Designed to Smile

Evaluation of a national child oral health improvement programme

Part II Evaluation

Interim Report I

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1. Executive Summary

This report is the first of a series of three reports evaluating the Designed to Smile national oral health improvement programme. It follows a series of three previous reports submitted to the Welsh Government between December 2009 and December 2011, evaluating the Super Pilot scheme.

Findings from two questionnaire surveys are reported: the first, a survey of staff from 215 schools and nurseries in Mid, East and West Wales; the second, a survey of 294 parents of children taking part in the brushing scheme in the Abertawe Bro Morgannwg University Health Board.

1.1 SCHOOL SURVEY

Questionnaire surveys were sent to 215 schools taking part in the programme based in the Anuerin Bevan, Hywel Dda, Powys and Abertawe Bro Morgannwg University Health Boards. The questionnaires asked both headteachers and classroom teachers about their views on the scheme and collected details of how often toothbrushing sessions were carried out and how long each session lasted.

Overall, schools were extremely positive about their experience of taking part in the programme. They commented particularly on the children's enthusiasm to brush their teeth in class alongside their friends. They felt that the scheme fitted well with their wider aims, and were complimentary about the training and support offered by the CDS teams. Inevitably, the results also highlight some risks to the programme. These relate primarily to compliance with the toothbrushing protocol and future participation in the programme.

The findings are split in to a number of sub-sections:

Awareness of the scheme: Just under half of the headteachers surveyed (47%) were aware of the scheme before being contacted by the CDS staff. This is an improvement compared to the previous survey of settings in Super Pilot regions, and awareness should be further boosted by a recent letter to schools and nurseries from the Ministers for Health and Education.

Fit with the school and overall impact: Almost all schools reported that they felt the scheme fitted well with their school curriculum and their wider health promotion efforts. Similarly, all but a handful of schools were of the view that the programme had impacted positively on the school as a whole.

Future intentions: 93% of schools and nurseries were very or fairly sure that they would continue taking part in the scheme in the future. The remaining 7% (representing 728 children) were either unsure or unlikely to continue with the scheme, with the majority citing time constraints. It is important that CDS staff work with such schools and nurseries to dissuade them from discontinuing their involvement with the scheme.

Class size and age groups: The majority of the classrooms surveyed were nursery or reception age (3-5 years old), while the rest were infant age, Year 1 or Year 2 (4-6 years old). There was an average of 24 children to a class, though classes in Powys tended to be smaller.

Brushing frequency: One fifth (21%) of schools reported missing at least one toothbrushing session in a normal school week. Overall, children miss around four weeks of brushing sessions in a normal 39-week school year, but the problem is worse in Powys and Abertawe Bro Morgannwg. Non-compliance with daily brushing is identified as the most important finding of this evaluation. From both a clinical and cost-effectiveness perspective, it is crucial that as the programme matures, all schools are encouraged to work towards daily brushing.

Brushing duration: On average, brushing took around 11 minutes per session. Crucially, schools that brushed for more than 15 minutes were far more likely than others to miss out sessions each week, or to express doubts about their involvement in the scheme going forward. Longer brushing times were associated with larger class sizes to some extent, but teachers reported that a range of factors, including manpower and classroom facilities, were influencing factors.

Satisfaction with training and support: All but a handful of schools were happy with both the length of their training session and the amount of information they had received. Likewise, most schools felt that they received adequate day-to-day support from the CDS staff.

Satisfaction with brushing materials: Satisfaction with toothbrushes, toothpaste, Brush-Buses and other materials was generally high. There were some reports of difficulties where re-supply of materials had caused delays in the scheme.

1.2 PARENT SURVEY

The second survey chapter reports on preliminary findings from a questionnaire survey of 294 parents whose children take part in the scheme in the Abertawe Bro Mogrannwg Health Board area.

Findings are presented with regard to four questions from the survey, which asked parents about how their child's participation in Designed to Smile had impacted on their home toothbrushing habits and their child's and their own attitude towards toothbrushing in general.

Effect of Designed to Smile participation on home toothbrushing: Around a third (31%) of children were more likely to brush their teeth at home in the morning since taking part in

the scheme, while around a fifth (21%) of children were more likely to brush at home in the evening since starting Designed to Smile. Only a very small number of children were less likely to brush at home in either the morning or the evening as a result of taking part in the programme.

Effect of Designed to Smile participation on children and parents' attitude towards home toothbrushing: A third of parents (33%) and two-thirds of children (67%) reportedly had a more positive attitude towards home toothbrushing since taking part in the school toothbrushing programme.

1.3 RECOMMENDATIONS:

The following recommendations are made based on the findings of the two surveys:

Recommendation #1: CDS staff need to highlight the importance of the daily brushing protocol to schools and nurseries, and follow-up on this advice with regular auditing.

Recommendation #2: The average time taken to brush my schools and nurseries (11 minutes) is significantly less time than many teaching staff anticipate and should be emphasised by CDS staff when promoting the scheme to new schools and nurseries.

Recommendation #3: Teacher training should heavily emphasise the importance of organising the scheme so that it takes up as little time as possible, and seek to learn and communicate lessons from schools that carry out the scheme more efficiently.

Recommendation #4: It would be advisable for CDS staff to keep up-to-date information on participating schools and nurseries in terms of how often they carry out the scheme and how long it takes them to do so. This sort of information would allow staff to target schools and nurseries that need the most support.

Recommendation #5: Although flexibility is important, schools and nurseries should be encouraged where possible to carry out the toothbrushing scheme at lunch-time or later in the day to minimise any risk that parents will see morning brushing as a replacement for brushing their child's teeth at home.

2. Introduction

2.1 BACKGROUND AND PREVIOUS EVALUATION WORK

In their *Eradicating Child Poverty in Wales* strategy, the Welsh Government set a target that by 2020 the dental health of 5 and 12 year olds in the most deprived fifth of the Welsh population will improve to that presently found in the middle fifth. In March 2008, the Welsh Government laid out plans for the commissioning and implementation of a school-based fluoride supplementation programme called Designed to Smile, aimed at meeting these targets. The programme is one of the principle initiatives of the National Oral Health Action Plan for Wales (NOHAP).

The core programme was to incorporate three elements: (i) supervised toothbrushing training for 3-5 year olds; (ii) oral health promotion for 6-11 year olds; and (iii) promoting oral health from birth (0-3 year olds).

Much of the early work has focussed on the first of these elements: the supervised tooth-brushing programme aimed at schools and nurseries.

The Community Dental Service (CDS) has been responsible for organising, coordinating and delivering the programme, including the production and translation of resources, the sourcing of materials and recruitment of new staff members to the project.

The scheme was originally piloted in two areas: in South Wales, in Cardiff, the Vale of Glamorgan, Bridgend, Rhondda Cynon Taf and Merthyr Tydfil; and also in the North Wales region. As well as providing a mixture of urban and rural localities, the pilot areas also cover almost a third of the Welsh population.

The Dental Public Health Unit has previously submitted three evaluation reports to the Welsh Government, in December 2009, 2010 and 2011, while the programme was being piloted in South East and North Wales. These reports were based on interviews of Community Dental Service staff, a survey of participating schools and interviews with parents whose children took part in the scheme. A summary of the findings from those reports is presented in Appendix A, and two academic papers arising from the work are presented in Appendix D and E.

2.2 THE CURRENT EVALUATION PROJECT

In October 2009, the Welsh Assembly Government made the decision to expand and enhance the programme, including the involvement of CDS teams in Aneurin Bevan, Abertawe Bro Morgannwg, Hywel Dda and Powys health board areas.

The Welsh Government has contracted the Dental Public Health Unit at Cardiff University to carry out a formal process evaluation of the Designed to Smile programme, with interim reports to be delivered in December 2012, December 2013 and December 2014. Figure 2.1 shows the three stages of the evaluation project, with the current interim report highlighted in yellow.

Figure 2.1: Part II Evaluation Plan 2012-2014

Stage	Subject	Method	Report date
Stage 1	(1) School staff (2) Parents of children	(1) Questionnaire survey of all participating settings in four Health Boards (2) Questionnaire survey of parents of children taking part in D2S	December 2012
Stage 2	Parents of children	Questionnaire survey of parents of children taking part in D2S	December 2013
Stage 3	CDS staff	Questionnaire survey of CDS staff from across Wales	December 2014

3. School Survey

This chapter reports on findings from a questionnaire survey sent to participating schools and nurseries in the Anuerin Bevan, Hywel Dda, Powys and Abertawe Bro Morgannwg University Health Boards. Schools and nurseries in these four areas have been added to the scheme more recently following the successful piloting and implementation of the scheme in selected areas of South East Wales and North Wales.

The school survey was based on a similar survey sent to schools in these Super Pilot areas. The purpose was to assess the views of teaching staff in schools and nurseries taking part in the project, and specifically aimed to assess:

- How well schools or nurseries feel the programme fits with their curriculum and other health promotion schemes
- The overall impact of the toothbrushing scheme on the school or nursery and its pupils
- How likely the school or nursery is to continue taking part in the scheme
- How often the school or nursery actually carries out the toothbrushing programme and how much time it takes them
- How happy they were with training, support and the toothbrushing materials provided to them.

Finally, both headteachers and classroom teachers were given an opportunity to provide general feedback through open response questions. Illustrative quotes are provided with the findings where appropriate.

3.1 METHOD

3.1.1 Schools and nurseries

The Community Dental Service (CDS) provided a list of the names and addresses of the 330 schools and nurseries that had started the toothbrushing scheme in the Aneurin Bevan, Hywel Dda, Powys and Abertawe Bro Morgannwg Local Health Board areas. These settings comprised the survey sampling frame.

3.1.2 Questionnaire

Two questionnaires were developed: one for completion by the school or nursery head teacher; and the second for completion by a classroom teacher who supervised the toothbrushing scheme in their class.

The questionnaires were based on those used for a previous survey of schools and nurseries in the Super Pilot areas, the results of which have been previously reported. The questionnaires were developed with the help of CDS staff and were piloted prior to their finalisation.

Both questionnaires are shown in Appendix B along with the covering letters.

3.1.3 Procedure

Both questionnaires were sent out to all schools and nurseries in June 2011, along with an explanatory covering letter and a pre-paid and addressed envelope for return. Both the questionnaires and covering letters were provided in English and Welsh.

Schools were assured that their responses would be anonymous and encouraged to be as honest as possible with their answers.

Three weeks after the first mailout, a second questionnaire and covering letter was sent to all schools that had yet to return the survey.

Finally, four weeks after the second mailout, the remaining schools were contacted by telephone where possible to confirm their address, obtain a named contact and encourage them to participate in the survey. If required, they were sent a further replacement copy of the questionnaires.

3.2 FINDINGS

The survey findings are presented in four separate sections:

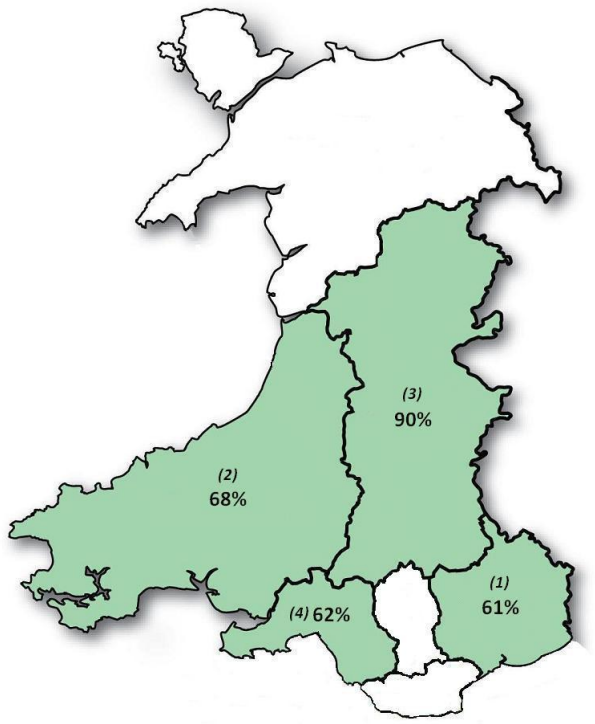
- The **response rate** gives details of the number of schools that responded to the questionnaire survey;
- The **basic results** present a frequency analysis for each of the questions asked in the headteacher and classroom teacher questionnaire surveys, with responses broken down by Local Health Board area;
- The **further analysis** section looks at the potential impact of school's future intentions and their brushing frequency, as well as investigating which factors are related to each of the two variables;
- The **regression analysis** section draws on data from both the current school survey and the previous survey of schools in Super Pilot areas, using regression analysis to investigate which school factors predict weekly brushing frequency.

3.2.1 Response Rate

Of the 330 schools and nurseries sent a questionnaire, 215 responded providing a 65% response rate. The survey was run independently of the CDS in order to ensure that schools could be as honest as possible with their feedback. As a result, it was not possible to recruit CDS staff to collect questionnaires from schools who had not completed the survey and therefore further boost the response rate.

Figure 3.1 gives a breakdown of the number and percentage of schools that replied from each of the four Local Health Board areas.

Figure 3.1: Survey response rate by LHB



LHB	N	Response rate
(1) Aneurin Bevan	56	60.9%
(2) Hywel Dda	69	68.2%
(3) Powys	18	90.0%
(4) ABMU	72	61.5%
TOTAL	215	65.2%

Response rates were fairly consistent across Local Health Board areas. Powys had a higher response rate than other areas, but there are fewer schools and nurseries brushing in this area.

3.2.2 Basic Results

HEADTEACHER QUESTIONNAIRE

The first of the two questionnaires was filled out by school or nursery headteachers (Appendix B).

The questions asked of headteachers were intended to provide an overview of a school or nursery's feelings about their involvement in the toothbrushing scheme and specifically asked about:

- their awareness of the Designed to Smile scheme before being approached to take part;
- the extent to which they felt Designed to Smile fitted with their school plans;
- the overall impact of Designed to Smile on their school;
- whether or not they intended to continue taking part in the scheme in the future.

Awareness of the scheme

Headteachers were asked whether or not they had heard about the Designed to Smile programme before being contacted by a member of the CDS team.

Table 3.1: Headteacher awareness of the scheme, by LHB

	OVERALL		Aneurin Bevan		Hywel Dda		Powys		Abertawe Bro Morg.	
	%	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*
Yes, aware of scheme	43.2	83	40.8	20	48.4	30	11.1	2	49.2	31
No, not aware of scheme	56.8	109	59.2	29	51.6	32	88.9	16	50.8	32
Total	100.0	192	100.0	49	100.0	62	100.0	18	100.0	63

Just under half of the headteachers (43%) were aware of the programme before they were contacted. Awareness ranged from 49% in ABMU to 11% in schools and nurseries in Powys.

COMMENTARY

Previous surveys of schools in the Super Pilot areas found awareness of the scheme to be disappointingly low among headteachers, with only around a quarter having heard of the scheme before being approached to take part.

It is encouraging to note that almost half of the headteachers in the current survey had heard of the scheme – this increased awareness of the Designed to Smile scheme is perhaps to be expected as it becomes more established with time, and will help the CDS staff to maintain the excellent school participation rates that they have established to date.

Awareness did vary by area, however, so continued promotion of the scheme both through local and national media, and through working with the appropriate educational authorities should remain a priority if the scheme is to be further expanded.

The recent joint letter from the Ministers of Health and Education will hopefully have addressed this issue.

Fit with the school

Headteachers were asked how well they thought the Designed to Smile scheme fitted with their overall curriculum and any other broad health promotion schemes that their school or nursery was involved with.

Table 3.2: How well does the D2S scheme fit with overall school curriculum, by LHB

	OVERALL		Aneurin Bevan		Hywel Dda		Powys		Abertawe Bro Morg.	
	%	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*
Very well	66.5	129	66.0	33	73.0	46	50.0	9	65.1	41
Fairly well	29.4	57	26.0	13	27.0	17	50.0	9	28.6	18
Not sure/no opinion	1.5	3	6.0	3	0.0	0	0.0	0	0.0	0
Not particularly well	2.1	4	2.0	1	0.0	0	0.0	0	4.8	3
Not well at all	0.5	1	0.0	0	0.0	0	0.0	0	1.6	1
Total	100.0	194	100.0	50	100.0	63	100.0	18	100.0	63

Only 5 schools of the 194 (3%) felt that the scheme fitted poorly with their school curriculum, with the vast majority (96%) reporting that the scheme fitted fairly or very well with their syllabus.

Table 3.3: How well does the D2S scheme fit with other health promotion schemes, by LHB

	OVERALL		Aneurin Bevan		Hywel Dda		Powys		Abertawe Bro Morg.	
	%	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*
Very well	71.6	139	76.0	38	76.2	48	66.7	12	65.1	41
Fairly well	25.8	50	22.0	11	23.8	15	33.3	6	28.6	18
Not sure/no opinion	2.1	4	2.0	1	0.0	0	0.0	0	4.8	3
Not particularly well	0.5	1	0.0	0	0.0	0	0.0	0	1.6	1
Not well at all	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Total	100.0	194	100.0	50	100.0	63	100.0	18	100.0	63

Similarly, almost all participating schools or nurseries (97%) were happy that the toothbrushing programme fitted fairly or very well with other health promotion schemes that they took part in.

> *"We consider ourselves to be a healthy school so the Designed to Smile scheme fits in well and helps us to further develop our curriculum.*
>
> *"It has linked well with other healthy schools initiatives and with both the science and PSHE curriculum.*

Overall impact on the school

Headteachers were asked to assess the overall impact of the scheme on their nursery or school.

Table 3.4: Overall impact of the D2S scheme on the school, by LHB

	OVERALL		Aneurin Bevan		Hywel Dda		Powys		Abertawe Bro Morg.	
	%	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*
Very positive	66.8	129	67.3	33	69.8	44	55.6	10	66.7	42
Fairly positive	27.5	53	26.5	13	27.0	17	44.4	8	23.8	15
Not sure / no opinion	3.1	6	4.1	2	3.2	2	0.0	0	3.2	2
Fairly poor	2.6	5	2.0	1	0.0	0	0.0	0	6.3	4
Very poor	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Total	100.0	193	100.0	49	100.0	63	100.0	18	100.0	63

Only 5 (3%) schools or nurseries felt that their participation in the scheme had negatively impacted them, while 6 (3%) were unsure whether or not the scheme had been a positive or negative experience. Over two thirds (67%) reported that taking part in Designed to Smile had been a 'very positive' experience for their school or nursery.

“” *Very positive. Children benefit from the routine of brushing their teeth every day and enjoy the activity. Many of the children recognise their own brushes and all know that it takes 2 minutes to brush your teeth. All children are happy to participate. It links very well with our Health Promoting Schools Scheme. The Designed to Smile staff have been excellent!*

“” *What an excellent scheme! The staff we have had from the 'Designed To Smile' team have been enthusiastic, knowledgeable, supportive and extremely well organised. Thank you.*

COMMENTARY

The findings reported here suggest that vast majority of schools and nurseries that agree to take part in the scheme find it to be a positive experience for the staff and the children.

Given the potential difficulty for schools and nurseries to set aside time for brushing in an already busy schedule, it is very encouraging that almost all headteachers that responded to the survey reported that the scheme fitted well with their curriculum and broader health promotion efforts.

These findings mirror those reported for schools and nurseries in the Super Pilot areas.

Future intentions

Finally, headteachers were asked about whether or not they anticipated continuing to run the scheme during the following academic year.

Table 3.5: Headteacher's intention to continue taking part in the scheme next academic year, by LHB

	OVERALL		Aneurin Bevan		Hywel Dda		Powys		Abertawe Bro Morg.	
	%	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*
Very likely	80.3	155	84.0	42	85.7	54	72.2	13	74.2	46
Fairly likely	12.4	24	10.0	5	9.5	6	16.7	3	16.1	10
Not sure / no opinion	3.1	6	6.0	3	3.2	2	5.6	1	0.0	0
Fairly unlikely	2.1	4	0.0	0	1.6	1	0.0	0	4.8	3
Very unlikely	2.1	4	0.0	0	0.0	0	5.6	1	4.8	3
Total	100.0	193	100.0	50	100.0	63	100.0	18	100.0	62

8 of the 193 schools were fairly or very unlikely to continue with the scheme, citing time constraints or lack of staff support as reasons. A further 6 schools reported being unsure about their future involvement, but the vast majority (93%) were fairly or very likely to continue participating in the scheme.

With regards to future intentions, it is important to remember that those 35% of schools or nurseries that did not respond to the survey may well be less positive about their future participation in the scheme than the schools and nurseries that did respond.

> *“ There are simply too many thing to do in a school for staff to be responsible for carrying out toothbrushing.*

> *“ The "Designed to Smile" programme is good and makes pupils aware of the importance of looking after their teeth. The only drawback we have found is the time it takes to organise the tooth brushing sessions every day in the already busy curriculum - this has resulted in the same negative feedback from staff.*

CLASSROOM TEACHER QUESTIONNAIRE

The second of the two questionnaires was filled out by a classroom teacher who supervised the toothbrushing sessions (Appendix B).

The questions were intended to provide some detail on the nature of the toothbrushing programme and specifically asked the teacher about:

- the number of children in the class and their age
- the number of times per week that the scheme was carried out
- the length of time it took to carry out the toothbrushing
- how happy teachers were with training, guidelines and support
- how happy teachers were with the toothbrushing materials provided.

Age groups

Many of the larger schools or settings have multiple year groups taking part in the scheme, but for the purpose of the questionnaire, teachers answered questions on behalf of just one of those classes.

Teachers were asked about the age group of the children that they supervised brushing.

Table 3.6: Age group of the children in the classroom, by LHB

	OVERALL		Aneurin Bevan		Hywel Dda		Powys		Abertawe Bro Morg.	
	%	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*
Nursery	47.6	98	54.5	30	53.7	36	47.1	8	35.8	24
Reception	18.0	37	16.4	9	14.9	10	17.6	3	22.4	15
Year 1 / Year 2	31.6	65	25.5	14	30.8	20	18.3	5	38.8	26
Year 3 / older	2.4	5	3.6	2	1.5	1	5.9	1	1.5	1
Total	100.0	206	100.0	55	100.0	67	100.0	17	100.0	66

The majority of classrooms (66%) were nursery or reception aged children (3-4 years old), while about a third were infant classes of Year 1 or Year 2 children (4-6 years old). A handful of schools ran the toothbrushing scheme for slightly older children, usually where some form of toothbrushing scheme had already been in place before Designed to Smile.

Class size

The number of children per class was also collected.

Table 3.7: Number of children in the classroom, by LHB

	OVERALL		Aneurin Bevan		Hywel Dda		Powys		Abertawe Bro Morg.	
	%	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*
Average number per class		24.3		23.9		24.8		21.9		24.7
<20	20.7	44	25.5	14	22.1	15	27.8	5	13.9	10
20–30	62.4	133	60.0	33	57.4	39	55.6	10	70.8	51
>30	16.9	36	14.5	8	20.6	14	16.7	3	15.3	11
Total	100.0	213	100.0	55	100.0	68	100.0	18	100.0	72

The majority of settings (62%) had between 20 and 30 children to a classroom. The average number of children per classroom was 24.3, with slightly smaller classes reported in Powys.

Frequency of brushing

Schools and nurseries were asked how many times, in a typical week, they carried out the toothbrushing programme in their classroom.

Table 3.8: How often the D2S scheme is carried out in a normal school week, by LHB

	OVERALL		Aneurin Bevan		Hywel Dda		Powys		Abertawe Bro Morg.	
	%	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*
Average weekly sessions		4.7		4,8		4,8		4,8		4,5
< 5 times per week	20.4	41	14.8	8	12.1	8	23.5	4	32.8	21
5 times per week	79.6	160	85.2	46	87.9	58	76.5	13	67.2	43
Total	100.0	201	100.0	54	100.0	66	100.0	17	100.0	64

Around two-fifths (20%) of settings reported that they normally missed at least one session each week. The likelihood of schools missing sessions varied by Local Health Board, with settings in Powys (24%) and ABMU (33%) reporting higher than average levels of non-compliance.

Duration of each brushing session

Teachers were also asked how long each brushing session lasted, including setting up and tidying away materials.

Table 3.9: Length of an average toothbrushing session, by LHB

	OVERALL		Aneurin Bevan		Hywel Dda		Powys		Abertawe Bro Morg.	
	%	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*
Average mins per session		11.0		9.7		10.2		10,2		13.2
0–9 mins	27.7	59	33.9	19	32.4	22	27.8	5	18.3	13
10–14 mins	43.7	93	50	28	42.6	29	38.9	7	40.8	29
15+ mins	28.6	61	16.1	9	25	17	33.3	6	40.8	29
Total	100	213	100	56	100	68	100	18	100	71

The average time taken per brushing session was 11 minutes, with the majority (56%) reporting that sessions lasted between 10 and 15 minutes. Schools and nurseries in ABMU took around 3 minutes longer to carry out sessions than those in the other three Health Board areas.

> *“ Sometimes it takes too long to set up and clear away, especially on days where there is singing or other activities in the afternoon.*
>
> *“ The children really enjoy it. It hasn't caused as much disruption as initially expected.*

Classroom support

Teachers were asked whether they conducted toothbrushing sessions on their own, or with the support of a classroom assistant.

Table 3.10: Level of classroom assistance for D2S scheme, by LHB

	OVERALL		Aneurin Bevan		Hywel Dda		Powys		Abertawe Bro Morg.	
	%	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*
No assistant	6.9	14	5.5	3	4.5	3	5.9	1	10.8	7
Sometimes assistant	10.3	21	5.5	3	14.9	10	5.9	1	10.8	7
Usually assistant	82.8	169	89.1	49	80.6	54	88.2	15	78.5	51
Total	100.0	204	100.0	55	100.0	67	100.0	17	100.0	65

While some teachers (7%) did report carrying out sessions without any support, the vast majority (83%) usually had a teaching assistant to help them. The remaining teachers (10%) reported that they sometimes had an assistant, but sometimes carried out sessions on their own.

Satisfaction with training

Teachers were asked to rate their level of satisfaction with the training that they received from CDS staff before the school had commenced the programme. Specifically, they were asked whether they'd received adequate information and whether they were happy with the length of the training session.

Table 3.11: Feeling about the amount of information provided in teacher training session, by LHB

	OVERALL		Aneurin Bevan		Hywel Dda		Powys		Abertawe Bro Morg.	
	%	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*
Too much	0.5	1	0.0	0	0.0	0	6.3	1	0.0	0
Just right	97.1	199	100.0	55	97.0	65	93.8	15	95.5	64
Not enough	2.4	5	0.0	0	3.0	2	0.0	0	4.5	3
Total	100.0	204	100.0	55	100.0	67	100.0	17	100.0	65

Table 3.12: Feeling about the length of the teacher training session, by LHB

	OVERALL		Aneurin Bevan		Hywel Dda		Powys		Abertawe Bro Morg.	
	%	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*
Too long	2.0	4	1.8	1	3.0	2	6.7	1	0.0	0
Just right	96.0	193	98.2	54	95.5	63	86.7	13	96.9	63
Not long enough	2.0	4	0.0	0	1.5	1	6.7	1	3.1	2
Total	100.0	201	100.0	55	100.0	66	100.0	15	100.0	65

Almost all schools were content that the level of information provided and the length of the training sessions were 'just right' (97% and 96% consecutively).

Satisfaction with guidelines

Teachers were asked how content they were with the written guidelines for carrying out the toothbrushing scheme that were provided by CDS staff.

Table 3.13: Feeling about the clarity of the written guidelines provided to the school, by LHB

	OVERALL		Aneurin Bevan		Hywel Dda		Powys		Abertawe Bro Morg.	
	%	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*
Very clear	60.9	123	74.5	41	56.1	37	62.5	10	53.8	7
Fairly clear	32.7	66	23.6	13	37.9	25	31.3	5	35.4	51
Not sure / no opinion	5.4	11	1.8	1	3.0	2	6.3	1	10.8	7
Fairly unclear	0.5	1	0.0	0	1.5	1	0.0	0	0.0	65
Very unclear	0.5	1	0.0	0	1.5	1	0.0	0	0.0	66
Total	100.0	202	100.0	55	100.0	66	100.0	16	100.0	62

61% of teachers found the guidelines very clear, with a further third (33%) reporting that they were fairly clear. Only a small number found them unclear (1%) or were unsure (5%).

Satisfaction with day to day support

Teachers were asked whether they felt the level of day-to-day support provided by the CDS staff was too much, just right or not enough.

Table 3.14: Feeling about the level of day-to-day support provided to the school by the CDS staff

	OVERALL		Aneurin Bevan		Hywel Dda		Powys		Abertawe Bro Morg.	
	%	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*
Too much	2.0	4	1.9	1	1.5	1	11.8	2	0.0	0
Just right	93.0	186	94.4	51	93.8	61	88.2	15	92.2	59
Not enough	5.0	10	3.7	2	4.6	3	0.0	0	7.8	5
Total	100.0	200	100.0	54	100.0	65	100.0	17	100.0	64

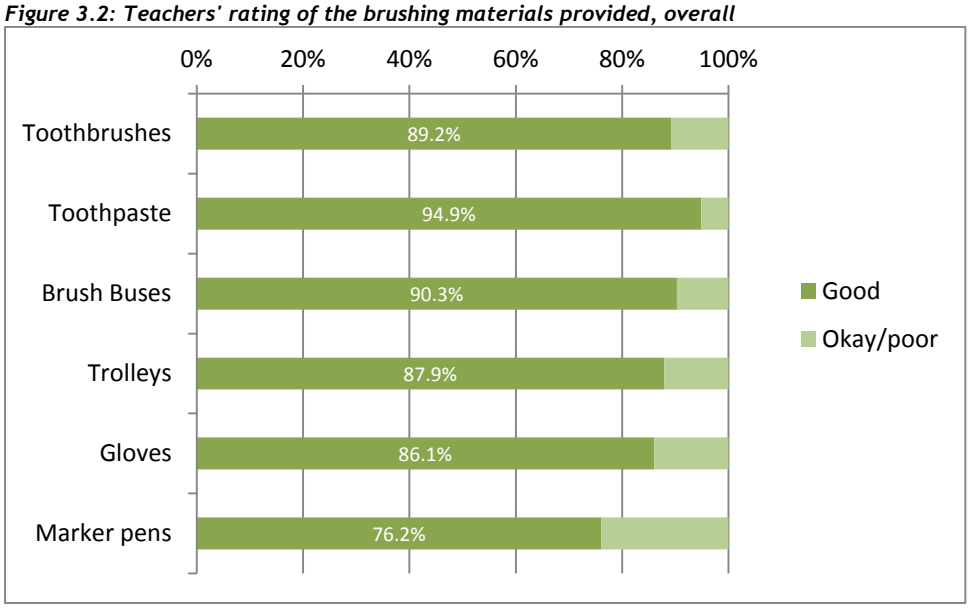
Again, most teachers were happy with the level of day-to-day support, with 93% reporting that it was just right. 10 teachers (5%) did however report that they felt that they did not receive enough support.

> *“ It's well organised and supported. Positive outcomes for both children and parents.*
>
> *“ Part of the success of the project is also down to the personnel involved - they couldn’t have been more helpful, and their enthusiasm for the project is infectious!*

Satisfaction with brushing materials

Figure 3.2 shows teachers' ratings of various different toothbrushing materials that were provided to the school by the CDS. Not all schools receive a trolley, gloves or marker pens, so percentages reported exclude those who chose the 'not applicable' option. For the purposes of the graph, 'very good' and 'fairly good' are combined, as well as 'okay', 'fairly poor' and 'very poor'.

Figure 3.2: Teachers' rating of the brushing materials provided, overall



The vast majority of schools thought that the three main brushing materials – the toothbrushes, toothpaste and Brush-buses – were fairly or very good. The least satisfactory piece of equipment was the marker pens – almost a quarter of schools (24%) thought they were either okay or poor.

> *"Each child (3 yrs old) will ask for their toothbrush. They love the different designs and the colours are great - the Tots colours could not have been chosen better. The parents are impressed!*

While the quality of the materials was generally felt to be good, there was some anecdotal evidence suggesting difficulties in some schools with the timely supply of materials such as new toothbrushes and especially toothpaste. Several teachers reported delays in the scheme while they waited for materials to be delivered.

> *“ We don’t enough brushes as I have several in the class who 'drop' brushes daily. These are on order but we have to wait until we get them.*
>
> *“ Towards the end of the financial year we had difficulty acquiring resources such as tissues and gloves and had to wait for the new financial year for these items. We found it more successful for the class teacher to decide which children went on each bus rather than the Designed to Smile member so some consultation needed before setting up buses if needed.*

3.2.3 Further Analysis

Future intentions

Impact

Table 3.15 shows the likelihood of schools and nurseries continuing their involvement with the scheme alongside the total number of children brushing in that setting as a whole. Three of the answer options – unsure, fairly unlikely and very unlikely – have been collapsed into the 'unsure/unlikely' category for the purposes of the analysis.

Table 3.15: School intention to continue taking part in the D2S scheme, by total number of children brushing

	Number of schools	Total number of children brushing	Percentage of all children brushing
Very likely	155	10,606	81.2%
Fairly likely	24	1,724	13.2%
Unsure / unlikely	14	728	5.6%
Total	193	13,058	100.0%

The table shows that around four-fifths (81%) of the children brushing in the sample were attending schools that were very likely to continue their involvement with the scheme in the future. A further 13% are at schools that are fairly likely to continue with the scheme, while 6% – representing 728 children in the current sample – attend schools that are unsure about, or unlikely to continue their involvement with the scheme in the future.

School factors relating to future intentions

Table 3.16 shows the percentage of schools that were unsure about their future involvement in the scheme, cross-tabulated with three school and classroom factors: the age of the children in the class, the number of children per class and the length of time that each toothbrushing session lasted.

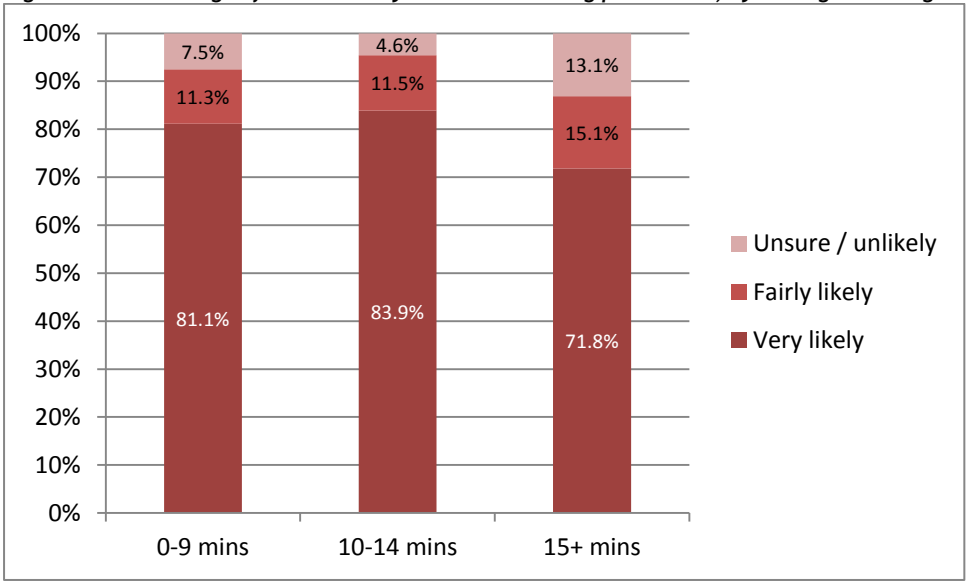
Table 3.16: Percentage of schools unsure about future involvement in D2S, by school factors

	Percentage of settings fairly or very likely to continue with the scheme	Percentage of settings unsure or unlikely to continue with the scheme
OVERALL	93.5	6.5
Age group		
Nursery	94.5	5.5
Reception	90.6	9.4
Infants	93.4	6.6
Class size		
<20	94.9	5.1
20-30	92.4	7.6
>30	94.1	5.9
Brushing time per session		
0-9 mins	92.5	7.5
10-14 mins	95.4	4.6
15+ mins	86.9	13.1

Chi-squared tests showed that neither the age group of the class or class size was significantly associated with a school's intention to continue taking part in the brushing programme.

Although it did not reach statistical significance, there was an observable trend whereby schools and nurseries that reported that brushing sessions lasted more than 15 minutes were almost twice as likely as an average school (13% vs. 7%) to be uncertain about their future involvement in the programme (Figure 3.3).

Figure 3.3: Percentage of schools likely to continue taking part in D2S, by average brushing time



COMMENTARY

As the Designed to Smile scheme is expanded to cover more schools and nurseries in Wales, it is important to remember that the effectiveness and long-term viability of the scheme is dependent upon the existing settings continuing their involvement with the scheme.

As was the case in the Super Pilot areas, the vast majority of schools surveyed indicated their intention to continue taking part in the scheme in the future. There are a minority of settings who are uncertain about their future participation, however.

Although a minority, they represent around 6% of the children brushing in these areas. The latest figures from the Welsh Oral Health Information Unit indicate that there are 39,217 children brushing across the Hywel Dda, Aneurin Bevan, Powys and Aberatwe Bro Morgannwg health boards – losing 6% or 2,353 of those children would obviously have a negative impact on the effectiveness of the programme.

Brushing frequency

Impact

Table 3.17 gives a more detailed breakdown of toothbrushing sessions missed in each Local Health Board area, taking into consideration both the reported brushing frequency and the total number of children brushing in each school.

The 'maximum possible weekly brushing-sessions' figure is calculated by multiplying the total number of children brushing in that area by five; while the 'actual number of weekly brushing sessions' figure is calculated on a school-by-school basis by multiplying the number of actual brushing sessions per week by the number of children in that school. This can be used to calculate the average number of sessions that a child in each area can be expected to miss per 39-week school year.

Table 3.17: Average number of yearly brushing sessions missed per school, by LHB

Health Board	Total number of schools	Total number of children	Maximum number of weekly brushing sessions	Actual number of weekly brushing sessions	Actual number of weekly brushing sessions per child	Efficiency measure	Average number of days missed each school year per child
Aneurin Bevan	56	3,528	17,640	16,437	4.66	**93.2**	13.3
Hywel Dda	69	3,685	18,425	16,874	4.58	**91.6**	16.4
Powys	18	925	4,625	4,020	4.35	**86.9**	25.5
ABMU	72	6,801	34,005	28,861	4.24	**84.9**	29.4
Overall	215	14,939	74,695	66,192	4.43	**88.6**	21.2

The figures show that the average child in the four surveyed Local Health Board areas can expect to miss 21 days, or just over 4 weeks of brushing time in each 39 week academic year. This represents 11% of all possible sessions, and is very similar to the results previously reported for the Super Pilot areas (23 days missed per year, 88% efficiency).

Again, there is variation in brushing frequency by Local Health Board. Children in Aneurin Bevan will only miss around two and a half weeks (13 days) each school year, while those in ABMU will miss around six weeks (30 days).

School factors relating to brushing frequency

Table 3.18 shows the percentage of settings that miss at least one brushing session a week, broken down by various classroom factors.

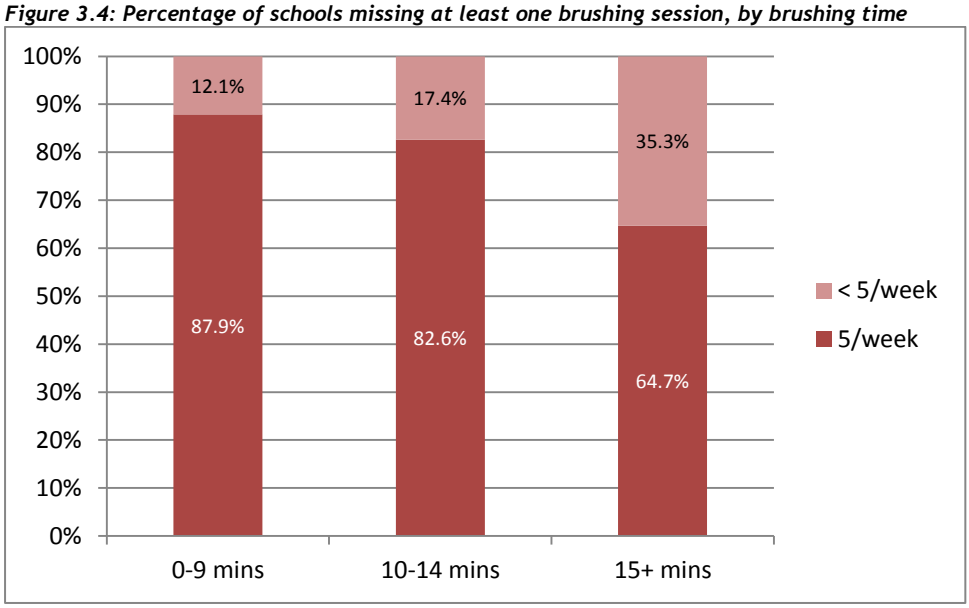
Table 3.18: Percentage of schools that miss at least one weekly brushing session, by school factors

	Percentage of settings that brush five times a week	Percentage of settings that brush less than five times a week
OVERALL	79.5	20.5
Age group		
Nursery	85.4	14.6
Reception	78.4	21.6
Infants	71.6	28.4
Class size		
<20	87.5	12.5
20-30	74.2	25.8
>30	92.9	7.1
Brushing time per session		
0-9 mins	87.9	12.1
10-14 mins	82.6	17.4
15+ mins	64.7	35.3

Chi-squared tests showed that both the age group of the class and the length of time that brushing sessions lasted were significantly related to brushing frequency ($p<0.01$).

Classes where brushing sessions lasted fifteen or more minutes were far more likely to miss at least one session per week (35%) compared to the average (21%). Figure 3.4 illustrates this relationship between brushing time and brushing frequency.

Figure 3.4: Percentage of schools missing at least one brushing session, by brushing time



Similarly, the probability of missed sessions increased with the age group of the class: infant classes were nearly twice as likely to miss weekly sessions as nursery classes (28% vs. 15%).

> *"The programme is far easier to organise and manage for children at Foundation Phase. We plan to continue with these children next year.*

There was a moderate but statistically insignificant effect of class size on brushing frequency. Smaller classes of fewer than 20 children were less likely to miss sessions than classes with between 20 and 30 children, but perhaps counter-intuitively, larger classes of 30 or more children were also less likely to miss sessions compared to the average.

COMMENTARY

A fifth (20%) of classes surveyed missed at least one brushing session per week, often missing multiple days in a week. The problem was particularly prevalent in ABMU Health Board, where a third of surveyed classes miss at least one session per week.

Further analysis shows that on average, children in these four Health Boards are missing around four weeks, or 12% of all possible brushing sessions each 39-week academic year.

From a clinical and cost-effectiveness perspective, this is an important area to address.

As previously reported, these data are based on data reported directly by teachers in sampled schools. They differ from the compliance figures reported by the CDS teams to the WOHIU as part of the process analysis.

Although the average time taken to carry out the toothbrushing sessions (11 minutes) is less than many schools anticipate, there is significant variance between settings. Those settings where teachers report taking 15 or more minutes to carry out the brushing sessions are far more likely to miss weekly sessions.

The length of time taken to conduct the sessions is related to class size to a small extent, but it appears that a number of factors play some role in determining how long teachers take to carry out brushing – comments referred to classroom facilities being one issue, and CDS staff report that some classroom teachers are better at organising the sessions than others.

Infant classes are almost twice as likely to miss at least one session of brushing per week compared to nursery and reception classes (29% vs 17%). Feedback from teachers suggested that timetabling pressures were far greater at infant level, resulting in toothbrushing sessions receiving slightly lower priority.

It is important the CDS are able to collect accurate data about which schools and nurseries are missing weekly brushing sessions, and which schools are taking longer to carry out the toothbrushing sessions than others, in order that they can effectively prioritise their resources and support.

3.2.4 Multiple Regression Analysis

Further analysis of factors associated with schools missing at least one brushing session each week was carried out using a combined dataset encompassing survey results from schools in the Super Pilot areas (n=214) and the current survey of schools in the 'newer areas' of Aneurin Bevan, Hywel Dda, Powys and Abertawe Bro Morgannwg University Health Boards (n=203).

Table 3.19: Percentage of schools missing at least one weekly brushing session, by Super Pilot and 'newer' areas

	OVERALL		Super Pilot areas		Newer areas	
	%	*N*	*%*	*N*	*%*	*N*
5 times per week	73.1	305	66.8	143	79.8	162
< 5 times per week	26.9	112	33.2	71	20.2	41
Total	100.0	417	100.0	214	100.0	203

Table 3.20 shows the relationship between brushing frequency and various school or classroom factors.

Table 3.20: Percentage of schools missing at least one weekly brushing session, by school factors

	Percentage of settings that brush five times a week	Percentage of settings that brush less than five times a week
OVERALL	72.9	27.1
Age group		
Nursery	81.4	18.6
Reception	66.4	33.6
Infants	67.5	32.5
Class size		
<20	70.9	29.1
20-30	72.3	27.7
>30	78.4	21.6
Brushing time per session		
0-9 mins	83.5	16.5
10-14 mins	77.9	22.1
15+ mins	56.7	43.3

Chi-squared tests showed that the number of reported brushing sessions per week was significantly ($p<0.01$) associated with the age group of the class and the length of time that toothbrushing sessions lasted. There was, however, no association between frequency of weekly brushing and the number of children in the class.

Multiple regression analysis showed that the odds of missing at least one session per week were significantly higher in classrooms that took 15 or more minutes per brushing session (Table 3.21) and classrooms with older children (Table 3.22).

Table 3.21: Odds ratio and confidence intervals for effect of brushing time on weekly brushing sessions

Mins each brushing session lasts	Settings brushing 5 times per week (%)	Settings brushing <5 times per week (%)	Odds ratio	95% CI
0–9 (ref)	91 (83.5)	18 (16.5)	1.00	
10–14	148 (77.9)	42 (22.1)	1.43	0.76–2.69
15+	68 (56.7)	52 (43.3)	3.97*	2.09–7.56

Table 3.22: Odds ratio and confidence interval for effect of class age group on weekl brushing sessions

Age group of children in class (yrs)	Settings brushing 5 times per week (%)	Settings brushing <5 times per week (%)	Odds ratio	95% CI
Nursery, 0–3 (ref)	136 (81.4)	31 (18.6)	1.00	
Reception, 4–5	83 (66.4)	42 (33.6)	2.18*	1.25–3.81
Infants, 5–6	81 (67.5)	39 (32.5)	2.28*	1.29–4.00

4. Parent Survey

In this chapter, we report on preliminary findings from a questionnaire survey of parents whose children take part in the scheme in the Abertawe Bro Mogrannwg Health Board area.

The survey was designed to assess various elements of home toothbrushing and parents' attitudes towards brushing, and more detailed results will be presented in Stage 2 of the evaluation in December 2013. The current report is concerned with four questions from the survey, which asked parents about how their child's participation in Designed to Smile had impacted on their home toothbrushing habits and their child's and their own attitude towards toothbrushing in general.

4.1 METHODS

4.1.1 Participants

The sampling frame for the questionnaire survey consisted of all parents whose children were participating in the school and nursery toothbrushing scheme Designed to Smile, in the Abertawe Bro Morgannwg University Health Board (ABMUHB) area of South Wales.

A total of 127 schools and nurseries from ABMUHB were participating in the scheme at the time of the study (65 in Swansea, 62 in Neath Port Talbot). The Community Dental Service provided a full list of participating nurseries and schools from the ABMUHB area with the number of children brushing in each setting. In order to achieve a sample size of at least 300 parents, 800 parents were invited to take part in the study from 20 different schools and nurseries in Swansea and Neath Port Talbot.

4.1.2 Questionnaire

A 6-page questionnaire (Appendix C) was developed to assess a number of elements of children's home toothbrushing behaviour, as well as parents' attitudes towards and beliefs about toothbrushing. The questions were developed with the help of the Community Dental Service and the survey was piloted extensively before being finalised.

Four questions were included assessing the extent to which a child's participation in the Designed to Smile scheme had affected:

- How often they brushed at home in the morning
- How often they brushed at home in the evening
- The child's attitude towards toothbrushing
- The parent's attitude towards toothbrushing

4.1.3 Procedure

All parents from 20 participating schools and nurseries in Swansea and Neath Port Talbot were given an information sheet about the survey by a CDS staff member while in school. Parents who agreed to take part completed a consent form providing their name, address and a contact telephone number.

All consenting parents were mailed a copy of the questionnaire survey, as well as a covering letter and a pre-paid and addressed envelope for returning the form. After 4 weeks, those parents who had no returned a form were contacted by telephone to encourage them to complete the form or to ask if they required a replacement. Those parents who decided that they didn't want to take part in the study were not contacted any further. After an additional 2 weeks, non-respondents were contacted for a final time and again offered a replacement copy of the questionnaire.

4.2 FINDINGS

4.2.1 Response rate

Consent forms were completed by 502 parents, with 301 parents returning a survey comprising a 60% response rate. The baseline figures used for the current analysis comprise 294 parents in total, due to a small number of parents not completing each question.

4.2.2 Overview

Parents were asked whether their child's participation in the Designed to Smile scheme had made them more or less likely to brush their child's teeth at home, both in the morning before school and in the evening after school.

Table 4.1: Effect of D2S participation on child's home toothbrushing in the morning

	Percent	N
More likely to brush since D2S	31.0	91
No change	65.0	191
Less likely to brush since D2S	4.0	12
Total	100.0	294

Table 4.2: Effect of D2S participation on child's home toothbrushing in the evening

	Percent	N
More likely to brush since D2S	21.8	64
No change	77.2	227
Less likely to brush since D2S	1.0	3
Total	100.0	294

Around a third (31%) of parents reported that they were more likely to brush their child's teeth at home in the morning, as a result of their child taking part in the scheme, while the majority (65%) reported no change. A small number of parents (4%) reported that they were less likely to brush their child's teeth at home as a result of their participation in Designed to Smile.

In the evening, the vast majority of parents (77%) reported no effect of Designed to Smile on their child's brushing. A fifth of parents (22%) did however report that evening brushing was more frequent since the scheme began.

Parents were asked to evaluate the effect of Designed to Smile participation on both their child's and their own attitude towards toothbrushing at home.

Table 4.3: Effect of D2S participation on child's attitude towards toothbrushing at home

	Percent	N
More positive about toothbrushing	67.3	198
No change	30.7	90
More negative about toothbrushing	2.0	6
Total	100.0	294

Table 4.4: Effect of D2S participation on parent's attitude towards toothbrushing at home

	Percent	N
More positive about toothbrushing	33.3	98
No change	66.7	196
More negative about toothbrushing	0.0	0
Total	100.0	294

Just over two-thirds of parents (67%) reported that their child had become more positive about toothbrushing at home as a result of taking part in the Designed to Smile programme in school or nursery.

Furthermore, a third of parents (33%) reported that they themselves had become more positive about brushing their child's teeth at home since they had taken part in the school brushing scheme.

4.2.3 Relationship to children's age

Table 4.5and Table 4.6 show the effect of Designed to Smile participation on morning and evening home brushing according to the child's age.

Table 4.5: Effect of D2S participation on child's home toothbrushing in the morning, by child's age

	3 yrs or younger	4 yrs	5 yrs	6 yrs or older	Total
More likely to brush since D2S	39.6	31.3	29.6	27.6	31.0
No change	58.3	65.7	64.2	68.4	65.0
Less likely to brush since D2S	2.1	3.0	6.2	4.1	4.0
Total	100.0	100.0	100.0	100.0	100.0

Table 4.6: Effect of D2S participation on child's home toothbrushing in the evening, by child's age

	3 yrs or younger	4 yrs	5 yrs	6 yrs or older	Total
More likely to brush since D2S	25.0	25.4	23.5	16.3	21.8
No change	72.9	74.6	75.3	82.7	77.2
Less likely to brush since D2S	2.1	0.0	1.2	1.0	1.0
Total	100.0	100.0	100.0	100.0	100.0

For both the morning and the evening, there was a general trend where parents of younger children were more likely to brush their child's teeth more often since they started the school programme.

In the morning, for instance, 40% of parents of children aged 3 or younger brushed their child's teeth more often compared to 28% of parents of children aged 6 or older.

Table 4.7and Table 4.8 show the effect of Designed to Smile participation on children's and parents' attitudes towards home brushing, again according to the age of the child.

Table 4.7: Effect of D2S participation on child's attitude towards home brushing, by child's age

	3 yrs or younger	4 yrs	5 yrs	6 yrs or older	Total
More positive about toothbrushing	66.7	73.1	69.1	62.2	67.3
No change	33.3	26.9	27.2	34.7	30.7
More negative about toothbrushing	0.0	0.0	3.7	3.1	2.0
Total	100.0	100.0	100.0	100.0	100.0

Table 4.8: Effect of D2S participation on parent's attitude towards home brushing, by child's age

	3 yrs or younger	4 yrs	5 yrs	6 yrs or older	Total

More positive about toothbrushing	37.5	37.3	33.3	28.6	33.3
No change	62.5	62.7	66.7	71.4	66.7
More negative about toothbrushing	0.0	0.0	0.0	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0

The relationship between a child's age and the change in their attitude (and their parent's attitude) towards brushing was less clear. In both cases, the positive effect of the programme was less pronounced for older children, aged 6 or older.

4.2.4 Relationship with child's brushing frequency

Figure 4.1 and Figure 4.2 show the effect of the Designed to Smile scheme on children's home brushing according to how often the child currently brushes at home. For the purposes of analysis, children whose parents reported that they brush 14 times a week or more were considered 'regular brushers' and those who brushed 13 times or fewer each week were classified as 'irregular brushers'.

Figure 4.1: Effect of D2S participation on home brushing in the morning, by weekly brushing frequency

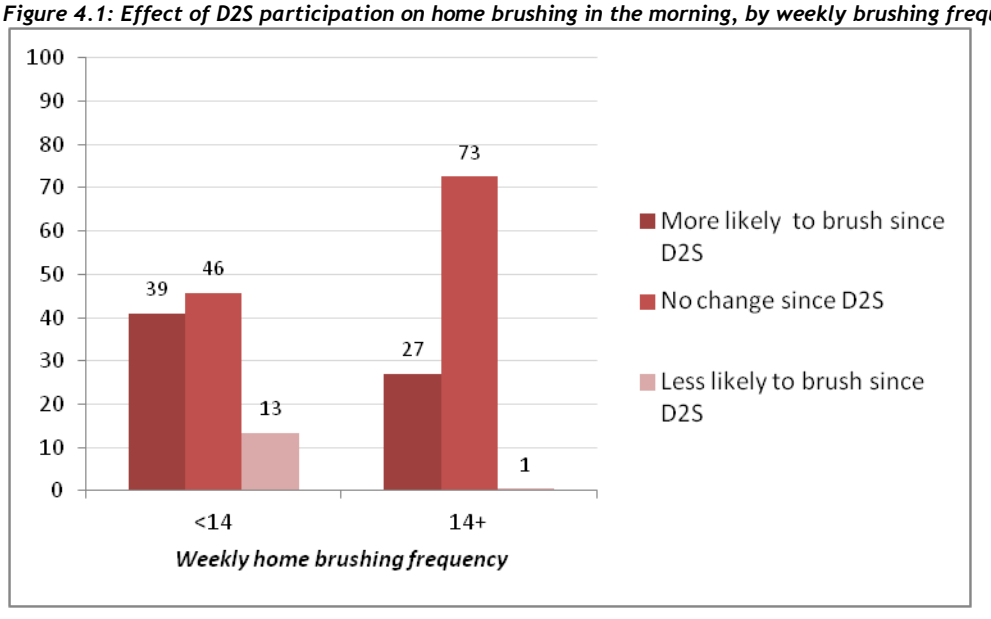
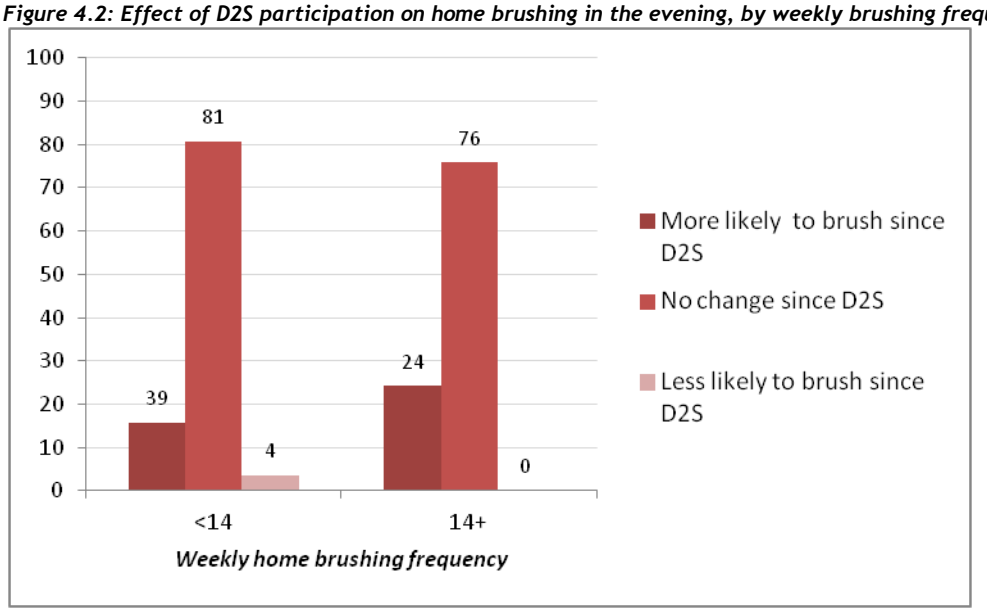


Figure 4.2: Effect of D2S participation on home brushing in the evening, by weekly brushing frequency



In terms of morning brushing, children who brush less frequently were actually more likely to have increased their morning brushing at home since taking part in the scheme, compared to more frequent brushers (41% vs. 27%).

13% of parents who brushed their children's teeth infrequently at home did, however, report brushing less often in the morning since their child had begun the school brushing programme.

In terms of evening brushing, the pattern was somewhat reversed. Parents who brushed their child's teeth regularly reported the greatest benefits, with almost a quarter (24%) more likely to brush their child's teeth in the evening since the scheme began, compared to 16% of parents who brushed their child's teeth irregularly.

Finally, Table 4.9and Table 4.10 show the effect of current home brushing frequency on the change in children's and parents' attitudes towards brushing.

Table 4.9: Effect of D2S participation on child's attitude towards home brushing, by weekly brushing frequency

	Irregular brusher	Regular brusher	Total
More positive about toothbrushing	69.9	66.4	67.3
No change	27.7	31.8	30.7
More negative about toothbrushing	2.4	1.9	2.0
Total	100.0	100.0	100.0

Table 4.10: Effect of D2S participation on parent's attitude towards home brushing, by weekly brushing frequency

	Irregular brusher	Regular brusher	Total
More positive about toothbrushing	33.7	33.2	33.3
No change	66.3	66.8	66.7
More negative about toothbrushing	0.0	0.0	0.0
Total	100.0	100.0	100.0

The data show that there was actually very little difference between the two groups in terms of attitudes towards brushing as a result of Designed to Smile participation.

COMMENTARY

In addition to the daily application of fluoride toothpaste, the Designed to Smile scheme has a significant oral health promotion element.

The data reported here suggest that participation in the toothbrushing scheme has had resulted in positive outcomes for many children in terms of toothbrushing at home. Around a third of children are more likely to brush at home in the morning, while a fifth are more likely to brush at home after school, in the evening.

Moreover, two thirds of children and a third of parents had a more positive attitude towards home toothbrushing since taking part in the scheme.

Younger children, and children whose parents brushed their teeth more infrequently at home, were more likely to benefit from participation in the scheme.

There was, however, a small group of parents who reported that their child was actually less likely to brush in the morning since taking part in the scheme. Previous interviews with parents suggest that, in schools or nurseries where school toothbrushing takes place early in the day rather than in the afternoon, there may be a temptation to skip home brushing in the morning.

5. Conclusions & Recommendations

The current report is based on findings from two questionnaire surveys: firstly, a survey of staff from schools and nurseries participating in the Designed to Smile scheme; and secondly, a survey of parents and carers of children who take part in the programme.

The overall impression from both surveys was very positive.

The vast majority of school and nursery headteachers felt that the toothbrushing scheme had impacted positively on their school and fitted well with their curriculum and wider health promotion efforts.

Likewise, school and nursery teachers were overwhelmingly positive about the level of training and support that they had received from the Community Dental Service staff involved in the programme. Comments were made about the enthusiasm shown by children towards the scheme as a result of their sessions with CDS staff.

Weekly brushing frequency

One of the main challenges for the CDS is in ensuring that participating schools and nurseries carry out the scheme every day, as intended. The data reported here suggest that in some areas, children can expect on average to miss 6 weeks of brushing sessions out of every 39-week academic year.

It is understandable that CDS staff need to allow some flexibility, where they think some schools or nurseries will not wish to take part if they have to carry out the scheme every day, but it is nevertheless important, for both the clinical and cost effectiveness of the scheme, that schools are encouraged to work towards daily brushing through training and regular audit.

Recommendation #1:

CDS staff need to highlight the importance of the daily brushing protocol to schools and nurseries, and follow-up on this advice with regular auditing.

Brushing duration

The average school or nursery reported that the toothbrushing scheme took 11 minutes to carry out, including time to tidy away materials afterwards. A number of schools commented that this was significantly less time that they had initially anticipated. Although the scheme has, to date, had very good consent rates among schools and nurseries, it may be possible to promote this average brushing time where teachers are worried about the programme taking up too much of their teaching time.

Recommendation #2:

The average time taken to brush my schools and nurseries (11 minutes) is significantly less time than many teaching staff anticipate and should be emphasised by CDS staff when promoting the scheme to new schools and nurseries.

Teacher training

Brushing time did vary by setting however, and some schools and nurseries take more than 15 minutes to carry out each session. These schools and nurseries are significantly more likely to miss sessions or report being unsure about their future involvement in the programme.

Brushing time was only moderately associated with class size – CDS staff have previously reported that much of the variation in brushing time is down to teaching staff and their organisational skills. Teacher training should heavily emphasise the importance of organising the scheme so that it takes up as little time as possible, and where possible, seek to learn lessons from schools that carry out the scheme efficiently.

Recommendation #3:

Teacher training should heavily emphasise the importance of organising the scheme so that it takes up as little time as possible, and seek to learn and communicate lessons from schools that carry out the scheme more efficiently.

Up-to-date information

Support Workers would ideally be able to visit every school or nursery on a weekly or fortnightly basis, and be to speak in depth with every headteacher at the end of a school year, but this may not always be practical.

The key for the CDS is in identifying which schools need more support than others and tailoring their input accordingly.

The results of the current survey cannot be disseminated at a school- level because of the anonymity promised to all schools taking part. It would, however, be of great benefit if the CDS were able to amend or add to their current yearly feedback forms in order to collect three important pieces of information about each school: the length of time it takes them to carry out brushing, the number of times they carry out brushing in a typical week and their inclination to continue with the scheme in the future. That information alone would allow

each team to target their resources at schools that need the most day-to-day help, and are the most likely to withdraw from the scheme.

Recommendation #4:

It would be advisable for CDS staff to keep up-to-date information on participating schools and nurseries in terms of how often they carry out the scheme and how long it takes them to do so. This sort of information would allow staff to target schools and nurseries that need the most support.

Effect of D2S participation on home brushing and attitude

The preliminary results from the survey of parents whose children take part in the scheme are very encouraging. There is evidence that participation in the toothbrushing scheme is having a positive effect for many children on their home toothbrushing habits – particularly younger children and children who brush less frequently. Both children and parents' attitudes towards toothbrushing had improved in many cases.

There is some limited evidence – supported by some anecdotal reports from school teachers – that a small number of parents may be dissuaded from carrying out morning toothbrushing at home if their child brushes in school or nursery early in the day. This appears to be restricted to very few cases, but where possible schools and nurseries should be encouraged towards carrying out brushing at lunch-time or later in the day.

Recommendation #5:

Although flexibility is important, schools and nurseries should be encouraged where possible to carry out the toothbrushing scheme at lunch-time or later in the day to minimise any risk

that parents will see morning brushing as a replacement for brushing their child's teeth at home.

6. Acknowledgements

We would like to gratefully acknowledge the support of the school staff and the parents who took time to complete the questionnaire surveys, as well as the Community Dental Service staff for assisting in the distribution of the surveys.

7. Appendix

Appendix A – Summary of previous Designed to Smile evaluation reports

The following document is a summary of findings from the first three reports of the initial stage of the process evaluation.

Summary of the Designed to Smile process evaluation

Evaluation process

The Welsh Assembly Government contracted the Dental Public Health Unit at Cardiff University to carry out a formal evaluation of the Designed to Smile programme. The table below shows the three stages of the evaluation project, and the submission dates of the associated reports.

Stage	Participants	Method	Report date
Stage 1	CDS staff	Face-to-face interviews with 14 staff in South Wales and North Wales	December 2009
Stage 2	School staff	Questionnaire survey completed by 298 schools in South Wales and North Wales pilot regions	December 2010
Stage 3	Parents of children	Telephone interviews with 15 parents in South Wales and North Wales	December 2011

Key findings

STAGE 1: CDS STAFF INTERVIEWS

The overall impression of the scheme that arose from the fourteen interviews was positive. Staff felt that the implementation of the scheme had gone well and were genuinely enthusiastic about their involvement in the programme. They considered the scheme to be on course to meet its aims. This was very encouraging given the short time since the commissioning of the scheme.

As with the implementation of any scheme of this size, there were inevitably a number of threats and opportunities communicated by the interviewees.

Consent: Consent to participate in the programme was reported to be high. However, considerable effort and staff time has been expended to ensure high coverage, which is compounded by the multiple consent forms associated with different elements of the programme and the need for rolling, year-on- year consent.

Staff: The introduction of non-clinical Support Workers was to felt to have been beneficial to the Designed to Smile programme. There was some variation in how these staff were being deployed in different areas. Consideration should be given to the training needs of this new category of staff and their developing role within the Designed to Smile team.

Flexibility vs. protocol: Staff described the need for a flexible approach to programme implementation. There is a need to ensure that, while steps are taken to secure schools' participation, this doesn't compromise the clinical and cost effectiveness of the programme.

Relationships with schools: Positive feedback and encouragement to schools is important both to recognise and reward involvement and as a means of securing ongoing participation in the scheme. It was felt that there was a misconception among some schools with regard to how long the scheme might take to implement in their classes, so methods of better communicating the straightforward nature of the toothbrushing programme should be considered.

Wider health and education context: There exists a need to integrate the Designed to Smile programme in the wider school curriculum, and ensure schools are rewarded for their involvement. Links to the wider health promotion agenda were evident, but could probably be exploited further.

Written materials, translation and resources: Staff reported some initial difficulty with the translation of written resources. This has now been largely resolved, but the translation

process would benefit from a review. Overall, staff were content with the quantity and quality of the physical resources available.

Monitoring and audit: Although there were clear guidelines for audit/quality inspections of schools participating in the scheme, it was not clear that they were being implemented in a consistent fashion. It is important to ensure that schools are clear about, and comply with the programme's protocols, and that this is rigorously monitored and documented.

Communication between teams: Although there was sharing of information between pilot sites, staff were of the view that opportunities for sharing best practice, particularly at an operational level, could be exploited further.

STAGE 2: SCHOOL SURVEY

Overall, schools were extremely positive about their experience of taking part in the programme. They commented particularly on the children's enthusiasm to brush their teeth in class alongside their friends. They felt that the scheme fitted well with their wider aims, and were complimentary about the training and support offered by the CDS teams. Inevitably, the results also highlighted some risks to the programme. These relate primarily to compliance with the toothbrushing protocol and future participation in the programme.

Awareness of the scheme: Despite the scope of the programme and the investment to date, 73% of school headteachers reported that they had not heard of the scheme before being approached by the CDS teams. It reflects well on the CDS staff that participation rates are nevertheless very high amongst targeted schools.

Fit with the school and overall impact: Almost all schools reported that they felt the scheme fitted well with their school curriculum and their wider health promotion efforts.

Similarly, all but a handful of schools were of the view that the programme had impacted positively on the school as a whole.

Future intentions: 90% of schools were either very or fairly sure that they would continue taking part in the scheme in the future. The remaining 10% (representing 1,520 children in 30 schools) were either unsure of their plans or unlikely to take part going forward, with the majority citing time constraints. It is obviously of great importance that the CDS are able to work with such schools to ensure their ongoing involvement in the programme.

Class size and age groups: The majority of classes surveyed were nursery or reception age (3-5 years old), with some Year 1 and Year 2 classes (5-7 years old). There was an average of 23 children per class, which was consistent between both South and North Wales and between age groups.

Brushing frequency: One third of schools reported that they missed at least one brushing session per week. Overall, it is estimated that children in South Wales miss a total of 3 weeks of brushing sessions over the course of the 39 week academic year, whereas children in North Wales miss 7 weeks. There are large variations by local area, however: children in Denbighshire, for instance, miss around 10 weeks of sessions. Non-compliance with daily brushing is identified as the most important finding of this evaluation. From both a clinical and cost-effectiveness perspective, it is crucial that as the programme matures, all schools are encouraged to work towards daily brushing.

Brushing duration: On average, brushing took around 11 minutes per session. Crucially, schools that brushed for more than 15 minutes were more than twice as likely as others to miss out sessions each week, or to express doubts about their involvement in the scheme going forward. Longer brushing times were associated with larger class sizes to some extent,

but teachers reported that a range of factors, including manpower and classroom facilities, were influencing factors.

Satisfaction with training and support: All but a handful of schools were happy with both the length of their training session and the amount of information they had received. Likewise, most schools felt that they received adequate day-to-day support from the CDS staff.

Satisfaction with brushing materials: Satisfaction with toothbrushes, toothpaste, Brush Buses and other materials was generally high. There were some reports of problems cleaning Brush-Buses and occasions where the re-supply of materials had caused delays in the scheme. Perhaps most pressingly, there still appear to be problems in some schools with labelling toothbrushes. It is strongly recommended that the CDS amend their yearly school feedback forms in order to collect reliable information on brushing frequency, brushing duration and future intention to participate in the programme. This data would allow each team to focus their resources on the schools in need of the most support in their local area.

STAGE 3: PARENT INTERVIEWS

The overall impression of the scheme that arose from the fifteen interviews was positive. Parents supported the scheme and most felt that it had been a positive experience for their child. Many reported that their child had shown an improved attitude towards toothbrushing, and had improved their brushing technique considerably.

Communication of the scheme to parents and dentists: All parents had received consent forms before taking part in the scheme and were happy with the information they had received. It was felt that parent meetings had been difficult to attend for those working full-time, and most parents reported that they would prefer more ongoing communication about

the scheme the school or the CDS staff. Some parents noted that their dental practitioner was unaware of the scheme.

Parents' thoughts about the scheme: Parents' attitude towards the scheme depended partly on their home brushing habits before the scheme began.

Those who brushed regularly were still largely supportive of the scheme, feeling that it reinforced their own messages and that many children in their school probably did not brush as often as their children. A minority of those whose children brushed regularly did however worry that the time spent on toothbrushing might mean that their children missed out on other learning opportunities – they perceived that there was not enough being done to educate parents about home brushing, in conjunction with the toothbrushing sessions in class.

Those parents who did not brush their children's teeth regularly at home were broadly supportive of the scheme. They felt that their children's attitude towards brushing had changed for the positive, facilitating their own efforts to brush their child's teeth at home.

Children's thoughts about the scheme: Parents reported that their children had taken very well to the scheme, and most considered part of their daily school routine. Parents highlighted the positive social aspect of children brushing in class with their friends, which they felt had led to greater enjoyment of toothbrushing in general. Similarly, many parents reported that children benefited from feeling ownership of their own toothbrush, both in class and through the 'home packs' of toothpaste and toothbrushes sent home to those taking part.

Effect of the scheme on children's home brushing habits: Those parents who brushed their child's teeth regularly typically saw the school sessions as a 'bonus brush', rather than a replacement for what they did at home. However, two parents of children whose school or nursery carried out the brushing scheme in the morning did report that they did occasionally

miss brushing their child's teeth before school. Those who brushes less frequently at home did not report any adverse effects on home brushing – indeed, a number of parents reported that the school sessions facilitated home brushing, due to improvements in their child's attitude towards brushing.

Effect of the scheme on children's attitude towards toothbrushing: Parents reported that their children had particularly enjoyed the oral health promotion talks given by CDS staff, and the involvement of the Dewi the Dragon puppet. Many pointed out that positive oral health messages given by teachers seemed to carry more authority, and so have more of a positive effect, than what they told their children at home.

Parents commonly reported that children enjoyed the social aspect of brushing with friends and that this positive association had carried over to home brushing. Many parents also felt that their child's brushing technique had noticeably improved as a result of the scheme – some were now happy to let their child brush with little or no supervision.

Finally, some parents reported that their child's positive experience with the Designed to Smile scheme had helped reduce anxieties related to visiting their own general dental practitioner.

Effect of the scheme on parents' attitude towards toothbrushing: Many parents reported that the main effect of the scheme was simply to raise awareness about toothbrushing and oral health, in general. They referred to a 'drip drip' effect of the talks, information sheets and feedback from their children. More than one parent reported that discussions about toothbrushing had prompted them to make dental appointments for their children, or to find them a dentist. Two parents of younger children (2-3 years old) reported that the scheme had made them aware of the need to brush their child's teeth at home, where they had previously been unsure of the appropriate age to begin brushing.

Home packs: Parents were extremely positive about the 'home packs' – free packs containing toothpaste and a toothbrush for children to use at home. Children were reportedly enthusiastic about having their own brush and parents felt that children were far more enthusiastic about brushing in the weeks following a new pack. Parents were grateful that the brushes and adult toothpaste were similar to those used in school, allowing continuity between school and home brushing.

There did, however, appear to be some discrepancy in how often parents received the home packs, according to which school their child attended. Some parents reported receiving packs each school term, whereas others had only received one or two over the course of a year or more.

Appendix B – School questionnaire survey and covering letters

The following surveys and covering letters were used for the school survey, the findings of which were discussed in Chapter 3.

Designed to Smile Questionnaire

FOR HEADTEACHER TO COMPLETE

General

1 **Had you heard of the Designed to Smile programme before you were contacted by the team?**

Tick one box only

Yes	☐	1
No	☐	2

Designed to Smile and your school

2 **How well do you feel the Designed to Smile programme fits in with your school curriculum as a whole?**

Tick one box only

Very well	☐	1
Fairly well	☐	2
Not sure/no opinion	☐	3
Not particularly well	☐	4
Not well at all	☐	5

3 **And how well do you think it fits in with other health-promotion schemes?**

Tick one box only

Very well	☐	1
Fairly well	☐	2
Not sure/no opinion/not applicable	☐	3
Not particularly well	☐	4
Not well at all	☐	5

4 **Overall, what sort of an impact do you think the Designed to Smile scheme has had on the school?**

Tick one box only

Very positive	☐	1
Fairly positive	☐	2
Not sure/no opinion	☐	3
Fairly negative	☐	4
Very negative	☐	5

Future intentions

5 **How likely is it that your school will continue to run the toothbrushing programme in the next academic year?**

Tick one box only

Very likely	☐	1
Fairly likely	☐	2
Not sure	☐	3
Fairly unlikely	☐	4
Very unlikely	☐	5

Comments or suggestions

6 **If you have any further comments, or suggestions for how the scheme may be improved, please let us know below:**

Holiadur Cynllun Gwên

I'R PENNAETH EI LENWI

Cyffredinol

1 **Oeddech chi wedi clywed am Gynllun Gwên cyn i'r tîm gysylltu â chi?**

Ticiwch un blwch yn unig

Oeddwn	☐	1
Nac oeddwn	☐	2

Cynllun Gwên a'ch Ysgol chi

2 **Pa mor dda yr ydych chi'n teimlo bod Cynllun Gwên yn cyd-fynd â chwricwlwm eich ysgol yn gyffredinol?**

Ticiwch un blwch yn unig

Yn dda iawn	☐	1
Yn eithaf da	☐	2
Heb fod yn sicr / dim barn	☐	3
Ddim yn arbennig o dda	☐	4
Ddim yn dda o gwbl	☐	5

3 **A pha mor dda, yn eich barn chi, y mae'n cyd-fynd â chynlluniau eraill i hybu iechyd?**

Ticiwch un blwch yn unig

Yn dda iawn	☐	1
Yn eithaf da	☐	2
Heb fod yn sicr / dim barn	☐	3
Ddim yn arbennig o dda	☐	4
Ddim yn dda o gwbl	☐	5

4 **Yn gyffredinol, pa fath o effaith y mae Cynllun Gwên wedi'i chael ar yr ysgol yn eich barn chi?**

Ticiwch un blwch yn unig

Cadarnhaol iawn	☐	1
Eithaf cadarnhaol	☐	2
Heb fod yn sicr / dim barn	☐	3
Eithaf negyddol	☐	4
Negyddol iawn	☐	5

Bwriadau at y dyfodol

5 **Pa mor debyg yw hi y bydd eich ysgol yn dal i redeg y rhaglen brwsio-dannedd yn y flwyddyn academaidd nesaf?**

Ticiwch un blwch yn unig

Tebygol iawn	☐	1
Eithaf tebygol	☐	2
Heb fod yn sicr	☐	3
Eithaf annhebygol	☐	4
Annhebygol iawn	☐	5

Sylwadau neu awgrymiadau

6 **Os oes gennych chi unrhyw sylw pellach, neu awgrymiadau ynghylch sut y gellir gwella'r cynllun, rhowch wybod i ni isod:**

Designed to Smile Questionnaire

FOR CLASSROOM TEACHER TO COMPLETE

Your class

1 What age group are the children in your classroom?

Tick one box only

Nursery	☐	1
Reception	☐	2
Year 1	☐	3
Year 2	☐	4
Year 3	☐	5

2 And how many children are there in your class, altogether?

Enter the number of children below

---------- children

Toothbrushing

3 On average, how many times do you carry out the toothbrushing programme each week?

Enter the number times per week below

---------- times per week

4 On average, how long does it take to carry out the toothbrushing programme each day?

Enter the number of minute below

---------- minutes

School staff training

5 With regard to the training that you received from the Designed to Smile team, would you say were given….

Tick one box only

too much information?	☐	1
just the right amount of information?	☐	2
too little information?	☐	3

6 And would you say that training session….

Tick one box only

lasted too long?	☐	1
lasted just the right length of time?	☐	2
didn't last long enough?	☐	3

Guidelines and support

7 How would you describe the written guidelines for the toothbrushing programme that you've been given?

Tick one box only

Very clear	☐	1
Fairly clear	☐	2
Not sure/no opinion	☐	3
Fairly unclear	☐	4
Very unclear	☐	5

8 Would you say that the level of day-to-day support that you receive from the Designed to Smile team is….

Tick one box only

too much?	☐	1
just right?	☐	2
not enough?	☐	3

Toothbrushing materials

9 **How would you rate the quality of the following toothbrushing materials provided to you by the Designed to Smile teams?**

Tick one box in each row

	Very good ▼	Fairly good ▼	Okay ▼	Fairly poor ▼	Very poor ▼	Not applicable ▼
Toothbrushes	☐	☐	☐	☐	☐	☐
Toothpaste	☐	☐	☐	☐	☐	☐
Brush buses	☐	☐	☐	☐	☐	☐
Trolleys	☐	☐	☐	☐	☐	☐
Gloves	☐	☐	☐	☐	☐	☐
Marker pens	☐	☐	☐	☐	☐	☐

Final thoughts

10 **What would you say have been the positive outcomes of the toothbrushing scheme in your class?**

11 **If you've experienced any problems with the Designed to Smile programme, or if you think there aspects of the programme that could be improved, please let us know in the box below:**

Holiadur Cynllun Gwên

I'R ATHRO/ATHRAWES EI LENWI

Eich dosbarth chi

1 **I ba grŵp oedran y mae'r plant yn eich dosbarth yn perthyn?**

Ticiwch un bwlch yn unig

Meithrin	☐	1
Derbyn	☐	2
Blwyddyn 1	☐	3
Blwyddyn 2	☐	4
Blwyddyn 3	☐	5

2 **A faint o blant sydd yn eich dosbarth i gyd?**

Rhowch nifer y plant isod

_____ o blant

Brwsio dannedd

3 **Ar gyfartaledd, faint o weithiau y byddwch chi'n cyflawni'r rhaglen brwsio dannedd bob wythnos?**

Rhowch y nifer o weithiau bob wythnos isod

_____ gwaith bob wythnos

4 **Ar gyfartaledd, pa mor hir y mae'n cymryd i gyflawni'r rhaglen brwsio dannedd bob dydd?**

Rhowch nifer y munudau isod

_____ munud

Hyfforddiant i staff yr ysgol

5 **O ran yr hyfforddiant a gawsoch gan dîm Cynllun Gwên, a fyddech chi'n dweud i chi gael...**

Ticiwch un bwlch yn unig

gormod o wybodaeth?	☐	1
yr union faint cywir o wybodaeth?	☐	2
rhy ychydig o wybodaeth?	☐	3

6 **Ac a fyddech chi'n dweud bod y sesiwn hyfforddi...**

Ticiwch un bwlch yn unig

wedi para'n rhy hir?	☐	1
wedi para'r amser cywir?	☐	2
heb bara'n ddigon hir?	☐	3

Canllawiau a chymorth

7 **Sut y byddech chi'n disgrifio'r canllawiau ysgrifenedig a gawsoch chi ar gyfer y rhaglen brwsio dannedd?**

Ticiwch un bwlch yn unig

Eglur iawn	☐	1
Eithaf eglur	☐	2
Heb fod yn sicr/dim barn	☐	3
Eithaf aneglur	☐	4
Aneglur iawn	☐	5

8 **A fyddech chi'n dweud bod lefel y cymorth a gewch chi gan dîm Cynllun Gwên o ddydd i ddydd ...**

Ticiwch un bwlch yn unig

yn ormod?	☐	1
yn gywir?	☐	2
ddim yn ddigon?	☐	3

Defnyddiau brwsio dannedd

9 **Beth yw'ch barn chi am ansawdd y defnyddiau isod a gewch chi gan dîm Cynllun Gwên o ran brwsio dannedd?**

Ticiwch un blwch ym mhob rhes

	Da iawn ▼	Eithaf da ▼	Iawn ▼	Eithaf gwael ▼	Gwael iawn ▼	Ddim yn gymwys ▼
Brwsys dannedd	☐	☐	☐	☐	☐	☐
Past dannedd	☐	☐	☐	☐	☐	☐
Bysiau brwsys	☐	☐	☐	☐	☐	☐
Trolïau	☐	☐	☐	☐	☐	☐
Menig	☐	☐	☐	☐	☐	☐
Pennau marcio	☐	☐	☐	☐	☐	☐

Sylwadau terfynol

10 **Beth, yn eich barn chi, yw canlyniadau cadarnhaol y cynllun brwsio dannedd yn eich dosbarth chi?**

11 **Os ydych chi wedi cael unrhyw broblem gyda rhaglen Cynllun Gwên, neu os credwch fod modd gwella agweddau ar y rhaglen, rhowch wybod i ni yn y blwch isod:**

Dear Sir/Madam,

I am writing to ask you to take part in a very brief survey about your school's involvement in the Designed to Smile toothbrushing scheme.

We have randomly selected 300 schools taking part in the scheme, and yours is one of the schools that were chosen.

The survey has been commissioned by the Welsh Assembly Government, who are keen to identify areas of the scheme which might be changed or developed in the future, in order to improve the experience of the schools taking part.

Any information that you provide in the survey will be strictly confidential. Your participation is entirely voluntary, but we hope that you'll take a few minutes to share your experience of Designed to Smile with us.

I've enclosed two short questionnaires: one to be completed by the head-teacher, and a second to be completed by any classroom teacher or assistant who supervises the toothbrushing on a day-to-day basis. Both forms are provided in English and Welsh, so you can complete the survey in your preferred language. There is also a pre-paid and addressed envelope included for returning the completed questionnaires.

If you have any questions at all about the survey, please contact the project co-ordinator Rob Trubey on 029 2074 5469.

Thank you for your time.

Yours sincerely,

Prof. I.G. Chestnutt

Dental Public Health Unit
Cardiff University Dental School
Heath Park, Cardiff

Tel: 029 2074 5469

Annwyl Syr/Madam,

Ysgrifennaf i ofyn i chi gymryd rhan mewn arolwg byr iawn o ymwneud eich ysgol â'r cynllun brwsio dannedd, Cynllun Gwên.

Rydym wedi dewis, ar hap, 300 o'r ysgolion sy'n cymryd rhan yn y cynllun, ac mae'ch un chi yn un o'r ysgolion a gafodd eu dewis.

Mae Llywodraeth Cynulliad Cymru wedi comisiynu'r arolwg am eu bod yn awyddus i ganfod pa feysydd yn y cynllun y gellid eu newid neu eu datblygu yn y dyfodol er mwyn gwella'r profiad a gaiff yr ysgolion sy'n cymryd rhan ynddo.

Caiff unrhyw wybodaeth a roddwch yn yr arolwg ei chadw'n gwbl gyfrinachol. Er mai mater gwirfoddol yw cymryd rhan ynddo, gobeithio y cymerwch chi ychydig funudau i roi gwybod ni am eich profiad o Gynllun Gwên.

Amgaeaf ddau holiadur byr, y naill i'w lenwi gan y pennaeth a'r llall i'w lenwi gan unrhyw athro neu athrawes neu gynorthwyydd dosbarth sy'n goruchwylio brwsio dannedd o ddydd i ddydd. Darperir y ddwy ffurflen yn Gymraeg a Saesneg er mwyn i chi allu eu llenwi yn eich dewis iaith. Cynhwysir hefyd amlen bwrpasol ar gyfer dychwelyd yr holiaduron.

Os bydd gennych unrhyw gwestiwn o gwbl am yr arolwg, ffoniwch arweinydd y prosiect, Rob Trubey ar 029 2074 5469.

Diolch i chi am eich amser.

Yn gywir iawn,

Yr Athro I.G. Chestnutt

Uned Iechyd Deintyddol y Cyhoedd
Ysgol Deintyddiaeth Prifysgol Caerdydd
Parc Mynydd Bychan, Caerdydd

Ffôn: 029 2074 5469

Dear Sir/Madam,

You may remember that I recently wrote to you to ask you to take part in a national survey of schools involved in the Designed to Smile toothbrushing scheme.

We have received a large number of responses so far which we hope will help us find ways to tailor the scheme for the benefit of all schools taking part. As yet, we have not received completed questionnaires from your school.

It is important that we receive as many completed questionnaires as possible. There a wide range of schools involved in the scheme, each with their own different experiences and viewpoints, all of which we are keen to learn.

I've enclosed replacement copies of the two questionnaires - one for completion by yourself and the other by a member of staff who supervises the toothbrushing – and a pre-paid return envelope with which to return them. Any information you share with us will be kept confidential at all times.

If you have any questions you'd like to ask about the survey, the project co-ordinator Rob Trubey is available to speak to on 029 2074 5469.

Thank you for your time.

Yours sincerely,

Prof. I.G. Chestnutt

Dental Public Health Unit
Cardiff University Dental School
Heath Park, Cardiff

Tel: 029 2074 5469

Annwyl Syr/Madam,

Efallai y cofiwch i mi ysgrifennu atoch yn ddiweddar i ofyn i chi gymryd rhan mewn adolygiad cenedlaethol o ysgolion sy'n rhan o gynllun brwsio dannedd Cynllun Gwên.

Rydym wedi derbyn nifer mawr o ymatebion hyd yn hyn a gobeithio y bydd y rheini'n ein helpu i ddod o hyd i ffyrdd o deilwra'r cynllun er budd pob ysgol sy'n cymryd rhan. Hyd yma, nid ydym wedi derbyn holiaduron wedi'u llenwi o'ch ysgol chi.

Mae hi'n bwysig ein bod ni'n derbyn cynifer ag sy'n bosibl o holiaduron wedi'u llenwi. Mae ystod eang o ysgolion yn ymwneud â'r cynllun, y mae gan bob un ohonynt ei phrofiadau a'i safbwyntiau ei hun, ac rydym ninnau'n awyddus i ddysgu amdanynt i gyd.

Rwyf wedi amgáu copïau eraill o'r ddau holiadur – un i chi ei lenwi eich hunan ac un arall i'w lenwi gan aelod o staff sy'n goruchwylio'r brwsio dannedd – ac amlen barod a stamp arni i chi eu dychwelyd. Bydd unrhyw wybodaeth rydych chi'n ei rhannu â ni'n cael ei chadw'n gyfrinachol bob amser.

Os oes gennych unrhyw gwestiynau yr hoffech eu holi am yr arolwg, mae Rob Trubey, cydlynydd y prosiect, ar gael i siarad â chi ar 029 2074 5469.

Diolch yn fawr i chi am eich amser.

Yn gywir iawn,

Ian Chestnutt

Yr Athro. I.G. Chestnutt

Uned Iechyd Deintyddol Cyhoeddus
Ysgol Ddeintyddol Prifysgol Caerdydd
Parc y Mynydd Bychan, Caerdydd

Ffôn: 029 2074 5469

Appendix C – Parent questionnaire survey and covering letters

The following questionnaire survey was used for the parent survey, the results of which are reported in Chapter 4. The questions used were questions 19-22.

Thank you for agreeing to take part in the Designed to Smile survey.

When you have finished completing the survey, you just need to place the questionnaire in the pre-paid and pre-addressed envelope provided and return it by post.

If you have any questions about the form, feel free to get in touch with survey coordinator Rob Trubey on 029 2074 5469.

About your child

All questions in this survey refer to the child who is currently taking part in Designed to Smile, and who is named in the covering letter.

This first section asks some basic questions about your child's age and gender, and their birth order.

1 How old is your child?

Write the age in the space below

_____ years _____ months

2 What gender is your child?

Tick one box only

- Male ☐
- Female ☐

3 How many *older* brothers or sisters does your child have?

Write a number in the space below

They have _____ older brothers/sisters

4 How many *younger* brothers or sisters does your child have?

Write a number in the space below

They have _____ younger brothers/sisters

Toothbrushing at home

The following questions are about your child's toothbrushing at home. If your child doesn't brush at home, just tick no to question 5 and skip straight to question 13.

5 Does your child brush their teeth (or have their teeth brushed) at home?

Tick one box only

- Yes ☐
- No ☐ *go to* ----------> **13**

6 Excluding what they do in school, how many times does your child brush their teeth (or have their teeth brushed) *each day*?

Write number in space below

_____ times per day

7 Who normally brushes your child's teeth at home?

Tick one box only

- Child brushes on their own ☐
- Adult brushes child's teeth for them ☐
- Sometimes child brushes, sometimes adult brushes ☐
- Child brushes with adult supervision ☐

Please note – all questions from this point on that talk about 'your child brushing' at home can mean either them brushing their own teeth, or you or another adult brushing their teeth for them.

8 **At what age did your child start toothbrushing?**

Write age in the spaces below

_____ Years _____ Months

9 **Excluding what they do in school, how many times does your child brush their teeth *each week*?**

Write number in space below

_____ times per week

The next question asks you to agree or disagree with a statement about how often your child brushes their teeth.

10 **Please indicate whether you agree or disagree with the following statement:**

"I am happy with how often my child's teeth are brushed each week"

Tick one box only

Strongly agree	☐
Agree	☐
Neutral	☐
Disagree	☐
Strongly disagree	☐

11 **In a normal week, how often does your child brush their teeth *in the morning*?**

Write number in space below

_____ times per week

12 **In a normal week, how often does your child brush their teeth *in the evening*?**

Write number in space below

_____ times per week

Other children at school

These four questions ask your opinion of how often you think other children in your child's school year brush their teeth (or have their teeth brushed) at home.

13 **What do you think is the *maximum* number of times that any child in your child's school year brushes their teeth each week?**

Write number in space below

_____ times per week

14 **What do you think is the *minimum* number of times that any child in your child's school year brushes their teeth each week?**

Write number in space below

_____ times per week

15 **What do you think is the *average* number of times that a child in your child's school year brushes their teeth each week?**

Write number in space below

_____ times per week

16 **How do you think your child's brushing compares to other children in their school year?**

Tick one box only

They brush less than all other children	☐
They brush less than most other children	☐
They brush about the same as most other children	☐
They brush more than most other children	☐
They brush more than all other children	☐

The next two questions ask you whether you agree with a set of statements about brushing your child's teeth, or making sure that they brush their teeth in the morning or the evening.

Please tick one box for each of the statements, to say whether you agree, disagree or are neutral towards it.

17 Please indicate how strongly you agree or disagree with the following statements about your child's toothbrushing at home:

Please tick one box in each row

Brushing my child's teeth or making sure they brush their teeth IN THE MORNING is something....	Strongly agree ▼	Agree ▼	Neutral ▼	Disagree ▼	Strongly disagree ▼
I do frequently	☐	☐	☐	☐	☐
I do automatically	☐	☐	☐	☐	☐
I do without having to consciously remember	☐	☐	☐	☐	☐
that makes me feel weird if I don't do it	☐	☐	☐	☐	☐
I do without thinking	☐	☐	☐	☐	☐
that would require effort not to do it	☐	☐	☐	☐	☐
that belongs to the daily routine	☐	☐	☐	☐	☐
I start doing before I realise I'm doing it	☐	☐	☐	☐	☐
I would find hard not to do	☐	☐	☐	☐	☐
I have no need to think about doing	☐	☐	☐	☐	☐
that's typically 'me'	☐	☐	☐	☐	☐
I have been doing for a long time	☐	☐	☐	☐	☐

Brushing my child's teeth or making sure they brush their teeth IN THE EVENING is something....	Strongly agree ▼	Agree ▼	Neutral ▼	Disagree ▼	Strongly disagree ▼
I do frequently	☐	☐	☐	☐	☐
I do automatically	☐	☐	☐	☐	☐
I do without having to consciously remember	☐	☐	☐	☐	☐
that makes me feel weird if I don't do it	☐	☐	☐	☐	☐
I do without thinking	☐	☐	☐	☐	☐
that would require effort not to do it	☐	☐	☐	☐	☐
that belongs to the daily routine	☐	☐	☐	☐	☐
I start doing before I realise I'm doing it	☐	☐	☐	☐	☐
I would find hard not to do	☐	☐	☐	☐	☐
I have no need to think about doing	☐	☐	☐	☐	☐
that's typically 'me'	☐	☐	☐	☐	☐
I have been doing for a long time	☐	☐	☐	☐	☐

The questions below refer to the daily tasks your child carries out in the morning and the evening , such as waking up, having breakfast, having an evening meal, etc. We just want to get an idea of whether or not there is a set routine for these things, or whether they are flexible and change from day to day.

18 **In a typical week *from Monday to Friday*, to what extent does your child carry out the following morning and evening activities at the same time each day?**

Please tick one box in each row

IN THE MORNING…. (Mon-Fri)	**Always the same time** ▼	**Usually the same time** ▼	**Sometimes the same time** ▼	**Rarely the same time** ▼	**Never the same time** ▼	**Not applicable** ▼
Waking up	☐	☐	☐	☐	☐	☐
Having breakfast	☐	☐	☐	☐	☐	☐
Having a wash	☐	☐	☐	☐	☐	☐
Getting dressed for school	☐	☐	☐	☐	☐	☐
Leaving the house for school	☐	☐	☐	☐	☐	☐

IN THE EVENING….(Mon-Fri)	**Always the same time** ▼	**Usually the same time** ▼	**Sometimes the same time** ▼	**Rarely the same time** ▼	**Never the same time** ▼	**Not applicable** ▼
Getting home from school	☐	☐	☐	☐	☐	☐
Having dinner	☐	☐	☐	☐	☐	☐
Having a wash before bed	☐	☐	☐	☐	☐	☐
Getting changed for bed	☐	☐	☐	☐	☐	☐
Going to bed	☐	☐	☐	☐	☐	☐

The Designed to Smile scheme

We now want to ask you a few questions about the Designed to Smile scheme and how it affects your child's toothbrushing at home.

19 Since they have been brushing in school with Designed to Smile, how has this affected toothbrushing at home in the morning?

Tick one box only

- They're more likely to brush in the morning ☐
- They're less likely to brush in the morning ☐
- It hasn't changed brushing in the morning ☐

20 Since they have been brushing in school with Designed to Smile, how has this affected toothbrushing at home in the evening?

Tick one box only

- They're more likely to brush in the evening ☐
- They're less likely to brush in the evening ☐
- It hasn't changed brushing in the evening ☐

21 Since your child has started brushing in school, how has that affected *their* attitude towards brushing their teeth at home?

Tick one box only

- They're more positive about brushing at home ☐
- They're more negative about brushing at home ☐
- It hasn't changed ☐

22 Since your child has started brushing in school, how has that affected *your* attitude towards brushing their teeth at home?

Tick one box only

- I'm more positive about brushing at home ☐
- I'm more negative about brushing at home ☐
- It hasn't changed ☐

The cost of brushing

The following questions are about the cost of various toothbrushing materials like toothbrushes and toothpaste.

23 What is your impression of the cost of buying a toothbrush for your child in the shops?

Tick one box only

- Very expensive ☐
- Fairly expensive ☐
- Not sure ☐
- Fairly cheap ☐
- Very cheap ☐

24 Has the cost of buying a toothbrush for your child ever put you off buying one?

Tick one box only

- Yes ☐
- No ☐

25 What is your impression of the cost of buying toothpaste for your child in the shops?

Tick one box only

- Very expensive ☐
- Fairly expensive ☐
- Not sure ☐
- Fairly cheap ☐
- Very cheap ☐

26 Has the cost of buying toothpaste for your child ever put you off buying it?

Tick one box only

- Yes ☐
- No ☐

These two questions ask you to choose between five different types of toothpaste, and select the one that you would choose to use for your child in the morning, and then which one you would choose to use for your child in the evening.

Again, there are no right or wrong answers to these questions – we're just interested in your own preference.

27 ***Imagine there was a toothpaste made from two ingredients. The first ingredient, "Fresh", made children's breath smell fresh and their teeth look bright and shiny. The other ingredient, "Health", prevented tooth and gum disease for five years.***

Imagine you can choose how much of each ingredient went into your child's toothpaste - but more of one ingredient means less of the other.

If you choose to have toothpaste made only from "Fresh" you get no "Health" and your child is more likely to have problems with their teeth and gums in five years. However, if you choose more "Health" then, while they are much less likely to suffer problems with their teeth and gums in the future, their mouths will not look or smell like they have been cleaned.

If you had the following five choices of toothpaste to use *in the morning*, which *one* would you choose to use for your child?

Please tick one box only

	FRESH		HEALTH	Choose *one* type of toothpaste to use in **the morning** ▼
(1)	100%	FRESH	0%	☐
(2)	75%	FRESH HEALTH	25%	☐
(3)	50%	FRESH HEALTH	50%	☐
(4)	25%	FRESH HEALTH	75%	☐
(5)	0%	HEALTH	100%	☐

28 **If you had the following five choices of toothpaste to use *in the evening*, which *one* would you choose to use for your child?**

Please tick one box only

	FRESH		HEALTH	Choose *one* type of toothpaste to use in **the evening** ▼
(1)	100%	FRESH	0%	☐
(2)	75%	FRESH HEALTH	25%	☐
(3)	50%	FRESH HEALTH	50%	☐
(4)	25%	FRESH HEALTH	75%	☐
(5)	0%	HEALTH	100%	☐

The following three questions ask you to make a choice between two imaginary options – an immediate reward, or a reward that you would receive at some point in the future.

We often make these types of choices in everyday life – there are no right or wrong answers, it's just a matter of preference.

We are interested in the way that people budget for certain things, and how this might relate to decisions about toothbrushing at home.

29 ***Imagine you had a lottery ticket and had won £87, but you could not claim the £87 immediately – instead, you had to wait a while before you could claim your winnings.***

What is the least amount of money you would sell the ticket for today, if you had to wait 30 days (a month) before claiming the prize?

Write amount in spaces below

_____ pounds _____ pence

30 **What is the least amount of money you would sell the ticket for today, if you had to wait 90 days (3 months) before claiming the prize?**

Write amount in spaces below

_____ pounds _____ pence

31 **What is the least amount of money you would sell the ticket for today, if you had to wait 7 days (a week) before claiming the prize?**

Write amount in spaces below

_____ pounds _____ pence

At some point later this year, we plan to carry out some pen-and-paper exercises with parents, to follow up on the findings of this survey. The exercises would last no more than 30 minutes, and would be conducted somewhere convenient for you. Any travel costs would be paid in full.

If you would be willing to be considered for these exercises, please let us know by ticking the appropriate box below.

32 **Would you be willing to be contacted at a later date?**

Tick one box only

Yes	☐
No	☐

Thank you very much for taking the time to fill out this survey.

Please return the completed questionnaire using the pre-paid and addressed envelope that came with it.

If you have the lost the envelope, please return to:

Rob Trubey,
School of Dentistry,
Cardiff University,
Heath Park,
Cardiff
CF14 4GZ

Appendix D – Q-methodology journal article

The following manuscript was submitted to the Community Dental Health journal in May 2012 and accepted for publication in July 2012. It is based on a card-sorting task carried out with CDS staff during the first stage of the initial process evaluation.

Attitudes towards establishing a daily supervised school-based toothbrushing programme - determined by Q-sort methodology.

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Applied Clinical Research and Public Health, Cardiff University School of Dentistry, UK

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Key words: *oral health; health promotion; toothbrushing; school dentistry; q-sort; workforce*

ABSTRACT

Objectives: This study used Q-sort methodology to determine the views of staff involved in a national school-based daily toothbrushing programme. ***Methods*:** Q-methodology is a mixed-method approach in which participants are asked to sort a collection of statements according to degree of agreement with them. Factor analysis identified subgroups of like-minded participants and revealed areas of consensus and disagreement. 24 Community Dental Service staff managing or delivering the toothbrushing programme were asked to rank 49 statements derived from previous qualitative interviews. ***Results:*** Varimax rotation produced a three-factor solution with five/six participants loading significantly into each group. Groups divided largely according to staff role: Factor 1, mainly Support Workers (assistants with no oral-health background); Factor 2, managers; and Factor 3, Oral Health Educators (dental nurses with teaching qualifications). As staff new to the area of oral-health, the views of Support Workers were of particular interest. Unlike others, this group saw Designed to Smile as a unique health promotion scheme and wanted to involve as many children as possible, regardless of oral-disease risk. Managers' perceptions of issues affecting the establishment of the programme differed from those staff in day-to-day contact with the 515 schools in which the toothbrushing took place. ***Conclusions*:** This study used a long established but little used technique to ascertain the commonality of views of staff. These data may be of value not only in managing the current programme, but for anyone who may be considering developing such a toothbrushing scheme.

Introduction

Schools in the UK have previously directed much energy towards educating children, parents and teachers about the importance of keeping teeth healthy (Davies and Bridgeman, 2011). Such lessons were supported by workbooks, games, songs, puppet shows and the use of anatomical models. While these activities may result in improved knowledge, there is little evidence that they translate to improved oral health (Kay and Locker, 1996; Sprod *et al*. 1996). This is particularly so in disadvantaged communities. Inappropriately applied attempts to try to change lifestyle behaviours may have the potential to widen health inequalities (Smith *et al*. 2009), as parents from less disadvantaged communities are more likely to act on advice given.

It is now recognised that oral health education initiatives that do not incorporate the use of fluoride are likely to have limited sustained impact on caries incidence. The benefits of fluoridated toothpaste in preventing dental caries are beyond doubt (Walsh *et al*. 2010) and has been shown to be effective when used in a supervised toothbrushing programme in schools (Curnow *et al*. 2002) and four years after the end of a randomised controlled trial in this setting (Pine *et al*. 2007).

In recognition of the above issues, the governments in Scotland and Wales have devoted considerable resources to the establishment of national school-based daily supervised toothbrushing programmes (Macpherson *et al*. 2010; Turner *et al*. 2010; Welsh Assembly Government 2009). "Childsmile" in Scotland (Childsmile 2012) and "Designed to Smile" in Wales (Designed to Smile, 2012) are multi-component programmes targeted at children in the most deprived areas.

This study concerns the establishment of a school-based daily supervised toothbrushing programme in Wales, operated by the Community Dental Service (CDS). Schools were recruited from the 150 most deprived areas in North and South Wales. After 12 months, 515 schools and 30,442 children aged 3-5 years were participating in daily in-school toothbrushing. A significant challenge in setting up this programme was to encourage the schools to take part, to train the teachers and classroom assistants who would supervise the on-going toothbrushing and to agree the specific details of how to operationalise the programme.

Traditionally school based oral health education programmes in the UK are delivered by Oral Health Educators who have a background in dental nursing or dental hygiene and have further qualifications in oral health education or a post-qualification diploma in education. In setting up the Designed to Smile programme it was decided to recruit a new cadre of workers termed "Support Workers" who had no formal qualifications in, or past experience of oral health education, but often had some experience of working with children in a school or other setting. The structure of the staff involved in setting up and delivering the toothbrushing programme is illustrated in Figure 1.

In managing the implementation and roll-out of the programme it was thought important to gauge the attitudes and views of the staff delivering the school based toothbrushing programme, namely the Oral Health Educators, the Support Workers and the Managers of the programme.

Q-sort methodology has been widely used to determine attitudes across a wide range of disciplines (Cross, 2005), but its use in dental research to date has been limited (Schnabel *et al*. 2009). Vermaire and colleagues (2010) provided a detailed description of the technique in a study which examined attitudes towards oral health among parents.

The objectives of this study were to:

- Examine attitudes of CDS staff towards how a daily supervised school-based toothbrushing programme should be delivered
- Investigate if the differences in views of staff were related to their job status or the geographic area in which they work
- Determine the implications of any differences observed and their value to commissioners and others interested in setting up a school-based toothbrushing programme.

Method

Q methodology is a research technique used to systematically investigate people's subjective beliefs, attitudes or preferences (Watts and Stenner, 2005) and dates from the 1930s (Stephenson, 1935). It combines qualitative and quantitative methods and provides a scientific foundation for the systematic study of subjectivity (Cross 2005; Watts and Stenner,

2005). It typically involves presenting a small number of purposively selected participants (the P set) with a list of statements representative of the subject under study (Q-statements) and asking them to rank them using a fixed layout (the Q-sort). By sorting the statements the respondents give subjective meaning to the statement set and so reveal their subjective viewpoint.

The individual Q-sorts are then subjected to factor analytical techniques to identify groups of participants with similar viewpoints to another, in order to identify a small number of unique 'viewpoints' on the topic under investigation. If each individual were to have a different view point, their Q-sorts would not correlate. If, however, significant clusters of correlations exist, they can be identified and described as common view points and individuals can be measured against them. Q-methodology can thus be used to reveal and describe a population of viewpoints rather than a population of people (as in conventional factor analysis) (Vermaire *et al*. 2010). Because the purpose is to identify the range and diversity of attitudes in a population and not the proportion of population that holds them, a small purposive sample of respondents is sufficient for a Q-study (Brown, 1993).

The statements to be sorted by the study participants were derived from a series of previously conducted face-to-face, semi-structured interviews carried out with 15 CDS staff. The resulting statements were then 'structured' to remove duplicate statements or statements too specific to individuals, and to ensure a balance of viewpoints for each theme.

To ensure that the statements were understandable a pilot exercise was undertaken with three CDS staff. As a result several statements were removed. The final Q-set contained 49 statements (Table 1).

A structured sample of 24 CDS staff were chosen to take part in the study, ensuring a balance of job roles and geographical location (Table 2). Each participant was sent a consent form explaining the nature of the study and was subsequently contacted to arrange a face-to-face meeting.

The Q-sort

The 49 statements were randomly numbered, printed on to 3 x 5 inch cards and laminated. Each participant was, in turn, presented with the 49 cards and asked to read through each one then place it in to one of three piles: statements they broadly agreed with, those they broadly disagreed with, and those they felt neutral or undecided about.

Next they were presented with the Q-sort grid (Figure 2). Using the cards in the 'agree' pile, participants were asked to identify the one statement which they agreed with the most, and place it in the +6 column. They were then asked to look at the remaining statements and choose the two which they agreed with the most, placing those in the +5 column. The process continued until all cards in the agree pile had been placed, and was then repeated for the 'disagree' cards with respondents placing the statement they disagreed with the most in the -6 column and so on. Then, the neutral cards were placed in the remaining slots on the grid, from left to right in order of how much participants agreed with each one. The exact shape of the q-sort grid is arbitrary, but is typically arranged in a quasi-normal distribution to reduce the burden on the participant (compared to, for instance, asking them to rank the statements one by one) and to reflect the fact that neutral responses to statements are more common than extreme agreement or disagreement

Participants were given the opportunity to re-arrange any cards that they wished to before the card arrangement was recorded on a separate sheet, along with some basic demographic details about the participant.

The data were analysed using the software package PQMethod (2012). The goal of Q-methodology is to identify a small number of shared viewpoints on a subject by grouping together people with similar Q-sorts. In order to do this, PQMethod follows three steps in the analysis stage:

firstly, it assesses the degree of similarity between each individual's card arrangement by producing a correlation matrix of each Q-sort;

it then subjects this correlation matrix to factor analysis, identifying several groups of participants (factors) with similar Q-sorts to one another;

and finally, this set of factors is subjected to varimax rotation to arrive at a solution which can be more clearly interpreted, typically involving a smaller number of factors which represent unique viewpoints.

For each factor, a representative Q-sort is calculated, effectively a weighted average of the Q-sorts of the participants that make up the factor. Each of the 49 statements is therefore assigned a score from +6 to -6, depending on how strongly participants in that factor tended to agree with them.

Results

Principle components factor analysis lead to a three factor solution emerging – that is there were three groups holding similar views. Each factor had an Eigenvalue exceeding 1.0 (i.e., the total variance explained by the factor was greater than that of any individual q-sort) and together the three factors accounted for over 50% of the variance.

Factor loadings (participants' degree of similarity with each factor) are shown in Table 1 along with each participant's demographic details. Q-sorts loading at 0.5 or over are significant at the $p<0.01$ level and are referred to as 'factor exemplars'. In total, six participants loaded significantly on to Factor 1, six on to Factor 2 and five participants on to Factor 3. The remainder either failed to load significantly on to any of the factors ('null sorts') or were correlated with multiple factors ('confounded sorts') and so were excluded from the analysis. Table 2 shows the composite Q-sorts for each of the final three factors.

Factor 1 is represented by six significantly loading Q-sorts. All but one of the participants who loaded to this Factor was a Support Worker, three from each of South Wales and North.

The group is largely defined by their preference for the scheme to involve as many children as possible, regardless of age and socio-economic background. They felt that the scheme should be extended to involve children aged 11 and over, should include schools in affluent areas, and be continued for children in Years 2 and 3 in participating schools. This viewpoint distinguishes them from the other two groups, who tended to favour a more targeted or pragmatic approach to selecting which schools should be involved in the program.

The group was also relatively sceptical about the benefits of promoting the toothbrushing scheme to schools through the Designed to Smile web-site through promotional DVDs or through letters sent to the head-teachers before contacting them by telephone.

Despite recognising the importance of a professional image for the scheme, the participants in Factor 1 felt that valuable time had been wasted on the producing 'glossy' paperwork. While both other groups felt strongly that more day-to-day support should be offered to participating schools, participants in this group were neutral about the idea.

Factor 2 is also represented by six significantly loading Q-sorts. Again, all but one of these participants had the same job role – in this case, area and team managers of the scheme. Four from North Wales (three managers) and two from South Wales.

The group exhibited a strong desire to focus resources on developing a more complete package of support for high-need schools, rather than trying to involve as many schools as possible.

The group also felt quite strongly that working with the youngest age cohorts (0-3 year olds) should be a priority for the scheme, a view that both other groups disagreed with.

They also felt it important to work closely with other health promotion schemes operating in schools, in contrast to other groups who tended to see Designed to Smile as more of a standalone, 'unique' health promotion programme.

Finally, this group, consisting largely of managers, perceived that paperwork was more of a problem than groups consisting largely of Support Workers and Health Educators who typically deal with the forms on a day-to-day basis. On the other hand, they felt that communication between local teams was far less of a problem than the other two groups.

Factor 3 is represented by 5 significant Q-sort loadings, all of whom were Health Educators. Three of the staff were from North Wales, and two from South Wales.

Factor 3 exemplars seemed to adopt a largely pragmatic, conservative approach in terms of the coverage of the scheme. They felt that the youngest age groups (0-3 year olds) were too difficult to target, that the scheme didn't need to target children aged over 11 and that the main focus should remain on the 3-5 year olds rather than including slightly older year groups. Furthermore, they advocated simply focusing on those schools that were willing to take part, rather than attempting to convince any of the more reluctant schools of the benefits of the scheme.

Interestingly, they felt that it was not their role to talk about diet and nutrition, and that they should just focus on the toothbrushing scheme. This is perhaps surprising given the job role of the group members. Indeed, it seems inconsistent with the interviews conducted with Health Educators, who were clearly aware of the importance of diet in dental health. Instead, it may come back to pragmatism: the feeling that the scheme should simply 'focus on the toothbrushing' is possibly more a reflection of what they believe the schools will realistically take on board.

The group were very enthusiastic about promoting the scheme through the Designed to Smile web-site, considerably more so than either of the other two groups.

Areas of consensus

The Q-sort identified three groups based on commonality of view points within groups. There were however a number of areas where consensus between the groups was also apparent (shown in italics in Table 2). The lack of need to develop closer links with local dentists was one such area.

There was general agreement that teams from different geographical localities should have freedom, within this national scheme, to try out new approaches to see what does and doesn't work. The group containing the managers felt more strongly that the same guidelines for the programme should be followed throughout, whereas those working in the schools, health educators and support workers, want more flexibility in how the in-school brushing programme could be operated.

Discussion

School-based toothbrushing programmes currently feature prominently in UK based oral health promotion strategies. The basic premise of this approach is that daily contact of teeth with fluoride is essential in preventing dental decay in high disease-risk children. These schemes are expensive to organise and deliver. In setting up the programme in Wales, the decision was taken to employ "lay-workers" as support staff; to work alongside conventionally trained members of the clinical dental team, to assist with the administration, set-up and roll-out of the toothbrushing scheme. Thus an understanding of the attitudes and viewpoints of the staff involved are important to ensure the programme is managed in an effective and efficient manner.

In common survey analysis, a representative sample of the population is presented with a theoretical selection of measurement instruments, which are expected to provide answers that can be generalised to the larger population. In Q-methodology, a representative set of opinion statements about the subject of study is evaluated by a theoretical selection of respondents, who are expected to reveal the range of attitudes that can be generalised to the subject (and this not the population sample). Q-methodology has been used in health disciplines other than dentistry. Gidman and colleagues have explored the impact of working conditions on the employment of female pharmacists (Gidman *et al*. 2009). They considered Q-methodology a technique which would provide additional insight beyond that gleaned from a conventional qualitative interview survey.

The *a priori* objective of this study was not to examine the attitudes of the three categories of staff separately. It was unknown if attitudes would correlate with job role, geographic location of work or some other factor. However, a key, if perhaps not surprising finding of the Q sort, is that the factor analysis revealed three significant factors (groupings of common viewpoints), and that the individuals loading to these factors could be separated into distinctive staff groupings. In interpreting the factors, it is important to remember that we cannot claim to represent the subjective viewpoints of all staff, as the Q sorts of seven staff members either failed to load significantly on to any of the factors, or correlated strongly with more than one factor. Nevertheless, the factor analysis and rotation resulted in a reduction to three key viewpoints which accounted for the large majority of staff who took part in the study.

Although the newly recruited support workers had undergone extensive training prior to commencing work in the field, it is apparent that they don't appreciate the need in a programme such as this to focus efforts on high-risk schools and in fact in the interview stage of data synthesis displayed some resentment to the resources being devoted to this section of society. This suggests that in developing and expanding the scheme, those in charge of the training programme need to take more time to explain the thinking behind and rational for targeting oral health promotion programmes. The general message here is that when "lay-workers" are employed to assist in community oral health programmes, it is import not to forget that they may well retain lay concepts and ideas which training should address.

This exercise has also been of value in demonstrating differences in attitudes and views of managers and field staff. Communication up and down the "command structure" in rolling out a national programme such as this is crucial. Clearly there are differences in opinion between different staff groups, for example over the amount of "paperwork" involved. This exercise conducted by an academic dental public health unit as part of the formal evaluation of the toothbrushing programme has been of value to the programme managers and commissioners in identifying areas of potential conflict. Awareness of these issues is of value in managing the Designed to Smile programme and may also be helpful to others considering establishing such a programme.

Considering those statements on which there is evidence of consensus across groups, all staff categories disagreed that there was a need for closer links with local general dental practitioners. This is an important finding for programme commissioners (the Welsh Assembly Government) as closer integration of different branches of NHS dental services is a policy objective. In addition to improving oral health via toothbrushing it would be hoped that the Designed to Smile Programme would play a role in facilitating dental attendance. Work is therefore required to understand further why Designed to Smile staff do not perceive a need to make links with colleagues in general dentistry.

In conclusion, this study has ascertained the commonality of views of staff involved in the set-up and roll-out of a national school-based toothbrushing programme. It has identified how views expressed in initial qualitative interviews differ across and between different staff groupings. These data will be of value not only in managing the current programme, but for anyone who may be considering developing such a scheme.

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Table 1. Characteristics of participants and factor loadings

	Demographics		Factor loadings		
	Job role	**Location**	**1**	**2**	**3**
1	Manager	North Wales	0.48	**0.64**	0.39
2	Manager	North Wales	-0.03	**0.79**	0.13
3	Manager	North Wales	0.18	**0.63**	0.29
4	Support Worker	North Wales	**0.71**	0.11	0.04
5	Dental Health Educator	North Wales	0.10	0.35	**0.61**
6	Support Worker	North Wales	0.31	**0.60**	0.23
7	Support Worker	South Wales	0.42	0.11	0.55
8	Support Worker	South Wales	**0.71**	-0.02	0.50
9	Admin	South Wales	0.49	0.04	0.47
10	Support Worker	South Wales	0.36	0.32	0.53
11	Support Worker	South Wales	0.50	0.15	0.49
12	Dental Health Educator	North Wales	0.06	-0.03	**0.67**
13	Support Worker	North Wales	**0.73**	-0.03	0.23
14	Support Worker	North Wales	**0.57**	0.20	0.27
15	Dental Health Educator	North Wales	0.07	0.14	**0.73**
16	Support Worker	South Wales	0.37	0.48	0.21
17	Dental Health Educator	South Wales	0.13	0.17	**0.67**
18	Dental Health Educator	South Wales	0.09	0.09	**0.49**
19	Support Worker	South Wales	0.19	0.43	0.41
20	Support Worker	South Wales	0.35	0.37	0.38
21	Dental Health Educator	South Wales	**0.55**	0.21	0.40
22	Support Worker	South Wales	**0.71**	0.05	-0.19
23	Manager	South Wales	0.14	**0.68**	-0.04
24	Manager	South Wales	0.01	**0.52**	0.34

Table 2: Q statements and factor scores

	Statements	***Factors***		
		1	***2***	***3***
1	*I think it's important to involve the older age groups (6-11 year-olds) in the schools that we're already covering* [a]	*+2*	*+3*	*+1*
2	I think it's best to concentrate on the younger (3-5 year old) age groups for now	-2	-3	+3
3	I think the toothbrushing scheme should be extended to involve children older than 11 years-old as well	+2	-5	-4
4	I think it's best to focus time and money on offering as much support as possible for the really high-need schools, rather than spending too much time on schools in affluent areas	-3	+6	+2
5	I think it makes sense to continue the brushing scheme for Year 2, Year 3 and beyond once it's already been set up in a school	+5	+5	1
6	I think all schools, even those in affluent areas, should have the opportunity to be involved in the toothbrushing programme	+4	-2	+1
7	I think it's important that we work on convincing any schools who've said no to take part in the scheme	-2	+1	-4
8	If a school doesn't want to take part, that's fine - we should focus our time and resources on the schools that do want to take part	0	+2	+5
9	I think it would be good to include more nutrition and diet advice as part of the programme	+3	-1	+1
10	I don't think it's our role to talk about diet and nutrition - we should just focus on the toothbrushing scheme	0	0	+4

11	I think we should increase the number of home packs we give to the children each year	-4	-4	-6
12	I think that targeting the 0+3 age group should be a priority for the future	-4	+4	-4
13	I think we should try and offer more day-to-day support to the schools already involved in the scheme	0	+4	+4
14	The 0-3 age group is too difficult to reach, so we'd be better of focusing on those children in nursery, reception and infant school	-3	-4	+2
15	*I think it's important to develop close links with local dentists*	*-6*	*-5*	*-5*
16	I think it's important that we work more closely with other health promotion schemes aimed at schools	-1	+5	0
17	I think Designed to Smile is unique, and should be kept separate from other health schemes	+4	-1	+2
18	I think one of the main priorities of the scheme should be helping children find their own local dentist	-1	-1	-5
19	*I think it's important to identify those children who need to see a dentist through screening, but it's up their parents or guardians to decide if they want to go*	*-1*	*0*	*-1*
20	I think we need to promote the scheme through the Designed to Smile web-site	-2	-1	+5
21	I think we need to improve communication between teams within our own local area	+2	-4	0
22	I think we need to improve communication between South and North Wales	0	-1	-2
23	I think there's a danger that having too many meetings could take away time we could spend supporting the schools	+1	+2	-2
24	I think something like a promotional DVD would help convince new schools to take part in the scheme	-3	0	-1
25	I think it's important to develop closer links with local health workers, such as GPs and pharmacists	+4	+1	+1
26	*I think the scheme needs to be promoted more at a national level*	*+1*	*+1*	*0*
27	I think the scheme needs to be promoted more at a local level	+1	0	0
28	I don't think we should promote the scheme too widely, or we may end up having to say no to some schools who want to take part	+1	-3	+2
29	*I think it's important to improve the speed with which we get materials translated to Welsh*	*-5*	*-2*	*-3*
30	I think there's too much paperwork, which takes up a lot of time	0	+3	-2
31	I think it's important to collect as much information as we can about each school and the children taking part	+1	0	-2
32	I think it's important that we get constant feedback from the schools involved in the programme	-2	+1	0
33	I think we spend more of the money on sending mobile dental clinics to send around to schools	-1	+4	+3
34	If a school wants to take part in the scheme, even if it's based in an affluent area, we should at least offer them advice and guidance	+3	-2	-3
35	I think we'd be better offering more support to the high-need schools than spending time and money on including schools from more affluent areas	0	+2	+3
36	I think it would be helpful if we could send a letter about the scheme to the head-teachers before we phoned them, so we wouldn't be calling out of the blue	-5	+3	0
37	I think it's best to try and meet the head-teachers before we send them too much paperwork, in case it puts them off the scheme	-2	-3	-1
38	*I think it would be helpful if we could get the schools to include the Designed to Smile consent form as part of their 'starter packs' for new children*	*+1*	*+3*	*+2*
39	I think it's important that we make sure that all the Designed to Smile literature look professional and glossy, to make the scheme look credible	+6	+2	+6
40	*I think it's important that we keep the Designed to Smile literature fresh and up-to-date, each year*	*0*	*-1*	*+1*
41	I think valuable time has been wasted producing glossy literature	+3	-2	-2
42	*I think it's important that teams from different areas have freedom to try out new approaches, to find out what does and doesn't work*	*-3*	*-3*	*-3*
43	*I think it's important that we're all following the same guidelines and carrying out the programme in exactly the same way, in each area*	*+5*	*+2*	*+4*
44	I think it's important to improve the accuracy with which we get materials translated to Welsh	+2	-2	0
45	*I'm happy with the quality of the brushes and buses that we supply to the schools* [b]	*-1*	*0*	*-1*
46	I think we could improve the quality of the brushes and buses and other materials that we supply to the schools	+3	+1	+3
47	I think we make enough visits to each school to pick up on any problems with their toothbrushing programme	-4	-6	-3
48	I think we should visit some schools more often than we do, just to make sure that we're not missing any problems with the toothbrushing programme	-1	+1	-1
49	*I think it would be good to include more general oral health advice as part of the programme*	*+2*	*0*	*+1*

[a] Italics represent consensus items
[b] buses = racks used to store toothbrushes in schools (www.thebrushbus.com)

Table 3: . Distinguishing statements for Factor 1

	Statements	Factors		
		1	**2**	**3**
35	I think we'd be better offering more support to the high-need schools than spending time and money on including schools from more affluent areas	+5	+2	+3
25	I think it's important to develop closer links with local health workers, such as GPs and pharmacists	+4	+1	+1
44	I think it's important to improve the accuracy with which we get materials translated to Welsh	+4	-2	0
34	If a school wants to take part in the scheme, even if it's based in an affluent area, we should at least offer them advice and guidance	+3	-2	-3
41	I think valuable time has been wasted producing glossy literature	+3	-2	-2
3	I think the toothbrushing scheme should be extended to involve children older than 11 years-old as well	+2	-5	-4
21	I think we need to improve communication between teams within our own local area	+2	-4	0
28	I don't think we should promote the scheme too widely, or we may end up having to say no to some schools who want to take part	+1	-3	+2
13	I think we should try and offer more day-to-day support to the schools already involved in the scheme	0	+4	+4
35	I think we'd be better offering more support to the high-need schools than spending time and money on including schools from more affluent areas	0	+2	+3
33	I think we should spend more of the money on sending mobile dental clinics around to schools	-1	+4	+3
7	I think it's important that we work on convincing any schools who've said no to take part in the scheme	-2	+1	-4
20	I think we need to promote the scheme through the Designed to Smile web-site	-2	-1	+5
32	I think it's important that we get constant feedback from the schools involved in the programme	-2	+1	0
4	I think it's best to focus time and money on offering as much support as possible for the really high-need schools, rather than spending too much time on schools in affluent areas	-3	+6	+2
24	I think something like a promotional DVD would help convince new schools to take part in the scheme	-3	0	-1
36	I think it would be helpful if we could send a letter about the scheme to the head-teachers before we phoned them, so we wouldn't be calling out of the blue	-5	+3	0

Table 4: . Distinguishing statements for Factor 2

	Statements	Factors		
		1	**2**	**3**
4	I think it's best to focus time and money on offering as much support as possible for the really high-need schools, rather than spending too much time on schools in affluent areas	-3	+6	+2
16	I think it's important that we work more closely with other health promotion schemes aimed at schools	-1	+5	0
12	I think that targeting the 0-3 age group should be a priority for the future	-4	+4	-4
36	I think it would be helpful if we could send a letter about the scheme to the head-teachers before we phoned them, so we wouldn't be calling out of the blue	-5	+3	0
30	I think there's too much paperwork, which takes up a lot of time	0	+3	-2
39	I think it's important that we make sure that all the Designed to Smile literature look professional and glossy, to make the scheme look credible	+6	+2	+6
7	I think it's important that we work on convincing any schools who've said no to take part in the scheme	-2	+1	-4
46	I think we could improve the quality of the brushes and buses and other materials that we supply to the schools	+3	+1	+3
17	I think Designed to Smile is unique, and should be kept separate from other health schemes	+4	-1	+2
6	I think all schools, even those in affluent areas, should have the opportunity to be involved in the toothbrushing programme	+4	-2	+1
44	I think it's important to improve the accuracy with which we get materials translated to Welsh	+4	-2	0
28	I don't think we should promote the scheme too widely, or we may end up having to say no to some schools who want to take part	+1	-3	+2
21	I think we need to improve communication between teams within our own local area	+2	-4	0

Table 5: . Distinguishing statements for Factor 3

	Statements	Factors		
		1	**2**	**3**
20	I think we need to promote the scheme through the Designed to Smile web-site	-2	-1	+5
8	If a school doesn't want to take part, that's fine - we should focus our time and resources on the schools that do want to take part	0	+2	+5
10	I don't think it's our role to talk about diet and nutrition - we should just focus on the toothbrushing scheme	0	0	+4
2	I think it's best to concentrate on the younger (3+5 year olds) age groups for now	-2	-3	+3
14	The 0-3 age group are too difficult to reach, so we'd be better of focusing on those children in nursery, reception and infant school	-3	-4	+2
4	I think it's best to focus time and money on offering as much support as possible for the really high-need schools, rather than spending too much time on schools in affluent areas	-3	+6	+2
16	I think it's important that we work more closely with other health promotion schemes aimed at schools	-1	+5	0
36	I think it would be helpful if we could send a letter about the scheme to the head-teachers before we phoned them, so we wouldn't be calling out of the blue	-5	+3	0
21	I think we need to improve communication between teams within our own local area	+2	-4	0
5	I think it makes sense to continue the brushing scheme for Year 2, Year 3 and beyond once it's already been set up in a school	+5	+5	-1
23	I think there's a danger that having too many meetings could take away time we could spend supporting the schools	+1	+2	-2
7	I think it's important that we work on convincing any schools who've said no to take part in the scheme	-2	+1	-4
18	I think one of the main priorities of the scheme should be helping children find their own local dentist	-1	-1	-5
11	I think we should increase the number of home packs we give to the children each year	-4	-4	-6

Legend for Figures

Figure 1. Representation of geographic areas and staff grade and structure in the delivery of the Designed to Smile Programme.

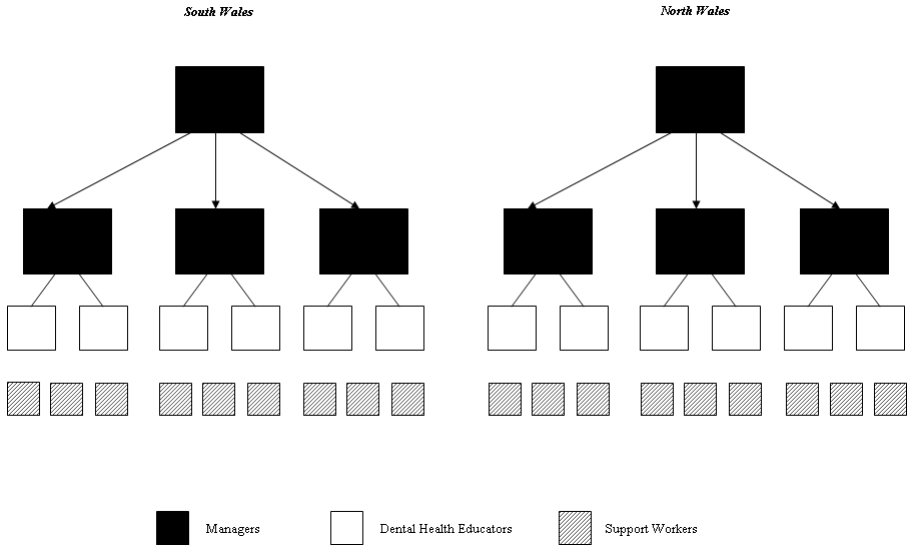
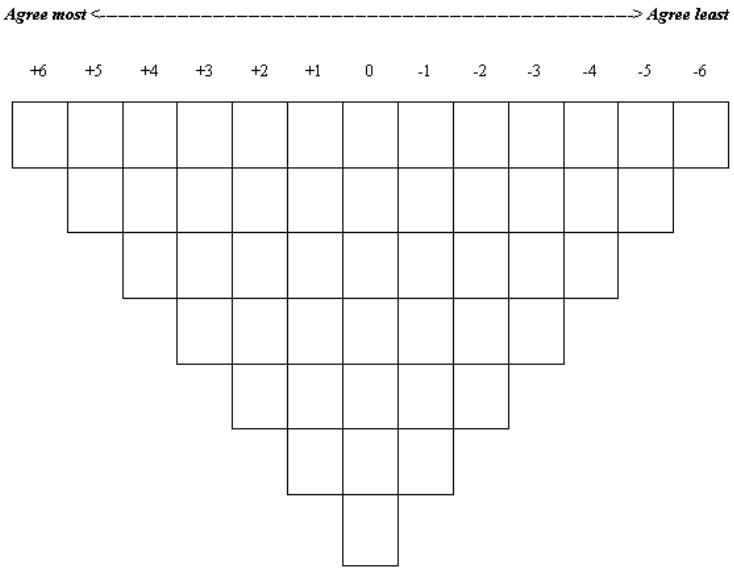


Figure 2. Q-sort grid on which study participants laid statement cards in order of agreement



Appendix E – Parent interview journal article

The following manuscript has been submitted for publication in the international Health Education Research journal. It is based on interviews carried out with parents of children taking part in the Designed to Smile scheme, previously reported on during the first stage of the process evaluation.

Parents' reasons for brushing or not brushing their child's teeth: a qualitative study

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Abstract

The aim of this study was to develop an in-depth understanding of the issues that face parents from socio-economically deprived areas when trying to brush their young children's teeth at home.

Fifteen parents of children aged 3-6 years old took part in semi-structured telephone interviews, discussing the reasons why they did or did not brush their children's teeth at home. Inductive thematic analysis was carried out on the resulting transcripts in order to develop themes which covered the most salient aspects of parents' experiences.

Many parents discussed the difficulty of brushing their children's teeth in the evening, due to changing day-to-day routines, and the subsequent difficulty of forming a toothbrushing habit. The motivating factors for brushing children's teeth were largely short-term and cosmetic. Satisfaction with brushing frequency was influenced more by perceptions of how often other parents brushed children's teeth than by the 'twice a day' norm or health outcomes.

The results are discussed in relation to theoretical accounts and findings from the psychology and behavioural economics literature, and comparisons are drawn with assumptions inherent in more traditional oral health promotion messages.

Introduction

Despite great improvements in oral health in recent decades, dental caries continues to be a significant source of morbidity for young children in developed countries [1, 2]. As with many other health outcomes, there is a well-established link between childhood dental caries and socioeconomic deprivation [3, 4], with children from socioeconomically deprived areas typically experiencing more dental decay compared to those from more affluent areas.

Despite this social gradient in disease, there exists large variation in oral health outcomes for children within socioeconomic groups. For instance, recent epidemiological data shows that 5 year-old children resident in areas designated as the most deprived quintile in Wales experience a wide range of oral health outcomes [5]. While 42% of this cohort are caries free, the remaining 58% have on average 4.6 decayed, missing or filled teeth.

The role of fluoridated toothpaste in preventing dental caries in children is beyond doubt [6]. Less than daily toothbrushing is a known risk factor for oral disease [7], and research has demonstrated a clear benefit of twice daily brushing compared to brushing just once a day or less [7, 8]. The variation in oral health outcomes for young children from similar socio-economic backgrounds is therefore suggestive of underlying differences in oral health behaviour such as toothbrushing and diet in the home environment, while under the guidance of their parents or caregivers.

There has been relatively little research exploring the influence of parent's psychosocial attributes on their children's oral health behaviour [9]. A handful of cross-sectional studies have found children's oral health behaviour to be related to parental oral health knowledge [10], attitude towards oral health [11] and beliefs about oral health [12]. However, in terms of oral health promotion and intervention, there appears to be little evidence that changing

people's attitudes, beliefs or knowledge brings around long-term changes in oral health outcomes [13, 14].

The current study used qualitative interviews to explore issues facing parents from socio-economically deprived areas when trying to brush their children's teeth at home. Qualitative research is particularly useful for 'giving a voice' to groups of people who are often overlooked in more conventional, quantitative research and provides the opportunity to 'gain an in-depth understanding of people's views, behaviour and decision-making processes from their own perspective [15].

Aim

The aim of this study was to gain an in-depth understanding of the issues facing parents from socio-economically deprived backgrounds in relation to brushing their child's teeth at home.

Method

Recruitment and sampling

In total, 15 parents took part in the study. Parents were purposely recruited on the basis of their child's involvement in a national, school-based toothbrushing scheme called Designed to Smile. The programme involves children aged between 3-6 years old and is run in nurseries and schools in areas of high socio-economic deprivation. As nursery and infant schools are populated by children from surrounding 'catchment areas', the parents and guardians of the children recruited were all from socio-economically deprived areas.

In order to access a varied group of participants and viewpoints, recruitment was facilitated by staff from the Community Dental Service (CDS). The CDS staff oversee the day-to-day running of the Designed to Smile scheme and have good relationships with schools and parents through their experience of working in the community.

Initially, six parents were recruited. After the initial interviews had been analysed, theoretical sampling [16] was used, whereby parents of slightly older (5 or 6 year-old) children and parents who brushed their children's teeth infrequently were purposely recruited in order to inform and broaden some of the emerging themes and ideas from the earlier interviews.

All parents were approached in the school setting by oral health promotion staff from the Community Dental Service, and asked if they would be willing to take part in a telephone interview about their experience of toothbrushing with their child at home. They were given an information sheet explaining each aspect of the research. Parents who were interested in taking part were asked to complete a consent form with a contact number and were then contacted by the researcher to arrange a suitable time to conduct the interview.

Recruitment of participants ended when saturation occurred – that is, successive interviews were offering no new insights or challenges to the developing ideas and themes [17].

Data collection

Data were collected via a series of in-depth interviews carried out over the telephone.

The interviews were semi-structured, following a brief interview schedule which was initially piloted with two parents, resulting in minor amendments. The interviews initially included three open questions:

- Tell me about your experience of brushing your child's teeth at home…
- What things make toothbrushing at home with your child easier, for you?
- What things make toothbrushing with your child at home harder, for you?

The questions served only as a starting point, with the remainder of the interview directed by participant's reported experiences. A series of simple, probing follow-up questions or responses ('tell me more about that', 'why do you think that is?') were employed to motivate the interviewee to share as much information as possible.

As the research progressed, and the initial stages of data analysis took place, the original interview schedule was added to and refined in order to elicit more information on emerging concepts and theories. For example, the first group of participants spoke about toothbrushing as being part of their morning 'routine'. As a result, subsequent interviewees were asked about their typical morning and evening activities, to further explore the concept of 'daily routines' in relation to toothbrushing.

Data analysis

Each of the interviews was digitally recorded and transcribed in full.

Data analysis was guided by the principles of thematic analysis, an approach to analysing qualitative data which provides a method for "identifying, analysing and reporting patterns (themes) within data" [18].

Importantly, the research process was iterative: data analysis therefore took place throughout the research cycle, and recruitment and data collection were guided by the on-going analysis and development of provisional concepts and themes. Figure 1 gives an overview of this iterative approach.

<Insert Figure 1 about here>

The stages of analysis were:

1. Reading through interview transcripts in full in order to become familiar with the data

2. Going through transcripts in detail, creating 'primary codes' by labelling words, phrases or sentences which represented parents' key ideas and thoughts about brushing their children's teeth at home

3. Combining together thematically similar primary codes to produce initial themes

4. Meeting with a second researcher, IGC, to read through transcripts and discuss codes and themes, to ensure inter-rater reliability and stimulate discussion and reflection about themes

5. Constantly reviewing themes throughout the research process in order to add, refine or sometimes remove themes based on new primary codes or patterns in the data

6. Eventually defining and naming a small number of themes which are felt to adequately represent the full data set.

Ethics

The study was conducted as part of a larger service evaluation of the Designed to Smile toothbrushing scheme, on behalf of the Welsh Government. All parents gave informed consent before taking part in interviews, were aware of their right to withdraw from the study at any point, and gave permission for the interviews to be digitally recorded. Interview transcripts were all anonymised.

Results

Table 1 gives basic demographic details for each of the 15 participants in the study.

<Insert Table 1 about here>

Three themes were generated from the data analysis, which were felt to represent the most salient issues addressed by the interviewees:

1) Toothbrushing routines and habits

2) Motivation for toothbrushing

3) Toothbrushing norms

These themes are considered below, with illustrative quotes provided.

Theme 1: Toothbrushing routines and habits

During early interviews, when parents were asked to talk in detail about their experiences of toothbrushing at home with their child, they frequently made reference to the context in which toothbrushing took place among all their other daily activities.

The result was that toothbrushing was essentially cued by these other events. For parents whose children brushed in the morning, for instance, it fitted in either before or after an event like waking up, eating breakfast, having a wash, bath or shower, getting dressed in school clothes and leaving home for school; while for those parents whose children brushed in the evening, it fitted in either before or after an event like getting home from school, having dinner, doing homework, having a wash, bath or shower, putting on pyjamas and going to bed.

We're quite predictable – things happen in a certain order! So we always get up, have breakfast, then brush their teeth, then it's get changed and out we go!

Yeah, they have their bath, they come down and they have their supper, which is normally a glass of milk and a cookie and they go back up and brush their teeth before bed. Toilet and teeth! Toilet and teeth and then bed.

In subsequent interviews, parents were asked to describe a typical morning or evening at home, in order to get a sense of how – or if – brushing their children's teeth fitted in to their overall routine.

It was evident that, for a number of parents, evenings were a lot less stable or predictable than mornings. Mornings were reported to be 'hectic', but generally followed a similar pattern, whereas evening routines often changed from one day to the next.

There were a number of reasons for this, including changing work patterns and shifts and other parental distractions, and for slightly older children, occasional homework and after-school clubs. The result was that children were often left with friends or family after school, and so got home and ate at different times throughout the week.

If we're really late, we'll eat out. Or general days, when we're back about five, you know, we'll have our dinner, then half past six, it'll be bath and we'll do their teeth whilst we're in the bathroom and they'll go to bed then. That's most days, but a hectic day we'll maybe just have tea and go straight to bed.

They just… at the end of the day, it's just hectic. Especially with after school things now. Because we've only just got in now [7:15pm] and I like the kid's in bed for seven. That's their routine. But because we've started doing these extra outside of the school things now, we're rushing about and doing things. I'm reading books and we're doing homework now, so it's just hectic, so you just sometimes miss it. They need to be in bed, don't they?

Those parents whose routines – particularly evening routines – changed from one day to the next typically reported that brushing their children's teeth was a challenge or a struggle each day, and was often missed as a result even when parents saw the value in evening brushing.

In contrast, parents whose morning or evening routines seemed to be consistent from one day to the next talked of children being in the 'habit' of brushing, implying that there was less deliberating about toothbrushing – it was something that 'just happened'.

If we're really late, we'll eat out. Or general days, when we're back about five, you know, we'll have our dinner, then half past six, it'll be bath and we'll do their teeth whilst we're in the bathroom and they'll go to bed then. That's most days, but a hectic day we'll maybe just have tea and go straight to bed.

They're just in a habit now. We don't have to talk about it really, they're just used to doing it… it's something they do, just like getting dressed or anything else.

Theme 2: Toothbrushing motivation

It was apparent that parents had a number of different reasons and motivations for brushing their children's teeth. Parents offered these explanations for brushing without any prompting initially, but later interviews were structured so that parents were asked more directly about the reason that they brushed their children's teeth in the morning and the evening.

Overwhelmingly, the motivation for brushing in the morning was short-term: hygienic, in the sense that it made teeth *feel* clean and ensured fresh breath, and cosmetic in that it made teeth *look* clean.

> *You know, you want to make sure he has clean teeth, nice shiny teeth, when he goes to school.*

The motivation for brushing children's teeth in the evening was more varied. Whereas parents were quick to give reasons for brushing their child's teeth in the morning, many parents (even those whose children regularly brushed twice a day) struggled to explain their reason for toothbrushing in the evening. In general, though, the benefits of evening brushing were seen as long-term, occurring at some point in the future. There was a sense that evening brushing helped keep teeth 'healthy' and reduced the risk of future problems when children were 'older'.

> *I suppose it's getting rid of any bacteria and stuff, so that it doesn't cause her teeth to be rotten in the long run.*
>
> *It's about putting on that toothpaste, and then it's all got night to work on his teeth, hasn't it? He's not eating then, so it's better, it's got time to work.*

It was noticeable that the cosmetic and hygienic reasons most often given for morning brushing were strong motivating factors for a lot of parents. Evening brushing was, by some parents, seen as something of a bonus by contrast. Indeed, a couple of parents struggled to see the point in evening brushing if their children were brushing in the morning.

> *I think in the morning, you just want to make sure they've got fresh breath and everything, but in the evening, well for me it's not as big a deal if they're brushing the next morning anyway.*

One of the reasons that cosmetic factors were seen as important was that parents felt that their children's teeth were part of their overall appearance, likening it to their clothes or hair for instance. In this sense, parents felt that their children having dirty teeth would be obvious to teachers and other school or nursery staff, and reflect badly on them as parents.

> *It's just general hygiene, isn't it? And their appearance. You wouldn't let them out of the door with muddy trousers, or food all over them, and their hair all scruffy, and everything, that wouldn't look good.*

Theme 3: Toothbrushing norms

Over the course of the fifteen interviews, almost every parent made an unprompted reference to the twice-a-day toothbrushing 'norm' when discussing home brushing.

However, the extent that such a message was considered relevant to parents' decision making appeared to depend on their perception of how often they imagined other parents brushed their children's teeth. For parents who believed that very few other parents brushed their child's teeth twice a day, the message about what you *should* do was not considered credible.

Overall, there was a wide range of views on how often other parents were perceived to brush their children's teeth. Often it followed that parents who brushed their children's teeth frequently thought that most parents did the same, and those who brushed their children's teeth less often were sceptical of the idea that other children brushed regularly.

> *I imagine most parents brush their children's teeth twice a day, yeah? That's the message, isn't it? I don't think it's that big a thing, really, so yeah, I think most parents would be the same as us.*
>
> *And everyone says it's twice a day you should do. But you're supposed to do lots of things! I think most parents are realistic… they don't all brush their children's teeth every day. You've got so much going on. It's just not going to happen is it? A lot of them won't ever do it, I bet!*

When parents were asked how satisfied they were with how often their child brushed their teeth, they tended to focus more on making comparisons with 'other' parents and children than they did on tangible outcomes such as tooth decay or pain.

Some parents felt content with brushing their child's teeth once a day because they felt that was about average compared to other parents, while others expressed guilt or a desire to brush more often because they felt other parents may do more than themselves. One parent of a child who brushed twice a day even expressed anxiety about their routine, because she thought that some other parents might brush their child's teeth three times a day.

> *Well we do it twice a day because that's what I've always been told, I guess. I don't know if some people brush their children's teeth after lunch as well, on the weekend, I don't know… I guess I haven't thought about that… maybe that's something we could do, I suppose.*

Discussion

The current study adopted a qualitative approach in order to explore some of the issues facing parents from socio-economically deprived backgrounds when trying to brush their children's teeth at home. Silverman [19] has discussed the importance of establishing reliability and validity in qualitative research. In the present study, internal reliability was sought by means of involving a second researcher in reading through transcripts and discussing codes and themes, often referred to as inter-rater reliability [20]. In order to increase the validity of the findings, a form of respondent validity [21] was employed, where later interviewees were asked more direct questions relating to ideas and themes that had been developed from earlier analysis.

Although there is naturally a limit to which findings in qualitative research can be generalised to the wider population, it is hoped that the broad themes discussed below will prove helpful in understanding some of the reasons that parents from socio-economically deprived backgrounds do or don't brush their children's teeth at home.

Consistent with previous research [22], the current study found that toothbrushing at home was closely linked to other routine events that take place in the morning or evening. To the extent that toothbrushing appeared to be cued by other events, the day-to-day stability of morning and evening routines seemed to be an important factor in whether or not parents could initiate a toothbrushing 'habit' in their children.

In the wider psychology literature, habits are defined as behaviours that exhibit 'automaticity', requiring minimal or no conscious thought [23]. Importantly, habits have been shown to be strong predictors of future behaviour, more so than having positive intentions to perform a behaviour [24].

The importance of stable routines for habit formation has been highlighted by both theoretical accounts and research in the field of medication adherence. Wood and colleagues [25, 26] present a model of habit formation in which repetitive behaviours are more likely to lead to habit formation when 'performed in stable circumstances—meaning in particular locations, at specific times…'. Wagner and Ryan found higher adherence levels to antiretroviral medication in adults whose day to day routines were more stable, concluding that "the extent to which one's daily life is structured and routinised is an important factor in understanding medication adherence" [27].

Traditionally, oral health educators and dental practitioners tend to emphasise the longer-term benefits of toothbrushing such as the prevention of dental disease. In the current study, however, parents were more strongly motivated to brush their children's teeth by shorter term, cosmetic or hygienic factors. Previous qualitative research has found that both adolescents and younger children tend to focus on cosmetic factors when discussing reasons for brushing their own teeth [28, 29], but this is the first study to suggest that parents have a similar focus when brushing their infant children's teeth.

The idea that shorter-term benefits may hold more appeal than apparently larger longer-term benefits is consistent with findings in psychology and behavioural economics. It is found that many people inform their decisions through attending to more immediate outcomes and discount the importance of delayed outcomes even when the value of these delayed outcomes are significantly greater [30], a phenomena sometimes referred to as myopia. There is, however, considerable variation in the extent with which people place importance on immediate and delayed outcomes: some people are more myopic than others. Moreover, the extent to which individuals exhibit myopia has been linked to the likelihood with which they

will engage in certain ‘health protective’ behaviours such as taking regular exercise or voluntary flu vaccinations [31].

Previous research has suggested a possible link between parents’ oral health knowledge or literacy and their child’s oral health behaviour [10]. In the current study, the overwhelming majority of parents were aware of – and often mentioned without prompting – the ‘twice a day’ toothbrushing norm, suggesting that this traditional oral health message was well understood among this group. However , the findings suggested that the extent to which parents were happy with how often they brushed their child’s teeth was influenced more by comparisons with their peers than with this ‘twice a day’ norm or with any specific outcomes such as their child’s decay experience.

These findings are consistent with research suggesting that satisfaction with a wide range of outcomes, such as income and body image are influenced more by comparisons with others than with absolute outcomes [32, 33].

Conclusions

The stability of day-to-day home routines, the perceived immediacy of the benefits of toothbrushing and perceptions of how often other parents brush their children's teeth all appear to be important factors for parents from socio-economically deprived backgrounds when thinking about brushing their children's teeth at home. These areas are relatively unexplored in oral health research, but have received more attention in the wider health and psychology literature. Future research should be aimed at further understanding these issues in relation to dental and oral health and exploring the extent to which these insights may inform future oral health education and intervention initiatives.

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Tables

Table 11: Demographic details of participants

Participant	Parent gender	Child gender	Child age	Reported brushing frequency
1	F	F	3	Twice a day
2	F	F	4	Once a day
3	F	M	4	Twice a day
4	F	M	4	Twice a day
5	M	F	5	Once/twice a day
6	F	M	3	Twice a day
7	F	F	3	Once a day
8	F	F	5	Rarely
9	F	M	4	Once a day
10	F	F	4	Once a day
11	F	M	4	Twice a day
12	F	M	5	Once/twice a day
13	F	F	6	Twice a day
14	M	F	6	Once a day
15	F	M	5	Twice a day

Appendix F: Designed to Smile poster presentation

The following is a poster based on data combined from the Super Pilot and newer school surveys, and reported on in Chapter 3.2.4. It was presented at the BASCD/EADPH meeting in London in November 2012.

1943

School of Dentistry / Yr Ysgol Ddeintyddiaeth

SCHOOL COMPLIANCE WITH A NATIONAL SUPERVISED TOOTHBRUSHING SCHEME

R TRUBEY & IG CHESTNUTT

Applied Clinical Research and Public Health, School of Dentistry, Cardiff University

INTRODUCTION

Designed to Smile is a national, Government-sponsored toothbrushing scheme, run in schools and nurseries in socio-economically deprived areas of Wales.

The scheme is managed by the Community Dental Service (CDS) who train school staff to supervise classroom brushing. Activity data shows that over 78,000 children (aged 0-6) currently take part in the scheme across Wales.

Schools and nurseries are expected to implement the scheme daily, from Monday-Friday. Adherence to the protocol is important to maximise the clinical effectiveness of the programme.

AIMS & OBJECTIVES

(1) To establish the proportion of schools or nurseries taking part in Designed to Smile that adhere to the once-per-day brushing protocol

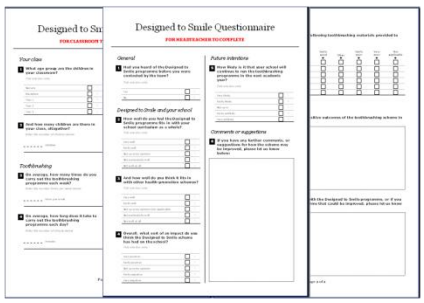
(2) To identify school or nursery factors which relate to non-adherence

MATERIALS & METHODS

615 participating schools and nurseries across Wales were sent two questionnaires, for completion by headteachers and classroom teachers.

The surveys collected demographic details about the school or nursery, and information about their experiences of running the scheme, including :

-how often toothbrushing was carried out each week
-the number of children in the class
-the age group of the children in the class
-how many minutes an average toothbrushing session lasted

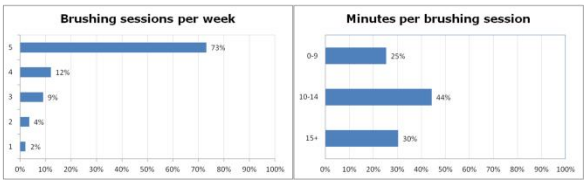


RESULTS

419 schools replied, providing a 68% response rate. 306 settings (73%) reported carrying out daily toothbrushing sessions, while 113 (27%) missed at least one session per week.

On average, each brushing session lasted 11.2 minutes, including time to set up and tidy away materials. 30% of schools reported that sessions took over 15 minutes.

Figure 1: Brushing frequency and duration



Chi-squared tests showed that the number of reported brushing sessions per week was significantly ($p<0.01$) associated with the age group of the class and the length of time that toothbrushing sessions lasted. There was, however, no association between frequency of weekly brushing and the number of children in the class.

The odds of missing at least one session per week were significantly higher in classrooms that took more than 15 minutes per brushing session (Table 1) and classrooms with older children (Table 2).

Table 1: Odds ratios for mins per brushing session

Mins each brushing session lasts	Settings brushing 5 times per week (%)	Settings brushing <5 times per week (%)	Odds ratio	95% CI
0-10 (ref)	91 (83.5)	18 (16.5)	1.00	
10-14	148 (77.9)	42 (22.1)	1.43	0.76-2.69
15+	68 (56.7)	52 (43.3)	3.97*	2.09-7.56

Table 2: Odds ratio for age group of children

Age group of children in class (yrs)	Settings brushing 5 times per week (%)	Settings brushing <5 times per week (%)	Odds ratio	95% CI
Nursery, 0-3 (ref)	136 (81.4)	31 (18.6)	1.00	
Reception, 4-5	83 (66.4)	42 (33.6)	2.18*	1.25-3.81
Infants, 5-6	81 (67.5)	39 (32.5)	2.28*	1.29-4.00

* $p<0.01$

CONCLUSIONS

From both a clinical and cost-effectiveness perspective, it is important that schools and nurseries carry out daily brushing sessions. The current survey found that around a quarter of settings currently fail to do so.

The amount of time that each brushing session lasts is a key predictor of non-compliance, as is the age of the children in the class.

It is hoped that this information will prove useful in helping to target support towards schools and nurseries.

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