

# **PICTURE OF ORAL HEALTH 2015**

## **DENTAL EPIDEMIOLOGICAL SURVEY OF 3 YEAR OLDS IN WALES 2013-14**

### **First Release Report on Caries into Dentine**

## Contents

	Page Number
Aim	2
Method	2-3
Results	3-12
Participation	3
Prevalence of decay experience at age 3	3-5
Severity of decay experience among children with decay experience at age 3	5-7
Average decay experience at age 3	7-9
Relationship between decay experience at age 3 and age 5	9-10
Early childhood caries	10-11
Extraction experience at age 3	11
Sepsis at time of exam	11
Plaque at time of exam	12

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<http://www.cardiff.ac.uk/dentistry/research/themes/applied-clinical-research-and-public-health/epidemiology-and-applied-clinical-research/wohiu>

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## **Aim**

To identify levels of dental decay at age 3.

## **Method**

A dental survey of 3 year olds in Wales was undertaken during the 2013-14 school year in parallel with the UK Child Dental Health Survey 2013. This is the first dental survey of 3 year olds in Wales.

The sampling frame was 3 year old children attending Care and Social Services Inspectorate Wales (CSSIW) registered providers of day care and nursery classes attached to schools. Sampling was undertaken by local health board (LHB) quintile of deprivation in 2013. The Welsh Index of Multiple Deprivation (2011) was used for sampling and has therefore also been used for weighting results. In the absence of comprehensive data on the 3 year old population by quintile of deprivation in each local health board, sampling and results were weighted in line with data from the 2011-12 5 year old survey population. Each LHB aimed to secure a minimum sample of 200 children.

Data was collected by trained and calibrated examiners employed by LHB community dental services. Training and calibration of examiners was undertaken using the criteria used by the Office for National Statistics for the Child Dental Health Survey (CDHS) 2013. This involves visual-only examination for missing teeth (mt), filled teeth (ft) and teeth with obvious dentinal decay ( $d_{3t}$ ). A similar approach was used in England in 2012-13 allowing cross national comparison of data on caries into dentine. In addition to this Wales collected data on caries extending into enamel but not yet into dentine ( $d_{1t}$ ), in line with the contemporaneous UK Child Dental Health Survey 2013. This document primarily reports on the  $d_{3t}$  level findings.

In Wales in 2013-14 a smaller sample of three year olds was taken compared with England in 2012-13. However Wales collected data on a wider range of indicators paralleling the five year old element of the Office for National Statistics Child Dental Health Survey 2013. Analysis of this data is on-going and this report is a first cut of the data comparing findings in Wales for caries into dentine with those from England.

In five year olds an assumption is made that missing incisors are naturally exfoliated even though it is known that this slightly underestimates the true number of teeth extracted due to caries at age 5. This assumption is inappropriate at age 3 and the results in this document more accurately reflect the number of teeth extracted due to caries. This should be borne in mind when comparing 3 year old survey data with findings from

previous surveys of 5 year olds. The same assumption of missing incisors being lost due to caries in 3 year olds was used in England in 2012-13 enabling comparison with data for England and its regions.

Presence of oral sepsis and of dental plaque was recorded.

Positive consent was obtained from the child's parent/guardian using two mailshots. Data was collected using the 'Dental SurveyPlus 2' software. Data collation, cleaning and analyses were undertaken by the Welsh Oral Health Information Unit in collaboration with Public Health Wales.

## Results

### Participation

A total of 187 day care and nursery settings and 1,483 children took part across Wales. LHB breakdowns are presented in Table 1.

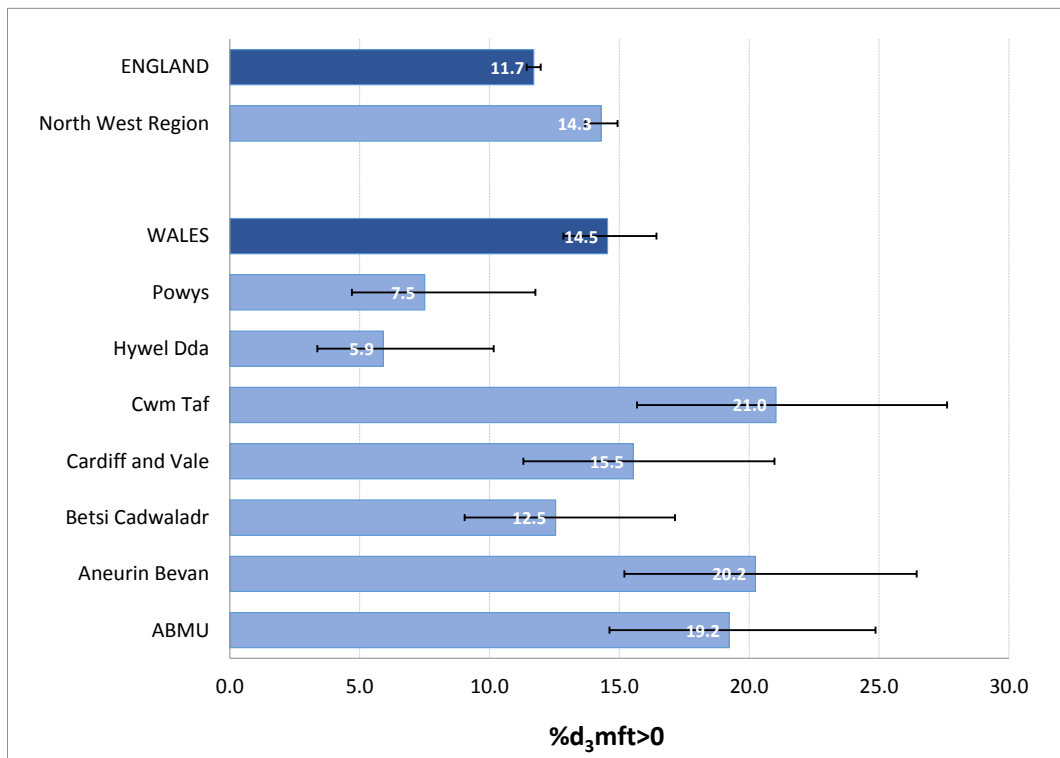
**Table 1 Number of day care settings and children taking part**

LHB	Number of settings	Number of children examined
Abertawe Bro Morgannwg	26	226
Aneurin Bevan	21	194
Betsi Cadwaladr	31	258
Cardiff and Vale	16	215
Cwm Taf	17	177
Hywel Dda	37	194
Powys	39	219
<b>WALES</b>	<b>187</b>	<b>1483</b>

### Prevalence of decay experience (% with $d_3mft > 0$ ) at age 3

Based on previous surveys of 5 and 12 year olds the most appropriate comparator for Wales is the North West region of England. Figure 1 illustrates that a similar proportion of 3 year olds in Wales have experienced decay as have in the North West of England. In both these cases the proportion is slightly higher than the proportion for the whole of England.

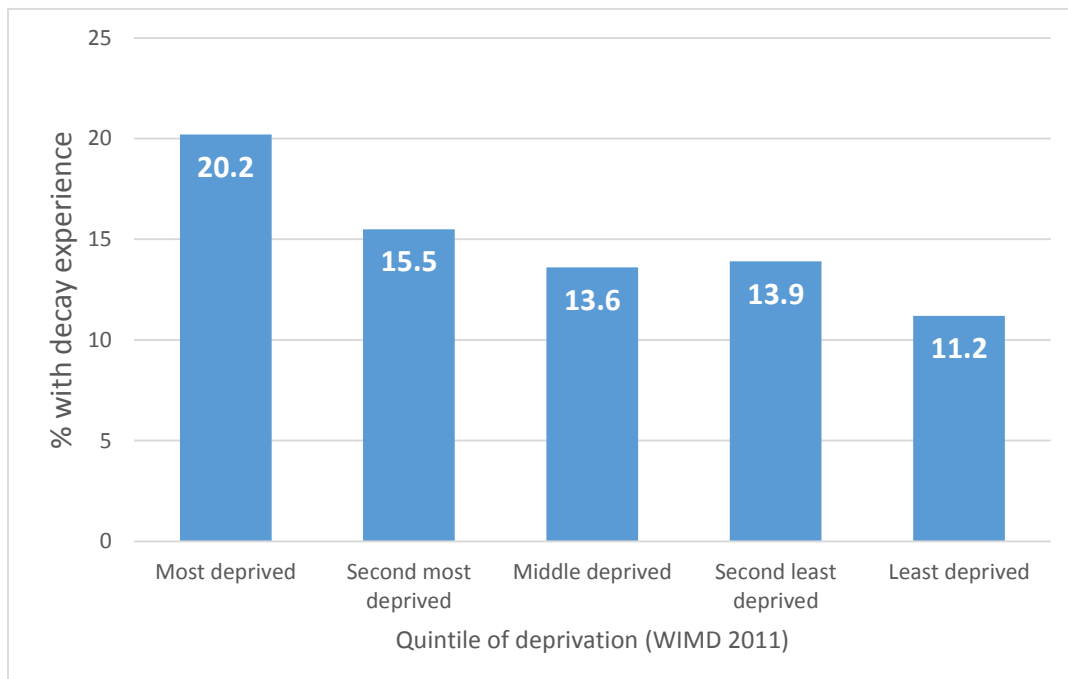
**Figure 1 Proportion of 3 year olds with at least one tooth affected by decay (% with  $d_3mft > 0$ \*)**



*\*3 year old convention regarding missing incisors*

Figure 1 also demonstrates the range of findings by LHB. The rural areas of Hywel Dda and Powys have statistically lower proportions of 3 year olds affected by decay than the LHBs covering the South Wales valleys (Cwm Taf, Aneurin Bevan and ABMU).

**Figure 2 Percentage of 3 year olds in Wales with caries experience by quintile of deprivation (WIMD 2011)**



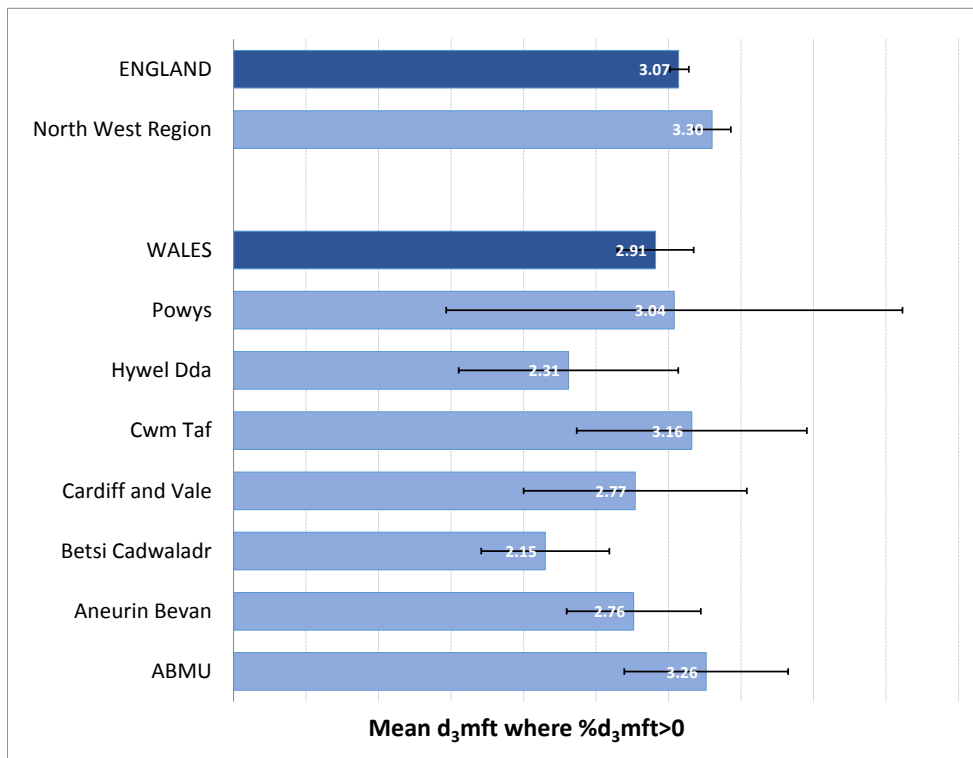
*\*3 year old convention regarding missing incisors*

Figure 2 illustrates inequality of prevalence of decay by quintile of deprivation. Decay prevalence is above the Welsh average (14.5%) for the most and second most deprived quintiles, particularly the most deprived quintile. This data suggests that Designed to Smile activity should continue to be focussed on the most deprived young children.

### **Severity of decay experience among children with decay experience ( $d_{3mft}$ where $d_{3mft} > 0$ ) at age 3**

The mean number of decay affected teeth among those with some caries experience ( $d_{3mft}$  where  $d_{3mft} > 0$ ) is a more accurate measure of the burden of disease among those affected than is the whole population mean  $d_{3mft}$ .

**Figure 3 Mean number of decayed teeth for 3 year olds with at least one tooth affected by decay ( $d_3mft$  ( $d_3mft>0^*$ ))**



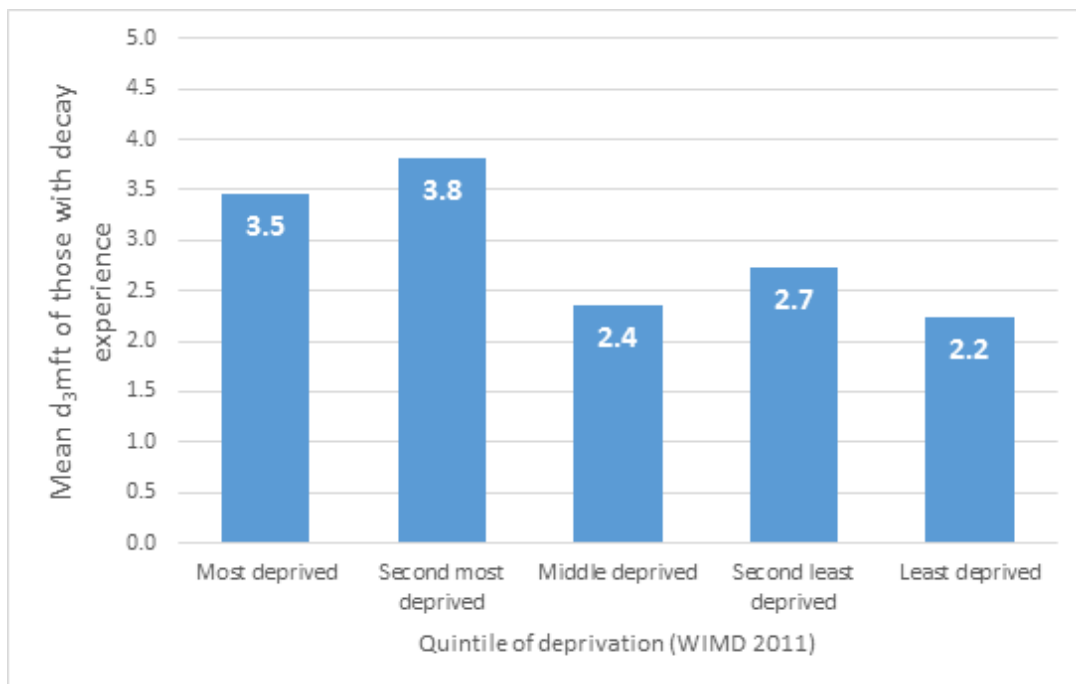
*\*3 year old convention regarding missing incisors*

Although the mean number of decay affected teeth per child with decay experience in Wales is slightly lower than the means for both England and the North West region of England, the confidence intervals overlap indicating that the differences are not statistically significant.

Typically a child in Wales aged 3 with decay will have about 3 teeth affected (2.91, Figure 3). While many children had only one tooth affected, 17.5% of those with decay experience had 5 or more teeth affected (range 5-14 teeth). The differences between LHBs for this indicator are less stark, the only statistically significant difference being Betsi Cadwaladr LHB compared with ABMU (Figure 3).

Figure 4 demonstrates the higher levels of decay for children in the deprived quintiles compared with less deprived peers. Interestingly children in the second most deprived quintile with decay had higher numbers of teeth affected by decay than peers in the most deprived quintile.

**Figure 4 Mean number of decayed teeth for 3 year olds with at least one tooth affected by decay ( $d_3mft$  ( $d_3mft>0^*$ )) by quintile of deprivation (WIMD 2011)**



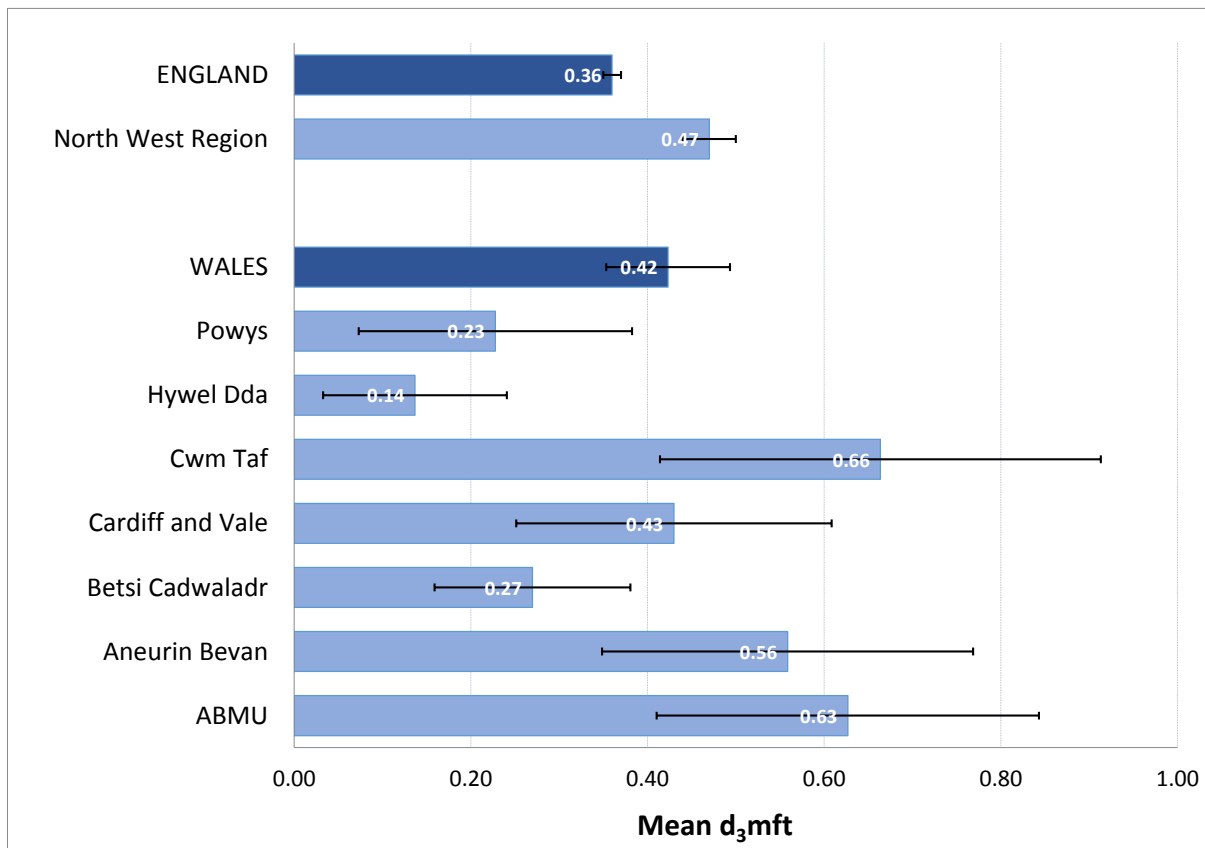
*\*3 year old convention regarding missing incisors*

### **Average decay experience ( $d_3mft$ ) at age 3**

The problem with use of the average decay experience is that it masks the severity of decay experienced by those with decay – thereby hiding the inequality experienced. The data is included here for completeness as this measure is commonly reported upon.



**Figure 5 Mean number of decayed teeth per 3 year old in Wales (d<sub>3</sub>mft\*)**



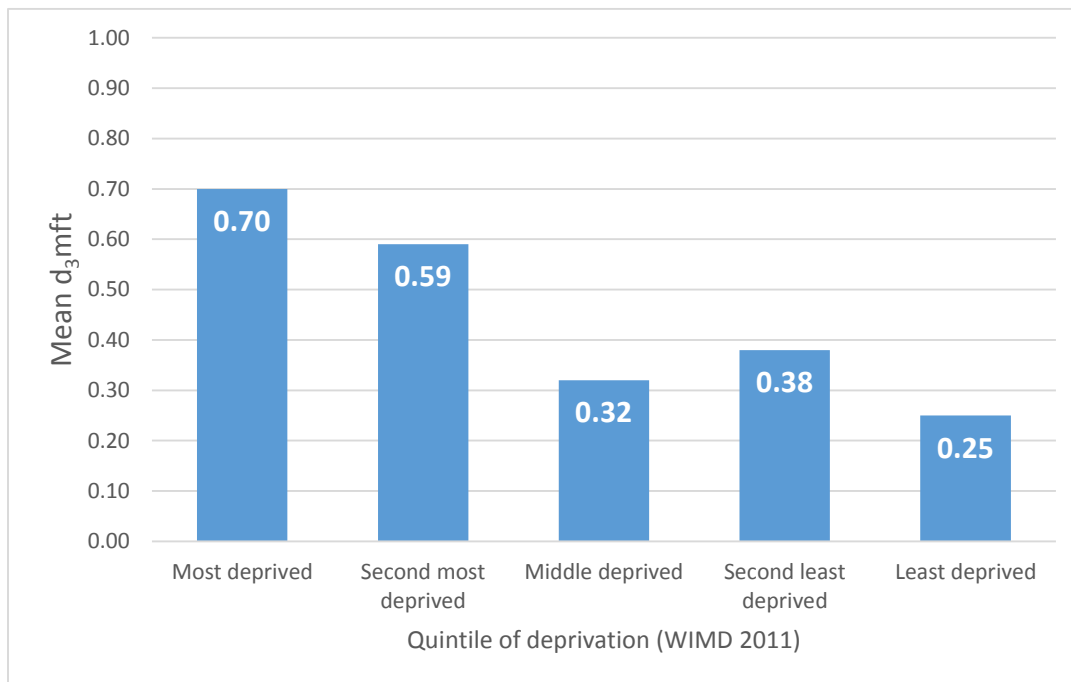
*\*3 year old convention regarding missing incisors*

Figure 5 shows that the mean d<sub>3</sub>mft for Wales is between the figures for England as a whole and for the North West Region of England, however as the confidence intervals overlap any differences are not statistically significant.

Hywel Dda has decay levels statistically significantly lower than the Welsh mean. The highest levels of decay are found in the South Wales valley LHBs (Cwm Taf, Aneurin Bevan and ABMU), but their results were not statistically significantly above the Wales mean (Figure 5).

Figure 6 demonstrates the differences in mean decay experience by quintile of deprivation, with much higher levels of decay in the two most deprived quintiles.

**Figure 6 Mean number of decayed teeth for 3 year olds in Wales (d<sub>3</sub>mft\*) by quintile of deprivation (WIMD 2011)**



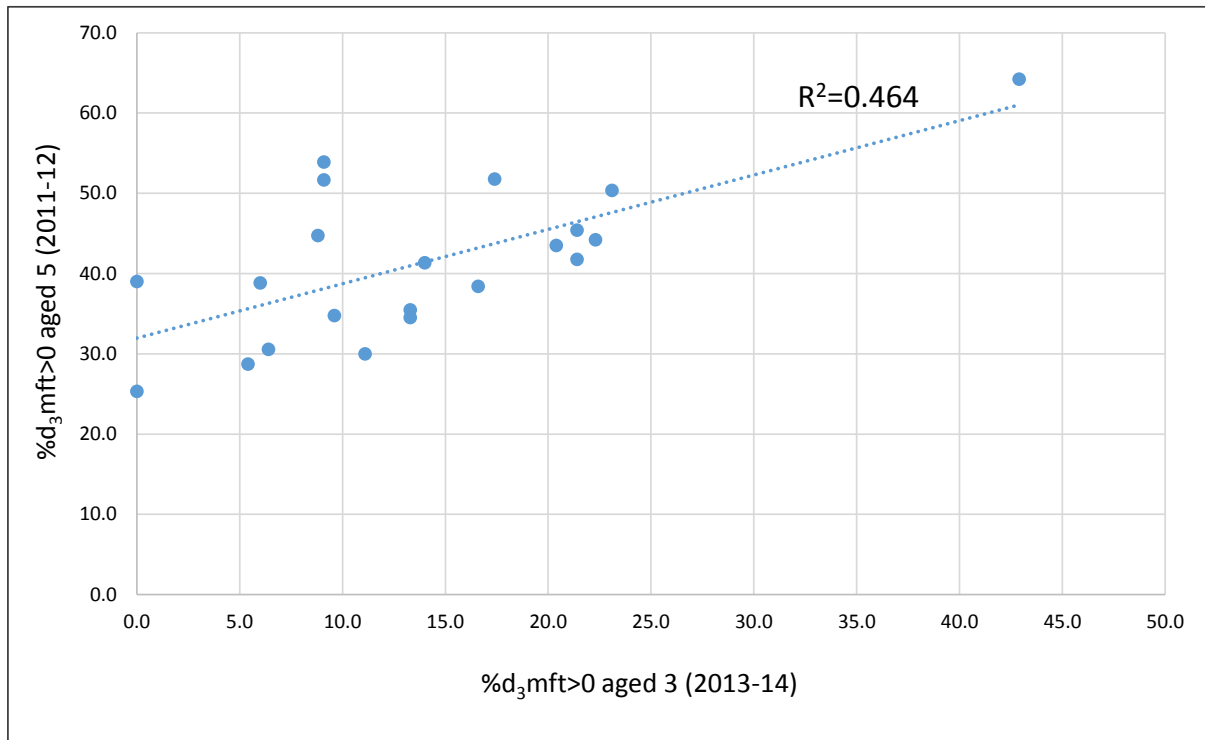
*\*3 year old convention regarding missing incisors*

### **Relationship between decay experience at age 3 and age 5**

In the absence of cohort data collected from the same children at age 3 and then two years later at age 5 we are limited to comparison of findings at age 3 with data collected from the most recent survey of 5 year olds.

Figure 7 presents the results of comparing the % of children with decay experience at ages 3 in 2013-14 with those aged 5 in 2011-12. This analysis suggests that at unitary authority level 46.4% of the decay prevalence at age 5 can be explained by the prevalence at age 3. In 2012-13 England found a similar relationship ( $R^2=0.4849$  England,  $R^2=0.464$  Wales).

**Figure 7: Correlation between caries prevalence at age 3\* and at age 5 for Unitary Authorities in Wales**

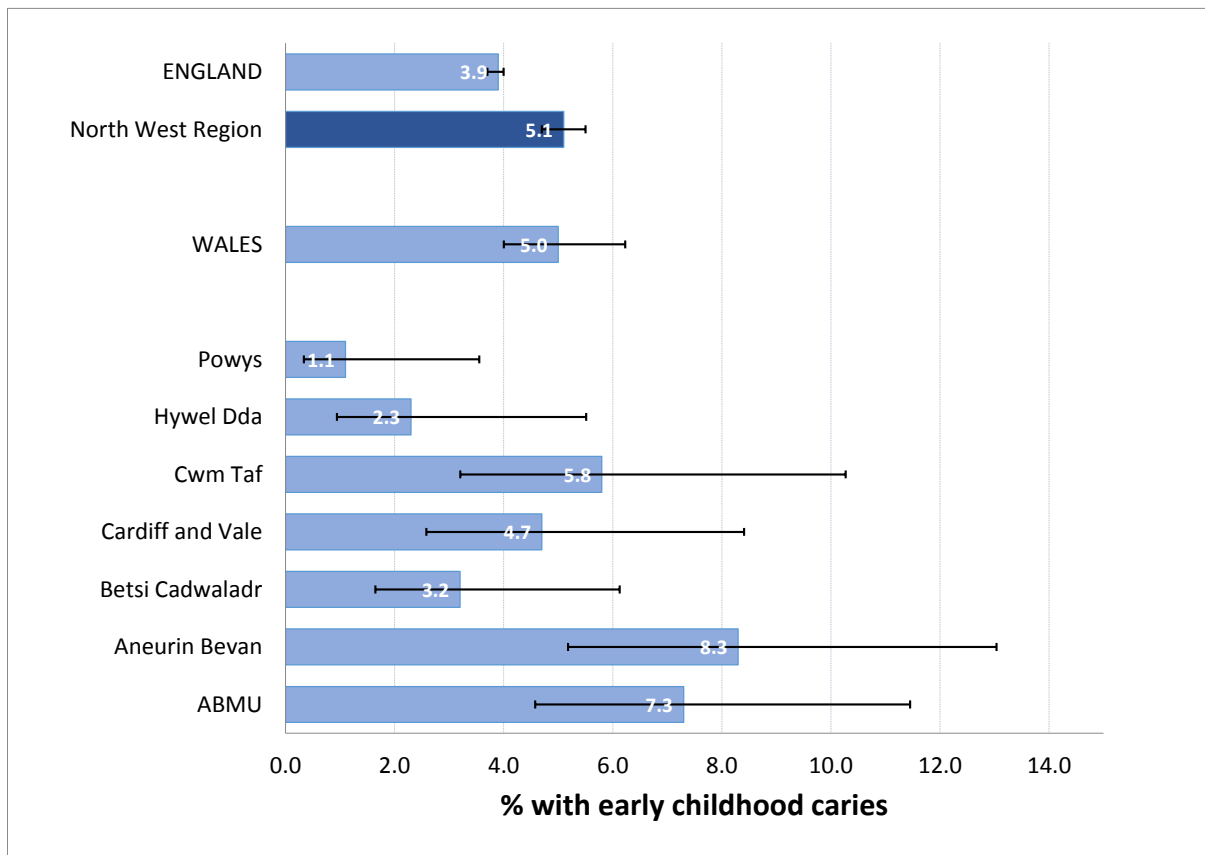


*\*3 year old convention regarding missing incisors for 3yo data only*

### **Early childhood caries**

Early childhood caries is caries affecting upper primary incisors, which is often associated with sugar sweetened drinks available in a baby bottle for long periods of the day or night. The findings for Wales shown in Figure 8 are similar to those for the North West of England and slightly higher than for England as a whole. Again there is a pattern of lower prevalence in rural LHBs and higher prevalence in the LHBs covering the South Wales valleys.

**Figure 8 Percentage of children age 3 in Wales with Early Childhood Caries**



### Extraction experience at age 3

The proportion of children aged 3 in Wales who have had one or more teeth extracted is 1.1%; this is higher than the 0.6% reported for the whole of England. Typically at age 3 this measure is a result of children having decay, presenting for dental care and then having a general anaesthetic provided to facilitate treatment. It is unclear whether a higher figure may reflect more appropriate treatment rather than greater proportion of children with teeth requiring extraction.

### Sepsis at time of exam

Across Wales just 3 children out of 1483 surveyed showed signs of infection associated with their teeth. This equates to 0.3% (weighted), very close to the 0.4% found across England in 2012-13.

## Plaque at time of exam

Table 2 illustrates the range of the proportions of children with plaque present when they were examined. This may reflect different approaches of the nursery settings involved in preparing the children to be examined. They may also reflect tooth brushing in the nursery setting for example as a part of Designed to Smile. The range includes an excellent 0% in Powys and Cardiff and the Vale LHB areas at one extreme and more concerning 60% in Aneurin Bevan LHB. The Welsh percentage was 21%, to date England have not published equivalent data.

**Table 2 Percentage of 3 year olds in Wales with dental plaque present at time of examination**

LHB	%
Abertawe Bro Morgannwg	38
Aneurin Bevan	60
Betsi Cadwaladr	37
Cardiff and Vale	0
Cwm Taf	1
Hywel Dda	15
Powys	0
<b>WALES</b>	21

In LHBs where more than 30% of children have visible plaque on their teeth there is some concern that a good proportion of these children may not be exposed to fluoride in the form of toothpaste. This suggests Designed to Smile type interventions could assist in promoting tooth brushing and teeth coming into contact with fluoride.