be considered for each level of risk: (i) radiographs, (ii) dental caries recall exams, (iii) saliva test, (iv) antibacterial chlorhexidine, xylitol, (v) fluoride, (vi) pH control, (vii) calcium phosphate topical supplements, (viii) sealants (resin-based or glass ionomer). Case scenarios are provided to support the processes. The clinical protocols are scientifically based; however, the inclusion of white spot lesions/early demineralisation of enamel lesions classification on smooth services together
with pit and fissures of the tooth with recommended preventive care would have been beneficial as this seems to be a dental concern for adolescents.\textsuperscript{70, 104}

The Caries Management System (CMS), an evidence-based preventive strategy for dental practitioners aimed at adult, children and adolescents outlined a 10 step approach to clinical practice.\textsuperscript{2, 5} The clinical protocols provided elements for the concepts of ‘health risk assessments’ referred to by researchers.\textsuperscript{76, 101, 105} The system includes an odontogram template to support use of the International Caries Detection and Assessment System (ICDAS II) assigning individuals into different risk levels. It provided support for reporting radiographic findings to assist clinician decision making for preventive treatment. The methodology and processes outlined are sound and valid, however it appeared to be greatly patient reliant for its success. Opportunities for piloting the CMS in public health settings should be undertaken to determine its practical value and effectiveness.

The International Caries Detection and Assessment System (ICDAS II) outlined does not appear to be utilised by the majority of Therapists practicing in public health, or if used is not filtered evenly across the Local Health Districts. Furthermore, in the two protocols patient medical history taking was not included as a component of the ten step process, however, reference is made to its role to improve clinical decision making.\textsuperscript{2, 5} To enhance its value the requirements of the medically compromised adolescent should be considered as alluded to by North\textsuperscript{82} and lifestyle challenges as indicated by Lussi and Jaeggi.\textsuperscript{106} The ICDAS II is also very time consuming and it would be prudent to ascertain whether a simpler examination system would provide sufficient information to assist preventive care treatment planning.

Jenson et al’s \textsuperscript{101} and Evans and Dennison’s \textsuperscript{2} clinical protocols provided substantial scientific evidence to inform caries management approaches that are applicable for adolescents. The authors emphasized the importance of caries risk assessments “routinely built into
comprehensive oral examinations and periodic oral examinations”. Medical and social history taking should be included in this category, as well as recording an individual’s access to fluoridated drinking water or exposure levels to alternative fluoride therapies. It has been demonstrated that individual oral health risks assessments are critical in the management of oral diseases. The CAMBRA and CMS approaches are extremely complex; however, with appropriate electronic oral health record support may have merit for general implementation, after further practical testing in both the public and private sectors.

Conversely, Walsh and Brostek provided four fundamental principles of minimal intervention dentistry (MID) encompassing previous researchers’ strategies for managing dental caries as:

(i) Recognition – early identification and assessment of potential caries risk factors using lifestyle analysis, saliva testing and plaque diagnostic tests (Figure 2.4),

(ii) Reducing or elimination of caries risk factors such as intake of cariogenic foods, modifying fluid balance, smoking cessation, and maintaining the normal pH of the oral environment,

(iii) Regeneration – to arrest and reverse incipient lesions, enamel regeneration by using remineralising agents such as topical fluorides and casein phosphopeptide-amorphous calcium phosphates (CPP-ACP) and,

(iv) Repair – where cavitated lesions are present, as much of the tooth structure should be maintained by using conservative techniques for caries removal; and bioactive materials are to be used to restore the tooth and promote internal healing of the dentine, specifically in cases of deep dentinal caries where there is risk of iatrogenic pulpal injury.

Nevertheless, it is these programs whilst encouraging, which need further research to assess their practical potential in the public primary dental care setting.
Figure 2.4 Use of Tri-Plaque ID three tone disclosing gel to illustrate acid producing cariogenic plaque as a light blue stained area on lower right canine, and mature non-fermenting plaque shown as a dark purple stain, and thin plaque as a pink-red stain, as illustrated by Walsh and Brostek. 108, 109
Lamster’s paper on periodontal care asserts the diagnosis phase is critical, including utilisation of other diagnostic methods, such as radiographs and analysis of biologic fluids such as saliva and tissue samples. He emphasised that “Arriving at the correct diagnosis allows for selection of appropriate treatment, with minimal time delay”.

Health care providers must continuously improve their diagnostic expertise particularly as oral inflammation may have adverse effects on tissues and organs at distant sites, in accordance with Sheiham and Watts Common Risk Factor Approach theory.

It appears that the diagnosis of dental caries and periodontal diseases is inconsistent. The importance of a ‘Preventive Diagnosis’ in the initial phase of patient care is essential. Existing clinical practices of Therapists within this ‘Diagnostic’ process in the public health system also appear to be inconsistent across the Local Health Districts.

### 2.4.2 Radiographs

The essential role of radiographs in dental caries and periodontal disease management is well documented including precautions regarding radiation practices. Brennan and Spencer stated that the use of radiographs as a diagnostic tool is important in the early detection of oral disease such as approximal dental caries, identifying lesions in a timely way whereby enabling preventive measures to combat their progress and avoiding operative interventions. The decision regarding which radiographs are to be taken depends on the extent and distribution of periodontal disease and dental caries.

Utilising radiographs for the management of dental caries is a key component of the CAMBRA and Caries Management System in preventive regimes for children and adolescents. Evans and Dennison’s protocols are yet to be validated in the NSW public health system, although research findings of the Caries Management System implementation has indicated it may be cost effective in the private health sector.
2.4.3 Role of bacteria

Prevention of dental disease requires a sound knowledge of the contributing risk factors, including evidence to support decision making for the prescription of further clinical investigations for the patients. Critical to this process is the evidence of the role of bacteria in dental disease aetiology. Researchers have provided overwhelming evidence of the role of bacteria in the aetiology of dental caries and periodontal disease across the lifespan.\(^4\), \(^99\), \(^116\)-\(^120\) Dental caries is caused by cariogenic bacteria using sugars to create an acidic environment.\(^63\) Biofilms, microbial communities and plaque ecology are significant determinants in disease development. With a bacteria acidity oral environment, local pH levels drop below critical values resulting in demineralisation of tooth tissue. Undisrupted diffusion of calcium, phosphate and carbonate from the tooth tissue results in cavitation.\(^120\) Cariogenic bacteria once established in the oral environment are deemed very difficult to manage.\(^60\), \(^108\), \(^121\), \(^122\)

Studies in microbiology have identified particular key pathogens which are associated with periodontal disease; these bacteria exist in biofilms with different subgingival microbial species that exist in adolescents presenting with periodontitis.\(^123\), \(^124\) Sucrose intake is associated with increased plaque volume due to production of extracellular glucans; a strong correlation exists between plaque volume and gingivitis, however, other research findings implied that amendments to sugar intake does not eliminate the development of gingivitis.\(^57\)

Genetic factors are known to modify hosts responses to the bacterial complex and are therefore major determinants of susceptibility to the development of periodontal diseases, and many systemic diseases have been reported to predispose children and adolescents to periodontal disease.\(^79\) Thus, it is critical to obtain comprehensive history of the patient and assess if there is a hereditary trend for periodontitis within the family to assist with the development of preventive strategies.
The importance of understanding the microbiology and role of bacteria is critical for clinical decision making in the control of dental caries and periodontal disease (Figure 2.5). Individualised preventive oral health regimes should be provided for those adolescents identified at risk, including saliva and plaque testing.
Figure. 2.5 Featherstone’s diagram illustrating the balance between protective and pathogenic factors in the dental caries process.98

Protective Factors
- Saliva flow and components
- Proteins, antibacterials
- Fluoride calcium, phosphate
- Protective dietary components

Pathological Factors
- Acidogenic bacteria (mutans streptococci and lactobacilli)
- Frequency of fermentable carbohydrate ingestion
- Reduced salivary function

No Dental Caries

Dental Caries
2.4.4 Role of saliva

Saliva has a significant role in the prevention of dental caries.\(^59,101,103,126\) The properties and functions of saliva including its role in the oral health of patients has been discussed and reviewed widely by various researchers.\(^{108}\) In the year 2000 Walsh\(^{126}\) argued that the multiplicity and importance of the role of saliva in the oral cavity is not yet appreciated by clinicians. The functions of saliva provided by researchers include:

- Lubricating the oral tissues (for swallowing and speech)
- Dilution and clearing the oral cavity, remove food particles and debris from the tissues, protecting the oral soft tissue from abrasion during mastication
- Assisting the special sense of taste by acting as a solvent for ions, and proteins
- Facilitating the digestion of carbohydrates with amylase and lipase
- Controlling the oral micro flora, through immunological (Iga), enzymatic, peptide and chemical mediators

Thus, the role of saliva in remineralisation should be emphasised in the management of oral diseases by Therapists for all patients, as it acts as a reservoir for ions (calcium, phosphorus and fluoride) which are essential for remineralisation;\(^57,59,98,101,126,127\) as well as buffering acids from dental plaque and from consumed foods and drinks; and prevention of erosion caused by episodes of lengthened exposure to weak acids or short term exposure to strong acids (e.g. reflux and vomiting).\(^{126,108}\)

Considering patients high consumption of carbonated drinks, increased use of alcohol, tobacco and social drugs, Therapists are well placed to provide oral health education focusing on encouraging patients to increase frequency of drinking tap water, decrease sugary snack consumption and provide essential smoking cessation advice where indicated.
2.5 Oral health education strategies

This section discusses the management of periodontal disease, enamel decalcification (white spot lesions, WSL), dental caries, erosion and tobacco use according to the preventive care processes and resources available to support clinicians. Levine and Stillman-Lowe 89 assert that there are two ways for individuals to reduce the risk of dental caries: (i) using fluoride effectively by brushing twice daily with fluoride toothpaste and (ii) reducing the harmful impact of sugars by decreasing the frequency and amount of consumption. They contend that these two processes are powerfully connected.89 Further, they assert that good oral hygiene practices (mechanical removal of plaque by toothbrushing) decreases the risk of gingivitis and periodontitis.89 This section discusses them separately, however, it is clear there is a marked overlap in the processes in the prevention of dental caries, gingivitis and periodontitis. This highlights the complexity and rationale for breaking down the processes for clinician and patient to enhance the effectiveness in the provision of preventive care in the clinical setting.

2.5.1 Oral health education

Engaging with adolescents in the clinical setting to provide ‘oral health education’ is opportunistic for Therapists in the Public Oral Health Service. Studies undertaken investigating oral health education tend to be an inclusive mix of ‘preventive activities’ hence the tendency to include dietary advice, oral hygiene advice, fluoride activities, fissure sealants, and smoking cessation as essential components of ‘oral health education’. Yarnall et al’s128 study demonstrated that there was insufficient time within a 15 to 30 minute session to cover all the suggested topics in the US Preventive Service Task Force program (Table 2.2). Although only a few oral health items are included, the US Preventive Service Task Force have ignored the practical problems in primary care dentistry. It is essential to allocate specific timeframes for preventive advice that is factored into Therapists’ day to day clinical
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Table 2.2  Time requirements for US Preventive Services Task Force Recommendation for Adults Age 25 Years and Older in Representative Practice as adapted from Yarnall et al’s report.\textsuperscript{128}

<table>
<thead>
<tr>
<th>Preventive Service</th>
<th>Annual Frequency</th>
<th>Minutes Per Service</th>
<th>Hours per Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tobacco Cessation</td>
<td>1.00</td>
<td>3.00</td>
<td>19.0</td>
</tr>
<tr>
<td>Regular physical activity</td>
<td>1.00</td>
<td>4.00</td>
<td>108.0</td>
</tr>
<tr>
<td>Problem drinking</td>
<td>1.00</td>
<td>5.00</td>
<td>14.0</td>
</tr>
<tr>
<td>Limit fat and cholesterol/diet</td>
<td>1.00</td>
<td>8.20</td>
<td>221.0</td>
</tr>
<tr>
<td>Adequate calcium intake</td>
<td>1.00</td>
<td>1.50</td>
<td>21.0</td>
</tr>
<tr>
<td>Visits to dental care provider</td>
<td>1.00</td>
<td>1.50</td>
<td>40.0</td>
</tr>
<tr>
<td>Floss, brush daily</td>
<td>1.00</td>
<td>1.50</td>
<td>40.0</td>
</tr>
<tr>
<td>STD prevention</td>
<td>1.00</td>
<td>3.00</td>
<td>81.0</td>
</tr>
<tr>
<td>Fall prevention</td>
<td>1.00</td>
<td>1.50</td>
<td>7.9</td>
</tr>
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Oral health education effectiveness and approaches have been critiqued by many researchers.\textsuperscript{97, 129-136} Their main concern for oral health teams providing preventive messages to the public is to ‘get it right and give it time’.\textsuperscript{132, 137} Stillman-Lowe\textsuperscript{132} highlighted inconsistencies that existed amongst practitioners in providing essential preventive messages to patients indicating the need for guidelines. Reference is made to the resource: Delivering Better Oral Health: An evidence-based toolkit for prevention (Department of Health and the British Association for the Study of Community Dentistry, 2007)\textsuperscript{138} to assist dentists provide consistency in their evidence-based preventive approaches for patients. Stillman-Lowe\textsuperscript{132} asserted the importance of simplicity and clarity of practitioners’ messages to patients. She referred to a two tier approach outlined in the resource: “All patients should be given the benefit of advice regarding their general and dental health, not just those thought to be ‘at risk’. For those patients about whom there is greater concern (e.g. Those with medical conditions, those with evidence of active disease and those for whom the provision of reparative care is problematic) more intensive actions are required”.\textsuperscript{132} Stillman-Lowe\textsuperscript{132} raised concerns of ‘how’ messages should be delivered to be effective, she acknowledged the challenges practitioners face, and referred to the validity of Blinkhorn’s\textsuperscript{97} guidelines for dental teams to be re-considered as outlined in Figure 2.6.
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Oral health education effectiveness and approaches have been critiqued by many researchers.97, 129-136 Their main concern for oral health teams providing preventive messages to the public is to ‘get it right and give it time’.132, 137 Stillman-Lowe132 highlighted inconsistencies that existed amongst practitioners in providing essential preventive messages to patients indicating the need for guidelines. Reference is made to the resource: Delivering Better Oral Health: An evidence-based toolkit for prevention (Department of Health and the British Association for the Study of Community Dentistry, 2007)138 to assist dentists provide consistency in their evidence-based preventive approaches for patients. Stillman-Lowe132 asserted the importance of simplicity and clarity of practitioners’ messages to patients. She referred to a two tier approach outlined in the resource:

“All patients should be given the benefit of advice regarding their general and dental health, not just those thought to be ‘at risk’. For those patients about whom there is greater concern (e.g. Those with medical conditions, those with evidence of active disease and those for whom the provision of reparative care is problematic) more intensive actions are required”132

Stillman-Lowe132 raised concerns of ‘how’ messages should be delivered to be effective, she acknowledged the challenges practitioners face, and referred to the validity of Blinkhorn’s97 guidelines for dental teams to be re-considered as outlined in Figure 2.6.
**Figure 2.6 Practical advice on oral health education as suggested by Stillman-Lowe**

<table>
<thead>
<tr>
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</tr>
</thead>
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<tr>
<td>- “The dental team needs to form a partnership with patients, working together to solve a health problem.</td>
</tr>
<tr>
<td>- Many dentists complain that, despite their best efforts, patients do not change their behaviour and the whole health education exercise is ultimately futile. Two factors must be considered:</td>
</tr>
<tr>
<td>- Patients bring with them the oral health values current in their own community – dental care may be given a low priority</td>
</tr>
<tr>
<td>- The dental team may over-estimate the time and effort given to educating patients. Verbal interactions is often minimal and dentists talk speedily ‘at’ rather than slowly ‘to’ their patients.</td>
</tr>
<tr>
<td><strong>To be successful:</strong></td>
</tr>
<tr>
<td>- Information for parents needs to be: understandable, relevant, non-authoritative, and given with conviction.</td>
</tr>
<tr>
<td>- Try to make a specific ‘preventable diagnosis’. In the same way that you would make a clinical diagnosis, and offer only advice which is aimed at solving the dental problem under discussion.</td>
</tr>
<tr>
<td>- Avoid generalist throw-away lines such as ‘brush your teeth better’. Specific advice, with an evaluation component to assess patient progress is a more sensible approach. Offer positive reinforcement when some success is achieved by the patient.</td>
</tr>
<tr>
<td>- Be realistic about the amount of advice which can be given within a certain time. Aim to build up knowledge gradually.</td>
</tr>
<tr>
<td>- Practical demonstrations involving the patient themselves will make education more interesting”.</td>
</tr>
</tbody>
</table>
A qualitative study to gain understanding of dentists’ methods for the provision of preventive advice to decrease decay in children established that delivery of dental health advice varied across the board without prioritised approaches. It was found that dentists provided preventive advice as brief educative lectures liking it to a teacher-pupil relationship, uncreative, and without appropriate additional resources to support the patients. Threlfall et al argued the case for consistent guidelines including educational support for general dental practitioners, which ties in with the current research proposal for adolescents. The authors also posed the question whether the dentist is the ‘best’ clinician placed to offer preventive advice to patients. This concept was explored and supported in Cashmore et al’s study which used dental assistants to overcome the lack of other available staff in the NSW Public Oral Health Services.

Sarmadi, Gahberg and Gabre investigated dentists’ and dental hygienists’ choices of preventive strategies for children and adolescents aged 3-19 years identified as at high risk of developing caries in a Swedish county. Results indicated that generally clinicians considered tooth brushing instructions and fluoride treatment as the primary priority in 60% of cases. Prevention strategies given for home care included fluoride treatment and diet counselling for half of the cases. The study demonstrated that more dentists planned and provided preventive treatment than hygienists and dental nurses. The explanation given was that dentists take more responsibility for the provision of care for children at high risk, whereas the dental hygienists and dental assistants have different roles in the care of patients. The authors concluded that overall ‘several’ preventive treatments were provided to the majority of children and adolescents. Of interest, the researchers affirmed that where more background information was provided in the risk assessments clinicians tended to provide the appropriate preventive care. Qualitative data identifying barriers for the inconsistencies in preventive care across the area may have enhanced this study.
There is strong evidence provided for preventive strategies and specific approaches for different settings and there is evidence in the literature arguing for clarity and simplicity of oral health education messages for individual patients, including consideration of social determinants of oral health.

2.5.2 Dietary Advice

Engaging appropriately with adolescents in the clinical setting with time to encourage them towards healthy dietary choices utilising different behaviour theories and approaches is supported by various researchers. The use of appropriate dietary guidelines to support clinicians is also indicated.

Rangan et al recommended four key approaches for individuals to reduce risk of dental disease: (i) decrease soft drink consumption; (ii) reduce frequency and quantity of consumption; (iii) replace soft drinks with artificially-sweetened drinks and (iv) replace soft drinks with water. Tahmassebi et al highlighted the attention given to the role of commercial soft drinks and conducted a literature review to determine previous and current knowledge on dental caries, erosion, drinks, soft drinks and fruit juice. They reported various efforts to ‘modify’ drinks by adding or eliminating certain elements to lessen the harmful effects on teeth. They suggested the development of appropriate ‘protocols’ to promote safe drinking practices with efforts to reduce harmful effects of drinks by modification. Manton el al’s study addressing this concept was reported with positive results, however further studies need to be undertaken to validate their findings.

Buchanan and Coulson reported on methods to reduce the consumption of carbonated drinks in adolescents using the Transtheoretical Model for behaviour change. According to researchers the Transtheoretical Model accepts that behaviour change is dynamic, nonlinear and has distinct stages. The first three stages are motivational (pre-contemplation,
contemplation and preparation) and the remaining two are action-based (action and maintenance). To measure self-efficacy, participants reporting that they drunk carbonated drinks were requested to indicate how confident they were in: i) reducing carbonated drinks and ii) eliminating carbonated drinks completely. Responses offered for both items ranged from not confident at all to very confident. The Theoretical Model yielded useful information, 55% of the participants were not considering any attempts to change their drinking habits, but 45% responded they would attempt to modify their behaviour. Scores for self-efficacy found that those with lower scores in pre-contemplation also had lower scores in their confidence to reduce or stop drinking carbonated drinks. Health as a value and attitudes to teeth were recorded and indicated that many adolescents did not place health as a value either for general health or their teeth.

The study provided insight into methodology, as well as using a theoretical framework to establish readiness of adolescents to modify inappropriate behaviour towards their wellbeing. Using newer evidence models of behaviour change is important as traditional dental health education approaches have been criticised by Kay and Locker\textsuperscript{130} and Watt and Fuller\textsuperscript{20} as lacking an evidence base. Another valuable element from Buchanan and Coulson’s\textsuperscript{64} study was how self-efficacy of adolescents was established by providing two options to determine levels of confidence in their ability to change behaviour.

Cashmore et al’s\textsuperscript{22} study where specific sessions were created for parental counselling is evidence of an effective approach for the delivery of dietary advice. The authors further recommended working with allied health professionals, for example dieticians to further support patients to achieve their goals. Threlfall et al\textsuperscript{30} suggested visual aids and providing materials for parents to take home with more emphasis on partnership may enhance oral health education sessions and the impact of advice.
There is sufficient evidence for Therapists to focus on the consumption of sugar and giving guidance, including encouraging patient self-efficacy towards health and wellbeing.

2.5.3 Oral Hygiene Advice

The provision of ‘oral hygiene instruction’ and advice for patients is a key performance indicator for Therapists in public health. However, little is known of how effective their current practices are or what barriers exist to the provision of effective toothbrushing techniques for their patients. Oral hygiene is an individual’s plan for effective toothbrushing and the use of floss if required to prevent microbial plaque biofilm accumulation on teeth and gingivae. There is ample evidence emphasising the importance of supportive environments, oral health education and access to resources [tooth brushes and toothpaste] for the control of dental diseases. Levine and Stillman-Lowe asserted that most forms of gingivitis may be reversed by effective oral hygiene, and prevent its progression to periodontitis.

Maintenance of effective plaque control is the foundation of any attempt to control periodontal disease. The daily practice of tooth brushing is considered essential to maintaining gingival health; however, individuals often fail to maintain optimal gingival health over sustained periods. Davies et al support this argument by stating that for many years brushing twice daily with fluoride toothpaste has been promoted by the profession due to its essential role in prevention and controlling of dental caries and periodontal disease, but little is known about long term compliance. Choo, et al asserted that a practical approach to oral hygiene should be to “modify the oral microflora to promote healthy periodontal and dental tissues”. Appropriate oral hygiene practices including regular professional care to aid in the prevention of periodontal disease are considered essential to maintain oral health, however, according to Arrow professional cleaning is not cost effective. Toothbrushing and flossing are common practices, however, Choo et al
maintained that even though new products with design modifications are made available to patients, “manual dexterity and cognitive ability” are critical for effective control of plaque. They further recommended that supportive environments across the board be in place for different population groups especially removing financial barriers. A key point raised by Choo et al\textsuperscript{146} is that oral health approaches need to be “tailored to lifestyles and abilities of children” supporting them to make personal decisions to “improve personal oral hygiene and oral health.

A study undertaken by Dorri, Sheiham and Watt\textsuperscript{153} to investigate the relationship between oral hygiene behaviours and general hygiene behaviours among Iranian adolescents in Mashhad, demonstrated that toothbrushing frequency was significantly associated with the frequency of having showers. This study illustrated the notion suggested by Choo et al\textsuperscript{146} to promote and support current oral health practices into a patient’s general lifestyle.

Thus, the importance of connecting with adolescents and establishing barriers to access oral health products and strategies that encourage them to practice sound oral hygiene practices in their own environment is vital for Therapists if they are to be effective.

2.5.4 Smoking cessation advice

As indicated in Section 2.3.4 adolescents are at risk of general and dental health problems because of tobacco use. The literature recommends smoking cessation at the dental chair side including expectations for public dental and oral health professionals as per the NSW Health Policy Directive.\textsuperscript{86} The NSW Public Oral Health Record Medical History requests clients to indicate if they smoke ‘yes’ or ‘no’.\textsuperscript{154} This is used as a trigger for clinicians in public oral health settings to provide a brief smoking cessation intervention for the patient.

A study conducted by Kast et al\textsuperscript{155} of Colorado practicing dentists (434), orthodontists (91) and hygienists (160) was undertaken using a postal survey to establish their ‘tobacco-use
prevention counselling’ activities, challenges to counselling and attitudes toward tobacco use with 12 year old children. Only a quarter responded, so the findings are compromised by non-response bias. Nevertheless the results are interesting, prevention counselling for tobacco-use in children was low, 38% for dentists and 44% for hygienists. The lack of skills was linked to low tobacco-use counselling activities. Hygienists viewed their role in counselling children positively; however lack of time resulted in low counselling activities. Few dental practitioners counselled 8 to 12 year old patients about tobacco use. The findings suggested that dentists with appropriate tobacco-use professional development might increase their skills and change clinical practice enabling them to be effective in providing tobacco-use counselling. The respondents acknowledged the need for education highlighting that support is required to enable practitioners to provide smoking cessation advice. It is difficult to recruit clinicians to complete postal questionnaires, and new approaches to gaining planning information are required.

A study conducted to determine the patterns of tobacco use counselling among physicians and dentists as reported by adolescents, and to establish the association between provider advice to quit and cessation activities among current smokers, found that physician and dentist advice remained well below recommended guidelines, despite the results which showed advice to quit was linked with cessation activity. Further studies are required to confirm whether brief provider tobacco use counselling is a missed opportunity to influence adolescent smoking behaviour.

In NSW Public Oral Health Services, Therapists are well placed in the clinical setting to provide smoking cessation advice to adolescents alongside other NSW public health tobacco control programmes. NSW Public Oral Health Services have a policy to encourage staff to use the NSW Smoking Cessation at the Chairside training resource to help them provide
advice to patients that are considering ‘quitting’. This could be of value as small changes in smoking behaviour can provide major health gains.

2.6 Clinical preventive treatment

Clinical preventive interventions based on scientific evidence should be foremost in the treatment for adolescents during their initial visit by undertaking a ‘preventive diagnosis’ as recommended by Blinkhorn. Reorientation of clinical services or processes aligned with the Ottawa Charter principles towards a ‘health promoting service’, therefore ensuring adolescents are offered appropriate levels of preventive care. Blinkhorn’s oral health education strategy should be considered for the provision of preventive treatment with realistic timeframes, clarity of messages and rationale for prescribing the preventive treatment, engaging to gain adolescents’ agreement to increase their confidence in oral health self-care.

2.6.1 Fluoride toothpaste

Fluoride is the “cornerstone” in the prevention of dental caries. The critical anti-caries effect of fluoride is believed to result from its action on the tooth/plaque-biofilm interface, through promotion of remineralisation of early caries lesions and by reducing tooth enamel solubility. Fluoride in the water and toothpastes, are deemed extremely effective in prevention of dental caries in children and adolescents.

The NSW Health Policy Directive on the use of fluorides is founded on the Australian Research Centre for Population Oral Health guidelines on “The use of fluoride” and contains the essential advice for clinicians to give their patients.

Several Cochrane reviews are used as benchmarks for the use of topical fluorides (toothpaste, mouthrinses, gels, or varnishes) and these reviews established the benefit of fluoride to reduce dental caries in children and adolescents.
Nordström and Birkhed’s study identified that there were insufficient clinical studies regarding the different concentrations of toothpaste with high fluoride (F). They evaluated toothpaste with 5,000ppm F concentration and compared it to toothpaste that had 1,450ppm F in adolescents with active caries. Their findings indicated that participants that used the 5,000ppm F toothpaste had significantly lower progression of caries compared with those that used the 1,450ppm F. They demonstrated that clinical management of dental caries in high caries risk adolescents should advise the use of toothpastes with 5,000ppm F, however once a patient’s caries risk was under control a 1,450ppm F toothpaste should be used. Findings from this study provided evidence to support the prescription of different types of toothpaste for patients in order to control caries.

For the management of gingivitis and periodontal disease, Blinkhorn et al examined the literature relating to the efficacy, method and safety of triclosan/copolymer in toothpaste. The authors stated that the ultimate goal for toothpastes with anti-plaque and anti-gingivitis elements is to yield significant clinical outcomes for patients brushing at home and during periods between professional oral health visits. The overall results from the clinical studies, systematic reviews and meta-analyses indicated strong support for the anti-plaque and anti-gingivitis effect of the twice daily use of triclosan/copolymer toothpaste. The evidence demonstrated clinical significance for plaque control and gingivitis including the slow progression of periodontal disease and cost effectiveness of toothpastes containing triclosan/copolymer.

This study provides examples of scientific evidence of oral health products efficacy to assist Therapists’ clinical decisions when prescribing the preventive oral health products to enhance individual adolescent’s oral environment, without being confused by the plethora of commercial products that often have limited clinical evidence of efficacy. A recent publication reported the dental behaviour of Australian children and compared it with the use
of fluorides in Australia guidelines.\textsuperscript{170} Approximately 17, 500 children aged 5 to 15 from four Australian states who used school dental services were surveyed from 2002 to 2004 in order to provide information regarding their dental health behaviours (Figure 2.7). The results shown in Figure 2.7 are promising, however, oral health promotion efforts should be re-enforced, to maintain long term oral health outcomes.
Figure 2.7 Australian oral health preventive behaviours as recorded by Armfield et al\textsuperscript{170}

- Over 99% of children brushed their teeth with fluoride toothpaste
- More than two-thirds of children brushed their teeth as recommended twice a day
- Children from higher income families brushed their teeth more often and more likely to use toothpaste from a younger age, used smaller amounts of toothpaste than those from lower income families
- Noted differences in toothbrushing behaviours evident across parental education, family income and residential remoteness groups
- Fluoride tablets are no longer available in Australia because of their link to fluorosis and the small numbers being prescribed which impacted on their commercial availability and distribution
- Use of fluoride mouth rinse was evident with older children, low percentage of children at any age used a fluoride mouth rinse; less than quarter of children using a fluoride mouth rinse used it every day; almost two-thirds of children who used a fluoride mouth rinse, only did a few times a week or infrequently.
2.6.2 Topical fluoride application

The application of topical fluoride varnish for the prevention of dental caries is well established, and should be performed as a separate clinical activity from the oral health education session. The rationale being not to ‘muddy’ the oral health education messages with the clinical procedures.\textsuperscript{132, 139} Sparse literature exists on the use of fluoride varnish by the Therapists working in the NSW Public Oral Health Service, despite there being a NSW Health Policy Directive which encourages the use of fluoride varnish.\textsuperscript{164}

The application of topical fluoride varnish to reduce tooth demineralisation and prevent dental caries is well supported.\textsuperscript{89, 159} Cochrane reviews have demonstrated support for the clinical use of topical fluoride varnishes and gels for children and adolescents.\textsuperscript{165, 166} Comparative findings between varnishes and gels were inconclusive, but an observational study\textsuperscript{166} reported that dental hygienists found varnishes easier to use than gels and they thought patients preferred the varnish application over gels.\textsuperscript{171}

Skold-Larsson, Modeer and Twetman\textsuperscript{172} conducted a study to measure the fluoride concentration in plaque after a single topical application of fluoride varnishes with contrasting levels of fluoride on thirty adolescents aged 12-17 years with fixed orthodontic appliances. Three different brands of topical fluoride were used: Bifluoride (6% F), Duraphat (2.23% F) and Fluor Protector (0.1% F). Findings from the study established that fluoride varnish treatments resulted in an increase of fluoride levels in plaque next to fixed orthodontic appliances for a period of up to 1 week (Duraphat), with some in the Bifluoride and Fluor Protector cohort continuing to indicate slight increased levels after 30 days.\textsuperscript{172}

The study further enhances the knowledge and efficacy of the use of topical fluoride varnishes in the clinical setting. The study cohort was small, however the experimental methodology was sound. With the increase in the number of adolescents undergoing
orthodontic treatment these results support the use of topical fluorides for patients with fixed appliances. Fluoride varnishes can also be used to assist adolescents with high levels of active carious lesions. However regular application (3 times a year) is required in order to deliver health gains.  

2.6.3 Fluoride Mouthrinses

The NSW Health Policy Directive on the use of fluoride mouthrinses, states that mouthrinses may be used by “people aged six years and above or more who have an elevated risk of developing caries”. Findings from an Australian national consensus workshop reported that the use of a fluoride mouthrinse is effective in reducing dental caries. The effect is greater in high-risk populations and smaller in low-risk populations. There is substantial evidence for the efficacy of fluoride mouthrinses in the control of dental caries including a systematic review. Marinho et al reported that daily and weekly/fortnightly rinsing programs resulted in 26% fewer decayed missing and filled permanent tooth surfaces compared to the control groups. NSW Public Oral Health Therapists are mandated to promote toothbrushing with a fluoride toothpaste, however, where patients are in need of further assistance, fluoride mouth rinses are another useful resource to enhance their preventive care messages.

There is currently a lack of information on the prescription of fluoride mouthrinses by Therapists working in NSW for adolescents.

2.6.4 Chlorhexidine mouth rinse

Evidence of the role of bacteria in the aetiology of dental caries and gingivitis/periodontal disease was discussed in Section 2.4.3. The oral environment harbours pathogenic bacteria therefore the rationale for the recommendation of antimicrobial agents is to assist with mechanical activities to prevent gingivitis and periodontal disease has been extensively
explored. Chlorhexidine as an antimicrobial agent which reduces the levels of bacteria present in the mouth and its effectiveness in reducing gingivitis and periodontitis has been confirmed by numerous studies. Jenson et al included chlorhexidine as a preventive measure in their essential elements for the control of dental caries and management of gingivitis where appropriate for high risk patients.

The National Oral Health Promotion Clearing House messages for the Australian public states that antibacterial mouthrinses with chlorhexidine may be effective as a short-term solution to gingivitis and recommend patients to seek dental/oral health professional advice. This is a sensible suggestion as chlorhexidine should only be used as part of a preventive package of other measures. The long term use can cause staining of the teeth and taste can be affected.

2.6.5 Pit and fissure sealants

The efficacy of using fissure sealants for the prevention of dental caries in the pits and fissures of teeth has been recommended since the 1970s. Fissure sealants are placed on the occlusal surfaces of teeth as a barrier between the tooth surface and oral environment.

A Cochrane systematic review of fissure sealants for the prevention of occlusal caries in children and adolescents found that they were effective in preventing dental caries in high risk children, but there was insufficient evidence as to their effectiveness at other caries risk levels. Phelan et al reported low levels of fissure sealant usage in their NSW Child Dental Survey 2007, indicating further research is warranted.

A study undertaken by Clarkson et al in Scotland offered incentives of remuneration and training to dentists in the use of fissure sealants. There was a 9.8% increase in the application of fissure sealants for children when a fee was offered but there was no such increase with the offer of education. From this study’s findings a direct fee for preventive services was
introduced by the Scottish National Health Dental Services for fissure sealant application. However, the question was raised whether dentists are the ‘best’ dental practitioners to provide fissure sealants for children in Scotland, echoing Threlfall et al’s query regarding the ‘best’ oral health team member to deliver oral health education for patients. These queries need to be reflected upon and may assist public health workforce distribution and improve the utilisation of skills and knowledge of Therapists and the evolution of services towards prevention.

A further study undertaken in California, with third grade children in a public school established that non-English language and parental functional health literacy had an impact on children receiving fissure sealants, and possible barriers to the provision of fissure sealants. Thus, this factor also needs to be reflected upon and raised if services are to be effective in the provision of fissure sealants as a preventive measure. The NSW Child Dental Survey 2007 reported that fissure sealants were underutilised, however a rational for this finding was not provided. The NSW Child Dental Survey 2007 did not differentiate patients into private or public, therefore, concerns about Therapists clinical practice in offering fissure sealants to patients accessing the public health sector was not clear.

NSW Health mandates placement of fissure sealants as an evidence-based clinical practice for the prevention of dental caries in permanent teeth of school aged children at appropriate age levels. However, information regarding the clinical provision of fissure sealants as a preventive approach for adolescents accessing public health services is unclear. Furthermore, there is a lack of information on existing challenges or facilitating factors for Therapists to provide fissures sealants to adolescents accessing NSW Public Oral Health Services.
2.6.6 Remineralising agents

A range of other preventive methods and resources should be considered by Therapists to enhance adolescent’s oral health in the public health settings. Consideration of preventive measures by dental practitioners is individually managed; these alternatives for management of caries may not be easily accessible to Therapists, however, this should be considered in this literature review. Featherstone\textsuperscript{4} stated that fluoride therapy alone is insufficient to control the caries process in high-risk individuals. New remineralising and anticaries products and new delivery systems are in development including future technology for the management of dental caries.\textsuperscript{4}

Researchers have provided evidence of casein phosphopeptide-amorphous, calcium phosphate nanocomplexes products commonly known as (CPP-ACP) effectiveness in remineralisation of tooth enamel.\textsuperscript{181} CPP-ACP is derived from bovine milk protein, casein, and calcium and phosphate in a range of products are available and used in the public oral health settings quite commonly. The need for improved therapy to reduce the bacterial challenge that initiates the caries process and to enhance remineralisation is indicated.

Reviews undertaken to inform the clinical efficacy of the remineralising concept have been conducted including randomised clinical trials for the non-invasive management of dental caries; also in combination with fluoride.\textsuperscript{69,181-183} The majority of the clinical trials for the clinical efficacy of CPP-ACP were undertaken by Australian research teams; however studies to test their effectiveness were primarily undertaken on adolescents having orthodontic treatment. They are a highly specific group who are not typical of public service patients.\textsuperscript{184,185}

The levels of access for Therapists to CPP-ACP products are not known, however, clinical judgement for the use of the CPP-ACP should be based on scientific evidence, and aligned with the scientific efficacy of fluoride oral health products used in the control of dental caries.
2.6.7 Chewing gum

Chewing sugar-free gums as a salivary stimulant has potential as a caries-preventive measure. Chewing gum is used as a vehicle for the addition of xylitol. Xylitol is a natural sweetener that basically cannot be fermented by the “caries-inductive oral microflora”.

Anecdotal evidence informs us that chewing sugar free gum is a popular choice among adolescents, mostly as a social factor to freshen the mouth breath. Other studies have added CPP-ACP to chewing gum to assist with enamel remineralisation processes.

Manton et al’s randomized study compared the efficacy of three commercially available sugar-free chewing gums: Trident White, Orbit, and Orbit Professional for the remineralisation of enamel subsurface lesions. Trident White was reported to have remineralisation of greater significance than Orbit and Orbit Professional. The Trident White’s gum significant remineralisation was attributed to the presence of casein phosphopeptide-amorphous calcium phosphate nanocomplexes. Although promising, other studies to compare these findings are required.

Studies undertaken in an effort to reduce transmission of mothers’ streptococci mutans to their child using xylitol chewing gum indicated a significant decrease in the levels of streptococci mutans. Findings reported at 5 years of age the mean dmfs were 71% lower in the xylitol group compared to the children in the fluoride group.

Having other modalities for the prevention of dental caries in adolescents such as chewing gum provides the Therapists with further tools for their preventive care approaches.

2.6.8 Patient self-care home regime

The promotion of oral health strategies for the patient’s self-care is paramount during the clinic encounter. Blinkhorn asserted that “the dental team needs to form a partnership with patients, working together to solve a health problem”; therefore, it is critical within and at the
completion of a patient’s clinical treatment to be provided with practical promotional information including the provision of appropriate resources for homecare.190

The frequency of oral examinations as recommended by Levine and Stillman-Lowe89 and by The UK National Institute for Clinical Excellence have been published and request that:

“The shortest interval between oral health reviews for all patients should be 3 months. The longest interval between oral health reviews for patients younger than 18 years should be 12 months. The longest interval between oral health reviews for patients aged 18 years and older should be 24 months”.89

Further Levine and Stillman-Lowe27 recommended an individual risk assessment be undertaken at each recall visit with an appropriate timeframe made for the next recall. Evans and Dennison2 suggested in their Caries Management System for children and adolescents that patients be monitored by having recalls at regular intervals, according to their caries risk status and included competence in their toothbrushing practices with further oral hygiene coaching where indicated, and re-application of topical fluoride treatments.

Although it appears measurement of these type of general home care preventive interventions is limited, they are nonetheless an essential component of preventive care for adolescents. Management of dental caries and periodontal diseases requires in-depth understanding of the patient’s risk factors and the protective factors available for appropriate clinical preventive interventions.

Public oral health systems should take into consideration the different training programs and backgrounds of the Therapists and ensure current knowledge is updated where appropriate. This section has highlighted that: (i) over 99% of Australian children under 18 years of age use fluoride toothpaste, indicating opportunities for Therapists to focus on enhancing and supporting their patients current practices; (ii) fluoride varnishes are effective; (iii) anti-
bacterial agents are of value for specific patients; (iv) pit and fissure sealants efficacy in the prevention of dental caries is well documented and should be part of a habitual clinical preventive care for all patients; (v) use of casein phosphopeptide-amorphous plus fluoride has merit for the management of dental caries; (vi) chewing sugar-free gums as a salivary stimulant has value as a caries-preventive measure; (vii) tools and age appropriate patient literature must be made available and accessible for Therapists to support the key messages for patients should be made available at the chairside; and (viii) appropriate recall timeframes for management of high risk patients for long term health comes should be a key component of patient care.

2.7 Barriers and facilitators for provision of clinical preventive care

The importance of providing quality care for patients is an ethical professional responsibility for NSW Therapists and evident in their participation and involvement in State initiatives for the improvement of children and adolescents oral health is evidence of their commitment to this view.22, 27 Preventive Policy Directives for use in Public Oral Health Services provided by Centre of Oral Health Strategy, NSW include:

- Smoking cessation; a brief intervention at the chairside: role of Public Oral Health/Dental Services86
- Use of fluorides,164 and
- Pit and fissure sealants180

However, Wright et al12 reported that from NSW population studies current clinical practices are not contributing to positive long term health outcomes and in other countries many patients continue to receive inappropriate or even unfavourable dental care.191, 192

Researchers have recommended that prior to planning and implementation of new interventions, barriers and facilitators in community settings such as schools, communities
and healthcare systems need to be established in terms of current knowledge, resources, and political and administration support. Grol and Wensing discussed theories and models of change with the emphasis on the need to address barriers at different levels when multifaceted changes are required to improve care. Approaches that facilitate measuring effectiveness of the interventions (e.g. increase of knowledge, change in behaviour by providing fissure sealants) and their continual viability or improvement processes should be made transparent.

This section discusses the necessity to identify barriers and enablers for Therapists to provide preventive oral health care for adolescents, including common impediments that exist or may arise for the proposed research intervention. There is only sparse information regarding barriers and enablers for Therapists in NSW to provide appropriate evidence based preventive oral health care for their patients. Nonetheless, recognition of the importance of clinical preventive services such as oral health education and smoking cessation, studies regarding the barriers to implementation and practices are evident and should be continued.

Researchers have employed various approaches to improve clinical practice including professional education and development, audits and feedbacks, evidence-based guidelines, total quality management, economic incentives and organisational changes. Grol claimed that despite the number of well-designed studies endeavouring to transform clinical practices, uncertainty of the most effective approaches and in which environments still exists. He further suggested that the most reliable means for improving the quality of care, is to be informed by scientific literature in conjunction with clinical practice insight to “generate concrete recommendations” to assist health professionals and patients decide on appropriate care, improve care processes, promote education and decrease unnecessary differences in health care services including cost efficiencies.
Cabana et al’s systematic review identified barriers to physicians’ adherence to practice guidelines. The authors reported that out of 5658 articles, 76 published articles identified at least one barrier to compliance to “clinical practice, practice parameters, clinical policies or national consensus statements”, for example physicians exhibited various levels of awareness of the asthma guidelines or measles immunisation guidelines. The authors concluded that studies on enhancing physician compliance may not be generalizable as obstacles identified in one setting may not exist in another reiterating Grol’s argument.

Grol and Grimshaw argued that introducing evidence-based and clinical guidelines into daily routine practice is complex. Further they declared that there is substantial evidence from systematic reviews of the possibility of improving clinician behaviour, however, this change often requires comprehensive approaches at many levels of an organisation. For example, at the patient’s level, professional level, health care team level, the organisation and wider environment. They discussed four studies of adherence to clinical guidelines including “the case of hand hygiene”. They identified that compliance was associated with: (i) type of health problem – stating that compliance improved with guidelines for acute care rather than for chronic care; (ii) standard of evidence supporting the recommendation; (iii) compatibility of the recommendation with existing values; (iv) fewer complexities in the decision making process; (v) clarity of expectations for key performance (vi) and less new skills and organisation change required to adhere to the recommendation.

A systematic review of randomised controlled trials conducted by Cheater et al to assess the effectiveness of strategies tailored to address specific, identified barriers to change in professional performances, concluded that “interventions tailored for prospectively identified barriers may improve care and patient outcomes”. However, there were limitations to the review as the authors could not establish whether the barriers were valid, determine the key barriers and if all barriers were identified and addressed by the interventions. Thus the
authors cautioned that tailored interventions to address barriers was ‘uncertain’ and that more rigorous trials were needed including process evaluations.

According to Clarkson\textsuperscript{199} the most successful efforts towards evidence based ‘health services’ in various countries have been those that were dependent on the efficient transfer of research findings to health professionals, however, acknowledged delays in uptake across the board. Clinical guidelines are indicated as being the most effective instrument for assessing evidence including implementation into clinical practice.\textsuperscript{199} For examples in the scientific literature Evans and Dennison\textsuperscript{2}, Jenson et al\textsuperscript{101}, Merijohn et al\textsuperscript{200}, and Walsh and Brostek’s\textsuperscript{109,110} minimal intervention dentistry clinical recommendations, protocols and guidelines. Clarkson stated that clinicians are required to “adapt to changing systems and adopt new techniques”.\textsuperscript{199} Clinical practice barriers to dissemination and implementation strategies, included lack of time, lack of involvement and lack of remuneration.\textsuperscript{199}

Yarnall et al\textsuperscript{128} conducted a study to establish clinical time for the provision of preventive care by a primary health practitioner to a patient as recommended by US Preventive Services Task Force. The methodology included published and estimated times per service at the recommended frequency to a patient cohort of 2,500 with an age and sex distribution comparable to that of the United States population. The authors concluded that 1,773 hours or 7.4 hours per working day is required for preventive services, therefore time constraints limit clinicians to provide and comply with preventive recommendations.\textsuperscript{128} This study affirms that ‘time’ is a common barrier hindering the clinicians’ ability to provide preventive care.

Watt et al\textsuperscript{201} conducted a study to evaluate the experience and attitudes of dental professionals in South East England regarding smoking cessation, including their perceived barriers and limitations to participate in service provision. Their findings included “fatalistic
and negative concept of prevention; perceived lack of relevance of smoking cessation to dentistry; patient hostility; and organizational factors within the practice setting”. The authors suggested that clinicians need to be supported and encouraged in their own clinical settings to provide smoking cessation, highlighting the need to address identified existing barriers to enhance patient care.201

Other barriers for dentists to deliver smoking cessation interventions, identified and reported by Trotter and Worcester202, included lack of resources and patient materials, clinician doubts regarding being effective, lack of confidence to tackle the issues and support patients to quit smoking and again the lack of time for preventive activities. Interestingly Trotter and Worcester202 reported that only 4 per cent of dentists had smoking cessation training, with sixty six per cent of them responding that they would attend training if offered. Seventy two per cent were country dentists, with fifty seven per cent of them willing to travel to Melbourne for training. Continuing Dental Education points was reported as an incentive by thirty three per cent of participants. Participants suggested that training needed to be aimed at ‘legitimising’ the role of dentists in smoking cessation, provide appropriate strategies and resources to enable them to practise smoking cessation as a day to day activity.202 Stacey et al’s203 questionnaire-based survey to determine the attitudes and activities of dental professionals in primary care in the Northern Deanery of the UK in relation to providing smoking cessation advice, established that dental health professionals in primary care settings understand the importance of providing smoking cessation and included the same barriers: lack of remuneration; lack of time; and lack of training.203

Leadership in organisations has been recognised as significant in influencing practitioners’ perceptions, reactions and acceptance to ‘innovations’ like evidence-based practices.204 According to Aarons204, there is a link between organisational characteristics, individual differences and attitudes toward work, it is important for these factors to be included in
studies of attitudes toward evidence-based practice. There is a growing interest in clinical leadership in dentistry, particularly in terms of quality improvement. Brocklehurst et al.\textsuperscript{205} highlighted the importance of transformational leadership in dentistry as a process to improve service delivery and provision of quality health care for patients. Campbell and Tickle\textsuperscript{206} in their paper recommend a multifaceted approach focusing on quality improvement at macro, meso and micro levels of service delivery. They delineated the notion of quality of care in dentistry and provided two methods to quality improvement, one of which is the Plan, Do, Study, Act; a methodology also used by the NSW Health Clinical Excellence Commission in their Clinical Leadership Program for health quality improvement programs.\textsuperscript{207} NSW Health has a commitment to Clinical Leadership Programs via the Clinical Excellence Commission as recognition of the importance of Clinical Leadership, and assurance for improving patient care practices and processes.\textsuperscript{16, 17, 207} A plethora of clinical improvement projects provide examples of frontline clinical leaders and clinicians efforts towards ensuring provision of quality care for patients.\textsuperscript{207} Furthermore, the installation of the NSW Health Agency of Clinical Innovation as the primary agency in NSW for engaging clinicians, designing and implementation of new models of care also recognizes the significance for continuous improvement of clinical approaches.\textsuperscript{16, 17} These ‘pillars’ provide opportunities to support and strengthen service delivery within NSW Health, and act as enablers for Therapists to be clinical leaders for oral health, empowering them to influence public health prevention policy and promote quality care delivery at frontline level.

The literature has identified common themes regarding barriers and enablers for the adoption of evidenced based practice into different settings. The information collated has relevance for Therapists as health professionals and practitioners. It has also demonstrated the lack of information and knowledge regarding Therapists clinical preventive practices, and areas for quality care improvement and approaches for adolescents in their care. Further, information is
lacking in their participation and utilisation of clinical excellence and innovation agencies to support them with improved models of care.

2.8 Literature review conclusion

The literature review has established that the provision of clinical preventive oral health care for adolescents is multi-levelled, complex and critical for future adult oral health outcomes. There is strong evidence highlighting the importance of understanding:

- the way public oral health services are delivered,
- adolescents’ risk factors which cause oral disease,
- influences and impacts of internal and external factors on health professionals,
- different models and approaches for clinical patient management.

The review also illustrates the importance of offering Therapists scientific evidence of clinical preventive care for adolescents that include clear guidelines for:

- Priority access clinical pathways to preventive care
- Evidence-based preventive care including appropriate use of fluorides and fissure sealants, dietary and smoking cessation advice
- Oral health assessment tools
- Case scenario supported discussions of preventive oral health issues
- The use of radiographs

From the literature review, strong evidence indicates the need for appropriate preventive oral health care to be provided for adolescents. Therapists practicing in NSW Public Oral Health Services have opportunities to provide clinical preventive oral health care for adolescents. Critical findings from the literature are the lack of knowledge and information regarding barriers and facilitators for NSW public health sector Therapists to provide appropriate preventive care for their patients. Thus, it is vital for researchers to engage and investigate
the provision of clinical preventive care practices of oral health practitioners in NSW Public Oral Health Services responsible for children and adolescents.

2.9 Objectives of the research

Based on the literature review the objectives of the research study are:

1. To evaluate levels and types of clinical preventive care provided by Therapists to adolescents choosing to access NSW Public Oral Health Services;
2. To assess the reliability of Therapists clinical preventive care activities reported on the NSW Information System for Oral Health database for re-use in research and clinical quality improvement activities to inform best practice;
3. To ascertain influencing factors and strategies for the provision of scientific based preventive care to adolescents attending Public Oral Health Services as perceived and used by: (i) Therapists; (ii) clinical directors and health service managers; and (iii) senior Therapists as clinical leaders;
4. To determine how Therapists assess and plan clinical preventive care for their adolescent patients; and
5. To explore Therapists’ participation in Continuing Professional Development focused on clinical preventive oral health care for adolescents.

2.10 Outline of the thesis

To achieve these objectives, eight related studies were undertaken and are presented across ten chapters.

**Chapter One**
Provides an overview and the research design of the thesis

**Chapter Two**
Reviews the literature and outlines the aims and objectives of the thesis
Chapter Three
A quantitative study of Therapists clinical and preventive care activities reported on the Information System for Oral Health database for the fifteen NSW Local Health Districts.

Chapter Four
A quantitative study to compare the reliability of two oral health systems capturing clinical diagnostic and preventive activities provided to adolescents by Therapists.

Chapter Five
A qualitative study of factors that influence Therapists’ provision of clinical preventive care to adolescents attending NSW Public Oral Health Services.

Chapter Six
A qualitative study assessing the management factors that influence the development of preventive care in the New South Wales Public Oral Health Services.

Chapter Seven
Two quantitative studies investigating how Therapists develop preventive care management plans for adolescents using three clinical vignettes.

Chapter Eight
A quantitative study to map Therapists continuing professional development participation on clinical preventive care specifically for adolescents.

Chapter Nine
A qualitative study to investigate senior Therapists influencing factors to support and enhance Therapists ability to offer preventive care to adolescents patients.

Chapter Ten
Presents an overview of the findings of Chapters 3 to 9 and implications for future action, research and development.
2.11 Peer reviewed publications

**Chapter 3** Angela V Masoe, Anthony S Blinkhorn, Jane Taylor, Fiona A Blinkhorn
Preventive and clinical care provided to adolescents attending public oral health service New South Wales, Australia: a retrospective study.
BioMed Central Oral Health 2014;14;(142)1-9

**Chapter 4** Angela V Masoe, Anthony S Blinkhorn, Jane Taylor, Fiona A Blinkhorn
Reliability study of clinical electronic records with paper records in the NSW Public Oral Health Service.
Public Health Research & Practice 2015;25:(2)1-6

**Chapter 5** Angela V Masoe, Anthony S Blinkhorn, Jane Taylor, Fiona A Blinkhorn
Factors influencing provision of preventive oral health care to adolescents attending public oral health services in New South Wales.

**Chapter 6** Angela V Masoe, Anthony S Blinkhorn, Jane Taylor, Fiona A Blinkhorn
Assessment of the management factors that influence the development of preventive care in the New South Wales public dental service.

**Chapter 7** Angela V Masoe, Anthony S Blinkhorn, Jane Taylor, Fiona A Blinkhorn
Preventive management plans recorded by Dental Therapists and Oral Health Therapists using clinical vignettes for adolescents accessing Public Oral Health Services, NSW Australia.
Australian Dental Journal, 2015; doi: 10.1111/adj.12336 PMID 25912297
Angela V Masoe, Anthony S Blinkhorn, Jane Taylor, Fiona A Blinkhorn

An assessment of preventive care offered to an orthodontic patient by oral health therapists in NSW Australia.

International Dental Journal, 2015; doi:10.1111/idj.12169

**Chapter 8**

Angela V Masoe, Anthony S Blinkhorn, Jane Taylor, Fiona A Blinkhorn

Mapping professional development activities involving clinical preventive care for adolescents by Oral Health Therapists working in NSW Public Oral Health Services.


**Chapter 9**

Angela V Masoe, Anthony S Blinkhorn, Jane Taylor, Fiona A Blinkhorn

Factors that influence the preventive care offered to adolescents accessing Public Oral Health Services, NSW, Australia.

Journal of Adolescent Health, Medicine and Therapeutics, 2015;6:101-113

- Details of conference presentations are noted in a preface to the relevant chapter
- Individual publications are presented in the referencing style according to each Journals’ publication requirements to which they have been submitted; a reference list is included at the completion of each individual publication.
- References associated with the literature review are presented at the end of the thesis.
Chapter 3:

Preventive and clinical care provided to adolescents attending Public Oral Health Service New South Wales, Australia: a retrospective study.
Preface

The NSW Health, Public Oral Health Service has overarching key governing policies for the provision of preventive care for adolescents under 18 years of age mandating Therapist’s scientific based clinical practice. However, there is a lack of information on how effective the Policy Directives are in influencing these clinicians to embed the preventive care recommendations into their clinical practice.

This retrospective study was undertaken to examine the clinical activities of Therapists in relation to the provision of preventive care for adolescents by interrogating state-wide Public Oral Health Service Electronic Health Record (EHR) data stored on the Information System for Oral Health (ISOH). The study found that Therapists provided the majority of clinical preventive care for adolescents, furthermore, the proportion of time spent on prevention varied markedly between Local Health Districts.

The study in this chapter is published in the BioMed Central Oral Health Journal, May 2014.

Angela V Masoe, Anthony S Blinkhorn, Jane Taylor, Fiona A Blinkhorn

Preventive and clinical care provided to adolescents attending public oral health service New South Wales, Australia: a retrospective study.

BioMed Central Oral Health 2014;14:(142)1-9
CO-AUTHORS’ STATEMENT CONFIRMING AUTHORSHIP CONTRIBUTION

This is to certify that the manuscript entitled ‘Preventive and clinical care provided to adolescents attending public oral health services New South Wales, Australia: a retrospective study’ submitted by Angela V Masoe in partial fulfilment of the requirements for the degree of Doctor of Philosophy (Oral Health) is the result of the following contributions:

- Angela V Masoe designed the research questions, collected the data, organised the statistical data analysis, drafted the manuscript, managed the submission and responded to the reviews.

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Preventive and clinical care provided to adolescents attending public oral health services New South Wales, Australia: a retrospective study

Angela V Masoe1*
†, Anthony S Blinkhorn2†, Jane Taylor1† and Fiona A Blinkhorn1†

Abstract

Background: Dental Therapists and Oral Health Therapists (Therapists) working in the New South Wales (NSW) Public Oral Health Service are charged with providing clinical dental treatment including preventive care for all children under 18 years of age. Adolescents in particular are at risk of dental caries and periodontal disease which may be controlled through health education and clinical preventive interventions. However, there is a dearth of evidence about the type or the proportion of clinical time allocated to preventive care.

The aim of this study is to record the proportion and type of preventive care and clinical treatment activities provided by Therapists to adolescents accessing the NSW Public Oral Health Service.

Methods: Clinical dental activity data for adolescents was obtained from the NSW Health electronic Information System for Oral Health (ISOH) for the year 2011. Clinical activities of Therapists were examined in relation to the provision of different types of preventive care for adolescents by interrogating state-wide public oral health data stored on ISOH.

Results: Therapists were responsible for 79.7 percent of the preventive care and 83.0 percent of the restorative treatment offered to adolescents accessing Public Oral Health Services over the one year period. Preventive care provided by Therapists for adolescents varied across Local Health Districts ranging from 32.0 percent to 55.8 percent of their clinical activity.

Conclusions: Therapists provided the majority of clinical care to adolescents accessing NSW Public Oral Health Services. The proportion of time spent undertaking prevention varied widely between Local Health Districts. The reasons for this variation require further investigation.

Keywords: Adolescents preventive care, Dental therapists, Public oral health service

Background

The Public Oral Health Service in NSW is charged with providing both clinical dental treatment and preventive care [1]. Oral health care for children under 18 years of age in the NSW Public Oral Health Service is mainly provided by Dental Therapists and Oral Health Therapists (Therapists) and has prevention as one of their key performance indicators [2,3]. The term Therapists will be used for both groups hereafter. There is little information on how Therapists allocate their clinic time when providing dental and preventive care to adolescents.

Adolescents (12 to 18 years of age) are a well-defined population group for whom dental ill health can be a problem [4,5]. These patients are identified as having distinctive needs due to their tendency for inappropriate dietary habits; likelihood of a high caries rate; use of tobacco, alcohol and other drugs, eating disorders, potential increase of gingivitis leading to periodontal disease and unique social and psychological needs [6,7].

Dental caries is the most common health problem for adolescents [5,6,8]. Researchers report that children with caries are more likely to experience dental caries as adults, with patterns of dental caries changing from a swift developing problem of childhood to a gradual progressive disease of adulthood [9], hence, it is pivotal for Therapists to seize opportunities to offer preventive oral health care.

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New South Wales, Australia: a retrospective study

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and individual support towards self-efficacy in the clinical setting during the adolescence years; this may yield better oral health outcomes for these patients [10-12].

The oral health of the Australian population has improved over the last decades but not uniformly [5,13,14]. The NSW Teen Dental Survey 2010 reported a mean DMFT of 1.2 for 14 and 15 year olds in NSW, with the Mid North Coast region having the highest mean DMFT of 3.0 and Hunter New England having the lowest mean DMFT of 0.5 [14]. Although the Teen Survey authors reported limitations in gaining a true representative sample across NSW, the mean DMFT scores for 14 and 15 year olds over the last decade have remained fairly stable [14]. Nevertheless, several groups within the population sampled experienced higher burdens of disease; those in rural and remote geographical locations in NSW, limited access to fluoridated water supplies, low socio-economic status and low household income [4,5,14,15]. For example the reported mean DMFT for NSW adolescents from rural and remote regions was 2.4 compared to that in the major cities of 1.2 [14]. Those individuals that usually present to the Public Oral Health Service for dental treatment would benefit greatly from preventive oral health care and advice (9).

Therapists in Public Oral Health settings are well placed to engage and support adolescent's self-efficacy towards sound oral health, underpinned by the Common Risk Factor Approach principles [16,17] and aligned with the NSW Healthy Kids Initiatives and Oral Health 2020 [1,18]. Therapists have the opportunity to offer effective levels of evidence based preventive care, such as topical fluorides and fissure sealants [1,9] to prevent and control dental caries and provide oral hygiene instruction to improve gingival health and promote use of fluoride toothpaste twice a day [9,19] to combat dental disease for patients regularly attending public dental clinics [20]. Additionally, with parental influence waning, Therapists as primary health providers may use Motivational Interviewing techniques to guide adolescents towards improving their individual oral health care habits [21,22]. This is in line with the preventive philosophy of the Australian Commonwealth Government Medicare Teen Dental Program for eligible adolescents introduced in 2008 [23].

All adolescents in NSW are eligible for free oral health care until their eighteenth birthday, however priority is given to those reporting highest dental need (pain) during telephone triage [24]. The NSW Ministry of Health has overarching key governing policies for emergency (pain relief); restorative treatment [24] and three specific preventive care policies for children under 18 years of age for clinical staff working in the Public Oral Health Service which are:

(i) To provide fluoride treatments and fluoride toothpaste advice [25].
(ii) To place pit and fissure sealants [26].
(iii) To offer Brief Intervention Smoking Cessation at the Chairside [27].

There is little information about how effective the Policy Directives are in persuading Therapists to embed these items of preventive care for adolescents into their clinical practice. It is important to monitor the Policies, as if implemented they could greatly improve the oral health of their adolescent patients. However, if preventive care is not being offered it is important to determine the reasons why the Policy is not being implemented.

This retrospective study was undertaken to examine the clinical activities of Therapists in relation to the provision of preventive care for adolescents by interrogating statewide Public Oral Health Service Electronic Health Record (EHR) data stored on the Information System for Oral Health (ISOH).

Methods

Items of clinical treatment and preventive care provided by Therapists to adolescents (12 to 18 years of age) in NSW for the financial year 2010/11 were collected from the Information System for Oral Health (ISOH) managed by the Centre for Oral Health Strategy, NSW Health. ISOH is the main repository that stores all clinical patient data for Therapists employed by NSW Public Oral Health Service. Clinical activity was identified by dental treatment item numbers based on The Australian National Dental Schedule System [28]. The data were provided for each Local Health District by activity type and age group. The items were further grouped according to item description (e.g. examinations, restorative and topical fluoride item numbers) and classified into two categories:

(i) Diagnostics and Clinical Treatment (oral examinations, diagnostic tests, radiographs, restorations and extractions).
(ii) Preventive Care (dietary advice, oral hygiene instruction, professional cleaning (i.e. plaque and calculus removal), topical fluoride applications, fissure sealants and smoking cessation).

Radiographs are incorporated in the age preventive category results to illustrate its necessity as a component of the preventive clinical activity for oral disease management processes.

The data were analysed using the Statistical Product and Service Solution V21 (SPSS) [29]. Percentages were used to describe key findings.

Ethical approval for the study was obtained from the Hunter New England Lead Health and Research Ethics Committee (HREC) Reference No. 12/02/15/5.04 and each of the fifteen Local Health Districts (LHDs). The
Chief Medical Officer, NSW Ministry of Health approved the use of data from ISOH for this research.

**Results**

The ISOH data showed that Therapists provided 79.7 percent of the clinical preventive activities and the majority of restorative treatment (83.0%) for adolescents who attended Public Oral Health Service clinics during 2010/11 with the remaining care undertaken by dentists, specialists and students (Table 1). In that year, Therapists provided dental care for 29, 599 adolescents who accessed NSW Public Oral Health Services, approximately 5.5 percent of NSW eligible adolescent population [30].

The proportion of preventive care offered to adolescents varied widely across the State of NSW, from 32.0 percent in Northern NSW LHD to 55.8 percent in Nepean Blue Mountains LHD (Figure 1). Therapists from four LHDs provided preventive care in excess of 50 percent of their clinical time; Nepean Blue Mountains 55.8 percent, Far West 55.2 percent, South Eastern Sydney 54.7 percent and Northern Sydney 53.9 percent. The only LHD which recorded preventive activities below 40 percent was Northern NSW LHD which includes the shires of Ballina and Byron Bay (Figure 1).

Overall, less preventive care (47.7%) was undertaken than diagnostic and clinical treatment (52.3%). Rural and remote LHDs undertook less preventive care (45.2%) compared with metropolitan counter parts (51.6%) (Figure 2).

Time given to dietary advice activities varied across the LHDs from 3.2 percent in Nepean Blue Mountains LHD to 17.8 percent in Western Sydney LHD. Overall, rural areas provided lower levels of dietary advice (below 10%) compared to metropolitan areas (Table 2).

There were differences between LHDs in the proportion of time spent offering oral hygiene instruction. This ranged between 10.1 percent (Southern NSW) to 21.4 percent (Western Sydney) (Table 2). Professional cleaning for adolescents also differed between LHDs ranging from 5.1 percent in Western NSW to 14.2 percent in South Eastern Sydney. There was a wide variation in the application of topical fluoride from 5.4 percent in Northern NSW LHD to 23.4 percent in the Far West (Table 2).

Table 2 also shows a wide variation in the use of fissure sealants in rural Local Health Districts, ranging from 12.3 percent for Mid North Coast to 26.1 percent for Southern NSW. Conversely, in metropolitan LHDs the proportion of fissure sealants placed ranged from 7 percent in South Eastern Sydney to 16.7 percent for Sydney LHD.

Although brief smoking cessation advice is a NSW Health Policy, Table 2 shows that it was rarely offered, but did increase with the age of the patient being treated (Table 3).

Clinical restorative activities ranged from 11.1 percent for adolescents in Western Sydney to a high of 30.9 percent provided for patients in Northern NSW LHD. There was less variation with the proportions of dental extractions, ranging from a high of 3.4 percent for both Murrumbidgee and Nepean Blue Mountains to a low of 1.7 percent in Sydney LHD. There was also a notable variation in the number of radiographs taken ranging from 14.0 percent in Far West to 25.5 percent in the Central Coast (Table 2).

There was little difference in the percentage of preventive clinical activities undertaken within age groups, the exceptions being smoking cessation advice which increased with patients’ age and the placement of fissure sealants which peaked at 13–14 years (15.2%). Radiographs as a baseline diagnostic and caries management tool increased steadily with age advancement, with a slight decrease at age 17 (18.8% to 21.8) (Table 3).

The offer of dietary advice across the age groups was consistently below 10.0 percent, declining with age of the patient to 7.5 percent for 17 year olds. Oral hygiene instruction followed the same pattern with 16.4 percent provided for 12 year olds, dropping to 13.3 percent for 17 year olds (Table 3). Professional cleaning (removal of plaque and calculus) activities to support and maintain healthy gingivae for adolescents were less than 10 percent across all age groups (Table 3).

Topical fluoride was rarely offered with percentages fluctuating around 15 percent across all age groups (Table 3).

**Discussion**

All adolescents in NSW are eligible for free public oral health care provided through primary community health, hospital and school settings by Therapists [24]. This care is enhanced by an established consultative and collaborative working relationship with dentists and Paediatric Dental Specialists. The Australian Commonwealth Government Medicare Teen Dental Program in response to concerns raised regarding adolescents being at risk of dental disease, offered adolescents whose families are eligible for Family Tax A, a preventive voucher that could be used in private and public dental services [23]. However, there were problems with this preventive scheme, as some eligible adolescents seeking private care were referred back to
Figure 1: Local health district’s therapists preventive and clinical activities performed for adolescents, year 2011.

Figure 2: Percentages of therapists preventive and clinical care activities performed for adolescents in New South Wales metropolitan, rural and remote regions, year 2011.
Figure 1
Local health district therapists preventive and clinical activities performed for adolescents, year 2011.

Figure 2
Percentages of therapists preventive and clinical care activities performed for adolescents in New South Wales metropolitan, rural and remote regions, year 2011.

Table 2
Number and percentage (within Local Health Districts) of therapists preventive and clinical activities performed for adolescents, year 2011.

<table>
<thead>
<tr>
<th>Local Health District</th>
<th>Radiographs</th>
<th>Dietary advice</th>
<th>Oral hygiene instruction</th>
<th>Professional clean</th>
<th>Topical fluoride</th>
<th>Fissure sealant</th>
<th>Smoking cessation</th>
<th>Restorative</th>
<th>Extraction</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
</tr>
<tr>
<td>Sydney (Metropolitan)</td>
<td>1888 (23.0)</td>
<td>785 (9.6)</td>
<td>1105 (13.5)</td>
<td>985 (12.0)</td>
<td>668 (8.1)</td>
<td>1373 (16.7)</td>
<td>10 (0.10)</td>
<td>1263 (15.4)</td>
<td>137 (1.7)</td>
<td>8214</td>
</tr>
<tr>
<td>South Western Sydney (Metropolitan)</td>
<td>3936 (21.9)</td>
<td>1889 (10.5)</td>
<td>2552 (14.2)</td>
<td>1136 (6.3)</td>
<td>3455 (19.2)</td>
<td>2015 (11.2)</td>
<td>9 (0.10)</td>
<td>2459 (13.7)</td>
<td>518 (2.9)</td>
<td>17969</td>
</tr>
<tr>
<td>South Eastern Sydney (Metropolitan)</td>
<td>1626 (12.0)</td>
<td>1454 (1.30)</td>
<td>1477 (13.2)</td>
<td>1582 (14.2)</td>
<td>2137 (19.2)</td>
<td>782 (7.0)</td>
<td>11 (0.1)</td>
<td>1869 (16.7)</td>
<td>222 (2.0)</td>
<td>11160</td>
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<tr>
<td>Illawarra Shoalhaven (Metropolitan)</td>
<td>2506 (18.0)</td>
<td>1674 (1.20)</td>
<td>2213 (15.9)</td>
<td>1740 (12.5)</td>
<td>1309 (10.0)</td>
<td>1116 (8.0)</td>
<td>10 (0.1)</td>
<td>2820 (20.3)</td>
<td>453 (3.3)</td>
<td>13922</td>
</tr>
<tr>
<td>Western Sydney (Metropolitan)</td>
<td>2124 (23.4)</td>
<td>1622 (17.8)</td>
<td>1945 (21.4)</td>
<td>759 (8.4)</td>
<td>571 (6.2)</td>
<td>750 (8.3)</td>
<td>21 (0.2)</td>
<td>1005 (11.1)</td>
<td>290 (3.2)</td>
<td>9087</td>
</tr>
<tr>
<td>Nepean Blue Mountains (Metropolitan)</td>
<td>2126 (13.2)</td>
<td>434 (3.2)</td>
<td>1294 (9.6)</td>
<td>1315 (9.8)</td>
<td>4340 (32.3)</td>
<td>1585 (11.8)</td>
<td>9 (0.1)</td>
<td>1916 (14.2)</td>
<td>452 (3.4)</td>
<td>13471</td>
</tr>
<tr>
<td>Northern Sydney (Metropolitan)</td>
<td>1058 (18.0)</td>
<td>592 (10.0)</td>
<td>1050 (17.9)</td>
<td>748 (12.7)</td>
<td>772 (13.2)</td>
<td>845 (14.4)</td>
<td>2 (0.0)</td>
<td>698 (11.9)</td>
<td>105 (1.8)</td>
<td>5865</td>
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<tr>
<td>Central Coast (Rural)</td>
<td>3426 (25.5)</td>
<td>1619 (1.20)</td>
<td>1799 (13.4)</td>
<td>504 (3.7)</td>
<td>2672 (19.9)</td>
<td>1084 (8.1)</td>
<td>25 (0.2)</td>
<td>2034 (15.1)</td>
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<td>Hunter New England (Rural)</td>
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<td>1086 (3.7)</td>
<td>4448 (15.1)</td>
<td>2354 (8.0)</td>
<td>4161 (14.1)</td>
<td>5907 (18.7)</td>
<td>51 (0.2)</td>
<td>3847 (13.1)</td>
<td>784 (2.7)</td>
<td>29408</td>
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<td>Northern NSW (Rural)</td>
<td>1596 (21.9)</td>
<td>452 (6.2)</td>
<td>1251 (17.2)</td>
<td>399 (5.5)</td>
<td>369 (5.4)</td>
<td>668 (9.4)</td>
<td>12 (0.2)</td>
<td>2246 (30.9)</td>
<td>240 (3.3)</td>
<td>7274</td>
</tr>
<tr>
<td>Mid North Coast (Rural)</td>
<td>1885 (21.2)</td>
<td>431 (4.8)</td>
<td>1257 (14.1)</td>
<td>781 (8.8)</td>
<td>1345 (15.1)</td>
<td>1097 (12.3)</td>
<td>3 (0.0)</td>
<td>1853 (20.8)</td>
<td>259 (2.9)</td>
<td>8911</td>
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<tr>
<td>Southern NSW (Rural)</td>
<td>1113 (16.7)</td>
<td>309 (4.6)</td>
<td>669 (10.1)</td>
<td>526 (7.9)</td>
<td>904 (13.6)</td>
<td>1733 (26.1)</td>
<td>35 (0.5)</td>
<td>1174 (17.7)</td>
<td>188 (2.8)</td>
<td>6651</td>
</tr>
<tr>
<td>Murrumbidgee (Rural)</td>
<td>1720 (14.8)</td>
<td>604 (5.2)</td>
<td>1724 (14.8)</td>
<td>1224 (10.5)</td>
<td>1385 (11.9)</td>
<td>1889 (16.2)</td>
<td>38 (0.3)</td>
<td>2676 (23.0)</td>
<td>391 (3.4)</td>
<td>11651</td>
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<tr>
<td>Western NSW (Rural)</td>
<td>1547 (20.0)</td>
<td>386 (5.0)</td>
<td>1334 (17.2)</td>
<td>396 (5.1)</td>
<td>619 (8.0)</td>
<td>1801 (23.3)</td>
<td>9 (0.1)</td>
<td>1416 (18.3)</td>
<td>236 (3.0)</td>
<td>7744</td>
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<tr>
<td>Far West (Rural)</td>
<td>214 (14.0)</td>
<td>161 (10.9)</td>
<td>269 (17.6)</td>
<td>182 (11.9)</td>
<td>358 (23.4)</td>
<td>97 (6.4)</td>
<td>1 (0.1)</td>
<td>212 (13.9)</td>
<td>33 (2.2)</td>
<td>1527</td>
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<tr>
<td>TOTAL NSW</td>
<td>33935 (20.4)</td>
<td>13498 (8.1)</td>
<td>24387 (14.7)</td>
<td>14626 (8.8)</td>
<td>25170 (15.2)</td>
<td>22359 (13.4)</td>
<td>246 (0.1)</td>
<td>27488 (16.5)</td>
<td>4589 (2.8)</td>
<td>166298</td>
</tr>
</tbody>
</table>
the public system when their parents were unable to meet the on-going costs of treatment outside the parameters of the voucher [14]. Most adolescents accessing NSW Public Oral Health Services are from disadvantaged groups including the working poor. These individuals would benefit greatly from preventive care and advice [10,12,21,31,32] from Therapists.

Fluoride policy

The NSW fluoride policy pertaining to professionally applied fluoride products for individuals above 10 years of age recommends that fluoride varnish and/or high concentrated fluoride gels should be used for patients who have an elevated risk of developing caries [25]. Topical fluoride use has been scientifically proven to be effective in the prevention and control of dental caries and their use for caries stabilisation [9,33,34].

The majority of adolescents being treated came from deprived (low socio-economic) and rural and remote areas where caries rates are high [14]. For example the high levels of restorative and extraction activities recorded for Northern NSW (Table 2) which is an unfluoridated area should signpost the importance of providing fluoride treatments for these at risk patients. However, the Therapists recorded an actual level of only 5.4 percent topical fluoride treatments for these patients. Adolescents living in Northern NSW have high levels of dental caries and Therapists from this area did spend time on oral hygiene instruction (17.2%) and the use of fluoride tooth paste, which aligns with the fluoride policy [25]. Therapists in two other LHDs spent similar proportion of time on oral hygiene instruction, one metropolitan and one rural. The reasons other LHDs spent less time is not clear, and further research using qualitative approaches is warranted.

Skinner et al. [14] reported a mean DMFT of 2.4 for NSW rural and remote regions, with a mean DMFT for Mid North Coast of 3.0 therefore provision of topical fluoride treatments for adolescents residing in these areas is especially important in conjunction with oral hygiene education and promotion of tooth brushing with fluoride toothpaste, according to government policy [14,25]. This study illustrated fluoride applications for rural and remote areas varied between 5.4 percent (Northern NSW) to 23.4 percent for Far West LHD, compared to metropolitan LHDs ranging from 8.1 percent (Sydney) to 32.3 percent in Nepean Blue Mountains.

Considering the Australian Government Teen Dental Program aimed at low socio-economic families had an emphasis on preventive care [23], it is disappointing to note the low levels of topical fluoride use and oral hygiene instruction across LHDs, as these are relatively simple and quick procedures that assist in dental caries prevention [9]. Previous studies have identified factors influencing clinician’s adherence to preventive guidelines for example lack of time, variances in practitioners awareness of protocols, guidelines and individual habitual clinical behaviours [35-37].

**Table 3 Number and percentages (within age of therapists preventive clinical activities performed for adolescents, year 2011**

<table>
<thead>
<tr>
<th>Preventive activity</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dietary Advice</td>
<td>3032 (9.2)</td>
<td>2616 (8.2)</td>
<td>2287 (7.8)</td>
<td>2064 (7.9)</td>
<td>1784 (7.7)</td>
<td>1724 (7.5)</td>
<td>13498 (8.1)</td>
</tr>
<tr>
<td>Oral Hygiene Instruction</td>
<td>5381 (16.4)</td>
<td>4801 (15.1)</td>
<td>4217 (14.3)</td>
<td>3751 (14.3)</td>
<td>3204 (13.8)</td>
<td>3033 (13.3)</td>
<td>24387 (14.7)</td>
</tr>
<tr>
<td>Professional Clean (plaque and calculus removal)</td>
<td>2884 (8.8)</td>
<td>268 (8.5)</td>
<td>2540 (8.6)</td>
<td>2297 (8.8)</td>
<td>2041 (8.8)</td>
<td>2177 (9.5)</td>
<td>14626 (8.8)</td>
</tr>
<tr>
<td>Topical Fluoride Application</td>
<td>4940 (15.0)</td>
<td>4878 (15.4)</td>
<td>4378 (14.9)</td>
<td>3941 (15.0)</td>
<td>3571 (15.4)</td>
<td>3462 (15.2)</td>
<td>25170 (15.2)</td>
</tr>
<tr>
<td>Fissure Sealant</td>
<td>4578 (13.9)</td>
<td>4745 (15.0)</td>
<td>4470 (15.2)</td>
<td>3502 (13.4)</td>
<td>2590 (11.2)</td>
<td>2474 (10.8)</td>
<td>22359 (13.4)</td>
</tr>
<tr>
<td>Radiographs</td>
<td>6191 (18.8)</td>
<td>6238 (19.7)</td>
<td>6059 (20.5)</td>
<td>5489 (20.9)</td>
<td>5038 (21.8)</td>
<td>4920 (21.5)</td>
<td>33935 (20.4)</td>
</tr>
<tr>
<td>Smoking Cessation</td>
<td>0 (0.0)</td>
<td>6 (0.0)</td>
<td>26 (0.1)</td>
<td>43 (0.2)</td>
<td>69 (0.3)</td>
<td>102 (0.4)</td>
<td>246 (0.1)</td>
</tr>
</tbody>
</table>

NSW STATE TOTAL | 32856 (100.0) | 31739 (100.0) | 29502 (100.0) | 26205 (100.0) | 23161 (100.0) | 22835 (100.0) | 166298 (100.0) |

**Pit and fissure sealant: use of in oral health services, NSW policy**

Placement of fissure sealants in the occlusal surfaces of permanent molars, the sites most susceptible to dental caries is a proven clinical preventive intervention, especially for those individuals classed as being at high risk of developing dental caries [26,38].

This study recorded the percentages of fissure sealants provided by Therapists for adolescents accessing the NSW Public Oral Health system; although levels of fissure sealants across LHDs were fairly low, the findings illustrated that Therapists placed fissure sealants aligned with permanent tooth eruption age timeframes. According to Skinner et al. [14] in their State-wide dental survey, South Eastern Sydney LHD 14–15 year olds had the most fissure sealants in their permanent teeth across NSW.
However, in our study fissure sealant percentages provided to adolescents by Therapists in this LHD were particularly low. This suggests the focus on fissure sealants as a preventive modality for 14–15 year olds may well have occurred in the private sector. A study undertaken by Clarkson et al. [39] in Scotland offered incentives of re- muneration and training for the underutilised practice of placement of fissure sealants by dentists. Following the intervention the authors reported a 9.8% increase in the provision of fissure sealants, with no significant difference noted in the type of education provided [39]. Little is known of the impact the Australian Government Teen Dental Program vouchers had on Therapists fissure sealant preventive practice as separate treatment items were not reported as there was a flat fee per voucher.

The use of bitewing radiographs by Therapists as a diagnostic and caries management tool was clearly not a standard procedure. This is clearly insufficient as they provide relevant clinical information prior to the placement of fissure sealants and planning a preventive strategy [26,32,40]. Despite the evidence of the value of fissure sealants as a preventive treatment, most NSW LHDs with high restorative and dental extraction activities reported low fissure sealant placement activity.

Bonetti et al.'s [35] study used psychological models to understand and predict general dental practitioner's clinical behaviour to placement of fissure sealants. The authors suggested that evidence-based behaviour of clinicians can be enhanced by influencing beliefs of the positive outcomes of fissure sealant placements and creating a clinical habit of performing them as an integral part of patient management.

Overall, the provision of fissure sealants as a preventive modality was inadequate in comparison with the time devoted to restorative care across the State for adolescents. Satur et al.'s [41] study reported that due to greater demand in rural areas for urgent treatment including emergencies, less preventive care was being offered to patients, and this may explain why some Therapists were not placing fissure sealants.

**Smoking cessation brief intervention at the chairside: role of public oral health/dental services policy**

According to the Cancer Council Australia, 80% of adults become addicted to smoking during their adolescent years [42]. Researchers recommend provision of smoking cessation in the dental setting for adolescents as an early intervention strategy [43]. Self-reporting by patients completing their medical history should be used as a trigger by all clinicians in NSW Public Oral Health Services to provide smoking cessation advice [27]. Therapists identified adolescents for smoking cessation advice commencing at age 13 and the numbers given advice slowly increased with patient age. Nonetheless, despite this policy smoking cessation advice was rarely offered. Trotter and Worcester's [44] study reported lack of resources and patient materials, clinician doubts regarding being effective, lack of confidence to tackle the issues and support patients to quit smoking and insufficient time as barriers to perform preventive activities. Our study suggests that further review and on-going training support for Therapists is required if smoking cessation is going to be offered routinely in line with the NSW Policy.

**Oral hygiene instruction**

Adolescence is a critical developmental life stage whereby clinicians may engage with patients to promote self-efficacy towards improved oral health practices for long term health outcomes [21,31]. In this study the offer of oral hygiene education to adolescents to promote brushing with fluoride toothpaste was low across all LHDs.

Oral hygiene is an individual's personal maintenance plan to disrupt the plaque biofilm to prevent its accumulation on teeth and gingiva [45]. The promotion of brushing twice a day with a fluoride toothpaste to prevent dental caries is an important part of this activity. Oral hygiene education guidelines for adolescents are lacking, but, toothbrushing with a fluoride toothpaste are part of the NSW Health Fluoride Use Policy [25]. Therefore, Therapists should be supported in the clinical setting with the provision of oral health products (fluoride toothpaste and tooth brush) to issue to patients for home-care use in line with the Ottawa Charter ‘supportive environment’ principle [46]. There was a decline of oral hygiene education for older adolescents which is a concern considering evidence of adolescents’ levels of caries experience [5,14] and their prospective as young parents.

Studies linking periodontal disease with systemic disease suggest that Therapists should offer professional prophylaxis in association with oral hygiene instruction [47,48]. This study illustrated that professional cleaning (plaque and calculus removal) clinical activities provided for adolescents could be improved, and this may happen as the proportion of dually qualified Therapists and Hygienists increases.

**Dietary advice**

There is overwhelming evidence regarding the role of sugar and its frequent consumption in the aetiology of dental caries [49,50], however dietary advice was given little time by Therapists in NSW. Somewhat surprisingly, given the higher levels of dental caries this study found that in six rural LHDs, Therapists provided lower levels of dietary advice to adolescents when compared with Therapists in metropolitan LHDs. There is certainly scope for further research to investigate why Therapists offering dietary advice is so variable across LHDs. Therapists in public health settings have opportunities to provide dietary advice for
adolescents utilising different strategies such as adopting Motivational Interviewing techniques and utilising easy to translate diet tip sheets [21,31].

There is a plethora of evidence regarding adolescent’s dietary habits. Parents and health practitioners face fierce media advertising of carbonated beverages, sport drinks and sugary snacks [51-53]. Nevertheless, it is important that Therapists work in collaboration with allied health professionals for example dieticians, diabetic educators, health promotion professionals and local community agencies to offer advice to young people so they have the knowledge to change their behaviour. This aligns with the Common Risk Factor Approach principles [16,17] so that advice on oral health fits in with the general health concerns of trying to reduce obesity and early onset of diabetes [1,54] and systemic diseases [47].

This is the first study undertaken in NSW to record the provision of preventive care provided by Therapists to adolescents accessing the Public Oral Health Service. The re-use of the ISOH data for research purposes requires more investigation. A useful first step would be to assess the reliability of the data in more detail. In addition, the way preventive items are coded should be the subject of a review as currently preventive activities are not captured in any great depth and useful data may be missed.

Conclusions

The retrospective study into the provision of preventive and clinical treatment by Therapists to adolescents accessing the NSW Public Oral Health Service has demonstrated that adolescents were offered preventive care but there was considerable variation between Local Health Districts.

A review of the way NSW Health Policy Directives are implemented and the reasons for non-compliance should be undertaken at a LHD level. Of particular concern is the need to enhance the use of topical fluorides, placement of fissure sealants, and the provision of dietary and smoking cessation advice.

Competing interests

The authors declare that they have no competing interests. The authors are responsible for the content of this study and do not reflect the views of the NSW Ministry of Health or the funding agency.

Authors’ contributions

AVH participated in the study design, performed the data analysis and drafted the manuscript. ASB appraised the data analysis and assisted with drafting the manuscript. JT participated in the design of the study and assisted with drafting the manuscript. The study was overseen by FAB, who participated in the study design, data analysis and drafting of the manuscript. All authors read and approved the final manuscript.

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References


Chapter 4:

Reliability study of clinical electronic records with paper records in the NSW Public Oral Health Service.
Preface

Building on from the previous study, the electronic health record (EHR) data have great potential for reuse in research and patient care quality improvement initiatives. However, in NSW Public Oral Health Service, currently dual systems of electronic and paper health records are used by Therapists to account for their clinical activities. Researchers have reported that inconsistencies and errors can occur where dual systems are used.

This chapter investigates and evaluates the degree of agreement between electronic clinical diagnostic and preventive data uploaded by Therapists, and recording of the same data into paper records. Reuse of patient data has great potential for clinical oral health research and quality improvement initiatives to ensure quality care for patients and overall health gains.

Electronic health records for adolescents from eight Area Health Services was obtained from the Information System for Oral Health New South Wales database of records, and compared with 200 paper records for adolescents that were stored at clinics. The reliability study illustrated that deficiencies occurred more often in paper records compared to electronic health records, signifying flaws in staff clinical practice and the current health information systems processes.

The study in this chapter is published in the Public Health Research & Practice Journal, 2015

Angela V Masoe, Anthony S Blinkhorn, Jane Taylor, Fiona A Blinkhorn

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Public Health Research & Practice 2015; Vol. 25(2) 1-6
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Information Sheet Focus Group
Jan 2012
If you have any questions, have a concern or complaint about the facilitation of the focus group, or would just like more information, please feel free to contact:

A/Professor Fiona Blinkhorn, Principal Investigator: Phone: (02) 4349 4530 or Mobile No. 0422 768 223

Further, research has been approved by the Hunter New England Human Research Ethics Committee of Hunter New England Local Health District, Reference 12/02/15/5.04

Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researcher, or, if an independent person is preferred, to Dr Nicole Gerrand, Manager Research Ethics and Governance, Hunter New England Local Health District, Locked Bag 1, New Lambton, NSW, 2305, Telephone (02) 49214950, email: Henhrec@hnehealth.nsw.gov.au

We greatly appreciate your time and contributions.

SIGNATURE OF SUPERVISORS AND INVESTIGATOR

A/P rof. Fiona. A. Blinkhorn A/Prof. Jane. Taylor Ms. A. Masoe

CO-AUTHORS' STATEMENT CONFIRMING AUTHORSHIP CONTRIBUTION

This is to certify that the manuscript entitled ‘Reliability study of clinical electronic records with paper records in the NSW Public Oral Health Service’ submitted by Angela V Masoe in partial fulfilment of the requirements for the degree of Doctor of Philosophy (Oral Health) is the result of the following contributions:

Angela V Masoe designed the reliability evaluation audit tool and protocols, provided information to LHD ISOH coordinators to collect the data, organised the statistical data analysis, drafted the manuscript, managed the submission and responded to the reviews.

Ms. Angela V. Masoe
School of Health Sciences
The of Newcastle

Associate Professor Jane Taylor
School of Health Sciences
The

S. Blinkhorn
Faculty of Dentistry
The University of Sydney
Abstract

Aim: Electronic health record (EHR) data have great potential for reuse in research and patient care quality improvement initiatives. However, in dual systems, where both electronic and paper health records are used, inconsistencies and errors may occur. The objective of this study was to determine the degree of agreement between EHR clinical data and paper records for reuse in clinical oral health research and quality improvement initiatives.

Methods: A random sample of 200 EHRs for adolescents from eight Area Health Services was obtained from the Information System for Oral Health New South Wales database of 29,599 records, and compared with 200 paper records for adolescents that were stored at clinics. The records were analysed for data reliability. The electronic records were percentage weighted to reflect the number of adolescents treated in each of the Area Health Services.

Results: The results showed an overall 95.0% agreement between the 200 individual EHRs and the 200 clinic-stored paper records. In 1.5% of cases, information contained in the paper record was not uploaded into the EHR, and in 3.5% of cases, information contained in the EHR was missing from the paper record.

Conclusions: It is possible to conclude that more deficiencies occurred in paper records compared with EHRs. These deficiencies should be taken into account if EHRs are to be reused for clinical oral health research or quality improvement initiatives. Considering the missing data and the great strides in information system technology, it would be logical to adopt one system, with a focus on electronic records to replace the paper records.
Reliability study of clinical electronic records with paper records in the NSW Public Oral Health Service

Angela V Masoe¹, Anthony S Blinkhorn², Kim Colyvas³, Jane Taylor¹ and Fiona A Blinkhorn¹

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Article history
Publication date: March 2015

Key points
• Electronic health record (EHR) systems in clinical facilities improve patient record control and documentation, and have great potential for reuse of data in oral health research and patient care quality improvement initiatives
• Dual systems using EHR and paper records to record patients’ clinical oral health activities increase the risk of errors and can be inefficient
• An electronic oral health record system to replace the current New South Wales Public Oral Health Service’s dual system is therefore recommended

Abstract

Aim: Electronic health record (EHR) data have great potential for reuse in research and patient care quality improvement initiatives. However, in dual systems, where both electronic and paper health records are used, inconsistencies and errors may occur. The objective of this study was to determine the degree of agreement between EHR clinical data and paper records for reuse in clinical oral health research and quality improvement initiatives.

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Introduction

Oral health information systems are essential for the evaluation and assessment of clinical dental services. If evaluation of these services is to be valid, then reliable, accurate patient records are required. The evolution of information systems and increased use of computers in clinical dentistry has placed more emphasis on the use of patient electronic health records (EHRs). A literature review by Hayrien et al provided an EHR classification based on the International Organization for Standardisation classification, and highlighted the need for common terminology, especially when defining EHRs. Their paper defined an EHR as a repository of patient data in digital form, securely stored and transferable, made accessible upon request by different users with appropriate authorisation, and containing multilevel information for the efficient provision of integrated quality healthcare.

Benefits of EHRs in clinical facilities can include improved record control, efficient documentation, storage and access to patient data, and improved information for clinical management with quality data for appraisal of patient care. However, there are many different EHR systems, and this plethora of record types has caused confusion. This is especially true in the dental arena, which is a primary care system that collects huge amounts of data. Problems caused by different EHR systems led the World Health Organization (WHO) in the 1990s to call on its member states to ‘harmonise’ information systems for oral health to improve the quality of oral health structures and healthcare. The Chief Dental Officer for WHO and his team reported different information measurements and focuses across countries, including in recording and capturing various types of services; however, health outcomes were often excluded from reports. It was also noted that some countries had established outcome-oriented information systems, but these were not all compatible, leading to an inability to access planning data for national and international organisations. Well-designed EHRs can capture and enable comparison and analysis of patients’ and practitioners’ activities for quality improvement purposes.

Atkinson found that a large percentage of electronic dental record data collected daily had the potential to be reused for research, generating new knowledge and improving patient care. Other researchers have demonstrated an increase in the reuse of electronic dental records for research, and have outlined common pitfalls associated with paper records, such as double handling of data and the likelihood of error in data transfer from paper to electronic databases. Additionally, it has been reported that parallel use of paper records and EHRs to capture medical and dental patient clinical data has resulted in inconsistencies between the record systems. On the other hand, it has been suggested that paper records are more flexible for describing patient symptoms and treatment, especially as some software packages are poorly designed and difficult to use. These issues are often raised to support the continuing use of paper records and as a justification for not implementing electronic data systems.

In the New South Wales (NSW) Public Oral Health Service, dual systems exist to administer and record clinical activity and manage patients’ dental care. The Information System for Oral Health (ISOH) is a centralised, state-wide repository for patient data in the NSW Public Oral Health Service, and is used to capture a clinician’s clinical activity as identified by dental treatment item numbers in the Australian national dental schedule. Paper records are predominantly used for recording a patient’s medical history, diagnosis, special test results, odontogram management plans and narratives of treatment provided. The current ISOH EHR performs some of these tasks (e.g. patient medical alerts are uploaded), but it does not have the capacity to record full medical histories. It is also possible to note ‘decayed’, ‘missing’ and ‘filled’ teeth scores, but the system lacks an odontogram for clinicians to record a detailed dental status assessment.

An overarching oral health record protocol from NSW Health provides guidance on the essential elements for the management of patients’ oral health records, but there appears to be a lack of standard operational procedures for clinicians to seamlessly upload patient clinical activity into ISOH. This may affect data reliability for patient management and reuse in oral health research. There also appears to be a lack of information on the reliability of ISOH data and clinic-based paper records.

The aim of this reliability study was to investigate whether the EHR data from ISOH agreed with paper records maintained in clinics in terms of diagnostic and preventive care provided for adolescents. Dental therapists and oral health therapists are the main providers of oral healthcare for adolescents attending the NSW Public Oral Health Service. There is little information on whether therapists appropriately record the diagnostic and preventive clinical care they offer their patients in the EHR and paper records. This research topic was chosen because the same patient clinical activity (item) data has to be entered into the EHR and written (narrative/item) in the patient paper records for continuous care purposes. For the purposes of this study, the EHR is considered the benchmark standard, because it is used for clinician performance appraisals and dental treatment clinical indicators, and has potential to be reused in clinical oral health research and patient quality improvement initiatives.
Method

The study assessed records dated between 1 January 2011 and 31 December 2011.

Electronic health records

The NSW State ISOH Manager drew a random sample of 200 EHRs from the total number (29,599) of adolescent diagnostic and preventive records. These were percentage weighted to reflect the number of adolescents treated by therapists in each of the eight Area Health Services (before the NSW Health restructure in 2011). Table 1 illustrates the sample distribution across the Area Health Services. The NSW Health restructure resulted in the formation of fifteen Local Health Districts (LHDs), which have maintained the same eight ISOH databases across districts, as per LHD service agreements.

Only diagnostic and preventive activities were included in the ISOH printout, as both are required to be entered into the EHR and the paper-based clinic record. Therapists were chosen as providers because of their workforce stability in the public health system over a one-year period compared with dentists.

Table 1. Distribution of electronic health records analysed in the study, by Area Health Service

<table>
<thead>
<tr>
<th>Area Health Service</th>
<th>Number of records analysed</th>
<th>% records analysed</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Coast</td>
<td>23</td>
<td>11.5</td>
</tr>
<tr>
<td>Northern Sydney and</td>
<td>13</td>
<td>6.5</td>
</tr>
<tr>
<td>Central Coast</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hunter New England</td>
<td>37</td>
<td>18.5</td>
</tr>
<tr>
<td>Sydney South West</td>
<td>26</td>
<td>13.0</td>
</tr>
<tr>
<td>South Eastern Sydney and</td>
<td>36</td>
<td>18.0</td>
</tr>
<tr>
<td>Illawarra Shoalhaven</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Western Sydney</td>
<td>27</td>
<td>13.5</td>
</tr>
<tr>
<td>Greater Western</td>
<td>15</td>
<td>7.5</td>
</tr>
<tr>
<td>Greater Southern</td>
<td>23</td>
<td>11.5</td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Paper-based health records

For the paper-based records, the oral health clinical directors and service managers were contacted for the 16 LHDs where the selected EHRs had been entered. Approval was obtained to undertake clinic paper records comparison analysis across the 16 LHD dental clinics where records were stored with the EHR using an item number and activity audit tool. The audit tool was developed according to essential criteria outlined in the NSW Health Oral Health Record Protocol, and was endorsed by two LHD clinical leaders. The audit tool was carefully pilot-tested by two dental assistants in two separate settings, both of whom were experienced in entering ISOH treatment activities. Adaptations to the audit tool were made based on their recommendations before it was used for this study.

Reliability assessment

LHD ISOH coordinators were chosen to undertake the reliability study, because they are not involved with clinical patient care, they have access to clinical records and the centralised LHD ISOH data, and they would collect the data at no cost. Face-to-face consultations and one video conference with LHD ISOH coordinators conducting the reliability exercise were undertaken to explain the study and offer advice about completing the assessment of both patient clinical record systems. Ten per cent of the data were further subjected to a second review by one oral health clinical leader and one oral health intake service coordinator, adhering to the reliability protocol process for consensus.

Assessment of whether the agreement between the EHRs and the paper-based records was satisfactory was made by considering the number/percentages of items/activities that disagreed between the two sets of 200 records. If both record systems did not have an entry for an item, this was counted as agreement between the record systems for that item.

The adequacy of the sample size was based on the uncertainty of percentage agreement. A Bayesian approach was used to determine the 95% credible intervals (credible intervals are the Bayesian equivalent of confidence intervals from frequentist statistics) over the range of 80% to 100%. At 80% agreement, the 95% credible interval was 73.9 to 84.9, giving a worst case of about a 6% uncertainty on the lower side. This was considered satisfactory for the purpose of the study. For a higher percentage agreement, the uncertainties were less – for example, at 95% agreement, the uncertainty was 91.0 to 97.2.

The data were analysed using IBMSPSS Statistics and percentages and kappa values are used to describe key findings.

Ethics approval for the study was obtained from the Hunter New England Local Health District Lead Health and Research Ethics Committee (HREC) Reference No. 12/02/15/5.04, and the 15 LHDs. The Chief Health Officer, NSW Ministry of Health, approved the use of data for this investigation from the Centre for Oral Health Strategy, NSW ISOH.

Results

The reliability study of ISOH data entries of EHR against paper record entries produced a 95.0% overall agreement rate.

In 1.5% of cases (n = 33), information contained in the paper record was not included in the EHR; and in 3.5% of cases (n = 78), information contained in the EHR was...
missing from the paper record (Table 2). The difference in agreement between the item numbers was significant ($c^2 (10) = 50.2, p < 0.001$). Using adjusted standardised residuals and follow-up chi-square tests, three different groups of agreement were identified. Items 012, 013, 121, 122 and 123 had similar agreement levels (combined agreement: 98.3%), followed by 011, 111 and 161 (combined agreement: 94.4%); 022, 131 and 141 had the lowest agreement (combined agreement: 89.8%).

Kappa agreement statistics were also calculated (Table 2). Nine kappa values were in the range 0.81–0.92, and the remaining two were 0.69 and 0.39. Combining all items gave a kappa value of 0.88.

When comparing item 011 'comprehensive oral examination' in the EHR data with the paper record data, two cases had the item/activity entered on the paper record and not in the EHR, and seven cases had the item/activity entered in the EHR but not on the paper record. The percentage agreement of 95.5% was considered acceptable (Table 2).

Data were missing in paper records for radiographs (7.5% of cases) and fissure sealants (5.5% of cases). Inaccuracy in item number data entry by clinicians for the application of topical fluoride remineralising agents was also noted for both EHRs and paper records (Table 2).

The dietary advice error percentage for EHRs was 2.5% compared with 6.5% for the paper record, giving an overall agreement of 91.0% (kappa 0.82), which was below the acceptable threshold (Table 2), indicating an area requiring attention.

Oral hygiene instruction had an overall agreement of 88.5% (kappa 0.69), illustrating further inconsistencies (Table 2).

### Discussion

The purpose of this study was to determine the degree of agreement between patient EHRs and paper records. The validation exercise was concerned only with whether the item number entered in the EHR correlated with what was written by the clinician in the paper record (narrative and/or item number) and vice versa. The findings of this reliability study illustrate inconsistencies, errors and missing data within the current dual record keeping system in the NSW Public Oral Health Service, suggesting that mistakes can occur when using dual record keeping systems. This has been reported by other researchers.\(^5\)\(^11\)\(^12\)

For provision of continuous quality care for patients, it is disappointing to have levels of more than 10% inaccuracy in recording patient treatment care. This study found missing data occurred more often in the paper records than the EHRs, demonstrating clinicians' ease with uploading clinical activity into ISOH. Parallel use of dual systems is often used to meet an organisation's various responsibilities.\(^11\) In the NSW Public Oral Health Service, the paper oral health record and EHRs contain legal patient clinical information and may be subpoenaed. However, the ISOH data entries are further linked to fiscal reports, key performance indicators for individual clinicians and LHD service agreements performance. It appears that clinicians have focused on entering data in the EHR, with less attention being placed on keeping accurate paper records. This may be because LHDs are required to record 'weighted occasions of services' generated from ISOH to meet state and Commonwealth activity-based targets, program measurements and individual clinical performance.

#### Table 2. Reliability analysis of electronic health records and paper records

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Item no. description</th>
<th>Item no. (or activity) in both EHR and paper record (n)</th>
<th>Item no. (or activity) not in EHR (n)</th>
<th>Item no. (or activity) not in paper record (n)</th>
<th>Agreement (%)</th>
<th>Kappa value (K)</th>
</tr>
</thead>
<tbody>
<tr>
<td>011</td>
<td>Comprehensive oral examination</td>
<td>165</td>
<td>2</td>
<td>7</td>
<td>95.5</td>
<td>0.83</td>
</tr>
<tr>
<td>012</td>
<td>Periodic oral examination</td>
<td>9</td>
<td>2</td>
<td>2</td>
<td>98.0</td>
<td>0.81</td>
</tr>
<tr>
<td>013</td>
<td>Oral examination – limited</td>
<td>29</td>
<td>2</td>
<td>2</td>
<td>98.0</td>
<td>0.92</td>
</tr>
<tr>
<td>022</td>
<td>Radiographs (periapical and bitewing)</td>
<td>91</td>
<td>3</td>
<td>15</td>
<td>91.0</td>
<td>0.82</td>
</tr>
<tr>
<td>111</td>
<td>Professional clean</td>
<td>38</td>
<td>4</td>
<td>6</td>
<td>95.0</td>
<td>0.85</td>
</tr>
<tr>
<td>121</td>
<td>Topical application of fluoride remineralising agents</td>
<td>15</td>
<td>2</td>
<td>1</td>
<td>98.5</td>
<td>0.90</td>
</tr>
<tr>
<td>122</td>
<td>Oral hygiene instruction</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>98.5</td>
<td>0.39</td>
</tr>
<tr>
<td>123</td>
<td>Fissure sealant</td>
<td>32</td>
<td>2</td>
<td>5</td>
<td>98.5</td>
<td>0.88</td>
</tr>
<tr>
<td>131</td>
<td>Dietary advice</td>
<td>87</td>
<td>5</td>
<td>13</td>
<td>91.0</td>
<td>0.82</td>
</tr>
<tr>
<td>141</td>
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<tr>
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<td></td>
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<td><strong>33</strong></td>
<td><strong>78</strong></td>
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<td>-</td>
<td>-</td>
<td><strong>95.0</strong></td>
<td><strong>0.88</strong></td>
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</tbody>
</table>

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EHR = electronic health record

* Agreement was based on $N = 200$ records, which included the records where both systems indicated an item was not provided. All kappa values were statistically significant.
appraisals. These are critical and require all clinicians to enter all patient treatment data into the EHRs. This management focus on the EHRs may be due to in-built computer software triggers that assist and remind clinicians to upload essential patient data at certain points in the software, which the paper records lack.

Electronic patient and provider data have the potential to promote clinical practice quality improvement and research.1,2 Researchers have suggested that oral health professionals should develop a common record with standard codes, including clinical outcome measures, to make the EHR more useful for recording clinical treatments, facilitating research and improving quality of care.2 Nicholson et al’s13 paper, although in a pharmaceutical health setting and used in a different context, discussed the development and use of natural language processes that may enable the widespread use of free text in electronic records. There is scope for further research into the feasibility of inserting a free-text functionality into the current ISOH treatment module to support the clinical quantitative data.

This study shows that there is scope for a state-wide electronic oral health record to replace the paper system. This would reduce discrepancies and inconsistencies, and ensure that all patient clinical care activity is recorded accurately. The current ISOH database has functionalities that could be enhanced to capture medical histories and clinical treatment narratives, including expanding the current odontogram to include more detailed oral health charting. There is also an opportunity for research into how effective the ISOH system is in capturing clinicians’ community health preventive/promotion activities across NSW LHDs for better population oral health reporting. Additionally, it would be prudent to include health service researchers when developing a new system, so there can be an added value research component to monitor and assess patient care. There is great scope for harmonising electronic information systems to allow interstate comparison of public dental services in Australia.

Acknowledgements

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Competing interests

The findings from this study are those of the authors and do not reflect the views of the funding body or the NSW Ministry of Health. AM received travel support from the NSW Ministry of Health Rural and Remote Health Professionals Postgraduate Scholarship Scheme.

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Chapter 5:

Factors influencing provision of preventive oral health care to adolescents attending Public Oral Health Services in New South Wales.
Preface

Therapists working in the NSW public oral health system are well placed to assist and support vulnerable adolescent groups towards oral health self-efficacy by providing free dental care including advice on preventing dental caries and periodontal disease. Additionally, clinical preventive care activities as key performance indicators should be measured for Local Health District service performance agreements by NSW Health.

This chapter presents findings of identified enablers and constraints as reported by Therapists to facilitate offering clinical preventive care to adolescents. The respondents identified personal self-health values, altruism, professional career satisfaction, professional clinical ethics, and their ability to relate and engage with adolescents as motivators to provide preventive care. Acknowledging adolescents psychosocial determinants of health factors such as mental health, transient home concerns, oral health literacy and dental phobias all impacted on their ability to provide effective preventive care to adolescents. These factors were the main reasons why they needed to advocate and increase clinical preventive care and support to adolescents.

The study in this chapter is published in the Journal of Dentistry and Oral Health, 2014.

**Angela V Masoe, Anthony S Blinkhorn, Jane Taylor, Fiona A Blinkhorn**

Factors influencing provision of preventive oral health care to adolescents attending public oral health services in New South Wales.

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Factors influencing provision of preventive oral health care to adolescents attending public oral health services in New South Wales.


If you have any questions, have a concern or complaint about the facilitation of the focus group, or would just like more information, please feel free to contact:

A/Professor Fiona Blinkhorn, Principal Investigator: Phone: (02) 4349 4530 or Mobile No. 0422 768 223

Further, research has been approved by the Hunter New England Human Research Ethics Committee of Hunter New England Local Health District, Reference 12/02/15/5.04. Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researcher, or, if an independent person is preferred, to Dr Nicole Gerrand, Manager Research Ethics and Governance, Hunter New England Local Health District, Locked Bag 1, New Lambton, NSW, 2305, Telephone (02) 49214950, email: Henhrec@hnehealth.nsw.gov.au

We greatly appreciate your time and contributions.

SIGNATURE OF SUPERVISORS AND INVESTIGATOR

A/P rof. Fiona. A. Blinkhorn A/Prof. Jane. Taylor Ms. A. Masoe

CO-AUTHORS' STATEMENT CONFIRMING AUTHORSHIP CONTRIBUTION

This is to certify that the manuscript entitled 'Factors influencing provision of preventive oral health care to adolescents attending public oral health services in New South Wales' submitted by Angela V Masoe in partial fulfilment of the requirements for the degree of Doctor of Philosophy (Oral Health) is the result of the following contributions:

- Angela V Masoe designed the focus group interview questions, recruited the participants, collected the data, organised the data analysis, drafted the manuscript, managed the submission and responded to the review.

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Factors Influencing Provision of Preventive Oral Health Care to Adolescents Attending Public Oral Health Services in New South Wales, Australia

Angela V Masoe1,*, Anthony S Blinkhorn2, Jane Taylor1 , Fiona A Blinkhorn1

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Abstract

Background: Many adolescents are at risk of dental caries and periodontal disease due to poor tooth brushing and dietary behavior. However, these oral health problems can be moderated by providing individuals with preventive care and advice. In New South Wales (NSW) Dental Therapists and Oral Health Therapists (Therapists) working in the public health system can help this vulnerable group by providing free dental care including advice on preventing dental caries and periodontal disease. The aim of this study was to identify factors that influence Therapists in the provision of preventive care to adolescents.

Method: Sixteen Therapists working in four NSW Local Health Districts (LHDs) participated in three structured two hour focus group sessions to: identify motivators/enablers to providing oral health care for adolescents in a clinic-based setting; and to record their solutions and strategies to enhance preventive practice. These discussions were interactively mapped, audio-recorded for recall and coded for thematic analysis.

Results: The participants identified personal self-health values, altruism, professional career satisfaction, professional clinical ethics, and their ability to relate and engage with adolescents as motivators to provide preventive care. They acknowledged that psychosocial determinants of health factors such as mental health, transient home concerns, knowledge of how to access timely oral health care, relying on others for transport, oral health literacy and dental phobias all impacted on their ability to provide effective preventive care to adolescents. These factors were the main reasons why they needed to reach out, advocate and invest time on preventive care for adolescents.

Conclusion: The Therapists believed in the value of preventive oral health care but reported that there were some overwhelming challenges that impacted on their ability to offer this service.

Keywords: Adolescents; Public oral health preventive care; Constraints; Facilitators; Therapists

Background

Oral health is integral to general health, and is essential for individuals to enable them to communicate effectively, have a positive quality of life, and maintain self-esteem and social self-confidence [1]. The oral health of the Australian population has improved over the last 30 years, largely due to increased access to water fluoridation and the widespread use of fluoride toothpaste [2-5]. Despite these positive changes dental caries in particular remains one of the most common chronic diseases affecting both children and adolescents. Armfield, et al. [6] reported that over 50% of 12 to 15 year olds suffered from dental caries in the 2003-2004 National Australian Child Dental Survey. Skinner, et al. [7] in a New South Wales (NSW) study found that over 45 per cent of 12 to15 year olds had dental caries. The latter study showed poorer levels of dental health among those: (i) from rural and remote regions (DMFT 2.4 versus State mean of 1.2); (ii) with parents on low income (DMFT 1.8 versus 0.7); and (iii) with limited access to fluoride water supplies (DMFT 1.7 versus 1.1 for those in fluoridated areas).

Adolescent patients are recognized as having distinct needs because of their tendency to have a higher sugar diet, poor oral
Factors Influencing Provision of Preventive Oral Health Care to Adolescents Attending Public Oral Health Services in New South Wales, Australia

Angela V Masoe1*, Anthony S Blinkhorn2, Jane Taylor1, Fiona A Blinkhorn1

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Adolescent patients are recognized as having distinct needs because of their tendency to have a higher sugar diet, poor oral
hygiene, use tobacco, alcohol and other drugs, and unique social and psychological needs [8-11]. These problems highlight the importance of offering preventive oral health advice and care [8, 12-15].

Dental caries and periodontal diseases are largely preventable and reversible if identified and managed early [16]. Changes in health behaviour can help prevent oral diseases such as: reducing the frequency of sugary food and drink intake; brushing teeth and gums twice a day with fluoride toothpaste; drinking fluoridated tap water; modifying alcohol consumption; ceasing tobacco use; and attending for regular professional oral health check-ups [8].

A range of oral health services are provided through the NSW public health system. These include dental services to children, adolescents and eligible adults according to criteria that prioritise emergency situations, those in most need and at highest risk of disease, dental education and oral health promotion services [17]. The NSW Ministry of Health is the purchaser and system administrator. Local Health Districts (LHDs) are responsible for providing the funds required to deliver services to address local needs [17]. The Oral Health Service is an integral part of the NSW public health system and offers free oral health care to all individuals under 18 years of age [17]. These services are mainly provided by Dental Therapists and Oral Health Therapists (Therapists). They have a pivotal role in the prevention of dental caries and periodontal disease [18-21] because of their academic training in oral health promotion and their expertise in providing oral health care to children and adolescents. They are well placed in public oral health settings to engage and support adolescent’s self-efficacy towards good oral health. Oral Health 2020: A strategic framework for dental health in NSW [17] encourages the development of targetted models of care for identified groups that promote client-centric service provision and prevention, and integration with other health care and community groups.

Researchers [22-30] recommend the following preventive care strategies for patients at risk of developing dental disease:

(i) Dietary advice (including drinks)
(ii) Oral hygiene instruction
(iii) Fluoride varnish application
(iv) Fissure sealants to reduce occlusal caries in permanent teeth
(v) Managed care at appropriate intervals for high risk individuals
(vi) Follow-up radiographs to monitor the progress of early caries lesions
(vii) Smoking cessation brief intervention for appropriate patients
(viii) Utilisation of Motivational Interviewing (MI)

These recommendations have been integrated into the NSW Ministry of Health policy for providing preventive care to children under 18 years targeting those most at risk of dental disease [31-33]. The Information System for Oral Health (ISOH: Information System for Oral Health: a NSW State-wide Public Oral Health Service centralised repository for patient data information) is used to determine what activity is conducted across the state by clinicians to align with the policy as identified by dental treatment item numbers based on the Australian national dental schedule [34]. The suite of preventive care activities used for individual clinician performance appraisal and LHD service agreement performance are categorised in Table 1.

<table>
<thead>
<tr>
<th>Personalised preventive care offered:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiographs (Bitewings and Periapical)</td>
</tr>
<tr>
<td>Dietary advice</td>
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<tr>
<td>Oral Hygiene Instruction</td>
</tr>
<tr>
<td>Remineralising agents (Professional fluoride applications, casein phosphopeptide with amorphous fluoride phosphates (CPP-ACP))</td>
</tr>
<tr>
<td>Fissure sealants</td>
</tr>
<tr>
<td>Prophylaxis (scaling and cleaning)</td>
</tr>
<tr>
<td>Smoking cessation</td>
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<tr>
<td>Recommendation (issue) of appropriate oral health products for home care use: disclosing tablets, tooth brush, fluoroide tooth paste, CPP-ACP paste, floss</td>
</tr>
<tr>
<td>Issue of age appropriate oral health education literature</td>
</tr>
<tr>
<td>Utilise Motivational Interviewing and coaching techniques</td>
</tr>
</tbody>
</table>

There appears to be variation of how this policy is implemented across the State. Therefore, this study was undertaken to identify: (i) influencing factors to providing clinic-based oral health care to adolescents and (ii) to record the strategies which therapists believed could enhance their preventive clinical practice.

Method

Qualitative methodology was used to investigate the two study aims. Focus groups were used as they can be both exploratory and descriptive. Participants were recruited by purposive sampling, selecting participants from rural and metropolitan locations to answer the research questions [35]. Three focus groups were arranged with staff from four NSW Local Health Districts: Murrumbidgee and Southern NSW LHDs were combined to represent rural and remote, South Eastern Sydney LHD represented metropolitan and Hunter New England LHD was a rural area in close proximity to a large city population.

To ensure scientific rigor and reliability of research data collected for the group sessions, the principles of Community Participatory Action Research (PAR) [36] were adopted, namely, equitably involving all the participants in the research process and acknowledging the unique strengths that each one brings to the session.

The focus group discussion was on a topic central to the Therapists’ daily lives [36], therefore pre-planning for structuring the focus group sessions was essential and included:

- A facilitation process: the participants were requested to write down their answers to what they perceived as motivators/enablers, constraints and proposed solutions for them to provide preventive care to adolescents on paper prior to sharing with the group,
- Capturing the data: A1 postie posters were used to capture discussion themes,
• All discussions were recorded to assist recall and help with the identification of topics
• The group discussion was summarized by a facilitator and participants were asked to confirm the points noted at the conclusion of the session.

The qualitative data analysis continued after the focus group sessions using the Thematic Analysis inductive approach [37]. Systematic steps pertaining to Thematic Analysis [37] were followed: (i) familiarisation with data by synthesising all data from focus groups onto a framework matrix using Microsoft Excel (ii) creating codes that identified unique features of the data relevant to answer the research questions (iii) review and further development of themes as dictated by the collected data (iv) comprehensive, inclusive and thorough examination of the codes to identify patterns of meaning (generating themes) (v) data analysed, interpreted and a narrative composed of key themes and (vi) verification of processes by academic principal investigators.

Ethics approval was obtained from lead Health and Research Ethics Committee Hunter New England LHD No. LNR/11HNE/495, Southern NSW LHD No. LRNSAA/12/GSAHS/30, Murrumbidgee LHD No. LRNSAA/12/GSAHS/31 and South Eastern Sydney LHD No. LRNSAA/12/STG/65

Results
Sixteen Therapists (thirteen females and three males) participated in the three two hour focus groups. The year of graduation ranged from 1972 to 2011, and they worked across ten dental clinics within the four LHDs in NSW. Participant’s described their perceptions of being employed by the NSW Health public oral health system to providing preventive services to adolescents. The overall theme identified from this study was ‘Facilitating Preventive Oral Health Care for Adolescents’. The key theme is supported by subthemes described in the following sections and illustrated in Figure 1.

Professional ethics and personal self-health preventive values
Personal and professional values motivated and enabled the participants to facilitate the provision of preventive care and ensure quality health care was provided for their patients. They made reference to the importance of maintaining registration and their professional commitment to ensure they keep abreast with current clinical oral health approaches for the provision of patient quality care.

“Preventive care compliments the restorative treatment or after relief of pain emergency appointments. It is our duty to encourage them to return for preventive care” (FG2).

The majority of participants referred frequently to the importance of self-health and professional values. They wanted to contribute and participate in maintaining a healthy community and this motivated them to provide preventive care for patients. To work with challenging cases, recognising the importance of supporting vulnerable adolescents specifically those with psychosocial issues, was also a main motivator.

“We are getting quite a few 16 and 17 year olds coming in. They are wondering why they’ve got sensitive teeth, why the illicit drugs actually cause them to grind, clench [their teeth]. We can at least try to get them to start thinking about this, what they are doing now, how it is having an impact long term” (FG1).

Most participants reported providing preventive care to patients was an essential component of their clinical professional ethical duty.

“Preventive care, it’s doing the right thing; it’s our duty of care, that’s what we are here for, isn’t it?” (FG2).

Adolescents’ who valued oral health, and achieved good oral health outcomes was professionally rewarding and satisfying for all the participants. Those working in rural settings reported adolescents re-presenting until they exited the programs upon turning 18 years of age.

“We have lovely patients; I am motivated by their smiles after I have completed all their work, and their mouths are free of pain. They have managed to maintain good tooth brushing habits, which really motivate me” (FG1).

Where adolescent’s displayed lack of concern for their oral health, participants stated at times affected their motivation levels.

“You treat everyone the same, get job satisfaction. Sometimes it is very challenging. I have a patient that gets all the support but keeps presenting with yet another cavity, that can demotivate me” (FG2).

Academic training
The public oral health setting provided opportunities to apply knowledge and skills from academic education was a major motivator/enabler for most participants.

“My University training and education: a lot of depth or focus on prevention, which helps my current practice in public health” (FG3)

These participants reported that the ability to practice evidence based principles of Minimal Intervention Dentistry (MID) to treat caries and concentrate on addressing lifestyle determinants of oral health was a ‘big enabler’ for them. However, some participants reported variations in clinician preventive care approaches.

“What separates the way we practice, there is a difference in philosophy, [...] tends to be treating the lesions, rather than treating the lifestyle disease, that’s a big difference” (FG3).

Historically, some participants stated their training on children under 12 years of age, then the client groups expanded to 14 year olds, and finally all children under the age of 18 years. A number of participants commented that they lacked confidence to work with adolescents, and preferred to work with younger patients.

“Much prefer working with younger ones, I have more confidence addressing their needs more than teenage dental problems” (FG1).

Professional development strategies including the enhancement of clinical learning environments to foster professional team mentorship and support were suggested by participants.

“Creating clinical learning environments where we are encouraged to share clinical case studies” (FG2).

Professional development
The majority of participants reported valuing continuing professional development and stated it was a key enabler for pro-
viding current preventive care by keeping abreast with new dental materials, through workshops provided by corporate companies, and contemporary oral health promotion and communication strategies provided by LHD conferences and professional associations. The training included management of dental caries, periodontal disease and Motivational Interviewing.

“Most adolescents present with complex dental issues, white spot lesions that require high fluoride toothpaste or... use of enamel remineralising agents for stabilisation, get that going before addressing the restorative work, yes, that’s an enabler” (FG3).

“It was helpful to use skills such as Motivational Interviewing with adolescents...” (FG1).

Conversely, not all participants had received training in MI techniques. Most participants thought more training and development in behaviour management and counselling skills would enhance their effectiveness in delivering oral health education to patients.

‘Up skilling to work effectively with adolescents, ‘what is the teenager’s motivator’, the psychology behind it all’ (FG1).

Educational chairside tools and resources

The majority of participants suggested using the patients presenting oral health status as a starting point to provide preventive care at the chairside. Most reported using the Tri- disclosing solution as an educational tool to encourage behaviour change.

“Being able to show the plaque with disclosing solutions gives them a visual presentation“ (FG3).

Another participant used a different technique to illustrate the dental issues of their patients.

“I don’t disclose, but I do scrape the plaque off their teeth and show them.” (FG1).

Therapists who had access to digital cameras took intra oral photographs of the patient’s mouths. They reported this made providing advice more personally relevant and important to their patients. It also helped with follow-up to determine if behaviour had changed.

The scope to apply different communication and coaching strategies to reach patients and families was a motivator for others. Trialling and using different approaches with adolescents and gaining positive results provided them with confidence.

“...if you can educate the eldest child then they become the role model for others and makes your work much easier” (FG3).

However, resourcing of preventive care strategies was inconsistent across the LHDs and within local clinics. They stated that the lack of age appropriate oral health education materials needed to be addressed. Participants also wanted consistency around the distribution of fluoride toothpaste, toothbrushes and remineralising agents for adolescents within LHDs.

Figure 1: Factors influencing the provision of preventive care by Therapists to adolescents accessing NSW Public Oral Health Services.
“You need to make access to preventive products easier, toothbrushes, fluoride toothpaste like Neutra-Fluor 5000, Tooth Mousse, floss etc.” (FG1).

“We need phone based APPs for today’s teenagers, how to brush teeth, fun and attractive to this age group” (FG1).

Although policies existed to direct provision of preventive care, participants indicated that there was a need for LHDs to provide specific adolescent evidence-based guidelines with clinical presentations for use at chairside. This strategy could encourage consistent preventive care offered to adolescents by clinicians across the LHDs, with opportunities for unusual case study discussions.

“There is a need for shifting of policy and work place culture to continuing education to include evidenced-based preventive philosophy” (FG3).

Psychosocial factors

Engaging and creating a respectful working relationship with adolescent patients was paramount for all participants. They referred to their ability to recognise psychosocial problems such as depression taking medication and fear of dentistry as an impetus for them to reach out to vulnerable adolescent’s and invest clinical time to provide preventive care.

“I use the patient’s social and medical histories to inform my clinical practice and decision-making” (FG1).

Most participants referred to adolescents’ poor oral health, health literacy, and lifestyle factors, such as smoking, use of social drugs, binge drinking and high consumption of sweet drinks, and the long-term impact as triggers or motivators for them to offer preventive care.

“… adolescents don’t realise that what they are doing [energy drinks, smoking, alcohol, drugs] will have an impact on them later…. Huge problem. I try to get them to brush a bit more regularly, modify what they are doing now.” (FG1).

“You start to relate to them, like young adults. [You ask them] to start thinking about long term economic value. I always point out to them if their teeth have to be fixed, they are going to be fixed again. It doesn’t matter whether its five to ten years down the track, it will cost money unless they do something about it. That’s money that can be put towards a car. At least they get that” (FG2).

Vulnerable adolescents had other distinctive social needs such as transient family structures, family dynamics, failure to attend appointments and relying on others for transport that required attention and support to ensure uptake of consistent health messages impacted on provision of preventive care.

“Changes in family structure, family dynamics, demands changing all the time, parents leaving children for longer periods. It does impact on their access to services, keeping their appointments and their ability to improve their toothbrushing or diet habits” (FG1).

Working in collaboration with other allied health agencies for example dieticians and NSW population health agencies was suggested as a strategy to increase the oral health promotion support network for Therapists and adolescents.

“Improved referral pathways to dieticians, health promotion school programs and local city council youth programs are potential support networks” (FG1).

This strategy was already used in some LHDs, however, was not sustainable and supported by all participants team members.

“We have done a lot of work to break down those barriers. […] does a lot of community education, and it involves dental assistants, but still some dental assistants don’t want to get involved. One of the key reasons we are able to provide preventive care is because it’s supported by oral health promotion activities” (FG2).

Government Policies

Despite their ethical inclination and best efforts to provide preventive care, most participants indicated the strong emphasis of the NSW Health triage system and policies to prioritise emergency situations, provide relief of pain and restorative treatment impacted on the ability to provide preventive care.

“It’s a Relief of Pain Driven service, that’s the priority” (FG1, FG2, FG3)

There was inconsistency in the responses to ‘sufficient time’ for providing preventive care. Management restriction of follow-up appointments and recall systems in some local settings for monitoring patients was a constraint for some participants.

“We are not allowed to have recall systems, and appointment sessions are prioritised for Call Centre use” (FG1 and FG2).

Further, the majority of Therapists reported that their appointment sessions were too short to deliver effective preventive care. The use of MI was seen as a potentially valuable tool to enhance behaviour change but only a few participants had sufficient time allocated to provide this more in-depth preventive care.

“Adolescents need lots of appointments, longer appointments. The confidence and ability to provide treatment followed by preventive care, or combined, is professionally satisfying…” (FG3).

These participants understood the importance for multiple and longer follow-up appointments to address vulnerable adolescents’ complex dental needs. Although time consuming, when the participants achieved positive results from challenging patients they reported it was professionally rewarding and built their confidence in managing adolescents with diverse needs.

“Sometimes using preventive care appointments can build my patients confidence, before, in-between or after doing any extensive treatment. They gain confidence to improve, in turn it builds my own confidence in my clinical approach” (FG3).

However, only a few participants stated they had sufficient time for this more in-depth level of care as follow-up appointments and duration of sessions were restricted and limited for others.

Dental Benefits Schemes

The Australian Commonwealth Government Medicare Teen Dental Program provided disadvantaged adolescents (at risk of dental disease) whose families are eligible for Family Tax A, a preventive voucher that could be used in private and public dental services [38]. The voucher in some LHDs enabled participants to fast track adolescents to dental care. Some participants reported that it funded extra clinical sessions for adolescents.

“Team Leaders manage adolescent waiting lists, create rosters, tag appointments, homing into preventive care sessions for Therapists. Managers approve this as they are monitoring lists.
effectively and raising revenue from the Government voucher scheme” (FG1).

Local team leaders taking charge of improving adolescents access to preventive services was perceived as an enabler. The generation of revenue swayed some managers to give approval. Participants suggested these funds could assist the purchase of preventive care resources such as high fluoride toothpaste for their adolescent patients with active dental caries. However, the majority of participants were unsure of the funding and accountability processes within their LHDs to purchase these resources for patients with active decay.

Professional Leadership and Teamwork

Some participants, new to the public health system, stated that working alongside experienced clinicians was valued because the latter provided them with practical knowledge on the management of adolescents’ oral health problems. A few participants reported that the clinical graduate programs to support the application of academic knowledge and skills in the workplace were an enabler to maintain the quality of clinical practice.

“Once every 6 months we have a peer review with our professional leader, present different cases, and make sure that you’re doing alright”. (FG3)

Most participants stated that team collaboration with a seamless link to management was important for fostering clinical learning environments ensuring continuous quality care for patients.

“There are opportunities for teams to make a difference at multiple levels within public health, creating learning environments in the workplace” (FG2).

The majority of participants commented on the importance of management support and approval for allocated time for team building activities, such as clinical forums, clinician reflection time, and opportunities for clinical case study discussions as essential enablers to embed preventive care philosophies. However, such activities are rare and somewhat ad hoc; with some reporting that it was leadership personality-type driven.

“We should all be involved to be informed, new materials and approaches to preventive care. Clinical Director, managers and clinicians should have regular clinical forums, we used to have them and they were very motivating, but, that Senior Dental Officer left…” (FG2).

Discussion

This qualitative study used a focus group design to engage and explore in-depth viewpoints of Therapists in four LHDs in NSW on the factors influencing them to offer preventive care to adolescents. Caution should be used in the interpretation of these data as the sample cannot be considered representative of all Therapists employed throughout NSW. Nonetheless, the influencing factors reported in this study provides a range of valuable topics that should be used to inform the development of models of care for health service improvement [17].

The strong preventive focus of participants in this study suggests that there has been a shift towards less interventionist dental care. Participants endeavoured to maintain balance between their professional ethos to meet the high demand for the relief of pain, provide prescribed scientific based preventive care [4, 24, 26, 29, 39] whilst adhering to various arms of NSW Health Policies [40]. Researchers have employed various approaches to improve clinical practice including professional education and development, audits and feedbacks, evidence-based guidelines, total quality management, economic incentives and organisational changes [41,42]. Cabana et al [43] review of public health services identified barriers to physician’s adherence to practice guidelines and at least one barrier to compliance to clinical practice, clinical policies or national strategies; for example physicians exhibited various levels of awareness of the asthma guidelines or measles immunisation guidelines. However, studies on enhancing physician compliance may not be generalizable as obstacles identified in one setting may not exist in another [42, 43].

Satur, et al. [20] reported that due to greater demand in rural areas for urgent dental treatment including emergencies, less preventive care was being offered to patients. The authors found that irrespective of where Therapists practiced: 76.3% regularly provided preventive care and dental health education; 74.6% dietary counselling; prophylaxis 69.5%; scaling 67.8%; and more than half of the participants were offering pit and fissure sealants. Whilst our study did not record data in this detail, all the participants were providing these items of preventive care.

Moynihan and Kelly’s [14] review reiterated that dental carries progresses with age and the effects of sugars on the dentition are lifelong, indicating the importance of offering dietary advice throughout a patient’s life course. This is particularly critical during the adolescent developmental life phase. Participants in this study adopted scientific approaches for the management of their patients; however constraints beyond their control like system administration factors, impacted on their ability to provide appropriate levels of preventive care for patients.

The Australian Institute of Health and Welfare [44] report Australia’s Health 2014, indicated oral disease as one of the four most expensive preventable chronic diseases to manage ($8.3 billion), which accounted for 6.3% of health spending. Furthermore, the NSW Health Centre for Epidemiology and Evidence [45] reported that dental disease was the fourth condition where hospitalization (16, 426 patients) could have been avoided for the years 2012 to 2013. Dental disease leading to hospitalization may have been avoided if appropriate preventive care and early disease management was provided through primary health care settings [45]. Despite challenges within the health system, participants in this study strongly advocated for a major shift towards a preventive care philosophy; balancing limited resources to address relief of pain type services. Creating a culture of ‘learning’ among professional team members at multiple levels, inclusive of LHD oral health executive members to address high demands for dental care for long term health outcomes was suggested by participants. Chen et al [46] highlighted health workers steadfast motivation and dedication to social commitment to overcome global health crisis, despite hardships, negative economic and system reforms further supporting the notion that human force drives health-system performance. Our study, although on a much
smaller scale, found that public oral health clinicians’ professional ethos enabled them to make concerted efforts to combat dental disease for disadvantaged patients whilst trying to adhere to National and State oral health promotion and preventive strategies [13,17].

This study found that community oral health promotion strategies underpinned by preventive care in clinical settings was a strategy used to address barriers for adolescents oral health behaviours. These efforts are aligned with NSW State healthy weight initiatives, tobacco control and diabetes interventions [17]. However, health service management approval and team support was essential. We found that where team leaders took charge of administrating appointment rosters inclusive of preventive sessions, participants were able to execute preventive strategies more readily for their patients. This issue has been noted in other health disciplines, for example Marshall and Altpeter [47] reported that social work education for the aged needed to be underpinned with leadership training for interested individuals to enhance their roles in health promotion. Although not directly suggested by participants in this study, cultivation of oral health professionals to provide local leadership in clinical preventive and oral health promotion strategies may be an incentive and enabler to improve provision of preventive care to patients.

Leadership in organisations has been recognised as significant in influencing practitioner’s perceptions, reactions and acceptance to enhancements in evidence-based practices [48]. According to Aarons [48], there is a link between organisational characteristics, individual differences and attitudes toward work, alluded to in this study. Brocklehurst, et al. [49] discussed the importance of transformational leadership in dentistry as a process to improve service delivery and provision of quality health care for patients. The recent NSW Health reforms saw the installation of the Agency of Clinical Innovation (ACI) and strengthening of the Clinical Excellence Commission (CEC) and Health and Education Training Institute (HETI). These three ‘pillars’ are to assist LHDs build local clinical leadership capacity thus enabling them collaborate effectively with clinical teams to provide improved models of health care [17].

Participants in our study mostly suggested professional development as a strategy to address a number of identified variations in the provision of preventive care by clinicians. Campbell and Tickle [50] don’t disagree, rather, they suggested a multifaceted approach with a focus on quality improvement at macro, meso and micro levels of service delivery. They delineated the notion of quality of care in dentistry and provided two methods to quality improvement, one which is the Plan, Do, Study, Act (PDSA), a method also adopted by the CEC [17]. Marguolis et al’s [51] randomised study of private paediatric and family practices across two regions in North Carolina combined continuing medical education and the PDSA cycle methodology to improve office administration processes for delivery of preventive care (immunisation and screening for tuberculosis, anaemia and lead). After thirty months there was noticeable increase in the proportion of children up to date with preventive services in intervention compared with control groups (screening for tuberculosis 54% v 32%, lead 68% v 30%, and anaemia 79% v 71%). This suggests that LHDs

oral health key stakeholders should encompass State Health integral pillars: ACI, CEC and HETI as fundamental mechanisms towards clinical quality improvement. Furthermore, the strategies should be inserted in oral health core business and made transparent to oral health teams.

Considering the psychosocial factors of patients and families, participants in this study expressed a need for two main areas of professional development, first psychology and behaviour management of adolescents and second health counselling for parents/carers during clinical sessions to support them towards self-efficacy. Furthermore, oral health teams may benefit from in-services on adolescents health literacy as consumers of health care systems as reported by Massey et al [52]. This is aligned with Wallerstein [53] advocacy for community empowerment for youth towards health improvement. Therefore it would be prudent for LHD health service managers to approve and empower clinical staff to access HETI MI on-line module during clinical time as a commitment to National and State oral health promotion and preventive care strategies [17].

The Government Preventive Scheme [38] for eligible disadvantaged adolescents and families enabled some LHDs to provide extra rostered preventive sessions and appointments for participants. This addressed some of the clinical time constraints for participants to access adolescents and provide preventive care. Researchers [54] have suggested collaboration and strengthening of relationships between physicians and non-clinicians to provide ‘illness care’ and ‘wellness care’. Our study found utilisation of Dental Assistants and working in collaboration with community and allied health professionals adopting Common Risk Factor approaches for smoking cessation, obesity and chronic disease as positive strategies to increase preventive and health promotion activities in LHDs.

With improved LHD local processes, it appears that participants may capitalise on Government Benefit funds to purchase much needed resources such as fluoride toothpaste of different strengths and remineralising agents to assist adolescents towards oral health self-efficacy as supported by Bardal et al’s [55] study with adolescents undergoing orthodontic treatment.

**Conclusion**

Therapists endeavour to facilitate provision of preventive care and advice for adolescents accessing the public health system, but reported overwhelming factors that impact on performing these services. A multifaceted approach for directors and managers to assist Therapists offer timely and appropriate preventive care to adolescents’ accessing public oral health services are therefore suggested.

**Competing Interests**

The authors declare that they have no competing interests. The authors are responsible for the content of this study and do not reflect the views of the NSW Ministry of Health or the funding Agency.

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References


Chapter 6: Assessment of the management factors that influence the development of preventive care in the New South Wales Public Dental Service.
Chapter 6:

Assessment of the management factors that influence the development of preventive care in the New South Wales Public Dental Service.
Preface

Leadership in organizations is important in influencing workers’ perceptions, response to organizational change, acceptance of health innovations, and scientifically informed practice. Clinical leadership in dentistry is a key component for the transitioning and development of clinician-led services, where local clinicians are encouraged to drive forward a quality agenda with a focus on patient outcomes.

This chapter used in-depth interviews to explore NSW Local Health Districts Oral Health Services clinical directors and health service managers perceptions of the factors that could support the delivery of preventive care to adolescents; and to ascertain the strategies they have utilised to assist Therapists provide clinical preventive care to this group of the population. Healthcare leaders highlighted NSW Health resourcing deficiencies of preventive dentistry, resulting in non-compliant and adherence to contemporary scientific evidence to manage oral diseases.


Assessment of the management factors that influence the development of preventive care in the New South Wales public dental service.


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CO-AUTHORS' STATEMENT CONFIRMING AUTHORSHIP CONTRIBUTION

This is to certify that the manuscript entitled 'Assessment of the management factors that influence the development of preventive care in the New South Wales public dental service' submitted by Angela V Masoe in partial fulfilment of the requirements for the degree of Doctor of Philosophy (Oral Health) is the result of the following contributions:

Angela V Masoe designed the interview questions, recruited the participants, collected the data, organised the data analysis, drafted the manuscript, managed the submission and responded to the reviews.

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Assessment of the management factors that influence the development of preventive care in the New South Wales public dental service

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Background: Oral diseases, particularly dental caries, remain one of the most common chronic health problems for adolescents, and are a major public health concern. Public dental services in New South Wales, Australia offer free clinical care and preventive advice to all adolescents under 18 years of age, particularly those from disadvantaged backgrounds. This care is provided by dental therapists and oral health therapists (therapists). It is incumbent upon clinical directors (CDs) and health service managers (HSMs) to ensure that the appropriate clinical preventive care is offered by clinicians to all their patients. The aims of this study were to 1) explore CDs' and HSMs' perceptions of the factors that could support the delivery of preventive care to adolescents, and to 2) record the strategies they have utilized to help therapists provide preventive care to adolescents.

Subjects and methods: In-depth, semistructured interviews were undertaken with 19 CDs and HSMs from across NSW local health districts. A framework matrix was used to systematically code data and enable key themes to be identified for analysis.

Results: The 19 CDs and HSMs reported that fiscal accountability and meeting performance targets impacted on the levels and types of preventive care provided by therapists. Participants suggested that professional clinical structures for continuous quality improvement should be implemented and monitored, and that an adequate workforce mix and more resources for preventive dental care activities would enhance therapists’ ability to provide appropriate levels of preventive care. CDs and HSMs stated that capitalizing on the strengths of visiting pediatric dental specialists and working with local health district clinical leaders would be a practical way to improve models of preventive oral health care for adolescents.

Conclusion: The main issue raised in this study is that preventive dentistry per se lacks strong support from the central funding agency, and that increasing prevention activities is not a simple task of changing regulations or increasing professional education.

Keywords: public oral health management, clinical leadership, preventive strategies, dental/oral health therapist

Introduction

Despite increased access to water fluoridation, widespread use of fluoride toothpaste, and health-promotion efforts, oral diseases, particularly dental caries and periodontal disease, remain a public health challenge. The Australian Institute of Health and Welfare’s Australians Health 2014 reported that oral disease is one of the four most expensive preventable chronic diseases, and in most cases these dental diseases are preventable. In the state of New South Wales, the Health Centre for Epidemiology and Evidence stated that dental disease was the fourth-most common reason for hospitalization in 2012–2013 for a disease that can be prevented. Australian epidemiological
The primary focus of any system of oral health care should focus on the prevention of disease, with particular attention given to the social determinants of health. Underpinned by a suite of strategies encompassing the common risk-factor approach. The public dental service is an integral part of the NSW public health system, and offers free oral health care to children and adolescents according to criteria that prioritize those individuals in most need and at highest risk of disease. The NSW Ministry of Health is the purchaser and system administrator of the public dental service, with local health districts (LHDs) responsible for utilizing the funds provided to deliver services to address local needs. Public dental services to children and adolescents are mainly provided by dental therapists and oral health therapists (therapists). They have a pivotal role in the prevention of dental caries and periodontal disease, because of their academic qualification and expertise in providing oral health care to children and adolescents. Therapists are well placed to engage and support adolescent patients’ self-efficacy toward good oral health. A strategic framework for dental health in NSW – Oral Health 2020 – encourages the development of targeted models of care for identified groups that promote patient-centric service provision and prevention, and integration with other health care and community groups.

Brocklehurst et al discussed the growing importance of clinical leadership in dentistry as a key component for the transitioning and development of clinician-led services where local clinicians drive forward a quality agenda with a focus on patient outcomes. Therefore, the public dental service should develop interventions to improve patient health outcomes. LHD clinical directors (CDs) and health service managers (HSMs) as oral health leaders should translate state public oral health strategies into practical goals that will improve the oral health of people living in their communities.

Leadership in organizations is important in influencing workers’ perceptions, response to organizational change, acceptance of health innovations, and scientific informed practice. However, there is little information on how public dental service CDs and HSMs provide support to therapists to enable them to embed scientific preventive care into clinical practice, such as the use of fissure sealants, application of topical fluoride, oral hygiene instruction, offering of dietary and smoking-cessation advice, and utilizing motivational interviewing techniques to improve compliance with preventive care guidance. Therefore, this study was undertaken to explore and identify 1) what CDs and HSMs perceive as factors influencing therapists to provide clinical preventive care to their patients, and to 2) record their recommendations supporting mechanisms for therapists to increase their clinical preventive activities.

Subjects and methods
Qualitative in-depth semistructured face-to-face interviews were used to explore the two study aims. Open questions were employed to gain insight into participants’ understanding of real workplace situations and processes. CDs and HSMs were recruited by purposive sampling from the 15 NSW LHD rural and metropolitan locations to answer the research questions.

All NSW LHD oral health CDs (n=13) and all HSMs (level four and five) (n=9) were formally invited by email to participate in the research study. The one-on-one interviews were undertaken at convenient locations for the participants. They were requested to reflect and respond to key open questions that were used to explore 1) influencing factors that could support therapists to offer preventive care, and 2) to identify and record their proposed strategies to enhance therapists’ clinical preventive practices to ensure quality oral health care is provided for their patients.

Consent was obtained from the CDs and HSMs to record the interview to facilitate the note-taking and support the data collection and analysis. During the interviews, some participants spontaneously opted to use whiteboards and drawings and provide documentation as evidence to illustrate LHD processes. Although not a grounded-theory research study, this technique is aligned with Glaser and Holton’s dictum that “all is data” relevant to answer the research questions.

The qualitative data analysis continued after the face-to-face interview sessions, using the thematic analysis inductive approach. Systematic steps pertaining to thematic analysis were followed: 1) familiarization with data by synthesizing all data into a framework matrix using Microsoft Excel, 2) creating codes that identified unique features of the data relevant to the research questions, 3) review and further development of themes as dictated by the collected data, 4) comprehensive, inclusive, and thorough examination of the codes to identify patterns of meaning (generating themes),
5) data analyzed and interpreted, and a narrative composed of key themes, and 6) verification of processes by academic principal investigators.27

Ethics approval was obtained from the lead Health and Research Ethics Committee, Hunter New England LHD: HNEHREC12/02/15/5.04 and the 15 LHDs (LHD site-specific assessment ethics approval numbers are available on request).

Results
Of the 15 LHDs, 12 CDs (seven rural and five metropolitan LHDs) participated in the study. Two CDs represented two rural LHDs each (Northern NSW and Mid North Coast, and Southern NSW and Murrumbidgee LHDs), and one LHD (Far West) did not have a CD at the time. The Far West LHD was represented by their HSM. Nine LHD HSMs were invited to join the study, and seven (three metro and four rural) agreed to participate. The main theme that emerged from this study was “Resourcing preventive oral health care for adolescents”; the theme was underpinned by key subthemes shown in Figure 1. Each of the subthemes are presented in more detail.

Fiscal accountability and policy
Fiscal accountability and meeting public dental demands according to NSW health policy were reported by participants as a major influencing factor that impacted on the support and provision of preventive care to adolescents.28 Performance agreements between LHDs and the funding agency NSW Ministry of Health are based on activity targets that impact on CD and HSM management decisions and affect the way clinical services are arranged.13 Clinical care, such as extractions and restorations, carry more weight with the funding agency than preventive care, such as fissure sealants, fluoride therapy, oral hygiene instruction, and dietary and smoking-cessation advice:

The bottom line is, invasive treatment such as extractions and restorative treatment have more kudos than preventive treatment such as fissure sealants and remineralising agents. [HSM06]

Although the scientific evidence highlighted the importance of providing preventive care, the respondents were being forced by the system to place greater emphasis on pain relief and restorative care. Conversely, some respondents stated that complaints generated from patients needing preventive care were unknown, compared to the level of complaints received from patients requiring emergency and immediate dental care:

Structuring several preventive appointments a day for therapists is unsustainable. You can’t have appointments to monitor whether patients complied with your oral hygiene instructions, when a mum rings in that her child has been up all night with a raging toothache and there are no appointments available. We can’t afford patient complaints. [CD02]

The Australian government’s benefit scheme Teen Dental Program (TDP) provided a preventive voucher for disadvantaged adolescents whose families were eligible for family tax A, which could be used for private and public dental services.29 Funding from the vouchers enabled some LHDs to provide extra clinical sessions for adolescents, for example, in the evenings or Saturday mornings. Figure 2 depicts the prioritized clinical pathway for eligible TDP adolescents as informed by some LHD respondents. However, with time and streamlining of clinical access to preventive care, these LHDs were able to incorporate the TDP adolescents’ clinical pathway into their general weekly core business, and the extra sessions were not required. Figure 2 illustrates work in progress by these LHDs toward improved prioritized preventive pathways for adolescents. A ditionally, Figure 3 illustrates a comprehensive care clinical pathway for patients, incorporating a focus on preventive care as relayed by respondents in some LHDs. Many CDs stated the prescriptive nature of the

![Figure 1: Resourcing preventive oral health care for adolescents accessing public oral health services in NSW illustrated and reported by clinical directors and health service managers.](image1)

**Abbreviation:** NSW, New South Wales.
voucher acted as a catalyst for the majority of therapists to provide preventive care and advice:

The implementation of the Teen Dental Program was very positive from the preventive care aspect, as it removed the financial aspect for the patient to access dental care and limitations for patients to return regularly. It’s motivating for therapists, patients, and the service as well in terms of economics. [CD04]

Conversely, most participants reported that often the TDP-eligible adolescents required restorative or invasive treatment at a cost beyond the allocated government funds, and so could not stay with the private sector and returned to seek restorative treatment with the public system, causing longer waiting lists.

Resourcing clinical preventive care pathways

Some participants stated there was a public misconception of “long waiting lists to access public dental care” for adolescents across the LHDs. With a focus on managing waiting lists utilizing the clinical LHD professional team-support structures depicted in Figure 4, regular monitoring of administration processes supported by government benefit scheme funding enabled some LHDs to provide timely preventive care for adolescents (Figures 2 and 3).

The importance of effective communication between triaging call centers with clearly defined processes for monitoring and measuring clinical activities ensured emergency patients had precedence over patients with less demanding needs. Well-structured appointment-roster systems for relief of pain utilizing all clinicians’ daily “unable to attend”-type appointments were processes that gave therapists leeway to insert preventive care appointments in some LHDs. Several participants argued that adolescent services were markedly different to adult services; therefore, therapists were able to provide full courses of treatment incorporating preventive care.

Our therapists draw up their rosters with the responsibility to structure their day with a balance of emergency and

Figure 2 Adolescents on government benefit scheme and prioritized high-risk groups clinical pathway to preventive care depicted by clinical directors and health service managers in four local health districts.
new appointments for the call centre. Follow-up appointments are available for them to manage and complete their patient’s treatment. The electronic appointment system (Information System for Oral Health – ISOH) has a “force booking flexibility” for either parties to meet daily emergency demands. [HSM05]

Whereas others argued to maintain consistency and equity for patient access across LHDs, oral health management mandated structured appointment rosters to support patient access to dental care, with little flexibility for therapists to offer preventive care at specific visits.

Where staffing levels were adequate, some respondents stated therapists were able to provide timely preventive care for all their patients. Figure 3 illustrates some LHDs’ versions of adolescents’ dental care clinical pathways incorporating prevention, with others stating that the current health restructure is an opportunity for clinical quality improvement. Community partnerships whereby therapists collaborated with allied health and primary community health services enabled timely referral of adolescents to preventive care:

> Developing partnerships with Aboriginal health professionals, youth agencies, opioid treatment programs and following similar prioritized clinical referral pathways can provide timely preventive care for adolescents. [CD04]

**Professional clinical structure**

The provision of preventive oral health care to all patients must be informed by scientific evidence and according to NSW health policies – “providing what is right for the individual patient and not what they as a therapist prefer to do” (CDR05) – synthesized the majority of CD viewpoints. In their capacity as primary health care providers, several CDs argued the key role and function of therapists is uniquely focused on preventive care and oral health promotion, which is much needed in the NSW public dental health system. All participants reported therapists were the main advocates and...
drivers for preventive oral health care activities in their LHD clinical community settings:

Therapists’ rhythm of work is prevention and oral health promotion; it’ s their field of expertise. [CDM09]

Figure 4 clarifies the relationships between the different levels of clinical oral health professionals. Organizational operational structures (Figure 4) were similar across the LHDs to support therapists and clinical oral health teams, with most CDs commenting it was work in progress. Therapist clinical leaders (TCLs) shown in the LHD hierarchical structure had a key role to uphold and account for therapists’ clinical preventive and oral health promotion activities. They functioned as advocates for therapists to access appropriate resources. These TCLs, in consultation with staff dentists (and HSMs where applicable), provided clinical support to frontline therapists. A few CDs commented that their pivotal role in providing clinical support to therapists was gradually being recognized, as LHDs moved toward strengthening multidisciplinary structures within clinical settings.

The majority of CDs and HSMs stated that the daily management and communication with therapists was the TCLs’ responsibility. Several CDs reported TCLs obtained clinician preventive data from patient electronic health-activity reports and patient clinical oral health records to conduct peer-review sessions with therapists. They reported that to their knowledge, the lack of clinical preventive care offered by therapists was not highlighted as a major concern.

**Resourcing clinical quality-improvement activities**

Identifying “interfering factors” that impacted on a therapist’s ability to provide preventive care to adolescents was reported by most participants as raising their awareness of areas for clinical quality improvement:

Giving access to adolescents for timely care was a key barrier to provision of preventive care:

Accessing adolescents, meaning they don’t come in the first place, is a key barrier for therapists to provide preventive care. Most teenagers attend seeking relief of pain, and are given further appointments which may include preventive care, they often fail to attend, some due to prolonged waiting times between appointments. [CD03]
A concern raised by several participants was that the therapists had been conditioned by the public system to systematically “look for holes in teeth” (HSM 07). Caries detection followed by focusing on restorative treatment was a clinical practice “norm”. Others stated that therapists often provided ad hoc oral hygiene instruction and dietary advice while performing other clinical tasks:

Therapists often provide oral hygiene instructions whilst providing a restoration or waiting for LA to work. The majority account these activities as preventive care; well, that’s not effective oral hygiene instruction or dietary advice, but I guess it’s better than nothing, as sometimes it’s all kids get in their course of care. [HSM 07]

A few CDs argued that a major gap for therapists at the chairside was their level of knowledge and skills to change behavior. New caries-management systems (CMSs) require therapists to understand adolescent psychology, and this requires in-service training to enhance each clinician’s skills to modify adolescents’ behavior:

… it’s about changing behavior, or modify adolescents’ inappropriate diet or oral hygiene behaviors if we are to control dental disease, which is what therapists should be focusing on. [CD 09]

A few CDs stated that therapists’ confidence and behavior-management capacity to communicate effectively with adolescents in the health context and manage assertive parents and special needs adolescents were impediments that impacted on therapists’ stress levels, motivation to work, and ability to provide appropriate levels of preventive care to patients and families:

A challenge for therapists with preventive sessions, we often have parents complain and become very aggressive towards clinicians because they only provided education, or they didn’t perform any of the restorative work required; their time [parent] attending the appointment was not effectively utilized. [CD 01]

 Nonetheless, others stated that despite therapists’ attending funded continuing professional development, upon their return knowledge application often did not occur or was not feasible, as mechanisms to implement new concepts were lacking, such as saliva-testing kits, periodontal screening-record templates, preventive remineralizing agents, and oral health products. Conversely, some participants argued that it was a matter of someone taking the lead, organizing clinical staff forums and in-house training sessions for staff, and improving processes for change implementation:

Our senior clinicians should take the lead enabling all clinicians to share updated clinical knowledge using consistent processes, learning together, clinical best practice methods for implementation; it’s something we plan to undertake with our teams. [CD 04]

A few participants stated part-time clinicians lacked sufficient time to see patients or read health policies and meet mandatory training requirements, which could impact on their clinical preventive practice. For example, the participants were not sure whether staff participated in motivational interviewing training sessions held for therapists, or whether they attended LHD scientific conference programs.

Several HSMs stated that the restructure of LHDs and the improvement in processes had reduced waiting lists to manageable levels, therapists were permitted and encouraged to focus on preventive care. Clinical quality-improvement work was in progress at some LHDs to shift the therapists’ clinical frame of reference:

… giving therapists permission, allowing them follow-up appointments for preventive care, shifting their clinical frame of reference from relief of pain to prevention. [HSM 07]

Resourcing continuing professional education

Professional development activities for therapists and clinical quality-improvement activities reported tended to intertwine and interrelate. Several respondents discussed recent graduating therapists’ knowledge base of the CMS and minimal intervention-dentistry philosophies and the uneven application in public health settings. The CMS for adolescents in public health settings was a concern for several CDs, considering the unpredictability of public dental demands, including adolescent’s psychosocial determinants of health. Nonetheless, several CDs highlighted the importance of professional clinical structures to support clinicians to introduce CMS and minimal intervention-dentistry concepts into clinical practice, thereby sharing knowledge with other colleagues.

A few respondents commented on their LHDs’ prevention clinics as benchmark models of care for all high-risk patients, established in consultation with pediatric dental specialists and dieticians, the variations of referral pathways into prevention clinics, or standalone prevention sessions (Figures 2 and 3). Delegated therapist leaders were
responsible for coordinating, monitoring, and providing LHD preventive care-orientation support. A few metropolitan CDs stated professional development facilitated by pediatric dental specialists was open to therapists across the state; however, whether therapists attended was subject to LHD management approval and support.

Pediatric dental specialists’ clinical sessions provided therapists in rural settings with referral pathways and opportunities for consultation on the management of special cases:

[For] early management of hypomineralised permanent molars, there is still confusion over whether to refer, apply fluoride varnish and how often, place GICs [glass ionomer cements] in them, use stainless steel crowns, all preventive techniques that they are aware of and want to practice, but need further clinical support …. [CD09]

HSMs all reported that external professional development to access contemporary preventive modalities was supported with funding or conference leave in consultation with therapists as a strategy to assist clinicians maintain annual professional registration.

Legislation and clinical governance
Taking advantage of NSW Health reforms to “create a culture of clinical excellence” (CD04), establishing learning environments to encompass preventive care was seen as a way forward by some participants. Reviewing the therapist-workforce mix aligned with the Oral Health Therapist Award and NSW Dental Board legislation were opportunities to strengthen professional clinical networks. Figure 4 demonstrates proposed professional clinical structures reported by a few CDs for LHD clinical governance processes for therapists, whereas other CDs reported it as work in progress, dependent on funding. Several participants quoted clinical governance processes to support their vision, while other CDs provided clear evidence of professional accountability for the provision of preventive care:

We have fairly robust, clear peer-review mechanisms in place. Patient clinical case reports are presented to clinicians (dentists and therapists). There are opportunities for clinician sessions, whereby they discuss a particular clinical problem and someone always comes up with a solution. [CD12]

Conversely, it was argued that there was a public misconception of what public dental services represented:

Therapists offer high-quality services in public health supported by our team of dentists and pediatric dental specialists. It’s a caring profession for them, not driven by monetary values. Meeting health-accreditation standards and performance indicators are LHD governance requirements, which clinicians have to meet; if not ... then we need to address these issues. [CD04]

Some CDs and HSMs acknowledged the private sector versus public health system dichotomy, especially as new NSW legislation had been passed that allows therapists to work in the private sector. Therapists practicing in the private sector were reported to be able to offer incentives, such as fluoride toothpaste and toothbrushes, to support a patient’s compliance with the home care preventive program, thereby enhancing the long-term working relationship with their patients. These factors impacted on therapists’ practices in public health, resulting in requests/demands for preventive oral health products to support oral health self-efficacy for their adolescent patients:

We have to cater for these changes, as they are positive influencing factors for public health. Therapists enjoy providing quality care supported with the offer of oral health products for their patients, so someone in my position can do something about these requests, but realistically it comes down to balancing the money, how much can we afford …. [CD03]

Resourcing chairside preventive care
The majority of CDs and a few HSMs highlighted the lack of appropriate oral health education resources for therapists’ use at the chairside as a major impediment. Most CDs reported that it was NSW Health’s responsibility to provide scientific-based preventive guidelines for LHD consistency:

... there's a lack of appropriate oral health education materials for therapists, consistent scientific dental disease management guidelines, which is the state's responsibility. Therapists need to use marketing strategies to make adolescents want to brush their teeth twice a day; hard to keep saying reduce the cola, but provide them with attractive incentives to drink more water. [CD09]

Preventive guidelines for different patient age-groups provided by pediatric dental specialists and endorsed by one periodontist were available in three LHDs. Referral pathways to dieticians were available in two LHDs with teaching hospitals. Two rural HSMs were considering how they could fund dietician positions for their LHDs.
Some HSMs stated that therapists were conditioned not to request chairside preventive materials and resources, as the dictum for so long had been:

... there is no funding to purchase necessary fluoride toothpaste and toothbrushes for patients. [HSM 06]

Nonetheless, access to fluoride toothpaste and toothbrushes was a norm for some LHDs, and a few LHDs also provided 5,000 ppmF toothpaste through state priority oral health promotion-funded youth and opioid-treatment programs. One other LHD was involved with a research project that enabled them to access family fluoride toothpaste and toothbrushes.

A few CDs highlighted scientific evidence for 5,000 ppmF toothpaste to control dental caries, and argued therapists should be able to offer this high-fluoride toothpaste to all identified at-risk adolescents as a major public health preventive strategy:

We should be issuing Neutrafluor 5,000 ppmF toothpaste to identified high-risk teenagers in conjunction with the family toothpaste; you keep promoting that message to brush twice a day with it, I guarantee it would be one of our most effective preventive strategies. [CD 011]

Several CDs commented that funding was essential to support preventive strategies; however, they were reliant on the LHD HSM’s funding approval.

Discussion

This study had two objectives: first to record CDs’ and HSMs’ views on factors influencing how therapists provided clinical preventive dentistry, and second to note how therapists could increase their preventive activities. The results show that these two objectives were inextricably combined, such that the themes identified in the data covered both objectives. The main issue raised is that preventive dentistry per se lacks strong support from the central funding agency and that increasing prevention activities is not a simple task of changing regulations or increasing professional education.

Resourcing of preventive care for adolescents is a continual balancing act for NSW public dental health care leaders in association with meeting LHD performance targets. System processes to ensure equity and fairness of patient access to clinical care and changes to workforce legislation were other factors that influenced oral health leaders’ resourcing of preventive care activities. This is consistent with Marks and Mertz’s dental leadership research brief, where they reported that dental directors faced such challenges as maintaining or ensuring sustainable funding, increased emphasis on providing quality care, and the movement toward a pay-for-performance model and workforce changes. Conversely, it is noteworthy that participants in our study counteracted these challenges by viewing health reforms as opportunities for reviewing professional clinical leadership structures, improving clinical governance processes, and incorporating scientific oral health preventive measures for public health patients. This study illustrated various levels of a CD’s dependency on HSMs to approve and fund scientific-based preventive strategies.

Nicol provided an insight into challenges or tensions health care leaders and managers faced within the British National Health Service (NHS). The focus is on shifting to a locally led, patient-centered, clinically driven change, placing stronger emphasis on a health and well-being service, with a paradigm shift from the traditional illness service to a health care system that is receptive to its consumers and funders, prioritizing quality care according to professionals, patients, and other agencies. To underpin this goal, Nicol outlined fundamental concepts, structures, and phases for consideration to enable frontline health professionals to provide leadership and take responsibility for implementing and delivering the NHS’s vision. The recently released NSW Health Plan: Towards 2021 is aligned with this vision.

Strategies for therapists’ professional development was a work in progress, not only to enhance offering of clinical preventive care for adolescents, but inclusive of a holistic oral health service vision for the future. However, participants in this study omitted to comment on strategies to underpin therapists’ clinical leadership-development needs, as discussed by Brocklehurst et al and Nicol, as fundamental to building clinical leadership capacity in health systems.

It would therefore be judicious for LHD CDs and HSMs to encourage and sponsor therapists to enroll and participate in clinical leadership professional development courses and clinical redesign programs offered by the NSW Clinical Excellence Commission, a agency of Clinical Innovation, and Health Education and Training Institute. These three key NSW Health pillars are to assist LHDs in building clinical leadership capacity, enabling CDs and HSMs to collaborate effectively with clinical teams to develop/redesign sponsored scientific-based models of oral health care, if the vision of a world-class clinical service is to be realized. A opting this world may address concerns raised by CDs and HSMs with their efforts towards shifting therapists’ frame of reference from “relief of pain” toward an NSW Health-sponsored scientific-based preventive care culture at
L HD level. Blinkhorn alluded to dental health systems that leaned toward creating “emergency-only operators”, rather than highly trained and skilled clinicians, a concern consistent with our study’s findings.32

The government benefit scheme was a significant enabler in improving clinical pathways for adolescents to access preventive dental care as prescribed by the voucher.29 Skinner et al referred to the Child Dental Benefit Scheme as solutions for adolescents under 18 years of age to access dental care from the private sector.2 Interestingly, this study found that NSW public dental services are also heavily reliant on government benefit-scheme funding to support preventive care pathways for adolescents, an area for future public oral health research in terms of funding stability and direct funding for preventive care for adolescents under 18 years of age, as per its core purpose.

The differentiation argument of adolescent care from adult services was an interesting point noted by some participants in this study. Clinical pathways for adolescents were distinctive, with therapists having the scope to provide quality oral health care. Illustrating installation of specific prevention clinics and sessions within the current health care system solidified the few participants’ stance for potential adolescent preventive models of care in their LHDs.

Cashmore et al’s study reorienting NSW pediatric oral health services toward prevention recommended the involvement and engagement of various dental teams during all planning phases when establishing programs.33 Our study’s participants planned to incorporate clinical teams in the health reforms to improve delivery of patient/client-centered care; however, they reported that funding parameters were often difficult to overcome. We found CDs and HSMs intended to enhance current clinical services internally, scoping better funding mechanisms to resource therapist preventive chairside activities. This is consistent with Cashmore et al’s suggestions for implementing preventive strategies that build on existing services.33

The respondents had a vision of creating a culture of clinical excellence for oral health, incorporating therapists’ timely provision of oral health care and preventive advice for adolescent patients in accordance with the NSW State Health Plan to deliver “world class clinical care”.37 NSW Health have devolved decision making to a local and regional level to augment transparency of funding and monitoring of performance.37 Although participants illustrated professional structures underpinned by strategies to enhance therapists’ preventive clinical practice, the complexities and interrelationships governing NSW clinical oral health services appeared uneven across LHDs in terms of human resources and funding for goods and services.

Conclusion

Resourcing and supporting therapists to provide timely and appropriate levels of preventive care to adolescents attending public dental services was important to CDs and HSMs. The main issue raised in this study is that preventive dentistry per se lacks strong support from the central funding agency, and that increasing prevention activities is not a simple task of changing regulations or increasing professional education.

Acknowledgments

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Author contributions

All authors contributed toward the design of the study, preparing and critically revising the paper, and agree to be accountable for all aspects of the work.

Disclosure

The authors report no conflicts of interest in this work. The findings from this study are those of the authors and do not reflect the views of the funding body or the NSW Ministry of Health.

References

management factors and preventive oral health care


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Chapter 7: Preventive management plans recorded using three clinical vignettes for adolescents accessing Public Dental Services NSW, Australia
Chapter 7:

Preventive management plans recorded using three clinical vignettes for adolescents accessing Public Dental Services NSW, Australia
Preface

Scientific rationale for the management of oral disease adopting early identification and assessment of potential risk factors through performing individual lifestyle assessments and clinical diagnostic tests is highly recommended by researchers. Effective disease management commences with the correct diagnosis.

This chapter investigates Therapists’ proposed clinical preventive management plans for adolescents accessing NSW Public Oral Health clinics presenting with (i) dental caries with no pain, (ii) pain associated with dental caries, and (iii) an adolescent with poor oral hygiene and suffering from halitosis who is having orthodontic treatment.

Three clinical vignettes were used to ascertain dental Therapists’ responses to the presenting cases. The respondents demonstrated variations in their clinical preventive care approaches for all three case scenarios with no standardisation of care, highlighting the need for NSW Health clinical directors to provide ongoing continuing professional development internally on the scientific rationale for managing oral diseases.

The two studies reported in this chapter are published as:

1. **Angela V Masoe, Anthony S Blinkhorn, Jane Taylor, Fiona A Blinkhorn**

Preventive management plans recorded using clinical vignettes for adolescents accessing public dental services NSW, Australia.


This study was presented at the International Association of Paediatric Dentistry Congress, Glasgow UK, July 2015
2. Angela V Masoe, Anthony S Blinkhorn, Jane Taylor, Fiona A Blinkhorn

An assessment of preventive care offered to orthodontic patients by oral health therapists in NSW Australia.

International Dental Journal, 2015;6:196-202
If you have any questions, have a concern or complaint about the facilitation of the focus group, or would just like more information, please feel free to contact:

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Further, research has been approved by the Hunter New England Human Research Ethics Committee of Hunter New England Local Health District, Reference 12/02/15/5.04. Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researcher, or, if an independent person is preferred, to Dr Nicole Gerrand, Manager Research Ethics and Governance, Hunter New England Local Health District, Locked Bag 1, New Lambton, NSW, 2305, Telephone (02) 49214950, email: Henhrec@hnehealth.nsw.gov.au

We greatly appreciate your time and contributions.

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CO-AUTHORS’ STATEMENT CONFIRMING AUTHORSHIP CONTRIBUTION

This is to certify that the manuscript entitled ‘Preventive management plans recorded using clinical vignettes for adolescents accessing public dental services NSW, Australia’ submitted by Angela V Masoe in partial fulfilment of the requirements for the degree of Doctor of Philosophy (Oral Health) is the result of the following contributions:

- Angela V Masoe provided the graphics, co-designed the vignettes with supervisors, recruited the participants, collected the data, organised the statistical data analysis, drafted the manuscript, managed the submission and responded to the reviews.

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Preventive management plans recorded by Dental Therapists and Oral Health Therapists using clinical vignettes for adolescents accessing Public Oral Health Services, NSW Australia

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Running Title: Preventive oral health management care plans for adolescents
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ABSTRACT:

Objective: To investigate factors that influence Dental Therapists and Oral Health Therapists (Therapists) plan preventive oral health care for adolescents attending New South Wales (NSW) Public Oral Health Services.

Methods: A cross-sectional postal survey using two clinical vignettes were used to record the preventive care treatment plans offered by Therapists working across fifteen NSW Local Health Districts (LHDs). Data were tabulated and Chi square statistics were used in the analysis.

Results: One hundred and seventeen Therapists returned questionnaires giving a 64.6% response rate. The participants highlighted the importance of offering oral hygiene instruction (97.0%); dietary advice (95.0%) and topical fluoride applications (74.0%). Recommended home use products included fluoride toothpaste 5000ppmF (59.0%) and casein phosphopeptide amorphous phosphates plus fluoride (CPP-ACPF) paste (57.7%). Over 50% used fissure sealants. More respondents (88%) would utilize Motivational Interviewing strategies for a patient with dental caries concerns, however, only 63% would use this technique for a patient in pain (p< 0.001).

Conclusion: Considerable variations were noted in Therapists recommendations for stabilizing and managing dental disease, suggesting a need for Clinical Directors to consider providing more advice to Therapists on the scientific basis of preventing dental caries.
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Conclusion: Considerable variations were noted in Therapists recommendations for stabilizing and managing dental disease, suggesting a need for Clinical Directors to consider providing more advice to Therapists on the scientific basis of preventing dental caries.

Introduction
There is an expectation that public oral health service clinicians should offer consistent and timely preventive focused dental care to improve and maintain the oral health of children and adolescents, particularly among those patients attending oral health services on a regular basis, thereby contributing to better oral health for ‘tomorrow’s adults’ [1, 2]. Children with dental caries are more likely to experience caries as adults [3, 4]. Furthermore, dental caries patterns are changing from a swift developing problem of childhood to a gradual progressive disease in adulthood [3, 4].

Dental caries and periodontal disease are largely preventable [5] yet they remain the most common chronic diseases affecting adolescents. Dental caries in particular is a problem because adolescents tend to have a high sugar consumption, poor oral hygiene, limited use of fluoride toothpaste, use tobacco, alcohol and other drugs; plus they have unique social and psychological needs [6-9]. Epidemiological studies in Australia have reported that approximately 50 percent of adolescents suffer from dental caries, with increased prevalence among vulnerable and disadvantaged groups [10, 11]. These issues highlight the importance of clinicians offering consistent preventive dental advice to all adolescents accessing public oral health services [1, 6, 12-14].

The New South Wales (NSW) Public Oral Health Service offers free dental care to all individuals under 18 years of age [15]. Dental Therapists, Oral Health Therapists and Dental Hygienists (employed as Therapists) are the main providers of these dental services, and they are well placed to offer preventive advice and care to control dental caries and periodontal disease as prevention is an integral part of their training [16, 17]. The term Therapists will be used to describe all three professionals from here onwards.
Early carious lesions are reversible [18], and periodontal problems can also be controlled, as adolescence is an important time to give oral hygiene advice, utilising Motivational Interviewing (MI) counselling and coaching strategies to enhance their capacity towards oral health self-care [3, 5, 19-21]. It is therefore essential that clinicians have a clear understanding of the oral environment dynamics and the influencing factors that impact on the dental caries process. Scientific evidence on the efficacy of fluoride modalities, fissure sealants, oral hygiene instruction, dietary and smoking cessation advice to prevent dental disease is well established, therefore Therapists should incorporate these into their patients management plans [3, 5, 19-21]. Common barriers and facilitators such as time factors, clinician involvement and remuneration for the implementation of preventive evidence-based practice by health practitioners have been reported [22, 23]. However, there is a dearth of information on Therapists’ preventive clinical practices. Therefore a study was undertaken using clinical vignettes to explore how Therapists planned preventive oral health care for adolescent patients.

**Methods**

Clinical vignettes have been defined as simulations of real events which can be used to elicit participants’ knowledge, attitudes or opinions according to how they would behave in the real world of work [24-26]. Vignettes may be distinct and standardised enabling all participants to respond to the same stimulus [27]. A cross-sectional self-administered survey using clinical vignettes for Therapists working within all the fifteen Local Health Districts (LHDs) of NSW Health was developed. The survey also included demographic information about the participants.
Based on research literature and academic curriculum teaching, clinical problems commonly seen in adolescents were chosen by an advisory team made up of two Paediatric Dental Specialists, an academic clinical curriculum convenor and two experienced Therapists. Three vignettes based on these problems were created and photographs used to help the Therapists visualise the clinical issues. One of the vignettes based on an orthodontic case scenario was inserted in-between the two key vignettes to reduce participant influence from the first stimulus. It is not reported in this paper. The vignettes were designed using the classic clinical dental presentation with a focus on: (i) history of the chief complaint, (ii) overall dental history, (iii) clinical examination and (iv) diagnostic tests. These were used by the Therapists to develop an assessment and management plan.

The first vignette described a 14 year old female patient who presented for a recall appointment because of concerns regarding dental caries on one of her upper anterior teeth (Figure 1). The second vignette was of a 16 year old female patient who presented complaining of a toothache on the lower right hand side of her mouth. (Figure 2).

Therapists were requested to use the scenario descriptions, photographs and charting provided for Vignette 1 and Vignette 2 and aligned with their clinical practice protocols [28] respond to the following statements:

(i) What if any special tests would you perform for the patient?
(ii) Write a short term treatment plan for this patient
(iii) Write a long term treatment plan for the patient (Figure 1 & Figure 2).

The vignettes were pilot tested with five Therapists who were working in the Australian Capital Territory. Changes were made and a further pilot was conducted with University of Newcastle Therapist students and minor amendments were made prior to commencement of the main survey.
The names and contact details for all Therapists working within the fifteen NSW Public Oral Health Services were obtained by contacting directors of each of the sixteen LHDs. One hundred and ninety two potential participants were identified and questionnaires containing return postage-paid envelopes were mailed and reminder letters posted out two weeks later. Further reminders to non-respondents were undertaken 1 month, 2 months and 3 months after the initial mailing.

A coding index system was constructed from the first 35 written responses guided by The Australian National Dental Schedule System [29]. These codes were reviewed, amended and confirmed in consultation with the advisory team, with subsequent responses coded and entered into a Microsoft Excel database; later collapsed into key clinical preventive categories. Chi square statistics was performed to determine the variation of respondents to the vignettes using the statistical package IBM SPSS Statistics [30]. Respondent’s narratives to clarify clinical decisions were also uploaded and analysed. To ensure rigor, two independent non-clinician oral health professionals were recruited to review and confirm data entry, data coding and narrative upload prior to data analysis. The advisory group systematically reviewed and verified data analysis processes within specific timeframes.

Ethics approval for the study was obtained from the Hunter New England Local Health District Lead Health and Research Ethics Committee (HREC) Reference No. 12/02/15/5.04 and all fifteen Local Health Districts.

**Results**

Following the mail out, further information was received on Therapist numbers. The original sample of 192 was reduced by 11 due to retirement and job changes, giving a final sample of 181, of whom 117 (64.6%) responded. The main findings included all responses from: (i) Dental Therapists (79.1%, N=91), (ii) Dental Hygienists (1.7%, N=2) and (iii) Oral Health Therapists (20.5% N=24) who completed and returned the questionnaire. More (61.5%;
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Vignette 1

Ninety seven respondents (82.9%) completed Vignette 1.

Special Tests (Table 1)

Bitewing radiographs (75.2%; N=73), plaque disclosing (74.2%; N=72) and saliva pH tests (52.6%; N=51) were the most common diagnostic tests recorded by respondents. Just under half (45.4% N=44) stated that they would undertake diet analysis to better inform their preventive strategies. Panoramic radiographs were mentioned by 8.2% (N=8). Under a quarter (21.6%, N=21) reported that they would plan a Periodontal Screening Record (PSR) and 6.1% (N=6) would assess the caries using the International Caries and Detection Assessment System (ICDAS).

Short Term Plan (Table 2)

Restorative treatment (97.9%, N=95) was a priority, although respondents indicated that initial activities would focus on improving the patients’ toothbrushing practices (97.0%, N=94), undertake removal of plaque and calculus (82.4%, N=80) and offer flossing instruction (74.2% N=72). The majority of respondents (97.9%, N=95) stated that glass ionomer cement (Fuji IX Extra) was their restorative material of choice, because of its fluoride release properties. Composite restorations were planned, but only if the patients’ oral hygiene improved. The dietary advice focused on increasing the patient’s water consumption and reducing sports drinks (95.0%, N= 92). Therapists proposed the Motivational Interviewing technique to encourage the patient to improve her home oral health practices (88.7%, N=86) and would provide an hour follow-up appointment because of the patient’s long journey to access dental care.
Seventy four percent (N=72) would apply topical fluoride and 55.7% (N=54) would place fissure sealants. Recommended oral health products for patient home use included 1000ppmF to 1450ppmF toothpaste (72.1%, N=70) (with antibacterial properties where indicated) 5000ppmF (59.8%, N=58); casein phosphopeptide amorphous phosphates plus fluoride (CPP-ACP) paste (Tooth Mousse) (57.7%, N=56), mouth rinses such as chlorhexidine and Neutra Fluor 900 (13.4%, N=13). Xylitol chewing gum (7.2%, N=7), offer of toothpaste, toothbrushes for patients home care use and oral health literature was noted by 14.4% (N=14) of the Therapists. Eighty percent (N=78) stated they would reassess the prevention plan for the patient at each follow-up appointment to determine whether it was working.

**Long Term Management Plan (Table 3)**

The respondents’ long term treatment plan focused on monitoring and assessing the patients’ oral health status with strategies to motivate her towards sustainable oral health practices (80.4%, N=78). Referral to a periodontist and a hygienist was suggested by four respondents (4.1%) if gingival health did not improve. Intervals for recall were recorded at 3 months (38.1%, N=37) and 6 to 12 months (61.8%, N=60).

**Vignette 2**

Seventy seven percent (N=90) respondents completed Vignette 2.

**Special Tests (Table 1)**

Bitewing radiographs (78.8%, N=71), plaque disclosing (67.8%, N=61), diet analysis (63.3%, N=57), saliva pH tests (52.6%, N=51), vitality test of the 46 (36.6%, N=33), referral for a panoramic radiograph (30.0%, N=27) and intra-oral photographs (6.6%, N=6) were recorded by the respondents. Recording the Plaque Index/PSRs (22.2%, N=20) and use of the ICDAS were also suggested by a small proportion of respondents (6.6%, N=6).
Short Term Plan (Table 2)

Addressing the patients’ chief complaint and assessing if any other issues of concern existed were a priority (83.3%, N=75). Twenty percent (N=18) stated they would consult or refer the patient to the staff dentist regarding Root Canal Treatment (RCT) for the 46 or an extraction. Providing quadrant restorative treatment over the duration of 5 or more clinical appointments was a frequent response (97.8%, N=88). Oral hygiene and toothbrushing instruction (96.7%, N=87) with fluoride toothpaste (65.5%, N=59) and dietary advice (95.6%, N=86) using Motivational Interviewing techniques (63.3%, N=57) were the short term suggestions. Seventy percent (N=63) noted they would monitor the patient’s change in behaviour and oral health status progress over the follow-up appointments for restorative treatment.

Removal of plaque and calculus (68.9%, N=62); application of topical fluoride (73.3%, N=66) and fissure sealants (57.7%, N=52) were noted. Oral health products to support the preventive home regime for the patient were Neutra-Fluor 5000 toothpaste (53.3%, N=48)); Tooth Mousse (40%, N=36) and mouth rinses such as chlorhexidine and Neutra Fluor 5000 (23.3%).

Long Term Management Plan (Table 3)

Respondents focused on providing quadrant restorative treatment over a 5 to 6 week period, and reviewing the patients’ dental health status and self-care management progress at each visit (70%, N=63). Just over a third (37.8%) would recall the patient at 3 months, 6 months (57.8%, N=52) and 12 months (12.2%, N=11). Twenty four percent (N=22) referred this patient for an orthodontic assessment whilst 34.4%, (N=31) would only refer once there was evidence of an improvement in oral hygiene.

The two vignettes elicited some differences in the diagnostic tests. Respondents assessing Vignette 2 were significantly more likely to order a panoramic radiograph for the patient
presenting with pain (p<0.001); and were also more likely to undertake a dietary analysis to assist their clinical decision making (p<0.01) when compared to Vignette 1.

Marked differences were noted for the number of respondents who would consider removal of plaque and calculus (p<0.05) and use of Motivational Interviewing technique for Vignette 1 compared to Vignette 2 (p<0.05).

The placement of fissure sealants for prevention of dental caries recorded by respondents was similar for both Vignettes. The prescription of Tooth Mousse was significantly different (p<0.01), with Therapists offering it more often for the Vignette 1 adolescent patient.

Table 3 illustrates slight differences in respondent’s long term plans for monitoring and reviewing each patients’ oral health status (38.1% versus 37.8%) for 3 months and 63.8% and 57.8% for 6 to months respectively (Table 3).

**Discussion**

The use of clinical vignettes to establish Therapists preventive management plans yielded valuable information. However, caution should be exercised in the interpretation of these findings as not all respondents completed both Vignettes. They may not have had time to answer the questions or were possibly intimidated by the Vignettes. Nevertheless, the non-response bias should not be a major issue given the high percentage responding to the survey.

Bernabe and Sheiham [4] reported that for most of the 26 countries in their study, irrespective of the DMFT levels in the 12 year olds, the percentage difference in levels of DMFT between the 12 year olds and the 35 to 44 year olds was above 500%. Thus, exemplifying the marked burden of dental disease in adults compared to children. This evidence should encourage public oral health services to adopt a preventive philosophy; first by ensuring oral health teams have contemporary scientific knowledge about caries management; and second the use
of dental materials to improve the oral environment conducive to the prevention of dental
diseases [3, 5]. Researchers have recommended clinicians embed in their daily clinical
practice the application of topical fluoride varnish, placement of fissure sealants and use of
glass ionomer cements [3, 5]. Considering most adolescents accessing Public Oral Health
Services NSW are from disadvantaged groups, this study has illustrated a need for LHDs to
review their current clinical oral health structures and processes to help clinicians to focus on
preventing future oral health problems.

Patients accessing public oral health services have the right to receive a thorough
examination of the mouth, teeth and supporting structures and not just the identification of
dental caries [31]. Proper disease management commences with a correct diagnosis [32].
Walsh and Brostek [5] delineated identification and assessment of potential caries risk
factors by performing lifestyle analysis, saliva testing and plaque biofilm analysis which are
fundamental to the management of dental disease. Information from these tests would enable
clinicians to outline appropriate personalised preventive strategies for their patient. This
study showed inconsistencies in the levels of essential diagnostic tests required in both
vignettes for caries and periodontal disease management, suggesting LHDs review clinical
preventive protocols and diagnostic systems available to clinicians. There is scope for further
research to explore constraints for clinicians to offer these diagnostic tests to patients at the
local health service level. For example access to diagnostic tools such as saliva testing
equipment and chairside age specific scientific evidenced preventive protocols to enhance
clinician preventive clinical practice and assist with monitoring and measurement of clinical
performance indicators.

This study found that prioritising relief of pain for the patient and addressing restorative
treatment were important clinical activities for Therapists, conversely, they also
simultaneously offered oral hygiene instruction and dietary advice. However, it is of concern
that the offer of a topical fluoride application and a recommendation of high fluoride toothpaste for the patient with pain was not standard. Nordstrom and Birkhed’s [33] study evaluated toothpastes with 5000ppm F concentration and compared it to toothpastes that had 1450ppm F in adolescents with active caries. The authors found that adolescents that used the 5000ppm F toothpaste had significantly lower progression of caries compared to those that used the 1450ppm F (p<0.05). Blinkhorn et al’s [34] review relating to the efficacy, mode of action and safety of triclosan/copolymer toothpaste found strong support of its anti-plaque and anti-gingivitis effect with twice daily use to control plaque and slow progression of periodontal disease for patients. The ultimate goal for toothpaste with anti-plaque and anti-gingivitis elements is to yield significant clinical outcomes for patients unsupervised, in the home setting and during periods between professional oral health visits [34].

Despite overwhelming scientific evidence regarding the placement of fissure sealants to reduce risk of dental caries in susceptible teeth [3, 6, 20], it is disappointing to note low percentages offered by respondents for adolescents with active caries in our study. Satur et al’s [35] study reported that Therapists tended to offer less preventive care where emergency relief of pain and demand for restorations were high. Therefore, the issuing or prescription of high fluoride toothpaste (5000ppm F) and CPP-ACPF paste for home use is an easy habitual clinical preventive strategy for Therapists that should be adopted, encouraged and supported. However, whilst there is growing evidence for remineralising agents such as CPP-ACPF paste as a caries management strategy [36, 37], there is a scarcity of randomised control trial findings to support its cost effectiveness and benefits for adolescent patients attending public oral health services. There is scope for further research studies to establish the benefits and cost effectiveness of CPP-ACPF paste use for adolescents attending NSW public oral health settings.
Our study found significant variations in the way Therapists developed their preventive strategies and recommendations of oral health products for home use to support their chairside messages to patients including offer of age appropriate literature. Sbaraini’s [38] study on factors that influenced Australian general dental practitioners offer of preventive care to their patients found that dentists in ‘structured preventive practices’ followed various forms of preventive protocols for all patients including the offer of various oral health products. Furthermore, these practices were adequately resourced to support the team’s preventive philosophy approaches, compared to ‘restorative practices’ where preventive care was offered by chance without systematically considering patients’ real need for it.

Wright et al [39] alluded to the low impact NSW Public Oral Health’s current clinical practices are having on reducing inequalities in oral health outcomes. Findings from our study suggest that it would be prudent for LHD clinical oral health teams to review their preventive oral health management care decision making and treatment plans for high risk patients seeking public health care. Tickle et al’s [1] study, whilst focused on a younger age group, reported that dentists appeared to be undertaking appropriate levels of preventive care according to the aetiological cause of dental disease, however, they seemed to be undertaking most of it to compensate for not restoring carious primary teeth. Nevertheless, the authors stated that the preventive care offered was highly responsive to disease patterns for high risk patients, and the approach was not particularly effective.

Therefore, it is suggested that LHD oral health clinical directors and teams review their clinical services with the view to implement improved models of clinical preventive care based on scientific evidence and to ensure they are adequately resourced. It is essential to warrant quality oral health care for all patients accessing public oral health services, particularly vulnerable adolescents, if improved health outcomes are to be achieved [15, 39].
Conclusion

There were considerable variations noted in Therapists recommendations for stabilising and managing dental disease for their adolescent patients, suggesting a need for Clinical Directors to improve models of preventive care delivery based on scientific evidence.

Acknowledgement

Funding Source: NSW Ministry of Health Rural and Remote Allied Health Professional Scholarship Scheme.

Our appreciation to Australian Capital Territory therapists and hygienists, University of Newcastle therapist students who participated in pilot testing the survey questionnaire; Rachael Moir and Karen Horvath for assisting with research data activities; NSW LHDs clinical directors, directors, health service managers and oral health promotion coordinators for supporting the research project. Thank you to Francis Baker, School of Mathematical and Physical Sciences, University of Newcastle, NSW Australia for professional statistics advice.
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References


Figure 1. Vignette 1 Dental caries – no pain

NC is a 14 year old female patient who presented for a recall appointment and stated she had noticed a small mark on her front tooth a few months ago that would not brush off with toothbrushing, but it has now developed into a small hole. She has experienced no pain and can eat and drink normally. NC is an irregular attender. NC is fit and healthy. She has had previous restorations in the primary dentition without LA. She cannot recall having any extractions. She brushes twice daily with Colgate Total toothpaste. NC is the older of two children. She lives in country NSW. The mother is a volunteer worker at a local Pre-School and her father works on a farm. It has taken an hour and a half to get to the dental clinic. NC was born in country NSW with fluoridated water supplies. NC’s mother says she has a good diet with freshly prepared food most days. NC plays a lot of sport and drinks high-energy drinks every day.

Clinical Observation

Extra-oral: Nothing abnormal detected.


Gingivae: Inflamed – chronic marginal gingivitis.

Caries: Active. Cavitation buccal surface of 13. Extensive areas of demineralisation on the buccal cervical areas of most upper and lower teeth, and lingual areas of lower molars.

Occlusion: Skeletal Class 1. Dental Class 11, with buccally displaced canine RHS.

Using the information, photographs and dental chart you have been provided with:

1. What if any special tests would you perform for this patient?
2. Write a short term treatment plan for NC.
3. Write a long term treatment plan for NC.
NC is a 14 year old female patient who presented for a recall appointment and stated she had noticed a small mark on her front tooth a few months ago that would not brush off with toothbrushing, but it has now developed into a small hole. She has experienced no pain and can eat and drink normally. NC is an irregular attender. NC is fit and healthy. She has had previous restorations in the primary dentition without LA. She cannot recall having any extractions. She brushes twice daily with Colgate Total toothpaste. NC is the older of two children. She lives in country NSW. The mother is a volunteer worker at a local Pre-school and her father works on a farm. It has taken an hour and a half to get to the dental clinic. NC was born in country NSW with fluoridated water supplies. NC’s mother says she has a good diet with freshly prepared food most days. NC plays a lot of sport and drinks high-energy drinks every day.

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Extra-oral: Nothing abnormal detected.

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Using the information, photographs and dental chart you have been provided with:

1. What if any special tests would you perform for this patient?
2. Write a short term treatment plan for NC.
3. Write a long term treatment plan for NC.
Table 1. Therapists’ reported recommendations of Special Tests for Vignette 1 and Vignette 2

<table>
<thead>
<tr>
<th>ITEM</th>
<th>N = 97</th>
<th>%</th>
<th>N = 90</th>
<th>%</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental caries and no pain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vignette 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bitewing radiographs</td>
<td>73</td>
<td>75.2</td>
<td>71</td>
<td>78.8</td>
<td>0.555</td>
</tr>
<tr>
<td>Panoramic radiograph</td>
<td>8</td>
<td>8.2</td>
<td>27</td>
<td>30.0</td>
<td>(&lt;0.0001)</td>
</tr>
<tr>
<td>Periapical radiograph of 46</td>
<td>0</td>
<td>0</td>
<td>24</td>
<td>26.6</td>
<td>(&lt;0.0001)</td>
</tr>
<tr>
<td>Intra-oral photos</td>
<td>2</td>
<td>2.0</td>
<td>6</td>
<td>6.6</td>
<td>0.120</td>
</tr>
<tr>
<td>Vitality test of 46</td>
<td>0</td>
<td>0</td>
<td>33</td>
<td>36.6</td>
<td>(&lt;0.0001)</td>
</tr>
<tr>
<td>ICDAS</td>
<td>6</td>
<td>6.1</td>
<td>6</td>
<td>6.6</td>
<td>0.893</td>
</tr>
<tr>
<td>Plaque Index/PSR</td>
<td>21</td>
<td>21.6</td>
<td>20</td>
<td>22.2</td>
<td>0.925</td>
</tr>
<tr>
<td>Plaque disclosing</td>
<td>72</td>
<td>74.2</td>
<td>61</td>
<td>67.8</td>
<td>0.331</td>
</tr>
<tr>
<td>Dietary analysis</td>
<td>44</td>
<td>45.4</td>
<td>57</td>
<td>63.3</td>
<td>0.014</td>
</tr>
<tr>
<td>Saliva (pH levels, viscosity)</td>
<td>51</td>
<td>52.6</td>
<td>37</td>
<td>41.1</td>
<td>0.117</td>
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</table>

<table>
<thead>
<tr>
<th>Pain associated with dental caries</th>
<th>N = 90</th>
<th>%</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vignette 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral examination</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Address Relief of Pain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refer Dental Officer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral hygiene instruction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Removal of plaque and calculus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coaching, motivational interviewing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flossing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dietary advice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restorative treatment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fissure sealants</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Topical fluoride</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neutra Fluor 5000 toothpaste</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mouth rinses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Xylitol chewing gum</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tooth Mousse Plus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluoride toothpaste (1000ppm-1450ppmF) and with antibacterial properties</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Issue oral health products or literature</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refer for orthodontic treatment</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* The P-value is Chi square (1df).
Multiple testing is not advised as the 'Special tests' may not be independent and there is a much greater chance of significant results with multiple testing.
### Table 1. Therapists’ reported recommendations of Special Tests for Vignette 1 and Vignette 2

<table>
<thead>
<tr>
<th>Item</th>
<th>Dental caries with no pain Vignette 1</th>
<th>Dental caries with no pain Vignette 1</th>
<th>Pain associated with dental caries Vignette 2</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = 97</td>
<td>%</td>
<td>N = 90</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Oral examination</td>
<td>36</td>
<td>37.1</td>
<td>69</td>
<td>76.7</td>
</tr>
<tr>
<td>Address Relief of Pain</td>
<td>0</td>
<td>0</td>
<td>75</td>
<td>83.3</td>
</tr>
<tr>
<td>Refer Dental Officer</td>
<td>0</td>
<td>0</td>
<td>18</td>
<td>20.0</td>
</tr>
<tr>
<td>Oral hygiene instruction</td>
<td>94</td>
<td>97.0</td>
<td>87</td>
<td>96.7</td>
</tr>
<tr>
<td>Removal of plaque and calculus</td>
<td>80</td>
<td>82.4</td>
<td>62</td>
<td>68.9</td>
</tr>
<tr>
<td>Coaching, motivational interviewing technique</td>
<td>86</td>
<td>88.7</td>
<td>57</td>
<td>63.3</td>
</tr>
<tr>
<td>Flossing</td>
<td>72</td>
<td>74.2</td>
<td>61</td>
<td>67.8</td>
</tr>
<tr>
<td>Dietary advice</td>
<td>92</td>
<td>97.0</td>
<td>86</td>
<td>95.6</td>
</tr>
<tr>
<td>Restorative treatment</td>
<td>95</td>
<td>97.9</td>
<td>88</td>
<td>97.8</td>
</tr>
<tr>
<td>Fissure sealants</td>
<td>54</td>
<td>55.7</td>
<td>52</td>
<td>57.8</td>
</tr>
<tr>
<td>Topical fluoride</td>
<td>72</td>
<td>74.2</td>
<td>66</td>
<td>73.3</td>
</tr>
<tr>
<td>Neutra Fluor 5000 toothpaste</td>
<td>58</td>
<td>59.8</td>
<td>48</td>
<td>53.3</td>
</tr>
<tr>
<td>Mouth rinses</td>
<td>13</td>
<td>13.4</td>
<td>21</td>
<td>23.3</td>
</tr>
<tr>
<td>Xylitol chewing gum</td>
<td>7</td>
<td>7.2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Tooth Mousse Plus</td>
<td>56</td>
<td>57.7</td>
<td>36</td>
<td>40.0</td>
</tr>
<tr>
<td>Fluoride toothpaste (1000ppm - 1450ppmF) and with antibacterial properties</td>
<td>70</td>
<td>72.1</td>
<td>59</td>
<td>65.5</td>
</tr>
<tr>
<td>Issue oral health products or literature</td>
<td>14</td>
<td>14.4</td>
<td>9</td>
<td>10.0</td>
</tr>
<tr>
<td>Refer for orthodontic treatment</td>
<td>0</td>
<td>0</td>
<td>22</td>
<td>24.4</td>
</tr>
</tbody>
</table>

* The P-value is Chi square (1 df).

Multiple testing is not advised as the ‘Special tests’ may not be independent and there is a much greater chance of significant results with multiple testing.
Table 3. Therapists’ reported long term oral health management plans for Vignette 1 and Vignette 2

<table>
<thead>
<tr>
<th>Monitor and re-assess individual needs:</th>
<th>N = 97</th>
<th>%</th>
<th>N = 90</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review and assess patient home preventive oral health care program</td>
<td>78</td>
<td>80.4</td>
<td>63</td>
<td>70.0</td>
</tr>
<tr>
<td>Referral to periodontist or hygienist</td>
<td>4</td>
<td>4.1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Refer for orthodontic treatment <strong>only</strong> if oral hygiene improves</td>
<td>0</td>
<td>0</td>
<td>31</td>
<td>34.4</td>
</tr>
<tr>
<td>Recall 3 months</td>
<td>37</td>
<td>38.1</td>
<td>34</td>
<td>37.8</td>
</tr>
<tr>
<td>Recall 6 to 12 months</td>
<td>60</td>
<td>61.8</td>
<td>52</td>
<td>57.8</td>
</tr>
</tbody>
</table>
Table 3. Therapists' reported long term oral health management plans for Vignette 1
and Vignette 2

<table>
<thead>
<tr>
<th>Dental caries</th>
<th>Vignette 1</th>
<th>Vignette 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>no pain</td>
<td>N = 97 %</td>
<td>N = 90 %</td>
</tr>
</tbody>
</table>

Monitor and reassess individual needs:
Review and assess patient home preventive oral health care program

- Referral to periodontist or hygienist
- Refer for orthodontic treatment only if oral hygiene improves
- Recall 3 months
- Recall 6 to 12 months

Information Sheet Focus Group
Jan 2012
If you have any questions, have a concern or complaint about the facilitation of the focus group, or would just like more information, please feel free to contact:
A/Professor Fiona Blinkhorn,
Principal Investigator: Phone: (02) 4349 4530 or Mobile No. 0422 768 223

Further, research has been approved by the Hunter New England Human Research Ethics Committee of Hunter New England Local Health District, Reference 12/02/15/5.04
Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researcher, or, if an independent person is preferred, to Dr Nicole Gerrand, Manager Research Ethics and Governance, Hunter New England Local Health District, Locked Bag 1, New Lambton, NSW, 2305, Telephone (02) 49214950, email: Henhrec@hnehealth.nsw.gov.au
We greatly appreciate your time and contributions.

SIGNATURE OF SUPERVISORS AND INVESTIGATOR

Ms. Angela V. Masoe
School of Health Sciences
The University of Newcastle

Associate Professor Fiona A. Blinkhorn
School of Health Sciences
The University of Newcastle

Associate Professor Jane Taylor
School of Health Sciences
The University of Newcastle

Professor Anthony S. Blinkhorn
Faculty of Dentistry
The University of Sydney
An assessment of preventive care offered to orthodontic patients by oral health therapists in NSW Australia

Angela V. Masoe 1, Anthony S. Blinkhorn 2, Jane Taylor 1 and Fiona A. Blinkhorn 1

1School of Health Sciences, Faculty of Health and Medicine, Oral Health, University of Newcastle, Ourimbah, NSW, Australia; 2Department of Population Oral Health, Faculty of Dentistry, University of Sydney, Westmead, NSW, Australia.

Objective: The aim of this study was to record preventive oral health care planned by dental therapists and oral health therapists (therapists) for patients with poor oral hygiene undergoing orthodontic treatment.

Materials and methods: A cross-sectional survey, using a clinical vignette of a patient with poor oral hygiene undergoing therapy with a fixed appliance, was undertaken to record the preventive care offered to this individual by therapists working across 15 Local Health Districts (LHDs). This orthodontic vignette was inserted between two dental caries-related vignettes. Data were coded and descriptive statistics were used to report the findings.

Results: One-hundred and seventeen therapists returned questionnaires (giving a response rate of 64.6%), of whom 82.0% (n = 95) completed the orthodontic vignette. Adopting motivational interviewing techniques to facilitate communication with the patient and their parent was recommended by 88.4% (n = 84) respondents, 98.0% (n = 93) offered oral-hygiene instruction, 70.5% (n = 67) recorded plaque levels and used disclosing solution and 60.0% (n = 57) offered dietary advice. Products recommended for use at home included fluoride toothpaste [1,450 ppm F (80.0%; n = 76) and 5,000 ppm F (59.0%; n = 24)] and casein phosphopeptide amorphous phosphates plus fluoride (CPP-ACPF) paste (33.3%; n = 32). Less than 20% offered fissure sealants.

Conclusion: Preventive advice and care was offered inconsistently by therapists in this study. To ensure that all therapists adopt a scientifically based approach to prevention, LHD clinical directors should implement continuous professional education programmes for therapists to improve patient’s health outcomes.

Key words: Orthodontic adolescent patient, public oral health, preventive care

INTRODUCTION
Orthodontic care is available to disadvantaged eligible adolescents under 18 years of age through the New South Wales (NSW) public oral health services, providing that they or their parents are holders of a government Medicare health-care card1–3. The policy criteria for referral of patients to specialist orthodontists states that ‘eligible patients who have active dental caries, chronic marginal gingivitis or whose oral hygiene is not at an optimal level should not be offered orthodontic treatment’1. Additionally, the policy clearly stipulates that if the patient is unable to maintain acceptable oral hygiene standards during treatment and does not respond to an improvement programme, orthodontic treatment should be discontinued1.

Orthodontic treatment often commences during adolescence, which is a significant period for behaviour, personality and self-image development4. Orthodontic brackets, wires, ligatures and other parts of the appliance create areas that encourage accumulation of plaque biofilm and food stagnation, which present challenges for adolescents regarding maintaining a daily optimal level of oral hygiene during the treatment period4,5.

Enamel demineralisation [white spot lesions (WSLs)] is an adverse complication associated with therapy with fixed appliances, as is chronic hyperplastic gingivitis with increased pocket depths, with slight, yet significant, loss of periodontal support associated with retention of plaque biofilm5–8. Increased gingivitis and gingival hyperplasia are reported as problems during orthodontic treatment; however, these rarely lead to periodontitis9. Salivary flow is altered by an...
An assessment of preventive care offered to orthodontic patients by oral health therapists in NSW Australia

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Enamel demineralisation [white spot lesions (WSLs)] is an adverse complication associated with therapy with fixed appliances, as is chronic hyperplastic gingivitis with increased pocket depths, with slight, yet significant, loss of periodontal support associated with retention of plaque biofilm⁶–⁸. Increased gingivitis and gingival hyperplasia are reported as problems during orthodontic treatment; however, these rarely lead to periodontitis⁹. Salivary flow is altered by an
A coding index system was constructed from the first 35 written responses, guided by The Australian National Dental Schedule System. These codes were reviewed, amended and confirmed in consultation with the advisory team, with subsequent responses coded and entered into a Microsoft Excel database; these were later collated into key clinical preventive categories. Respondent’s narratives to clarify clinical decisions were also uploaded and analysed. To ensure rigor, two independent non-clinician oral health professionals were recruited to review and confirm data entry, data coding and narrative upload before data analysis. The advisory group systematically reviewed and verified data-analysis processes within specific time frames.

Ethics approval for the study was obtained from the Hunter New England Local Health District Lead Health and Research Ethics Committee (HREC) Reference No. 12/02/15/5.04 and all 15 LHDs. This research was conducted in full accordance with the World Medical Association Declaration of Helsinki.

RESULTS
Following the initial mail out, further information was received on therapist numbers. The original sample of 192 was reduced by 11 because of retirements and job changes, giving a final sample of 181, of whom 117 (64.6%) responded. Respondents were: (i) dental therapists (79.1%; n = 91); (ii) dental hygienists (1.7%; n = 2); and (iii) oral health therapists (20.5%; n = 24). Most (61.5%; n = 72) respondents worked in rural LHDs compared to metropolitan LHDs (38.4%; n = 45). The mean time since completion of their academic qualification was 21.9 ± 12.7 years.

Ninety-five (82.0%) of the 117 respondents completed the orthodontic vignette reported in this paper. Therapists noted that this patient had halitosis because he was having difficulties cleaning his teeth as a result of his fixed orthodontic appliance. The types of preventive oral health care recommended for the patient by the therapists are shown in Table 1.

TJ is a 14 year old male patient. His mother says that all of the family are complaining of TJ’s bad breath. TJ has not noticed anything of concern, except the braces are hard to keep clean. His mother is more concerned about his teeth than he is. TJ is a healthy young lad with no history of any serious illness. TJ is a regular dental attender and has accessed public health services all his life. He is under the orthodontist for treatment of a Class II Division I malocclusion and his next appointment with the orthodontist is in 4 weeks’ time. He had 14 & 24 extracted under LA in order to commence orthodontic treatment 12 months ago. He has never required restorations in primary or permanent dentitions.

TJ is the youngest of 3 children in the family. He lives in Sydney. The parents are both employed intermittently with local commercial companies. He lives close to the dental clinic. TJ has a good diet according to mum. He drinks tap water and soft drinks are only bought occasionally; sweets are available in the form of biscuits, cakes and muesli bars for school lunches.

Clinical Observation:
Extra-oral:
No abnormality detected.
Intra-oral:
Oral hygiene: poor. Plaque present on most teeth. No calculus present.
Gingivae:
Red and inflamed – chronic marginal gingivitis, bleeding on gentle probing.
Occlusion:
Skeletal Class 1,  Dental Class 1

Using the information, photograph and dental chart you have been provided with:
1. What treatment, if any, would you carry out for TJ today?
2. Would you bring TJ back to the clinic for treatment, if yes, what?

The orthodontic vignette was designed using the classic clinical dental presentation, with a focus on: (i) history of the chief complaint; (ii) overall dental history; (iii) clinical examination; and (iv) diagnostic tests. These were used by the therapists to develop an assessment and management plan. The orthodontic vignette described a 14 year-old male patient (TJ) who presented with his mother because of concerns regarding a halitosis problem (Figure 1). Therapists were requested to use the scenario description, photograph and charting provided for the vignette, aligned with their clinical practice protocols, to respond to the following questions:
1. What treatment, if any, would you carry out for TJ today?
2. Would you bring TJ back to the clinic for treatment, if yes, what?

The vignette was pilot tested with five therapists who were working in the Australian Capital Territory, and minor amendments were made before starting the main survey.

The names and contact details for all therapists working within the NSW public oral health services were obtained by contacting directors of each of the 15 LHDs. An information document outlining the research and inviting participants to consent voluntarily to participate by completing and returning the survey was developed. One-hundred and ninety-two potential participants were identified. Survey questionnaires, an information document and return postage-paid envelopes were mailed and reminder letters were posted out 2 weeks later. Further reminders to non-respondents were undertaken 1, 2 and 3 months after the initial mailing.
A coding index system was constructed from the first 35 written responses, guided by The Australian National Dental Schedule System. These codes were reviewed, amended and confirmed in consultation with the advisory team, with subsequent responses coded and entered into a Microsoft Excel database; these were later collated into key clinical preventive categories. Respondent’s narratives to clarify clinical decisions were also uploaded and analysed. To ensure rigor, two independent non-clinician oral health professionals were recruited to review and confirm data entry, data coding and narrative upload before data analysis. The advisory group systematically reviewed and verified data-analysis processes within specific time frames.

Ethics approval for the study was obtained from the Hunter New England Local Health District Lead Health and Research Ethics Committee (HREC) Reference No. 12/02/15/5.04 and all 15 LHDs. This research was conducted in full accordance with the World Medical Association Declaration of Helsinki.

**RESULTS**

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### Table 1 Therapists’ record of immediate oral health treatment for the orthodontic patient \((n = 95)\)

<table>
<thead>
<tr>
<th>Treatment option</th>
<th>(n)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprehensive oral examination</td>
<td>28</td>
<td>27.5</td>
</tr>
<tr>
<td>Bite-wing radiographs</td>
<td>15</td>
<td>15.8</td>
</tr>
<tr>
<td>Intra-oral photographs</td>
<td>6</td>
<td>6.3</td>
</tr>
<tr>
<td>Plaque index (PI) or Periodontal Screening Record (PSR)</td>
<td>7</td>
<td>7.4</td>
</tr>
<tr>
<td>Plaque disclosing</td>
<td>67</td>
<td>70.5</td>
</tr>
<tr>
<td>Oral hygiene, including tongue cleaning</td>
<td>93</td>
<td>98.0</td>
</tr>
<tr>
<td>Use of a hand mirror as an oral hygiene instruction patient-learning tool</td>
<td>78</td>
<td>82.2</td>
</tr>
<tr>
<td>Use Motivational Interviewing (coaching technique) for TJ (\text{and parent})</td>
<td>84</td>
<td>88.4</td>
</tr>
<tr>
<td>Dietary advice</td>
<td>57</td>
<td>60.0</td>
</tr>
<tr>
<td>Super Floss and Piksters</td>
<td>60</td>
<td>63.1</td>
</tr>
<tr>
<td>Professional cleaning (plaque and calculus removal)</td>
<td>65</td>
<td>68.4</td>
</tr>
<tr>
<td>Topical fluoride applications (varnish and gels)</td>
<td>45</td>
<td>47.3</td>
</tr>
<tr>
<td>Fluoride toothpaste (Colgate Total antibacterial, 1,450 ppm F)</td>
<td>76</td>
<td>80.0</td>
</tr>
<tr>
<td>Recommend use of Neutra Fluor 900 mouthwash (900 ppm F)</td>
<td>24</td>
<td>25.3</td>
</tr>
<tr>
<td>Recommend use of mouth rinse (chlorhexidine, antibacterial agents, saline rinses and Neutra Fluor 900 ppm F)</td>
<td>23</td>
<td>24.2</td>
</tr>
<tr>
<td>Recommend use of Tooth Mousse plus fluoride (CPP-ACPF)</td>
<td>32</td>
<td>33.7</td>
</tr>
<tr>
<td>Fissure sealants</td>
<td>17</td>
<td>17.9</td>
</tr>
<tr>
<td>Issue oral health products and relevant brochures</td>
<td>15</td>
<td>15.8</td>
</tr>
<tr>
<td>Seek medical practitioner advice (if oral health practices improve and halitosis persists as it may be caused by other underlying health issues)</td>
<td>25</td>
<td>26.3</td>
</tr>
</tbody>
</table>

CPP-ACPF, casein phosphopeptide amorphous phosphates plus fluoride.

Immediate care (Question 1) consisted of an oral examination (27.5%; \(n = 28\)), bitewing radiographs (15.8%; \(n = 15\)), plaque disclosing (70.5%; \(n = 67\)), recording the Plaque Index or Periodontal Screening Record (7.4%; \(n = 7\)) and providing oral hygiene instruction and advice on tongue cleaning (98.0%; \(n = 93\)) (Table 1). As the chief complaint was halitosis, the majority of respondents (82.2%; \(n = 78\)) focused on toothbrushing instruction, which included asking the patient whether he cleaned his tongue. Education regarding the importance of tongue cleaning to reduce the bacterial load, which might be contributing to the halitosis, was part of the care plan.

The use of super-floss and piksters as tools to improve cleaning between teeth was recorded by 63.1% \((n = 60)\) of the respondents. Motivational interviewing techniques, such as having the patient demonstrate how he currently brushed his teeth, followed by the therapist using a hand mirror to show where he needed to improve, was suggested by 88.4% \((n = 84)\) of the participants. The majority (68.4%; \(n = 65\)) reported that after offering oral hygiene instruction, they would undertake a professional clean (removal of plaque and calculus). Sixty per cent \((n = 57)\) provided dietary advice with a focus on sugar consumption and its impact on bacterial growth as a contributor to halitosis. Placement of fissure sealants was recorded by 17.9% \((n = 17)\) of the respondents.

Eighty per cent \((n = 76)\) stated that they would offer advice on fluoride toothpaste (1,000–1,450 ppm F), including use of Neutra Fluor 5000 (25.3%, \(n = 24\)) and Tooth Mousse (33.7%, \(n = 32\)), for the management of demineralised enamel areas. Mouth rinses were also recommended (24.2%, \(n = 23\)), which included the use of antibacterial agents, such as chlorhexidine, Neutra Fluor 900 mouthwash (900 ppm F, once weekly) and saline rinses in conjunction with the oral hygiene regime.

When asked if they would bring the patient back for further treatment (Question 2), 44.2% \((n = 42)\) stated they would bring the patient back weekly until the condition had stabilised and to monitor the oral hygiene home practices and gingival health (Table 2). Approximately one-third (28.4%, \(n = 27\)) stated that they would give him fortnightly appointments, and if there was no improvement or there was evidence of further deterioration of gingival health they would inform TJ that an early referral back to the orthodontist for de-banding was almost inevitable to prevent further oral health issues. Less than 5% \((n = 3)\) recommended bringing the patient back in 1 month;

### Table 2 Therapists’ management plan for follow-up of the orthodontic patient \((n = 95)\)

<table>
<thead>
<tr>
<th>Time period</th>
<th>(n)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekly follow-up</td>
<td>42</td>
<td>44.2</td>
</tr>
<tr>
<td>Review patient oral hygiene and preventive home-care practices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provide oral hygiene support where indicated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seek medical practitioner advice if halitosis has not improved</td>
<td>27</td>
<td>28.4</td>
</tr>
<tr>
<td>Fortnightly follow-up</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Review patient oral hygiene and preventive home care practices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communicate with orthodontist if condition has not improved with consideration for de-band (therapist caution TJ and parent)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seek medical practitioner advice if halitosis has not improved</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One-month follow-up</td>
<td>3</td>
<td>3.1</td>
</tr>
<tr>
<td>Recall appointment, general review of patient’s oral hygiene practices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeat above oral hygiene and home-care advice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seek medical practitioner advice if halitosis has not improved</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-month recall appointment</td>
<td>15</td>
<td>15.8</td>
</tr>
<tr>
<td>Review and undertake general oral health care examination</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12-month general oral health recall</td>
<td>5</td>
<td>5.3</td>
</tr>
<tr>
<td>Regular oral health review</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
15.8% \((n = 15)\) suggested a 6-month review and 5.3% \((n = 5)\) offered re-appointment at 12 months (Table 2). Just over one-quarter \((26.3%; \ n = 25)\) stated that they would discuss other possible reasons for halitosis, suggesting that TJ and his mother should seek medical advice if the problem did not improve (Table 1).

**DISCUSSION**

The objective of this study was to record therapists’ planned preventive oral health care for an orthodontic adolescent patient using a clinical vignette. Most adolescents accessing public oral health systems are from disadvantaged backgrounds and the working poor\(^{20}\). There is a dearth of research in the area of preventive clinical practices to support public orthodontic patients; thus, this study, utilising a clinical vignette to record therapists’ preventive care plans, has provided valuable information. Furthermore, there is a major flaw in the NSW public oral health system for tracking referral of eligible adolescent patients to orthodontic specialist services and follow-up care. Thus, there is scope for future clinical research into the referral and feedback processes to ensure continuous quality care of patients.

NSW Health, which commissions the public dental service, does not have a policy or protocol specifically for preventive care for patients under orthodontic treatment. However, there are general preventive oral health care policies on the use of pit-and-fissure sealants, topical fluorides and smoking-cessation advice\(^{21-24}\). Therapists should apply these same principles to all orthodontic patients.

This study found fairly adequate levels of motivational interviewing to facilitate communication with the patient to enhance his oral hygiene instruction, including the use of a hand mirror as an educational tool for demonstrating an interactive learning session. However, the infrequent use of the plaque index and periodontal screening recorded by the therapists is a major concern considering the patient’s very poor gingival health and halitosis. Furthermore, the use of tri-plaque disclosing solutions, a relatively simple procedure, should have been recommended by all therapists to monitor the patient’s current and future oral hygiene practices\(^{5,25}\).

Hadler-Olsen et al.’s\(^{5}\) public health study in Norway, of adolescents under 16 years of age, reported that assessment of plaque levels using plaque-disclosing tablets in conjunction with oral hygiene instructions was important. Adolescents were provided with an oral health kit containing an orthodontic toothbrush, interdental brushes, plaque-disclosing tablets, fluoride toothpaste and mouth rinse to facilitate the preventive regime\(^{5}\). Those \((n = 9)\) who complied with the comprehensive oral hygiene regime developed, on average, one new WSL, patients with moderate compliance \((n = 27)\) developed 1.4 WSLs and those \((n = 4)\) with poor compliance developed 3.3 WSLs\(^{5}\). Instituting a comprehensive oral hygiene regimen for orthodontic patients was reported as challenging by Hadler-Olsen et al.\(^{5}\), but it illustrates the importance of providing rigorous preventive measures for orthodontic patients.

A study by Derk et al.\(^{26}\) reviewed the use, by orthodontic practices, of measurements to prevent decalcification during fixed appliance treatment, and comparison of these measures with the available scientific evidence found that many orthodontists failed to implement procedures in their dental establishments to prevent enamel demineralisation. Thus, these authors\(^{26}\) recommended the development of practice guidelines for the prevention of enamel demineralisation. If this strategy is to be used by public oral health services, then clinical quality-improvement mechanisms would have to be adopted to monitor the implementation and compliance of clinicians to ensure improved patient health outcomes, as part of clinical governance\(^{27}\).

Dietary advice was offered by 60% of the respondents, which is disappointing considering the critical role that sugar plays in plaque formation and in the aetiology of dental caries. Some form of advice on restricting sugary foods and drinks between meals, and healthy alternatives for snacks, should have been part of the immediate care option\(^{6,10}\).

Only a small proportion \((17.9\%)\) suggested that fissure sealants should be offered at this visit, which shows that the majority of respondents had focused on the main clinical problems of gingivitis and halitosis. The patient was described as carries free, so sealants were not an urgent requirement.

Application of topical fluoride varnish (and gels) recorded in this study was low \((47.3\%)\), and as the patient is described as having no previous dental carries, it is not an immediate and urgent issue to discuss fluoride and other remineralising products. This is better left to future visits because too much information at the initial visit will confuse both the mother and the patient. However, because of the increased carries risk in fixed appliance therapy it is vital that the patient is given this information in an early follow-up appointment.

The majority of respondents did recommend the use of 1,450 ppm F toothpaste \((80\%)\); 25.3% recommended 5,000 ppm F and 33.7% offered CPP-ACP. A study conducted by Sonesson et al.\(^{8}\) to establish the efficacy of daily toothbrushing with 5,000 ppm F toothpaste on enamel demineralisation, found that the prevalence of WSLs was significantly lower in the group using the high-fluoride toothpaste \((P = 0.04)\). There was an 18.1% incidence of WSL in the high-fluoride
toothpaste group compared with an incidence of WSL of 26.6% in the reference group. Therefore, an orthodontic patient’s WSL risk should be assessed, and use of a suite of remineralising agents, such as 5,000 ppm F toothpaste, in conjunction with CPP-ACP agents, should be discussed and advice offered at future visits, to ensure that optimal levels of calcium, phosphate and fluoride ions are present in the saliva to support enamel remineralisation during orthodontic treatment.

Gingivitis, leading to gingival enlargement (gingival hyperplasia), can be controlled by adopting high standards of oral hygiene. However, Zachrisson and Zachrisson’s longitudinal study of 49 patients, 11–13 years of age at the commencement of treatment, reported that despite good oral hygiene and sodium fluoride rinsing performed twice weekly throughout the study, most patients developed generalised moderate gingival hyperplasia. The authors reported that gingival health improvement was noted after the first month of orthodontic band removal. Conversely, the review by Blinkhorn et al., relating to the effectiveness, safety, delivery and use, by patients, of triclosan/copolymer toothpaste, found strong support for its positive medicinal effect on preventing biofilm formation and promoting gingival health with twice-daily use to control plaque and slow progression of periodontal disease. Thus, LHDs in NSW should review the scientific efficacy of oral health products regularly to ensure their appropriate prescription to assist patients’ oral health home regimes.

Of concern, this study found inconsistencies in the follow-up time frames used to monitor the patient’s oral hygiene status. Considering the presenting clinical oral health status of the patient, 20% of the respondents recorded a follow-up time frame of between 6 and 12 months, which is deemed far too long to offer support to the patient ensuring improved oral health outcomes. A study by Bardal et al. reported findings over a period of 6 months; they found that monitoring oral hygiene at 6, 12 and 24 weeks gave positive results in terms of good gingival health for orthodontic patients. Therefore, a review of time frames used by public health systems for vulnerable adolescents undergoing fixed orthodontic treatment should be developed and publicised.

It was somewhat surprising to note that 15.8% of the respondents would take bitewing radiographs at the first visit. The diagnostic yield will be compromised by the orthodontic brackets and the patient is a low carries risk. The heavy deposits of plaque will predispose the patient to smooth surface lesions, which will not be shown on a bitewing. The US Food and Drug Administration, in collaboration with the American Dental Association, urges dental professionals to minimise radiation exposure. A patient who is receiving orthodontic care will have a full treatment-planning schedule of radiographs; therefore, it is most unwise to prescribe further radiographs that will be of little diagnostic value.

A potential limitation of this study was capturing and reporting the multifaceted preventive activities during the communication interplay between the clinician and the patient. Similar difficulties in recording clinical preventive activities have been previously reported by Tickel et al. Therefore, caution should be exercised in the generalisation of this study’s findings.

Nonetheless, this study, utilising a vignette as a way of replicating a real event to elicit therapists’ clinical preventive care planning according to how they would behave in clinical practice, has yielded new information to assist the public oral health services of NSW to develop clinical preventive care quality improvement programmes.

CONCLUSION

Preventive oral health strategies reported by respondents for the clinical management of a patient undergoing fixed orthodontic treatment varied markedly. It is recommended that rigorous preventive care and clinical treatment for adolescents should be embedded in the clinical practice of therapists for disadvantaged and high-risk patients. Clinical directors should provide therapists with ongoing scientific professional education on the management of dental caries and periodontal disease, including the resourcing of relevant oral health products for offering to patients, in order to ensure good clinical outcomes. Additionally, evaluation mechanisms to monitor implementation and compliance to NSW Health preventive policies and protocols should be a component of annual clinical governance processes.

Acknowledgements

This study was funded by NSW Ministry of Health Rural and Remote Allied Health Professional Scholarship Scheme and Centre for Oral Health Strategy. We are grateful to Australian Capital Territory therapists and hygienists who participated in pilot testing the survey questionnaire; Rachael Moir research officer, University of Newcastle for research data assistance; NSW LHDs clinical directors, health service managers and NSW Oral Health Promotion Network members for supporting the research activities.

Author contributions

All authors contributed to the design of the study. AVM, ASB and FAB participated in analysing the data and drafting the manuscript. All authors read and approved the final manuscript.
Competition interests

The authors declare that they have no competing interests.

REFERENCES


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Chapter 8:

Mapping professional development activities involving clinical preventive care for adolescents by Oral Health Therapists working in Public Oral Health Services NSW, Australia
Preface

Evidence of Continuing Professional Development is considered an assurance of Therapists scientific clinical knowledge and competence to provide quality care to their patients.

Many disadvantaged adolescents are at risk of dental caries and periodontal disease that can be modified by Therapists offering them preventive clinical care and advice.

This aim of the study reported in this chapter was to explore Therapists participation patterns and activities for Continuing Professional Development in clinical preventive oral health for adolescents.

The study in this chapter is published in the Journal of Child and Adolescent Behaviour, May, 2015.

Angela V Masoe, Anthony S Blinkhorn, Jane Taylor, Fiona A Blinkhorn

Mapping professional development activities involving clinical preventive care for adolescents by Oral Health Therapists working in NSW Public Oral Health Services.
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Mapping professional development activities involving clinical preventive care for adolescents by Oral Health Therapists working in NSW Public Oral Health Services.

Information Sheet Focus Group
Jan 2012

If you have any questions, have a concern or complaint about the facilitation of the focus group, or would just like more information, please feel free to contact:

A/Professor Fiona Blinkhorn,
Principal Investigator: Phone:  (02) 4349 4530 or Mobile No. 0422 768 223

Further, research has been approved by the Hunter New England Human Research Ethics Committee of Hunter New England Local Health District, Reference 12/02/15/5.04

Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researcher, or, if an independent person is preferred, to Dr Nicole Gerrand, Manager Research Ethics and Governance, Hunter New England Local Health District, Locked Bag 1, New Lambton, NSW, 2305, Telephone (02) 49214950, email: Henhrec@hnehealth.nsw.gov.au

We greatly appreciate your time and contributions.

SIGNATURE OF SUPERVISORS AND INVESTIGATOR

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A/Prof. Jane. Taylor
Ms. A. Masoe

CO-AUTHORS’ STATEMENT CONFIRMING AUTHORSHIP CONTRIBUTION

This is to certify that the manuscript entitled ‘Mapping dental therapists professional development on clinical preventive care for adolescents, NSW Public Oral Health Services’ submitted by Angela V Masoe in partial fulfilment of the requirements for the degree of Doctor of Philosophy (Oral Health) is the result of the following contributions:

- Angela V Masoe designed the survey, recruited the participants, collected the data, organised the statistical data analysis, drafted the manuscript, managed the submission and responded to the reviews.

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Mapping Professional Development Activities Involving Clinical Preventive Care for Adolescents by Oral Health Therapists Working in Public Oral Health Services NSW, Australia

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Abstract

Background: Continuing professional development (CPD) is an essential component for dental Therapists and oral health Therapists to uphold registration with the Australian Dental Board. Evidence of CPD is considered an assurance of Therapists scientific clinical knowledge and competence to provide quality care to patients. Many vulnerable adolescents are at risk of dental caries and periodontal disease due to poor oral hygiene self-care practices and dietary behaviours. Therapists have a pivotal role to play in the provision of scientific-based clinical preventive care and advice to encourage adolescents towards oral health self-efficacy for lifelong benefits.

The aim of this study was to record CPD clinical preventive care activities focused on adolescents undertaken by Therapists working in NSW Public Oral Health Services.

Methods: A cross-sectional self-administered survey using a postal questionnaire was used to record the continuing professional development activities of Therapists working in all NSW Local Health Districts (LHDs) in relation to clinical preventive care offered to adolescents.

Results: One hundred and seventeen Therapists (64.6%) responded to the survey. Approximately 20% of respondents had not undertaken CPD on preventive care for adolescents in the last two years, 33.3% documented less than 5 hours, and 36.1% more than 10 hours. Almost 88 percent of respondents received their CPD from within their LHDs, and ranked peer reviews and team building events for sharing information as key strategies to enhance their ability to offer clinical preventive care to adolescents.

Conclusion: This study has shown that one third of all Therapists had received less than 5 hours CPD focussing on helping adolescents maintain their oral health in the last 2 years. In order to support Therapists continuing professional education, inter-professional peer reviews in partnership with dentists, visiting dental specialists, and whole team approaches should be regularly undertaken. In addition scoping of other modes of education such as the Information Communication Technology for broader reach are worthy of further investigation.

Keywords: Adolescent oral health; Preventive care; Continuing professional development; Dental and oral health therapists

Background

Despite the scientific evidence of the value of clinical preventive care and oral health education strategies to control oral disease over the past decade, researchers have reported a slow uptake by dental practitioners’ to embed the evidence into their clinical practice for improved patient health outcomes [1-4]. Continuing professional development (CPD) for health professionals is a strategic approach to ensure quality health care [5]. However, limited resources and high demands of the dental and oral health practitioners for education and training at multiple levels, has been reported as placing strain on the providers of scientific based CPD [6].

The definition provided by the Dental Board of Australia for CPD is: “the means by which members of the profession maintain, improve and broaden their knowledge, expertise and competence, and develop the personal and professional qualities required throughout their professional lives” [7]. The British General Dental Council guidelines are somewhat more descriptive and define CPD as: "lectures, seminars, courses, individual study and other activities that can be included in your CPD record if it can be reasonably expected to advance your professional development as a dentist or dental care professional and is relevant to your practice or intended practice” [8].

Evidence of dental practitioner’s ongoing CPD is considered an assurance of their scientific clinical knowledge and competence to provide quality oral health care to all patients [7]. Efforts to improve clinical practice have included audits and feedback reports, evidence-based guidelines, total quality management, economic and organizational changes underpinned by professional education and development [9,10]. According to Grol [9], the most reliable means for improving quality of care, is to be informed by scientific literature, in conjunction with clinical practice insight to stimulate informed recommendations to assist health professionals to decide on the most appropriate care and processes to promote education, and decrease variations in health care services and cost inefficiencies [11,12].

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The literature on CPD states that lifelong learning is a fundamental mechanism to enhance clinical governance principles to ensure the public's confidence in dental and oral health professions [13-15]. In the State of New South Wales (NSW), the Ministry of Health funds the Local Health Districts (LHDs) to provide free clinical and preventive care for all children and adolescents under 18 years of age [11]. The majority of this care is provided by dental Therapists and oral health Therapists (Therapists). The LHDs as the clinical governing agency are responsible for ensuring that all dental practitioners are compliant with the recommended CPD goals to maintain their registration to practice [11,12]. Therapists under the Australian Health Practitioner Regulation National Law have a mandatory requirement to participate in CPD to maintain registration with the Dental Board of Australia [7]. According to the CPD requirements, dental practitioners must complete a minimum of 60 hours over 3 years with 80 per cent to be clinically or scientifically based [7]. A study by Hopcraft et al. [13] reported the rationale for dental practitioners undertaking CPD in the State of Victoria, however, no reference was made to Therapists' clinical preventive care CPD. Nonetheless, the study reported that the topic of the CPD course was a main motivator for Therapists to attend courses. Although the dental literature has reported broadly on dental practitioners CPD patterns, the majority of research has focused on dentists [15-17] with Hopcraft et al. [13] study being one of the few to include Therapists. There is a dearth of information on the CPD activities of Therapists working within NSW Public Oral Health Services especially in relation to their perceptions of CPD focused on clinical preventive care and managing the adolescent patient to support their compliance with NSW Health oral preventive policies [18-20]. Therefore this study was undertaken to scope and record Therapists participation and perceptions of CPD activities pertaining to clinical preventive care for adolescents.

Methods

A cross-sectional self-administered postal survey, administered by NSW Health, was sent to Therapists working within all the fifteen Local Health Districts (LHDs). The 17 item questionnaire was developed from focus group pilot work with Therapists in four NSW LHDs [21] which explored influencing factors for the provision of preventive care to adolescents, and encompassed Continuing Professional Development questions pertaining to the clinical preventive care of adolescents. Demographic information about the participants was collected and Likert scales were used as the measurement instrument to determine whether the participants strongly disagreed or strongly agreed (strongly disagree =1 to strongly agree = 5) with a series of statements [22].

The contact details for all Therapists working within the NSW Public Oral Health Services were received by contacting the directors of each of the fifteen LHDs. One hundred and ninety two Therapists were initially identified, and questionnaires containing return postage-paid envelopes were mailed with reminder letters being sent to non-respondents at 2 weeks, 1 month, 2 months and 3 months after the initial mailing.

The data were analysed using the IBM SPSS package [23]. The differences between the mean responses were tested using the independent sample T-test for equality of variances.

Ethics approval for the study was obtained from the Hunter New England Local Health District Lead Health and Research Ethics Committee (HREC) Reference No. 12/02/15/5.04 and all fifteen Local Health Districts.

Results

Further information regarding the number of Therapists working in NSW Public Oral Health Services was received after the survey distribution. The original sample of 192 was reduced by 11 due to job changes and retirements, giving a final sample of 181, of whom 117 (64.6%) responded. More (61.5%; N=72) respondents worked in rural LHDs compared to metropolitan LHDs (38.4%; N=45).

Figure 1 shows that just over 20 per cent of the respondents did not undertake any CPD on preventive care for adolescents, 33.3 per cent had received less than 5 hours of CPD and over 35.1 per cent had received more than 10 hours of CPD, with rural and remote Therapists (37.7%) reporting slightly more than their metropolitan counterparts (33.3%).

Table 1 illustrates that respondents received most information about the preventive care of adolescents from in-service training
Table 3: Therapists response to the question “What in your opinion are the most important structures that need to be in place to support provision of preventive care in your clinic? (Please rank them: 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10, with 1 as highly important).”

<table>
<thead>
<tr>
<th>Item</th>
<th>Metropolitan</th>
<th>Rural and Remote</th>
<th>P-Value</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Engaging with adolescents attending the clinic is easy for me.</td>
<td>45 4.27 0.78</td>
<td>71 4.27 0.94</td>
<td>0.99</td>
<td>116 4.27 0.88</td>
</tr>
<tr>
<td>2. My training and education has given me confidence to work effectively with adolescents</td>
<td>42 4.26 0.8</td>
<td>72 3.89 1.13</td>
<td>0.2</td>
<td>115 3.99 1.1</td>
</tr>
<tr>
<td>3. I have confidence providing dietary advice for adolescents.</td>
<td>45 4.36 0.83</td>
<td>72 4.21 0.87</td>
<td>0.37</td>
<td>117 4.27 0.85</td>
</tr>
<tr>
<td>4. My knowledge of evidence-based preventive care for adolescents is inadequate</td>
<td>45 2.4 1.12</td>
<td>72 2.61 1.06</td>
<td>0.33</td>
<td>117 2.53 1.08</td>
</tr>
<tr>
<td>5. I am not confident to communicate effectively with adolescents.</td>
<td>43 1.86 0.91</td>
<td>71 1.9 1 0.83</td>
<td>0.16</td>
<td>116 2.5 1.09</td>
</tr>
<tr>
<td>6. I do not have time to reflect on my clinical practice</td>
<td>44 2.32 1.12</td>
<td>72 2.61 1.07</td>
<td>0.16</td>
<td>116 2.5 1.09</td>
</tr>
</tbody>
</table>

Legend: strongly disagree = 1; disagree = 2; unsure = 3; agree = 4; strongly agree = 5

Table 2: Therapists ranking of enablers and constraints to offering preventive oral health care to adolescents.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Item</th>
<th>Metropolitan</th>
<th>Rural and Remote</th>
<th>P-Value</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Implement 6 monthly clinical peer reviews</td>
<td>44 7.43 2.84</td>
<td>70 6.97 3.12</td>
<td>0.01</td>
<td>114 7.15 3.01</td>
</tr>
<tr>
<td>2</td>
<td>Regular team building events to maintain morale and share information to improve working partnerships.</td>
<td>44 5.61 2.84</td>
<td>70 5.46 2.85</td>
<td>0.81</td>
<td>114 5.52 2.84</td>
</tr>
<tr>
<td>3</td>
<td>Referral system for focussed ‘prevention session’ with dental/oral health therapist</td>
<td>44 5.11 2.71</td>
<td>70 5.11 2.66</td>
<td>0.92</td>
<td>114 5.11 2.67</td>
</tr>
<tr>
<td>4</td>
<td>ISOH tagged clinical preventive care appointment times for clinicians</td>
<td>44 5.36 3.31</td>
<td>70 4.83 3.10</td>
<td>0.77</td>
<td>114 5.04 3.18</td>
</tr>
<tr>
<td>5</td>
<td>Process to access oral health products consistently across the Local Health District for adolescents</td>
<td>44 5.25 2.85</td>
<td>70 4.54 2.92</td>
<td>0.84</td>
<td>114 4.82 2.9</td>
</tr>
<tr>
<td>6</td>
<td>Forum for clinicians to discuss different case studies, oral health information and education</td>
<td>44 4.70 2.19</td>
<td>70 4.36 2.44</td>
<td>0.75</td>
<td>114 4.49 2.35</td>
</tr>
<tr>
<td>7</td>
<td>Make resources available for interactive oral health education at the chair side e.g. development of age appropriate oral health education resources such as smart phone applications and DVD’s</td>
<td>44 4.52 2.70</td>
<td>70 4.43 2.61</td>
<td>0.67</td>
<td>114 4.47 2.63</td>
</tr>
<tr>
<td>8</td>
<td>Clinical team leaders to provide ongoing CE on evidence based practice and minimal intervention</td>
<td>44 4.52 3.10</td>
<td>70 4.41 2.84</td>
<td>0.72</td>
<td>114 4.46 2.93</td>
</tr>
<tr>
<td>9</td>
<td>Work culture change towards evidence-based practice</td>
<td>44 3.77 2.98</td>
<td>70 3.77 3.14</td>
<td>0.87</td>
<td>114 3.77 3.07</td>
</tr>
<tr>
<td>10</td>
<td>Preventive guidelines for adolescents in surgeries for clinicians</td>
<td>44 3.82 2.79</td>
<td>70 3.43 2.64</td>
<td>0.98</td>
<td>114 3.58 2.69</td>
</tr>
</tbody>
</table>

Overall rank according to mean responses.

Table 3: Therapists response to the question “What in your opinion are the most important structures that need to be in place to support provision of preventive care in your clinic? (Please rank them: 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10, with 1 as highly important).”
Considering Groh's [9] stance for improving patient care is to be informed by scientific literature, it may be that respondents did not undertake active CPD per se for preventive care, but, used self-directed learning by reading journal articles or on-line learning activities. Buck and Newton's study [28] found that 87 per cent of dentists read professional journals more than once a month and 10.9 per cent less than once a month, however Barnes et al. [29] review stated it was acceptable as long as the reader was adept at filtering the information. This study found 39.3 per cent of respondents used on-line websites to access relevant information; however, Hopcraft et al. [13] reported that Victorian dental practitioners did not rate the internet as a preferred format for CPD. Reynolds et al. [6] discussed the benefits of information communication technology (ICT) and e-learning where ‘students’ have the flexibility of learning at their own pace and in their own time and space. The authors alluded to ‘blended learning’ whereby a combination of face-to-face, simulations and on-line teaching may take place; suggesting major opportunities for Therapists in different settings to participate in clinical preventive care CPD offered via different modes of delivery. There is opportunity for further research, investigating the barriers for Therapists to access paediatric dental specialists to consult on specific clinical cases, as highlighted by LHDs clinical directors and health service manager’s vision to create learning environments among oral health professionals for patient care quality assurance [30].

Eaton and Reynolds' paper [31] discussed and illustrated innovative approaches on how ICT could be maximised in clinical settings, suggesting possibilities for interprofessional learning among dental practitioners in NSW LHDs. However, researchers have raised educational learning concerns associated with on-line learning such as participants’ information technology skills in navigating computer systems, methodology and limitations to clinical learning [29].

Overall, this study found Therapists (87.9%) received most of their preventive care CPD from within the LHDs in which they worked. Furthermore, a fair number of respondents (35.9%) reported receiving preventive care information from their clinical directors. The review by Barnes et al. [29] of CPD for dentists in Europe reported costs, health professional’s work and home, and financial commitments as factors influencing dentists’ participation in CPD. It would therefore appear logical for clinical directors and health service managers to invest and support CPD events for interprofessional education and learning within their LHDs for overall cost efficiency benefits. Bullock et al. [17] discussion paper refers to group learning, and hands on courses being popular with practical tips and information on new materials. The authors [17] stated that: ‘dentists are practical people who want practical courses’. A study assessing the factors influencing healthcare leaders to enhance Therapists’ offer of preventive care to adolescents, reported that creating learning environments for Therapists across the LHD oral health professional teams was a key strategy [30].

Therapists in this study reported that it was important to engage in 6 monthly peer reviews as a strategy to enhance their ability to provide preventive care to adolescents. Bullock et al. [17] discussed the value of collaborative clinical audit and peer review to identify the needs of dental practitioners and alluded to such benefits as providing a framework for clinical facilitators to plan focused local short courses for small groups. The authors stated that clinical audits and peer reviews are fundamental processes that could be used to develop more comprehensive structured CPD, and could be linked to an assessment of their impact on practice.

A recent paper [29] reported that peer review and self-assessment are recommended components for CPD to identify areas for improvement, encompassing self-reflection as a key factor in potentially changing clinical practice. Interestingly, this study found that respondents reported that there was a lack of time to reflect on their clinical practice, indicating an area for further investigation.

Although there appears to be little information available for oral health practitioners learning in workplaces, Simpson and Freeman's [32] paper on reflective practice and experiential learning tools for continuing professional development provided information for oral health teams and health managers to implement performance appraisals which should include strategies to enhance health professional's workplace health and patient safety.

The findings from this study suggest there are opportunities for NSW LHD clinical directors, as health care leaders, to provide focused clinical preventive care advice for Therapists, with interprofessional educational learning opportunities using evidence-based quality improvement and clinical governance mechanisms [33,34].

Caution in the interpretation of the findings for generalised use should be exercised, as the results demonstrated no significant tendencies towards enablers or constraints to the statements posed, or significant variations towards which structures or processes were more effective than others to support Therapists to provide preventive care for adolescents. However, as reported in this study, it may be due to the lack of time for clinicians to reflect on their clinical practices.

**Conclusion**

This study has shown that continuing professional development opportunities should be explored for Therapists to receive education within their Local Districts provided by visiting dental specialists, clinical directors, senior staff dentists and supported by health managers.

This study has shown that one third of Therapists had received less than 5 hours CPD in the last 2 years on helping adolescents maintain their oral health. In order to support Therapists continuing professional education, interprofessional peer reviews in partnership with dentists, visiting dental specialists, and whole team approaches should be implemented within all LHDs. In addition, the scoping of other modes of education such as the Information Communication Technology are worthy of further investigation.

**Acknowledgments**

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**Author Contributions**

All authors contributed to the study design and drafting of the manuscript. All authors read and approved the final manuscript.

**Conflict of Interest**

The findings from this study are those of the authors and do not reflect the views of the funding agency or NSW Ministry of Health.

**References**

7. Dental Board of Australia: Continuing professional development registration standard.
Chapter 9: Factors that influence the preventive care offered to adolescents accessing Public Oral Health Services, NSW, Australia.
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This chapter investigates the facilitating factors and strategies used by senior therapist clinicians to encourage Therapists to offer clinical preventive care to adolescents. Additionally, opportunities for clinical quality improvement were scoped.

In-depth face to face interviews were undertaken with senior clinicians to record their perceptions and strategies to enhance Therapist’s clinical preventive practices. The respondents alluded to the need for chairside scientific evidenced based protocols in contrast to NSW Health policies that were too broad for translation into everyday clinical practice.

The study in this chapter is published in the Journal of Adolescent Health, Medicine and Therapeutics.

Angela V Masoe, Anthony S Blinkhorn, Jane Taylor, Fiona A Blinkhorn

Factors that influence the preventive care offered to adolescents accessing Public Oral Health Services, NSW, Australia,

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If you have any questions, have a concern or complaint about the facilitation of the focus group, or would just like more information, please feel free to contact:

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Further, research has been approved by the Hunter New England Human Research Ethics Committee of Hunter New England Local Health District, Reference 12/02/15/5.04

Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researcher, or, if an independent person is preferred, to Dr Nicole Gerrand, Manager Research Ethics and Governance, Hunter New England Local Health District, Locked Bag 1, New Lambton, NSW, 2305, Telephone (02) 49214950, email: Henhrec@hnehealth.nsw.gov.au

We greatly appreciate your time and contributions.

SIGNATURE OF SUPERVISORS AND INVESTIGATOR

A/Prof. Fiona. A. Blinkhorn A/Prof. Jane. Taylor Ms. A. Masoe

CO-AUTHORS' STATEMENT CONFIRMING AUTHORSHIP CONTRIBUTION

This is to certify that the manuscript entitled 'Factors which influence the preventive care offered to adolescents accessing Public Oral Health Services, NSW Australia' submitted by Angela V Masoe in partial fulfilment of the requirements for the degree of Doctor of Philosophy (Oral Health) is the result of the following contributions:

- Angela V Masoe designed the interview questions, recruited the participants, collected the data, organised the data analysis, drafted the manuscript, managed the submission and responded to the reviews.

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Factors that influence the preventive care offered to adolescents accessing Public Oral Health Services, NSW, Australia

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Background: Many adolescents are at risk of dental caries and periodontal disease, which may be controlled through health education and clinical preventive interventions provided by oral health and dental therapists (therapists). Senior clinicians (SCs) can influence the focus of dental care in the New South Wales (NSW) Public Oral Health Services as their role is to provide clinical support and advice to therapists, advocate for their communities, and inform Local Health District (LHD) managers of areas for clinical quality improvement. The objective of this study was to record facilitating factors and strategies that are used by SCs to encourage therapists to provide preventive care and advice to adolescent patients.

Methods: In-depth, semistructured interviews were undertaken with 16 SCs from all of the 15 NSW LHDs (nine rural and six metropolitan). A framework matrix was used to systematically code data and enable key themes to be identified for analysis.

Results: All SCs from the 15 NSW Health LHDs participated in the study. Factors influencing SCs' ability to integrate preventive care into clinical practice were: 1) clinical leadership and administrative support, 2) professional support network, 3) clinical and educational resources, 4) the clinician's patient management aptitude, and 5) clinical governance processes. Clinical quality improvement and continuing professional development strategies equipped clinicians to manage and enhance adolescents' confidence toward self-care.

Conclusion: This study shows that SCs have a clear understanding of strategies to enhance the therapist's offer of scientific-based preventive care to adolescents. The problem they face is that currently, success is measured in terms of relief of pain activities, restorations placed, and extraction of teeth, which is an outdated concept. However, to improve clinical models of care will require the overarching administrative authority, NSW Health, to accept that the scientific evidence relating to dental care has changed and that management monitoring information should be incorporated into NSW Health reforms.

Keywords: preventive oral health care, scientific evidence, dental therapists and oral health therapists' clinical practice

Background
Oral health is integral to general health. Good oral health enables people to communicate effectively, have optimal quality of life, and maintain positive self-esteem and social self-confidence. However, adolescents are at risk of developing dental caries and periodontal disease because many tend to have high-sugar diets, poor oral hygiene practices, and limited use of fluoride toothpaste; use tobacco, alcohol, and other drugs; and have unique social and psychological needs.

Australian epidemiological studies have reported that approximately 50% of adolescents suffer from dental caries, with increased prevalence among disadvantaged
groups and those residing in rural and remote regions.\textsuperscript{5,7} These problems highlight the importance of ensuring that adolescents accessing public oral health services are offered clinical preventive care such as protective sealants for indicated permanent teeth and fluoride applications.\textsuperscript{2,8–11} Modifications in adolescents’ health behaviors can assist in preventing oral diseases by reducing the frequency of sugary foods and drinks intake, brushing teeth and gums twice a day with fluoride toothpaste, drinking fluoridated tap water, reducing alcohol intake, ceasing tobacco use, and participating in regular professional oral health checkups.\textsuperscript{7} However, researchers have reported an existing gap between scientific advances and their clinical application.\textsuperscript{12,13}

Researchers\textsuperscript{14–22} recommend the following preventive care strategies for patients at risk of developing dental disease:

- Dietary advice (including drinks)
- Oral hygiene education
- Clinical fluoride treatments
- Protective sealants for indicated permanent teeth
- Personalized oral health review time frame for high-risk individuals
- Smoking cessation brief intervention
- Use of motivational interviewing (MI) techniques.

Common obstacles about the knowledge translation of evidence-based preventive care into clinical practice included time factors, remuneration for the implementation of preventive evidence-based practice by health practitioners, and psychosocial factors of dental professionals and patients.\textsuperscript{23–25} The primary focus of any oral health care system should be prevention, considering the important links between oral disease and obesity, cardiovascular disease, diabetes, oral cancer, and low birth weight aligned with the common risk factor principles.\textsuperscript{1,26,27}

In the State of New South Wales (NSW), the Ministry of Health is the system administrator and purchaser, funding the Local Health Districts (LHDs) responsible for delivering health services required to address local community needs.\textsuperscript{28,29} The NSW Public Oral Health Services provide a range of services. Clinical preventive care and oral health promotion (OHP) focused on addressing the social determinants of disease, offering free oral health care to eligible patients (on government health care benefits) according to criteria that prioritize emergency situations, those in pain, and those living in deprived areas of the State.\textsuperscript{28,29}

All adolescents in NSW are eligible for free public oral health care provided by dental therapists and oral health therapists through primary community health, hospital, and school settings.\textsuperscript{28} Dental therapists and oral health therapists registered with the Dental Board of Australia provide clinical dental treatment and preventive oral health care for all children and adolescents under the age of 18.\textsuperscript{30} Oral health therapists have advanced hygienist skills that enable them to provide hygiene services for eligible patients above 18 years of age as prescribed by a registered dentist.\textsuperscript{30} The term “therapists” will be used from here onward to describe both groups unless indicated otherwise. Therapists in public health settings are well placed to offer preventive advice and care to control dental caries and periodontal disease for adolescents, as clinical prevention is a key performance indicator.\textsuperscript{26,31} Therapists have an established consultative and collaborative clinical working relationship with dentists and pediatric dental specialists.\textsuperscript{32}

Professional clinical leadership support for therapists is provided by senior clinicians (SCs) in each LHD in accordance with the NSW Health oral health therapist award\textsuperscript{33} and NSW Health-specific oral health policies.\textsuperscript{34–35} These SCs, in addition to undertaking clinical care, also provide advice to health service managers regarding the development and provision of evidence-based clinical services and patient-centered models of care.\textsuperscript{10}

Leadership within organizations is important in influencing workers’ perceptions, response to organizational change, acceptance of health innovations and scientific informed practice.\textsuperscript{36} There is currently little information on how SCs support and empower therapists to integrate published scientific-based preventive care into their daily clinical practice.\textsuperscript{16} For example, placement of fissure sealants, offer of topical fluorides, oral hygiene instruction, dietary counseling, smoking cessation advice, and utilization of MI techniques are means to improve compliance with preventive care advice.\textsuperscript{10,17,19–21,37} Therefore, this study was undertaken to record the strategies and facilitating factors that SCs use to enhance the type and scope of preventive care offered by therapists in their day-to-day dental care of adolescents.

**Methods**

Ethics approval was obtained from lead NSW Health and Research Ethics Committee, Hunter New England LHD: HNEHREC 12/02/15/5.04 and all 15 LHDs.

The study was conducted across the 15 NSW LHDs from September 2012 to April 2013. This study is part of a larger research project investigating the provision of preventive care provided to adolescents accessing NSW Public Oral Health Services. Qualitative in-depth semistructured face-to-face interviews were used to collect the data. All SCs working in each of the 15 LHDs in NSW were invited to
participate in the study. One LHD had two SCs (coastal and hinterland). The interview sessions were conducted in the LHDs where they were most convenient for the participants, and lasted between 45 minutes and 1 hour. The researcher (AVM) who conducted all the interviews had previous oral health qualitative research experience, and was familiar with public oral health organizations. An advisory group of two pediatric dental specialists, an academic oral health advisor and an experienced therapist guiding the study, developed key questions that were tested and further validated in a focus group with therapists. These open questions were used to gain insight into SC participants’ understanding of real workplace situations and processes. The researcher requested each SC to reflect and respond to key open questions on their perceptions of influencing factors and strategies that could support and enhance therapists’ clinical preventive practices (Figure S1). Consent was obtained to record the interviews in order to assist the note taking and support the data collection and analysis.

Categorizing of each participant’s responses to the interview questions occurred immediately after the interviews. Saturation point was reached when responses to the same question plateaued or became repetitive and no new concepts were revealed by later participants.

During the interviews, the majority of the SCs freely offered to showcase dental surgery clinical setups for OHP and preventive care, further providing documentation as evidence to illustrate LHD processes. Although not a grounded theory research study, this technique is aligned with Glaser and Holton’s dictum that all data collected from the setting is relevant to inform the research inquiry.

The qualitative data analysis continued after the face-to-face interview sessions using the thematic analysis inductive approach. Systematic steps pertaining to thematic analysis were followed: 1) familiarization with data by synthesizing all data into a framework matrix using Microsoft Excel, 2) creating codes that identified unique features of the data relevant to the research questions, 3) review and further development of themes as dictated by the collected data, 4) comprehensive, inclusive, and thorough examination of the codes to identify patterns of meaning (generating themes), 5) data were analyzed (by the first author AVM, further critiqued and recategorized by ASB and FAB), interpreted, and a narrative was composed of key themes, and 6) verification of processes by academic principal investigators.

Additionally, techniques adopted to ensure the rigor of this research included: 1) research conducted and supervised by an academic organization advisory group external from the NSW Ministry of Health, 2) audit trails for administration purposes, 3) a note-taking journal used during the interviews and for advisory group reflective narrations throughout the study, 4) summarization and confirmation of key points with participants to conclude the interview session, and 5) consent to recontact the participants for further clarification of any pertinent points during the data analysis stages.

**Results**

All SCs from the 15 NSW Health LHDs (six metropolitan and nine rural) consented to participate in the study. One LHD had two SCs (coastal and hinterland). Preventive care was personally valued by all respondents, as a professional clinical ethos that underpinned their clinical leadership approach at multiple levels. The overarching theme that emerged from participants’ commonly identified responses that were coded and categorized for this study was: “Enhancing therapists’ scientific-based clinical preventive care practice to support adolescents,” with five subthemes described in the following sections as illustrated in Figure 1. However, the subthemes overlapped and were interconnected; consequently, a topic can appear in a number of themes.

**Clinical leadership and health service administration network support**

A clear hierarchical clinical leadership structure (Figure 2) within each LHD was reported essential for communication and implementation of NSW Health policies to inform

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**Figure 1** Influencing factors to enhance the provision of clinical preventive care to adolescents accessing NSW Public Oral Health Services. 

**Abbreviation:** NSW, New South Wales.
and enhance therapists’ preventive clinical practice by all participants. Conferring and collaborating as a professional oral health team at multiple levels (Figure 2) was stated as conducive to the therapist’s ability and compliance to provide preventive care to adolescents.

The majority of SCs reported that they were accountable to clinical directors and health service managers, and reliant on their approval, direction, and support for the implementation of NSW Health preventive policies, scientific evidence clinical care, and OHP activities for therapists (Figure 2).

Although we have a specific oral health promotion (OHP) coordinator who liaises directly with clinical staff regarding clinical preventive programs, my role links clinical care, OHP, management of staffing resources, and education in consultation with our clinical director and health service management team. [SC05]

Fundamental efficient and effective health management and clinical administration processes were important to assist therapists in prioritizing oral health prevention as long-term quality care for adolescents. Challenges with waiting times to access oral health care were reported by 50% of SCs. Triageing systems according to NSW Health Policy, prioritizing “relief of pain” access, often led to motivated adolescents and parents needing much preventive care being placed on low-prioritized waiting lists, and they were often lost to follow-up.41

Nevertheless, 75% of participants reported that the Australian Government Benefit Scheme “Teen Dental Program” (TDP), which provided a preventive voucher for disadvantaged adolescents whose families are eligible for Family Tax A, impacted on some LHDs and shifted the focus to offering the majority of adolescents access to preventive care, irrespective of TDP eligibility.42 All participants reported that many adolescents had difficulties navigating the call center processes to access care; however, dental staff would generally assist adolescents attending to register for dental care if they expressed an interest:

... they come in with their friends for peer support or to check it out, therapists tend to chat to them, bit of apprehension there, often they are interested asking about their teeth so, if they are aged 14 and above, we are flexible, we try and triage them, give them a check-up, preventive chat, why not …. [SC09]

Two participants reported that specific prevention clinics established in consultation with pediatric dental specialists enhanced the integration of preventive care into clinic treatment plans for patients with high levels of dental disease. One rural SC reported that recently appointed oral health therapists
and rural clinical student placements enabled the LHD to set up a “prevention clinic” that focused on adolescents. This was also a useful revenue-raising activity allowing TDP vouchers to be utilized for adolescent care. In addition, this enabled the establishment of referral pathways to prioritized dental care for high-risk adolescents identified by community and allied health professionals such as Aboriginal health educators, diabetes educators, and drug and alcohol agencies.

In rural settings, the rostering of mobile clinics, and better utilization of community clinics to be aligned with school holidays and clinical staff leave were critical to providing efficient oral health care services to adolescents and their communities. In two rural settings, staff endeavored to provide much needed preventive care to adolescents in centrally placed schools, typically for the initial visit, as patient travel and access needed to be coordinated with mobile van schedules.

Professional oral health workforce

Approximately 50% of the participants believed that the efficient integration of preventive care into clinical practice hinged upon an adequate therapist to dental assistant ratio working in the clinics. The efficient utilization of dental assistants at the chairside for oral health education and the full utilization of available clinical dental surgery chairs supported preventive care activities. However, the clinician’s operative clinical activities to meet health service funding accountability were a priority. For example, emergency and relief of pain-type activities such as teeth extractions and restorative treatment carried more funding weight compared with preventive clinical care such as placement of protective fissure sealants on identified permanent teeth and simple therapeutic fluoride application treatments. Additionally, oral hygiene instruction and dietary and smoking cessation advice had lower funding values. Common narratives were:

Training of dental assistants in oral health promotion has been approved by management to support clinicians. However, chairside assistant duties [assisting dentist or therapist for operative treatment] take precedence over education and oral health promotion activities. Clinical treatment activities have more funding weight and accountability compared to prevention. [SC015]

Three participants stated that specific preventive clinical protocols that had been developed in consultation with pediatric dental specialists and a periodontist enhanced the therapists’ clinical practice. Two participants commented that their preventive clinical protocols were aligned with that of a major dental teaching hospital’s pediatric unit; with one respondent reporting that therapists in their LHD participated in a fissure sealant randomized clinical trial led by the Head of Oral Health Research for the LHD. This local research study enhanced the therapists’ preventive knowledge and clinical practice, and gave them further encouragement to learn more about preventive care.

Therapists were part of a fissure sealant-randomized clinical trial research study. It provided therapists with knowledge and skills on how to gather clinical evidence, reflect on individual clinical techniques, use of different preventive dental materials and sharing of research findings at a State clinical conference presentation, it was an interesting clinical learning experience [SC011]

A approximately 25% of respondents commented on the therapists’ levels of interest in working with adolescents, particularly in relation to their confidence and competence. There was concern that therapy training schools focused on primary school-aged children and that adolescent care was given little time in the curriculum. However, in multiple-staff clinics, open communication between therapists and dentist team leaders enabled effective sharing of clinical information, and referral pathways to ensure optimal treatment and preventive care for adolescents. The increased recruitment of oral health therapists was seen as advantageous to the health service because the hygienist clinical skill set added value to the dental team, especially in terms of specialized type of oral health self-care.

Clinical resources and oral health products

A approximately 50% of respondents stated that the LHD and NSW Health-funded scientific conferences were the most cost-effective continuing professional development (CPD) strategy for therapists. Several participants mentioned that the increase in numbers of oral health therapists in conjunction with CPD was slowly shifting the emphasis of dental care from a prioritized pain relief, operative dentistry restorative approach to minimal intervention dentistry (less “drill and fill”) and stabilization of a patient’s oral environment and provision of holistic care. This was due to oral health therapists’ academic training being more focused on preventive oral health therapy philosophies in contrast to “surgical cutting/drilling of the tooth” concepts.

A key role for the majority of SCs was advocating for dental chairside preventive resources to support therapists’ clinical preventive care activities. The lack of age-appropriate
literature and teaching aids for adolescents was an overall common concern. All SCs suggested that the Center for Oral Health Strategy (governing State public oral health agency, Figure 1) needed to develop adolescent age-specific oral health education resources for consistency of State health messages. Nevertheless, 75% of respondents stated that State health capital funds enabled the installation of digital imaging for their LHDs, with five respondents also stating that intraoral cameras were installed in their LHD clinics. The updated equipment enabled therapists to incorporate visual clinical digital images of “presenting oral health problems in adolescents’ mouths” [SC015] as starting points to their health education sessions.

Approximately 75% of respondents reported that their LHDs had OHP coordinators (OHPCs) who represented the therapist’s prevention requirements at State level. Approximately 75% of participants referred to OHPCs as pivotal in supporting chairside clinical preventive activities. Four respondents referred to NSW Health OHP initiatives for identified high-risk groups such as Aboriginal groups, youth, and opioid treatment programs that prioritized referral pathways for clinical care, supported with oral health resources as key enablers toward prevention of dental diseases. One rural LHD participant reported that a research-funded project enabling therapists to access free fluoride toothpaste and toothbrushes for disadvantaged families in a non-fluoridated area was a key preventive care strategy for their area. Access to oral health products was reported as being dependent on the approval of purchase orders by health service managers, with cost often a factor in their non-availability. High-fluoride toothpaste, enamel remineralizing products, and mouthrinses were usually not available to clinicians because of their cost. Although fluoride and antibacterial mouthrinses were therapeutic agents commonly used for prevention of dental diseases, 75% of respondents stated that from their perspective, it would be more practical to persuade the therapists to concentrate on providing oral hygiene instruction promoting family fluoride toothpaste for adolescents, rather than confusing the adolescent further with the mouth rinsing concept:

I like to focus on getting adolescents to brush their teeth twice a day with fluoride toothpaste. Mouthrinses, special cases ... we tell them where they can get it. [SC011]

Approximately 25% of participants stated that the numerous oral health products on the market from competing oral health companies created challenges for clinicians as well as patient use. SCs suggested that regular clinical team discussions on scientific evidence for prescribing these products to their patients were therefore necessary. Two SCs provided evidence of oral and dental product charts to guide oral health therapists’ clinical decision making, with one rural SC providing guidelines issued by two separate dental companies.

Two respondents argued that dietary advice given by therapists should be reevaluated by clinical directors, with a view to suggesting that LHDs should fund referrals to dietitians’ sessions. Dietary issues, they explained were a complex area requiring specialist attention, as adolescents at risk of dental caries should be managed by dietitians for long-term health benefits.

Facilitating adolescent’s oral health needs

A advocating for adequate clinical appointment times for therapists to engage with, and form good working relationships with, adolescents was seen as an important part of a SC’s role:

Being strong and stating why therapists need the allocated time. Graduates are coming in as well, if they feel that there’s a kind of unwritten perception that the faster you go, the better you are. So, allowing them the time, and letting them see us do it that longer time. Getting to know their patient and getting to care for their patient is what has to be highest priority [SC013]

Figure 3 illustrates the majority of participants’ views on adolescents’ common oral health concerns, practices, clinical presentations, and their reported preventive solutions. The majority of the respondents referred to disadvantaged adolescents’ psychosocial determinants of oral health being: 1) fear of dentistry, 2) dependence on parents/carers for transport, 3) transient homes and disruption in their young lives, 4) lack of home support, 5) uptake of alcohol, 6) tobacco and drug use, 7) teenage pregnancy, 8) teenage parents seeking assistance for their children developing early childhood dental decay, and 9) other adolescent risk behaviors (resulting in trauma of teeth).

... adolescent age group, surrounded with all this adult external stuff, going through so much change that they can be hard to reach sometimes. Taking up smoking, drinking, drugs ... having an impact on their mouth, rampant caries (dental decay). Attitudes of adolescents can be
Figure 3 Senior clinicians’ perceptions of factors affecting adolescents’ oral health issues and potential solutions.

very challenging. Teenage pregnancy and the father of the child, their children developing early childhood dental caries [SC013]

The majority of respondents also reported adolescents’ mental status and on depression medication as noted in their self-reporting social and medical histories.

Seventy-five percent of respondents stated that adolescent patients tended to lack knowledge of what dental plaque is and how to clean their teeth adequately. The majority of respondents quantified therapists’ need for adequate clinical appointment time to engage with adolescents to understand their needs, provide coaching sessions using MI techniques to teach effective oral hygiene, and link this with dietary and smoking cessation advice.

It is knowing how to best deal with these interesting cases, like a web, different dynamics. It just becomes more complicated but fun, trying to figure them out because when you really do have somebody’s attention at that age, it has lasting ramifications and that’s a joyful thing at work from a preventive perspective [SC013]

Aproximately 25% of respondents argued that trying to change managers’ frame of references on the value of prevention took time, which was disappointing and frustrating. Dental decay and chronic gingivitis were the most common dental problems reported for adolescents, both of which are caused by behavioral issues that require advice and counseling to rectify (Figure 3).

Working with adolescents with low self-esteem is motivating, bringing the change around. Adolescents are compliant when things are clearly explained to them, knowing they are supported until they are confidently making those lifelong changes. We have some real success stories. [SC03]

In six LHDs, saliva testing kits were available to assist with the education processes with just under 75% of participants unable to purchase such kits due to cost restraints.

A dolescents are challenging, we start pitching messages to address the acidity levels of their sports drinks, fizzy drinks, alcohol beverages and link it to what we see in their mouths; plaque [dental] and saliva pH tests, all learning activities for them [SC014]

Athough NSW Health has policies mandating the use of protective sealants for permanent teeth, respondents suggested other effective and efficient options for adolescents, as

<table>
<thead>
<tr>
<th>Psychosocial factors</th>
<th>High-sugar diets</th>
<th>Oral health practices</th>
<th>Clinical preventive solutions (preventive clinical protocols)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low health literacy, problems navigating call center processes</td>
<td>High consumption of sugary foods and snacks</td>
<td>Oral health low priority: poor oral hygiene practices</td>
<td>Oral health education: oral hygiene instruction, drinking more water, dietary and smoking cessation advice using motivational interviewing techniques</td>
</tr>
<tr>
<td>Fear of dentistry</td>
<td>High intake of carbonated soft drinks, sports drinks, energy drinks</td>
<td>Adolescents have active lives, extra sports and education requirements, which compete with attending regular oral health appointments</td>
<td>Topical fluoride varnishes</td>
</tr>
<tr>
<td>Transient homes, carers, and guardians</td>
<td>Increase uptake of alcohol such as cocktails, colored “fruit”-flavored spirit drinks</td>
<td>Do not drink enough water</td>
<td>Use of glass ionomer cements</td>
</tr>
<tr>
<td>Reliant on parents/carers for transport</td>
<td></td>
<td>Increase of adolescent employment from age 14 onward, they have the money to independently purchase tobacco, sugary foods and snacks, or alcohol</td>
<td>Professional cleaning</td>
</tr>
<tr>
<td>Mental health issues, taking medication for depression</td>
<td></td>
<td>Increase of adolescent employment from age 14 onward, they have the money to independently purchase tobacco, sugary foods and snacks, or alcohol</td>
<td>Fissure sealants</td>
</tr>
<tr>
<td>Increase access to social drugs (social groups)</td>
<td></td>
<td>Steady increase of adolescent employment from age 14 onward, they have the money to independently purchase tobacco, sugary foods and snacks, or alcohol</td>
<td>Issuing saliva-enhancing remineralizing products for home use</td>
</tr>
</tbody>
</table>

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parents often agree to further appointments during relief of pain appointments, but tend not to return. The SCs believed topical fluoride varnish should be applied immediately at that initial appointment and that fissure sealants could be applied if the patient returned. This practical option was seen as a way of assisting therapists get through their patient schedules as fluoride varnish can be applied more easily than protective sealants.

Parent commitment to appointment, easier to provide fluoride varnish, more practical than sealants, just not 100% sure they would attend next, for whatever reasons. [SC03]

Many adolescents, seeking an orthodontic assessment, attended the dental service because of concerns about their personal image. However, most did not require an orthodontic referral, but there was scope for therapists to provide preventive advice. This was seen as a positive opportunity to include prevention in the clinical system.

Although the majority of respondents stated that recall systems were critical to monitor a patient's progress, it was unachievable in most LHDs, because it was dependent on public dental demands and waiting lists. Information of where to access dental care was provided to adolescents and parents at the completion of treatment, and guidance was offered when their eligibility to free public dental care changed.

Clinical governance
Clinical governance processes such as professional credentialing for registration and evidence of CPD enabled the majority of respondents to communicate effectively with the therapists working in their LHD to enhance their preventive clinical practice. Clinical audits utilizing patient electronic record data were used by six participants to enhance the integration of preventive care into clinical practice. The NSW Health restructure was described as advantageous for several participants as new LHDs were smaller than previous Area Health Services, enabling better communication with clinical staff and bringing managers closer to clinical operational sites.

Just over 25% of participants stated that LHDs were forming new clinical leadership partnerships. The key actions were to evaluate current OHP efforts and link in with clinical preventive care. Examples provided included referrals to therapists arising from community health promotion programs, for example, Aboriginal youth and young mothers’ groups to raise awareness for accessing the public dental services. It was important to ensure current effective community efforts to the participants, but with the caveat that clinical staff should have the capacity to cater for any increased volume of patients.

Peer reviews and clinical auditing identified areas of development for therapists, providing participants with evidence for quality improvement projects, and to ascertain areas for clinical professional development were reported by less than 50% of SCs. Clinical activity was identified by dental treatment item numbers based on The Australian National Dental Schedule System.28

I’m doing clinical audits of 011s [comprehensive oral examination] against preventive items, the usual 131 [dietary advice], 141 [oral hygiene instruction], fissure sealants 161 and their smoking cessation [191]; so, we are also doing training around the interpretation and use of prevention, like what justifies recording a “131 or 141”. [SC014]

All participants stated that professional education would assist therapists 1) clinical behavior management of adolescents and their parents, and 2) clinical management of high caries-risk patients.

Approximately 25% of participants argued that NSW Health preventive policies were ineffective as they were document statements far removed from chairside clinical situations, whereas clinical protocols were systematic in nature, providing practical clinical options to manage adolescents presenting with oral health problems. Two participants provided clinical guidelines for adolescents under 18 years of age, using step-by-step treatment care options for clinical care that assisted therapists to plan appropriate clinical and preventive care.

Discussion
The objective of this study was to record SCs’ views on the facilitating factors and strategies that would assist therapists to offer preventive care to adolescents. This study found that clinical directors’ and health service management support at multiple levels was essential to ensure efficient health administration and clinical processes to enable therapists to provide quality clinical care to patients. Moreover, a clear consultative hierarchical clinical professional structure was perceived pivotal for enhancing communication for the implementation of NSW Health preventive policies, including efforts for the translation of scientific evidence into therapist's clinical practice.

Campbell and Tickle, in their paper on how to improve quality in primary dental care, suggested that a focus on quality across the entire health care system needs to occur if quality improvement is to transpire.37 They also explained that this is because primary care operates within a health care
system delivered by teams within organizations, although care is provided by individual clinicians to individual patients. The authors suggested the need for understanding multilevel approaches for change at the: 1) individual clinician level (eg, therapist), 2) team level (eg, LHD dentist, therapist, dental assistant, and administration), and 3) the organization (LHDs), 4) the larger system (NSW Ministry of Health).

The participants in this study described the impact of the Australian Government TDP on their LHDs’ clinical processes and practices to enhance the levels of dental care for adolescents, activated by the preventive prescriptive nature of the voucher. This suggests that positive changes toward a prioritized preventive care approach should be adopted by NSW Public Oral Health Services governing agency, and supported with clear directives from LHD clinical directors and managers to clinicians. Arons stated that leadership in organizations can importantly influence practitioners’ understandings, reactions, and acceptance to improvements in evidence-based practices. Transformational leadership in dentistry, according to Brocklehurst, is a fundamental process to improve service delivery and quality of care reach to patients, and future improvement for the translation of scientific-based preventive research findings into the therapist's clinical practice.

This study found that efficient utilization of the oral health workforce (administration and dental assistant team members) enabled therapists to support vulnerable adolescents’ access to dental care more effectively. Additionally, the establishment of working partnerships with prioritized referral pathway processes for allied health professionals, such as Aboriginal health and youth workers in support of disadvantaged adolescents groups in some LHDs, suggests that opportunities exist in local communities for therapists to enhance OHP activities to address adolescents’ social determinants of health aligned and consistent with researchers’ recommendations.

Freeman highlighted the importance of dental health professionals being acquainted with the psychosocial determinants of a patient’s health behaviors, as it provides clinicians with an insight of the struggles patients are experiencing when complying with the dental health care advice. Participants in this study made reference to adolescent’s struggles and levels of skills and knowledge toward self-care. Freeman further alludes to dental health professionals’ psychosocial influences such as their own health beliefs, attitudes which may influence the patients’ capacity to adhere to the dental health messages.

Wallerstein’s report on the evidence of the effectiveness of empowerment to improve health discussed youth and family empowerment strategies that have enhanced disadvantaged youths’ self-care management of their health problems, modifying risk behaviors, and building caregivers’ skills and efficacy. Respondents in this study refer to clinical processes and areas for quality improvement to enhance the therapist's capacity to cater for the unique psychosocial needs of vulnerable adolescents and teenage parents, with adequate time as a key-enhancing factor, to engage and encourage adolescents toward oral health self-care. The importance of multilevel professional communication and working partnerships across health professional agencies described in this study, to support therapists address adolescents psychosocial needs, is aligned with Wallerstein’s statements that alliances and “interorganizational partnerships” that engage and promote empowerment by better participation and policy changes have yielded diverse health outcomes. Thus, there is scope for future public oral health research into community empowerment strategies for young teenage parents and their children for long-term health outcomes.

The majority of participants advocated and argued for specific preventive clinical protocols to support and guide therapists to address adolescents’ oral health issues. Stillman-Lowe, in her paper, stated that oral health teams have a pivotal role to provide evidence-based health education information to patients, and that much more support should be provided to oral health professionals to update their clinical practice. The respondents highlighted the lack of adolescent-specific oral health education resources and suggested for the NSW Center for Oral Health Strategy (governing agency) to address this problem. Conversely, participants reported engaging and forming positive working relationships with patients by using digital X-ray images and intraoral photographs, saliva testing activities as effective strategies to communicate and encourage adolescent’s oral health self-care. These strategies are aligned with Blinkhorn’s recommendations to undertake practical demonstrations, as engaging the patient will make advice sessions more interesting and effective; however, further research is necessary to evaluate the efficacy of these interventions in NSW LHDs. It would be advantageous for local oral health teams to allow time during staff meetings to review short scientific articles such as the paper by Stillman-Lowe to generate discussion on the most effective methods of providing health education advice. Ismail et al reported on the findings from a number of expert workshops on various caries management pathways currently available to preserve dental tissues and promote oral
health. The authors acknowledged that scientific evidence had been available for decades on how to manage dental caries, but that little change to clinical practice had occurred. Participants in our study stated that oral disease management system philosophies should be supported in public health settings, and advocated strongly for specific clinical protocols to help the implementation of new clinical knowledge, rather than relying on broad health policy statements that were of little practical value to clinicians working on a day-to-day basis with patients.

For example, Evans and Dennison’s caries management system (CMS) provides a clinical protocol that presents an evidence-based preventive strategy for children and adolescents. A specific odontogram, using the International Caries Detection and Assessment System (ICDAS) coding, illustrates ten clear steps for clinical actions. Considering CMSs are scientific-based concepts that graduates bring with them into public oral health settings, it is a matter of some concern that NSW Health LHDs have not tested the CMS protocol in the public oral health arena. Jensen et al’s17 Clinical Protocols for Caries Management by Risk Assessment also uses ICDAS coding and provides case scenarios and clinical photographs to guide clinical decision making. Merijohn et al’s49 clinical decision support chairside tools for evidence-based dental practice illustrates how to consolidate scientific evidence to facilitate clinical decision making at the chairside. It also enables efficient and effective translation of knowledge to the patient “at the point of care”. Jensen et al’s17 and Merijohn et al’s49 protocols have not been assessed for their potential value in the NSW Public Oral Health Services. Clinical protocols are valid tools for therapists to enhance preventative clinical practice, suggesting that LHDs’ dental clinical directors and managers should seek advice from the NSW Health Clinical Excellence Commission (CEC), Health Education and Training Institute (HETI), and the Agency for Clinical Innovation (ACI) to assist clinical professional teams develop scientific clinical preventive oral health care models of care for adolescents.

This study has provided evidence that SCs want to change the focus of clinical care to cater for adolescents’ unique oral health needs. The disappointing finding is that despite the importance of preventive care, our respondents felt that their applicability in public oral health community settings had not been given high priority. The value of the public service is still being measured in terms of access for relief of pain, restorations placed, and extraction of teeth rather than improvements in oral health. Although one LHD reported participation in preventive research activities as creating a learning environment for therapists, the translation of research findings into treatment planning has not been embedded within the NSW Public Oral Health Services, highlighting the concerns raised by Ismail et al, Walsh and Brostek that implementation of a more holistic approach to dental care has been delayed by managerial inertia and a focus on relief of pain and restorative procedures.

It would be prudent for LHDs’ clinical directors to capitalize on visiting pediatric dental specialists and periodontists and tap into their expertise to develop preventive care strategies for adolescents, utilizing the latest available scientific evidence. The LHDs should obtain assistance by linking into sponsored programs available through the NSW Health networks, namely the CEC, ACI, and HETI and build on existing clinical pediatric specialist services. The NSW Health Plan outlines the importance of supporting and harnessing research and innovation, so there is official support for health service redesign.

Clinical governance is an integral part of quality improvement. This study found that clinical auditing of diagnostic and preventive item numbers is one strategy which could communicate and support therapists to enhance their preventive care and advice to patients. Findings from this study illustrate the need for LHDs across NSW to develop auditing tools underpinned by evidence-based clinical protocols to ensure their applicability and usefulness for measuring therapists key performance indicators. Therefore, it is suggested that LHD health care managers and leaders seek the assistance of dental teaching hospitals and academic institutions to develop clinical protocols and evaluate their impact in terms of health outcomes over time.

All NSW LHDs were represented in the study, providing valuable information to inform future policy and clinical guidelines for therapist’s preventive clinical practice. However, studies for comparison with the findings of this research were not available as there is a dearth of research into the professional leadership practice of therapists. Clearly, more confirmatory studies are required.

All SCs from all LHDs consented to participate in the study; however, interviews were conducted during NSW Health restructuring, with four experienced participant SCs reporting that they were in acting roles, and, therefore, generalization of the findings from this study should be used with caution.

**Conclusion**

This research shows that SCs have a clear understanding of the issues involved in realigning a dental service to provide
preventive as well as clinical care. The problem they face is that currently, success is measured in terms of relief of pain activities, restorations placed, and extraction of teeth, which is an outdated concept. However, to change clinical protocols will require the overarching administrative authority, NSW Health, to accept that the scientific evidence relating to dental care has changed, and management monitoring information will have to be redesigned.

Acknowledgments


We thank all NSW Local Health District senior dental therapists and oral health therapist clinicians who consented to participate in this study. We are grateful to clinical directors and health service managers for their approval of and support for the study.

Author contributions

All authors contributed to the design of the study and the preparation and critical revision of the manuscript, and agree to be accountable for all aspects of the study.

Disclosure

The findings from this study are those of the authors and do not reflect the views of the funding body or NSW Ministry of Health. The authors report no other conflicts of interest in this work.

References

35. Cat No. DEN 199.


Supplementary material

1. What do you perceive as facilitators or enablers for therapists to provide clinical preventive care to adolescents accessing your clinic/s (LHD)?
2. What do you perceive as barriers/challenges for therapists to provide clinical preventive care to adolescents accessing your clinic/s (LHD)?
3. How may these barriers be addressed?
4. In your opinion, what are the key support structures that need to be in place in the clinic/s, LHD to support therapists in offering preventive oral health care to adolescents?
5. Who is/would be responsible for actioning these suggestions?
6. Is there anything else you would like to discuss that may have occurred to you, during the interview?
7. Do you have any other questions?

Conclude: summarize with participant responses and provide copy of notes for their record.
(Thank the participant and obtain consent for researcher to recontact participant if further clarification of their responses is required)

Confirm contact details
Telephone number:
Email address:

Figure S1 Interview questions to be explored with senior therapists.
Abbreviation: LHD, Local Health District.
Chapter 10

Conclusions
10.1 Overview of the main findings
The purpose of this thesis was to contribute to a better understanding of the clinical and preventive care offered by Therapists to adolescents accessing NSW Public Oral Health Services. The objectives were:

- To evaluate levels and types of clinical preventive care provided by Therapists to adolescents choosing to access NSW Public Oral Health Services;
- To assess the reliability of Therapists’ clinical preventive care activities reported on the NSW Information System for Oral Health database for re-use in research and clinical quality improvement activities to inform best practice;
- To ascertain influencing factors and strategies for the provision of scientifically based preventive care to adolescents attending Public Oral Health Services as perceived and used by: (i) Therapists; (ii) clinical directors and health service managers; and (iii) senior Therapists as clinical leaders;
- To determine how Therapists assess and plan clinical preventive care for their adolescent patients; and
- To explore Therapists’ participation in continuing professional development focused on clinical preventive care for adolescents.

Despite initial challenges in obtaining Health Research Ethics approval across the State of New South Wales during various stages of health reforms affecting the Local Health Districts, the strength of this research was in obtaining State-wide oral health data at multiple levels for evaluation and analysis, a first in Australia. The main issue during the investigation arose with some clinical governance mechanisms. There is a lack of standardisation of clinical and preventive care auditing tools used for measurement and reporting of Therapists’ activities. Nonetheless, work in progress across the Local Health
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District’s Oral Health Service was reported by participants as part of Australian National Standards Quality Health Standards governance, which identified areas for improvement that will be discussed in the following section.

To evaluate levels and types of clinical preventive care provided by Therapists to adolescents choosing to access NSW Public Oral Health Services.

Clinical and preventive care activity data provided by Therapists for adolescents was obtained from the NSW Health electronic Information System for Oral Health in 2011, for analysis and evaluation. The report on this project was given in Chapter Three and published in the BioMed Central Oral Health Journal.\(^{208}\) The study demonstrated that Therapists provided the majority of clinical care to more than 29,000 adolescents (79.7%) accessing NSW Public Oral Health Services; accounting for 5.5% of the 12 to 17 year olds in all Local Health Districts.\(^{208}\) Variations of clinical preventive care and advice offered to adolescents over this one year period varied from 32% to 55% of Therapists’ clinical activity.

Findings from this study have contributed information for clinical quality improvement consideration at multiple levels of the NSW Public Oral Health Services for better population health outcomes.

To assess the reliability of Therapists clinical preventive care activities reported on the NSW Health Information System for Oral Health database for re-use in research and clinical quality improvement activities to inform best practice.

The integrity of health data to inform clinical quality improvement and re-use for research is paramount.\(^{209}\) Currently an electronic health record database system and paper records are being used to capture clinicians’ clinical activity, this study was undertaken to determine the degree of agreement between the two systems. The report is outlined in Chapter Four and published in the Journal of Public Health Research and Practice.\(^{209}\)
This study demonstrated that more discrepancies occurred in paper records compared to electronic health records. Although the error rate could be deemed by some as insignificant, nonetheless, these deficiencies should be taken into consideration for action if electronic health records data are to be re-used for clinical preventive oral health research, particularly with respect to clinical governance purposes and patient care quality improvement, including staff appraisals and key performance indicators.

**To determine influencing factors and strategies for the provision of scientific based preventive care to adolescents attending Public Oral Health Services as perceived and used by: (i) Therapists; (ii) clinical directors and health service managements; and (iii) senior Therapists as clinical leaders.**

This objective was answered by undertaking three separate studies which will be outlined accordingly in this section.

(i) **To record the factors that influence the provision of preventive oral health care by Therapists to adolescents attending Public Oral Health Services.**

Therapists have a pivotal role in the prevention and promotion of good oral health for adolescents, particularly disadvantaged individuals in rural and remote areas. Three two hour structured focus group sessions were conducted across four Local Health Districts. Sixteen Therapists participated to determine the motivators/enablers to providing oral health care for adolescents in a clinic-based setting; and to record their solutions and strategies to enhance preventive practice. The findings from this study are reported in Chapter Five.²¹⁰

The participants identified self-health values, altruism, professional career satisfaction, clinical ethics and their ability to relate and engage with adolescents as motivators to provide preventive care. They further acknowledged adolescents psychosocial determinants of health factors such as mental health issues, transient home concerns, knowledge of how to access
timely oral health care, transport, oral health literacy and dental phobias impacting on their ability to provide effective preventive care to adolescents.

Therapists believed in the value of preventive oral health care, and the need to reach out, advocate and invest time on preventive care for adolescents, however they reported overwhelming challenges that impacted on their ability to provide this service. Opportunities exist for clinical quality improvement to rethink and re-focus provision of care for adolescents at multiple levels of the NSW Public Oral Health Service, towards a preventive and health promoting service.210

(ii) To assess and record health management factors that influence the development of preventive care to support Therapists.

Leadership in organizations is important in influencing workers’ perceptions, response to organizational change, acceptance of health innovations, and scientific informed practice. Clinical leadership in dentistry is a key component for the transitioning and development of clinician-led services, where local clinicians are encouraged to drive forward a quality agenda with a focus on patient outcomes.204, 205

Building on the information provided by the Therapists in Chapter Five, a qualitative study using in-depth interviews was undertaken to:

- Ascertain NSW Local Health Districts Oral Health Services clinical directors and health service managers perceptions of the factors that could support the delivery of preventive care to adolescents, and to
- Determine the strategies they have utilised to assist Therapists provide clinical preventive care to adolescents.
The findings from the clinical directors and health service managers study is reported in Chapter Six. Oral healthcare managers and leaders supported Therapists in their endeavours to provide preventive care to adolescents, however, although the issues are complex at multiple levels, there is a need for NSW Health as the central administration agency to prioritise and increase/improve the ‘funding weight’ of preventive care to produce the ‘reward’ in terms of activity compared to restorative services.

(iii) Factors which influence Senior Therapists support Therapists to offer preventive care to adolescents attending the Public Oral Health Services, NSW Australia.

Continuing on from the previous study, clinical leadership support provided by senior clinicians within the healthcare organisation demonstrates that clinical supervision and support for oral health professionals is important. These roles have the capacity to inform and advise health service managers on the delivery, planning, implementation, evaluation and reporting on services. Clinical leaders play an important role to identify and support opportunities for improvement in clinical practice, as well as to develop and lead ongoing quality improvement activities with other health professionals.205

Facilitating factors and strategies used by senior Therapist clinicians to encourage Therapists offer clinical preventive care to adolescents were investigated in this study, as well as opportunities for clinical quality improvement. The results from this study are outlined in Chapter Nine.

In-depth face to face interviews were undertaken with senior clinicians to record their perceptions and strategies to enhance Therapists clinical preventive practices. The respondents alluded to the need for chairside scientifically based evidenced protocols in contrast to NSW Health policies that were too broad for translation into their day to day clinical practice. To improve models of care for clinical preventive care, the overarching
administrative authority, NSW Health should accept that the scientific evidence relating to oral health care has changed and management monitoring information should be incorporated into NSW Health reforms. On the other hand, the Local Health Districts have the capacity to build on existing structures, education interventions should be integrated into wider quality improvement programs. Accordingly, clinical directors and health service managers should seek sponsorship through the NSW Health supporting pillars such as the Clinical Excellence Commission, Agency of Clinical Innovation and Health Education and Training Institutes to support the re-design of services to focus on patient-centred care, embracing a preventive care philosophy.16, 17

To determine how Therapists assess and plan clinical preventive care for their adolescent patients.

To determine how Therapists assess and plan clinical preventive care for their adolescent patients, a cross sectional survey was undertaken using three clinical vignettes of:

(i) A 14 year old female who presented for a recall appointment because of concerns regarding dental caries on one of her upper anterior teeth,
(ii) A 16 year old female patient who presented complaining of a toothache on the lower right hand side of her mouth, and
(iii) A patient with poor oral hygiene undergoing orthodontic treatment.

Therapists were requested to use the clinical vignettes to determine their clinical preventive plans for each patient.

The results of the treatment planning exercise are reported in Chapter Seven in two separate publications. Effective disease management commences with the correct diagnosis. Scientific rationale for the management of oral disease adopting early identification and assessment of potential risk factors through performing individual lifestyle assessments and
clinical diagnostic tests is highly recommended by researchers.\textsuperscript{108,137} The studies illustrated variations in Therapists clinical preventive care approaches in all three case scenarios, highlighting the need for NSW Public Oral Health Services clinical directors, supported by health service managers to provide ongoing continuing professional education on the scientific rationale for managing oral diseases.

**To explore Therapists’ participation in continuing professional development focused on clinical preventive care for adolescents by Therapists.**

Evidence of Continuing Professional Development (CPD) is considered essential for Therapists to provide quality care to their patients, based on the latest scientific evidence.

The study reported in Chapter Eight investigated Therapists’ participation in CPD on clinical preventive oral health care specifically for adolescents. The findings demonstrated that CPD opportunities should be developed within the Local Health Districts, and could be provided by visiting dental specialists, clinical directors and senior clinicians and supported by health service managers. Building workforce learning capacity using interprofessional peer reviews and whole team learning approaches, and maximising the Information Communication Technology for rural and remote areas are worthy of further investigation.

**10.2 Implications for action**

The aim of this thesis was to investigate the provision of clinical preventive care provided by Therapists to adolescents accessing NSW Public Oral Health Services. This study has highlighted that there is great potential for building the Therapist workforce capacity to provide timely and appropriate clinical preventive care for adolescents.
Clinical redesign towards clinical preventive oral health care for adolescents

According to Campbell and Tickle\textsuperscript{206} to improve quality in primary dental care there is a need to focus on quality across the entire healthcare system. They explained that this is because primary care operates within a healthcare system delivered by teams within organisations, despite care being provided by individuals to individual patients. Therefore, although NSW Health as the overarching administrative agency is responsible for clinical policy directives\textsuperscript{17}, there are opportunities for each Local Health District to work in collaboration and obtain sponsorship through agencies such as the Agency of Clinical Innovation, Clinical Excellence Commission and Health Education and Training Institute to support and empower frontline clinicians and primary dental care services to redesign their workplace clinical practices and processes. Clinical leaders and health service managers have the capacity, and are encouraged by NSW Health to collaborate with these agencies to redesign identified areas for quality improvement.\textsuperscript{16, 17}

Communication has commenced to scope the feasibility of presenting the findings of this study to the NSW Health Agency of Clinical Innovation as a potential project to redesign a Model of Preventive Oral Health Care for Adolescents in 2016. This innovative project has gained approval, support and sponsorship from the health service manager and clinical director for the Oral Health Clinical Network, Southern NSW and Murrumbidgee Local Health Districts.

Resourcing clinical preventive care for adolescents

A key overall finding from this study highlighted by Therapists, clinical directors, health service managers and senior Therapists was that clinical preventive care at multiple levels required to be adequately resourced. Resourcing clinical preventive care refers to:

\begin{itemize}
  \item Funding ‘weight’ to be reviewed by NSW Health of clinical preventive care activities (item numbers) acknowledging the evidence-based ‘rewards’ in comparison to restorative activities, with a transparent top down drive towards a clinical preventive care philosophy for improved patient health outcomes;
  \item Providing an electronic oral health record system for patient safety and efficiency;
  \item Resourcing administration systems adequately, for efficient and effective access to care processes, enabling the disadvantaged and vulnerable adolescents navigate the health system more readily and easily;
  \item Resourcing efficient and effective appointment rosters to meet the clinical demands for relief of pain, alongside a prioritised preventive care access system for adolescents as demonstrated in several Local Health Districts;
  \item Resource development of scientific based chairside clinical diagnosis and preventive care protocols, underpinned by Continuing Professional Development and clinical governance processes to ensure quality care improvement;
  \item Review the workforce skill set to ensure Therapists are confident and competent in caring for different age groups, as well as discussing the curriculum of Bachelor of Oral Health University programs to deliver graduates with skills in oral health preventive care; and
  \item Utilising and flowing the revenue generated from the Commonwealth funds directly into resourcing preventive clinical oral health care for children and adolescents as assigned by the Federal government for long term oral and general health gains.
\end{itemize}
Clinical redesign towards clinical preventive oral health care for adolescents

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- Providing an electronic oral health record system for patient safety and efficiency;
- Resourcing administration systems adequately, for efficient and effective access to care processes, enabling the disadvantaged and vulnerable adolescents navigate the health system more readily and easily;
- Resourcing efficient and effective appointment rosters to meet the clinical demands for relief of pain, alongside a prioritised preventive care access system for adolescents as demonstrated in several Local Health Districts;
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- Review the workforce skill set to ensure Therapists are confident and competent in caring for different age groups, as well as discussing the curriculum of Bachelor of Oral Health University programs to deliver graduates with skills in oral health preventive care; and
- Utilising and flowing the revenue generated from the Commonwealth funds directly into resourcing preventive clinical oral health care for children and adolescents as assigned by the Federal government for long term oral and general health gains.
Creating learning environments

This thesis consistently referred to the need for Continuing Professional Development for Therapists at all levels. The topics that were important to the participants in the study were:

- Motivational Interviewing techniques for patient (child and parent) management and education,
- Psychology of behaviour management,
- Scientific based evidence for caries management and periodontal disease prevention,
- Clinical governance quality improvement processes,
- Clinical leadership for peer review and support,
- Creating preventive care pathways and services.

Furthermore, the clinical leaders and health service managers highlighted the importance of creating interprofessional learning environments whereby dentists, paediatric dental specialists, dental assistants, Therapists and health service managers share information in order to deliver ‘clinical excellence’ care. To enhance this notion, evidence from this thesis supports the need for ease of access to training and education within Local Health Districts. This study provides the evidence for clinical directors, senior Therapists as clinical leaders and appropriately resourced by health service managers to focus on CPD that supports and enhances Therapists capacity to operationalise scientific based preventive clinical evidence into their day to day clinical practice.

Implications for future research

The NSW Health Plan encourages the undertaking of clinical research to inform improved strategies to deliver appropriate and timely health care to patient and communities.

This study suggests that there is potential for further research:
i. Considering the great advances in technology, introduce an upgraded electronic oral health record system to capture, manage and have the potential to harmonise public oral health electronic data should be evaluated with an added value for interstate comparison of dental services in Australia.  

ii. Using sound research methodologies to develop and pilot clinical guidelines and protocols on the dental and oral health care of adolescents with a group of Therapists so that the clinicians have ownership. Additionally, research projects should be considered and aligned with public health sectors clinical governance processes.

iii. To develop and test Continuing Professional Development preventive oral health care modules for Therapists in partnership with relevant key stakeholders such as visiting paediatric dental specialists, university institutes and other health and education providers.

iv. Scope the feasibility and explore possible sponsorship for post-graduate research opportunities for Therapists working in the public health sector in partnership with university institutes or teaching hospitals as encouraged and supported by the NSW State Health Plan towards 2021. Potential areas identified for public oral health research in addition to the above include:

- community empowerment strategies for adolescents and families
- fiscal impact of the Commonwealth Child Dental Benefit Scheme on eligible patients long term oral health, and
- further confirmatory studies into the professional leadership of Therapists and oral health clinical leaders.
10.3 Conclusion

In conclusion, my research has provided a comprehensive report detailing the findings from an investigation into the provision of preventive care to adolescents accessing the NSW Public Oral Health Services. The thesis contributes new and valuable information to the dental and oral health literature which could help prevent dental caries and periodontal disease. The findings presented illustrate the complexity and multifaceted aspects of primary dental and oral health care, and the organisations responsible for the overall health and welfare of the communities it services.

It is essential to have the right structures and mechanisms in place to measure the efficiency and effectiveness of clinical preventive care provided to adolescents for their long term health gain. It was pleasing to find that Therapists believed they had the potential to make long term differences to the oral health of communities, provided healthcare managers, clinical directors and senior Therapists as clinical leaders offered practical help and sufficient resources to move from emergency to a holistic model of oral health care.
In conclusion, my research has provided a comprehensive report detailing the findings from an investigation into the provision of preventive care to adolescents accessing the NSW Public Oral Health Services. The thesis contributes new and valuable information to the dental and oral health literature which could help prevent dental caries and periodontal disease. The findings presented illustrate the complexity and multifaceted aspects of primary dental and oral health care, and the organisations responsible for the overall health and welfare of the communities it services.

It is essential to have the right structures and mechanisms in place to measure the efficiency and effectiveness of clinical preventive care provided to adolescents for their long term health gain. It was pleasing to find that Therapists believed they had the potential to make long term differences to the oral health of communities, provided healthcare managers, clinical directors and senior Therapists as clinical leaders offered practical help and sufficient resources to move from emergency to a holistic model of oral health care.

References


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Appendices
Appendix 1 Ethics approval forms and NSW Chief Medical Officer approval for study data release

Ethics Approval from the Lead Health Research Ethics Committee, the 15 Local Health Districts and the permission from Dr Kerry Chant, Chief Medical Officer to use NSW Oral Health de-identified patient data.
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Ethics Approval from the Lead Health Research Ethics Committee, the 15 Local Health Districts and the permission from Dr Kerry Chant, Chief Medical Officer to use NSW Oral Health de-identified patient data.
2 February 2012

A/Professor F Blinkhorn
Program Convenor Graduate Diploma Dental Therapy
Faculty of Health
School of Health Sciences
University of Newcastle
PO Box 127
Ourimbah NSW 2258

Dear Professor Blinkhorn,

Re: Model of Preventive Oral Health Care for Adolescents

HNEHREC Reference No: 12/02/15/5.04
NSW HREC Reference No: LNR/11/HNE/495
NSW SSA Reference No: LNRSSA/11/HNE/496

Thank you for submitting the above protocol for single ethical review for a multi-centre study. This project was considered to be eligible to be reviewed as Low and Negligible risk research and so was reviewed under the by the Hunter New England Human Research Ethics Committee expedited process at an executive meeting held on 1 February 2012. This Human Research Ethics Committee is constituted and operates in accordance with the National Health and Medical Research Council’s National Statement on Ethical Conduct in Human Research (2007) (National Statement) and the CPMP/ICH Note for Guidance on Good Clinical Practice. Further, this Committee has been accredited by the NSW Department of Health as a lead HREC under the model for single ethical and scientific review. The Committee’s Terms of Reference are available from the Hunter New England Local Health District website: http://www.hnehealth.nsw.gov.au/Human_Research_Ethics.

I am pleased to advise that following acceptance under delegated authority of the requested clarifications and revised Email Cover Letter, Information Statements and Consent Forms by Dr Nicole Gerrard Manager, Research Ethics & Governance, the Hunter New England Human Research Ethics Committee has granted ethical approval of the above project.

The following documentation has been reviewed and approved by the Hunter New England Human Research Ethics Committee:

- For the Research Protocol (undated);
- For the Information Sheet Consultation/Interview (Version dated January 2012);
- For the Information Sheet Focus Group (Version dated January 2012);
- For the Information Sheet Clinical On-Line Quiz (Version dated January 2012);
- For the On-Line Clinical Quiz Email Cover Letter (Version dated January 2012); and
- For the Themes to be investigated in Focus Groups & Grounded Theory Consultation Type Interviews (undated)

Hunter New England Research Ethics & Governance Unit
(Locked Bag No 1)
(New Lambton NSW 2305)
Telephone (02) 49214 950 Facsimile (02) 49214 818
Email: hnehrec@hnehealth.nsw.gov.au
For the protocol: An investigation of preventive care provided for adolescent accessing NSW Public Oral Health Program: A convergent mixed methods study

Approval has been granted for this study to take place at the following sites:

- Central Coast LHD Dental Clinics
- Far West LHD Dental Clinics
- Hunter New England LHD Dental Clinics
- Illawarra Shoalhaven LHD Dental Clinics
- Mid North Coast LHD Dental Clinics
- Murrumbidgee LHD Dental Clinics
- Nepean Blue Mountains LHD Dental Clinics
- Northern NSW LHD Dental Clinics
- Northern Sydney LHD Dental Clinics
- South Eastern Sydney LHD Dental Clinics
- South Western Sydney LHD Dental Clinics
- Southern NSW LHD Dental Clinics
- Sydney LHD Dental Clinics
- Western NSW LHD Dental Clinics
- Western Sydney LHD Dental Clinics

Approval from the Hunter New England Human Research Ethics Committee for the above protocol is given for a maximum of 3 years from the date of this letter, after which a renewal application will be required if the protocol has not been completed.

The National Statement on Ethical Conduct in Human Research (2007), which the Committee is obliged to adhere to, include the requirement that the committee monitors the research protocols it has approved. In order for the Committee to fulfill this function, it requires:

- A report of the progress of the above protocol be submitted at 12 monthly intervals. Your review date is February 2013. A proforma for the annual report will be sent two weeks prior to the due date by email.

- A final report must be submitted at the completion of the above protocol, that is, after data analysis has been completed and a final report compiled. A proforma for the final report will be sent two weeks prior to the due date by email.

- All variations or amendments to this protocol, including amendments to the Information Sheet and Consent Form, must be forwarded to and approved by the Hunter New England Human Research Ethics Committee prior to their implementation.

- The Principal Investigator will immediately report anything which might warrant review of ethical approval of the project in the specified format, including:
  - any serious or unexpected adverse events

  - Adverse events, however minor, must be recorded as observed by the Investigator or as volunteered by a participant in this protocol. Full details will be documented, whether or not the Investigator or his deputies considers the event to be related to the trial substance or procedure. These do not need to be reported to the Hunter New England Human Research Ethics Committee.

Hunter New England Research Ethics & Governance Unit
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- Serious adverse events that occur during the study or within six months of completion of the trial at your site should be reported to the Manager, Research Ethics & Governance, of the Hunter New England Human Research Ethics Committee as soon as possible and at the latest within 72 hours.


- Serious adverse events are defined as:
  - Causing death, life threatening or serious disability.
  - Cause or prolong hospitalisation.
  - Overdoses, cancers, congenital abnormalities whether judged to be caused by the investigational agent or new procedure or not.
  - Unforeseen events that might affect continued ethical acceptability of the project.

- If for some reason the above protocol does not commence (for example it does not receive funding); is suspended or discontinued, please inform Dr Nicole Gerrand, as soon as possible.

You are reminded that this letter constitutes ethical approval only. You must not commence this research project at a site until separate authorisation from the Chief Executive or delegate of that site has been obtained.

A copy of this letter must be forwarded to all site investigators for submission to the relevant Research Governance Officer.

Should you have any concerns or questions about your research, please contact Dr Gerrand as per the details at the bottom of the page. The Hunter New England Human Research Ethics Committee wishes you every success in your research.

Please quote 12/02/15/5.04 in all correspondence.

The Hunter New England Human Research Ethics Committee wishes you every success in your research.

Yours faithfully

For: Associate Professor M Parsons
    Chair
    Hunter New England Human Research Ethics Committee

Hunter New England Research Ethics & Governance Unit
(Locked Bag No 1)
(New Lambton NSW 2305)
Telephone (02) 49214 950 Facsimile (02) 49214 818
Email: hnehrec@hnehealth.nsw.gov.au
2 February 2012

A/Professor F Blinkhorn
Program Convenor Graduate Diploma Dental Therapy
Faculty of Health
School of Health Sciences
University of Newcastle
PO Box 127
Ourimbah NSW 2258

Dear Professor Blinkhorn,

Re: Model of Preventive Oral Health Care for Adolescents

HNEHREC Reference No: 12/02/15/5.04
NSW HREC Reference No: LNR/11/HNE/495
NSW SSA Reference No: LNRSSA/11/HNE/496

Thank you for submitting an application for authorisation of this project. I am pleased to inform you that authorisation has been granted for this study to take place at the following sites:

- Hunter New England LHD Dental Clinics

The following conditions apply to this research project. These are additional to those conditions imposed by the Human Research Ethics Committee that granted ethical approval:

1. Proposed amendments to the research protocol or conduct of the research which may affect the ethical acceptability of the project, and which are submitted to the lead HREC for review, are copied to the research governance officer;

Hunter New England Research Ethics & Governance Unit
(Locked Bag No 1)
(New Lambton NSW 2305)
Telephone (02) 49214 950 Facsimile (02) 49214 818
Email: hnehrec@hnehealth.nsw.gov.au
2. Proposed amendments to the research protocol or conduct of the research which may affect the ongoing site acceptability of the project, are to be submitted to the research governance officer.

Yours faithfully

Dr Nicole Garrand
Research Governance Officer
Hunter New England Local Health District
29 June 2012

A/Professor F Blinkhorn
School of Health Sciences
University of Newcastle
PO Box 127
Ourimbah NSW 2258

Dear Professor Blinkhorn,

Re: Model of Preventive Oral Health Care for Adolescents (12/02/15/5.04)

HNEHREC Reference No: 12/02/15/5.04
NSW HREC Reference No: LNR/11/HNE/495
NSW SSA Reference No: LNRSSA/11/HNE/496

Thank you for submitting a request for an amendment to the above project. This amendment was reviewed by the Hunter New England Human Research Ethics Committee. This Human Research Ethics Committee is constituted and operates in accordance with the National Health and Medical Research Council’s National Statement on Ethical Conduct in Human Research (2007) (National Statement) and the CPMP/ICH Note for Guidance on Good Clinical Practice. Further, this Committee has been accredited by the NSW Department of Health as a lead HREC under the model for single ethical and scientific review.

I am pleased to advise that the Hunter New England Human Research Ethics Committee has granted ethical approval for the following amendment requests:

- To conduct the Consultation Interviews using Grounded Theory Principles by digital recording and professional transcribing of consultation/interviews;
- For the Participant Information Sheet Consultation/Interview (Version dated 27 June 2012); and
- For the Participant Consent Form for Consultation/Interview (Version dated 27 June 2012)

For the protocol: **Model of Preventive Oral Health Care for Adolescents**

Approval from the Hunter New England Human Research Ethics Committee for the above protocol is given for a maximum of 3 years from the date of the approval letter of your initial application, after which a renewal application will be required if the protocol has not been completed. The above protocol is approved until **February 2015**.
Approval has been granted for this study to take place at the following sites:

- Central Coast LHD Dental Clinics
- Far West LHD Dental Clinics
- Hunter New England LHD Dental Clinics
- Illawarra Shoalhaven LHD Dental Clinics
- Mid North Coast LHD Dental Clinics
- Murrumbidgee LHD Dental Clinics
- Nepean Blue Mountains LHD Dental Clinics
- Northern NSW LHD Dental Clinics
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- Southern NSW LHD Dental Clinics
- Sydney LHD Dental Clinics
- Western NSW LHD Dental Clinics
- Western Sydney LHD Dental Clinics

The *National Statement on Ethical Conduct in Human Research* (2007) which the Committee is obliged to adhere to, include the requirement that the committee monitors the research protocols it has approved. In order for the Committee to fulfil this function, it requires:

- A report of the progress of the above protocol be submitted at 12 monthly intervals. Your review date is February 2013. A proforma for the annual report will be sent two weeks prior to the due date.

- A final report must be submitted at the completion of the above protocol, that is, after data analysis has been completed and a final report compiled. A proforma for the final report will be sent two weeks prior to the due date.

- All variations or amendments to this protocol, including amendments to the Information Sheet and Consent Form, must be forwarded to and approved by the Hunter New England Human Research Ethics Committee prior to their implementation.

- The Principal Investigator will immediately report anything which might warrant review of ethical approval of the project in the specified format, including:
  - any serious or unexpected adverse events
    - Adverse events, however minor, must be recorded as observed by the Investigator or as volunteered by a participant in this protocol. Full details will be documented, whether or not the Investigator or his deputies considers the event to be related to the trial substance or procedure.

- Serious adverse events that occur during the study or within six months of completion of the trial at your site should be reported to the Professional Officer of the Hunter New England Human Research Ethics Committee as soon as possible and at the latest within 72 hours.

- Copies of serious adverse event reports from other sites should be sent to the Hunter New England Human Research Ethics Committee for review as soon as possible after being received.

- Serious adverse events are defined as:
  - Causing death, life threatening or serious disability.
- Cause or prolong hospitalisation.
- Overdoses, cancers, congenital abnormalities whether judged to be caused by the investigational agent or new procedure or not.
- Unforeseen events that might affect continued ethical acceptability of the project.

- If for some reason the above protocol does not commence (for example it does not receive funding); is suspended or discontinued, please inform Dr Nicole Gerrand, the Manager, Research Ethics and Governance Unit as soon as possible.

The Hunter New England Human Research Ethics Committee also has delegated authority to approve the commencement of this research on behalf of the Hunter New England Local Health District. This research may therefore commence.

Should you have any queries about your project please contact Dr Nicole Gerrand as per the contact details at the bottom of the page. The Hunter New England Human Research Ethics Committee Terms of Reference, Standard Operating Procedures, membership and standard forms are available from the Hunter New England Local Health District website: Internet address: http://www.hnehealth.nsw.gov.au/research_ethics_and_governance_unit

Please quote 12/02/15/5.04 in all correspondence.

The Hunter New England Human Research Ethics Committee wishes you every success in your research.

Yours faithfully

For: Associate Professor M Parsons
Chair
Hunter New England Human Research Ethics Committee
2 February 2012

A/Professor F Blinkhorn
Program Convenor Graduate Diploma Dental Therapy
Faculty of Health
School of Health Sciences
University of Newcastle
PO Box 127
Ourimbah NSW 2259

Dear Professor Blinkhorn,

Re: Model of Preventive Oral Health Care for Adolescents

HNEHREC Reference No: 12/02/15/5.04
NSW HREC Reference No: LNR/11/HNE/495
NSW SSA Reference No: LNRSSA/11/HNE/498

Thank you for submitting an application for authorisation of this project. I am pleased to inform you that authorisation has been granted for this study to take place at the following sites:

- Hunter New England LHD Dental Clinics

The following conditions apply to this research project. These are additional to those conditions imposed by the Human Research Ethics Committee that granted ethical approval:

1. Proposed amendments to the research protocol or conduct of the research which may affect the ethical acceptability of the project, and which are submitted to the 'lead HREC for review, are copied to the research governance officer;

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Hunter New England Research Ethics & Governance Unit
(Locked Bag No 1)
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Email: hnehrec@hnehealth.nsw.gov.au

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2. Proposed amendments to the research protocol or conduct of the research which may affect the ongoing site acceptability of the project, are to be submitted to the research governance officer.

Yours faithfully

Dr Nicole Guérard
Research Governance Officer
Hunter New England Local Health District
12 July 2012

A/Professor Fiona Blinkhorn
Faculty of Health, School of Health Science
University of Newcastle
PO Box 127
Ourimbah NSW 2258

Dear Professor Blinkhorn

Project Title: An investigation of preventive care provided for adolescents accessing NSW Public Oral Health Program: A convergent mixed methods study. (Model of Preventive Oral Health for Adolescents)

Ref Numbers: HNE HREC Ref: 12/02/15/5.04
NSW HREC Ref: LNR/11/HNE/495
NSW SSA Ref: LNRS/11/HNE/496

Thank you for submitting an application for site authorisation for the above research project. I am pleased to inform you that authorisation for:

- Phase 1 - Stage 2: Validation of data, has been granted for this project to take place at Oral Health Services Sites within Northern NSW Local Health District (NNSW LHD)

Authorisation has not been granted for the following:

- Phase 1 – Stage 3: Focus Groups, due to resource issues NNSW LHD Oral Health Services will not be able to participate in the stage of the study.

Authorisation will be considered upon receipt of further documentation and corresponding Ethics approval for the remainder of the project ie:

- Phase 1 - Stage 4: Self completed Postal Survey
- Phase 1 - Stage 5: Ground Theory – consultation type interviews
- Phase 1 - Stage 6: On-Line Clinical Quiz
- Phase 2 - Stage 3: Testing the effectiveness of the new model and guidelines

The following conditions apply to this research project. These are additional to those conditions imposed by the Human Research Ethics Committee (HREC) that granted ethical and scientific approval:

1. Proposed amendments to the research protocol or conduct of research which may affect the ethical or scientific acceptability of the application and are submitted to the approving
HREC for review must be copied to the Research Governance Officer.

2. Proposed amendments which affect the authorised documents / materials for circulation at the sites listed above, or which alter the information submitted in your application for site authorisation, must be submitted to the Research Governance Officer.

If you wish to discuss the above, please do not hesitate to contact me on the numbers below.

Yours sincerely

Janine Holston
Research Governance Officer
Northern NSW LHD

Cc.  Ms Angela Masoe, Investigator, Oral Health services Southern NSW LHD.
Ms Vicki Rose, Chronic and Primary Care Manager Northern NSW LHD
Dr Greg Davlès, Clinical Director Oral Health, Northern NSW LHD
2 February 2012

A/Professor F Blinkhorn
Program Convenor Graduate Diploma Dental Therapy
Faculty of Health
School of Health Sciences
University of Newcastle
PO Box 127
Ourimbah NSW 2258

Dear Professor Blinkhorn,

Re: Model of Preventive Oral Health Care for Adolescents

HNEHREC Reference No: 12/02/15/5.04
NSW HREC Reference No: LNR/11/HNE/495
NSW SSA Reference No: LNRSSA/11/HNE/496

Thank you for submitting an application for authorisation of this project. I am pleased to inform you that authorisation has been granted for this study to take place at the following sites:

- Hunter New England LHD Dental Clinics

The following conditions apply to this research project. These are additional to those conditions imposed by the Human Research Ethics Committee that granted ethical approval:

1. Proposed amendments to the research protocol or conduct of the research which may affect the ethical acceptability of the project, and which are submitted to the lead HREC for review, are copied to the research governance officer;

Hunter New England Research Ethics & Governance Unit
(Locked Bag No 1)
(New Lambton NSW 2305)
Telephone (02) 49214 950 Facsimile (02) 49214 818
Email: hnehrec@hnehealth.nsw.gov.au
2. Proposed amendments to the research protocol or conduct of the research which may affect the ongoing site acceptability of the project, are to be submitted to the research governance officer.

Yours faithfully

Dr Nicole Garrand
Research Governance Officer
Hunter New England Local Health District
13th May 2013

A/Professor Fiona Blinkhorn
Faculty of Health, School of Health Science, University of Newcastle
PO Box 127
Ourimbah NSW 2258

Dear Prof Blinkhorn

Re: Site Amendment Authorisation

HREC Reference Number: LNR/11/HNE/495
Site Reference Number: SSA/12/NCC/62
Project Title: An investigation of preventative care provided for adolescents accessing NSW Public Oral Health Program: a convergent mixed methods study.
Protocol Number: Version 2 dated 15th March 2012

Thank you for submitting an application for an amendment to the above project. I am pleased to inform you that this amendment has been authorised to be implemented in the Dental Services of the Mid North Coast Local Health District.

Documents authorised for distribution at the above site include:
- The Postal Survey Questionnaire, Version 1 (relacing the on-line quiz)

In addition I acknowledge receipt of the following documents:

It should be noted the research project continue as per conditions imposed by the Human Research Ethics Committee and in accordance with the Guidelines for Good Clinical Research Practice in Australia.

Yours Sincerely,

Ms Maureen Lawrence
Research Governance Officer
Mid North Coast Local Health District.

Cc. Ms Angela Masoe, Investigator, Oral Health services Southern NSW LHD.
Ms Catherine Osborne, Area Manager Oral Health MNCLHD
Dr Greg Davies, Clinical Director Oral Health, NNSWLHD
26th July 2012

A/Professor Fiona Blinkhorn
Faculty of Health, School of Health Science, University of Newcastle
PO Box 127
Ourimbah NSW 2258

Dear Prof Blinkhorn

Re: AMENDMENT AUTHORISATION

HREC Reference Number: LNR/11/HNE/495
Site Reference Number: SSA/12/NCC/62
Project Title: An investigation of preventative care provided for adolescents accessing NSW Public Oral Health Program: a convergent mixed methods study.
Protocol Number: Version 2 dated 15th March 2012

Thank you for submitting an application for an amendment to the above project. I am pleased to inform you that this amendment has been authorised to be implemented in the Mid North Coast Local Health District.

Documents authorised for distribution at the above site include:
- Consultation Interviews using Grounded Theory Principles by digital recording and professional transcribing of consultation/interview.
- Participant Information Sheet for Consultation/Interview, Version dated 27th June 2012.
- Participant Consent Form for Consultation/Interview, Version dated 27th June 2012.
- For the themes to be investigated in focus group and grounded theory consultation type interviews, originally undated and now dated January 2012.

In addition I acknowledge receipt of the following documents:
- HREC letter dated 29th June 2012.

It should be noted the research project continue as per conditions imposed by the Human Research Ethics Committee and in accordance with the Guidelines for Good Clinical Research Practice in Australia.

Yours Sincerely
4th July 2012

A/Professor Fiona Blinkhorn
Faculty of Health, School of Health Science
University of Newcastle
PO Box 127
Ourimbah NSW 2258

Dear Prof. Blinkhorn,

Re: SITE RESEARCH AUTHORISATION

HREC Reference Number: LNR/11/HNE/495

Site Reference Number: SSA/12/NCC/62

Project Title: An investigation of preventative care provided for adolescents accessing NSW Public Oral Health Program: a convergent mixed methods study.

Protocol Number: Version 2 dated 15th March 2012

Thank you for submitting an application for site authorisation of the above referenced project. I am pleased to inform you that authorisation has been granted for phase 1 stage 2 of this project to take place in the Mid North Coast Local Health District.

The remainder of the project (Phase 1 stages 3 - 6 and Phase 2 stages 1 - 3) will be considered when more detail available and HREC have approved the survey, interview questions and quiz.

Should the MNCLHD be considered for the focus group I will need to know the number of staff involved and the geographic location of this meeting prior to seeking further management approval for this component.

I acknowledge receipt of the following approved documents:

- HREC approval letter dated 2nd February.
- Information sheet for consultation/interview dated January 2012.

The following conditions apply to this research project. These are additional to those conditions imposed by the Human Research Ethics Committee that granted ethical and scientific approval:
1. Proposed amendments to the research protocol or conduct of the research which may affect the ethical or scientific acceptability of the application and are submitted to the approving HREC for review must be copied to the Research Governance Officer.

2. Proposed amendments which affect the ongoing documents/materials for circulation at the site listed above, or which alter the information submitted in your application for site authorisation, must be submitted to the Research Governance Officer.

3. All Medical Practitioners are to ensure they have adequate Professional Indemnity Insurance to cover clinical trial activity.

If you wish to discuss the above please contact the Research Governance Officer as per details below.

Yours Sincerely

Ms Maureen Lawrence
Research Governance Officer
MNCLHD

Cc. Ms Angela Masoe, Investigator, Oral Health services Southern NSW LHD.
Ms Catherine Osborne, Area Manager Oral Health MNCLHD
Dr Greg Davies, Clinical Director Oral Health, NNSWLHD
11 February 2013

A/Prof. Fiona Blinkhorn
University of Newcastle
Program Convenor Graduate Diploma of Dental Therapy
Faculty of Health
P O Box 127
Ourimbah
2258
Australia

Dear A/Prof. Blinkhorn,

1212-439M: An investigation of preventive care provided for adolescents accessing NSW Public Oral Health Program: A convergent mixed methods study., A/Prof. Fiona Blinkhorn,

I am pleased to inform you that on the 11 February 2013, the delegate of the Chief Executive authorised the Site Specific Assessment for the above study on behalf of Northern Sydney Local Health District (NSLHD).

It is noted that the approval covers the following NSW Health site:
- Central Coast Local Health District

The documentation included in the approval is as follows:
- NSW Low Negligible Risk application submission code AU/6/17CB012 dated 17 January 2012
- HREC approval letter dated 2 February 2012
- Low Negligible Risk Site Specific application submission code AU/7/3DAD08 dated 3 March 2012
- Participant Information Sheet Consultation/Interview (version dated 27 June 2012)
- Participant Consent Form Consultation/Interview (version dated 27 June 2012)
- Information Sheet Clinical On-Line Quiz (version dated January 2012)
- Research Protocol (undated)
- Themes to be Investigated in Grounded Theory Consultation Type Interviews (undated)

At this time, we also remind you that, in order to comply with the Guidelines for Good Clinical Research Practice (GCRP) in Australia, and in line with NSLHD HREC policy, the Chief Investigator is responsible to ensure that:

1. The HREC is notified of anything that might warrant review of the ethical approval of the project, including unforeseen events that might affect the ethical acceptability of the project.
2. The HREC is notified of all Serious Adverse Events (SAEs) or Serious Unexpected Suspected Adverse Reactions (SUSARs) in accordance with the Serious Adverse Event Reporting Guidelines. Please refer to the Research Office website.
3. Proposed amendments to the research protocol or conduct of the research that may affect the ethical acceptability of the project are submitted to the HREC on an amendment form (including any relevant attachments). For multi-centre studies, the Chief Investigator should submit to the Lead HREC and then send the amendment approval letter to the investigators at each of the sites so that they can notify their Research Governance Officer.
4. Proposed changes to the personnel involved in the study are submitted to the HREC on a Change in Personnel Form (accompanied by the investigator’s CV where applicable).

AURED NEAF REF: LNR/11/HNE/495
NSLHD REF NO: 1212-439M,
5. The HREC must be provided with an annual progress report for the study by the 31st October each year. For multi-centre studies the Chief Investigator should submit to the Lead HREC on behalf of all sites. The annual report acknowledgment from the Lead HREC should be submitted to the Research Governance Officer.

6. The HREC must be provided with a final report upon completion of the study. For multi-centre studies the Chief Investigator should notify the Lead HREC and the Investigators at each site should notify the relevant Research Governance Officer.

7. The HREC must be notified, giving reasons if the project is discontinued at a site before the expected date of completion.

Internet: http://www.northernsydneyresearch.com.au

Site Authorisation remains valid until the HREC approval associated with this project expires. It is therefore noted that the Ethics approval for this project will expire on 2 February 2015. Should you require an extension an amendment form should be submitted to the approving HREC. Once approved by the Lead HREC you will need to notify the Research Governance Officer.

Yours sincerely,

Kylie Becker
Governance Officer

RESEARCH OFFICE
NORTHERN SYDNEY CENTRAL COAST HEALTH

AURED NEAF REF: LNR/11/HNE/495
NSLHD REF NO: 1212-439M,
27 May 2013

A/Prof. Fiona Blinkhorn
University of Newcastle
Program Convenor Graduate Diploma of Dental Therapy
Faculty of Health
P O Box 127
Ourimbah
2258
Australia

Dear A/Prof. Blinkhorn,

1212-439M: An investigation of preventive care provided for adolescents accessing NSW Public Oral Health Program: A convergent mixed methods study., A/Prof. Fiona Blinkhorn,

Thank you for your amendment notification dated 3 May 2013 (received 5 May 2013) requesting approval for an amendment from the Research Governance Officer (RGO) of Northern Sydney Local Health District (NSLHD). I am pleased to inform you that your amendment for the protocol on the above study has now been authorised.

The Research Governance Officer acknowledges that the amendment was approved by the Hunter New England Human Research Ethics Committee

The approval includes the following documents:

• Lead HREC Amendment Approval Letter Dated 24 April 2013
• To change the clinical on-line quiz to be a postal survey
• Postal Survey Questionnaire version 1 dated April 2013
• Oral Health Clinical Treatment Planning Scenarios version 1 dated 2013

Thank you for providing updated documentation for acknowledgement.

Yours Sincerely

Kylie Becker
Governance Manager
RESEARCH OFFICE
NORTHERN SYDNEY CENTRAL COAST HEALTH

AURED NEAF REF: LNR/11/HNE/495
NSLHD REF NO 1212-439M,
17 July 2012

A/Prof Fiona Blinkhorn
PO Box 127
Ourimbah NSW 2258

Angela.Masoe@csahs.health.nsw.gov.au

Dear A/Prof Blinkhorn

HREC reference number: LNR/11/HNE/495
SSA reference number: LNRSSA/12/STG/65
Collaborative Group: University of Newcastle

Thank you for submitting a Low and Negligible Risk Research – New South Wales, Site Specific Assessment (SSA) Form for governance review on 9 April 2012 with further documentation received on 7 May and 7 July 2012.

Please quote the above SSA reference number in all correspondence to the Research Governance Officer.

I confirm that the Associate Investigators are: A/Prof Jane Taylor and Angela Masoe.

The following definitions have been given to classify research conducted under this application type:

**Low risk research**
The *National Statement on Ethical Conduct in Human Research 2007* describes research as "low risk", where the only foreseeable risk is one of discomfort. Discomforts may include minor side-effects of medication, discomforts related to measuring blood pressure or anxiety induced by an interview. Where the risk, even if unlikely, is more serious than discomfort, the research is not low risk.

**Negligible risk research**
The *National Statement on Ethical Conduct in Human Research 2007* describes research as "negligible risk" where there is no foreseeable risk of harm or discomfort; and any foreseeable risk is not more than inconvenience to the participants. Inconvenience is the least form of harm that is possible for human participants in research. The most common examples of inconvenience in human research are filling in a form, participating in a survey or giving up time to participate in a research activity. Where the risk, even if unlikely, is more than inconvenience, the research is not negligible risk.

The following documents were submitted for consideration and entered into AURED:

<table>
<thead>
<tr>
<th>Document</th>
<th>Details</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSA LNR Form</td>
<td>AU7/E07C015</td>
<td>13/03/2012</td>
</tr>
</tbody>
</table>

I am pleased to inform you that authorisation has been granted by the Chief Executive (or delegate) for this project to take place at the following site/s:

☐ Oral Health Services
    ☐ South Eastern Sydney Local Health District

SESLHD Research Support Office
St George & Sutherland Hospitals & Health Services
Level 3, James Laws House
St George Public Hospital
Gray Street, KOGARAH NSW 2217
CentralEthics@csahs.health.nsw.gov.au

Telephone: 61 2 91320276  Facsimile: 61 2 9133560

LNRSSA Approval Letter – 1 December 2011
Authorisation is conditional on ethical and scientific approval of the project, which has been granted in line with Policy Directive PD2010_053 Research - Ethical and scientific review of human research in NSW Public Health Organisations.

You are required to provide the Research Support Office with the following details (where applicable) at your earliest convenience:

1. Project commencement date
2. Proposed amendments to the research protocol or personnel which may affect the ongoing site acceptability of the project - these may include budget, risk, staffing and infrastructure issues
3. All authorised documentation from the approving HREC

Yours faithfully,

Lisa Stanton
Research Governance Officer
St George / Sutherland Hospitals and Health Services.

cc.

☐ Dr Kirk Meredith – Oral Health

SSELHO Research Support Office
St George & Sutherland Hospitals & Health Services
Level 3, James Laws House
St George Public Hospital
Gray Street, KOGPAH, NSW 2217
Centre/Ethics@sselhs.health.nsw.gov.au
Telephone: 61 2 911 20223 Fax: 61 2 911 3290

LNR SSA Approval Letter – 1 December 2011
A/Professor Blinkhorn
Program Convener Graduate Diploma Dental therapy
Faculty of Health
School of Health Sciences
University of Newcastle
P O Box 127
OURIMBAH NSW 2258

Dear A/Professor Blinkhorn

HREC project number: 11/HNE/495
Project title: Model of Preventive Oral Health Care for Adolescents

Thank you for submitting a Site-Specific Assessment Form for Low and Negligible Risk Research application for authorisation of the above project. I am pleased to inform you that authorisation has been granted for this study to take place at the following sites:

- Dental Clinics – Illawarra Shoalhaven Local Health District

The following conditions apply to this research project. These are additional to those conditions imposed by the Human Research Ethics Committee that granted ethical approval:

1. Proposed amendments to the research protocol or conduct of the research which may affect the ethical acceptability of the project, and which are submitted to the lead HREC for review, are copied to the research governance officer;
2. Proposed amendments to the research protocol or conduct of the research which may affect the ongoing site acceptability of the project, are to be submitted to the research governance officer.

Yours faithfully

KRISTY PIERCE
Research Governance Officer

4 June 2012

Research Directorate
Level 8, Block C, Wollongong Hospital
(LMB 8808, SCMC NSW 2521)
5th June 2013

A/Professor Fiona Blinkhorn
Faculty of Health, School of Health Sciences
University of Newcastle
PO Box 127
Ourimbah NSW 2258

Dear A/Professor Blinkhorn,

Project Title: An investigation of preventive care provided for adolescents accessing NSW Public Oral Health Program: A convergent mixed methods study.

HREC Reference: LNR/11/HNE/495
SSA Reference: LNRSSA/12/LPOOL/212
Local Project Number: 12/124 LNR

I refer to Angela Masoe’s correspondence of 3rd May 2013 and enclosing the following documentation for the above mentioned study acknowledged by the Hunter New England Local Health District Human Research Ethics Committee on the 24th April 2013 which is noted with thanks.

➢ Postal Survey Questionnaire, Version 1.0, dated April 2013
➢ Treatment Planning Scenarios, Version 1.0, dated 2013

Yours Sincerely,

Merla Ghazal
Acting Manager, Ethics & Research Governance Office
South Western Sydney Local Health District (SWSLHD)
A/ Professor Fiona Binkhorn
Faculty of Health, School of Health Sciences
University of Newcastle
PO Box 127
Ourimbah NSW 2258

Dear A/ Professor Binkhorn,

HREC reference number: LNR/11/HNE/495
SSA Reference number: LNRSSA/12/LPOOL/212
Project number: 12/124 LNR

***SITE SPECIFIC AUTHORISATION***

Thank you for submitting an application (received 22/6/2012) for authorisation of this project. I am pleased to inform you that the Chief Executive has granted authorisation for this study to take place at the following site(s):

- South Western Sydney Oral Health Clinics

The participant documents approved for use at this site are:

- Participant Information Sheet and Consent Form (Clinical Online Quiz), site specific, Version 1.0 dated 15/6/2012
  Based on Master version dated Jan 2012
- Participant Information Sheet and Consent Form (Consultation/ Interview), site specific, Version 1.0 dated 29/8/2012
  Based on Master version dated 27/6/2012

Note: CV’s for A/ Professor Fiona Binkhorn and associated investigators are not required to be submitted for future 2012 projects as there is now one on file.

The following conditions apply to this research project. These are additional to those conditions imposed by the Human Research Ethics Committee that granted ethical approval:

1. Proposed amendments to the research protocol or conduct of the research which may affect the ethical acceptability of the project, and which are submitted to the lead HREC for review, are copied to this office.

2. Proposed amendments to the research protocol or conduct of the research which may affect the ongoing site acceptability of the project, are to be submitted to this office.

3. Please note that you are responsible for making the necessary arrangements (e.g. identity pass; signed confidentiality agreement and vaccine compliance as per NSW Health Policy Directive P2011_005) for any researcher who is not employed by the South Western Sydney Local Health District and is conducting the research on-site.

Yours sincerely,

Merela Ghazal
Acting Manager - Ethics & Research Governance Office
South Western Sydney Local Health District (SWSLHD)
20 May 2013

A/Professor Fiona Blinkhorn
Program Coordinator, Grad. Dip. Dental Therapy
University of Newcastle
PO Box 127
Ourimbah NSW 2258

CC by email: Angela Masoe – program coord. oral health services SNSWLHD and MLHD.

Dear A/Professor Blinkhorn

HREC reference number: LNR/11/HNE/495
SSA reference number: LNRSSA/12/GSAHS/30
Project title: An Investigation of preventive care provided for adolescents accessing NSW Public Oral Health Program: A convergent mixed methods study.

Amendment 2 (change from online to postal survey; addition of oral health treatment plan documentation; addition of new research assistant).

Thank you for submitting for governance review the documentation regarding this amendment. Documentation reviewed:

- HREC approval letter dated 24 April 2013
- Postal survey questionnaire V1
- Oral health treatment planning V1

The above documentation is authorised for use at SNSW LHD sites.

If you have any queries about this amendment or any other matters please contact us on 02 6492 9682 or at gsahs.ethics@gsahs.health.nsw.gov.au

Research Governance resources for Southern NSW LHD staff: select “Clinical Governance”/ then “Research Ethics and Governance” tab.

Yours sincerely

Sally Josh
Research Support Officer
Southern NSW LHD
10 July 2012

A/Professor Fiona Blinkhorn
PO Box 127
Ourimbah NSW 2258

CC by email only: Angela Masoe

Dear A/Professor Blinkhorn

HREC reference number: LNR/11/HNE/495
SSA reference number: LNRSSA/12/GSAHS/30

Amendment number 1

Thank you for submitting for governance review the documentation regarding this amendment. Documentation reviewed:

- Ethical approval letter (approval of use of digital recording of interviews), dated 29 June 2012
- Application form for the amendment dated 27/6/12
- Revised Information sheet dated 27/6/12
- Revised Consent form dated 27/6/12

The above documentation has been noted and kept on file and is authorised for use at Southern NSW LHD sites.

If you have any queries about this amendment or any other matters please contact me on 02 6492 9682 or at gsahs.ethics@gsahs.health.nsw.gov.au

Yours sincerely

Sally Josh
Research & Support Officer
Southern NSW Local Health District

Southern NSW Local Health District
ABN 94 455 894 851
PO Box 1845 Queanbeyan NSW 2620
Tel 02 6213 8333 Fax 02 6269 6353
Website www.gsahs.nsw.gov.au
10 May 2012

A/Professor Fiona Blinkhorn
PO Box 127
Ourimbah NSW 2258

CC by email only: Angela Masoe

Dear A/Professor Blinkhorn

HREC reference number: LNR/11/HNE/495
SSA reference number: LNRSSA/12/GSAHS/30

Thank you for submitting an application for authorisation of this project. I am pleased to inform you that authorisation has been granted for this study to take place at Southern NSW Local Health District oral health sites.

Documents reviewed/authorised for use at the site are as follows
- LNR application form (not included here)
- SSA form dated 9/4/12 and signatures
- Ethical approval letter dated 2/2/12
- Information sheet and consent form for interviews V2, 15/3/12
- Information sheet and consent form for on-line quiz V2, 15/3/12
- Information sheet and consent form for Focus group V2 15/3/12
- Focus group themes V2, 18/3/12
- Research Protocol, ND
- Clinical Review code sheet, ND
- Record review protocol -summary table, ND
- Online quiz email cover letter V2, 15/3/12
- Copy of permission email for survey monkey use dated 09/01/12
- CVs of investigators

The following standard conditions apply to this research project. These are additional to those conditions imposed by the Human Research Ethics Committee that granted ethical approval:

1. Please inform the research governance officer in writing if the project either:
   a. does not commence, or is
   b. subject to significant delays in commencing, or is
   c. discontinued before expected completion.
2. Proposed amendments to the research protocol or conduct of the research which may affect the ethical acceptability of the project, and which are submitted to the HREC for review, must be copied to the research governance officer.

3. Proposed amendments to the research protocol or conduct of the research which may affect the ongoing site acceptability of the project, must be submitted to the research governance officer.

4. Serious or unexpected adverse effects or unforseen events that are reported to the HREC that approved the study should also be reported to the research governance officer.

5. An annual 'site progress report' should be submitted to the research governance officer. The first will be due one year from the date of this letter. An electronic template for this report is attached with the emailed copy of this letter; templates are also available from the research governance officer at gsahs.ethics@gsahs.health.nsw.gov.au

6. NEW in 2012. As part of the standard monitoring process for authorised research, occasional site audits by the Research Governance Officer will be conducted in Southern NSW LHD. If your project/site is randomly selected for an audit you will be given ample notice and instructions.

7. On completion of your study, a copy of the final report, as submitted to the HREC that approved the study, should be forwarded to the research governance officer.

Please note that the 'start date' of this project will be recorded as the date of authorisation (date of this letter). Please email the Research Governance Officer at the address below with an alternative date if you wish a different start date to be recorded.

If you have any queries about this SSA please contact the research governance officer on 02 6492 9682 or email. gsahs.ethics@gsahs.health.nsw.gov.au

Yours sincerely

Sally Josh
Research Governance Officer
Southern NSW and Murrumbidgee Local Health Districts

Enc. Electronic template for Site Progress Report - by email.
11th July 2012

Angela Masoe
Oral Health Program Coordinator
PO Box 729 Collett St,
Queanbeyan
NSW 2620

Dear Angela,

HREC reference number: LNR/11/HNE/495
SSA reference number: SSA/12/GSAHS/31
Project title: Model of Preventative Oral Health Care for Adolescents

Thank you for submitting an application for authorisation of this project. I am pleased to inform you that authorisation has been granted for this study to take place at MLHD.

Documents reviewed/authorised for use at the site are as follows:
- Variation Form Model of Preventative Oral Health care for Adolescents
- Information Sheet for Participants, Version 3
- Variation Form Approval for Consultation and Interview Document
- Consent Form for Participants, Version 3

The following standard conditions apply to this research project. These are additional to those conditions imposed by the Human Research Ethics Committee that granted ethical approval:

1. Please inform the research governance officer in writing if the project either:
   a. does not commence, or is
   b. subject to significant delays in commencing, or is
   c. discontinued before expected completion.

2. Proposed amendments to the research protocol or conduct of the research which may affect the ethical acceptability of the project, and which are submitted to the HREC for review, must be copied to the research governance officer.

3. Proposed amendments to the research protocol or conduct of the research which may affect the ongoing site acceptability of the project, must be submitted to the research governance officer.

4. Serious or unexpected adverse effects or unforeseen events that are reported to the HREC that approved the study should also be reported to the research governance officer.

5. An annual ‘site progress report’ should be submitted to the research governance officer. The first will be due one year from the date of this letter. An electronic template for this report is attached with the
10 May 2012

A/Professor Fiona Blinkhorn
PO Box 127
Ourimbah NSW 2258

CC by email only: Angela Masoe

Dear A/Professor Blinkhorn

HREC reference number: LNR/11/HNE/495
SSA reference number: LNRSSA/12/GSAHS/31

Thank you for submitting an application for authorisation of this project. I am pleased to inform you that authorisation has been granted for this study to take place at Murrumbidgee Local Health District oral health sites.

Documents reviewed/authorised for use at the site are as follows

- LNR application form (not included here)
- SSA form dated 9/4/12 and signatures
- Ethical approval letter dated 2/2/12
- Information sheet and consent form for interviews V2, 15/3/12
- Information sheet and consent form for on-line quiz V2, 15/3/12
- Information sheet and consent form for Focus group V2 15/3/12
- Focus group themes V2, 18/3/12
- Research Protocol, ND
- Clinical Review code sheet, ND
- Record review protocol -summary table, ND
- Online quiz email cover letter V2, 15/3/12
- Copy of permission email for survey monkey use dated 09/01/12
- CVs of investigators

The following standard conditions apply to this research project. These are additional to those conditions imposed by the Human Research Ethics Committee that granted ethical approval:

1. Please inform the research governance officer in writing if the project either:
   a. does not commence, or is
   b. subject to significant delays in commencing, or is
   c. discontinued before expected completion.
2. Proposed amendments to the research protocol or conduct of the research which may affect the ethical acceptability of the project, and which are submitted to the HREC for review, must be copied to the research governance officer.

3. Proposed amendments to the research protocol or conduct of the research which may affect the ongoing site acceptability of the project, must be submitted to the research governance officer.

4. Serious or unexpected adverse effects or unforeseen events that are reported to the HREC that approved the study should also be reported to the research governance officer.

5. An annual ‘site progress report’ should be submitted to the research governance officer. The first will be due one year from the date of this letter. An electronic template for this report is attached with the emailed copy of this letter; templates are also available from the research governance officer at gsahs.ethics@gsahs.health.nsw.gov.au

6. NEW in 2012. As part of the standard monitoring process for authorised research, occasional site audits by the Research Governance Officer will be conducted in Southern NSW LHD. If your project/site is randomly selected for an audit you will be given ample notice and instructions.

7. On completion of your study, a copy of the final report, as submitted to the HREC that approved the study, should be forwarded to the research governance officer.

Please note that the ‘start date’ of this project will be recorded as the date of authorisation (date of this letter). Please email the Research Governance Officer at the address below with an alternative date if you wish a different start date to be recorded.

Please note: A new Research Governance Officer, Sharyn Kelleher, has commenced for Murrumbidgee Local Health District. Please contact her for future reporting and correspondence relating to this SSA on email Sharyn.kelleher@gsahs.health.nsw.gov.au or telephone 6933 9145 or mobile telephone 0417 185 572.

Yours sincerely

Sally Josh
Research Governance Officer
Southern NSW and Murrumbidgee Local Health Districts

Enc. Electronic template for Site Progress Report - by email.
20th May 2013

Ms Angela Masoe
Program Coordinator: Health Development
Oral Health Services
Southern NSW & Murrumbidgee LHDs
Queanbeyan District Hospital
Collett Street
QUEANBEYAN NSW 2620

Dear Ms Masoe,

Western NSW & Far West Local Health Districts
HREC Project No. LNR/11/HNE/495
SSA Application No. LNRSSA/12/GWAHS/29
Amendment No. AM02

An Investigation of Preventive Care Provided for Adolescents Accessing NSW Public Oral Health Program: A Convergent Mixed Methods Study

Site Specific Assessment Application for Low & Negligible Risk Research Amendment Request

Thank you for submitting an amendment for the above project. The Research Governance Officer reviewed your proposal on 20th May 2013.

I am pleased to advise that the Research Governance Officer has granted authorisation for the use of the requested amendments within the Western NSW & Far West Local Health Districts. The following documentation has been reviewed and authorised by the Research Governance Officer:

- Amendment Request – dated 3/5/2013
  - To change the clinical online quiz to be a postal survey

- Oral Health (Postal Survey) Questionnaire – version 1, dated 2013
- Oral Health Clinical Treatment Planning Scenarios – version 1, dated 2013

Should you have any queries regarding your project, please do not hesitate to contact the Western NSW & Far West Local Health Districts Research Governance Officer on (02) 6339 5601 or via email ethics.committee@gwahs.health.nsw.gov.au.

Please quote SSA Reference No. LNRSSA/12/GWAHS/29 in all correspondence.

Yours sincerely

Suzanne Degiorgio
Ethics & Research Governance Officer
Western NSW & Far West Local Health Districts
17th July 2012

Ms Angela Masoe  
Program Coordinator: Health Development  
Oral Health Services  
Southern NSW & Murrumbidgee LHDs  
Queanbeyan District Hospital  
Collett Street  
QUEANBEYAN NSW 2620

Dear Ms Masoe,

Western NSW & Far West Local Health Districts  
HREC Project No. LNR/11/HNE/495  
SSA Application No. LNRSSA/12/GWAHS/29  
Amendment No. AM01

An Investigation of Preventive Care Provided for Adolescents Accessing NSW Public Oral Health Program: A Convergent Mixed Methods Study

Site Specific Assessment Application for Low & Negligible Risk Research Amendment Request

Thank you for submitting an amendment for the above project. The Research Governance Officer reviewed your proposal on 17th July 2012.

I am pleased to advise that the Research Governance Officer has granted authorisation for the use of the requested amendments within the Western NSW & Far West Local Health Districts. The following documentation has been reviewed and authorized by the Research Governance Officer:

- Amendment Request (emailed) – dated 7/7/2012  
  - Consultation interviews using Grounded Theory principles  
  - Digital recording to be used and professionally transcribed by researchers

- Participant Information Sheet for Consultation / Interview (amended) (dated 27/6/2012)

- Participant Consent Form for Consultation / Interview (amended) (dated 27/6/2012)

Population Health Unit  
PO Box 143  
Leve 1, 230 Howick Street  
BATHURST NSW 2795  
Tel: (02) 6339 5601 Fax: (02) 6339 5189
Should you have any queries regarding your project, please do not hesitate to contact the Western NSW & Far West Local Health Districts Research Governance Officer on (02) 6339 5601 or via email ethics.committee@gwahs.health.nsw.gov.au.

Please quote SSA Reference No. LNRSSA/12/GWAHS/29 in all correspondence.

Yours sincerely

Suzanne Degiorgio
Ethics & Research Governance Officer
Western NSW & Far West Local Health Districts
10\textsuperscript{th} May 2012

Ms Angela Masoe  
Program Coordinator: Health Development  
Oral Health Services  
Southern NSW & Murrumbidgee LHDs  
Queanbeyan District Hospital  
Collett Street  
QUEANBEYAN NSW 2620

Dear Ms Masoe,

\textbf{Western NSW \& Far West Local Health Districts}  
HREC Project No. LNR/11/HNE/495  
SSA Application No. LNRSSA/12/GWAHS/29

\textbf{An Investigation of Preventive Care Provided for Adolescents Accessing NSW Public Oral Health Program: A Convergent Mixed Methods Study}

\textbf{Site Specific Assessment Application for Low \& Negligible Risk Research}

Thank you for submitting a site specific assessment application to conduct research within the Western NSW \& Far West Local Health Districts.

I am pleased to inform you that authorisation has been granted for this study to take place at the following sites within the Western NSW \& Far West Local Health Districts:

- Area Manager Oral Health Services
- Dental \& Oral Health Therapists throughout LHDs

The following conditions apply to this research project. These are additional to those conditions imposed by the Human Research Ethics Committee that granted ethical approval:

1. Proposed amendments to the research protocol or conduct of the research which may affect the ethical acceptability of the project, and which are submitted to the lead HREC for review, are copied to the research governance officer;

2. Proposed amendments to the research protocol or conduct of the research which may affect the ongoing site acceptability of the project, are to be submitted to the research governance officer.
Should you have any queries regarding your project, please do not hesitate to contact the Western NSW & Far West Local Health Districts Research Governance Officer on (02) 6339 5601 or via email ethics.committee@gwahs.health.nsw.gov.au.

Please quote SSA Reference No. LNRSSA/12/GWAHS/29 in all correspondence.

The Western NSW & Far West Local Health Districts wish you every success in your research.

Yours sincerely

Suzanne Degiorgio

Ethics & Research Governance Officer

Western NSW & Far West Local Health Districts
17 May 2013

A/Professor Fiona Blinkhorn
School of Health Sciences
University of Newcastle
PO Box 127
Ourimbah NSW 2258

Dear A/Professor Blinkhorn

HREC reference number: LNR/11/HNE/495
SSA reference number: LNRSSA/12/NEPEAN/60

Receipt is acknowledged of Angela Masoe's letter dated 3 May 2013, submitting the following documents for the above mentioned study which will be held on file:

- Copy of curriculum vitae for Rachael Moir, new research assistant to this study.

I am pleased to confirm ongoing governance approval to this study.

Yours faithfully

Yasoda Sathiyaseelan
Research Governance Officer

cc: Angela Masoe, Oral Health Program Coordinator (angela.masoe@geahs.health.nsw.gov.au)
13th May 2013

A/Professor Fiona Blinkhorn
Faculty of Health, School of Health Science, University of Newcastle
PO Box 127
Ourimbah NSW 2258

Dear Prof Blinkhorn

Re: Site Amendment Authorisation

HREC Reference Number: LNR/11/HNE/495
Site Reference Number: SSA/12/NCC/62
Project Title: An investigation of preventative care provided for adolescents accessing NSW Public Oral Health Program: a convergent mixed methods study.
Protocol Number: Version 2 dated 15th March 2012

Thank you for submitting an application for an amendment to the above project. I am pleased to inform you that this amendment has been authorised to be implemented in the Dental Services of the Mid North Coast Local Health District.

Documents authorised for distribution at the above site include:

- The Postal Survey Questionnaire, Version 1 (replacing the on-line quiz)

In addition I acknowledge receipt of the following documents:


It should be noted the research project continue as per conditions imposed by the Human Research Ethics Committee and in accordance with the Guidelines for Good Clinical Research Practice in Australia.

Yours Sincerely

Ms Maureen Lawrence
Research Governance Officer
Mid North Coast Local Health District.

Cc. Ms Angela Masoe, Investigator, Oral Health Services Southern NSW LHD.
Ms Catherine Osborne, Area Manager Oral Health MNCLHD
Dr Greg Davies, Clinical Director Oral Health, NNSWLHD
04 September 2012

A/Professor Fiona Blinkhorn
School of Health Sciences
University of Newcastle
PO Box 127
Ourimbah NSW 2258

Dear A/Professor Blinkhorn

HREC reference number: LNR/11/HNE/495
SSA reference number: LNRSSA/12/NEPEAN/60
Protocol number: undated

Thank you for submitting a Low/Negligible Risk (LNR) application for site authorisation of this project. I am pleased to inform you that site authorisation has been granted for this study to take place at the following sites:

- Nepean Blue Mountains Local Health District Oral Health Administration and Dental Clinics

The approved documents for use at this site are:

- Consultation / Interview - Participant Information Sheet and Consent Nepean Centre for Oral Health version 4 dated 6 July 2012 based on master version dated 27 June 2012

- Focus Group - Participant Information Sheet and Consent Nepean Centre for Oral Health version 4 dated 7 July 2012 based on master version dated January 2012

- Clinical On-line Quiz - Participant Information Sheet and Consent Nepean Centre for Oral Health version 4 dated 7 July 2012 based on master version dated January 2012

- Clinical On-line Quiz email cover letter version dated January 2012

- Themes to be investigated in Focus Groups & Grounded Theory Consultation Type Interviews (undated)
The following conditions apply to this research project. These are additional to those conditions imposed by the Human Research Ethics Committee that granted ethical approval:

1. Non NBMLHD research team members who will be conducting study visits at Nepean Hospital are to organise a time with the Research Governance Officer to sign a confidentiality agreement and obtain ID badge prior to conducting study visits at Nepean Hospital;

2. Proposed amendments to the research protocol or conduct of the research which may affect the ethical acceptability of the project, and which are submitted to the lead HREC for review, are copied to the research governance officer;

3. Proposed amendments to the research protocol or conduct of the research which may affect the ongoing site acceptability of the project, are to be submitted to the research governance officer.

Yours faithfully

Maggie Piper
NBMLHD and WSLHD
Research Governance Officer

c.c Angela Masoe, Oral Health Services, Queanbeyan District Hospital, Collett St, Queanbeyan, NSW 2620
04 September 2012

A/Professor Fiona Blinkhorn
School of Health Sciences
University of Newcastle
PO Box 127
Ourimbah NSW 2258

Dear A/Professor Blinkhorn

HREC reference number: LNR/11/HNE/495
SSA reference number: LNRSSA/12/WMEAD/191
Protocol number: undated

Receipt is acknowledged of Ms Masoe's letter dated 3 May 2013 submitting the following documentation for the above mentioned study which will be held on file:

- HNELHD HREC letter dated 24 April 2013
- Oral Health Clinical are Treatment Planning Scenarios, Version 1
- Oral Health Questionnaire, Version 1 Dated April 2013


I am pleased to confirm ongoing governance approval for this study.

You are reminded that the conditions outlined in your approval letter dated 4 September 2012 continue to apply to this research project.

Yours faithfully

Maggie Piper
WSLHD Research Governance Officer

c.c Angela Masoe, Oral Health Services, Queanbeyan District Hospital, Collett St, Queanbeyan, NSW 2620

15/05/2013
04 September 2012

A/Professor Fiona Blinkhorn
School of Health Sciences
University of Newcastle
PO Box 127
Ourimbah NSW 2258

Dear A/Professor Blinkhorn

HREC reference number: LNR/11/HNE/495
SSA reference number: LNRSSA/12/WMEAD/191
Protocol number: undated

Thank you for submitting a Low/Negligible Risk (LNR) application for site authorisation of this project. I am pleased to inform you that site authorisation has been granted for this study to take place at the following sites:

- Western Sydney Local Health District Oral Health Administration and Dental Clinics

The approved documents for use at this site are:

- Consultation / Interview - Participant Information Sheet and Consent Westmead Centre for Oral Health version 4 dated 7 July 2012 based on master version dated 27 June 2012

- Focus Group - Participant Information Sheet and Consent Westmead Centre for Oral Health version 4 dated 7 July 2012 based on master version dated January 2012

- Clinical On-line Quiz - Participant Information Sheet and Consent Westmead Centre for Oral Health version 4 dated 7 July 2012 based on master version dated January 2012

- Clinical On-line Quiz email cover letter version dated January 2012

- Themes to be investigated in Focus Groups & Grounded Theory Consultation Type Interviews (undated)
The following conditions apply to this research project. These are additional to those conditions imposed by the Human Research Ethics Committee that granted ethical approval:

1. Non WSLHD research team members who will be conducting study visits at Westmead Hospital are to organise a time with the Research Governance Officer to sign a confidentiality agreement and obtain ID badge prior to conducting study visits at Westmead Hospital;

2. Proposed amendments to the research protocol or conduct of the research which may affect the ethical acceptability of the project, and which are submitted to the lead HREC for review, are copied to the research governance officer;

3. Proposed amendments to the research protocol or conduct of the research which may affect the ongoing site acceptability of the project, are to be submitted to the research governance officer.

Yours faithfully

Maggie Piper
NBMLHD and WSLHD
Research Governance Officer

c.c Angela Masoe, Oral Health Services, Queanbeyan District Hospital, Collett St, Queanbeyan, NSW 2620
Associate Professor Fiona Blinkhorn  
Discipline of Oral Health  
University of Newcastle  
Central Coast Campuses  
PO Box 127  
OURIMBAH NSW 2258

Dear Associate Professor Blinkhorn,

I refer to your request for de-identified unit record data relating to the NSW Oral Health Data Collection.

Under clause 18(2) of the Health Administration Regulation 2010, such epidemiological data may be released with my approval. I am pleased to advise that access to the data has been granted for the purposes of projects carried out by the University of Newcastle.

The release of this data is subject to the conditions set out in the enclosed instrument of approval and I ask that you read these conditions carefully. Also attached is confidentiality undertaking which will need to be completed and returned before the data are released.

Should you have any queries about the data release, please contact John Skinner in the Centre for Oral Health Strategy NSW on (02) 8821 4305.

Yours sincerely

Dr Kerry Chant  
Deputy Director-General, Population Health and  
Chief Health Officer

October 2011
CONFIDENTIALITY UNDERTAKING

I, Associate Professor Fiona Blinkhorn, Discipline of Oral Health, University of Newcastle, understand that, in receiving unit record data of the NSW Oral Health Data Collection, I will have access to confidential data, which includes personal and dental information in respect of individual persons.

I undertake strictly to preserve the confidentiality of these data, and understand that the disclosure of information may constitute an offence under section 22 of the Health Administration Act 1982 (attached). I understand that I must comply with the conditions described in the Approval under Clause 16(2) – Disclosure of Information.

I agree to ensure that any staff working on projects using the above data are aware of the provisions of this Undertaking and the need to comply with them. I further agree that any report that is derived from the data will present information in an aggregate form only.

Signed:

in the presence of

(name):

(signature):

(position):

Date:
HEALTH ADMINISTRATION REGULATION 2010

APPROVAL UNDER CLAUSE 16(2) - DISCLOSURE OF INFORMATION

I Kerry Chant, Chief Health Officer of the Department of Health, pursuant to clause 16(2) of the Health Administration Regulation 2010, hereby approve the release of information described in Schedule 1 below, to Associate Professor Fiona Blinkhorn, Discipline of Oral Health, University of Newcastle.

The release of information is subject to the following conditions:

1. the data are to be used only to support projects carried out by the Discipline of Oral Health, University of Newcastle;
2. the data are to be kept in a secure physical and electronic environment that is accessible only by persons directly involved in the above projects;
3. a confidentiality undertaking will be completed prior to the information being released;
4. the NSW Department of Health is to be acknowledged in any publication or report that arises from the use of the data;
5. the data will not be matched with information on individuals from another source;
6. no information will be released with which it may be possible to identify an individual person;
7. individuals identified in the data are not to be personally identified in any publication or report; and
8. this authority continues until and unless it has been revoked in writing.

Signed this .................................. day of ........................................... 2011

Dr Kerry Chant
Chief Health Officer
Appendix 2 Reliability study protocol and template

(Chapter 4)
Dear [Name],

Your assistance is sought for the research activity to validate preventive item numbers entered on ISOH by Dental Therapists/Oral Health Therapists for the calendar year 2011.

I will meet with you at a time convenient for you to outline the validation exercise.

The process is as follows:

1. Using the Patient Tally list provided: access ISOH.
2. On ISOH in the Inquiry Module, using Find Client screen search for patient name.
3. On top of the Inquiry Module Screen (highlighted navy blue) with patient name and Unique ID details confirm 'correct patient' on Patient Tally Sheet.
4. In the Inquiry Module double click in Treatment Module – teal green; this will take you into the Treatment Module Screen.
5. Scroll down to Course of Care beginning with an 'N' for July 2010 to June 2011.
6. Go to Table 2 of this document: Each patient should have a unique 'Code Number' e.g. 001 to 037 under the Local Health District as per Patient Tally Sheet to ensure all sampled patients are completed.
7. Column one has details of Item No.'s on ISOH and the oral health record for patients Course of Care.
8. First, tick (√) the type of Initial Examination provided for the Course of Care e.g. 011, 012, 013 as inserted by clinician if present on ISOH and validate with the Oral Health Record.
9. On ISOH click on Follow-Up appointments of the July 2010 to June 2011 Course of Care and tick (√) for Item No.s as entered on ISOH by clinician.
10. Using patient Oral Health Record validate ISOH items in Course of Care. Validate ISOH data entry by placing tick (√) in oral health record column. Please leave blank if no data entry in either system.

NB.

- If there is an entry in the oral health record and none on ISOH, place tick (√) in the column of the oral health record only.
- In the event an oral health record cannot be found: please insert 'NF' (not found) in Patient Tally Sheet column as shown.
Dear,

Your assistance is sought for the research activity to validate preventive item numbers entered on ISOH by Dental Therapists/Oral Health Therapists for the calendar year 2011.

I will meet with you at a time convenient for you to outline the validation exercise.

The process is as follows

1. Using the Patient Tally list provided: access ISOH
2. On ISOH in the Inquiry Module, using Find Client screen search for patient name.
3. On top of the Inquiry Module Screen (highlighted navy blue) with patient name and Unique ID details confirm ‘correct patient’ on Patient Tally Sheet.
4. In the Inquiry Module double click in Treatment Module – teal green; this will take you into the Treatment Module Screen.
5. Scroll down to Course of Care beginning with an ‘N’ for July 2010 to June 2011.
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7. Column one has details of Item No.’s on ISOH and the oral health record for patients Course of Care.
8. First, tick (√) the type of Initial Examination provided for the Course of Care e.g. 011, 012, 013 as inserted by clinician if present on ISOH and validate with the Oral Health Record.
9. On ISOH click on Follow-Up appointments of the July 2010 to June 2011 Course of Care and tick (√) for Item No.s as entered on ISOH by clinician.
10. Using patient Oral Health Record validate ISOH items in Course of Care. Validate ISOH data entry by placing tick (√) in oral health record column. Please leave blank if no data entry in either system.

NB.
- If there is an entry in the oral health record and none on ISOH, place tick (√) in the column of the oral health record only.
- In the event an oral health record cannot be found: please insert ‘NF” (not found) in Patient Tally Sheet column as shown
### Table 1. PATIENT TALLY SHEET

<table>
<thead>
<tr>
<th>No. of Records</th>
<th>Unique Pat Sys ID (From Centre for Oral Health Strategy)</th>
<th>Patient Name</th>
<th>Date of Birth</th>
<th>Completed Please Tick (√)</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td></td>
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</tbody>
</table>

**SPARES TO BE USED IF CLINICAL ORAL HEALTH RECORD CANNOT BE LOCATED**

S - 25
S - 26
S - 27
S - 28
S - 29
S - 30
S - 31
S - 32
S - 33
S - 34
S - 35
S - 36
S - 37
S - 38
S - 39
S - 40

If oral health record not found insert ‘NF’ and USE SPARES.
TABLE 2. VALIDATION of ISOH and Oral Health Record

<table>
<thead>
<tr>
<th>LOCAL HEALTH DISTRICT</th>
<th>ISOH ITEM No. Data Entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>HUNTER NEW ENGLAND</td>
<td>Please place a tick (√) in Column if Item No. used for patient in the Course of Care.</td>
</tr>
</tbody>
</table>

**PATIENT SYS ID:** 99999

<table>
<thead>
<tr>
<th>DETAILS in Course of Care</th>
<th>Item No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprehensive oral examination</td>
<td>011</td>
</tr>
<tr>
<td>Periodic oral examination</td>
<td>012</td>
</tr>
<tr>
<td>Brief oral examination</td>
<td>013</td>
</tr>
<tr>
<td>Radiographs</td>
<td>022</td>
</tr>
<tr>
<td>Dietary Advice</td>
<td>131</td>
</tr>
<tr>
<td>Oral Hygiene Instruction</td>
<td>141</td>
</tr>
<tr>
<td>Removal of plaque or stain</td>
<td>111</td>
</tr>
<tr>
<td>Remineralising agent (Fluoride applications)</td>
<td>121</td>
</tr>
<tr>
<td></td>
<td>122</td>
</tr>
<tr>
<td></td>
<td>123</td>
</tr>
<tr>
<td>Fissure Sealants</td>
<td>161</td>
</tr>
<tr>
<td>Smoking Cessation</td>
<td>191</td>
</tr>
</tbody>
</table>

**COMMENTS:**

---

**LOCAL HEALTH DISTRICT:** HUNTER NEW ENGLAND

**PATIENT SYS ID:** 99999

<table>
<thead>
<tr>
<th>ISOH ITEM No. Data Entry</th>
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<tbody>
<tr>
<td>Please place a tick (√) in Column if Item No. used for patient in the Course of Care.</td>
</tr>
</tbody>
</table>

**DETAILS in Course of Care**

<table>
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<tr>
<td>011</td>
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<td>161</td>
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<tr>
<td>191</td>
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</tbody>
</table>

**Oral Health Products Issued**

Notes in oral health record only:

Please Tick (√)

**Oral health brochures issued**

Notes in oral health record only:

Please Tick (√)
Appendix 3 Participant information sheet and consent form (focus groups and interviews)

(Chapter 5, 6 and 9)
15th August, 2012

Dear

You are invited to participate in a PhD research study conducted by Ms Angela Masoe (PhD Candidate) from Southern NSW Local Health District in conjunction with Associate Professor’s Fiona Blinkhorn and Jane Taylor from the School of Health Sciences, University of Newcastle. The purpose of the research is to identify barriers and facilitators that currently exist to provide preventive focused clinical oral health care for adolescents accessing the NSW Public Oral Health Program. The project’s population focus is adolescents 12 to 17 years of age in line with most Australian studies. It is proposed that a Model of Preventive Oral Health Care for adolescents be developed and tested as a component of Continuing Professional Development supported with Clinical Oral Health Guidelines for clinicians.

Evidence of Models of Care and Clinical Guidelines for age specific groups exists in other countries eg. United Kingdom, with the current trend to provide sound clinical leadership within the organisation to support implementation and sustainability of proposed programs. This improves the capacity of clinicians to meet policy and clinical practice requirements with clarity of accountability at different levels for the provision of quality oral care for adolescents.

To provide us with in-depth information regarding barriers and facilitators that exist within the NSW Public Child Oral Health Program, we would like to invite you to participate in a 2hr focus group discussion. The Focus Group will be held at

Your participation in this project is completely voluntary. If you wish to withdraw at any stage, or withdraw any of the information you have provided, you are free to do so without prejudice. To withdraw from the research focus group simply inform the research investigator facilitating the session. Your decision not to participate in this research will not affect your current employment.

All information you provide will remain confidential and your identity will be kept anonymous.

The information we collect will be reported in a thesis to the University of Newcastle, may be presented at an academic conference or published in a journal, but will not identify you in any way.

If you would like to participate, please indicate that you have read and understood this information by signing the attached consent form and return to: angela.masoe@gsah.health.nsw.gov.au.

[Contact Information]

If you have any questions, have a concern or complaint about the facilitation of the focus group, or would just like more information, please feel free to contact:

A/Professor Fiona Blinkhorn, Principal Investigator: Phone: (02) 4349 4530 or Mobile No. 0422 768 223

Further, research has been approved by the Hunter New England Human Research Ethics Committee of Hunter New England Local Health District, Reference 12/02/15/5.04

Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researcher, or, if an independent person is preferred, to Dr Nicole Gerrand, Manager Research Ethics and Governance, Hunter New England Local Health District, Locked Bag 1, New Lambton, NSW, 2305, Telephone (02) 49214950, email: Henhrec@hnehealth.nsw.gov.au

We greatly appreciate your time and contributions.
If you have any questions, have a concern or complaint about the facilitation of the focus group, or would just like more information, please feel free to contact:

A/Professor Fiona Blinkhorn,
Principal Investigator: Phone: (02) 4349 4530 or Mobile No. 0422 768 223

Further, research has been approved by the Hunter New England Human Research Ethics Committee of Hunter New England Local Health District, Reference 12/02/15/5.04

Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researcher, or, if an independent person is preferred, to Dr Nicole Gerrand, Manager Research Ethics and Governance, Hunter New England Local Health District, Locked Bag 1, New Lambton, NSW, 2305, Telephone (02) 49214950, email: Henhrec@hnehealth.nsw.gov.au
We greatly appreciate your time and contributions.

SIGNATURE OF SUPERVISORS AND INVESTIGATOR

A/Prof. Fiona. A. Blinkhorn A/Prof. Jane. Taylor Ms. A. Masoe
Consent To Participate
Oral Health Research Study for Adolescents

I hereby give my consent for information I provide to be used in the PhD research study titled: “An investigation of preventive care provided to adolescents accessing NSW Public Oral Health Services: A convergent mixed methods study”.

I understand that the information that I give will be stored and used in a way that does not identify me, and that the results are used for research purposes and may be reported in scientific and academic journals or conferences.

I am giving this consent freely and understand that I can withdraw my consent and any information provided at any stage.

If I have further questions regarding the project I may contact principal investigators:

A/Professor Fiona Blinkhorn: 02 4349 4530
A/Professor Jane Taylor: 02 4349 4545

Full Name: ____________________________________________

Signature: ____________________________________________

Date: ________________________________________________

(Investigator to keep signed copy and leave unsigned copy with respondent)
Information Sheet for the Research Project:  
Model of Preventive Oral Health Care for Adolescents NSW Oral Health Program  
Document Version 27th June 2012

Dear

You are invited to participate in a PhD research study conducted by Associate Professor’s Fiona Blinkhorn and Jane Taylor from the School of Health Sciences, University of Newcastle and Ms Angela Masoe (PhD Candidate) from Southern NSW Local Health District.

The purpose of the research is to identify barriers and facilitators that currently exist to provide preventive focused clinical oral health care for adolescents accessing the NSW Public Oral Health Program. The project’s population focus is adolescents 12 to 17 years of age in line with most Australian studies. It is proposed that a Model of Preventive Oral Health Care for adolescents be developed and tested as a component of Continuing Professional Development supported with Clinical Oral Health Guidelines for clinicians.

Evidence of Models of Care and Clinical Guidelines for age specific groups exists in other countries eg. United Kingdom, with the current trend to provide sound clinical leadership within the organisation to support implementation and sustainability of proposed programs. This improves the capacity of clinicians to meet policy and clinical practice requirements with clarity of accountability at different levels for the provision of quality oral care for adolescents.

To provide us with in-depth information regarding barriers and facilitators that exist within the NSW Public Child Oral Health Program, we would like to invite you to participate in a 30 - 45 minute consultation/interview. Your consent will be sought to have the consultation/interview digitally recorded. The student investigator will contact you by phone to confirm a venue in your Local Health District to conduct the consultation. A convenient time for you within work hours will be negotiated with the investigator.

Your participation in this project is completely voluntary. If you wish to withdraw at any stage, or withdraw any of the information you have provided, you are free to do so without prejudice. To withdraw from the research interview simply inform the research investigator conducting the interview.

Your decision not to participate in this research will not affect your current employment. All information you provide will remain confidential and your identity will be kept anonymous.

The information we collect will be reported in a thesis to the University of Newcastle, and may be presented at an academic conference or published in a journal, but will not identify you in any way.
If you have any questions, have a concern or complaint about the consultation interview process or would just like more information, please feel free to contact:

A/Professor Fiona Blinkhorn,
Principal Investigator: Phone 003A (02) 4349 4530 or Mobile No. 0422 768 223

Further, the research has been approved by the Hunter New England Human Research Ethics Committee of Hunter New England Local Health District, Reference 12/02/15/5.04
Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researcher, or, if an independent person is preferred, to Dr Nicole Gerrand, Manager Research Ethics and Governance, Hunter New England Local Health District, Locked Bag 1, New Lambton, NSW, 2305, Telephone (02) 49214950, email: Henhrec@hnehealth.nsw.gov.au

We greatly appreciate your time and contributions.

A/Prof. Fiona A. Blinkhorn A/Prof. Jane Taylor Ms. A. Masoe
Consent Form

Model of Preventive Oral Health Care for Adolescents NSW Public Oral Health Program
Document Version 3 27th June 2012

I hereby give my consent for information I provide to be used in the PhD research study titled: “An investigation of preventive care provided for adolescents accessing NSW Public Oral Health Services: A convergent mixed methods study”.

I understand that the information that I give will be stored and used in a way that does not identify me, and that the results are used for research purposes and may be reported in scientific and academic journals or conferences.

Digital recording of the consultation/interview has been explained and discussed with me.

I agree to be digitally recorded and may be professionally transcribed (Please tick) □

I do not agree to be digitally recorded. (Please tick) □

I am giving this consent freely and understand that I can withdraw my consent and any information provided at any stage.

If I have further questions regarding the project I may contact principal investigators:

A/Professor Fiona Blinkhorn: 02 4349 4530
A/Professor Jane Taylor: 02 4349 4545

Full Name: ____________________________________
Signature: ____________________________________
Date: _________________________________________

(Investigator to keep signed copy and leave unsigned copy with respondent)
Appendix 4 Qualitative study questionnaire

Questions explored with study participants

1. What do you perceive as facilitators or enablers for therapists to provide clinical preventive care to adolescents attending your clinic/s (LHD)?

2. What do you perceive as barriers/challenges for therapists to provide clinical preventive care to adolescents accessing your clinic/s (LHD)?

3. How may these barriers be addressed?

4. In your opinion, what are the key support structures that need to be in place in the clinic/s, LHD to support therapists offer preventive oral health care to adolescents?

5. Who is/would be responsible for actioning these suggestions?

6. Is there anything else you'd like to discuss that may have occurred to you, during the interview?

7. Do you have any other questions?

CONCLUDE: Summarise with participant responses and provide copy of notes for their record.

(Teach the participant and obtain consent for re-contact for interview clarification)

Confirm contact details

Telephone number:

Email address:
Appendix 4 Qualitative study questionnaire

Questions explored with study participants

1. What do you perceive as facilitators or enablers for therapists to provide clinical preventive care to adolescents attending your clinic/s (LHD)?

2. What do you perceive as barriers/challenges for therapists to provide clinical preventive care to adolescents accessing your clinic/s (LHD)?

3. How may these barriers be addressed?

4. In your opinion, what are the key support structures that need to be in place in the clinic/s, LHD to support therapists offer preventive oral health care to adolescents?

5. Who is/would be responsible for actioning these suggestions?

6. Is there anything else you’d like to discuss that may have occurred to you, during the interview?

7. Do you have any other questions?

CONCLUDE: Summarise with participant responses and provide copy of notes for their record.

(Thank the participant and obtain consent for re-contact for interview clarification)

Confirm contact details

Telephone number:
Email address:
Appendix 5 Participant questionnaire: Part A

(Chapter 7)
Dear Colleague,

You are invited to participate in a research study conducted by Associate Professor’s Fiona Blinkhorn and Jane Taylor from the School of Health Sciences, University of Newcastle and Angela Masoe from Southern NSW and Murrumbidgee Local Health Districts.

The purpose of the research is to identify any barriers and facilitators that may currently exist for Dental Therapists and Oral Health Therapists to provide preventive clinical oral health care for adolescents accessing NSW Public Oral Health Services. The research project population focus is adolescents 12 to 17 years of age, which is in line with most Australian studies.

We are hoping that this research will assist with the formulation of a new model of oral health care that can be used in the Public Oral Health Service with the ultimate goal of improving the oral health of our adolescent patients.

PROCEDURE

If you volunteer to participate in this study, we would ask you to do the following:

1. Complete the attached survey questionnaire.
2. Return it in the enclosed stamped address envelope.

It is estimated that the survey will take on average anywhere from 15 to 20 minutes to complete. All Dental/Oral Health Therapists in NSW Public Oral Health Services are eligible to participate.

Completing the questionnaire is voluntary and there will be no repercussions if you decide not to participate. Your decision not to participate in this research will not affect your current employment.

CONFIDENTIALITY

All information you provide will remain confidential and your identity will be kept anonymous. A protocol is in place to ensure confidentiality of survey data. By completing the survey and returning it in the stamped addressed envelope provided indicates you have consented to participate in this research.

FEEDBACK OF THE RESULTS OF THIS STUDY TO THE SUBJECTS

Once the research is completed a brief report explaining the findings from this study will be available for those interested. This report will be available via the University of Newcastle.

COMPLAINTS ABOUT THIS RESEARCH

The research has been approved by the Hunter New England Human Research Ethics Committee of Hunter New England Local Health District, Reference 12.02.15.5.04. Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researcher, or, if an independent person is preferred, to Dr Nicole Gerrand, Manager Research Ethics and Governance, Hunter New England Local Health District, Locked Bag 1,
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Completing the questionnaire is voluntary and there will be no repercussions if you decide not to participate. Your decision not to participate in this research will not affect your current employment.

CONFIDENTIALITY

All information you provide will remain confidential and your identity will be kept anonymous. A protocol is in place to ensure confidentiality of survey data.

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New Lambton, NSW, 2305, telephone (02) 49214950, email Hnehrec@hnehealth.nsw.gov.au

We do hope that you will be able to participate in this important research. If you would like any further information regarding the study, please contact:

Associate Professor Fiona Blinkhorn
Program Convenor
Graduate Diploma in Dental Therapy
School of Health Sciences
PO Box 127, Ourimbah
NSW 2258, Australia
Telephone: 02 4349 4530          Mobile: 0422 768 223

A/Prof. Fiona Blinkhorn  A/Prof. Jane Taylor  Angela Masoe
1. The Local Health District setting you work in today is:
   □ Metropolitan?
   □ Rural?

2. In a working week, how many clinical sessions (e.g. 1, 2, 3, 4 or 5) do you spend in a:
   □ Single operator clinic (all the time)?
   □ Single operator with Part Time Dental Officer Clinic?
   □ Multi-staffed clinic with Dental/Oral Health Therapists and Dental Officers?
   □ Private Practice Part Time?
   □ Other ____________________________________________________________

3. Are you a:
   □ Dental Therapist
   □ Dental Hygienist
   □ Oral Health Therapist

4. You work as a:
   □ Full Time Employee with NSW Health?
   □ Part Time Employee with NSW Health?
   □ Part Time employee with a Private Practice?
   □ Other ____________________________________________________________

5. Your qualification details are:

<table>
<thead>
<tr>
<th>Award</th>
<th>Year</th>
<th>Place where obtained</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Certificate of Dental Therapy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Diploma of Dental Therapy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Certificate of Dental Hygienist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Diploma of Dental Hygiene</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Bachelor of Oral Health (Hygienist)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Bachelor of Oral Health Therapy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Graduate Diploma of Dental Therapy</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PART A

6. In the last 2 years how many hours of Continuing Professional Development focused on adolescents preventive oral health care have you ever undertaken?

☐ None
☐ Less than 5 hrs
☐ 5 to 10 hrs
☐ More than 10 hrs
☐ Unsure

7. In the past 2 years, where have you received, if any, information on preventive oral health care for adolescents?

You may tick more than one box.

☐ Local Health District In-Services
☐ Clinical Director
☐ Clinical Team Meetings
☐ Staff Meetings
☐ Dental Therapy/Oral Health Therapists Meetings
☐ Professional Dental Journals
☐ On-line dental and oral health websites
☐ External Dental and Oral Health Conferences
☐ NSW Health Dental and Oral Health Conferences
☐ Visiting Corporate Companies
☐ Don’t know/Unsure where to access information
☐ Other _________________________________________________________________________

8. How important do you think clinical preventive care activities (such as fluoride application, diet advice, fissure sealants) is to:

(Please tick (v) )

<table>
<thead>
<tr>
<th>Item</th>
<th>Not at all important</th>
<th>Important</th>
<th>Unsure</th>
<th>Fairly important</th>
<th>Very important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical Director</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Oral Health Director/Manager</td>
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<tr>
<td>Allied Health Manager</td>
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</tr>
<tr>
<td>Senior Dental Officer</td>
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<td></td>
</tr>
<tr>
<td>Dental Officer</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Oral Health Therapist</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Dental Therapist</td>
<td></td>
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</tr>
<tr>
<td>Dental Hygienist</td>
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</tr>
<tr>
<td>Dental Assistant</td>
<td></td>
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</tr>
</tbody>
</table>
9. Please list what, if anything, motivates you to provide preventive care for adolescents:

10. Please place a tick (v) in one of the columns to indicate your level of agreement to each statement:

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engaging with adolescents attending the clinic is easy for me.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Preventive care is provided for all adolescents as part of their full course of care.</td>
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</tr>
<tr>
<td>There is sufficient time in an appointment for me to provide preventive care for adolescents.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>I have confidence providing dietary advice for adolescents.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>I use disclosing solution as an educational tool with adolescents.</td>
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<tr>
<td>I have regular access to evidence-based practice information.</td>
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<tr>
<td>Fluoride toothpaste of different strengths is available to support my oral health education messages.</td>
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</tr>
<tr>
<td>My training and education has given me confidence to work effectively with adolescents.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>I have the opportunity to share new preventive information with my colleagues.</td>
<td></td>
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</tr>
<tr>
<td>Dental Assistants could provide tooth-brushing instructions and give dietary advice to adolescent patients.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Creating a learning environment in the dental clinic for adolescents is important to me</td>
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</tr>
</tbody>
</table>

11. Please list the main barrier(s) for you to provide preventive care for adolescents in a routine dental appointment.
12. Can you offer any solutions to address the barriers you have listed?

13. Some barriers have been identified for Dental/Oral Health Therapists to provide preventive care. Please place a tick (√) in one of the columns to indicate your level of agreement with each statement:

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Waiting Lists is a barrier for me to provide preventive care for adolescents.</td>
<td></td>
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<tr>
<td>‘Relief of Pain’ system prevents me from providing preventive care for adolescents.</td>
<td></td>
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<tr>
<td>I don’t have time for preventive care as adolescents have so many complex restorative needs.</td>
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<tr>
<td>I do not have time to reflect on my clinical practice.</td>
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<tr>
<td>Giving dietary advice to adolescent patients is a waste of time.</td>
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<tr>
<td>My knowledge of evidence-based preventive care for adolescents is inadequate.</td>
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<tr>
<td>Other work demands prevent me from providing preventive care.</td>
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<tr>
<td>There is an overall lack of clinical time to provide preventive care for adolescents.</td>
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</tr>
<tr>
<td>I am not confident to communicate effectively with adolescents.</td>
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<tr>
<td>I find my clinical priorities different to most of my colleagues.</td>
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<tr>
<td>I have difficulties communicating with management why I need longer appointments for adolescents.</td>
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</tr>
<tr>
<td>Dental Assistants sometimes don’t support my spending time on preventive care.</td>
<td></td>
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</tr>
</tbody>
</table>

14. From your experience, what are the usual dental problems adolescents present with?
15. Do you think adolescents are interested in preventive oral health care?

☐ Always
☐ Most of the time
☐ Sometimes
☐ Never

16. On reflection, do adolescents keep their follow-up appointments?

☐ Always
☐ Most of the time
☐ Sometimes
☐ Never

17. What in your opinion are the most important structures that need to be in place to support provision of preventive care in your clinic? (Please rank them: 1 to 10 with 1 being the most important).

_____ Work culture change towards embedded preventive evidence-based practice
_____ Preventive Guidelines for adolescents in surgeries for clinicians
_____ ISOH tagged clinical preventive care appointment times for clinicians.
_____ Process to access oral health products consistently across the Local Health District for adolescents
_____ Clinical Team Leaders to provide ongoing Continuing Education on e.g. Evidence-Based Practice and minimal intervention
_____ Forum for clinicians to discuss different case studies/oral health promotion and education
_____ Implement 6 monthly Clinical Peer Reviews
_____ Referral system for focused ‘prevention session’ with Dental/Oral Health Therapist
_____ Make resources available for ‘interactive’ oral health education at the Chairside e.g. development of age appropriate oral health education resources such as smart phone applications & DVD’s.
_____ Regular team building events to maintain morale and encourage ‘sharing of information’ to improve working partnerships.

Other:
18. Who is (are) the main person/s responsible for ensuring your top 5 priorities are actioned in your Local Health District?

19. Do you have any further suggestions or comments?

THANK YOU FOR PARTICIPATING IN THIS SURVEY

PLEASE

PLACE COMPLETED SURVEY IN RETURN ENVELOPE PROVIDED AND RETURN BY
Appendix 6 Participant questionnaire: Part B

(Chapter 7)
Dear Colleague,

We invite you to participate in a research project looking at how we provide oral health care to adolescents living in New South Wales conducted by Associate Professor’s Fiona Blinkhorn and Jane Taylor from the School of Health Sciences, University of Newcastle and Angela Masoe from Southern NSW and Murrumbidgee Local Health Districts. The scenarios focus on current knowledge and practices of Dental Therapists and Oral Health Therapists as they are important providers of care to young people.

We do hope that you can join us as there is very little research undertaken by our professional group and this is an opportunity to develop a Model of Oral Health Care for Adolescents we can all have ownership of.

PROCEDURE

If you volunteer to participate in this study, we would ask you to do the following:

1. Complete the attached survey questionnaire consisting of clinical case studies.
2. Return it in the enclosed stamped address envelope.

It is estimated that the survey will take on average anywhere from 20 to 30 minutes to complete. All Dental/Oral Health Therapists in NSW Public Oral Health Services are eligible to participate.

Completing the questionnaire is voluntary and there will be no repercussions if you decide not to participate. Your decision not to participate in this research will not affect your current employment.

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All information you provide will remain confidential and your identity will be kept anonymous. A protocol is in place to ensure confidentiality of survey data.

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If you would like any further information regarding the study, please contact:

Associate Professor Fiona Blinkhorn
Program Convenor
Graduate Diploma in Dental Therapy
School of Health Sciences
PO Box 127, Ourimbah
NSW 2258, Australia
Telephone: 02 4349 4530     Mobile: 0422 768 223

With best wishes,

A/Prof Fiona Blinkhorn    A/Prof Jane Taylor    Angela Masoe
CASE STUDY 1

Patient: NC

Gender: Female

Age at presentation: 14

Chief Complaint:
Recall appointment but has noticed a small “hole” in one of her teeth near the front of her mouth.

History of Presenting Condition:
NC first noticed a small mark on the tooth a few months ago that would not brush off with toothbrushing, but it has now developed into a small hole. She has experienced no pain and can eat and drink normally.

Medical history:
NC is fit and healthy.

Dental history:
NC is an irregular attender. She has had previous restorations in the primary dentition without LA. She cannot recall having any extractions. Brushes twice daily with Colgate Total toothpaste.

Family history:
NC is the older of two children. She lives in country NSW. The mother is a volunteer worker at a local Pre-School and her father works on a farm. It has taken an hour and a half to get to the dental clinic.

Diet History:
NC was born in country NSW with fluoridated water supplies. NC’s mother says she has a good diet with freshly prepared food most days. NC plays a lot of sport and drinks high-energy drinks every day.

Clinical Observation:
Extra-oral: Nothing abnormal detected.
Intra-oral:
Oral hygiene: poor
Plaque: present on most of the cervical margins of most teeth.
Calculus: present lingual surfaces of lower incisors

Gingivae: Inflamed – chronic marginal gingivitis


Extensive areas of demineralisation on the buccal cervical areas of most upper and lower teeth, and lingual areas of lower molars.

**Occlusion:**

Skeletal Class 1

Dental Class I, with buccally displaced canine RHS.

Using the information, photographs and dental chart you have been provided with:

1. What if any, special tests would you perform for this patient?
2. Write a short term treatment plan for NC
3. Write a long term treatment plan for NC.
CASE STUDY 1 RESPONSE:

CASE STUDY 2

Patient:
TJ

Gender:
Male

Age at presentation:
14

Chief Complaint:
His mother says that all of the family are complaining of TJ's bad breath.

History of Presenting Condition:
He has not noticed anything of concern, except the braces are hard to keep clean. His mother is more concerned about his teeth than he is.

TJ is under orthodontic treatment with Public Health Services. He is due for his next orthodontic appointment in 4 weeks.

Medical history:
TJ is a healthy young lad with no history of any serious illness.

Dental history:
TJ is a regular dental attender and has accessed Public Health Services all his life. He is under the orthodontist for treatment of a Class II division 1 malocclusion and his next appointment with the orthodontist is in 4 weeks time.

He had 14 & 24 extracted under LA in order to commence orthodontic treatment 12 months ago. He has never required restorations in primary or permanent dentitions.

Family history:
TJ is the youngest of 3 children in the family. He lives in Sydney. The parents are both employed intermittently with local commercial companies. He lives close to the dental clinic.

Diet History:
TJ has a good diet according to mum. He drinks tap water and soft drinks are only bought occasionally; sweets are available in the form of biscuits, cakes and muesli bars for school lunches.

Clinical Observation:
Extra-oral: No abnormality detected.
Intra-oral:
CASE STUDY 2

Patient: TJ

Gender: Male

Age at presentation: 14

Chief Complaint:

His mother says that all of the family are complaining of TJ’s bad breath.

History of Presenting Condition:

He has not noticed anything of concern, except the braces are hard to keep clean. His mother is more concerned about his teeth than he is.

TJ is under orthodontic treatment with Public Health Services. He is due for his next orthodontic appointment in 4 weeks.

Medical history:

TJ is a healthy young lad with no history of any serious illness.

Dental history:

TJ is a regular dental attender and has accessed Public Health Services all his life. He is under the orthodontist for treatment of a Class II division 1 malocclusion and his next appointment with the orthodontist is in 4 weeks time.

He had 14 & 24 extracted under LA in order to commence orthodontic treatment 12 months ago. He has never required restorations in primary or permanent dentitions.

Family history:

TJ is the youngest of 3 children in the family. He lives in Sydney. The parents are both employed intermittently with local commercial companies. He lives close to the dental clinic.

Diet History:

TJ has a good diet according to mum. He drinks tap water and soft drinks are only bought occasionally; sweets are available in the form of biscuits, cakes and muesli bars for school lunches.

Clinical Observation:

Extra-oral: No abnormality detected.

Intra-oral:
Oral Hygiene: poor

Plaque: present on most teeth. No calculus present.

Gingivae red and inflamed – chronic marginal gingivitis, bleed on gentle probing

Occlusion:

  Skeletal Class 1
  Dental Class 1

Using the information, dental charting and the photograph you have been provided with:

1. What treatment, if any, would you carry out for TJ today?
2. Would you bring TJ back to the clinic for any treatment-if yes, what?
Oral Hygiene: poor
Plaque: present on most teeth. No calculus present.
Gingivae red and inflamed – chronic marginal gingivitis, bleed on gentle probing

Occlusion:
Skeletal Class 1
Dental Class 1

Using the information, dental charting and the photograph you have been provided with:

1. What treatment, if any, would you carry out for TJ today?
2. Would you bring TJ back to the clinic for any treatment—if yes, what?
Case Study: 3

Patient: AK
Gender: Female
Age at presentation: 16
Reason for attendance:
AK attended the clinic complaining of a toothache on the lower right hand side of her mouth.

Medical History:
AK is fit and well.

Dental history:
AK previously attended a private dentist in Queensland. She last attended 12 months ago. She has had restorations with LA in the past and extractions under GA for the removal of decayed primary molars.

Social History:
AK was born in Queensland, Australia, and is the youngest of 4 children. Their family moved to Newcastle for her parents work at the Highway Service Centre. AK spends a fair amount of time on her own after school. AK promises to attend all her appointments to get her teeth fixed.

Diet History:
Meals are prepared by different members of the family and are usually ready meals. AK says that she drinks a fair amount of coke and loves chips.

Clinical Observation:
Extra-oral: No abnormality detected.
Intra-oral:
Oral hygiene: poor
Plaque: Present on all teeth.
Gingivae: Red and inflamed – chronic marginal gingivitis, bleed on gentle probing
Caries activity: Active, high caries rate
Occlusion:

Skeletal class 1

Dental Class 1

Crowding Upper and Lower Anteriors

12 palatally positioned, tooth wear 32 due to traumatic occlusion, lower incisor/canine crowding

Using the information, photographs and dental chart you have been provided with:

1. What, if any, special tests would you perform for this patient?
2. Write a short-term treatment plan for AK.
3. Write a long-term treatment plan for AK.
Results:

Most respondents (88%) would utilise Motivational Interviewing (MPI) as a means of discussing preventive strategies for a patient with dental caries concerns, however, only 63% would use this technique for a patient in pain. The average child’s satisfaction with Fluoride varnish on a plaque-free index of multiple deprivation (IMD) was 7.5 (mean = 7.5, SD = 1.2). Of the 100 participants, aged 2-17 (mean = 11.5, n = 100) reported having their teeth cleaned with a fluoride varnish. This was only applied 6-monthly in 60% (n = 60) of cases. Children in areas of high deprivation are in greatest need of these interventions. Children in areas of low deprivation can be further supported to increase the frequency of application.

Aim:

To investigate factors that influence Therapists plan preventive care and advice. In New South Wales (NSW), Australia, 117 Therapists returned questionnaires giving a 64.6% response rate. The participants highlighted the importance of effective oral health care for adolescents attending NSW Public Oral Health (NSW) Dental Therapists and Oral Health Therapists (Therapists) working in the public health system may assist this vulnerable group by offering free dental care and advice on preventing dental disease due to poor toothbrushing and dietary behavior. Adolescents are at risk of dental caries and periodontal disease and their health care needs have become an established part of many oral-health promotion projects. The Prevention of Periodontal Disease (PPD) study has become an established part of many oral-health promotion project: saving smiles in Soe, Indonesia, which has become an established part of many oral-health promotion projects. The first student placement commenced in 2010.

Design:

A cross-sectional study involving 4-year-old children (n = 324) was conducted in 2013 (n = 324). The study included a fluoride varnish program designed to improve the oral health outcomes for school age children. Baseline data was collected in 2009, and updated each year. After discussion with several stakeholders it was decided that the project would include a fluoride varnish program. Patients who were deemed high caries risk were offered fluoride varnish application outside the dental clinic. The children’s views on fluoride varnish application by Extended-Duty Dental Nurses in the non-dental setting were assessed as plaque free, from 3% (n = 324) – 60% (n = 60) of 5-year-old children required more than one application but 37.5% (n = 37.5) of children were deemed high caries risk. Nearly half (46%) were frequently as indicated by national guidelines and the caries risk assessment.

Conclusion:

While some dental practices are providing fluoride varnish, there is a need for further research to determine the optimal frequency of application. Initial results demonstrate the oral health benefits of this simple intervention. Further studies will determine the optimal frequency of application.
Preventive care offered to an adolescent accessing public oral health services in NSW Australia

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Background: Adolescents are at risk of dental caries and periodontal disease due to poor toothbrushing and dietary behaviour. These oral health problems may be moderated by providing individuals with preventive care and advice. In New South Wales (NSW) Dental Therapists and Oral Health Therapists (Therapists) working in the public health system may assist this vulnerable group by offering free dental care and advice on preventing oral diseases.

Aim: To investigate factors that influence Therapists plan preventive oral care and advice on preventing dental diseases.

Design: A cross-sectional postal survey using two clinical vignettes were used to record the preventive care treatment plans offered by Therapists working across all 16 NSW Local Health Districts. Data were tabulated and Chi square statistics were used in the analysis.

Results: 117 Therapists returned questionnaires giving a 64.6% response rate. The participants highlighted the importance of offering oral hygiene instruction (97.0%); dietary advice (95.0%) and topical fluoride applications (74.0%). Recommended home use products included fluoride toothpaste 5000 ppmF (59.0%) and casein phosphopeptide amorphous phosphates plus fluoride (CPP-ACP) paste (57%). Over 50% offered fissure sealants. Most respondents (88%) would utilise Motivational Interviewing strategies for a patient with dental caries concerns, however, only 63% would use this technique for a patient in pain ($P < 0.001$).

Conclusion: Considerable variations were noted in Therapists recommendations for stabilising and managing oral disease, suggesting a need for Clinical Directors to consider providing additional professional education to Therapists on the scientific basis and clinical prevention techniques for preventing dental diseases.