



WINNING SMILES

SCHOOLS ORAL HEALTH PROMOTION PROGRAMME FOR 7 TO 8-YEAR-OLDS

REPORT



ISBN: 0-9540263-7-3

Published by the Dental Health Foundation, Ireland in association with Dental Public Health and Behavioural Sciences, Queen's University Belfast; Oral Health Services Research Centre, University College Cork; Population Health Directorate, HSE; Dental Services HSE Dublin North East and the Dental Services of the Eastern Health and Social Services Board, Northern Ireland.

Dental Health Foundation, Ireland, 26 Harcourt Street, Dublin 2, Ireland.
T: + 353 1 478 0466 F: + 353 1 478 0475 W: www.dentalhealth.ie

Preface	3
Acknowledgements	4
Foreword	5
Executive Summary	6
Milestones of Development	9
Chapter 1: Introduction and Rationale	11
1.1 Introduction and Rationale	11
1.2 Aims	14
1.3 Objectives	15
Chapter 2: The Winning Smiles Controlled Trial	16
2.1 Methodology	16
Study Design	16
Sample Size	16
Rationale for Sample Size	16
Inclusion and Exclusion Criteria for Selection of Subjects	16
Quantitative Assessments	17
Saliva Collection Protocol: Baseline, Six Months and 12 Months	17
Quantitative Assessment of Child Oral Health-Related Quality of Life, Oral Health-Related Knowledge, Attitudes and Behaviours and Self-esteem	19
Ethics and Regulatory Issues	20
Confidentiality	20
Data Processing	21
Data Analysis	21
2.2 Results of the Winning Smiles Control Trial	22
Toothpaste Use Evaluation, Salivary Fluoride Levels Results	22
Quantitative Results	22
The Impact of Oral Health Promotion on Equilibrium Salivary Fluoride Levels	26
Use of Equilibrium Salivary Fluoride Levels to Assess the Validity of Reported Brushing Frequency/ Behaviour	29
Discussion	32
Conclusions on Toothpaste Use Evaluation, Salivary Fluoride Levels.	33
Evaluation of Oral Health Related Quality of Life, Oral Health Related Knowledge, Attitudes and Behaviour	34
Results	34
The Sample	34
Child Oral Health-Related Quality of Life (COHRQoL)	34
Oral Health-Related Attitudes	36
Oral Health-Related Knowledge	37
Oral Health-Related Behaviours	38
Discussion	38
Conclusions on Evaluation of Oral Health Related Quality of Life, Oral Health-Related Knowledge, Attitudes and Behaviours	39
Chapter 3: Winning Smiles: The Qualitative Studies	40
3.1 Introduction	40
3.2 Oral Health Promoters' Perceptions and Concerns in Delivering Health Promotion Programmes in Schools: A Story-Dialogue Workshop	40
Background	40
Oral Health Promoters' Perceptions and Concerns in delivering Health Promotion Programmes in Schools: A Story Dialogue Workshop	40
Oral Health Promotion	41
Story-Dialogue Workshop Method	41

ISBN: 0-9540263-7-3

Published by the Dental Health Foundation, Ireland in association with Dental Public Health and Behavioural Sciences, Queen's University Belfast; Oral Health Services Research Centre, University College Cork; Population Health Directorate, HSE; Dental Services HSE Dublin North East and the Dental Services of the Eastern Health and Social Services Board, Northern Ireland.

Objectives of Story-Dialogue Workshops in the Winning Smiles Project	41
Overview of the 'Winning Smiles' Story Dialogue Workshop	43
Discussion	43
Conclusions	44
3.3 Tooth brushing Rules: A Qualitative Exploration of Children's Thoughts on the Winning Smiles Intervention	45
Introduction to a child-centred approach	45
3.4 Views of Teachers on 'Winning Smiles' Programme - Teachers Debriefing	55
Introduction	55
Results	55
Enjoyment of Programme	55
How Programme Helped Satisfy Curriculum Requirements	55
Views on Resources Provided	55
Views on Teachers' Workshops	56
Views on Teachers' Notes	56
Views on Teachers' Role in Programme	56
Views on OHPs' Role in programme	56
Teachers' suggestions for Improvement	56
Conclusion	57
Chapter 4: Conclusions and Recommendations	58
4.1 Conclusions	58
4.2 Recommendations	60
Chapter 5: Project Management	61
Microsite and Discussion Forum	61
Partnership	66
Winning Smiles Steering Committee: An Example of Partnership in Health	69
List of Abbreviations	70
Glossary of Terms	71
References	73
Appendices	79
Appendix 1 The Winning Smiles Programme Resources and Delivery	79
Appendix i Plaque Recording Sheet and Marking System	86
Appendix ii Wall Chart Instruction	87
Appendix 2 Informed Consent and Information Sheet and letter to parents prior to saliva sampling	88
Appendix 3 Laboratory Protocol: Direct Method for Fluoride Analysis	93
Appendix 4 Child Questionnaire	97
Appendix 5 Tables of results of COHRQoL, Self-esteem, Oral health related knowledge, attitudes and behaviours.	114
Appendix 6 Reported oral health-related attitudes	121
Appendix 7 The Declaration of Helsinki	139
Appendix 7a CRF and Adverse Event Reporting form of the Winning Smiles Controlled Trial	143
Appendix 8 Parents focus groups	145
Appendix 9 Detailed Outline of the Quantitative Intervention	147
Appendix 9a Instructions for Use-of-Toothpaste Pamphlet	155
Appendix 10 Frequency Distribution graphs of Salivary Fluoride Concentration	156
Appendix 11 Statistical significance of changes in salivary fluoride levels within groups.	158
Appendix 12 Teachers' debriefing questionnaire	161
Appendix 13 Collated responses from School Teachers	165
Tables	173
Figures	175


Preface



I am delighted to be associated with the Report of the 'Winning Smiles' Schools Oral Health Programme for children. The Report highlights the importance of children's oral health and well-being and sets out the key considerations for the future. I am encouraged by this programme's emphasis on targeting children in greatest need of support on the island of Ireland.

I congratulate the Dental Health Foundation and its collaborative partners for this important initiative, together with the children, their parents and teachers whose participation has been central to the research programme's success.

I wish all those involved every success with this important work moving forward.



Bertie Ahern, T.D.
Taoiseach

Acknowledgements

We are very grateful to the Taoiseach, Mr Bertie Ahern, T.D., for his association with this schools oral health initiative.

The Steering Committee would like to thank the grant awarding bodies for their support for this research initiative, both in Northern Ireland and the Republic of Ireland: The Research and Development Office, Directorate of the Northern Ireland Health and Social Services Agency and the Department of Health and Children, Dublin, respectively.

We would like to acknowledge the school principals, teachers, parents and children of all the schools that participated in this research initiative. Without their assistance this initiative would not have been possible.

We are grateful to Mr Chris Fitzgerald, Principal Officer, Public Health Division, Department of Health and Children, Dublin for his support and guidance to the Dental Health Foundation.

We would like to express our thanks to Dr Jane Wilde, Director; and Mr Owen Metcalfe, Associate Director; The Institute of Public Health in Ireland and the Winning Smiles Programme Study Partners, (as detailed on page 67).

This Report was prepared based on valuable contributions from the following, namely (as detailed on page 67-69):

<i>Ms Adrienne Foley</i>	<i>Dr Rose Kingston</i>	<i>Dr Helen Rooney</i>
<i>Professor Ruth Freeman</i>	<i>Ms Deirdre Martin</i>	<i>Ms Deirdre Sadlier</i>
<i>Dr Barry Gibson</i>	<i>Mr Paul O'Kane</i>	<i>(Chairperson)</i>
<i>Ms Patricia Gilsenan-O'Neill</i>	<i>Prof. Denis O'Mullane</i>	<i>Ms Patti Speedy</i>
<i>Ms Ann Harmon</i>	<i>Dr Mary Ormsby</i>	<i>Dr Helen Whelton</i>
<i>Prof. GM Humphris</i>	<i>Ms Sheilagh Reaper-Reynolds</i>	
<i>Dr Celia Keenaghan</i>		

This publication, the resources for the programme and administration for the initiative were funded by the Dental Health Foundation, Ireland.

Finally, we would like to acknowledge the important support that Ms Patricia Gilsenan-O'Neill, and Mr Tom Rogers, Dental Health Foundation, Ireland provided in the administration of this initiative and in the compilation of this Report.

Editorial Group

Professor Ruth Freeman, Dental Public Health and Behavioural Sciences, Queen's University, Belfast

Dr: Celia Keenaghan, Population Health Directorate, Health Service Executive

Professor Denis O'Mullane, Oral Health Services Research Centre, University College Cork

Dr: Mary Ormsby, Health Service Executive, Dublin North East

Ms. Deirdre Sadlier, Dental Health Foundation, Ireland

Ms. Patti Speedy, Eastern Health and Social Services Board, Northern Ireland

Dr: Helen Whelton, Oral Health Services Research Centre, University College Cork

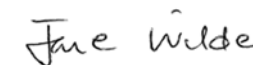
Foreword

The Institute welcomes this report and commends the approach used in developing and evaluating the Winning Smiles Schools Oral Health Programme for 7 to 8-year-olds.

The main determinants of health, including oral health, are social and economic circumstances, and we are very pleased that this programme was designed with the important aim of reducing inequalities in oral health amongst children. There has been a fall in decay levels over the last three decades but there is little cause for complacency as tooth decay continues to be a very common childhood disease especially for children who are less well off.

The Institute of Public Health in Ireland promotes co-operation for public health on the island of Ireland. Our work consists of strengthening information, capacity building and supporting improved policy making for public health. We believe sharing experience and learning and developing good North / South relationships and networks strengthens public health. The work of the Winning Smiles Programme fits well with our strategic objectives and is a fine example of all-island work. It is also consistent with the call for action arising from the North / South Survey "Children's Oral Health in Ireland 2002".

This report is an important milestone in increasing understanding of ways to improve oral health and tackle inequalities in oral health for children across the island of Ireland.



Jane Wilde MB., FRCPI., FFPHM.
Director of the Institute of Public Health in Ireland

Executive Summary

Overview of Winning Smiles

The Winning Smiles Intervention is an innovative school-based oral health promotion programme designed for children aged 7–8 on the island of Ireland. It was developed in response to a call for ‘innovative approaches to reduce decay levels and address inequalities in oral health in Ireland’¹ and is in line with the recommendations of the Liverpool Declaration.² The programme was introduced and evaluated in schools randomly selected in areas of high social deprivation and disadvantage in Dublin and Belfast. It set out to encourage fluoride toothpaste use, to improve child oral health-related quality of life and self-esteem and to increase oral health-related knowledge and attitudes as well as to assess changes in reported oral health behaviours among children living in relative poverty. All of these actions have a significant role in improving oral health and preventing dental caries. The study reported on here adopted a mixed methodology in evaluating the intervention, including a Controlled Trial and Qualitative studies. The formative aspects to the study were the assessment of the value and sensitivity of equilibrium salivary fluoride measurements and the child oral health-related quality of life evaluation.

The evaluation of Winning Smiles is a significant demonstration of progressing research-based evidence into policy and practice. A partnership approach facilitated by the leadership of the Dental Health Foundation was adopted in this study. A multi-sectoral, multi-disciplinary Steering Committee with members from a wide variety of interests, experience and perspectives, including academia and health services, was established. The Steering Committee focused on the oral health needs of children as their common purpose. This enabled members to share common ground and purpose within the context of their diverse backgrounds. The Steering Committee worked on the development of the intervention, the evaluation of the intervention and the production of the final report.

Other key stakeholders in this study were children, parents, oral health promoters and schools targeted by the intervention. To this end, alongside the quantitative study employed to measure the effectiveness of the intervention, qualitative studies were carried out to ensure that people’s experiences of the intervention were captured.

Two immediate outcomes from this partnership approach can be identified. The first is the positive impact of the intervention on the oral health of the children involved in the study. The second is the findings presented in this report which are an important milestone in tackling inequalities in oral health among children on the island of Ireland.

Key Findings from the Evaluation

The key findings from the evaluation of Winning Smiles are detailed below.

The Equilibrium Salivary Fluoride measure is a useful indicator of toothbrushing compliance. 18-hour equilibrium salivary fluoride levels provide a useful indicator of exposure to water fluoridation as evidenced by the differences in salivary fluoride levels between the Dublin and Belfast children. The measurement of Equilibrium Salivary Fluoride is sensitive to time since last brushing. An 18-hour post-brushing period provides more valid results than a 14-hour post-

brushing period. Using 18-hour equilibrium salivary fluoride levels as an indicator of frequency of use of fluoride toothpaste, the data indicate that:

All children increased their use of fluoride toothpaste between baseline and six months. This suggests that a visit by the dental team to the school had a positive impact on use of fluoride toothpaste regardless of whether an intervention was introduced.

The impact of the visit by the dental team at the start of the study to both of the control schools where no intervention was introduced was lost by 12 months as salivary fluoride levels dropped to their baseline levels or lower.

The impact of the intervention on frequency of toothpaste use in the Belfast experimental group, which received an educational intervention but no toothpaste supplies, was lost by 12 months.

The intervention in the Dublin experimental group, which included regular distribution of free toothpaste to the children over the 12-month period of the study, was associated with a sustained increase in the frequency of toothpaste use in the 12-month period of the study.

Comparing responses to a question on frequency of toothbrushing administered at baseline, six and 12 months indicates a lack of reproducibility among the responses. Assuming that brushing frequency does not change a lot with time, these results indicate that ascertaining compliance with tooth brushing instructions by means of questionnaires is inaccurate.

The psycho-social findings of the Winning Smiles evaluation showed positive and encouraging trends. Children attending experimental schools experienced improvements in their oral health-related quality of life, oral health awareness and oral and social self-image. The increase in oral health awareness is a welcome outcome and was related to a fall in the children’s perceptions of how satisfied they were with oral health at 12-month follow-up. The decline in the children’s satisfaction with their oral health, together with increased oral health awareness, is suggestive of a shift in the children’s perceptions of their oral health status. Hence it was concluded that Winning Smiles increased the children’s perceptions of their oral health.

It was disappointing that Winning Smiles had not influenced oral health-related attitudes. However, it could be suggested that this may have been due to the inaccuracy of using single items to assess relatively complex attitudes. It may be concluded that multi-item inventories such as Child Oral Health Related Quality of Life (COHRQoL)³ are more reliable and valid measures of oral health-related attitudes than single-item assessments.

Children attending Winning Smiles schools had significantly larger mean scores for toothbrush and toothpaste knowledge at 12 months, compared with the children attending control schools. They also had increases in their oral health-related knowledge, whereas the other children experienced a fall in knowledge scores. It may be proposed that the children’s skills acquisition (knowledge and toothbrushing techniques) assisted them in converting parental toothbrushing rules into their own toothbrushing practices. These findings suggested that Winning Smiles had assisted in maintaining and increasing oral health-related knowledge in the participating children.

³ See section 2.2.

¹ Whelton H., Crowley E., O’Mullane, D., Cronin M. & Kelleher V. North-South survey of children’s oral health 2002 - preliminary results. Dublin, Department of Health and Children. 2003.

² The 8th World Congress on Preventive Dentistry (WCPD) took place 7-10 September 2005 in Liverpool, United Kingdom. The WCPD was organised jointly by the International Association for Dental Research (IADR), the World Health Organization (WHO), the European Association of Dental Public Health (EADPH) and the British Association for the Study of Community Dentistry (BASCD). (http://www.who.int/oral_health/events/liverpool_declaration/en/index.html)

The qualitative exploration of the children's opinions and feelings about toothbrushing and the Winning Smiles intervention revealed the children's wish to make their own toothbrushing rules. Furthermore, the competitive element of Winning Smiles tuned into the children's wish to be the 'rule maker' and allowed their natural rivalry with one another to be vocalised and expressed; even for children who had difficulty in expressing their thoughts in 'written words', their contributions, whether verbal or drawn, were important. Therefore, from learning about toothbrushing to disclosing their teeth and receiving their certificates and medals, Winning Smiles allowed the children to experience an increase in their self-esteem and oral and social self-image. It may be concluded that the 'Winning Smiles' intervention assisted in modifying aspects of the children's oral health-related quality of life, their self-esteem and oral health literacy.

Oral health promoters and school personnel found the intervention to be a positive experience and one that is feasible to implement in partnership between oral health promoters and schools. Further implementation of the Winning Smiles should build on relationships between school personnel and oral health promoters. The development of guidelines on roles and processes to promote good working relations is a necessary step in this process.

Distribution of free fluoride toothpaste to schoolchildren aged 7–8 years when accompanied by an educational programme, is found in this study to have potential to impact toothbrushing habits.

The results of the current study pose further questions of importance for the promotion of oral health.

- If the programme were continued beyond 12 months, would the trend for increasing salivary fluoride levels continue to increase?
- Would the increase in salivary fluoride levels be accompanied by a decrease in caries levels?
- Would salivary fluoride levels increase following the distribution of fluoride toothpaste in the absence of an educational programme?
- If the educational programme were repeated at six months, would the salivary fluoride levels among the Belfast experimental group have remained elevated?
- If the dental teams visited the control groups at six months, would the children's salivary fluoride levels have remained elevated at 12 months?

The economics of preventing caries among children in Ireland will be significantly influenced by the answers to these questions. Future studies will address these questions and will advance our ability to reduce the burden of dental disease experienced by children, particularly those who are less well off.

The findings of this study represent a major advance in monitoring the effectiveness of oral health promotion as they support the validity of using the Equilibrium Salivary Fluoride level as an objective measure of compliance with increasing frequency of toothpaste use. The results of this study also suggest that asking children in Second Class or Primary Four how often they brush their teeth is not a valid way of measuring toothbrushing habits. The study highlights the need for evaluation of similar interventions to combine a quantitative with a qualitative methodology to ensure that a range of perspectives, including the child's, is understood when interpreting findings.

Milestones of Development

An Oral Health Promotion Programme for Young Children on the Island of Ireland

- 1990 The programme originated in the Darndale/Coolock area of Dublin, where it was recognised by Dr Power, Ms A Bogle and the dental team members that a focused approach was required if improvements in oral health were to be achieved. The mechanism for the programme used a dental team intervention approach, using simplified education tools and motivational awards.
- 1995 The Dental Health Foundation, at the invitation of the then Eastern Health Board (ROI) further developed and expanded the programme in the Dublin Region.
- This expansion led to other areas of programme developments throughout the Republic of Ireland.
- 1996 The Dental Health Foundation, through its ongoing liaison with the public dental services in Northern Ireland, established a pilot project based in Belfast. This arose out of shared concerns for oral health improvement for young children at high risk of dental disease. Meanwhile, the programme in the Republic of Ireland continued and annual awards were presented by An Taoiseach, Mr Bertie Ahern, TD.
- 1999 A process evaluation of the programme as an educational programme in Northern Ireland and the Republic was completed. Its conclusions reported that considerable investment in an evidence-based approach to the design, development, implementation and evaluation of such a programme would be necessary to secure its future success.
- 2000 The Dental Health Foundation initiated the establishment of a formal North/South partnership between the Public Dental Services on the Island of Ireland, to evaluate the programme. The team comprises: Oral Health Services Research Centre, University College Cork; Dental Public Health & Community Science, Queen's University Belfast and representatives of the Republic and Northern Ireland Health Services. In particular, the Dental Health Foundation proposed a new measure of compliance for use of fluoride toothpaste as part of the research programme. This approach was supported by the Department of Health and Children in consultation with experts from the Oral Health Services Research Centre, University College Cork, and Queen's University Belfast.
- Funding was made available to the project partners. The evaluation was jointly funded by the Health Promotion Unit of the Department of Health and Children and the Research and Development Office, Directorate of the Northern Ireland Health and Social Services Central Services Agency.
- 2001 Final year of awards ceremony in ROI in its current format; this was after an 11-year period.
- 2002 Review of the Awards and plans for evaluation communicated to the Office of the Taoiseach.
- 2002 Formal evaluation of the Oral Health Promotion programme, newly named 'Winning Smiles'.
- 2003 'Winning Smiles' Programme development facilitated by the North/South Partnership established by the Dental Health Foundation. This partnership was extended to include the diversity of representation concerned to improve

children's oral health, including children themselves, parents and teachers. Full details of the programme resources and delivery are given in Appendix 1.

Formal research programme in place.

Research programme ongoing with data collection and analysis from Belfast and Dublin Schools.

2005 Research programme concluded

2006 Final report and launch

Chapter 1: Introduction and Rationale

1.1 Introduction and Rationale

In the past 30 years, there has been a dramatic decline in the incidence of dental caries. However, despite the considerable improvements in both incidence and prevalence of tooth decay, a number of communities have continued to experience higher than average levels of disease. In order to understand this apparent inconsistency, with regard to declining disease several researchers pointed to the irrefutable evidence of the importance of social deprivation as a consistent marker of oral health inequality and, more specifically, childhood dental caries (1,2,3,4,5,6,7,8,9). It seemed that children who resided in low-income households and in relative poverty had the greatest prevalence of childhood dental caries. Childhood dental caries was proposed as an indicator of health inequality and deprivation (3,4,10,11). The findings of the first survey of all Irish school children, by Whelton and colleagues (4), provided research evidence to support this socio-economic hypothesis for oral health disparity. Whelton et al. (4) showed that despite great improvements in dental health, children who experienced the greatest social deprivation in the north and south of Ireland had the greatest experience of dental caries, while having the least experience of preventive treatments such as fissure sealants. The findings of the 2003 United Kingdom survey of children's oral health concurred with Whelton et al. (4). These authors concluded that:

'The prevalence of dental decay is associated with social factors, with children from more deprived backgrounds or from lower social status groups being substantially more likely to have decay in most age groups. . . It is likely that a range of factors, perhaps including cultural background and geography, combine with social factors to explain the variation observed between social factors and dental caries.'

<http://www.statistics.gov.uk/CHILDREN/dentalhealth/default.asp> (12)

While it was acknowledged that health promotion interventions could reduce such oral health inequalities, Willems et al., (10), Van Nieuwenhuysen et al., (13) and Kallestal and Wall (14) voiced caution. They (Willems et al., 2005; Van Nieuwenhuysen et al., 2002; Kallestal and Wall 2002) suggested that oral health education programmes were unlikely to be effective in moderating childhood inequalities and, if handled insensitively, could increase rather than decrease health disparities (15). The requirement to target oral health interventions to those with the greatest socio-demographic and oral health needs was acknowledged. Whelton et al. (4) went further and demanded that since:

'The survey found that in general the oral health of the less well off is worse than that of the rest of the population. Decay levels among dependants of medical card holders (RoI) and those in receipt of low-income benefits (NI) were higher than in the rest of the population. **Innovative approaches to reduce decay levels and address inequalities in oral health are required.**

Although many studies have explored the relationship between oral health status and measures of socio-economic status, the link between oral health and deprivation, according to Watt (16) is in its infancy. Furthermore, the importance of life course theory – the predictive power of childhood social circumstance (17) and dental caries experience for adult social circumstance and oral health – has until recently been largely ignored, as a social determinant of oral health inequality (18,19). Therefore, it would appear that relative rather than absolute levels of

poverty are strong predictors of childhood dental caries (20), and that oral health inequalities in childhood remain a significant public health problem (21). Furthermore, it is postulated that an oral health intervention aimed at children, living in poor social circumstances (22) and relative poverty (20,23), could, it would seem, have the potential to reduce oral health inequality.

Nevertheless the question remained: what would be the active dimension of such an oral health intervention? It was suggested that brushing with fluoride toothpaste, despite the influence of the social gradient was (7) and is effective in preventing dental caries. The evidence-based research has been provided in the Cochrane Review by Marhino et al. (24) and is irrefutable. It is not necessary here to detail the findings of Marhino et al. (24) but, to quote Petersen and Lennon (25), with regard to the World Health Organisation's recommendation:

'that every effort must be made to [have] affordable toothpaste for use in... countries'

The provision of affordable fluoride toothpaste was, therefore, essential to reduce childhood oral health disparities (26,27,28). Research (26,27,28) has demonstrated that the provision of free fluoridated toothpaste results in significant reductions in childhood caries experience. Davies et al. (28) concluded that the provision of free fluoride toothpaste and toothbrushes incorporated into oral hygiene programmes had, 'clinical benefit for high caries risk children living in deprived districts'.

The above findings suggested the need to provide free fluoride toothpaste and brushes to children residing in areas of high deprivation, to reduce oral health inequalities. It seemed necessary to devise an oral health intervention aimed at children residing in relative poverty, making the transition between primary and secondary education, to provide oral health information to promote oral health-related quality of life, self-esteem and oral health awareness while reducing parental financial burdens by providing free fluoride toothpaste and brushes.

School-based programmes have been of value in raising children's oral health awareness and knowledge (29). However, school-based interventions, working in isolation, are unlikely to break the link between poor childhood health and adult illness (22). Graham (30) called for action by policy makers and for a coordinated approach between health and education sectors (31). This necessitated the adoption of a wider 'common risk factor agenda' (32) and the inclusion of health education interventions as part of childhood poverty policies. According to Graham and Power (22), health education programmes which are couched and form part of an overall policy on childhood poverty may have the ability to break the vicious circle of adult ill-health. In essence, school-based health education programmes, targeted at those in greatest need, could have the potential to shape children's life course relationships between their present socio-economic position and health outcomes in adulthood (31).

Therefore it would seem reasonable to conclude that there is a need to develop a school-based oral health intervention to promote fluoride toothpaste use and to increase oral health awareness, oral health-related quality of life and self-esteem in children living in relative poverty and who are making the transition between primary and secondary education. It is further suggested that a school settings approach should be adopted which would encourage social cohesion between children, and that the school setting should encompass the qualities of the health promoting school. The need to develop, implement and evaluate a school-based oral health intervention in areas of greatest deprivation in Dublin and Belfast would be necessary in order to address Whelton et al.'s (4) call for: *'Innovative approaches to reduce decay levels and address inequalities in oral health are required.'*

Winning Smiles: A Schools-Based Oral Health Promotion Intervention

A school-based oral health promotion programme (Appendix 1) was developed from a previous, well-accepted, oral hygiene school-based intervention. The new programme, renamed 'Winning Smiles', incorporated the newer research findings (for example, the provision of free fluoride toothpaste and brushes) in order to reduce childhood health disparities and promote oral health as well as psychological health and social well-being. Winning Smiles, was subsequently introduced and evaluated in schools randomly chosen from those located in areas of high social deprivation and disadvantage in Dublin and Belfast. Children in their fourth year of primary education (7 to 8-year-olds)⁴ were thus invited to participate in a controlled trial to evaluate formally the effectiveness of Winning Smiles to firstly to encourage fluoride toothpaste use, secondly to improve child oral health-related quality of life and self-esteem, and finally to increase oral health-related knowledge and attitudes, as well as assessing changes in reported oral health behaviours.

The dependent variable to be used in this evaluation is the 18-hour equilibrium baseline salivary fluoride concentration, shown by Duckworth (33) to be a reliable indicator of the regularity of toothbrushing. As salivary fluoride levels are reported to be higher amongst those with lower levels of caries, there is a biological justification for using this outcome measure. The 14-hour equilibrium baseline salivary fluoride concentration will also be evaluated as a dependent variable. This measurement will provide new information on the extent to which the time since last brushing (between 14 and 18 hours) with fluoride toothpaste impacts on equilibrium baseline salivary fluoride concentrations and whether it is important to carefully control time since last brushing in the investigation. This information is important to the design of future studies using this outcome measure.

⁴ The rationale for choosing this age group was first, in relation to their stage of psychological and cognitive development. Children in their eight year of life are said to be in the latency phase. This is a quiet phase in which children are amenable to learning about how to care for their bodies. Secondly, as mentioned previously, these children will soon be making the transition from primary to post primary education and according to Graham (30) this is a critical time to address health issues for children living in relative poverty.

1.2 Aims

Hence the aims of the Winning Smiles evaluation were to evaluate the effectiveness of school-based oral health promotion programmes designed to:

- Encourage the use of fluoride toothpaste among children in primary education residing and attending schools in areas of social deprivation in Dublin and Belfast,
- Improve child oral health-related quality of life and self-esteem,
- Increase oral health-related knowledge and attitudes.
- To assess the value of the measurement of the Equilibrium Salivary fluoride levels as described by Duckworth and Morgan (40) as a measurement of the impact of oral health promotion initiatives designed to increase the frequency of use of fluoride toothpaste.
- To assess the sensitivity of Equilibrium Salivary Fluoride measurements to variation in sampling time, – that is, to establish the importance of sampling time to study design.
- To assess the validity of reported toothbrushing habits.

1.3 Objectives

- 1) To assess the impact of Winning Smiles on oral health-related quality of life and self-esteem using valid and reliable measures of child oral health-related quality of life (Humphris et al., 2005; Jokovic et al., 2003) and self-esteem (Coopersmith, 1967).
- 2) To assess the impact of Winning Smiles on increasing oral health-related knowledge, attitudes and changing oral health-related behaviours.
- 3) To explore perceptions and concerns of oral health promoters involved in providing school-based health promotion programmes.
- 4) To explore the children's thoughts, feelings and opinions of the Winning Smiles intervention.
- 5) To explore the views of the teachers in relation to the appropriateness and acceptability of the Winning Smiles challenge.
- 6) To assess the reaction of parents, teachers and dental health educators to the programme to inform the future development of this and other schools-based oral health promotion programmes.

The outcome measures were:

- 1) The changes in 18-hour post-brushing equilibrium baseline salivary fluoride concentration between baseline, six months and 12 months and the differences in these measurements between experimental and control groups in the two study sites.
- 2) The differences between 14-hour and 18-hour post-brushing equilibrium baseline salivary fluoride at the three sampling periods.
- 3) The quality of life, attitudes and behaviour of the children at baseline and 12 months.
- 4) The attitudes of the parents of participating children at baseline and 12 months.
- 5) The change in reported brushing frequency within individuals during the course of the study from baseline to six and 12 months in each of the four groups.

Chapter 2 – The Winning Smiles Controlled Trial

2.1 Methodology

Study Design

This was a controlled trial of an intervention aimed at improving oral health among children in their fourth year in primary school in Dublin and Belfast. In Dublin an oral health promotion programme was delivered to the children and complimentary fluoride toothpaste (1450 ppm) and a toothbrush were hand delivered to each classroom for 12 months. In Belfast, the same oral health promotion intervention was delivered without supplying complimentary toothpaste or toothbrushes. Control groups in both cities received no intervention. Ethical approval for the study was obtained from the Ethics Committee of the Cork Teaching Hospitals for the Dublin study, and from Queen's University Belfast Research Ethics Committee for the Belfast study.

Sample Size

The target sample size was 100 children in Primary 4 (Belfast study) and 100 children in Second Class (Dublin study) from primary schools in areas of socio-economic deprivation with approximately equal numbers of boys and girls to be included in the evaluation of the programme.

Rationale for Sample Size

The sample sizes of 50 per active programme and 50 per control group in both Belfast and Dublin have power in excess of 90 per cent to demonstrate 20 per cent differences in 18-hour equilibrium salivary fluoride concentrations (two two-sided tests with a 5 per cent level of significance).

Sample selection:

In Dublin, two schools were selected from the Department of Education and Science list of disadvantaged schools in the North Dublin area. These schools were randomly assigned to intervention and control groups. In Belfast, five schools (two intervention, three control) were selected on the basis that over 50 per cent of the children received free school meals. Two schools were randomly allocated to the intervention group and three to the control group. The intervention had not been delivered in any of the schools previously.

Following a meeting with the school principal to explain the programme, the research team visited the schools to explain the study and to distribute written informed consent forms to the children. These informed consent forms had been literacy proofed and conformed to the National Adult Literacy Agency's guidelines. The children were asked to get the forms completed by their parents or guardians and to return them to the class teacher. Workshops were held with the teachers both in Dublin and Belfast, to explain the study. The completed consent forms were collected from the schools after a few days. The consent forms were checked for consent and for validity. Children gave verbal assent to participation in the study and their right to withdraw/ refuse was observed at all times (Figure 1).

Inclusion and Exclusion Criteria for Selection of Subjects

Qualifying subjects were those who satisfied the following inclusion / exclusion criteria.

Inclusion criteria

1. Children must be about to be participants in the oral health promotion programme in place in their school or a member of the control group.
2. Parents of children had to be willing to read and sign the Informed Consent Form.

3. Children had to be willing to participate in the evaluation by the completion of questionnaires and the provision of saliva samples.

Exclusion criteria

1. Children who were not about to be participants in the oral health promotion programme or who were not about to be members of the control group.
2. Children whose parent(s) did not sign the Informed Consent Form.
3. Children who displayed any unwillingness to participate.

See *Flow Chart on the next page*

Quantitative Assessments

Quantitative assessment of salivary fluoride levels

The children were asked to provide saliva samples at Baseline, six months and 12-month follow-up. Children were asked to refrain from brushing from 9.00 p.m. the evening prior to collection of fluoride samples (A contact letter was sent to parents; see Appendix 2). The first collection was taken before the morning break, usually 10.30-11.00 a.m. This sample provided a measure of the equilibrium baseline fluoride concentration at approximately 14 hours post brushing. A second sample was collected before the children went home at approximately 2.00-3.00 p.m., to give the equilibrium baseline fluoride concentration at 17-18 hours post brushing. Research has demonstrated that the equilibrium baseline fluoride concentration at 18 hours post brushing is higher among regular users of fluoride toothpaste than among others. A subsidiary aim of this study was to determine whether the equilibrium baseline fluoride concentration at 14 hours also separates the regular from the irregular brushers. Saliva samples were analysed for fluoride content according to the direct method, (Appendix 3), the standard method used at the Oral Health Services Research Centre in UCC.

Saliva Collection Protocol: Baseline, Six Months and 12 Months.

On arrival at the school, the dental team obtained a list of children in each relevant class and the absent children for that day. The locations of the children's classrooms and the room to be used by the team for saliva collection were identified and the equipment set up accordingly.

The following equipment was used: test tubes, funnels, test-tube racks, indelible marker, ice packs, Styrofoam containers, timer, disposable non-latex gloves, disposable wipes and brown tape.

Rigorous cross-infection control procedures were adhered to throughout the saliva collection. Disposable gloves were used at all times. Disinfectant wipes were used to wipe surfaces in the immediate vicinity of the collection area as required.

Unstimulated saliva samples were collected at baseline, six-month and 12-month visits. Children were asked to refrain from tooth brushing from 9 p.m. the previous evening on each occasion. To ensure standardisation (and timing) of the samples, they were collected at the same times every day. The first collection was taken before the children's morning break, i.e. 9.15-11.00 a.m. The second collection was taken before the children went home i.e. 1.15-3.00 p.m. (18 hour).

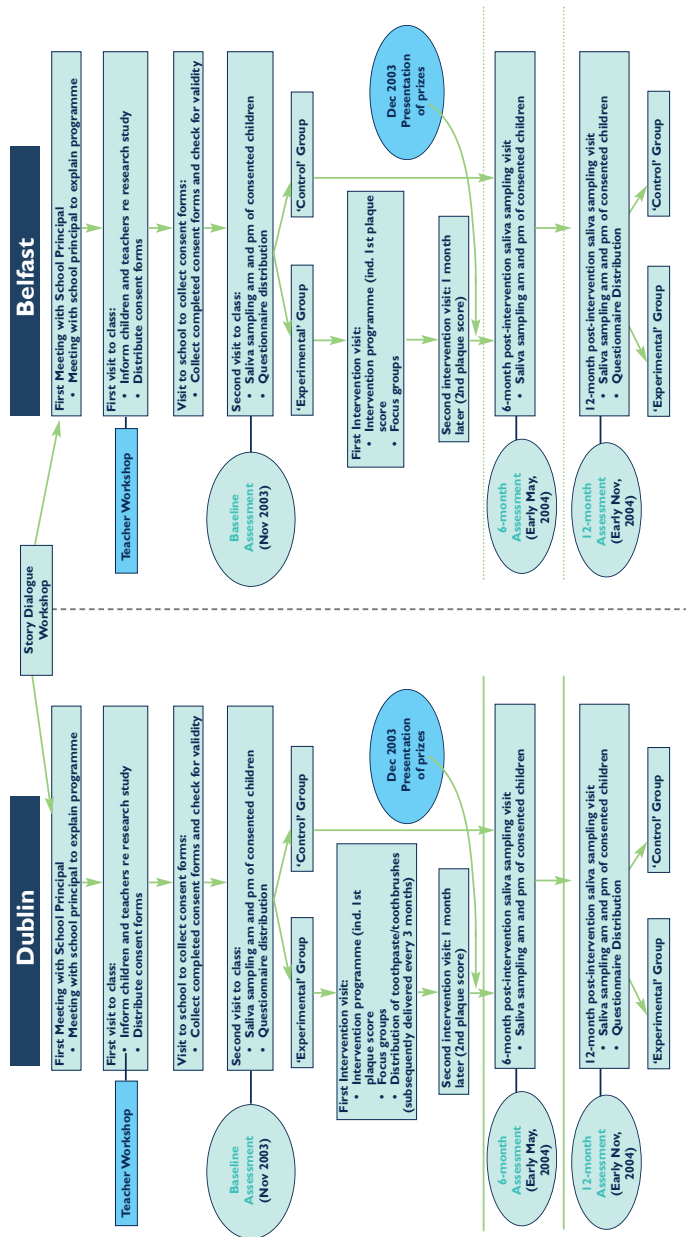


Figure 1: Study Flow Chart of the Winning Smiles Programme control trial (see Appendix 1)

Each child sampled in the morning was sampled in the afternoon of the same day. For ease of collection, 4–5 children were sampled together. Between 20 and 30 samples were collected in the morning and the same number in the afternoon.

The children were first asked to swallow the saliva in their mouths. Each child was then asked to expectorate saliva into a receptacle for a timed five minutes or until at least 1.5 mls had been collected. Each receptacle was marked with subject identification number (san no.), initials, date of birth, date of sampling and time of sampling. The tubes were sealed tightly and packed in Styrofoam boxes with frozen ice packs. The containers were then sent by overnight courier to the laboratory in the OHSRC for fluoride analysis.

Laboratory Analysis

Saliva samples were analysed for fluoride content using the direct method in the laboratory in the Oral Health Services Research Centre. An appropriate range of sodium fluoride standards was used. All measurements of saliva samples were repeated three times, taking the average of the second and third readings as the measurement result (if necessary, the first measurement was used to determine the appropriate standard interval).

Quantitative Assessment of Child Oral Health-Related Quality of Life, Oral Health-Related Knowledge, Attitudes and Behaviours and Self-esteem

The measurement of child oral health-related quality of life (COHRQoL [8 to 10-year-olds]), oral health-related knowledge, attitudes and behaviours and self-esteem was assessed using a questionnaire (Appendix 4). The questionnaire consisted of four parts. The first section inquired of the children's age, and gender. Two additional questions asked the children if their teeth or mouth had bothered them and their opinion of their teeth and mouth. These questions were assessed on a 4-point Likert scale ranging from 'not at all' (scoring 4) to 'a lot' (scoring 1) and 'very good' (scoring 4) to 'poor' (scoring 1) respectively.

The second part was the 25 item COHRQoL [8 to 10-year-olds] questionnaire (34). The questions ask the children to think about their teeth and mouth and whether in the previous four weeks they had experienced pain, sore spots, pain when drinking or eating cold drinks or foods, food packing or bad breath. The remaining questions assessed whether in the previous four weeks the children had, as a result of their teeth or mouth, difficulty in eating, sleeping, talking, smiling, laughing, socialising, concentrating or speaking out in class or had felt shy, worried or had been teased or questioned by other children about their teeth or mouth. Responses to the questions were assessed on a 5-point Likert scale. The responses ranged from 'Never' scoring 5 to 'Everyday or almost everyday' scoring 1. A confirmatory factor analysis of the COHRQoL identified three subscales. The three subscales were:

- Subscale 1: oral health awareness;
- Subscale 2: oral and social self image
- Subscale 3: social confidence and well-being (35).

These three subscales were calculated in addition to total scores for COHRQoL [8 to 10-year-olds].

The third part assessed oral health-related knowledge, attitudes and behaviours. Oral health-related knowledge questions were of a yes/no format. Questions enquired as to the children's toothbrushing and toothpaste knowledge, their knowledge of healthy and unhealthy snacks as well as their knowledge of how to prevent dental caries. Knowledge scales were calculated for total snack knowledge, safer snack knowledge, total toothbrush knowledge and total prevention knowledge. For each of the knowledge scales, each time a correct answer was

provided by the participant, a score of one was awarded. A scale ranging from 0 (none correct) to 13 (all correct) was calculated for total snacking knowledge; for the safer snack scale, scores ranged from 0 (none correct) to 8 (all correct); for the total toothbrushing knowledge scale, scores ranged from 0 (none correct) to 3 (all correct); and for the preventive knowledge scale, the scores ranged from 0 (none correct) to 5 (all correct).

The attitude questions assessed satisfaction and importance to care for teeth and mouth on a 4-point Likert scale. The responses ranged from 'very pleased/ 'very important' (scoring 4) to 'not at all pleased/ 'not at all important' (scoring 1). Several questions assessed the children's oral health behaviour with regard to toothbrushing and fluoride toothpaste use and dental attendance.

The fourth part of the questionnaire was the Coopersmith Self-Esteem Inventory-School Form (Coopersmith SEI-SF), for 8 to 15-year-olds (36). The Coopersmith SEI-SF has high reliability and validity. The respondents stated whether a set of eight favourable or unfavourable statements were 'like me' or 'not like me'. A score of one was awarded for a positive response. The summation of the individual scores provided a total score for self-esteem. Total scores range from 8 (high self-esteem), to 0 (low self-esteem) (Appendices 5 and 6).

Administration of the Questionnaire

The questionnaire was distributed to all consented children in the experimental and control groups at baseline and 12 months. The children were asked to complete the questionnaire under examination conditions. The researcher read out each question in turn and allowing time for the children to mark their answer on their questionnaire. Once completed, the questionnaires were collected.

Ethics and Regulatory Issues

The study was carried out in accordance with:

- The text of the Declaration of Helsinki adopted by the World Medical Assembly in June 1964, amended at Tokyo, October 1975, at Venice, October 1983, at Hong Kong, September 1989, and at Somerset West, Republic of South Africa, October 1996, given in Appendix 7.
- The European Community guidelines for Good Clinical Practice (GCP),(37)
- The ICH recommendations: Good Clinical Practice.(38)

The parents of each child were contacted and asked to sign a written informed consent form for the participation of their child in the evaluation (Appendix 2) and for their own participation in the focus group discussions (Appendix 8). The programme itself (Appendix 9) is part of the oral health promotion programme of the public dental services in the two jurisdictions.

CONFIDENTIALITY AND USE OF DATA

Confidentiality

The methods of data collection and processing are designed to safeguard the confidentiality of the subjects. The results of the Dublin study are considered to be the property of the Dental Health Foundation Ireland. The results of the Belfast study are considered property of the Research and Development Office, Belfast, Northern Ireland. The study reports are the responsibility of the Principal Investigators.

No data (abstract, poster communication, manuscript) may be published without the mutual agreement of the Principal Investigators and the Dental Health Foundation Ireland.

Data Processing

All raw data recorded by hand was recorded promptly and legibly in indelible ink and was signed or initialled and dated by the data recorder. Alterations were explained, initialled and dated by the person who made the original record. An internal quality control check was made on all study documents.

The data were entered into a computer file for analysis.

All study documentation was maintained in an up-to-date condition at all times during the study and was available to the coordinating agency's staff and Regulatory Authorities on request.

Data Analysis

Quantitative data:

All analyses for the Dublin study were performed using SAS® (v9.1). All analyses for the Belfast study were performed using SPSS. (v12). The questionnaire data were subjected to frequency distributions, chi-square tests, repeated measures ANOVA, conditional modelling and logistic regression analysis (39). Salivary fluoride concentrations were summarised using appropriate tables of descriptive statistics and were formally analysed using analysis of variance techniques. Appropriate data transformations were applied, if necessary.

2.2 Results of the Winning Smiles Control Trial

Toothpaste Use Evaluation, Salivary Fluoride Levels Results

Quantitative Results

The Sample

The target sample size was 100 children in Primary 4 (Belfast study) and 100 children in Second Class (Dublin study).

The total number of children recruited for the study is shown in Table 1. The number exceeded the target to allow for dropouts and because whole classes were invited to participate.

Table 1: Total no. of children in second Class (Dublin study) and P4 (Belfast study) by gender and group

	Control		Experimental	
	Male	Female	Male	Female
Dublin	34	24	40	40
Belfast	20	39	59	52

Saliva samples were collected in two schools in Dublin and four schools in Belfast for children for whom consent was available in November 2003, May 2004 and November 2004 (Table 2). The day before the scheduled sampling visits, a letter was sent to the parents through the children, asking that the children refrain from brushing from 8p.m. the previous evening. Saliva was collected between 9 and 11 a.m. (14-hour post brushing sample) and again between 12.30 and 2.30 p.m. (18-hour post-brushing sample).

Table 2: Number of children who participated in saliva sampling at baseline, six-months and 12-months

	Baseline		six-months		12-months	
	Control	Experimental	Control	Experimental	Control	Experimental
Dublin	50	67	48	62	48	55
Belfast	53	58	51	54	50	58

Not all children were present at all three time points when the school was visited for saliva collection. In Dublin, all three saliva samples were collected from 47 children in the control school and 52 children in the experimental. In Belfast, 47 children in the control schools and 54 in the experimental schools gave all three saliva samples.

Equilibrium Salivary Fluoride results: 14-hour post brushing samples versus 18-hour post brushing samples.

One of the aims of this study was to determine the sensitivity of Equilibrium Salivary Fluoride measurements to

variation in sampling time – that is, to establish the importance of sampling time to study design. Previous work by Duckworth and Morgan (40) used an 18-hour post-brushing measurement and the measure was validated using this post-brushing period. However, Duckworth and Morgan did not investigate the impact of a shorter post-brushing period. To investigate this issue, salivary samples were taken in both the morning and afternoon, following the issue of instructions to refrain from brushing after 8.00 p.m. on the previous evening. The results for salivary fluoride for Dublin and Belfast control and experimental groups were plotted for the morning (14 hours post brushing) and afternoon samples (18 hours post brushing) taken at baseline, six and 12 months. The points represent the means and the lines extending from them (error bars) represent the size of the standard deviations. The first plot shows the mean and standard deviation for the fluoride levels in the morning samples collected in Dublin. The second plot shows the same data for the morning samples in Belfast; the third shows the results for the afternoon samples in Dublin, and the fourth shows the results for the afternoon samples in Belfast.

The plots show that the standard deviations are much larger for the morning (AM) samples than the afternoon (PM) samples in both Dublin and Belfast – in some cases, the standard deviations for the morning samples are larger than the mean value.

Figure 2: Mean and standard deviations of morning (14-hour post brushing, AM) and afternoon (18-hour post brushing, PM) samples – all subjects

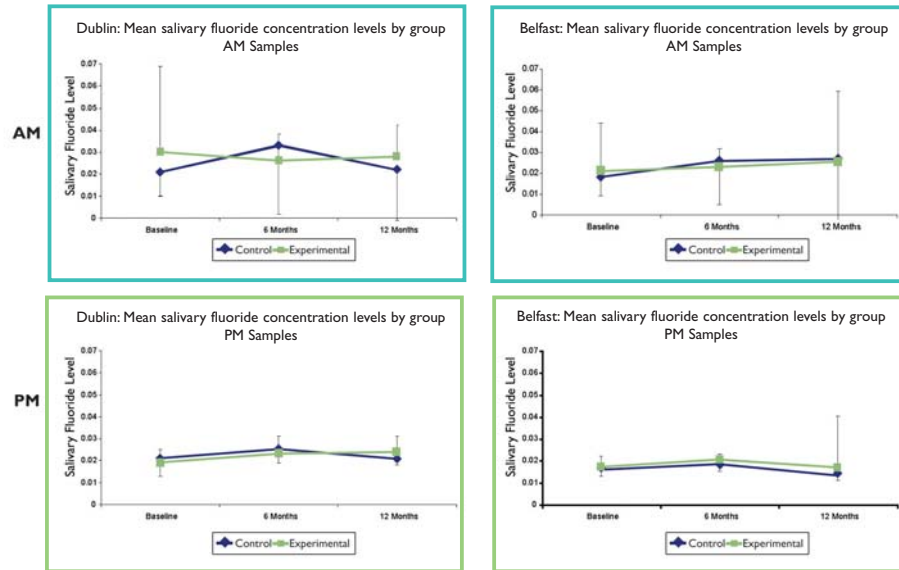
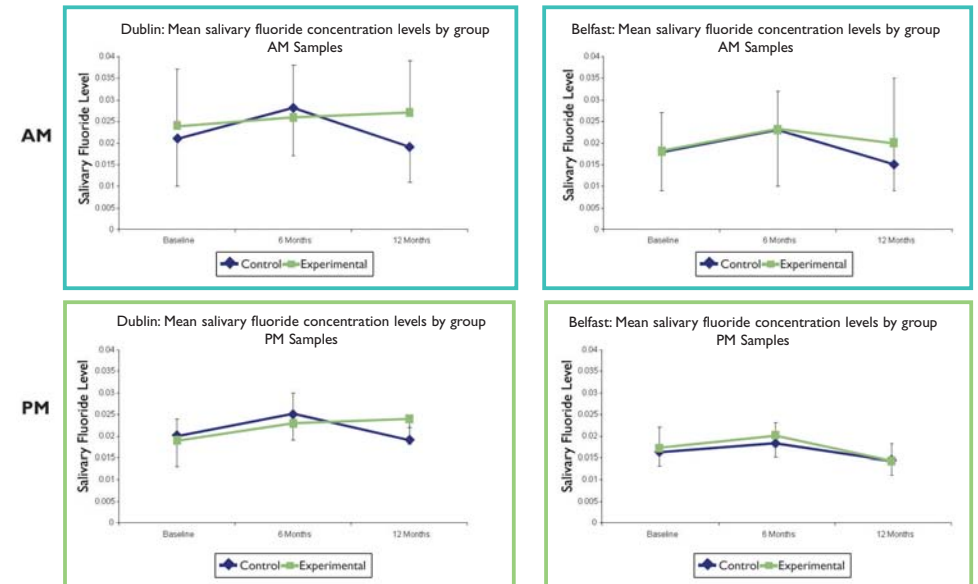


Figure 3: Mean and standard deviations of morning (14-hour post brushing, AM) and afternoon (18-hour post brushing, PM) samples – excluding outliers



Whilst the vast majority of children had salivary fluoride levels that were less than two-and-a-half times the mean value, a small number of children had values in excess of four times the mean (salivary fluoride concentration of 0.08 or higher). In the absence of a rational explanation for these outliers, their data was excluded to look at the impact of their exclusion on the variation in salivary fluoride levels among the morning and afternoon samples. The standard deviations are much smaller in these graphs but are still much larger for the morning samples than the afternoon samples indicating a lot more variability in the morning samples.

The data presented in Figure 2 and Figure 3 indicate that salivary fluoride concentration had not reached equilibrium by the morning sampling time while the salivary fluoride concentration was nearer equilibrium in the afternoon samples. Thus, the afternoon sample was a more robust measure of salivary fluoride concentration than the morning sample.

These data indicate the importance of sampling time to the validity of the equilibrium salivary fluoride measurement. The salivary fluoride levels measured from the afternoon samples were used in all further analyses in this study.

The Impact of Oral Health Promotion on Equilibrium Salivary Fluoride Levels

The variation in salivary fluoride eighteen hours after brushing was expected to be low: 99 per cent of children had salivary fluoride levels within two-and-a-half times their group average at each time point. However, two of the 200 children (present for all three saliva sampling visits) had salivary fluoride levels greater than four times the average. As the reason for this variation was unknown and use of fluoride toothpaste shortly before saliva sampling could not be precluded, it was considered appropriate to exclude the data for these two children from the analysis. Thus, any subject who had a salivary fluoride concentration level of more than 0.08 mg/L (four times the mean) at any of the time points was considered an outlier for that time point and their data for all three visits are excluded from all analyses here. This leaves 46 subjects in the Dublin control group, 52 subjects in the Dublin experimental group, 47 subjects in the Belfast control group and 53 subjects in the Belfast experimental group.

Observation of the distribution of children according to salivary fluoride levels in each of the four groups (Appendix 10) indicated that some of the measurements at the different time points were not normally distributed and many of the distributions were positively skewed. From an analytical perspective, this indicated the need for log transformation, a statistical technique which is applied to non-normal data to normalise it for statistical analysis. Thus, the salivary fluoride concentration data (mg/L) was transformed using a log transformation. All statistical tests on observed differences in salivary fluoride concentration levels carried out here between different groups at the same time points or for the same group at different time points (pairwise) were conducted on the log-transformed data. Statistical significance was set at 0.05.

Differences in Salivary Fluoride Levels Between Dublin and Belfast Children

The mean baseline salivary fluoride concentration levels in Dublin were 0.020mg/L and 0.019mg/L in the control and experimental groups respectively. The corresponding figures in Belfast were 0.016mg/L and 0.017mg/L respectively. Children in the Dublin samples had domestic water fluoridation as urban areas in the Republic of Ireland are supplied with fluoridated water; there is no water fluoridation in Northern Ireland. Therefore it is likely that the higher salivary fluoride levels among the Dublin sample can be attributed to the fluoridation of public water supplies in Dublin. This difference was also apparent at six months and 12 months (Table 3). T-tests carried out on the log-transformed data for the experimental groups show that the differences were statistically significant with the salivary fluoride concentration levels in Dublin being statistically significantly higher than the corresponding levels in Belfast at baseline ($p=0.0071$), six months ($p<0.0001$) and 12 months ($p<0.0001$). The salivary fluoride concentration levels in the Dublin control group were also statistically significantly higher than the corresponding levels in the Belfast control group at baseline ($p<0.0001$), six months ($p<0.0001$) and 12 months ($p<0.0001$).

Differences in Salivary Fluoride Levels Between Control and Experimental Groups within Dublin and Belfast

The statistical significance of differences in salivary fluoride concentration levels between control and experimental groups in both cities at baseline, six and 12 months (Table 3) was also tested using the log-transformed data. Salivary fluoride concentration levels were higher in the Dublin control group than the Dublin experimental group at baseline ($p=0.0704$) and six months ($p=0.1218$) but these differences were not statistically significant. At 12 months, however, the salivary fluoride concentration levels were statistically significantly higher in the Dublin experimental group than in the Dublin control group ($p<0.0001$).

In Belfast, although at baseline salivary fluoride concentration levels were higher in the experimental group than the control group the difference was not significant ($p=0.2952$); however, at six months they were significantly

higher in the experimental group ($p=0.0047$). At 12 months, the salivary fluoride concentration levels were the same in the experimental and control groups ($p=0.8859$).

Table 3: Mean salivary fluoride concentration levels (mg/L) at baseline, six and 12 Months

Group	Baseline	6-Months	12-Months
Belfast			
Control	0.016	0.018	0.014
Experimental	0.017	0.020	0.014
Dublin			
Control	0.020	0.025	0.019
Experimental	0.019	0.023	0.024

Changes in Salivary Fluoride Levels within Control and Experimental Groups in Dublin and Belfast over Time

For both the experimental and control groups in Belfast, salivary fluoride concentration levels increased considerably between baseline and six months. However, this effect decreased with time as salivary fluoride concentration levels had fallen again at 12 months in both groups to below the initial baseline concentration.

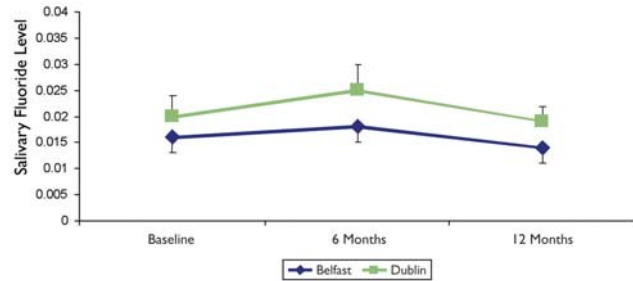
In the Dublin control group, there was also a considerable increase in mean salivary fluoride concentration levels between baseline and six months. However, at 12 months, mean salivary fluoride concentration level had fallen again to just below the baseline concentration level (Table 3). This would suggest that the visit to the school at baseline by the dental teams prompted an increase in dental awareness. However, without the delivered intervention, this effect decreased over time as levels had fallen again by 12 months.

In the Dublin experimental group, there was also an increase in mean salivary fluoride concentration levels between baseline and six months from 0.019mg/L to 0.023 mg/L and this increase continued to 12 months. These increases in salivary fluoride concentration levels at the two time points indicate a progressive improvement over time. The Dublin experimental group received the intervention at baseline but also received toothpaste every three months by post. This would indicate that the additional supply of toothpaste as well as the intervention delivered at baseline, served as a continual reminder to use fluoride toothpaste regularly over the 12-month period.

Mean salivary fluoride concentration levels increased in all four groups from baseline to six months (Figure 4, Figure 5). An increase in mean salivary fluoride concentration levels in the experimental schools was expected but a comparative increase in the control schools would imply that dental visits to the schools even without a delivered intervention increased dental awareness among the children.

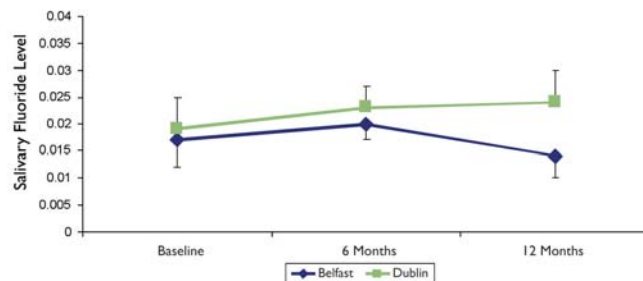
All four groups demonstrated an increase in mean salivary fluoride concentration levels from baseline to six months (Figure 4, Figure 5). However, the only group to continue with this trend to 12 months was the Dublin experimental group who received the intervention at baseline and a supply of toothpaste at regular intervals during the 12-month study.

Figure 4: Control : Mean salivary fluoride concentration levels by city - PM Samples



	Belfast		Dublin	
Baseline	0.016	0.003	0.020	0.004
6 months	0.018	0.003	0.025	0.005
12 months	0.014	0.003	0.019	0.003

Figure 5: Experimental : Mean salivary fluoride concentration levels by city - PM Samples



	Belfast		Dublin	
Baseline	0.017	0.005	0.019	0.006
6 months	0.020	0.003	0.023	0.004
12 months	0.014	0.004	0.024	0.006

Statistical Significance of Changes in Salivary Fluoride Levels within Control and Experimental Groups in Dublin and Belfast over Time

The statistical significance of observed differences in the salivary fluoride concentration levels between the different time points (baseline, six months and 12 months, Figures 4 and 5) for each of the study groups was then tested using pairwise T-tests on the log-transformed data using the SAS TTEST procedure, see Appendix 11. The analysis is carried out on children who were present on all three sampling visits (n=198 excluding 2 outliers).

For the Belfast control group (n=47), the pairwise T-tests show that there was a significant increase in the salivary fluoride concentration levels between baseline and six months (p<0.0001). For these subjects, there was a significant decrease in the salivary fluoride concentration levels between the samples collected at six months and 12 months (p<0.0001) and also between the baseline and 12-month samples (p=0.0012).

In the case of the Belfast experimental group (n=53), there was a significant increase in the salivary fluoride concentration levels between baseline and six months (p<0.0001). For these subjects there was a significant decrease in the salivary fluoride concentration levels between the exams at six months and 12 months (p<0.0001) and also between the exams at baseline and 12 months (p=0.0001).

In Dublin, among the control group (n=46), there was a significant increase in the salivary fluoride concentration levels between baseline and six months (p=0.0003). For these subjects there was a significant decrease in the salivary fluoride concentration levels between the exams at six months and 12 months (p<0.0001). The decrease in salivary fluoride concentration levels between the exams at baseline and 12 months was not statistically significant (p=0.0667).

For the Dublin experimental group (n=52), there was a significant increase in the salivary fluoride concentration levels between baseline and six months (p<0.0001). For these children, in contrast to the other three groups being considered, there was also a significant increase in the salivary fluoride concentration levels between the exams at baseline and 12 months (p<0.0001). Although there was an increase in the salivary fluoride concentration levels between the six month and 12 month exam, this difference was not statistically significant (p=0.5034).

Use of Equilibrium Salivary Fluoride Levels to Assess the Validity of Reported Brushing Frequency/Behaviour

The traditional method used to ascertain compliance with instructions on toothpaste use is to ask the targeted group a series of questions about tooth brushing habits such as frequency of brushing. In this study, the children were asked, 'How often do you brush your teeth?' Children were asked to tick one of the following answers: a) Never; b) Once a day; c) Twice a day; d) More than twice a day; and e) no answer. These questions were answered by the participants at baseline and at 12 months.

In the Dublin Control group, 46 subjects answered the questions at both examinations (two subjects who said they brushed twice a day at baseline gave 'no answer' at 12 months). At baseline, three subjects claimed they never brushed, six claimed that they brushed once a day, 16 claimed that they brushed twice a day and 23 claimed they brushed more than twice a day (Table 4). The corresponding figures at 12 months were seven, six, 21 and 12. Looking at the diagonals (that is those who gave the same answer at baseline and at 12 months), three consistently said that they never brushed, one out of six consistently said that they brushed once a day, three claiming they brushed more often and two moved to the 'never' category. Of the 16 who claimed that they brushed twice a day at baseline, only eight gave the same answer at 12 months, three claiming to brush more

often and three claiming to brush less often, with two giving no answer. Of the 23 who said they brushed more than twice a day at baseline, only eight gave the same answer at 12 months, with the remaining 15 claiming to brush less often.

Table 4: Distribution of Dublin Control group children according to reported frequency of brushing at baseline and 12 months

How often do you brush your teeth? – 12 months	How often do you brush your teeth? – Baseline				
	Never	1/day	2/day	>2/day	Total
No Answer	-	-	2	-	2
Never	3	2	1	1	7
1 / day	-	1	2	3	6
2 / day	-	2	8	11	21
> 2 / day	-	1	3	8	12
Total	3	6	16	23	48

Table 5: Distribution of Belfast Control group children according to reported frequency of brushing at baseline and 12 months

How often do you brush your teeth? – 12 months	How often do you brush your teeth? – Baseline				
	Never	1/day	2/day	>2/day	Total
No Answer	-	3	4	3	10
Never	1	-	-	-	1
<1 / day	-	-	1	2	3
1 / day	-	2	5	1	8
2 / day	-	4	5	5	14
> 2 / day	1	4	5	13	23
Total	2	13	20	24	59

The distributions of the same questions for the Belfast Control group (Table 5), the Dublin Experimental group (Table 6) and the Belfast Experimental group (Table 7) show a similar inconsistency in the answers provided at baseline and at 12 months. These results indicate that ascertaining compliance with toothbrushing instructions by means of questionnaires is inaccurate and the validity of the answers provided at baseline and at 12 months is questionable. It is suggested that a more valid method for monitoring compliance with fluoride toothpaste use is provided by the alternative method used in this project namely the 18-hour salivary fluoride concentration levels.

Table 6: Distribution of Dublin Experimental group children according to reported frequency of brushing at baseline and 12 months

How often do you brush your teeth? – 12 months	How often do you brush your teeth? – Baseline				
	Never	1/day	2/day	>2/day	Total
No Answer	-	1	7	8	16
Never	-	-	-	1	1
<1 / day	-	2	1	2	5
1 / day	1	1	3	8	13
2 / day	-	1	6	13	20
> 2 / day	-	1	8	5	14
Total	1	6	25	37	69

Table 7: Distribution of Belfast Experimental group children according to reported frequency of brushing at baseline and 12 months

How often do you brush your teeth? – 12 months	How often do you brush your teeth? - Baseline						
	No Answer	Never	<1/day	1/day	2/day	>2/day	Total
No Answer	-	1	-	2	1	4	8
1 / day	-	-	-	3	3	1	7
2 / day	-	2	1	5	15	7	30
> 2 / day	1	-	-	-	8	6	15
Total	1	3	1	10	27	18	60

A further indication of the inadequacy of questionnaires to ascertain compliance with tooth brushing instructions is provided when you look at the consistency between the answers to the questions 'How often do you brush your teeth?' and 'When did you last brush your teeth?'. A summary of the contingency table generated from the replies to these questions by the children from all groups combined at baseline and at 12 months is provided in the following two tables.

At baseline, 17 subjects reported to have brushed more than 24 hours previously and yet they claimed to brush twice a day or more (Table 8). Similar results were obtained at the 12-month examinations (Table 9).

Table 8: Distribution of children according to time since last brushing teeth (at baseline PM sample) and reported frequency of brushing at baseline

Time since Brushing (PM) – Baseline	How often do you brush your teeth? – Baseline					Total
	Never brush my teeth	Less than once a day	Once a day	Two times a day	More than two times a day	
Less than 16 hours	-	-	2	3	7	12
16 to < 20 hours	3	1	13	50	63	130
20 to < 24 hours	-	-	-	-	-	0
24 to < 28 hours	-	-	-	-	1	1
28 or more hours	4	1	16	17	10	48
Total	7	2	31	70	81	191

Table 9: Distribution of children according to time since last brushing teeth (at 12 month PM sample) and reported frequency of brushing at 12 months.

Time since Brushing (PM) – 12 months	How often do you brush your teeth? – 12 months					Total
	Never brush my teeth	Less than once a day	Once a day	Two times a day	More than two times a day	
Less than 16 hours	-	-	6	11	6	23
16 to < 20 hours	1	4	12	28	32	77
20 to < 24 hours	-	-	-	2	2	4
24 to < 28 hours	-	-	-	3	-	3
28 or more hours	4	2	14	36	16	72
Total	5	6	32	80	56	179

Discussion

The effectiveness of fluoride toothpaste in preventing dental caries is well established (41). However, frequency of use is an important variable impacting on its effectiveness. Both Irish (42) and international data (43) indicate that toothpaste use among Irish children is less than optimal. Increasing the frequency of use of fluoride toothpaste is a goal of the Irish National Health Promotion Strategy, 2000–2005 (44). Davies et al. (45) already reported the caries preventive effect of distributing free fluoride toothpaste to children from age 12 months. The study described in this report indicates the potential for distribution of free fluoride toothpaste at a later stage, to schoolchildren in Second Class (age approximately 7-8 years), to impact their toothbrushing habits when

accompanied by an educational programme. The results of the current study pose further questions of importance to oral health promoters.

- If the programme were continued beyond 12 months, would the trend for increasing salivary fluoride levels continue to increase?
- Would the increase in salivary fluoride levels be accompanied by a decrease in caries levels?
- Would salivary fluoride levels increase following the distribution of fluoride toothpaste in the absence of an educational programme?
- If the educational programme were repeated at six months would the salivary fluoride levels among the Belfast experimental group have remained elevated?
- If the dental teams had visited the control groups at six months, would the children's salivary fluoride levels have remained elevated at 12 months?

These are important questions to answer as they have a major bearing on the economics of preventing caries among children in Ireland. Future studies will address these questions and will advance our ability to reduce the burden of dental disease experienced by children, particularly those who are less well off.

Conclusions on Toothpaste Use Evaluation, Salivary Fluoride Levels.

The findings of this study represent a major advance in monitoring the effectiveness of oral health promotion, as they support the validity of using the equilibrium salivary fluoride level as an objective measure of compliance with increasing frequency of toothpaste use. The results of this study also suggest that asking children in Second Class or Primary Four, how often they brush their teeth is not a valid way of measuring toothbrushing habits.

Eighteen-hour equilibrium salivary fluoride levels provide a useful indicator of exposure to water fluoridation as evidenced by the differences in salivary fluoride levels between the Dublin and Belfast children.

The measurement of equilibrium salivary fluoride is sensitive to time since last brushing. An 18-hour post-brushing period provides more valid results than a 14-hour post-brushing period.

Using 18-hour equilibrium salivary fluoride levels as an indicator of frequency of use of fluoride toothpaste, the data indicate that:

All children increased their use of fluoride toothpaste between baseline and six months. This suggests that a visit by the dental team to the school had a positive impact on use of fluoride toothpaste, regardless of whether an intervention was introduced.

The impact of the visit by the dental team at the start of the study to both of the control schools where no intervention was introduced was lost by 12 months as salivary fluoride levels dropped to their baseline levels or lower:

The impact of the intervention on frequency of toothpaste use in the Belfast experimental group which received an educational intervention but no toothpaste supplies was lost by 12 months.

The intervention in the Dublin experimental group which included regular distribution of free toothpaste to the children over the 12-month period of the study was associated with a sustained increase in the frequency of toothpaste use in the 12-month period of the study.

Comparing responses to a question on frequency of toothbrushing administered at baseline, six and 12 months indicates a lack of reproducibility among the responses. Assuming that brushing frequency does not change much with time, these results indicate that ascertaining compliance with toothbrushing instructions by means of questionnaires is inaccurate.

Evaluation of Oral Health-Related Quality of Life, Oral Health-Related Knowledge, Attitudes and Behaviour Results

The baseline and 12-month follow-up data are presented in graphic form to provide summary results of the effects of the Winning Smiles Intervention upon the children’s oral health-related quality-of-life scores, together with their increased awareness of their oral health (subscale 1) and oral and social self-image (subscale 2), as well as their oral health-related attitudes and knowledge.⁵ These findings illustrate that there was some effect of the intervention upon the children’s oral health which enhanced their quality of life. This was particularly so for increased awareness of the health of their teeth and improved oral and social self-image.

The Sample

One hundred and thirty-eight Dublin children and 245 Belfast children were invited to take part in the controlled trial (Table 10). The overall response rate was 75% (287) and was 64% (247) at 12-month follow-up. Two hundred and forty-seven children completed the questionnaire at baseline and 12-month follow-up. All children (247) in Dublin and Belfast who completed the questionnaire at baseline and 12-month follow-up were used in the data analysis although 53 of the children attending Belfast intervention schools had not consented to providing saliva samples (Table 10).

Child Oral Health-Related Quality of Life (COHRQoL)

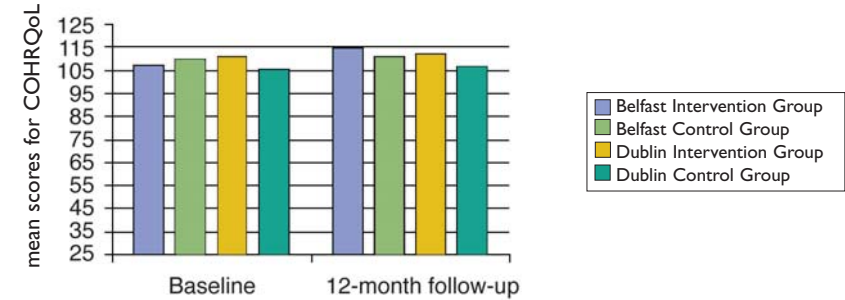
Changes in child oral health-related quality of life were noted for all children between baseline and 12-month follow-up. Attendance at intervention schools, was shown to be related to greater mean scores for COHRQoL at the 12-month follow-up (P<0.09).⁶

Table 10: Number of children who completed the questionnaire at baseline and at 12-month follow-up

	Baseline		12-month follow-up	
	Children attending control schools	Children attending experimental schools	Children attending control schools	Children attending experimental schools
Dublin	48	69	46	53
Belfast	111	59	98	50

⁵ Tables of all other results, including self-esteem, oral health-related attitudes, and knowledge are to be found in Appendices 5 and 6
⁶ Data analysis controlled for location and baseline scores

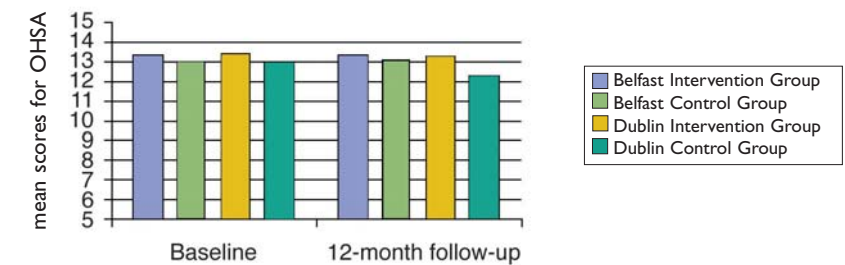
Figure 6: The Effect of the Winning Smiles Intervention on COHRQoL at 12 month follow-up



- COHRQoL: Subscale 1: oral health awareness

Oral health status awareness scores for all children changed between baseline and 12-month follow-up. However, attendance at intervention schools was associated with higher mean scores for oral health status awareness (P<0.06).²

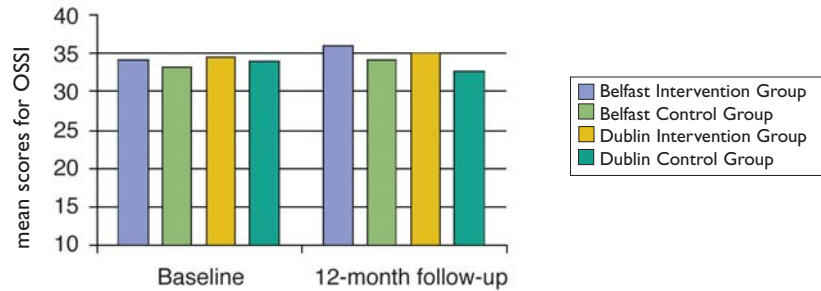
Figure 7: The Effect of the Winning Smiles Intervention on Oral Health Status Awareness at 12 month follow-up



- COHRQoL: Subscale 2: oral and social self image

Oral and social self-image scores changed, for all children between baseline and 12-month follow-up (P=0.07).² Attendance at intervention schools was associated with greater mean scores at 12-month follow-up.

Figure 8: The Effect of the Winning Smiles Intervention on Oral and Social Self-Image at 12-month follow-up

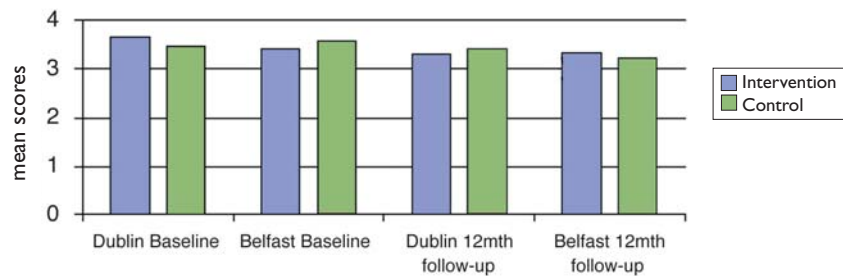


Oral Health-Related Attitudes

- Satisfaction with oral health by time, experimental status and school location

Children attending intervention schools experienced a significant fall in their perceived satisfaction with their oral health ($F(1,243)=5.48; p=0.02$). There was a relationship between satisfaction with oral health and oral health status awareness ($r=-0.25; P=0.01$). This relationship suggested that the intervention had increased the children's understanding and that they gained an appropriate awareness of their oral health status.

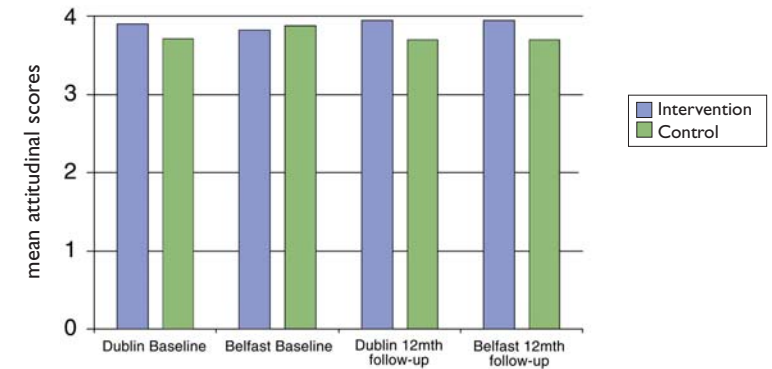
Figure 9: The Effect of the Winning Smiles Intervention upon Satisfaction with Oral Health at Baseline and 12-month follow-up



- Importance of caring for dental health by time, location and experimental status of school

Children attending intervention schools experienced significant increases in their scores for the importance of caring for their teeth at 12 month follow-up ($F(1,243)=3.91; p=0.04$). This suggested that the intervention had raised the children's awareness as to the need to care for their own dental health.

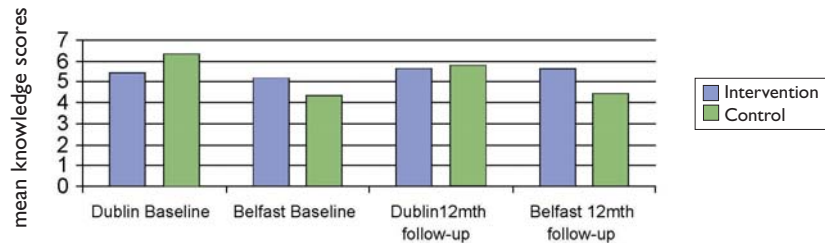
Figure 10: The Effect of the Winning Smiles Intervention on the Importance to Care for Dental Health at Baseline and 12-month follow-up



Oral Health-Related Knowledge

- Total toothbrushing knowledge
Children attending intervention schools had significantly greater mean scores for toothbrushing and toothpaste knowledge at the 12-month follow-up, compared with children attending control schools ($P=0.02$).
- Snacking knowledge
 - [i] Total snack knowledge
All children had equivalent scores for knowledge of healthy and unhealthy snacks (total snack knowledge). Children attending intervention schools had significantly greater mean scores for total snacking knowledge than control school children ($P=0.009$).
 - [ii] Knowledge of safer snacks
Children attending intervention schools had significantly greater mean scores for knowledge of safer snacks at the 12-month follow-up than the children attending control schools ($P=0.004$).

Figure 11: The Effect of the Winning Smiles Intervention for Knowledge of Safer Snacks at Baseline and 12-month follow-up



These findings suggested that the intervention had assisted in providing and maintaining the children’s knowledge base with regard to fluoride toothpaste use and choice of healthy snacks.

Oral Health-Related Behaviours

- Reported toothbrushing behaviour
At baseline, 77% (191) of the children stated that they brushed their teeth at least twice daily; at 12-month follow-up 75% (184) reported that they brushed their teeth at least twice daily. There was no significant difference in reporting toothbrushing behaviour between children attending Dublin and Belfast intervention or control schools at 12-month follow-up (P=0.98)
- Reported dental attendance behaviours
At baseline, 73% (179) of the children stated that they attended the dentist at least on a yearly basis. At the 12-month follow-up, 74% (183) of the children reported that they attended the dentist on a yearly basis. Children attending intervention schools were more likely to report that they attended the dentist compared with children attending control schools (P=0.02).

Discussion

The aim of this part of the controlled trial was to assess the impact of Winning Smiles on child oral health-related quality of life, self-esteem, oral health-related attitudes, knowledge and behaviour. This was considered to be an important aspect of the evaluation as Winning Smiles had provided the children with child-centred health education to enable them to make healthier choices and adopt self-care oral health practices (46).

- Child oral health-related quality of life
The second outcome variable was child oral health-related quality of life. Differences were noted in COHRQoL between children attending intervention and control schools at the 12 month follow-up. Although not statistically significant, the increased quality of life suggested that Winning Smiles had in some way influenced the children’s perceptions of their oral health. This proposition is supported by the finding that the children attending intervention schools had greater mean scores for Subscale 1: oral health awareness at 12 month follow-up compared with the children attending control schools. It may also be proposed that the

children attending intervention schools experienced changes in their perception of themselves since they had higher mean scores for Subscale 2: oral and social self-image. It is reasonable to suggest that this second subscale may represent a state measure of self-esteem which, unlike Coopersmith’s trait measure of self-esteem, was modified by the Winning Smiles intervention. While these propositions may be speculative they nevertheless suggest a positive trend with regard to the role of an oral health promotion programme to improve children’s perceptions of their oral health-related quality of life.

- Oral health-related attitudes, knowledge and behaviour
Support for the suggestion that the Winning Smiles influenced the children’s oral health awareness (Subscale 1) was found in the fall in the children’s satisfaction with their oral health. This was particularly so at the 12-month follow-up for children attending intervention schools. Furthermore, for the children who scored high for oral health awareness (Subscale 1) had reduced score for satisfaction with their oral health, suggesting that Winning Smiles had improved the children’s understanding and had allowed them to gain an appropriate awareness of their oral health status. Thus, children who had received the Winning Smiles intervention also increased their awareness of the importance of caring for their own teeth. These findings are in agreement with those elsewhere (46,47,48) which have suggested that educational aspects of oral health promotion programmes, such as the Winning Smiles intervention, may act as a precondition to enabling children to adopt self-care practices.

Intrinsic to the objectives was the assessment of the longevity of the educational part of Winning Smiles. The health promotion literature is inconsistent with regard to the longevity of health knowledge acquisition. Some research suggests that the acquisition of oral health information is short-lived (49,50) while others, working in general health, have found (51) long-term changes in health knowledge. Sprod et al. (52) felt that issues of longevity of attainment were inconsequential since even short-term increases in health knowledge could lead to improvements in health. The present findings demonstrated that the children experienced a longevity in their oral health-related knowledge acquisition. Children attending intervention schools had increased toothbrushing, toothpaste and snacking knowledge at 12-month follow-up. It may be suggested that this represents a positive outcome of the Winning Smiles oral health promotion programme.

Although the children stated that they brushed their teeth at least twice a day the results from the equilibrium fluoride study demonstrate the invalidity of reported behaviours as an outcome measure. Considering this, the children’s reporting of dental attendance behaviour should also be viewed with caution and may represent an increase in oral health-related knowledge rather than a change in health behaviour.

Conclusions on Evaluation of Oral Health-Related Quality of Life, Oral Health-Related Knowledge, Attitudes and Behaviours

The results of the second part of the Winning Smiles evaluation were positive and encouraging. It may be proposed that Winning Smiles had the function of assisting the children in gaining an appropriate appreciation of their oral health which enabled them to be cognisant of the importance of self-care practices for oral health. Commensurate with this improved awareness was a shift in their oral and social self-image which it was proposed was related to changes in state dimensions of self-esteem. It may be concluded, therefore, that Winning Smiles improved oral health-related knowledge and assisted in modifying oral health-related attitudes, including COHRQoL.

Chapter 3: Winning Smiles: The Qualitative Studies

3.1 Introduction

This chapter presents the findings from the qualitative part of the study. The first section reports on oral health promoters' perceptions and concerns in delivering health promotion programmes in schools using the methodology of a story dialogue workshop. The second section presents teachers' views on the programme. The final section presents the findings from a qualitative exploration of children's thoughts on the Winning Smiles intervention.

3.2 Oral Health Promoters' Perceptions and Concerns in Delivering Health Promotion Programmes in Schools: A Story Dialogue Workshop

Background

As a school-based oral health education programme, the Winning Smiles research project noted the findings of Kay and Locker (53), who stated that these types of programmes had not, up to that point, been successful in improving children's levels of oral hygiene. Kay and Locker (53) argued that simple approaches to school-based health education programmes are often as effective as more complex ones. This was particularly relevant for the Winning Smiles project

Kay and Locker (53) stated that the improvement of individual knowledge of dental health *can* be achieved through effective health promotion programmes. Indeed, this should be regarded as the social and professional responsibility of health promoters working in this area. There is an undeniable ethical responsibility for health promotion organisations to disseminate the health message, regardless of what society actually does with that message.

Oral Health Promoters' Perceptions and Concerns in delivering Health Promotion Programmes in Schools: A Story-Dialogue Workshop

Researchers working on the Winning Smiles project were interested in attempting to uncover, through a process of structured dialogue, what the health promoters felt were the major obstacles in schools in Northern Ireland and the Republic of Ireland, to the successful implementation of an effective oral health promotion programme that could produce not only demonstrable evidence of increased health knowledge amongst the participants (the children) but also an indication that educative programmes can affect long-term behavioural, attitudinal and cultural change.

It was suggested informally by the health promoters on a number of occasions that professional conflict, lack of communication with teachers, and competing priorities within schools were chief among the reasons for oral health interventions proving to be problematic or unsuccessful. There was not a general feeling amongst the health promotion community involved in this project that either children or their parents were the primary barriers to the satisfaction of the objective of achieving long-term behavioural change within socially disadvantaged communities.

In order to formalise these anecdotal suggestions, and represent them within an appropriate (methodological and theoretical) research framework, the research team pursued the establishment of a research mechanism that could satisfy the dual objectives of:

- 1) Acquiring meaningful and contextualised qualitative data from health promoters regarding their beliefs about barriers to change in the oral health promotion context; and
- 2) Encouraging representatives from the various agencies involved in the research project to open up 'lines of communication' – in terms of sharing knowledge, resources, understanding and differing perspectives.

Oral Health Promotion

Health promotion, like health education, has been criticised for lacking an evidence base and representing nothing more than a set of normative claims (54). This is despite the growing realisation that conventional post-positivist approaches are, on their own, insufficient mechanisms for assessing the evidence base of health promotion and health education activity (55). A large proportion of health promotion activity is based on tacit knowledge and specific 'localised' relationships. This report is no exception.

One method that utilises the tacit knowledge of practitioners, and could adequately fulfil the objectives of the research team (as outlined in the Introduction) are Story-Dialogue Method Workshops (55). The aim of this section of the report is to provide a detailed analysis of the empirical findings that emerged from this Story-Dialogue process during the Winning Smiles project in Dublin and Belfast.

Story-Dialogue Workshop Method

The Story-Dialogue Method uses 'narratology' as a method of examining the ways in which narrative structures the participants' perceptions of their professional culture, society and the issues pertinent to the Winning Smiles oral health promotion programme. The study of narrative is particularly important in this context since narrative forms constitute one of the primary ways that people construct meaning in general.

Objectives of Story-Dialogue Workshops in the Winning Smiles Project

This type of group dialogue process was defined by face-to-face interaction. The process of storytelling was structured around generative themes, in order to produce voluminous and free-flowing data, as opposed to closed and negative responses. The following objectives were outlined:

- To establish the context of health-promotion-related behaviour in the different professional communities (Northern Ireland and Republic of Ireland)
- To uncover the main everyday problems as perceived by the health promoters (Dublin and Belfast) in relation to the social and health situations and problems that they encounter (in relation to school-based oral health promotion programmes)
- At a deeper level, to analyse the dominant professional dynamic – what are 'ordinary' everyday behaviours according to these particular health promoters? What principles govern their professional relationships with colleagues and with schools/teachers, and, by extension, with the professional community of which they are a part?
- To establish the main concerns of health promoters regarding school-based health promotion programmes
- To establish the main perceptions of the health promoters in relation to the major barriers to effective oral health promotion for children in Dublin and Belfast.

The Story-Dialogue Workshop Method attempts to create structured group dialogue around case stories that address particular generative themes. In this paradigm, key actors within the health promotion 'community' are encouraged to articulate their experiences of school-based programmes from their own perspective. This workshop for health promoters during the 'Winning Smiles' project was designed to include one full day in which a story group (five to 15 participants) met to discuss case stories (experiences of health promoting programmes) which were based on a generative theme, using dialogue as a means of assisting the participants in creating theories and models of good practice (55).

As noted, the goals of the Story-Dialogue method are twofold – first, to develop a shared relationship between evaluators and the groups doing the work; and secondly, to analyse programme work through the use of a problem-posing approach, enabling the programme to be modified and adjusted accordingly. A key priority for Story-Dialogue Workshop participants is the production of the 'generative theme'. The group participants select their own theme and make it specific to the various types of professional problems they have experienced. The theme is then formally written out in detail, naming various actors and organisations. The theme for the 'Winning Smiles' workshop was:

The Generative Theme – 'Tensions':

Tensions are problematic for the implementation, delivery and evaluation of school-based health promotion initiatives. Tensions exist between schools and the oral health promoters who are interested in keeping disturbances to the flow of everyday life to a minimum. Tensions also exist between teachers and health promotion practitioners for similar reasons. Such tensions relate to very different reasons for being involved in health promotion programmes - including different values in relation to the importance of oral health. Finally, tensions can also exist between health promotion practitioners and research team evaluators. The former will have much tacit knowledge about the implementation and local context of the intervention whereas the latter will be more interested in the technical outcomes of the programmes.

An explicit understanding of tensions that can affect the implementation and outcomes of health promotion programmes can help facilitate the delivery of such programmes. Clarity concerning the role of tensions, such as that between the school and the health promoting team in either facilitating or hindering a programme, can also help health promoters identify and avoid such tensions. Sharing their knowledge and experience of tensions with schools, teachers and evaluators can help health promoters to become sensitive to how their work might inadvertently create tension between themselves, teachers, and the children whose interests the intervention is designed to serve. Explicit consideration of the sorts of tensions the health promoter might encounter is therefore an important aspect of good-quality health promotion.

Within the workshop, two participants were required to produce stories focussed on the generative theme. The workshop conducted as part of the "Winning Smiles" project went through the various stages outlined in Figure 12.

Figure 12: Overview of the Story-Dialogue workshop

<p>Introduction Participants given a basic introduction to the workshop and the Generative Theme</p>	<p>Story Round 2:</p> <ul style="list-style-type: none"> • Reflection Circle • Quick Reflection • Structured Dialogue • Creating Insight Cards
<p>Story Round 1:</p> <ul style="list-style-type: none"> • Reflection Circle • Quick Reflection • Structured Dialogue • Creating Insight Cards 	<p>Second Level Synthesis: generation of categories Plenary Feedback Session during which small groups share the insights and lessons that they have gained about the generative theme.</p>

Overview of the 'Winning Smiles' Story-Dialogue Workshop

There were two story rounds, each having four parts: the storytelling (reflection circle), quick reflection and a structured dialogue and creation of insight cards.

Reflection Circle

A member of the group detailed in narrative format their experience of delivering the Winning Smiles programme, including all the conflicts and difficulties involved. Participants were encouraged to be open and frank about their experience and feelings.

Structured Dialogue

Within this process a structured dialogue (which was aimed at covering the types of questions outlined in Figure 13) then ensued.

Figure 13: The Structured Dialogue

What tensions do you see the health promoter experiencing?
(description)

Why, do you think, are they experiencing these tensions?
(explanation, causes)

So what can we learn from this example about tensions in health promotion from this example?
(reflection, learning and synthesis)

Now what should be done to use these tensions productively?
(Action)

Creating Insight Cards

The creation of insight cards was an important part of the recording activity that was undertaken by the workshop participants. It involved the participants writing down three key insights from the structured dialogue. Specific insights were then formed from these ideas. The production of insight cards helped to collate the most salient aspects of the structured dialogue from the perspective of the participants.

Discussion

A method of resolving the problem of competing priorities between schools/teachers and health promoters is to make sure that all classroom-based health promotion activity is child focused, so that conflicts of interest will be less likely to occur.

Empowerment can be achieved through the promotion of negotiation between health promoters and teachers, and the promotion of a mutual engagement in the programme delivery. The following cycle can be used for the intervention: briefing meetings, intervention following (where possible) the negotiated guidelines, and debriefing meetings aimed at providing positive feedback between health promoters and teachers.

It was decided to focus more on quality than quantity. A series of guidelines should be produced concerning when to withdraw from problematic professional situations, how to handle varying degrees of indiscipline in the classroom and the establishment of a working contract with the teachers.

Conclusion

Guidance notes need to be produced for oral health promoters in terms of their professional practice. These should aim to offer a procedural framework for consideration in all school-based interventions.

The competing priorities of teachers and the health promoters can create potential for unhelpful clashes. The consequence of this situation is to undermine health promoters, teachers and the impact of the oral health message. Mixed messages that emerge because of clashes between teachers and health promoters can negatively affect the outcome of school-based oral health intervention programmes.

Health promoters should seek to improve relationships with schools and teachers through more concerted efforts at professional communication.

3.3 Toothbrushing Rules: A Qualitative Exploration of Children's Thoughts on the Winning Smiles Intervention



Background to the Study

The aim of this qualitative exploration was to understand what the toothbrushing intervention, Winning Smiles, meant to the participating children. Starting with the method outlined in the protocol, the means of interacting with the children was gradually revised and refined. It was during this process that an alternative approach — a child-centred approach — was discovered. The child-centred approach allowed the research to tune into the childhood's universe (56) in order to achieve the aim of this qualitative exploration.

Introduction to a Child-Centred Approach

In recent times there has been a shift and subsequent growth in the literature documenting the change from research *on* to research *with* children (57, 58, 59). Traditional research with children has typically been conducted from the perspective of four different theoretical positions:

- i. The realm of common sense
- ii. Classical philosophy
- iii. Developmental psychology
- iv. The field of psychoanalysis.

These various theoretical positions together with national and international developments form the background to a series of new approaches to children that marks a shift away from research on children to research with them (62) .

The child-centred methodology relies upon an awareness of children as individuals who are competent and express their thoughts, feelings and wishes with and without words. (60) Consequently the methods dedicated to working with children involve the use of pictures and diaries, sentence completion, writing, drawings, making models and taking photographs, amongst other things (61). In general terms, each method of research is tailored to the psychological and cognitive needs as well as the social context in which the child finds themselves. As with all qualitative research, some combination of methods is advised. Of particular relevance to this report are the use of

worksheets and drawings. Typically worksheets involve the use of spider diagrams or compiling lists on a particular subject. It is good practice, as in all qualitative research, to be flexible and use different methods (58, 61, 62).

Method

A total of ten focus groups with 44 children were conducted in Dublin and Belfast between 13 November 2003 and 26 May 2004¹. Table 11 provides a summary of the numbers of participants at each school.

Table 11: Schools and numbers of child participants

School name	Date	Participants ²
Dublin primary school 1	13/11/03	Focus group 1: 4 girls and 3 boys
Dublin primary school 2	18/11/03	Focus group 2: 3 girls and 2 boys Focus group 3: 2 girls and 2 boys Focus group 4: 3 girls and 1 boy
Belfast primary school 1	24/05/04	Focus group 5: 3 girls and 1 boy Focus group 6: 3 girls and 1 boy
Belfast primary school 2	25/05/04	Focus group 7: 2 girls and 2 boys Focus group 8: 3 girls and 1 boy
Belfast primary school 3	26/05/04	Focus group 9: 1 girl and 3 boys Focus Group 10: 3 girls and 1 boy

Initially the format of the focus groups closely followed the research protocol. However, it became apparent that the format chosen was not suitable to achieve the aims of the qualitative exploration.

Future focus groups were, thus, conducted with fewer children. However, similar problems remained — how to get the children to focus on teeth and toothbrushing? The initial difficulties of the focus groups resulted in a period of reflection, reviewing and refining, and the adoption of a child-centred methodology. Therefore it was decided to use a mixture of task (writing) and picture drawing to help the children to focus on the task at hand:

[a] The task set for the children was to write their ten toothbrushing rules on a worksheet

[b] To express their thoughts about teeth and toothbrushing in their drawings.

Adopting these child-centred methods provided a vehicle to allow the children to think and talk about where, when and who made the toothbrushing rules and to focus on teeth and toothbrushing.

Results: The Children's Experiences of the 'Winning Smiles' Intervention

Toothbrushing Rules

The toothbrushing rules worksheet (Figure 14) and the drawings (Figures 15, 16 and 17) allowed the children to convey and express their thoughts on who made the toothbrushing rules and how they could be altered by parents. It also permitted an examination of how the children perceived the Winning Smiles Intervention. In a few instances, when the children were required to spell and write words, some found it difficult. These children were reassured and asked to describe their drawings and to explain their rules.

Toothbrushing Rules: What Are They?

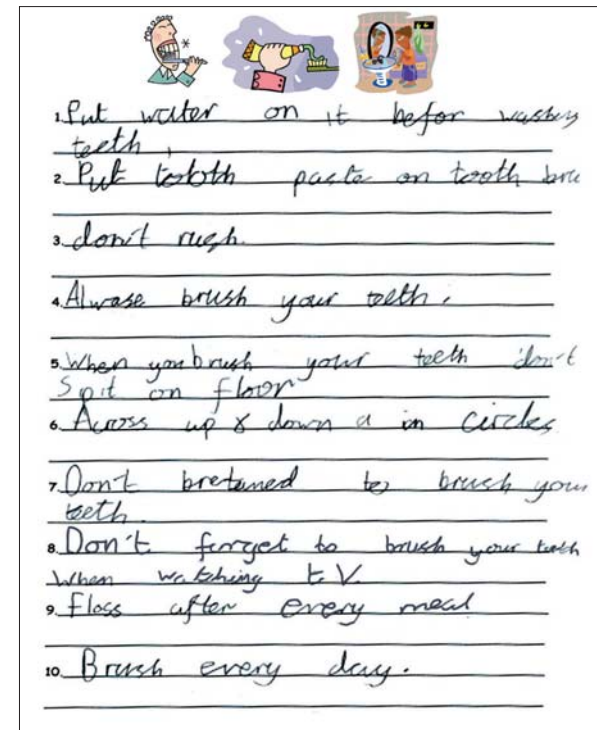
The children's rules were a series of *dos* and *don'ts*. The *dos* were the most commonly stated rules and seemed to reflect the dental health education the children had heard elsewhere — for instance, 'brush you teeth two times a day'; 'always use toothpaste when brushing teeth' — whereas other rules were the children's own — 'you've got to keep them white'; 'put water on it before you brush your teeth'. While the above were to be expected, the *don'ts* were in some cases quite unexpected such as 'Don't be lettin' your teeth go green!' In Figure 14, for example, the child wrote, 'when you brush you're teeth don't spit on the floor' and stated 'don't rush'. Other children's rules reflected the social context in which they lived:

'If you don't have a toothbrush use you Mum's or Dad's.' [Cathy: Belfast primary school 1]

'Don't lie to your Mum and Dad by saying you've brushed when you've not.'

[Lizzie: Belfast primary school 2]

Figure 14: Toothbrushing Rules worksheet completed by Henry, Dublin primary school 1



¹ Parent focus groups were unsuccessful with a low turnout of adults in the schools.

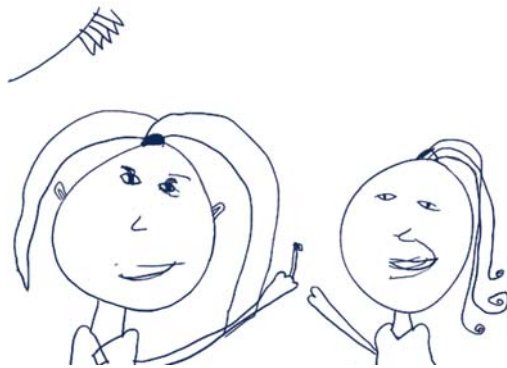
² The children's names have been changed to ensure their anonymity.

Toothbrushing Rules: Who Makes Them?

In the children's opinion, the toothbrushing rules were made, broken and enforced by adults. The children, however, appreciated that there was a hierarchy, with regard to toothbrushing rule-making. The dentist, either in the guise of the oral health promotion officer who visited the school or the dentist the children had visited, was the most important person when it came to toothbrushing rules.

Parents, while important rule-makers, could have their position flouted by the children who felt they were the 'grown-ups' and the ones who made the rules. Sally [Belfast primary school 2: 25/05/04] gave examples of other areas of her life such as tidying her room in which she felt she was the 'grown-up rule-maker'. However, despite Sally's wish to be 'a grown-up rule-maker', it was Sally's mother who made the toothbrushing rules and encouraged her daughter to brush her teeth. This is illustrated in Sally's drawing of her mother handing Sally her toothbrush with paste (Figure 15):

Figure 15: Sally: Belfast Primary School 2: 25/05/04



Parents could break, modify or revise the toothbrushing rules in accordance with work pressures and/or family needs. Cathy complained that she wasn't always able to brush her teeth in the morning:

I was just washing myself and my Mummy said, 'Hurry up and get to school' and I had to rush out. 'Cos my Daddy had to make sure that he was ready for his friend to take him to work and he said, 'You'd better be ready to go when I'm ready.' [Cathy: Belfast primary school 1: 24/05/04]

In families where money was in short supply, children were advised by their parents to use either their mother's or father's toothbrush. In other instances, children stated that they would simply:

'Use your finger!' [Peter: Belfast primary school 1: 24/05/04]

The type and colour of toothbrush was important to the children. They felt that 'Bob the Builder' brushes were for babies whereas electric toothbrushes were of some value [Dublin primary school 2]. The children were intrigued with the colour of toothbrushes and how children's brushes differed in colour from those of their parents. Jill [Dublin primary school 2: 18/11/03] in particular noted, with pride, that her toothbrush was the same colour as Mary's mother's brush whereas Edward's brush was 'green and white'. This discussion about type and colour of toothbrush seemed to illustrate the children's wish to be 'grown-up'.

The children were fearful of breaking the toothbrushing rules as they worried about the consequences. It may be postulated that some children's fears of breaking the toothbrushing rules were connected to attending the dentist. Harold, describing his drawing (Figure 16), exclaimed:

'Look, his teeth are all broken because he didn't brush them!'

Figure 16: Harold: Belfast primary school 1: 24/05/04



Other children stated, distinctly, that they were frightened of 'black teeth' [Dublin primary school 2] or 'fillings' [Belfast primary school 1]. However, some children such as Gary and Claire were fearful of something just going wrong:

Belfast primary school 2: 25/05/04

Researcher: 'What do you think of rules then?'
Steven: 'I hate them.'
Gary: 'They are all right; they are good for my teeth.'
Researcher: 'When you break rules, do you get in trouble?'
Gary: 'I do.'
Claire: 'I don't disobey the rules.'
Researcher: 'Why's that?'
Claire: 'Because you do stuff wrong when you break it.'

It may be postulated that Gary's fears of breaking the toothbrushing rules were connected to attending the dentist.

Some evidence for this may be gained from Gary's drawing which shows his toothbrush superior to the dental clinic (Figure 17) — it is the dentist who makes the toothbrushing rules and if the dentist's rules are broken, dental treatment is the consequence. This suggestion was confirmed by Gary's description of his own drawing:

'Clean your teeth or you will get holes in them, like I did. I got a hole in there. I had to go to sleep to get [the tooth] out.' [Gary: Belfast primary school 2: 25/05/04]

Figure 17: Gary: Belfast primary school 2: 25/05/04



Claire's fears of breaking the toothbrushing rules were also related to her experiences of dental treatment:

'See me at the dentist; there's a big giant hospital thing and I had to get gas in me; I had to get knocked out and I had to get me two adult teeth out. And I got left in this coffee room in bed. And I had to get my finger clip thing on my finger. And I had to get me blood pressure on my leg.' [Claire: Belfast primary school 1: 24/05/04]

This allowed another fear to be vented by the children — that they would lose the opportunity to have their tooth for the tooth fairy. Concerns were raised that when a tooth was taken out, it might be 'too rotten' for the tooth fairy to use:

Dublin primary school 2, 18/11/03

Jill to Polly: 'You had a tooth taken out and it cracked, didn't it? [Polly nods.] One there and one there [pointing into Polly's mouth]. The tooth fairy wouldn't even take it; Polly brought it in to us to show it to us. The tooth fairy didn't even use it, it was so rotten.'

In conclusion, it may be suggested that the children were aware of the importance of brushing their teeth to prevent the need for frightening dental treatments. It seems reasonable to suggest that the children's views on toothbrushing were predominately located within a model of health-directed behaviours — that is, that the children believed that brushing teeth prevented tooth decay. Nevertheless it became apparent that the children were also concerned about the appearance of their teeth and that these appearance worries were linked to non-compliance with the toothbrushing rules. Furthermore, the children wished to be 'grown-up', to be in charge and to make their own rules. In view of these observations, it is necessary to include the role of self-esteem and oral health-related quality of life as factors in the children's adoption of toothbrushing practices as presented in the Winning Smiles intervention. For the participating children, toothbrushing was predominately perceived as a health-directed behaviour; however, the adoption of a daily toothbrushing regime was connected with the wish to have 'white teeth' and be the 'grown-up rule maker'. It may be suggested that a toothbrushing intervention which increases self-esteem and quality of life would assist in converting the children's toothbrushing rules into toothbrushing practices.

Toothbrushing Rules: The Children's Thoughts on 'Winning Smiles'

The children talked animatedly and reported vivid memories about participating in the Winning Smiles intervention. It seemed that anything that took the children away from their 'lessons' and broke up the school day was perceived as 'fun' and was welcomed. Cathy's view [Belfast primary school 1] that 'I would like to stay here all day' was a commonly expressed wish. The qualitative study was, therefore, of value and of interest to the children, if talking about teeth was perceived by some as 'weird' [Dublin primary school 2].

Three aspects of Winning Smiles were highlighted by the children as being particularly good. The first was the colouring or disclosing of plaque on the children's teeth. The children enjoyed giving detailed accounts of the experience:

'Paul got a mirror and he looked in our mouths, and then he put yellow stuff in and you had to brush your teeth and see whenever he got this [light] and it lit up purple and when it was shone on your teeth it lit up pink!' [Betty, Belfast primary school 3: 26/05/04]

The second aspect that the children enjoyed was providing saliva samples. The children enjoyed providing their saliva and were excited by spitting their saliva into a container. This proved to be a great source of amusement, both in doing it themselves and in watching others do it.

'A wee girl in our class went like that there [he mimes spitting] and spat it all down her T-shirt!' [Gary, Belfast primary school 3: 25/05/05]

Aside from the excitement, in providing the saliva sample, the children recognised the importance of saliva for eating. The children stated that saliva was important because it '[goes] into the food' so that '[food] all 'slides down like a roller coaster.' [Molly, Belfast primary school 3: 25/05/04]

Finally, the competitive nature of the Winning Smiles intervention was regarded as central by the children. The children's rivalry was observed as a general jockeying for position between the children and particularly among those children who enjoyed being in competitions and who took part in drama and dancing festivals.

Furthermore, the children's knowledge of healthy foods and drinks was also a focus of their rivalry and competition. Foods such as apples and vegetables '[were] especially good for your body' but 'also good for your teeth'. Children showed their knowledge and prowess by not only stating, for example, that 'water is healthy' but by providing an explanation: 'Because [water] helps your insides' [Kate, Belfast primary school 3]³.

It seemed that the competitive element of Winning Smiles tuned into the children's rivalry and allowed them to express this aspect of their cognitive and behavioural functioning. While some children were hesitant in forming and expressing their opinions, when encouraged to do so, they were able to provide important contributions to aid the researchers' understanding of the children's thoughts on the Winning Smiles intervention. Therefore the fun and competitive elements ensured that the Winning Smiles intervention was perceived by the participating children as enjoyable.

Discussion

The aim of this qualitative exploration was to understand what the Winning Smiles toothbrushing intervention meant to the participating children. In order to achieve the aim, it was necessary to adopt a child-centred approach and to engage with the children. Two child-centred methodologies were used to connect and to assist the children in expressing their thoughts and opinions on the Winning Smiles intervention – these were to write and draw about what they thought about teeth and toothbrushing.

The children's toothbrushing rules were a conglomerate of dos and don'ts and reflected a conflict in the children's behaviour, because their rules described what the children felt they *should do* ('toothbrushing rules') as well as what they *actually did* ('toothbrushing practices').

The children unanimously stated that it was, first, the dentist and, secondly, their parents who defined, made and enforced the toothbrushing rules. It became clear that while the children feared the consequences of their non-compliance with toothbrushing rules — 'black' and/or 'broken teeth' — they experienced a conflict in this regard. On the one hand, it was important for the children to comply with the toothbrushing rules as this meant that they would avoid 'black' or 'broken teeth', etc. but on the other hand, compliance with parental rules reinforced the children's relative powerlessness with respect to adults. Therefore, while the ritual of daily night and morning toothbrushing was embedded in the relationship between child, parent and dental health professional, in all other respects, the rules reflected the discipline imposed upon them by parental figures. Nevertheless, within this apparent powerless position, the children had space to manoeuvre — to comply, resist or redefine their own toothbrushing practices. Since the children were concerned about the appearance of their teeth and wished to be

'grown-up', it was suggested that oral health-related quality of life and self-esteem could act as drivers to convert the children's toothbrushing rules into their own toothbrushing practices.

Within the context of the family, however, the children's ability to convert rules into practices was influenced by the 'household rules' (63). It was not surprising that in the mornings children were often left to their own devices and did not brush their teeth prior to going to school. Lone parents or parents rushing to work meant that children were hurried out of the house without having completed their ablutions. The social context of the family, therefore, influenced the supervision and enforcement of the children's toothbrushing practices in the home environment.

The school environment provided another place where the child could be informed of health rules and practices. School-based health promotion interventions are commonplace and more recently the concept of the health promoting school has become central to the implementation of the Ottawa Charter. Intrinsic to the philosophy of the health promoting school is the need to provide children with the necessary knowledge (rules) and practical (practices) skills for health. In the context of the school setting, skills acquisition is a reflection of increased autonomy and empowerment. It may be suggested that the competitive element of Winning Smiles allowed the children to express their developing autonomy and empowerment, as illustrated in their increased oral health-related knowledge. Furthermore, it is possible that such skills acquisition acts as an additional influence upon the transition of rules into practice. Thus the social context and the setting of the school environment allowed the children in this investigation to develop their toothbrushing skills (rules and practices) and increase their autonomy and empowerment.

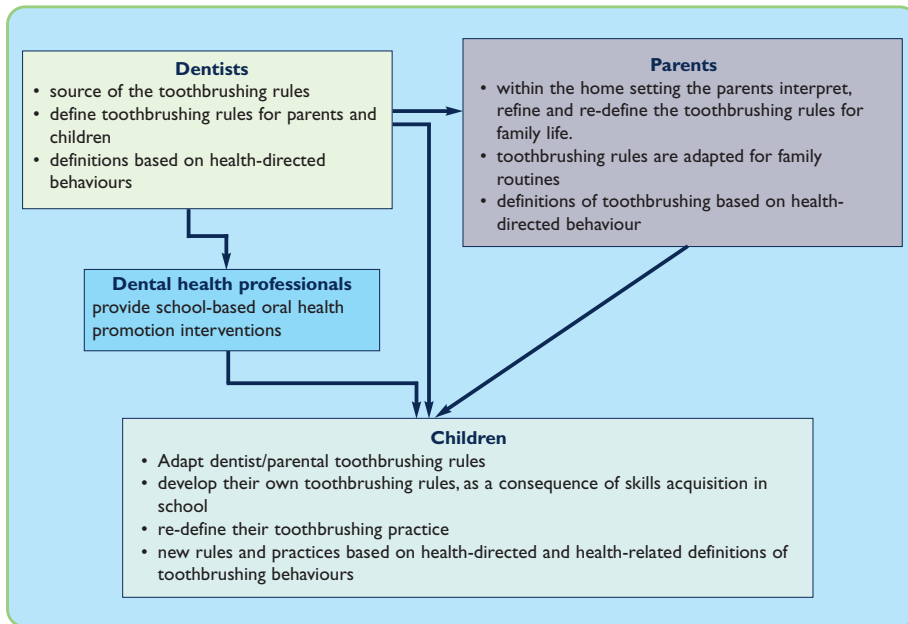
Jenks (57) describes the dual nature of childhood. In the 1800s, children were viewed as corruptible, impish-like people who were in need of strict control, whereas now they are viewed as being 'at risk', with the need for constant observation, scrutiny and protection by parents. Children are believed to be subject to a series of social rules and regulations and it is through compliance with these rules and regulations that they become autonomous and rational members of society (57, 64, 65). Such views as these ignore the dynamic interplay between child and parent and the wish for autonomy.

Childhood must be considered as a time when there is interplay between child autonomy and parental control. For the children in this study, it was not surprising that the wish to be grown-up and to make their own rules (to be autonomous) was evident in much of the children's material, but equally prevalent in the data was the children's recognition that they were controlled and had to do as instructed.

Figure 18 thus illustrates a proposed pathway in which children, acting autonomously, receive and adapt the dentist/parent/school toothbrushing rules to formulate their own toothbrushing practices.

Difficulties arise when a tussle develops between the child's wish for autonomy and the parents' need for control. This conflict has been highlighted by Freeman et al. (63) in a qualitative study of snacking behaviours. In this study, parents developed 'hard' and 'soft' 'policing' strategies for the enforcement of rules associated with their concerns over snacking behaviours. 'Hard' policing strategies were characterised by 'a dictatorial and strict mode of enforcement'. The problem of this mode of policing was that it depended on consistency of control. 'Soft policing' was characterised by an apparent lack of parental power and an overall concern to do the best for their children.

³ These connections were almost exclusively made by children who attended schools which had an healthy eating policy

Figure 18: Transforming toothbrushing rules to child toothbrushing practices


One of the central problems of the hard enforcement strategy was that children had little in the way of developing 'internal means' of managing their dietary cravings.

Children must be provided with the skills — the 'internal means' — to manage their own health, and this is central to children being encouraged to take ownership of their toothbrushing rules and to adapt them into their own toothbrushing practices. Toothbrushing programmes such as Winning Smiles, which assist children to develop such health skills and allow them to transform their health rules into health practices, will assist in achieving a goal of oral health promotion.

Conclusions

- The competitive element of Winning Smiles tuned into the children's competitiveness. The fun and competitive elements ensured that the Winning Smiles intervention was perceived by the participating children as enjoyable.
- The children's views on toothbrushing were predominately located within a health-directed behaviour model.
- The children voiced concerns about the appearance of their teeth and wished to be 'grown-up' and make their own rules suggesting that there were health-related dimensions to their toothbrushing rules.
- Winning Smiles intervention improved the children's self-esteem and oral health-related quality of life.
- Winning Smiles increased the children's skills acquisition (knowledge and toothbrushing techniques), which assisted them in converting parental toothbrushing rules into their own toothbrushing practices.

3.4 Views of Teachers on Winning Smiles Programme – Teachers' Debriefing

Introduction

In order to explore the views of the teachers in relation to the appropriateness and acceptability of the Winning Smiles challenge, a debriefing exercise was developed for use with the teachers involved in delivering the programme.

All the teachers in the intervention schools in Dublin (six teachers) and Belfast (five teachers) were invited to take part. A questionnaire/interview schedule was designed to explore the teachers' views on the programme in relation to curriculum requirements, the children's enjoyment of it, the role of both the teachers and the oral health promoters in the implementation of the programme and the various component parts of the resource pack provided. Views on the Teachers' Workshop were also explored. A copy of the full questionnaire/ interview schedule can be found in Appendix 12.

In Dublin the debriefing was carried out by means of one-to-one interviews in the intervention school. Unfortunately, owing to industrial action, it was not possible to carry out one-to-one interviews with the teachers in the two Belfast intervention schools; however, they kindly agreed to fill in the questionnaires themselves. As a result, it was not possible to explore fully their views on the initiative so there is not as much clarity and richness of information as we would have liked from these two schools.

Results

Because of how information was collected in the two different areas, it was difficult to collate the responses submitted for each of the issues explored. The complete responses given in both areas (Dublin and Belfast) have therefore been included in Appendix 13 and the following is a general summary of the findings, focusing mainly on the main areas of commonality and difference.

Enjoyment of Programme

All teachers in both Dublin and Belfast schools responded positively when questioned on this, indicating that the children had enjoyed being involved in the programme. When they were asked which part they enjoyed the most, a range of responses was received. Some respondents gave more than one answer to this question; however, in Dublin the most enjoyable aspects were the drooling sessions and the worksheets, while in Belfast the disclosing tablets were seen to be the most enjoyable aspect of the intervention.

How Programme Helped Satisfy Curriculum Requirements

All respondents, in both Dublin and Belfast schools, indicated that the programme had helped to satisfy the requirements of the school curriculum. Dublin schools indicated that, in addition to meeting the requirements of Social and Personal Health Education (SPHE), it also helped them with Social and Environmental Studies Education (SESE). Once again some respondents gave more than one answer.

Views on Resources Provided

This question explored the teachers' views on the various resources provided in the Teachers' Pack. All teachers in both Dublin and Belfast responded very positively to the materials provided, and the general view was that they were appropriate, colourful and child-friendly. Teachers in the Dublin school commented on the quality of the paper and said that they appreciated getting the original copies and the fact that they did not have to rely on photocopies.

The majority of the teachers used all the Classroom and Homework Sheets and negative comment was received on only two of them. Homework Sheet 1 – 'How to keep your Winning Smile!' – was considered by some teachers in Belfast to be too easy for the age group involved and it was suggested that it could possibly contain more detail. On the other hand, some teachers in the Dublin school felt that Classroom Worksheet 2 – 'Plaque Attack' – was a bit complicated for 7-year-olds and required a lot of background work. The remainder of the feedback on the various worksheets was positive, and in particular Classroom Worksheet 3 – 'Word Search', – with teachers from both areas indicating that children enjoyed these. Two teachers in the Dublin school commented that using the homework sheets allowed the children to bring the message home and carry on the tasks at home.

The 'Optional Home Experiment' was not used by any of the teachers in Dublin and the general view was that there would not be sufficient parental support at home. However, these were used in the Belfast schools and the feedback would indicate that the children enjoyed this element of the programme.

The feedback on the 'Acid Attack Charts' indicated that in both Belfast and Dublin these were mainly used by the Oral Health Promoters rather than the teachers.

The 'Winning Smiles Progress Chart' was consistently used by all Teachers and was perceived to be a very useful element of the pack. The children's involvement in filling it in was highlighted by a number of the respondents. However a number of teachers indicated that it was too small and could be more colourful.

Views on Teachers' Workshops

These were perceived to have been very useful and the fact that they were held in the schools was noted and appreciated. In both areas it was felt that the programme and supporting information were well presented and the link between school and dental service was felt to have been valuable.

Views on Teachers' Notes

These were again found to be a very useful guide for the teachers in planning the programme; however, several of them indicated that they did not need to refer to them once the programme had begun.

Views on Teachers' Role in Programme

The majority of teachers in both areas indicated that they felt that teachers should take the lead role and that they were very happy with their role in teaching the programme. However, they indicated that they very much appreciated the support of the oral health promoters.

Views on OHPs' Role in Programme

The teachers in both Dublin and Belfast were very effusive in their praise of the OHPs' role in the programme, indicating that they had a very good rapport with the pupils who, in turn, were influenced by their enthusiasm.

Teachers' suggestions for Improvement

More feedback to this question was received from the Dublin teachers, possibly because of the one-to-one nature of the exercise. One of the Belfast teachers indicated that they were happy with the programme as it was and one suggested that there should be better information for teachers at the start of the programme. Several Dublin teachers indicated that they felt the programme could be carried on up through the school and that it should be

repeated regularly to 'keep the momentum going'. A number of the Dublin teachers also talked about time constraints and the difficulty in getting the programme finished due to the proximity of Christmas.

Conclusion

In general terms the comments of the teachers involved in the delivery of the programme have been very positive and have provided some useful feedback which should be taken on board in the production of the final materials. Formal discussions on the final format of the programme are required; however, in light of the feedback received it is important that the high quality be maintained in the production of the materials.

We are very grateful to all the teachers involved for their support throughout the implementation and evaluation of the intervention.

Chapter 4: Conclusions & Recommendations

At the outset of this programme of research, the aims of the Winning Smiles evaluation were:

- To evaluate the effectiveness of school-based oral health promotion programmes designed to:
 - encourage the use of fluoride toothpaste among children in primary education residing and attending schools in areas of social deprivation in Dublin and Belfast
 - improve child oral health-related quality of life and self-esteem
 - increase oral health-related knowledge and attitudes.
- To assess the value of the measurement of the equilibrium salivary fluoride levels as described by Duckworth and Morgan (1991) as a measurement of the impact of oral health promotion initiatives designed to increase the frequency of use of fluoride toothpaste.
- To assess the sensitivity of equilibrium salivary fluoride measurements to variation in sampling time. That is to establish the importance of sampling time to study design.
- To assess the validity of reported toothbrushing habits.

4.1 Conclusions

The findings of this study represent a major advance in monitoring the effectiveness of oral health promotion as they support the validity of using the equilibrium salivary fluoride level as an objective measure of compliance with increasing frequency of toothpaste use. The results of this study also suggest that asking children in Second Class or Primary Four; how often they brush their teeth, is not a valid way of measuring toothbrushing habits.

The 18-hour equilibrium salivary fluoride levels provide a useful indicator of exposure to water fluoridation as evidenced by the differences in salivary fluoride levels between the Dublin and Belfast children. The measurement of equilibrium salivary fluoride is sensitive to time since last brushing. An 18-hour post-brushing period provides more valid results than a 14-hour post-brushing period.

Using 18-hour equilibrium salivary fluoride levels as an indicator of frequency of use of fluoride toothpaste, the data indicate that:

All children increased their use of fluoride toothpaste between baseline and six months. This suggests that a visit by the dental team to the school had a positive impact on use of fluoride toothpaste regardless of whether an intervention was introduced.

The impact of the visit by the dental team at the start of the study to both of the control schools where no intervention was introduced was lost by 12 months as salivary fluoride levels dropped to their baseline levels or lower.

The impact of the intervention on frequency of toothpaste use in the Belfast experimental group which received an educational intervention but no toothpaste supplies was lost by 12 months.

The intervention in the Dublin experimental group which included regular distribution of free toothpaste to the children over the 12-month period of the study was associated with a sustained increase in the frequency of toothpaste use over the 12-month period of the study.

Comparing responses to a question on frequency of toothbrushing administered at baseline, six and 12 months indicates a lack of reproducibility among the responses. Assuming that brushing frequency does not change a lot with time, these results indicate that ascertaining compliance with toothbrushing instructions by means of questionnaires is inaccurate.

The psycho-social findings of the Winning Smiles evaluation showed positive and encouraging trends. Children attending experimental schools experienced improvements in their oral health-related quality of life, oral health awareness and oral and social self-image. The increase in oral health awareness was a welcomed outcome and was related to a fall in the children's perceptions of how satisfied they were with oral health at 12-month follow-up. It was proposed that the decline in the children's satisfaction with their oral health, together with increased oral health awareness, was suggestive of a shift in the children's perceptions of their oral health, status. Hence it was concluded that Winning Smiles had increased the children's perceptions of their oral health.

Closely related to increased awareness was improved oral and social self-image. It has been suggested that these changes might have represented improvements in social aspects of the children's self-esteem as a consequence of the programme. Some support for this proposition is found in the findings of the qualitative exploration of the children's opinions and feelings about toothbrushing and the Winning Smiles intervention. The children's wish to be 'all grown-up' and to make their own toothbrushing rules was evident in the research findings. Furthermore, the competitive element of Winning Smiles tuned into the children's wish to be the 'rule-maker' and allowed their natural rivalry with one another to be vocalised and expressed; even for children who had difficulty in expressing their thoughts in 'written words', their contributions, whether verbal or drawn, were important. Therefore, from learning about toothbrushing to disclosing their teeth and receiving their certificates and medals, it was concluded that Winning Smiles allowed the children to experience an increase in their self-esteem and oral and social self-image.

It was disappointing that Winning Smiles had not influenced oral health-related attitudes. Apart from a fall in satisfaction with oral health, the children experienced little, if any, change in their oral health-related attitudes. It seemed that Winning Smiles had not influenced oral health-related attitudes. It might be suggested that this may have been due to the inaccuracy of using single items to assess relatively complex attitudes. Therefore it may be the inability of the attitudinal questions to assess change or modification, rather than the absence of change itself. It may be concluded that multi-item inventories such as COHRQoL (34, 35) are more reliable and valid measures of oral health-related attitudes than single-item assessments.

With regard to oral health-related knowledge, over 50 per cent of children knew that they should use a toothbrush with soft bristles and a small head. The majority of the children knew about the benefits of fluoride at baseline and at 12-month follow-up. However, children attending experimental schools had significantly larger mean scores for toothbrush and toothpaste knowledge at 12 months than the children attending control schools. Furthermore, children attending experimental schools had increases in their oral health-related knowledge, whereas the other children experienced a fall in knowledge scores. These findings suggested that Winning Smiles had assisted in maintaining oral health-related knowledge in the participating children.

It may be proposed that the children's skills acquisition (knowledge and toothbrushing techniques) assisted them in converting parental toothbrushing rules into their own toothbrushing practices. Therefore, it would seem that there were positive outcomes for this school-based programme with regard to increased oral health-related

knowledge. It may be concluded that the Winning Smiles intervention had assisted in modifying some aspects of the children's oral health-related quality of life, their self-esteem and oral health literacy (48).

4.2 Recommendations

1. It is recommended that Winning Smiles should form part of the overall Health Promotion/Population Health agenda for Children on the island of Ireland. In light of the research questions both answered and raised by this report, Winning Smiles should be developed and monitored to ensure that children in all schools designated as disadvantaged have the opportunity to improve their oral health related quality of life, self-esteem and oral health-related knowledge, attitudes and behaviour. A number of modifications to the programme should take place:
 - Detailed meetings to provide an opportunity for two-way communication need to be included in preparing staff for the programme. The creation of an appropriate planning cycle should be considered in relation to this.
 - Each of the various agencies involved in school-based health promotion need a clearly structured role and it is recommended that these be in place prior to intervention programmes.
 - The timing of the programme should be reviewed in relation to the calendar year.
 - The high quality of the resources should be maintained.
 - A written set of guidelines should be produced for each of the various agencies involved, detailing:
 - The teacher's role
 - The health promoter's role
 - The school's role
 - Positive feedback mechanisms
 - Information meetings
 - The supply of commercially available toothpaste
2. It is recommended that 18-hour equilibrium salivary fluoride levels as a more accurate option to self-report among children be used in future assessment of the impact of oral health promotion on toothpaste use.
3. It is further recommended that the research questions raised regarding fluoride toothpaste use (set out in section 2.2) be addressed and the findings analysed so as to ensure the implementation of the programme in the most effective and efficient manner.
4. It is recommended that child oral health-related quality-of-life measures be used in future assessment of the impact of oral health promotion.
5. It is recommended that evaluation of similar interventions should combine a quantitative with a qualitative methodology to ensure that a range of perspectives, including that of the child, is understood when interpreting findings.
6. It is recommended that in order to gain long-term positive health outcomes, initiatives need to be sustainable and repeated at regular intervals. The Winning Smiles programme is a progression from similar programmes initially developed for younger children. It is recommended that a similar initiative, which can be incorporated into existing curricula, should be developed for adolescents.

Chapter 5: Project Management

Microsite and Discussion Forum

A Microsite (66) and Discussion Forum (67) were developed as the main communications and management tool of this research programme to aid feedback and evaluation among committee members.

The use of IS/IT tools such as the Winning Smiles Discussion Forum and Microsite have been identified as fostering democratic principles as analysed by Gilsenan and Rodriguez (68) during their examination of the Dental Health Foundation's work practices. They found that the steering committee structure used by the project team, aided by the Discussion Forum and Microsite, met the first of Gratton's six tenets of 'Democratic Enterprise' (The relationship between the organisation and the individual is 'adult-to-adult'). (69). The benefits of developing and using organisational democracy practices are highlighted by Cloke and Goldsmith who claim that organisations that do so create an environment where individuals can realise their fullest potential and, in turn, the organisation, or in this case the group, prospers (70). The Committee's democratic basis lent itself to undertaking practices and ideals from amongst its members in an effort to develop the most effective and productive way of working. The Microsite and Discussion Forum were developed in this light and member participation was forthcoming, positive and inclusive.

The Microsite was developed as a sub-site of the main Dental Health Foundation website. While having a separate web address it maintained the branding and overall visual design of the Foundation's website. The Microsite contained specific information related to the Winning Smiles project, such as the project aims, the evaluation team's contact details, documentation related to the project including meeting minutes, agendas, presentations, the project protocol and a link to the project's Discussion Forum.

The Discussion Forum, developed using phpBB software (71), was divided into categories and sub-categories to aid in-depth discussion on specific areas of the project and to facilitate work within a sub-committee structure. The function of the Forum was to provide the facility for users to submit postings for other committee members to read and reply to if required. The forum enabled valuable discussions not only to take place but to be permanently recorded and made available for other members of the committee to review. It should be noted, however; that no formal decisions were made through this mechanism. All decisions relating to strategy and appropriate actions were finalised in a formal meeting setting.

While assessing the benefits and challenges posed by the Microsite and Discussion Forum the following three keys factors were considered:

1. Usability
2. Accessibility
3. Security

Table 12: Benefits and Challenges of the Microsite

Microsite	
Usability	
Benefits <ul style="list-style-type: none"> The Microsite operated in the same way as any website making it very simple to use. 	Challenges <ul style="list-style-type: none"> No link from the DHF website to the Microsite; however, this acted as a security measure.
Accessibility	
Benefits <ul style="list-style-type: none"> Documentation section on Microsite including all meeting agenda, minutes, and presentations. 	Challenges <ul style="list-style-type: none"> Internet access required. At the start of the project, two members of the team did not have access to the Internet; however, both acquired access in the final year of the project following organisational changes.
<ul style="list-style-type: none"> Evaluation Team section containing contact details for committee members which acted as an online address book. 	<ul style="list-style-type: none"> The URL or web address of the site was quite long and difficult to remember. However, this could be overcome by saving the web address as a 'favourite' in the members web browser or as a link on their PC desktop. It should be noted that this would be useful only if members used the same PC to access the Microsite each time.
Security	
Benefits <ul style="list-style-type: none"> There was no link from the Microsite to the DHF site to avoid users of the Foundation's website accessing the Microsite in an effort to protect data during the research stage of the project. 	Challenges <ul style="list-style-type: none"> The site could be accessed by anyone online if they found the website address through an online search.

Table 13: Benefits and challenges of the Discussion Forum

Discussion Form	
Usability	
Benefits <ul style="list-style-type: none"> Frequently Asked Questions (FAQ) section Search Facility 	Challenges <ul style="list-style-type: none"> Initial navigation time consuming until members became familiar with the layout and features.
<ul style="list-style-type: none"> Categories and sub-categories layout enabled the project to be broken up into manageable sections (e.g. Sub-committees work) 	<ul style="list-style-type: none"> Preference to telephone or email other members to get instant response

Table 13: Benefits and Challenges of the Discussion Forum (continued)

Usability	
Benefits <ul style="list-style-type: none"> Members able to view all discussions taking place even if they were not directly involved in that particular area. Permanent record of all discussions which could be referred to at anytime. Email alert automatically sent to members to notify them when another member had replied to their posting By registering as a user members could gain access to additional features not available to guest users such as private messaging and email facilities If the user included an email address at registration they received notification via email if a private message was left for them on the Discussion Forum Once the member logged in they were notified if they had any new private messages. Private messages were stored on the Forum and were not accessible by any other member of the group. If a user forgot their username or password a backup facility was provided whereby a new password was issued to the users email on request. 	Challenges <ul style="list-style-type: none"> Only the two committee members with administrator privileges were able to setup new categories and sub-categories. Each category and sub-category needed to be checked by members to ensure that they posted there listing in the relevant one. Needed email account to avail of alert facility. One member did not have access to email at the start of the project, however, they subsequently obtained an email account. Members needed to ensure that if they changed their email address it was updated on the membership list. Needed to be logged on to the Discussion Forum to receive private messages.
Accessibility	
Benefits <ul style="list-style-type: none"> Private Messaging facility available to members anywhere they could access the Internet – useful for committee members who did not have email or were unable to access their email account while travelling. 	Challenges <ul style="list-style-type: none"> As with the Microsite Internet access was required. No facility available on the Discussion Forum to provide a link to the Microsite. To return to the Microsite from the Discussion Forum the user needed to retype the website address in the address bar or click the 'back' button on their web browser.

Table 13: Benefits and Challenges of the Discussion Forum (continued)

Security	
Benefits <ul style="list-style-type: none"> The Usergroups facility which assigned individual access rights to members – ensuring that only relevant members could access certain data – could have proved useful with confidential aspects of the project, however; this feature was not used. 	Challenges <ul style="list-style-type: none"> Accessible by anyone online through an online search – therefore all discussions that took place could potentially be read by anyone.
	<ul style="list-style-type: none"> If a member ticked the 'log me in automatically' box during login and at the end of their session forgot to logout, someone else using the same PC would have been able to access the Discussion Forum.

Both the Microsite and Discussion Forum proved an effective way of ensuring that members of the project group could keep up-to-date on all aspects of the project. Apart from the communications benefits provided by the online tools they also provided an efficient way of distributing documentation among committee members.

During the committee's analysis of the benefits and challenges of these tools it was agreed that the Discussion Forum in particular had proved beneficial during the development of project methods but was not as valuable during the running of the project and was used infrequently during this period. It was recognised by the committee that it may have also have been useful during the writing of the project report but a preference emerged for a formal meeting to be called to discuss the most appropriate way to present the project findings.

“A longstanding feature of IS/IT development has been the ambitious attempts to integrate information systems within organisations. The use of IS/IT creates more opportunities for discussion and perhaps a more equal participation Getting value out of information requires more than technology. Information is inherently hard to control. It is ever expanding and unpredictable. Only when executives view information in this light they will manage to utilise it effectively.” (Gilsenan, P, Rodriguez, B, The role of IS/IT in fostering Organisational Democracy, 2005)

On this basis both the Microsite and Discussion Forum although posing a number of challenges to the group can be seen as being beneficial on the whole to the committee in a capacity as an information tool. An underlying factor that runs true for all forms of technology is the need for it to be available and useable to be effective.

Ultimately, the greatest challenge posed by incorporating technology into already established work practices can be simply that the work practices are already established and, if they have been working effectively, an attitude can prevail of 'if it's not broken don't fix it'.

Figure 19: Microsite of the 'Winning Smiles' Steering Committee

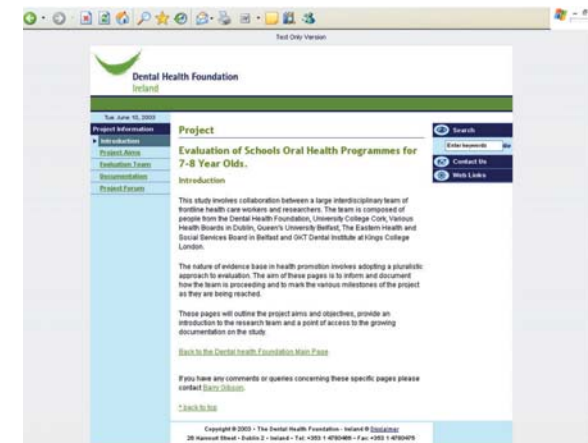


Figure 20: Discussion Forum of the 'Winning Smiles' Steering Committee



Partnership

Winning Smiles Steering Committee: An Example of Partnership in Health

The need for partnership working to tackle the physical, economic, social and cultural determinants of health has been recognised by the World Health Organisation¹⁰ and by governments in Ireland¹¹ and Northern Ireland.¹² On this basis and guided by the Institute of Public Health Partnership Framework,¹³ the Winning Smiles Steering Committee was established, involving key stakeholders from the health services and academic bodies north and south. The Steering Committee members represented a wide variety of interests, experience and perspectives. Multi-sectoral, multi-disciplinary and cultural diversity was valued and nurtured throughout the process of the study. The Steering Committee focused on the oral health needs of children as their common purpose. This enabled members to share common ground and purpose within the context of their diverse backgrounds.

Specific processes were put in place to build effective working relationships and capability within the Committee. Attention was paid to clear leadership, communication channels and joint areas of work. At a practical level, the steering committee was facilitated in its work by the Dental Health Foundation, and sub-committees were established which focused on the development of training resource materials, the evaluation of the intervention and the production of the final report.

Parents and teachers were significant partners in rolling out the Winning Smiles project in schools. Another key stakeholder in this study was the children targeted by the intervention. The UN Convention on the Rights of the Child establishes children's right to a voice in matters affecting them. To this end, alongside the quantitative study employed to measure the effectiveness of the intervention, qualitative studies were carried out to ensure that the children's experiences of the intervention were expressed in the study.

Two immediate outcomes from this partnership approach can be identified. The first is the impact of the intervention on the oral health of the children involved in the study. The second is the production of this report which will be used to promote the benefits of the Winning Smiles intervention to the wider population. The partnership captured the repository of expertise and experience available and it was further developed.

Table 14: Winning Smiles Programme Study Partners

Project Leadership and Co-ordination Agency:	Dental Health Foundation Ireland 26 Harcourt Street, Dublin 2, Ireland
Principal Investigator Dublin Study:	Dr. Helen Whelton Oral Health Services Research Centre, Wilton, Cork, Ireland
Principal Investigator Belfast Study:	Prof. Ruth Freeman, Dental Public Health and Behavioural Sciences, Queen's University, Belfast, School of Dentistry, RGH, Grosvenor Road, Belfast BT12 6BP Northern Ireland
Grant Awarding Body For The Dublin Study:	Health Promotion Unit Department of Health & Children, Hawkins House, Hawkins Street, Dublin 2, Ireland.
Grant Awarding Body For The Belfast Study:	Research and Development Office, Directorate of the Northern Ireland Health and Social Services Agency, 12-22 Linenhall Street, Belfast BT2 8BS Northern Ireland.
Study Sites ROI:	HSE Dublin North East HSE Dublin Mid-Leinster
Study Sites NI:	Eastern Health and Social Services Board North & West Belfast Health & Social Services Trust
Consultants:	Prof. D.M. O' Mullane Oral Health Services Research Centre, Wilton, Cork, Ireland Prof. G.M. Humphris, Health Psychology, Bute Medical School, University of St. Andrews St. Andrews, Fife, Scotland, KY16 9TS
Research Assistant to the Dublin Study:	Dr. Rose Kingston Oral Health Services Research Centre, Wilton, Cork, Ireland
Research Assistant to the Belfast Study:	Dr. Helen Rooney, Dental Public Health & Behavioural Sciences Queen's University, Belfast, School of Dentistry RGH, Grosvenor Road, Belfast BT12 6BP

¹⁰ WHO (1998) Health 21 – Health for All in the 21st Century.

¹¹ DoHC (2001) Quality and Fairness: A Health System For You - Health Strategy.

¹² DHSSPS (2002) Investing for Health – Report.

¹³ IPHI (2001) Partnership Framework – a model for partnerships in health.

Contract Researcher to the Dublin & Belfast Study:	Dr. Barry Gibson Lecturer in Medical Sociology Department of Oral Health and Development School of Clinical Dentistry Claremont Crescent, Sheffield, United Kingdom S10 2TA
Project Manager For the Dublin Study:	Ms. Maria Tobin Oral Health Services Research Centre Wilton, Cork, Ireland
Statisticians:	Mr. Michael Cronin, Oral Health Services Research Centre, Wilton, Cork, Ireland
	Ms. Edel Flannery, Oral Health Services Research Centre, Wilton, Cork, Ireland
Data Analyst:	Ms. Virginia Kelleher, Oral Health Services Research Centre, Wilton, Cork, Ireland
Laboratory Technician:	Ms. Eileen Mac Sweeney, Oral Health Services Research Centre, Wilton, Cork, Ireland.

Winning Smiles Steering Committee

Dental Health Foundation, 26 Harcourt Street, Dublin 2

- Ms. Deirdre Sadlier - Executive Director (Chairperson)
- Ms. Patricia Gilsenan-O'Neill - Administrator
- Mr. Tom Rogers - Project Officer, Knowledge & Communications

Health Service Executive – Dublin North East

- Dr. Mary Ormsby, Principal Dental Surgeon; HSE Dublin North East
- Ms. Adrienne Foley, Oral Health Promoter; HSE Dublin North East
- Ms. Deirdre Martin, Oral Health Promoter; HSE Dublin North East

Health Service Executive – Dublin Mid-Leinster

- Ms. Sheilagh Reaper-Reynolds - A/Funltional Manager Health Promotion

Health Service Executive - Population Health Directorate

- Dr. Celia Keenaghan – Principal Research Officer, Programme of Action for Children

National Parents Council (Primary)

- Ms. Ann Harmon

University College Cork - Oral Health Services Research Centre

- Dr. Helen Whelton - Director
- Dr. Rose Kingston - Research Fellow
- Prof. Denis O'Mullane - Consultant

Queen's University Belfast – Dental Public Health and Behavioural Sciences

- Professor Ruth Freeman Professor of Dental Public Health
- Dr. Helen Rooney - Research Assistant in Dental Public Health and Behavioural Sciences

University of Sheffield

- Dr. Barry Gibson - Lecturer in Medical Sociology

Eastern Health and Social Services Board, Belfast

- Ms. Patti Speedy – Senior Health promotion Officer; Dental Department
- Mr. Paul O'Kane - Oral Health Promotion Co-ordinator; North and West Belfast HSST

List of Abbreviations

DHF	Dental Health Foundation
NI	Northern Ireland
OHP	Oral Health Promoter
OHSRC	Oral Health Services Research Centre
QUB	Queen's University, Belfast
ROI	Republic of Ireland
SESE	Social and Environmental Studies Education
SPHE	Social, Personal and Health Education
UCC	University College Cork
ppm	Parts per million
CRF	Case Report Form
COHRQoL	Child Oral Health Related Quality of Life
SAS®	Statistical Analysis System
SPSS	Statistical Package for the Social Sciences
ANOVA	Analysis of Variables

Glossary of Terms

Adverse Event

Any change in health that occurs in a person after he or she enrolls in a clinical trial. Not every adverse event is related to the treatment or test being studied, but researchers must report all adverse events.

ANOVA - Analysis of Variables

A test of the statistical significance of the differences among the mean scores of two or more groups on one or more variables.

Case Report Form (CRF)

A record of information collected on each subject during the research project.

Chi-square test

A statistical test used to determine the probability of obtaining the observed results by chance, under a specific hypothesis.

Dental Caries

Cavities or holes in the outer two layers of a tooth — the enamel and the dentin. Dental caries are caused by bacteria which metabolise carbohydrates (sugars) to form organic acids which dissolve tooth enamel. If allowed to progress, dental caries may result in tooth decay, infection, and loss of teeth.

Discussion Forum

'An online service that allows registered users to post questions and responses to other posted questions. Online services and bulletin board services (BBSs) provide a variety of forums, in which participants with common interests can exchange open messages'. (web.uncg.edu/dcl/icampus/access/glossary.asp, 2006)

Fissure Sealants

Fissure sealants are a dental treatment consisting of a plastic material to one or more teeth, for the purpose of preventing dental caries or other forms of tooth decay.

Frequency Distribution

An organised display of a set of data that shows how often each different piece of data occurs.

Incidence

The frequency of new occurrences of disease within a defined time interval. Incidence rate is the number of new cases of a specified disease divided by the number of people in a population over a specified period of time, usually one year.

Independent Variable

A variable that is not under the experimenter's control — the data. It is the variable that is observed and measured in response to the independent variable.

Likert Scale

A multi-point rating scale that measures the strength of a subject's agreement with a clear statement. Developed by

Rensis Likert, it comprises items that have responses on a continuum and response categories such as 'strongly agree', 'agree', 'disagree', and 'strongly disagree'.

Logistical Regression

A variant of standard regression used when the dependent variable is a dichotomy, such as success/failure.

Microsite

'A microsite is a separately promoted part of a larger Website. A microsite is designed to meet separate objectives and has a separate Web address or URL (Uniform Resource Locator) as its home page. Typically, a microsite resides on the same Web server and reflects the branding and overall visual design of the larger site with which it is associated.' (www.whatis.com, 2003)

Parts per Million

A volume unit of measurement; the number of parts of a substance in a million parts of another substance. For example, 10 ppm nitrate in water means 10 parts of nitrate in a million parts of water. Similarly, one part per million corresponds to a minute in two years or a single cent in €10,000

phpBB

phpBB is a high-powered, fully scalable, and highly customizable Open Source bulletin board package. phpBB has a user-friendly interface, simple and straightforward administration panel, and helpful FAQ. Based on the powerful PHP server language and your choice of MySQL, MS-SQL, PostgreSQL or Access/ODBC database servers, phpBB is the ideal free community solution for all web sites. (<http://www.phpbb.com/>, 2006)

Prevalence

The prevalence of a disease in a statistical population is defined as the ratio of the number of cases of a disease present in a statistical population at a specified time and the number of individuals in the population at that specified time. For example, the prevalence of obesity among American adults in 2001 was estimated by the US Centers for Disease Control (CDC) at approximately 20.9%.

SAS® —Statistical Analysis System

A comprehensive statistical and graphical package that includes modules for several types of specialised analysis.

SPSS - 'Statistical Package for the Social Sciences'

The computer program SPSS was released in its first version in the 1960s, and is among the most widely used programs for statistical analysis in social science. It is also used by market researchers, health researchers, survey companies, government, education researchers, and others.

URL

Uniform Resource Locator — address of a website or webpage available on the Internet

References

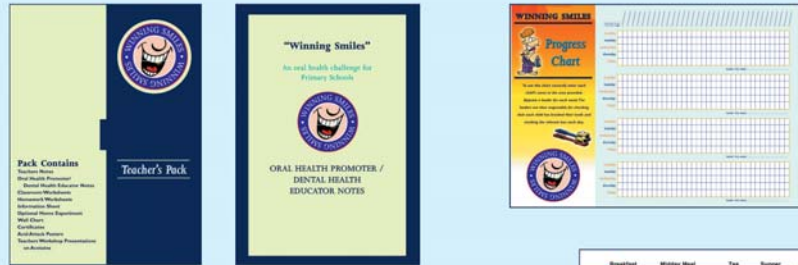
Winning Smiles References as they appear in the text:

- Mattila, M.I., Rautava, P., Sillanpaa, M., Paunio, P., 'Caries in 5 year old children and associations with family related factors'. *J Dent Res* 2000, **79**: 875–81.
- Muirhead, V., Marcenos, W., 'An ecological study of caries experience, school performance and material deprivation in 5 year old state primary school children'. *Community Dent Oral Epidemiol* 2004; **32**: 265–70.
- Pine, C.M., Adair, P.M., Petersen, P.E., Douglass, C., Burnside, G., Nicoll, A.D., Gillett, A., Anderson, R., Beighton, D., Jin-You, B., Broukal, Z., Brown, J.P., Chestnutt I.G., Declerck D, Devine D, Espelid I, Falcolini G, Ping FX, Freeman R, Gibbons, D., Gugushe, T., Harris, R., Kirkham, J., Lo, E.C., Marsh, P., Maupome, G., Naidoo, S., Ramos-Gomez, F., Sutton, B.K., Williams, S., 'Developing explanatory models of health inequalities in childhood dental caries'. *Community Dent Health* 2004; **21** (1 Suppl): 86–95.
- Whelton, H., Crowley, E., O'Mullane, D., Cronin, M. and Kelleher, V., *North-South survey of children's oral health 2002 — preliminary results*. Dublin, Department of Health and Children, 2003.
- Wennhall, I., Matsson, L., Schroder, U., Twetman, S., 'Caries-prevalence in 3-year-old children in a low socio-economic multicultural urban area in southern Sweden'. *Swed Dent J*. 2002; **26**(4): 167–72
- Freeman, R., Oliver, M., Bunting, G., Kirk, J., Saunderson, W., 'Addressing Children's Oral Health Inequalities in Northern Ireland: A Research-Practice-Community Partnership Initiative'. *Public Health Reports* 2001; **116**: 617–25.
- Jones, C.M., Worthington, H., 'Water fluoridation, poverty and tooth decay in 12-year-old children', *Journal of Dentistry* 2000; **28**: 389–93.
- Jones, C.M., Taylor, G.O., Whittle, J.G., Evans, D., Trotter, D.P., 'Water fluoridation, tooth decay in 5 year olds and social deprivation measured by the Jarman score: analysis of data from British dental surveys'. *BMJ* 1997; **315**: 514–17.
- Tang, J., Altman, D.S., Robertson, D., O'Sullivan, D.M., Douglas, J.M., Tinanoff, N., 'Dental caries prevalence and treatment levels in Arizona preschool children'. *Public Health Report* 1997; **112**: 319–29.
- Willems, S.M., Vanobbergen, J., Martens, L., De Maeseeneer, J., 'The independent impact of household- and neighbourhood-based social determinants on early childhood caries: a cross-sectional study of inner-city children'. *Family and Community Health. Health of Children* 2005 April/June; **(28)2**: 168–75.
- Freeman, R., Breistein, B., McQueen, A. and Stewart, M., 'The dental health status of five-year-old children in North and West Belfast'. *Community Dental Health* 1997; **14**: 253–7.
- National Statistics. 2003 Children's dental health survey. www.statistics.gov.uk/CHILDREN/dentalhealth/default.asp; accessed January 2006.
- Van Nieuwenhuysen, J.P., Carvalho, J.C., D'Hoore, W., 'Caries reduction in Belgian 12-year-old children related to socio-economic status'. *Acta Odontol Scand* 2002 Mar; **60**(2): 123–8.

14. Kallestal, C., Wall, S., 'Socio-economic effect on caries. Incidence data among Swedish 12-14 year olds'. *Community Dent Oral Epidemiol* 2002; **30**: 108-14.
15. Bunton et al., 'Sociological critiques of health promotion'. in R. Bunton, S. Nettleton, R. Burrows (eds), *The sociology of health promotion: critical analyses of consumption, lifestyle and risk*, pp. 41-58. London: Routledge, 1995.
16. Watt, R.G., 'Emerging theories into the social determinants of health: implications for oral health promotion'. *Community Dent Oral Epidemiol*. 2002 Aug; **30**: 241-7. Review.
17. Taylor, J., Spencer, N.J., Baldwin, N., 'The social, economic and political context of parenting'. *Archive of the Disabled Child* 2000, **82**: 113-20.
18. Sanders, A.E., Spencer, A.J., 'Childhood circumstances, psychosocial factors and the social impact of adult oral health'. *Community Dent Oral Epidemiol* 2005; Oct **33**: 370-77.
19. Poulton, R., Caspi, A., Milne, B.J., Thomson, W.M., Taylor, A., Sears, M.R., Moffitt, T.E., 'Association between children's experience of socioeconomic disadvantage and adult health: a life course study'. *The Lancet* 2002; **360**: 1640-45
20. Patussi, M.P., Marcenes, W., Croucher, R., Sheiham, A., 'Social deprivation, income inequality, social cohesion and dental caries in Brazilian school children', *Soc Sci Med*. 2001; **53**: 915-25.
21. Mouradian, W., Wehr, L., Crall, J.J., 'Disparities in children's oral health and access to care'. *JAMA* 2000; **284**: 625-31.
22. Graham, H. and Power, C., 'Childhood disadvantage and adult health: a life course framework'. *Child Care Health Dev*. 2004; **30**: 671-8.
23. Antunes, J.L.F., Narvai, P.C., Nugent, Z.J., 'Measuring inequalities in the distribution of dental caries'. *Community Dent Oral Epidemiol* 2004; **32**: 41-8.
24. Marinho, V.C., Higgins, J.P., Sheiham, A., Logan, S., 'One topical fluoride (toothpastes, or mouthrinses, or gels, or varnishes) versus another for preventing dental caries in children and adolescents'. *Cochrane Database Syst Rev*. 2004; **(1)**: CD002780. Review.
25. Petersen, P.E., Lennon, M.A., 'Effective use of fluorides for the prevention of dental caries in the 21st century: the WHO approach'. *Community Dent Oral Epidemiol*. 2004 Oct; **32**: 319-21.
26. Ellwood, R.P., Davies, G.M., Worthington, H.V., Blinkhorn, A.S., Taylor, G.O., Davies, R.M., 'Relationship between area deprivation and anticaries benefit of an oral health programme providing free fluoride toothpaste to young children'. *Community Dent Oral Epidemiol*. 2004; **32**: 159-65.
27. Curnow, M.M., Pine, C.M., Burnside, G., Nicholson, J.A., Chesters, R.K., Huntington, E., 'A randomised controlled trial of the efficacy of supervised toothbrushing in high-caries-risk children'. *Caries Res*. 2002; **36**: 294-300.
28. Davies, G.M., Worthington, H.V., Ellwood, R.P., Bentley, E.M., Blinkhorn, A.S., Taylor, G.O., Davies, R.M., 'A randomised controlled trial of the effectiveness of providing free fluoride toothpaste from the age of 12 months on reducing caries in 5-6 year old children'. *Community Dent Health*. 2002 Sep; **19**: 131-6.
29. Vanobbergen, J., Declerck, D., Mwalili, S., Martens, L., 'The effectiveness of a 6-year oral health education programme for primary schoolchildren'. *Community Dent Oral Epidemiol*. 2004 Jun; **32(3)**: 173-82.
30. Graham, H., 'Intellectual disabilities and socio-economic inequalities in health: an overview of research'. *Journal of Applied Research in Intellectual Disabilities*. 2005; **18**: 101-111.
31. Graham, H., 'Building an inter-disciplinary science of health inequalities: the example of lifecourse research'. *Soci Sci Med* 2002; **55**: 2005-16.
32. Sheiham, A., Watt, R.G., 'The Common Risk Factor Approach: a rational basis for promoting oral health'. *Community Dent Oral Epidemiol*. 2000; **28**: 399-406.
33. Duckworth, R.M., Morgan, S.N., Gilbert, R.J., 'Oral fluoride measurements for estimation of the anti-caries efficacy of fluoride treatments'. *J Dent Res*. 1992 Apr; 71 Spec No: 836-40. Review.
34. Humphris, G., Freeman, R., Gibson, B., Simpson, K., Whelton, H., 'Oral health-related quality of life for 8-10-year-old children: an assessment of a new measure'. *Community Dent Oral Epidemiol*. 2005 Oct; **33**: 326-32.
35. Jokovic, A., 'Development of oral health related quality of life measures for children'. PhD thesis, Toronto: University of Toronto; 2003.
36. Coopersmith, S., *The Antecedents of Self-Esteem*. San Francisco, CA: Freeman, 1967.
37. Directive 2001/20/EC of the European Parliament and of the Council of 4 April 2001 on the approximation of the laws, regulations and administrative provisions of the Member States relating to the implementation of good clinical practice in the conduct of clinical trials on medicinal products for human use. Official Journal L 121, 01/05/2001 P. 0034-0044
38. *International Conference on Harmonisation of Technical Requirements for Registration of Pharmaceuticals for Human use*. ICH Harmonised Tripartite Guideline for Good Clinical Practice E6(R1) 10 June 1996.
39. Huberman, A.M., Miles, M.B., 'Data management and analysis methods' in N. K. Denzin and Y.S. Lincoln (eds), *Handbook of Qualitative Research*. London: Sage, 1994.
40. Duckworth, R.M., Morgan, S.N., 'Oral fluoride retention after use of fluoride dentifrices'. *Caries Res*. 1991; **25(2)**: 123-9.
41. Marinho, V.C., Higgins, J.P., Sheiham, A., Logan, S., 'Fluoride toothpastes for preventing dental caries in children and adolescents'. *Cochrane Database Syst Rev*. 2003; **(1)**: CD002278.
42. North South Survey of Children's Dental Health, 2002, Whelton, H., Crowley, E., O'Mullane, D., Harding, M., Guiney, H., Cronin, M., Flannery, E., Kelleher, V. Department of Health and Children, Dublin, Ireland, *in press*.
43. Currie, C., Roberts, C., Morgan, A., Smith, R., Settertobulte, W., Samdal, O., Barnekow Rasmussen, V. (eds), *Young People's Health in Context. Health Behaviour in School-aged Children (HBSC) study: international report from the 2001/2002 survey*. World Health Organisation, Geneva, 2004.

44. The National Health Promotion Strategy 2000–2005, Department of Health and Children, Dublin, Ireland.
45. Davies, G.M., Worthington, H.V., Ellwood, R.P., Bentley, E.M., Blinkhorn, A.S., Taylor, G.O., Davies, R.M., 'A randomised controlled trial of the effectiveness of providing free fluoride toothpaste from the age of 12 months on reducing caries in 5–6 year old children'. *Community Dent Health*. 2002; (3): 131–6.
46. Freeman, R., Maizels, J., Wylie, M., Sheiham, A., 'The Relationship between Dental Health Related Knowledge, Attitudes and Dental Health Behaviour in 14 to 16 Year-Old Adolescents'. *Community Dental Health*. 1993; 10, 397–404.
47. Östberg, A-L., 'Adolescents' view of oral health education: a qualitative study'. *Acta Odontologica Scandinavica* 2005; 63; 300–307.
48. Poutanen, R., Lahti, S., Hausen, H., 'Oral health-related knowledge, attitudes and beliefs among 11 to 12-year-old Finnish schoolchildren with different oral health behaviours'. *Acta Odontol Scand*. 2005; 63: 10–16.
49. Brown, L.F., 'Research in dental health education and health promotion: a review for the literature'. *Health Educ Q*. 1994; 21: 83-102.
50. Kay, E., Locker, D., 'Is dental health education effective? A systematic review of current evidence'. *Community Dent Oral Epidemiol*. 1996; 24: 231–5.
51. Hu, G.H., Hu, J., Song, K.Y., Lin, D.D., Zhang, J., Cao, C.L., Xu, J., Li, D., Jiang, W.S., 'The role of health education and health promotion in the control of schistosomiasis: experiences from a 12-year intervention study in the Poyang Lake area'. *Acta Trop*. 2005; 96: 232–41.
52. Sprod, A.J., Anderson, R., Treasure, E.T., 'Effective oral health promotion: literature review'. Technical Report 20, Cardiff: Health Promotion. University of Wales College of Medicine, Cardiff, 1996.
53. Kay, E., Locker, D., 'A systematic review of the effectiveness of health promotion aimed at improving oral health'. *Community Dent Health* 1998; 15: 132–44.
54. Nutbeam, D., 'Evaluating health promotion — progress, problems and solutions'. *Health Promotion International*. 1998; 13(1): 27–44.
55. Labonte, R., Feather, J., Hills, M., 'Story Dialogue Method for Health Promotion Knowledge Development and Evaluation'. *Health Education Research, Theory & Practice* 1999; 14(1): 39–50.
56. Freire, P., *Pedagogy of the Oppressed*. New York: Continuum, 1970.
57. Jenks, C., *Childhood*. London: Routledge, 1996.
58. James, A., Jenks, C., Prout, A., *Theorizing Childhood*. Cambridge: Polity Press, 1998.
59. Christensen, P, James, A., *Research with children: Perspectives and Practices*. London: Routledge, 2000.
60. Freud, A., (1951). 'Observations on child development' in R. Ekins and R. Freeman (eds), *Selected Writings*. London: Penguin Books, 1998.
61. Punch, S., 'Research with children: The same or different with adults?' *Childhood* 2002; 9(3): 321–41.
62. Scott, J., 'Children as respondents: the challenge for quantitative methods' in P. Christensen, A. James (eds), *Research with children: Perspectives and Practices*. London: Routledge, 2000.
63. Freeman, R., Ekins, R., Oliver, M., 'Doing best for children: An emerging grounded theory of parents' policing strategies to regulate between meal snacking'. *The Grounded Theory Review: An International Journal*. 2005; 4(3): 59–79.
64. Foucault, M., 'Disciplinary Power and Subjection' in S. Lukes (ed.), *Power: Readings in Social and Political Theory*. New York: New York University Press, 1986.
65. Lupton, D., *The Imperative of Health: Public Health and the Regulated Body*. London: Sage, 1995.
66. Whatis.com (2003), 'Microsite' (cited 27 August 2003). Available from URL: <http://whatis.techtarget.com/wsearchResults/1,290214,sid9,00.html?query=microsite>
67. The University of North Carolina Greensboro, Division of Continual Learning, DCL Online Learning Glossary (2006), 'Discussion Forum' (cited 3 April 2006). Available from <URL: <http://web.uncg.edu/dcl/icampus/access/glossary.asp>>
68. Gilsonan, P, Rodriguez, B., 'The role of IS/IT in fostering Organisational Democracy'. 2005 BSc. In Information Systems. Trinity College Dublin
69. Gratton, L. (2004): Cited by Gilsonan, P, Rodriguez, B., 'The role of IS/IT in fostering Organisational Democracy'. 2005 BSc. In Information Systems. Trinity College Dublin
70. Cloke, K. and Goldsmith, J. (2002): cited by Gilsonan, P, Rodriguez, B., 'The role of IS/IT in fostering Organisational Democracy'. 2005 BSc. In Information Systems. Trinity College Dublin
71. phpBB, (2006), 'What is phpBB?' (cited 3 April 2006). Available from URL: <http://www.phpbb.com>

Resources available from the Oral Health Promoter/
Dental Health Educator



Awards- Certificates - Medals - Cups



Appendices

Appendix I The Winning Smiles Programme Resources and Delivery

“Winning Smiles” has been designed to help fulfil the requirements of the Social Personal Health Education Curriculum in the Republic of Ireland (ROI), and the Northern Ireland (NI) Curriculum at Key Stages 1 & 2, where health education is taught as a cross-curricular theme. It provides the opportunity to work in a wide range of subject areas across the curriculum and will also help in the development of teamwork, social skills and self esteem. It is a collaborative and multidisciplinary initiative, requiring the involvement of members of the community dental team and of the class teachers, with the common goal of promoting the welfare of the children.

Broad outline of the “Winning Smiles” Programme Delivery in Schools

The “Winning Smiles” intervention takes the form of three planned visits by community dental staff to the classroom, over a period of approximately six weeks, with some simple follow-up work in the form of Homework and Classroom Worksheets for teachers to carry out with the children between visits 2 and 3. A fourth and final visit takes place at the end of the initiative to present awards to the children who participate in the challenge.

The project depends on the element of competition both within and between participating classes. The children are taught how to brush their teeth with fluoride toothpaste, and how to remove plaque, and are challenged to carry out and record a twice daily toothbrushing regime over a four week period. A simple ‘plaque score’ to identify the amount of dental plaque each child has on his/her teeth, is calculated at the outset of the project and again four weeks later at an unannounced visit. The before and after plaque scores are then compared and levels of change calculated. This information is passed on to the children to let them know how well they have fared both individually and collectively.

An Awards Ceremony is held at the end of the intervention and all the children who take part in ‘Winning Smiles’ are presented with a certificate of participation. Those who show a significant improvement receive an improvement certificate, and those who achieve a ‘plaque-free’ score at the end of the project are presented with a medal.

Within each school, if more than one class is involved in the project, the class that achieves the highest level of improvement will receive a cup. There is also an interschool competition where, within a given area if more than one school is participating, there is an annual award for the school that achieves the highest level of improvement.

Table 1.5: Summary outline of ‘Winning Smiles’ Programme

Step 1. First Meeting with School Principal	Contact School Principal, explain the purpose and implications of the programme and invite the school's participation.
Step 2. Teacher's Workshop	Present the programme to the teachers, identify the role of the OHP/DHE and of the teachers, introduce resources, agree timescale for programme.
Step 3. 1st Visit to Class	Encourage and motivate the children to participate – emphasize the competitive element. Give out parental consent forms and advise children that they will be unable to take part if this is not signed by a parent and returned.

Step 4. (Approx 1 week later)	Collect completed consent forms from school.
Step 5. 2nd Visit to Class – 1st Intervention Visit	Provide educational input and toothbrushing demonstration – (Approx 30 mins) Carry out first plaque score – (Approx 30 mins) Give wall chart to teacher/pupils <i>Toothbrush and toothpaste to be given to children in Dublin only.</i> Provide further encouragement and motivation. Advise children that you will be making a 'surprise' return visit to do a further plaque score.
Step 6. 3rd Visit to Class – 2nd Intervention Visit (Approx 4 weeks later)	Carry out second plaque score – advise children of outcome. Provide additional encouragement for children to keep up their toothbrushing even though the competition is over Advise children when the presentation of prizes will take place.
Step 7. Presentation of Prizes (2-4 wks after Step 6)	Presentation of medals, certificates, cups and plaques. Children, parents, teachers and Oral Health Promotion Team participate.
Step 8.	Toothpaste and brushes continue to be distributed in Dublin schools until 12 months after study starts.

First Meeting with School Principal

Objectives:

- To inform the School Principal of the Programme
- To provide the Principal with detailed information on the programme
- To seek the school's participation on the programme

Duration: Depends on the availability of the Principal (up to 30 mins. is necessary)

Personnel: OHP/DHE

Resources:

- Information letter to School Principal
- Copy of the consent form

Steps:

- The OHP/DHE should contact the school by phone to seek a time and date for the first visit with the Principal
- The OHP/DHE should be prepared to give a brief outline of the programme during this first phone conversation.
- The OHP/DHE visits the school to meet with the School Principal to discuss involvement in the programme.
- The benefits of involvement are outlined and agreement to participate is sought.
- A date is arranged for the teacher's workshop.

Teachers' Workshop

Objectives:

- To present the programme to the teachers

- Identify the role of the OHP/DHE
- To identify the role of the teachers
- To introduce the resources
- To agree a timescale for the programme

Duration: Approximately 1 hour

Personnel: OHP/DHE

Resources:

- Teachers' notes
- Acetates
- Sample of programme resources

Step 1: Welcome and introduction:

Duration: 5 minutes approximately

The OHP/DHE:

- Introduces self to the teachers
- Identifies a common concern with the welfare of the children
- Identifies this as the basis of collaboration with the teachers

Step 2: Briefing on Oral Health Promotion Programme

Duration: 30 minutes approximately

The OHP/DHE:

- Gives an outline of the programme using acetates, notes and sample programme resources
- Seeks advice from the teachers on how the common goal of the welfare of the children can be advanced via collaboration between the OHP/DHE and the teachers.
- Tries to get suggestions on how to deliver the programme and in what way it might help the teachers to cover their curricular requirements

Step 3: Discussion and review of roles, resources etc.

Duration: 15 minutes approximately

The OHP/DHE:

- Asks for advice on how specifically the teachers would like to collaborate in the programme i.e. do they want to be active or passive? What role do they see themselves playing in it?
- Shares how the OHP/DHE usually likes to work and shows flexibility if the teacher perhaps wants them to change their approach.
- Indicates that they would like feedback from the teachers through completion of an evaluation sheet at the end of the programme (Appendix 12).

First Visit to Class – Introduction

Objectives:

- To present the programme to each target class
- To distribute consent forms to each of the classes

- To agree dates with the teacher for collection of completed consent forms

Duration: 30 minutes per class

Personnel: OHP/DHE

Resources:

- Samples of certificates, medals and cups
- Information letter for parents
- Consent forms

Steps:

- The OHP/DHE visits each target class.
- The OHP/DHE is introduced to the class, describes the programme and outlines the rewards for successful participation in the programme.
- The OHP/DHE explains simply to the children what they can win and what they must do to win.
- The OHP/DHE distributes the consent forms explaining that they must be returned to enable participation in the plaque testing aspect of the programme.

Note: The class teacher is present and plays a supportive role.

Visit to School to Collect Consent Forms

Objectives:

- To collect completed consent forms.
- To agree dates with the teacher for intervention visits – children not to be informed.

Duration: 15 minutes

Personnel: OHP/DHE

Second Visit to Class - First Intervention Visit – Oral Hygiene - Plaque Score 1

Objectives:

- To convey key oral health messages
- To increase knowledge on the importance of teeth and their use
- To provide information on diet and nutrition and the effects of frequency of sugar consumption on teeth
- To increase knowledge of tooth-friendly and non-tooth-friendly foods
- To demonstrate a correct method of toothbrushing
- To demonstrate a pea-sized amount of toothpaste
- To carry out a plaque test and score pupils
- To observe and advise pupils practising their new toothbrushing skills
- To provide motivation and encouragement to sustain the programme
- To effect a behaviour change in children re brushing behaviour

Duration: 1 hour approximately per class

Step 1 – approximately 10 minutes for educational component (compatible with SPHE and NI curriculum)

Step 2 – approximately 10 minutes for oral hygiene component

Step 3 – approximately 30 minutes for plaque score

Step 4 – approximately 10 minutes for observation of toothbrushing skills

Personnel: OHP/DHE

Step 1: Educational Component: Discussion and Activity on Nutrition and Oral Health

Duration: 10 minutes approximately

The OHP/DHE:

- Discusses the importance of teeth and their use.
- Uses the sugar frequency/acid attack chart to explain the concept of acid attacks in a very simple form. Demonstrates the concept.
- Asks pupils to identify meal and snack times on the chart and list what they have eaten during the previous 24-hour period.
- Identifies the number of acid attacks that occur on the chart (during that period).
- Invites the class to discuss the impact that sugar-consumption patterns have on their oral health and how it can affect general health. A special emphasis is placed on the danger to teeth caused by sugary snacks and drinks.
- Discusses how often the children eat and drink sugary products everyday
- Explains about plaque and its role as a cause of decay and a cause of gum disease

Resources:

- Model of teeth
- Oral hygiene and dietary pictures
- Acid attack chart.

Step 2: Discussion and Activity on Brushing Behaviour

Duration: 10 minutes approximately

The OHP/DHE discusses good oral hygiene practices with the pupils, addressing the following issues:

- Brushing demonstration: Shows the children how to brush properly using the tooth model and toothbrush. Gives simple reasons for the best method.
- Using a regular toothbrush and a tube of toothpaste, demonstrate how much toothpaste to use. Emphasises the importance of not swallowing the toothpaste.
- Explains the dental benefits of fluoride in toothpaste.
- Explains to the children that they need to brush twice a day, once in the morning and once in the evening before bedtime, for three minutes each time (the length of a song!)

Resources:

- Large toothbrush
- Model of teeth
- Tube of fluoride toothpaste (to demonstrate a small pea sized amount) and correct-sized toothbrush (e.g small head).

Step 3: Plaque Score

Duration: 30 minutes approximately

It is explained to the child that the disclosing tablet will colour the 'plaque' on their teeth and that this shows where better toothbrushing is needed.

- The children are asked to chew the disclosing tablet, swish it around their mouth and spit it out into the sink.
- Supervision is required while this task is being completed.
- The OHP/DHE views the upper and lower labial surfaces of the central and lateral incisors and the buccal surfaces of the first permanent molars and marks the score sheet accordingly.
- This is a visual learning exercise and each child is shown the problem areas. A handheld mirror is used for this purpose.
- Twelve teeth are scored in total, and marked out of a total of twelve. (See attached score sheet Appendix i).
- The aim for each child is to achieve as low a plaque score as possible.

Resources:

- Plaque disclosing agent
- Access to a sink required
- Plaque recording sheets (Appendix i)
- Disposable non-latex gloves
- Waste disposal bags
- Tissues
- Spectrum wipes
- Pens

Step 4: Observation of Toothbrushing Skills

Duration: 10 minutes approximately

- The pupils divide into pairs and observe each other practising their newly learned toothbrushing skills. Each pupil observes themselves in a hand mirror held by their partner.
- Supervision by the OHP/DHE and the teacher is required during this task.
- The class is presented with a brushing recorder wall chart. The OHP/DHE explains (with the co-operation of the teacher) how the chart should be used. See attached 'Wall Chart Instructions' (Appendix ii).
- The teacher is presented with activity worksheets and toothbrushes and paste (Dublin only) and explains how they should be used.

Home Link

Ask the pupils to practice brushing their teeth as instructed at home and report back each day to their class team leader on their progress which is marked on the wallchart (see 'Wall Chart Instructions' Appendix ii).

Resources:

- Toothbrushes and toothpaste (Dublin only)
- Hand mirrors
- Brushing wallchart (Appendix ii)
- Worksheets
- Toothbrushes provided for children who forget to bring them (NI only)

Note: The class teacher is present for all steps and plays a supportive role.

Second Intervention Visit – Oral Hygiene - Plaque Score 2

Objective: To carry out the second 'visual plaque test' and score the pupils

Duration: 30 minutes per class

Personnel: OHP/DHE

Resources:

- Plaque-disclosing agent
- Access to a sink
- Plaque recording sheets (Appendix i)
- Disposable non-latex gloves
- Waste disposal bags
- Tissues
- Spectrum wipes
- Paper towel
- Pens

Steps:

- The OHP/DHE addresses the wallchart and commends pupils on their participation.
- The OHP/DHE carries out plaque test adopting the same approach as used in Step 3 in the First Intervention Visit.
- The OHP/DHE makes a comparison of results and the information is used to encourage the children to maintain good practice.
- The OHP/DHE arranges a date with the Principal for prize giving.

Note : The class teacher is present and plays a supportive role

Presentation of Prizes – 'Presentation Day'
Objectives:

- To present the pupils in each class with their awards
- To present the winning class with their prize
- To reward participation and achievements
- To reinforce the positive messages of the programme
- To collect completed evaluation sheets (Appendix 12)

Duration: 1 hour

Personnel: OHP/DHE, school officials

Resources:

- Medals and certificates for pupils
- Cup for Best Class
- Award list
- Evaluation sheets (Appendix 12)

Awards structure:

- Every child who participated but did not show an improvement gets a Certificate of Participation.
- Every child showing an improvement gets a Certificate of Achievement.
- Every child achieving '0' gets a medal in addition to the certificate.
- The 'Best Class' is the class with the lowest average score and is awarded a cup and a night off homework.

Steps:

- The OHP/DHE and key school officials present the prizes on 'Prize Day'.
- The prizes are distributed in a classroom/school hall.
- Children are called one by one to accept their prize from the guests.
- Presentation can be followed, if desired, by a party using healthy-option refreshments.

Appendix i Plaque Recording Sheet and Marking System
Plaque Recording Sheet and Marking System
Scoring Methods and Rewards Structure

- The objective is to achieve as low a 'visual plaque' score as possible.
- The OHP/DHE looks at the child's teeth and gives a score for every tooth that has plaque present e.g. if there is plaque present on all 12 of the teeth the child receives a score of 12.
- This is a visual learning tool.

Certificates and Medals

- These are individual awards.
- Every child receives a Certificate of Participation or a Certificate of Achievement.
- Every child achieving a score of '0' receives a medal in addition to the certificate.

The Cups

- Each school is provided with a 'Cup' which is presented to the winning class within that school.
- The winning class is identified by getting an average score for each class.
- The class with the lowest average score is the winner in that school.

Marking System		
Number of teeth with plaque		Score
Zero Teeth*	=	0
1 Tooth	=	1
2 Teeth	=	2
3 Teeth	=	3
4 Teeth	=	4
5 Teeth	=	5
6 Teeth	=	6
7 Teeth	=	7
8 Teeth	=	8
9 Teeth	=	9
10 Teeth	=	10
11 Teeth	=	11
12 Teeth	=	12

*Note: This means there is no plaque present

Appendix ii Wall Chart Instruction
Steps
Before the Lesson

- Show the teacher the wall chart.
- Ask for the teacher's co-operation in using the wall chart over the next four weeks.
- Ask the teacher to write the names of all the pupils in the class on the wall chart.

During the Lesson

- Put the wall chart up on the wall at the end of the 'brushing' instruction section of the lesson plan.
- Show the pupils where their names appear on the chart.
- Explain that the teacher will appoint a class leader every week for four weeks.
- The class leader will be instructed to ask each of their classmates, the following questions on a daily basis.
 1. Did you brush your teeth last night before you went to bed?
 2. Did you brush your teeth this morning before you came to school?
- The class leader will place a positive or negative mark on the wall chart representing the 'positive' or 'negative' responses received to their questions.

After the Lesson (during next visit)

- Ask the children to show you the wall chart and discuss the progress they are making.
- Ask them did they enjoy the activity and ask them questions about their brushing habits.
- Congratulate them on their progress and acknowledge their participation.

Thank the teachers for their co-operation.

Appendix 2 Informed Consent and Information Sheet and letter to parents prior to saliva sampling

Republic of Ireland – Control Group

Dear Parent / Guardian,

Winning Smiles

A research team from University College Cork & Queens University Belfast are carrying out a study on using fluoride toothpaste. We hope that this study will help children to take good care of their teeth. The study will have two parts and will be carried out with all the children in your child's class.

Part 1: A researcher, with the help of your child's teacher, will ask the children to fill in a short questionnaire in class. The questions are on dental health, self-esteem and quality of life. The answers that your child will give are confidential. The children will be asked to fill out the questionnaire at the start of the study and after 12 months. Some children will also be asked to take part in a discussion about dental health at the start and at the end of the study. Children will be asked to bring their tube of toothpaste in to school.

Part 2: Your child will also be asked to drool (spit) into a jar so that we can find out how much fluoride is in their saliva (spit). Your child's saliva will be collected at the start of the study, after 6 months and again after 12 months.

At the end of the study, in 12 months time your child will receive a toothbrush and tube of toothpaste as a thank you for taking part in the study.

It would be very helpful if you could talk to your child about the challenge as each child can only take part if a parent/guardian agrees to it and if the child wants to do it. If you do not wish your child to take part this will not have any effect on future visits to the dentist. Your child is free to stop taking part at any stage in 'Winning Smiles' if they wish.

We would be grateful if both you and your child could sign the consent form on the next page and give it to your child to bring back to school. The form is really important as your child will not be able to take part without it.

If you have any questions about the study or if you need any more information please phone Dr Helen Whelton at 021 4901212 during office hours or you can leave a message at other times.

Winning Smiles

Subject Number:
 Volunteer initials:

Parent/Guardian Consent Form

Name of child: (please print) _____

Date of Birth: //

I understand what this study is about and **I agree** to my child taking part in Winning Smiles

Signed: _____

Date: _____
Parent/Guardian

Please write in brand and variety of toothpaste used by your child
 e.g. 'Colgate Total' or 'Crest Regular' or 'Macleans Milk Teeth'

I understand what this study is about and **I do not agree** to my child taking part in 'Winning Smiles'

Signed: _____

Date: _____
Parent/Guardian

Child Consent Form

I understand what this study is about and **I agree** to take part

Signed: _____

Date: _____
Child

I understand what this study is about and **I do not agree** to take part

Signed: _____

Date: _____
Child

Republic of Ireland – Experimental Group

Dear Parent / Guardian,

Winning Smiles

A research team from University College Cork & Queens University Belfast are carrying out a study on using fluoride toothpaste. We hope that this study will help children to take good care of their teeth. The study will have a number of different parts and will be carried out with the children in your child's class.

Part 1: A researcher, with the help of your child's teacher, will ask the children to fill in a short questionnaire in class. The questions are on dental health, self esteem and quality of life. The answers that your child will give are confidential. The children will be asked to fill out the questionnaire at the start of the study and after 12 months. Some children will also be asked to take part in a discussion about dental health at the start and at the end of the study.

Part 2: The local Dental Health Team will come to the school to help the children take care of their teeth. They will give each child a toothbrush and a tube of fluoride toothpaste. They will also teach the children about tooth-brushing and healthy eating. The lessons will be carried out in a fun way and will involve a tooth-brushing competition.

Part 3: The teacher will remind each child to brush their teeth twice a day using a fluoride toothpaste. Each day the children will be asked about their tooth-brushing and this will be put on a chart in the classroom. We hope that you will help by reminding your child to brush their teeth every morning and before bedtime.

All children in your child's class who are taking part in the study will be given free toothpaste and toothbrushes in school on a regular basis during the year that the study is taking place.

As part of this programme we will use a harmless vegetable dye to help check how well each child is brushing their teeth.

Part 4: Your child will also be asked to drool (spit) into a jar so that we can find out how much fluoride is in their saliva (spit). Your child's saliva will be collected at the start of the study, after 6 months and again after 12 months.

It would be very helpful if you could talk to your child about the challenge as each child can only take part if a parent/guardian agrees to it and if the child wants to do it. If you do not wish your child to take part this will not have any effect on future visits to the dentist. Your child is free to stop taking part at any stage in 'Winning Smiles' if they wish.

We would be grateful if both you and your child could sign the consent form on the next page and give it to your child to bring back to school. The form is really important as your child will not be able to take part without it.

If you have any questions about the study or if you need any more information please phone Dr Helen Whelton at 021 4901212 during office hours or you can leave a message at other times.

Thank you for your time.

Winning Smiles

Subject Number:
 Volunteer initials:

Parent/Guardian Consent Form

Name of child: (please print) _____

Date of Birth: / /

I understand what this study is about and **I agree** to my child taking part in Winning Smiles

Signed: _____

Date: _____
Parent/Guardian

Please write in brand and variety of toothpaste used by your child
 e.g. 'Colgate Total' or 'Crest Regular' or 'Macleans Milk Teeth'

I understand what this study is about and **I do not agree** to my child taking part in 'Winning Smiles'

Signed: _____

Date: _____
Parent/Guardian

Child Consent Form

I understand what this study is about and **I agree** to take part

Signed: _____

Date: _____
Child

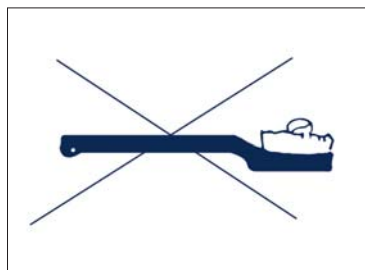
I understand what this study is about and **I do not agree** to take part

Signed: _____

Date: _____
Child

Dear Parent,

Re: No brushing or toothpaste after 9.00pm tonight or tomorrow morning please



Some time ago you consented to your child's participation in the evaluation of the 'Winning Smiles' dental health program. The researcher will be calling to your child's school tomorrow to collect samples of your child's saliva (spit). The saliva will be collected before the morning break and again before your child finishes school for the day. These samples will be used to measure the level of fluoride in your child's saliva.

Usually we encourage children to brush their teeth but before the researcher calls it is very important that the child does not brush their teeth for at least 12 hours! I am writing to ask you to ensure that your child **does not** brush their teeth after 9.00pm this evening and your child **must not** brush his or her teeth before school in the morning. This is just for 1 day. After the researcher has collected the saliva your child can return to their normal brushing pattern.

Yours sincerely,

Appendix 3 Laboratory Protocol: Direct Method for Fluoride Analysis

1. PURPOSE

This standard operating procedure (SOP) covers the preparation of Total Ionic Strength Adjustment Buffer (TISAB), standard sodium fluoride solutions, electrode calibration and sample analysis for direct fluoride ion content.

2. REAGENTS

- trans-1,2-diaminocyclohexane- N,N,N1,N1-tetraacetic acid (CDTA)
- Glacial acetic acid (Analar)
- Sodium fluoride (Analar)
- Sodium hydroxide (Analar)
- Demineralised, distilled water such as MilliQ water

3. APPARATUS

Balance	Capable of weighing to 0.1 mg
Autopipettes	1 ml and 0.1 ml
Polypropylene or acrylic bottles with caps	5ml, 30ml, 60ml and 150ml
Spatula	
Weighing boats	
pH meter	Orion model 720A
Fluoride ion-specific electrode	Orion model 94-095C
Reference electrode	Orion model 90-01 single junction reference electrode

*Note: No glass can be used in fluoride analysis as the fluoride is absorbed onto the glass surface

4. PROCEDURE

4.1 Preparation of sodium fluoride standard solutions

Weigh 0.2211 g sodium fluoride into a 150ml bottle. Add demineralised, distilled water to 100.00g (ie. 99.7789g of water added) and shake until all the sodium fluoride is dissolved. This gives a 1000ppm fluoride standard.

Weigh 10.00g of the 1000ppm fluoride standard into a 150ml bottle. Add 90.00g demineralised, distilled water to give a total of 100.00g and shake the solution thoroughly. This gives a 100ppm fluoride standard.

Weigh 10.00g of the 100ppm fluoride standard into a 150ml bottle. Add 90.00g demineralised, distilled water to give a total of 100.00g and shake the solution. This gives a 10ppm fluoride standard.

Weigh 30.00 of the 10ppm fluoride standard into a 150ml bottle. Add 70.00g demineralised, distilled water to give a total of 100.00g and shake the solution. This gives a 3ppm fluoride standard.

Weigh 10.00g of the 10ppm fluoride standard into a 150ml bottle. Add 90.00g demineralised, distilled water to give a total of 100.00g and shake the solution. This gives a 1ppm fluoride standard.

Weigh 30.00g of the 1ppm fluoride standard into a 150ml bottle and add 70.00g demineralised, distilled water to give a total of 100.00g and shake the solution. This gives the 0.3ppm fluoride standard.

Weigh 10.00g of the 0.1 ppm fluoride standard and add 90.00g demineralised, distilled water to give a total of 100.00g. Shake the solution. This gives the 0.01ppm fluoride standard.

Weigh 30.00g of the 0.1 ppm fluoride standard and add 70.00g demineralised, distilled water to give a total of 100.00g. Shake the solution. This gives the 0.03ppm fluoride standard.

Weigh 10.00g of the 0.1 ppm fluoride standard and add 90.00g demineralised, distilled water to give a total of 100.00g. Shake the solution. This gives the 0.01ppm fluoride standard.

Weigh 7.00g of the 0.1 ppm fluoride standard and add 93.00g demineralised, distilled water to give a total of 100.00g. Shake the solution. This gives the 0.007ppm fluoride standard.

The above gives the usual range of standards used on the fluoride ion-specific electrodes. However, for some types of samples (e.g. plaque) a lower standard of 0.005ppm fluoride standard is needed. To prepare this weigh 5.00g of the 0.01ppm fluoride standard into a 150ml bottle and add 95.00g demineralised, distilled water to give a total of 100.00g. Shake the solution.

4.2 Preparation of TISAB

Weigh 10.00g sodium hydroxide into 150ml bottle and add 50.00g demineralised, distilled water. Shake until the sodium hydroxide is dissolved and allow to cool.

In a separate 60ml bottle weigh 28.50g glacial acetic acid and add to the sodium hydroxide solution. Shake and allow to cool.

In a 60ml bottle weigh 11.50g demineralised, distilled water. Use some of this water to rinse out the glacial acetic acid container into the main solution. Add the rest of the water to the solution and shake.

Weigh 2g Trans-1,2-diamino cyclohexane-N,N,N,N-tetraacetic acid (CDTA) in a weighing boat and add to the solution. Shake until the CDTA is dissolved. The resulting TISAB is then split into three 60ml bottles and is ready for use.

4.3 Preparation of calibration standards

For the 10, 3, 1, 0.3, 0.1, 0.03, 0.01, and 0.007ppm fluoride standard (and 0.005ppm fluoride standard if being used).

Weigh 25.00g of standard into a 30ml bottle. Add 10% of the weight of the standard, in TISAB to the solution and shake the solution. ie. If the weight of standard is 25.1042g, then the amount of TISAB added should be 2.5104g.

This process should be repeated for each of the standards.

4.4 TISAB check

Before use with samples the TISAB needs to be checked. This is to ensure that there is no fluoride contamination in either the TISAB or the demineralised, distilled water used in the preparation of the fluoride standards. To check

the TISAB weigh 20.00g of the same demineralised, distilled water used in the preparation of both TISAB and standard fluoride solutions into a 60ml bottle and to it add 10% of the weight of demineralised, distilled water in TISAB (~2g) and shake the buffered water solution. Put the electrodes into the solution and monitor the mV readings over time. The fluoride electrodes should always be kept in buffered water when not in use, and fresh buffered water put onto the electrodes after use, if not every day.

The reading given for the buffered water is usually above 200mV but will vary for each electrode, so a record of the background mV values should be kept. If the mV value of the buffered water is low it indicates a problem with either the TISAB, or the water used in its preparation. A new batch of TISAB should be prepared and the old batch discarded.

4.5 Fluoride calibration

Measure and record background level of the electrode before any standards have been used.

Take the electrode out of the buffered water; rinse and dry the electrode. Put the electrode into a sample of the – lowest fluoride standard and take a reading after fifteen minutes. For the length of time that each standard has to be read on the electrode see Table 16.

After the relevant length of time, take the electrode out of the standard, rinse and dry the electrode, put into a fresh sample of the same standard, and take a reading after five minutes. Take the electrode out of the standard, rinse and dry the electrode. Put the electrode into a sample of the previous set of standards (of the same fluoride level) and take a reading after five minutes.

Before any samples are analysed using a set of standards, the standards should be tested.

Table 16: Fluoride electrode reading time

Standard	Time	Time	Time	Fresh Standard	Old Standard
0.005	15 mins	5 mins	5 mins	5 mins	5 mins
0.007	5 mins	5 mins	5 mins	5 mins	5 mins
0.01	5 mins	5 mins	5 mins	5 mins	5 mins
0.03	5 mins	5 mins	5 mins	5 mins	5 mins
0.1	5 mins	5 mins		5 mins	5 mins
0.3	5 mins	5 mins		5 mins	5 mins
1	5 mins			5 mins	5 mins
3	4 mins			4 mins	4 mins
10	4 mins				4 mins

4.6. Sample analysis

Any sample that is to be put onto the fluoride ion-specific electrode should have 10% of the sample weight added in TISAB before analysis. For samples containing sodium fluoride or ionic fluoride the samples can be analysed without the need for digestion by acid phosphatase which is needed before analysis if the samples contain fluorinated phosphates. Samples should be analysed from those of the lowest fluoride level to those of highest fluoride level within a fluoride calibration with each sample being read after 5 minutes. To fit the samples into the calibration, run the calibration as shown (excluding the reading of old standards) and read the samples between standards that are closest to their expected fluoride level. For samples of unknown fluoride level these should be run twice, when possible, once to obtain an approximate fluoride level for the samples and repeated to obtain more accurate readings.

4.7 Preparation of saliva and urine samples

- Remove samples from freezer and leave to thaw at room temperature.
- Mix for 10 seconds on a vortex mixer.
- Weigh, to 4 decimal places a 1 ml aliquot into a 5ml tube.
- Add 10% of the weight in TISAB.
- Mix on the vortex mixer.
- The sample is analysed within the expected standard range.
- The millivolt reading obtained is then used to calculate the fluoride ion concentration from the slope and intercept values.

5. Calculation

The value for the intercept should be close to the mV value for the 1 ppm fluoride standard and the slope value should be between -56 and -62

The difference between the mV values for standards which are a factor of ten apart (eg. 0.1 and 1 ppm fluoride standard) should be between 57 and 62, and ideally between 57 and 60.

To work out the slope and intercept, use log/numeric graph paper and plot the standard values (ie 0.01, etc) along the logarithmic scale and the corresponding mV values along the numeric scale. Plot mV readings read for the standards against appropriate standard value and fit a line through the points.

The intercept is the mV reading on the fitted line which corresponds to the 1 ppm fluoride standard.

To work out the ppm fluoride standard values from the mV readings

$$\frac{- \text{mV reading for 1 ppm fluoride standard sample mV reading}}{+ve \text{ slope (slope value converted to positive value)}}$$

Antilog the answer.

Alternatively this is done in Excel.

Appendix 4 Child Questionnaire



CHILD ORAL HEALTH QUESTIONNAIRE

 Subject Number:

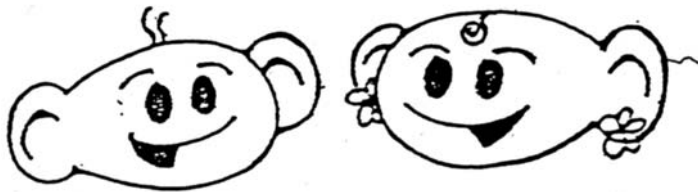
Hello,

Thanks for helping us with our study!

We are doing this study to understand better things that may happen to children because of their **teeth and mouth.**

Please Remember:

- Don't write your name on the questionnaire.
- This is **not a test** and there are no right or wrong answers.
- Answer as **honestly** as you can.
- **Don't talk to anyone** about the questions when you are answering them.
- No one you know will see your answers.
- Read each question **carefully** and think about the things that have happened to you in the **past 4 weeks.**
- Before you answer, ask yourself: **"Does this happen to me because of my teeth or mouth?"**
- Put an in the box beside the answer that is best for you.



FIRST, A FEW QUESTIONS ABOUT YOU

Today's date: / /
DAY MONTH YEAR

1. Are you a boy or a girl?

- Boy
- Girl

2. How old are you? _____

3. When you think about your teeth or mouth, would you say that they are:

- Very good
- Good
- O.K.
- Poor

4. How much do your teeth or mouth bother you in your everyday life?

- Not at all
- A little bit
- Some
- A lot

NOW A FEW QUESTIONS ABOUT YOUR TEETH AND MOUTH

How often have you had:

5. Pain in your teeth or mouth in the past 4 weeks?

- Never
- Once or twice
- Sometimes
- Often
- Everyday or almost every day



6. Sore spots in your mouth in the past 4 weeks?

- Never
- Once or twice
- Sometimes
- Often
- Everyday or almost every day

7. Pain in your teeth when you drink cold drinks or eat foods in the past 4 weeks?

- Never
- Once or twice
- Sometimes
- Often
- Everyday or almost every day

8. Food stuck in your teeth in the past 4 weeks?

- Never
- Once or twice
- Sometimes
- Often
- Everyday or almost every day

9. Bad breath in the past 4 weeks?

- Never
- Once or twice
- Sometimes
- Often
- Everyday or almost every day



NOW A FEW QUESTIONS ABOUT YOUR TEETH AND MOUTH (continued)

In the past 4 weeks, how often have you:

10. Needed longer time than others to eat your meal because of your teeth or mouth?

- Never
- Once or twice
- Sometimes
- Often
- Everyday or almost every day

11. Had a hard time biting or chewing food like apples, corn on the cob or steak because of your teeth or mouth?"

- Never
- Once or twice
- Sometimes
- Often
- Everyday or almost every day



12. Had trouble eating foods you would like to eat because of your teeth or mouth?

- Never
- Once or twice
- Sometimes
- Often
- Everyday or almost every day

13. Had trouble saying some words because of your teeth or mouth?

- Never
- Once or twice
- Sometimes
- Often
- Everyday or almost every day

14. Had a problem sleeping at night because of your teeth or mouth?

- Never
- Once or twice
- Sometimes
- Often
- Everyday or almost every day



SOME QUESTIONS ABOUT YOUR FEELINGS

In the past 4 weeks, how often have you:

15. **Been upset because of your teeth or mouth?**

- Never
- Once or twice
- Sometimes
- Often
- Everyday or almost every day



16. **Felt frustrated because of your teeth or mouth?**

- Never
- Once or twice
- Sometimes
- Often
- Everyday or almost every day

17. **Been shy because of your teeth or mouth?**

- Never
- Once or twice
- Sometimes
- Often
- Everyday or almost every day

18. **Been concerned what other people think about your teeth or mouth?**

- Never
- Once or twice
- Sometimes
- Often
- Everyday or almost every day



19. **Worried that you are not as good-looking as others because of your teeth or mouth?**

- Never
- Once or twice
- Sometimes
- Often
- Everyday or almost every day

QUESTIONS ABOUT YOUR SCHOOL

In the past 4 weeks, how often have you:

20. **Missed school because of your teeth or mouth?**

- Never
- Once or twice
- Sometimes
- Often
- Everyday or almost every day



21. **Had a hard time doing your homework because of your teeth or mouth?**

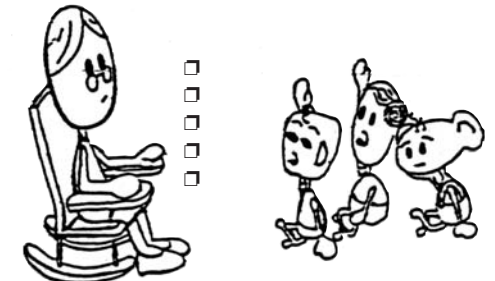
- Never
- Once or twice
- Sometimes
- Often
- Everyday or almost every day

22. **Had a hard time paying attention in school because of your teeth or mouth?**

- Never
- Once or twice
- Sometimes
- Often
- Everyday or almost every day

23. **Not wanted to speak or read out loud in class because of your teeth or mouth?**

- Never
- Once or twice
- Sometimes
- Often
- Everyday or almost every day



QUESTIONS ABOUT YOU BEING WITH OTHER PEOPLE

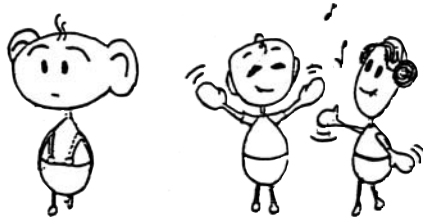
In the past 4 weeks, how often have you:

24. **Tried not to smile or laugh when with other children because of your teeth or mouth?**

- Never
- Once or twice
- Sometimes
- Often
- Everyday or almost every day

25. **Not wanted to talk to other children because of your teeth or mouth?**

- Never
- Once or twice
- Sometimes
- Often
- Everyday or almost every day

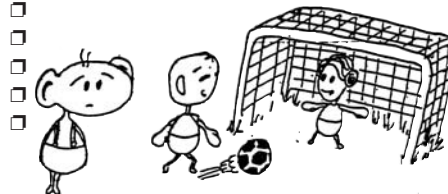


26. **Not wanted to be with other children because of your teeth or mouth?**

- Never
- Once or twice
- Sometimes
- Often
- Everyday or almost every day

27. **Stayed away from activities like sports and clubs because of your teeth or mouth?**

- Never
- Once or twice
- Sometimes
- Often
- Everyday or almost every day



QUESTIONS ABOUT YOU BEING WITH OTHER PEOPLE (continued)

In the past 4 weeks, how often have you:

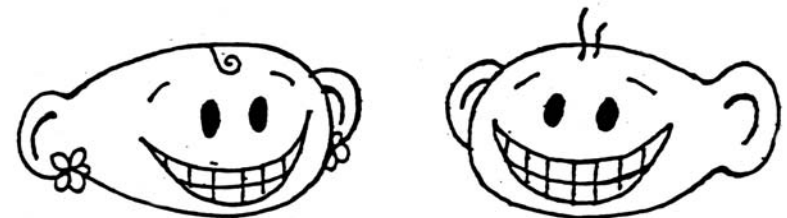
28. **Other children teased you or called you names because of your teeth or mouth?**

- Never
- Once or twice
- Sometimes
- Often
- Everyday or almost every day



29. **Other children asked you questions about your teeth or mouth?**

- Never
- Once or twice
- Sometimes
- Often
- Everyday or almost every day



GENERAL QUESTIONS



30. How often do you brush your teeth?
(Please tick only 1 box)

- More than two times a day
- Two times a day
- Once a day
- Less than once a day
- Never brush my teeth

31. How often do you go to the dentist?
(Please tick only 1 box)

- Every six months
- Once a year
- Once every two years
- Never go to the dentist

32. How nervous are you about going to the dentist?
(Please tick only 1 box)

- Very frightened
- Very nervous
- A little bit nervous
- Not at all nervous



GENERAL QUESTIONS



33. How pleased are you with your teeth?
(Please tick only 1 box)

- Very pleased
- Quite pleased
- Not very pleased
- Not at all pleased

34. How important is it for you to look after your teeth?
(Please tick only 1 box)

- Very important
- Quite important
- Not very important
- Not at all important

35. Who do you take most notice of when it comes to looking after your teeth?
(Please tick as many boxes as you want)

- Parents
- Teachers
- TV
- Dentist
- School nurse
- Friends
- Brothers or sisters



GENERAL QUESTIONS



36. Did you brush your teeth?
(Please tick only 1 box)

- Last night and this morning
- Only this morning
- Only last night
- Can't remember

37. Have you ever been shown how to brush and clean your teeth?
(Please tick only 1 box)

- Yes
- No
- Don't know

38. Where were you shown how to brush and clean your teeth?
your teeth? (Please tick as many boxes as you want)

- At school
- At the dentist's
- Other
- Can't remember
- Never been shown



GENERAL QUESTIONS



39. What type of toothbrush should you use to clean your teeth?
(Please tick only 1 box)

- A brush with a small head with soft bristles
- A brush with a big head
- A hard brush
- Don't know

40. Why is fluoride toothpaste good for your teeth?
(Please tick only 1 box)

- Makes your teeth strong
- It tastes nice
- Don't know

41. Have you ever been told how to stop getting bad (decayed) teeth?
(Please tick only 1 box)

- Yes
- No
- Don't know



GENERAL QUESTIONS



42. What do you think stops teeth from going bad?
(Please tick as many boxes as you want)

- Brushing my teeth
- Going to dentist
- Drinking milk
- Eating sugar less often
- Using fluoride toothpaste
- Don't know

43. Why do you brush your teeth?
(Please tick as many boxes as you want)

- To stop bad breath
- To stop my teeth going bad
- To remove plaque
- To keep my teeth clean
- To avoid going to the dentist
- Other



GENERAL QUESTIONS



44. What snacks are good for your teeth?
(Please tick as many boxes as you want)

- Sweets/chocolate
- Sandwiches
- Crisps
- Biscuits
- Crackers
- Fruit
- Yoghurt
- Cheese
- Bread/toast
- Milk
- Coke
- Water
- Orange squash
- Tea/coffee



SELF-ESTEEM

Nearly Finished!!

Just eight more questions to go!

For these questions, just answer "Yes or "No"

For example, the first sentence says:

I find it very hard to talk in front of the class

If you find it hard to talk in front of the class, tick the box with the heading
"Yes"

If you do not find it hard to talk in front of the class, then tick the box with
the heading "No"

DO NOT TICK BOTH BOXES

I find it very hard to talk in front of the class	Yes <input type="checkbox"/>	No <input type="checkbox"/>
I am proud of my schoolwork	Yes <input type="checkbox"/>	No <input type="checkbox"/>
I am doing the best work that I can	Yes <input type="checkbox"/>	No <input type="checkbox"/>
I like to answer questions in class	Yes <input type="checkbox"/>	No <input type="checkbox"/>
I am not doing as well in school as I would like to	Yes <input type="checkbox"/>	No <input type="checkbox"/>
I often feel upset in school	Yes <input type="checkbox"/>	No <input type="checkbox"/>
I feel as if I am not good enough	Yes <input type="checkbox"/>	No <input type="checkbox"/>
I often get discouraged in school	Yes <input type="checkbox"/>	No <input type="checkbox"/>

Appendix 5 Tables of Results of COHRQoL, Self-esteem, Oral Health-Related Knowledge, Attitudes and Behaviours.

Attitudinal scores at baseline and 12-month follow-up

[1] Child Oral Health-Related Quality of Life (COHRQoL)

COHRQoL scores ranged from 33 to 125 at baseline. The mean score for COHRQoL at baseline was 109.06 (95%CI: 107.11, 111.01) with a median score of 115. COHRQoL scores ranged from 63 to 125 at 12-month follow-up. The mean score was 111.88 (95%CI: 110.37, 113.39) with a median score of 114.

Table 17: Testing for the effect of the grouping variable school experimental status controlling for baseline scores for COHRQoL: dependent variable COHRQoL scores at 12-month follow-up

Variables	B	SE	t	p
(Constant)	82.99	5.01	16.58	<0.001
Baseline scores: COHRQoL	0.29	0.04	6.53	<0.001
School location	-4.29	1.41	-3.04	0.003
Experimental status of school	-2.42	1.45	-1.67	0.09

The effect of the experimental intervention was significant at the 9% level independent of baseline level and location effects (Table 17).

- COHRQoL subscale 1: oral health status awareness
Oral health status awareness scores ranged from 6 to 15 at baseline. The mean score at baseline was 13.21 (95%CI: 12.96, 13.47) with a median score of 14. Oral health status awareness scores ranged from 5 to 15 at 12-month follow-up. The mean score was 13.14 (95%CI: 12.87, 13.41) with a median score of 14.

Table 18: Testing for the effect of the grouping variable school experimental status controlling for baseline scores for oral health status awareness: dependent variable oral health status awareness scores at 12-month follow-up

Variables	B	SE	t	p
(Constant)	11.16	0.93	12.04	<0.001
Baseline scores: oral health status awareness	0.17	0.06	2.55	0.01
School location	-0.42	0.09	-1.42	0.14
Experimental status of school	-0.52	0.28	-1.83	0.06

The effect of the experimental intervention was significant at the 6% level independent of baseline level and location effects (Table 18).

- COHRQoL subscale 2: oral and social self-image
Oral and social self-image scores ranged from 9 to 30 at baseline. The mean score at baseline was 33.94 (95%CI: 33.27, 34.65) with a median score of 36. Oral and social self-image scores ranged from 15 to 40 at 12-month follow-up. The mean score was 34.63 (95%CI: 34.02, 35.25) with a median score of 36.

Table 19: Testing for the effect of the grouping variable school experimental status controlling for baseline scores for oral and social self-image: dependent variable oral social self-image scores at 12-month follow-up

Variables	B	SE	t	p
(Constant)	27.07	1.89	14.63	<0.001
Baseline scores: oral and social self-image	0.26	0.05	4.87	<0.001
School location	-2.05	0.60	-0.61	0.001
Experimental status of school	-1.11	0.61	-0.43	0.07

The effect of the experimental intervention was significant at the 7% level independent of baseline and location effects (Table 19).

- COHRQoL subscale 3: social confidence and well-being
Social confidence and well-being scores ranged from 10 to 35 at baseline. The mean score at baseline was 31.78 (95%CI: 31.23, 32.33) with a median score of 33. Social confidence and well-being scores ranged from 19 to 35 at 12-month follow-up. The mean score was 32.22 (95%CI: 31.78, 32.66) with a median score of 33.

Table 20: Testing for the effect of the grouping variable school experimental status controlling for baseline scores for social confidence and well-being: dependent variable social confidence and well-being scores at 12-month follow-up

Variables	B	SE	t	p
(Constant)	25.19	1.61	15.60	<0.001
Baseline scores: social confidence and well-being	0.23	0.49	4.66	<0.001
School location	-0.26	0.43	0.61	-0.55
Experimental status of school	-0.19	0.44	0.43	-0.67

There was no significant effect of the experimental intervention while controlling for baseline and location effects (Table 20).

[2] Self-esteem

Self-esteem scores ranged from 1 to 8 at baseline. The mean score at baseline was 6.15 (95%CI: 5.96, 6.35) with a median score of 6. Self-esteem scores ranged from 1 to 8 at 12-month follow-up. The mean score was 6.26 (95%CI: 6.05, 6.47) with a median score of 7.

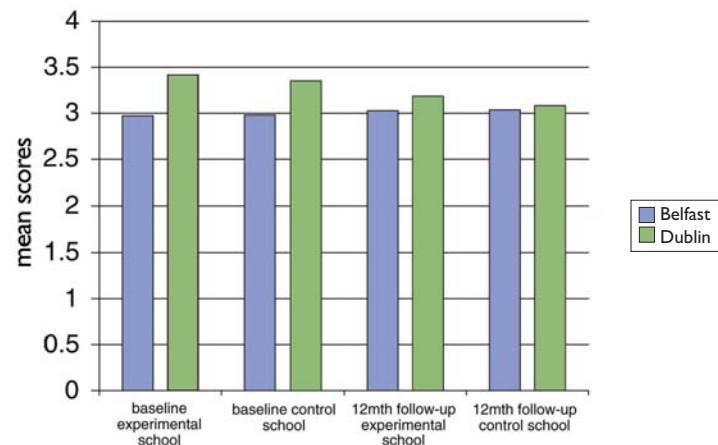
Table 21: Testing for the effect of the grouping variable school experimental status controlling for baseline scores for self-esteem: dependent variable self-esteem scores at 12-month follow-up

Variables	B	SE	t	p
(Constant)	5.06	0.44	11.45	<0.001
Baseline scores: self-esteem	0.22	0.07	3.34	0.001
School location	-0.09	0.21	-0.45	0.66
Experimental status of school	-0.31	0.21	-1.46	0.15

There was no significant effect of the experimental intervention while controlling for baseline and location effects (Table 21).

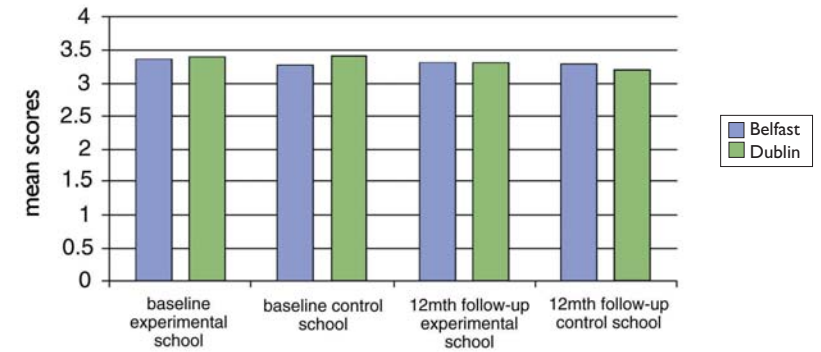
There were significant decreases in mean scores for satisfaction with teeth explained by the interaction of experimental status and location school attended with time ($F(1,243)=5.48; p=0.02$).

Figure 21: Opinion of teeth by time, experimental status and school location



There was no significant effect of the experimental intervention demonstrated for opinion of teeth mean scores between Dublin and Belfast schoolchildren ($F(1,243)=0.02; p=0.90$).

Figure 22: Bother with teeth by time, experimental status and school location



There was no significant effect of the experimental intervention demonstrated for mean scores for being bothered with their teeth between Dublin and Belfast schoolchildren ($F(1,243)=0.03; p=0.87$).

Knowledge scores at baseline and 12 month follow-up

[1] Total toothbrushing knowledge

The total toothbrushing knowledge scores ranged from 0 (none correct) to 3 (all answers correct) at baseline and 12-month follow-up.

The mean score for total toothbrushing knowledge at baseline was 2.00 (95%CI: 1.89, 2.11) with a median score of 2.00. At the 12-month follow-up the mean score was 2.03 (95%CI: 1.93, 2.14) with a median score of 2.00.

Table 22: Testing for the effect of the grouping variable school experimental status controlling for baseline scores for total toothbrushing knowledge: dependent variable total toothbrushing knowledge scores at 12-month follow-up

Variables	B	SE	t	p
(Constant)	1.73	0.14	12.71	<0.001
Baseline scores total knowledge	0.13	0.06	2.11	<0.04
School location	0.34	0.11	-3.12	0.002
Experimental status of school	-0.25	0.11	-2.35	0.02

The effect of the experimental intervention was significant at the 2% level independent of baseline and location effects (Table 22).

[2] Snacking knowledge

The possible range of scores for total snacking knowledge was 0 (none correct) to 13 (all answers correct). At baseline, the range of scores for total snacking knowledge was from 2 to 13. At 12-month follow-up, the range of scores was from 3 to 13.

At baseline, the children's mean score for total snack knowledge was 9.44 (95%CI 9.19, 9.69) and median score was 10. At the 12-month follow-up the mean score was 9.75 (95%CI 9.52, 10.97) and the median score was 10. At baseline, the children's mean score for safer snacking knowledge was 5.28 (95%CI 5.05, 5.52) and median score was 6. At the 12 month follow-up the mean score was 5.44 (95%CI 5.21, 5.66) and the median score was 6.

Table 23: Testing for the effect of the grouping variable school experimental status controlling for baseline scores for total snacking knowledge: dependent variable total snacking knowledge scores at 12-month follow-up

Variables	B	SE	t	p
(Constant)	8.38	0.55	15.26	<0.001
Baseline scores: total snack knowledge	0.16	0.06	2.43	0.005
School location	0.37	0.21	1.32	0.19
Experimental status of school	-0.60	0.22	-2.64	0.009

The effect of the experimental intervention was significant at the 0.9% level independent of baseline and location effects (Table 23).

Table 24: Testing for the effect of the grouping variable school experimental status controlling for baseline scores for knowledge of healthier snacks: dependent variable knowledge of healthier snacks scores at 12-month follow-up

Variables	B	SE	t	p
(Constant)	4.35	0.34	12.97	<0.001
Baseline scores: total snack knowledge	0.23	0.06	3.81	<0.001
School location	0.33	0.23	1.40	0.16
Experimental status of school	-0.65	0.23	-2.89	0.004

The effect of the experimental intervention was significant at the 0.4% level independent of baseline and location effects (Table 24).

[3] Preventing dental decay knowledge

The range of scores for preventing dental decay ranged from 0 (none correct) to 4 (all answers correct). The range of mean scores at baseline for preventing dental decay was 2.34 (95%CI: 2.24, 2.49). The mean scores for preventing dental decay at 12-month follow-up was 2.49 (95%CI: 2.36, 2.61).

Table 25: Testing for the effect of the grouping variable school experimental status controlling for baseline scores for knowledge for preventing dental decay: dependent variable knowledge for preventing dental decay scores at 12-month follow-up

Variables	B	SE	t	p
(Constant)	2.21	0.17	12.82	<0.001
Baseline scores: knowledge of preventing dental decay	0.10	0.07	1.51	0.13
School location	0.31	0.13	2.31	0.02
Experimental status of school	-0.20	0.13	-1.49	0.14

There was no significant effect of the experimental intervention while controlling for baseline and location effects (Table 25).

Reported behaviour at baseline and 12 month follow-up

[1] Reported toothbrushing behaviour

At baseline 77% (191) of the children stated that they brushed their teeth at least twice daily; at 12-month follow-up 75% (184) reported that they brushed their teeth at least twice daily.

Table 26: Testing for the effect of the grouping variable school experimental status controlling for baseline reported daily toothbrushing: dependent variable reported daily toothbrushing at 12 month follow-up

Variables	Relative odd Exp B	95%CI	P
(Constant)	1.57		0.14
Baseline reported daily toothbrushing	3.94	(2.01, 7.72)	<0.001
School location	-0.84	(0.23, 0.81)	0.009
Experimental status of school	-0.97	(0.53, 1.81)	0.98

There was no significant effect of the experimental intervention while controlling for baseline and location effects (Table 26).

[2] Reported dental attendance behaviours

At baseline 73% (179) of the children stated that they attended the dentist at least on a yearly basis. At the 12-month follow-up, 74% (183) of the children reported that they attended the dentist on a yearly basis.

Table 27: Testing for the effect of the grouping variable school experimental status controlling for baseline reported dental attendance: dependent variable reported dental attendance at 12-month follow-up

Variables	Relative odd Exp B	95%CI	P
(Constant)	2.31		0.03
Baseline reported dental attendance	3.59	(1.81, 7.14)	<0.001
School location	-0.28	(0.14, 0.58)	<0.001
Experimental status of school	-1.01	(0.53, 1.93)	0.02

There was a significant effect of the experimental intervention while controlling for baseline and location effects. Children attending experimental schools were more likely to report that they attended for dental care at least once a year, at 12-month follow-up (Table 27).

Appendix 6 Reported oral health-related attitudes

Oral health-related attitudes

Figure 23: Oral health attitudes at baseline and 12-month follow-up

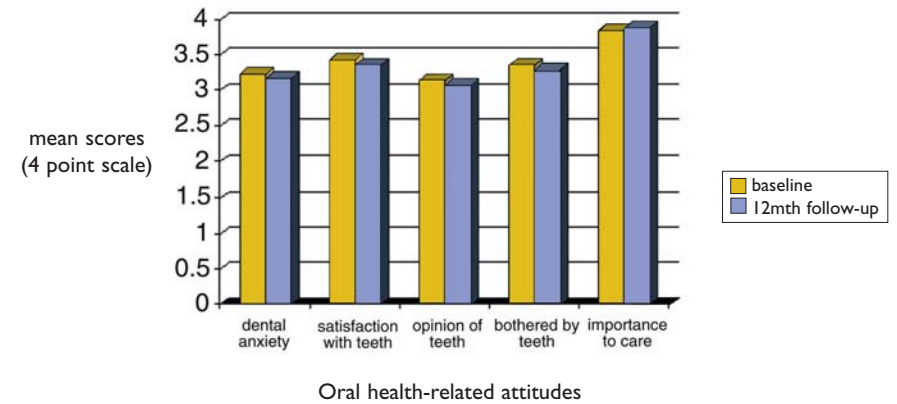
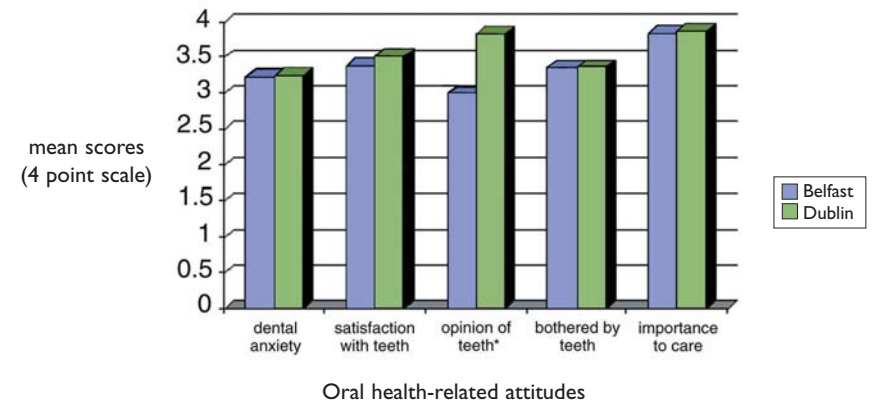
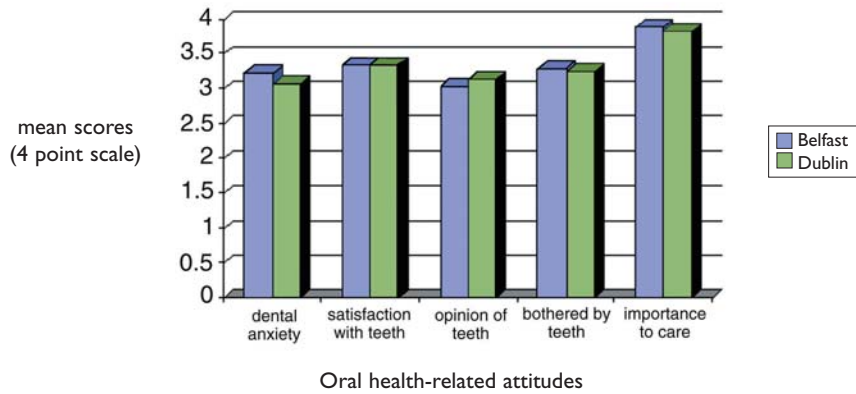


Figure 24: Oral health attitudes by location of school at baseline



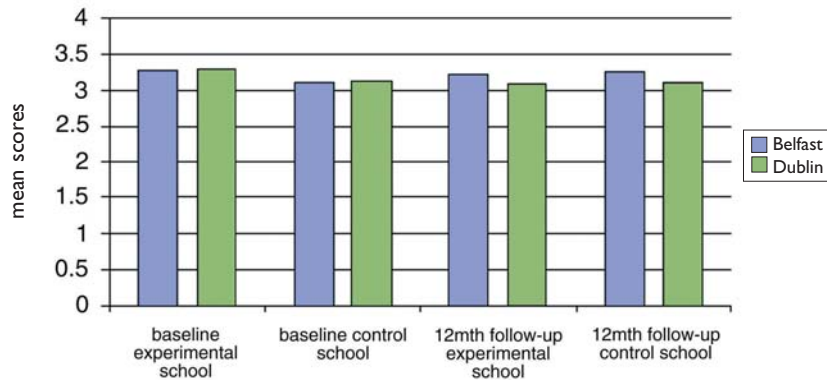
*Dublin children had significantly higher mean scores for opinion of their teeth than Belfast children (p<0.001)

Figure 25: Oral health attitudes by location of school at 12 month follow-up



No significant differences were found between Dublin and Belfast schoolchildren for oral health-related attitudes at 12-month follow-up

Figure 26: Dental anxiety by time, location and experimental status of school



No significant differences were found between Dublin and Belfast schoolchildren for dental anxiety, with time or experimental status of school.

Oral health-related knowledge

Figure 27: Knowledge of fluoride toothpaste at baseline and 12-month follow-up

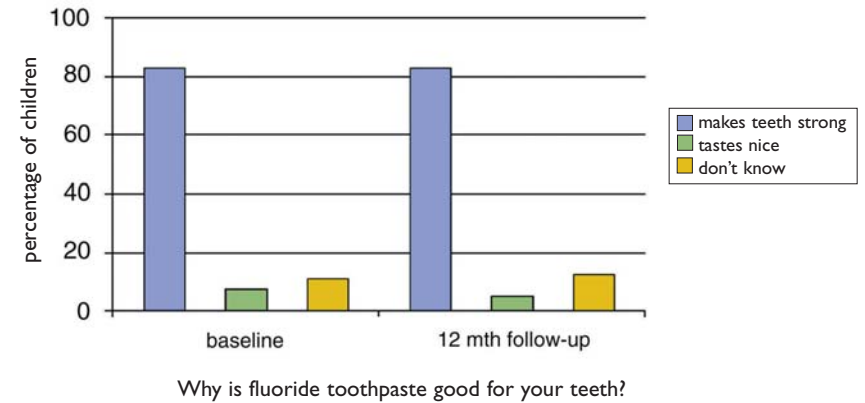
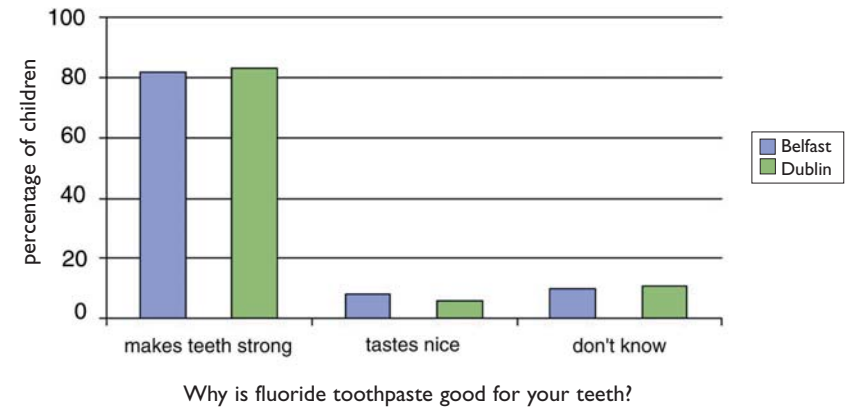
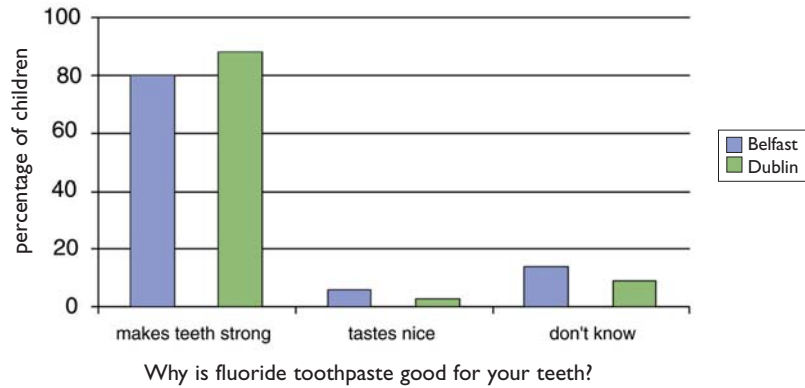


Figure 28: Knowledge of fluoride toothpaste by location of school at baseline



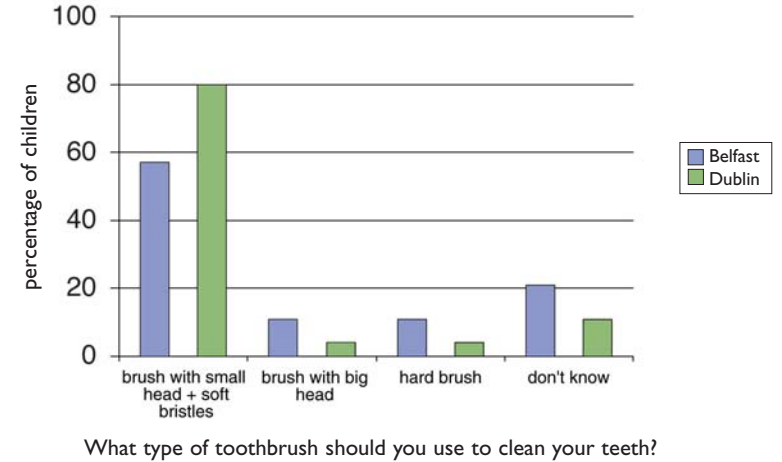
Equivalent proportions of children in Dublin and Belfast knew that fluoride makes teeth strong ($p=0.83$).

Figure 29: Knowledge of fluoride toothpaste by location of school at 12-month follow-up



Equivalent proportions of children in Dublin and Belfast knew that fluoride makes teeth strong ($p=0.23$).

Figure 31: Knowledge of toothbrush choice by school location at baseline



Significantly larger proportions of children in Dublin than in Belfast knew that their toothbrush should have a small head and soft bristles ($p<0.001$).

Figure 30: Knowledge of toothbrush choice

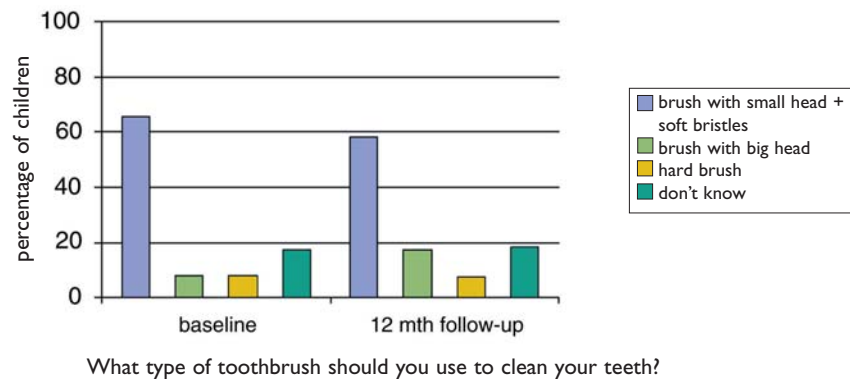
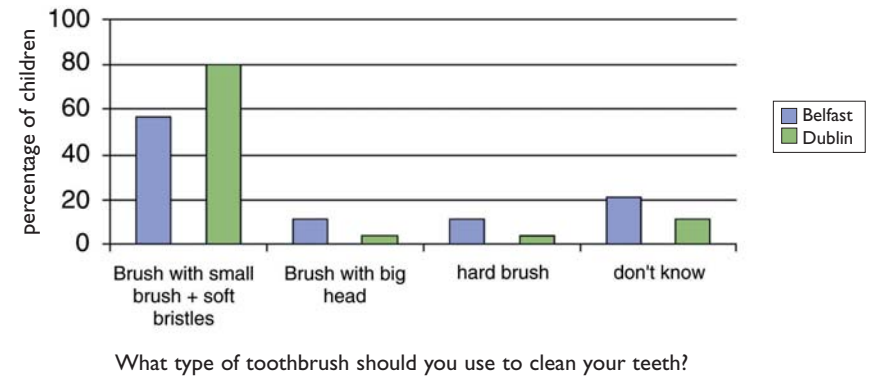


Figure 32: Knowledge of toothbrush choice by school location at 12-month follow-up



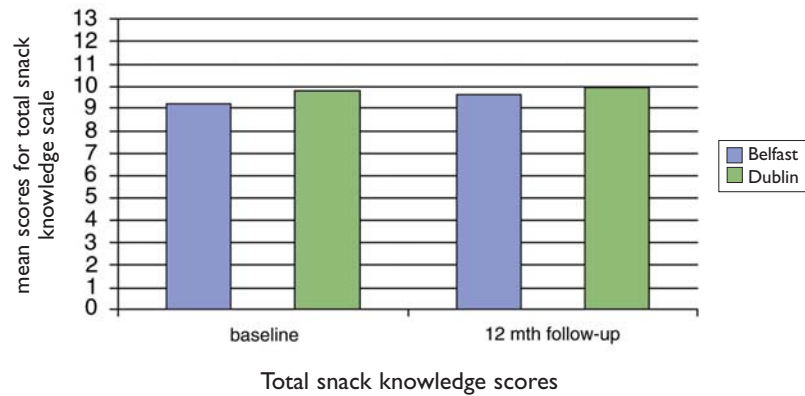
Significantly larger proportions of children in Dublin than in Belfast knew that their toothbrush should have a small head and soft bristles ($p<0.001$).

Safer snack knowledge scores

- Total snack knowledge score
At baseline, the children's mean score for total snack knowledge was 9.44 (95%CI 9.19, 9.69) and median score was 10. At the 12-month follow-up, the mean score was 9.75 (95%CI 9.52, 10.97) and the median score was 10
- Safer snacking knowledge scores
At baseline, the children's mean score was 5.28 (95%CI 5.05, 5.52) and median score was 6. At the 12-month follow-up the mean score was 5.44 (95%CI 5.21, 5.66) and the median score was 6.
- Unsafer snacking knowledge scores
At baseline, the children's mean score was 4.10 (95%CI 3.97, 4.22) and median score was 4. At the 12-month follow-up the mean score was 4.47 (95%CI 4.36, 4.59) and the median score was 5.

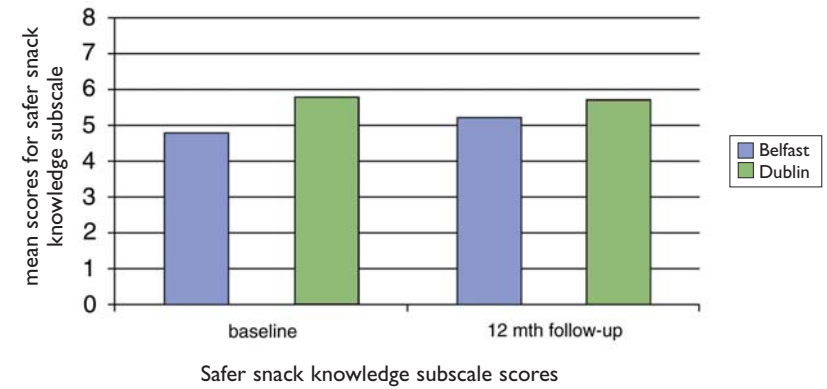
Snack knowledge scores by location of school

Figure 33: Total snack knowledge scores by location of school



At baseline, Dublin children had significantly higher mean scores for knowledge of safer snacks than children in Belfast ($p=0.01$). At 12-month follow-up, the Dublin and Belfast children had equivalent mean scores for knowledge of safer snacks ($p=0.18$).

Figure 34: Safer snack knowledge scores by location of school



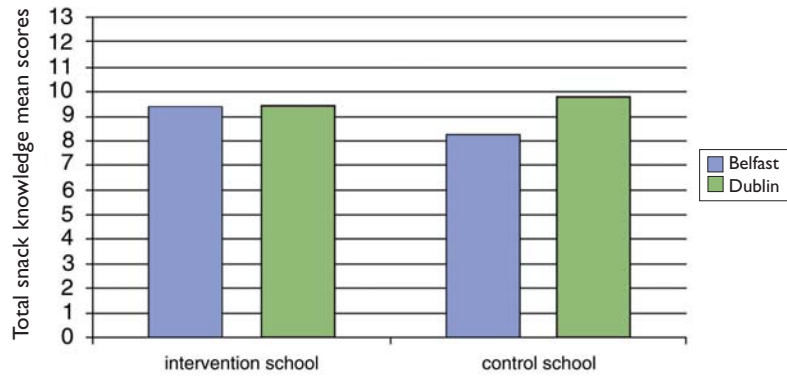
At baseline, Dublin and Belfast children had equivalent scores for knowledge of safer snacks ($p=0.53$) but at 12-month follow-up the Dublin children had significantly higher mean scores for knowledge of safer snacks than children in Belfast ($p=0.04$).

Figure 35: Unsafer snack knowledge scores by location of school



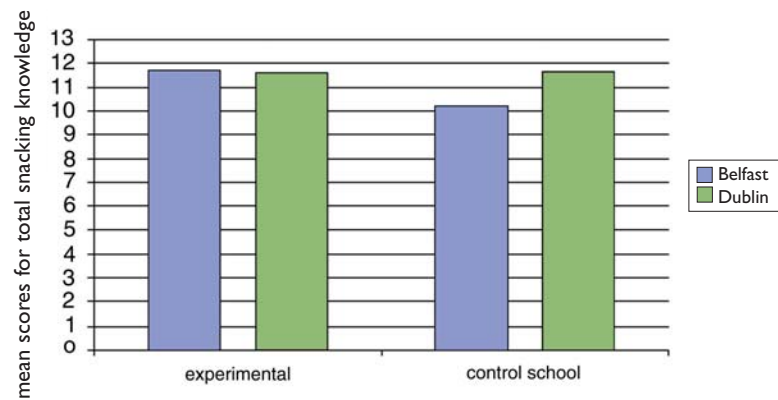
Children in Dublin had significantly higher mean scores for knowledge of less safe snacks than children in Belfast ($p<0.001$). At 12-month follow-up, Dublin and Belfast children had equivalent scores for knowledge of less safe snacks ($p=0.20$).

Figure 36: Total snacking knowledge scores by intervention status and location of school at baseline



Children in Dublin had significantly higher mean scores for knowledge of safer snacks than those in Belfast ($p < 0.001$). Dublin control children had significantly higher scores than the others ($p < 0.001$).

Figure 37: Total snacking knowledge scores by intervention status and location of school at 12-month follow-up



Children in Belfast attending experimental schools had significantly higher mean scores for total snacking knowledge than children attending control schools in Belfast ($p < 0.001$).

Prevention of dental caries knowledge

Figure 38: Prevention of dental caries knowledge at baseline

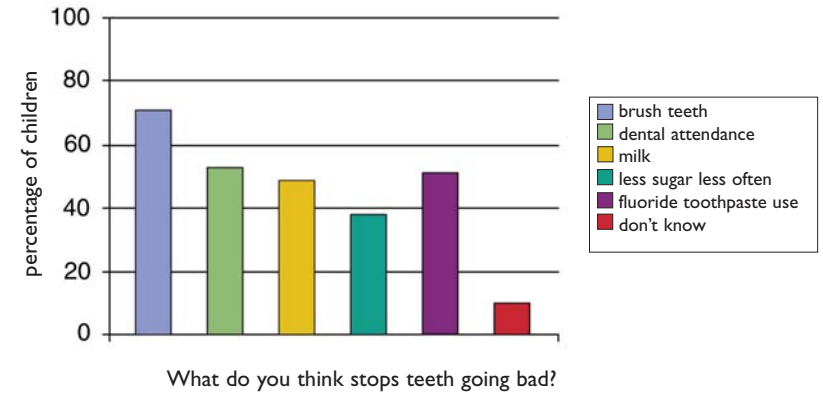


Figure 39: Prevention of dental caries knowledge at 12-month follow-up

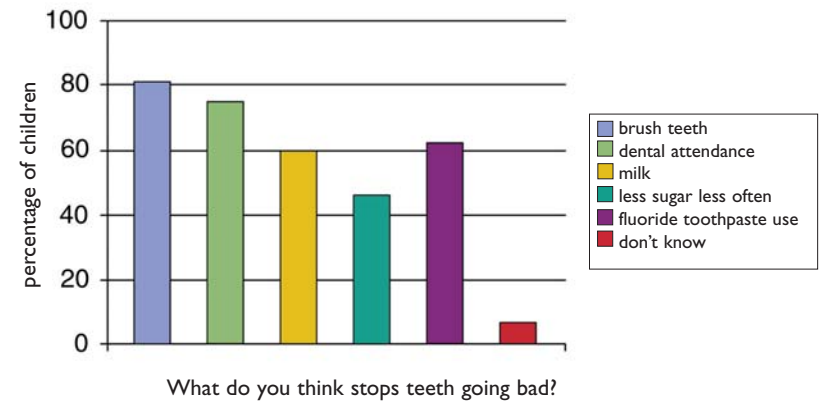
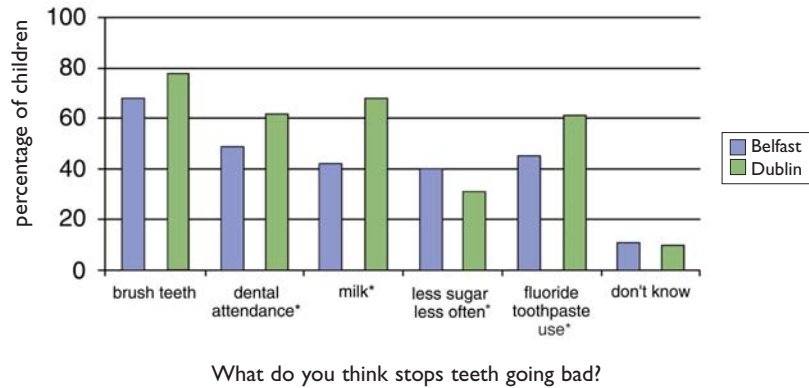
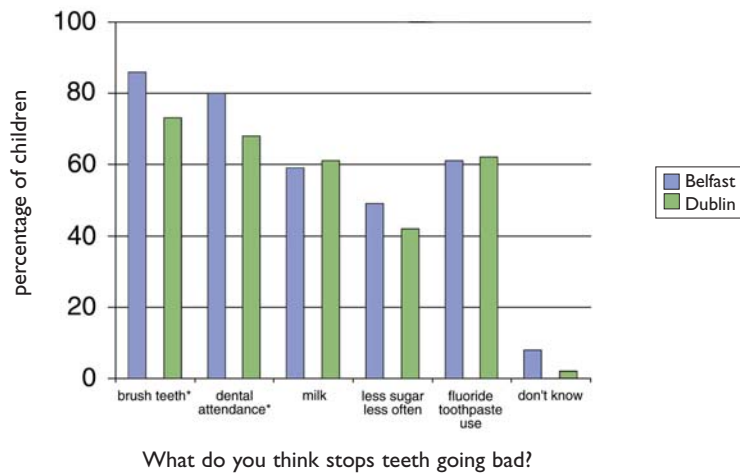


Figure 40: Prevention of dental caries knowledge by location of school at baseline



Significantly larger proportions of Belfast children than Dublin children stated that dental attendance ($p < 0.05$) and using fluoride toothpaste ($p = 0.01$) prevented dental decay. Significantly larger proportions of Dublin schoolchildren stated that drinking milk prevented tooth decay ($p < 0.001$).

Figure 41: Prevention of dental caries knowledge by location of school at 12-month follow-up



Significantly larger proportions of Belfast children than Dublin children stated that brushing teeth ($p = 0.02$) and dental attendance ($p = 0.03$) prevented dental decay.

Sources of oral health information

Figure 42: Ever been shown how to brush your teeth? Baseline and 12-month follow-up

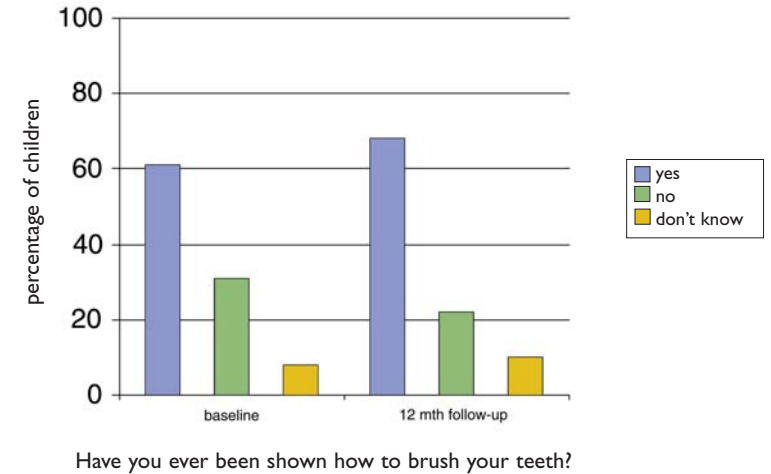
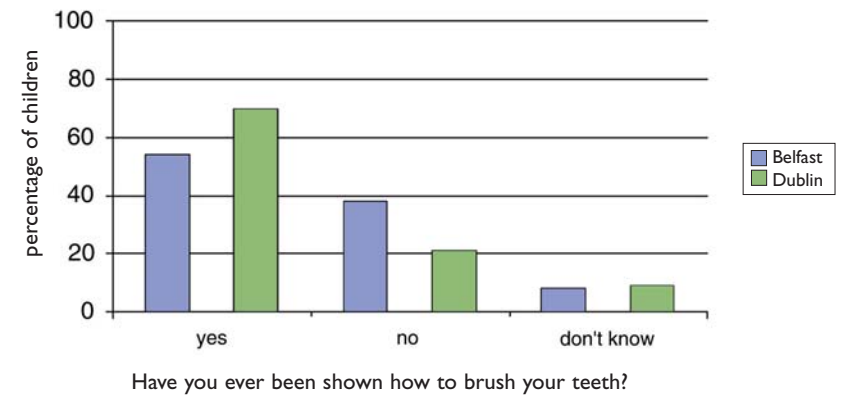
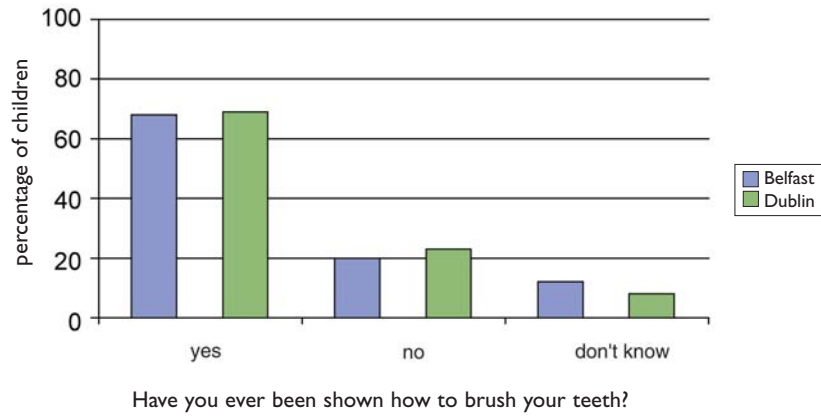


Figure 43: Ever shown how to brush your teeth by location of school: Baseline



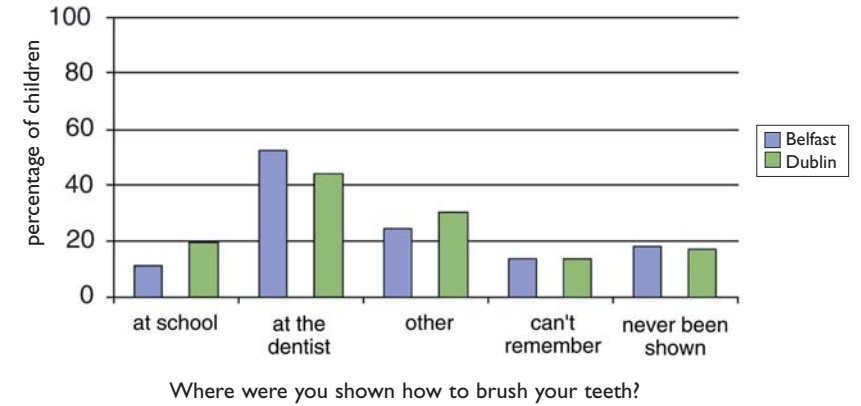
Significantly larger proportions of Dublin children than Belfast children stated that they had been shown how to brush their teeth. ($p = 0.01$).

Figure 44: Ever been shown how to brush your teeth by location of school: 12 month follow-up



At 12-month follow-up, equivalent proportions of Dublin and Belfast children stated that they had been shown how to brush their teeth ($p=0.63$).

Figure 46: Where were you shown how to brush your teeth? by location of school: baseline



Equivalent proportions of children in Dublin and Belfast stated that they had been shown how to brush their teeth at school ($p>0.05$) or at the dentist's ($p>0.05$). No other differences were shown between location of school.

Figure 45: Where were you shown how to brush your teeth? Baseline and 12-month follow-up

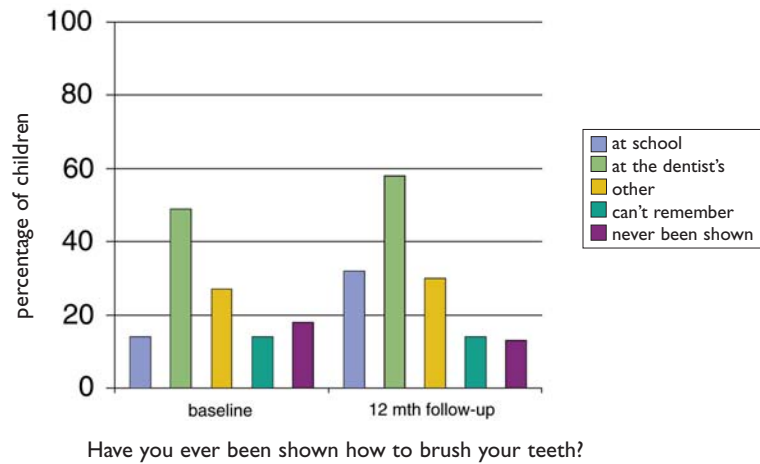
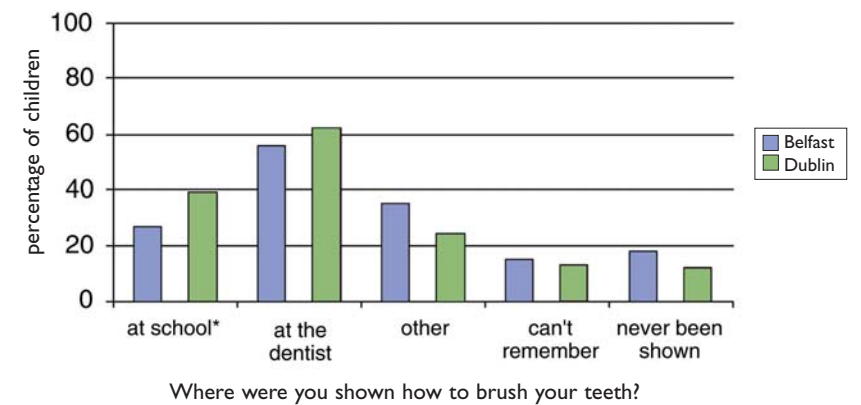


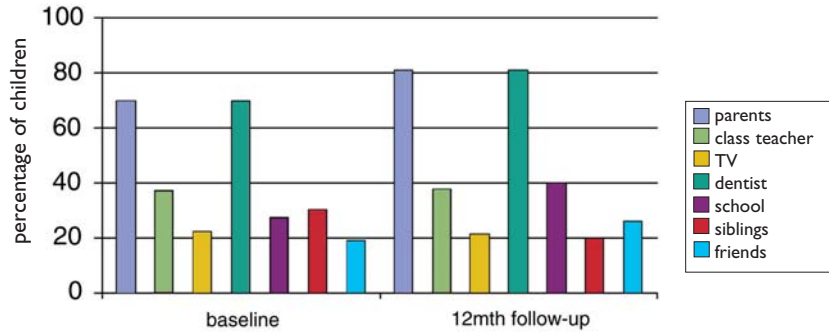
Figure 47: Where were you shown how to brush your teeth? by location of school: 12-month follow-up



Significantly larger proportions of Dublin children than Belfast children stated that they had been shown how to brush their teeth at school ($p<0.05$).

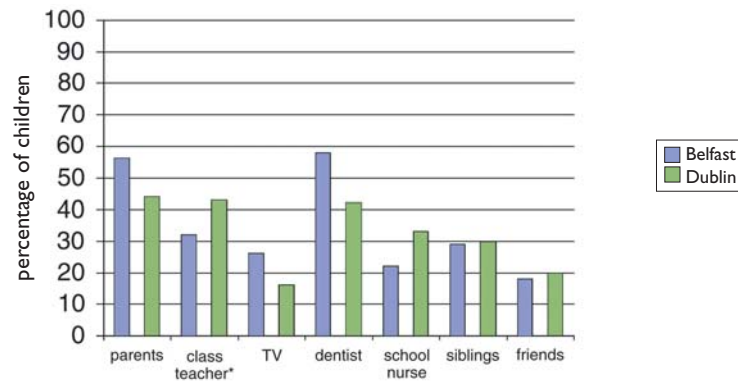
Salient Referents

Figure 48: Salient referents by location of school at baseline and 12-month follow-up



Who do you take most notice of when it comes to looking after your teeth?

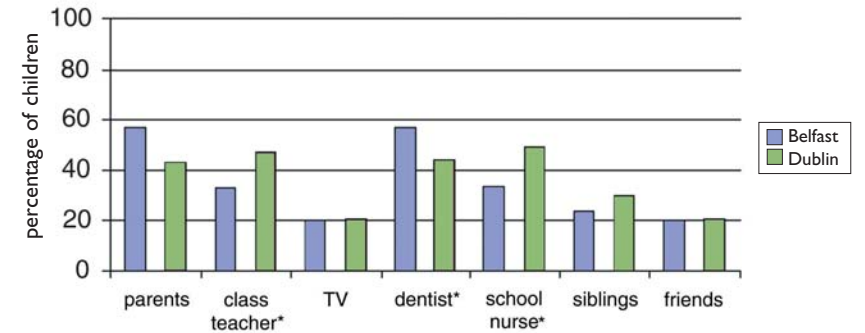
Figure 49: Salient referents by location of school at baseline



Who do you take most notice of when it comes to looking after your teeth?

Significantly larger proportions of Dublin children than Belfast children stated that they took notice of their teachers when it came to looking after their teeth ($p < 0.05$). Trends suggested that larger proportions of Dublin schoolchildren relied on the school nurse ($p = 0.06$) for toothbrushing information whereas larger proportions of Belfast children listened to their parents ($p = 0.08$) and to the TV ($p = 0.07$).

Figure 50: Salient referents by location of school at 12-month follow-up



Who do you take most notice of when it comes to looking after your teeth?

Significantly larger proportions of Dublin children stated that they took notice of their teachers ($p = 0.03$) and the school nurse ($p = 0.03$) whereas larger proportions of Belfast children relied on their dentists for toothbrushing information ($p = 0.02$).

Reported oral health-related behaviours

Reported toothbrushing behaviours

Figure 51: Reported frequency of toothbrushing per day

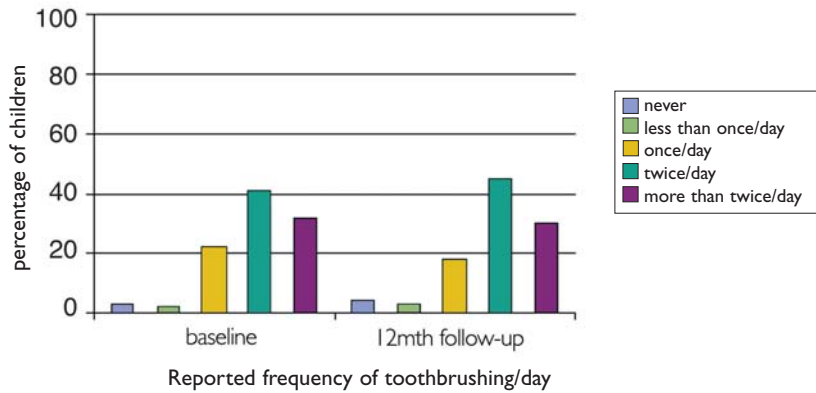
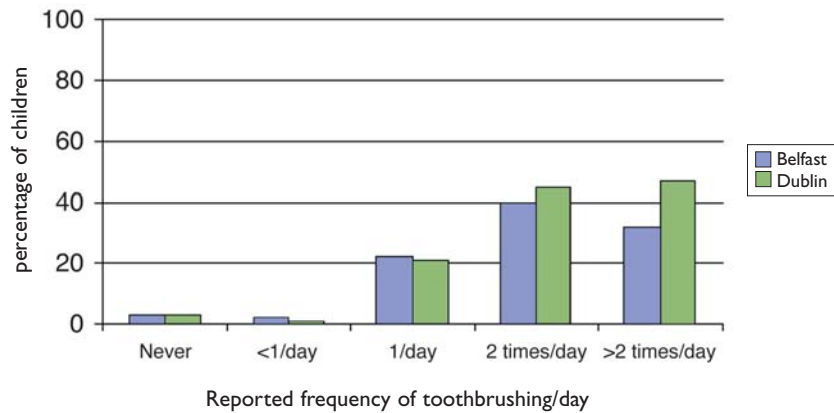
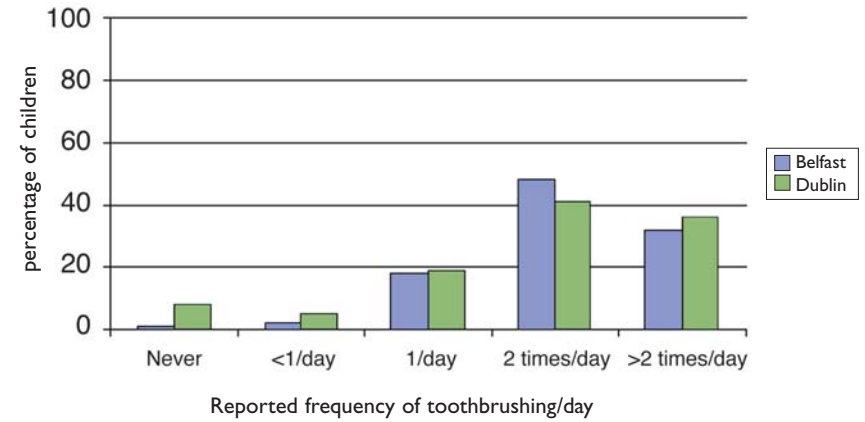


Figure 52: Reported frequency of daily toothbrushing by location of school at baseline



Significantly larger proportions of children in Dublin than in Belfast reported that they brushed their teeth more than twice per day ($p=0.02$)

Figure 53: Reported frequency of daily toothbrushing by location of school at 12-month follow-up



Significantly larger proportions of children in Belfast than children in Dublin reported that they brushed their teeth more than twice per day ($p=0.02$)

Reported frequency of dental attendance

Figure 54: Reported frequency of dental attendance

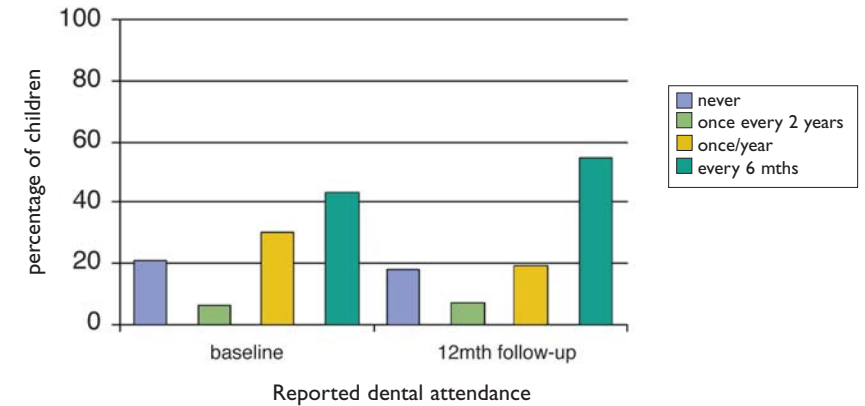
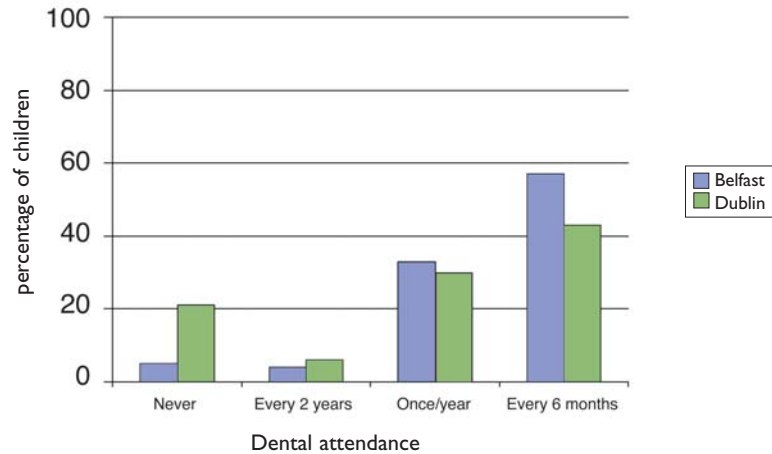
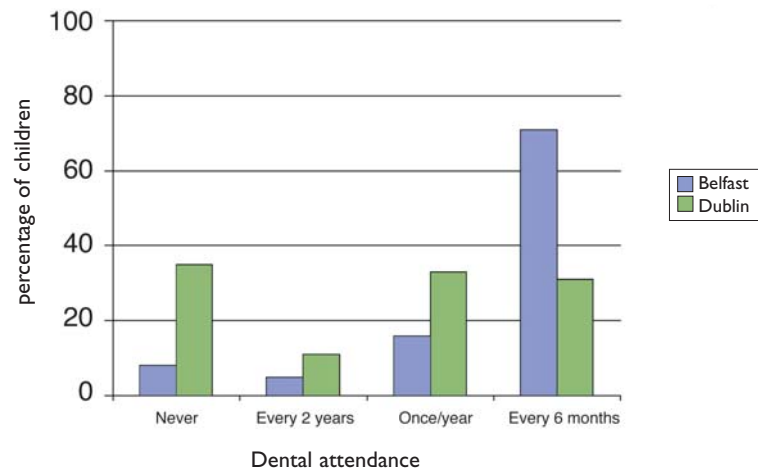


Figure 55: Reported frequency of dental attendance by location of school at baseline



Significantly larger proportions of children in Belfast than in Dublin reported that they attended the dentist every six months ($P < 0.001$).

Figure 56: Reported frequency of dental attendance by location of school at 12-month follow-up



Significantly larger proportions of children in Belfast than in Dublin reported that they attended the dentist every six months ($P < 0.001$).

Appendix 7 The Declaration of Helsinki

The Declaration of Helsinki
 Recommendations Guiding Physicians in Biomedical Research
 Involving Human Subjects
 Adopted by the 18th World Medical Assembly
 Helsinki, Finland, June 1964,
 and amended by
 the 29th World Medical Assembly, Tokyo, Japan, October 1975;
 the 35th World Medical Assembly, Venice, Italy, October 1983;
 the 41st World Medical Assembly, Hong Kong, September 1989;
 and the
 48th General Assembly, Somerset West, Republic of South Africa, October 1996

INTRODUCTION

It is the mission of the physician to safeguard the health of the people. His or her knowledge and conscience are dedicated to the fulfillment of this mission.

The Declaration of Geneva of the World Medical Association binds the physician with the words, "The health of my subject will be my first consideration," and the International Code of Medical Ethics declares that, "A physician shall act only in the subject's interest when providing medical care which might have the effect of weakening the physical and mental condition of the subjects."

The purpose of biomedical research involving human subjects must be to improve diagnostic, therapeutic, and prophylactic procedures and the understanding of the etiology and pathogenesis of disease.

In current medical practice most diagnostic, therapeutic, or prophylactic procedures involve hazards. This applies especially to biomedical research.

Medical progress is based on research which ultimately must rest in part on experimentation involving human subjects. In the field of biomedical research a fundamental distinction must be recognized between medical research in which the aim is essentially diagnostic or therapeutic for a subject, and medical research, the essential object of which is purely scientific and without implying direct diagnostic or therapeutic value to the person subjected to the research. Special caution must be exercised in the conduct of research which may affect the environment, and the welfare of animals used for research must be respected.

Because it is essential that the results of laboratory experiments be applied to human beings to further scientific knowledge and to help suffering humanity, the World Medical Association has prepared the following recommendations as a guide to every physician in biomedical research involving human subjects. They should be kept under review in the future. It must be stressed that the standards as drafted are only a guide to physicians all over the world. Physicians are not relieved from criminal, civil, and ethical responsibilities under the laws of their own countries.

I. BASIC PRINCIPLES

- A. Biomedical research involving human subjects must conform to generally accepted scientific principles and should be based on adequately performed laboratory and animal experimentation and on a thorough knowledge of the scientific literature.
- B. The design and performance of each experimental procedure involving human subjects should be clearly formulated in an experimental protocol which should be transmitted for consideration, comment, and guidance to a specially appointed committee independent of the investigator and the sponsor provided that this independent committee is in conformity with the laws and regulations of the country in which the research experiment is performed.
- C. Biomedical research involving human subjects should be conducted only by scientifically qualified persons and under the supervision of a clinically competent medical person. The responsibility for the human subject must always rest with a medically qualified person and never rest on the subject of the research, even though the subject has given his or her consent.
- D. Biomedical research involving human subjects cannot legitimately be carried out unless the importance of the objective is in proportion to the inherent risk to the subject.

- E. Every biomedical research project involving human subjects should be preceded by careful assessment of predictable risks in comparison with foreseeable benefits to the subject or to others. Concern for the interests of the subject must always prevail over the interests of science and society.
- F. The right of the research subject to safeguard his or her integrity must always be respected. Every precaution should be taken to respect the privacy of the subject and to minimize the impact of the study on the subject's physical and mental integrity and on the personality of the subject.
- G. Physicians should abstain from engaging in research projects involving human subjects unless they are satisfied that the hazards involved are believed to be predictable. Physicians should cease any investigation if the hazards are found to outweigh the potential benefits.
- H. In publication of the results of his or her research, the physician is obliged to preserve the accuracy of the results. Reports of experimentation not in accordance with the principles laid down in this Declaration should not be accepted for publication.
- I. In any research on human beings, each potential subject must be adequately informed of the aims, methods, anticipated benefits, and potential hazards of the study and the discomfort it may entail. He or she should be informed that he or she is at liberty to abstain from participation in the study and that he or she is free to withdraw his or her consent to participation at any time. The physician should then obtain the subject's freely-given informed consent, preferably in writing.
- J. When obtaining informed consent for the research project, the physician should be particularly cautious if the subject is in a dependent relationship to him or her or may consent under duress. In that case the informed consent should be obtained by a physician who is not engaged in the investigation and who is completely independent of this official relationship.
- K. In case of legal incompetence, informed consent should be obtained from the legal guardian in accordance with national legislation. Where physical or mental incapacity makes it impossible to obtain informed consent, or when the subject is a minor, permission from the responsible relative replaces that of the subject in accordance with national legislation.
Whenever the minor child is in fact able to give a consent, the minor's consent must be obtained in addition to the consent of the minor's legal guardian.
- L. The research protocol should always contain a statement of the ethical considerations involved and should indicate that the principles enunciated in the present Declaration are complied with.

II. MEDICAL RESEARCH COMBINED WITH PROFESSIONAL CARE (CLINICAL RESEARCH)

- A. In the treatment of the sick person, the physician must be free to use a new diagnostic and therapeutic measure, if in his or her judgment it offers hope of saving life, reestablishing health, or alleviating suffering.
- B. The potential benefits, hazards, and discomfort of a new method should be weighed against the advantages of the best current diagnostic and therapeutic methods.
- C. In any medical study, every subject - including those of a control group, if any - should be assured of the best proven diagnostic and therapeutic methods. This does not exclude the use of inert placebo in studies where no proven diagnostic or therapeutic method exists.

- D. The refusal of the subject to participate in a study must never interfere with the physician-subject relationship.
- E. If the physician considers it essential not to obtain informed consent, the specific reasons for this proposal should be stated in the experimental protocol for transmission to the independent committee.(I,B)
- F. The physician can combine medical research with professional care, the objective being the acquisition of new medical knowledge, only to the extent that medical research is justified by its potential diagnostic or therapeutic value for the subject.

III. NONTHERAPEUTIC BIOMEDICAL RESEARCH INVOLVING HUMAN SUBJECTS (NON-CLINICAL BIOMEDICAL RESEARCH)

- A. In the purely scientific application of medical research carried out on a human being, it is the duty of the physician to remain the protector of the life and health of that person on whom biomedical research is being carried out.
- B. The subjects should be volunteers - either healthy persons or subjects for whom the experimental design is not related to the subject's illness.
- C. The investigator or the investigating team should discontinue the research if in his/her or their judgment it may, if continued, be harmful to the individual.
- D. In research on man, the interest of science and society should never take precedence over considerations related to the well being of the subject.

Appendix 7a - CRF and Adverse Event Reporting form of the Winning Smiles Controlled Trial

Child's Name _____			
SAN <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>		School <input type="text"/> <input type="text"/>	
Initials <input type="text"/> <input type="text"/> <input type="text"/>		Sex <input type="checkbox"/> date of birth <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
Inclusion criteria Informed consent form signed <input type="checkbox"/> Child willing to participate <input type="checkbox"/>		Exclusion criteria Informed consent form not signed <input type="checkbox"/> Child unwilling to participate <input type="checkbox"/>	
Answers to the above questions must be YES in order for child to be eligible		Answers to the above questions must be No in order for child to be eligible	
Date of Collection (Baseline) <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>		Date last brushed <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
Time last brushed <input type="text"/> <input type="text"/>		Hours since brushing am <input type="text"/> <input type="text"/> Hours since brushing pm <input type="text"/> <input type="text"/>	
<input type="text"/> <input type="text"/> am	<input type="text"/> <input type="text"/> am	<input type="text"/> <input type="text"/> pm	<input type="text"/> <input type="text"/> pm
Time collected	Time of last food or drink	Time collected	Time of last food or drink
Collected by _____			
Date of Collection (6 months) <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>		Date last brushed <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
Time last brushed <input type="text"/> <input type="text"/>		Hours since brushing am <input type="text"/> <input type="text"/> Hours since brushing pm <input type="text"/> <input type="text"/>	
<input type="text"/> <input type="text"/> am	<input type="text"/> <input type="text"/> am	<input type="text"/> <input type="text"/> pm	<input type="text"/> <input type="text"/> pm
Time collected	Time of last food or drink	Time collected	Time of last food or drink
Collected by _____			
Date of Collection (12 months) <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>		Date last brushed <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
Time last brushed <input type="text"/> <input type="text"/>		Hours since brushing am <input type="text"/> <input type="text"/> Hours since brushing pm <input type="text"/> <input type="text"/>	
<input type="text"/> <input type="text"/> am	<input type="text"/> <input type="text"/> am	<input type="text"/> <input type="text"/> pm	<input type="text"/> <input type="text"/> pm
Time collected	Time of last food or drink	Time collected	Time of last food or drink
Collected by _____			

Adverse Events Form

Narrative Description:

Relationship to study:

Not Related Unlikely Possible Probable Highly Probable

Frequency: 1 = single
2 = intermittent Severity: 1 = mild
2 = moderate
3 = severe

Date of Onset: / / Resolution: 1 = resolved
2 = unresolved
3 = fatal

Date of Resolution: / /

Duration of Event: record only if less than 24 hours _____

Medication taken to treat the event: No Yes

Does the event meet the definition of serious: No Yes

Action taken: 1 = none
2 = interrupted
3 = discontinued

Comment:

Investigators signature: _____ Date: _____

Appendix 8 Parents' Focus Groups

Baseline: At the focus group, the parent's perception of the child's baseline current attitudes and behaviours related to toothbrushing will be elucidated.

- Does your child like to brush their teeth?
- How much toothpaste do they use?
- Has anyone shown you how to brush your child's teeth?
- Do you supervise your child brushing their teeth? Directly? Indirectly – i.e. ask if it is done? Check teeth to see if they are clean?
- How often does your child brush their teeth?
- When does your child brush their teeth?
- Is it easy to get your child to brush?
- Does your child need a lot of encouragement to get them to brush?
- What is fluoride?

Post Programme

Acceptability of the Programme

How did you feel about someone else coming in to school to talk to your child about brushing their teeth?

Here the researcher will be looking for attitudes about other people entering the classroom space with other messages: the rationale is to establish if the parent thinks this sort of activity is justified.

Are you aware of other things like this happening in the school; if so, what are these and how do you think they compare to this?

Once again, the researcher is looking to stimulate comparisons with other professionals and their activities and to see if they are seen as more or less important. The researcher will therefore stimulate the conversation to this end.

Did you actively get involved in making sure your child brushed their teeth during the competition? Was this any more than you usually would?

As above, the core objective of the evaluation is to see how the competitive elements of the intervention are interpreted and observed by all involved. Therefore the focus group will try to see how such competitions are viewed by parents.

Toothbrushing

Did your child try to brush their teeth more for the competition?

This question aims to look at the penetration of the competition into the child's behaviour and essentially how it affected another domain of everyday life. There are key theoretical issues here which might explain any resistances to the programme in terms of its ability to transfer across domains of everyday life. In this way, this is how this programme is basically an intersectoral form of health promotion.

In addition, as in the children's focus groups, the researcher will be looking to for signs that the child started off really well but that the enthusiasm then subsided. If this is the case, then the researcher will aim to find out why it was the case. Moreover, there might be some children and indeed parents displaying a low enthusiasm initially, but who then reported becoming more involved as the competition developed.

The research will therefore be looking for a possible dynamic effect of the competition on enthusiasm.

Did the child talk to you much about the competition? What sorts of things did you talk about?

Once again, the aim is to explore possible group effects, only this time the idea is to look at the interaction of the competition within the home interface – Looking for positive and negative relationships and how these might relate to the success of the programme.

Did you help your child brush their teeth by reminding them?

What was the best bit about the programme?

What was the worst bit about the programme?

What do you think fluoride is? Do you think it is important?

Appendix 9 Detailed Outline of the Quantitative Intervention

Table 28: Summary outline of intervention programme

Step 1. First Meeting with School Principal (Spring/Summer Term 2003)	Contact school principal, explain the purpose and implications of research project and invite school's participation. Meet with relevant class teachers to discuss project.
Step 2. First Visit to Class (Autumn Term 2003)	Go into each participating classroom and inform teacher and children about the competition Encourage and motivate the children to participate - emphasize the competitive element Distribute parental consent forms and advise children that they will be unable to take part if the form not signed by a parent and returned.
Step 3. (About 1 week later)	Collect completed consent forms from school
Step 4. Second Class Visit	Collect saliva samples
Step 5. First Intervention Visit	Carry out first plaque score - (approx 15 mins) Provide educational input and toothbrushing demonstration - (approx 20 mins) Give wall chart to teacher/pupils <i>Toothpaste and tooth brush to be given to children in Dublin only</i> Provide further encouragement and motivation Advise children that you will be making a 'surprise' return visit to do a further plaque score
Step 6. Second Intervention Visit (4 weeks later)	Carry out second plaque score – advise children of outcome Provide additional encouragement for children to keep up their toothbrushing – even though the competition is over! Advise children when the presentation of prizes will take place.
Step 7. (2–4 weeks following Step 5)	Presentation of medals, certificates, cups and plaques
Step 8.	Toothpaste and brushes continue to be distributed in Dublin schools until 12 months after study starts.

DETAILS OF THE INTERVENTION TO BE IMPLEMENTED BY THE NAHB
First Meeting with School Principal
Objectives:

- To inform the School Principal of the Programme
- To provide the Principal with detailed information on the programme
- To seek the school's participation on the programme

Duration: Depends on the availability of the Principal (up to 30 mins. is necessary)

Personnel: OHP/DHE

Resources:

- Information letter to School Principal
- Copy of the consent form.

Steps:

- The Oral Health Promoter/Dental Health Educator should contact the school by phone to seek a time and date for the first visit with the Principal.
- The Oral Health Promoter/Dental Health Educator should be prepared to give a brief outline of the programme during this first phone conversation.
- The Oral Health Promoter/Dental Health Educator visits the school to meet with the School Principal to discuss involvement in the programme.
- The benefits of involvement are outlined and agreement to participate is sought.
- A date is arranged for the teachers' workshop.

Costs:

- Travelling expenses
- Printing costs

First Visit to Class
Objectives:

- To present the programme to each target class
- To distribute consent forms to each of the classes
- To agree dates with the teacher for collection of completed consent forms.

Duration: 30 minutes per class

Personnel: OHP/DHE

Resources:

- Samples of certificates, medals and cups
- Information letter for parents
- Consent forms.

Steps:

- The Oral Health Promoter/Dental Health Educator (and Research Assistant) visits each target class.
- The Oral Health Promoter/Dental Health Educator is introduced to the class, describes the programme and the research project and outlines the rewards for successful participation in the programme.

- The Oral Health Promoter/Dental Health Educator explains simply to the children what they can win and what they must do to win.
- The OHP/DHE distributes the consent forms, explaining that they must be returned to enable for participation in the plaque testing aspect of the programme.
The teacher guides this process.

Costs:

- Travelling expenses
- Printing costs of information letter (minimal)
- Medals and certificates (approx €400)

Note: The class teacher is present and plays a supportive role.

Visit to school to collect consent forms
Objectives:

- To collect completed consent forms
- To agree dates with the teacher the date for intervention visits – children not to be informed

Duration: 15 minutes

Personnel: OHP/DHE

Costs: Travelling expenses

Second Visit to Class
Objectives:

- To collect morning saliva samples
- To collect afternoon saliva samples
- To distribute questionnaires
- To confirm with the teacher the date for the next visit.

Duration: one hour in the morning, one hour in the afternoon

Personnel: the OHP/DHE, Research Assistant

Resources:

- Test tubes
- Funnels
- Test-tube racks
- Indelible marker
- Ice packs
- Styrofoam containers
- Timer
- Disposable non-latex gloves
- Disposable wipes
- Brown tape
- Waste-disposal bags
- Tissues
- Questionnaires.

Steps:

- The Research assistant is introduced to the class and describes the saliva collection process.
- The Research Assistant and the OHP/DHE collect the morning saliva samples.
- The Research Assistant and the OHP/DHE agree a time to return in the afternoon.
- The Research Assistant and the OHP/DHE collect the afternoon saliva samples.
- The OHP/DHE describes the questionnaires and gives a brief outline of their completion.
- The OHP/DHE leaves the questionnaires with the teacher for completion prior to the next visit.

Costs:

- Travelling expenses
- Cost of printing questionnaires (minimal)
- Cost of saliva sampling equipment

Note: The class teacher is present and plays a supportive role.

First Intervention Visit
Objectives:

- To convey key oral health messages
- To increase knowledge on the importance of teeth and their use
- To provide information on diet and nutrition and the effect of frequency of sugar consumption on teeth
- To increase knowledge of tooth-friendly and non-tooth-friendly foods
- To demonstrate a correct method of toothbrushing
- To demonstrate a pea-sized amount of toothpaste
- To carry out a plaque test and score pupils
- To observe and advise pupils practising their new toothbrushing skills
- To provide motivation and encouragement to sustain the programme
- To effect a behaviour change in children re brushing behaviour.

Duration: 1 hour and 15 minutes per class:

Step 1 – 15 minutes for educational component (compatible with SPHE and NI curriculum)

Step 2 – 15 minutes for oral hygiene component

Step 3 – 30 minutes for plaque score

Step 4 – 15 minutes for observation of toothbrushing skills

Personnel: OHP/DHE

Step 1: Educational Component: Discussion and Activity on Nutrition and Oral Health

Duration: 15 minutes

The OHP/DHE :

1. Discusses the importance of teeth and their use.
2. Uses sugar frequency/acid attack chart to explain the concept of acid attacks in a very simple form. Demonstrates the concept.
3. Ask the pupils to identify meal and snack times on the chart and list what they have eaten during the previous 24-hour period.

4. Identifies the number of acid attacks that occur on the chart (during that period)
5. Invites the class to discuss the impact that sugar-consumption patterns have on their oral health and how it can affect general health. A special emphasis is placed on the danger to teeth caused by sugary snacks and drinks.
6. Discusses how often the children eat and drink sugary products every day.
7. Explains about plaque and it's role as a cause of decay and a cause of gum disease.

Resources:

- Model of teeth
- Food pyramid (ROI)/food plate (NI)
- Oral hygiene pictures
- Acid attack chart.

Step 2: Discussion and Activity on Brushing Behaviour

Duration: 15 minutes

The OHP/DHE discusses good oral hygiene brushing practices with the pupils, addressing the following issues :

1. Brushing Demonstration : Show the children how to brush properly using the tooth model and toothbrush. Give simple reasons for the best method.
2. Using a regular toothbrush and a tube of toothpaste, demonstrate how much toothpaste to use. Emphasise the importance of not swallowing the toothpaste.
3. Explain the dental benefits of fluoride in toothpaste.
4. Explain to children that they need to brush twice a day, once in the morning and once in the evening before bedtime, for three minutes each time (the length of a song!) Explain why they should do this.

Resources:

- Large toothbrush
- Model of teeth
- Tube of fluoride toothpaste (to demonstrate a small pea-sized amount) and correct-sized toothbrush (e.g. small head)

Step 3: Plaque Score

Duration: 30 minutes

It is explained to the child that the disclosing tablet will colour "the plaque" on their teeth and that this shows where better tooth brushing is needed.

- The children are asked to chew the disclosing tablet, swish it around their mouth and spit it out into the sink.
- Supervision is required while this task is being completed.
- The OHP/DHE views the upper and lower labial surfaces, at the central and lateral incisors and the buccal surfaces of the first permanent molars and marks the score sheet accordingly.
- This is a visual learning exercise and each child is shown the problem areas. A handheld mirror is used for this purpose.
- Twelve teeth are scored in total, and marked out of a total of twelve. (See attached score sheet).
- The aim for each child is to achieve as low a plaque score as possible.

Resources:

- Plaque-disclosing agent

- Access to a sink required
- Plaque-scoring sheets
- Disposable non-latex gloves
- Waste-disposal bags
- Tissues.

Step 4: Observation of toothbrushing skills

Duration: 15 minutes

1. The pupils divide into pairs and observe each other practising their newly learned toothbrushing skills. Each pupil observes themselves in a hand mirror held by their partner.
2. Supervision by the OHP/DHE and the teacher is required during this task.
3. The class is presented with a brushing recorder wall chart. The OHP/DHE explains (with the co-operation of the teacher) how the chart should be used. (See Wall Chart Instructions, appendix ii).
4. The teacher is presented with activity worksheets, toothbrushes and paste (Dublin only) and the OHP/DHE explains how they should be used.

Home Link

- The pupils are asked to practise brushing their teeth at home as instructed and report back each day to their class team leader on their progress which is marked on the wallchart (See Wall Chart Instructions, appendix ii).

Resources:

- Toothbrushes and toothpaste (Dublin study only)
- Hand mirrors
- Brushing wall chart
- Worksheets
- Toothbrushes provided for children who forgot to bring them (Belfast study only)

Costs:

- Travelling expenses
- Cost of printing OH pictures, plaques score sheets, wallchart, activity worksheets
- Cost of hand mirrors
- Cost of disclosing agent, wipes, gloves etc (can be met from primary dental-care budget)

Note: The teacher is present for all steps and plays a supportive role.

Programme for Dublin

Same as for Belfast with the addition of distribution of fluoride toothpaste to the families of the participating children. 4 x 100ml or 8 x 50ml tubes to be distributed quarterly to cover a 12-month period. Quantities estimated based on 0.5mg use twice per day by family of four; New brush for participating child to be distributed quarterly also. Pamphlet to be distributed (Appendix 9a) with toothpaste advising use of a pea-sized amount of paste and use under supervision.

Second Intervention Visit

Objective: To carry out the second 'visual plaque test' and score the pupils.

Duration: 30-40 minutes per class (depending on class size)

Personnel: OHP/DHE

Resources:

- Plaque-disclosing agent
- Access to a sink required
- Plaque scoring sheets
- Disposable non-latex gloves
- Waste-disposal bags
- Tissues

Steps:

- The OHP/DHE addresses the wallchart and commends pupils on their participation
- The OHP/DHE carries out plaque test adopting the same approach as used in Step 3 in the First Intervention Visit.
- The OHP/DHE makes a comparison of results and the information is used to encourage the children to maintain good practice.
- The OHP/DHE arranges a date with the Principal for prize-giving

Costs:

- Travelling expenses
- Cost of disclosing agent, wipes, gloves etc (can be met from primary dental-care budget)

Note: The class teacher is present and plays a supportive role.

Presentation of Prizes

Objectives:

- To present the pupils in each class with their awards
- To present the winning class with their prize
- To reward participation and achievements
- To reinforce the positive messages of the programme

Duration: 1 hour

Personnel: OHP/DHE, school officials

Resources:

- Medals and certificates for pupils
- Cup for Best Class
- Award List
- Refreshments

Awards structure:

- Every child who participated but did not show an improvement gets a Certificate of Participation
- Every child showing an improvement gets a Certificate of Achievement
- Every child achieving 0% gets a medal in addition to the certificate
- The 'Best Class' is the class with the lowest average score and receives a cup and a night off homework.

Steps:

- The Oral Health Promoter and key school officials present the prizes on 'Prize Day'.
- The prizes are distributed in a classroom/school hall.

- Children are called one by one to accept their prize from the guests.
- Presentation is followed by a party using healthy-option refreshments.

Costs:

- Travelling expenses
- Cost of printing certificates
- Cost of medals and cup (already in stock)
- Cost of refreshments (€150)

Score Sheet
Scoring Methods and Rewards Structure

- The objective is to achieve as low a 'visual plaque' score as possible.
- The Oral Health Promoter looks at the child's teeth and gives a score for every tooth that has plaque present, e.g. if there is plaque present on all 12 of the teeth, the child receives a score of 12.
- This is a visual learning tool.

Certificates and Medals

- These are individual awards.
- Every child receives a Certificate for Participation.
- Every child achieving a score of '0' receives a medal in addition to the certificate.

The Cups

- Each school is provided with a 'Cup' which is presented to the winning class within that school.
- The winning class is identified by getting an average score for each class.
- The class with the highest average improvement score is the winner in that school.

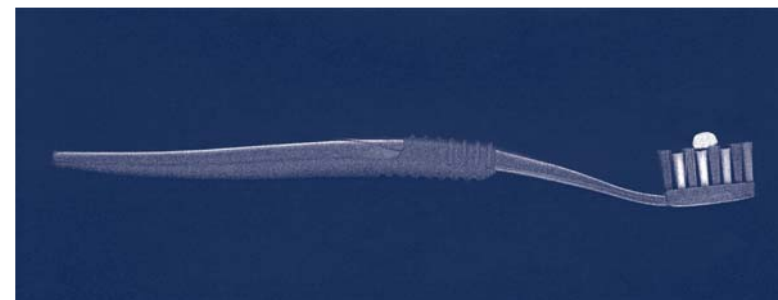
Added Intervention in Dublin

Distribution of fluoride toothpaste to the families of the participating children. 4 x 100ml or 8 x 50ml tubes to be distributed quarterly to cover a 12-month period. Quantities estimated based on 0.5mg use twice per day by family of four. New brush for participating child to be distributed quarterly also.

Pamphlet (Appendix 1a) to be distributed with toothpaste advising use of a pea-sized amount of paste and use under supervision.

Appendix 9a Instructions for Use-of-Toothpaste Pamphlet
Teeth for Life
Instructions for Use

- Make brushing part of your child's daily routine.
- Brush in the morning and evening with the fluoride toothpaste — it may help to sit behind your child whilst brushing so that you can see the teeth easily.
- Please use a pea-sized amount of toothpaste on the brush as illustrated.



- Hold the brush next to the picture to see the right amount.
- Encourage your child to spit the toothpaste out after brushing.
- We will send your child more toothpaste in three months' time.
- We suggest that you do not give your child fluoride drops or tablets unless they are prescribed by your own dentist.

Appendix 10 Frequency Distribution Graphs of Salivary Fluoride Concentration

Figure 57. Frequency distribution of salivary fluoride concentration at Baseline, six and 12 months – Belfast Control (n=47)

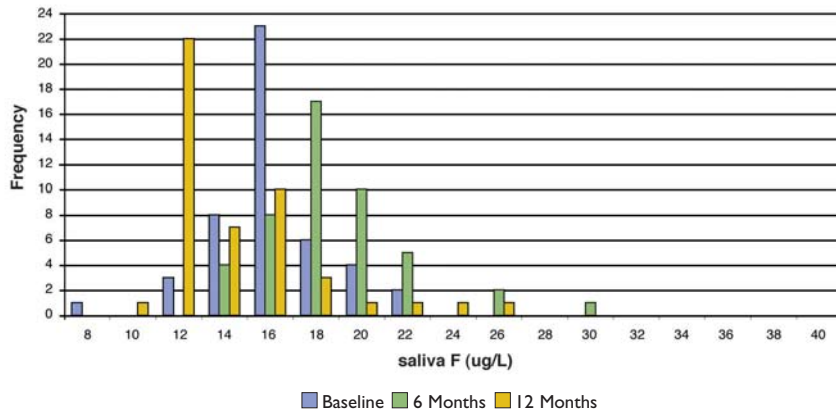


Figure 59. Frequency distribution of salivary fluoride concentration at Baseline, six and 12 months – Dublin Control (n=46)

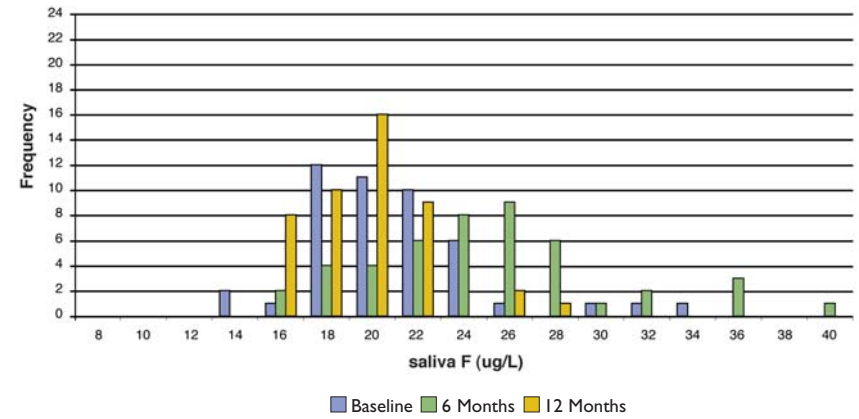


Figure 58. Frequency distribution of salivary fluoride concentration at Baseline, six and 12 months – Belfast Experimental (n=53)

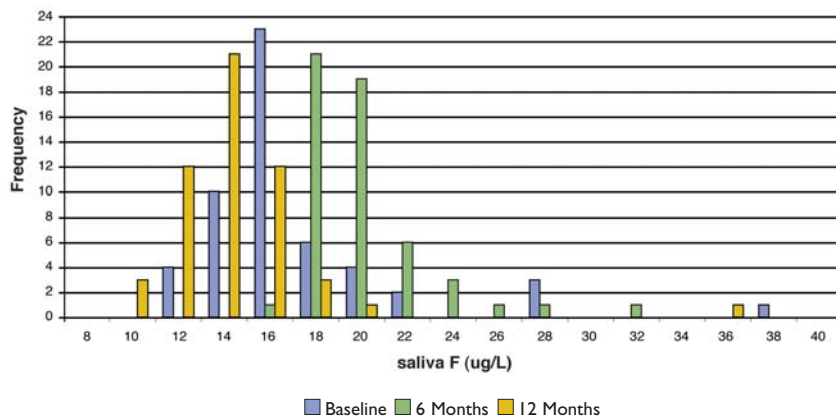
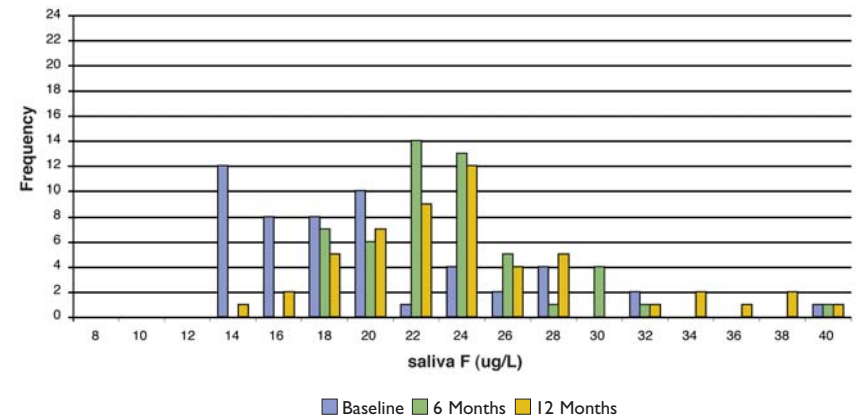


Figure 60. Frequency distribution of salivary fluoride concentration at Baseline, six and 12 months – Dublin Experimental (n=52)



Appendix 11 Statistical Significance of Changes in Salivary Fluoride Levels within Groups.

The results of the paired t-tests for the change in salivary fluoride concentration levels over time using the SAS TTEST procedure are shown below. For each group the TTEST procedure displays the following summary statistics:

- N, the number of nonmissing values
- Lower CL Mean, the lower confidence bound for the mean
- the Mean or average
- Upper CL Mean, the upper confidence bound for the mean
- Lower CL Std Dev, the lower confidence bound for the standard deviation
- Std Dev, the standard deviation
- Upper CL Std Dev, the upper confidence bound for the standard deviation
- Std Err, the standard error of the mean
- the Minimum value, if the line size allows
- the Maximum value, if the line size allows

Next, the results of the paired t tests are given. For paired observation t tests, the TTEST procedure displays

- t Value, the t statistic for testing the null hypothesis that the mean of the differences for the group at the two time points being tested is zero
- DF, the degrees of freedom
- Pr > |t|, the probability of a greater absolute value of t under the null hypothesis. This is the two-tailed significance probability.

Table 29: Results of the paired t-tests for the change in salivary fluoride concentration levels over time using the SAS TTEST procedure – Dublin Control

Statistics										
Difference	N	Lower CL Mean	Mean	Upper CL Mean	Lower CL Std Dev	Std Dev	Upper CL Std Dev	Std Err	Minimum	Maximum
log_Six log_Base	46	0.0857	0.1778	0.2698	0.257	0.3098	0.3903	0.0457	-0.595	0.8557
log_Twelve log_Base	46	-0.114	-0.055	0.004	0.1648	0.1986	0.2502	0.0293	-0.575	0.4463
log_Twelve log_Six	46	-0.297	-0.233	-0.169	0.1788	0.2156	0.2715	0.0318	-0.726	0.1278

T-Tests			
Difference	DF	tValue	Pr > t
log_Six - log_Base	45	3.89	0.0003
log_Twelve - log_Base	45	-1.88	0.0667
log_Twelve - log_Six	45	-7.32	<0.0001

Table 30: Results of the paired t-tests for the change in salivary fluoride concentra levels over time using the SAS TTEST procedure – Dublin Experimental

Statistics										
Difference	N	Lower CL Mean	Mean	Upper CL Mean	Lower CL Std Dev	Std Dev	Upper CL Std Dev	Std Err	Minimum	Maximum
log_Six log_Base	52	0.1224	0.2026	0.2828	0.2415	0.2881	0.3573	0.04	-0.528	0.7932
log_Twelve log_Base	52	0.1434	0.2277	0.312	0.2539	0.3029	0.3756	0.042	-0.375	1.0186
log_Twelve log_Six	52	-0.05	0.0251	0.0998	0.2248	0.2683	0.3327	0.0372	-0.693	0.7376

T-Tests			
Difference	DF	tValue	Pr > t
log_Six - log_Base	51	5.07	<0.0001
log_Twelve - log_Base	51	5.42	<0.0001
log_Twelve - log_Six	51	0.67	0.5034

Table 31: Results of the paired t-tests for the change in salivary fluoride concentration levels over time using the SAS TTEST procedure – Belfast Control

Statistics										
Difference	N	Lower CL Mean	Mean	Upper CL Mean	Lower CL Std Dev	Std Dev	Upper CL Std Dev	Std Err	Minimum	Maximum
log_Six log_Base	47	0.0799	0.1481	0.2164	0.1931	0.2324	0.2919	0.0339	-0.194	0.7621
log_Twelve log_Base	47	-0.202	-0.128	-0.053	0.211	0.2539	0.3189	0.037	-0.56	0.7621
log_Twelve log_Six	47	-0.346	-0.276	-0.206	0.1986	0.239	0.3001	0.0349	-0.693	0.3448

T-Tests			
Difference	DF	tValue	Pr > t
log_Six - log_Base	46	4.37	<0.0001
log_Twelve - log_Base	46	-3.45	0.0012
log_Twelve - log_Six	46	-7.92	<0.0001

Table 32: Results of the paired t-tests for the change in salivary fluoride concentration levels over time using the SAS TTEST procedure – Belfast Experimental

Statistics										
Difference	N	Lower CL Mean	Mean	Upper CL Mean	Lower CL Std Dev	Std Dev	Upper CL Std Dev	Std Err	Minimum	Maximum
log_Six - log_Base	53	0.1274	0.1893	0.2512	0.1884	0.2245	0.2777	0.0308	-0.642	0.6931
log_Twelve - log_Base	53	-0.245	-0.166	-0.086	0.2424	0.2888	0.3573	0.0397	-0.999	0.9163
log_Twelve - log_Six	53	-0.42	-0.355	-0.29	0.1988	0.2368	0.293	0.0325	-0.693	0.7221

T-Tests			
Difference	DF	tValue	Pr > t
log_Six - log_Base	52	6.14	<0.0001
log_Twelve - log_Base	52	-4.18	0.0001
log_Twelve - log_Six	52	-10.91	<0.0001

Appendix 12 Teachers' Debriefing Questionnaire

Thank you for agreeing to meet with me today. The purpose of this meeting is to find out what you really thought about the 'Winning Smiles' programme and to give you the opportunity to make any suggestions about how you feel it could be improved. This should take about 30 minutes.

Q1 Did the children enjoy the 'Winning Smiles' programme?
Yes No

Q2 Which part of do you think they enjoyed the most and why?

Q3 Did the programme help to satisfy the requirements of the NI/SPHE Curriculum?
Yes No

Please explain in what way it did/didn't.

Q4 I'd like to ask you some questions about the various resources that are provided in the Teachers' Pack.

Classroom Worksheet 1 (Show the teacher the Worksheet)

Did you use this worksheet? Yes No

If 'yes', please explain how. _____

If 'no', please explain why you didn't use it. _____

Would you make any changes to it? Please explain. _____

Classroom Worksheet 2 (Show the teacher the Worksheet)

Did you use this worksheet? Yes No

If 'yes', please explain how. _____

If 'no', please explain why you didn't use it. _____

Would you make any changes to it? Please explain. _____

Classroom Worksheet 3 (Show the teacher the Worksheet)

 Did you use this worksheet? Yes No

 If 'yes', please explain how. _____

 If 'no', please explain why you didn't use it. _____

 Would you make any changes to it? Please explain. _____

Homework Sheet 1 (Show the teacher the Worksheet)

 Did you use this worksheet? Yes No

 If 'yes', please explain how. _____

 If 'no', please explain why you didn't use it. _____

 Would you make any changes to it? Please explain. _____

Homework Sheet 2 (Show the teacher the Worksheet)

 Did you use this worksheet? Yes No

 If 'yes', please explain how. _____

 If 'no', please explain why you didn't use it. _____

 Would you make any changes to it? Please explain. _____

Homework Sheet 3 (Show the teacher the Worksheet)

 Did you use this worksheet? Yes No

 If 'yes', please explain how. _____

 If 'no', please explain why you didn't use it. _____

 Would you make any changes to it? Please explain. _____

Information Sheet (Show the teacher the Information Sheet)

 Did you use this worksheet? Yes No

 If 'yes', please explain how. _____

 If 'no', please explain why you didn't use it. _____

 Would you make any changes to it? Please explain. _____

Optional Home Experiment (Show teacher the Home Experiment)

 Did you use this? Yes No

 If 'yes', please explain how. _____

 If 'no', please explain why you didn't use it. _____

 Would you make any changes to it? Please explain. _____

Acid Attack Charts (Show the teacher the Charts)

 Did you use these charts? Yes No

 If 'yes' please explain how. _____

 If 'no' please explain why you didn't use it. _____

 Would you make any changes to it? Please explain. _____

'Winning Smiles' Progress Chart (Show the teacher the Chart)

 Did you use this chart? Yes No

 If 'yes', please explain how. _____

 If 'no', please explain why you didn't use it. _____

 Would you make any changes to it? Please explain. _____

Q5 What did you think of the teachers' workshop? (Probe if necessary e.g. If they say it was useful/not very useful, ask a question such as 'In what way?' or 'Why was this?')

Q6 What did you think of the Teachers' Notes? (Probe if necessary e.g. If they say it was useful/not very useful ask a question such as 'In what way?' or 'Why was this?')

Please suggest anything which should/could be added to or removed from the Teachers' Notes to make them more useful?

I would like to ask you some questions relating to the actual running of the programme in the classroom.

Q7 How did you feel about your role in the programme?

(Please make any suggestions you may have for changes in this)

Q8 How did you feel about the role of the oral health promotion person (OHP) in the programme?

(Please make any suggestions you may have for changes in this)

Q9 Do you have any other suggestions on how the 'Winning Smiles' programme might be improved?

Q10 Have you any other comments?

Thank you very much for taking part in the research project and in this interview. The information you have given us is confidential and will be very useful for the future development of the 'Winning Smiles' initiative.

Appendix 13 Collated responses from School Teachers

Collated responses from Dublin Schools

Debriefing was carried out with teachers in the intervention school. The evaluation was carried out by means of one-to-one interviews. A total of 6 teachers were involved.

		Total Number of Teachers = 6	
Q1. Did the children enjoy the 'Winning Smiles' programme?	Yes = 6	No = 0	
Q2. Which part did they enjoy most? (Some respondents gave more than one answer).	<i>Teachers' Comments</i>		
Drooling session	3		
Worksheets	3		
Progress chart	2		
Brushing	1		
Mirrors	1		
Visits to classroom	1		
Participating in research	2		
Q3. Did the programme help to satisfy the requirements of NI/SPHE Curriculum?	Yes = 6	No = 0	
<i>Teachers' Comments</i>			
All teachers felt that the programme satisfied the requirements of SPHE. They also felt that it satisfied some of the requirements of SESE			
Please explain in what way it did. (Some respondents gave more than one answer)			
'Taking care of my body'	6		
Nutrition	5		
'Growing and changing'	3		
'Myself'	2		
Mathematics	2		
Data collection – tables and graphs	1		
Q4. Views on resources provided in Teachers' Pack			
Classroom/homework worksheets			
Five teachers completed all worksheets. One teacher completed two classroom and three homework worksheets but didn't get all classroom worksheets completed due to shortage of time. All teachers commented on how much they appreciated getting the original copies and not having to rely on photocopies. All found the worksheets colourful and child friendly. Three teachers commented on the good quality paper. Two teachers commented that using the homework worksheets allowed the children to bring the message home and carry on with the tasks at home. One teacher completed all the classroom worksheets and then sent these home with the homework worksheets. Each pupil's sheets were put into a 'Winning Smiles' workbook.			

		Total Number of Teachers = 6	
Classroom Worksheet 2. "Plaque Attack"			
Did you use this worksheet?		Yes = 5	No = 1
<i>Teachers' Comments</i>			
A bit complicated for 7-year-olds		3	
Required a lot of background work		1	
A bit of time needed		1	
Classroom Worksheet 3. "Word Search"			
Did you use this worksheet?		Yes = 6	No = 0
<i>Teachers' Comments</i>			
Children enjoy word searches and crosswords		3	
Optional Home Experiment "Disclosing and Brushing"			
Did you use this experiment sheet?		Yes = 0	No = 6
<i>Teachers' Comments</i>			
Did not use home experiment as felt there would be no support at home		6	
Some parents found the programme almost a nuisance – 'she was giving out 'cos she couldn't brush her teeth'		1	
Busy time of the year, insufficient time to organise		2	
Acid Attack Charts			
Did you use these charts?		Yes = 0	No = 6
(The charts were used by the Oral Health Promoter in the introductory talk to the class but none of the teachers had used them.)			
Winning Smiles Progress Chart			
Did you use this chart?		Yes = 6	No = 0
<i>Teachers' Comments</i>			
Child-led, excellent idea		4	
Unsure if children gave completely accurate responses		2	
Very useful for maths/data work		2	
Too small in size		3	
Colour should be brighter		1	
Q5. Views on Teacher's Workshop			
<i>Teachers' Comments</i>			
Very useful. Very clear and well laid out		6	
Very good idea. Often teachers are given no practice and just told to get on with it		1	
Good link between school and dental service		2	
Good idea to have workshop in the school and not in e.g. a hotel		1	
Unfortunately could not attend. Felt I had missed out		1	

		Total Number of Teachers = 6	
Q6. Views on Teacher's Notes			
<i>Teachers' Comments</i>			
Very helpful guide – used throughout the programme		2	
Very good but didn't need to use them during the programme		2	
Q7. Views on Teacher's Role in Programme			
<i>Teachers' Comments</i>			
Liked the idea of the teacher doing a lot of the work		4	
Teachers have the skills to impart the information		3	
Teachers know the class so well and can teach the programme to their level		2	
Liked the combination of the teacher and the OHP		3	
Views on OHP's Role in Programme			
<i>Teachers' Comments</i>			
Children responded very well to OHP		4	
OHP coming in was a 'treat' and the children looked forward to that		2	
The support provided by the OHP was excellent - knowing the OHP was a great help		1	
Q8. Suggestions for Improvement			
<i>Teachers' Comments</i>			
Continue the programme on up into senior school		3	
Repeat the programme regularly		4	
Keep the momentum going even after the programme has been completed perhaps by dropping in a progress chart every few months		1	
Had difficulty getting the time to do all the worksheets - wasn't sure but thought all the sheets had to be done and was under pressure to finish. Perhaps teachers could be told it is not necessary to do them all, or perhaps programme could be spread out over a longer time. Consent forms are too difficult for parents to understand		2	
The questionnaire is too difficult for some children		1	

Collated Responses from Belfast Schools

Unfortunately owing to industrial action, it was not possible to carry out one-to-one interviews with the teachers involved in the Belfast study, however they kindly agreed to fill in the questionnaires themselves. This was the only way to get the questionnaires completed before the end of the school year, but as a result we were unable to fully explore their views on the initiative so there is not as much clarity and richness of information as we would have liked. A total of 5 teachers in the 2 test schools were involved.

	Total Number of Teachers = 5	
Q1. Did the children enjoy the 'Winning Smiles' programme?	Yes = 5	No = 0
Q2. Which part did they enjoy most? (Some respondents gave more than one answer). <i>Teachers' Comments</i>		
Drizzling session	1	
Disclosing tablets	5	
Brushing	1	
Competitive Element	1	
Q3. Did the programme help to satisfy the requirements of NI/SPHE Curriculum? <i>Teachers' Comments</i>		
Please explain in what way it did. (Some respondents gave more than one answer)		
Science	2	
Healthy Eating	2	
Information about Teeth	1	
Information about Body	1	
Q4. Views on resources provided in Teacher's Pack		
Classroom Worksheet 1. "Five Steps to a 'Winning Smile'" Did you use this worksheet?	Yes = 5	No = 0
<i>Teachers' Comments on how it was used</i>		
Discussed with pupils and draw pictures to illustrate sheet	1	
Used it as a sequencing exercise	1	
Discussed the five steps	1	
Classroom resources to follow-up programme	1	
No comments	1	
<i>Suggested Changes</i>		No = 3
Classroom Worksheet 2. "Plaque Attack" Did you use this worksheet?	Yes = 5	No = 0
<i>Teachers' Comment on how it was used</i>		
Discussed with pupils and diagram labelled	1	
I sent this home for homework	1	
Read, discussed and completed at home	1	
No comments	2	
<i>Suggested Changes</i>	No = 3	No Comments = 2

	Total Number of Teachers = 5	
Classroom Worksheet 3. "Word Search" Did you use this worksheet?	Yes = 5	No = 0
<i>Teachers' Comments on how it was used</i>		
Discussed with pupils and pupils completed this independently	1	
Used it at quiz time on Friday afternoon	1	
Children always enjoy word searches and jokes	1	
No comments	2	
<i>Suggested Changes</i>	No = 3	No Comments = 2
Homework Sheet 1. "How to keep your 'Winning Smile'" Did you use this worksheet?	Yes = 3	No = 2
<i>Teachers' Comment on how it was used</i>		
Pupils used pictures to complete sentences	1	
Good follow-up worksheet	1	
No Comments	1	
<i>Teachers' Comment on why it was not used</i>		
There wasn't enough detail on it	1	
No Comments	1	
<i>Suggested Changes</i>		
More detail	1	
A bit easy for P4	1	
No	1	
Homework Sheet 2. "Name the Healthy Snacks" Did you use this worksheet?	Yes = 4	No = 1
<i>Teachers' Comment on how it was used</i>		
Useful sheet for revising healthy foods	1	
I used this as part of a maths fractions homework	1	
Children enjoyed sorting healthy food names	1	
No comments	1	
<i>Teachers' Comment on why it was not used</i>		
No Comments	1	
<i>Suggested Changes</i>		No = 2
Homework Sheet 3. "How a Tooth Decays" Did you use this worksheet?	Yes = 4	No = 1
<i>Teachers' Comment on how it was used</i>		
Pupils coloured in tooth decay and completed sentences	1	
As part of a science homework	1	
It was good when explaining tooth decay and unfamiliar words eg cavity	1	
No comments	1	

	Total Number of Teachers = 5	
Homework Sheet 3. "How a Tooth Decays" Did you use this worksheet? <i>Teachers' Comment on why it was not used</i>	Yes = 4	No = 1
No comments		
<i>Suggested Changes</i>	No = 3	
Information Sheet "A Good Toothbrushing Guide" Did you use this information sheet? <i>Teachers' Comment on how it was used</i>	Yes = 5	No = 0
Pupils took a copy for use at home and coloured pictures		
Enlarged sheet and used as part of a display		
Great to remind children to only use a pea sized amount of toothpaste		
No comments	2	
<i>Suggested Changes</i>	No = 3	
Optional Home Experiment "Disclosing and Brushing" Did you use this experiment sheet? <i>Teachers' Comment on how it was used</i>	Yes = 5	No = 0
Discussed with pupils and pupils enjoyed home experiment		
Sent home tablets and note to parents		
Children enjoyed competing at home after discussion at school		
Sent home and children had to write up experiment	2	
No comments		
Acid Attack Charts Did you use this chart? <i>Teachers' Comment on how it was used</i>	Yes = 2	No = 1
Put on display on blackboard and discussed with class		
OHP used them during talk to children		
<i>Teachers' Comment on why it was not used</i>		
No comments		
<i>Suggested Changes</i>	No = 3	
Winning Smiles Progress Chart Did you use this chart? <i>Teachers' Comment on how it was used</i>	Yes = 5	No = 0
Excellent resource, useful for monitoring progress and encouraging pupils to keep brushing teeth		
Used every morning. Children ticked chart if they brushed teeth		
Filled in daily while children were brushing each night.		
Filled in every day		
Ticked each day if teeth brushed		
<i>Suggested Changes</i>	No = 5	

	Total Number of Teachers = 5	
Q5. Views on Teacher's Workshop <i>Teachers' Comments</i>		
Very useful. Programme was well explained and definitely helped to make the pupils more aware of the importance of caring for their teeth.		
Teacher's workshop was very helpful. Children very enthusiastic as teacher was well informed.		
Very good. Lots of information.		
Did not attend this:*		
Didn't go.*		
* All teachers were involved in the workshops, however they were very informal and these responses may indicate that they did not perceive the meetings as 'workshops'.		
Q6. Views on Teacher's Notes <i>Teachers' Comments</i>		
Very useful in determining the main focus of the task for the pupils.		
Very helpful guide.		
Very good – useful tool to help teaching of this topic.		
Useful but not referred back to once programme had begun.		
No comments		
<i>Suggestions for additions to programme</i>		
Nothing		
No	4	
Q7. Views on Teacher's Role in Programme <i>Teachers' Comments on how it was used</i>		
I was very satisfied with my role and I felt that the notes were very useful.		
Although I was involved great support from outside organisation.		
Able to help in any way, although visitors to the class were all very efficient.		
No comments	2	
Q8. Views on OHP's Role in Programme <i>Teachers' Comments on how it was used</i>		
OHP was excellent and produced an excellent rapport with the pupils. The pupils in turn were eager and enthusiastic about the course.		
Very helpful hands on.		
Very good, very efficient		
The children enjoyed this activity		
Clear instructions and helpful.		

	Total Number of Teachers = 5
Q9. Suggestions for Improvement	
<i>Teachers' Comments on how it was used</i>	
No. 1 was very happy with the programme and the pupils gained a lot of enjoyment from the programme.	1
Better information for the teachers at the start.	1
No	2
No Comment	1
Q10. Any Other Comments	
<i>Teachers' Comments on how it was used</i>	
No	4
No comments	1

Tables

1. Total no. of children in Second Class (Dublin study) and P4 (Belfast study) by gender and group
2. Number of children who participated in saliva sampling at baseline, six months and 12 months
3. Mean salivary fluoride concentration levels (mg/L) at baseline, six and 12 months
4. Distribution of Dublin Control group children according to reported frequency of brushing at baseline and 12 months
5. Distribution of Belfast Control group children according to reported frequency of brushing at baseline and 12 months
6. Distribution of Dublin Experimental group children according to reported frequency of brushing at baseline and 12 months
7. Distribution of Belfast Experimental group children according to reported frequency of brushing at baseline and 12 months
8. Distribution of children according to time since last brushing teeth (at baseline PM sample) and reported frequency of brushing at baseline
9. Distribution of children according to time since last brushing teeth (at 12-month PM sample) and reported frequency of brushing at 12 months
10. Number of children who completed the questionnaire at baseline and at 12-month follow-up
11. Schools and numbers of child participants
12. Benefits and challenges of the Microsite
13. Benefits and challenges of the Discussion Forum
14. Winning Smiles Programme study partners
15. Summary outline of Winning Smiles Programme
16. Fluoride electrode reading times
17. Testing for the effect of the grouping variable school experimental status controlling for baseline scores for COHRQoL: dependent variable COHRQoL scores at 12-month follow-up
18. Testing for the effect of the grouping variable school experimental status controlling for baseline scores for oral health status awareness: dependent variable oral health status awareness scores at 12-month follow-up
19. Testing for the effect of the grouping variable school experimental status controlling for baseline scores for oral and social self-image: dependent variable oral social self-image scores at 12-month follow-up
20. Testing for the effect of the grouping variable school experimental status controlling for baseline scores for social confidence and well-being: dependent variable social confidence and well-being scores at 12-month follow-up
21. Testing for the effect of the grouping variable school experimental status controlling for baseline scores for self-esteem: dependent variable self-esteem scores at 12-month follow-up
22. Testing for the effect of the grouping variable school experimental status controlling for baseline scores for total toothbrushing knowledge: dependent variable total toothbrushing knowledge scores at 12-month follow-up

23. Testing for the effect of the grouping variable school experimental status controlling for baseline scores for total snacking knowledge: dependent variable total snacking knowledge scores at 12-month follow-up
24. Testing for the effect of the grouping variable school experimental status controlling for baseline scores for knowledge of healthier snacks: dependent variable knowledge of healthier snacks scores at 12-month follow-up
25. Testing for the effect of the grouping variable school experimental status controlling for baseline scores for knowledge for preventing dental decay: dependent variable knowledge for preventing dental decay scores at 12-month follow-up
26. Testing for the effect of the grouping variable school experimental status controlling for baseline reported daily toothbrushing: dependent variable reported daily toothbrushing at 12-month follow-up
27. Testing for the effect of the grouping variable school experimental status controlling for baseline reported dental attendance: dependent variable reported dental attendance at 12-month follow-up
28. Summary outline of intervention programme
29. Results of the paired t-tests for the change in salivary fluoride concentration levels over time using the SAS TTEST procedure — Dublin Control
30. Results of the paired t-tests for the change in salivary fluoride concentration levels over time using the SAS TTEST procedure — Dublin Experimental
31. Results of the paired t-tests for the change in salivary fluoride concentration levels over time using the SAS TTEST procedure — Belfast Control
32. Results of the paired t-tests for the change in salivary fluoride concentration levels over time using the SAS TTEST procedure — Belfast Experimental

Figures

1. Study flow chart of the Winning Smiles Programme control trial
2. Mean and standard deviations of morning (14-hour post brushing, AM) and afternoon (18-hour post brushing, PM) samples — all subjects
3. Mean and standard deviations of morning (14-hour post brushing, AM) and afternoon (18-hour post brushing, PM) samples — excluding outliers
4. Control: Mean saliva fluoride concentrations by city — PM samples
5. Experimental: Mean saliva fluoride concentrations by city — PM samples
6. The Effect of the Winning Smiles Intervention on COHRQoL at 12-month follow-up
7. The Effect of the Winning Smiles Intervention on Oral Health Status Awareness at 12-month follow-up
8. The Effect of the Winning Smiles Intervention on Oral and Social Self-Image at 12 month follow-up
9. The Effect of the Winning Smiles Intervention upon Satisfaction with Oral Health at Baseline and 12-month follow-up
10. The Effect of the Winning Smiles Intervention on the Importance to Care for Dental Health at Baseline and 12-month follow-up
11. The Effect of the Winning Smiles Intervention for Knowledge of Safer Snacks at Baseline and 12-month follow-up
12. Overview of the Story-Dialogue workshop
13. The Structured Dialogue
14. Toothbrushing Rules worksheet completed by Henry: Dublin primary school 1
15. Sally: Belfast primary school 2: 25/05/04
16. Harold: Belfast primary school 1: 24/05/04
17. Gary: Belfast primary school 2: 25/05/04
18. Transforming toothbrushing rules to child toothbrushing practices
19. Microsite of the Winning Smiles Steering Committee
20. Discussion Forum of the Winning Smiles Steering Committee
21. Opinion of teeth by time, experimental status and school location
22. Bother with teeth by time, experimental status and school location
23. Oral health attitudes at baseline and 12-month follow-up
24. Oral health attitudes by location of school at baseline
25. Oral health attitudes by location of school at 12-month follow-up
26. Dental anxiety by time, location and experimental status of school
27. Knowledge of fluoride toothpaste at baseline and 12-month follow-up
28. Knowledge of fluoride toothpaste by location of school at baseline
29. Knowledge of fluoride toothpaste by location of school at 12-month follow-up
30. Knowledge of toothbrush choice
31. Knowledge of toothbrush choice by school location at baseline
32. Knowledge of toothbrush choice by school location at 12-month follow-up

33. Total snack knowledge scores by location of school
34. Safer snack knowledge scores by location of school
35. Unsafe snack knowledge scores by location of school
36. Total snacking knowledge scores by intervention status and location of school at baseline
37. Total snacking knowledge scores by intervention status and location of school at 12-month follow-up
38. Prevention of dental caries knowledge at baseline
39. Prevention of dental caries knowledge at 12-month follow-up
40. Prevention of dental caries knowledge by location of school at baseline
41. Prevention of dental caries knowledge by location of school at 12-month follow-up
42. Ever been shown how to brush your teeth? Baseline and 12-month follow-up
43. Ever been shown how to brush your teeth by location of school: Baseline
44. Ever been shown how to brush your teeth by location of school: 12-month follow-up
45. Where were you shown you how to brush your teeth? Baseline and 12-month follow-up
46. Where were you shown how to brush your teeth? by location of school: baseline
47. Where were you shown how to brush your teeth? by location of school: 12-month follow-up
48. Salient referents by location of school at baseline and 12-month follow-up
49. Salient referents by location of school at baseline
50. Salient referents by location of school at 12-month follow-up
51. Reported frequency of toothbrushing per day
52. Reported frequency of daily toothbrushing by location of school at baseline
53. Reported frequency of daily toothbrushing by location of school at 12-month follow-up
54. Reported frequency of dental attendance
55. Reported frequency of dental attendance by location of school at baseline
56. Reported frequency of dental attendance by location of school at 12-month follow-up
57. Frequency distribution of salivary fluoride concentration at baseline, six and 12 months — Belfast Control (n=47)
58. Frequency distribution of salivary fluoride concentration at baseline, six and 12 months — Belfast Experimental (n=53)
59. Frequency distribution of salivary fluoride concentration at baseline, six and 12 months - Dublin Control (n=46)
60. Frequency distribution of salivary fluoride concentration at baseline, six and 12 months - Dublin Experimental (n=52)