PICTURE OF ORAL HEALTH 2016

DENTAL EPIDEMIOLOGICAL SURVEY OF 5 YEAR OLDS 2014/15

Contents

Authors

Maria Morgan, Senior Lecturer, Welsh Oral Health Information Unit, Cardiff University.

Nigel Monaghan, Honorary Senior Lecturer, Cardiff University.

http://www.cardiff.ac.uk/dentl/research/themes/appliedclinicalresearch/epidemiology/oralhealth/index.html

Summary

The 2014/15 dental survey of five year olds shows a further 6% reduction in the proportion of children with experience of dental decay in Wales when compared with the previous survey undertaken in 2011/12 (41.4% falling to 35.4%). In the eight years since 2007/8 this demonstrates a 12% reduction in the proportion of children with at least one tooth affected by decay (from 47.6%).

This is mirrored by a similar statistically significant reduction in all Wales mean decay experience (average number of decayed, missing and filled teeth per child) from 1.98 in 2007/08 to 1.29 in 2014/15. These improvements in oral health mainly reflect steady improvements in most areas of Wales.

Dental disease levels in children in Wales continue to improve across all social groups. There is no evidence of widening inequalities here. This is in contrast with surveys prior to 2007 when improved decay levels were normally associated with widening inequality.

The Designed to Smile programme was in the early stages of implementation for under 5's in many areas of Wales until 2012. As a result, some of the children surveyed in 2014/15 attending schools eligible to participate in Designed to Smile may not have yet received the full benefits of this programme.

Analyses in this survey confirm that schools which have been targeted for the Designed to Smile Programme currently have greater baseline levels of dental disease. This is to be expected as they were targeted because of historically high disease levels associated with material deprivation.

Early data analyses suggest that dmft in children attending Designed to Smile schools is improving. When five year olds survey results for 2015/16 are available the full impact of Designed to Smile should be emerging.

Introduction

This document presents data from a dental survey of school year 1 children (approximately 5-years of age) undertaken in Wales between September 2014 and April 2015, as a part of the NHS dental survey programme.

This summary report will be complemented by data tables which will be available on the Welsh Oral Health Information Unit website shortly after publication of this report.

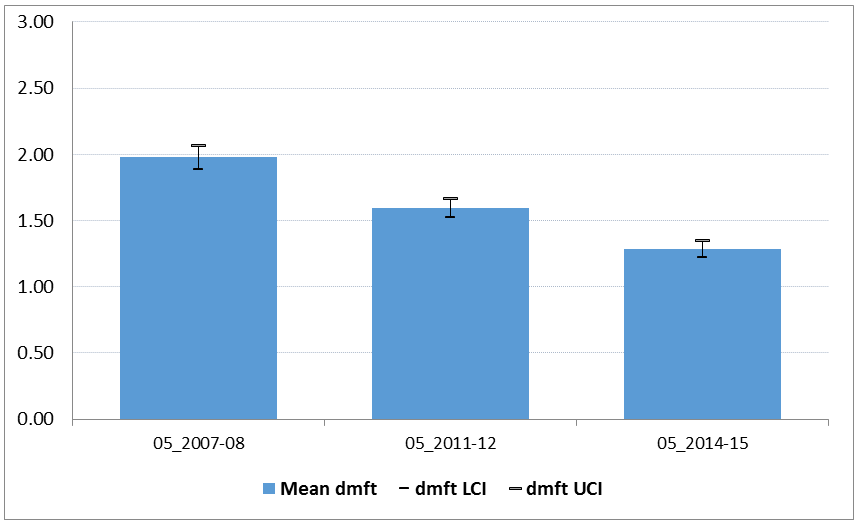
Information relating interpretation of data collected in the past for surveys of this age group are outlined in the Appendix.

Preventable Decay in Wales

The sum of decayed, missing and filled teeth is a measure of the decay experience of the average child. It is therefore the burden of disease which theoretically could have been prevented and thus key data for evaluation of efforts to prevent decay.

Figure 1 shows the trend in the mean number of decayed, missing and filled teeth per child in Wales. Between 2007/08 and 2011/12 there was a reduction in dmft from 1.98 to 1.59. In 2014/5 we saw a further reduction to 1.29. This represents a 35% reduction in mean dmft scores in 8 years.

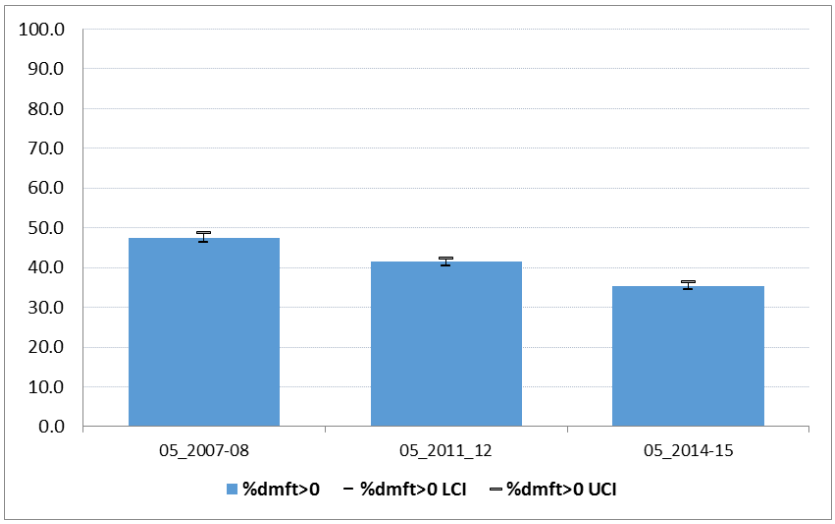
Figure 1 Trend in mean dmft for Wales 2007/08 – 2014/15



See Appendices 2, 3 & 4 for data

Not all of the children examined had decay. Figure 2 shows a reduction in the proportion of children with decay between 2007/08 (47.6%), 2011/12 (41.4%) and 2014/15 (35.4%). This represents continuing improvement of the proportion of children who have no obvious decay experience by age 5. Thus in 2015 in a class of 30 children about 19 will have no decay experience compared with 16 in 2008.

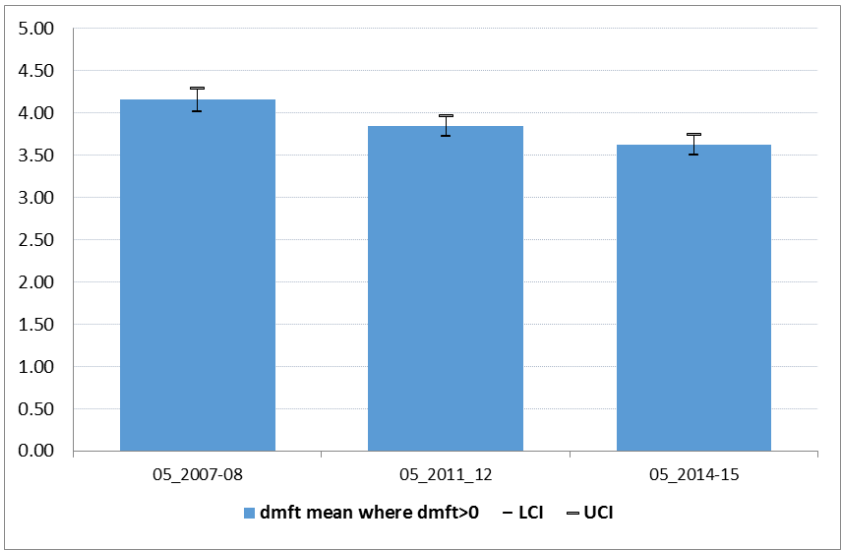
Figure 2 Percentage of children in Wales with caries (%dmft>0) 2007/08 – 2014/15



See Appendices 2, 3 & 4 for data

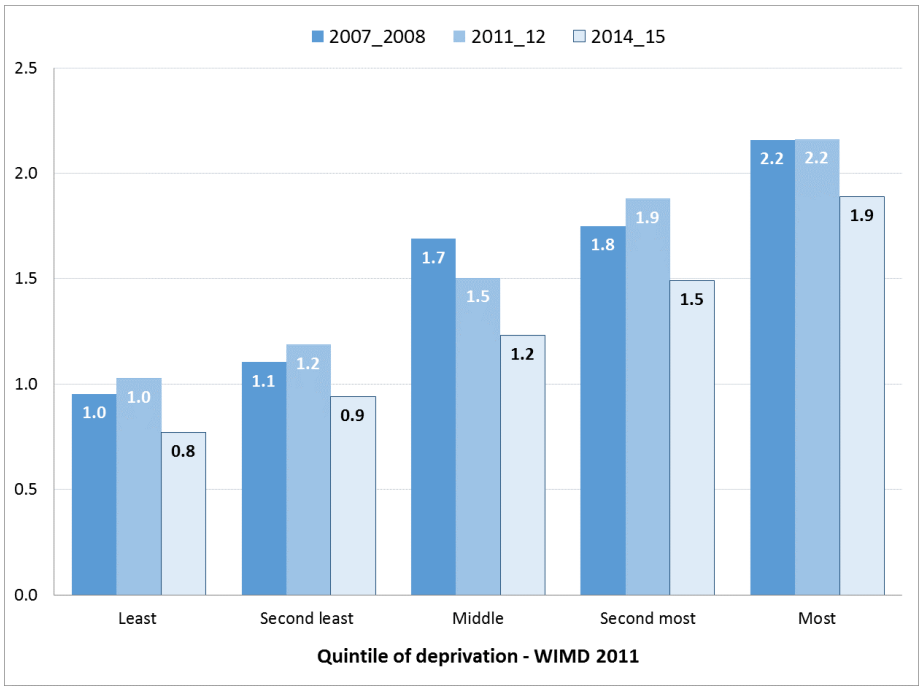
Data on those children who have at least 1 decayed, missing or filled tooth starts to illustrate the stark differences between the children with decay and those without. Mean dmft for a child with at least one tooth so affected is shown in Figure 3. The continuing reduction from 4.16 in 2007/8 to 3.85 in 2011/2012 and now to 3.63 in 2014/5 is statistically and clinically significant. This represents one tooth fewer affected by decay among every 2 children with decay experience.

Figure 3 Mean dmft of children in Wales with decay experience (mean dmft where dmft>0) 2007/08 – 2014/15



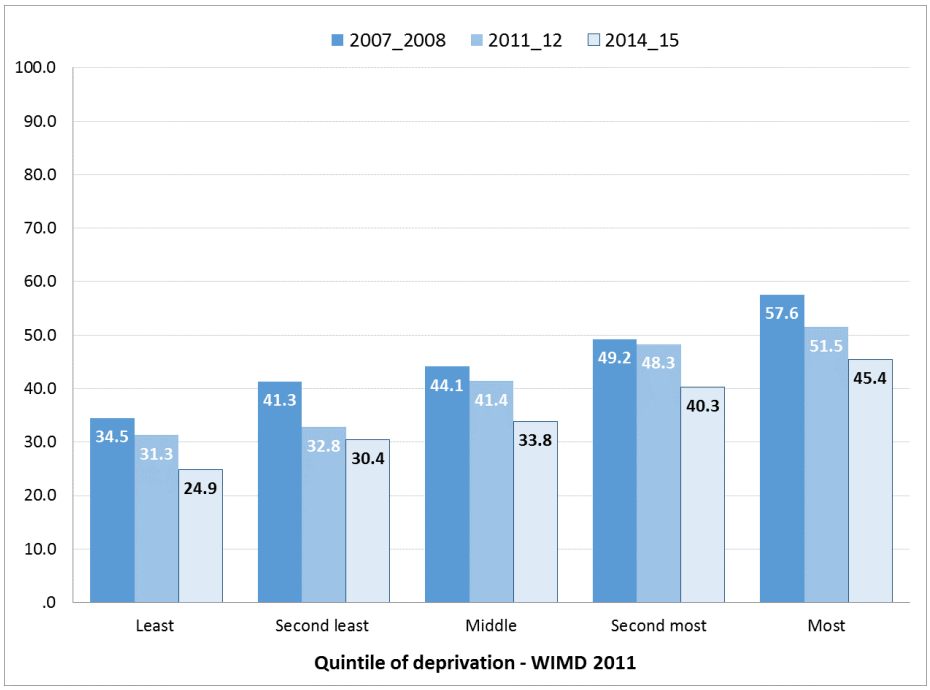
See Appendices 2, 3 & 4 for data

Figure 4 Inequalities in mean number of decayed teeth (dmft) in Welsh children, 2007/08 – 2014/15



Figures 4 and 5 illustrate the relationship between dmft and the Welsh Index of Multiple Deprivation (WIMD). Mean dmft and the %dmft>0 for all quintiles of deprivation have fallen in 2014/15 when compared with values for 2011/12. This improvement across all quintiles of deprivation is impressive given the impact of a global economic downturn. Decay is higher is poorer communities across the globe and would be expected to either rise or show little improvement in hard times.

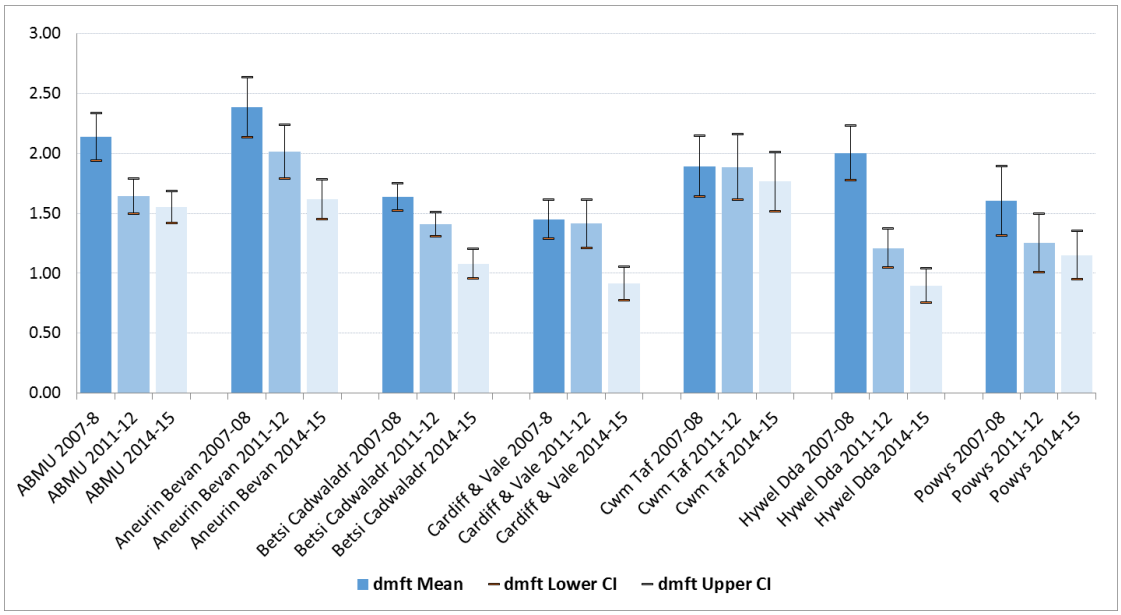
Figure 5 % of children in Wales with decay by Welsh Index of Multiple Deprivation (%dmft>0), 2007/08 – 2014/15



Preventable Decay in Local Health Boards

Local Health Board (LHB) mean dmft scores for 2007/08 until 2014/15 are presented in Figure 6 and have shown statistically significant reductions over 8 years in all LHBs except Cwm Taf and Powys. The mean dmft in 2014/15 ranged from 0.90 in Hywel Dda to 1.77 in Cwm Taf.

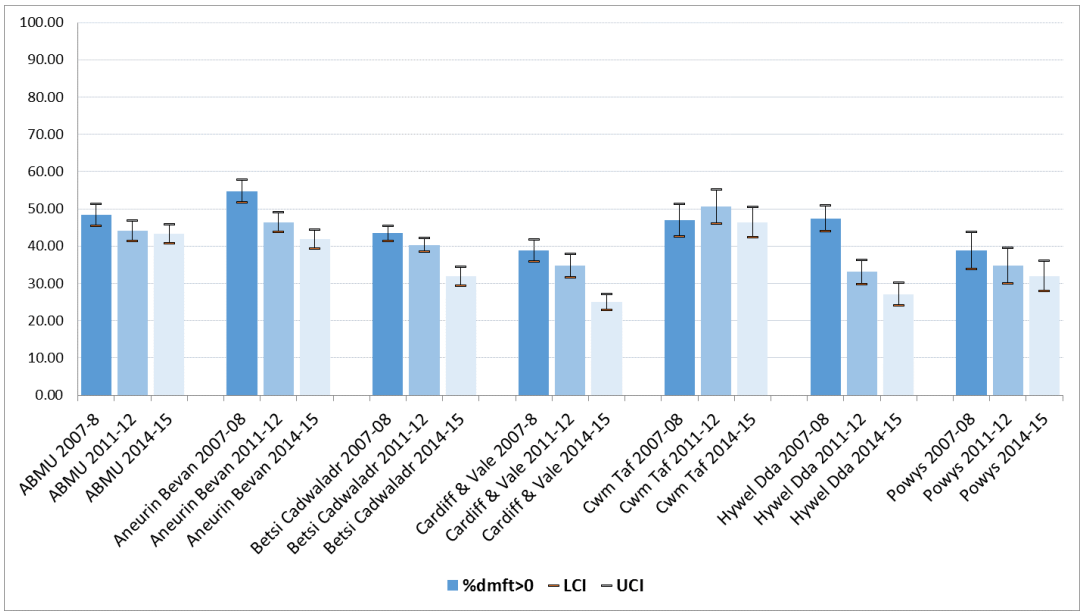
Figure 6 Mean dmft per 5 year old by LHB, 2007/08 – 2014/15



See Appendices 2, 3 & 4 for data

Figure 7 illustrates the proportion of children with at least 1 decayed tooth (%dmft>0) by LHB between 2007/08 and 2014/15.

Figure 7 Percentage with caries (%dmft>0) among 5 year olds by LHB, 2007/08 – 2014/15

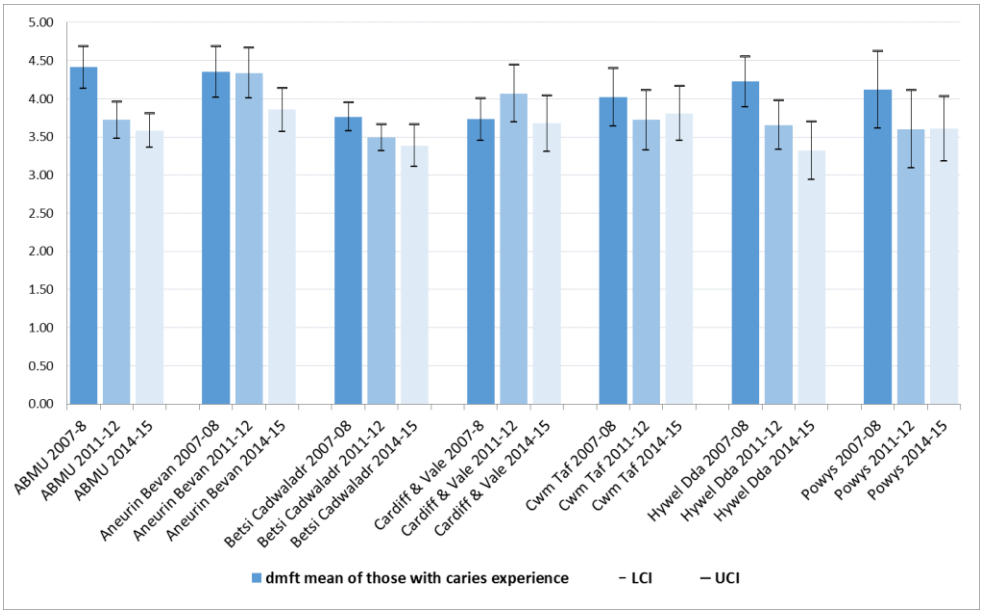


See Appendices 2, 3 & 4 for data

Again that have been statistically significant reductions in this index for all LHBs, except Cwm Taf, ABMU and Powys. For the latter two LHBs there were reductions which were not statistically significant with the sample size used for these surveys. In 2014/15 the

percentage of children with caries experience ranged from 24.9% in Cardiff and Vale to 46.3% in Cwm Taf.

Figure 8 Mean dmft of those with decay experience (mean dmft where dmft>0) by LHB, 2007/08 – 2014/15



See Appendices 2, 3 & 4 for data

Figure 8 presents the average number (from 1 to 20) of decayed teeth for children with some decay, i.e. mean dmft of those with dmft. In 2014/15 this ranged from 3.32 in Hywel Dda to 3.86 in Aneurin Bevan.

As more children are rendered caries free, this index could fall, stay the same or rise depending on decay trends among those most at risk of decay. The reduction at an all Wales level for this characteristic (Figure 3) reflects reductions across all LHBs which only reach statistical significance in ABMU and Hywel Dda. Overall in Wales, those at most risk of decay are experiencing decreasing numbers of teeth affected.

Preventable Decay in Unitary Authorities

As Unitary Authorities have smaller populations than LHBs the sample size for the survey is smaller and findings from the survey are therefore less likely to demonstrate statistically significant changes.

The mean dmft by Unitary Authority is shown in Appendix 1 for each region of Wales for 2007/08, 2011/12 and 2014/5. Statistically significance reductions in preventable decay were seen in 10 of the 22 Unitary Authorities.

Wider UK Data

At the time of drafting this report wider UK data for mean dmft for 2014/2015 is not available. In due course access to this data should be available via links on the British Association for the Study of Community Dentistry website.

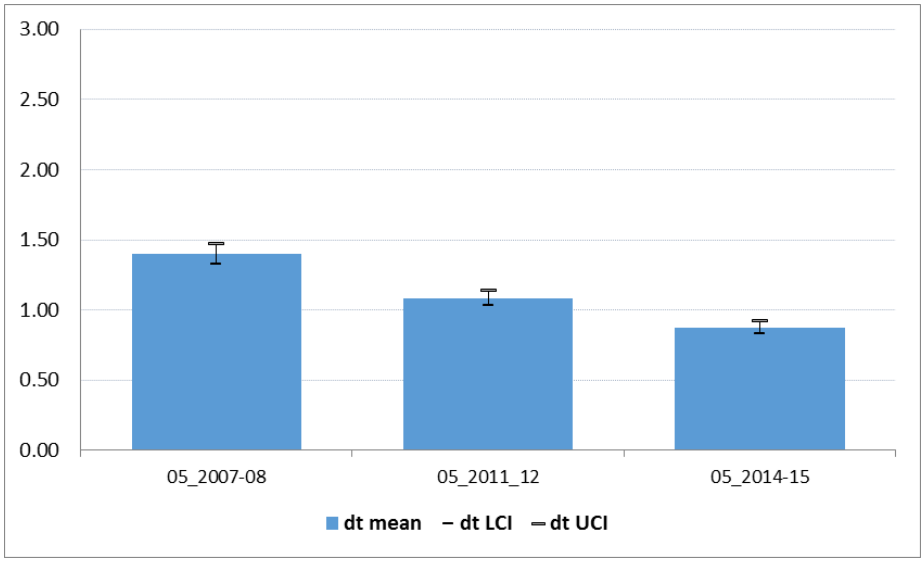
Active Decay in Wales

The decayed teeth (dt) component measures decay which the examining dentist believes to be actively progressing. Active decay puts the child at risk of pain, infection and suggests risk of decay of permanent successor teeth. Decayed teeth data (dt) is a marker indicating children with current need for support in managing this chronic dental disease.

All Wales

Figure 9 shows the trend in the mean number of decayed teeth per child in Wales. Between 2007/08 and 2014/15 there has been a continuing reduction in dt from 1.40 to 0.88.

Figure 9 Mean number of decayed teeth (dt) per child in Wales, 2007/08 – 2014/15

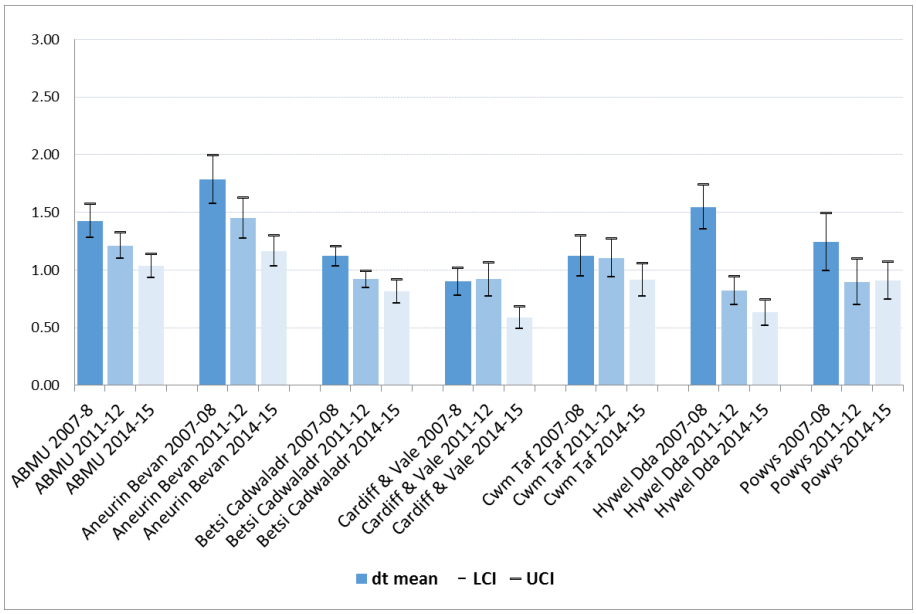


See Appendices 2, 3 & 4 for data

Active Decay in Local Health Boards

Mean dt scores between 2007/08 and 2014/15 are presented in Figure 10. Over the 8 year period there have been statistically significant reductions in all LHBs except Cwm Taf and Powys. In 2014/15 mean dt ranged from 0.59 in Cardiff and Vale to 1.17 in Aneurin Bevan LHB.

Figure 10 Mean decayed teeth per child by Local Health Board (dt), 2007/08 – 2014/15



See Appendices 2, 3 & 4 for data

Active Decay in Unitary Authorities

Decayed teeth data at unitary Authority level is included in appendices 2 for 2014/15, 3 for 2011/12 and 4 for 2007/8.

Caries experience does not follow a bell shaped distribution curve, many children have only one or two decayed teeth. If fewer children present with one or two decayed teeth can push up the mean caries experience of the remaining children with decay experience. Between 2007/08 and 2014/15 there have been reductions in mean dmft averaging 0.69 across Wales. In 18 unitary authority areas the improvement was in the range of 0.22-1.42 decayed, missing or filled teeth per child. In 4 unitary authorities the improvement was below 0.2 dmft.

Wider UK data

At the time of drafting this report wider UK data on active decay for 2014/2015 is not available. In due course access to this data should be available via links on the British Association for the Study of Community Dentistry website.

Designed to Smile Impact

Designed to Smile is the National Oral Health Programme for Wales. This is a targeted oral health promotion programme which is focussed on preventing dental decay in children in pre-school and primary school settings. Work to roll the programme out across the whole of Wales was commenced in 2010. Further information is available from the Welsh Oral Health Information Unit.

Over the last 3 surveys samples included 5 year old children from schools involved in the initial Designed to Smile pilot and from schools that are now being included in the Designed to Smile programme as it is rolled out. It also surveyed children who are not taking part in Designed to Smile. These surveys were not specifically designed to evaluate Designed to Smile, however D2S should impact on these indicators because of the scale of the D2S programme.

Schools Involved in Designed to Smile Programme

Tables 1 and 2 illustrate the proportion of schools and children which are now participating (or not) in Designed to Smile which were randomly sampled in the surveys between 2007/08 and 2014/15.

Table 1 Number of schools surveyed, by participation in D2S, 2007/08 – 2014/15

	Number of schools participating in dental survey			% taking part in D2S
Epidemiology survey year	Taking part in D2S now	Not taking part in D2S now	All	
2007-08	305	320	625	48.8
2011-12	291	325	616	47.2
2014-15	293	228	521	56.2

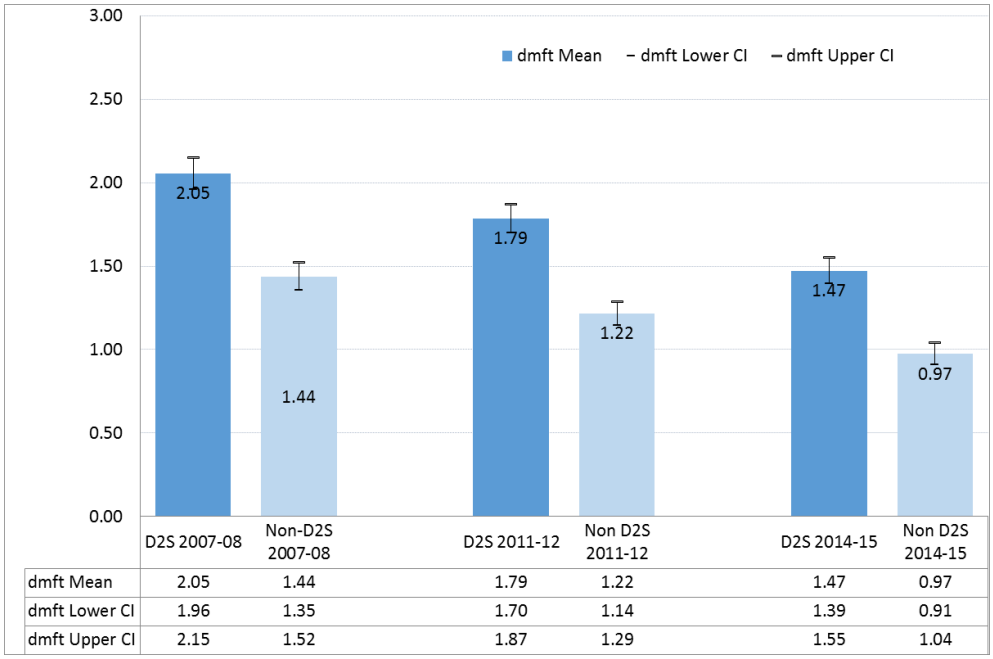
Table 2 Number of children examined, by survey year and participation in D2S

	Number of children examined, attending school which is now			% taking part in D2S
Epidemiology survey year	Taking part in D2S	Not taking part in D2S	All	
2007-08	3641	3459	7100	51.3
2011-12	3891	3843	7734	50.3
2014-15	4181	3535	7716	54.2

Mean dmft in schools selected for inclusion in the Designed to Smile programme is greater than for the schools which have not been involved in the programme (Figure 11). Similarly, there is a larger proportion of children with decay experience (%dmft>0) attending schools now participating in Designed to Smile (Figure 12). This confirms that the programme is being targeted at schools with greater disease experience.

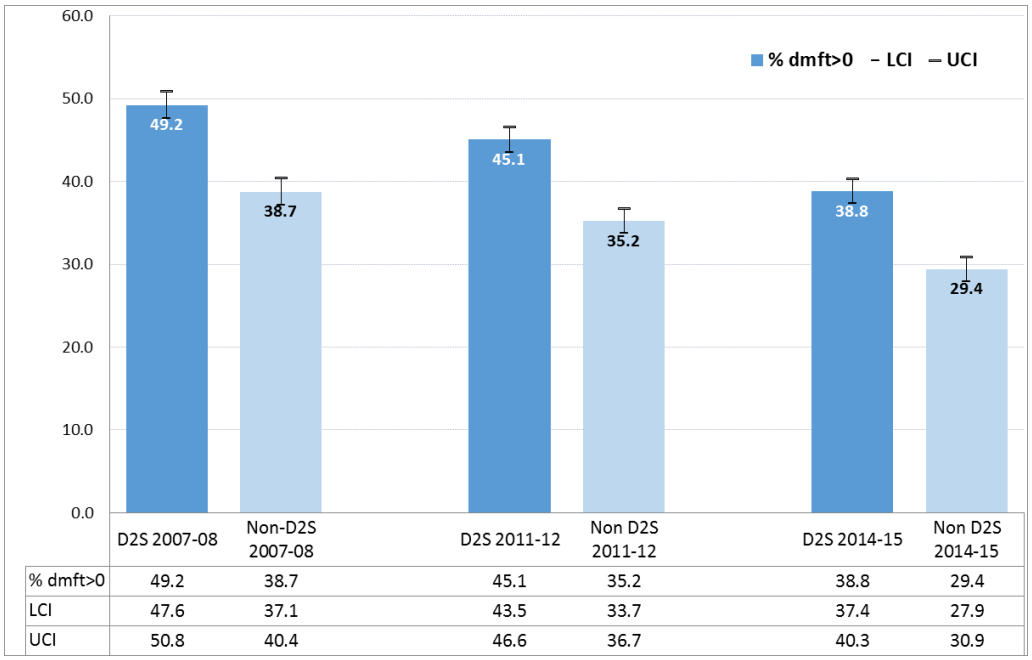
Since 2008, mean dmft has reduced in all schools. The reduction in mean dmft is slightly greater in Designed to Smile Schools. A similar improvement pattern is seen in the proportion of children with experience of decay (%dmft>0, Figure 12).

Figure 11 Mean dmft for children attending primary schools by participation in Designed to Smile, 2007/08 – 2014/15



	D2S 2007-08	Non-D2S 2007-08	D2S 2011-12	Non D2S 2011-12	D2S 2014-15	Non D2S 2014-15
dmft Mean	2.05	1.44	1.79	1.22	1.47	0.97
dmft Lower CI	1.96	1.35	1.70	1.14	1.39	0.91
dmft Upper CI	2.15	1.52	1.87	1.29	1.55	1.04

Figure 12 % dmft>0 for children attending primary schools by participation in Designed to Smile, 2007/08 – 2014/15



	D2S 2007-08	Non-D2S 2007-08	D2S 2011-12	Non D2S 2011-12	D2S 2014-15	Non D2S 2014-15
% dmft>0	49.2	38.7	45.1	35.2	38.8	29.4
LCI	47.6	37.1	43.5	33.7	37.4	27.9
UCI	50.8	40.4	46.6	36.7	40.3	30.9

Additional Information

Data from previous Welsh surveys is available from the Welsh Oral Health Information Unit website.

Appendix 1 – Mean dmft trends by Unitary Authority, 2007/08 to 2014/15

Figure 13 North Wales – Mean dmft trends by Unitary Authority, 2007/08 to 2014/15

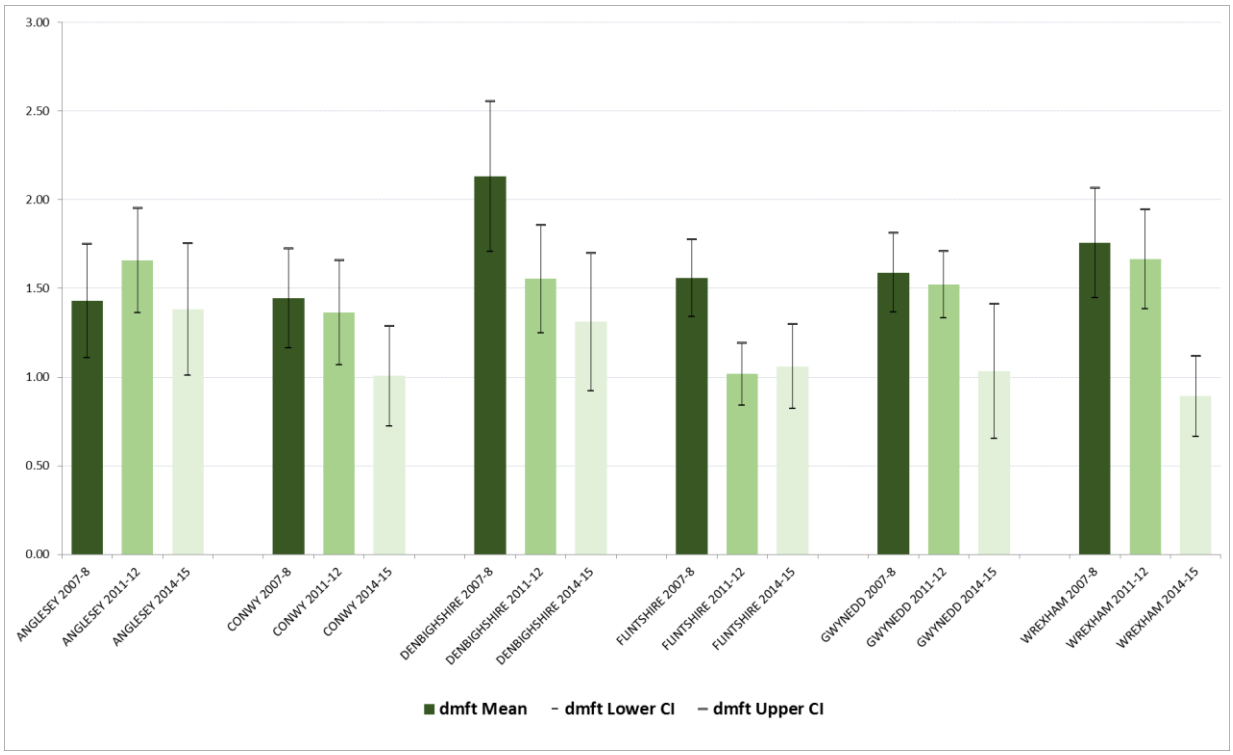


Figure 14 Mid and West Wales – Mean dmft trends by Unitary Authority, 2007/08 to 2014/15

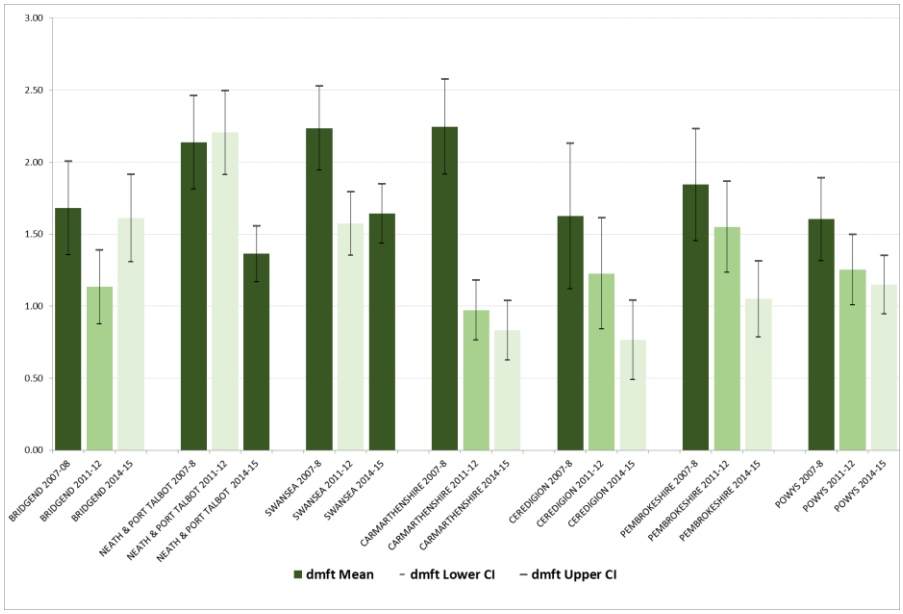
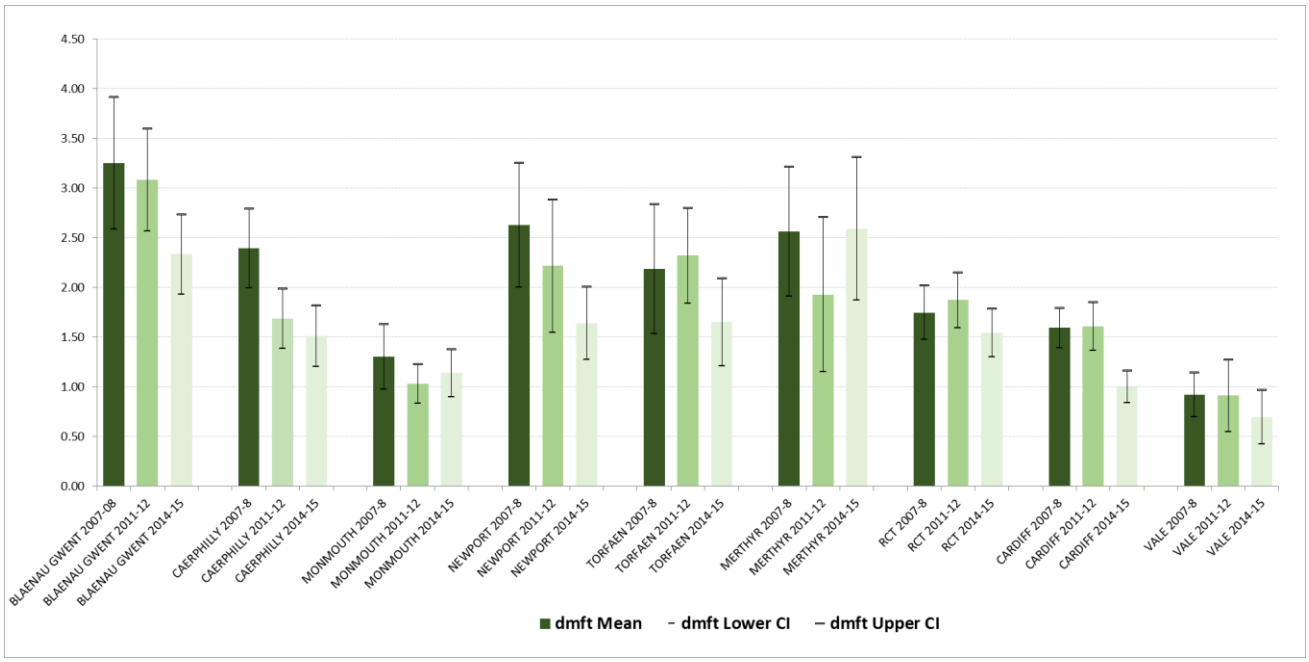


Figure 15 South East Wales – Mean dmft trends by Unitary Authority, 2007/08 to 2014/15



Appendix 2 Key Dental Caries Variables from the Survey of 5 year olds 2014/15

LHB	UA	mean dmft	%dmft>0	mean dmft of those with caries expereince	mean dt
Aneurin Bevan	Blaenau Gwent	2.33	52.3	4.46	1.79
Aneurin Bevan	Caerphilly	1.51	42.3	3.58	1.07
Aneurin Bevan	Monmouthshire	1.14	32.4	3.51	0.85
Aneurin Bevan	Newport	1.64	41.6	3.94	1.08
Aneurin Bevan	Torfaen	1.65	42.0	3.94	1.33
Abertawe Bro Morgannwg	Bridgend	1.61	46.2	3.49	1.01
Abertawe Bro Morgannwg	Neath Port Talbot	1.36	39.6	3.44	0.86
Abertawe Bro Morgannwg	Swansea	1.64	43.9	3.74	1.18
Betsi Cadwaladr	Anglesey	1.38	44.2	3.13	1.14
Betsi Cadwaladr	Conwy	1.01	29.3	3.44	0.75
Betsi Cadwaladr	Denbighshire	1.31	35.9	3.65	1.13
Betsi Cadwaladr	Flintshire	1.06	32.5	3.26	0.74
Betsi Cadwaladr	Gwynedd	1.03	33.8	3.06	0.69
Betsi Cadwaladr	Wrexham	0.89	24.1	3.70	0.65
Cardiff and Vale	Cardiff	1.00	26.7	3.74	0.65
Cardiff and Vale	Vale of Glamorgan	0.70	20.2	3.45	0.42
Cwm Taf	Merthyr Tydfil	2.59	58.6	4.43	1.32
Cwm Taf	Rhondda Cynon Taff	1.54	43.1	3.58	0.81
Hywel Dda	Carmarthenshire	0.83	25.6	3.25	0.53
Hywel Dda	Ceredigion	0.76	22.8	3.35	0.60
Hywel Dda	Pembrokeshire	1.05	30.9	3.39	0.80
Powys	Powys	1.15	31.8	3.61	0.91
ABERTAWE BRO MORGANNWG		1.55	43.3	3.59	1.04
ANEURIN BEVAN		1.62	41.9	3.86	1.17
BETSI CADWALADR		1.08	31.9	3.39	0.81
CARDIFF AND VALE		0.92	24.9	3.68	0.59
CWM TAF		1.77	46.3	3.81	0.92
HYWEL DDA		0.90	27.0	3.32	0.63
POWYS		1.15	31.8	3.61	0.91
WALES		**1.29**	**35.4**	**3.63**	**0.88**

Appendix 3 Key Dental Caries Variables from the Survey of 5 year olds 2011/12

LHB	UA	mean dmft	%dmft>0	mean dmft of those with caries expereince	mean dt
Aneurin Bevan	Blaenau Gwent	3.08	64.2	4.80	2.52
Aneurin Bevan	Caerphilly	1.69	43.5	3.88	1.09
Aneurin Bevan	Monmouthshire	1.03	30.0	3.44	0.78
Aneurin Bevan	Newport	2.22	45.4	4.88	1.56
Aneurin Bevan	Torfaen	2.32	53.9	4.31	1.72
Abertawe Bro Morgannwg	Bridgend	1.13	35.5	3.20	0.68
Abertawe Bro Morgannwg	Neath Port Talbot	2.20	51.7	4.27	1.62
Abertawe Bro Morgannwg	Swansea	1.57	44.2	3.56	1.25
Betsi Cadwaladr	Anglesey	1.66	45.6	3.64	0.96
Betsi Cadwaladr	Conwy	1.36	39.0	3.50	0.89
Betsi Cadwaladr	Denbighshire	1.55	41.3	3.76	1.01
Betsi Cadwaladr	Flintshire	1.02	34.5	2.95	0.70
Betsi Cadwaladr	Gwynedd	1.52	41.8	3.64	1.03
Betsi Cadwaladr	Wrexham	1.66	44.7	3.72	1.04
Cardiff and Vale	Cardiff	1.61	38.4	4.19	1.01
Cardiff and Vale	Vale of Glamorgan	0.91	25.3	3.60	0.69
Cwm Taf	Merthyr Tydfil	1.93	51.8	3.73	0.89
Cwm Taf	Rhondda Cynon Taff	1.87	50.4	3.72	1.16
Hywel Dda	Carmarthenshire	0.97	30.6	3.18	0.59
Hywel Dda	Ceredigion	1.23	28.7	4.27	0.86
Hywel Dda	Pembrokeshire	1.55	38.8	3.99	1.14
Powys	Powys	1.25	34.8	3.60	0.90
ABERTAWE BRO MORGANNWG		1.64	44.2	3.72	1.21
ANEURIN BEVAN		2.01	46.4	4.34	1.45
BETSI CADWALADR		1.41	40.4	3.49	0.92
CARDIFF AND VALE		1.41	34.7	4.07	0.92
CWM TAF		1.89	50.7	3.72	1.11
HYWEL DDA		1.21	33.1	3.66	0.82
POWYS		1.25	34.8	3.60	0.90
WALES		**1.59**	**41.4**	**3.85**	**1.08**

Appendix 4 Key Dental Caries Variables from the Survey of 5 year olds 2007/08

LHB	UA	mean dmft	%dmft>0	mean dmft of those with caries expereince	mean dt
Aneurin Bevan	Blaenau Gwent	3.25	63.1	5.15	2.24
Aneurin Bevan	Caerphilly	2.40	55.2	4.34	1.80
Aneurin Bevan	Monmouthshire	1.30	35.4	3.69	1.18
Aneurin Bevan	Newport	2.63	60.7	4.33	1.92
Aneurin Bevan	Torfaen	2.19	53.8	4.06	1.67
Abertawe Bro Morgannwg	Bridgend	1.68	45.2	3.72	1.01
Abertawe Bro Morgannwg	Neath Port Talbot	2.14	49.1	4.36	1.53
Abertawe Bro Morgannwg	Swansea	2.24	48.8	4.58	1.45
Betsi Cadwaladr	Anglesey	1.43	40.6	3.52	0.86
Betsi Cadwaladr	Conwy	1.45	40.6	3.56	1.12
Betsi Cadwaladr	Denbighshire	2.13	50.5	4.22	1.43
Betsi Cadwaladr	Flintshire	1.56	41.8	3.72	1.10
Betsi Cadwaladr	Gwynedd	1.59	42.9	3.70	1.10
Betsi Cadwaladr	Wrexham	1.76	46.0	3.82	1.12
Cardiff and Vale	Cardiff	1.59	41.7	3.82	0.99
Cardiff and Vale	Vale of Glamorgan	0.92	28.3	3.25	0.57
Cwm Taf	Merthyr Tydfil	2.56	52.3	4.90	1.59
Cwm Taf	Rhondda Cynon Taff	1.75	45.9	3.81	1.02
Hywel Dda	Carmarthenshire	2.25	53.2	4.22	1.68
Hywel Dda	Ceredigion	1.62	35.7	4.55	1.26
Hywel Dda	Pembrokeshire	1.84	44.9	4.10	1.50
Powys	Powys	1.60	38.9	4.12	1.24
ABERTAWE BRO MORGANNWG		2.14	48.5	4.41	1.43
ANEURIN BEVAN		2.38	54.8	4.35	1.78
BETSI CADWALADR		1.64	43.4	3.76	1.12
CARDIFF AND VALE		1.45	38.9	3.73	0.90
CWM TAF		1.89	47.1	4.02	1.12
HYWEL DDA		2.00	47.4	4.22	1.55
POWYS		1.60	38.9	4.12	1.24
WALES		**1.98**	**47.6**	**4.16**	**1.40**

Appendix 5 Interpretation of historical survey data

This document on the NHS dental survey programme in Wales is the third produced since changes had to be made to the consent arrangements for dental examination of school year 1 children (approximately 5-year-old) requiring formal written parental consent.

Data collected before 2006 cannot be compared with data collected from 2007/08. The bias introduced by the changed consent arrangements will never be fully understood because children were not examined if parental consent was not provided.

Decay levels generated from surveys of this age group are recognised as an underestimation of the true experience for three main reasons:

1. Missing deciduous incisors are not included in these calculations because in a few children they may have naturally exfoliated by age 5. All missing incisors are assumed to have been naturally exfoliated although some will in fact have been extracted. Thus the reported decay levels at age 5 are always a slight underestimation of the true decay experience of those children examined in a survey.

2. These surveys employ a visual examination of the child's mouth, no radiographs are taken. This is another factor which means that reported decay levels underestimate the true disease level.

3. Furthermore, previous research suggests that children who do not participate in the dental surveys are likely to have more decay than those participating,

Thus the mean decay levels in children reported here and in the two previous surveys are likely to slightly under estimate the true decay experience of children aged 5 in Wales.

These underestimates are likely to be present in all three surveys since 2007 to similar degrees. As a result the trends reported by comparison across these surveys will provide a realist picture of changes in decay experience.