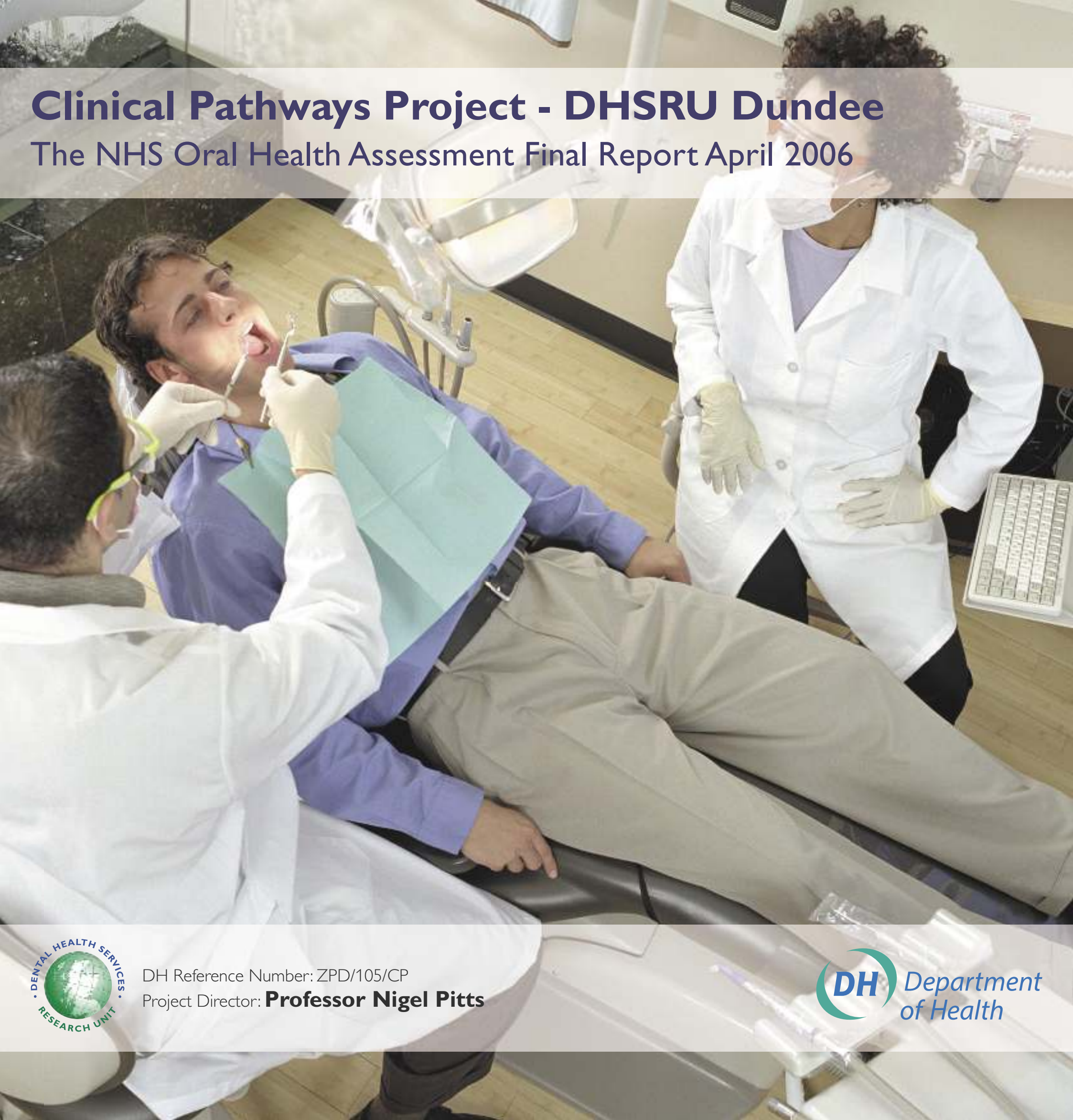
Clinical Pathways Project - DHSRU Dundee

The NHS Oral Health Assessment Final Report April 2006



DH Reference Number: ZPD/105/CP

Project Director: **Professor Nigel Pitts**

DENTAL HEALTH SERVICES RESEARCH UNIT

DH Department of Health

Executive Summary of Definitive Report September 2005

Background
The Clinical Pathways Project was commissioned by the Department of Health England following the publication of *NHS Dentistry: Options for Change* (Product code: 28742), a government report which cited clinical or care pathways as part of an eight point plan for future service redevelopment. The Dental Health Services Research Unit (DHSRU) at the University of Dundee was successful with their bid to develop, from the available evidence and best practice, the first NHS dental care pathway for England and Wales. This pathway would represent the universal gateway to continuing NHS dental care for all patient groups and would be called the Oral Health Assessment.

Project Aim
The project aimed to produce a standard Oral Health Assessment care pathway in two formats, electronic and paper. The Oral Health Assessment in both these formats would:

- Act as a supportive tool based on best practice and the available evidence.
- Inform the patient and dental team to plan appropriate and effective NHS dental care which is prevention focused.
- Facilitate introduction of non fee per item of service NHS dental remunerated contracts.

Project Duration
31 months (Start Date: November 2002 - Finish Date: May 2005)

Method
The Oral Health Assessment (OHA) evolved in accordance with standard care pathway development procedure and was overseen by the Oral Health Assessment Steering Group. This Group composed of around 16 members had overall control and sign-off of all project products and liaised closely with the Chief Dental Officer and Representatives of the *Options for Change* Top Team. The Steering Group received comprehensive monthly reports throughout project duration submitted by DHSRU, to establish current OHA development progress. Each monthly report informed the Steering Group on: activities undertaken during that month; products completed; quality work carried out; tolerance status; actual or potential problems or deviations from the agreed PRINCE2 Project Plan; work planned for the following month and products still to be completed. Appendix 4 in the Interim Report contains all submitted Reports. From time to time the project plan and timing have been modified by the Department of Health in line with incremented development in related policy.

The development of the OHA was initiated by establishing the Clinical Advisory Group (CAG) a broadly based team composed of 17 members with representatives from patient groups, dental primary care (salaried and general dental practitioners); and dentistry field leaders. The CAG was further supplemented by a smaller, similarly constructed 8 member group, the Special Needs/Care Focus Group. This group would advice the CAG in relation to additional requirements so ensuring product standardisation applicable to all patient types. The CAG reviewed available evidence and best practice in relation to what should constitute an Oral Health Assessment. This was then translated into algorithmic format and on to inform the paper Oral Health Assessment document and the development of an Information Technology (IT) software prototype (created by Applied Computing, University of Dundee). Both formats of the Oral Health Assessment were tested and commented on by various *Options for Change* Fieldsites to ensure quality assurance of the products. The test phase was further supplemented by a focus group and individual pilot tests (see project flowchart overleaf).

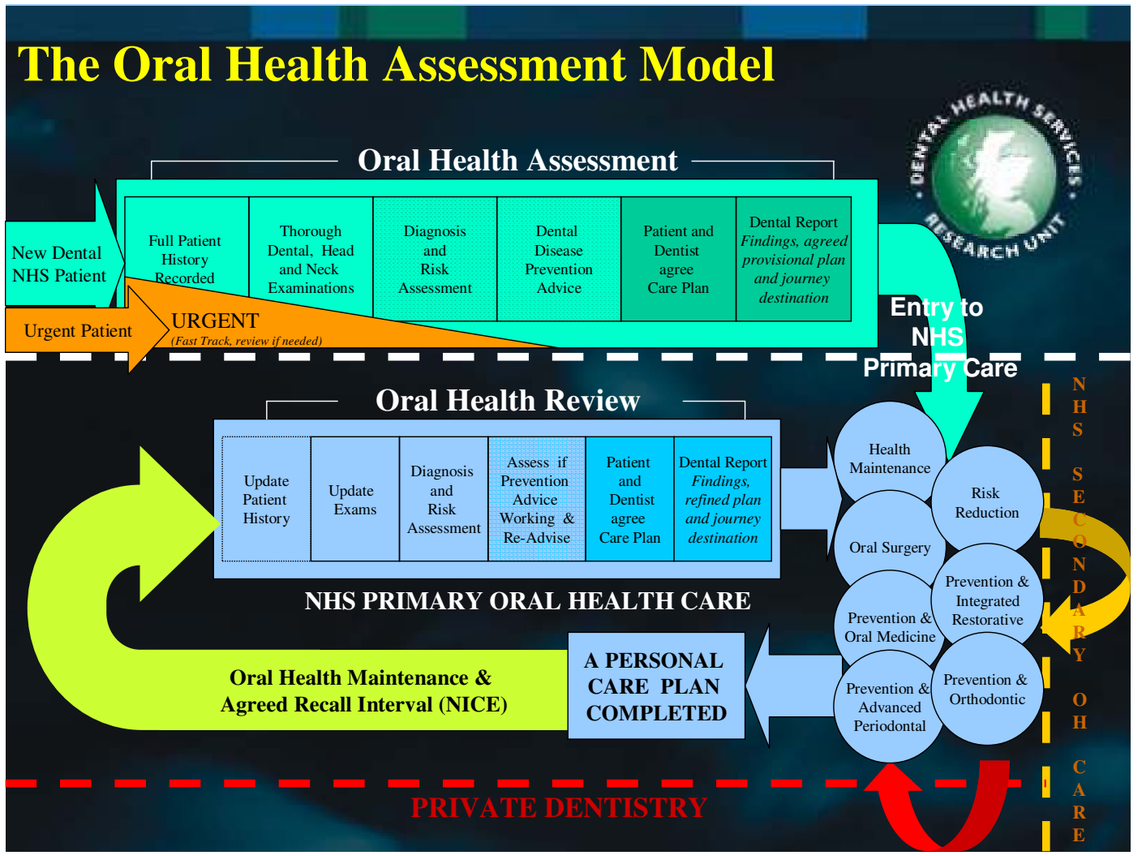
Results
In accordance with the contract a standard Oral Health Assessment was created. This was developed inline with an overall vision of integration into continuing Dental Primary Care (Figure i). The OHA was further developed into the designated end products: a paper OHA document and an IT OHA prototype. Both products evolved from original criteria set out in the *Options for Change* document and incorporated the key elements required to deliver the NICE guidelines in dental recall published in October 2004. A comprehensive "Interim Report" was provided to the Department of Health (12 copies) on 13th June 2005 This Final Report provides a comprehensive end point for the OHA stage of pathway development and sets out the next steps. The Clinical Pathways project was run to time and on budget using the PRINCE2 project management system.

Further Publications since May 2005
Hally, J.D. and Pitts, N.B. (2005) Developing the First Dental Care Pathway: The Oral Health Assessment *Primary Dental Care*; 12 (4): 117-121 (Annex 1)

Next Steps
As the Oral Health Assessment was specifically designed for Primary Care professionals, it adheres closely to the needs of both today's dental team and the diversity of their patient groups. Its intrinsic structure also establishes the Department of Health's desire for Prevention focused, evidence based care which can seamlessly be introduced to the clinical environment and is consistent between providers. Future development requires the completion of further care pathways within the patient's care package (e.g. Health Maintenance pathway, Prevention and Integrated Restorative pathway etc.) in consultation with Specialty interests, allowing full closure and functionality of the continuing care cycle in Figure i.

Postscript
With the approval of the Department of Health England, materials were made available to the Scottish Executive Health Department. Within Scottish Primary Dental Care further modification, development and testing in line with feedback from BDA Scotland and the National Dental Advisory Committee (NDAC Scotland) has resulted in an Oral Health Assessment for those aged 60 years and older (Annex.2). Results of final pilot testing (in both salaried and general dental service) are expected in November 2005 with the view to definitive update and roll out by the end of the year with an incremental rollout inline with the Action Plan for Improving Oral Health and Modernising Dental Services in Scotland.

Figure i



OHA Product Development and Testing Process

OHA Project Members

OHA Steering Group Members

Please note membership varied through project duration but key members*remained constant

David Hewlett	Previously Shadow Special Health Authority
Jenny Hally*	DHSRU, University of Dundee
Nigel Pitts*	DHSRU, University of Dundee
Laurence Jacobs*	British Dental Association
Mary McCann	Deputy Chief Dental Officer Scotland
Rowena Pennycate	British Dental Association
Rod Staines*	Dental Practice Board
Stuart Johnston	British Dental Association
Tim Brown	Office of Chief Dental Officer, DoH
Tim Bentley*	Office of Chief Dental Officer, DoH
Alan Lee*	Previously Shadow Special Health Authority
Peter Dyer*	Consultant Maxillo-facial surgeon, Lancaster
Darrin Robinson	NHS Modernisation Agency
Chris Audrey	Previously Shadow Special Health Authority
Tony Jenner *	Office of Chief Dental Officer, DoH
Barry Cockcroft*	Office of Chief Dental Officer, DoH
Hugh Bennett	National Assembly Wales

DHSRU Core Team University of Dundee

Prof. Nigel Pitts		Dr Jan Clarkson
Dr Chris Longbottom	Ms Hazel Braid	Mrs Joyce Adams
Miss Louise Cardno	Ms Jenny Hally	Mrs Marilyn Laird

Clinical Advisory Group Members

Prof. Nigel Pitts	Ms. Frances Blunden	Dr Jan Clarkson
Dr Chris Longbottom	Mr. Shiv Pabary	Professor Liz Kay
Dr. Glen Buxey-Softley	Ms Jenny Hally	Ms. Janet Clarke
Prof. Paul Speight	Dr. Ian Needleman	Mr. Philip Cannell
Prof. Kevin O'Brien	Dr Fraser McDonald	Prof. Keith Horner
Prof. Jimmy Steele	Prof. David Thomas	

Special Needs/Care Focus Group Members

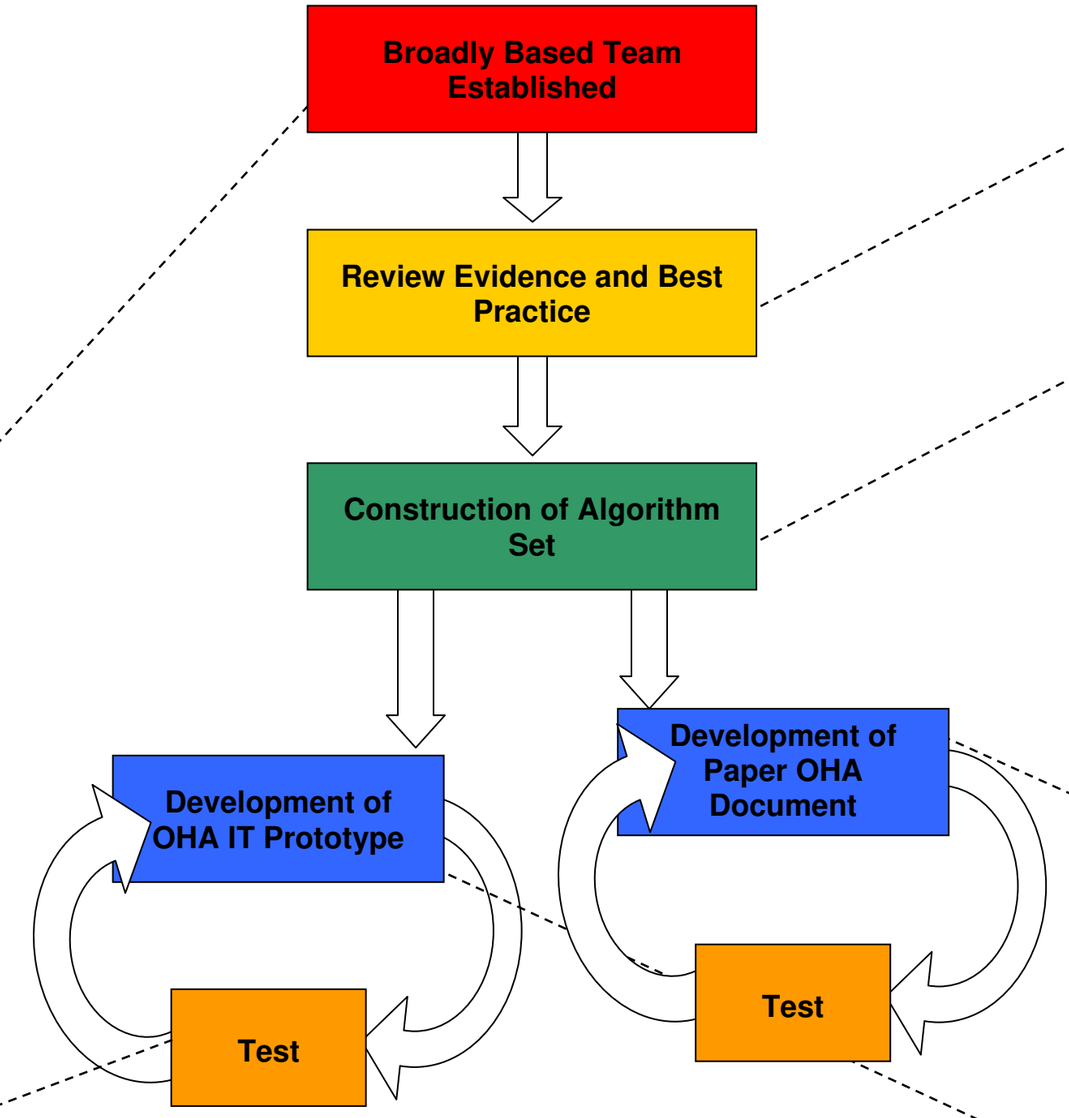
Prof. Nigel Pitts	Mr. James Henderson	Ms. Ann Stead
Ms. Vanita Brookes	Ms Nicola Pearson	Ms Janet Clarke
Ms Janet Fiske		Ms Jenny Hally

Fieldsite Bulletin Board Registered Members

Prof. Nigel Pitts	Ms Janet Clarke	Ms Sarah Lumley
Mr Ian Hetherington	Mr A. Dacosta	Ms Debbie White
Ms Diane Murphy	Ms Roma Amabile	Mr Martin Boote
Ms Ursula Bennett	Ms Nicola Pearson	Mr Rob McGeogh
Ms Rachel Tomson	Ms Holy Koh	Mr Damien Reilly
Ms Mita Choudhury	Ms Marie Wilson	Ms Karen Swales
Ms Jackie Chambers	Ms Michelle Slater	Ms Barabara Coyne
Ms K. Themistocleous	Ms Lesley Gough	Ms Nicola Marshall
Mr Rod Staines	Ms Ruth Gasser	Ms Carol Greaves
Mr Peter Dyer	Ms Karen Tidswell	Ms Karen Mayle
Mr Laurie Jacobs	Mrs Mary McCann	Mr Stuart Johnston
Ms Rowena Pennycate	Mr David Langman	Ms Jackie Duxbury
Mr Ben Atkins	Mr Tony Langman	Mr John Boyles
Mr Richard Ablett	Mr John Green	Mr Anthony Griffiths
Ms Helen Griffiths	Mr David Smith	Mr Ben Squires
Ms Gillian Roberts	Mr Matthew Gill	Mr Keith Dickens
Ms Carol Spencer	Ms Julie Theaker	Mr John Morris
Mr Darrel Jackson	Ms Alison Brett	Mr Peter Richardson
Mr Surjit Kainth	Mr Mark Bowen	Mr John Almond
Ms Mary Palmer	Mr Matthew Jones	Ms Carol Mander
Mr Tony Prowde	Mr Steve Owen	Ms Jenny Hally

Applied Computing University of DundeeOHA Prototype Development Team

Prof. Nigel Pitts		Dr Peter Gregor
Professor Ian Ricketts	Miss Claire Jones	Ms Jenny Hally



Project Details

Project Title:	Pathways Project (DH Ref No. ZPD/105/CP)
Completion Date:	27th May
Duration of Study:	31 months
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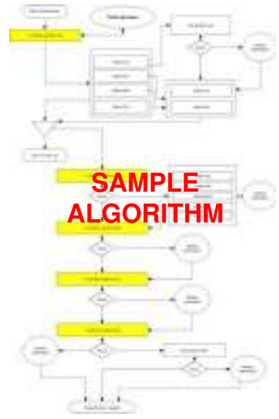
OHA Products

Collated Evidence CDs

Available evidence and best practice relating to specialist body Guidance collated by DHSRU onto set of CDs allowing CAG to access material easily.



The OHA Algorithms

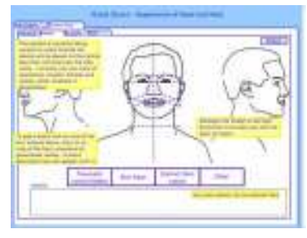
A set of 4 algorithms were developed which together composed the individual components of the Oral Health Assessment. The algorithms are as follows:

- The Dental History
- The Medical History
- The Social History
- The Examination

The Examination algorithm also highlighted the variance record and the Child's Examination.

Paper OHA

A 19 page summary document highlights the OHA. The document provides a menu for thorough Oral Assessment and can be tailored to individual patient needs.



OHA IT Prototype

A touch screen version of the OHA was developed by the Applied Computing Team at the University of Dundee inline with the agreed algorithms. The IT prototype is a graphic representation of how a CAG approved pathway would look and could be implemented.

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Introduction

The Clinical Pathways Project (DH Reference Number: ZPD/105/CP) was initiated in November 2002. This followed the publication of the Government's report *NHS Dentistry: Options for Change* [1], which set out a clear vision for the future of the NHS dental service in England and Wales. This vision brought together key themes and issues for recommended changes that were designed to "provide a first class NHS dental service, responsive to local needs". In summary, the vision consisted of an eight point plan of suggested priorities for action. Part of this plan was the development of clinical or care pathways to establish a more preventive ethos within dental practice and detaching payment from "clinically appropriate" patient care.

The Dental Health Services Research Unit at the University of Dundee, following a successful bid in 2002 was awarded the contract to develop the first NHS dental (clinical) care pathway. This pathway would be called the Oral Health Assessment (OHA). Initially named as an individual element of the *Options for Change* eight point plan, it would be developed according to care pathway criteria and would combine both an evidence based ethos with best practice. According to the Department's brief, the Oral Health Assessment should be designed to act as the "gateway to NHS dentistry" and "unlike the present GDS examination, the assessment should focus on prevention of disease, lifestyle advice, the discussion of any necessary treatment options and date of the next assessment".

The aim of this document, the Definitive OHA Clinical Pathway Report is to highlight the development process of the Oral Health Assessment. Full details of the project's end products, both in Information Technology (IT) and paper format, may be found in the Clinical Pathways Project Interim Report submitted to the Department in June 2005. It is intended that both these reports are read in conjunction to define the overall two and a half year development process of the first dental (clinical) care pathway: the Oral Health Assessment.

1. The Care Pathway Concept

A care pathway can be defined as "a documented sequence of effective clinical interventions, placed in an appropriate time frame, written and agreed by a multi-disciplinary team. They help a patient with a specific condition or diagnosis move progressively through a clinical experience to the desired outcome" (M. Seward, Former Chief Dental Officer England, Department of Health 2002).

In other words, a care pathway is a documentation tool[2] which looks at care from the patient's perspective. It can form part or all of the clinical record [3] and describes the patient's 'journey' through a clinical experience, where co-ordination, consistent high standards and appropriateness of care in relation to best practice and the evidence base, are fundamental in its objective.

There are several alternative names for care pathways in current circulation, including clinical pathways, integrated care pathways, care profiles, care protocols, critical care pathways, and multidisciplinary pathways of care. Throughout this document the term *care pathways* will be used. This is the preferred terminology suggested by the National Pathway Association at their Annual General Meeting in 2004.

Despite differences in terminology [4, 5] the concept of the care pathway has in fact been part of UK general health service improvement since the early 1990s[6]. Originally an industrial based concept, care pathways evolved following a nursing and case management initiative in Boston's New England Medical Centre in 1983. Much of the work done to adapt the concept to a health care setting has been credited to Karen Zander from the Centre for Case Management in the USA.[7, 8, 9, 10]

Since they began in the 1980's, care pathways have spread throughout the world being used in various care settings and medical specialties.[11] Being used extensively in both secondary and primary care environments[12, 13, 14, 15] as well as an interface for seamless patient transfer between the two.[16, 17, 18]

This move towards the use of care pathways within the NHS has been driven by their ability to deliver consistent high quality patient care. The Clinical Resource and Audit Group (CRAG) report in 1999, evaluated 103 NHS pathways which were in operation in Scotland. They concluded their analysis by stating "this report demonstrates the effectiveness of integrated care pathways in almost all of the areas evaluated. Evidence is copious, consistent and statistically significant".[19]

Beneficial outcomes to care pathway implementation have also been claimed by Bryan (2002), Johnson (1997) and the National Assembly for Wales (1999).
These documents make reference to:

- Improved patient involvement
- Better care outcomes
- Facilitation of staff development.
- Higher patient satisfaction
- Support for Clinical governance
- Seamless care promotion.

These general benefits of pathway implementation are a result of the care pathway's ability to provide:

- Completeness and quality of documentation.
- Reduction of duplication.
- Education of staff and patients.
- Easier audits via variance tracking.
- The ability to incorporate guidelines into daily practice.
- The improvement of the quality of care provided.

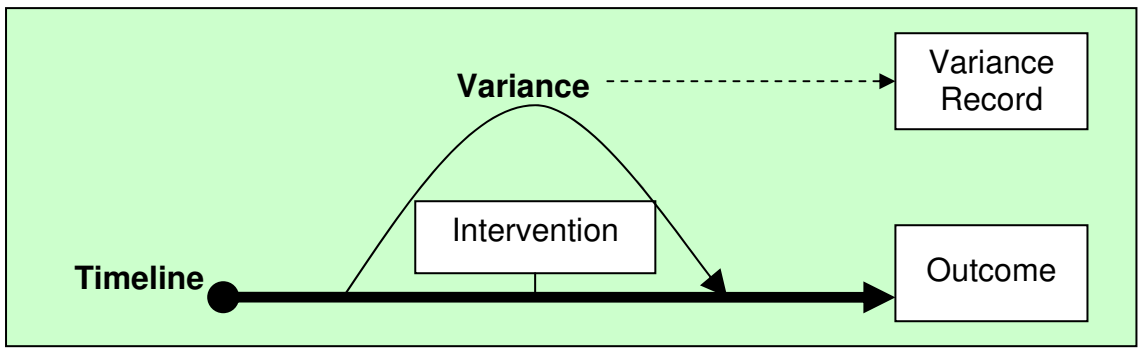
And all this in turn has the potential to decrease the risk of complaints and litigation.

Despite the numerous advantages associated with care pathways, some practitioners still dislike how care pathways can alter every day routine and claim that the structured documentation takes time to complete. Nevertheless, it is this form of structured documentation that promotes a more uniform, quality service and why 86% of trusts in a 1998 survey of UK health service provision claimed that they used care pathways (to some degree) in facilitating their patient care. [23]

2. Care Pathway Structure

Care pathways are composed of 4 main elements: firstly a timeline; secondly an intervention; thirdly an outcome and fourthly a variance record[24]. Figure 1 highlights the interaction between these elements in this diagrammatic representation of care pathway composition.

Figure 1: **Diagrammatic Representation of the Elements of a Care Pathway**



These elements will now be discussed in order. First, the timeline element, this should include a plan of the clinical care that is to be undertaken by the clinician along a defined time scale. It can be defined as hours or days, or it can be guided by objectives or stages of care. Second, the intervention is the investigations or tasks that should be undertaken along this timeline and thirdly the outcome highlights the results of the intervention while monitoring the patient's progress through their individual 'journey of care'. The fourth, and probably the most important element, is the variance record. This gives the care pathway its unique dynamic structure, allowing it to be tailored to specific patient needs.

In essence therefore a care pathway acts as a template for care, guiding each patient towards a desired objective while ensuring that any specific intervention is delivered at the right time, in the right way by the right team member responsible for care. It should be noted that these pathways are by no means a substitute for clinical judgement and that a practitioner can deviate from the pathway at any point, providing a valid clinical reason is given for doing so. In other words, the pathway asks the clinician to "determine whether each defined intervention is appropriate for a given patient, thereby promoting clinical freedom based on the needs of the individual".[25] These valid reasons for deviation from the care pathway make up the variance record. This record can then be analysed and used in the clinical audit process, allowing continuous patient care improvement.

Project Background

The Clinical Pathways Project was introduced following the publication of the government's report *NHS Dentistry: Options for Change* [1] in August 2002. The document set out elements of an agreed eight point plan for future service redevelopment which included the introduction of care pathways and an Oral Health Assessment within dental primary care. The publication was written as the result of a series of previous publications that had highlighted the needs and wishes for the dental profession in England.[26, 27, 28, 29, 30, 31, 32, 33] *Options for Change* brings together the key themes and issues that were raised throughout this discussion period and suggests eight main priorities for action.

The key themes of this document are summarised below:

1. Local commissioning and funding
2. Changing the methods of remuneration for General Dental Practitioners (GDPs)
3. Focusing on a more preventive ethos
4. Changing the patient's experience of NHS dentistry
5. Altering practice structure
6. Developing the dental team
7. Introducing clinical/care pathways
8. Introducing information and communication technology

As one of these key themes, the care pathway concept was initially suggested not only as a means of breaking the bond between "payments to dentists and the types of treatment offered" but also of introducing "best practice and the available evidence base" seamlessly into the primary dental care environment. To allow for the potential integration of this concept into practice, it was important that the pathway concept was intrinsic from the very start of the patient–dentist relationship. Therefore it was decided early in the Clinical Pathways Project that the Oral Health Assessment, this "gateway to NHS dentistry" should be designed as the initial care pathway.

Originally the Clinical Pathway Project was intended to develop three NHS dental care pathways within a two year time period:

- An Oral Health Assessment
- A Periodontal Pathway
- An Endodontic pathway

This was later reconfigured following the Department of Health's introduction of the PRINCE2 Project management scheme in June 2003. At that time the Department decided to focus on one main pathway, the Oral Health Assessment which was to be developed over 2 and half years and would be the universal gateway to continuing dental care for all patient groups. The focus of the project has been kept inline with incremental policy developments in dental primary care in England.

The Dental Health Services Research Unit (DHSRU), following a successful bid secured the contract for the Clinical Pathway Project in November 2002.

The project started on 1st November 2002 and was completed by 27th May 2005. All milestones were met; the project was delivered on time and within budget.

There have been a number of discussions about commissioning the next phase of pathway development and the authors look forward to entertaining these discussions under the new arrangements in England.

1. Initial Staffing Structure

Following the initial acquisition of the Clinical Pathways contract, DHSRU set up a core project team consisting of key unit members. This team was supplemented by a clinically trained methodologist employed to integrate all of the various project strands ensuring that all group members involved in pathway development contributed effectively by the deadlines required.

The project was designed to be overseen by the Clinical Pathways Steering Group who had overall control and final sign-off of all project products.
The Steering group was responsible for:

- Liaising with the Chief Dental Officer/Chief Dental Officer representatives and the *Options for Change* Top Team regarding timing, progress and project evolution.
- Ensuring appropriate linkage with those taking forward clinical governance, remuneration, ICT, Dental Practice Board links, education and research.

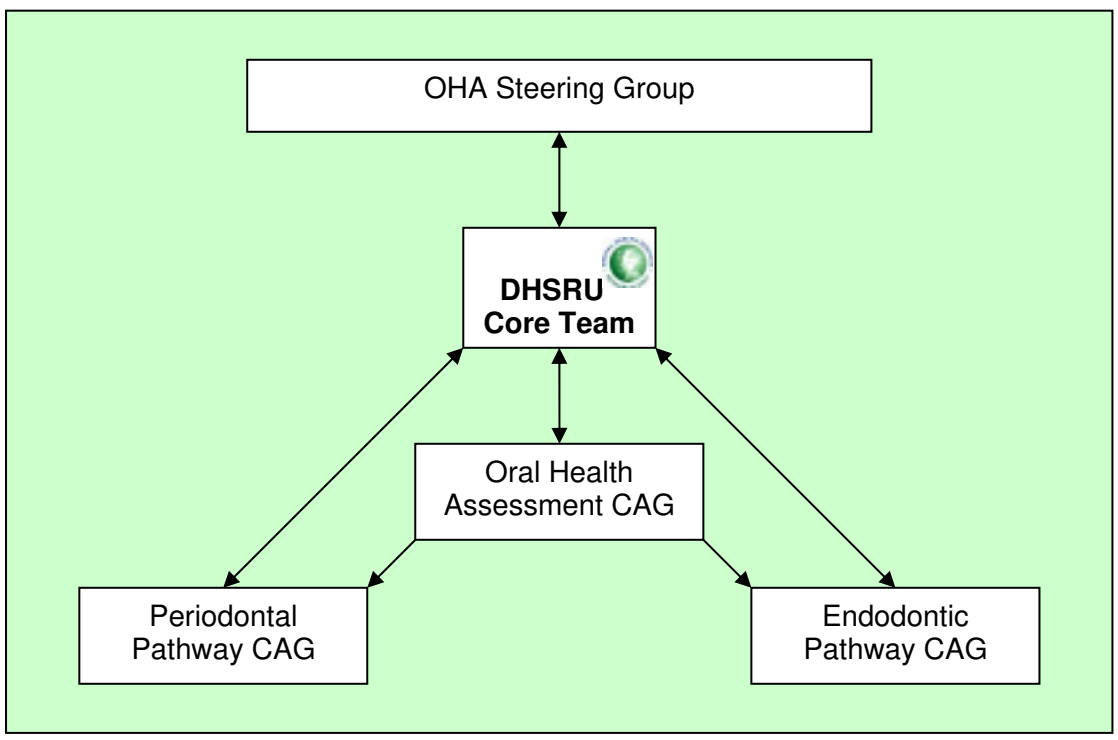
Members of the DHSRU core team were required to meet with the Steering Group on an average of every two months to discuss project progress and to highlight developmental issues and following PRINCE2 integration, submit a monthly progress report (detailed in Appendix 4 of the Clinical Pathways Project Interim Report). The initial Steering Group membership is highlighted in the Executive Summary at the beginning of this the Definitive Report. The composition of this group altered over the project's two and half year duration although key members remained constant.

Initially the Steering Group was to be supported by three Clinical Advisory Groups (one per care pathway) composed of Primary Care representatives from both general and salaried practice as well as specialty experts.

The groups also included a patient representative (the need for patient input to pathway design was deemed highly recommended for all care pathway development by the National Pathway Association in 2004).

Each Clinical Advisory Group was responsible for components development of their specified care pathway so ensuring a patient tailored, primary care sensitized end product. It was initially envisaged that each Clinical Advisory Group would meet on four occasions to discuss and develop their individual pathway. They would be supported by the DHSRU core team (see Figure 2 below).

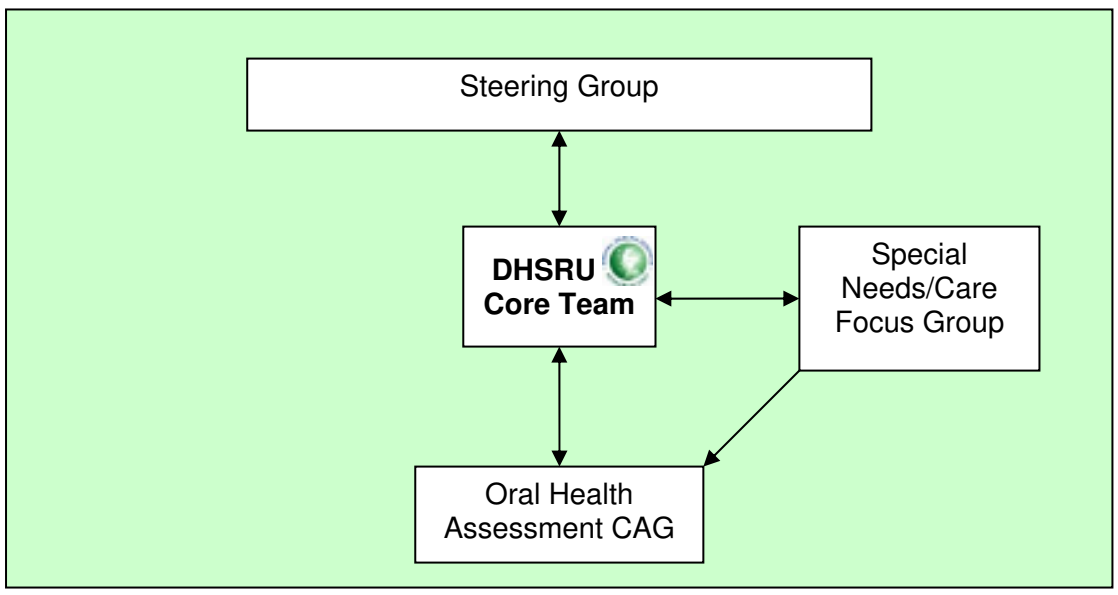
Figure 2: **Original Project Staffing Structure**



The membership of the Clinical Advisory Group (CAG) for the Oral Health Assessment was established in January 2003. It was followed by the membership of the Periodontal Pathways CAG and that of the Endodontic CAG.

Following the incorporation of PRINCE2 Project Management into the running of the Clinical Pathways Project however, it was deemed that the Clinical Advisory Groups for both the Endodontic and Periodontology pathways would be aborted and only the Oral Health Assessment CAG should proceed. Figure 3 highlights the updated staffing structure for the Clinical Pathways Project following the PRINCE2 project re-organisation in June 2003.

Figure 3: **Definitive Project Staffing Structure**



To assist the remaining Clinical Advisory Group a Special Needs/Care Focus Group was established. This group was responsible to ensuring that any agreed elements had the diversity to cater for those with additional requirements.

The Special Needs/Care Focus Group was composed of primary care practitioners, individuals considered to be leaders within the field of Special Care dentistry and a patient representative.

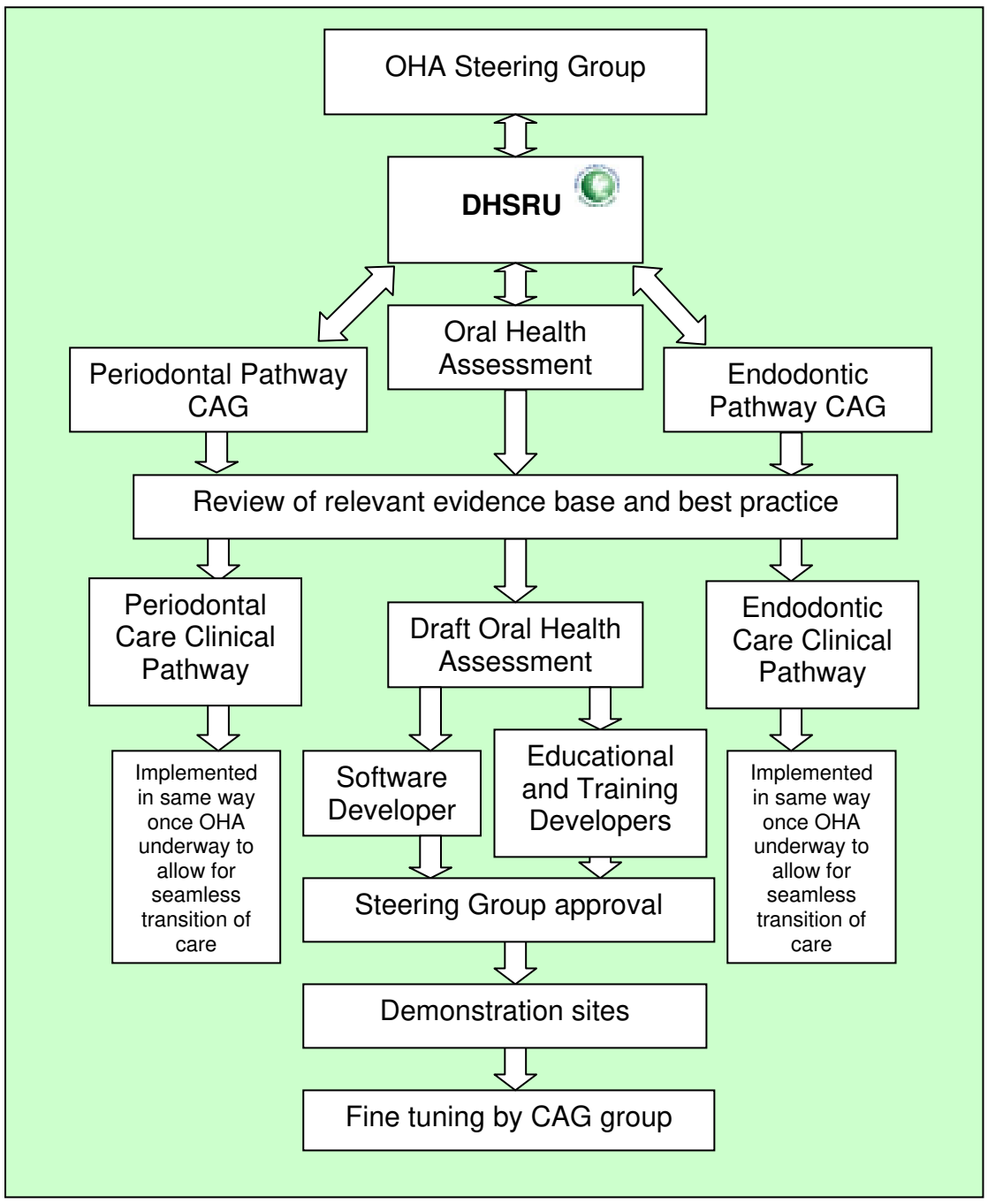
The group met on one occasion to discuss key elements and feed into the Clinical Advisory Groups development process.

The names of the members of this group can be found in the Clinical Pathways Project Interim Report Appendix 2 which was submitted to the Department of Health in June 2005.

2. Initial Project Outline

As already highlighted, the initial project outline was to develop three care pathways over an allotted two year period. The Oral Health Assessment care pathway was to be developed first as this would determine how best to take forward the format of the other two pathways (Periodontal care pathway and Endodontic care pathway) which would be initiated later. This would be done in a staggered fashion by the Clinical Advisory Groups for each specific pathway: as highlighted in Figure 4.

Figure 4: **Original Project Outline and Structure**



Following the incorporation of PRINCE2 Project Management in June 2003, the project was reconfigured and the project aims altered in accordance with time restraints and available resources.

The implications of the incorporation of the PRINCE2 Project management system into the Clinical Pathways Project included:

- Only one care pathway to proceed: The Oral Health Assessment.
- Revised Project end date being 27th May 2005 and not 31st October 2004 as previously planned. This revised date was based on tight time frames aimed at completing the OHA Pathway in time for May 2005 (the provisional external deadline imposed by Department of Health for full roll out).
- The number of CAG Meetings for the Oral Health Assessment would increase to 6, instead of 4 as previously planned. There would also be the addition of a Special Needs/Care Focus Group to assist the CAG.
- The need for additional funding was highlighted

3. PRINCE2 Project Management

PRINCE2 is a project management system which is owned and maintained by the UK Office of Government Commerce. It has been adopted by the NHS as its preferred methodology and has also been incorporated into the running of a number of other public and private organisations.

The following list highlights some of the organisations using PRINCE2:

- RAF
- Tesco Stores
- UK Police Forces
- Rolls Royce
- Automobile Association
- Camelot
- Office for Government Online
- Norwich Union
- Department of Justice
- London Underground
- British Medical Association

PRINCE2 was not adopted into the Clinical Pathways Project until June 2003; seven months after the project began (November 2002). The project's re-evaluation at this stage meant that initially agreed elements of the project design had to be aborted to concentrate resources on one pathway: the Oral Health Assessment. The end product of the Clinical Pathways Project was therefore redefined inline with these changes and the overall project description altered.

4. Definitive Project Description

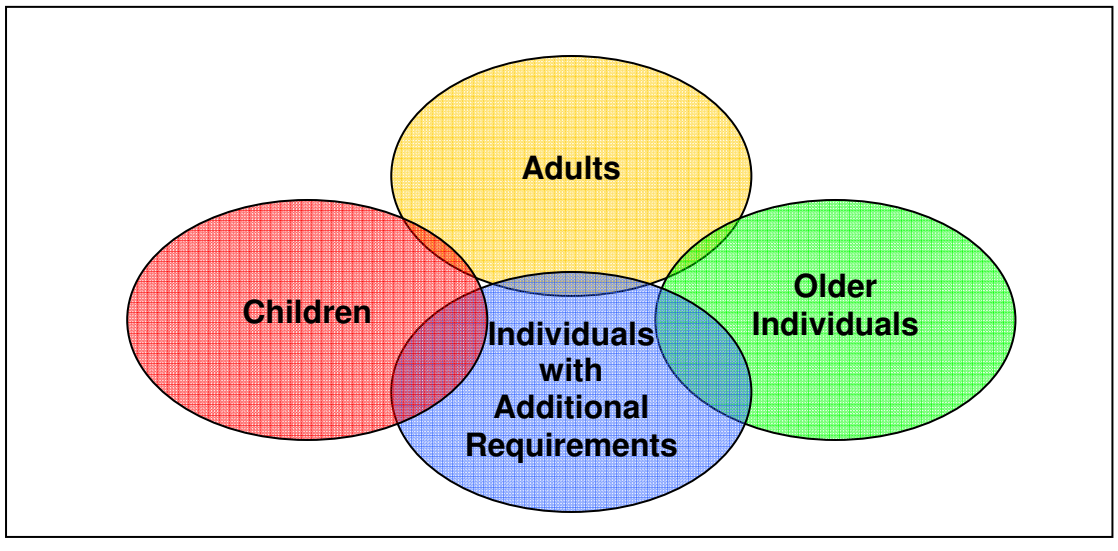
The following describes the Clinical Pathway Project in summarised format as per PRINCE2 project management ethos.

1. Product Title: Oral Health Assessment Pathway
2. Purpose:
    - To produce one pathway: the Oral Health Assessment Clinical Pathway
    - To produce a supportive tool based on best practice and the available evidence
    - To inform the Patient and Dental Team to plan appropriate and effective NHS dental care which is prevention focused
    - To facilitate introduction of non fee per item of service NHS Dental Remunerated Contracts
3. Product composition:
    - Clinical Record: Backbone Data Set; Variance Record; Key Clinical Record and Historical Record
    - Decision Tree Rules
    - Decision Support Information
    - Encoding Standard: ICRS Standard to be supplied by the Department of Health
4. Format:
    - Electronic
    - Paper
5. Derivation: Invited bid July 2002

6. Quality Criteria:
    - Promote likelihood of clinically appropriate care
    - Capture prevention and intervention
    - Not excessively intrusive
7. Quality Method
    - OHA Steering Group (DHSRU submitted monthly reports to the Steering Group which highlighted project progress and issues which required decisions by the sponsors)
    - Clinical Advisory Group
    - Peer Review
    - Field Sites
8. Quality Check Skills
    - Dental Team
    - Patient Feedback

It was envisaged that the Oral Health Assessment would be designed as the initial gateway into NHS continuing care. It also had to be universal in nature being applicable to all patient groups (see Figure 5).

Figure 5: **Oral Health Assessment Applicable Patient Groups**



This universal nature of the Oral Health Assessment created a wide remit for the Clinical Pathways Project due to the diversity of each patient group. The PRINCE2 project plan established a heavily structured means of dealing with this remit within the newly defined, designated project time span.

5. PRINCE2 Project Plan

Once the definitive Project description had been established, the project management Gantt chart was constructed under the guidance of the Department of Health PRINCE2 project manager, to ensure all components of the Oral Health Assessment were developed within the allotted time scale (to finish in May 2005). This was done by highlighting all deliverables and milestones over the project's duration.

Table 1 summarises the main milestones relating to the work undertaken by the Clinical Advisory Group in the initial development stage of the Oral Health Assessment (OHA).

Table 1: **Clinical Advisory Group Milestones**

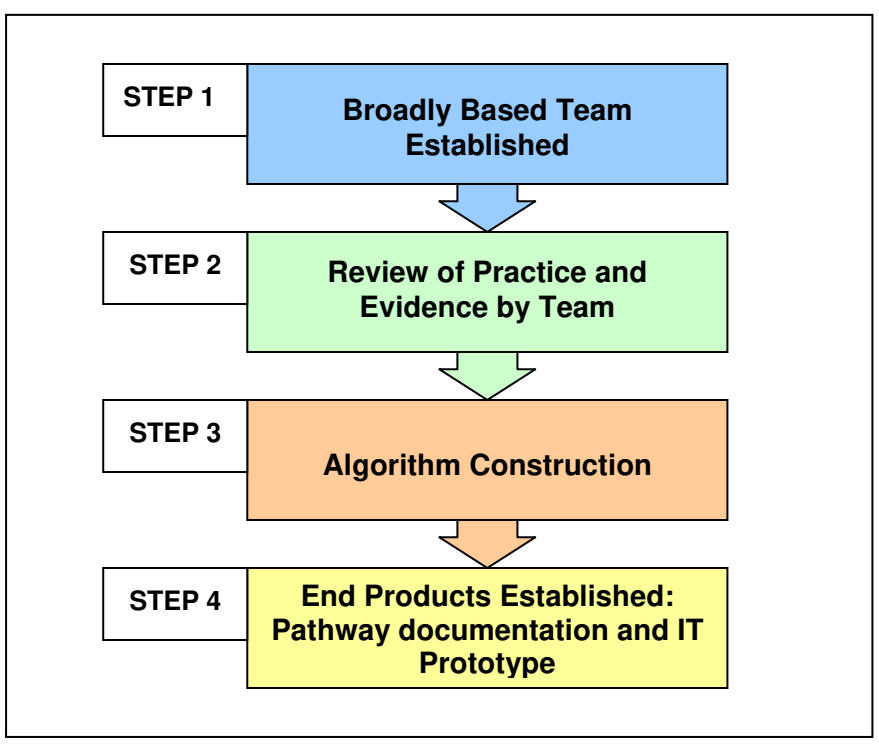
Milestone	**Date**	**Objective**
1st OHA Clinical Advisory Group Meeting	3.03.03	Sign off appropriate evidence
2nd OHA Clinical Advisory Group Meeting	23.06.03	Sign off Backbone
3rd OHA Clinical Advisory Group Meeting	11.09.03	Sign off Typical NHS patient
4th OHA Clinical Advisory Group Meeting	17.10.03	Sign off Special Needs/Care
5th OHA Clinical Advisory Group Meeting	17.03.04	Sign off Decision Tree
6th OHA Clinical Advisory Group Meeting	5.05.04	Sign off Variance History

The six meetings that made up the initial part of the Clinical Pathways Project were intended to develop the components of the Oral Health Assessment. Once the OHA pathway concept and components had been established by the Clinical Advisory Group, this would then be further developed into the Project's two end products: a paper document and an IT prototype (a graphic representation of how a Clinical Advisory Group approved pathway would look and could be implemented).

These products were then to be tested in a number of small pilot studies aimed at focusing user opinion on the current version of the product. This would then allow for further development inline with Dental Primary Care practitioner and patient opinion.

All care pathways are generally constructed in four main steps as highlighted in Figure 6.

Figure 6: **Care Pathway Development Overview Diagram**



1. Broadly Based Team Established

Step one of care pathway development required the establishment of a multi-disciplinary team. In the case of the Oral Health Assessment, this team (the Clinical Advisory Group or CAG) consisted of: a patient representative; primary care professionals from both general practice and the salaried service; and specialty leaders. The CAG was supplemented by an additional group, the Special Needs/Care Focus Group which was set up to ensure that those patients with additional requirements would be represented appropriately in the initial stages of pathway design. The collaboration of both groups would ensure the development of a universal end product, suitable for all patient types.

2. Review of Practice and Evidence Base

The second step of care pathway development involved the review of best practice and the available evidence. Both the Clinical Advisory Group and the Special Needs/Care Focus Group undertook the task of reviewing current best practice and the available evidence. Many of the initial documents used as start points in this review process were cited in the original *Options for Change* publication and are listed in Table 2 below.

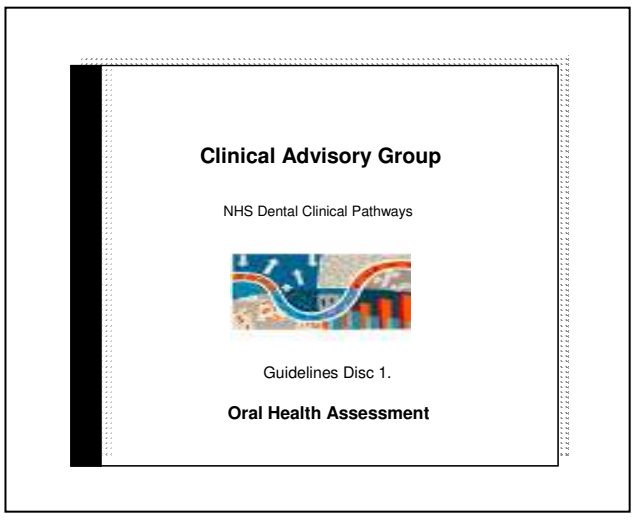
Table 2: **Options for Change cited Publications**

Submitting body	Title	Citation
British Dental Practice Managers' Association	▪ Code of Practice and Guide to Members	BDPMA April 2001
British Association of Dental Nurses	▪ Occupational Standards	BADN c/o Healthworks UK
British Association for the Study of Community Dentistry	▪ Oral Health Promotion Policy ▪ Public Health Aspects of periodontal disease ▪ Dental Screening ▪ Dental Services for Older People ▪ Frequency of Attendance for Examination ▪ Home use of Fluorides ▪ Dental Services for Handicapped Elderly People	BASCD 1999 BASCD 1994 BASCD 1990 BASCD 1990 BASCD 1988 BASCD 1988 BASCD 1986
Dental Laboratories Association	▪ Dental Appliance Manufacturers' Audit Scheme (DAMAS)	DLA, issue 4 May 1999
Faculty of General Dental Practitioners (UK)	▪ Self Assessment Manual and Standards ▪ Selection Criteria in Dental Radiography ▪ Adult Antimicrobial ▪ Current Guidance in General Dental Practice ▪ Prescribing in Primary Dental Care ▪ Clinical Examination and Record keeping	Dental Advisory Board RCS 1992 FGDP (UK) 1998 FGDP (UK) 2000 FGDP (UK) 1999 FGDP (UK) 2001 (in press)
British Endodontic Society	▪ Undergraduate Curriculum Guidelines for Endodontology ▪ Root Canal Treatment in the General Dental Services ▪ Consensus Report of the European Society of Endodontology on quality guidelines for endodontic treatment	Int Endodontic J, 34:2001 Endodontic Review Panel Dental Practice Board 1999 Int Endodontic J, 27, 115–124

British Society of Periodontology	▪ Referral Policy and Parameters of Care ▪ Periodontology in General Dental Practice in the UK: a Policy statement	BSP 1999 BSP, March 2001
British Society for Restorative Dentistry	▪ Guidelines for Crown and Bridgework ▪ A Strategy for Planning Restorative Dental Care	BSRD, 1993 Eur J Prosthodont Rest Dent, 4 (4); 149–153
Faculty of Dental Surgery, RCSEng.	▪ Clinical guidelines for Oral Management of Oncology Patients ▪ Paediatric Dentistry: ▪ National Clinical Guidelines ▪ The Management of Patients with Third Molar Teeth ▪ Clinical Guidelines and Integrated Care Pathways for the Oral Health Care of People with Learning Disabilities ▪ Guidelines for Surgical Endodontics ▪ National Clinical Guidelines 1997 ▪ Diagnosis and Prevention of Dental Erosion: Clinical Guideline ▪ Treatment of Intrinsic Discoloration in Permanent Anterior Teeth in Children ▪ Extraction of Primary Teeth: Balance and Compensation Methodologies for Clinical Audit in Dentistry ▪ Restorative Dentistry Index of Treatment Need Complexity Assessment	(none given) FDSRCS (Eng)/Dental Practice Board 1999 FDSRCS (Eng) 1997 FDSRCS (Eng) and BSDOH 2001 FDSRCS (Eng) 1999 FDSCRC(Eng)./ Department of Health 1997 FDSRCS(Eng) 2000 (none given) RCS (Eng) 2000 RCS (Eng)

All these documents were sourced and collated in CD format (Figure 7) on behalf of the Clinical Advisory Group. This created a comprehensive resource which was later added to with further data CDs throughout the care pathway development period.

Figure 7: **Data CD containing Oral Health Assessment Reference Material**



Collated by DHSRU

In addition to these known guidelines and standards of professional organisations the Clinical Advisory Group and the Special Needs/Care Focus group were invited to submit additional documentation which members deemed appropriate for consideration in care pathway development.

Some of the additional documentation related specifically to special care and was considered at the Special Needs/Care Focus group prior to submission to the Clinical Advisory Group for the Oral Health Assessment. A selection of these documents is listed below:

- Am I making myself Clear? Mencap's Guidelines for accessible writing (2002)
- Guidelines for the Development of Local Standards of Oral Health Care for Dependent, Dysphagic, Critically and Terminally Ill Patients, British Society for Disability and Oral Health (BSDH), January 2002
- Guidelines for the Oral Health Care of People with a Physical Disability, BSDH January 2000
- The Development of Standards for Domiciliary Dental Care Services: Guidelines and Recommendations: British Society for Disability and Oral Health BSDH, January 2000
- Guidelines for Oral Health Care for Long stay Patients and Residents, BSDH, January 2000
- Oral Health Care for People with Mental Health Problems Guidelines and Recommendations, BSDH January 2000.

In terms of care pathway design, this process of reviewing best practice and the available evidence base aimed to establish the scope and boundaries of the pathway as well as the desired outcomes. In line with PRINCE2 project management the appropriate evidence established by the Clinical Advisory Group was then signed off by the group at the end of the first meeting on the 3rd March 2003 and so secured the first project milestone.

3. Algorithm Construction

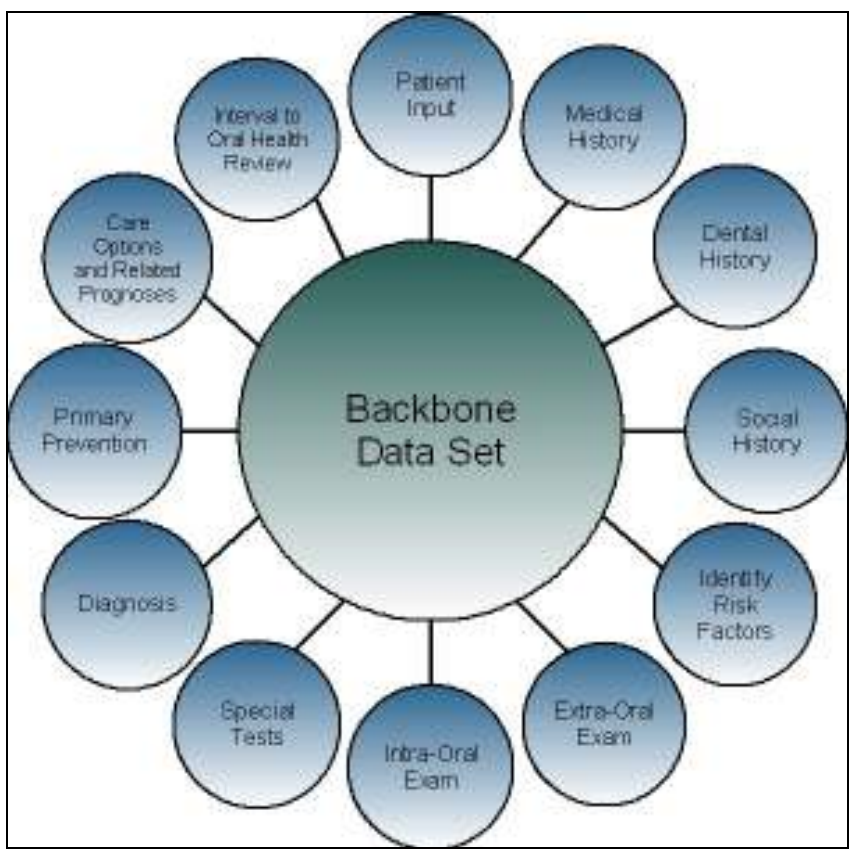
3.1. The First Clinical Advisory Group Meeting

Once the evidence base had been established and signed-off at the first Clinical Advisory Group meeting on the 3rd March 2003 (as highlighted in Section 2: Review of Practice and Evidence Base), further details essential to the Oral Health Assessment structure were extracted. This information was used as the basis for subsequent CAG meetings which aimed to translate these details into a process map or algorithm. Algorithmic construction consisted of a number of sub-steps, each sub-step equating to a meeting of the Clinical Advisory Group and milestone within the Clinical Pathways Project.

3.2. The Second Clinical Advisory Group Meeting

The first of these sub-steps in algorithmic construction was undertaken at the second Clinical Advisory Group meeting on the 23rd June 2003. Achieving the second milestone of the Clinical Pathways Project involved the sign-off of the Oral Health Assessment backbone data set. The backbone data set was developed to reflect the universal nature of the Oral Health Assessment and established the general elements that were to be consistent with dental care of all patient groups (see Figure 8).

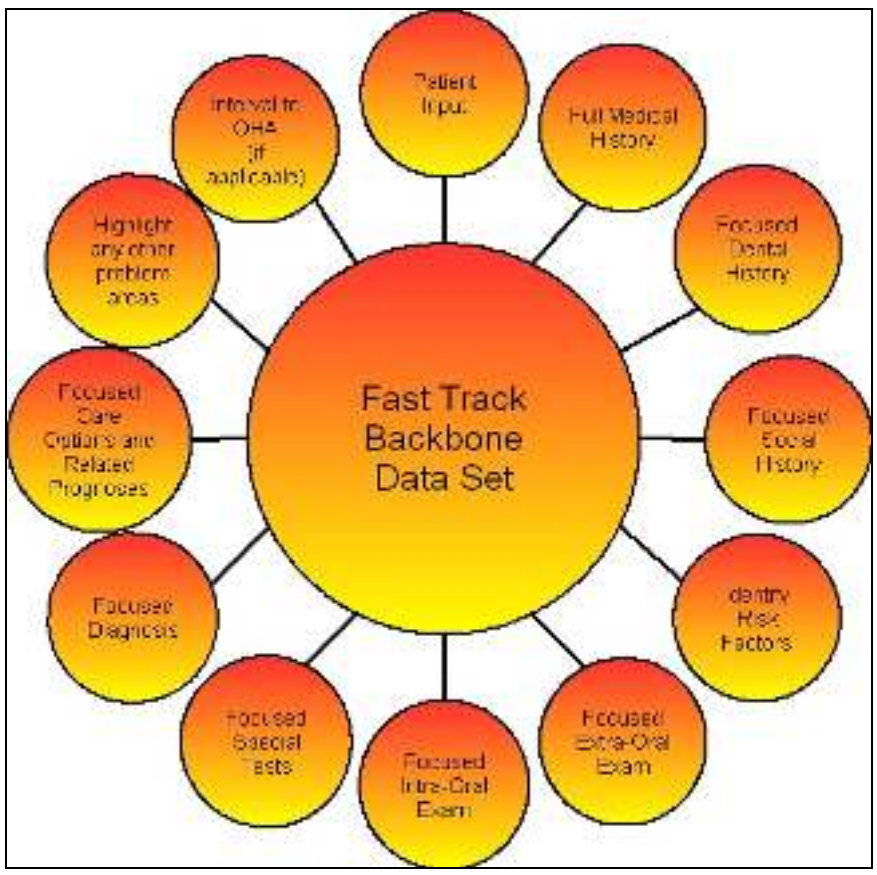
Figure 8: **The Oral Health Assessment Backbone Data Set**



At this second meeting of the Clinical Advisory Group, it was also agreed that the details of this backbone would not be conducive to patients attending with dental problems. Such urgent patients should have the option to by-pass most of the assessment components allowing for an efficient fast track to treatment.

The elements for this scenario were also established by the Group and a further Urgent Back Bone Data set was developed. A diagrammatic representation of the Urgent back bone data set is highlighted in Figure 9.

Figure 9: **The Oral Health Assessment Fast Track Backbone Data Set**



Following agreement on both the backbone data sets, the Clinical Advisory Group went on to further develop each component of the data set so preparing for the next sub-step of pathway development.

3.3. The Third Clinical Advisory Group Meeting

By the third Clinical Advisory Group meeting, further development supported by the DHSRU Core Team, helped to construct a discussion document highlighting elements for the typical individual within each age category and where possible highlighting the evidence base and best practice. This document was then considered by the Clinical Advisory Group in the run up to the 3rd CAG meeting before being agreed and signed-off at the meeting itself on the 11th September 2003. These agreed elements which were highlighted in this document are included in the Interim Clinical Pathways Report submitted to the Department in June 2005.

Once considered by the CAG, this document was submitted to the Special Needs/Care Focus Group. All the proposed elements agreed for the typical individual within each age category by the CAG were then considered within an additional needs setting. This Special Needs/Care Focus Group then went on to tailor the document inline with patient requirements. The Group was unanimous in promoting the concept of the universal pathway stating that “the Oral Health Assessment should be available to all no matter their level of ability”. This therefore reconfirmed the need for a fully universal Assessment that could cater for all.

3.4. The Fourth Clinical Advisory Group Meeting

The Special needs/care edited document was then submitted to the CAG members and discussed, developed and agreed at their 4th Meeting on 17th October 2004.

3.5. The Fifth Clinical Advisory Group Meeting

Prior to the 5th Clinical Advisory Group meeting, the agreed components that were now deemed universal, were transcribed into algorithms (decision trees) and sent out to CAG members. These were then considered and signed off at this meeting on the 8th March 2004.

3.6. The Sixth Clinical Advisory Group Meeting

The sixth meeting on the 5th May 2004 allowed the CAG to sign-off the variance record so completing the algorithmic construction phase. The final CAG meeting also agreed the overall Oral Health Assessment model and the OHA paper document (this will be discussed in more detail in Section 4.1). CAG members continued their involvement with the DHSRU core team throughout the test phase of the project providing additional input and advice when necessary.

4. The Oral Health Assessment Algorithms

From the information agreed by the Clinical Advisory Group (during the six designated meetings) and the Special Needs/Care Focus Group, a set of 4 main algorithms were developed.

- The Dental History
- The Medical History
- The Social History
- The Examination

Each algorithm was designed to interconnect, one with another to create the overall Oral Health Assessment care pathway. The first three algorithms composed the patient's history and were intended to form the part of the Oral Health Assessment that would be completed by the patient him or herself. The information provided by the patient would then be fed into the examination algorithm (the fourth algorithm) for the Dental Team to undertake a tailored assessment guided by the needs of the individual so establishing the universal ethos of the pathway. Prior to the initiation of the Oral Health Assessment care pathway a Patient Profile was established. This contained many essential patient details required for identification. The patient Profile agreed by the CAG during the algorithm construction phase is highlighted below in Table 3.

Table 3: **CAG Agreed Key Patient Profile Elements**

Key Patient Profile Elements for the Oral Health Assessment	
▪ Surname	▪ NHS Number
▪ First Name	▪ Telephone Number
▪ Title	▪ E-mail Address
▪ Ethnicity	▪ Occupation
▪ Gender	▪ Doctor's Name
▪ Address	▪ Doctor's Telephone Number
▪ Date of Birth	▪ Availability at short Notice

Due to patient diversity, a further 'Additional Requirements' section was established where any special needs could be recorded prior to initiating the Oral Health Assessment care pathway. This 'Additional Requirements' section was guided by the Special Needs/Care Focus Group and included details such as patient general ability and carer/guardian/parent information, etc.

4.1. The Dental History Algorithm

The Dental History Algorithm is the first and shortest of all the algorithms that make up the Oral Health Assessment. It is based on the main elements highlighted by the Clinical Advisory Group and Special Needs/Care Focus Group which were deemed to be essential parts of a dental history. The algorithm is essentially composed of four main questions each providing a selection of possible responses. The main questions are highlighted in yellow throughout the length of the algorithm. Most of these questions can be answered with a simple yes or no, although the first question gives a selection of possible time periods for the patient to choose from. Depending on their response this can then lead to the appropriate sub-question.

In cases where a full Oral Health Assessment is not feasible (i.e. in urgent cases) many of the components of the dental algorithm can be by-passed so producing a fast track pathway consisting of only 2 elements (question 1 and question 2). Once this section of the Oral Health Assessment is complete the next algorithm is initiated.

All information gathered during this first phase of the assessment is intended to help tailor the clinical component (the examination algorithm) as well as the patient's final care package. By collating detailed information at this stage of the assessment, a thorough patient profile can be established as the foundation for appropriate care provision, moulded round the individual's needs.

The Dental History algorithm is available through DHSRU.

4.2. The Medical History Algorithm

This is the second algorithm to be constructed as part of the Oral Health Assessment. The Clinical Advisory Group agreed the main elements and then expanded on them to establish the algorithm's components. Due to the importance of a concise Medical History in all clinical scenarios, this algorithm is the only one that remains in its entirety for both OHA and Fast track patients. The resulting algorithm is available through DHSRU.

The medical history algorithm is composed of 6 main elements, each defined and agreed by the Clinical Advisory Group. These elements can be seen as the orange and blue coloured parts of the algorithm. Each coloured element depicts a question or questions relating to the acquisition of a thorough patient medical history. Many of the questions in the algorithm link to further sub-questions that allow for more details regarding that condition to be recorded. The blue section of the algorithm details a list of thirteen condition specific questions. Each question can be answered by stating "yes", "no" or "unsure". In cases where a patient answers "unsure" to a question, this can be followed up by the dental team in the surgery environment. Any questions that a patient answers "yes" to, go on to create a summary of the patient's current health status. This is then followed by two further sub-questions relating to the patient's specified conditions.

This section then feeds back into the main body of the algorithm and a question relating to drug and medication use. The Clinical Advisory Group envisaged that an IT facilitated version of the history should have links to an online version of the British National Formulary. This would then allow the dental team to check patient medication, doses and contraindications quickly and accurately. The Group also discussed future implications of the system, suggesting an eventual link up with NHSNet allowing seamless information transfer and automatic self population of fields so reducing the amount of time required for the patient to complete the questionnaire.

Once the patient had entered their medical history details the group highlighted the need for patient/guardian signature to be recorded. For the IT prototype it was suggested that this could be done electronically. On completion of this algorithm, the Oral Health Assessment patient would then be required to complete a social history. For the fast track patient however the history element would be complete and they would enter the surgery so activating the Examination algorithm (see Section 4.4.).

4.3. The Social History Algorithm

The Social History algorithm is the third and last algorithm that makes up the patient's history component of the Oral Health Assessment care pathway. The Social History was again developed from the agreed components established by the Clinical Advisory Group. Each component was further developed by the group to create the algorithmic format.

The main questions making-up the social history are highlighted throughout the algorithm in pale blue. Topics like diet, smoking cessation, alcohol consumption and patient anxiety are covered, with many of the topic questions being further supplemented by a series of sub-questions to establish a more comprehensive social profile.

For Fast Track patients, the social history can essentially be by-passed, only patients wishing an Oral Health Assessment need to complete this part of the questionnaire. The social history algorithm can be made available through DHSRU.

Once the patient has completed the patient history component of the assessment (either fast track or Oral Health Assessment), an oral examination can then be undertaken by the dental team. This is highlighted in both full and fast track algorithmic formats in the next section.

4.4. The Examination Algorithm

The Examination algorithm constitutes the main body of the Oral Health Assessment care pathway. It structures the examination process that is to be undertaken by the Dental Team for an individual patient. Information from the first three algorithms (which were completed by the patient) flow into this algorithm to established a tailored care format, specific to the individual needs of the patient in question. The main structure of this algorithm is highlighted below.

The algorithm is essentially composed of two main parts. The first part is called the pre-examination and the second the examination algorithm proper. The first part is made up of a patient consultation which deals with the patient's presenting issue, associated history and review of patient history details.

The second part of the algorithm can be further divided into: an extra-oral examination; an intra-oral examination; additional records and investigations; a risk assessment; diagnoses; initial prevention, discussion and establishment of personal care package and end report. These elements and their components are highlighted in pale blue throughout this algorithm.

To allow for universal patient access the examination algorithm was further modified for patients under 18 years of age. This was to accommodate the mixed dentition stage and to allow for age specific care. The modified Examination Algorithm is available through DHSRU. It should be noted that this algorithm is only another strand of the original examination format and not a separate pathway.

To establish all the elements of a care pathway within the Oral Health Assessment, the Variance Record was also superimposed onto the examination algorithm. This provided intrinsic gateways allowing entry and exists along the course of the pathway if a valid reason for doing so was cited. The addition of this element allowed the dental team to use professional judgement to navigate through the various items included in the algorithm. Depending on the individual needs of the patient the examination via the variance could be tailored to meet requirements.

The Examination algorithm also had to demonstrate the Fast Track pathway alternative. This has been highlighted in orange and runs parallel to the framework of the Oral Health Assessment pathway, essentially using main elements as a menu for individualised fast track care.

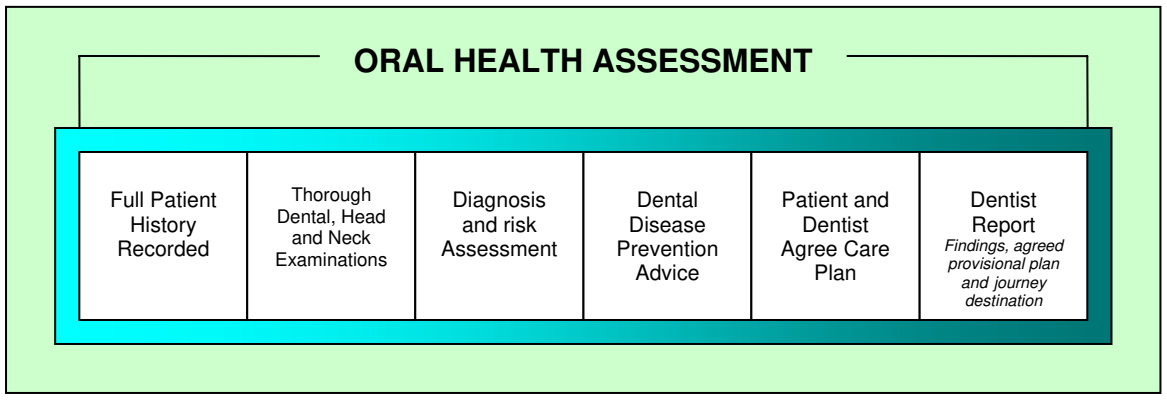
Following further discussion with the periodontal representative on the Clinical Advisory Group in 2005, the periodontal status element of the examination algorithm was updated in line with breaking periodontal guidelines. The updated section of the algorithm is also available through DHSRU.

As with all pathway components, new and emerging dental and medical evidence will have an impact on the constituent components of each algorithm. Algorithmic development is therefore not a one time event but instead a continual developmental cycle that takes the latest 'evidence based' information and incorporates it directly into the care pathway system.

4. Pathway Products

The Clinical Advisory Group, following the intricate development of the assessment algorithms, realised the need for a simplified overview of the product's structure. This was done using a schematic diagram highlighting the main components (see Figure 10).

Figure 10: **The Components that make up a Comprehensive OHA**



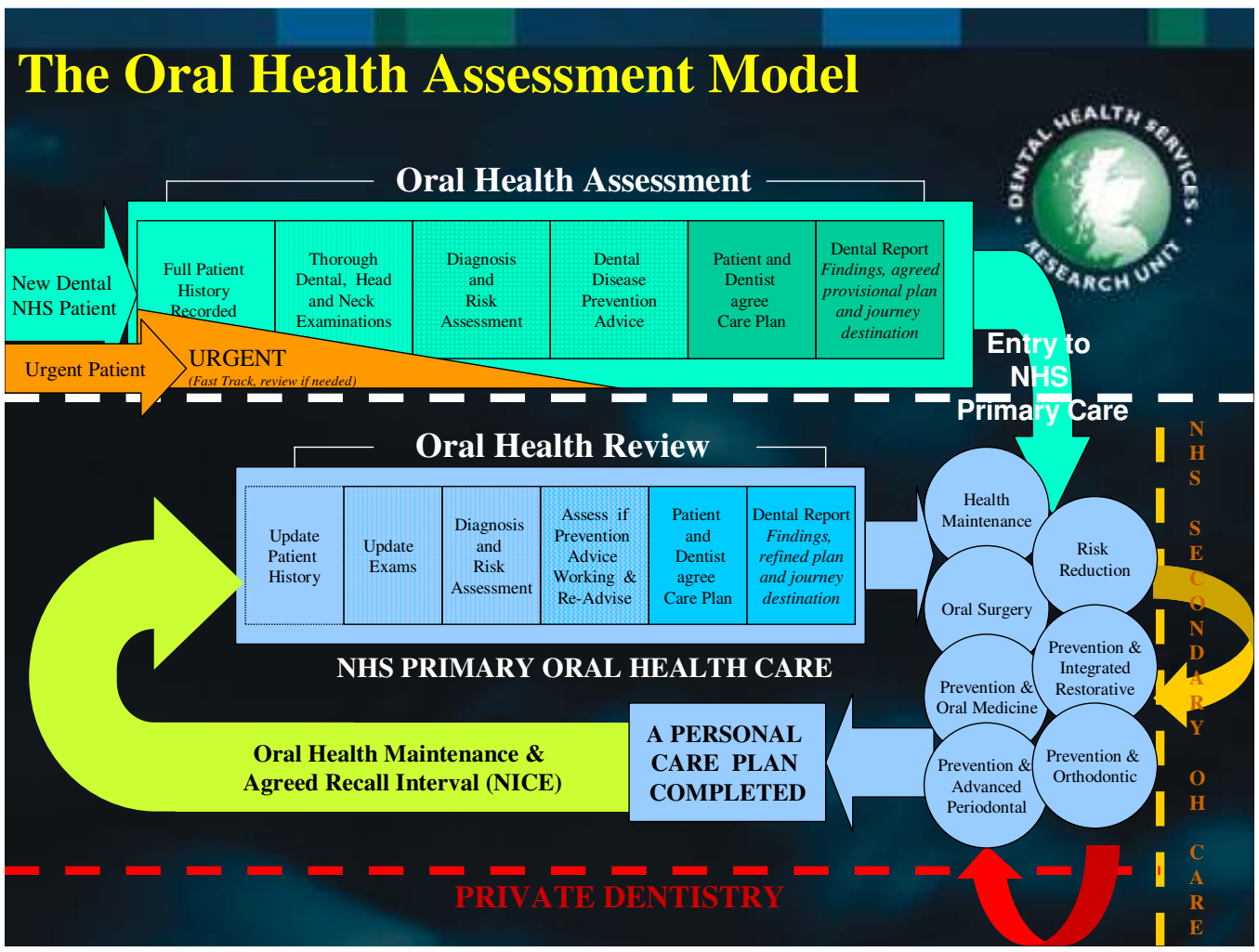
The Clinical Advisory Group then went on to further develop this concept by demonstrating how the Oral Health Assessment would fit into Primary Care and continuing dental care. This was demonstrated in the development of an overview model (see Figure 11).

This model establishes the Oral Health Assessment as "the gateway" to continuing NHS dental care. Composed of six key themes, it allows the new dental NHS patient, direct entry into the continuing care cycle. This cycle consists of a personalised care plan, individualised Recall Interval and Oral Health Review. For patients who do not wish to enter into continuing care, a fast track alternative is also included and is depicted in orange along the body of the Oral Health Assessment in the model.

This orange area equates to the fast track aspect of the Examination algorithm. For such fast track patients, the option of an Oral Health Assessment can still be available at a later date.

On completion of the Oral Health Assessment and entry to NHS Continuing Primary Care, the patient's personalised care plan is initiated. These care options are indicated by the results of the Assessment and would take the form of interconnecting care pathways. Suggested pathways are highlighted in Figure 11 and include the Prevention and Oral Medicine pathway, Prevention and Advanced Periodontal Pathway and Health Maintenance Pathway.

Figure 11: **The Oral Health Assessment Model**



In some cases, individual treatment items within a pathway may need to be undertaken out with the Primary Care setting (in Secondary or Private Care). This model highlights the potential for cross over to these care settings as defined by the patient's personalised care plan. This care plan which consists of interconnecting pathways was deemed to be out with the scope of the current Clinical Pathways project and therefore still requires further work.

On completion of the personalised care plan, an individualised Recall interval is established using National Institute for Health and Clinical Excellence (NICE) guidelines[34] and the risk assessment element within the OHA. This is followed by an Oral Health Review, a generalised update of the original assessment. According to this model, an Oral Health Assessment is only completed once, when a patient enters NHS continuing dental care. After this, Oral Health Reviews are preformed as a means of updating patient's records. This then establishes the continuing dental care cycle.

5.1. Product One: The Pathway Document

The final step of care pathway document development was completed on the 5th May 2004. On this date the Clinical Advisory Group signed off the variance record algorithm and the resulting Oral Health Assessment paper document. The paper document was developed to encapsulate the essence of the algorithms by condensing them into their essential elements. The full paper pathway documentation can be found in the Interim Report submitted to the Department of Health in June 2005.

Some of the features of this document have been highlighted in the following Figures although it should be noted that all pages have subsequently been updated. All elements of the document had been considered by the CAG in the run up to the final meeting and were agreed and signed-off on the 5th May 2004.

In line with algorithm construction the first four pages of the Oral Health Assessment document reflect the patient history component. This component contains the main questions agreed by the Clinical Advisory Group and the Special Needs/Care Focus Group to be essential in tailoring care to a patient's specific requirements. The first four pages are highlighted below in Figures 12, 13, 14 and 15.

The first page equates to the elements of the key patient profile being supplemented with an area for recording any additional requirements. This page is followed by the medical history which is essentially a summary of the main components of the medical history algorithm. The third page merges both the dental and social history, again summarising the algorithmic components. The social history is complemented by the fourth page, a questionnaire responsible for establishing patient dental anxiety (The modified Dental Anxiety Score). This element was guided by the Special Needs/Care Focus Group and was included as an additional element of the pathway following consultation with the Clinical Advisory Group.

Figure 12: **Patient Profile**

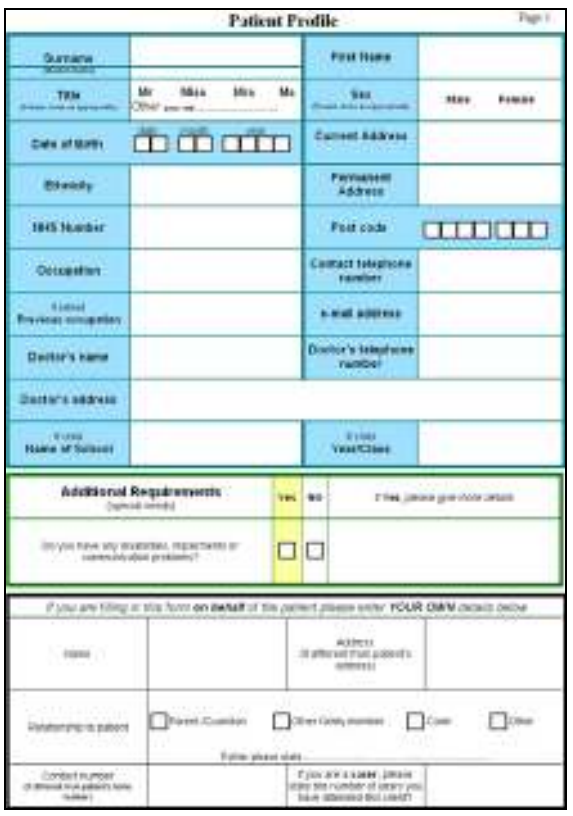


Figure 13: **Medical History**

Figure 14: **Dental and Social History**

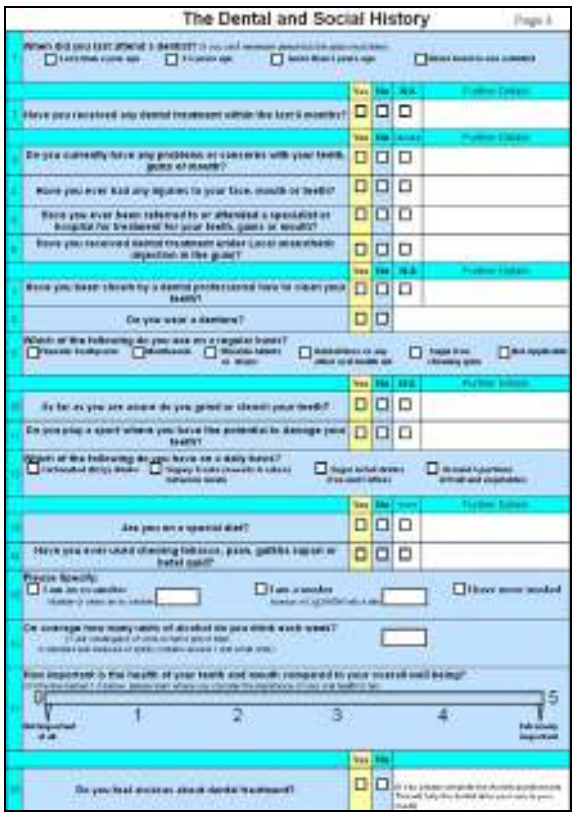
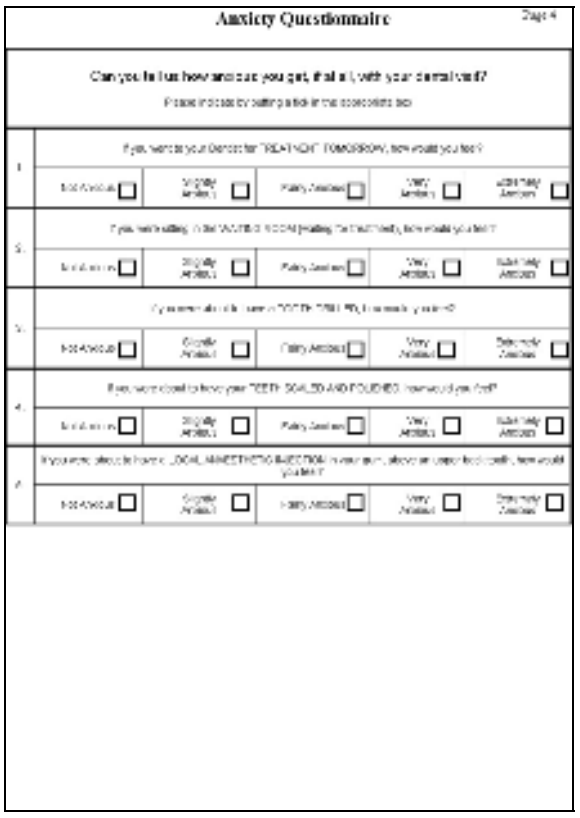


Figure 15: **Anxiety Questionnaire**



The proceeding pages of the paper pathway document deal with the examination component of the Oral Health Assessment. This is undertaken by the Dental Team. The initial part of the examination algorithm is termed the Pre-Examination and is composed of a patient consultation (discussion) where the patient's presenting issue, history relating to that issue and review of the patient's history (contents of the patient profile, medical, dental, social and anxiety questionnaires) are considered.

From the algorithmic format, this has been translated into one page of the Oral Health Assessment Document, allowing the Dental Team free space to record any relevant issues. Each component of the pathway is highlighted in blue with recording space provided below (see Figure 16). To allow for the dental team to instigate professional judgement, a variance record has also been included as per the original algorithms. This is indicated by the yellow margin to the right of each page. If a section could not be completed satisfactorily or was inappropriate for a patient, the dental team can tick the box in the yellow margin entitled "variance" and enter the reason for this variance in the section at the bottom of the page. This section is called the Variance Record.

The sixth page (Figure 17) initiates the Extra-Oral Examination and includes the following elements: general appearance; appearance of the head and neck; palpation of the lymph nodes; assessment of TMJ apparatus; and space for the recording any additional examination information. To cater for the various age groups some sections are not applicable for all adults. According to the Clinical Advisory Group for example, skeletal pattern assessment may only be necessary for those of an appropriate growth age in the 18 years of younger age category. For patients above 18 years, this element is not necessary but optional and down to the professional judgement of the dental practitioner (such elements are generally highlighted in the blue column in the left of the page). Again a variance record has been included to allow for professional judgement.

Following the Pre-Examination and Extra-Oral Examination, the proceeding pages of the OHA document detail the Intra-Oral Examination. The first of these pages is entitled the 'Dentition: Overview and Periodontal Status' (see Figure 18). This page, as its name suggests, provides a general overview of the patient's dental status and current periodontal condition. Elements such as the number of teeth present/missing and discoloured can be easily recorded on a simple dental chart at the top of the page. This information provides the dental practitioner with a baseline for more detailed charting (if possible) later in the assessment.

Figure 16: **Pre-Examination**

Figure 17: **Extra-Oral Examination**

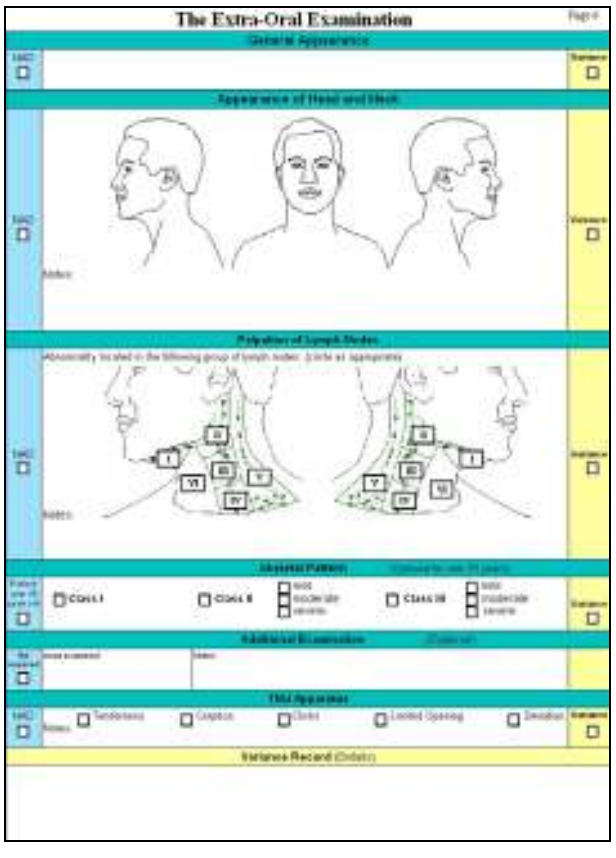
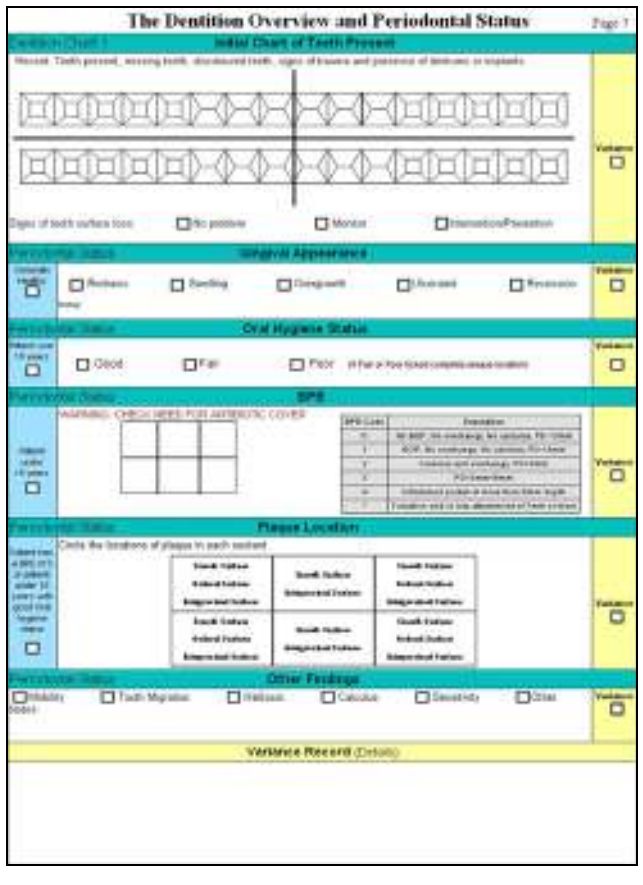


Figure 18: **The Dentition Overview and Periodontal Status**

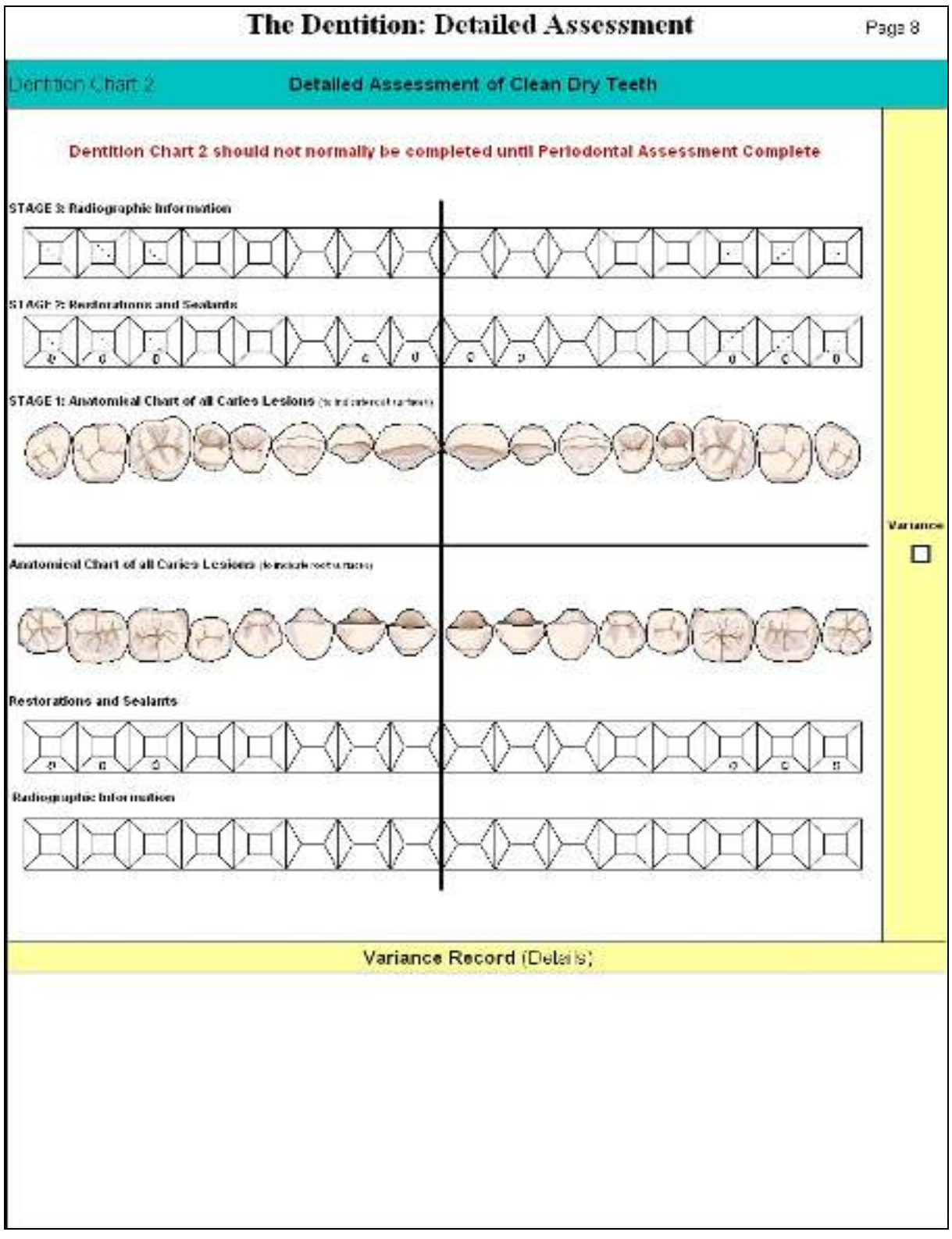


This element is followed by the periodontal assessment which consists of 5 main components: a BPE; plaque location chart; information relating to the patient's oral hygiene status; gingival appearance and a section for any additional periodontal findings. Again some of the components of the periodontal assessment are age specific, indicated by the blue column on the left of the page. All elements highlighted by the Dentition Overview and Periodontal Status page, allow variance to occur. This is again highlighted by the incorporation of the yellow margin at the right of the page so allowing the practitioner to leave the pathway at any particular element (for example, in cases of poor patient co-operation) and re-enter at a subsequent section.

The 8th page of the Oral Health Assessment document (see Figure 19) required substantial development on the part of the Clinical Advisory Group. Following the establishment of the patient's general intra-oral status, the need for a more detailed dental examination was deemed necessary and was highlighted in the original Examination Algorithm. This more detailed assessment would require the teeth being clean and dry prior to examination to allow for the accurate diagnosis of primary caries. To allow for this more detailed examination the existing format of dental recording required alteration. The Clinical Advisory Group agreed on a more anatomical representation of dentition to record the precise location of primary caries lesions. This was supplemented by two other charts: one for recording restorations and sealants and the other for any additional radiographic information. Both these charts highlighted the presence of pits, fissures and ridges. Again a variance record was included in line with the established algorithmic elements.

The Clinical Advisory Group also considered the importance of incorporating the International Caries Detection and Assessment System (ICDAS) codes to improve the level of information collated during a dental examination. These codes would allow for the level of carious activity to be recorded providing essential information for prevention and the monitoring of dental decay. The detailed charting aspect of the OHA document has been further developed in line with the needs of the older patient for the Scottish Oral Health Assessment. This assessment is composed of a number of Proformae (Clinical and Patient) and demonstrates the incorporated improvements to the detailed chart in Clinical Proforma 2.

Figure 19: **The Dentition: Detailed Assessment**



Pages nine and ten of the Oral Health Assessment document (Figure 20 and Figure 21) were designed to deal with the soft tissue and denture assessment. According to the algorithm's prescription only the soft tissue assessment was deemed a universal component for all patient groups. This assessment would allow for each aspect of intra-oral soft tissue to be examined systematically while further details e.g. size colour etc could be recorded on the mouth map. The denture assessment is an optional component of the Oral Health Assessment based on the presence of a dental prosthesis. For those patients without a denture, the dental team would by-pass this sheet by ticking the box in the red section at the left of the page.

The denture assessment consists of: a description of the denture; a record of the current design; the patient's perception relating to their current appliance and the dental professional's general opinion relating to that denture. Any section which the dental team feels is inappropriate for a given patient may be by-passed as long as a valid reason is recorded in the variance record.

The following three pages of the Oral Health Assessment document were designated as optional components of the assessment (as per the original Examination algorithm) i.e. their completion was dependant on the clinical judgement of the dental team and the specific requirements of the patient.

The first of these three optional components, page eleven (Figure 22), deals with the occlusal assessment. The Clinical Advisory Group was explicit in their prescription for this component of the Oral Health Assessment in that it should be simple and quick to complete. The Index of Treatment Need (IOTN) was deemed the most appropriate mode of assessment with a requisite for use on those patients aged below 18 years (as long as the dental team felt it appropriate for that given patient). A description of each of the IOTN codes was included on this sheet to aid assessment. In cases where the IOTN was not appropriate for a child patient (under 18 years) the variance record would be completed.

Patients over 18 years of age were not required to undertake an IOTN (Orthodontic Assessment) but the inclusion of this element was left to the dental team based on the patient's needs. A free text section was also included where a brief description of the occlusal status of the patient may be recorded rather than or in addition to the IOTN.

Figure 20: **Soft Tissue Assessment**

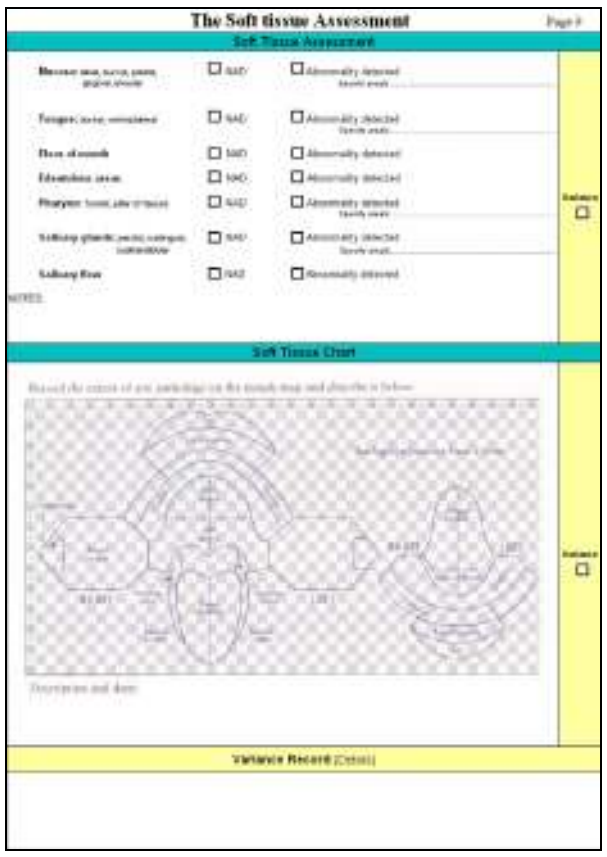


Figure 21: **Denture Assessment**

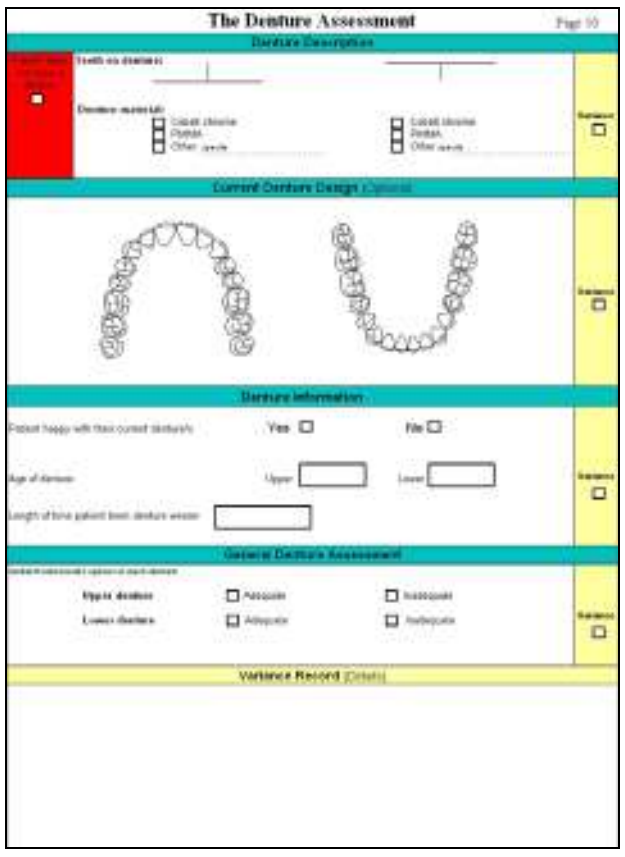
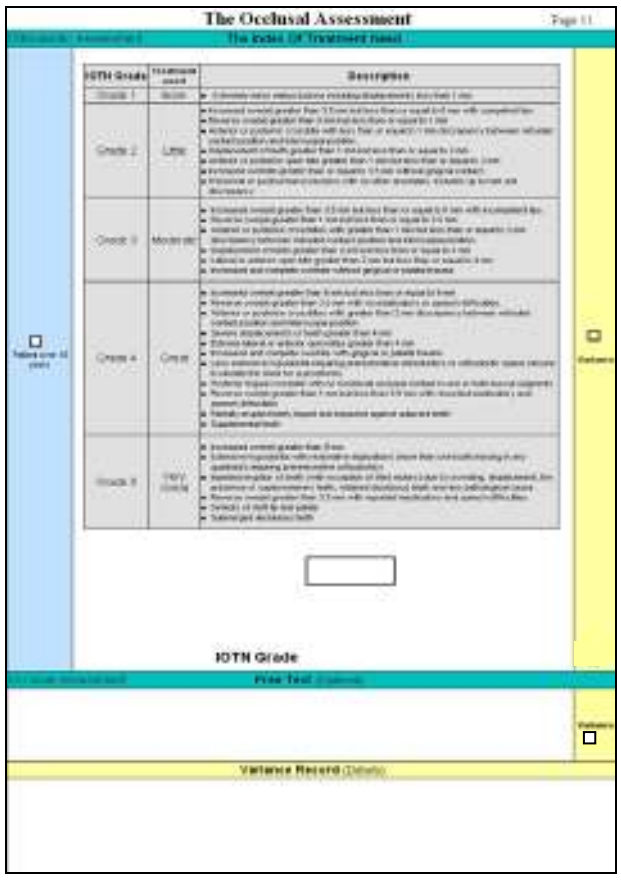


Figure 22: **The Occlusal Assessment**



Following the occlusal assessment the next optional component of the OHA is the 'Additional Records and Investigation' sheet (Figure 23 and 24). This part of the assessment extends over two separate pages (page 12A and 12B of the OHA document) and provides a menu of main investigations which may be required to further establish the oral status of any given patient. The individual elements which compose this section are listed below:

- Provision of study models.
- Provision of radiographs. This section includes a Radiographic report, radiographic selection criteria and radiograph quality assessment.
- Results of vitality testing.
- Results of undertaking a cracked cusp test.
- Provision of clinical photographs.
- Provision of an oral biopsy.
- Tooth tenderness on percussion (TTP).
- Presence of apical tenderness.
- And notes of any other investigations that the dental team have undertaken, not highlighted in the list above.

All listed elements are optional, although the dental team should establish that a patient does not require a particular investigation by ticking the box in the red column on the left of each sheet. If however an investigation is deemed necessary by the dental team but cannot be completed successfully then the variance record would be completed.

The Examination algorithm agreed by the Clinical Advisory Group also highlighted the need for a Risk Assessment to Inform the Recall Interval. Page thirteen (Figure 25) and fourteen (Figure 26) were developed in line with NICE Guidelines[34] published in October 2004, to establish a recall interval based on a patient's specific needs so moving away from the traditional 6monthly check-up for all.

Page thirteen deals with assessing the patient's risk to oral and dental disease. The page was developed to mirror the risk assessment set out by the NICE document and is composed of 10 areas of risk review covering both the patient's history and the clinical aspect of the assessment. The dental team reviews the previous pages of the OHA document and considers each of the stated risks in relation to a particular patient. This is done by identifying any known risk factor and ticking the 'Yes' box. Likewise if a patient does not have a particular risk the 'No' box should be ticked.

If the dental team is unable to assess a particular component e.g. due to an inadequate history being given by the patient, then the variance box should be ticked and the record at the bottom of the page completed.

Once this section of the sheet is complete, the dental team then weighs up the risk factors by considering both the green (low risk) and red (high risk) boxes that have been ticked. It should be noted that the patient's overall risk and hence their recall frequency is not a simple numerical comparison of the number of red/green boxes ticked but instead based on the dentist's perception of the weight of any given risk relating to the patient's oral status and the need to be recalled more regularly. This therefore provides a more holistic approach to establishing the recall interval.

Following the completion of the risk assessment, page 14 should then be completed. This form highlights an earlier version of the recall interval selection concept which has since been reconfigured and updated to improve usability. Originally there were 5 stages to establishing and agreeing the recall interval. Stage one determines the recall range for a particular patient based on age. Patients aged over 18 years had a NICE determined recall range of 3 to 24 months. For those aged up to 17 years this was reduced to 3 to 12 months.

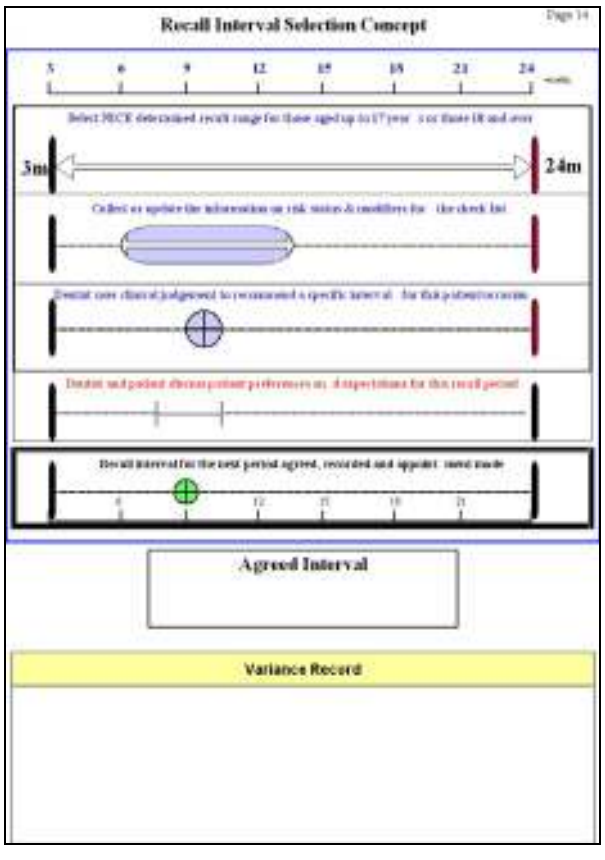
Stage two involved establishing a more focused recall range that relates specifically to the patient's risk profile i.e. are they more high risk or low risk. In stage three the dental team then selects a definitive interval according to their clinical judgement. The patient and dentist then discuss this recommendation considering patient preference and expectations for this recall period, this is stage four. Finally in stage five, the dentist and patient agree a recall period in light of all previous information recorded in the recall selection concept. If for any reason the selection concept cannot be completed the variance record should be completed.

Figure 23: **Additional Records A**

Figure 24: **Additional Records B**

Figure 25: **Risk Assessment**

Figure 26: **Recall Interval**



The final four pages of the paper document that represents the Oral Health Assessment care Pathway deals with: Diagnoses and Initial Prevention; the Patient's Personal Dental Care Package and the Initial Report (one page for the dental Team's records and one for the patient).

The Diagnosis and Initial Prevention component are represented on one page (page 15) of the document (Figure 27) and is supplemented by a variance record. The Diagnosis element provides free space for the dental team to list the patient's diagnosis or diagnoses as required and is followed by the Prevention element which lists 7 proposed initial prevention elements that may be deemed necessary for patient care.

This is followed by the Personal Dental Care Package on page 16 (Figure 28) which provides a list of future pathways of care with prevention components where appropriate, that maybe applicable to the patient's dental and oral health needs. All these pathways require development. The final two pages essentially form the summary of the patient's specific treatment need and include the agreed date for the next appointment. To maintain the pathway's patient focus, the Clinical Advisory Group recommended that a copy of this summary document should be given to the patient. The last four pages of the document are illustrated in Figures 27, 28 and 29.

Many of the presentation ideas set out in this prototype document were further developed not only in the IT prototype but also in the work undertaken for NHS Scotland and their OHA for older individuals.

Figure 27: **Diagnosis and Prevention**

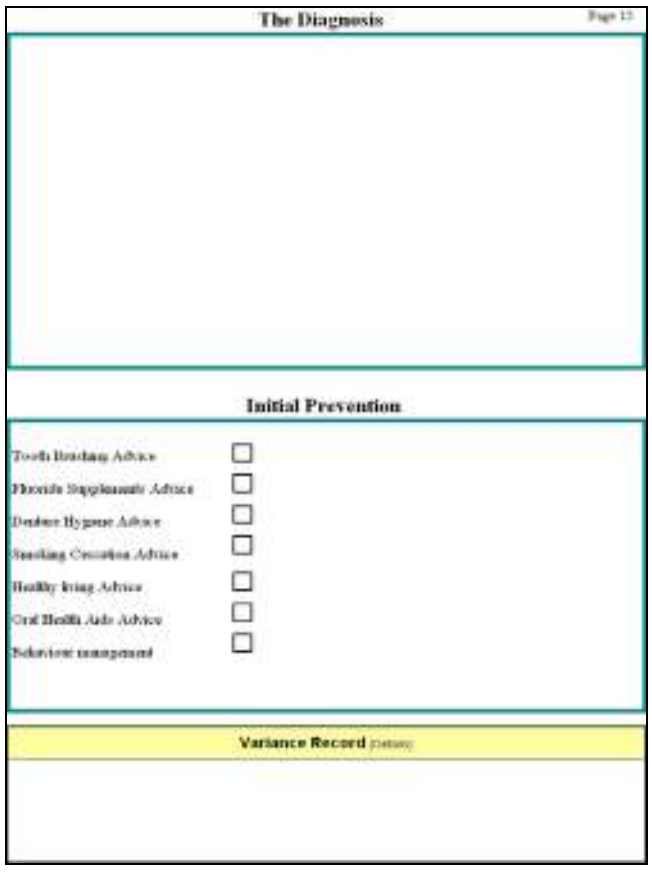


Figure 28: **Personal Care Package**

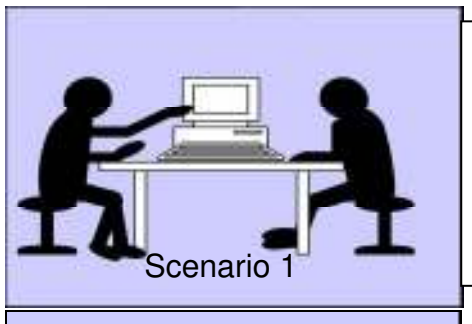
Figure 29: **Initial Reports** (Dentist and Patient)

4.2. Product Two: The Information Technology (IT) Prototype

The algorithms which highlighted the process of care were also used as the basis for an IT Oral Health Assessment concept model. This model was developed by DHSRU in conjunction with the department of Applied Computing at the University of Dundee using the Options for Change field sites and dental focus groups to guide development. This prototype highlighted the components of the Oral Health Assessment in dynamic form, allowing information to be collated and transferred where appropriate to various stages of the assessment, giving a self population effect in some of the OHA fields. This prototype provides the blueprint for the ultimate Oral Health Assessment IT format.

In initial consultations Applied Computing and the DHSRU Core Team were keen to develop a prototype which would not be excessively intrusive to the dental examination procedure. Initial consideration of dental practice ergonomics and available evidence[35-40] resulted in considering the workflow within the clinical environment. A schematic representation of general computer, patient and dental team interaction was developed to see how IT could be better integrated into the current procedure (see Figure 30). This was based on observations drawn from a small group of NHS 'computerised' dental practices.

Figure 30: **Current Dental Surgery Ergonomics**



To establish better dental surgery ergonomics many concepts were considered by the core team and Applied Computing. The concept on the touch screen computer was deemed most applicable to the needs of both the patient and dental team. This product was developed through phases of continual testing and redevelopment; therefore this product will be further explored in the next section.

Product Initial Testing

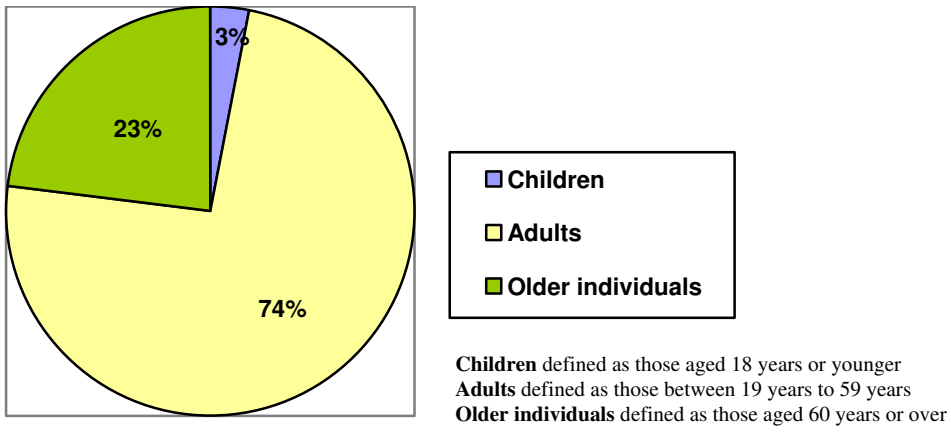
Product testing was undertaken throughout the duration of the Clinical Pathways Project. Pilot testing was used by the Core Team (in conjunction with Applied Computing) to establish a direction for development rather than the evaluation of an end product. Such test phases established the creation of a tailored primary care product in both paper and IT formats. Some of the tests undertaken during the Clinical Pathways Project are detailed for completeness below.

1. Initial Pilot Test of the Paper Document

In the initial stages of document production, volunteers from the Dental Practice Board agreed to take part in a small pilot study in September/October 2003 aiming to highlight any issues relating to the ease of Oral Health Assessment document completion. This was the first pilot test to be undertaken and was performed at an early stage of project development.

Seventeen Dental Registration Officer (DRO) volunteers tested the prototype paper version of the Oral Health Assessment on a total of 61 patients. Figure 31 highlights patient composition according to age category. Each DRO assessed between 1 to 5 patients with ages ranging between 15 to 77 years. The average patient age for the pilot study was 48 years old.

Figure 31: **Composition of patient group by age category**

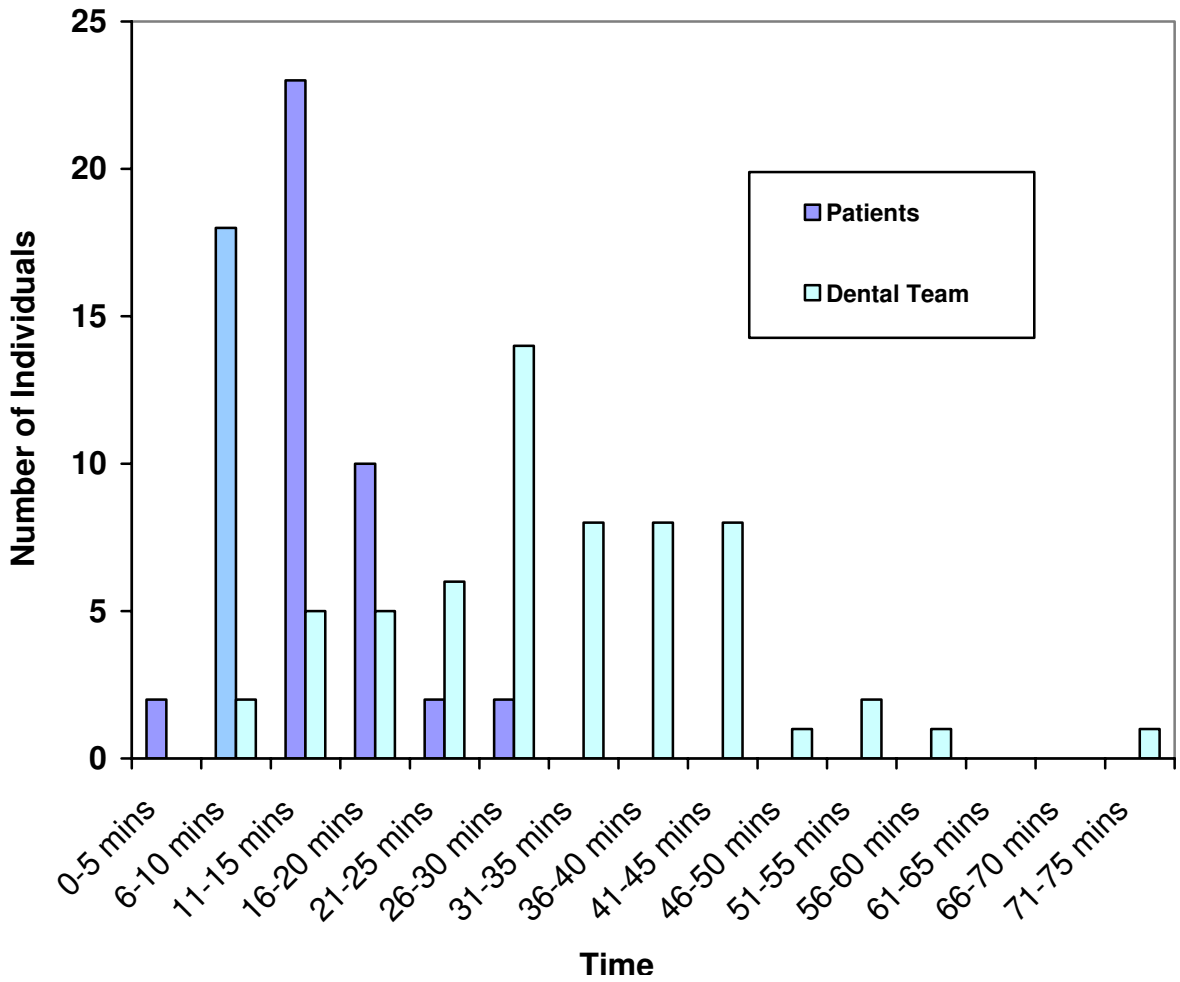


Children defined as those aged 18 years or younger
Adults defined as those between 19 years to 59 years
Older individuals defined as those aged 60 years or over

At this initial stage, no guidance notes were supplied with pathway documentation, instead volunteers were asked to negotiate the various elements using only the information supplied on each sheet. This therefore established the current usability of this initial paper format.

A rough estimate of the completion time was requested for both the patient component and the dental team's component of the paper document. The average time taken for a dental team to complete the Oral Health Assessment document without guidance was 32 minutes, while patients took on average 14 minutes to complete their portion of the assessment including the histories (Figure 32).

Figure 32: **Times taken for Patients to complete History Component and Dental Team to complete the Clinical component of OHA**



During the pilot study Dental Teams were also asked to comment on the assessment by providing 5 likes and 5 dislikes relating to the documentation. Table 4 summarises the issues raised.

Table 4: **Summary of DRO likes and dislikes regarding the OHA Document**

Likes	**Dislikes**
▪ Comprehensive nature	▪ Lack of guidance
▪ Structured format	▪ Detail of some sections
▪ General presentation	▪ Time to complete
▪ Logical progression	

Following the results of the pilot test, the document was further developed in line with the comments made by the DRO volunteers. Particular emphasis was based on the areas of weakness and improvements made to establish the paper end product highlighted in the development chapter and detailed in the Interim Report in Appendix 6. These improvements were further carried into the development of the OHA IT prototype.

Further work based on the development of the English Oral Health Assessment documentation has been undertaken in Scotland since June 2005. This documentation entitled 'The Oral Health Assessment for the 60 Years and over' has been specifically tailored to the needs of this patient group in Scotland.

2. Fast Track Patient History initial Pilot: IT vs. paper version

Following initial phase development of the Oral Health Assessment IT prototype, a pilot study was set up to test the patient component of the assessment. This component, called the patient interview would be tested via a touch screen computer as prescribed during the development phase of the prototype. The pilot study would compare the paper version of the fast track history questionnaire for urgent dental patients at Dundee Dental Hospital with the touch screen computerised version.

Patients attending the Diagnosis Department, a drop in centre for unregistered patients with dental problems, were asked to take part in the pilot study on 14th September 2004 and would complete one or other of these history taking formats prior to surgery entry.

Of the 25 Patients attending the clinic, only two declined to participate in the study. Patients were asked either to complete a paper history questionnaire (Figure 33) the fast track version of the OHA patient history or the touch screen IT prototype version (an earlier version of the one highlighted in screen shot format in Appendix 7 of the Interim Report). It should be noted that due to the nature of patients entering this department only the 'fast track' component of the patient history algorithms, as highlighted in the development chapter of this report, were used to create both the pilot IT prototype and the paper version. The full Oral Health Assessment patient component was not tested.

All patients who were involved in the study were asked to complete a short Review Questionnaire to establish views and opinions relating to the version tested. The pilot also considered the opinions of dentists working at the clinic regarding the history information obtained from the patients.

Of the 23 patients who agreed to take part in the study, 12 completed the paper history questionnaire while 11 tested the IT prototype version. The format for patient completion was assigned randomly to patients as they entered the waiting room.

2.1. The Paper History Questionnaire

The profile of the 12 patients involved in the testing of the paper history questionnaire was as follows:

- The average patient age was 35 years, ranging from 18 to 64 years.
- Seven females and 5 males completed the paper version.

All 12 patients involved in this arm of the study completed the paper version of the History Questionnaire and the Review Questionnaire prior to being seen by the dentist in the clinical setting. All patients felt that the history questionnaire did not take them any longer than they expected with timings ranging from 1 minute to 15 minutes to complete. The average time taken for completion of the paper history questionnaire was 5 minutes.

Eleven out of the 12 patients felt that the history form was easy to understand. The patient who stated that the form was not easy to complete, did not give any further information as to which section required improvement. All patients liked the layout of the Medical history form: the colours used; the size and position of the boxes.

Figure 33: **Fast Track Medical History Form used in Pilot Study**

		Yes	No	Unsure	Further Details
1	Are you in good general health?	☐	☐	☐	
2	Are you allergic to anything you know of?	☐	☐	☐	
3	Have you ever had any heart problems/conditions?	☐	☐	☐	
4	Have you ever had rheumatic fever?	☐	☐	☐	
5	Have you ever had any chest or breathing problems/conditions?	☐	☐	☐	
6	Have you ever had any Stomach, gut, liver or kidney problems/conditions?	☐	☐	☐	
7	Do you have any blood or bleeding problems/conditions?	☐	☐	☐	
8	Do you have Epilepsy, or are you prone to fits or faints?	☐	☐	☐	
9	Do you have any problems or conditions relating to your bones, joints or muscles?	☐	☐	☐	
10	Do you have Hepatitis, HIV, AIDS or Tuberculosis (TB)?	☐	☐	☐	
11	Are you pregnant or is there a possibility you could be pregnant?	☐	☐	☐	
12	Do you have Diabetes?	☐	☐	☐	
13	Do you have Multiple Sclerosis, Parkinson's disease, Motor Neurone disease, Alzheimer's or a condition similar?	☐	☐	☐	
14	Do you have a Thyroid problem or condition?	☐	☐	☐	
15	Do you have a condition or problem not specified above?	☐	☐	☐	
16	Are you currently under treatment from a doctor, consultant or clinic?	☐	☐	☐	
17	Do you carry a medical warning card?	☐	☐	☐	
18	Are you taking or meant to be taking medicine prescribed by your doctor or otherwise?	☐	☐	☐	
19	Are there any conditions that run in your family?	☐	☐	☐	
20	Have you ever had an illness or operation that required hospital treatment?	☐	☐	☐	
21	When did you last attend a dentist? ☐ Less than a year ago ☐ 1-2 years ago ☐ More than 2 years ago ☐ Never been				

In terms of the actual questions asked in the medical history section:

- 11 out of 12 patients found them easy to answer.

One patient did have concerns with question 16 (Are you currently under treatment from a doctor, consultant or clinic?) stating that it was “out of character with what had gone before” and that it required considerable thought on their part to answer it.

Patients were also asked whether they understood why these medical history questions are asked before a dental examination. Only one patient stated that they did not understand the need for a dentist acquiring such information.

Finally patients were asked, if given a choice they would prefer to complete a paper form (like the one they just had) or if they could, try a computerised touch screen version of it. Of the patients involved in this arm of the pilot, 6 would like to have tried a computerised version, 2 would rather just use paper and 4 had no preference. Of those patients who would prefer to use a paper version both had little or no previous experience with computers (the youngest individual at 18 years and another at 35 years).

At the end of the pilot the patient history questionnaire was signed by the patient and taken into the clinic.

2.2. The IT Prototype (Touch Screen) History Questionnaire

The profile of the 11 patients involved in the testing of the IT prototype history questionnaire was as follows:

- The average patient age was 41 years, ranging from 28 to 57 years.
- Seven females and 4 males completed the IT version of the questionnaire.

All 11 patients completed the IT Prototype (touch screen) version of the History Questionnaire and the Review Questionnaire prior to being seen by the dentist in the clinical setting. All patients felt that the IT Prototype history questionnaire did not take them any longer than they expected with timings ranging from 1 min 51 seconds to 5 minutes to complete. The average time taken for completion of the IT history questionnaire was 3 minutes.

All patients felt that the Touch Screen computer was easy to use and understand. Eight out of the 10 patients claimed to enjoy using the touch screen facility (the other three patients stated their indifference).

Nine patients liked the layout of the Touch screen but comments from the others included the need to increase the font size and provide bigger, more distinct touch screen buttons to improve ease of use.

In terms of the actual questions asked in the medical history section:

- All 11 patients found them easy to answer.

Although one patient did not understand why medical history questions needed to be asked before a dental examination.

Of the 11 patients in this arm of the study 10 would wish to use the IT Touch Screen prototype version of the history questionnaire again. Only one patient stated that they would prefer a paper format instead. Surprisingly this was not the individual with the least computer experience. Indeed the individual preferring the paper option stated that they used a computer on almost a daily basis. Of the others who preferred to use the IT touch screen version, two stated that they had only ever used a computer on a couple of previous occasions; while the others claimed to use computers on a daily basis.

On completion of the IT prototype, a print out summary of the history information collated was given to the patient to check, sign and take into the clinic for the dentist.

2.3. Overall Comments from dentists regarding the collated histories.

It is current practice in the Diagnosis Department for dentists to record the patient history only once a patient has entered the clinical environment. During this pilot study, dentists were given the completed patient history questionnaires as the patient entered the clinic, in the form of either the paper version or IT printout of the history depending on the format completed. In this pilot study the dentists were asked for their general comments regarding the paper and IT print out versions of the prototype as well as the concept of a touch screen patient interview system.

Some of the initial comments collated from the dentists, stemmed more from the change in practice that the pilot test introduced rather than the format of history taking itself. Many dentists highlighted the advantage of allowing the patient to fill in the patient history themselves prior to surgery entry. Dentists stated that it allowed patient's to be more focused on the information required of them once the history was reviewed in the surgery: "Patients seemed to be more prepared" for the consultation, in that they were ready "with the names and the doses of drugs and past illnesses"

In terms of the concept of an IT based patient history facility, dentists stated that they saw the use of a touch screen patient interview prior to the patient entering the clinic as “very beneficial” stating that the IT patient history is a “Good idea, provided it can be updated easily to allow for any change to the patient medical history”. In general, the dentists who took part in the pilot study stated that this initial IT prototype had “potential”.

Following this pilot study the prototype was redeveloped in line with the Oral Health Assessment, to include the full dental, social and medical history algorithmic elements. The updated version of the patient component of the Oral Health Assessment was then distributed to the Options for Change Fieldsites, CAG and Steering Group for comment.

3. IT Prototype Testing in Options for Change Fieldsites

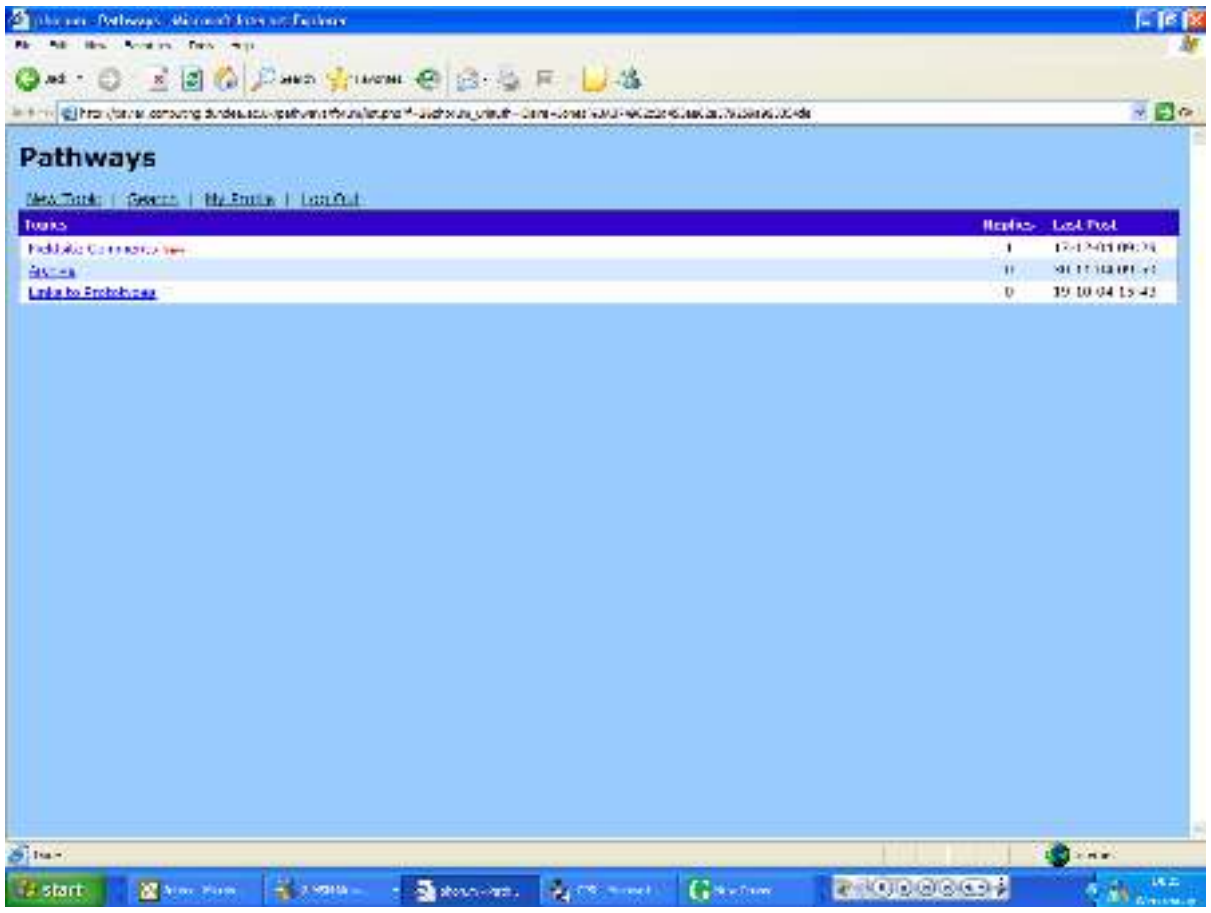
3.1. The Options for Change Fieldsites

The NHS Modernising Dentistry Programme, in September 2002, invited dental practices, Primary Care Trusts and Strategic Health Authorities to be involved in field testing proposals for modernisation, based around areas of priority highlighted in the *Options for Change* document. Twenty-six field sites were identified and grouped according to specific areas of study. No dedicated fieldsites were assigned to the Clinical Pathways Project’s Oral Health Assessment but sites volunteered to take part in the prototype’s development. The initial up-take of this invitation was slow but in the latter stages of pathway development 63 members were registered to the Oral Health Assessment’s Bulletin Board (the medium by which the Fieldsites accessed the latest prototype update).

3.2. The Bulletin Board

The Bulletin Board (Figure 34) was developed by the Department of Applied Computing (University of Dundee) and used a web based design to allow registered members access to the Oral Health Assessment IT prototype. This electronic facility provided the ideal medium for the interested field site members, dispersed over large geographical areas, to contribute to new discussions or existing debates online without meeting in person. This system with its obvious advantage of being able to interconnect Fieldsites through out England despite geographical barriers also has the benefit of being economical to run and also kept a complete history of all discussions regarding proposed improvements to the IT OHA prototype.

Figure 34: **Bulletin Board Presentation**



The aim of the Oral Health Assessment bulletin board was to obtain as much feedback as possible about the version of software distributed, encouraging interactive discussion and a means of communication with all individuals involved in the Clinical Pathways Project.

- **Registering for the Board**

Any members of the Options for Change Fieldsites who were interested in contributing to the development process of the Oral Health Assessment IT Prototype were asked to register for the board by sending their name and email address to Applied Computing at the University of Dundee. Applied Computing then issued an e-mail with the bulletin Board's web address. When a new member received this message they could then log in and change the initial password using the edit profile option.

- **When Items are Posted**

When anything new or any replies were posted on the board each member received an email with the link to that item. All members were initially set to receive notification when both topics and replies were added to the board facility; however this setting could be changed by using the profile–edit e-mail notification option if the member felt that they were receiving too many emails and just want to check the board every so often. Figure 34 highlights the presentation of the Bulletin Board.

Providing the software by means of the bulletin board allowed the prototype to be rigorously tested, evaluated and improved prior to re-release. This therefore established a cyclical development process where the prototype was continually being updated following the comments received from members. Due to the complex nature of the Oral Health Assessment, the prototype elements were distributed via the Bulletin Board in a consecutive manner, with one updated portion being re-released along with a newly developed section. All these portions combined together formed the Oral Health Assessment in its entirety. Some of the initial comments received from the field sites, CAG and Steering Group relating to the early prototype are summarised Table 5 highlighting the following areas for further consideration and development that were dealt with in the updated version of the prototype.

Table 5: **Summary of Comments made by Bulletin Board Members regarding the Initial IT Prototype**

Comments from Bulletin Board Members

• The need to allow (if applicable) multiple answers to the same question.
• More specific instruction required for completion.
• The need to allow amendments to question answers (if appropriate).
• Layout Changes: General layout changes were highlighted in terms of colours used and the overall style of the prototype. Other suggestions included:
  o Ability to increase the font size in the patient questionnaire section if required.
  o The need to reorganise question numbering.
  o Addition of a navigational bar showing the patients progress through the questionnaire.
  o Ability to link with other sites such as the electronic BNF.

The resulting cycle of prototype redevelopment aimed to build on these comments and adapt the prototype accordingly. The end point prototype model can be seen in the Interim Report in Appendix 7 in the form of a series of screen shots. This prototype as originally envisaged, provides a graphic representation of how a Clinical Advisory Group approved pathway would look and could be implemented. It goes some way to highlight a patient sensitized product

4. IT prototype Focus Group Comments

In May 2005 the end stage Oral Health Assessment was presented in front of a group of Primary Care dentists at Dundee University. This was done to establish opinion on the prototype with individuals who had not been responsible for its development. This prototype had been developed inline with the *Options for Change* Fieldsites' comments and was due to be submitted to the Department of Health as the end-stage prototype (i.e. ready for further development in the software manufacturers market) at the end of May 2005. It was the aim of this focus group to provide constructive advice to help further system development and improvement in the future.

The focus group was held over 2 lunchtime seminars with around 10 dentists attending each focus group. These groups allowed the dentists to not only interact with and comment on the content and functionality of the IT prototype but to also compare it with the paper document. The following comments were made regarding the elements.

The focus group highlighted the impact on practice that the introduction of the OHA in any format may have on not only patients but also the dental team. In terms of the dental team the main consideration was that of time and money especially in relation to implementation in the current “fee per item of service” climate. Dentists suggested that a special fee should be agreed to encourage the team’s completion of an OHA with its use being initially rolled out within the vocational trainee and community dental services. These comments relate specifically to the Scottish experience and although applicable to the English model do not coincide directly with the *Options for Change* service developments already in progress south of the boarder, for completeness however they have been included in this report.

In terms of the content of the patient component of the OHA, the focus group felt that it was far more thorough than the average patient history currently taken in practice and that despite creating a more holistic approach to care it would require substantial investment in terms of patient education. Patients may not understand the need to record such in depth information and that the current time frame of GDP practice may limit patients having the time to successfully complete the forms.

The use of other members of the dental team to aid patient form completion in the practice environment was also discussed. The receptionist was suggested as the member of the dental team most likely to play a role in assisting form completion. Again this was seen as an area for staff training as this would mean a change in the current job profile and would have a direct impact on an already fully utilised member of the dental team. It would however also allow for a greater interaction in patient care and may be seen as a way of further developing this post.

The Focus group also suggested the use of information technology as a means of improving and aiding form completion. This could be done via the internet, text or interactive TV where the patient completes the OHA questionnaire (with instruction) in the comfort of their own home prior to their appointment date. This would avoid any delay in the waiting room due to form filling and avoid utilising dental team members. There was also a suggestion to liaise facility this with e-booking.

In terms of the IT patient history prototype itself, the group commented positively on the dynamic screen presentation. They liked the ability the prototype had to tailor questions specifically to the needs of the patient (hiding irrelevant main and sub questions depending on the information entered by the patient). The depth of information requested by the questionnaire was also discussed particularly with regard to access. Concerns were raised by the group relating to acquiring detailed information particularly for patients with special requirements when access is via another health care provider e.g. general medical practitioner. It was suggested that this could be overcome by integrating dentistry with an electronic patient records service providing access to the required details. This information could then self populate the OHA patient history so making the patient's portion of the touch screen prototype almost obsolete.

The clinical component of the OHA was also considered by the Focus Group. It was agreed that many of the elements of this component would be helpful to the dental team in establishing a thorough patient profile although training issues were raised particularly in terms of the new dental charts and use of ICDAS codes (although this was seen as a step forward particularly in the realm of prevention). Other areas, such as the inclusion of the BMI and healthy living advice were also highlighted as training areas not only for the dental teams but also the patients. Again the need to be part of the bigger IT picture in terms of contributing to the NHS patient record was highlighted as many members felt that if they are asked to record a patient's BMI it should feed into an overall data bank and vice versa (if another care provider has already recorded this it should automatically populate this field in the OHA.

Of the other aspects of the OHA clinical component of the IT prototype, the following suggestions were made as additional elements to improve functionality:

- Medical Alerts should be included to highlight any areas of concern
- Addition of a zoom feature.
- Inclusion of a Smart pen to aid the recording of information onto charts and graphics.

The majority of the clinical component's screens were well received by the focus group with the dentists particularly liking the touch screen quality of the prototype and the graphics used to record information.

Some issues were raised regarding the use of the * in the BPE assessment. This was addressed by the periodontal specialist CAG member who confirmed that the prototype was correct and that its use was inline with current British Society of Periodontology recommendations. This therefore highlighted another area of further dental team education and the need for overall standardisation of dental records.

In conclusion the paper and IT prototype version of the OHA was well received by the Focus Group dentists although it did highlight a number of areas of training required for both dental team and patient if the OHA is to be used to its full potential.

Project Discussion

Since the initiation of this project in November 2002, the aim has been to create an Oral Health Assessment in both paper and IT formats that would have the potential to be further developed and implemented into Primary Dental Care. The start point for this project was the limited information included in the *Options for Change* document relating to care pathways and the Oral Health Assessment. The team at DHSRU have developed the ideas cited in this publication inline with current best practice and the available evidence base to create the first dental NHS care pathway, universal in nature and with the potential to be used successfully in a clinical environment.

Much of the emphasis in this project has been to create an assessment, prevention focused and robust in its integral components however due to the time pressures on current practice; this issue has also featured heavily throughout the test period. A recent paper by Wayne, Ameen and Coll in the British Journal of Health care Management does go some way however to highlight feasibility particularly with the adoption of the community general dental practitioner model[41]. Nevertheless the general reaction to the concept of the OHA, following the publication of an article in the Journal of Dental Primary Care in October 2005, has been particularly positive.

The Oral Health Assessment created through the Clinical Pathways project provides an innovative and new way of thinking within dental primary care, allowing for the introduction of a more modern, evidence-based service which has the flexibility to respond to all patient groups whatever their individual need. The pathway also provides a method of operationalising the NICE guidelines on risk-based recall intervals which could be updated at Oral Health Reviews and provides a specification that would allow commercial software vendors to implement the Oral Health Assessment.

Post-devolution, the NHS in Scotland has, with the agreement of the Department of Health England, adopted various elements of the OHA in its new developments and Action Plan. However, if the full potential of this modernised approach to dental primary care is to be delivered for NHS in England, there is now an urgent need to specify and deliver the Personal Pathway Components in: Health Maintenance, Risk Reduction, Oral Surgery, Prevention and Integrated Restorative Care, Prevention and Periodontal Care, and

Prevention and Orthodontic Care. The DHSRU team and the Clinical Advisory Group have all expressed a willingness to continue this development work in order to ensure seamless links to the Oral Health Assessment and NICE Recall Guideline.

NB Pitts and JD Hally November 2005.

References

1. Department of Health. NHS Dentistry: Options for Change. London: Stationary Office; 2002.
2. Porrier GP, Oberleitner MG. Clinical Pathways in Nursing: A guide to Managing Care from Hospital to Home. Spring-house, PA: Springhouse Corporation; 1999.
3. Browning R, Hollingbery T. Mental health. For good measure. Health Serv J. 2000;**110** (5725):34-5
4. National Pathways Association. Annual General Meeting. NPA;2004
5. de Luc K. Developing Care Pathways. National Pathways Association. Abingdon: Radcliffe Medical Press; 2001.
6. Johnson S. Factors influencing the success of the ICP projects. Prof Nurse. 2000; **15**:776-779
7. Currie VL, Harvey G. The Origins and Use of Care Pathways in the USA, Australia and the United Kingdom. Report No.15. Oxford: Royal College of Nursing Institute; 1997. (Revised 1988)
8. Zander K. Collaborative care: Two effective strategies for positive outcomes. In: Zander K (editor). Managing Outcomes through Collaborative Care: The Application of Care Mapping and Case Management. Chicago, IL: American Hospital Publishing; 1995.
9. Zander K. Program design. In: Zander (editor). Managing Outcomes Through Collaborative Care: The Application of Care Mapping and Case Management. Chicago, IL: American Hospital Publishing; 1995.
10. Zander K. Managed care within acute settings: Design and implementation via nursing case management. Health Care Superv. 1998; **6(2)**: 27-43
11. International Survey on Clinical Pathways. European Pathway Association; 2005
12. Rees G, Huby G, McDade L, McKechnie L. Joint working in community mental health teams: implementation of an integrated care pathway. Health Soc Care Community. 2004;**12**:527-36
13. Jones A, Johnstone R. Reflection on implementing a care pathway for the last few days of life in nursing homes in North Wales. Int J Palliat Nurs. 2004;**10**:507-9
14. Hilton J. A care pathway for home parenteral nutrition. Nurs Times. 2000;**96(18)**:38-9
15. Bender AD, Motley RJ, Pierotti RJ, Bischof RO. Quality and outcomes management in primary care practice. J Med Pract Manage. 1999;**14**:236-40.

16. Herbermann M. Building a seamless system of hospital-home health services. Semin Nurse Manag. 2000;**8**:20-5.
17. Wagginer MG. Clinical Pathways; form hospital to the home. Medsurg Nurs. 1999;**8**:265-6
18. Robinson NE, Mahoney S. Clinical pathways span the continuum of care. Health Care Food Nutr Focus. 1997 Jan;**13(5)**:4-5
19. CRAG. Clinical Audit and Quality Using Intergarted Pathways of Care. Project: CA96/01; Glasgow: CRAG;1999.
20. Bryan S, Holmes S, Posslethwaite D, Carty N. The role of integrated care pathways in improving the patient experience. Prof Nurse. 2002;**18**:77-9.
21. Johnson S. Pathways of Care. Oxford: Blackwell Science; 1997.
22. NHS Wales. Introduction to Clinical Pathways: Putting Patients First. Cardiff: National Assesmbly for Wales; 1999.
23. Currie VL. Directory of UK NHS Trusts Using Care Pathways. Oxford: Royal College of Nursing Institute; 1998.
24. Hill M. Integration of care map tools into documentation system In: Zander K (editor). Managing Outcomes Through Collaborative Care: The Application of Care Mapping and Case Management. Chicago, IL: American Hospital Publishing; 1995
25. Middleton S, Barnett J, Reeves D. What is an integrated care pathway? Hayward Med Communications. 2001;3:1-9. Available from :http://www.evidence–based-medicine.co.uk
26. Department of Health. Modernising NHS Dentistry-Implementing the NHS Plan. London: United Kingdom Parliament; 2001
27. House of Commons Select Committee on Health. First Report. Access to NHS Dentistry. London: united Kingdom Parliament; 2001.
28. Department of Health. Government Response to the House of Commons Select Committee on Health's Report on Access to NHS Dentistry. London: Stationary Office; 2001.
29. Department of Health. Dentistry Modernisation Steering Groups' Reports. London: DH; 2001.
30. Department of Health. Shifting the Balance of Power within the NHS: Securing Delivery. London: BDA; 2001.
31. British Dental Association (BDA). Response to Shifting the Balance of Power within the NHS: Securing Delivery. London: BDA; 2001.
32. British Dental Association. Modern NHS Primary Dental Care, Organisation and Development, 2001-2005. A BDA Discussion Document from the Primary Dental Care Working Party, October 2001. London: BDA; 2001

33. Department of Health. Shifting the Balance of Power: The next steps. London: Stationary Office; 2002.
34. National Health Service. National Institute for Clinical Excellence Guideline: Dental Recall:Recall Interval Between Routine Dental Examinations. London: NICE;2004. Available from: **www.nice.org.uk/CG019NICEguideline**
35. Bailit HL, Truax TD. Dental Clinician: A Computerized Patient Record. Journal of Dental Practice Administration, 1990 7(3): 118.
36. Sharkey SW, Murison JM. Towards a General Computer-Based Dental Record System. International Journal of Biomedical Computing. 1973; 4(4):272.
37. Button PS, Doyle K, Karitis JW, Selhorst C. Automating Clinical Documentation in Dentistry: Case Study of a Clinical Integration Model. Journal of Healthcare Information Management. 1999; 13(3):31-40
38. Freyberg BK. Computerization: The Future of Dental Practice Management. Journal of the Californian Dental Association. 1993; 21 (4):44-6
39. Rhodes PR. The Computer-Based Oral Health Record. Journal of Dental Education. 1996;60(1):14-15.
40. White SC. Decision-Support Systems in Dentistry. Journal of Dental Education. 1996; 60(1).
41. Richards W, Ameen JRM, Coll AM. The Community General Dental Practitioner. British Journal of Health Care Management. 2005; 11 (10):308-312.