PICTURE OF ORAL HEALTH 2014

DENTAL EPIDEMIOLOGICAL SURVEY OF 12 YEAR OLDS 2012-13

Contents

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

SUMMARY

Long term trends from the late 1980s to the present day highlight a significant reduction in both the prevalence and average experience of dental caries amongst 12 year olds living in Wales; the average D_3MFT and the $\%D_3MFT>0$ now stand at 0.8 and 36% respectively.

Recent trends confirm significant reductions in average D_3MFT and D_3T. However, the key story emerging from the data presented in this report is that the bulk of the reduction in caries comes from fewer children experiencing decay, not a reduction in the number of teeth affected among those with decay affected teeth. The prevalence of dental caries ($\%D_3MFT>0$) and untreated decay ($\%D_3T>0$) is where most of the improvement is taking place.

For those children with experience of decay the mean number of teeth per child with decay is not reducing (overall).

We saw an increase in inequality between 2004/5 and 2008/9, we have seen partial recovery of that i.e. some signs suggesting slower improvement for least deprived quintiles and faster improvement for most deprived quintiles.

We have presented data on 3 data points. Designed to Smile has not impacted yet on this age group. Data collected in 2016/17 and 2020/21 will inform the estimation of impact of this programme on the permanent dentition.

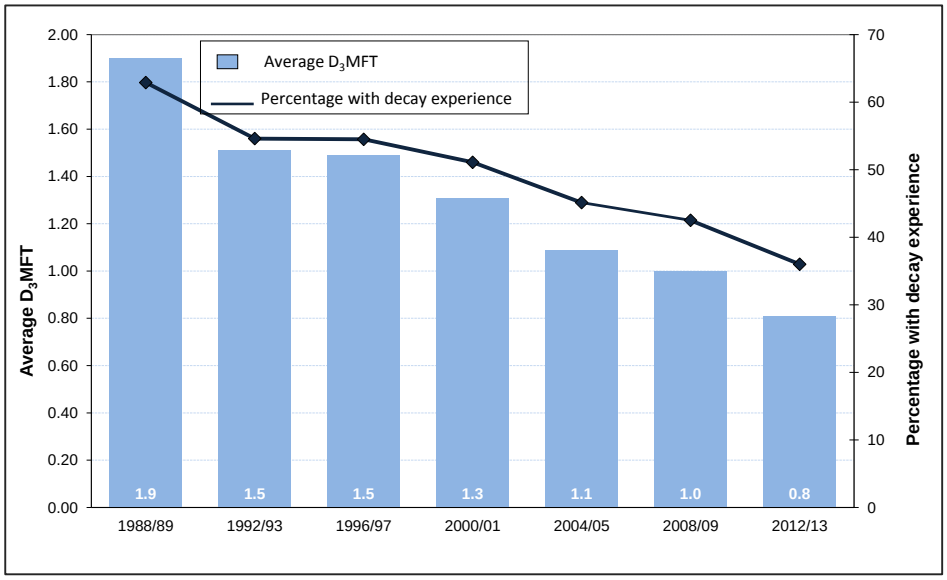
PREVENTABLE DECAY

WALES – long term trends

The sum of Decayed, Missing and Filled teeth (D_3MFT[1]) 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 trends in the mean number of Decayed, Missing and Filled teeth per child and the percentage decay experience (%$D_3MFT>0$) for 12 year olds living in Wales between 1988 and 2014. Over the last 25 years the average D_3MFT has reduced by over half from 1.9 in 1988/89 to 0.8 in 2012/13. The prevalence of decay experience (%$D_3MFT>0$) has fallen from 63% in 1988 to 36% in 2013.

Figure 1 Trend in mean D_3MFT and %$D_3MFT>0$ for Wales between 1988-2013



WALES and LHBs

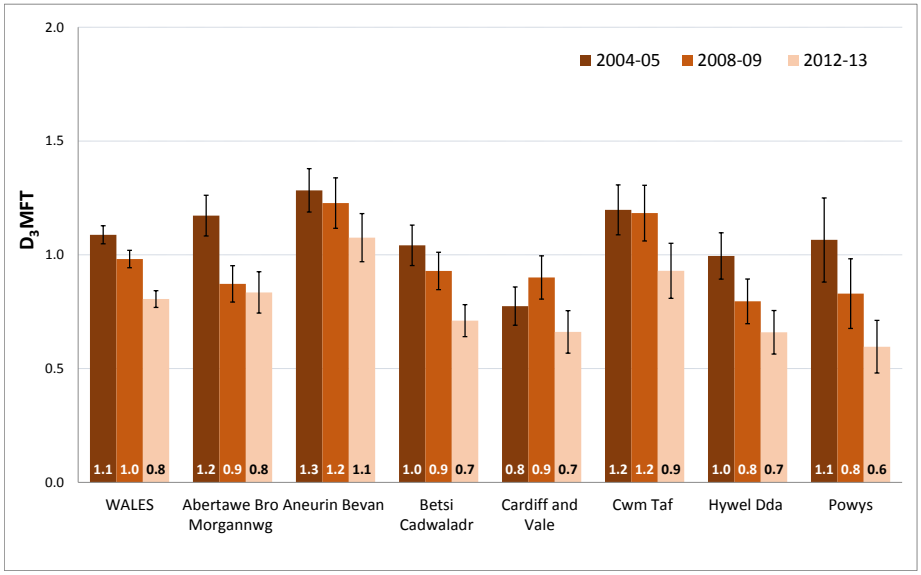
When reviewing the three most recent surveys of 12 year olds, i.e. the surveys conducted during the winters of 2004/05, 2008/09 and 2012/13 it can be seen that average D_3MFT for Wales has reduced significantly from 1.1 (*CI*[2]*:1.0 – 1.1*) to 0.8 (*CI:0.6 - 0.8*).

There were corresponding statistically significant reductions for Abertawe Bro Morgannwg, Aneurin Bevan, Betsi Cadwaladr, Cwm Taf, Hywel Dda and Powys between the 2004/05 and 2012/13 survey years (but not necessarily reductions across all 3 surveys, Figure 2). Cardiff and Vale LHB, which had the best oral health in 12 year olds in Wales in 2004/05, was the only one which did not experience a statistically significant reduction in average D_3MFT across the 3 surveys from 0.8 (*CI:0.7 – 0.9) to* 0.7 (*CI:0.6 – 0.8*).

[1] The data presented for decay (at the D3 level) relate only to dental decay that clinically appears to have penetrated dentine (the inside of the tooth). This is a different diagnostic level from that used by many dentists when examining patients in a dental surgery, i.e. dental check-ups.

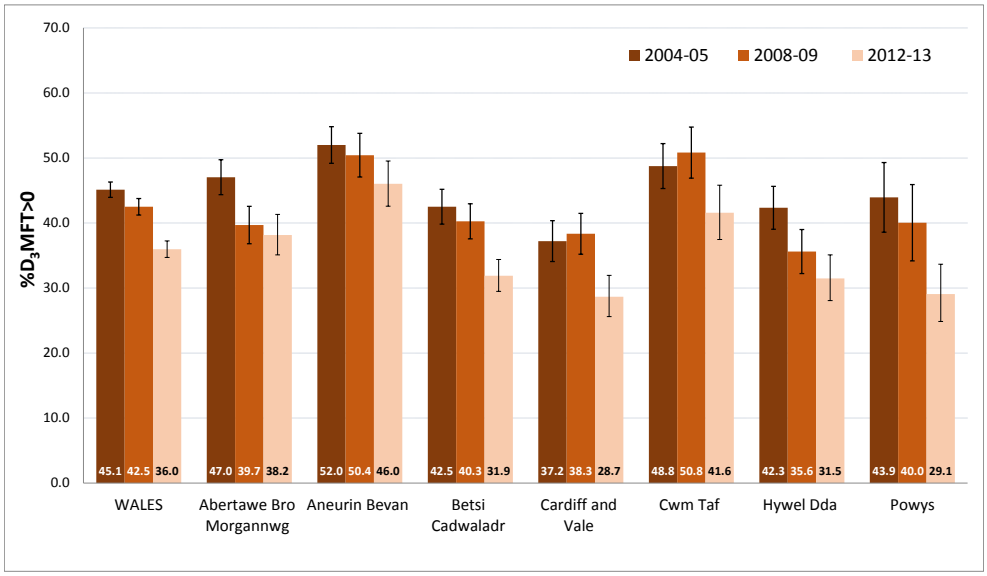
[2] All confidence intervals are reported at 95% level in this report.

Figure 2 Trend in mean D_3MFT for Wales/LHBs, 2004-2013



Not all of the children examined in Wales had decay. Figure 3 shows a reduction in the proportion of children with experience of decay in 2004/05 (45.1%), 2008/09 (42.5%) and 2012/13 (36.0%). It is encouraging that more children have no obvious decay experience in their permanent dentition by age 12.

Figure 3 Percentage of children with caries (%$D_3MFT>0$), 2004-2013



Thus in 2013 in a class of 30 children about 11 will have some decay experience in their permanent dentition compared with 14 in 2004. This represents the average position, some will be better and some worse.

Indeed the key story emerging from the data presented in this report is that the bulk of the reduction in caries comes from fewer children experiencing decay, not a reduction in the number of teeth affected among those with decay affected teeth.

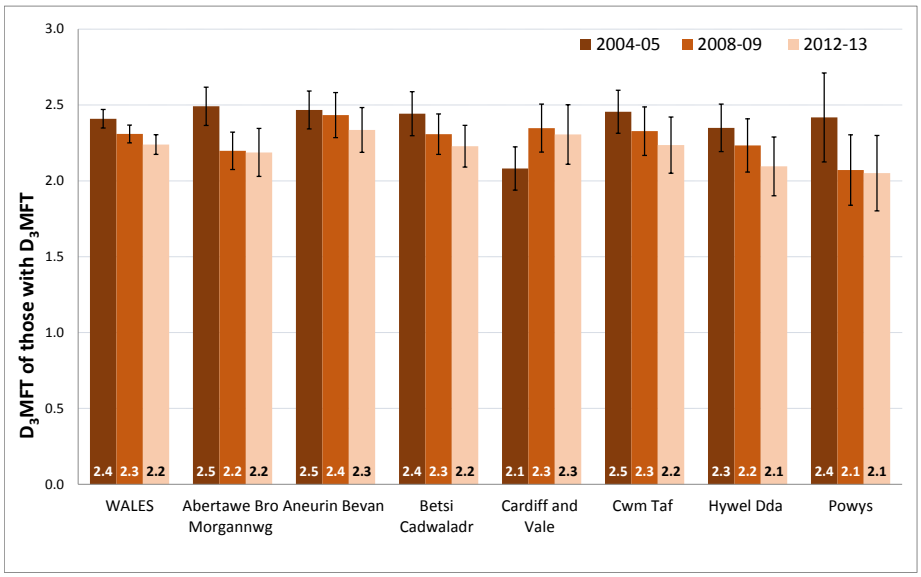
There were corresponding statistically significant reductions for Abertawe Bro Morgannwg, Betsi Cadwaladr, Cardiff and Vale, Hywel Dda and Powys between the 3 survey years (but not necessarily reductions across all 3 surveys, Figure 3). A statistically significant reduction in %D_3MFT between 2004 and 2013 was not experienced in the following local health boards: Aneurin Bevan 52.0% (*CI: 49.2% - 54.8%) to* 46.0% (*CI: 42.6% – 49.5%*) and Cwm Taf 48.8% (*CI: 45.3% – 52.2%) to* 41.6% (*CI: 37.5% – 45.8%*, see Figure 2). The latter health board did experience a statistically significant reduction from 50.8% in 2008/09 to 41.6% in 2012/13.

Looking at the mean decay experience of those children who have at least 1 Decayed, Missing or Filled Tooth illustrates the true magnitude of the inequalities experienced by children affected by decay. The mean D_3MFT for a child with at least one tooth so affected is shown in Figure 4. The reduction for Wales from 2.4 D_3MFT (D_3MFT>0) in 2004/05 (*CI: 2.3 – 2.5*) to 2.2 in 2012/13 (*CI: 2.2 – 2.3*) does suggest a slowly improving position. This again underscores that the majority of the improvement in whole population D_3MFT arises from reduced proportion of children with decay experience.

Thus in 2013 in a class of 30 children the 11 children with decay experience will each have an average of 2.2 teeth affected. This represents the average position, some will be better and some worse.

Only Abertawe Bro Morgannwg experienced a statistically significant reduction in this characteristic between 2004/05 and 2012/13, from 2.5 (*CI: 2.4 -2.6*) to 2.2 (*CI: 2.0-2.3*) respectively (Figure 4).

Figure 4 Mean D_3MFT of those with decay experience (mean D_3MFT of those with D_3MFT>0) 2004-2013



All the remaining health boards except one experienced small reductions but these were not statistically significant at local health board level, but the sum effect of these was a statistically significant improvement at the all Wales level. The apparent increase in D_3MFT for 12 year olds living in Cardiff and the Vale from 2.1 to 2.3 is not statically significant (Figure 4).

Preventable decay by Unitary Authority

As Unitary Authorities have smaller populations than LHBs the sample size for the survey is smaller, confidence intervals are wider, and findings from the survey are therefore less likely to demonstrate statistically significant changes. With smaller sample sizes there is more potential for bias within sampling associated with random effects.

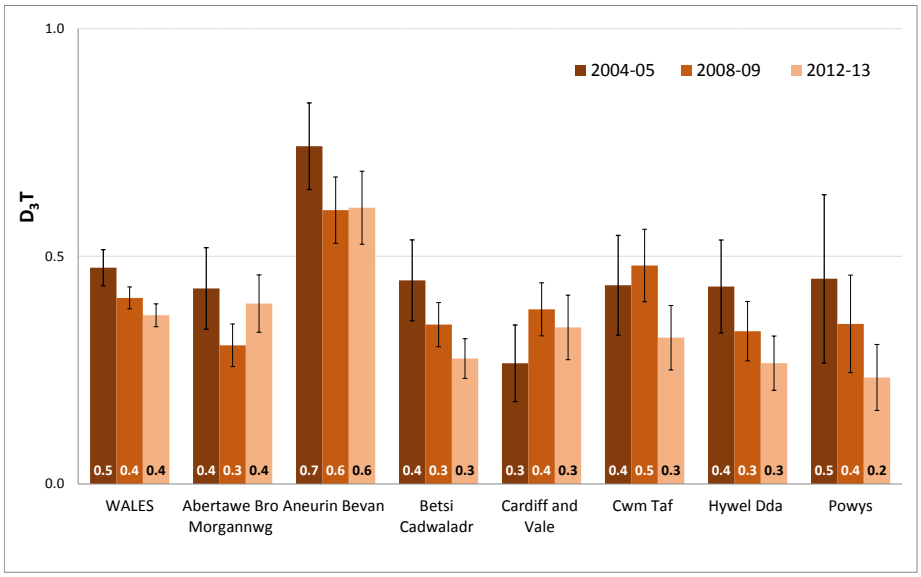
Data on mean D_3MFT scores, caries prevalence and untreated decay experience by unitary authority are presented in Appendix 1-3.

The mean D_3MFT by Unitary Authority is shown graphically in Appendix 4 for surveys commencing 2004/05 through to 2012/13. Of the twenty two unitary authorities seven showed statistically significant reductions between 2004/05 and 2012/13. For eight unitary authorities there was a statistically significant fall in the proportion of children with decay experience.

ACTIVE DECAY IN WALES

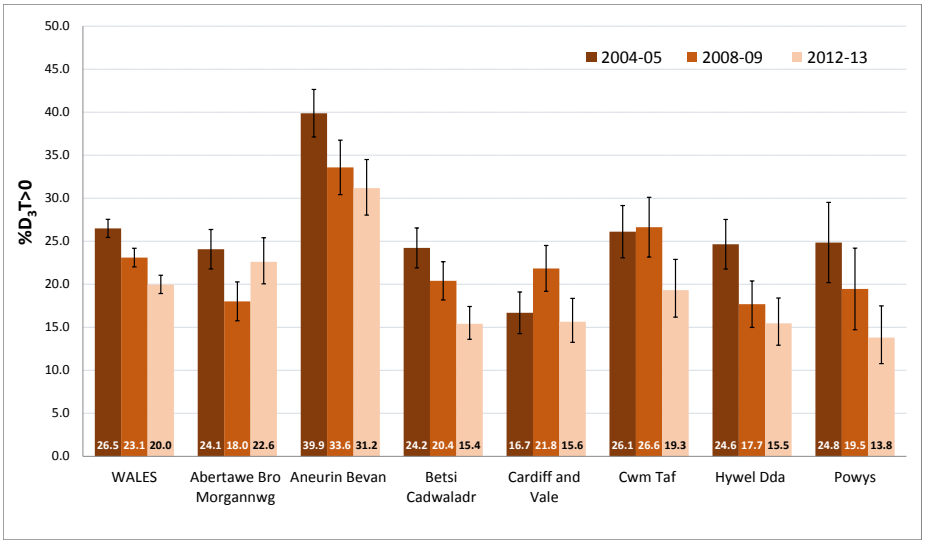
The decayed teeth (D_3T) component as collected by dentists measures decay which the examining dentist believes to be active. Hard discoloured lesions are not included in the data reported here. Active decay puts the child at risk of pain, infection and further loss of tooth tissue. The changes for decayed teeth are less prominent than those experienced for preventable decay. Twelve year old children in Wales experienced a statistically significant reduction in average D_3T between 2004/05 from 0.5, (*CI: 0.4 - 0.5*) to 0.4 in 2012/13 (*CI: 0.3 - 0.4*) equating to a 1/10th of a tooth. However, the 2012/13 average was the same as the 2008/9 average suggesting that this characteristic has plateaued (Figure 5).

Figure 5 Average D_3T 2004-2013



Whilst there have been fluctuations for this characteristic at health board level, most of the changes have not been statistically significant. Although twelve year olds living in Cwm Taf health board in 2012/13 had an average D_3T of 0.5 (*CI: 0.4 - 0.6*) which was statistically lower than the 2008/09 average, i.e. 0.3 (*CI:0.3 - 0.4,* Figure 5).

Figure 6 Percentage of children with decay (%D_3T>0), 2004-2013



Prevalence of untreated decay (%D3T>0) has fallen across Wales incrementally over the past three surveys (Figure 6). In 2004/05 the percentage of Welsh 12 year olds with at least one decayed tooth was 26.5% (*CI: 25.4% - 27.5%)* and in 2012/13 this figure had fallen to 20% (*CI: 18.9% - 21.0%*).

This means that in 2013 in a class of 30 Welsh 12 year olds there were on average 6 children with at least one untreated decayed tooth in their permanent dentition. This compares with 8 children in a class of 30 in 2004/05. These represent average positions, some will be better and some worse.

On reviewing the health board data for this characteristic in Figure 6 it can be seen that Aneurin Bevan, Betsi Cadwaladr, Cwm Taf, Hywel Dda and Powys all experienced significant reductions when comparing the 2004/05 data with that collected in 2012/13. Both Abertawe Bro Morgannwg and Cardiff and Vale health boards experienced fluctuations in experience of D_3T, resulting in 2012/13 levels being the same as those experienced in 2004/05 (Figure 6).

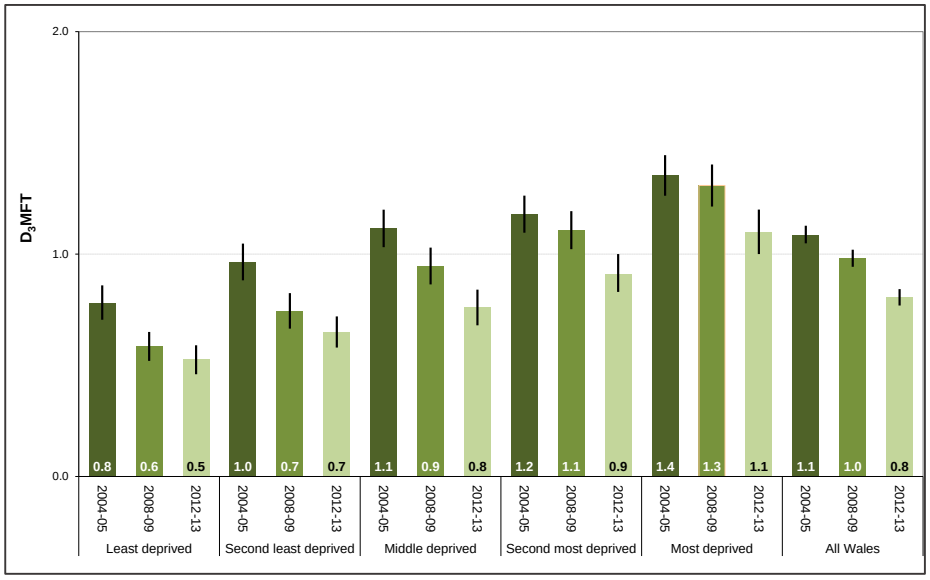
INEQUALITIES IN DECAY EXPERIENCE

Looking at inequality from a socio-economic perspective, there is still a strong relationship between mean decay levels and quintile of deprivation as shown in Figures 7 and 8. These illustrate the relationship between D_3MFT and $\%D_3MFT>0$ and the Welsh Index of Multiple deprivation (WIMD) for the 3 survey years commencing 2004/05 through to 2012/13.

A progress report on the 2008/09 survey results produced by the WOHIU in 2010 documented an overall reduction in the mean D_3MFT and the $\%D_3MFT>0$ for Welsh 12 year olds when compared with the Child Poverty Target baseline year of 2004/05, but it also highlighted concern that most of the reduction appeared to have taken place in the least deprived groups (Figures 7 and 8).

On reviewing the data from the 2012/13 surveys in parallel with the previous surveys it can be seen that there have been statistically significant reductions in both average D_3MFT and $\%D_3MFT>0$ for the two most deprived quintiles between 2008/09 and the current survey (Figures 7 and 8).

Figure 7 Average D_3MFT by quintile of deprivation (WIMD) for surveys of 12 year olds from 2004-2013



Between 2004/05 and 2012/13 when considering the ratios of the most deprived quintile to the middle deprived quintile it can be seen that the inequality gap has remained constant (Table 1). For example, for average D_3MFT the ratio of the most deprived to the middle deprived quintiles were 1.2, 1.4 and 1.4 in 2004/05, 2008/09 and 2012/13 respectively. The faster rate of improvement for the more deprived quintiles between 2008/09 and 2012/13 is welcomed. Hopefully Designed to Smile will start to impact on 12 year olds by 2016/17 and accelerate the improvement of dental health for children living in the most deprived communities.

Figure 8 %D_3MFT>0 by quintile of deprivation (WIMD) for surveys of 12 year olds from 2004-2013

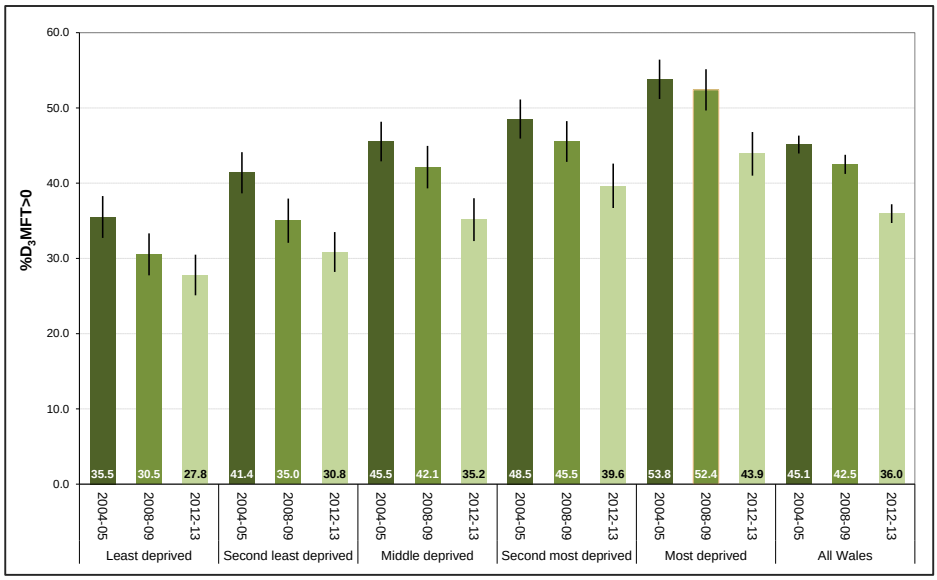


Table 1 Mean D_3MFT, %D_3MFT>0 & Mean D_3MFT of those with D_3MFT for 12 year olds from 2004-2013 by quintiles of deprivation index, highlighting ratio of most deprived: middle deprived – Wales

	2004-05			2008-09			2012-13		
	mean D_3MFT	%D_3MFT>0	Mean D_3MFT of those with D_3MFT	mean D_3MFT	%D_3MFT>0	Mean D_3MFT of those with D_3MFT	mean D_3MFT	%D_3MFT>0	Mean D_3MFT of those with D_3MFT
Least deprived	0.8	35.5	2.2	0.6	30.5	1.9	0.5	27.8	1.9
Second least deprived	1.0	41.4	2.3	0.7	35.0	2.1	0.7	30.8	2.1
Middle deprived	1.1	45.5	2.5	1.0	42.1	2.3	0.8	35.2	2.2
second most deprived	1.2	48.5	2.4	1.1	45.5	2.4	0.9	39.6	2.3
Most deprived	1.4	53.8	2.5	1.3	52.4	2.5	1.1	43.9	2.5
All within area	1.1	45.1	2.4	1.0	42.5	2.3	0.8	36.0	2.2
Ratio - most deprived: middle deprived	**1.2**	**1.2**	**1.0**	**1.4**	**1.2**	**1.1**	**1.4**	**1.2**	**1.2**

Appendix 1: Selected epidemiological variables from the survey of 12 year olds 2012-13

Local Health Board	Unitary Authority	D_3MFT	$\%D_3MFT>0$	Mean D_3MFT of those with caries experience	D_3T	$\%D_3T>0$	Mean D_3T of those with caries experience
Abertawe Bro Morgannwg	BRIDGEND	0.77	39.3	1.95	0.36	23.0	0.92
Abertawe Bro Morgannwg	NEATH & PORT TALBOT	0.86	37.8	2.28	0.48	26.5	1.26
Abertawe Bro Morgannwg	SWANSEA	0.86	37.7	2.28	0.36	19.6	0.96
Aneurin Bevan	BLAENAU GWENT	1.42	57.7	2.47	1.03	44.2	1.78
Aneurin Bevan	CAERPHILLY	1.11	45.2	2.47	0.71	33.7	1.58
Aneurin Bevan	MONMOUTH	0.60	28.6	2.10	0.15	13.3	0.53
Aneurin Bevan	NEWPORT	0.88	43.2	2.05	0.33	21.6	0.76
Aneurin Bevan	TORFAEN	1.39	56.3	2.46	0.86	44.5	1.52
Betsi Cadwaladr	ANGLESEY	0.66	33.1	2.00	0.33	17.9	1.00
Betsi Cadwaladr	CONWY	0.61	24.5	2.49	0.16	9.5	0.65
Betsi Cadwaladr	DENBIGHSHIRE	0.75	31.2	2.40	0.24	11.8	0.78
Betsi Cadwaladr	FLINTSHIRE	0.67	31.7	2.12	0.23	16.2	0.74
Betsi Cadwaladr	GWYNEDD	0.80	38.6	2.08	0.45	23.5	1.18
Betsi Cadwaladr	WREXHAM	0.75	32.2	2.33	0.26	13.8	0.80
Cardiff and Vale	CARDIFF	0.90	36.5	2.47	0.55	24.7	1.51
Cardiff and Vale	VALE	0.32	17.6	1.84	0.05	2.9	0.30
Cwm Taf	MERTHYR	0.94	45.3	2.07	0.44	28.1	0.97
Cwm Taf	RCT	0.93	40.5	2.29	0.29	16.7	0.71
Hywel Dda	CARMARTHENSHIRE	0.68	31.2	2.17	0.26	16.1	0.84
Hywel Dda	CEREDIGION	0.59	28.6	2.06	0.29	17.6	1.03
Hywel Dda	PEMBROKESHIRE	0.67	33.5	2.00	0.25	13.3	0.75
Powys	POWYS	0.60	29.1	2.05	0.23	13.8	0.81
	Abertawe Bro Morgannwg	0.83	38.2	2.19	0.40	22.6	1.04
	Aneurin Bevan	1.08	46.0	2.34	0.61	31.2	1.32
	Betsi Cadwaladr	0.71	31.9	2.23	0.28	15.4	0.86
	Cardiff and Vale	0.66	28.7	2.31	0.34	15.6	1.20
	Cwm Taf	0.93	41.6	2.24	0.32	19.3	0.77
	Hywel Dda	0.66	31.5	2.10	0.27	15.5	0.84
	Powys	0.60	29.1	2.05	0.23	13.8	0.81
	WALES	**0.81**	**36.0**	**2.24**	**0.37**	**20.0**	**1.03**

Appendix 2: Selected epidemiological variables from the survey of 12 year olds 2008-09

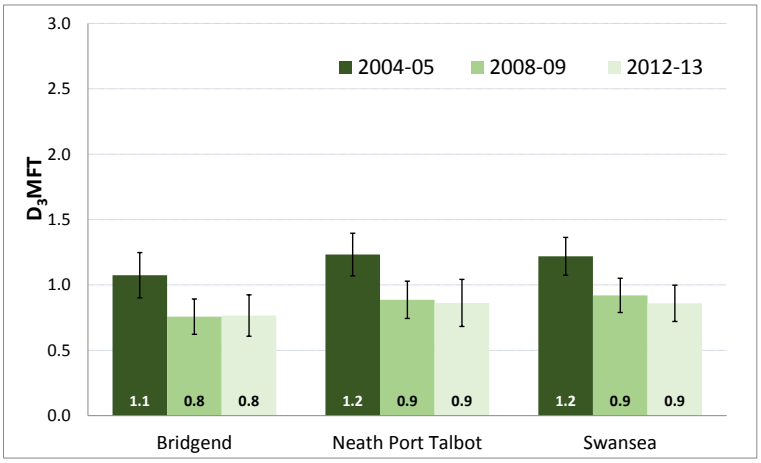
Local Health Board	Unitary Authority	D_3MFT	$\%D_3MFT$	Mean D_3MFT of those with caries experience	D_3T	$\%D_3T>0$	Mean D_3T of those with caries experience
Abertawe Bro Morannwg	Bridgend	0.76	34.8	2.17	0.30	18.0	0.87
Abertawe Bro Morannwg	Neath & Port Talbot	0.89	41.3	2.15	0.30	18.6	0.72
Abertawe Bro Morannwg	Swansea	0.92	41.3	2.23	0.31	17.8	0.75
Aneurin Bevan	Blaenau Gwent	1.61	58.8	2.74	0.91	41.7	1.54
Aneurin Bevan	Caerphilly	1.19	52.3	2.28	0.64	37.9	1.22
Aneurin Bevan	Monmouthshire	1.07	43.7	2.45	0.59	31.8	1.34
Aneurin Bevan	Newport	1.07	46.5	2.31	0.45	26.7	0.97
Aneurin Bevan	Torfaen	1.39	51.9	2.67	0.55	32.2	1.05
Betsi Cadwaladr	Anglesey	0.66	33.0	2.00	0.30	16.8	0.90
Betsi Cadwaladr	Conwy	1.20	40.9	2.94	0.61	29.3	1.50
Betsi Cadwaladr	Denbighshire	0.95	43.0	2.20	0.38	23.8	0.89
Betsi Cadwaladr	Flintshire	0.77	35.9	2.13	0.19	13.5	0.52
Betsi Cadwaladr	Gwynedd	0.90	40.2	2.23	0.34	18.9	0.84
Betsi Cadwaladr	Wrexham	1.03	43.1	2.38	0.30	18.4	0.69
Cardiff and Vale	Cardiff	0.89	37.5	2.38	0.42	23.4	1.13
Cardiff and Vale	Vale of Glamorgan	0.93	40.8	2.28	0.32	19.6	0.78
Cwm Taf	Merthyr Tydfil	0.87	42.7	2.05	0.37	20.7	0.87
Cwm Taf	Rhondda Cynon Taff	1.23	51.4	2.38	0.49	27.1	0.96
Hywel Dda	Carmarthenshire	0.78	35.8	2.17	0.36	20.7	1.00
Hywel Dda	Ceredigion	0.61	31.0	1.95	0.15	10.1	0.49
Hywel Dda	Pembrokeshire	0.87	35.6	2.44	0.37	16.5	1.05
Powys	Powys	0.84	40.2	2.10	0.35	19.3	0.87
Abertawe Bro Morgannwg	Abertawe Bro Morgannwg	0.87	39.7	2.20	0.30	18.0	0.77
Aneurin Bevan	Aneurin Bevan	1.23	50.4	2.43	0.60	33.6	1.19
Betsi Cadwaladr	Betsi Cadwaladr	0.93	40.3	2.31	0.35	20.4	0.87
Cardiff and Vale	Cardiff and Vale	0.90	38.3	2.35	0.38	21.8	1.00
Cwm Taf	Cwm Taf	1.18	50.8	2.33	0.48	26.6	0.94
Hywel Dda	Hywel Dda	0.80	35.6	2.23	0.34	17.7	0.94
Powys	Powys	0.83	40.0	2.07	0.35	19.5	0.88
WALES	**WALES**	**0.98**	**42.5**	**2.31**	**0.41**	**23.1**	**0.96**

Appendix 3: Selected epidemiological variables from the survey of 12 year olds 2004-05

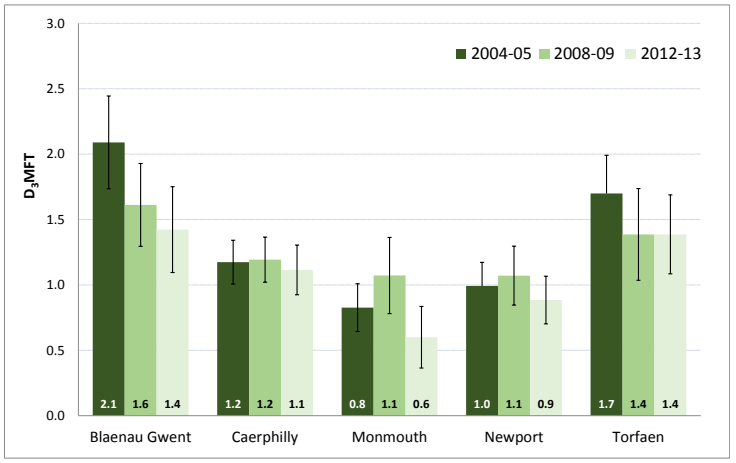
Local Health Board	Unitary Authority	D_3MFT	$\%D_3MFT$	Mean D_3MFT of those with caries experience	D_3T	$\%D_3T>0$	Mean D_3T of those with caries experience
Abertawe Bro Morannwg	Bridgend	1.07	41.8	2.58	0.51	24.9	1.22
Abertawe Bro Morannwg	Neath & Port Talbot	1.23	49.5	2.47	0.47	28.7	0.94
Abertawe Bro Morannwg	Swansea	1.22	48.5	2.51	0.37	20.0	0.76
Aneurin Bevan	Blaenau Gwent	2.09	68.6	3.03	1.36	58.0	1.98
Aneurin Bevan	Caerphilly	1.17	48.5	2.44	0.62	35.6	1.29
Aneurin Bevan	Monmouthshire	0.83	45.3	1.94	0.54	36.9	1.26
Aneurin Bevan	Newport	0.99	46.2	2.13	0.53	33.6	1.15
Aneurin Bevan	Torfaen	1.70	61.5	2.76	0.96	46.6	1.55
Betsi Cadwaladr	Anglesey	1.15	47.6	2.39	0.53	27.3	1.09
Betsi Cadwaladr	Conwy	0.87	35.6	2.43	0.49	23.7	1.38
Betsi Cadwaladr	Denbighshire	0.94	38.6	2.40	0.35	22.9	0.90
Betsi Cadwaladr	Flintshire	1.04	41.7	2.50	0.33	18.8	0.79
Betsi Cadwaladr	Gwynedd	1.05	45.1	2.33	0.49	26.6	1.09
Betsi Cadwaladr	Wrexham	1.24	48.3	2.56	0.57	29.1	1.18
Cardiff and Vale	Cardiff	0.82	38.1	2.13	0.33	19.7	0.85
Cardiff and Vale	Vale of Glamorgan	0.69	34.6	1.97	0.14	9.6	0.39
Cwm Taf	Merthyr Tydfil	1.22	51.7	2.43	0.34	22.8	0.68
Cwm Taf	Rhondda Cynon Taff	1.18	47.9	2.45	0.47	27.0	0.98
Hywel Dda	Carmarthenshire	0.84	36.6	2.30	0.26	16.4	0.70
Hywel Dda	Ceredigion	1.08	49.0	2.21	0.51	32.2	1.05
Hywel Dda	Pembrokeshire	1.13	46.5	2.44	0.61	31.7	1.31
Powys	Powys	1.07	43.9	2.42	0.45	24.9	1.02
Abertawe Bro Morgannwg		1.17	47.0	2.49	0.43	24.1	0.91
Aneurin Bevan		1.28	52.0	2.47	0.74	39.9	1.43
Betsi Cadwaladr		1.04	42.5	2.44	0.45	24.2	1.05
Cardiff and Vale		0.77	37.2	2.08	0.27	16.7	0.71
Cwm Taf		1.20	48.8	2.46	0.44	26.1	0.90
Hywel Dda		0.99	42.3	2.35	0.43	24.6	1.02
Powys		1.07	43.9	2.42	0.45	24.8	1.02
WALES		**1.09**	**45.1**	**2.41**	**0.48**	**26.5**	**1.05**

Appendix 4 - D_3MFT BY UA

ABMU



ANEURIN BEVAN



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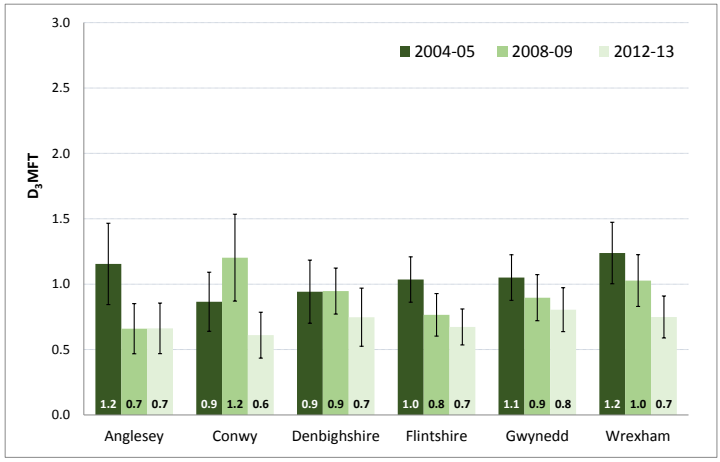
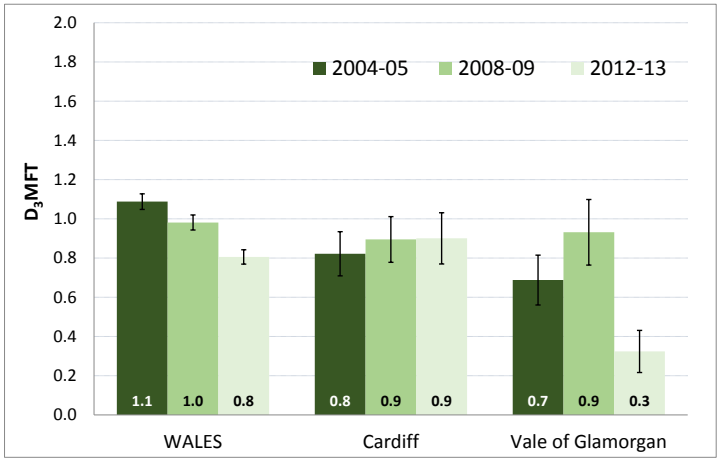


CARDIFF AND VALE



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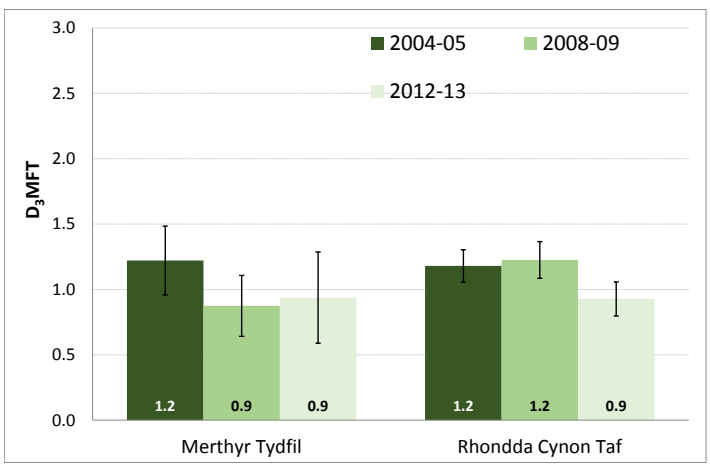

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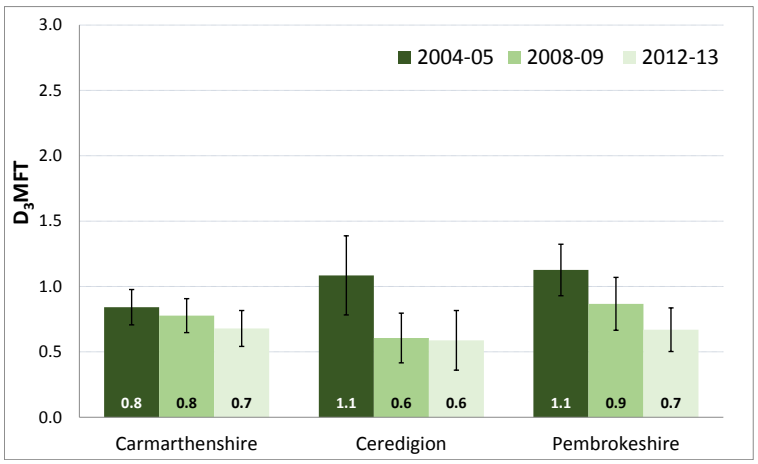

POWYS