Dental caries in 5 year olds 2007/08 and 2011/12

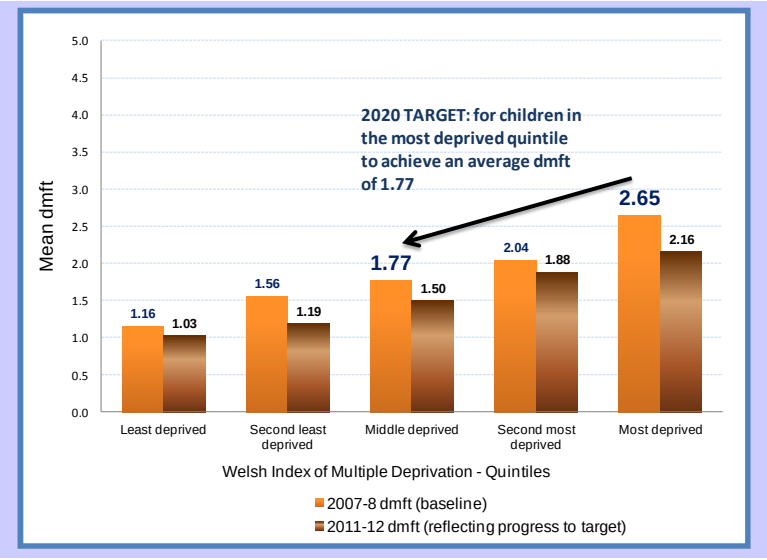
The 2013 Oral Health Profile for Cardiff and Vale University Health Board presents oral health data for school year 1 (approximately 5 years of age) generated from a survey undertaken during the winter of 2011/12 and compares it with the previous survey carried out in 2007/08. This profile focuses on local health board (LHB), unitary authority (UA) and upper super output area (USOA) analyses. For Wales's level data see the "Picture of Oral Health" at the Welsh Oral Health Information Unit (WOHIU) website.

This is the first comparison of data collected via formal written parental consent, as two sets of data are now available incorporating this approach. Before 2007/08 child oral health surveys used passive consent; this methodological change prohibited analysis of trends as data was no longer comparable.

Key messages

- **The percentage of 5 year olds experiencing preventable decay in Cardiff & Vale UHB fell between the two surveys**
- **All other health board and unitary authority indicators remained fairly constant**
- **There has been a narrowing of inequalities in health board dental health indicators underpinning national child poverty targets**

Figure 1 Average dmft[1] for 5 year olds in 2007/08 and 2011/12 in Wales, by quintiles of the Welsh Index of Multiple Deprivation



Progress towards National oral health target

One goal of national oral health policy is to reduce inequalities experienced in children's oral health. Progress towards this goal is assessed by monitoring trends recorded by child oral health surveys. There are Wales's level targets for 5 and 12 year olds. For 5 year olds, the aim is to improve the

[1] The average number of decayed, missing and filled teeth (dmft) is a measure of the decay experience in children. It is therefore the burden of disease which theoretically could have been prevented and thus key data for evaluation of efforts to prevent decay.

average dmft and the percentage with caries, for the most deprived fifth as at 2007/08 to match the caries levels experienced by the middle fifth in 2007/08, by 2020. For the most deprived fifth of 5 year old children in Wales, the average dmft was 2.65 in 2007/08. The national child poverty target for 2020 is to bring this average down to 1.77. In 2011/12 the average dmft for the most deprived fifth was 2.16; half a tooth reduction when compared with 2007/08 and good progress towards the 2020 target (Figure 1).

The results of the Wales 2011/12 survey of 5 year olds suggest that prevalence of dental caries is improving but this needs to be confirmed by reviewing the results of future surveys, the next being scheduled for 2015-16.

These targets are **Welsh targets**; to date there are **no** Health Board targets. But, this oral health profile does give an indication of changes to oral health within the Cardiff and Vale health board area.

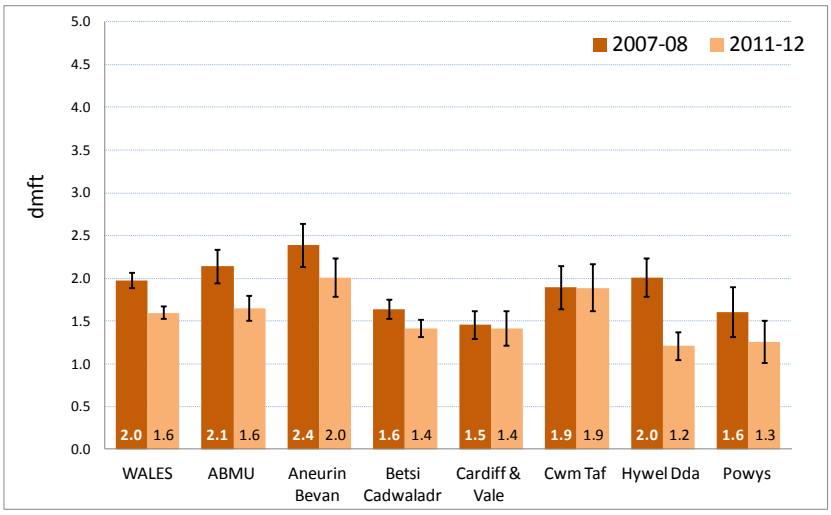
Local Health Boards (LHBs)

PREVENTABLE DECAY

The sum of decayed, missing and filled teeth is a measure of the decay experience of the average child. It is the burden of disease which theoretically could have been prevented.

Average dmft scores for Welsh local health boards in 2007/08 and 2011/12 are presented in Figure 2. Hywel Dda, Betsi Cadwaladr and Abertawe Bro Morgannwg University health boards experienced statistically significant reductions. In Cardiff and Vale the averages were 1.5 (95%CI[2] 1.3-1.6) and 1.4 (95%CI: 1.2-1.6) respectively. The 2007/08 Cardiff and Vale average was lower when compared with the Welsh average for the same survey (2.0, 95%CI:1.9-2.1) whilst the health board 2011/12 average was similar to the Welsh average for the same year (1.6, 95% CI:1.5-1.7).

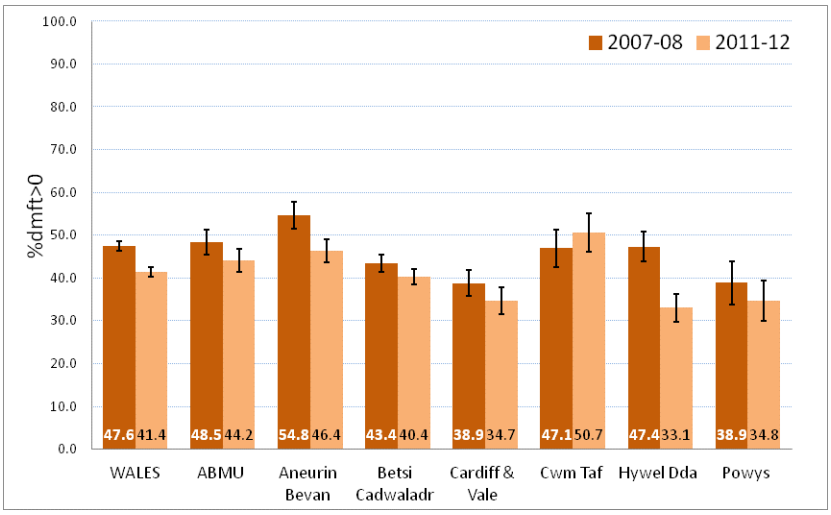
Figure 2 Average dmft for 5 year olds, Welsh local health boards, 2007/08 compared with 2011/12



[2] 95%CI represents the 95% lower and upper confidence intervals. A confidence interval constitutes a range of values for a variable of interest, e.g. mean dmft, constructed so that this range has a specified probability of including the true value of the variable. So a 95% confidence interval has a 95% probability of including the true value.

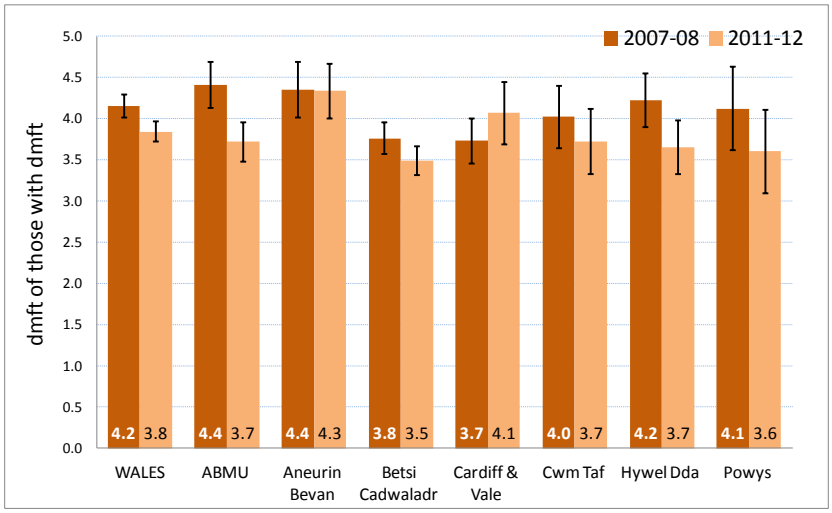
Figure 3 illustrates the proportion of children with at least one decayed tooth (%dmft>0) by LHB in 2007/08 and 2011/12. Although there appears to be a general tendency (except in Cwm Taf) for a reduction in the proportion of children with decay experience, the changes only reach statistical significance in Aneurin Bevan and Hywel Dda LHB areas.

Figure 3 Percentage of 5 year olds with caries experience (%dmft>0), Welsh local health boards, 2007/08 compared with 2011/12



The %dmft>0 for Cardiff and Vale in 2011/12 was 34.7% (95%CI: 31.5%-37.9%) which was statistically lower than the Welsh average of 41.4% (95%CI: 40.3%-42.5%).

Figure 4 Average dmft of those with caries experience for 5 year olds, Welsh local health boards, 2007/08 compared with 2011/12



The average number of decayed, missing and filled teeth among the children with at least one decayed/missing/filled tooth is shown in Figure 4. There is a general tendency for a reduction in the mean scores; the only change shown which reaches statistical significance is in ABMU where the averages for 2007/08 and 2011/12 were 4.4 (95%CI: 4.1-4.7) and 3.7 (95%CI: 3.5-4.0) respectively.

ACTIVE DECAY

The decayed teeth (dt) component of total experience of decay (dmft) measures active decay. This puts the child at risk of pain, infection and suggests risk of decay of permanent successor teeth. In the past it has been called untreated disease.

The concept of treating all decay in deciduous teeth by providing fillings or extractions is being questioned and researched. Children with decay need to reduce the consumption of sugar in their diets, carry out supervised toothbrushing with fluoride toothpaste and have regular application of fluoride varnish by dental professionals, as opposed to operative dental procedures. Thus dt data is now regarded as a marker for children/families who need support in managing this chronic dental disease.

Only Betsi Cadwaladr and Hywel Dda showed statistically significant reductions in average dt scores between 2007/08 and 2011/12 (Figure 5). In 2011/12 average dt ranged from 0.8 in Hywel Dda to 1.5 in Aneurin Bevan LHB. The dt for Cardiff and Vale was 0.9 (95%CI: 0.8-1.1) which was within average range when compared with Wales, 1.1 (95%CI: 1.0-1.1).

Figure 5 Average dt for 5 year olds, Welsh local health boards, 2007/08 compared with 2011/12

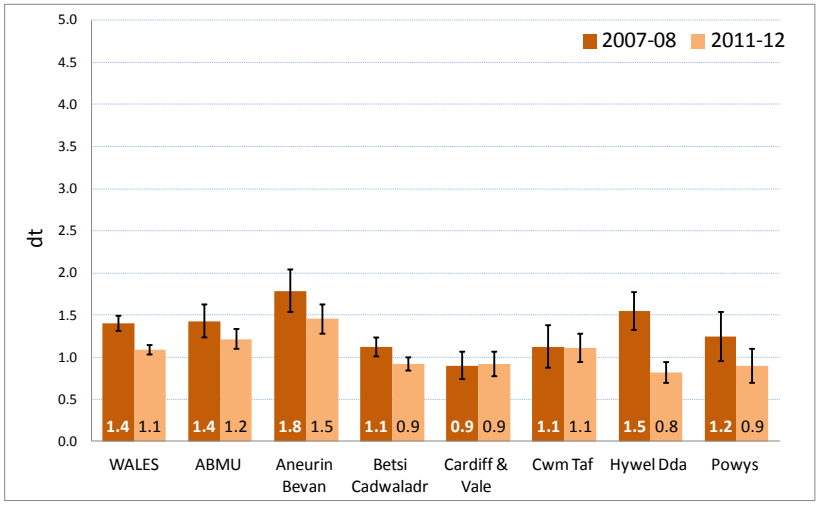
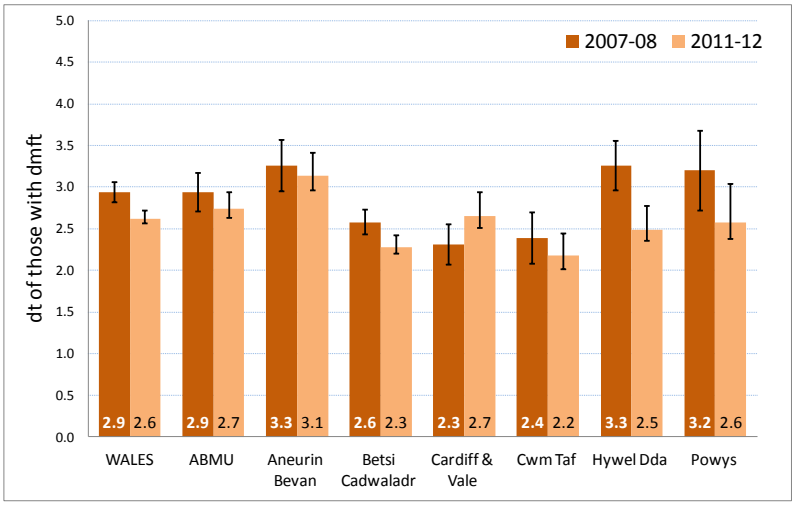


Figure 6 shows changes in average dt for those children with decay experience between the 2 survey years by health board. Only Hywel Dda and Betsi Cadwaladr experienced a statistically significant reduction. In 2011/12 the averages ranged from 2.2 in Cwm Taf to 3.1 in Aneurin Bevan. The 2011/12 average for Cardiff and Vale was 2.7 (95%CI: 2.4-2.9) which was within the Welsh average range of 2.6 (95%CI: 2.5-2.7) for the same survey.

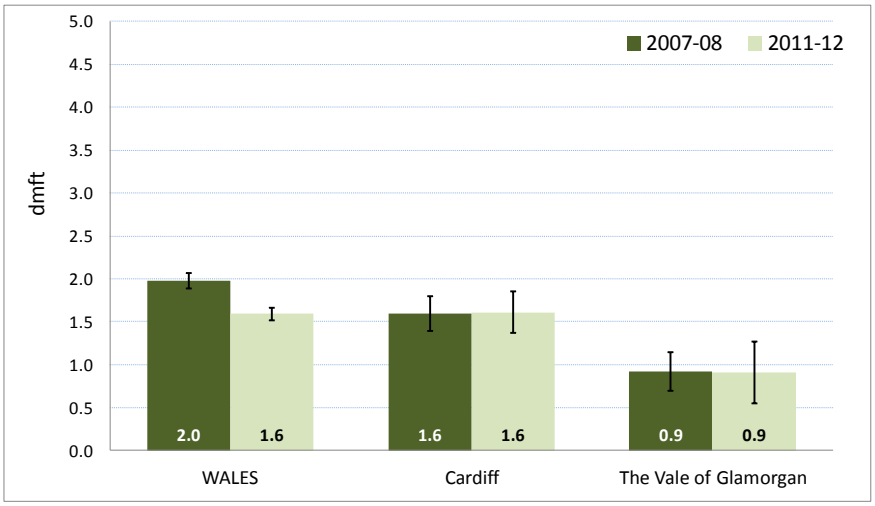
Figure 6 Average dt of those with any experience of caries (dmft) for 5 year olds, Welsh local health boards, 2007/08 compared with 2011/12



Unitary Authorities (UAs)

PREVENTABLE DECAY

Figure 7 Average dmft for 5 year olds, in unitary authorities within Cardiff and Vale University Health Board, 2007/08 compared with 2011/12



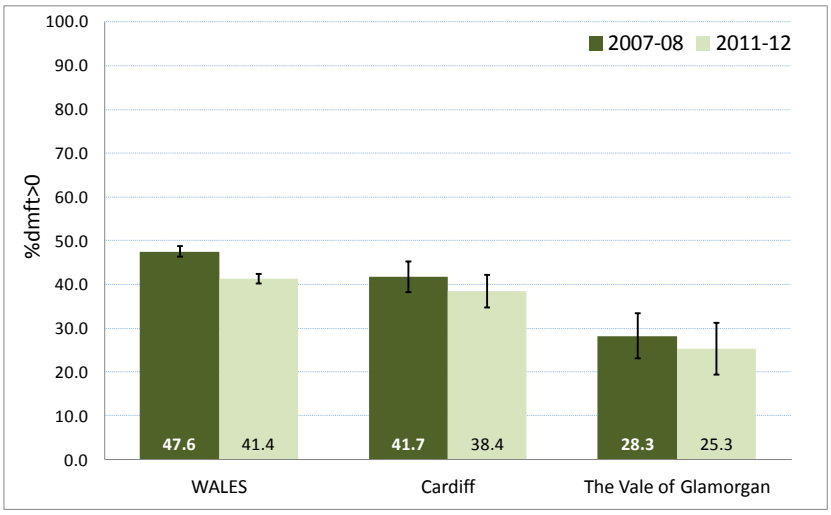
Between 2007/08 and 2011/12 there was a statistically significant reduction in average dmft for Wales, the values were 2.0 (95%CI: 1.9-2.1) and 1.6 (95%CI: 1.5-1.7) respectively.

The average dmft for the Vale of Glamorgan plateaued at 0.9 for both surveys. These averages were significantly lower than the Welsh averages for the surveys in 2007/08 and 2011/12 (Figure 7).

Similarly, the average dmft for Cardiff plateaued at 1.6 for both surveys. However whilst the 2007/08 average (1.6, 95%CI 1.4-1.8) was significantly lower than the Wales' average the 2011/12 dmft for this unitary authority (1.6, 95%CI: 1.4-1.9) was within the Welsh average range (Figure 7).

For Wales there was a significant reduction in the proportion of 5 year olds with decay (%dmft>0) between 2007/08 and 2011/12, the values were 47.6% (95%CI: 46.4%-48.7%) and 41.4% (95%CI: 40.3%-42.5%) respectively. It is encouraging that more children have no obvious decay experience by age 5 (Figure 8).

Figure 8 Percentage of 5 year olds with caries experience (%dmft>0) in unitary authorities within Cardiff and Vale University Health Board, 2007/08 compared with 2011/12

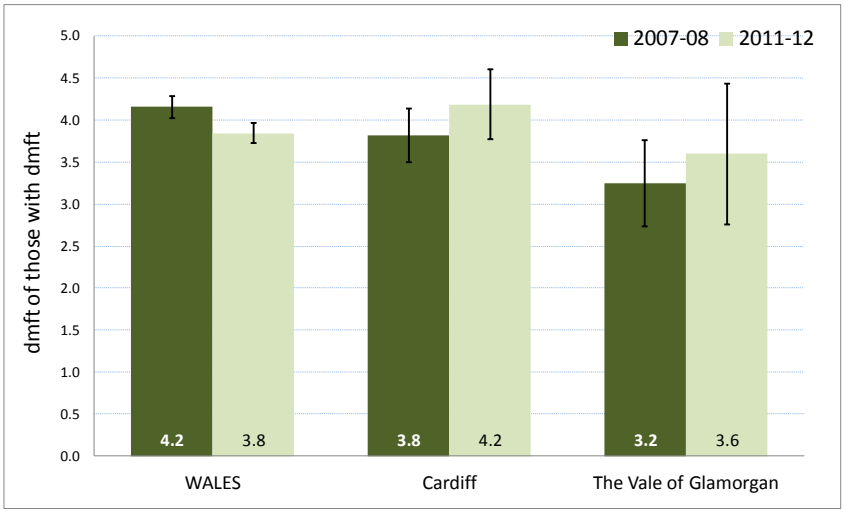


Both Cardiff and Vale UHB constituent unitary authorities experienced small reductions (approximating to 3%) in the %dmft>0 between the 2 surveys in 2007/08 and 2011/12. However, because of the wide confidence intervals linked to smaller sample sizes, this change was not statistically significant (Figure 8).

Caries prevalence (%dmft>0) for children in the Vale of Glamorgan was statistically significantly lower than the Welsh average experience for both surveys. For example the %dmft>0 for the UA in 2011/12 was 25.3% (95%CI: 19.5%-3.1.2%).

The percentage caries experienced by Cardiff children in this age-group was within the average range for Wales for both surveys. In 2011/12 the percentage was 38.4% (95%CI: 34.7%-42.2%, Figure 8).

Figure 9 Average dmft of those with caries experience for 5 year olds, in unitary authorities within Cardiff and Vale University Health Board, 2007/08 compared with 2011/12



Looking only at those children who have at least one decayed, missing or filled tooth illustrates the stark differences between children with decay and those without. The average dmft for a child with

dmft is shown in Figure 9. For Wales overall, the reduction from 4.2 in 2007/08 (95% LCI 4.0 – 95% UCI 4.3) to 3.8 in 2011/12 (95%LCI 3.7 – 95% UCI 4.0) does suggest an improving position.

Both Cardiff and the Vale of Glamorgan unitary authorities experienced small increases (representing 0.4 of a tooth) in the average dmft of those with dmft between the 2 surveys. Neither of these increases were statistically significant (Figure 9).

The 2007/08 and 2011/12 averages for the Vale of Glamorgan were 3.2 (95%CI: 2.7-3.8) and 3.6 (95%CI: 2.8-4.4) respectively. The former average was significantly lower than the contemporaneous Welsh average, whereas the latter average was within Welsh average range for the same survey. The 2011/12 average for Cardiff was 4.2 (95%CI: 3.8-4.6, Figure 9).

ACTIVE DECAY

Between 2007/08 and 2011/12 there was a statistically significant reduction in average dt for Wales, the values were 1.4 (95%CI: 1.3-1.5) and 1.08 (95%CI: 1.0-1.1) respectively (Figure 10).

The average dt for Cardiff plateaued at 1.0 for the 2007/08 and 2011/12 surveys of school year 1 children. The survey averages were within the Welsh average range for the contemporaneous surveys (Figure 10).

There was little change in the average dt for the Vale of Glamorgan between 2007/08 and 2011/12, the averages were 0.6 (95%CI: 0.4-0.7) and 0.7 (95%CI: 0.4-1.0) respectively (Figure 10). Both survey year averages were significantly lower than the Welsh average for the same year.

Figure 10 Average dt for 5 year olds, in unitary authorities within Cardiff and Vale University Health Board, 2007/08 compared with 2011/12

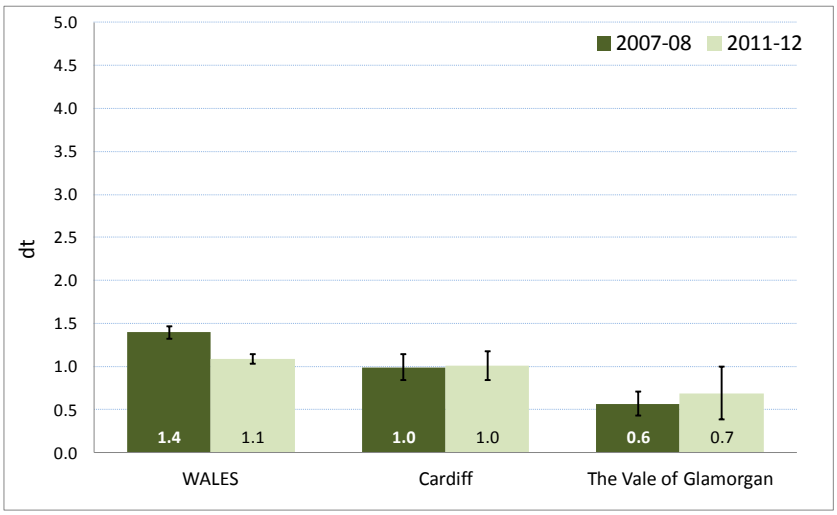
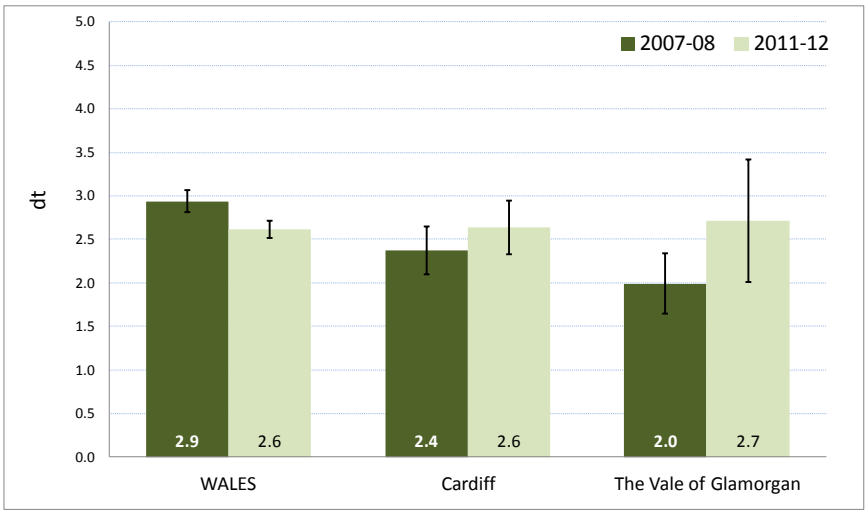


Figure 11 Average dt of those with any experience of caries (dmft) for 5 year olds, in unitary authorities within Cardiff and Vale University Health Board, 2007/08 compared with 2011/12



The average dt of children who have at least one decayed, missing or filled tooth for Wales fell between 2007/08 and 2011/12 from 2.9 (95%CI 2.8-3.1) to 2.6 (95% CI 2.5-2.7). This statistically significant improvement represented a reduction of almost 1/3rd of a tooth.

The dt experience of those with decay in both Cardiff and the Vale of Glamorgan exhibited small increases between the two survey years which were not statistically significant. The 2007/08 averages for both unitary authorities (Cardiff 2.4 95%CI2.1-2.6: Vale of Glamorgan 2.0 95%CI 1.6-2.3) were statistically lower than the Welsh average for the same survey. However, the 2011/12 averages for Cardiff and the Vale of Glamorgan were both within the Welsh average range.

Overall, the unitary authority breakdowns of the survey data highlight that the decay experience of Cardiff and the Vale of Glamorgan has plateaued between the two surveys. Whilst Cardiff was within Welsh average range the Vale of Glamorgan appears to have better oral health than the Welsh average.

Upper Super Output Areas (USOAs[3])

Figure 12 Average dmft for 5 year olds in Cardiff and Vale University HB USOAs, as at 2011/12

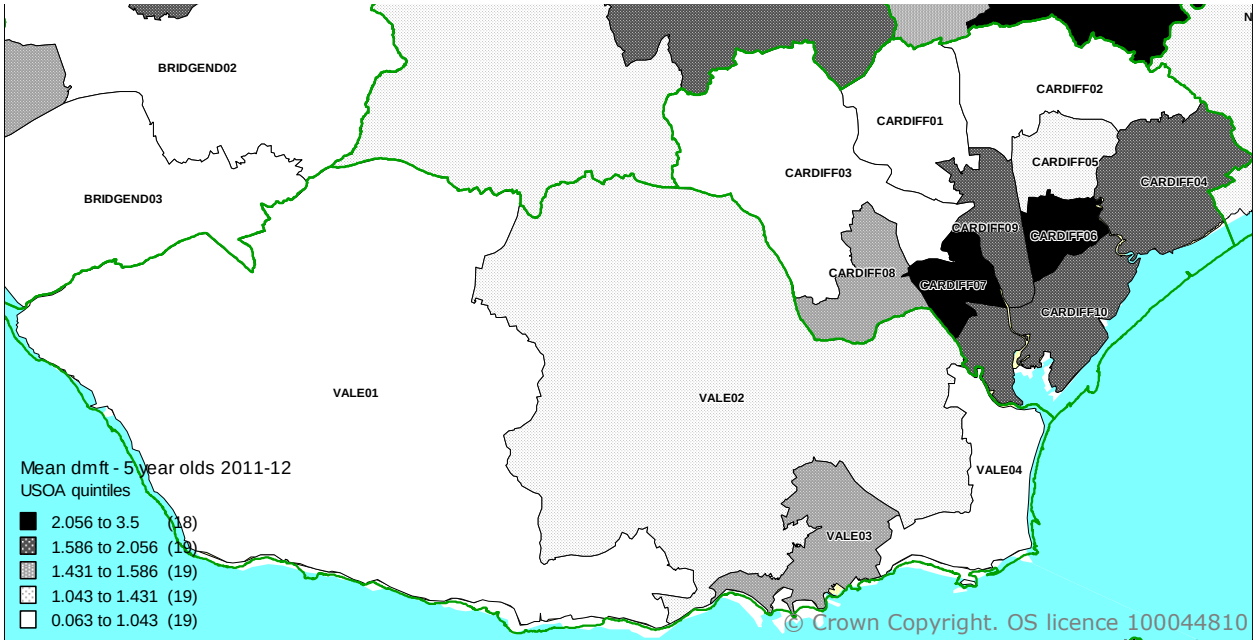


Figure 13 Average dmft for 5 year olds - USOAs within Cardiff and the Vale of Glamorgan 2007/08 compared with 2011/12

Super Output Areas (SOAs) were designed to improve the reporting of small area statistics and are built up from groups of Output Areas.

There are 3 categories of SOAs, i.e. lower, middle and upper. There are 94 Upper Super Output Areas (USOAs) in Wales (average population approx. 32,000).

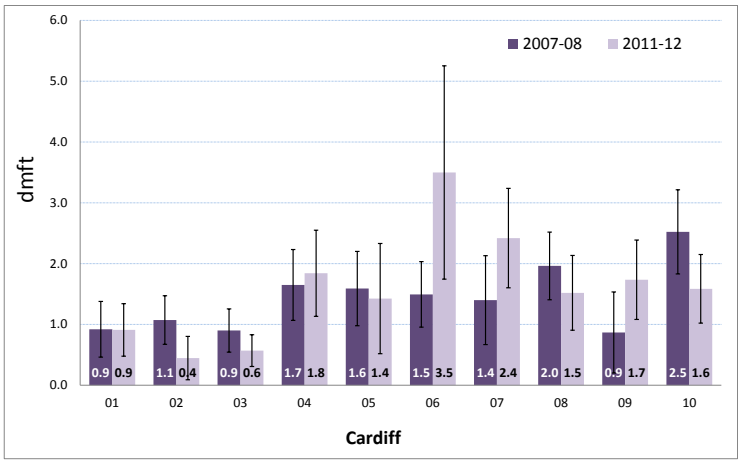
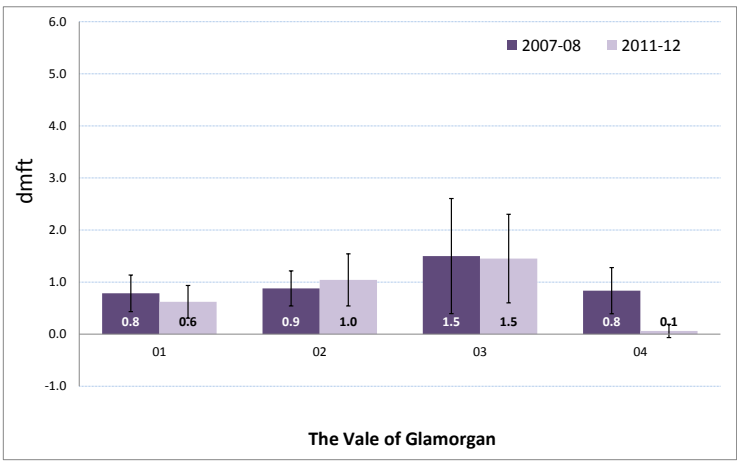


Figure 12 presents a map of the average dmft for 5 year olds in 2011/12 for the USOAs in Cardiff and Vale University health board. Figure 13 highlights the changes in average dmft for these USOAs between 2007/08 and 2011/12.

There are 10 USOAs in Cardiff, the dmft in 2011/12 ranged from 0.4 in Cardiff 02 to 3.5 in Cardiff 06. There was a notable increase in the average dmft for Cardiff 06, from 1.5 in 2007/08 (95%CI: 1.0-2.0) to 3.5 in 2011/12 (95% CI: 1.7-5.3). But because of the small sample sizes at USOA level and the associated wide 95% confidence intervals this was not a statistically significant change.

[3] USOAs constitute a statistical geography produced by the Data Unit Wales, based on a set of Super Output Areas produced by the Office for National Statistics. USOAs have been designed to provide a geography of a similar population size that is more detailed than local authority but still large enough to allow a wide range of statistics to be produced, with each of the 94 USOAs in Wales having an average population of 32,000 people.



The range in dmft experienced by the 4 USOAs in the Vale of Glamorgan in 2011/12 was 0.1 in Vale of Glamorgan 04 to 1.5 in Vale of Glamorgan 03. Vale of Glamorgan 04 experienced a significant reduction in dmft between 2007/08 and 2011/12 from 0.8 (95%CI 0.4-1.3) to 0.1 (95%CI -0.1-0.2).

Inequalities in oral health, Wales and Cardiff & Vale UHB

Table 1: Mean dmft & %dmft>0 for 5 year olds by quintiles of deprivation index, for Wales and Cardiff and Vale University Health Board

	5 year olds 2011-12				5 year olds 2007-08			
	WALES		Cardiff and Vale		WALES		Cardiff and Vale	
	mean dmft	%dmft>0	mean dmft	%dmft>0	mean dmft	%dmft>0	mean dmft	%dmft>0
Least deprived	1.0	31.3	1.2	30.7	1.2	34.5	0.9	30.0
Second least deprived	1.2	32.8	0.5	19.2	1.6	41.3	1.2	32.1
Middle deprived	1.5	41.4	1.5	38.5	1.8	44.1	1.7	43.1
second most deprived	1.9	48.3	1.6	43.5	2.0	49.2	1.2	32.0
Most deprived	2.2	51.5	1.7	39.5	2.7	57.6	2.4	57.2
All within area	1.6	41.4	1.4	34.7	2.0	47.6	1.5	38.9
Ratio - most deprived:middle deprived	1.4	1.2	1.1	1.0	1.5	1.3	1.4	1.3

Although children's oral health has improved on average, inequalities remain. Caries, like many other diseases increases with social deprivation. In Wales, we have the child poverty targets to monitor inequalities in oral health.

As outlined on page 1, the overall aim is to improve the average dmft and the % with caries for the most deprived fifth so that by 2020 they match caries levels experienced by the middle fifth, when the baseline was set in 2007/08. Whilst health board and unitary authority averages for most caries indicators have remained the similar across the two surveys children from the more deprived areas within Cardiff and Vale UHB have experienced improvements in oral health between the 2 survey periods—similar to Wales as a whole (page 1). The ratios of the most deprived : middle deprived have fallen for both average dmft and the %dmft>0, indicative of a narrowing of inequalities, both for Wales and Cardiff and Vale UHB.

The average dmft and the %dmft>0 for the most deprived fifth in Cardiff and Vale UHB in 2011/12 were 1.7 and 39.5% respectively. These are within the 2020 targets for the most deprived group (1.77 and 44.1%). There is no need for complacency as dental caries is a preventable disease; two fifths of children aged 5 still experience of decay in the health board area. Improvements need to be made to mirror the decay experience of children in similar areas of Scotland – where the Child Smile initiative appears to be reaping benefits.

USEFUL WEBSITES

Welsh Oral Health Information Unit	http://www.cardiff.ac.uk/dentl/research/themes/appliedclinicalresearch/epidemiology/oralhealth/index.html
PHW observatory	http://www.wales.nhs.uk/sitesplus/922/home
British Association for the Study of Community Dentistry	http://www.bascd.org/
Designed to Smile	http://www.designedtosmile.co.uk/
Child Smile	Home page http://www.child-smile.org.uk/index.aspx Results from the recent evaluation http://jdr.sagepub.com/content/92/2/109.full
Child Dental Health survey data	http://webarchive.nationalarchives.gov.uk/+/www.dh.gov.uk/en/Publicationsandstatistics/Bulletins/Chiefdentalofficersbulletin/Browsable/DH_4860753
Adult Dental Health survey data	http://www.hscic.gov.uk/pubs/dentalsurveyfullreport09
Health Maps Wales	http://www.infoandstats.wales.nhs.uk/page.cfm?orgid=869&pid=40976