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Welsh Oral Health
Information Unit

Uned Gwybodaeth
Iechyd Geneuol Cymru

PICTURE OF ORAL HEALTH 2024

DENTAL EPIDEMIOLOGICAL INSPECTION
OF SCHOOL YEAR SEVEN (12-YEAR-OLD)
CHILDREN IN WALES 2023/24

Technical report

This report presents the analysis of the NHS Wales Dental Epidemiology Programme's national inspection of school year seven children (twelve-year-olds) in Wales conducted during the 2023-24 academic year. The inspection was co-ordinated by Oral Health Intelligence at Public Health Wales and the Welsh Oral Health Information Unit at the School of Dentistry, Cardiff University. Data were collected by the NHS Community Dental Service teams.

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Table of abbreviations

BASCD	British Association for the Study of Community Dentistry
CDS	Community Dental Service
CI	Confidence interval
D3T	Number of teeth with untreated dentinal decay in primary teeth
D3MFT	Number of decayed, missing, and/or filled primary teeth
FT	Number of filled primary teeth
MT	Number of primary teeth that have been extracted due to dental caries
PHW	Public Health Wales
PUFA	Evidence of open pulp, ulceration, fistula, and/or abscess
THB	Teaching Health Board
UHB	University Health Board
WHC	Welsh Health Circular
WOHIU	Welsh Oral Health Information Unit

Summary

This report presents the analysis of the NHS Wales Dental Epidemiology Programme national inspection of school year seven children (twelve-year-olds) in Wales conducted during the 2023/24 academic year. This was the first national oral health inspection of child of this age conducted in Wales since 2016/17. A total of 6,329 children from a total of 203 state-funded schools were examined as part of this inspection. In total, 80% of all children sampled were examined. This inspection only collects data on permanent (adult) teeth.

The prevalence (number of children with dental caries experience) and severity (average number of teeth affected) of dental caries (tooth decay) in school year seven children continues to fall in Wales. In 2008/09, 43 out of every 100 children had dental caries (tooth decay) experience, and each affected child had an average of 2.31 teeth with experience of decay. In 2023/24 this had fallen to 25 out of every 100 children with dental caries experience, with each affected child having an average of 1.97 teeth with experience of decay. The prevalence of dental caries experience has fallen since the last inspection of this age group in 2016/17 (29.6% to 25.3%). There has also been a small decrease in the overall number of teeth affected by dental caries across the whole population (i.e., including affected and unaffected children) between 2016/17 and 2023/24 (0.61 to 0.50).

There is a clear social gradient in dental caries experience amongst 12-year-old children in Wales. Individuals from the most deprived communities are more likely to experience dental caries and also have more teeth affected. The gap between the most and least deprived communities, as measured by the slope index of inequality of dental caries prevalence, has narrowed between 2008/09 and 2023/24.

Dental caries can negatively affect the quality of life of children and their caregivers. School year seven children in Wales who have experience of dental caries were more likely to report oral health-related quality of life impacts than children without dental caries experience (32.1% vs. 27.7%). The most common impact was pain, which affected almost one in four children (23.6%) with who have experienced dental caries.

Introduction

Inspections of school year seven (12-year-old) children provide detailed data on oral health need for surveillance, service planning and evaluation purposes.

The NHS Wales Dental Epidemiological Programme is the responsibility of Public Health Wales, Welsh Oral Health Information Unit (WOHIU) at Cardiff University and Local Health Boards. Welsh Government requires Public Health Wales to conduct the programme under *Welsh Health Circular (WHC) (2021) 32: Role and Provision of Dental Public Health in Wales*. All-Wales co-ordination of the programme is undertaken by the Dental Epidemiology Co-ordinator in Public Health Wales. The sampling frame, data cleaning, analysis and reporting is undertaken by the WOHIU at Cardiff University. Community Dental Services in Local Health Boards are required to conduct the data collection for the programme under *WHC (2022) 22: Role of the Community Dental Service*.

The objectives of the inspection of school year seven (12-year-old) children were to:

1. Record data from a nationally representative sample of school year seven children in Wales during the 2023/2024 academic year
2. Obtain valid estimates of dental caries prevalence and severity in school year seven (12-year-old) children using methodology which is comparable with previous inspections.

Method

The conduct of the inspection followed guidance from the British Association for the Study of Community Dentistry (BASCD) (Pitts et al. 1997, Pine et al. 1997a, Pine et al. 1997b) according to a pre-specified protocol.

The inspection population were children in school year seven (the school year in which the twelfth birthday is achieved). The sampling frame were all children in Wales in school year seven attending mainstream state-funded middle and secondary schools. Special educational needs schools were not included in the sampling frame.

All mainstream middle and secondary schools in Wales who have a year seven class were included in the survey (n=208). The sampling intensity (the number of children who were examined from a school) was adjusted to account for the population of the Unitary Authority and the prevalence of disease in the 2016/17 survey. This varied from 1 in 2 children in smaller Unitary Authorities with high disease prevalence to 1 in 10 children in the largest Unitary Authorities.

Since 2006, positive consent has been sought during oral health inspections in Wales. The *Welsh Health Circular (2006) 052 Consent for school dental inspections and dental epidemiological surveys*, concluded that children over the age of 10-11 were considered competent to provide informed consent for a dental inspection. In the current inspection, parents were informed by letter that their child would be offered the opportunity to take part in the survey unless the parent refused prior to the survey (in accord with the Education Reform Act 1996 s 520(2)). The children whose parents had not refused, were provided with an

information sheet one week prior to the inspection. Consent for the examination was sought from each child on the day of the inspection.

Data were collected by trained and calibrated clinicians employed by Community Dental Services. Only permanent (adult) teeth were examined during this inspection. A visual examination method was used. Radiographs were not taken. Visually obvious decay into dentine (D3T) was the minimal clinical threshold for caries reporting, in line with the BASCD criteria (Pitts et al. 1997). Visually obvious dentinal decay is a widely accepted threshold for dental inspections; however, it is likely to be an underestimate of the true prevalence and severity of dental caries as it does not measure decay confined to the dental enamel.

Dental caries experience (D3MFT) was defined as one or more permanent teeth with visually obvious dentinal decay (D3T); a tooth judged to have been extracted due to caries (MT); or a tooth with a restoration (FT). The presence or absence of pathology due to dental caries was recorded using the PUFA-index as described by Monse et al. (2010). This records visible pulpal involvement (P), ulceration caused by dislocated tooth fragments (U), fistula (F) and abscess (A) associated with carious teeth. Oral health-related quality of life of children and their service use within the previous month was recorded using six oral questions which were delivered immediately following the examination (see Appendix 1). Response options were 'Yes' or 'No'.

Data were collected using Microsoft Access. Data were collated, checked and cleaned. Welsh Index of Multiple Deprivation (WIMD) 2019 ranks, the official measure of relative deprivation for small areas in Wales, were assigned using the child's home postcode. Data were weighted using small area populations obtained from Local Education Authorities.

Weighted data were analysed according to a pre-determined statistical analysis plan. The 95% confidence intervals applied a finite population correction using STATA (version 17). Error bars indicate 95% confidence limits on figures in this report. Confidence intervals were used to assess statistical significance. Comparisons are made, where feasible, with previous inspections of school year seven cohorts in Wales which employed the same methodology. In the interpretation of these comparisons, particularly those presenting trends at Local Health Board level, readers should be cognisant of the Bridgend County Borough Council area change which occurred on 1st April 2019 and affects the following health boards: Cwm Taf University Health Board (UHB) (pre-1st April 2019); Abertawe Bro Morgannwg UHB (pre-1st April 2019); Cwm Taf Morgannwg UHB (post-1st April 2019) and Swansea Bay UHB (post-1st April 2019) (see Appendix 2).

Results

Participation

A total of 6,329 children from 203 state-maintained mainstream schools were examined during the inspection (Table 1). This represents 18% of the total school year seven population in mainstream state-maintained schools in Wales in 2023/24. In total, 80% of the children sampled were examined.

The deprivation profile of the sample is shown in Table 2.

Local Health Board	Estimated school year seven population	Number of schools visited	No. of children sampled	No. of examinations	Proportion of sampled children for whom an examination was completed
Aneurin Bevan UHB	5954	33	1752	1468	84%
Betsi Cadwaladr UHB	7487	54	2313	1796	78%
Cardiff and Vale UHB	5906	26	703	541	77%
Cwm Taf Morgannwg UHB	5238	29	998	807	81%
Hywel Dda UHB	4241	27	1075	862	80%
Powys THB	1081	11	265	192	72%
Swansea Bay UHB	4431	23	762	663	87%
TOTAL	34338	203	7868	6329	80%

Table 1: Summary of inspection population, number of schools visited, sample size and number of examinations undertaken.

Local Health Board	Welsh Index of Multiple Deprivation (WIMD) 2019 Distribution of the examined population (n=6,329)				
	Most deprived quintile	Second most deprived quintile	Middle deprived quintile	Second least deprived quintile	Least deprived quintile
Aneurin Bevan UHB	455	319	262	188	226
Betsi Cadwaladr UHB	263	309	438	427	333
Cardiff and Vale UHB	125	62	67	77	195
Cwm Taf Morgannwg UHB	232	237	109	105	117
Hywel Dda UHB	70	167	302	228	49
Powys THB	15	16	54	82	21
Swansea Bay UHB	201	142	76	88	142
TOTAL	1361	1252	1308	1195	1083

Table 2: Summary of the Welsh Index of Multiple Deprivation (WIMD) 2019 distribution of the examined population (n=6,329).

Prevalence of dental caries experience

There has been a reduction in the prevalence of dental caries experience (%D3MFT>0) in school year seven children from 42.5% (95% CI 41.2% to 43.8%) in 2008/09 to 25.3% (95% CI 24.0% to 26.0%) in 2023/24 (this inspection) (Figure 1, [Supplementary table 1](#)). There was an absolute reduction in prevalence of dental caries experience of 4.3% (95% CI 2.0% to 6.5%) between the 2016/17 survey (29.6% (95% CI 28.4% to 30.7%)) and 2023/24 (25.3% (95% CI 24.2% to 26.4%)) (this inspection).

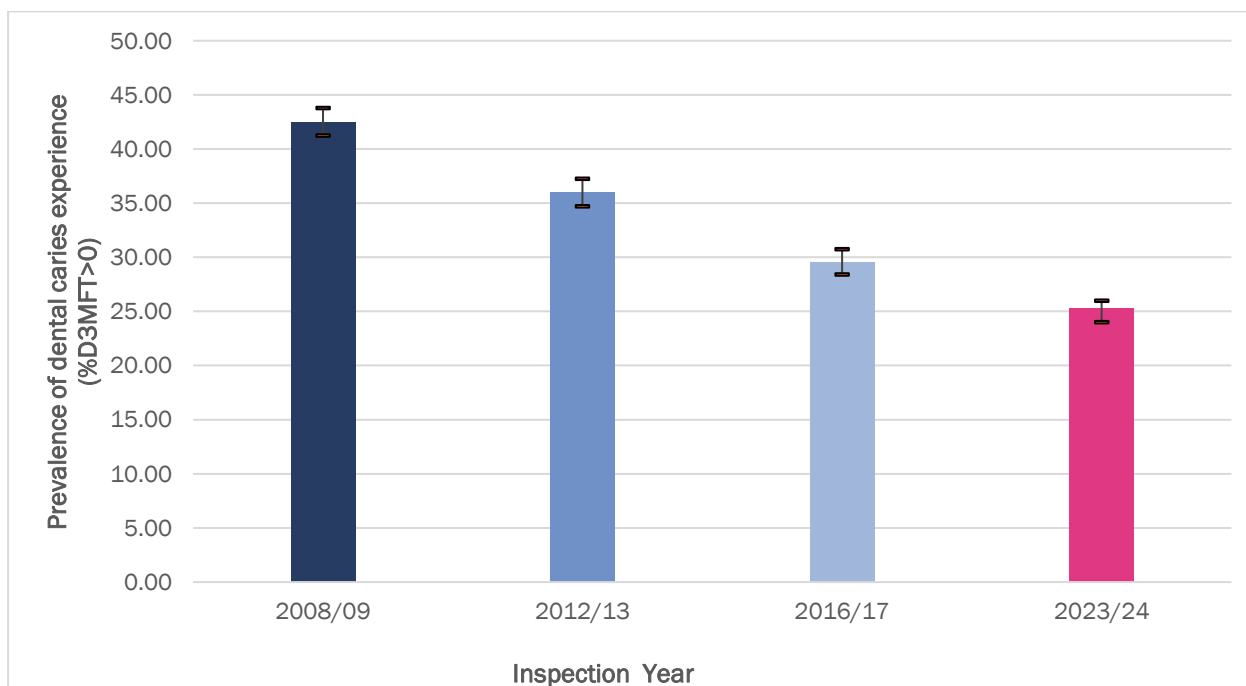


Figure 1: Prevalence of dental caries experience (%D3MFT>0) in school year seven children in Wales 2008/09 to 2023/24

Severity of dental caries experience

There has been a reduction in the average number of teeth affected by dental caries (D3MFT) from 0.98 (95% CI 0.94 to 1.02) in 2008/09 to 0.50 (95% CI 0.47 to 0.52) in 2023/24 (this inspection) (blue bars Figure 2, [Supplementary table 2](#)). There was a decrease in mean D3MFT of 0.11 (95% CI 0.06 to 0.16) between the 2016/17 and 2023/24 inspections (an 18.0% absolute reduction).

When only the children with disease experience (D3MFT>0) are considered, there has been a reduction in the mean number of teeth affected (orange bars Figure 2). The average number of teeth with disease experience in children who have decay experienced reduced from 2.31 (95% CI 2.25 to 2.37) in 2008/09 to 1.97 (95% CI 1.90 to 2.03) in 2023/24 (this inspection). However, there was no difference observed between 2016/17 and 2023/24.

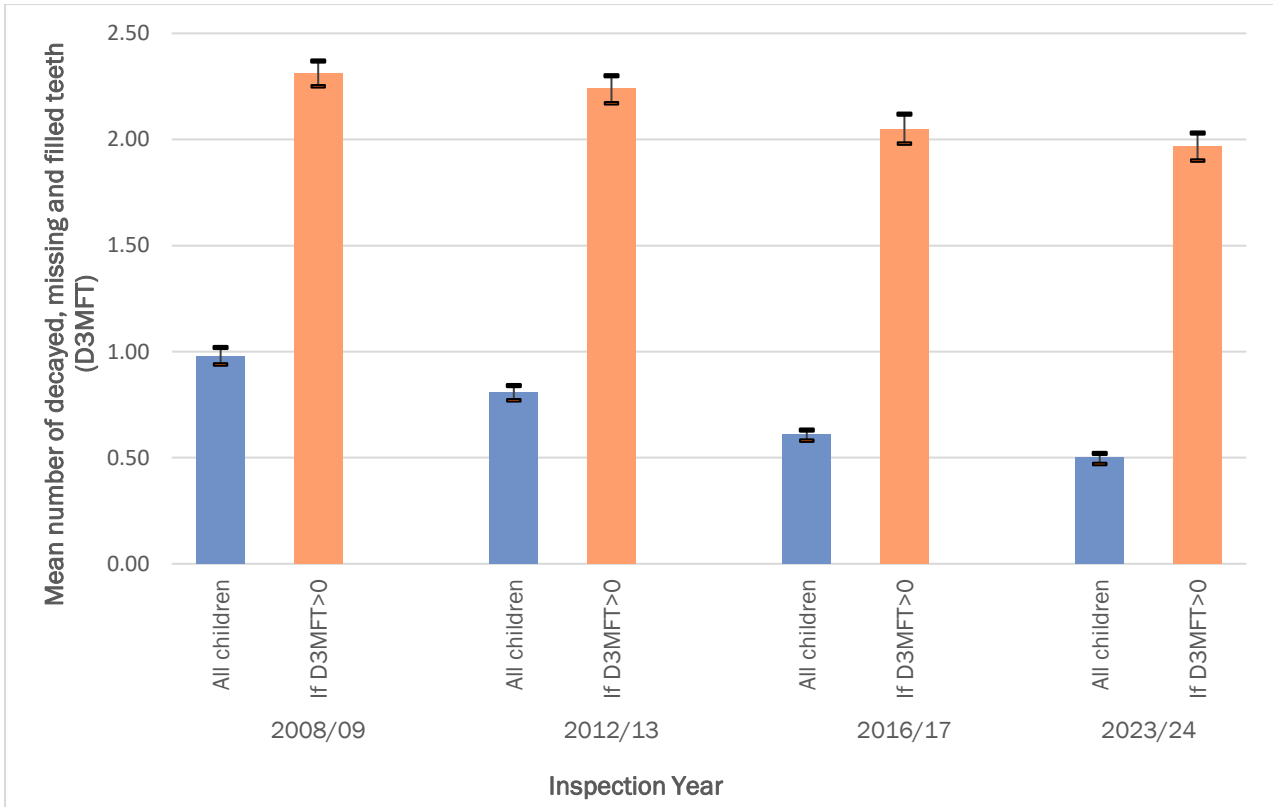


Figure 2: Mean number of teeth with dental caries experience (D3MFT) and the mean number of teeth affected in those with dental caries experience (D3MFT if D3MFT>0) in school year seven children in 2023/24

Untreated dental caries

The largest component of dental caries experience is untreated dental caries (D3T). The prevalence of untreated dental caries (%D3T>0) has decreased from 23.1% (95% CI 22.0% to 24.2) in 2008/09 to 16.9% (95% CI 15.9% to 17.8%) in 2023/24 (Table 3, blue bars Figure 3). There was no change between 2016/17 and 2023/24 inspections.

There was no change in mean number of teeth with untreated caries amongst children with decay experience in the last four inspections (orange bars Figure 3 and [Supplementary table 3](#)).

Inspection year	Prevalence of untreated dental caries (%D3T>0) (%)		
	Mean	95% CI Low	95% CI High
2008/09	23.1	22.0	24.2
2012/13	20.0	18.9	21.0
2016/17	15.5	14.6	16.4
2023/24	16.9	15.9	17.8

Table 3: Prevalence of untreated dental caries (%D3T>0) 2008/09 to 2023/24 in school year seven children in Wales

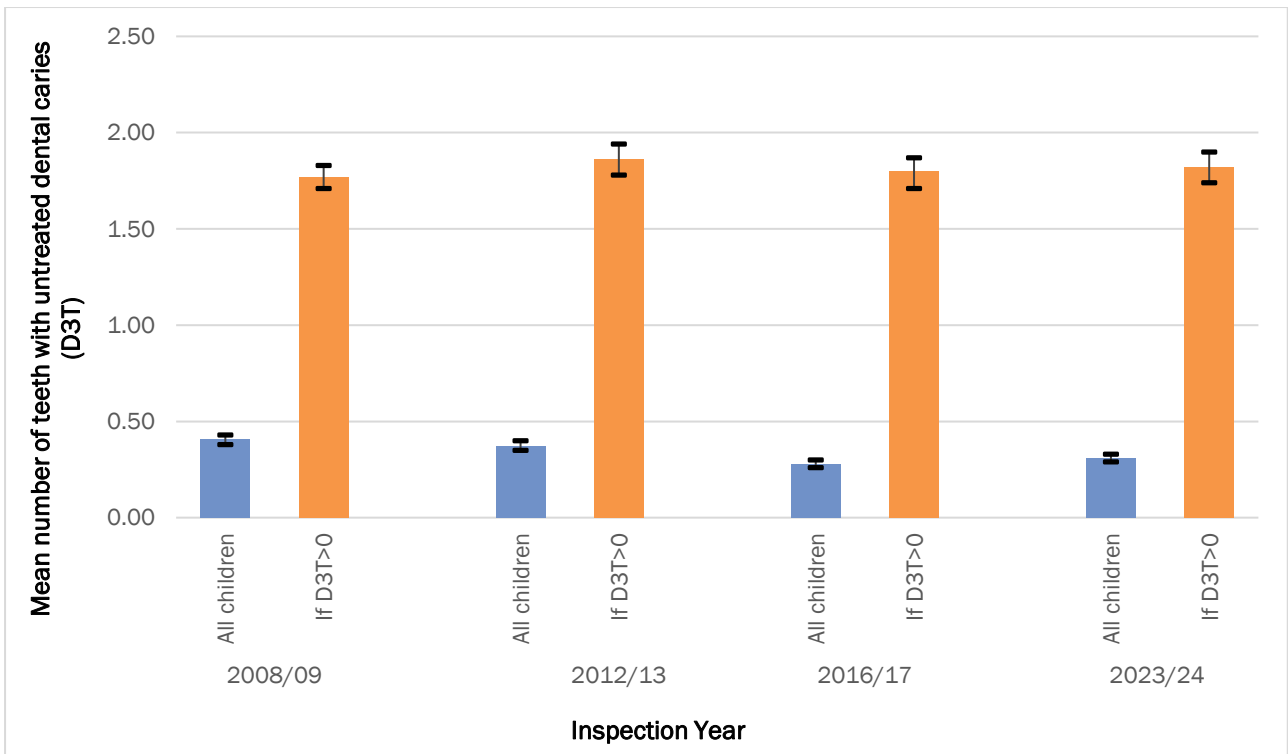


Figure 3: Mean number of teeth with untreated dental caries (D3T) and the mean number of teeth affected in those with untreated dental caries (D3T if D3T > 0) in school year seven children in 2023/24

Consequences of untreated dental caries

The prevalence of PUFA signs across Wales was 0.81% (95% CI 0.59% to 1.0%).

Impact of dental caries experience

Almost one third of children (28.1%) reported that their oral health had impacted on their quality-of-life (Table 4). In children with dental caries experience (D3MFT > 0), over a third (32.1%) reported an impact. The most common oral health-related quality of life impact was pain (16.6% of all children and 20.8% of those with dental caries experience). Responses to the difficulty smiling, laughing, and showing your teeth without being embarrassment were similar for both children with and without dental caries experience (14.1% and 13.0% respectively).

In total, 14.2% of children reported seeing a dentist in the last month because of a problem with their teeth or mouth (21.3% of children with dental caries experience) (Table 5).

Oral health-related quality of life impacts	Prevalence of one or more oral health-related quality of life impacts in the last month %		
	All children (n=6,322)	In those without dental caries experience (D3MFT=0, n=4,679)	In those with dental caries experience (D3MFT>0, n=1,643)
Had pain or discomfort in your teeth or mouth?	16.6	15.2	20.8
Had difficulty eating because of problems with your teeth or mouth?	9.6	9.1	11.2
Had difficulty relaxing (including sleeping) because of problems with your teeth or mouth?	3.7	3.1	5.5
Had difficulty smiling, laughing, and showing your teeth without being embarrassed because of problems with your teeth or mouth?	13.0	12.6	14.1
Had difficulty doing your schoolwork or missed school because of problems with your teeth or mouth?	2.7	2.0	5.0
ANY DOMAIN	28.1	27.7	32.1

Table 4: Prevalence of oral health-related quality of life impacts in the last month in all children and just those with dental caries experience (D3MFT>0) in school year seven children in 2023/24

	Prevalence of service use in the last month %		
	All children (n=6,319)	In those without dental caries experience (D3MFT=0, n=4,677)	In those with dental caries experience (D3MFT>0, n=1,642)
Been to see a dentist because of a problem with your teeth or mouth? (n=6,319)	14.2	11.8	21.2

Table 5: Service use in the last month in all children and those with and without dental caries experience (D3MFT>0) in school year seven children in 2023/24

Deprivation and dental caries experience

There is a clear social gradient in the prevalence and severity of dental caries experience amongst children in Wales. Individuals from the most deprived communities were more likely to experience dental caries (Figure 4, [Supplementary table 4](#)) and also have more teeth affected (Figure 5, [Supplementary table 5](#)). A similar social gradient is seen with respect to untreated dental caries across the whole population (blue bars Figure 6, [Supplementary table 6](#)). However, when only children with dental caries experience are considered (orange bars Figure 6), no gradient is observed.

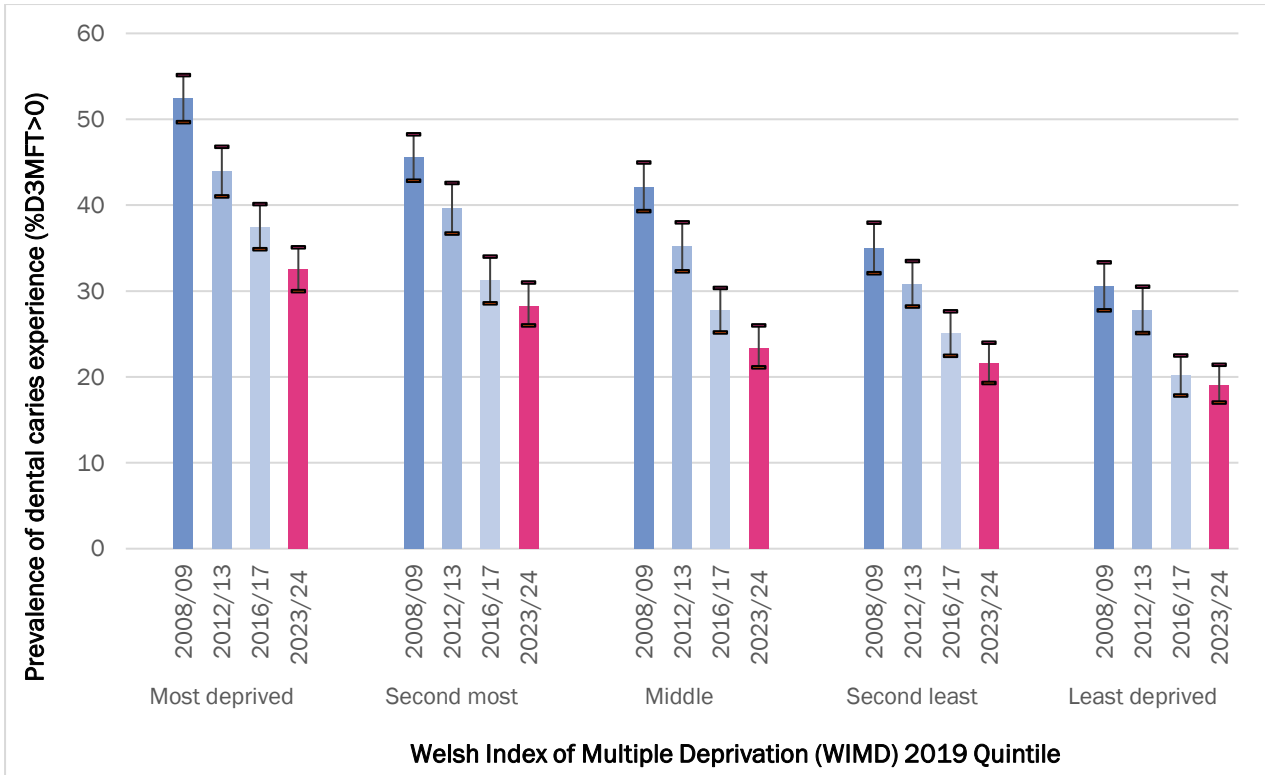


Figure 4: Prevalence of dental caries experience (%D3MFT>0) by Welsh Index of Multiple Deprivation (WIMD) 2019 quintile in school year seven children 2008/09 to 2023/24.

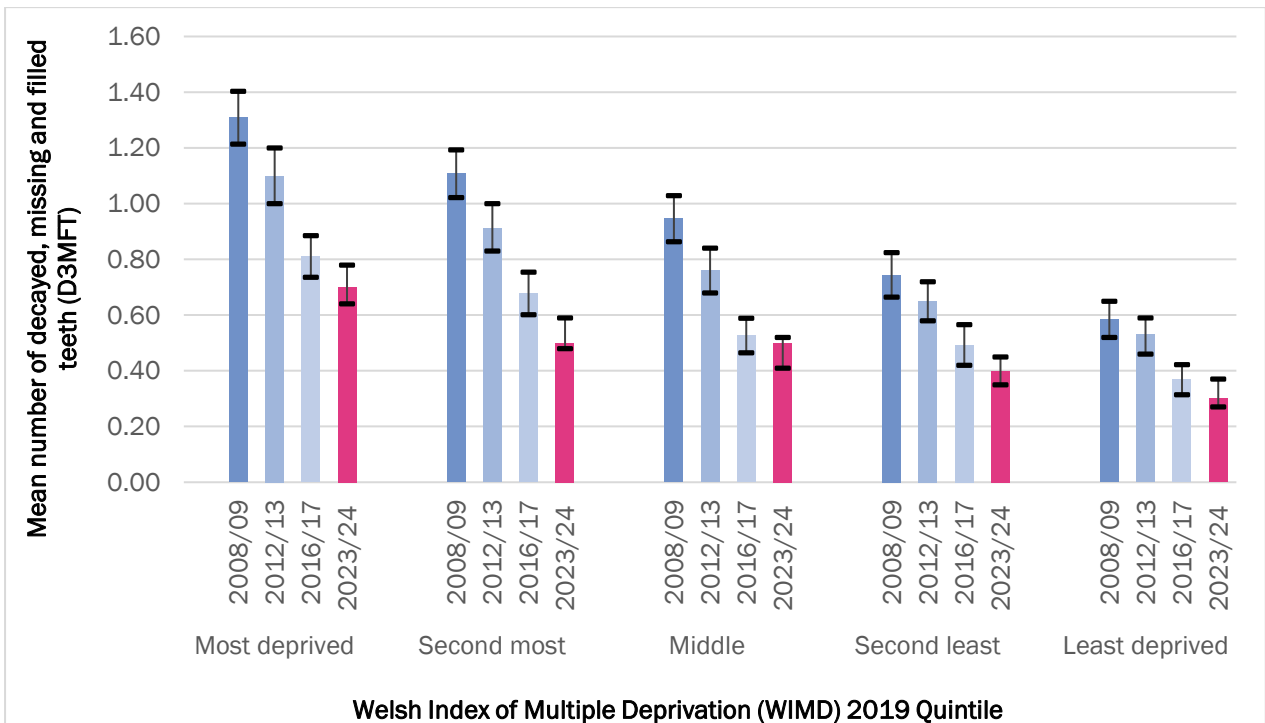


Figure 5: Mean number of decayed, missing and filled teeth (D3MFT) by Welsh Index of Multiple Deprivation (WIMD) 2019 quintile in school year seven children 2008/09 to 2023/24.

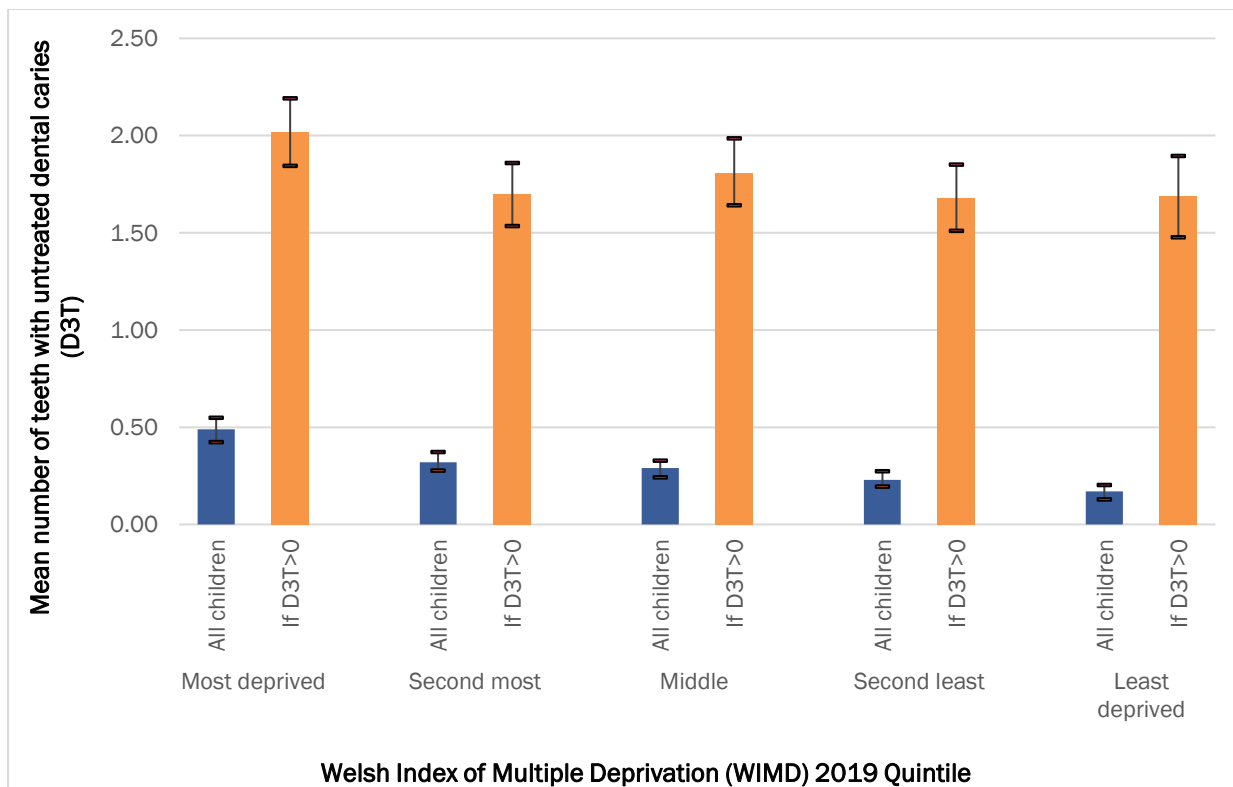


Figure 6: Mean number of teeth with untreated dental caries (D3T) and the mean number of affected teeth in those with untreated dental caries (D3T if D3T>0) in by WIMD (2019) quintile in school year seven children 2023/24

The difference in the prevalence of a disease or condition between people living in the most deprived and the least deprived areas is measured by the slope index of inequality. This is a measure of absolute inequalities. The slope index of inequality of dental caries prevalence has decreased between 2008/09 and 2023/24 (Figure 7, [Supplementary table 7](#)).

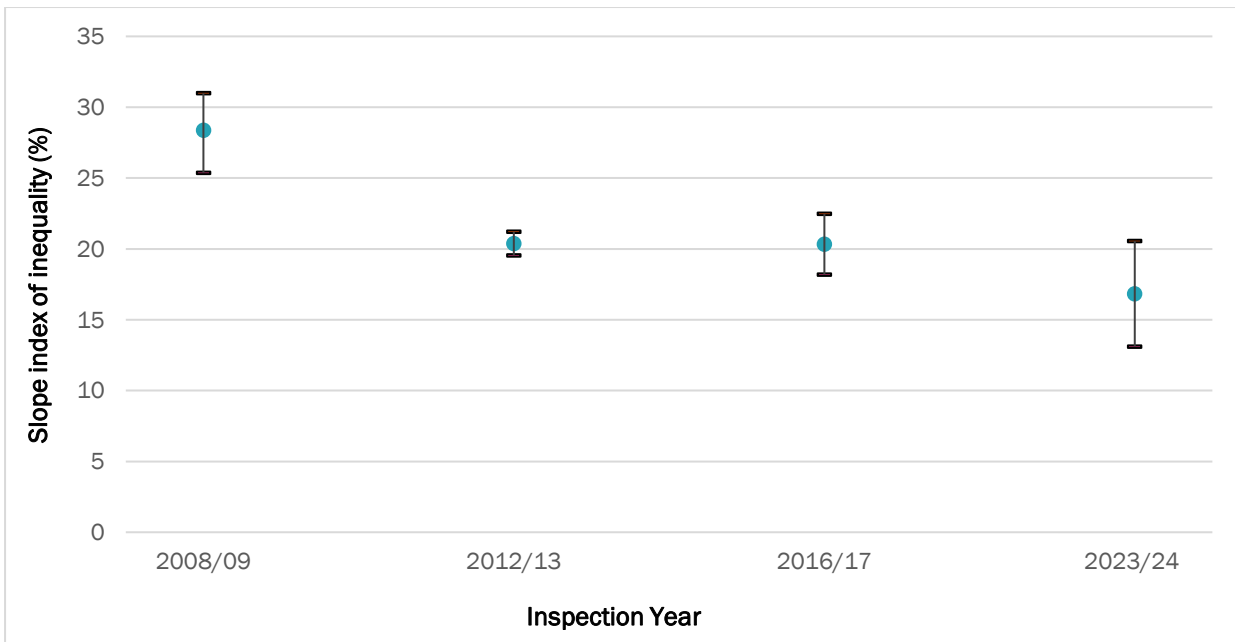


Figure 7: Slope index of inequality in the prevalence of dental caries experience in school year seven children in Wales, 2004/05 to 2023/24

The social gradient was also apparent in oral health-related quality of life measures. Children in the most deprived WIMD (2019) quintiles were more likely to report one or more oral-health related quality of life impacts than those in the least deprived areas. When only children with dental caries experience (D3MFT>0) were considered, the social gradient was still apparent (Figure 8, [Supplementary table 8](#) & [Supplementary table 9](#)).

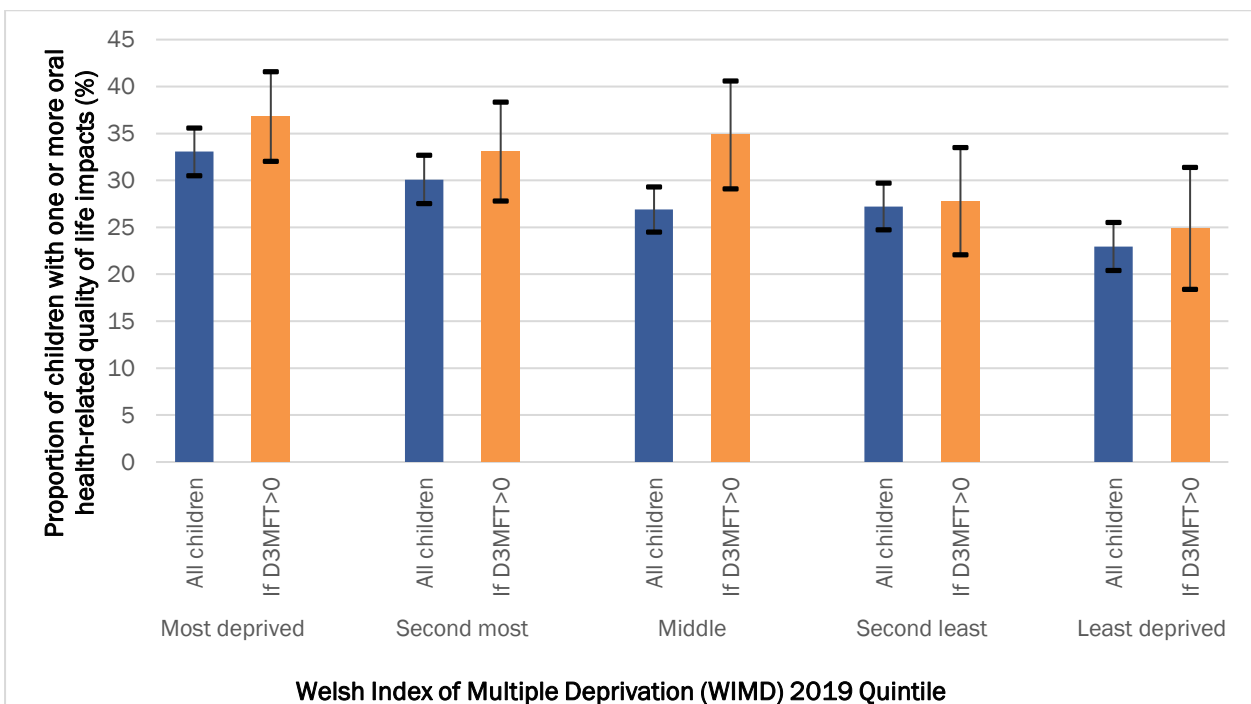
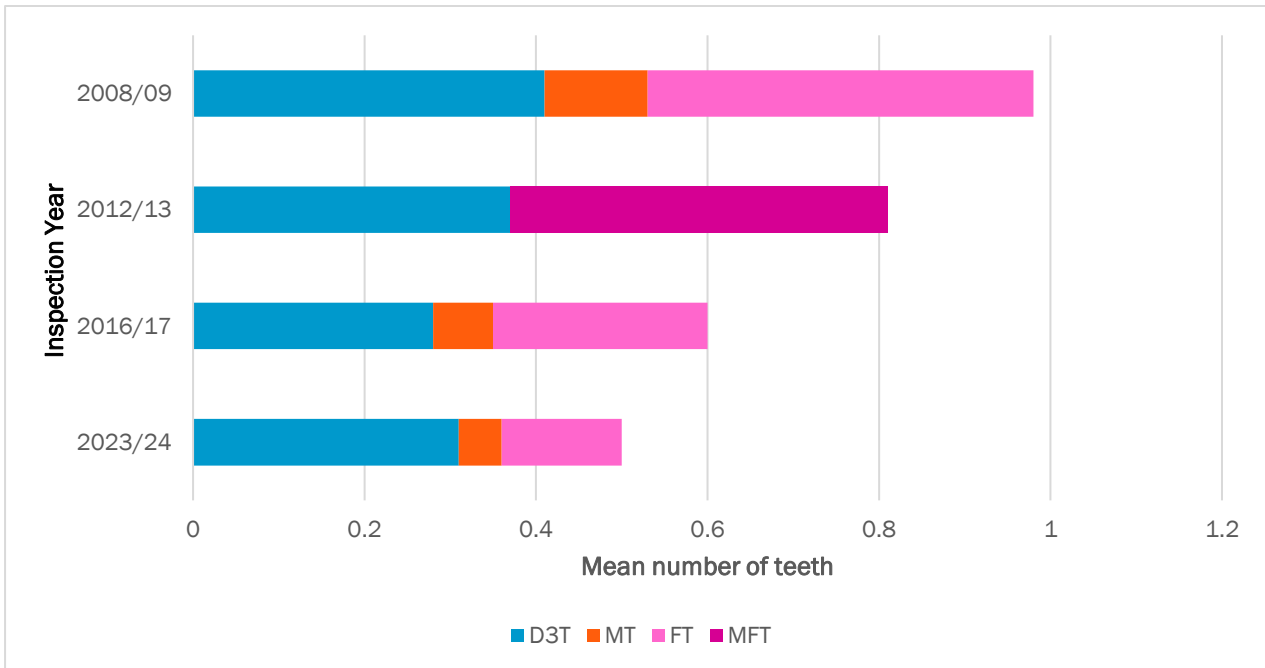


Figure 8: Proportion of children with one or more oral health-related quality of life impacts in all children and those with dental caries experience (D3MFT>0), by WIMD (2019) quintile 2023/24

Management of dental caries

Both the mean number of missing (MT) and the mean number of filled (FT) teeth have decreased between 2016/17 and 2023/24 inspections (Figure 9, [Supplementary table 10](#)).



*Owing to historical differences in reporting, the missing (MT) or filled teeth (FT) data is not available for 2012/13.

Figure 9: Mean number of decayed (D3T), missing (MT) and filled teeth (FT) in school year seven children 2008/09 to 2023/24

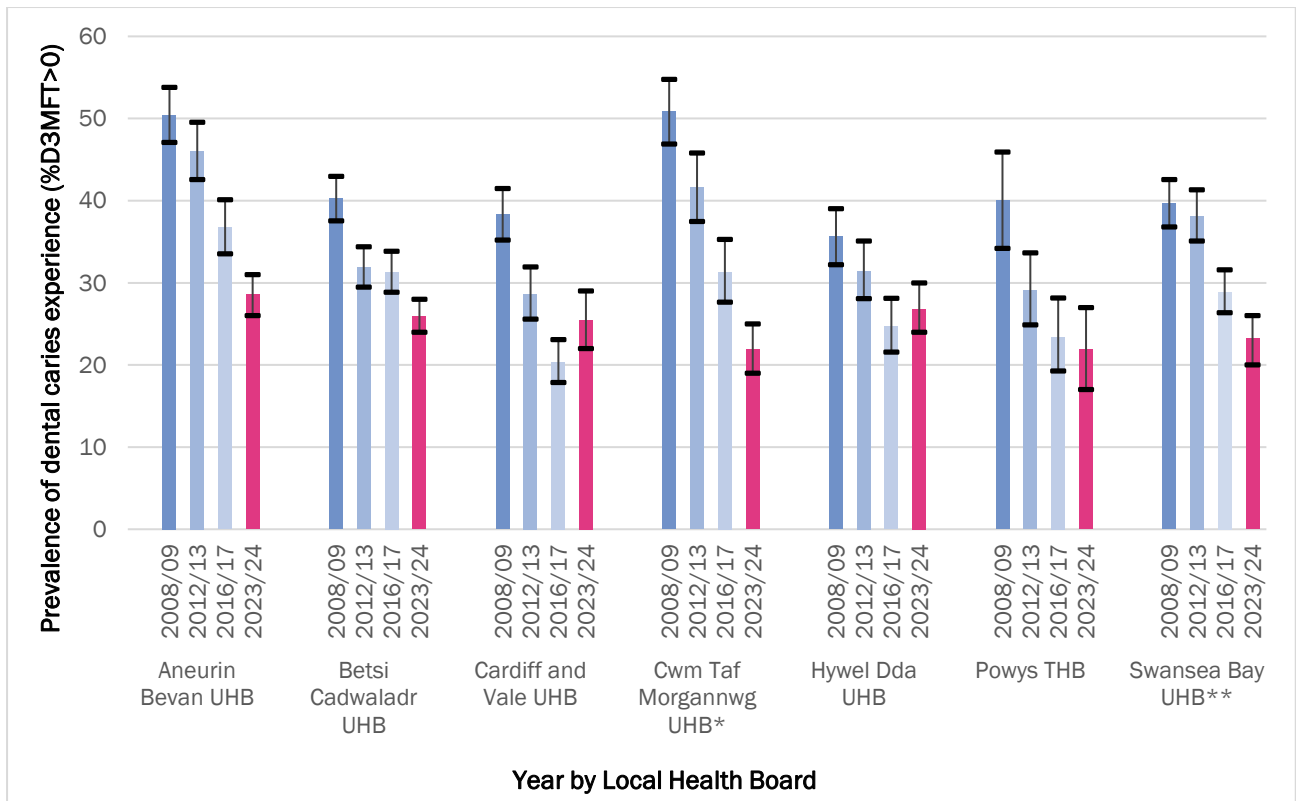
Regional differences in dental caries experience

Prevalence of dental caries experience

The prevalence of dental caries experience (%D3MFT>0) ranges from 21.9% in both Cwm Taf Morgannwg UHB (95% CI 19.0% to 24.8%) and Powys THB (95% CI 16.6% to 27.2%) to 28.6% (95% CI 26.3% to 31.0%) in Aneurin Bevan UHB (Figure 10, [Supplementary table 11](#)).

Since 2016/17 there has been a reduction in the prevalence of disease in two Local Health Boards (Aneurin Bevan UHB, Betsi Cadwaladr UHB,) and no change in three (Cardiff and Vale UHB, Hywel Dda UHB, and Powys THB). Due to the Bridgend County Borough Council area change, it is not possible to interpret changes in disease prevalence in Cwm Taf Morgannwg UHB (formerly Cwm Taf UHB) and Swansea Bay UHB (formerly Abertawe Bro Morgannwg UHB).

At a Unitary Authority-level, dental caries prevalence (%D3MFT>0) ranges from 16.8% (95% CI 12.4% to 21.2%) in Bridgend to 36.4% (95% CI 32.0% to 40.9%) in Blaenau Gwent (Figure 11, [Supplementary table 12](#)).



* Cwm Taf UHB prior to 1st April 2019

** Abertawe Bro Morgannwg UHB prior to 1st April 2019

Figure 10: Prevalence of dental caries experience (%D3MFT>0) in school year seven children by Local Health Board, 2008/09 to 2023/24

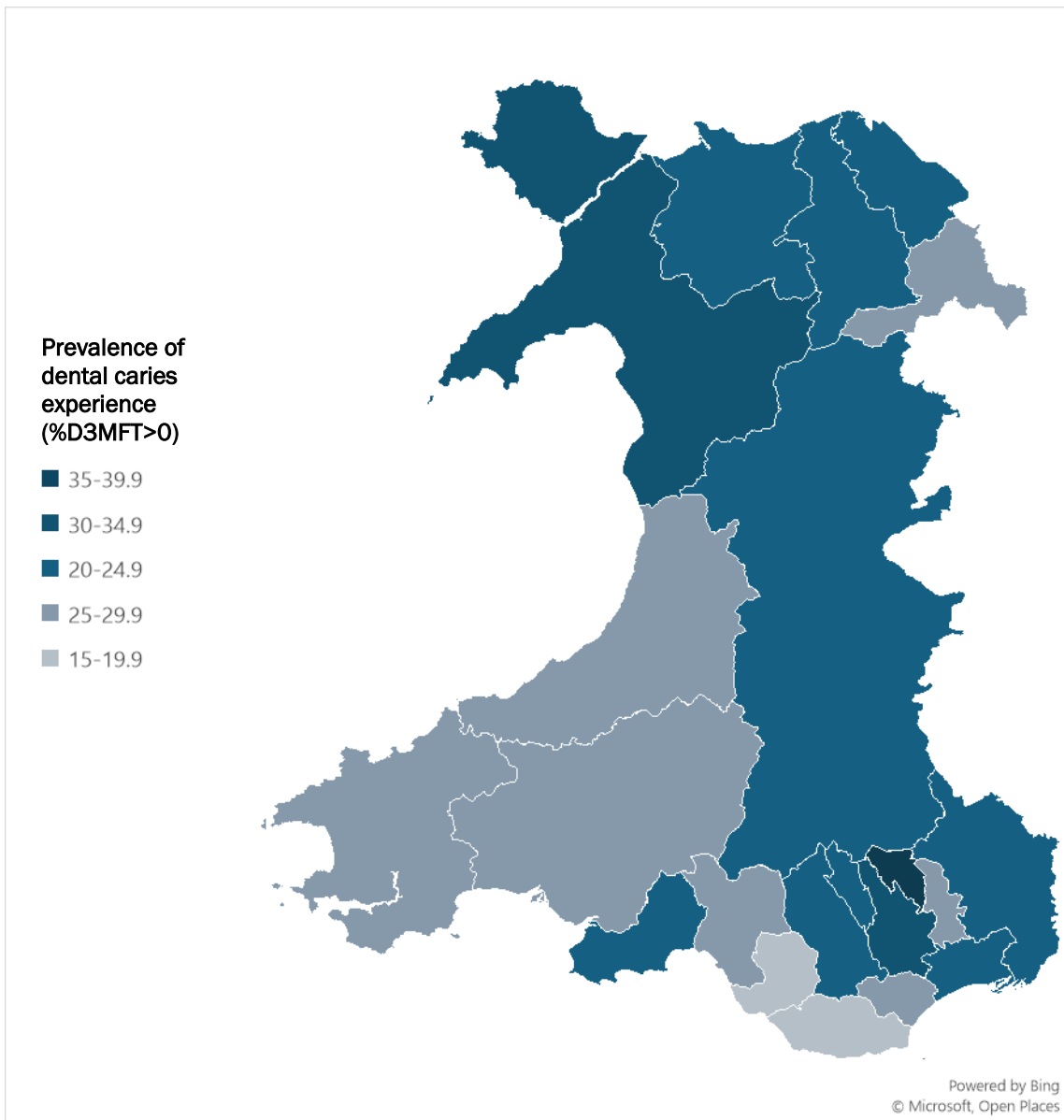


Figure 11: A choropleth of prevalence of dental caries experience (%D3MFT>0) in school year seven children by Unitary Authority in 2023/24

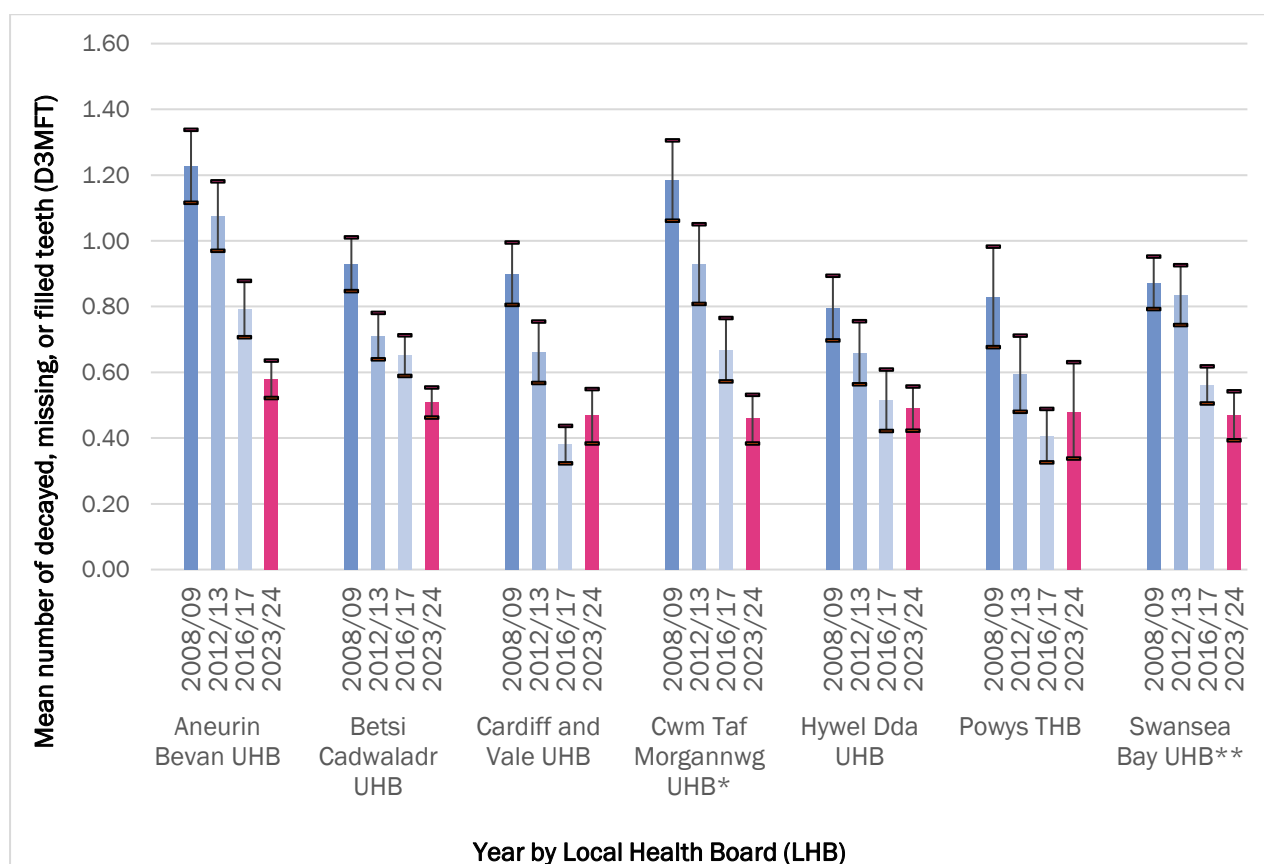
Severity of dental caries experience

The average number of teeth with dental caries experience (D3MFT) ranges from 0.46 (95% CI 0.38 to 0.53) in Cwm Taf Morgannwg UHB to 0.58 (95% CI 0.52 to 0.64) in Aneurin Bevan UHB (Figure 12, [Supplementary table 13](#)).

When only the children with disease experience (D3MFT>0) are considered, the average number of teeth with dental caries experience (D3MFT) ranges from 1.83 in both Cardiff and Vale UHB (95% CI 1.63 to 2.03) and Hywel Dda UHB (95% CI 1.67 to 1.99) to 2.21 (95% CI 1.78 to 2.65) in Powys THB ([Supplementary table 14](#)).

Since 2016/17 there has been a reduction in the severity of disease (in all children, as well as only those with dental caries experience) in two Local Health Board (Aneurin Bevan UHB, Betsi Cadwaladr UHB) and no change in a further three (Cardiff and Vale UHB, Hywel Dda UHB, Powys THB) (Figures 12 and 13, [Supplementary table 13](#) and [Supplementary table 14](#)). Due to the Bridgend County Borough Council area change, it is not possible to interpret changes in disease severity in Cwm Taf Morgannwg UHB (formerly Cwm Taf UHB) and Swansea Bay UHB (formerly Abertawe Bro Morgannwg UHB).

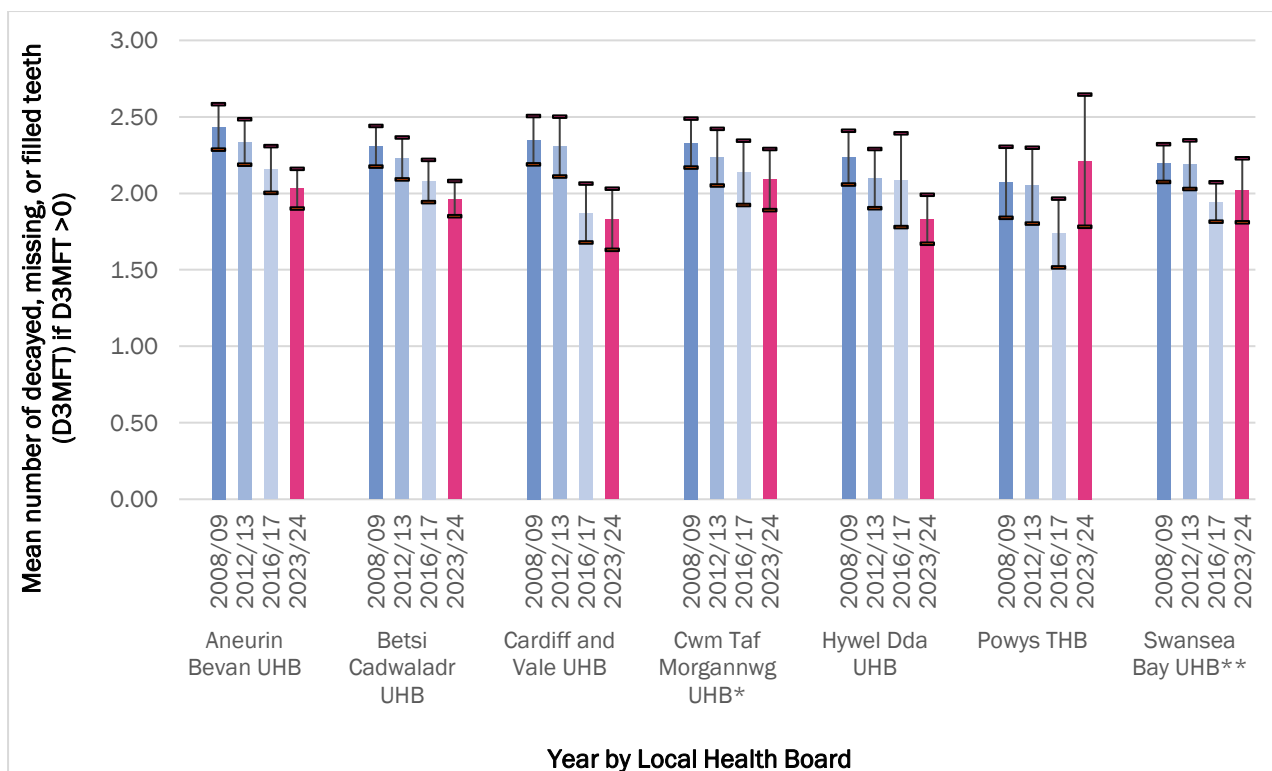
At a Unitary Authority-level disease severity ranges from mean number of decayed, missing or filled teeth (D3MFT) of 0.29 (95% 0.20 to 0.38) in the Vale of Glamorgan to 0.81 (95% CI 0.68 to 0.94) in Blaenau Gwent (Figure 14, [Supplementary table 12](#)).



* Cwm Taf UHB prior to 1st April 2019

** Abertawe Bro Morgannwg UHB prior to 1st April 2019

Figure 12: Mean number of decayed, missing or filled teeth (D3MFT) in Local Health Boards, 2008/09 to 2023/24



* Cwm Taf UHB prior to 1st April 2019

** Abertawe Bro Morgannwg UHB prior to 1st April 2019

Figure 13: Mean number of decayed, missing or filled teeth (D3MFT) in children with dental caries experience (D3MFT>0) in Local Health Boards, 2008/09 to 2023/24

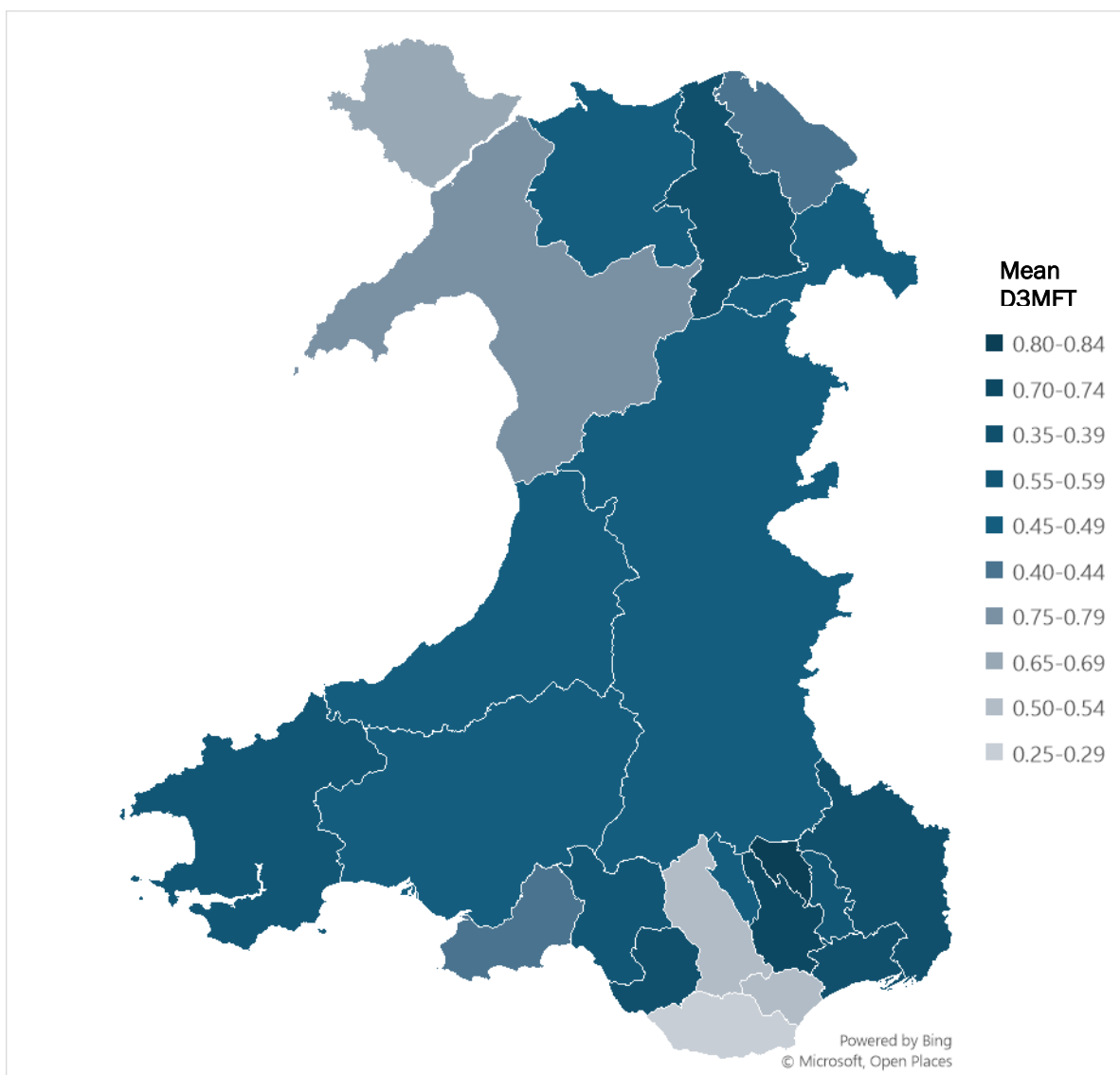
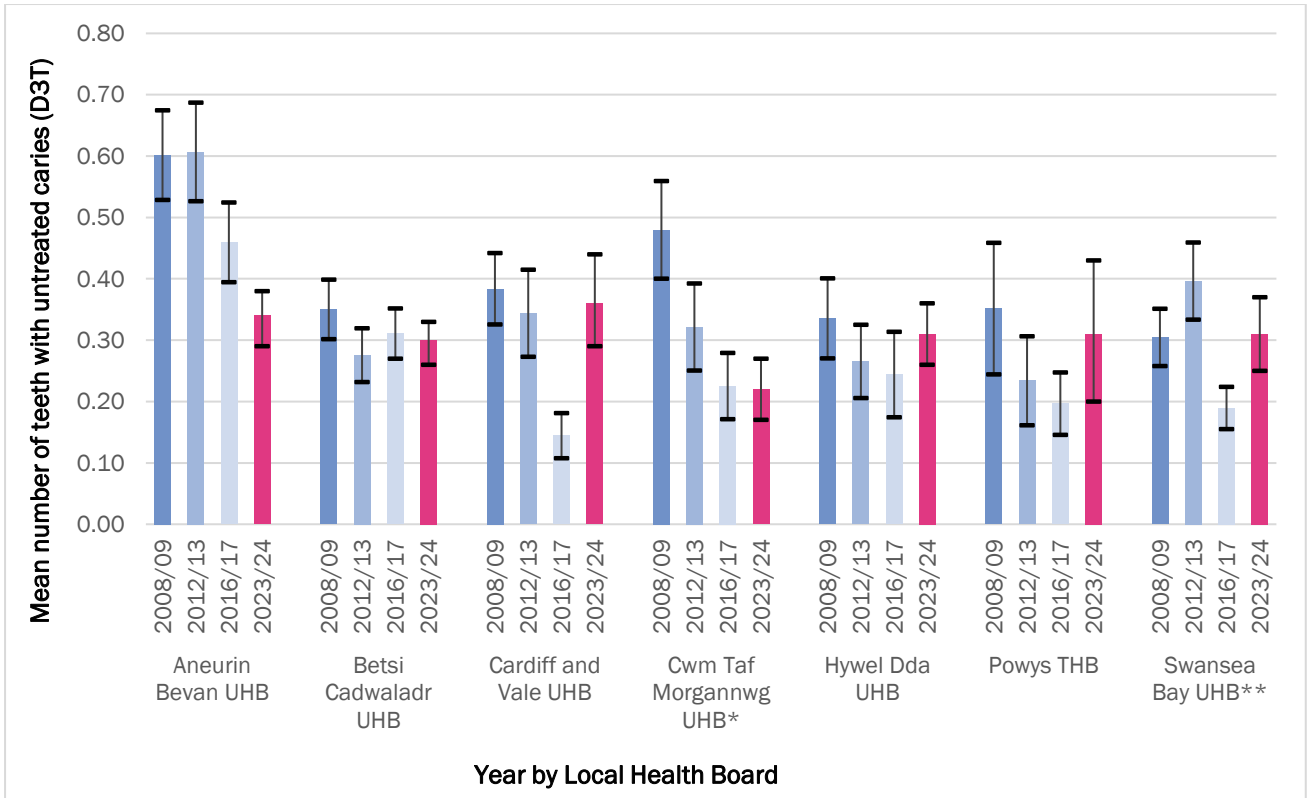


Figure 14: A choropleth of mean number of decayed, missing, or filled teeth (D3MFT) in school year seven children Unitary Authority in 2023/24

Untreated dental caries

The prevalence of untreated dental caries (%D3T>0) ranges from 12.4% (95% CI 10.1% to 14.7%) in Cwm Taf Morgannwg UHB to 19.6% (95% CI 16.3 to 22.9%) in Cardiff and Vale UHB (Figure 15, [Supplementary table 15](#)).

Since 2016/17 there have been reduction in the prevalence and severity of untreated dental caries in one Local Health Board (Aneurin Bevan UHB), no change in three (Betsi Cadwaladr UHB, Hywel Dda UHB, and Powys THB) and an increase in one (Cardiff and Vale UHB) (Figure 15, [Supplementary table 15](#)). Due to the Bridgend County Borough Council area change, it is not possible to interpret changes in untreated disease prevalence or severity in Cwm Taf Morgannwg UHB (formerly Cwm Taf UHB) and Swansea Bay UHB (formerly Abertawe Bro Morgannwg UHB).



* Cwm Taf UHB prior to 1st April 2019

** Abertawe Bro Morgannwg prior to 1st April 2019

Figure 15: Mean number of teeth with untreated dental caries (D3T) in Local Health Boards, 2008/09 to 2023/24

Impact of dental caries

The prevalence of one or more oral health-related quality of life impacts varies between 8.5% (95% CI 6.5% to 10.5%) in Swansea Bay UHB to 41.2% (95% CI 37.8% to 44.8%) in Cwm Taf Morgannwg UHB (Table 5).

	One or more OHRQoL impacts			Visited the dentist in the last month		
	Prevalence (%)	95% Confidence interval		Prevalence (%)	95% Confidence interval	
		Low	High		Low	High
Aneurin Bevan UHB	37.7	35.3	40.1	16.0	14.1	17.8
Betsi Cadwaladr UHB	38.3	36.1	40.3	21.9	20.1	23.8
Cardiff and Vale UHB	16.8	13.7	19.9	6.2	4.2	8.3
Cwm Taf Morgannwg UHB	41.2	37.8	44.8	24.2	21.1	27.1
Hywel Dda UHB	13.9	11.4	16.3	8.8	6.9	10.7
Powys THB	38.0	31.8	44.3	11.5	7.4	15.6
Swansea Bay UHB	8.5	6.5	10.5	3.2	9.1	4.4
WALES	28.1	27.0	29.1	14.2	13.3	15.0

Table 6: Prevalence of child oral health-related quality of life impacts and service use in Local Health Boards

Management of dental caries

The number of missing teeth is highest in Cwm Taf Morgannwg UHB and lowest in Cardiff and Vale UHB. The number of filled teeth is highest in Aneurin Bevan UHB and Betsi Cadwaladr UHB and lowest in Cardiff and Vale UHB and Hywel Dda UHB (Figure 16, [Supplementary table 16](#)).

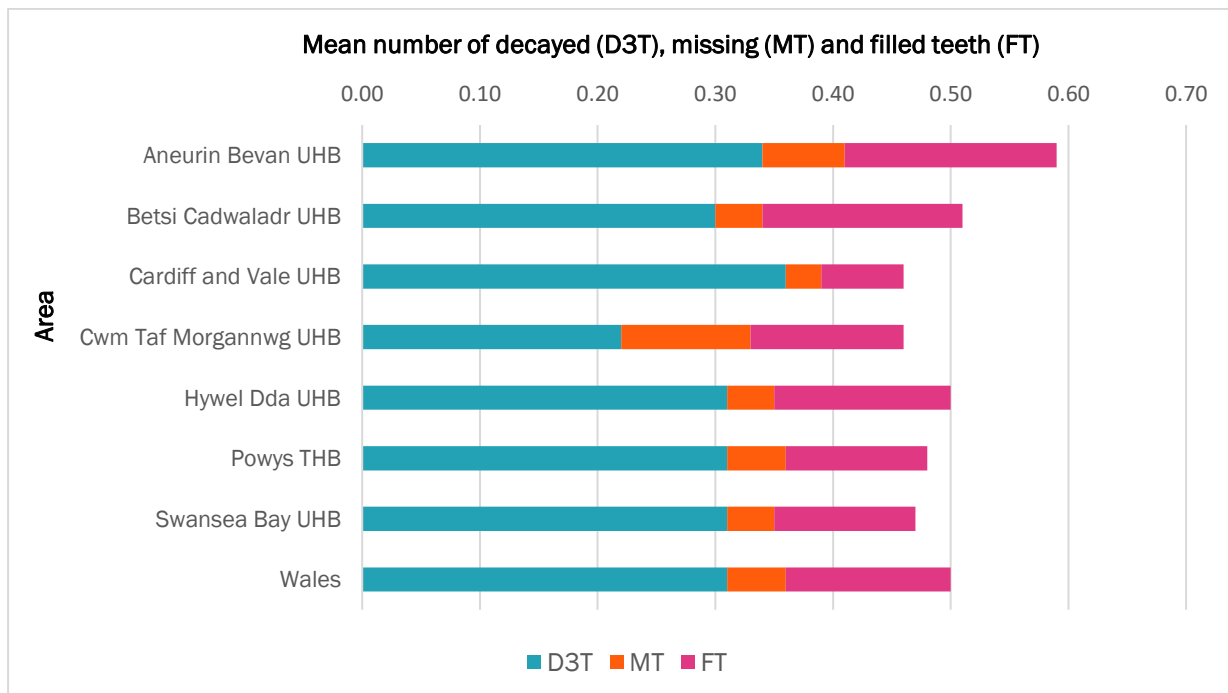


Figure 16: Mean number of decayed (D3T) missing (MT), and filled teeth (FT) in Wales and per Local Health Board 2023/24

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Supplementary Tables

Supplementary table 1: Prevalence of dental caries experience (%D3MFT>0) in school year seven children in Wales 2023/24

Inspection Year	Prevalence of dental caries experience (%D3MFT>0)		
	Mean	95% CI Low	95% CI High
2008/09	42.5	41.2	43.8
2012/13	36.0	34.7	37.3
2016/17	29.6	28.4	30.7
2023/24	25.3	24.2	26.4

Supplementary table 2: Mean number of teeth with dental caries experience (D3MFT) and the mean number of teeth affected in those with dental caries experience (D3MFT if D3MFT>0) in school year seven children in 2023/24

Inspection Year		Number of teeth with dental caries experience (D3MFT)		
		Mean	95% CI Low	95% CI High
2008/09	All children	0.98	0.94	1.02
	If D3MFT>0	2.31	2.25	2.37
2012/13	All children	0.81	0.77	0.84
	If D3MFT>0	2.24	2.17	2.30
2016/17	All children	0.61	0.58	0.63
	If D3MFT>0	2.05	1.98	2.12
2023/24	All children	0.50	0.47	0.52
	If D3MFT>0	1.97	1.90	2.03

Supplementary table 3: Mean number of teeth with untreated dental caries (D3T) and the mean number of teeth affected in those with untreated dental caries (D3T if D3T>0) in school year seven children in 2023/24

Inspection Year		Number of teeth with untreated dental caries (D3T)		
		Mean	95% CI Low	95% CI High
2008/09	All children	0.41	0.38	0.43
	If D3T>0	1.77	1.71	1.83
2012/13	All children	0.37	0.35	0.40
	If D3T>0	1.86	1.78	1.94
2016/17	All children	0.28	0.26	0.30
	If D3T>0	1.80	1.71	1.87
2023/24	All children	0.31	0.29	0.33
	If D3T>0	1.82	1.74	1.90

Supplementary table 4: Prevalence of dental caries experience (%D3MFT>0) by Welsh Index of Multiple Deprivation (WIMD) 2019 quintile

WIMD (2019) Quintile	Inspection Year	Prevalence of dental caries experience (%D3MFT>0)		
		Mean	95% CI Low	95% CI High
Most deprived	2008/09	52.40	49.65	55.15
	2012/13	43.90	41.00	46.80
	2016/17	37.48	34.85	40.11
	2023/24	32.50	30.00	35.10
Second most deprived	2008/09	45.54	42.83	48.25
	2012/13	39.60	36.70	42.60
	2016/17	31.29	28.58	34.00
	2023/24	28.20	26.00	31.00
Middle deprived	2008/09	42.13	39.30	44.95
	2012/13	35.20	32.30	38.00
	2016/17	27.77	25.17	30.37
	2023/24	23.40	21.10	26.00
Second least deprived	2008/09	35.01	32.07	37.95
	2012/13	30.80	28.20	33.50
	2016/17	25.05	22.45	27.64
	2023/24	21.60	19.30	24.00
Least deprived	2008/09	30.53	27.75	33.32
	2012/13	27.80	25.10	30.50
	2016/17	20.18	17.85	22.51
	2023/24	19.00	17.00	21.40

Supplementary table 5: Mean number of decayed, missing and filled teeth (D3MFT) per Welsh Index of Multiple Deprivation (WIMD) 2019 quintile.

WIMD (2019) Quintile	Inspection Year	Number of decayed, missing or filled teeth (D3MFT)		
		Mean	95% CI Low	95% CI High
Most deprived	2008/09	1.31	1.21	1.40
	2012/13	1.10	1.00	1.20
	2016/17	0.81	0.74	0.88
	2023/24	0.70	0.64	0.78
Second most deprived	2008/09	1.11	1.02	1.19
	2012/13	0.91	0.83	1.00
	2016/17	0.68	0.60	0.75
	2023/24	0.50	0.48	0.59
Middle deprived	2008/09	0.95	0.86	1.03
	2012/13	0.76	0.68	0.84
	2016/17	0.53	0.46	0.59
	2023/24	0.50	0.41	0.52
Second least deprived	2008/09	0.74	0.66	0.82
	2012/13	0.65	0.58	0.72
	2016/17	0.49	0.42	0.57
	2023/24	0.40	0.35	0.45
Least deprived	2008/09	0.58	0.52	0.65
	2012/13	0.53	0.46	0.59
	2016/17	0.37	0.31	0.42
	2023/24	0.30	0.27	0.37

Supplementary table 6: Mean number of teeth with untreated dental caries (D3T) and the mean number of affected teeth in those with untreated dental caries (D3T if D3T>0) by WIMD (2019) quintile in 2023/24

WIMD (2019) quintile		Number of teeth with untreated dental caries (D3T)		
		Mean	95% CI Low	95% CI High
Most deprived	All children	0.49	0.42	0.55
	If D3T>0	2.02	1.84	2.19
Second most deprived	All children	0.32	0.28	0.37
	If D3T>0	1.70	1.54	1.86
Middle deprived	All children	0.29	0.24	0.33
	If D3T>0	1.81	1.64	1.99
Second least deprived	All children	0.23	0.19	0.27
	If D3T>0	1.68	1.51	1.85
Least deprived	All children	0.17	0.13	0.20
	If D3T>0	1.69	1.48	1.89

Supplementary table 7: Slope index of inequality in the prevalence of dental caries experience in school year seven children in Wales, 2008/09 to 2023/24

Inspection Year	Slope index of inequality (SII) in dental caries experience prevalence (%)		
	SII	95% CI Low	95% CI High
2008/09	28.4	25.4	31.0
2012/13	20.4	19.5	21.2
2016/17	20.3	18.2	22.5
2023/24	16.8	13.1	20.6

Supplementary table 8: Prevalence of one or more oral health-related quality of life impacts by Welsh Index of Multiple Deprivation (WIMD) 2019 quintiles in school year seven children in 2023/24

WIMD (2019) Quintile		Prevalence of one or more oral health-related quality of life impacts (%)		
		Mean	95% CI Low	95% CI High
Most deprived	All children	33.06	30.50	35.57
	If D3MFT>0	36.79	32.02	41.56
Second most deprived	All children	30.09	27.52	32.66
	If D3MFT>0	33.06	27.79	38.32
Middle deprived	All children	26.90	24.50	29.30
	If D3MFT>0	34.84	29.10	40.58
Second least deprived	All children	27.20	24.71	29.69
	If D3MFT>0	27.77	22.07	33.47
Least deprived	All children	22.95	20.40	25.49
	If D3MFT>0	24.88	18.37	31.38

Supplementary table 9: Mean oral health-related quality of life impact by WIMD (2019) quintile

WIMD (2019) Quintile		Oral health-related quality of life impact score		
		Mean	95% CI Low	95% CI High
Most deprived	All children	0.56	0.51	0.61
	If D3MFT>0	0.69	0.58	0.80
Second most	All children	0.49	0.44	0.54
	If D3MFT>0	0.61	0.49	0.73
Middle	All children	0.44	0.39	0.48
	If D3MFT>0	0.60	0.48	0.72
Second least	All children	0.43	0.38	0.47
	If D3MFT>0	0.42	0.32	0.51
Least deprived	All children	0.36	0.31	0.41
	If D3MFT>0	0.40	0.28	0.52

Supplementary table 10: Mean number of decayed (D3T), missing (MT) and filled teeth (FT) in school year seven children 2008/09 to 2023/24

Inspection Year	Teeth with untreated decay (D3T)			Missing teeth (MT)			Filled teeth (FT)		
	Mean	95% CI Low	95% CI High	Mean	95% CI Low	95% CI High	Mean	95% CI Low	95% CI High
2008/09	0.41	0.38	0.43	0.12	0.10	0.13	0.45	0.43	0.48
2012/13	0.37	0.35	0.40	0.44					
2016/17	0.28	0.26	0.30	0.07	0.06	0.08	0.25	0.24	0.27
2023/24	0.31	0.29	0.33	0.05	0.05	0.06	0.14	0.12	0.15

Supplementary table 11: Prevalence of dental caries experience (%D3MFT>0) by Local Health Board 2008/09 to 2023/24

Local Health Board	Inspection Year	Prevalence of dental caries experience (%D3MFT>0) (%)		
		Mean	95% CI Low	95% CI High
Aneurin Bevan UHB	2008/09	50.4	47.1	53.8
	2012/13	46.0	42.6	49.5
	2016/17	36.8	33.5	40.1
	2023/24	28.6	26.3	31.0
Betsi Cadwaladr UHB	2008/09	40.3	37.6	43.0
	2012/13	31.9	29.5	34.4
	2016/17	31.3	28.8	33.9
	2023/24	25.9	23.8	27.8
Cardiff and Vale UHB	2008/09	38.3	35.2	41.5
	2012/13	28.7	25.6	31.9
	2016/17	20.4	17.9	23.1
	2023/24	25.5	21.9	29.1
Cwm Taf Morgannwg UHB ¹	2008/09	50.8	46.9	54.8
	2012/13	41.6	37.5	45.8
	2016/17	31.3	27.7	35.3
	2023/24	21.9	19.0	24.8
Hywel Dda UHB	2008/09	35.6	32.2	39.0
	2012/13	31.5	28.1	35.1
	2016/17	24.7	21.6	28.1
	2023/24	26.8	23.9	29.8
Powys THB	2008/09	40.0	34.2	45.9
	2012/13	29.1	24.9	33.7
	2016/17	23.4	19.3	28.2
	2023/24	21.9	16.6	27.2
Swansea Bay UHB ²	2008/09	39.7	36.8	42.6
	2012/13	38.2	35.1	41.3
	2016/17	28.9	26.4	31.6
	2023/24	23.2	20.1	26.2

¹ Cwm Taf UHB prior to 1st April 2019 move of Bridgend Council Borough Council area

² Abertawe Bro Morgannwg UHB prior to 1st April 2019 move of Bridgend Council Borough Council area

Supplementary table 12: Prevalence of dental caries experience (%D3MFT>0) and number of teeth with dental caries experience (D3MFT) at Unitary Authority Area

Local Health Board	Unitary Authority Areas	Prevalence of dental caries experience (%D3MFT>0) (%)			Number of teeth with dental caries experience (D3MFT)		
		Mean	95% CI Low	95% CI High	Mean	95% CI Low	95% CI High
Aneurin Bevan UHB	Blaenau Gwent	36.4	32.0	40.9	0.81	0.68	0.94
	Caerphilly	32.5	27.9	37.1	0.70	0.57	0.83
	Monmouthshire	22.1	17.1	27.1	0.39	0.28	0.50
	Newport	22.5	18.1	27.1	0.39	0.30	0.48
	Torfaen	28.4	25.0	31.7	0.59	0.50	0.67
Betsi Cadwaladr UHB	Conwy	22.8	19.3	23.2	0.46	0.37	0.54
	Denbighshire	20.3	16.1	24.5	0.36	0.26	0.45
	Flintshire	23.5	18.7	28.3	0.43	0.31	0.54
	Gwynedd	31.7	27.7	35.8	0.75	0.62	0.87
	Isle of Anglesey	30.0	26.1	34.0	0.67	0.56	0.78
	Wrexham	28.8	23.4	34.3	0.47	0.36	0.58
Cardiff and Vale UHB	Cardiff	28.0	23.4	32.7	0.54	0.43	0.65
	The Vale of Glamorgan	19.1	14.1	24.1	0.29	0.20	0.38
Cwm Taf Morgannwg UHB	Bridgend	16.8	12.4	21.2	0.37	0.25	0.49
	Merthyr Tydfil	24.8	20.7	28.9	0.49	0.38	0.61
	Rhondda Cynon Taff	24.1	19.6	28.6	0.50	0.39	0.61
Hywel Dda UHB	Carmarthenshire	25.4	20.5	30.3	0.46	0.35	0.57
	Ceredigion	27.6	23.8	31.3	0.47	0.40	0.54
	Pembrokeshire	28.7	24.0	33.5	0.55	0.43	0.66
Powys THB	Powys	21.9	16.6	27.2	0.48	0.34	0.63
Swansea Bay UHB	Neath Port Talbot	27.1	22.7	31.5	0.59	0.46	0.72
	Swansea	20.8	16.8	24.8	0.40	0.31	0.48

Supplementary table 13: Mean number of teeth with dental caries experience (D3MFT) by Local Health Board 2008/09 to 2023/24

Local Health Board	Inspection Year	Number of teeth with dental caries experience (D3MFT)		
		Mean	95% CI Low	95% CI High
Aneurin Bevan UHB	2008/09	1.23	1.12	1.34
	2012/13	1.08	0.97	1.18
	2016/17	0.79	0.71	0.88
	2023/24	0.58	0.52	0.64
Betsi Cadwaladr UHB	2008/09	0.93	0.85	1.01
	2012/13	0.71	0.64	0.78
	2016/17	0.65	0.59	0.71
	2023/24	0.51	0.46	0.55
Cardiff and Vale UHB	2008/09	0.90	0.80	1.00
	2012/13	0.66	0.57	0.75
	2016/17	0.38	0.32	0.44
	2023/24	0.47	0.38	0.55
Cwm Taf Morgannwg UHB ¹	2008/09	1.18	1.06	1.31
	2012/13	0.93	0.81	1.05
	2016/17	0.67	0.57	0.77
	2023/24	0.46	0.38	0.53
Hywel Dda UHB	2008/09	0.80	0.70	0.89
	2012/13	0.66	0.56	0.76
	2016/17	0.52	0.42	0.61
	2023/24	0.49	0.42	0.56
Powys THB	2008/09	0.83	0.68	0.98
	2012/13	0.60	0.48	0.71
	2016/17	0.41	0.33	0.49
	2023/24	0.48	0.34	0.63
Swansea Bay UHB ²	2008/09	0.87	0.79	0.95
	2012/13	0.83	0.74	0.93
	2016/17	0.56	0.51	0.62
	2023/24	0.47	0.39	0.54

¹ Cwm Taf UHB prior to 1st April 2019 move of Bridgend Council Borough Council area

² Abertawe Bro Morgannwg UHB prior to 1st April 2019 move of Bridgend Council Borough Council area

Supplementary table 14: Mean number of teeth with dental caries experience (D3MFT) in children with dental caries experience (D3MFT>0) by Local Health Board 2008/09 to 2023/24

Local Health Board	Inspection Year	Mean number of teeth with dental caries experience (D3MFT) in children with dental caries experience (D3MFT>0)		
		Mean	95% CI Low	95% CI High
Aneurin Bevan UHB	2008/09	2.43	2.29	2.58
	2012/13	2.34	2.19	2.48
	2016/17	2.16	2.00	2.31
	2023/24	2.03	1.90	2.16
Betsi Cadwaladr UHB	2008/09	2.31	2.17	2.44
	2012/13	2.23	2.09	2.37
	2016/17	2.08	1.94	2.22
	2023/24	1.96	1.85	2.08
Cardiff and Vale UHB	2008/09	2.35	2.19	2.51
	2012/13	2.31	2.11	2.50
	2016/17	1.87	1.68	2.06
	2023/24	1.83	1.63	2.03
Cwm Taf Morgannwg UHB ¹	2008/09	2.33	2.17	2.49
	2012/13	2.24	2.05	2.42
	2016/17	2.13	1.92	2.34
	2023/24	2.09	1.89	2.29
Hywel Dda UHB	2008/09	2.23	2.06	2.41
	2012/13	2.10	1.90	2.29
	2016/17	2.09	1.78	2.39
	2023/24	1.83	1.67	1.99
Powys THB	2008/09	2.07	1.84	2.30
	2012/13	2.05	1.80	2.30
	2016/17	1.74	1.52	1.97
	2023/24	2.21	1.78	2.65
Swansea Bay UHB ²	2008/09	2.20	2.07	2.32
	2012/13	2.19	2.03	2.35
	2016/17	1.94	1.82	2.07
	2023/24	2.02	1.81	2.23

¹ Cwm Taf UHB prior to 1st April 2019 move of Bridgend Council Borough Council area

² Abertawe Bro Morgannwg UHB prior to 1st April 2019 move of Bridgend Council Borough Council area

Supplementary table 15: Prevalence of untreated dental decay (D3T) and mean number of affected teeth by Local Health Boards 2008/09 to 2023/24

Local Health Board	Inspection Year	Prevalence of untreated dental caries (%D3T>0)			Teeth with untreated dental caries (D3T)			Teeth with untreated dental caries (D3T) in those with untreated decay (D3T>0)		
		Mean	95% CI Low	95% CI High	Mean	95% CI Low	95% CI High	Mean	95% CI Low	95% CI High
Aneurin Bevan UHB	2008/09	33.6	30.4	36.8	0.60	0.53	0.67	1.79	1.66	1.92
	2012/13	31.2	28.0	34.5	0.61	0.53	0.69	1.95	1.79	2.11
	2016/17	24.3	21.4	27.3	0.46	0.39	0.52	1.89	1.72	2.03
	2023/24	18.6	16.7	20.5	0.34	0.29	0.38	1.81	1.63	1.98
Betsi Cadwaladr UHB	2008/09	20.4	18.2	22.6	0.35	0.40	0.28	1.72	1.57	1.86
	2012/13	15.4	13.6	17.4	0.23	0.32	0.31	1.79	1.61	1.96
	2016/17	17.8	15.8	19.9	0.31	0.27	0.35	1.75	1.59	1.87
	2023/24	15.4	14.4	17.4	0.30	0.26	0.33	1.87	1.72	2.03
Cardiff and Vale UHB	2008/09	21.8	19.2	24.5	0.38	0.33	0.44	1.76	1.60	1.92
	2012/13	15.6	13.3	18.4	0.34	0.27	0.41	2.20	1.94	2.46
	2016/17	7.9	6.3	9.8	0.14	0.11	0.18	1.83	1.51	2.03
	2023/24	19.6	16.3	22.9	0.36	0.29	0.44	1.86	1.64	2.08
Cwm Taf Morgannwg UHB ¹	2008/09	26.6	23.2	30.1	0.48	0.40	0.56	1.80	1.62	1.99
	2012/13	19.3	16.2	22.9	0.32	0.25	0.39	1.66	1.43	1.90
	2016/17	13.6	11.0	16.6	0.23	0.17	0.28	1.66	1.40	1.84
	2023/24	12.4	10.1	14.7	0.22	0.17	0.27	1.76	1.49	2.03
Hywel Dda UHB	2008/09	17.7	15.0	20.4	0.34	0.27	0.40	1.90	1.67	2.13
	2012/13	15.5	12.9	18.4	0.27	0.21	0.33	1.72	1.48	1.96
	2016/17	13.1	10.7	15.9	0.24	0.17	0.31	1.86	1.41	2.19
	2023/24	18.7	16.2	21.3	0.31	0.26	0.36	1.64	1.48	1.80
Powys THB	2008/09	19.5	14.7	24.2	0.35	0.24	0.46	1.81	1.48	2.14
	2012/13	13.8	10.8	17.5	0.23	0.16	0.31	1.70	1.37	2.02
	2016/17	13.9	10.6	17.9	0.20	0.15	0.25	1.42	1.20	1.58
	2023/24	14.6	10.0	19.1	0.31	0.20	0.43	2.14	1.66	2.63
Swansea Bay UHB ²	2008/09	18.0	15.7	20.3	0.30	0.26	0.35	1.69	1.54	1.84
	2012/13	22.6	20.0	25.4	0.40	0.33	0.46	1.75	1.57	1.94
	2016/17	10.5	8.8	12.4	0.19	0.16	0.22	1.81	1.61	1.93
	2023/24	16.6	14.0	19.3	0.31	0.25	0.37	1.89	1.64	2.13

¹ Cwm Taf UHB prior to 1st April 2019 move of Bridgend Council Borough Council area

² Abertawe Bro Morgannwg UHB prior to 1st April 2019 move of Bridgend Council Borough Council area

Supplementary table 16: Mean number of decayed (D3T), missing (MT) and filled teeth (FT) in school year seven children by Local Health Board 2023/24

Local Health Board	Teeth with untreated decay (D3T)			Missing teeth (MT)			Filled teeth (FT)		
	Mean	95% CI Low	95% CI High	Mean	95% CI Low	95% CI High	Mean	95% CI Low	95% CI High
Aneurin Bevan UHB	0.34	0.29	0.38	0.07	0.05	0.09	0.18	0.15	0.21
Betsi Cadwaladr UHB	0.30	0.26	0.33	0.04	0.03	0.06	0.17	0.14	0.19
Cardiff and Vale UHB	0.36	0.29	0.44	0.03	0.01	0.05	0.07	0.05	0.09
Cwm Taf Morgannwg UHB	0.22	0.17	0.27	0.11	0.07	0.15	0.13	0.09	0.16
Hywel Dda UHB	0.31	0.26	0.36	0.04	0.02	0.05	0.15	0.11	0.18
Powys THB	0.31	0.20	0.43	0.05	0.01	0.09	0.12	0.06	0.18
Swansea Bay UHB	0.31	0.25	0.37	0.04	0.01	0.06	0.12	0.08	0.15
Wales	0.31	0.29	0.33	0.05	0.05	0.06	0.14	0.12	0.15

Appendix 1 – Oral health related quality of life impact questions

	In the last month, have you:		
1	Had pain or discomfort in your teeth or mouth?	Yes	No
2	Had difficulty eating because of problems with your teeth or mouth?	Yes	No
3	Had difficulty relaxing (including sleeping) because of problems with your teeth or mouth?	Yes	No
4	Had difficulty smiling, laughing, and showing your teeth without being embarrassed because of problems with your teeth or mouth?	Yes	No
5	Had difficulty doing your schoolwork or missed school because of problems with your teeth or mouth?	Yes	No
6	Been to see a dentist because of a problem with your teeth or mouth?	Yes	No

Appendix 2 – Bridgend Boundary Change

On the 1st April 2019 the responsibility for providing healthcare services for people in the Bridgend County Borough Council area moved from Abertawe Bro Morgannwg UHB to Cwm Taf UHB. The two Local Health Boards became Swansea Bay UHB and Cwm Taf Morgannwg UHB respectively.

The result of this boundary change is an increased school year seven population size in Cwm Taf Morgannwg UHB (Table A1).

Historically the Bridgend County Borough Council area had been an area of comparatively better oral health in Abertawe Bro Morgannwg UHB (Table A2). Similarly, the two Unitary Authorities areas in Cwm Taf UHB (Merthyr Tydfil and Rhondda Cynon Taf) both typically had higher prevalence and severity of dental caries than in the Bridgend County Borough Council. As a result of these changes this report does not draw conclusions about changes in disease prevalence and severity for these Local Health Boards between the 2023/24 inspection and those conducted prior to this point.

Local Health Board	Mean estimated school year seven population 2016/17	Estimated year 7 population 2023/24
Abertawe Bro Morgannwg UHB/Swansea Bay UHB	5757	4431
Cwm Taf UHB/Cwm Taf Morgannwg UHB	3313	5238

Table A1: Population and number of examinations of two University Health Boards pre- and post-Bridgend boundary changes

		Cwm Taf UHB		Abertawe Bro Morgannwg UHB		
		Merthyr Tydfil	Rhondda Cynon Taf	Bridgend	Neath Port Talbot	Swansea
2008/09	Mean D3MFT	0.87	1.23	0.76	0.89	0.92
	%d3fMT>0	42.7	51.4	34.8	41.3	41.3
	Mean D3MFT if D3MFT>0	2.05	2.38	2.17	2.15	2.23
	Mean D3T	0.37	0.49	0.30	0.30	0.31
2012/13	Mean D3MFT	0.94	0.93	0.77	0.86	0.86
	%d3fMT>0	45.3	40.5	39.3	37.8	37.7
	Mean D3MFT if D3MFT>0	2.07	2.29	1.95	2.28	2.28
	Mean D3T	0.44	0.29	0.36	0.48	0.36
2016/17	Mean D3MFT	0.93	0.66	0.47	0.70	0.52
	%d3fMT>0	36.4	30.1	25.1	36.2	25.8
	Mean D3MFT if D3MFT>0	1.98	2.18	1.86	1.93	2.01
	Mean D3T	0.25	0.22	0.15	0.23	0.19
		Cwm Taf Morgannwg UHB			Swansea Bay UHB	
2023/24	Mean D3MFT	0.49	0.50	0.37	0.59	0.40
	%d3fMT>0	24.8	24.1	16.8	27.1	20.8
	Mean D3MFT if D3MFT>0	1.98	2.08	2.18	2.17	1.90
	Mean D3T	0.25	0.23	0.19	0.42	0.25

Table A2: Clinical profiles of Cwm Taf Morgannwg UHB (formerly Cwm Taf UHB) and Swansea Bay UHB (formerly Abertawe Bro Morgannwg UHB) for 2012/13 to 2023/24