An Evaluation of Outreach Dental Education

Volume Two

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Appendix A

Publications and Presentations

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List of Publications


A21 Smith, M., Lennon, M.A., Brook, A.H. and Robinson, P.G. A Randomized Controlled Trial of Outreach Placement’s Effect on Dental Students’ Clinical Confidence. Journal of Dental Education 2006; 70(5): 566-570. 298

Dental teams will need to develop and expand if they are to meet the needs of all communities. These challenges are at the heart of government policy and the Modernisation of Dentistry agenda as set out in The NHS Plan, NHS Dentistry: Options for Change, GCD’s First Five Years, and the 2003 Health and Social Care Bill.

Outreach training is a significant and effective step in dental students’ preparation for practice. Inter-professional working is a key element in this development. The proposal seeks to develop and embed an inter-professional approach to dental education through placements for teams of dental undergraduates, hygienists, therapists and nurses in NHS primary care settings.

Building on a successful spring 2003 pilot with twenty students across several locations, a half-cohort study in 2004 will inform further developments for full implementation the following academic year. The placements will expand dental services in areas of identified need and increase students’ awareness of different communities.

A Team Training Group within the Dental School of the University of Sheffield is driving this initiative, developing training packages for supervising dentists, encouraging the production of learning materials for placement students and coordinating the changes needed to ensure coherence with other parts of students’ programmes.

The influence of this model will extend beyond those students involved in developing inter-professional teams. The local supervising staff will be closely involved and neighbouring GDPs will be encouraged to observe the initiative through CPD activities.

This proposal aims to develop and evaluate inter-professional outreach placements for dental students in host clinics in areas of dental need. The poster illustrates experiences from the pilot drawn from the initial evaluation findings.
A2  **South Yorkshire Workforce Confederation conference, Sheffield, November 2003, Poster 2 Training the Dental Team Together in Outreach Placements**

Dental teams will need to develop and expand if they are to meet the needs of all communities. These challenges are at the heart of government policy and the Modernisation of Dentistry agenda as set out in *The NHS Plan*, *NHS Dentistry: Options for Change*, GCD's First Five Years, and the 2003 Health and Social Care Bill.

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A3  International Association for Dental Research conference, March 2004, Abstract 1, Dental students' experience of interdisciplinary outreach training

Dental Schools are developing new undergraduate curricula, with interdisciplinary outreach placements replacing some of the hospital-based training.

Objectives: To explore students' experience of outreach placement.

Intervention: Six-week block placement for 20 undergraduate and therapy students in existing primary care clinics, in areas of need, to work supervised by local dentists.

Methods: Semi-structured interviews with all 20 students by staff independent of the course team. Interviews were audio-recorded, transcribed and then content analysed. Findings were triangulated by reviewing by a second observer, against a questionnaire-based survey and against peer-run focus groups.

Results: Overall students were very positive about their experience and the potential role of outreach training in dental education. Students described: gaining greater experience of new types of patients (children, special needs, phobics, asylum seekers, less affluent, drug users, etc.) and their communities; learning from broader clinical experience, alternative approaches and practicing or observing dentistry in different settings; the benefits of working as part of a multi-disciplinary team; and, acquiring a more holistic and pragmatic view of health care. Many students reported gaining greater confidence, wider awareness of potential careers in dentistry and a greater sense of realism from their experience. Some reflected on their own training needs.

Students also discussed the importance of preparation for, and return from, the placements and the relative merits of different styles of supervision.

Conclusion: Dental outreach training can provide students with valuable learning experience in a range of areas but requires careful management to ensure a common understanding of the programme's purposes and anticipated outcomes.
A4 International Association for Dental Research conference, March 2004, Abstract 2, Supervisors’ perceptions of interdisciplinary outreach training in the dental curriculum

Dental education is changing; supplementing hospital-based undergraduate curricula with interdisciplinary outreach placements.

Objectives: To explore the perceptions of placement staff hosting students on dental outreach training.

Intervention: Six-week block placement for 20 undergraduate and therapy students, supervised by local dentists and supported by clinic nurses in 11 primary care clinics.

Methods: Semi-structured interviews with 32 staff across ten placements by a researcher independent of the organising team. Interviews were audio-recorded, transcribed and then content analysed. Interim findings were validated by presentation to placement representatives for comment.

Results: Overall placement staff were positive about the benefits to students including inculcating a more holistic, pragmatic view of health care and wider awareness of dental careers and the potential role of outreach training in dental education. Benefits to staff included a sense of satisfaction as host, contributing to dentistry’s future and local recruitment, having to reconsider routine decisions for explanation to students and social benefits for the dental team.

Staff asked for greater attention to be paid to communicating students’ prior competence and individual development needs; engaging interest in non-clinical work, and developing the supervisory role in checking work, providing feedback and assuring consistent grading standards. Supervisors stressed the importance of early preparation and logistic considerations.

Conclusion: Primary dental care settings can contribute more to dental education. Staff enjoyed helping students and regained an analytical approach to their work. Careful management is required to ensure a common understanding of the programme’s purpose.
UK Dental Schools are developing new undergraduate curricula, with interdisciplinary outreach placements replacing some of the hospital-based training.

Objectives: To record students' clinical and non-clinical activity on outreach placement.

Intervention: Six-week block placement for 20 undergraduate and therapy students in existing primary care clinics, in areas of need, to work supervised by local dentists.

Methods: A variety of methods were used: semi-structured interviews with all 20 students by staff independent of the course team; questionnaire-based survey of 17 students; and capture of categorised data on treatment episodes from students' clinical logbooks. Findings were triangulated by presentation to students and separately to their supervisors for discussions chaired by a second observer, and against peer-run focus groups.

Results: Outreach experiences were varied, often novel and frequently developmental for students. They included: • gaining greater experience of new types of patients (children, special needs, phobics, asylum seekers, less affluent, drug users, etc.) and their communities; • gaining broader clinical experience and alternative approaches; and practicing or observing dentistry and other health care in different settings. The need for mechanisms to build in to the outreach programme to encourage greater consistency of experience became apparent.

This Team Training in Primary Care Settings Project is National Dental Development Unit funded (grant EL1/EL2)

Conclusion: Dental outreach training provides students with valuable learning experience in a range of areas and requires mechanisms to ensure consistent anticipated outcomes.

Dental education, in common with some other vocational disciplines, is making increased use of placements to provide high-impact learning experiences for students.

Objectives: To explore stakeholder perceptions of phase one of an incremental development supplementing hospital-based curricula with outreach placements.

Intervention: Six-week block placements for 20 undergraduate and therapy students, supervised by local dentists in 11 clinics.

Methods: Semi-structured interviews with 32 placement staff, 20 students and 11 university tutors by a researcher independent of the curriculum team. Interviews were audio recorded, transcribed and content analysed. Interim findings were validated by presentation to respective stakeholder groups for comment.

Results: Placement staff were positive about benefits to students, identified benefits for themselves and were anxious to ensure high quality placements through improved management. Students anticipated high volumes of hands-on experience increasing their competence but not the extent of improvements in their team working, patient management and confidence. Academic staff supported the principle of outreach and appreciated the impact on the existing curriculum of increased outreach provision.

Conclusion: Placements can contribute to dental education and have spin-off benefits for staff. Careful management is required to fully integrate placement into the curriculum.
Appendix A Presentations

A7 International Association for Dental Research conference, March 2005, Abstract 1, Outreach Placements Increase Students' Confidence to Plan Treatment

Dental Schools are developing new undergraduate curricula, with primary care placements complementing hospital-based training.

Objectives: To compare the effects of outreach placement and traditional exclusively hospital-based clinical experience on students' confidence in providing treatment for a range of patients presenting with common dental problems.

Design: Randomised controlled trial.

Intervention: Random allocation of senior dental undergraduates to existing hospital-based clinics (n=25) or five-week block placement in existing primary care clinics to work supervised by local dentists (n=24).

Methods: At baseline students self-rated their global confidence on a five-point Likert-scale. These measures were repeated at follow-up, augmented by a global transition judgement and a then-test (asking students to re-rate their baseline rating in the light of experience) of confidence.

Results: • Groups were comparable at baseline. The outreach group scored higher (P=0.08) in the transition judgement (mean 3.7, SD 0.9) than the control group (mean 3.1, SD 1.1) indicating their perceived increase in confidence was greater.

• In the then-test, on reflection the outreach group considered their baseline ratings of confidence were over-optimistic (mean then-tests scores 3.2, SD 0.9 and baseline 3.7, SD 0.5) while the control group thought theirs were accurate (mean then-tests scores 3.8, SD 0.7 and baseline 3.6, SD 0.8). As follow-up scores for global confidence did not differ significantly between groups the implied increase in confidence for the outreach group was significantly greater (P=0.01).

Conclusion: Dental outreach training in primary care settings is more effective than dental hospital training in improving their self-rated confidence in tackling clinical situations. Students' insight gained on outreach (for example through experiencing increased diversity of patients) shifts their internal scales of confidence so complicating the measurement of change.
A8 International Association for Dental Research conference, March 2005, Abstract 2, Outreach placements increase undergraduates' treatment planning ability

Dental Schools are developing new undergraduate curricula, with primary care placements complementing hospital-based training.

Objective: To compare the effects of outreach placement and traditional hospital-based training on students' treatment planning ability.

Design: Randomised controlled trial

Intervention: Random allocation of a cohort of senior dental undergraduates to existing hospital-based clinics (n = 25) or five-week block placement in existing primary care clinics, to work supervised by local dentists (n = 24).

Methods: At follow-up, students took a history from a standard simulated patient who rated their performance using the Arizona Clinical Interview Rating scale (ACIR) with second rating by an experienced dentist via audio recording. Students then discussed their treatment plan with assessors blind to the allocation. The assessors scored four aspects: dental history captured, social history captured, appropriateness of treatment plan (showing cognisance of full history) and inclusion of wider issues (patient's children's needs and wider health promotion).

Results: Groups were comparable at baseline. At follow up ACIR scores for interviewing skills did not differ significantly. The outreach group scored higher (mean 4.4, SD 2.1) than the control group (mean 2.8, SD 1.9) for capturing a social history (P = 0.01) and appropriate treatment planning (means, SDs 5.6, 2.1 and 3.9, 2.3 respectively, P=0.01). There were no significant differences between groups' scores for the dental history obtained, nor for inclusion of the wider issues.

Conclusion: Dental outreach training was significantly more effective than traditional hospital-based training in improving students' ability to capture relevant points of social history from a patient and to consider them when planning treatment.
A9 British Society for Dental Research, Dundee, April 2005, Oral presentation, Outreach Placement Increases Students' Clinical Activity

Dental Schools are developing new undergraduate curricula, with primary care placements complementing hospital-based training.

Objectives: To compare students' clinical activities on outreach placement and traditional exclusively hospital-based training.

Design: Randomised controlled trial.

Intervention: Random allocation of senior dental undergraduates to existing hospital-based clinics (n=25) or five-week block placement in existing primary care clinics to work supervised by local dentists (n=24). Placements were in either community dental service clinics or dental access centres (n=17).

Methods: At baseline students' clinical experience and competence were noted from School records. The School clinical experience measure was repeated at follow-up when students also declared the number and categories of patients encountered during the intervention period.

Results:

- Groups were comparable at baseline for all variables.

- Outreach students encountered more than twice as many patients during the intervention period (mean 68, SD 18) than the control group (mean 30, SD 23, P=0.01 in t-test). Community dental service patients encountered were predominantly children and dental access centre patients, adults. Outreach students also encountered more exceptional categories of patient (mean 2.8, SD 1.7) than the control group (mean 1.7, SD 1.6, P=0.02).

- For the semester including the intervention the outreach students' number of treatment episodes for simple plastic restorations (mean 44, SD 15) was almost three times that of the control group (16, SD 9, P=0.01). Data for endodontic procedures and dentures displayed similar ratios. The difference was less pronounced for cast restorations: outreach mean 5.2 (SD 3.9), control 3.3 (SD 2.8, P=0.07).

Conclusion: Dental outreach training in primary care settings provides greater numbers of patients and treatment episodes for students than dental hospital training. The patients encountered on outreach include greater numbers from exceptional patient categories. Dental access centres and community dental service settings provide contrasting patient profiles.
A10 International Association for Dental Research conference, June 2006, Abstract, Do block outreach placements disadvantage students' school-based learning?

Dental schools are increasingly replacing hospital-based training with periods of placement in primary care. This could impact negatively on students' academic or clinical progress.

Objective: To compare the effects of outreach placement and traditional exclusively hospital-based clinical experience on students' final course assessment scores and hospital clinical activity.

Design: Randomised controlled trial.

Intervention: Random allocation of senior dental students to existing hospital-based clinics (n=24) or five-week block placement in existing primary care clinics working supervised by local dentists (n=25).

Methods: At baseline students' hospital-based clinical experience and clinical skill were measured. Follow-up assessments considered students' hospital clinical activity during the intervention semester and theoretical and clinical ability as presented at final examination board twelve months later. To reduce type I error, only 6 of 24 available measures were considered and multiple testing correction applied. Results were discussed with student representatives.

Results:

• Groups were comparable at baseline.

• The number of hospital patient treatments during the semester for the outreach (mean 28, SD=6) and control groups (mean 29, SD=11) were similar (P=0.62) as were their scores for the quality of that clinical work (means 62, SD=1 and 63, SD=2, P=0.66).

• Groups' final clinical assessments were similar (mean scores 58, SD=3; 61, SD=5, P=0.04 and Bonferroni corrected α'=0.01). Scores for children's dentistry (means 64, SD=6 and 64, SD=4, P=0.96) and overall theoretical scores were also similar (means 54, SD=4 and 57, SD=4, P=0.08). One outreach and 4 control students were awarded honours (P=0.14, Chi sq.)

Conclusion: Surprisingly, absences from the school arising from extended block placements did not reduce the quantity of hospital-based clinical experience. Student representatives reported students rescheduled patients' appointments avoiding outreach periods. Outreach did not impact negatively on students' theoretical assessments but did in one component of several clinical assessments. Analysis risked type I error.
Appendix A Presentations

A11 International Association for Dental Research Pan-European conference, September 2006, Abstract 1, Do outreach placements affect the quality of students' hospital-based work?

Dental schools' students increasingly learn on outreach placements away from the dental hospital. These experiences may affect the quality of students' hospital-based clinical work.

Objective: Pilot study to compare the quality of students' clinical work before and after outreach placement.

Design: Uncontrolled pre-test, post-test comparison of routine formative assessments of students' clinical work and patient management in the dental hospital.

Method: Second-year Hygiene and Therapy students from the University of Sheffield's School of Clinical Dentistry undertook outreach placements for three days each week over ten weeks. Students mostly worked in pairs nursing for one another. The grades for students' last five restorative procedures before placements started and the first five after placement completion were extracted from archived records.

Results: There were seven students in this pilot cohort. For clinical ability the mean measure was 59.7% (SD=4.1) at pre-test and 62.4% (SD=2.8) at post-test, p=0.13. For patient management the corresponding values were 63.3% (SD=3.0) and 64.0% (SD=1.5), p=0.52.

Conclusion: The quality of students' hospital-based clinical work was similar before and after attending their hospital-based clinical for outreach placements. These data give an indication of the samples required to formally test the effect of outreach on clinical grades. The study's design does not differentiate between the effects of the outreach placements and concurrent school and hospital-based learning experiences and maturation.
A12 International Association for Dental Research Pan-European conference, September 2006, Abstract 2, Gender differences in students’ self-reported estimates of clinical experience

Dental staff may make supervisory judgments based on students’ reports of their clinical experience. An exploratory analysis comparing students’ reports of their experience in restorative dentistry suggested a gender related difference in the accuracy of students’ estimates.

Objective: To compare the accuracy of male and female students’ estimates of the volume their clinical work.

Design: Comparison of dental students’ self-reports and existing departmental records.

Method: A single cohort was considered. Clinical records of amalgam, composite and glass ionomer restorations were totalled (To) for the fourth year dental students to the end of the first semester of 2005/2006. Separately, within a week of that census, students reported to the School’s outreach administrator their estimated numbers of completed simple plastic restorations (Ta, identified on the data collection form as amalgam, composite and glass ionomer restorations) with annotations to inform outreach supervisors of their clinical experience. Data reported later were excluded from the analysis. The percentage overestimate was calculated as 100 x (Ta-To) / Ta and tested for gender differences.

Results: Data were available from 55 of 63 students in the cohort. Lost to analysis were 5 males and 3 females. The students’ average number of completed restorations (To) was 47 (SD=15). For males the mean overestimate was 18% (SD=4%,n=37). For females the underestimate was 2% (SD=2%,n=18), p=0.05 (t-test).

Conclusion: Male students over report their clinical experience while females slightly under report it. This may be a cautionary finding for supervising staff using such estimates to gauge students’ abilities.
A13 South Yorkshire Dental Network, Oral presentation to meeting, November 2004 Outreach Placement Initiative

Description of the trial intervention and the follow-up assessment followed by a presentation of the findings.

Outreach Placement Initiative

Michael Smith, Programme Evaluator
For the South Yorkshire Dental Network

Environment

- 1970s introduction of some community-based experience
- GDc's The First Five Years - curriculum development
  - Primary care
  - Team working
- CCHS's location and patient base
- Change - DACs, PDS.

Phases of Development

- 2003 Pilot 20 students 6 weeks
  4½ days a week 13 locations
- 2004 Trial 40 students 5 weeks
  2 ½+ days a week 5 locations
- 2005 60 students 6+ weeks

Students and Staff

- 4th year, 2nd semester
  5th year, 1st semester undergraduates
- Second year Hygiene and Therapy students
- Up to four students per supervisor
- Experienced, up-to-date local staff
  approved by the University
- Staff development with external, placement and University input
- Nurses included

Team Training

- GDc's The First Five Years
  - integral part of a greater dental team
  - substantial assisted operating
  understanding primary dental care and routine clinical practice.
- Referral
- Paired working
- Appreciating roles within small teams

Research - Pilot

- Greater clinical activity - productivity
- 'Real-life' experience - more typical
- Wider range of patient types
- One of the team... Treated like a dentist
- Large increase in confidence
- "Feel I can now tackle anything that comes through the door"

Research - Trial

- Randomised controlled trial
- Over twice as many patients encountered
- Significantly improved
  - Capture of key points of social history
  - Appropriateness of treatment planning
- Increase in confidence
  - Revised internal scale, Greater increase

Future

- 2003 Pilot 20 students 6 weeks
- 2004 Trial 40 students 5 weeks
- 2005 60 students 6+ weeks
- 2006 90 students
- 2007 100 students 6 months
- New DACs, PDS9, CDS

Summary

- Becoming an integral part of the courses
- Highly encouraging pilot and half-year phases
- Growing, developing and evolving
- Your involvement is welcome
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  Prof Michael A Lennon, Prof Peter G Robinson

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A14 Annual meeting of the Directors of Schools of Hygiene and Therapy. Oral presentation to meeting, March 2005 Sheffield’s Developments in Outreach Placements

Summary of the three phases of the development and key findings.

**Outreach Placements**

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*Outreach*

Student clinical working in a primary care setting

- Extra-mural rotation
- Community-based experience
- Outplacement
- Patient diversity

Sheffield’s Developments

- Builds on ‘community’ programme
- Curricular change
- Requirement for patients
- Local proposals to increase access
- Funding: Training the Dental Team in Primary Care

Sheffield’s Outreach

<table>
<thead>
<tr>
<th>Year</th>
<th>Volunteers</th>
<th>Pilot, weeks</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>10</td>
<td>3 weeks</td>
<td>10</td>
</tr>
<tr>
<td>2004</td>
<td>11</td>
<td>3 weeks</td>
<td>25</td>
</tr>
<tr>
<td>2005</td>
<td>7</td>
<td>10 three-day weeks</td>
<td>48</td>
</tr>
</tbody>
</table>

Management

Programme Steering Group

Meetings with Clinical Managers

Outreach Office Team

Dental, Hygiene and Hygiene

University/School

Recruiting Process

CPE Paediatric and Health Education Leadership

Placements

Clinical Managers

Supervising Dentists, Therapists and Nurses

Evaluation Method

- Semi-structured interviews and focus groups
  - Supervising dentists and nurses
  - Students
- Content analysis
- Identification of themes
- Validated by Triangulation

Pilot Placements

- 10 H&T students, 10 BBS
- Three to six-week block placements
- Primary care settings
- Areas of high need
- Supervision by local dentists
- Local protocols

II&T Students’ Perceptions

- Increased competence
- Variety of patient types
- Improved patient management
- Increased confidence
- Emphasis on clinical and other aspects
- Accrued greater status
- Appreciate supervisors’ input
Appendix A Presentations

Placement Staff Perceptions
- benefits to students
- identified benefits for themselves
- anxious to ensure high quality placements
- keen to continue partnership

Clinical Experience  BDS 2003

Treatment Profiles

RCT - Aim
Compare effectiveness of outreach in primary care settings and traditional hospital-based training to increase
- confidence
- competence
in treating a variety of patients with common problems

RCT - Confidence Results
Compared to two months ago, how much has your confidence that you can tackle a range of people presenting with common dental problems changed? Is it...

RCT - Ability Method
Standard simulated patient
- Dental Chart, Radiograph and Medical History
- Student
  - Case Notes
  - Structured treatment plan
  - Patient and dentists face interview drill
- Discussion with two measures (fixed to interventions)
  - dental history captured
  - social history captured
  - appropriateness of treatment plan is assessed
  - inclusion of viable options

RCT - Activity

2004 H&T Outreach
- 5 travelled daily, 6 in accommodation: 5 locations.
- "For more patients than the dental hospital"
- "Good to be part of a great team"
- Screening worked well. Plenty of therapy work.
- Nurses helped students cope.
- Exposure to new patient types appreciated.
- Supervision "very helpful, making detailed practical suggestions for improving technique."
- Improved students' time management, versatility and patient management.

2005 H&T Outreach
- "Valuable" - "really enjoyable"
- "Freedom and respect from the staff and from the patients"
- Valued "nurses popping in every 5 or 10 minutes."
- Supervision "brilliant" and "less picky."
- Encouraged to consider employment
- Empowered to shape learning experiences

The Future
- Benefits of longer placements
- Quantify patient types
- Qualitative: Aspects of the experience contributing to students' development
- Pilot in Personal Dental Service

Conclusions
- Placements piggy-backed onto services provide valuable and enjoyable learning experience
- Primary care dentists supervise well
- Breadth of 'realistic' experience increased students' confidence and competence
- Students need to be proactive
- Good communication essential
Appendix A Presentations

A15 British Association for the Study of Community Dentistry workshop, Outreach Teaching. Oral presentation. November 2005

Outreach Learning - a randomised controlled trial of outreach placements.
Summary of the three phases of the development and key findings from the research.

Guy's Campus, London.

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**Outreach Teaching**
A randomised controlled trial of outreach placements

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**Context**
- Builds on 'community' programme
- Curricular change
- Requirement for patients
- Local proposals to increase access
- Funding: Training the Dental Team in Primary Care Settings

**Qualitative Study**
- Volunteers
- Sought hands-on experience
- Found pragmatic approaches, how to work with people, how to apply learning, a new confidence
- Accorded respect
- CSFs Communication & Resourcing
- Disruption but unanticipated benefits

**Outreach Programme Aims**
- Develop Professional Responsibility
  appreciate their ethical responsibility for the oral health of the whole community
- Understand Public Health Dentistry
  understand the principles and practice of public health dentistry
- Understand Practice Environment
  appreciate the responsibilities and requirements of the practice environment
- Develop Clinical Skills
  provide comprehensive dental care for a range of patients

**RCT**
Compare effectiveness of outreach in primary care settings and traditional hospital-based training to increase
- confidence
- competence
in treating a variety of patients with common problems

**Trial profile**

**RCT - Confidence**
How much has your confidence that you can tackle a range of people presenting with common dental problems changed? Is it:
- A great deal better
- A lot better
- Quite a bit better
- A little better
- Much the same
- Worse than before

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**Acknowledgements**

Researchers: Andy Blinkhorn, Fiona Blinkhorn, Alan Brook, Mike Lennon, Luke Ruck, Peter G Robinson

Placements: Sheffield CDS, Chesterfield CDS, Hull DAC, Lincoln DAC, Darke Valley DAC

NHS Directors of Dental Services, the students and patients.
Competence Assessment

- Standard simulated patient
- Dental Chart, Radiograph and Medical History
- Student interviews
- Formulates treatment plan
- Patient and dentist rate interview skills
- Discussion with two assessors (blind to intervention)
  - Dental history captured
  - Social history captured
  - Appropriateness of treatment plan re histories
  - Inclusion of wider issues

RCT - Treatment Planning

- Intervening
- Social History Captured
- Treatment Plan

RCT - Activity

- Patients Encountered per Student
- P=0.05

RCT - Clinical Profiles

- Dental outreach training in primary care settings.
  - Improves clinical confidence more effectively
  - Improves treatment planning more effectively
  - Provides more patients and treatment episodes
  - Provides greater variety of patients
- Contrasting experiences in DAC and CDS settings

RCT - Findings

- Dental outreach training in primary care settings:
  - Improves clinical confidence more effectively
  - Improves treatment planning more effectively
  - Provides more patients and treatment episodes
  - Provides greater variety of patients
- Contrasting experiences in DAC and CDS settings

Conclusion

- Outreach provides experiences the dental hospital and School can’t
- Those experiences enhance students’ learning
- There may be advantages in each student experiencing contrasting settings
- Further research needed to identify of the most beneficial aspects of the experience
Appendix A Presentations

Outreach increases undergraduates' treatment planning ability

Some initial findings from the 2004 research into Outreach - No. 1

Yr4 dental students were randomly allocated to the usual hospital clinics or a 5 week block placement in Hull DAC, Lincoln DAC, Sheffield CDS or Rotherham CDS to work supervised by local dentists.

Afterwards students took a history from a patient then discussed their treatment plan with assessors. The assessors scored them on:
- the dental history captured,
- the social history captured, and
- the appropriateness of the treatment plan.

The two groups scored the same for capturing a dental history and were rated equally by the patient for their interviewing skill.

Result 1: Outreach students' scores for capturing the patient's social history were significantly higher.

Result 2: Outreach students' scores for appropriate treatment planning were significantly higher.

An Outreach student wrote:
- "I have been creating practical treatment plans which the patient can afford and manage. Balancing patients' demands with what is realistically achievable"

Conclusion:
Outreach was significantly more effective than hospital-based training in improving students' ability to capture relevant points of social history from a patient and to consider them when planning treatment.
Outreach Increases Students’ Confidence to Plan Treatment

Some initial findings from the 2004 research into Outreach - No. 2

Yr 4 dental students were randomly allocated to the usual hospital clinics or a 5 week block placement in Hull DAC, Lincoln DAC, Sheffield CDS or Rotherham CDS to work supervised by local dentists.

Before they started and after they finished, students rated their level of confidence on a five-point scale. At follow-up they also rated how much their confidence had improved and re-rated their starting confidence rating in the light of experience.

The two groups had practically identical levels of confidence before starting.

Result 1
The outreach group felt their level of confidence had improved more than the control group who stayed in hospital clinics. The probability of this result being found by chance was under one in twenty.

Outreach students wrote:
- I feel more confident in tackling patients’ problems
- An enormous boost to my confidence as I now realise I can do work to time
- Areas which I felt confident in, I learnt were still weak and could be improved.

Result 2
Looking back as they finish Outreach students realised they’d overestimated their confidence at the start. The average improvement from their revised estimate to their final confidence was much greater than the control group’s average improvement.

The probability of this result being found by chance was under 1 in 100.

Conclusions:
- Outreach is more effective than dental hospital training in improving students’ confidence in tackling clinical situations.
- Measuring this change in confidence is complicated by Outreach students’ experiences on placement, away from the sheltered hospital environment, making them realise they were not as confident as they thought they were before starting.
Students' Experiences on Outreach Compared to in the Hospital

Some initial findings from the 2004 research into Outreach - No.3

Yr4 dental students were randomly allocated to the usual hospital clinics or a 5 week block placement in Hull DAC, Lincoln DAC, Sheffield CDS or Rotherham CDS to work at least 5 sessions a week supervised by local dentists.

Afterwards students reported their five weeks of clinical experience as numbers of patients encountered in various categories.

Result 1:
Outreach students encountered more than twice as many individual patients during their placement compared to the hospital-based students.

Outreach students wrote:
- I've gained so much extra clinical experience... patients from all backgrounds some had not seen a dentist for years... varying ages
- Good to get on top of basic skills... no advancement in the level of clinical skill, more an increase in patient volume
- Treating patients with special needs successfully was highly rewarding

Result 2:
Outreach students in DACs did encounter some children but far more adults
Outreach students in CDS encountered more younger patients and patients with special needs.

Individually, Outreach students generally experienced a wider variety of patient types than hospital-based students when categories such as non-English speakers and the age groups of children and adults were taken into account.

Conclusions:
Outreach provides students with opportunities to increase and widen their clinical experience by encountering new types of patient.
CDS and DACs provide different Outreach experiences.
A17 International Association for Dental Research, Pan-European Confederation Conference. Symposium presentation: Outreach Training Programmes – What do the data say? September 2006

Outreach Rotations: An RCT of their contribution to undergraduates’ learning

Outreach Training

- Primary care placements
  5 week block, ~3 days a week clinical working
New community
Local protocols, local supervision
Project work in DPH

- Increased experience


Aim of the RCT

Compare the effectiveness of outreach in primary care with traditional hospital-based training to increase

- Confidence
- Competence

in treating patients with common problems

Confidence - Baseline assessment

Self-rated global confidence

Your training should prepare you to be able to diagnose, plan and provide treatment for a range of people presenting with common dental problems.

How confident do you feel that you can tackle a range of people presenting with common dental problems?

Confidence - Follow-up assessment

- Self-rated confidence
- Then-test

How confident do you now think you were at tackling a range of people presenting with common dental problems two months ago?

- Transition judgement of confidence

Think back two months. Compared to two months ago, how much has your confidence that you can tackle a range of people presenting with common dental problems changed?

Results - Confidence

How confident do you feel that you can tackle a range of people presenting with common dental problems?

- Totally
- Reasonably
- Undecided
- Lacking
- Not at all

P = 0.05
Results - Confidence 2

Compared to two months ago, how much has your confidence that you can tackle a range of people presenting with common dental problems changed?

Is it...

- A lot better
- Quite a lot better
- A little better
- About the same
- Worse than before

Statistical significance: $P < 0.05$

Competence: Ability to plan dental treatment

- Standard simulated patient
- Dental chart, radiograph & medical history
- Student interviews & formulates treatment plan

Patient and dentist rate interview skills

Discussion with two assessors (masked to the intervention)

Hypotheses & Results - Competence

Method - Follow up study

- **Baseline**
  - Clinical experience
  - Clinical skill

- **Follow-up**
  - Clinical activity in the hospital

Exam Board: theoretical ability, clinical ability and multiple testing correction applied

Follow up study

To compare the effects of outreach and hospital-based clinical experience on students’ hospital clinical activity and final assessments.

Results - Follow up study

- Groups similar at baseline
Results – Follow up study

- During the intervention semester in the hospital

**Summary**

- Wider experience
- Benefits for confidence and competence

No negative impact on theoretical assessments or clinical work in the hospital

**Conclusions**

- Outreach training has demonstrable benefits
- Achieved without educational costs to traditional programme

Further research needed into the effects of longer programmes, different setting and different modes of attendance
Appendix A Presentations

A18 International Association for Dental Research, Pan-European Confederation Conference. Oral presentation. September 2006

Gender differences in students’ self-reported estimates of clinical experience

Dental staff may make supervisory judgments based on students’ reports of their clinical experience. An exploratory analysis comparing students’ reports of their experience in restorative dentistry suggested a gender related difference in the accuracy of students’ estimates.

Objective: To compare the accuracy of male and female students’ estimates of the volume their clinical work.

Design: Comparison of dental students’ self-reports and existing departmental records.

Method: A single cohort was considered. Clinical records of amalgam, composite and glass ionomer restorations were totalled (To) for the fourth year dental students to the end of the first semester of 2005/2006. Separately, within a week of that census, students reported to the School’s outreach administrator their estimated numbers of completed simple plastic restorations (Ta, identified on the data collection form as amalgam, composite and glass ionomer restorations) with annotations to inform outreach supervisors of their clinical experience. Data reported later were excluded from the analysis. The percentage overestimate was calculated as 100x(Ta-To)/Ta and tested for gender differences.

Results: Data were available from 55 of 63 students in the cohort. Lost to analysis were 5 males and 3 females. The students’ average number of completed restorations (To) was 47(SD=15). For males the mean overestimate was 18%(SD=4%,n=187). For females the underestimate was 2%(SD=2%,n=37), p=0.05 (t-test).

Conclusion: Male students over report their clinical experience while females slightly under report it. This may be a cautionary finding for supervising staff using such estimates to gauge students’ abilities.

Perspectives of staff on student outreach placements

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Objective: To explore the perspectives of placement staff on outreach training.

Intervention: Block clinical placements in primary care settings for dental undergraduates and hygiene and therapy students.

Method: After completion of the placements, 32 participating staff across nine primary care locations took part in qualitative interviews and focus groups. The staff provided data on placement organisation, the students’ development and their supervision, and any effects on themselves as hosts.

Results: The major themes included the learning environment, supervision and communication. The staff saw benefits to students in working in a smaller primary care clinic with nursing support and immediately available supervision by a dental generalist. Other benefits included increased confidence, broader clinical experience and applying theoretical learning to new communities. Effective communication and adequate resourcing were critical success factors. Staff supported the outreach placements in primary care settings to enhance students’ dental education.

Conclusions: These findings provide a planning and evaluation framework for dental educators involved in outreach.

Key words: outreach; dental student; community-based education; staff perceptions.

Outreach training, in which primary care settings away from dental hospitals provide supervised opportunities for students to practise on consenting patients, may enhance undergraduates’ skills and knowledge, including their preparation for modern practice (1,2). Similar developments are occurring worldwide. For example, students' entire final year on outreach forms part of an Australian course (3) and an 8-month voluntary outreach programme is underway in the US (4).

Whilst outreach has not been researched with the rigour familiar to clinicians using an evidence-based approach, there has been some evaluation. Claimed benefits of outreach for students include contact with typical and diverse patients, improved clinical confidence (5) and speed, the development of communication and teamwork skills, a wider appreciation of dentistry and other healthcare services (6) and increased social responsibility (7–10). For host services anticipated benefits include improved recruitment opportunities (11) and preparedness of new recruits (6, 9) plus the development of existing staff (12). Perceived benefits for communities are improved access and potential increase in dental schools’ throughput (13). Despite international differences in the context of outreach, there are many similarities amongst programmes’ claimed benefits.

Outreach forms one challenge of the UK Government’s modernisation agenda (14). Consequently there is interest in the experiences of those dental schools operating outreach programmes (6, 15, 16).

Primary dental care in the UK’s National Health Service (NHS) is changing from the long-standing system of general practitioners paid under a fee for item service and the Community Dental Service (CDS). The CDS, now renamed the salaried primary dental care service, caters for children in otherwise under-served areas and patients with special dental needs. It also has an oral health promotion role. Dental access centres (DACs) are staffed by salaried dentists and provide care including emergency care for people experiencing difficulty in accessing NHS dental care. Personal dental service settings (PDSs) are a recently introduced form of general dental practice providing local autonomy for practitioners who provide services under contract from the health authority. Dental hospitals provide mainly specialist care. Dental schools are linked with dental hospitals for students’ clinical training.

In the UK, Manchester has long placed undergraduates in primary care settings dentistry (17–19). Liverpool’s outreach programme for undergraduates and
therapy students includes tutorials, guided projects and working alongside other health professions (20, 21). Whilst attendance on the above is 1 day a week, Cardiff’s and Glasgow’s outreach programmes include block placements (M.L. Hunter, personal communication, Cardiff Dental School, Cardiff, UK; 22). Elsewhere in the UK, outreach developments appear, based on the limited published information located, to be mainly detached extensions to dental hospital provision simulating general dental practice (23, 24). Likewise, the US scheme uses faculty staff to supervise simulated practice (4) whilst the Australian and a Swedish scheme use existing primary care staff and premises (3, 25).

The University of Sheffield’s School of Clinical Dentistry is developing a situated learning (26) approach to dental education for undergraduates and hygiene and therapy students through outreach placements grafted onto existing NHS primary care services. The placements expand dental services in areas of identified need and increase students’ awareness of communities other than those served by the dental hospital. Students spend five or more half-day sessions of clinical experience each week supervised by approved dentists already working in 11 centres. Importantly, this supervision and the opportunity of working alongside primary care staff gave the dental hospital-trained students a perspective that contrasted with that prevalent in secondary care (5, 9).

A pilot intervention in the spring of 2003 placed students in outreach settings in conveniently available DAC or CDS clinics across northern England. Ten dental students spent 6 weeks on placement full-time and 11 hygiene and therapy students, 3 weeks. All students maintained a clinical record and undergraduate students also undertook projects related to community health. The lack of published research into staff perceptions and the intention of developing the pilot intervention into a full programme both suggested a need for study of staff perceptions of outreach provision. With this in mind, the aim of this research was to identify the range of experiences of staff supervising or supporting students, and the range of staff interpretations of the placements. This research formed part of a larger investigation of outreach which used qualitative and quantitative methods with students and placement staff.

Methods

A qualitative approach employed semi-structured, exploratory interviews and focus groups with place-

<table>
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<th>TABLE 1. Preliminary topic guide</th>
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<td>Students' development whilst on placement</td>
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<td>School's organisation of the placement</td>
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<tr>
<td>Hosts' organisation of the placement</td>
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<tr>
<td>Supervision of the students</td>
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<td>Any effects on the hosts</td>
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Data were collected from 32 staff in seven individual interviews and six focus groups of two to eight staff. The interviews typically lasted 45 min and focus groups 40—75 min, and were conducted in the placements to reduce evaluation apprehension. Early interviews were with those placements with longer standing connections with the School and those taking the greatest number of students. Focus groups tested consensus and the range of views. Emerging lines of inquiry refined later questioning, corroborated data and identified exceptions. Further data were collected until data saturation was achieved with the last two interviews generating no new analytical categories.

Data were transcribed verbatim from audio tapes and content analysis involved coding the transcribed responses and grouping similar coded responses into categories. An experienced second researcher (PGR) reviewed early coding against transcripts to ensure reliability. A tentative thematic framework was identified from the categories and data indexed for mapping and interpretation for reporting, after Ritchie and Spencer (27).

Observer bias was minimised by the recruitment of an experienced interviewer from outside the Dental School who was thoroughly briefed on the outreach project and by the second researcher checking the analysis. A presentation of the findings was made on two occasions to groups of the original participating staff from several placements for respondent validation (28).
Smith et al.

TABLE 2. Themes amongst staff perceptions of outreach placements

<table>
<thead>
<tr>
<th>Main themes</th>
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<td>Outreach as a learning environment</td>
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Strands running through the themes

The 'real-life' nature of students' learning experiences
Tailoring of learning experiences to students' individual needs
Effects on the hosts

Results

Of the 32 participating staff, there were 17 dentists, three therapists, one hygienist, 10 nurses and an administrator (half the dentists were male and all remaining staff were female) from nine placement clinics of which two were DACs and the remainder were CDSs.

Overall, the staff felt the placements had been of clear benefit to the students and had generally operated smoothly despite initial organisational difficulties. They had found the experience of hosting students rewarding if a little disruptive. Most considered themselves fortunate in having a 'good' student who contributed to the success of the placement.

The results are presented in the themes identified in the analysis of reported experience (see Table 2) and supported by anonymised quotations from the interviews. The first main theme, the learning environment of the outreach placement, includes arrangement placements made to accommodate students and perceived contrasts with students' experiences in the dental hospital. The supervision theme explores strategies for protecting patients by appropriate selection, oversight and intervention. The sub-theme, promoting learning through supervision, describes approaches used to take students beyond their immediate clinical experiences. The communication theme identifies some prerequisites for successful placements.

Three strands running through these themes were identified during analysis: the 'real-life' nature of students' learning experiences; the tailoring of learning experiences to students' individual needs; and the effects on the hosts. Findings relating to these strands are reported within the above framework.

Outreach as a learning environment

Supervisors thought that primary care placements gave students a wider appreciation of everyday dentistry, dental careers and of how dental teams worked and developed in the students a more pragmatic view of providing for patients' needs. Applying knowledge to unfamiliar populations was believed to reinforce students' learning.

Within the dental school... you have different departments... But that's where this sort of teaching in community could be so useful to get them looking at the whole picture... I think it will produce better dentists as a result. (CDS dentist)

Contrasts between environments

Staff perceived contrasts between their settings and the dental hospital. The contrasts were characterised by less compliant patients, different solutions, simpler procedures, shorter appointments and a less restrictive environment for students on the placements. Staff perceptions of dental hospital-based learning drew on their own training and, in a few cases, working there supporting students.

It may not be according to the text book, but it will be a learnt behaviour... adapted to working in the real world. (CDS dentist)

There were apparent differences between settings. In CDS clinics staff were more likely to integrate links with other health professionals as part of students' core experience. They also referred to the family or patient's behaviour as one of the selection criteria for suitability. DAC staff were more likely to maximise students' clinical contact, to comment on their pace of work and to stress pragmatic short-term treatments.

Staff perceived a need to shift students from their perception of the hospital's approach to dental treatment to the more holistic approach predominant in their service. Some were concerned that their methods may differ from the hospital's and so be unacceptable or confusing for students.

Overall, staff found the experience of hosting students stimulating. They were required to explain procedures to students unfamiliar with primary care. Sometimes they had to recall the rationale for routine actions and this too was considered beneficial.

Practical arrangements

Visits by students to the placements before starting reassured both parties and clarified their expectations of the placement. Induction tours and observation of working for a session were found to help students settle in. Staff described students as initially tense and formal in the unfamiliar setting, but generally fitting in well surprisingly quickly. Many participants commented that students for their ease in dealings with staff and patients and these students were soon treated as 'just another member of staff'.
Whilst some disturbance of normal working in the placement clinics was inevitable, most staff described this as minor. However, staff in clinics with only a single chair tended to develop a backlog of appointments. Managers envisaged future resourcing problems for supervision where placements took just one or two students.

The staff observed that students’ pace improved to about one-third of a dentist’s work rate but without the difficult cases. Failure of booked patients to attend caused some quiet sessions, but busy times in the ‘drop-in’ DACs saw staff protecting students from stressful overload.

Teamworking
A key member of the dental team was observed to be the dental nurse. Where resources allowed the provision of an experienced dental nurse, this was reported to be invaluable.

Nurses’ knowledge of the surgery and patients allowed students to concentrate on patient care. Furthermore, later sections will describe how nurses were also helpful in the supervision and assessment of students.

We needed a nurse who knew the patients and knew the surgery so the student didn’t have to think about any of that. So the right instruments and the right forms would be to hand. (CDS dentist)

The dental teams found unanticipated benefits from hosting students. They mentioned refreshing diversions from routines and social gains from the presence of ‘new faces’. Moreover, staff reported a fillip engendered by the students’ enthusiasm.

Another reported benefit related to recruitment. Outreach provided opportunities to raise students’ awareness of the career possibilities in the setting and the attractions of working locally. Several staff made offers of future employment to the students they hosted.

Supervision
Two main facets of the supervisory role were described: providing clinical services for patients and learning experiences for students. Occasionally the two facets conflicted and patients’ needs took precedence. Some supervisors who were new to the role found it more onerous than anticipated.

If a patient started to get a little bit agitated then... we would go and sit in the corner. With one pulpotomy we had to take over as the patient was getting restless from having been in the chair too long... (CDS dentist)

Protecting patients
Supervisors’ strategies for the protection of patients being treated by students involved a combination of patient selection, observation and, where necessary, intervention. Staff and students were familiar with checking agreed steps of clinical procedures. This process assured the quality of patient care and allowed assessment and feedback for educational purposes.

Criteria for selecting suitable patients often centred on behavioural rather than clinical factors with amenable patients known to supervisors being preferred. An appreciation of individual students’ clinical experience and capabilities was also important. Supervising staff went so far as to commend students for their professionalism in highlighting their own limitations and seeking assistance before problems arose. Patients almost invariably consented to being seen by a student: most readily when a familiar nurse explained the situation.

The preferred arrangement for working allowed the supervisor to move unobtrusively from being alongside a student, sometimes nursing for them, through to out of sight but still in earshot and easily summoned. One CDS dentist commented:

She actually asked would I chairside for her to start with. So she wanted a lot of input. And by the end... I did stand back and I could see she was a lot more confident.

This example is typical as staff reduced the intensity of supervision as their confidence in each student’s abilities grew.

Dental hygiene and therapy students were already experienced dental nurses. Consequently they could assist. Conversely, undergraduates were inexperienced in surgery routines and patient management, and so supervisors preferred to have an experienced nurse present to assist and ensure attention to patients’ needs. All supervisors valued the nurses’ chairside vigilance and appraisals of students’ developing capabilities.

Promoting learning
Supervisors promoted students’ learning by tailoring the learning experiences, support, feedback and coaching as each student progressed. Where students pressed for more or increasingly complex work placements accommodated these where practicable.

They enjoyed having a bit more freedom here. They realised they’re appreciated... enjoyed building their confidence and understood that they could come to you if they had a problem. (DAC senior nurse)
Smith et al.

Staff identified distinct changes in the students during the placement. Students mastered new treatments, gained confidence in checking their own work and managed unfamiliar types of patients more effectively. Staff attributed part of this development to the sheltered, supportive learning environment they had provided.

Techniques for promoting learning varied between individuals and between situations. Supervisors used socratic questioning, discussion, closed- and open-questioning, occasional didactic instruction and demonstration, besides acting as role models.

I think they need that sort of nurturing and fostering at this stage. It's having to allow them to develop. It wasn't a matter of saying 'You should have done this', 'You should have done that.' No, it was 'How did you see that?'... 'Well I felt that in that situation I might...' (DAC dentist)

They encouraged reflection through pre- and post-treatment discussions and emphasised the need to provide constructive feedback. Best practice included staff explicitly extending students' reflection on cases to generalising and building their working knowledge. Students' engagement with such interaction was a significant factor in developing increasingly productive relationships with supervisors. Some supervisors felt uncomfortable checking and being judgemental about students' work and giving critical feedback.

Feedback is... as I understand it, is turning every negative into a positive. (DAC dentist)

Staff perceived advantages for students' breadth of experience in seeing varied approaches from a number of dentists.

Some supervisors suggested the School adopt a more prescriptive approach in specifying the clinical contact time, target numbers for procedures and suitable visits. This was one of several examples where staff were anxious to meet their responsibilities to the student and to the School.

Staff were committed to, and proud of, providing valuable and enjoyable learning experiences tailored for individual students. Motivators for placement staff all related to the students; namely their contribution to the work of the clinic, being appreciative and being seen to improve.

It does depend on the student because you are willing to put in a lot from our point of view when you know that the student is really interested. Then you don't mind putting yourself out... (CDS dentist)

We didn't want to let the students down... and the staff, as a team, I think they worked hard. But we've enjoyed it (DAC dentist)

As described previously, staff found hosting students demanding, refreshing and rewarding. I took over and it made me feel quite wonderful to have a chance to demonstrate how to do it. (CDS dentist)

They knew... so much more than me from the textbook that it kept you on your toes... Quite challenging but not a bad thing really for trying to keep you up to date. (CDS dentist)

Communication

A shared understanding of the placement's purposes and more practical information were considered important in both placement-School and staff-student communication.

Supervisors were aware of channels of support from the School and the few using them reported prompt and helpful responses.

In most cases supervisors and staff had received sufficient information on students' clinical experience before students started. This was then supplemented by discussion with students on arrival. Placements of uncertain of individual students' abilities and those inexperienced in working with therapists made initial appointments for simpler procedures for the purposes of formative assessment. Some of these supervisors requested more information about students from the School in the form of discussion or pen portraits.

Communication between staff and students was considered effective with a good rapport being achieved during the placement. Staff enjoyed the evident interest students had in their clinics' work.

They were fantastic. The whole social thing was just great, the nurses loved it... especially the interest they showed in our work (CDS dentist)

Discussion

This qualitative exploration of the perceptions of placement staff involved in outreach training found that staff saw benefits to students in working in a smaller primary care clinic with nursing support and immediately available individual supervision by a dental generalist. There was some disruption of
clinics' normal working but many unanticipated benefits. These findings can be used by dental educators who are planning or evaluating outreach programmes.

Whereas most research into stakeholder perceptions of outreach placements has focused on students (29, 30) or patients (19, 21), only five studies report the perceptions of placement staff. Lennon et al. (21) investigated pilot PDS placements and noted the practice principals' positive attitudes and staff perceptions of unspecified benefits to both the practice and the volunteer students. The evaluation reported by Elkind et al. (31) focused on operational matters and noted that students worked in pairs without nursing support. A US evaluation reported mentoring of students renewing staff enthusiasm for dentistry (32) and a Swedish one stressed the importance of placement-faculty cooperation (25). The fifth study did not evaluate a clinical working placement but day visits to interview staff, who reported being encouraged to reflect critically on their practice, and patients (12). The Sheffield placements differed from these studies in being full time rather than 1 day per week. Whilst the findings of all six studies are consistent, the present study obtained in-depth data from a greater number and wider range of staff. Moreover, its method and narrower scope permitted greater rigour and investigation of the phenomena. Caution though is required in drawing international comparisons as the contexts in which placements occur differ markedly.

Supervisors' emphasis reflected the priorities of their settings: CDS providing continuing care and treating more children and anxious patients, DACs providing prompt access to care for acute cases. There may be advantages to the breadth of available learning experiences by placing students in both settings.

Hosting students full time over several weeks and discussion of visits to other health services may well have encouraged helpful supervisory relationships. Staff perceived students developing increasingly productive relationships with supervisors, an appreciation of teamwork and an awareness of careers. These outcomes and students' professionalism have not been reported in the other studies but were reported by students taking part in this pilot (33).

The tensions created in balancing the needs of patients and students are well known (34-37). Staff strove to maintain normal service levels, gained patients' consent to be treated by students and intervened if problems arose. The integrity of patient care was not compromised.

There was a variety of supervisory practice and low staff confidence in some aspects of their role. These findings suggest a role for professional development (CPD) in building on the pilot and this would be an additional benefit to placement staff. However, staff concerns would appear to be ill-founded, students taking part in this pilot universally praised the staff, their supervision and the feedback they were given (33). A main aim of CPD may be to reassure staff.

Increasing, as some staff suggested, emphasis on using hospital protocols and procedures could risk subverting the placements' primary care perspective (1). These individuals may not have fully appreciated the key aim of providing experience in primary care settings and again CPD could be used to reaffirm the staff of the valuable insights they bring to undergraduate training.

The reported best practice in going beyond providing students with feedback on their experiences with individual patients, and encouraging them to develop generalised solutions followed Cox's model (38) for clinical teaching to broaden working knowledge.

Outreach students stress the importance of nurse assistance (20, 24, 33). Not cited in other research is the invaluable role of nurses in supervising students both in terms of protecting patients and in providing feedback to students. However, this exciting opportunity for team working development carries a cost. To get the most from outreach an adequate supply of nurses requires funding. This finding also argues against the approach of students working in pairs used in some outreach programmes.

The method of interviewing staff some period after the placement ended may encourage detachment and reflection but may introduce some recall bias. Staff members' own training experiences may bias their perceptions of placement experiences, especially when contrasting these with students hospital training experiences. The cross-checking by multiple participants in focus groups and later validation should reduce any such biases.

Limitations on the wider application of these findings arise from the context of this research. The placements took place at a time of change in therapists' duties whilst many dentists were unfamiliar with therapists' roles. In addition, the nature of primary dental care is changing in the UK with a new general dental service contract being introduced, a greater role for DACs and a review of salaried primary care services. The DAC and CDS settings provided contrasting experiences. The emergent nature of the programme probably exacerbated communication problems and limited host placements' preparations.

Staff perspectives on outreach training

Appendix A Publications
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Staff actively supported the outreach placements in primary care settings as an enhancement to students' dental education. They identified benefits to students in increased and broadened clinical experience, teamwork and in applying theoretical studies to new communities. Staff also discovered unexpected benefits from hosting students. Effective communication and adequate resourcing were perceived as critical success factors.

In addition to the CPD areas already indicated, several points discussed above may be pertinent to planning outreach placements: implementation varying by setting; productive supervisory relationships; good practice in generalising learning; and the important role of nurses.

The findings of this study prompt further investigation of the relative merits of block and longitudinal placements, the variation in learning experiences by setting and quantifying the effects of placements compared with the traditional curriculum. The last of these is being addressed by the authors.

In conclusion, placement staff in this pilot held encouragingly positive attitudes towards outreach and reported productive teaching and learning experiences. Further, the study suggests potential benefits from the development of measures to increase consistency in some aspects of teamwork and communications. More importantly these findings provide an invaluable framework for dental educators who are planning or evaluating outreach programmes.

Acknowledgements

The authors extend grateful thanks to the staff in all the placements for their permission for the study and their extensive feedback. The School is indebted to them for providing students with learning opportunities in such a supportive manner.

References


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**Student perspectives on their recent dental outreach placement experiences**

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**Background:** Dental schools are developing new curricula, with outreach placements enhancing the hospital-based training.

**Objectives:** To assess the students' experience of outreach as one component of determining the value and feasibility of outreach placements.

**Intervention:** Six-week block placements for 10 undergraduates and 3 weeks for 11 hygiene and therapy students in existing primary care clinics, in areas of need, to work supervised by local dentists.

**Methods:** Semi-structured interviews with 20 students by staff independent of the course team. Interviews were audio-recorded, transcribed and content analysed before being verified by a second observer. Findings were triangulated against a peer-run focus group and students' clinical records.

**Results:** Students were very positive about their experience and the potential role of outreach training in dental education. They described: gaining greater experience of new types of patients and their communities; learning from broader clinical experience, alternative approaches and practicing or observing dentistry in different settings, the benefits of team working, and, acquiring a more holistic and pragmatic view of health care. Many students reported gaining greater confidence, wider awareness of potential careers in dentistry and a greater sense of realism in their experience. Some reflected on their own training needs. Students also discussed the importance of preparation for the placements and the merits of different styles of supervision.

**Conclusion:** Dental outreach training can provide students with valuable learning experiences in a range of areas. It requires careful management to ensure those experiences match individuals' needs and the programme's purposes.

Key words: outreach; community-based education; extramural; dental student, perceptions.

**Introduction**

**Dental education** is developing to meet the challenges of governments' modernization agendas (1–3). Outreach placements, in which students undertake supervised practice on consenting patients away from the dental hospital in primary care settings have been said to enhance undergraduates', hygienists' and therapists' learning (4–6) and to help develop their competence for later dental practice (7).

Student perceptions are central to both assessing quality and targeting development in educational programmes (8, 9). Most published evaluations of UK outreach dental education programmes include students' perceptions and almost all of those describe either the Manchester (10–12) or Liverpool (13) programmes. Recurring findings in these and other reports (7, 14–17) include students' appreciation of nursing support and closer supervision, students improving their confidence, pace of working, team working and patient management, and students experiencing new types of patients and procedures.

Internationally, there is considerable overlap among the purposes of outreach schemes. Addressing inequalities in workforce distribution through raising students' awareness of the underserved is widespread (18, 19). Serving unfamiliar cultures and providing additional access to care often feature in US extramural programmes (20). Some schemes stress comprehensive care and holistic approaches (12) and others, practice management (21). Consequently, care must be exercised in generalising findings given the differences in dental services between nations and in schemes' objectives.

The University of Sheffield's School of Clinical Dentistry is developing outreach placements in National Health Service (NHS) primary care settings in areas of identified need. Besides providing opportunities to extend students' clinical experience, the placements' objectives were to enhance their understanding of community dentistry, comprehensive care, the factors involved in health behaviours, the profession's ethical responsibility and a working environment.
This research was part of a larger evaluation which used qualitative and quantitative methods with the students and placement staff (22). It aimed to assess the students’ experience of outreach as one component of determining the value and feasibility of primary care outreach.

Methods

The intervention placed students in outreach clinics in locations across northern England to work with a primary care ethos and to local protocols. Placements were identified ad hoc from within existing networks of contacts to provide conveniently located placements matched to students' needs. Most had not previously offered student placements. Starting after Easter 2003, 10 fourth-year dental students spent 6 weeks on placement full-time and 11 second-year hygiene and therapy students (H&T students) spent 3 weeks. Seven students were the only student at their placement, six attended in pairs and eight in fours. Their placement supervisors were approved dentists, briefed and offered additional development for supervision, already working in the two dental access centres or nine community dental service clinics (DACs providing care including emergency care for people experiencing difficulty in accessing NHS dental care, or CDS serving children in otherwise underserved areas, patients with special needs and having an oral health promotion role). Students maintained a clinical record but had no quotas of procedures to meet. They experienced at least five half-day sessions per week of supervised clinical practice and increased their awareness of a new community distant from the Dental School. Undergraduates undertook projects related to community health and made observational visits to related health services. Whilst the undergraduates individually volunteered for outreach as their elective study, H&T students’ participation was a group decision.

There were two qualitative arms to this study: semi-structured, exploratory interviews with students returning from placements and a smaller scale peer-run focus group exploring their experiences. The latter was included to reduce the risks of reactive effects. The interviews were held within 2 weeks of students’ return from outreach placements to reduce recall bias.

The intention was to identify the range of experiences and students' interpretations of those experiences. The preliminary topic guide for interviews listed key areas chosen from the initiative’s documentation. Those areas were placement organisation, team working, clinical experience, patient management, student supervision and any effects on students. However, using elements of constant comparative analysis (23), new leads were followed as they arose.

The students were informed of the study before placements commenced and gave their individual consent to participate. All students were interviewed in an annexe to the Dental School. To minimise observer bias and social desirability bias the interviewer was not previously known to the students being one of a newly appointed team from outside the School though briefed on the outreach initiative.

The data were transcribed verbatim by the interviewer and subjected to content analysis through line by line coding (24). Similar coded responses were grouped into categories iteratively for reporting. At an early stage a second observer (PGR) read all available transcripts and checked about one-fifth of the codes for appropriateness and consistency of application. This was repeated at a later stage to further validate the data.

Additional techniques to assure the quality of the data were triangulation against the results from the peer-run focus group and against a quantitative analysis of data from students’ clinical records. Then subsequent validation by presentation of the findings to the students.

Results

Of the 21 participants, data were gathered from 10 dental students and 10 H&T students. The four males were dental students. All but one of the dental students entered their course directly after leaving school, whereas the therapists had several years dental nursing experience.

The results of the interviews and those of the parallel peer-run focus groups were so similar that they are not distinguished in the data.

All students recommended the value of outreach placements for gaining career enhancing ‘real’ experience. Key features of outreach were the number and variety of patients seen and the opportunity to ‘get out there and do it’ integratively putting their training into practice in a new and workplace setting. The sense of realism was linked to teamwork, a busy schedule and a single surgery with everything to hand.

It’s like finishing off for me...I don’t feel like a dental student. I feel like a dentist in many ways because I have had this experience...All the parts of the course fit together, its not bits of the syllabus but
one thing. It is definitely the best way to train dentists’. Undergraduate 1

‘When you get out there it’s a big eye-opener... good experience’. H&T student C

The results, illustrated by anonymised quotations, are reported in the six categories identified in the data: dentistry in community settings, patients and their needs, learning through reflection, building confidence, supervision and organisation.

Dentistry in community settings
The communities encountered on placement were new and formative experiences for students who gained an impression of the impact on these populations’ dental health arising from cultural, educational and economic factors.

‘I was shocked at how much dental disease there was’. H&T student D

Increased clinical experience was students’ main motivation given for volunteering. Their clinical records indicated that undergraduates treated between 47 and 111 patients and H&T students, nine to 53 patients.

‘I probably got more work done in those six-weeks than in two years... at the hospital’. Undergraduate F

Students quickly felt part of their dental team and, through individual nursing assistance, appreciated the value of teamworking. Where dental students worked with or observed H&T students, hygienists, therapists or other health professionals it gave them insights into the others’ capabilities.

The new learning environment, volume of clinical work and frequent interactions from teamworking were all believed to enhance and accelerate students’ development. They felt they missed little by being away from the School.

Patients and their needs
Patients encountered on placement were considered more typical of general practice than those at the dental hospital, more likely to have other problems or poor dental health or to be simply seeking relief from pain.

Students discovered a more holistic approach to dentistry; concentrating less on clinical technique and more on finding practicable solutions. Taking detailed histories and background information from staff helped students appreciate the need to plan treatment compatible with patients’ lifestyles and expectations.

‘Very different from the hospital where you do the textbook treatment because you have got good patients to do it on... Out there you just have to do what you can’. H&T student D

Learning through reflection on experiences
Often supervisors encouraged students to reflect on the day’s anticipated work using styles which varied from a simple statement of requirement to a problem-based learning approach.

‘We’d read through the notes and if there was something we didn’t understand they would talk us through it’. Undergraduate N

Undergraduates were also helped to use appropriate vocabularies and registers to improve their rapport with patients, especially children.

‘I can laugh and joke with patients now whereas before I was very highhanded and wouldn’t talk to patients during treatment’. Undergraduate I

Working on outreach, students realised how the various parts of their course fitted together and noted that experiential learning reinforced earlier theoretical learning. They also became more self-critical of the adequacy of their clinical skills. Some considered themselves better placed to make future career decisions.

‘It did make me realise that if we were so lucky with the people we were working with there then I’d have to be very careful where I choose to go for my VT which is for a whole year so if I get that wrong it could be a really miserable experience’. Undergraduate L

Most students reflected on their visits and shadowing though attitudes to this varied with a few deeming these a poor substitute for clinical practice. Learning from observation was greatest when students helped organise it, its timing ‘broke the week up’ or discussion integrated it with clinical work.

‘One of the dentists there did a really good job for those kids... made their dental visit special for them... I learnt a lot from her’. Undergraduate K

Building confidence
Despite being nervous before starting, students’ apprehensions regarding speed of working, unfamiliar patient types and unfamiliar procedures had disappeared within a few days. For example, treating children...

‘...was quite scary at the beginning but we picked up the skills and patient management. Something I really enjoyed... gradually’. Undergraduate F
Increased confidence was attributed to repeated opportunities to re-apply skills, appreciative comments from patients and, crucially, supportive supervision. Placement was viewed as a significant step towards becoming competent to practice with being accepted as a working member of a dental team being an important factor in this progress. Students noted they became more focussed as their confidence improved.

“What I wanted and got was a realistic view of what dentistry is like without the confines and artificiality of the dental school... What has developed most is my ability to make decisions... I wanted to apply what I've learnt for myself and see if I could sort it out... It seemed so much easier there and to tell you the truth, I think it all revolves around the nurses. They knew what I needed and they were like our training wheels’. Undergraduate N

Supervision
All students valued the prompt availability of encouraging supervision and contrasted this with the inevitable delays in the larger dental hospital setting. Students accepted and could see value in a wide range of approaches from apparently mutual learning experiences to formal tutoring. Supervision was provided in a manner that gave many students a sense of freedom to practice in a controlled environment.

‘A nice environment to do things for the first time because it was very chilled out... it wasn’t obvious that... they were watching... He had no qualms about telling us if... we had done something stupid... He’d make you do a tutorial on the subject so that he could understand exactly where you were coming from... it made you think... Because you wanted to impress them it makes you really try and... push the boundaries’. Undergraduate I

‘We started to realise... that you can actually decide to do something different and not have the same opinion as your tutor provided you can argue your point’. Undergraduate L

Usually, the intensity of supervision reduced as supervisors’ confidence in the student’s ability increased though this trend varied depending on the treatment and patient. Dental nurses supplemented supervisors’ support and supervised nurses for students where close observation was needed. Those supervisors not beside the student were available nearby if needed. Students perceived supervisors’ reluctance to stand watch over them was intended to reduce their stress and, in some cases, the supervisors’ embarrassment.

‘They left us, to an extent, to just get on with it, because they knew that we could do things’. H&T student E

Students reported oral feedback often being given after each patient including useful tips, explanations or discussion and being supplemented by formal wider-ranging review meetings particularly in the early days. This frequent, close contact helped students form productive supervisory relationships with staff who became...

‘...our friends... advising us... and giving insights into why they chose their career path. It was quite interesting to hear their points of view and just speak to them on... level terms’. Undergraduate M

Organisation
Those students most involved in arranging their placement and their learning experiences found their placements most fulfilling. With placement staff they were

‘...working out what we were doing as we went along. A lot of the trips we organised ourselves... I really enjoyed it and got a lot out of it’. Undergraduate L

Visits to placements before starting were valued by students generally unfamiliar with the settings. A suggested development was moving students round contrasting placements to further broaden their experience.

‘There was all the information before I went. It was brilliantly organised- I turned up and they were ready for me’. Undergraduate H

Given the emergent nature of the programme, it is unsurprising that students identified variation in its organisation. Broken chains of communication meant a few placements initially could not match experiences to students’ needs. Usually, this was due to a lack of information on individuals’ capabilities resulting in cautious bookings which were often rearranged over the first weeks.

‘We did have a one-to-one with the clinical director at the end of the first day. Very open... He asked what we expect from being here’. H&T student E

Students credited the dental hospital with having educated and trained them appropriately to benefit from their placements. A few also saw implications for development of their programmes towards interprofessional learning.
Smith et al.

'[Greater integration] would be excellent because we're having to work together. The whole of dentistry is changing with more emphasis on...a team effort...So why shouldn't we be together for some of the clinical and the lectures'. Undergraduate I

Overall, students considered placements would certainly benefit everyone on their courses provided, in a few cases, that the organisational difficulties were addressed.

Discussion

This research assessed the students' perceptions of the value and feasibility of primary care outreach learning through qualitative semi-structured interviews. Students valued the volume and variety of clinical experience in a primary care clinic gained while working with nursing support and immediately available supervision. They reported teamwork, increasing confidence and developing more holistic, pragmatic views of treatment planning. Attitudes to shadowing and observation were more varied. Many students shaped their placements and developed rewarding experiences and relationships. Organisational or communication problems in some cases limited the intended learning experiences.

Amongst UK studies these data are unique in two respects. First, they report a 6-week full-time placement, with most students distant from the dental school and immersed in the placement culture rather than making day visits (12, 26). Second, that culture allowed students to gain new insights into a primary care ethos, largely undistorted by the influence of dental school staff, protocols or treatment quotas.

As noted in this study, applying learned theories in a new setting appears popular (11, 16, 25, 26) and is said to increase students' understanding (17, 27). In particular, theories relating to patient management and public health gain meaning once applied in clinical settings (10, 28, 29). Students in this study were encouraged to move beyond routine procedures to dealing with problematic situations in typical ways. In this respect placements matched the characteristics of the higher level of Schön's practicums (30) for developing the key professional skill of reflective practice (4, 5, 31).

The students in this study lacked the concerns regarding meeting clinical treatment requirements reported elsewhere with placements (11, 32).

The students reported developing their skill in teamwork, despite limited opportunities for team training. These skills and the holistic and pragmatic approaches to treatment planning are emphasised by the profession (4, 31). The students related the depth of impression their experiences made on them to immersion in a longer, full-time placement. The relative merits of full-time placement and the 1 day a week placements of other schools (12, 28) cannot be compared in this study.

Given the reported variation in supervision and with supervisors evolving their roles there may be benefits in training supervisors to establish a common understanding over learning experiences and styles of supervision. One approach could consider the key factors in developing students' confidence and competence through critical incident case studies.

Students' perceived benefits in this study translate well with those reported by others evaluating similar developments in dental education (12, 13, 33). The use of the phrase 'real-life' to describe such experiences is widespread in describing outreach (7, 15, 34-36) and this perceived realism's strong sensory component enhances learning (37). Matched in evaluations elsewhere are students' anticipated easier transition towards practice and their greater awareness of possible careers (13, 16, 38, 39).

The developments suggested by students have been proposed elsewhere. For example, by increasing the variety of experiences by rotating students around settings (6) and increasing sharing of learning experiences (4, 5, 31).

Optimal communication of individual students' experience and requirements to placements would allow matching of learning experiences to students' needs. If students are to help shape their placements they may need development to negotiate improvements.

As with any study, these findings should be generalised with care. The placements were located at a time of change in therapists' duties when many dentists remained unfamiliar with their role. Some placements could not provide opportunities for team training and others' preparations were limited by the emergent nature of the programme. Furthermore, these placements did not benefit from being fully integrated into the timetable. The students' emphasis on developing clinical skills may reflect a predisposition among these volunteers but may also be a common trait among dental students. However, the steps taken to minimise recall, social desirability and observer bias may have restricted other threats to validity.

In conclusion, outreach training can provide students with valuable learning experience in a range of
areas. However, careful preparation is required to ensure all learning experiences are matched to students' needs and the programme's objectives.

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References


Student perspectives on dental outreach


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A Randomized Controlled Trial of Outreach Placement’s Effect on Dental Students’ Clinical Confidence

Michael Smith, B.Ed.; Michael A. Lennon, M.D.S.; Alan H. Brook, M.D.S.; Peter G. Robinson, Ph.D.

Abstract: This randomized controlled trial compared the effects of outreach placement with traditional, exclusively dental school-based clinical experience on students' confidence in providing treatment for patients presenting with common dental problems. Senior dental students (n=49) were allocated at random to existing dental school-based clinics or placement in primary care clinics to work supervised by local dentists. At baseline, students self-rated their global confidence on a five-point scale. These measures were repeated at follow-up, augmented by a transition judgment and a then-test of confidence (asking students to look back and re-rate their pre-placement confidence). Groups were comparable at baseline. Follow-up scores for global confidence were similar between groups. The outreach group scored higher in the transition judgment (mean 3.7, SD 0.9) than the control group (mean 3.1, SD 1.1, P=0.05). In the then-test, on reflection, the outreach group considered their baseline ratings of confidence were overoptimistic (mean then-test scores 3.2, SD 0.9 and baseline 3.7, SD 0.5) while the control group thought theirs were accurate (mean then-test scores 3.8, SD 0.7 and baseline 3.6, SD 0.8, P=0.01). The findings suggest dental outreach training in primary care settings is more effective than dental school training alone in improving students' confidence in tackling clinical situations. The measurement of change in confidence is complicated by shifts in students' internal scales arising from insights gained on outreach.

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The development of this outreach program and the trial were funded by the UK’s National Dental Development Unit grants EL1/EL2.

Key words: undergraduate dental education, senior dental student, extramural, community-based, outreach, confidence

Curricula in dental schools increasingly include clinical experiences in primary care settings outside the school. These arrangements are called outreach, extramural, or community-based experience. There is ample anecdotal evidence from program evaluations that hands-on outreach experiences increase students’ confidence in coping with clinical situations, but hard data on outreach’s educational outcomes are lacking.

Confidence in providing oral health care for patients is considered important as an educational outcome. Among medical students, increased confidence has been associated with increased clinical competence, though the relationship between the two is not well understood.

The University of Sheffield School of Clinical Dentistry is developing an outreach program for senior dental students. Besides providing opportunities to extend students’ clinical experience, the objectives of the program were to enhance students’ understanding of community dentistry, comprehensive care, health-related behaviors, professionals’ ethical responsibility, and a working environment. The first group of returning students claimed increased confidence in tackling common dental problems.

Confidence cannot be directly measured, but student self-reporting of perceived confidence is commonplace. Its measurement in intervention studies may be complicated by a response shift in which the experimental group recalibrates its baseline impression of confidence as a consequence of the intervention itself. Transition judgments in which subjects assess the degree of change itself, or assessments known as “post-then tests,” which retrospectively assess pre-intervention levels at follow-up, are recommended methods for avoiding errors arising from response shift.
This randomized controlled trial aimed to assess the effectiveness of outreach placement on students' confidence in providing treatment for patients using transition judgments and post-then tests.

Methods and Materials

The intended sample was the fifty-four dental students of the University of Sheffield School of Clinical Dentistry's penultimate year. Five students who attended overseas dental schools during the year's second semester were excluded from the sample, resulting in a final sample of forty-nine students.

Students were involved in the design of the study in two phases. First, a draft of the protocol was discussed with class officers, and then a refined protocol was presented to the intended sample before recruitment commenced. No faculty were involved in the conduct of the study, and students were reassured that neither their decisions about participation nor their allocations to outreach or control groups would adversely affect assessment of their degree program.

Students were randomized into the dental school or outreach placements by an assistant with no knowledge of individual students, using electronically generated random numbers. Allocations were concealed from students until baseline assessments were completed. Twenty-five students were randomized to the study group (outreach group as described below) and twenty-four to the control, dental school-based group who completed regular rotations in hospital dental clinics.

The outreach group attended National Health Service (NHS) salaried primary dental care placements full time for five weeks. Eighteen placements were in two Dental Access Centers (DACs provide care including emergency care for people experiencing difficulty in accessing NHS dental care) and seven in two Community Dental Services (the CDS provides community-based specialist services such as oral health promotion and caters to children in otherwise underserved areas and patients with special dental needs). All placements were in urban areas of identified need in northeastern England. Each week students had between five and seven half-day clinical sessions with dental nurse support, performed health care according to local protocols, and were supervised by local dentists. In addition they observed allied health care services and completed a report in which they analyzed two patients' case studies in relation to community health data.

The outreach group attended the placements consecutively throughout the 2004 summer term. Concurrently, the dental school group continued their normal hospital clinics including restorative and dental emergency clinic rotations.

At baseline, students' clinical competence and confidence were assessed. Competence was assessed using each student's average mark in dental school clinical assessments throughout the previous semester. Self-assessed confidence was measured using question A in Figure 1 with its five-point Likert-style scale ranging from "not at all confident" to "totally confident."

At follow-up, students' confidence was measured using three questions displayed in Figure 1: a global self-assessment (question A), a then-test (question B), and a transition judgment (question C) with responses given on five- and six-point Likert-style scales scored using the item codes shown in the figure.

These assessments were pretested on a convenience sample of students (n=32) from a previous cohort to estimate their discriminant power. The transition judgment predicted that a sample of twenty (40 percent of the intended sample) would suffice (power=0.8, alpha=0.05).

To reduce reactive effects, the assessment was administered by staff not involved with the students' course and in an annex to the school the day after the study group completed its outreach placements.

After undertaking simple descriptive analyses of all variables in the two groups and simple comparisons of potential confounding variables, statistical analysis compared the outcomes measures between the groups using the t-test. Data were compared between groups using analysis of covariance and checks made of the effects of potential founders and mediators using stratified and multiple regression analyses. These analyses were carried out on an intention to treat basis using sample means to substitute for any missing values.

The protocol for this study gained ethical approval in March 2004 and was followed throughout.

Results

All forty-nine eligible students consented to participate. Fourteen of the twenty-five students in
Your training should prepare you to be able to diagnose, plan, and provide treatment for a range of people presenting with common dental problems.

A. How confident do you feel that you can tackle a range of people presenting with common dental problems?

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B. How confident do you now think you were at tackling a range of people presenting with common dental problems two months ago?

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C. Think back two months. Compared to two months ago, how much has your confidence that you can tackle a range of people presenting with common dental problems changed? Is it...

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<th>About the same</th>
<th>A little better</th>
<th>Quite a lot better</th>
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The ancillary analyses revealed no significant variation in scores by wave of attendance, number of years of teaching experience of placement supervisors, placement setting, or student gender.

### Discussion

This randomized controlled trial demonstrated that outreach training significantly increased students' confidence in providing everyday dental care for patients. These experimental data confirm anecdotal reports that community outreach experiences increase dental students' confidence and so address concerns about the rigor of evaluations.1

The measurement of self-assessed change in confidence was complicated by shifts in students' internal scales of confidence. Whilst simple cross-sectional comparisons at follow-up revealed no difference between the groups, the then-test indicates that the experience of community-based outreach encouraged students to revise their internal scales of confidence. Therefore, the simple comparison at follow-
up was undermined because perceptions of confidence had changed in one group of students presumably as a consequence of their educational experience. Moreover, the then-test indicates that students who have been on outreach now believed they had been overoptimistic about their confidence before their placement. Put simply, they realized afterwards that some of their earlier confidence was misplaced. This newly gained insight is reflected in the difference in transition judgments between groups.

Other aforementioned studies had linked increased confidence with increased competence. Such a parallel increase in competence was found in a separate study of these students’ outreach placements. The outreach students were better at planning treatment for a simulated patient that took her lifestyle and wishes into account.

The previous cohort of students who participated in a pilot version of the community outreach placements attributed their increase in confidence to repeated opportunities to reapply skills, appreciative comments from patients, and especially, support from both dental nurses and supervising dentists. Features of the outreach experience that contrast with students’ school-based clinical experience include about four times the number of patients per week, individual dental nurse support, fewer students per supervisor, and a more intimate working environment with fewer surgeries and a smaller dental team.

While these studies identify an educational benefit from outreach, there are associated costs to academic programs. Additional resources are required for favorable levels of supervision and nursing support, and students’ absence from the dental school may represent lost opportunities to enhance their learning in other areas.

As in any research, these data should be viewed with care. There may be limitations on generalizing these data to dental education programs operating in different ways. Recall and social desirability bias may affect the validity of the follow-up assessments. However, other features of the trial increase its validity: four independent outreach locations were used, and there was no recruitment bias. In addition, incorporation of the then-test was able to compare shifts in students’ internal scales of confidence.

### Conclusion

This trial suggests primary care outreach experiences were effective as an adjunct to traditional dental school-based training in improving students’ confidence in providing treatment. These findings encourage further development of outreach as a component in dental education.

### Acknowledgments

The authors wish to acknowledge the support of staff and patients in the placements in providing suitable learning opportunities for students. The students are thanked for their participation in the trial.

### REFERENCES


M. Smith, M. A. Lennon, A. H. Brook, F. A. Blinkhorn, A. S. Blinkhorn and P. G. Robinson

"...there is a widespread belief that outreach placements can broaden the base of available clinical material and enhance the educational experience."

INTRODUCTION

Many dental schools are increasing the role of primary care placements in new curricula to enhance students' learning and prepare them to meet communities' needs. Such placements complement students' traditional hospital-based training and are variously termed outreach, extramural or community-based placements. Most students will later work in primary care settings.

Surveys of outreach programmes encourage their development and there is a widespread belief that such placements can broaden the base of available clinical material and enhance the educational experience. This view is supported by many positive programme evaluations and the occasional cautionary one. There is limited evidence on the impact of outreach programmes and a call for further research. The University of Sheffield's School of Clinical Dentistry is developing an undergraduate outreach programme. The first phase saw returning students claiming increased understanding of pragmatic treatment planning with increased appreciation of patients' social circumstances. Similar observations have been made in other uncontrolled programme evaluations.

The aim of this randomised controlled trial was to compare the effectiveness of dental outreach in a primary dental care setting and a traditional hospital-based training in increasing the competence of dental students to plan treatment for patients with common dental problems.

The construct of treatment planning underpinning this study has three stages.

1. Interviewing
2. Collecting relevant information from the social history
3. Using that information to plan appropriate treatment

The first stage and the associated capture of a dental history are familiar and well practiced tasks for senior dental students. Consequently, we hypothesised that outreach experiences would not improve performance in these respects. The remaining stages, collecting relevant information from the social history and using that information to plan appropriate treatment, were hypothesised to benefit.
MATERIALS AND METHODS

The intended sample was all 54 fourth year, senior students at the University of Sheffield's School of Clinical Dentistry. Excluded from the sample were any students who declined to participate or who attended overseas dental schools during the semester.

Student representatives were involved in the experiment's design, which was then presented to the whole cohort before recruitment. Students were measured throughout that participation decisions and allocations would not adversely affect their studies. The study gained ethical approval from the North Sheffield Research Ethics Committee in March 2004 and the protocol was followed throughout.

Allocation

Students in three timetable blocks were randomised into the hospital or outreach placements using electronically generated random numbers. Allocations were concealed from students until baseline assessments were completed.

Intervention

The outreach group attended National Health Service (NHS) salaried primary dental care placements full time for five weeks. Eighteen placements were in two Dental Access Centres (DACs) provide care including emergency care for people experiencing difficulty in accessing NHS dental care) and seven in two Community Dental Services (the CDS provides community-based specialist services such as oral health promotion and care for children in otherwise underserved areas and patients with special dental needs) in locations in urban and rural areas of identified need. Each week students had between five and seven half-day clinical sessions with dental nurse support, working to local protocols and supervised by local dentists. In addition they observed other local healthcare services and completed a written project relating two patients' case studies to community public health data.

The outreach group attended the placements consecutively throughout the 2004 summer term. The hospital group continued their normal dental hospital clinics including restorative and casualty clinics for the five weeks while the outreach blocks were on placement.

Baseline measures

Students' clinical competence was established through two pragmatically selected measures to check randomisation. Self-assessed competence was measured using a five-point Likert scale ranging from poor to excellent and scored 1, poor, to 5, excellent, to the question "Your training aims to help you plan treatment for patients taking into consideration the clinical states of their mouths and relevant factors in their everyday lives. How good do you think you are at treatment planning?" Competence of the student was also assessed using average formative marks in dental hospital clinical assessments throughout the previous semester.

Follow up assessments

Follow up assessments considered interviewing skills, capture of social history and treatment planning. Interviewing skills were assessed practically with a standardised patient. Performance in the remaining two stages was by written report and oral assessment. The assessments were held the day after each placement ended and students were aware of the assessments being made.

Measures of the type used at follow-up were not conducted at baseline in case repeated assessments might prime the students.

The trial

The 'patient' was selected from a bank of actors, who simulate patients, to match the history: a disadvantaged young mother presenting with poor oral health, several decayed teeth and severe pain (see Fig 1).

Fig. 1 The history portrayed by the standardised patient

Students were instructed to take a complete history of the 'patient' and formulate a treatment plan before being assessed for 10 minutes by two clinicians experienced in children's dentistry. Excluded from the sample were any students who declined to participate or who attended overseas dental schools during the semester.

...
in evaluating dental curricular developments.18 This "patient's" assessment was supplemented by subsequent second rating by an experienced clinician (FAB) via unobtrusive, but visible, audio recording of the interviews. Second ratings omitted the two non-verbal communication scale items.

Students’ record sheets were independently read by the two clinicians (ASB, FAB). The written histories and treatment plans were awarded provisional codes 0, absent, to 3, spontaneously present, for items listed in Figure 2. An agenda was then agreed for questioning the student to clarify any areas of uncertainty. After 10 minutes questioning the assessors independently revised and recorded their assessment codes before discussing any differences and agreeing a joint assessment. The histories and treatment plans were scored as the sums of codes in each of the four areas.

The development of these assessments occupied four days. After initial training to portray her role consistently the patient was trained and calibrated as an ACIR clinician by first rating experienced clinicians and then other dental students. Later, adjustments were made to the patient description (Fig. 1), the simulation and the immenet criteria and codes (Fig. 2) during refinement.

Table 1 Baseline measures

<table>
<thead>
<tr>
<th></th>
<th>Outreach n = 25 mean (SD)</th>
<th>Hospital n = 24 mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-assessed clinical competence</td>
<td>2.6 (0.6)</td>
<td>2.8 (0.9)</td>
</tr>
<tr>
<td>Clinic-based competence measure</td>
<td>62.4 (1.5)</td>
<td>62.6 (2.3)</td>
</tr>
</tbody>
</table>

RESULTS

All 49 eligible students consented to participate. Fourteen of the 25 students in the outreach group were female as were 15 of the 24 in the hospital group. The groups were similar at baseline for both measures of clinical competence (Table 1). Following recruitment and baseline data gathering in March 2004, students started their allocated expert supervision in March 2004. Students started their allocated expert supervision in March 2004.
...outreach training was more effective than traditional hospital-based training alone in improving students' ability to capture relevant points of social history from a patient and to consider these when planning treatment.

Table 2 Follow up measures

<table>
<thead>
<tr>
<th></th>
<th>Outreach n = 22 mean (SD)</th>
<th>Hospital n = 23 mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1 - Interviewing skill</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient's rating</td>
<td>62 (4)</td>
<td>63 (5)</td>
</tr>
<tr>
<td>Dentist's rating</td>
<td>40 (12)</td>
<td>40 (8)</td>
</tr>
<tr>
<td>Stage 2 - Information capture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dental history obtained</td>
<td>5.0 (3.5)</td>
<td>4.8 (3.0)</td>
</tr>
<tr>
<td>Social history obtained</td>
<td>4.4 (2.1)**</td>
<td>2.8 (1.9)**</td>
</tr>
<tr>
<td>Stage 3 - Treatment planned</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment planning was appropriate</td>
<td>5.6 (2.1)**</td>
<td>3.9 (2.3)**</td>
</tr>
<tr>
<td>Inclusion of wider issues</td>
<td>2.6 (1.7)</td>
<td>2.3 (1.4)</td>
</tr>
</tbody>
</table>

** Significant at p < 0.01

DISCUSSION

This randomised controlled trial found outreach training more effective than traditional hospital-based training alone in improving students' ability to capture relevant points of social history from a patient and to consider these when planning treatment.

Our hypotheses that outreach experiences would not improve competence in the familiar tasks of interviewing and taking a dental history but would have a beneficial effect on capturing a social history and planning appropriate treatment were supported. Our findings provide robust support for the widespread belief in the value of placements and in policymakers' recommendations to use outreach in primary care to develop professionals who are best suited to providing appropriate care through heightening students' awareness of community needs.

DeCastro et al. in a recent US study finding that outreach students graduated with higher examination board score suggested this improvement may be due to increased clinical experiences. This is also a plausible explanation in our study, though perhaps the favourable supervision ratio, nursing support and the location of the learning in a working environment are other relevant factors.

While the study does identify educational gains from outreach placements there are associated educational costs. For example, there may also be lost opportunity costs to students' learning in other fields resulting from these being away from the dental school and research into this may be valuable. There is also a need for further research into the specific educational benefits arising from different types of primary care settings as suggested by the exploratory analysis.

The outreach experience in this study involved working three or more days a week as a member of a primary care team separate from the dental school and...
hospital, and completing a community public health project. Students were supervised by local staff and had experienced individual dental nursing support. There may be limitations on generalising the findings to other schemes operating in different ways or in contexts where producing graduates prepared to address social issues is not a high priority. However, other features of the trial increase the external validity of this study: the patient’s case was unexceptional, the skills assessed were everyday requirements of many dentists, the assessment setting was a typical surgery, four independent outreach locations were used, students were not selected to participate, and blinders of the assessors to the intervention was successful. Further, the measure of treatment planning achieved construct validity and reliability through thorough development and practice. A factor in ensuring this validity was assessment by clinician assessors familiar with the NHS primary care sector that engages most of the dental workforce. While other treatment plans might be argued, the assessments rewarded approaches that acknowledged the patients’ condition, preferences and circumstances.

The benefits of outreach experience did not extend to the more frequent inclusion in treatment plans of the wider issues of the patient’s children’s needs or multidisciplinary health promotion. It may be that while five weeks outreach experience had helped students move to a more holistic consideration of the patient’s needs, this improvement had neither extended to consideration of the family as a whole nor to matters which were not predominantly dental in nature. Alternatively, the students may have deemed these issues of secondary importance whilst considering a patient experiencing severe pain.

 Debate remains regarding different approaches to intention to treat analysis. What is clear is that a loss to follow up which is less than 10% and which is random has little effect on comparisons. This was confirmed by substitution with sample means and only challenged when the imputations assumed a worst case outcome for missing data.

CONCLUSION

This trial found outreach experiences as an adjunct to traditional hospital-based training were effective in improving students’ ability to capture a patient’s social history and to plan appropriate treatment in the light of that social history. These findings support further development of outreach in dental education as a contribution to achieving community public health objectives.

The authors wish to acknowledge the support of placements staff and patients in providing suitable learning opportunities for students. Jackie Shaw’s contribution in developing the patient’s role, Hilary Broder’s advice regarding simulated patients and the students for their cooperation. This study was supported by NDDU grants EL1/EL2.

Appendix B

Documents: Protocols, Letters and Questionnaires

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B1 Student perception study: Letter of Invitation to Participate

THE UNIVERSITY OF SHEFFIELD
Oral Health and Development

Dear [Name],

Letter of invitation to participate in the research into outreach

You should now be settled in your placements and busy treating patients. I am sure all will be progressing smoothly but if you have any problems or questions do contact the Team Training Programme Office (0114 271 7885 (office)). The programme evaluator and research assistant, Mr Michael Smith, is now in post and will respond to your queries.

Mr Smith will contact you around the time of your return to the School to invite you to attend an interview to provide feedback on your experiences on placement and to explore your views on this type of training. The topics likely to be covered in the interview include:

- your clinical work
- the patients you encountered and their match to your expectations
- the support and supervision you experienced
- your views on team training.

We would like you to take part in the interview because the research should contribute to our understanding of outreach training.

Mr Smith is not a member of the School faculty so you can give your feedback in confidence. However, your decision to take part or decline to take part in the research is independent of any course requirements or assessments. Whatever your decision, it will:

- not influence any School assessments of your performance and
- not result in any personal information being revealed to myself, your lecturers, administrators, or anyone other than the researcher, Michael Smith.

Should you have any queries please contact me.

Research assistant, Michael Smith, will be contacting you shortly to seek your agreement to participate in this research.

Yours sincerely,

Professor Peter G Robinson,
B2 Categories used in Summarising Students’ Clinical Experience

The following classes will be used for the analysis of the baseline characteristics of students.

1. Restorations
   a. simple plastic restoration *
      i.e. amalgam / composite / glass ionomer
   b. endodontics
   c. complex restoration *
      i.e. inlay / overlay / crown / veneer
   d. other restoration *

2. Prosthetics
   a. denture / overdenture
   b. addition / reline / impression / adjustment / other

3. Periodontal
   a. Review / monitoring
   b. OHC
   c. Non-surgical periodontics
      i.e. scaling / irrigation / polish / root surface debridement
   d. Surgical periodontics
   e. other periodontics

4. Oral Surgery
   a. permanent teeth extracted
   b. other oral surgery

5. Sedation
   a. RA IS operator
   b. RA IS assist
   c. IV sedation operator
   d. IV sedation assist

6. Children’s Dentistry
   a. fissure sealant
   b. simple restoration *
   c. complex restoration * (e.g. steel crown)
   d. preventative treatment (e.g. Duraphat)
   e. prevention advice
   f. deciduous extractions
   g. pulpotomies / root treatments

7. Radiograph taken

* indicates the classes of treatment contributing to the principal measure of clinical experience in this study

Classifications of Patients

1. Special Needs
2. Children
3. Adult
THE UNIVERSITY OF SHEFFIELD
Oral Health and Development

Dear

Letter of invitation to participate in the outreach research project

You may recall our meeting early in January in when we outlined the proposed research in outreach dental education when you helped shape the research. That proposal has received ethics committee and research governance approval.

We can now formally invite you to participate in the natural experiment of outreach placement for undergraduate dental education which has Sheffield Teaching Hospitals Research Department reference code STH13657 and North Sheffield Research Ethics Committee reference code NS2004 2 1862.

We would like you to take part because the research should make a significant contribution to our understanding of outreach training, a field lacking rigorous research, and in addition, some of the assessments used in the research are similar in format to assessments you will encounter later in your course and the practice may be valuable experience.

May I remind you that taking part or declining to take part in the research will:

- not influence the School’s random allocation of students to outreach or dental hospital groups and
- not result in any personal information being revealed to myself, your lecturers, administrators, or anyone other than the researcher, Michael Smith.

Enclosed with this letter is an information sheet describing the research project. It answers most of the common questions likely to be raised. Should you have any queries please contact me or any of the research team, your personal tutor or senior School staff.

Research assistant, Michael Smith, will be contacting you shortly to seek your consent to participate in this research.

Yours sincerely,

Professor Peter G Robinson,
Principal Researcher
B4 Student information: Description of the RCT Intervention

All fourth year students will attend a preparatory series of lectures.

Students allocated to outreach will be divided into three waves to attend placements sequentially for five weeks full time starting 19 April, 24 May and 28 June 2004. Students will be placed singly, in pairs, threes or fours in the following locations:

- Lincoln Dental Access Centre
- Hull Dental Access Centre
- Sheffield Community Dental Service’s Wheata Clinic
- Rotherham Community Dental Service

Placements will provide students with at least 5 half-day sessions of clinical experience with dedicated nursing support per week. Clinical experience will involve providing comprehensive dental care (within the student’s capability) to appropriate patients attending the setting. Students will have a dedicated clinical supervisor throughout this clinical work. Supervisors will be experienced and qualified dental practitioners who already work at the setting and who will be appointed by the University as Honorary Lecturers. Supervisors will have undertaken adequate continuing professional development in the years before appointment and will attend development in the field of supervision including the giving of feedback and grading clinical work.

Students and placement staff will be provided with access to paper and electronic copies of relevant information such as:
- aims and objectives of the placement;
- guidance on roles, rights and responsibilities;
- protocols for standard procedures;
- contact points for further assistance.

During their non-clinical time students will be provided with opportunities for non-clinical activities to include some or all of the following:

- Shadowing of dental practitioner within placement setting
- Visit to observe dentistry in a clinic allied to the placement
- Visit to observe dentistry practices in a residential setting
- Visit to observe dentistry or dental survey work in a school setting
- Visit to observe dentistry in a hospital setting
- Visit to observe oral health instruction or promotion
- Visit to a general dental practice
- Shadowing of dental practitioner or visit to dental work within another setting not identified above
- Attendance at a training session for dental staff
- Attendance at a multi-professional case conference
- Attendance at a meeting of, say, mothers with infants or hospice day-clinic
- Observing or participating in day care facilities for infants or seniors
- Observing care facilities for drug abusers
- Visit to observe the work of health visitors
- Observing or participating in a smoking cessation session

Finally, students will conduct project work in public health dentistry agreed in advance with the placement supervisor and University tutor.
Appendix B DOCLIIIIClItS

B5 Student information: Description of the Research Project

THE UNIVERSITY OF SHEFFIELD

Oral Health and Development

School of Clinical Dentistry

Claremont Crescent
Sheffield S10 2TA

Tel: (0114) 271 7885 (office)

Information on a Research Project

A Natural Experiment in Outreach Placement

We would like to invite you to take part in this important research project. We are asking all fourth year BDS students to take part but before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read this information carefully and discuss it with your friends and tutors if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

If you have any questions about this project please ask any of the following or your personal tutor:

- Michael Smith, Programme Evaluator, Ext.68648, michael.smith@sheffield.ac.uk
- Professor Michael Lennon, Programme Manager Ext.68649, m.a.lennon@sheffield.ac.uk
- Professor Peter Robinson, Ext.17892, peter.g.robinson@sheffield.ac.uk

What is the purpose of the study?

While there is widespread belief that BDS students benefit from experience of working away from the teaching hospital, there are few quality data to support or refute that belief. As this year, half of the fourth year students are going on outreach and half are enjoying similar experiences based in the CCDH, there is a window of opportunity to compare the outcomes between the two groups – a natural experiment.

What will be involved if I agree to take part in the study?

Taking part involves:

- The information in your fourth year clinical logbooks (excluding patients’ names) being used in the research
- Some anonymised marks from your examinations being used as part of the evaluation
- A 30 minute practice case study based viva and an assessment similar to an OSCE
- We may wish to contact you later on during your VT year to enquire about any long-term benefit of the programme.

As well as providing us with information about the Outreach, the extra assessments such as the viva and the OSCE have been designed to assist you in your preparation for finals. But their primary purpose is to assess the outreach, not you.

Faculty staff need not know whether or not you are taking part in the evaluation.

Do I have to take part in the study?

NO. You are free to decline to join the study and may withdraw at any time or choose not to answer certain questions. You will receive the same quality of tuition at the School whether you join the study or not.
However, whether you take part in the research experiment or not, students selected for outreach will be expected to take part in the outreach training programme.

When and where will I complete the questionnaires?
We would like to send you the questionnaires through the internal mail in February or March and in the summer as the outreach placements finish and later by post to the contact address you leave with the School. The OSCE-type assessment and the viva will take place in the School. The audio recording of this and the questionnaires will be archived for ten years.

What other information will be collected in the study?
We intend to ask VT trainers about the level of preparedness for VT of students from your year group. In doing this the response will remain confidential and the purpose of the enquiry will be made clear to the VT trainer.

Will there be effects on my studies?
NO, your participation in the research will not affect your studies in any way. If you were, or were not, to be allocated a place on outreach, participation in the research will not affect that decision which is based on random number tables. Your decision to participate in the research or not will not be communicated to your tutors.

Will the information obtained in the study be confidential?
Anything you say will be treated in confidence, no names will be mentioned in any reports of the study and care will be taken so that individuals cannot be identified from details in reports of the results of the study.

How will it help me?
There is no payment for taking part.
The benefits from taking part will be that you are;
- helping us in our research to improve the training of future dentists
- invited to participate in an extra-curricular viva and other assessments that require no preparation but may well prove worthwhile practice for you before finals.

What if I am not happy about the way the study has been conducted?
If you have any reason to complain about any aspect of the way you have been approached or treated during this research, the normal University complaints mechanisms are available to you and are not affected because you have taken part in the research. If you have any complaints or concerns, please contact Professor Peter G. Robinson on 0114 268 7885 or Professor Michael Lennon (not a tutor here but manager of the Outreach programme) on 0114 2268649. To use the normal University complaints procedure send your complaint in writing addressed to “The Registrar and Secretary, University of Sheffield, Firth Court, Western Bank, Sheffield, S10 2TN”.

What do I do now?
Mr Michael Smith (a researcher working for the university) will tell you about the research and ask you to sign a form to show you agree to take part. If you don’t want to take part, just tell Mr Smith. If you need time to discuss this project with someone, just tell Mr Smith.

Keep this sheet for reference.
We will also give you a copy of a signed consent form to keep.

Thank you for your help!
CONSENT FORM

Title of Project: Natural Experiment in Outreach Placement

Name of Researcher: Professor Peter G Robinson

1. I confirm that I have read and understand the information sheet dated 9 January 2004 (version 1) for the above study and have had the opportunity to ask questions.

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my studies or legal rights being affected.

3. I understand that the marks awarded for sections of my examinations may be looked at by responsible researchers associated with this project. I give permission for these individuals to have access to those records.

4. I agree to take part in the above study.

Name of Participant: Michael Smith

Name of Person taking consent: Peter G Robinson

Date: 2004
Signature: 

Date: 2004
Signature: 

Date: 2004
Signature:
B7 RCT Patient Information used in the case study

Broomhill Dental Practice
Sheffield 10

Patient Record
Donna Briggs  DoB: 2/3/79
12c Wordsworth Court, Southey Green

Dental Chart

Results of special tests:
Ethyl Chloride
- Upper left first molar is very sensitive
- Lower right first molar and upper left second do not respond
- All other teeth respond normally.

Tenderness to percussion
- No teeth are tender to percussion.

The orthopantomograph of the case study:
Medical History (self completed):

**ARE YOU CURRENTLY**

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>Give details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnant?</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receiving treatment from a hospital, doctor, clinic?</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taking any prescribed medicines (e.g. tablets, inhalers, ointments, injections, contraceptives or HRT)?</td>
<td>✓</td>
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<tr>
<td>Carrying a medical warning card?</td>
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**DO YOU SUFFER FROM**

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<th>Give details</th>
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<tbody>
<tr>
<td>Allergies to any medicines (e.g. penicillin) or substances (e.g. latex rubber) or foods?</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hay fever or eczema?</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bronchitis, asthma or other chest condition?</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fainting attacks, giddiness, blackouts or epilepsy?</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart problems, angina, blood pressure or stroke?</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes, or does anyone in your family?</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arthritis?</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bruising or persistent bleeding following injury, tooth extraction or surgery?</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any infectious diseases (including HIV, hepatitis)?</td>
<td>✓</td>
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</table>

**DID YOU, AS A CHILD OR SINCE, HAVE**

<table>
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<th>No</th>
<th>Give details</th>
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</thead>
<tbody>
<tr>
<td>Rheumatic fever or chorea?</td>
<td>✓</td>
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<td></td>
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<td>Liver (e.g. jaundice, hepatitis) or kidney disease?</td>
<td>✓</td>
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<td>Any other serious illnesses?</td>
<td>✓</td>
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<td>Blood refused by the blood transfusion service?</td>
<td>✓</td>
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<td>A bad reaction to local anaesthetic?</td>
<td>✓</td>
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<td>A joint replacement or other implant?</td>
<td>✓</td>
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<td>Treatment that required you to be in hospital?</td>
<td>✓</td>
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<tr>
<td>Heart surgery?</td>
<td>✓</td>
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<tr>
<td>Brain surgery?</td>
<td>✓</td>
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<tr>
<td>Growth hormone treatment before the mid-1980s?</td>
<td>✓</td>
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<tr>
<td>Close relative (parent, sibling, child, grandparent or grandchild) with Creutzfeldt Jakob disease?</td>
<td>✓</td>
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**DRINKING**

How many units of alcohol do you drink per week? (a unit is half a pint, a single measure of spirits or a single glass of wine) **2 units per week**

**SMOKING AND CHEWING**

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<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>In Past</th>
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<tr>
<td>Do you smoke any tobacco products now or in the past?</td>
<td>✓</td>
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<tr>
<td>Do you chew tobacco, pan or supari now or in the past?</td>
<td>✓</td>
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Please give any other details which your dentist might need to know about such as self-prescribed medicines (e.g. Aspirin)

*only for toothache and headaches.*
B8 RCT Simulated patients’ notes of case to be portrayed

Female aged in mid twenties. Date of Birth 2 Mar 1979

Community

Lives on an extensive 1960s Council housing estate is served only by a small corner shop / post office, hairdresser, community association office and two shuttered retail outlets. Five minutes in the opposite direction away from their home is an infant/junior school and large Working Men’s Club. The estate is almost 3 miles from the dental setting which is on an arterial A road lined with larger detached 1930s private housing.

Home

First floor apartment in a block of four, one in a crescent of blocks arrayed in a crescent rising from reasonably tidy open grassy areas.

Family

Two children Keanu, aged 7, and Lola, 3, by different fathers neither now around. Childcare is a problem with no available adult family members close by. The elder of her children has bad teeth and rarely cleans teeth. Good attendance at school, but not attending at dentist. Favourite drink – Cola.

Employment/Education/ Affluence Not currently employed. Unless working for an income over £14kpa there would be less in the family purse each week than at present. Got on alright at school but the teachers never seemed to bother about whether we worked or got on. Liked Mrs Pendle, Geography and got a GCSE D in that and something in English and Business Studies. She has no car. Bus service is hourly during the day but that leaves a 7 minute uphill walk/push back to her crescent.

History

Originally from near Grimsby but moved to Sheffield soon after the birth of first child with the father for him to take work maintaining sewing machinery.

Firm then closed. He drifted off and she was better off without him both financially and less trouble.

Parental generation still near Grimsby but brother and sister in Hull and Leicester respectively. Little contact.

Left school, started work in a couple of shops – neither lasted – and later tried a hairdressing course left course when pregnant. Then there were kids.
What the children like

Diet: Convenience foods with some fast-food when out. Child at school has free school meals and likes the pizza and chips. Doesn't like Thursdays when it's salads or quiche. "Can't afford to give them what they don't like"

Mother

A young woman who is not well educated. She is a single mother of a pre-school child and another child. She has a plastic carrier bag with sugary convenience foods by the chair. Alcohol consumption: not usually at home, socially when she gets out – which is rare, perhaps monthly – even then not too much as it is expensive. Smoking: perhaps several cigarettes a day and has been doing since school.

Attitude/Approach to dental health

She does not like the idea of dental treatment (but is more likely to mention kids and buses if asked) she does not have a history of regular dental treatment. Brushes before ‘going out’ but this often makes the gums bleed – unsettling. She wants to keep her front teeth – not bothered too much about the back ones. Avoids going to the dentists, doctors, school offices and usually gets tense and snappy before visits like these. She wants such things ‘over and done with’ - preferably quickly. The school dentist did most of the work she has had done.

Reason for this visit to the dentist

First double tooth on top left hurts badly despite taking headache tablets which only dulled the pain. No idea why this is now worse – always some pain or other in mouth but nowhere near this bad normally. Food does get caught in and between teeth but no gum swelling or particularly bad tastes. Tetchy – not having slept. Some of her decayed teeth need immediate treatment for pain relief and others that may need care over several visits.

Previous visits to the dentist

She has several fillings and some untreated decayed teeth. About seven years ago she has made two visits to this dental practice on her own behalf. On one of those she attended for the next appointment and on the other she did not.
B9 RCT OSCA recording sheet

Student ID _____________  Rated By ________

Student Task: Take and record a history from a (simulated) patient.
Draw up a treatment plan for that patient.

Grading codes: 0 Not present, 1 Hesitantly on prompt, 2 Readily on prompt, 3 Spontaneously present

Dental History 9 marks
- Diet of the patient .................................................................
- Attendance pattern of the patient ...........................................
- Oral hygiene of the patient ....................................................

Social History 6 marks
- Patient's access – transport problems ....................................
- Patient's access – childcare problems .................................

Treatment Plan 12 marks
- An appropriate solution for pain relief .................................
- A plan for repeated pt visits that is cognisant of social factors including:
  Unlikely to attend for many visits .................................
- Patient's wishes .............................................................
- A plan for prevention of dental disease (e.g. via diet, OH, F) for the patient
  that is cognisant of her social factors (e.g. income, wishes, family)

Wider Issues 6 marks
- Identifying if her children have unmet dental treatment/preventive needs
- A multi-disciplinary approach to health promotion in this family
  (possibly including other carers both formal and informal)

Maximum of 33 marks PTO
Global assessments of performance:

Cognisance of social factors

- 5 Spontaneously identifies all of the relevant social factors.
- 4 Identifies most of the relevant social factors.
- 3 Identifies some of the relevant social factors.
- 2 Some recognition of the relevance of social factors on prompting.
- 1 Shows no recognition of social factors.

Acceptability of treatment plan that is cognisant of social history

- 5 Spontaneously identifies an appropriate solution to meet all needs with no extraneous care included.
- 4
- 3
- 2
- 1 After heavy prompting identifies a solution meeting no needs, consisting of irrelevant care

Did you gain the impression that the student had attended an outreach placement or not?

- Yes, □ because I knew beforehand.
- No, □ because they mentioned this or I knew beforehand.
- Yes, □ because they mentioned this or I knew beforehand.
- No, □ because they mentioned this or I knew beforehand.

Add any comment for feedback to the student on their performance:
### B10 RCT Arizona Clinical Interview Rating Scale

|   | Progresses through the major subsections in sequence | Questions directed to areas which are primarily relevant to the subsection of concern | Complete information obtained logically re chief complaint, systematically, chronologically obtaining most of the pertinent information | Progresses from one subsection to another using transitional statements which assure you that the information being sought is necessary and important | In areas with a lot of potential information, asks forced choice Qs so narrowing in on points needing further elaboration | Asks questions or takes notes in a manner which results in an interview that progresses smoothly with few unnecessary delays in the dialogue | Did not repeat questions, seeking duplication of earlier information provided, unless to clarify / summarise | At the end of a line of inquiry (e.g., history of present problem) he summarised (section) data obtained to check accuracy / completeness | Questions asked and information provided were concise, understandable; jargon-free (or jargon immediately explained) | Seeks verification of your responses with specific information | Maintained good eye contact with you | Attentive to your responses, allowed completion of statements without undue interruptions | Alert, sensitive and responsive to possible concerns expressed regardless of whether such concerns were immediately relevant to the present problem, e.g., marital problems, child discipline problems, depression, and explored them sufficiently | Provided positive social reinforcement and feedback e.g., occasional smile, nodding, praise | At the end, encourages you to raise any additional questions and provides her with an opportunity e.g. “Is there anything else you would like to bring up or discuss further?” | Provided little support or positive social reinforcement. Stress was on negative attributes | At the end of the complete interview, summarises all main information for you, allowing you to confirm/correct it |
| 1 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5
| 2 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3
| 4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2
| 5 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1
| 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0
| 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0
| 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0
| 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0
| 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0
| 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0
| 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0
| 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0
| 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0
| 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0
| 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0

See reverse for more detail.
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<th></th>
<th>Sequence</th>
<th>Relevance</th>
<th>Timeline</th>
<th>Transitional Statements</th>
<th>Non-directive</th>
<th>Flow / Continuity</th>
<th>Non-repetitive</th>
<th>Sections summarised</th>
<th>Jargon-free</th>
<th>Documentation</th>
<th>Eye-contact</th>
<th>Attentive</th>
<th>Sensitive</th>
<th>Encouraging</th>
<th>Anything else?</th>
<th>Summarises</th>
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<tr>
<td>1</td>
<td>Progresses through the major subsections in sequence.</td>
<td>Questions directed to areas which are primarily relevant to the subsection of concern</td>
<td>Complete information obtained logically and, chief complaint, systematically, and chronologically obtained most of the pertinent information</td>
<td>Progresses from one subsection to another using transitional statements which assure you that the information being sought is necessary and important</td>
<td>In areas with a lot of potential information, the interviewer asks forced choice Qs so Narrowing in on points needing further elaboration</td>
<td>The interviewer asks questions and/or takes notes in a manner which results in an interview that progresses smoothly with few unnecessary delays in the dialogue</td>
<td>Did not repeat questions, seeking duplication of earlier information provided, unless to clarify summarise</td>
<td>At the end of a line of inquiry (e.g., history of present problem) he summarised data obtained to check accuracy completeness</td>
<td>Questions asked and information provided were concise, understandable, jargon-free (or jargon immediately explained)</td>
<td>Seeks verification of your responses with specific information</td>
<td>Maintained good eye contact with the mother during interview</td>
<td>Attentive to your responses, allowed completion of statements without undue interruptions</td>
<td>Alert, sensitive and responsive to possible concerns expressed regardless of whether such concerns were immediately relevant to the present problem (marital problems, child discipline, depression) and explored them sufficiently</td>
<td>Provided positive social reinforcement and feedback e.g., occasional smile, nodding, praise</td>
<td>At the end, encourages you to raise any additional questions and provides her with an opportunity e.g., &quot;Is there anything else you would like to bring up or discuss further?&quot;</td>
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<td>2</td>
<td>Covers all of the major sections but out of sequence.</td>
<td>Generally seeks information relevant to the section concerned, but occasionally requests information related to other areas</td>
<td>At times pertinent information on complaint not obtained in a chronological order, but obtained most of the information</td>
<td>Sometimes introduces subsections with transitional statements, but fails to do so at other times</td>
<td>The interviewer uses forced choice and leading questions to obtain information</td>
<td>At times, the interview is marked with unnecessary pauses which temporarily break the continuity of the interview</td>
<td>Occasionally repeated questions seeking duplicate information because of the interviewer's failure to remember the data</td>
<td>Sometimes summarised data at the end of a line of inquiry, but failed to do so consistently</td>
<td>Questions asked and information provided were concise, failing to spontaneously define the terms for you unless you asked him to</td>
<td>At the end of a specific line of inquiry, the interviewer failed to summarise the data obtained</td>
<td>Usually attentive but occasionally interrupted unnecessarily</td>
<td>Able to detect concerns expressed unrelated to the child's present physical problems, but failed to explore them sufficiently</td>
<td>Neither overly positive nor negative in dispensing feedback and reinforcement</td>
<td>Neither overly positive nor negative in dispensing feedback and reinforcement</td>
<td>At the end of the complete interview, the interviewer does not provide you the opportunity to discuss anything else</td>
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<td>3</td>
<td>Omits major subsections of the history</td>
<td>Questions directed to irrelevant areas, indicating an apparent lack of organisation</td>
<td>Information obtained in a haphazard fashion, resulting in the omission of pertinent data</td>
<td>Progresses through subsections illogically, you are left feeling uncertain of the purpose of questions</td>
<td>The interviewer asked all leading questions (e.g., &quot;Your child has never had diarrhoea, has he?&quot;)</td>
<td>Interview is conducted with long pauses which break the continuity of the interview</td>
<td>Repeated several questions seeking information previously provided because he failed to remember data already obtained</td>
<td>At the end of a specific line of inquiry, the interviewer failed to summarise the data obtained</td>
<td>Questions asked and information provided were concise, failing to spontaneously define the terms for you unless you asked him to</td>
<td>No attempt at verification, accepts information at face value</td>
<td>Made no attempt to maintain eye contact with the mother</td>
<td>Un-alert / insensitive to possible concerns expressed if not directly related to the present physical problem</td>
<td>Provided little support or positive social reinforcement, Stress was on negative attributes</td>
<td>Provided little support or positive social reinforcement, Stress was on negative attributes</td>
<td>At the end of the complete interview, the interviewer does not provide you the opportunity to discuss anything else</td>
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B11 RCT Baseline Assessment Questionnaire

THE UNIVERSITY OF SHEFFIELD
Oral Health and Development
School of Clinical Dentistry
Claremont Crescent
Sheffield S10 2TA
Tel: (0114) 271 7885 (office)

Date ____ / ____ /2004
Research Number _____

A natural experiment of outreach placement
for undergraduate dental education

Baseline Questionnaire

This questionnaire is part of the evaluation of the outreach training. There are just 2 questions that take about 3 minutes. It asks about you undertaking different aspects of dental care.

There are no risks to taking part. Whether or not you take part the teaching you receive will not be affected in any way. All information gathered in the study will be confidential. No one will have access to this information except the researchers.

If you have any questions about this project please ask the person who gave you the questionnaire or contact Professor Peter G Robinson by telephoning 0114 271 7885

PLEASE REMEMBER:
- Don’t write your name on the questionnaire
- It’s not a test and so there are no right or wrong answers

1. Your training aims to help you plan dental treatment for individual patients taking into consideration the clinical states of their mouths and all relevant factors in their everyday lives.

How good do you think you are at treatment planning?

☐ Poor ☐ Fair ☐ Good ☐ Very Good ☐ Excellent

2. Your training should prepare you to be able to diagnose, plan and provide treatment for a range of people presenting with common dental problems.

How confident do you feel that you can tackle a range of people presenting with common dental problems?

☐ Totally confident ☐ Reasonably confident ☐ Undecided ☐ Lacking in confidence ☐ Not at all confident

Thank you for your help
A natural experiment of outreach placement for undergraduate dental education

Follow up Questionnaire

This questionnaire is part of the evaluation of the outreach training. There are just 6 questions that take about 5 minutes. It asks about you undertaking different aspects of dental care.

There are no risks to taking part. Whether or not you take part the teaching you receive will not be affected in any way. All information gathered in the study will be confidential. No one will have access to this information except the researchers.

If you have any questions about this project please ask the person who gave you the questionnaire or contact Professor Peter G Robinson by telephoning 0114 271 7885

PLEASE REMEMBER:

- Don’t write your name on the questionnaire
- It’s not a test and so there are no right or wrong answers
- There are questions on both sides of the paper
Your training aims to help you plan dental treatment for individual patients taking into consideration the clinical states of their mouths and all relevant factors in their everyday lives.

1. How good do you think you are at treatment planning?
   - [ ] Poor  [ ] Fair  [ ] Good  [ ] Very good  [ ] Excellent

2. Think back two months. Compared to two months ago, how much has your ability to treat plan for patients changed? Is it...
   - [ ] Worse  [ ] About the same  [ ] A little better  [ ] Quite a lot better  [ ] A lot better  [ ] A great deal better

3. How good do you now think you were at treatment planning two months ago?
   - [ ] Poor  [ ] Fair  [ ] Good  [ ] Very good  [ ] Excellent

The next three questions are about your confidence.

Your training should prepare you to be able to diagnose, plan and provide treatment for a range of people presenting with common dental problems.

4. How confident do you feel that you can tackle a range of people presenting with common dental problems?
   - [ ] Totally confident  [ ] Reasonably confident  [ ] Undecided  [ ] Lacking in confidence  [ ] Not at all confident

5. How confident do you now think you were at tackling a range of people presenting with common dental problems two months ago?
   - [ ] Totally confident  [ ] Reasonably confident  [ ] Undecided  [ ] Lacking in confidence  [ ] Not at all confident

6. Think back two months. Compared to two months ago, how much has your confidence that you can tackle a range of people presenting with common dental problems changed? Is it...
   - [ ] Worse than before  [ ] About the same  [ ] A little better  [ ] Quite a lot better  [ ] A lot better  [ ] A great deal better

Thank you for your help.
Appendix B Documents

B13 Aims and Objectives of the Sheffield Outreach Training Programme

The Outreach Programme provides students' with practical experience of dentistry within a community. It provides a real working environment to encourage professional development. Work is undertaken in small groups ensuring an individual approach to learning. The aims of the Outreach Programme cover the following areas:

- Professional Responsibility;
- Public Health Dentistry;
- Practice Environment;
- and Further Development of Clinical Skills

These aims and objectives are achieved by means of clinical practice; tutorials and preparatory lectures; a practice environment and visits into the community. Students are encouraged to make links between their experience on the Outreach Programme and their lectures on dental public health and primary dental care, and with other parts of their courses.

PROFESSIONAL RESPONSIBILITY

Aim To make students appreciate the ethical responsibility of dental professionals for the oral health of the whole community.

Objectives
- an awareness of the changing needs and expectations of the community;
- an awareness of the dental profession's wider role e.g. in health promotion, emergency services and domiciliary care;
- an awareness of links with other services within and without health services;
- an awareness of the overriding responsibility to protect and promote general health.

PUBLIC HEALTH DENTISTRY

Aim To increase student understanding of the principles and particularly in the practice of public health dentistry.

Objectives
- understood the difference between normative need, perceived need and demand;
- understood the principles and uses of dental epidemiology;
- understood the principles and uses of oral health promotion as applied in an area of deprivation;
- recognised the different ways dental services can be set up to meet community needs and appreciated the strengths and weaknesses of the different approaches;
- an awareness of the relative contributions made by the environment (physical, economic and social) and dental services to the dental welfare of the public.

PRACTICE ENVIRONMENT

Aim To give students an appreciation of the responsibilities and requirements of the practice environment.

Objectives
- gained an appreciation of clinical environment organisation, including health and safety aspects;
- appreciated the needs for time management and setting priorities when planning patient care;
- appreciated the role of clinical governance and its application in the practice environment;
- appreciated the importance of teamwork within the dental team.

FURTHER DEVELOPMENT OF CLINICAL SKILLS

Aim To consolidate awareness and develop students' skills in the provision of comprehensive dental care for a range of patient groups.

Objectives
- developed the skills of patient management, including communication skills;
- experienced and gained skills in team dentistry;
- developed skills in the use of preventive dentistry techniques;
- further developed the skills of clinical operative dentistry in a primary dental care environment.
Appendix C

Statistical Findings

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Table C.1 Allocation of 25 students by setting and location

<table>
<thead>
<tr>
<th>Placement</th>
<th>Percentage of Study Group</th>
<th>Number of students attending the placement together</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental Access Centres</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAC 1</td>
<td>48</td>
<td>4</td>
</tr>
<tr>
<td>DAC 2</td>
<td>24</td>
<td>2†</td>
</tr>
<tr>
<td>Access Centres’ total</td>
<td>72</td>
<td></td>
</tr>
<tr>
<td>Community Dental Services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDS 1</td>
<td>24</td>
<td>2</td>
</tr>
<tr>
<td>CDS 2</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Community Services’ total</td>
<td>28</td>
<td></td>
</tr>
</tbody>
</table>

† One student’s absence for the whole of their placement apart from the two-day induction meant their partner was effectively working unpaired.
## Table C.2 Number of adults and children treated by students in each setting and location

<table>
<thead>
<tr>
<th>Placement</th>
<th>Number (N^o) of students</th>
<th>Average (N^o) of Patients per student, (SD)</th>
<th>(N^o) of Adult Patients, (SD)</th>
<th>(N^o) of Child Patients, (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dental Access Centres</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAC 1</td>
<td>12</td>
<td>73 (17)</td>
<td>69 (16)</td>
<td>4 (1)</td>
</tr>
<tr>
<td>DAC 2</td>
<td>6</td>
<td>53 (23)</td>
<td>48 (23)</td>
<td>4 (1)</td>
</tr>
<tr>
<td>DAC total</td>
<td>18</td>
<td>67 (21)</td>
<td>63 (26)</td>
<td>4 (1)</td>
</tr>
<tr>
<td><strong>Community Dental Services</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CDS 1</td>
<td>6</td>
<td>72 (7)</td>
<td>11 (9)</td>
<td>61 (13)</td>
</tr>
<tr>
<td>CDS 2</td>
<td>1</td>
<td>80</td>
<td>5</td>
<td>75</td>
</tr>
<tr>
<td>CDS total</td>
<td>7</td>
<td>72 (7)</td>
<td>10 (9)</td>
<td>63 (13)</td>
</tr>
<tr>
<td><strong>Dental Hospital (control)</strong></td>
<td>24</td>
<td>30 (23)</td>
<td>26 (21)</td>
<td>4 (3)</td>
</tr>
</tbody>
</table>

NB The distribution of number of patients encountered per student for the control group was a bimodal distribution (Fig. C.1 below). The cluster of students seeing the greater number of patients was assigned to the Dental Hospital’s Accident and Casualty clinic during the intervention period.
### Table C.3 Comparison of UK dental schools by key indicators

<table>
<thead>
<tr>
<th>Annual Undergraduate Intake of Students</th>
<th>Total A level Points of Entrants (old system)</th>
<th>Typical A level Grades of Entrants</th>
<th>QAA Subject Assessment Review score</th>
<th>Research Assessment Exercise rating</th>
<th>Undergraduate Guide for Applicants Global Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>151</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>94</td>
<td>29.4</td>
<td>AAAa</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>82</td>
<td>28.4</td>
<td>AABc</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>76</td>
<td>28.2</td>
<td>AAB</td>
<td>24</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>75</td>
<td>28.2</td>
<td>AAB</td>
<td>24</td>
<td>6</td>
<td>100</td>
</tr>
<tr>
<td>72</td>
<td>27.3</td>
<td>AAB</td>
<td>23</td>
<td>5</td>
<td>99.4</td>
</tr>
<tr>
<td>Sheffield</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>72</td>
<td>27.2</td>
<td>AAB</td>
<td>23</td>
<td>5</td>
<td>99.2</td>
</tr>
<tr>
<td>67</td>
<td>27</td>
<td>AAB</td>
<td>23</td>
<td>5</td>
<td>98.3</td>
</tr>
<tr>
<td>62</td>
<td>26.9</td>
<td>AAB</td>
<td>22</td>
<td>5</td>
<td>97.9</td>
</tr>
<tr>
<td>62</td>
<td>26.6</td>
<td>ABB</td>
<td>21</td>
<td>4</td>
<td>97.5</td>
</tr>
<tr>
<td>60</td>
<td>26.3</td>
<td>ABB</td>
<td>19</td>
<td>4</td>
<td>97.5</td>
</tr>
<tr>
<td>59</td>
<td>26</td>
<td>ABB</td>
<td>4</td>
<td></td>
<td>97.3</td>
</tr>
<tr>
<td>38</td>
<td>25.6</td>
<td>ABB</td>
<td>4</td>
<td></td>
<td>95.1</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td>94.7</td>
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<td>94.5</td>
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<td>94.4</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>92.9</td>
</tr>
</tbody>
</table>

The data relate to UK undergraduate dentistry programmes (Hon BDS or BChD) at the time of this research. They are presented anonymised and ranked with the position of the University of Sheffield’s School of Clinical Dentistry highlighted.

Sources: HEFCE Dental Returns 1993 to 2004 (bespoke analysis by HESA); O’Leary, 2004; UCAS, 2004; Leach, 2005; QAA, 2005.
Figure C.1 Number of clinical half-day sessions worked per week on placement or in the dental hospital

NB The simple count of clinical sessions makes no allowance for the length of sessions differing between settings.
Figure C.2  Number of patients encountered by students during the intervention period

![Bar chart showing the number of patients encountered by students in the Study and Control groups during the intervention period. The chart divides the number of patients into the following age groups: 0-19, 20-39, 40-59, 60-79, and 80-99 years. The bars indicate the count of patients encountered in each age group for both the Study and Control groups. The bars for the Study group are darker, while the bars for the Control group are lighter. The chart shows a higher number of patients in the 60-79 and 80-99 age groups for both groups.]
Figure C.3 Number of treatments per student during the intervention period by setting

NB The data above include only the treatments undertaken in the placement setting for the study groups, CDS and DAC, but the treatments undertaken in the Dental Hospital for the control group during the intervention period.
Figure C.4 Annual number of treatments per student in the Dental Hospital during the year of the intervention by setting

NB The data above include only treatments undertaken in the Dental Hospital (Hosp.) and do not include treatments undertaken on outreach training placements. Group averages are shown for the students allocated to the CDS and DAC study groups and the Hospital control group.
Appendix D
Chronologies

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Figure D.1 Chronology of the research and development programme

<table>
<thead>
<tr>
<th>Year</th>
<th>Outreach programme</th>
<th>Qualitative study</th>
<th>RCT of outreach education</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>Dec Recruitment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>Jan Pre-placement</td>
<td>Intervention</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Feb briefings</td>
<td>Interventions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mar Volunteer</td>
<td>Focus groups</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Apr Evaluation</td>
<td>Initial Analysis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jul RCT of outreach study</td>
<td></td>
<td>Consultation Protocol agreed</td>
</tr>
<tr>
<td>2004</td>
<td>Jan supervisor development</td>
<td></td>
<td>Approval, Recruit, Baseline assessment, Allocation</td>
</tr>
<tr>
<td></td>
<td>Apr Half-cohort placements</td>
<td></td>
<td>Intervention in 3 waves and follow-up assessments</td>
</tr>
<tr>
<td></td>
<td>May Further Analysis</td>
<td></td>
<td>Initial analysis</td>
</tr>
<tr>
<td></td>
<td>Jun Reporting</td>
<td></td>
<td>Clinical data collection</td>
</tr>
<tr>
<td></td>
<td>Jul Analysis</td>
<td></td>
<td>Analysis</td>
</tr>
<tr>
<td></td>
<td>Aug Reporting</td>
<td></td>
<td>Reporting</td>
</tr>
<tr>
<td>2005</td>
<td>Jan Staff development</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Feb Full cohort placements</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mar Reporting</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Apr Analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>May Reporting</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jun Analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jul Reporting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>Jan Staff development</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Feb Full cohort placements</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mar Reporting</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Apr Analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>May Reporting</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jun Analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jul Reporting</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Figure D.2 Chronology of the initial placements and qualitative study

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>December</td>
<td>Students recruited to the programme.</td>
</tr>
<tr>
<td>2003</td>
<td>February</td>
<td>Placements identified and allocated.</td>
</tr>
<tr>
<td></td>
<td>March</td>
<td>Pre-placement briefings and visits.</td>
</tr>
<tr>
<td></td>
<td>April</td>
<td>Placements commenced.</td>
</tr>
<tr>
<td></td>
<td>May</td>
<td>Placements completed.</td>
</tr>
<tr>
<td></td>
<td>July to</td>
<td>Interviews and focus groups with placement staff and students.</td>
</tr>
<tr>
<td></td>
<td>September</td>
<td></td>
</tr>
<tr>
<td></td>
<td>October to</td>
<td>Qualitative data analysis and validation.</td>
</tr>
<tr>
<td></td>
<td>December</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>January</td>
<td>Presentations to staff and students of the findings.</td>
</tr>
</tbody>
</table>
### Figure D.3 Chronology of the trial of outreach training

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>September</td>
<td>Students enter Year 4 and maintain usual records of clinical activity. Discussions with student year-group representatives.</td>
</tr>
<tr>
<td>2003</td>
<td>November</td>
<td>Programme evaluation survey of motives for choice of career. Initial drafting of confidence and competence questions. Training for researcher in the organisation of OSCEs.</td>
</tr>
<tr>
<td>2003</td>
<td>December</td>
<td>Students consulted on draft protocol. 1st pilot of confidence and competence questions 2nd pilot of confidence and competence questions.</td>
</tr>
<tr>
<td>2004</td>
<td>January</td>
<td>Ethical and Research Committee approval application lodged.</td>
</tr>
<tr>
<td>2004</td>
<td>February</td>
<td>Allocation to groups/placement locations by School (unpublished) End of Semester 1. Start of Semester 2. Discussion with year-group on implications for DPU.</td>
</tr>
<tr>
<td>2004</td>
<td>March</td>
<td>Ethical and Research Committee approval granted. Information sheet distributed to students. Recruitment to trial. Baseline data collected from students. Disclosure to students of allocations to groups/locations Import of programme evaluation data on motivation to study. Discussions with two individuals re their allocations.</td>
</tr>
<tr>
<td>2004</td>
<td>April</td>
<td>Further development of follow-up assessment and calibration of assessors. Wave 1 students start their allocations.</td>
</tr>
<tr>
<td>2004</td>
<td>May</td>
<td>Final development of follow-up assessment and calibration of assessors. Wave 1 students finish their allocations.</td>
</tr>
<tr>
<td>2004</td>
<td>June</td>
<td>Wave 1 Follow-up assessments. Wave 2 students start their allocations.</td>
</tr>
<tr>
<td>2004</td>
<td>July</td>
<td>Wave 2 Follow-up assessments. Wave 3 students start their allocations.</td>
</tr>
<tr>
<td>2004</td>
<td>August</td>
<td>Wave 3 students finish their allocations. End of Semester 2. Data entry of baseline and follow-up data.</td>
</tr>
<tr>
<td>2004</td>
<td>September</td>
<td>Collection of School clinical data for Semester 1.</td>
</tr>
<tr>
<td>2004</td>
<td>November</td>
<td>Collection of School clinical data for Semester 2.</td>
</tr>
<tr>
<td>2004</td>
<td>December</td>
<td>Feedback to students on early findings and OSCA performance.</td>
</tr>
<tr>
<td>2005</td>
<td>Spring</td>
<td>Presentations to staff and students of the findings.</td>
</tr>
</tbody>
</table>
Appendix E

Glossary

ACIR – Arizona Clinical Interview Rating scale (Stillman et al., 1977)

Activity diagram – in a Scandinavian model of activity theory, a triangular diagrammatic representation of the relationships between the subject of an activity and its objects (then in turn its outputs) showing instruments used and the underpinning influences of the community, its rules and the division of labour (Engeström 1987)

Activity theory – an aid analysis of activities (a number of related actions directed towards a particular goal) in context

Apprenticeship – a system of training (predominantly) skilled craft practitioners mostly through paid working with master craftsmen (sic) who facilitate learning the trade often including some theoretical education

BDA – British Dental Association, a national professional association for dentists

Boundary crossing – transition between settings (activity systems), for example between an educational setting and a workplace, requiring knowledge and skills to be applied in a different manner

CDS – Community Dental Service, a salaried primary care service providing: a safety-net full range of treatment to patients for not served by the general dental services; some treatments not be generally available in the general dental service; dental health promotion; oral screening for children in state schools; and epidemiological field work
Appendix E Glossary

Close nursing support – the continuous availability of a dental nurse to assist in the provision of oral care by a dental operative

Coaching – the act of supporting a learner to achieve their goals, often with expert knowledge, goal setting, encouragement and questions

Cognitive apprenticeship – a form of vocational training in which tacit processes are made explicit for learners to observe, enact and practice with help from a trainer (Brown et al., 1989)

Community of Practice – a social process of learning occurring when people with a common interest collaborate over an extended period to share ideas, find solutions, and build innovations

Competence – the ability to perform a particular task properly

Confidence – a belief in one’s own abilities to do something in a specific situation (NIACE, 2004)

Connective model of work experience – a conception of work experience in which the workplace’s communities of practice work in genuine partnership with academic staff to provide a situated learning environment for students based on social theories of learning (Guile and Griffiths, 2003)

Constructivist learning – learning creating individual understandings through learners’ unique internal interactions between their knowledge, memories and feelings and through newly presented information

COPDEND - Committee of Postgraduate Deans and Directors, a group charged with managing Postgraduate education for dentists, training for dental specialties and continuing professional development for dentists and having a supportive role in returning and retraining dentists.

DAC – Dental Access Centre, a dental facility provide care including emergency care for people experiencing difficulty in accessing NHS dental care

DCP – Dental Care Professional, a more recent term for PCI’s following a change of role to a ‘person who assists a dentist in performing dental services by undertaking limited dental procedures which do not require the full education, training and skills of the dentist’ Dental Auxiliary Review Group, GDC 1998

DH – Department of Health, the government department responsible for public health issues

DHS – Dental Hospital Service. A secondary and tertiary service with patients often referred to the DHS from the primary care services such as GDP

Expanded dental team – a dental team including DCPs, particularly dental hygienists or dental therapists

Expansive work placement – a placement offering learners opportunities to experience multiple communities of learning, question the activities they learn and observe and develop their metacognitive skills. Compare with restrictive placements
Extended duties - additional dental procedures which may be undertaken by DCPs, particularly dental therapists and dental technicians, introduced to reform and expand dental teams

Fading - The gradual withdrawal of support from a learner as they develop their competence in a particular skill

GDC - General Dental Council, the organisation which regulates the dental profession (including dental education) in the UK

Foundation Training - Revised form of Vocational Training launched as a national initiative in 2005 for medics this is extending to dentistry. The two-year training programme forms a bridge between undergraduate studies and specialist or general practice training.

GDP - General Dental Practice or General Dental Practitioner. The 'High Street' dental practice or the dentists working therein.

GDS - General Dental Service

HEI - Higher Education Institution

Hygiene Operative Technique Course - a preclinical course for dental hygiene students developing practical skills completion of which permits progression to training using the same techniques to treat patients

Junior Restorative Course - a preclinical course for trainee dental students and dental therapy students developing practical skills in restorative dentistry. Successful completion of this course permits progression to training using the same techniques to treat patients

Learning trajectory - a series of learning experiences building towards a learning goal

Legitimate peripheral participation - a model of how novice learners are provided with learning opportunities in a community of practice to gain experience and an induction into a craft or profession (Lave and Wenger, 1991)

Metacognition - the knowledge of one's own thinking processes and strategies

Modelling - a tool to aid the assimilation of a tacit process in which a skill is reduced to its component parts which are learned initially separately with the aid of a master until accurately and reliably reproduced before being applied in real or realistic situations

NCIHE - National Committee of Inquiry into Higher Education

NDWU - National Dental Workforce Unit

NHS - National Health Service

OFT - Office of Fair Trading, a body charged with responsibility for making markets work well for UK consumers by promoting and protecting consumer interests while ensuring that businesses are fair and competitive

Outreach training - clinical training in a primary care setting away from the dental school and dental hospital

Paired working - students nursing for one another rather than a student working with individual qualified nursing support
PCD – Professionals Complementary to Dentistry registered or to be registered with the General Dental Council: dental hygienists and dental therapists, dental nurses, dental technicians, clinical dental technicians and orthodontic therapists (GDC, 2004). See DCP.

PCT – Primary Care Trust, local NHS body charged with ensuring access and choice to health services, including dental care, and ensure the Government’s commitments to health and health services are delivered (Commissioning a Patient-Led NHS, 2005).

PDS – Personal Dental Service, a variation on the General Dental Service created as part of modernising the NHS to improving access introduced in 1997. Pilot schemes offered dentists more flexible ways of working than fee-per-item and encouraging preventive care. Later, in 2006 on full implementation, PDS contracts restored targets for undertaking dental procedures with financial incentives to meet those targets.

Placement – a period of work experience or outreach training in one location

QAA – Quality Assurance Agency for Higher Education (England)

Restrictive work placement – work placement with narrow learning experiences where, stereotypically, novices tackle few tasks in one work area, are given little explanation and not encouraged to question their work. Compare with expansive work placement

Schema – broad mental representations of knowledge

Setting – type of location, for example DAC or CDS, of an outreach placement

Situated learning – contextual learning socially embedded in a work environment

SPDCS – Salaried Primary Dental Care Service a relatively new term encompassing the Community Dental Service (CDS) and Dental Access Centres (DACs) which provide primary care by salaried dentists

Transmissive learning – a model of education in which clearly defined content is presented by teachers in a format judged to ease learning, usually in an educational setting to large classes and where standardised tests monitor the success of teaching and learning

Vocational Training – (in dentistry) immediate post-graduate training for dentists under the guidance of an experienced practitioner. The programme is designed to help a dentist make the transition from inexperienced graduate to competent practitioner. See also Foundation Training

Work experience – learning experiences in a workplace usually for unpaid students

Zone of potential construction – an instructor’s impression of a learner’s zone of proximal development (Steffe and D’Ambrosio, 1995)

Zone of proximal development – ZPD, the range of tasks or knowledge outside a learner’s current competence which are achievable with expert, or at least more experienced, guidance and support (Vygotsky, 1978)