Public Health England

Protecting and improving the nation's health

Dental public health epidemiology programme

Oral health survey of five-year-old and 12-year-old children attending special support schools 2014

A report on the prevalence and severity of dental decay

About Public Health England

Public Health England exists to protect and improve the nation's health and wellbeing, and reduce health inequalities. It does this through world-class science, knowledge and intelligence, advocacy, partnerships and the delivery of specialist public health services. PHE is an operationally autonomous executive agency of the Department of Health.

Public Health England
Wellington House
133-155 Waterloo Road
London SE1 8UG
Tel: 020 7654 8000
www.gov.uk/phe
Twitter: @PHE_uk
Facebook: www.facebook.com/PublicHealthEngland

Prepared by: Dental Public Health Epidemiology Team
For queries relating to this document, contact: Nick.Kendall@PHE.gov.uk

Published: September 2015
PHE publications gateway number: 2015218

Contents

Executive summary

This report presents summarised results from the Public Health England (PHE) Dental Public Health epidemiology programme (DPHEP) survey of five and 12-year-old children attending special support schools, 2014.[i] Estimates for disease prevalence and severity are reported at national, government regional, PHE centre and where appropriate, upper-tier local authority level. Where comparisons can be made with the 2013 Child Dental Health survey (CDHS) or with the PHE DPHEP survey data these are shown. The survey has provided information for targeting activities to address the dental indicator (tooth decay in children aged five) included in the public health outcomes framework (PHOF) and for planning services to suit the specific needs of this group.

This is the first time a national dental survey has been undertaken for this population group.

Summary tables can be found in Appendices A and B of this report. Full tables of results are available from www.nwph.net/dentalhealth/

Overall, of the five-year-old children in England whose parents gave consent for their participation in this survey, 22% had experienced dental decay. On average, these children had 3.90 primary teeth that were obviously decayed, missing or filled. The average number of decayed, missing or filled teeth ($d_3$mft) in the whole sample (including the 78% who were free of obvious decay) was 0.88.

For this age group, overall severity and prevalence were slightly lower than for children attending mainstream schools, but those who have experience of decay have more teeth affected on average. This age group were twice as likely to have had one or more teeth extracted than their mainstream-educated peers.

Among the 12-year-old children in England whose parents gave consent for their participation in this survey, 29% had experienced dental decay. On average, these children had 2.37 permanent teeth that were obviously decayed, missing or filled. The average number of decayed, missing or filled teeth (D_3MFT) in the whole sample (including the 71% who were decay free) was 0.69.

For 12-year-old children, again, overall severity and prevalence was lower than for children attending mainstream schools but those who had decay had it more severely with more teeth being affected on average.

At the government regional level, the five-year-old children's results revealed variation in the prevalence and severity of dental decay. The North West had the highest

prevalence and severity (33%, 1.49) compared with the lowest in the South West (10%, 0.33). At PHE centre level there was also variation with the highest prevalence of caries experience affecting 42% of children in Cumbria and Lancashire[ii] and 5% in Devon, Cornwall and Somerset.[ii] Severity ranged from greater than 1.50 $d_3$mft in two PHE centres to below 0.20 $d_3$mft in one other PHE centre.

The results for 12-year-old children also revealed a variation at the government regional level in the prevalence and severity of dental decay. The North West again had the highest prevalence and severity (41%, 1.04) compared with the lowest prevalence in the South East (22%) and the lowest severity in London (0.47). At PHE centre level the highest prevalence of caries experience was in Greater Manchester where 44% of children were affected and the lowest prevalence of caries experience affecting 18% was in Kent, Surrey and Sussex.[ii] Severity ranged from 1.23 D_3MFT in Greater Manchester to below 0.50 D_3MFT in London, South Midlands and Hertfordshire, and Kent, Surrey and Sussex.

This report highlights the results of more detailed analysis of the possible relationships between dental status and other factors in these children.

Local authorities are now responsible for improving health and reducing inequalities, including oral health.[1] This report provides baseline and benchmarking data that can be used in joint strategic needs assessments and to plan and commission oral health improvement interventions. PHE produced ‘Local authorities improving oral health: commissioning better oral health for children and young people: an evidence-informed toolkit for local authorities’ in June 2014,[2] which provides guidance regarding commissioning evidence-informed oral health improvement interventions.

National Institute for Health and Care Excellence (NICE) also published guidance ‘Oral health: approaches for local authorities and their partners to improve the oral health of their communities’ in October 2014 and this focusses on vulnerable groups, which include children with disabilities.[3]

Introduction

This report presents summarised results of the oral health of five and 12-year-old children attending special support schools who were surveyed in the academic year 2013 to 2014. This is the first national dental survey of this population age group in England.

Since 1985 standardised and coordinated surveys of child dental health have been conducted across the UK which provided robust, comparable information for use at local, government regional and national levels. In England these surveys are now part of the PHE Dental Public Health epidemiology programme (DPHEP), supported by the Dental Public Health epidemiology team (DPHET) and the Knowledge and Intelligence team North West (KIT NW). The surveys follow UK wide standards set down by the British Association for the Study of Community Dentistry (BASCD).[6] The standards that refer to school-based surveys normally exclude special support schools from the sampling frame so knowledge about children attending special support schools was only known in a few areas where additional ad hoc surveys were undertaken. The national survey reported here took place during the year when the fifth decennial survey of child dental health was being completed. This allows for comparisons to be made between the results of the Child Dental Health survey 2013 (CDHS)[15] and those from the most recent PHE DPHEP surveys.

A national protocol was prepared which was based, as far as possible, on the protocol for the 2012 survey of five-year-olds and the 2008 survey of 12-year-olds with adjustments to allow for the special circumstances of the survey children. These adjustments related to sampling methods, examination position, lighting and partial examinations.

It is acknowledged that many children with medical, behavioural, cognitive and communicative special needs attend mainstream schools, with or without support. The proportion of these varies from one local authority area to another depending upon local policies. Most authorities have some special educational provision for children with severe problems. These children may make greater demands on specialist dental treatment services in the short or long term which need to be estimated for planning purposes. The planning process should also ensure that these children, alongside their mainstream-educated peers, have equitable access to oral health improvement services to support achievement and maintenance of good oral health.

From 1 April 2013 the responsibility for commissioning dental public health functions transferred to local authorities[1] as set out in Statutory Instrument 3094 (2012).[4] This survey aims to support this responsibility by providing information on a particular sub-group of vulnerable children. The survey also provides relevant information relating to the dental indicator (tooth decay in children aged five) in the public health outcomes framework (PHOF).[5]

Information produced from PHE-coordinated surveys of child dental health provides key information for local oral health needs assessments, which are used by local authorities and NHS England when commissioning preventive and therapeutic services.

Section 1. Methodology

This survey was based on a national protocol which aligned as closely as possible with previous protocols for caries surveys of five and 12-year-old children and which was based on standards set by BASCD.[7] Adjustments were made to allow for the special circumstances of the survey children with regard to sampling methods, examination position, lighting and partial examinations.

The survey was undertaken during the academic year 2013 to 2014. The sampling frame was children attending state provided or independent, non-residential special support schools of all types which provide education for five-year-old and/or 12-year-old children. Funding of education at special support schools is, in most cases, provided by the state. The primary sampling unit was upper-tier local authorities and no sampling of schools was required as there are so few in each upper-tier local authority.

Data was collected by trained and calibrated examiners employed by NHS trusts providing community dental services. The training and calibration of examiners was carried out using the methodology described by Pine et al[6] and BASCD criteria for clinical examination, described by Pitts et al,[7] were employed. This involves a visual only examination for missing teeth (mt and MT), filled teeth (ft and FT) and teeth with obvious dentinal decay (d_3t and D_3T). The d_3mft (for primary teeth) or D_3MFT (for permanent teeth) is produced. The subscript $_3$ indicates that decay into dentine is recorded, which is widely accepted in the literature, acknowledging that it provides an underestimate of the true prevalence and severity of disease. The presence and absence of plaque and oral sepsis were also recorded.

The protocol required that positive consent was obtained before the survey from the child's parent or from someone with the competence to give consent on behalf of the child. Requests for consent for sampled children were sent to parents and followed by a second request where no response was made to the first.

Data was collected using the Dental SurveyPlus 2 computer program. Electronic files of the raw, anonymised data were sent from fieldwork teams to dental epidemiology coordinators (DECs) and on to the PHE DPHET via a secure web portal. Data cleaning, quality checks and initial analyses were undertaken before the data was linked via the child's home postcode to look-up tables for geographic allocation and for scores from the index of multiple deprivation 2010 (IMD 2010) which have been adjusted for the 2011[9] census. The DPHET and the KIT NW worked jointly on the analyses, result collation, report compilation and quality assurance.

No weighting of the sample data was undertaken because there is some evidence that a number of disabilities and conditions are more prevalent in more deprived populations.[10] It would therefore produce incorrect estimates of dental disease prevalence from this population if the data were weighted to reflect the distribution of deprivation levels in total local authority.

Confidence limits were calculated and are presented as errors bars on charts in this report and in the tables available from www.nwph.net/dentalhealth. The 95% confidence limits are the lower and upper levels of a range of values, around the estimate, within which we can say with 95% confidence that the true value for the population lies. Larger sample sizes result in smaller confidence interval ranges, thus values are more likely to be true. When comparing results, if the lower and upper confidence intervals of sample estimates do not overlap, then it can be assumed there is a significant difference between the estimates.

Section 2. Results

Headline results are presented here along with an indication of the range of results and some high-level illustrations with comparisons with same age children attending mainstream schools. Full tables and charts of results at upper-tier local authority (where sufficient numbers were involved), PHE centre, government regional and national levels are available at www.nwph.net/dentalhealth.

Participation in the survey

In total, 149 upper-tier local authorities out of 152 took part in the survey. However, in only 14 local authorities were enough five-year-old children examined to produce valid estimates for individual LAs, and only 55 examined enough 12-year-old children to enable this. It was anticipated that there would be insufficient data to report results for a large number of local authorities. However, reporting at government regional and PHE centre levels was possible and comparison with other child cohort surveys at these levels was also possible.

A total of 89% of consented children were examined, representing 66% of five-year-old children and 50% of 12-year-old children attending special support schools. Simple non response to the request for consent was the most common reason for no consent, despite two requests and schools actively seeking returned forms. Only 3% of five-year-old children and 5% of 12-year-old children with consent declined to take part on the day of examination. Absenteeism accounted for a further loss of 8% of five-year-old and 7% of 12-year-old consented children.

The proportion of five-year-old children who participated in the survey varied between PHE centres, from 49% in Kent, Surrey and Sussex[ii] to 88% in Anglia and Essex. Among 12-year-

old children representation varied from 40% in Cumbria and Lancashire[ii] to 73% in Thames Valley.

A total of 1,415 completed dental charts were included in the final five-year-old caries analysis which represented 73% of those children seen, 23% (450) had only a partial examination and for 4% (71) no examination was possible. There was a completed plaque assessment for 95% (1,834) of five-year-old children seen and 94% (1,813) had a completed sepsis assessment.

In the 12-year-old analysis a total of 3,055 completed dental charts were included in the caries analysis which represented 88% of those children seen, 10% (349) had only a partial examination and for 2% (55) no examination was possible. There was a completed plaque assessment for 98% (3,385) of 12-year-old children seen and 97% (3,362) had a completed sepsis assessment.

Table 1: Number of special support schools and number of children attending them (source: Edubase 2013*), number of children seen and % of those attending by PHE centres

PHE centre	5-year-olds				12-year-olds			
	Special support schools N	Children attending N	Children examined N	Examined % of children attending	Special support schools N	Children attending N	Children examined N	Examined % of children attending
Anglia and Essex	39	136	119	88	51	420	271	65
Avon, Gloucestershire and Wiltshire	23	118	92	78	29	248	148	60
Cheshire and Merseyside	27	125	98	78	39	331	192	58
Cumbria and Lancashire[ii]	31	79	63	80	40	336	134	40
Devon, Cornwall and Somerset[ii]	20	59	33	56	32	210	107	51
East Midlands	43	135	112	83	53	392	171	44
Greater Manchester	28	194	135	70	39	442	187	42
Kent, Surrey and Sussex[ii]	47	299	146	49	78	634	257	41
London	85	500	286	57	110	986	472	48
North East	29	187	127	68	36	458	202	44
South Midlands and Hertfordshire	26	165	117	71	38	363	219	60
Thames Valley	25	100	62	62	27	211	153	73
Wessex	28	129	107	83	31	334	221	66
West Midlands	65	466	308	66	78	935	421	45
Yorkshire and the Humber	47	249	131	53	59	573	304	53
England	**563**	**2,941**	**1,936**	**66**	**740**	**6,873**	**3,459**	**50**

*Numbers on Edubase may differ from actual numbers in schools.

Table 2: Examination status of five- and 12-year old children by PHE centres

PHE centre	5-year-olds seen			12-year-olds seen		
	Full examination %	Partial examination %	No examination possible %	Full examination %	Partial examination %	No examination possible %
Anglia and Essex	74	22	4	92	7	1
Avon, Gloucestershire and Wiltshire	87	13	0	82	18	0
Cheshire and Merseyside	74	21	4	93	7	0
Cumbria and Lancashire[ii]	68	19	13	77	13	10
Devon, Cornwall and Somerset[ii]	61	39	0	89	11	0
East Midlands	80	18	2	96	4	0
Greater Manchester	67	30	3	92	7	1
Kent, Surrey and Sussex[ii]	72	16	12	85	8	7
London	75	22	2	89	10	1
North East	71	24	5	87	12	1
South Midlands and Hertfordshire	85	15	0	92	8	0
Thames Valley	61	39	0	81	19	0
Wessex	71	26	3	84	15	1
West Midlands	72	25	4	91	8	1
Yorkshire and the Humber	66	31	3	87	12	2
England	**73**	**23**	**4**	**88**	**10**	**2**

This shows that the majority of children, 73% of five-year-olds and 88% of 12-year-olds, were able to undergo a full examination in school. However, a significant minority (23% and 10%) could only co-operate sufficiently to have a partial examination. In all but two centres the proportions of children who could not be examined at all was fewer than 5%. This gives some idea of the proportion of children attending special support schools who would need specialised clinical services to enable a full examination to be carried out. While it can be deduced that more than 27% of five-year-olds and 12% of 12-year-olds attending special support schools would need specialised services for the provision of clinical treatment, these are minimum figures. It cannot be known what proportion of those children who complied with full examination would also be sufficiently compliant to safely accept more active treatment.

Full examination was least often completed for five-year-old children with severe learning disability (68%) and most often completed among those attending schools that specialise in hearing or visual disability (96%) (Table 5). Among 12-year-olds full examination occurred with

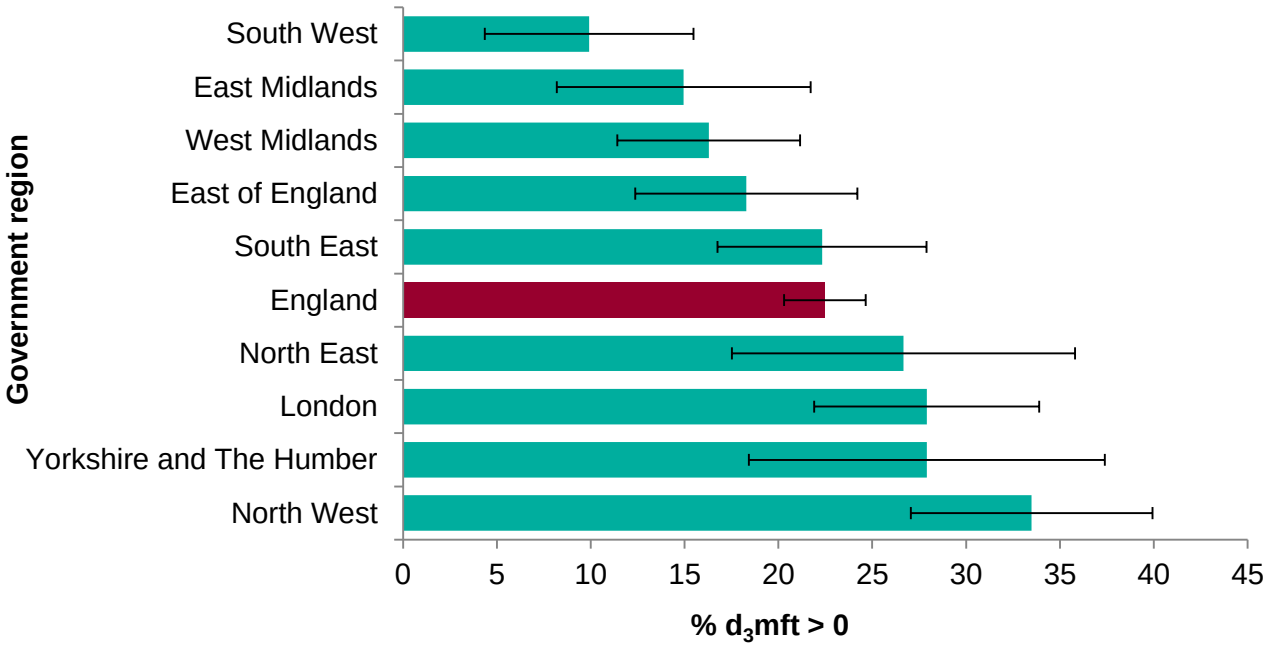
96% of those with moderate learning disabilities and was lowest at 74% among those with profound and multiple learning disabilities (Table 6).

Prevalence of dental decay at age five

In England, 22% of five-year-old children attending special support schools had experience of obvious dental decay (caries), having one or more primary teeth that were decayed to dentinal level, extracted or filled because of caries (%$d_3$mft>0). The remaining 78% were free from visually obvious dental decay. Across the government regions, estimates ranged from 33% in the North West to 10% in the South West (Figures 1 and 2).

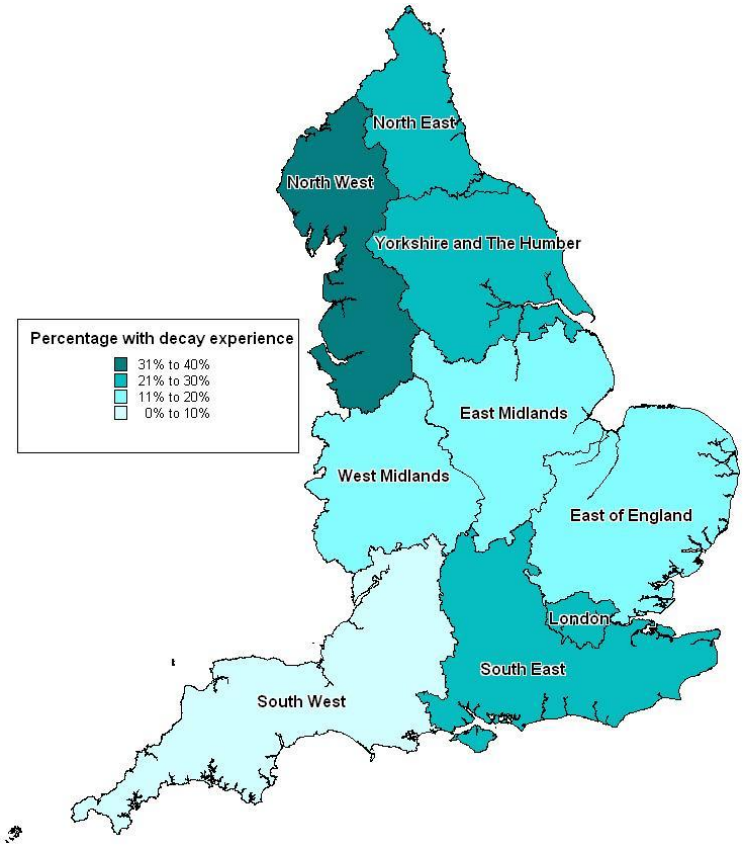
This compares with a prevalence of 28% found in the 2012 DPHEP survey of children attending mainstream schools (Table 3).

Figure 1: Percentage of five-year-old children attending special support schools with decay experience ($d_3$mft > 0) in England by government region, 2014.



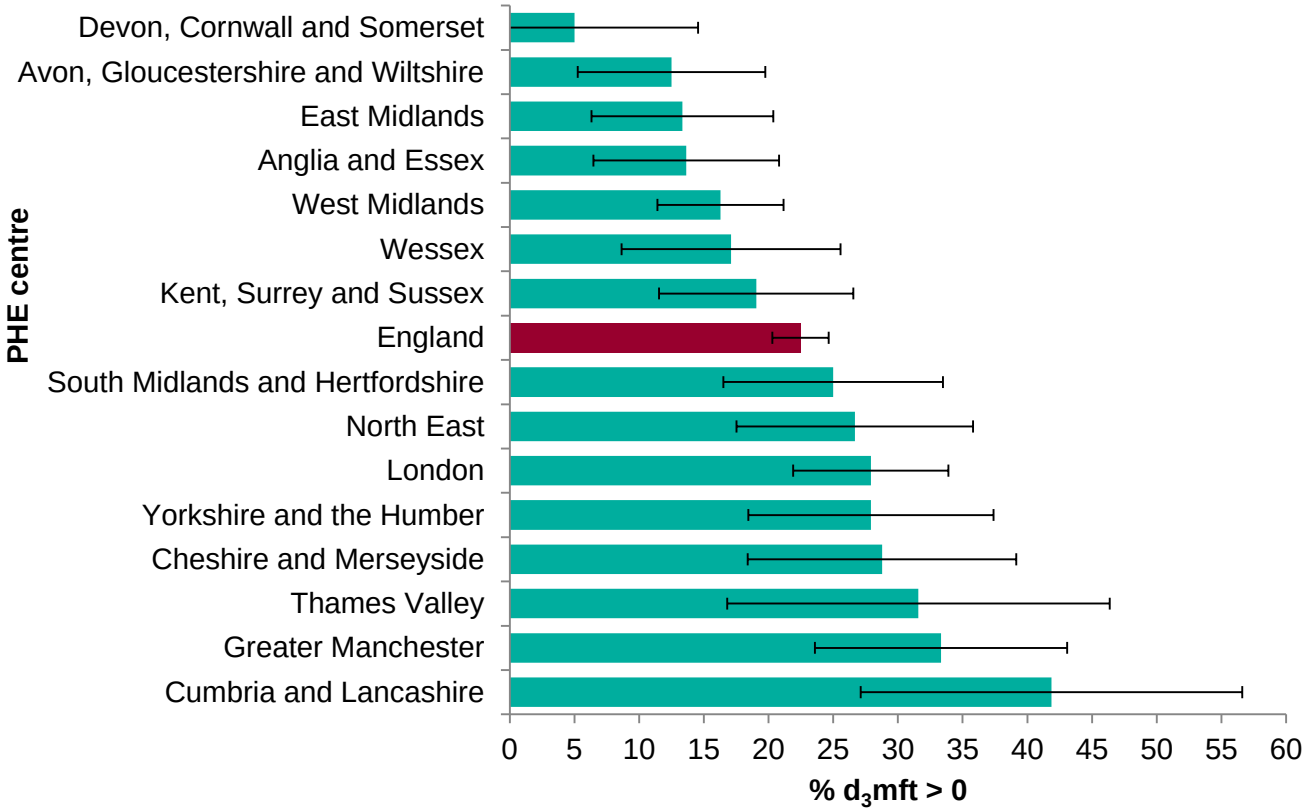
Error bars represent 95% confidence limits

Figure 2: Percentage of five-year-old children attending special support schools with decay experience ($d_3$mft > 0) in England by government region, 2014.



At the PHE centre level there were variations, ranging from Cumbria and Lancashire[ii] where 42% were affected, to Devon, Cornwall and Somerset[ii] where 5% had experience of dentinal decay (Figure 3).

Figure 3. Percentage of five-year-old children attending special support schools with decay experience ($d_3$mft > 0) in England by Public Health England centre, 2014.



Error bars represent 95% confidence limits

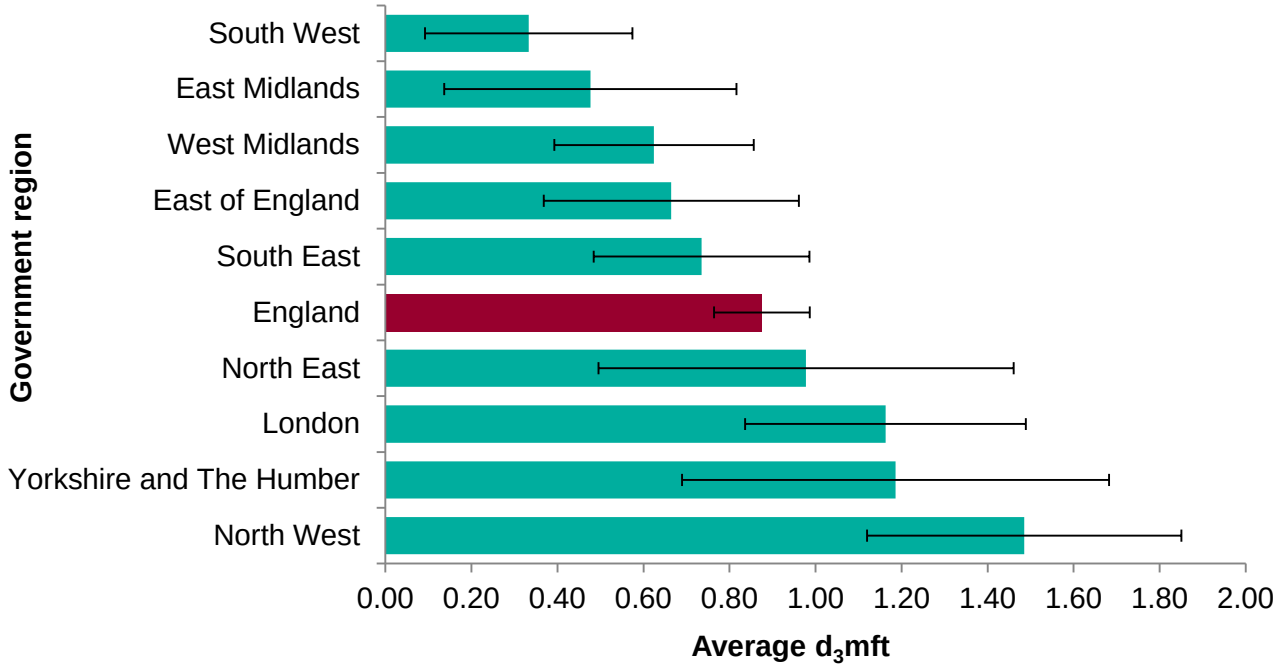
Severity of dental decay at age five

In England, the average number of primary teeth affected by decay (decayed, missing or filled teeth ($d_3$mft) per child attending special support schools was 0.88. At the government regional level this ranged from 1.49 in the North West to 0.33 in the South West (Figure 4).

The figure is slightly lower than the mean of 0.94 found in the 2012 DPHEP survey of mainstream five-year-olds[11] (Table 3).

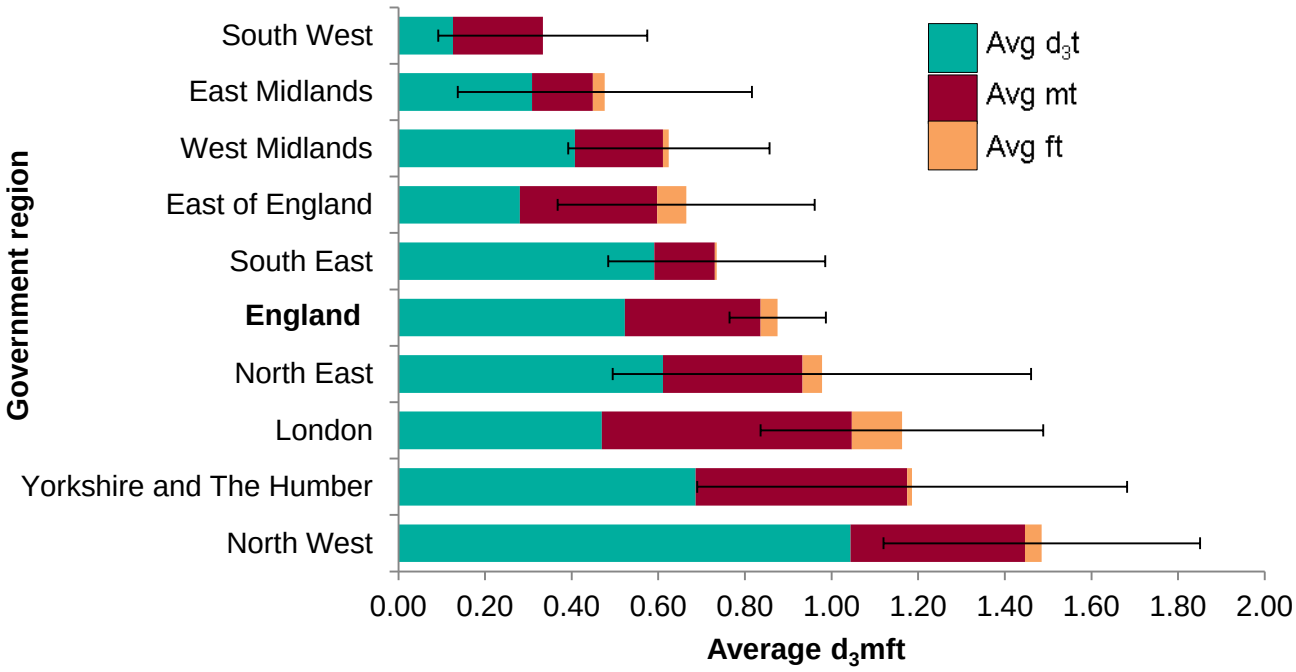
The number of teeth with obvious, untreated dentinal decay (d_3t) made up 60% of the $d_3$mft index in this age group, compared with 78% in mainstream schools.

Figure 4: Average number of dentinally decayed, missing (due to decay) and filled primary teeth (d_3mft) among five-year-old children attending special support schools in England by government region, 2014.



Error bars represent 95% confidence limits

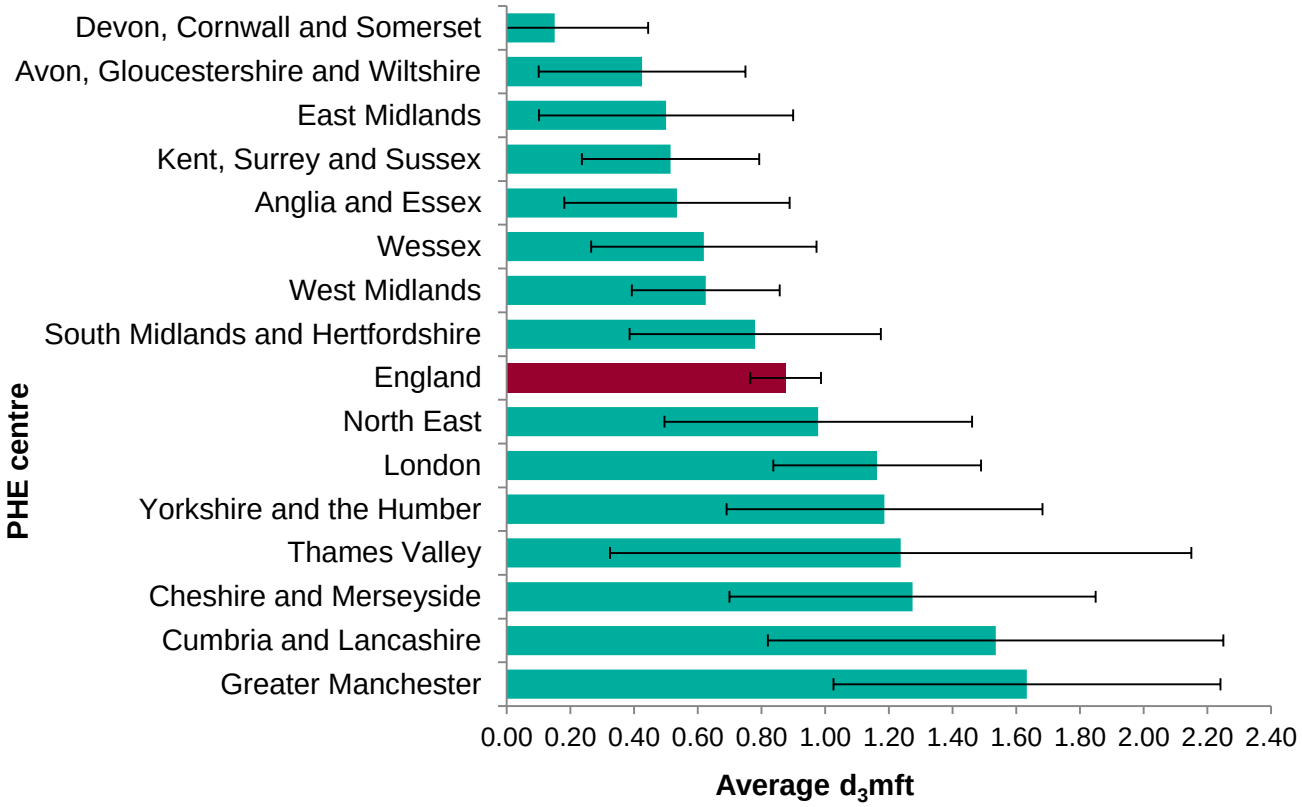
Figure 5: Average number of dentinally decayed, missing (due to decay) and filled primary teeth (d_3mft), with components, among five-year-old children attending special support schools in England by government region, 2014.



Error bars represent 95% confidence limits

There was variation in mean $d_3$mft across PHE centres, ranging from 1.63 in Greater Manchester to 0.15 in Devon, Cornwall and Somerset[ii] (Figure 6).

Figure 6: Average number of dentinally decayed, missing (due to decay) and filled primary teeth ($d_3$mft) among five-year-old children attending special support schools in England by Public Health England centre, 2014.

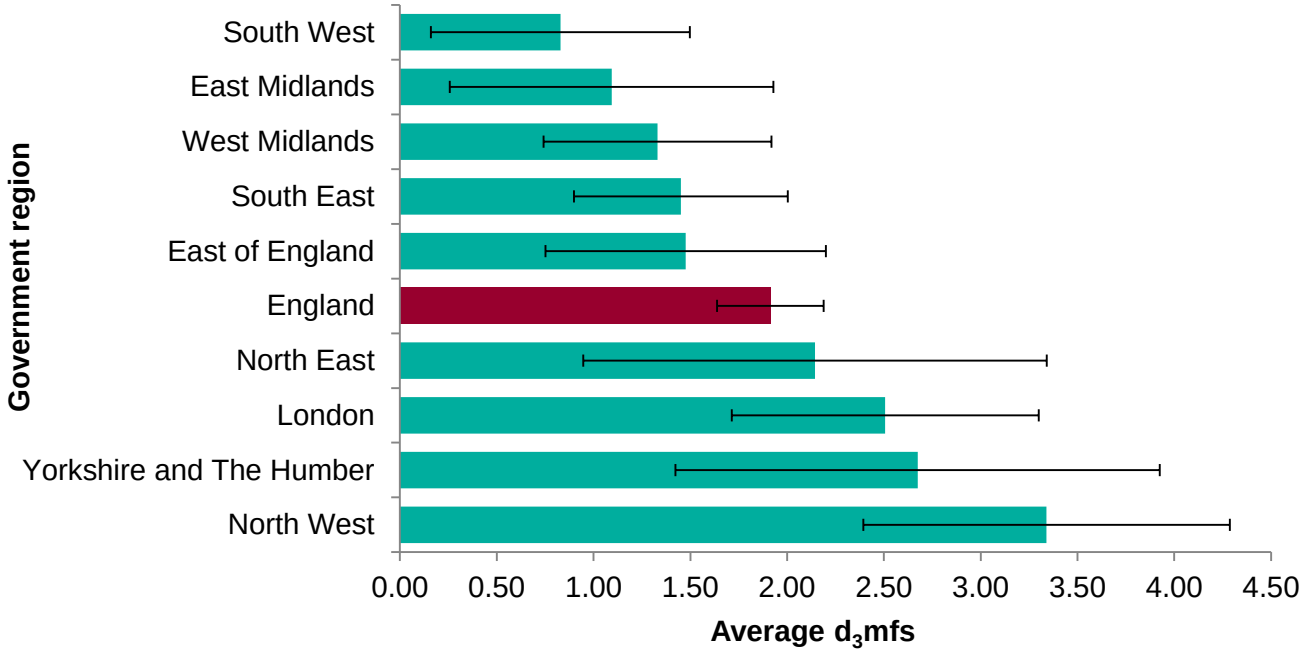


Error bars represent 95% confidence limits

Extent of dental decay at age five

In England, the average number of primary tooth surfaces affected by decay (decayed, missing or filled surfaces, $d_3$mfs) per child attending special support schools was 1.91, this compares with an average of 2.14 $d_3$mfs among mainstream-educated children. At the government regional level this ranged from 3.34 in the North West to 0.83 in the South West (Figure 7). Those affected by decay experience in special support schools had an average 8.51 $d_3$mfs compared to those in mainstream education with decay experience who had on average 7.71 surfaces affected. Further analysis reveals that decayed teeth in both groups had a similar number of surfaces affected by decay.

Figure 7: Average number of dentinally decayed, missing (due to decay) and filled primary surfaces ($d_3$mfs) among five-year-old children attending special support schools in England by government region, 2014.



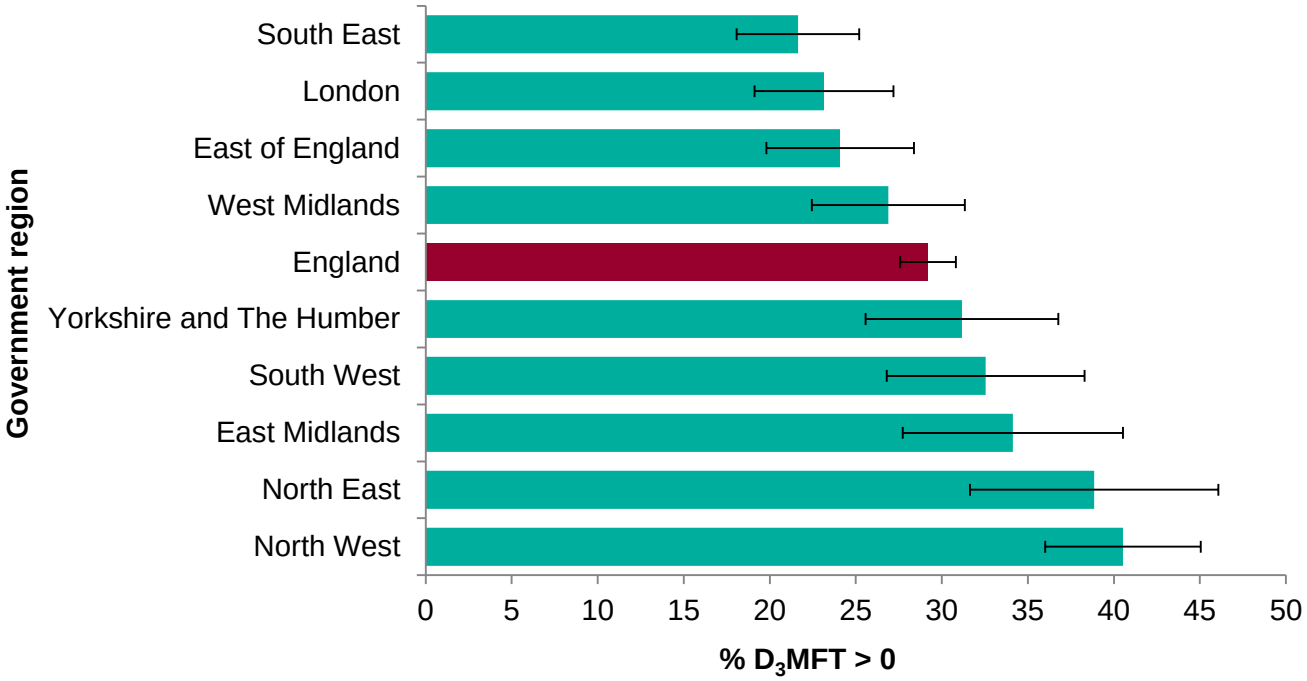
Error bars represent 95% confidence limits

Prevalence of dental decay at age 12

In England, 29% of 12-year-old children attending special support schools had experience of obvious dental decay (caries), having one or more permanent teeth that were obviously decayed to dentinal level, extracted or filled because of caries (%D_3MFT>0). The remaining 71% were free from visually obvious dental decay. Across the government regions, estimates ranged from 41% in the North West to 22% in the South East (Figures 8 and 9).

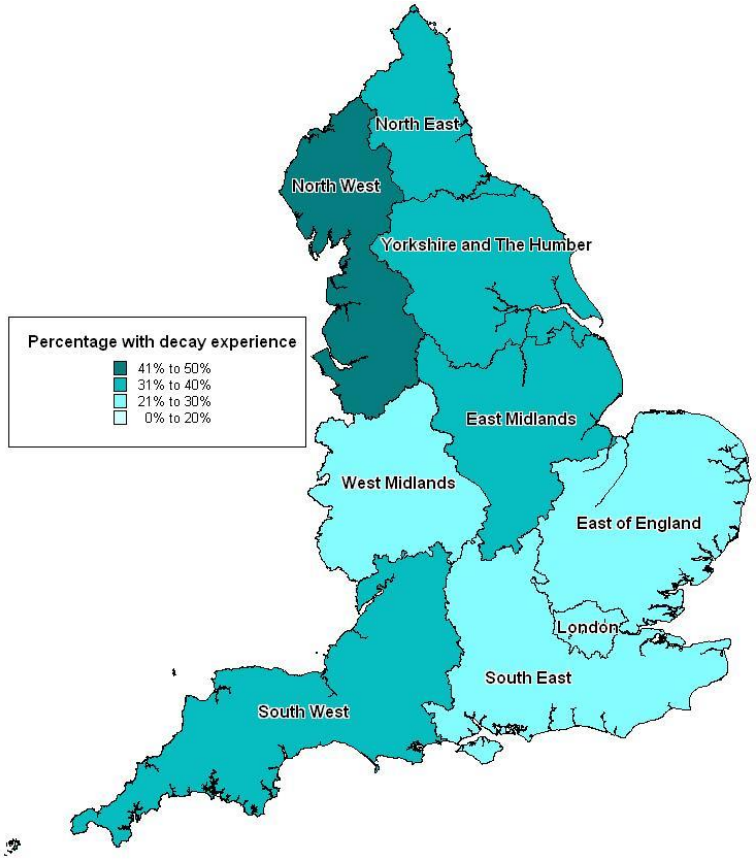
This compares with 33% of 12-year-old children attending mainstream schools as found in the 2008/09 survey of 12-year-olds (Table 4).[12]

Figure 8: Percentage of 12-year-old children attending special support schools with decay experience ($D_3MFT > 0$) in England by government region, 2014.



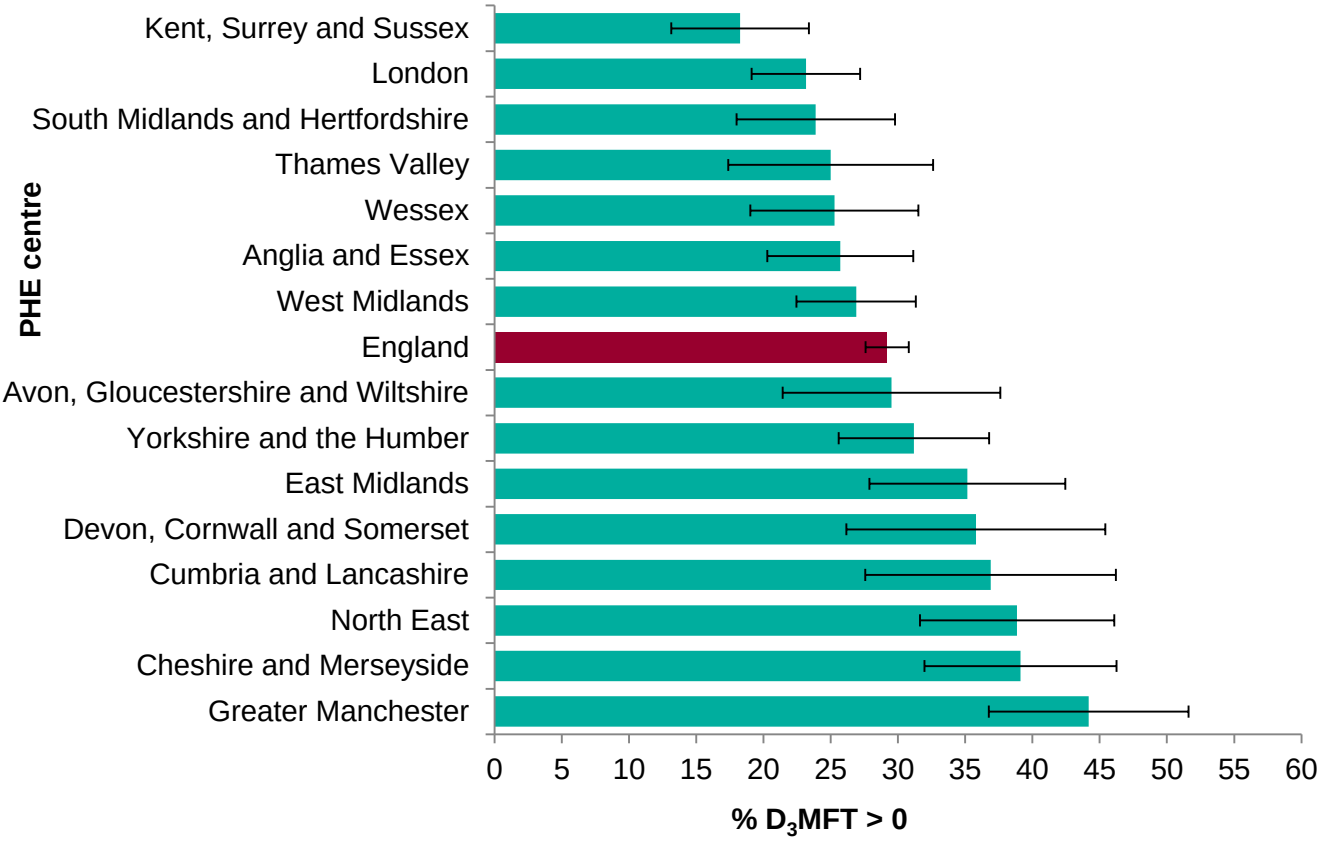
Error bars represent 95% confidence limits

Figure 9: Percentage of 12-year-old children attending special support schools with decay experience ($D_3MFT > 0$) in England by government region, 2014.



At the PHE centre level there were variations, ranging from Greater Manchester where 44% were affected to Kent, Surrey and Sussex[ii] where 18% had experience of dentinal decay (Figure 10).

Figure 10: Percentage of 12-year-old children attending special support schools with decay experience ($D_3MFT > 0$) in England by Public Health England centre, 2014.



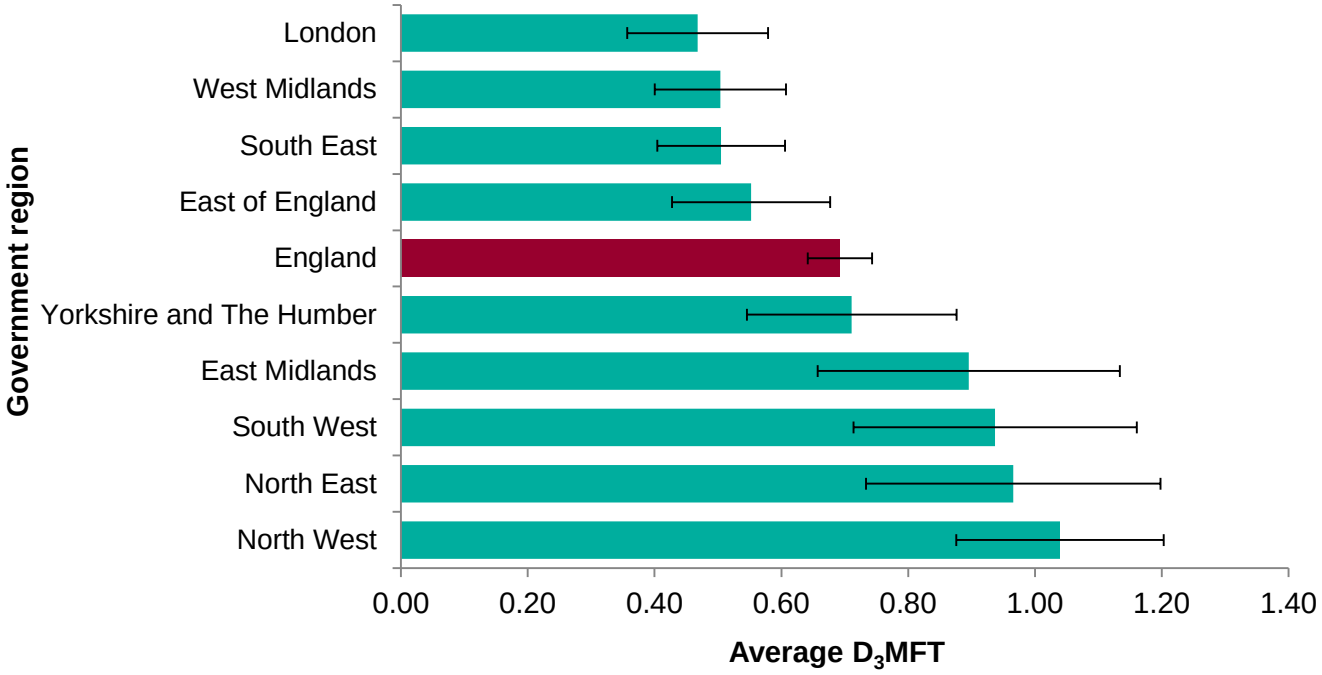
Severity of dental decay at age 12

In England, the average number of permanent teeth affected by decay (decayed, missing or filled teeth (D_3MFT) per child attending special support schools was 0.69. At the government regional level this ranged from 1.04 in the North West to 0.47 in London (Figure 11).

This compares with a mean of 0.74 found in the 2008/09 survey of 12-year-olds attending mainstream schools (Table 4).

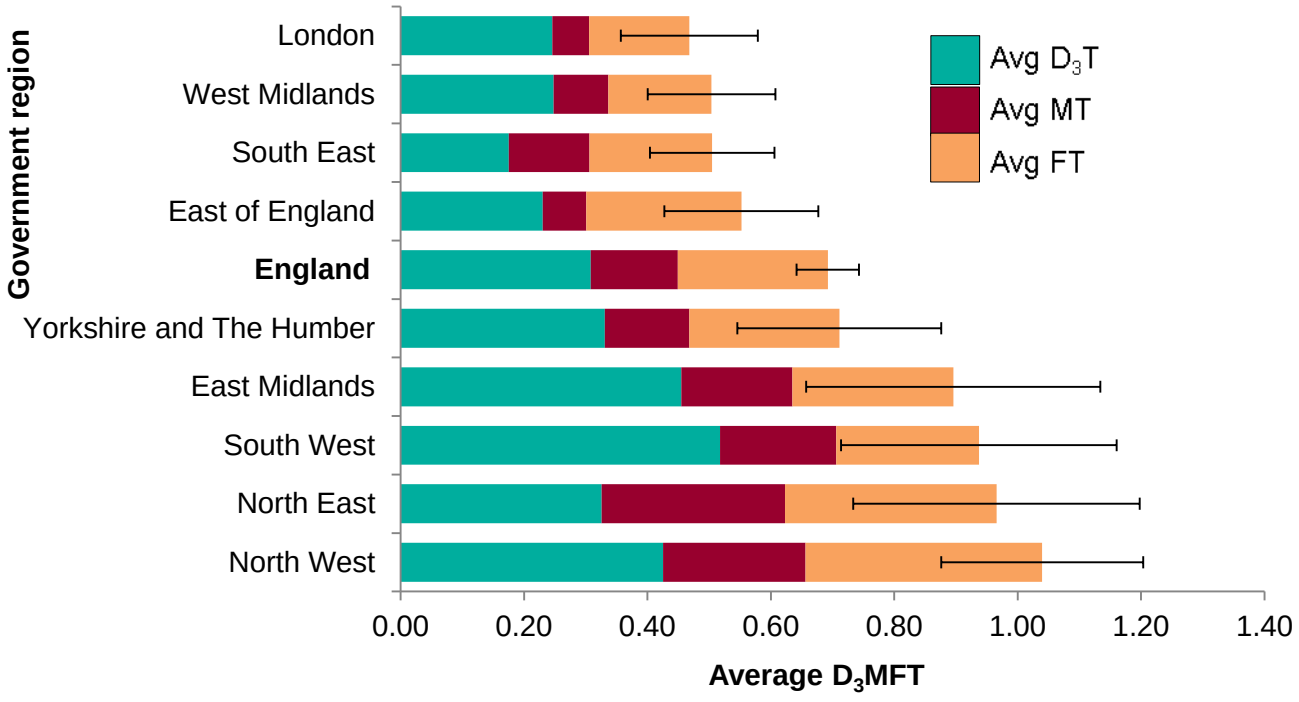
The number of teeth with obvious, untreated dentinal decay (D_3T) made up 44% of the D_3MFT index in this age group, compared with 43% in mainstream schools.

Figure 11: Average number of dentinally decayed, missing (due to decay) and filled permanent teeth (D_3MFT) among 12-year-old children attending special support schools in England by government region, 2014.



Error bars represent 95% confidence limits

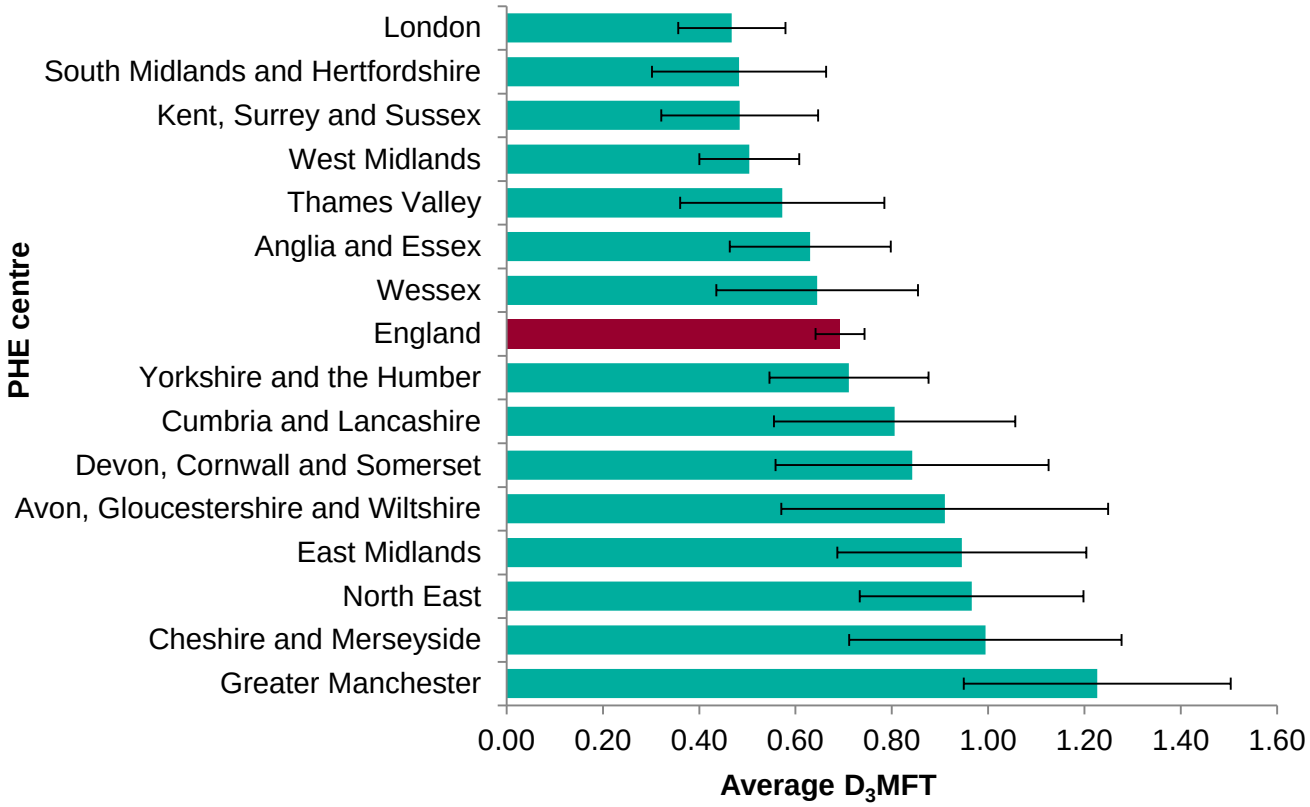
Figure 12: Average number of dentinally decayed, missing (due to decay) and filled primary teeth (D_3MFT), with components, among 12-year-old children attending special support schools in England by government region, 2014.



Error bars represent 95% confidence limits

There was variation in mean D_3MFT across PHE centres, ranging from 1.23 in Greater Manchester to 0.47 in London (Figure 13).

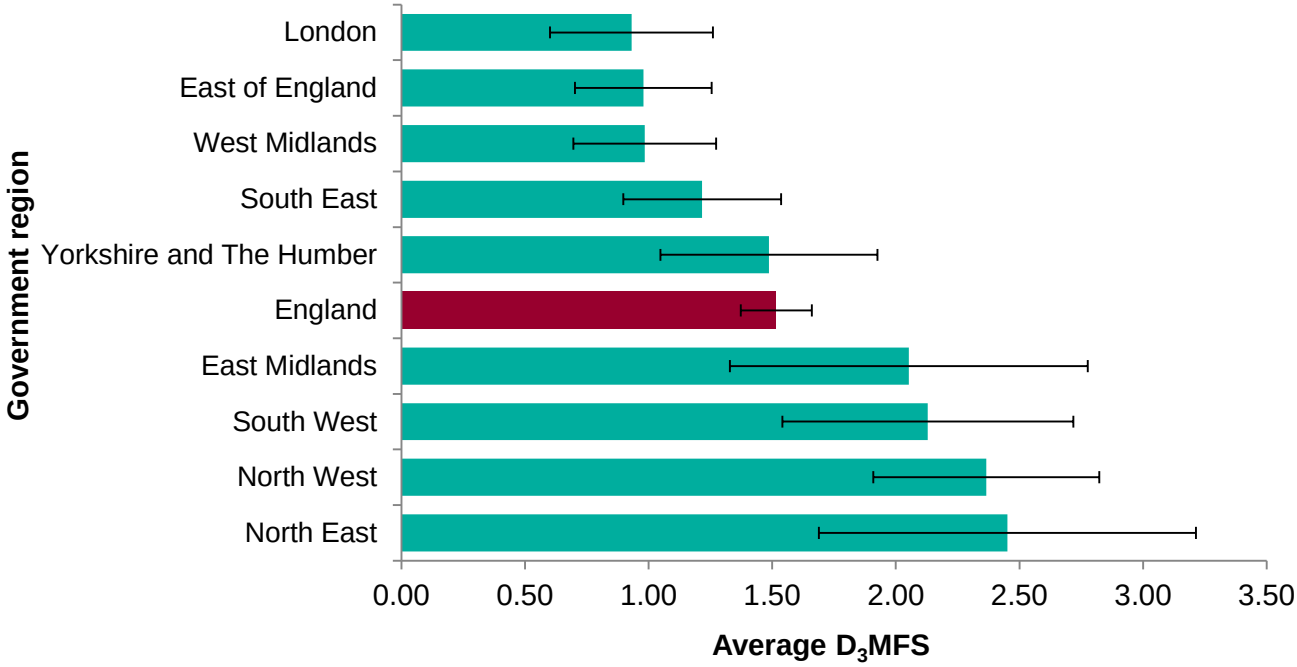
Figure 13: Average number of dentinally decayed, missing (due to decay) and filled permanent teeth (D_3MFT) among 12-year-old children attending special support schools in England by Public Health England centre, 2014.



Extent of dental decay at age 12

In England, the average number of permanent surfaces affected by decay (decayed, missing or filled surfaces (D_3MFS) per child attending special support schools was 1.52. At the government regional level this ranged from 2.45 in the North East to 0.93 in London (Figure 14). Those affected by decay experience had an average 5.20 D_3MFS.

Figure 14: Average number of dentinally decayed, missing (due to decay) and filled permanent surfaces (D_3MFS) among 12-year-old children attending special support schools in England by government region, 2014.



Severity of decay among children with caries experience at age five and 12

It is helpful to look more closely at those children who had experience of decay, separately from those with none. In the current survey the decay identified occurred in 22% of five-year-olds and 29% of 12-year-olds who were surveyed. Calculation of the average number of decayed, missing or filled teeth in the groups affected with decay (referred to as $d_3mft>0$ or $D_3MFT>0$) allows us to understand more about the extent of disease in the mouths of children who were affected.

Among the children with decay experience, the average number of decayed, missing (due to decay) or filled teeth was 3.90 among five-year-olds and 2.37 among 12-year-olds, this compares with 3.38 in mainstream five-year-old children and 2.21 in mainstream 12-year-old children (Tables 3 and 4). This ranged in special support school children from 4.43 in the North West to 3.19 in the East Midlands among five-year-olds, and ranged from 2.88 in the South West to 1.87 in the West Midlands among 12-year-olds.

At PHE centre level the variation of severity among affected children was greater, with a range of 4.90 in Greater Manchester to 2.70 d_3mft in Kent, Surrey and Sussex[ii] for five-year-olds. Among 12-year-olds the highest score for affected children was 3.08 in Avon, Gloucestershire and Wiltshire and the lowest in West Midlands (1.87).

This shows that children attending special support schools who get any decay have more teeth affected by this decay.

Comparison with children attending mainstream schools

Among five-year olds attending special support schools the prevalence of decay experience of 22% compares with 28% in the 2012 DPHEP survey of mainstream educated children. The mean severity measure of 0.88 $d_3$mft compares with 0.94 found in the 2012 DPHEP survey (Table 3). This comparison uses BASCD standards for calculating the prevalence of caries experience and the mean $d_3$mft.

Comparison with the 2013 Child Dental Health survey (CDHS) data requires the removal of the 'mt' component of the index for calculation of both prevalence and severity for the primary dentition. This is because the CDHS excludes missing teeth from their calculations for severity and prevalence and reports the $d_3$ft only. Thus, the revised prevalence for special support five-year-olds becomes 18% and compares with 31% in the CDHS (Table 3a). The mean $d_3$ft for special support children is 0.56 and compares with 0.89 in the CDHS. This shows the impact that the 'missing' component has upon the prevalence and severity calculations, especially for children attending special support schools.

Similar comparison can be made for 12-year-olds with the prevalence of 29% being lower than 33% in the 2009 DPHEP survey and 32% found in the CDHS. The mean D_3MFT of 0.69 in this survey is lower than that found in the 2009 DPHEP survey of 12-year-olds (0.74) and the CDHS (0.78). The criteria for calculation in the permanent dentition remain the same in all three surveys (Table 4).

Tables 3 and 3a: Mean prevalence and severity of dental caries among five- year-old children attending special support schools compared with DPHEP 2012 (applying BASCD criteria which include mt in the calculation of $d_3$mft) **and CDHS 2013** (applying CDHS criteria which exclude mt in the calculation of severity and prevalence).

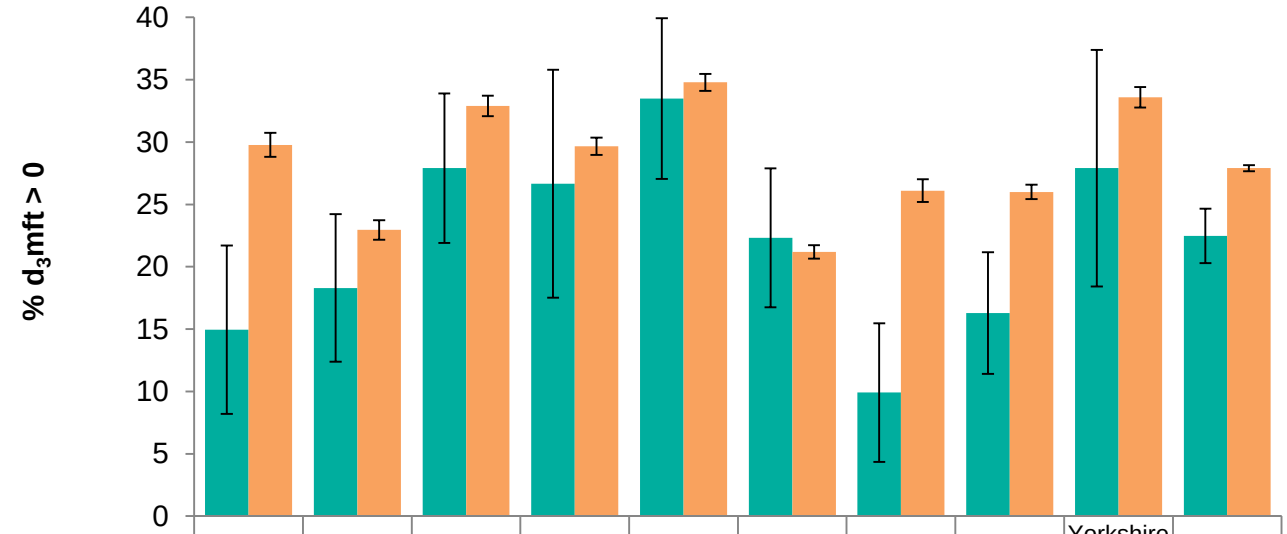
Survey group	N examined	% affected by caries ($dm_3ft>0$) (95% CI)	Mean $d_3$mft (95% CI)	Mean $d_3$mft among those affected (95% CI)
Special support school 5-yr-olds (mt included)	1,415	22.5 (20.3, 24.6)	0.88 (0.76, 0.99)	3.90 (3.58, 4.22)
Mainstream school 5-yr-olds 2012 DPHEP	133,516	27.9* (27.7, 28.1)	0.94 (0.93, 0.96)	3.38* (3.36, 3.41)

Table 3a:

Survey group	N examined	% affected by caries ($d_3ft>0$) (95% CI)	Mean d_3ft (95% CI)	Mean d_3ft among those affected (95% CI)
Special support school 5-yr-olds (mt excluded)	1,415	18.2 (16.2, 20.2)	0.56 (0.48, 0.64)	3.10 (2.81, 3.39)
Mainstream school 5-yr-olds 2012 DPHEP	133,516	26.8* (26.5, 27.0)	0.83* (0.82, 0.84)	3.12 (3.09, 3.14)
Mainstream school 5-yr-olds 2013 CDHS	1,526	30.7* (26.6, 34.8)	0.89* (0.74, 1.05)	2.90 (2.66, 3.17)

*significantly different from measure for special support children

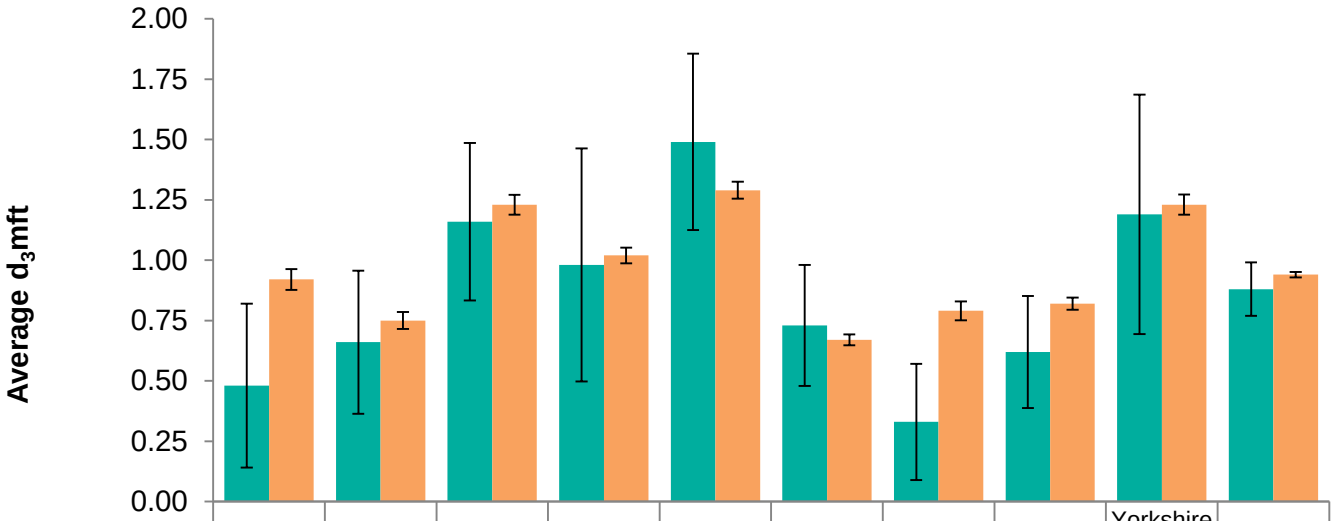
Figure 15: Percentage of five-year-old children with decay experience ($d_3mft > 0$) in special support (2014) and mainstream schools (2012) in England by government region.



	East Midlands	East of England	London	North East	North West	South East	South West	West Midlands	Yorkshire and The Humber	**England**
Special support	15	18	28	27	33	22	10	16	28	22
Mainstream	30	23	33	30	35	21	26	26	34	28
Difference (%)	15 (50%)	5 (20%)	5 (15%)	3 (10%)	1 (4%)	-1 (-5%)	16 (62%)	10 (37%)	6 (17%)	5 (19%)

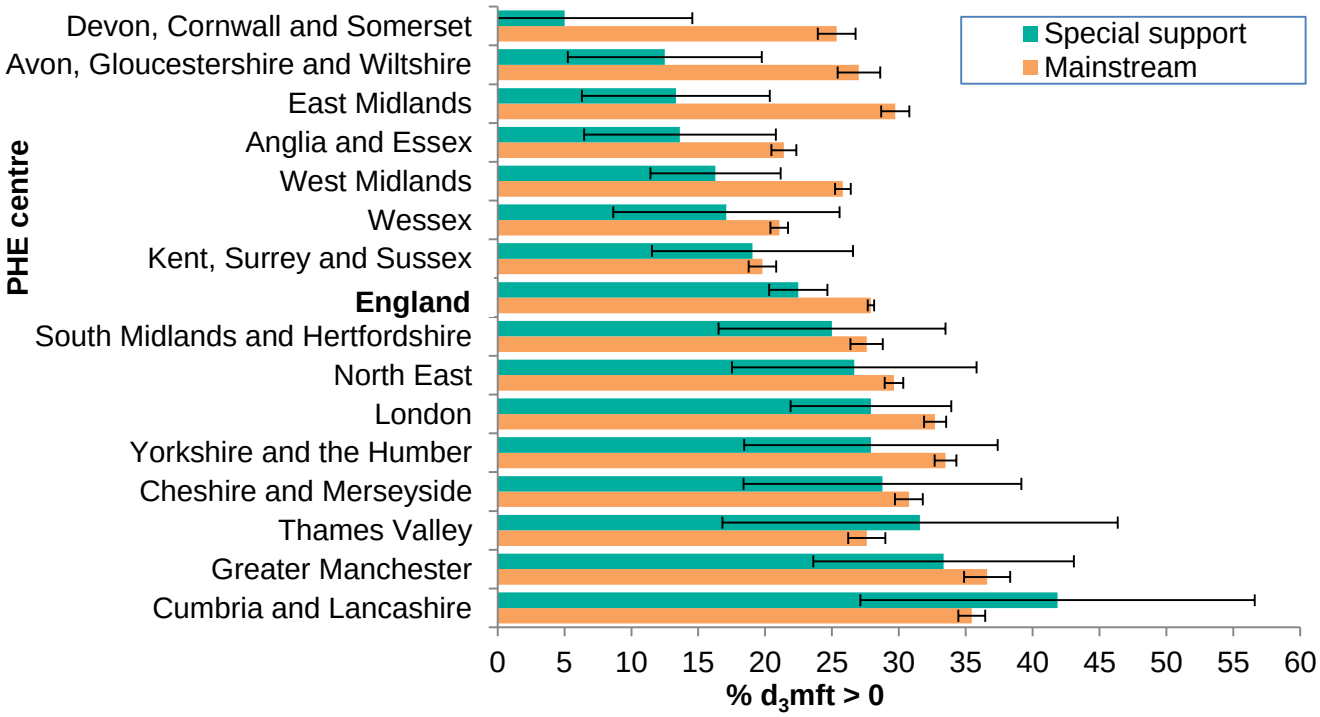
Error bars represent 95% confidence limits

Figure 16: Average number of dentinally decayed, missing (due to decay) and filled primary teeth (d_3mft) among five-year-old children in special support (2014) and mainstream schools (2012) in England by government region.



	East Midlands	East of England	London	North East	North West	South East	South West	West Midlands	Yorkshire and The Humber	**England**
Special support	0.48	0.66	1.16	0.98	1.49	0.73	0.33	0.62	1.19	0.88
Mainstream	0.92	0.75	1.23	1.02	1.29	0.67	0.79	0.82	1.23	0.94
Difference (%)	0.44 (48%)	0.09 (12%)	0.07 (6%)	0.04 (4%)	-0.20 (-16%)	-0.06 (-9%)	0.46 (58%)	0.20 (24%)	0.04 (3%)	0.06 (6%)

Figure 17: Percentage of five-year-old children with decay experience ($d_3mft > 0$) in special support (2014) and mainstream schools (2012) in England by Public Health England centre.



Error bars represent 95% confidence limits

Figure 18: Average number of dentinally decayed, missing (due to decay) and filled primary teeth ($d_3$mft) among five-year-old children in special support (2014) and mainstream schools (2012) in England by Public Health England centre.

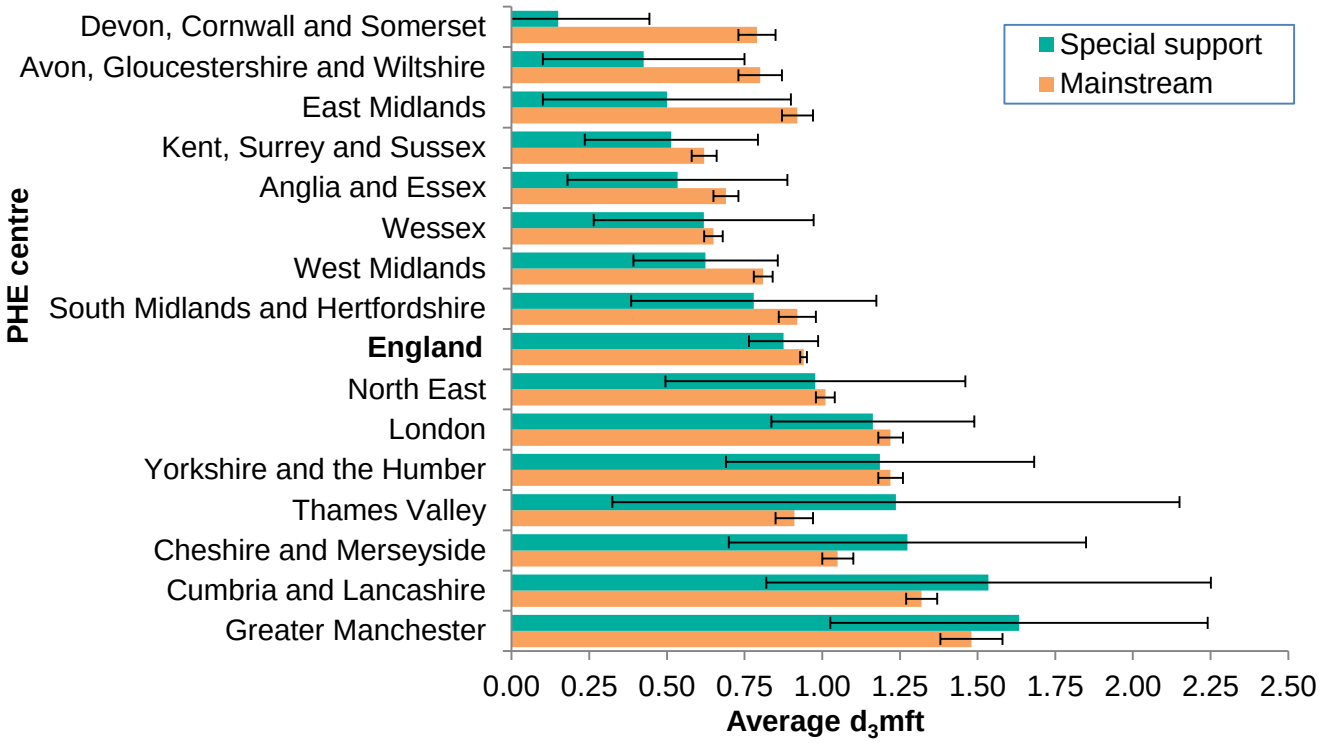
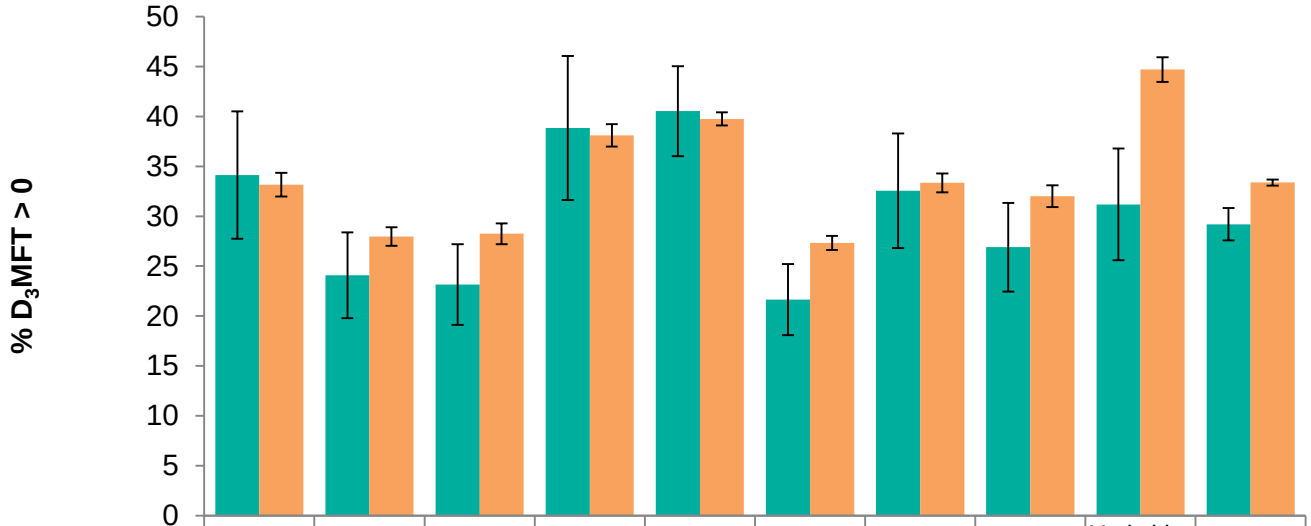


Table 4: Mean prevalence and severity of dental caries among 12-year-old children attending special support schools compared with DPHEP 2009 survey and CDHS 2013.

Survey group	N examined	% affected by caries (95% CI)	Mean D_3MFT (95% CI)	Mean D_3MFT among those affected (95% CI)
Special support school 12-yr-olds	3,055	29.2 (27.6, 30.8)	0.69 (0.64, 0.74)	2.37 (2.26, 2.49)
Mainstream school 12-yr-olds 2009 DPHEP	89,442	33.4* (33.1, 33.7)	0.74 (0.73, 0.75)	2.21* (2.19, 2.23)
Mainstream school 12-yr-olds 2013 CDHS	1,434	31.6 (26.9, 36.3)	0.78 (0.65, 0.91)	2.50 (2.17, 2.76)

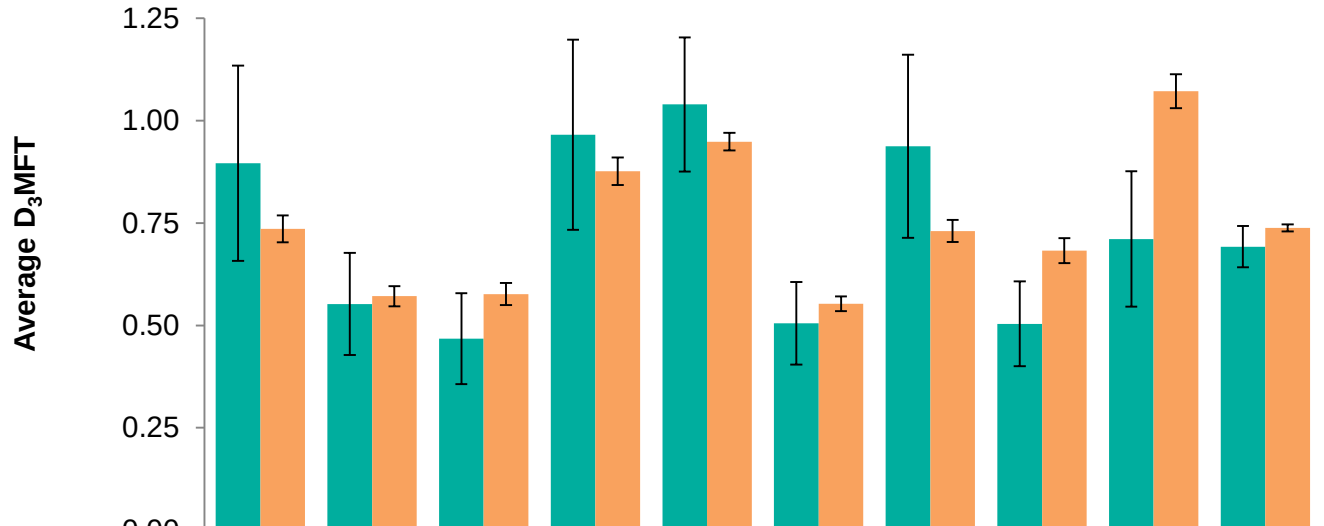
*significantly different from measure for special support children

Figure 19: Percentage of 12-year-old children with decay experience ($D_3MFT > 0$) in special support (2014) and mainstream schools (2009) in England by government region.



	East Midlands	East of England	London	North East	North West	South East	South West	West Midlands	Yorkshire and The Humber	**England**
Special support	34	24	23	39	41	22	33	27	31	29
Mainstream	33	28	28	38	40	27	33	32	45	33
Difference (%)	-1 (-3%)	4 (14%)	5 (18%)	-1 (-2%)	-1 (-2%)	6 (21%)	1 (2%)	5 (16%)	14 (30%)	4 (13%)

Figure 20: Average number of dentinally decayed, missing (due to decay) and filled permanent teeth (D_3MFT) among 12-year-old children in special support (2014) and mainstream schools (2009) in England by government region.



	East Midlands	East of England	London	North East	North West	South East	South West	West Midlands	Yorkshire and The Humber	**England**
Special support	0.90	0.55	0.47	0.97	1.04	0.50	0.94	0.50	0.71	0.69
Mainstream	0.74	0.57	0.58	0.88	0.95	0.55	0.73	0.68	1.07	0.74
Difference (%)	-0.16 (-22%)	0.02 (3%)	0.11 (19%)	-0.09 (-10%)	-0.09 (-10%)	0.05 (9%)	-0.21 (-28%)	0.18 (26%)	0.36 (34%)	0.05 (6%)

Figure 21: Percentage of 12-year-old children with decay experience ($D_3MFT > 0$) in special support (2014) and mainstream schools (2009) in England by Public Health England centre.

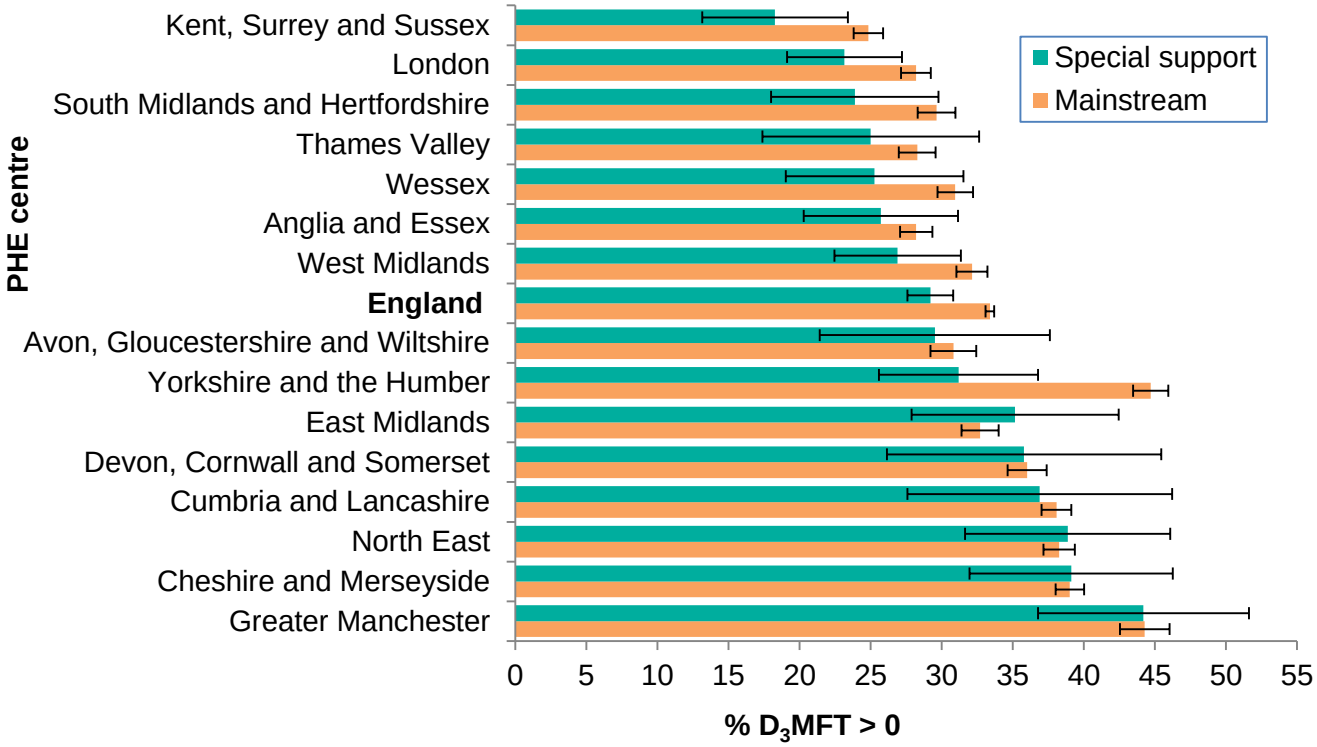
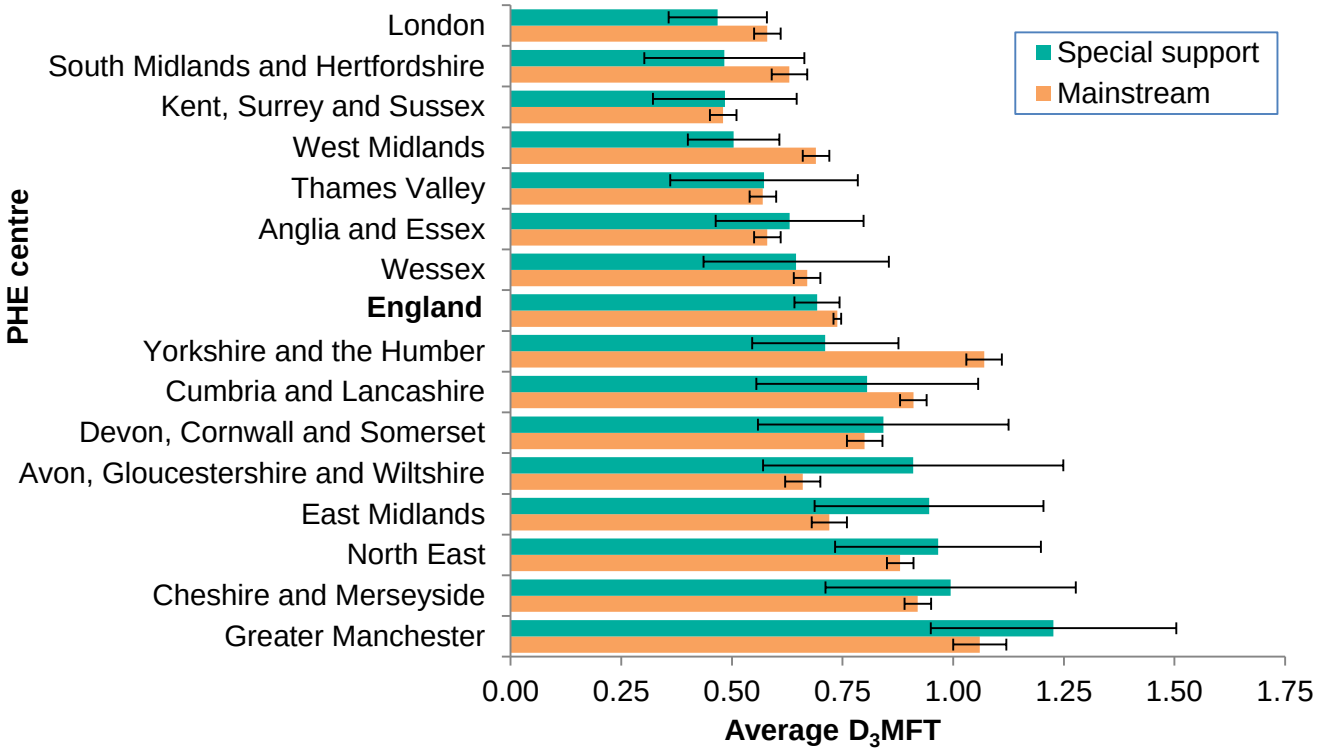


Figure 22: Average number of dentinally decayed, missing (due to decay) and filled permanent teeth (D_3MFT) among 12-year-old children in special support (2014) and mainstream schools (2009) in England by Public Health England centre.



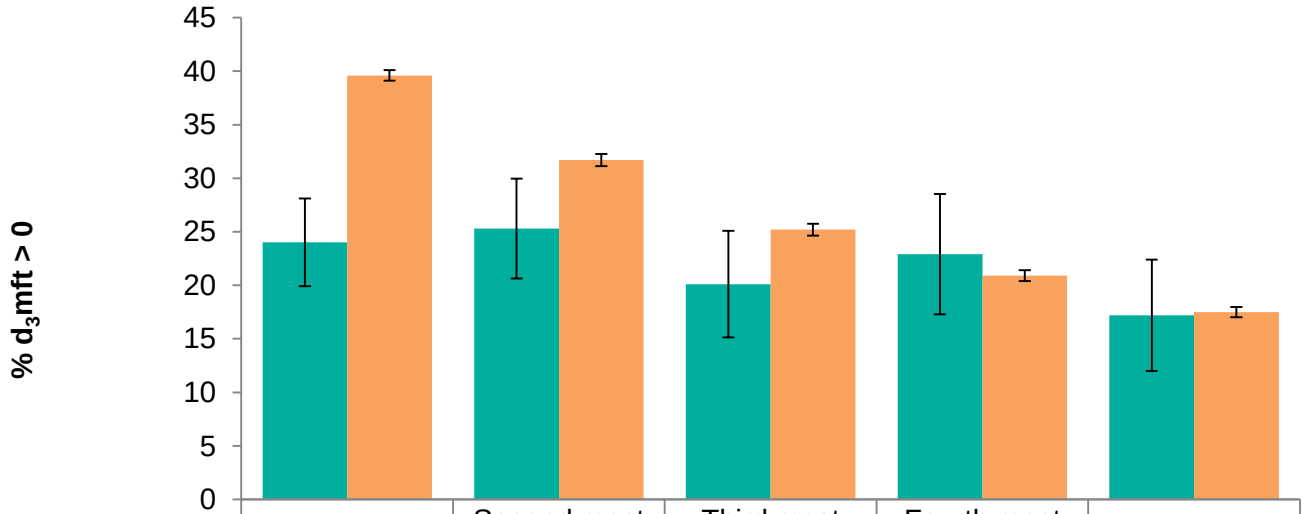
In summary, comparison with survey information involving mainstream educated children shows that in most instances the levels of decay in both age groups are similar within each of the geographical areas presented. There are very few significant differences and these are in the same direction with some geographies where the prevalence or severity of decay among children attending special support schools is lower than among mainstream educated children.

Correlation of decay prevalence and severity with deprivation

The association of high levels of decay with high levels of deprivation have been widely described. For example, in the most recent survey of five-year-olds in England, the correlation was shown to be strong, with 45% of the variation in decay levels in local authorities being explained by differences in deprivation.[11] Deprivation is measured using the index of multiple deprivation.[9]

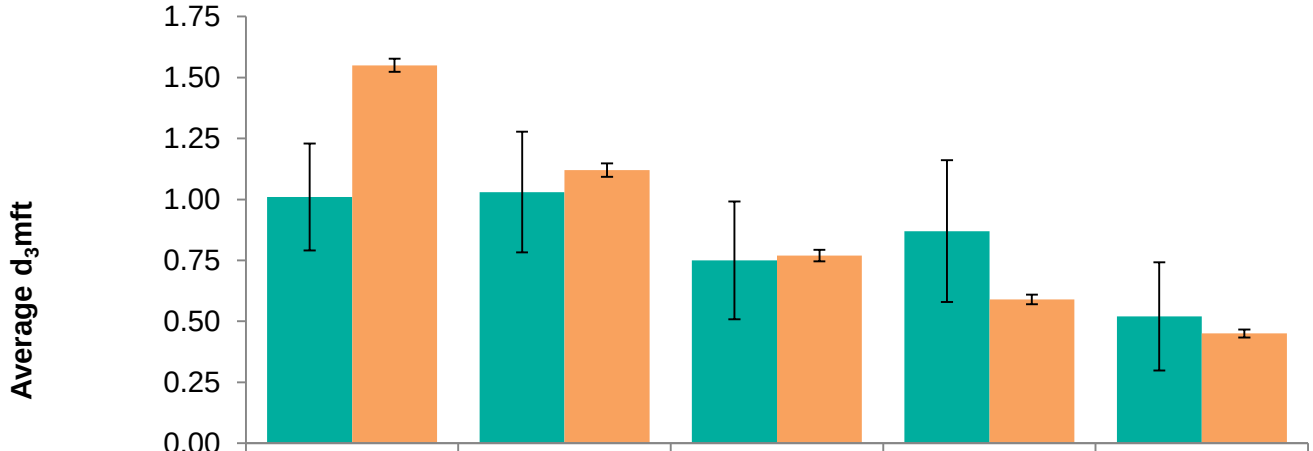
The association would appear to be weaker among five-year-old children in special support schools than those attending mainstream schools (see Figures 23 and 24). Children attending special support schools who are in the more deprived groups have significantly lower prevalence of caries but only in the most deprived group is there a significant difference in severity.

Figure 23: Prevalence of caries among five-year-old children attending special support schools and DPHEP survey 2012 results by index of multiple deprivation (IMD 2010).



	Most deprived	Second most deprived	Third most deprived	Fourth most deprived	Least deprived
Special support	24	25	20	23	17
Mainstream	40	32	25	21	18
Difference (%)	16 (39%)	6 (20%)	5 (20%)	-2 (-10%)	0 (2%)

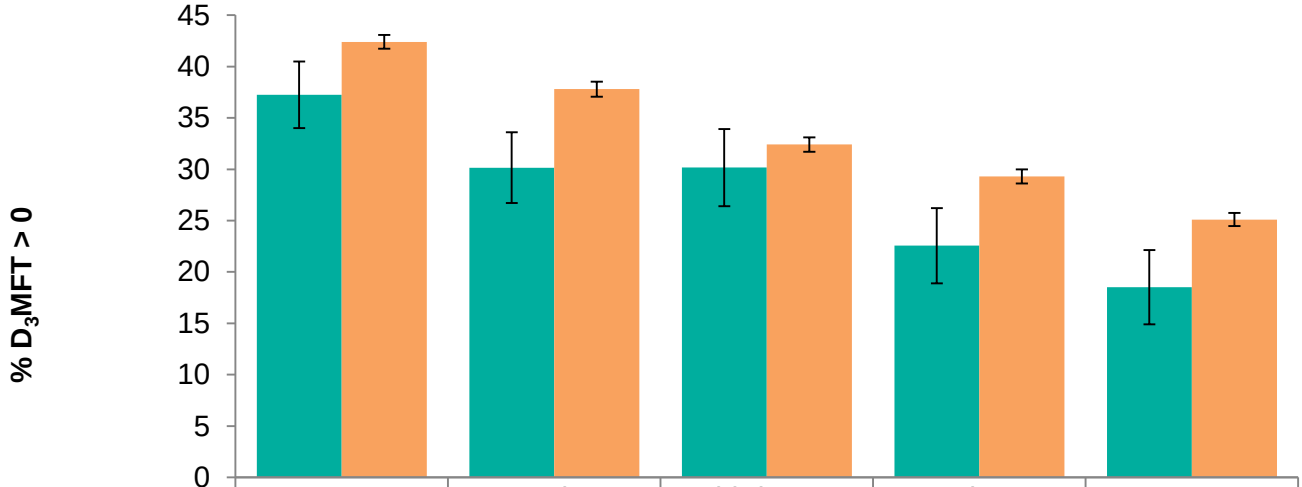
Figure 24: Severity of caries among five-year-old children attending special support schools and DPHEP survey 2012 results by index of multiple deprivation (IMD 2010).



	Most deprived	Second most deprived	Third most deprived	Fourth most deprived	Least deprived
Special support	1.01	1.03	0.75	0.87	0.52
Mainstream	1.55	1.12	0.77	0.59	0.45
Difference (%)	0.54 (35%)	0.09 (8%)	0.02 (3%)	-0.28 (-47%)	-0.07 (-16%)

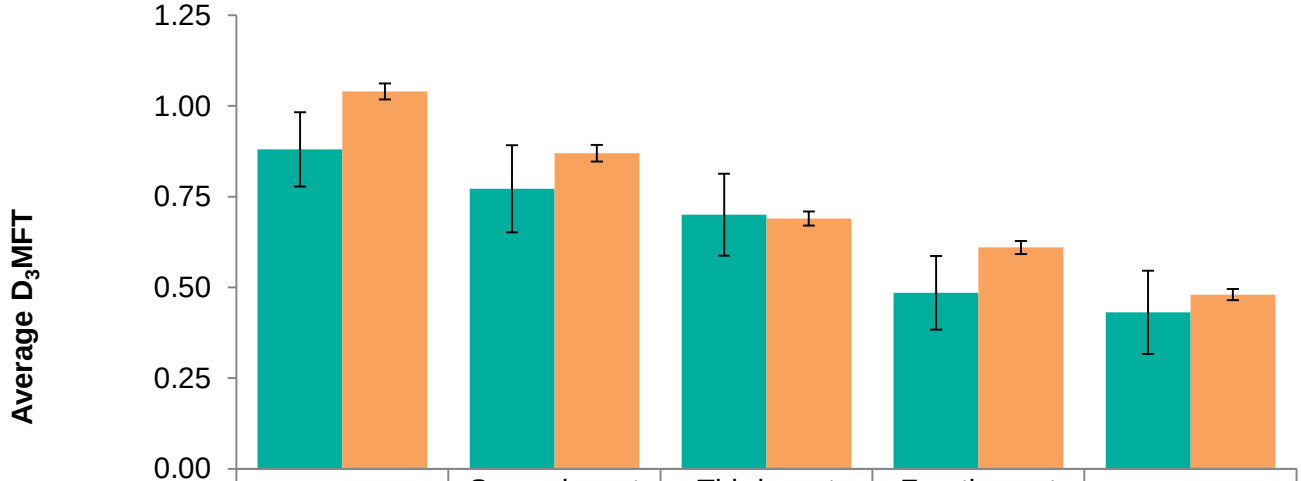
Figures 25 and 26 suggest that there is a stronger relationship between socio-economic deprivation and caries levels for 12-year-olds attending special support schools than for five-year-olds. This mirrors the association found among mainstream educated children where the most deprived children have higher prevalence and severity of decay.

Figure 25: Prevalence of caries among 12-year-old children attending special support schools and DPHEP survey 2009 results by index of multiple deprivation (IMD 2010).



	Most deprived	Second most deprived	Third most deprived	Fourth most deprived	Least deprived
Special support	37	30	30	23	19
Mainstream	42	38	32	29	25
Difference (%)	5 (15%)	8 (20%)	2 (7%)	7 (23%)	7 (26%)

Figure 26. Severity of caries among 12-year-old children attending special support schools and DPHEP survey 2009 results by index of multiple deprivation (IMD 2010).



	Most deprived	Second most deprived	Third most deprived	Fourth most deprived	Least deprived
Special support	0.88	0.77	0.70	0.49	0.43
Mainstream	1.04	0.87	0.69	0.61	0.48
Difference (%)	0.16 (15%)	0.10 (11%)	-0.01 (-1%)	0.12 (20%)	0.05 (10%)

Prevalence of extraction experience (children with teeth extracted due to dental decay) at age five

The proportion of five-year-old children attending special support schools who have had one or more teeth extracted on one or more occasions, across England, was 6% (95% CI 4.9–7.4%) (Table 5). At government regional level this ranged from 11% in London to 3% in the East and West Midlands and at PHE centre level ranged from 12% in Cumbria and Lancashire[ii] to zero in the Thames Valley. This overall figure is significantly higher than that found among mainstream educated children where the proportion with extraction experience was 3% (95% CI 3.0–3.2%).

It should be noted that the vast majority of these extractions would have required admission to hospital for such young children.

Measures of decay for different types of disability

There doesn't appear to be a strong or consistent pattern of disease levels affecting particular types of disability among five or 12-year-olds (Tables 5 and 6). The only exception is for older children with behavioural or social disabilities where the prevalence of decay and untreated decay are higher than other groups and the proportion with substantial plaque present is also high.

Table 5: Various measures of decay for all five-year-old children attending special support schools and by disability group. Children classified according to the prime specialisation of the school they attended. It is recognised that many children have multiple disabilities so the code of the school acted as a proxy measure for broad disability types.

Group	N (%) dental chart completed	N (%) plaque assessment completed	N (%) sepsis assessment completed	*Mean $d_3$mft	* % with decay experience ($d_3$mft>0)	* Mean $d_3$mft of those affected	* % with untreated decay (d_3t>0)	* % with extraction experience (mt>0)	^ % with substantial amount of plaque visible	^ % with sepsis present	* % with incisor caries
All	1,415 (73%)	1,834 (95%)	1,813 (94%)	0.88	22.5	3.90	17.2	6.1	4.3	1.0	4.7
Autistic spectrum disorder	241 (76%)	303 (96%)	299 (94%)	1.07	25.3	4.23	17.8	9.1	1.3	1.0	4.6
Behavioural emotional and social difficulty	29 (91%)	31 (97%)	31 (97%)	0.69	27.6	2.50	24.1	6.9	3.2	3.2	0.0
Hearing or visual impairment	26 (96%)	27 (100%)	27 (100%)	0.92	19.2	4.80	15.4	3.8	11.1	0.0	3.8
Moderate learning disability	227 (79%)	281 (97%)	278 (96%)	0.82	25.1	3.26	22.9	2.6	3.2	1.4	5.3
Profound and multiple learning disability	322 (73%)	417 (94%)	410 (92%)	0.81	20.5	3.95	14.6	7.1	5.8	1.2	2.8
Severe learning disability	365 (68%)	503 (94%)	497 (93%)	0.88	20.5	4.27	15.6	6.0	5.4	0.8	6.8
Specific learning disability	19 (73%)	23 (88%)	23 (88%)	0.95	26.3	3.60	15.8	10.5	0.0	0.0	0.0
Physical disability	59 (81%)	68 (93%)	68 (93%)	0.68	18.6	3.64	15.3	1.7	7.4	1.5	6.8
Speech language and communication impairment	56 (77%)	70 (96%)	70 (96%)	0.73	21.4	3.42	12.5	8.9	1.4	0.0	1.8
Other Including Asperger's syndrome, ADHD, multi-sensory impairment	71 (60%)	111 (93%)	110 (92%)	1.00	25.4	3.94	21.1	4.2	4.5	0.0	5.6

*Reported for those who had a completed dental chart. ^Reported for those who had a completed plaque or sepsis assessment

Table 6: Various measures of decay for all 12-year-old children attending special support schools and by disability group

Group	N (%) dental chart completed	N (%) plaque assessment completed	N (%) sepsis assessment completed	*Mean D_3MFT	* % with decay experience ($D_3MFT>0$)	* Mean D_3MFT of those affected	* % with untreated decay ($D_3T>0$)	* % with extraction experience ($MT>0$)	^ % with substantial amount of plaque visible	^ % with sepsis present
All	3,055 (88%)	3,385 (98%)	3,362 (97%)	0.69	29.2	2.37	15.4	6.1	19.5	0.6
Autistic spectrum disorder	378 (88%)	421 (98%)	420 (98%)	0.58	25.7	2.26	14.3	5.3	17.1	1.2
Behavioural emotional and social disability	277 (95%)	280 (96%)	280 (96%)	1.07	41.5	2.58	25.6	8.7	23.9	0.7
Hearing or visual impairment	55 (90%)	60 (98%)	60 (98%)	0.62	29.1	2.13	10.9	7.3	16.7	0.0
Moderate learning disability	1,014 (96%)	1,050 (100%)	1,046 (99%)	0.71	30.1	2.35	16.2	4.6	20.0	0.5
Profound and multiple learning disability	381 (74%)	495 (96%)	485 (94%)	0.56	23.1	2.42	8.7	9.4	19.6	0.6
Severe learning disability	558 (83%)	652 (96%)	646 (96%)	0.63	27.8	2.26	15.9	5.2	17.3	0.3
Specific learning disability	33 (92%)	36 (100%)	36 (100%)	0.48	27.3	1.78	6.1	0.0	25.0	0.0
Physical disability	60 (90%)	64 (96%)	64 (96%)	0.33	20.0	1.67	11.7	5.0	23.4	1.6
Speech language and communication impairment	58 (94%)	61 (98%)	61 (98%)	0.72	24.1	3.00	13.8	5.2	13.1	1.6
Other Including Asperger's syndrome, ADHD, multi-sensory impairment	241 (90%)	266 (99%)	264 (99%)	0.85	33.6	2.53	15.4	8.3	22.6	0.4

*Reported for those who had a completed dental chart. ^Reported for those who had a completed plaque or sepsis assessment.

Prevalence of caries affecting incisors (early childhood caries)

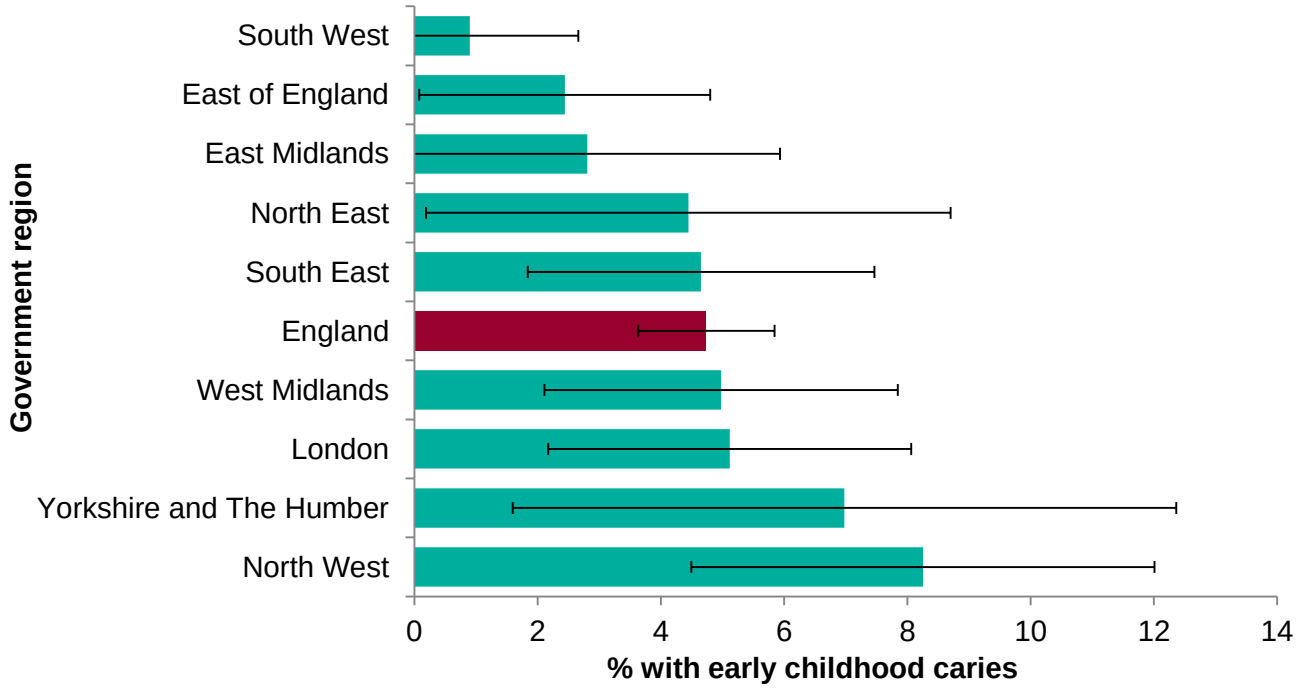
The raw data for five-year-olds was manipulated to allow for reporting of a specific type of caries sometimes called early childhood caries (ECC). This is an aggressive form of decay that affects upper incisors and can be rapid and extensive in attack. It is associated with long term bottle use with sugar-sweetened drinks, especially when these are given overnight or for long periods of the day. The definition of ECC used here is:

> Caries affecting any surface of one or more upper primary incisors, regardless of the caries status of any other teeth.[13]

Overall the prevalence of ECC was 4.7% (95% CI 3.6–5.8%) (Table 5) and varied by government region, but at PHE centre level there was a far wider range from 12% in Cumbria and Lancashire[ii] to 0% in Devon, Cornwall and Somerset.[ii]

In comparison the prevalence of ECC among five-year-old children attending mainstream schools in 2012 was higher at 6.3% (95% CI 6.2–6.4%).

Figure 27. Percentage of five-year-old children attending special support schools with early childhood caries in England by government region, 2014.



Error bars represent 95% confidence limits

Children with sepsis at the time of the examination

Sepsis was defined in the protocol as the presence of a dental abscess or sinus recorded by visual examination of the soft tissues. Across England, 1% of five-year-old children attending special support schools showed signs of sepsis (Table 5). As might be expected, the level was generally higher in those areas where there were higher levels of decay. For example, the highest levels occurred in Greater Manchester (4%). This prevalence compares with 2% found in the 2012 mainstream survey.

The prevalence of sepsis among 12-year-olds attending special support schools was very low at 0.6% (Table 6), sepsis information was not collected in the 2009 mainstream school survey.

Children with substantial amount of plaque at the time of the examination

Across England, 4% of five-year-old children attending special support schools had substantial amount of plaque visible (Table 5), compared with 2% found in 2012 mainstream children. At PHE centre level this ranged from 11% in Thames Valley to 0.8% in Kent, Surrey and Sussex.[ii]

Among 12-year-old children attending special support schools, 20% had substantial amount of plaque visible across England (Table 6), compared with 10% found in 2009 mainstream children. At PHE centre level this ranged from 34% in Avon, Gloucestershire and Wiltshire to 9% in Wessex. In this age group over 20% of children were found to have substantial amounts of plaque present in specific disability groups; behavioural and social disability, those with specific learning disability, physical disability and other non-specified disabilities.

It is likely that parents undertake toothbrushing for younger children but older ones are left to brush by themselves. Physical limitations could mean that plaque removal is difficult for some 12-year-olds and it would appear that some behavioural disabilities mean that toothbrushing isn't done effectively.

Assessing factors and associations with disease

Table 7: Summary table for five-year-old children to assess where similarities lie.

5-year-old children	Proportion with caries experience %	Mean d_3mft
Mainstream schools	27.9	0.94
Special support schools	22.5	0.88
Disability type		
Autistic spectrum disorder	25.3	1.07
Behavioural, emotional, social difficulty	27.6	0.69
Hearing or visual impairment	19.2	0.92
Moderate learning difficulty	25.1	0.82
Profound, multiple learning difficulty	20.5	0.81
Severe learning difficulty	20.5	0.88
Specific learning difficulty	26.3	0.95
Physical disability	18.6	0.68
Speech language and communication	21.4	0.73
Other, including Asperger's syndrome, ADHD, multi-sensory impairment	25.4	1.00

Table 8: Summary table for 12-year-old children to assess where similarities lie.

12-year-old children	Proportion with caries experience %	Mean D_3MFT
Mainstream schools	33.4	0.74
Special support schools	29.2	0.69
Disability type		
Autistic spectrum disorder	25.7	0.58
Behavioural, emotional, social difficulty	41.5	1.07
Hearing or visual impairment	29.1	0.62
Moderate learning difficulty	30.1	0.71
Profound, multiple learning difficulty	23.1	0.56
Severe learning difficulty	27.8	0.63
Specific learning difficulty	27.3	0.48
Physical disability	20.0	0.33
Speech language and communication	24.1	0.72
Other, including Asperger's syndrome, ADHD, multi-sensory impairment	33.6	0.85

The information derived from this survey shows that there is no single factor to explain variation in disease between children attending special support schools compared with those in

mainstream education, or within the group of children with disabilities. The strongest trend is seen when groups are compared by geographic location, where disease levels among children attending special support schools mirror those in mainstream education in the same locality. Deprivation shows a weaker association with caries among special support children than for mainstream educated children. No clear pattern has been found whereby children attending specific types of special support schools have notably higher or lower levels of disease (Table 8 and table 9).

Section 3. Implications of results

This report only reports measures of oral health for children attending special support schools. It is acknowledged that the majority of children with disabilities and special needs are educated in mainstream schools and that local policies vary regarding educational provision for this group. It therefore cannot be known how disease levels among all children with special needs vary and compare with children who have no disabilities. This report simply reports the levels of disease among those children who are educated in special support schools.

The levels of dental decay and other measure reported here are likely to be an underestimate of the true picture. This is explained in two ways; firstly the standard epidemiological examination used does not report decay into enamel and, as radiographs are not used, caries on approximal surfaces of teeth may not be seen. Secondly, the bias created by the requirement for positive parental consent tends to cause lower levels of disease to be recorded than in surveys where passive consent is used. The hypotheses explaining these findings are that families that live less organised lives are less likely to return a signed form and less likely to have good oral care habits and that parents who know that their child has decay would be less willing for this to be seen by an epidemiological examiner.

Variation and inequality

For the first time, this report is able to show the wide variation in the levels of dental decay experienced by children attending special support schools in different parts of the country. The cause of dental decay is well understood and is related to the frequency and amount of sugar consumed in foods and drinks and to low fluoride exposure. In the younger age group the impact of infant and young child feeding is of particular note. High levels of consumption of sugar-containing food and drink is also a contributory factor to other issues of public health concern in children for example, childhood obesity.

Results show that there was greater polarisation of dental decay among children attending special support schools than is typically seen among mainstream educated children. Put simply, fewer children have experience of decay, but those who have tend to have decay more severely, with more teeth affected than mainstream educated children.

Variation in disease levels was found according to geographic location, socio-economic status and to some degree, type of disability. The strongest association was with location in England; in areas where decay levels are high among mainstream educated children they are also high for children attending special support schools. This finding may be explained by the multi-factorial influences on oral health related behaviour, with higher levels and more frequent consumption of sugar and less regular use of fluoride toothpaste being the social norm in some parts of the country than others.

The larger proportion of five-year-olds with experience of extraction may reflect treatment approaches where a general anaesthetic is required either due to the high number of teeth affected or because the patient is unable to tolerate dental care under local anaesthesia. In these circumstances the avoidance of repeat anaesthetics is the dominant principle for planning treatment and therefore any teeth with a questionable prognosis are likely to be removed. Consultants and specialists in paediatric dentistry are in the best position to make these decisions and be able to provide the full range of clinical services in and out of theatre.

Putting this information to use

Data from this survey can be used to give background information when considering the PHOF dental indicator (4.2 tooth decay in children aged five).[5] Children attending special support schools should be regarded as vulnerable because of the consequences of decay in terms of impact on the general health of the child and the specialist services required to manage it.

Since the Health and Social Care Act (2012) amended the National Health Service Act (2006) responsibilities for health improvement, including oral health improvement, rest locally with local authorities who now provide or commission oral health promotion programmes to improve the health of the local population, to the extent that they consider appropriate in their areas. PHE recently published an evidence based toolkit to support this work, 'Local authorities improving oral health: commissioning better oral health for children and young people'[2] (CBOH) and subsequently jointly published a further guidance document with the local government association 'Tackling poor oral health in children and young people'. NICE have also produced recent oral health guidance which makes recommendations on undertaking oral health needs assessments, developing a local strategy on oral health and delivering community-based interventions and activities for all age groups including children.[3]

Locally this data can also be used in oral health needs assessments, and in contributions to local authority joint strategic needs assessments (JSNAs). Commissioning or providing dental public health programmes should follow strategic planning. Advice is available from consultants in dental public health at PHE centres regarding planning and commissioning tailored oral health improvement programmes. There is good evidence that, in addition to place based generic health improvement activities, which will address some of the common risk factors for

dental decay, strategies to increase the exposure to fluoride are effective.

In order to improve oral health for this vulnerable group action is required at all levels to contribute to oral health improvement and the reduction of oral health inequalities. This requires a partnership approach; with upstream healthy public policy, creating supportive environments and downstream reorientation of services, for example focussing dental activities on prevention.

Preventive actions that clinical teams can encourage should be based on 'Delivering better oral health: an evidence based toolkit for prevention'[14] and include:

- Breast feeding provides the best nutrition for babies
- From 6 months of age infants should be introduced to a free flow cup and from the age of 1 use of a feeding bottle discouraged
- Sugar should not be added to weaning foods or drinks
- The frequency and amount of sugary food and drinks should be reduced
- Avoid sugar containing foods and drinks at bedtime when saliva flow is reduced and buffering capacity lost
- As soon as teeth erupt, to maximise caries prevention, brush them twice daily with a family fluoride toothpaste (1350 -1500 ppm fluoride), 0 - 3 year olds using a smear and 3 - 6 year olds a pea-sized amount
- Brush last thing at night and at least one other occasion
- Spit out toothpaste and do not rinse
- Brushing should be supervised by a parent or carer
- Sugar free medicines should be recommended

Commissioning clinical care for children with extra needs

Those commissioning treatment services for this group, and for other children with disabilities who attend mainstream school, will note the increased severity and aim to prevent decay wherever possible. Contracts with clinical teams should support, encourage and reward a proactive preventive approach. Commissioning of specialist services will be required within primary and hospital care for those children with additional needs who cannot be examined, or receive simple or advanced clinical treatment without sedation or general anaesthesia. Commissioners will want to be assured that such services have the expertise and facilities available to ensure equality of outcome for children with disabilities.

Clinical teams will be aware of the implications of caries and its consequences for a child with additional needs. Results of this survey show that action to prevent decay is required for all children but particularly for those at higher risk, such as those with some evidence of decay. 'Delivering better oral health: an evidence based toolkit for prevention'[14] gives clear indications of the advice to be given and actions that the clinical team should take.

[i] Survey data were collected during the academic year 2013 to 2014 but are referred to here as 2014.
[ii] Some lower-tier local authorities did not participate.

Section 4. References

1. The Stationery Office (2006). Health & Social Care Act 2012. Available at www.legislation.gov.uk/ukpga/2012/7/enacted

2. Public Health England (2014). Local authorities improving oral health: commissioning better oral health for children and young people. An evidence-informed toolkit for local authorities available at www.gov.uk/government/publications/improving-oral-health-an-evidence-informed-toolkit-for-local-authorities

3. NICE (2014). Oral health: approaches for local authorities and their partners to improve the oral health of their communities. NICE guidelines [PH55]. Available at www.nice.org.uk/guidance/ph55

4. Statutory Instrument 2012 No 3094. National Health Service, England Social Care Fund, England Public Health, England. The NHS Bodies and Local Authorities (Partnership Arrangements, Care Trusts, Public Health and Local Healthwatch) Regulations 2012. Available at www.legislation.gov.uk/uksi/2012/3094/part/4/made

5. Department of Health. Public Health Outcomes Framework 2013 to 2016. From: Department of Health. First published: www.gov.uk/government/publications/healthy-lives-healthy-people-improving-outcomes-and-supporting-transparency

6. Pine, C. M., Pitts, N. B. and Nugent, Z. J. (1997a). British Association for the Study of Community Dentistry (BASCD) guidance on the statistical aspects of training and calibration of examiners for surveys of child dental health. A BASCD co-ordinated dental epidemiology programme quality standard. Community Dental Health **14** (Supplement 1):18-29

7. Pitts, N. B., Evans, D. J. and Pine, C. M. (1997). British Association for the Study of Community Dentistry (BASCD) diagnostic criteria for caries prevalence surveys – 1996/97. Community Dental Health **14** (Supplement 1): 6-9

8. Pine, C. M., Pitts, N. B. and Nugent, Z. J. (1997b). British Association for the Study of Community Dentistry (BASCD) guidance on sampling for surveys of child dental health. A BASCD coordinated dental epidemiology programme quality standard. Community Dental Health **14** (Supplement 1):10-17

9. Office for National Statistics (2013). Ward population estimates, mid – 2011(Census based). Statistical bulletin. Available at www.ons.gov.uk/ons/dcp171778_311891.pdf

10. Emerson, E. (2012). Deprivation, ethnicity and the prevalence of intellectual and developmental disabilities. J Epidemiol Community Health **66**:218-224 doi:10.1136/jech.2010.111773

11. Public Health England (2013). National dental epidemiology programme: oral health survey of five-year-old children 2012. A report on the prevalence and severity of dental decay. Available at www.nwph.net/dentalhealth

12. NHS Dental epidemiology programme for England. Oral Health Survey of 12 year old Children 2008 / 2009. Available at www.nwph.net/dentalhealth

13. Davies, G. M., Blinkhorn, F. A., and Duxbury, J. T. (2001). Caries among 3-year-olds in Greater Manchester. British Dental Journal **190**: 381-384

14. Public Health England (2014). Delivering better oral health: an evidence based toolkit for prevention. Third edition. Available at www.gov.uk/government/publications/delivering-better-oral-health-an-evidence-based-toolkit-for-prevention

15. Health and Social Care Information Centre (2015). Child Dental Health Survey 2013, England, Wales and Northern Ireland. Available at http://www.hscic.gov.uk/catalogue/PUB17137

Section 5. Supplementary tables

Appendix A: Dental Public Health Epidemiology Programme for England, Oral Health Survey of five-year-old children attending special support schools 2014, upper tier local authority (LA), Public Health England (PHE) Centre, region

Public Health England

Some lower-tier LAs did not partake in survey

Based on fewer than 20 volunteers

Region	Upper Tier LA Code	Upper Tier LA Name	5-year-olds attending special support schools	Dental chart completed	Mean d_3mft	% $d_3mft > 0$	Mean d_3mft (% $d_3mft > 0$)	% with incisor caries	95 % Confidence Limits							
									Lower d_3mft	Upper d_3mft	Lower % $d_3mft > 0$	Upper % $d_3mft > 0$	Lower $d_3mft > 0$ (mean)	Upper $d_3mft > 0$ (mean)	Lower % with incisor caries	Upper % with incisor caries
Eng	**Eng**	**England**	**2,941**	**1,415**	**0.88**	**22.5**	**3.90**	**4.7**	**0.76**	**0.99**	**20.3**	**24.6**	**3.58**	**4.22**	**3.6**	**5.8**
Upper tier local authorities	31	Leicestershire	37	32	0.78	25.0	3.13	6.3	0.08	1.48	10.0	40.0	0.98	5.27	0.0	14.6
	32	Lincolnshire	28	26	0.77	15.4	5.00	3.8	0.00	1.84	1.5	29.3	0.00	10.93	0.0	11.2
	22	Essex	43	34	0.56	20.6	2.71	0.0	0.08	1.04	7.0	34.2	1.19	4.24	0.0	0.0
	26	Hertfordshire	60	44	0.45	13.6	3.33	0.0	0.00	1.00	3.5	23.8	0.00	6.75	0.0	0.0
	00AJ	Ealing	38	26	1.35	38.5	3.50	7.7	0.54	2.15	19.8	57.2	2.29	4.71	0.0	17.9
	30	Lancashire (survey undertaken in Burnley, Fylde, Hyndburn, Lancaster, Pendle, Preston, Ribble Valley, Rossendale, Wyre ONLY)	65	30	1.67	43.3	3.85	10.0	0.74	2.59	25.6	61.1	2.39	5.30	0.0	20.7
	00CB	Wirral	35	25	1.64	36.0	4.56	4.0	0.53	2.75	17.2	54.8	2.59	6.52	0.0	11.7
	24	Hampshire	70	40	0.43	10.0	4.25	2.5	0.00	0.87	0.7	19.3	2.08	6.42	0.0	7.3
	29	Kent (survey undertaken in Ashford, Canterbury, Dover, Gravesham, Sevenoaks, Thanet, Tonbridge & Malling, Tunbridge Wells ONLY)	108	51	0.47	17.6	2.67	5.9	0.05	0.89	7.2	28.1	0.85	4.49	0.0	12.3
	45	West Sussex	51	21	1.05	33.3	3.14	0.0	0.19	1.91	13.2	53.5	1.36	4.93	0.0	0.0
	23	Gloucestershire	58	39	0.36	15.4	2.33	2.6	0.01	0.71	4.1	26.7	0.76	3.91	0.0	7.5
	00CN	Birmingham	124	46	0.22	6.5	3.33	4.3	0.00	0.48	0.0	13.7	1.60	5.06	0.0	10.2
	41	Staffordshire	62	52	0.63	15.4	4.13	3.8	0.13	1.14	5.6	25.2	2.05	6.20	0.0	9.1
	44	Warwickshire	45	34	0.44	17.6	2.50	5.9	0.09	0.79	4.8	30.5	1.66	3.34	0.0	13.8
PHE Centres	X25001AA	London	500	215	1.16	27.9	4.17	5.1	0.84	1.49	21.9	33.9	3.41	4.92	2.2	8.1
	X25002AA	South Midlands and Hertfordshire	165	100	0.78	25.0	3.12	2.0	0.39	1.17	16.5	33.5	1.94	4.30	0.0	4.7
	X25002AC	East Midlands	135	90	0.50	13.3	3.75	3.3	0.10	0.90	6.3	20.4	1.42	6.08	0.0	7.0
	X25002AD	Anglia and Essex	136	88	0.53	13.6	3.92	2.3	0.18	0.89	6.5	20.8	2.29	5.54	0.0	5.4
	X25002AE	West Midlands	466	221	0.62	16.3	3.83	5.0	0.39	0.86	11.4	21.2	2.98	4.69	2.1	7.8
	X25003AA	Cheshire and Merseyside	125	73	1.27	28.8	4.43	4.1	0.70	1.85	18.4	39.2	3.22	5.64	0.0	8.7
	X25003AC	Cumbria and Lancashire	79	43	1.53	41.9	3.67	11.6	0.82	2.25	27.1	56.6	2.55	4.79	2.0	21.2
	X25003AD	Greater Manchester	194	90	1.63	33.3	4.90	10.0	1.03	2.24	23.6	43.1	3.77	6.03	3.8	16.2
	X25003AE	North East	187	90	0.98	26.7	3.67	4.4	0.50	1.46	17.5	35.8	2.35	4.98	0.2	8.7
	X25003AF	Yorkshire and the Humber	249	86	1.19	27.9	4.25	7.0	0.69	1.68	18.4	37.4	3.21	5.29	1.6	12.4
	X25004AA	Avon, Gloucestershire and Wiltshire	118	80	0.43	12.5	3.40	1.3	0.10	0.75	5.3	19.7	1.64	5.16	0.0	3.7
	X25004AC	Devon, Cornwall and Somerset	59	20	0.15	5.0	3.00	0.0	0.00	0.44	0.0	14.6	3.00	3.00	0.0	0.0
	X25004AD	Wessex	129	76	0.62	17.1	3.62	5.3	0.26	0.97	8.6	25.6	2.56	4.67	0.2	10.3
	X25004AE	Kent, Surrey and Sussex	299	105	0.51	19.0	2.70	2.9	0.24	0.79	11.5	26.6	1.68	3.72	0.0	6.0
	X25004AF	Thames Valley	100	38	1.24	31.6	3.92	7.9	0.32	2.15	16.8	46.4	1.63	6.20	0.0	16.5
Regions	E	East Midlands	155	107	0.48	15.0	3.19	2.8	0.14	0.82	8.2	21.7	1.39	4.99	0.0	5.9
	G	East of England	266	164	0.66	18.3	3.63	2.4	0.37	0.96	12.4	24.2	2.50	4.76	0.1	4.8
	H	London	500	215	1.16	27.9	4.17	5.1	0.84	1.49	21.9	33.9	3.41	4.92	2.2	8.1
	A	North East	187	90	0.98	26.7	3.67	4.4	0.50	1.46	17.5	35.8	2.35	4.98	0.2	8.7
	B	North West	398	206	1.49	33.5	4.43	8.3	1.12	1.85	27.0	39.9	3.75	5.11	4.5	12.0
	J	South East	507	215	0.73	22.3	3.29	4.7	0.48	0.99	16.8	27.9	2.52	4.06	1.8	7.5
	K	South West	213	111	0.33	9.9	3.36	0.9	0.09	0.57	4.4	15.5	1.77	4.96	0.0	2.7
	F	West Midlands	466	221	0.62	16.3	3.83	5.0	0.39	0.86	11.4	21.2	2.98	4.69	2.1	7.8
	D	Yorkshire and The Humber	249	86	1.19	27.9	4.25	7.0	0.69	1.68	18.4	37.4	3.21	5.29	1.6	12.4

Appendix B: Dental Public Health Epidemiology Programme for England, Oral Health Survey of twelve-year-old children attending special support schools 2014, upper tier local authority (LA), Public Health England (PHE) centre, region

Public Health England

Some lower-tier LAs did not partake in survey

Number examined too small (<20) for robust estimate

Based on fewer than 20 volunteers

Region	Upper Tier LA Code	Upper Tier LA Name	12-year-olds attending special support schools	Dental chart completed	Plaque assessment completed	Mean D_3MFT	% $D_3MFT > 0$	Mean D_3MFT (% $D_3MFT > 0$)	% with substantial plaque	95 % Confidence Limits							
										Lower D_3MFT	Upper D_3MFT	Lower % $D_3MFT > 0$	Upper % $D_3MFT > 0$	Lower $D_3MFT > 0$ (Mean)	Upper $D_3MFT > 0$ (Mean)	Lower % with substantial plaque	Upper % with substantial plaque
Eng	**Eng**	**England**	**6,873**	**3,055**	**3,385**	**0.69**	**29.2**	**2.37**	**19.5**	**0.64**	**0.74**	**27.6**	**30.8**	**2.26**	**2.49**	**18.2**	**20.9**
East Midlands LAs	17	Derbyshire	33	25	27	0.60	16.0	3.75	14.8	0.00	1.40	1.6	30.4	0.00	7.86	1.4	28.2
	31	Leicestershire	79	35	35	0.69	31.4	2.18	22.9	0.27	1.10	16.0	46.8	1.40	2.97	8.9	36.8
	32	Lincolnshire	93	37	38	1.05	43.2	2.44	31.6	0.47	1.64	27.3	59.2	1.43	3.45	16.8	46.4
	34	Northamptonshire	118	46	50	0.72	30.4	2.36	22.0	0.13	1.30	17.1	43.7	0.71	4.01	10.5	33.5
	37	Nottinghamshire	50	21	22	0.76	19.0	4.00	4.5	0.03	1.49	2.3	35.8	2.61	5.39	0.0	13.2
East of England LAs	12	Cambridgeshire	55	44	50	0.86	29.5	2.92	0.0	0.36	1.36	16.1	43.0	1.87	3.97	0.0	0.0
	00KC	Central Bedfordshire	36	24	26	0.25	16.7	1.50	3.8	0.01	0.49	1.8	31.6	0.93	2.07	0.0	11.2
	22	Essex	161	75	79	0.53	22.7	2.35	17.7	0.25	0.82	13.2	32.1	1.57	3.14	9.3	26.1
	26	Hertfordshire	132	80	87	0.45	22.5	2.00	18.4	0.20	0.70	13.3	31.7	1.26	2.74	10.3	26.5
	33	Norfolk	78	42	42	0.50	19.0	2.63	14.3	0.15	0.85	7.2	30.9	1.80	3.45	3.7	24.9
	00JA	Peterborough	47	22	22	0.50	31.8	1.57	0.0	0.10	0.90	12.4	51.3	0.73	2.41	0.0	0.0
	00KF	Southend-on-Sea	41	22	23	0.95	36.4	2.63	8.7	0.22	1.69	16.3	56.5	1.19	4.06	0.0	20.2
	42	Suffolk	10	27	32	0.44	18.5	2.40	18.8	0.02	0.87	3.9	33.2	1.07	3.73	5.2	32.3
London LAs	00AF	Bromley	57	24	24	0.29	12.5	2.33	29.2	0.00	0.61	0.0	25.7	1.68	3.0	11.0	47.4
	00AJ	Ealing	36	24	26	0.54	20.8	2.60	46.2	0.00	1.11	4.6	37.1	0.68	4.52	27.0	65.3
	00AK	Enfield	39	25	30	0.60	24.0	2.50	10.0	0.00	1.22	7.3	40.7	0.49	4.51	0.0	20.7
	00AL	Greenwich	8	18	21				9.5							0.0	22.1
	00AM	Hackney	13	19	20				5.0							0.0	14.6
	00AP	Haringey	33	17	20				20.0							2.5	37.5
	00AT	Hounslow	32	31	32	0.90	48.4	1.87	25.0	0.46	1.34	30.8	66.0	1.27	2.47	10.0	40.0
	00AU	Islington	23	19	20				20.0							2.5	37.5
	00AX	Kingston upon Thames	32	22	23	1.36	36.4	3.75	30.4	0.21	2.52	16.3	56.5	1.27	6.23	11.6	49.2
North East LAs	00EJ	County Durham	99	49	56	1.18	46.9	2.52	42.9	0.74	1.63	33.0	60.9	1.96	3.08	29.9	55.8
	00EM	Northumberland	62	20	23	0.55	30.0	1.83	17.4	0.03	1.07	9.9	50.1	0.55	3.12	1.9	32.9
	00CM	Sunderland	43	24	25	1.33	50.0	2.67	28.0	0.55	2.11	30.0	70.0	1.53	3.81	10.4	45.6
North West LAs	00BL	Bolton	44	19	20				5.0							0.0	14.6
	00BX	Knowsley	31	20	21	1.60	65.0	2.46	23.8	0.97	2.23	44.1	85.9	1.94	2.99	5.6	42.0
	30	Lancashire (survey undertaken in Burnley, Fylde, Hyndburn, Lancaster, Pendle, Preston, Ribble Valley, Rossendale, Wyre ONLY)	240	69	80	0.75	36.2	2.08	28.8	0.46	1.04	24.9	47.6	1.61	2.55	18.8	38.7
	00BY	Liverpool	120	40	42	1.28	42.5	3.00	21.4	0.73	1.82	27.2	57.8	2.33	3.67	9.0	33.8
	00BN	Manchester	61	39	46	1.13	48.7	2.32	32.6	0.63	1.63	33.0	64.4	1.61	3.02	19.1	46.2
	00CA	Sefton	72	31	34	0.71	29.0	2.44	26.5	0.23	1.19	13.1	45.0	1.46	3.43	11.6	41.3
	00BS	Stockport	68	23	23	1.04	34.8	3.00	13.0	0.31	1.78	15.3	54.2	1.72	4.28	0.0	26.8
	00BT	Tameside	27	26	26	1.04	30.8	3.38	7.7	0.13	1.95	13.0	48.5	1.06	5.69	0.0	17.9
	00CB	Wirral	43	21	24	1.10	47.6	2.30	33.3	0.46	1.73	26.3	69.0	1.47	3.13	14.5	52.2

Appendix B: Dental Public Health Epidemiology Programme for England, Oral Health Survey of twelve-year-old children attending special support schools 2014, upper tier local authority (LA), Public Health England (PHE) centre, region

Public Health England

Some lower-tier LAs did not partake in survey

Number examined too small (<20) for robust estimate

Based on fewer than 20 volunteers

Region	Upper Tier LA Code	Upper Tier LA Name	12-year-olds attending special support schools	Dental chart completed	Plaque assessment completed	Mean D_3MFT	% $D_3MFT > 0$	Mean D_3MFT (% $D_3MFT > 0$)	% with substantial plaque	95 % Confidence Limits							
										Lower D_3MFT	Upper D_3MFT	Lower % $D_3MFT > 0$	Upper % $D_3MFT > 0$	Lower $D_3MFT > 0$ (Mean)	Upper $D_3MFT > 0$ (Mean)	Lower % with substantial plaque	Upper % with substantial plaque
South East LAs	11	Buckinghamshire	30	47	55	0.66	25.5	2.58	20.0	0.27	1.05	13.1	38.0	1.70	3.47	9.4	30.6
	21	East Sussex	55	23	27	0.22	17.4	1.25	0.0	0.01	0.43	1.9	32.9	0.76	1.7	0.0	0.0
	24	Hampshire	159	107	110	0.48	22.4	2.13	2.7	0.28	0.68	14.5	30.3	1.65	2.60	0.0	5.8
	29	Kent (survey undertaken in Ashford, Canterbury, Dover, Gravesham, Sevenoaks, Thanet, Tonbridge & Malling, Tunbridge Wells ONLY)	248	79	89	0.51	13.9	3.64	10.1	0.20	0.81	6.3	21.6	2.71	4.56	3.8	16.4
	00MG	Milton Keynes	29	22	23	0.45	27.3	1.67	8.7	0.05	0.86	8.7	45.9	0.70	2.64	0.0	20.2
	38	Oxfordshire	71	25	45	0.68	32.0	2.13	15.6	0.19	1.17	13.7	50.3	1.19	3.06	5.0	26.1
	00MS	Southampton	35	19	20				0.0							0.0	0.0
	43	Surrey	152	59	62	0.53	20.3	2.58	22.6	0.21	0.84	10.1	30.6	1.77	3.40	12.2	33.0
	45	West Sussex	107	44	46	0.48	20.5	2.33	15.2	0.12	0.83	8.5	32.4	1.20	3.46	4.8	25.6
South West LAs	00HA	Bath and North East Somerset	15	18	20				50.0							28.1	71.9
	18	Devon	83	44	45	0.66	31.8	2.07	31.1	0.33	0.99	18.1	45.6	1.55	2.59	17.6	44.6
	19	Dorset	51	18	33				24.2							9.6	38.9
	23	Gloucestershire	80	46	48	1.04	32.6	3.20	37.5	0.46	1.63	19.1	46.2	1.99	4.41	23.8	51.2
	40	Somerset	16	21	28	1.43	47.6	3.00	14.3	0.63	2.22	26.3	69.0	2.03	3.97	1.3	27.2
	00HY	Wiltshire	13	25	30	0.96	28.0	3.43	16.7	0.06	1.86	10.4	45.6	0.94	5.92	3.3	30.0
West Midlands LAs	00CN	Birmingham	204	40	45	0.63	27.5	2.27	35.6	0.19	1.06	13.7	41.3	1.15	3.40	21.6	49.5
	00CQ	Coventry	40	26	26	0.58	34.6	1.67	19.2	0.23	0.92	16.3	52.9	1.20	2.13	4.1	34.4
	00CR	Dudley	76	21	21	0.43	33.3	1.29	19.0	0.14	0.72	13.2	53.5	0.92	1.65	2.3	35.8
	41	Staffordshire	148	80	81	0.31	20.0	1.56	23.5	0.16	0.47	11.2	28.8	1.21	1.92	14.2	32.7
	00GL	Stoke-on-Trent	38	28	31	0.79	39.3	2.00	6.5	0.33	1.24	21.2	57.4	1.30	2.70	0.0	15.1
	00CU	Walsall	72	22	26	0.32	18.2	1.75	0.0	0.02	0.62	2.1	34.3	1.26	2.24	0.0	0.0
	44	Warwickshire	109	57	61	0.68	38.6	1.77	18.0	0.40	0.97	26.0	51.2	1.33	2.22	8.4	27.7
	00CW	Wolverhampton	65	19	21				0.0							0.0	0.0
	47	Worcestershire	45	34	40	0.65	17.6	3.67	20.0	0.13	1.16	4.8	30.5	2.46	4.87	7.6	32.4
Yorkshire and the Humber LAs	00CC	Barnsley	0	24	25	0.79	37.5	2.11	28.0	0.26	1.32	18.1	56.9	1.22	3.00	10.4	45.6
	00CX	Bradford	52	23	25	0.74	39.1	1.89	0.0	0.27	1.20	19.2	59.1	1.20	2.58	0.0	0.0
	00FA	Kingston upon Hull, City of	32	20	23	0.65	35.0	1.86	21.7	0.15	1.15	14.1	55.9	0.96	2.76	4.9	38.6
	00CZ	Kirklees	74	23	29	0.26	17.4	1.50	24.1	0.01	0.51	1.9	32.9	0.93	2.07	8.6	39.7
	00FD	North Lincolnshire	37	18	21				0.0							0.0	0.0
	36	North Yorkshire	26	25	27	0.60	20.0	3.00	3.7	0.00	1.33	4.3	35.7	0.00	6.04	0.0	10.8
	00CG	Sheffield	73	40	48	1.25	50.0	2.50	52.1	0.75	1.75	34.5	65.5	1.86	3.14	38.0	66.2

Appendix B: Dental Public Health Epidemiology Programme for England, Oral Health Survey of twelve-year-old children attending special support schools 2014, upper tier local authority (LA), Public Health England (PHE) centre, region

Public Health England

Some lower-tier LAs did not partake in survey

Number examined too small (<20) for robust estimate

Based on fewer than 20 volunteers

Region	Upper Tier LA Code	Upper Tier LA Name	12-year-olds attending special support schools	Dental chart completed	Plaque assessment completed	Mean D_3MFT	% $D_3MFT > 0$	Mean D_3MFT (% $D_3MFT > 0$)	% with substantial plaque	95 % Confidence Limits							
										Lower D_3MFT	Upper D_3MFT	Lower % $D_3MFT > 0$	Upper % $D_3MFT > 0$	Lower $D_3MFT > 0$ (Mean)	Upper $D_3MFT > 0$ (Mean)	Lower % with substantial plaque	Upper % with substantial plaque
PHE Centres	X25001AA	London	986	419	467	0.47	23.2	2.02	23.1	0.36	0.58	19.11	27.2	1.7	2.35	19.3	27.0
	X25002AA	South Midlands and Hertfordshire	363	201	218	0.48	23.9	2.02	14.2	0.30	0.66	17.99	29.8	1.4	2.59	9.6	18.9
	X25002AC	East Midlands	392	165	171	0.95	35.2	2.69	18.1	0.69	1.20	27.87	42.4	2.2	3.17	12.4	23.9
	X25002AD	Anglia and Essex	420	249	266	0.63	25.7	2.45	11.7	0.46	0.80	20.27	31.1	2.1	2.85	7.8	15.5
	X25002AE	West Midlands	935	383	416	0.50	26.9	1.87	18.0	0.40	0.61	22.45	31.3	1.6	2.10	14.3	21.7
	X25003AA	Cheshire and Merseyside	331	179	192	0.99	39.1	2.54	20.3	0.71	1.28	31.96	46.3	2.0	3.10	14.6	26.0
	X25003AC	Cumbria and Lancashire	336	103	121	0.81	36.9	2.18	28.9	0.55	1.06	27.57	46.2	1.8	2.58	20.8	37.0
	X25003AD	Greater Manchester	442	172	185	1.23	44.2	2.78	16.2	0.95	1.50	36.76	51.6	2.4	3.20	10.9	21.5
	X25003AE	North East	458	175	199	0.97	38.9	2.49	33.2	0.73	1.20	31.64	46.1	2.1	2.86	26.6	39.7
	X25003AF	Yorkshire and the Humber	573	263	298	0.71	31.2	2.28	23.5	0.55	0.88	25.58	36.8	1.9	2.62	18.7	28.3
	X25004AA	Avon, Gloucestershire and Wiltshire	248	122	148	0.91	29.5	3.08	33.8	0.57	1.25	21.42	37.6	2.3	3.87	26.2	41.4
	X25004AC	Devon, Cornwall and Somerset	210	95	92	0.84	35.8	2.35	27.2	0.56	1.13	26.15	45.4	1.9	2.83	18.1	36.3
	X25004AD	Wessex	334	186	219	0.65	25.3	2.55	8.7	0.44	0.85	19.02	31.5	2.0	3.09	4.9	12.4
	X25004AE	Kent, Surrey and Sussex	634	219	240	0.48	18.3	2.65	12.5	0.32	0.65	13.15	23.4	2.2	3.14	8.3	16.7
	X25004AF	Thames Valley	211	124	153	0.57	25.0	2.29	13.7	0.36	0.78	17.38	32.6	1.8	2.77	8.3	19.2
Regions	E	East Midlands	510	211	221	0.90	34.1	2.63	19.0	0.66	1.13	27.7	40.5	2.13	3.12	13.8	24.2
	G	East of England	636	382	411	0.55	24.1	2.29	11.9	0.43	0.68	19.8	28.4	1.97	2.61	8.8	15.1
	H	London	974	419	467	0.47	23.2	2.02	23.1	0.36	0.58	19.1	27.2	1.69	2.35	19.3	27.0
	A	North East	458	175	199	0.97	38.9	2.49	33.2	0.73	1.20	31.6	46.1	2.11	2.86	26.6	39.7
	B	North West	1,109	454	498	1.04	40.5	2.57	20.9	0.88	1.20	36.0	45.0	2.28	2.85	17.3	24.5
	J	South East	1,103	513	568	0.50	21.6	2.33	10.2	0.40	0.61	18.1	25.2	2.07	2.60	7.7	12.7
	K	South West	563	255	307	0.94	32.5	2.88	29.0	0.71	1.16	26.8	38.3	2.42	3.34	23.9	34.1
	F	West Midlands	947	383	416	0.50	26.9	1.87	18.0	0.40	0.61	22.5	31.3	1.64	2.10	14.3	21.7
	D	Yorkshire and The Humber	573	263	298	0.71	31.2	2.28	23.5	0.55	0.88	25.6	36.8	1.94	2.62	18.7	28.3
Eng	**Eng**	**England**	**6,873**	**3,055**	**3,385**	**0.69**	**29.2**	**2.37**	**19.5**	**0.64**	**0.74**	**27.6**	**30.8**	**2.26**	**2.49**	**18.2**	**20.9**