

Official Statistics

National Dental Epidemiology Programme (NDEP) for England: oral health survey of 5 year old children 2022

Updated 11 October 2023

Applies to England

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This publication is available at <https://www.gov.uk/government/statistics/oral-health-survey-of-5-year-old-children-2022/national-dental-epidemiology-programme-ndep-for-england-oral-health-survey-of-5-year-old-children-2022>

Executive summary

This report presents the results of the sixth National Dental Epidemiology Programme survey of 5 year old children in England, 2022. The data was collected during the 2021 to 2022 school year. The survey was delayed from 2020 to 2021 by the coronavirus (COVID-19) pandemic. This data is the source for the dental indicator (percentage of 5 year olds with visually obvious dental decay) included in the [Public Health Outcomes Framework](https://www.gov.uk/government/collections/public-health-outcomes-framework) (<https://www.gov.uk/government/collections/public-health-outcomes-framework>).

For the first time in this series of 5 year old surveys, the prevalence of children with enamel decay is presented. This is an important threshold to highlight the proportion of children who are found to have early stage decay who would ordinarily be counted as being free of obvious decay. This is presented at national and regional levels. Estimates at national, regional, upper and lower-tier local authority level are reported for prevalence of experience of dental decay (the percentage of children with one or more teeth with visually obvious dental decay experience) and severity of experience of dental decay (the average number of teeth per child with visually obvious dental decay experience).

In this survey of 5 year olds in England, the national prevalence of children with enamel and/or dental decay was 29.3%. Regionally, this ranged from 23.3% in the South West to 38.7% in the North West.

Overall, 23.7% of 5 year old children in England in this survey had experience of dental decay. This was similar to the finding of the previous survey of 5 year olds in 2019, where 23.4% of the surveyed children had experience of dental decay. Among the 23.7% of children with experience of dental decay, each child had on average 3.5 (confidence interval 3.50 to 3.59) teeth with experience of dental decay (at the age of 5 years children normally have 20 primary teeth).

There was wide variation in both prevalence and severity of experience of dental decay by geographical area. At a regional level, 5 year old children living in the north west of England were most likely to have experienced dental decay (30.6%). At upper-tier local authority level Brent, in the London region, had the highest prevalence of experience of dental decay (46.0%).

Children living in the most deprived areas of the country were almost 3 times as likely to have experience of dental decay (35.1%) as those living in the least deprived areas (13.5%). There were also disparities in the prevalence of experience of dental decay by ethnic group, which was significantly higher in the other ethnic group (44.8%) and the Asian or Asian British ethnic group (37.7%).

Note: the ethnicity code set reflects categories used in the [2021 national population census](https://www.ethnicity-facts-figures.service.gov.uk/style-) (<https://www.ethnicity-facts-figures.service.gov.uk/style->

[guide/ethnic-groups](#)).

There had been a decrease in the prevalence of experience of dentinal decay in 5 year olds from 30.9% in 2008 to 23.3% in 2017. However there has been no continuation of this improvement in 2019 or in the results of this latest survey. Inequalities in prevalence of experience of dentinal decay in 5 year olds reduced from 2008 to 2015 but there have been no further reductions in inequalities since then.

Local authorities are responsible for improving health, including oral health (see the [Health and Social Care Act 2012](#) (<https://www.legislation.gov.uk/ukpga/2012/7/contents/enacted>)). This report provides data that may be used in joint strategic needs assessments and oral health needs assessments to plan, commission and evaluate oral health improvement interventions and dental services. The Office for Health Improvement and Disparities (OHID) and the National Institute for Health and Care Excellence (NICE) have published documents to support local authorities in these activities:

- [Improving oral health: an evidence-informed toolkit for local authorities](#) (<https://www.gov.uk/government/publications/improving-oral-health-an-evidence-informed-toolkit-for-local-authorities>)
- [Improving oral health: supervised tooth brushing programme toolkit](#) (<https://www.gov.uk/government/publications/improving-oral-health-supervised-tooth-brushing-programme-toolkit>)
- [Improving the oral health of children: cost effective commissioning](#) (<https://www.gov.uk/government/publications/improving-the-oral-health-of-children-cost-effective-commissioning>)
- [Improving oral health: a community water fluoridation toolkit for local authorities](#) (<https://www.gov.uk/government/publications/improving-oral-health-community-water-fluoridation-toolkit>)
- [Oral health: local authorities and partners, NICE 2014](#) (<http://www.nice.org.uk/guidance/ph55>)

Poor oral health impacts on children and families. It affects children's ability to eat, smile and socialise and causes pain and infection with days missed at school, and parents' work, to attend a dental service to receive care. Dental decay is largely a preventable disease.

Full tables of results from the survey are available from the [oral health collections page](#) (<http://www.gov.uk/government/collections/oral-health>). The survey results are official statistics so are compliant with the Code of Practice for Statistics and meet the high standards of trustworthiness, quality and value.

Introduction

This report presents a summary of the results of the National Dental Epidemiology Programme oral health survey of 5 year old children undertaken during the 2021 to 2022 school year.

This is the sixth survey in the series of standardised and coordinated national surveys of the oral health of 5 year old children in England that have been conducted to standards set by the British Association for the Study of Community Dentistry (BASCD)^[footnote 1] ^[footnote 2] ^[footnote 3]. These surveys have resulted in robust, comparable data for use by local and national government and the NHS. OHID has responsibility for coordinating these surveys in England as part of the National Dental Epidemiology Programme of annual surveys and works to BASCD standards, which helps to ensure generalisability of the findings. Responsibility for commissioning the surveys lies with upper-tier local authorities, as set out in Statutory Instrument 3094 (2012)^[footnote 4]. Those local authorities that participated in this survey commissioned dental providers to undertake the fieldwork according to a [national protocol \(https://www.gov.uk/government/publications/oral-health-survey-of-5-year-old-children-national-protocol\)](https://www.gov.uk/government/publications/oral-health-survey-of-5-year-old-children-national-protocol).

Information from the surveys is vital to inform oral health needs assessments at a local level. NHS and local authority commissioners utilise the information as part of the commissioning cycle when planning and evaluating local health services and health improvement interventions.

The survey reported here provides information on the prevalence of enamel caries and the prevalence and severity of experience of dentinal decay in 5 year old children attending mainstream, state-funded schools.

Method

The survey was undertaken during the 2021 to 2022 school year and according to a national protocol. The methods and standards used in this survey were the same as those used applied in previous surveys of this series, facilitating comparison of results over time.

The survey population was children who had reached the age of 5 years but had not yet had their sixth birthday on the day of examination. The sampling frame was children attending mainstream, state-funded schools. The sampling unit was local authority boundaries at unitary, metropolitan or lower tier levels. Random samples were drawn for each local authority in England using the same methods and similar sampling intensities used in previous surveys and according to the survey protocol. In some local authority areas larger samples

were drawn at the request of commissioners to facilitate analysis at smaller geographical levels.

Sampled schools were contacted to seek their co-operation and age-eligible children were selected and invited to participate in the survey. Written agreement from a child's parent or a person with parental responsibility was obtained before any child could participate in the survey.

Data was collected by trained and calibrated clinicians who were typically employed by NHS trusts providing community dental services.

A visual-only examination method was used. Visually obvious decay into dentine was the measurement threshold in line with BASCD criteria. Visually obvious decay is the widely accepted threshold in the literature for dental surveys. However, it provides an underestimate of the true prevalence and severity of disease as it does not capture decay confined to the tooth enamel. Therefore, for the first time in this series of 5 year old surveys, the presence of decay confined to the tooth enamel was also recorded at a child-level to allow the prevalence to be reported. Extensive dental decay was measured using the pufa index:

- open pulp (p)
- traumatic ulceration (u)
- fistula (f)
- abscess (a)

The presence of dental plaque was recorded.

Data was collected using a tailor-made data collection format in Microsoft Access. Electronic files of the raw, anonymised data were uploaded to a secure channel on a shared Microsoft Teams site by regional dental epidemiology coordinators. The data was collated, checked and cleaned. Using the home postcodes of the participants, the data was assigned to lower super output areas so that index of multiple deprivation 2019 (IMD 2019) scores could be assigned (see [English indices of deprivation 2019](https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019) (<https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019>)).

Deprivation scores were used to allow weighting of the data to more closely match the actual distribution of deprivation quintiles in the source population. The weighted data were then analysed using simple statistics to calculate estimates of a range of measures of oral health for each local authority.

Note: the sampling method used for this survey was school based and therefore not truly representative of the population of 5 year old children by IMD quintile. Thus, the sample was treated as a stratified random sample, that is, children were selected randomly from each IMD quintile, but the sampling probability varied between IMD quintiles. For this reason, IMD-weighted estimates were produced to provide more robust estimates of overall

prevalence. Deprivation quintiles divide populations into fifths according to distribution of IMD 2019 scores.

All report confidence intervals are the 95% confidence intervals. This is the range of measures in which we can be 95% confident that the true value lies. Prevalence of experience of dental decay is presented with confidence limits calculated using the Wilson-Score method. Mean numbers of teeth with experience of dental decay for all children (for trend comparison) and mean numbers for those children with experience of dental decay are presented together with the upper and lower 95% confidence limits. The median number of teeth with experience of dental decay for all children is also presented at national and regional level, together with the interquartile range. However, the median values at local authority area level are not presented. This is due to the distribution of experience of dental decay in the 5 year old population where the majority of children have not experienced the disease hence the median values are all zero.

Error bars indicate 95% confidence limits on charts in this report. Confidence intervals were used to assess statistical significance.

Data suppression was applied when there were fewer than 30 children examined.

In this report, the term 'dentinal decay' indicates the presence of visually obvious dental decay into dentine and excludes enamel decay, which is reported separately. The term 'experience of dentinal decay' indicates the presence of dentinal decay, teeth that are missing due to dentinal decay and teeth that are filled due to dentinal decay. In previous publications in this survey series, the term 'dental decay' was used to indicate dentinal decay.

Results

Headline results from the survey at national, regional and upper-tier local authority level are presented below. Full tables of results at national, regional, lower and upper-tier local authorities are available from the [oral health collections page \(http://www.gov.uk/government/collections/oral-health\)](http://www.gov.uk/government/collections/oral-health).

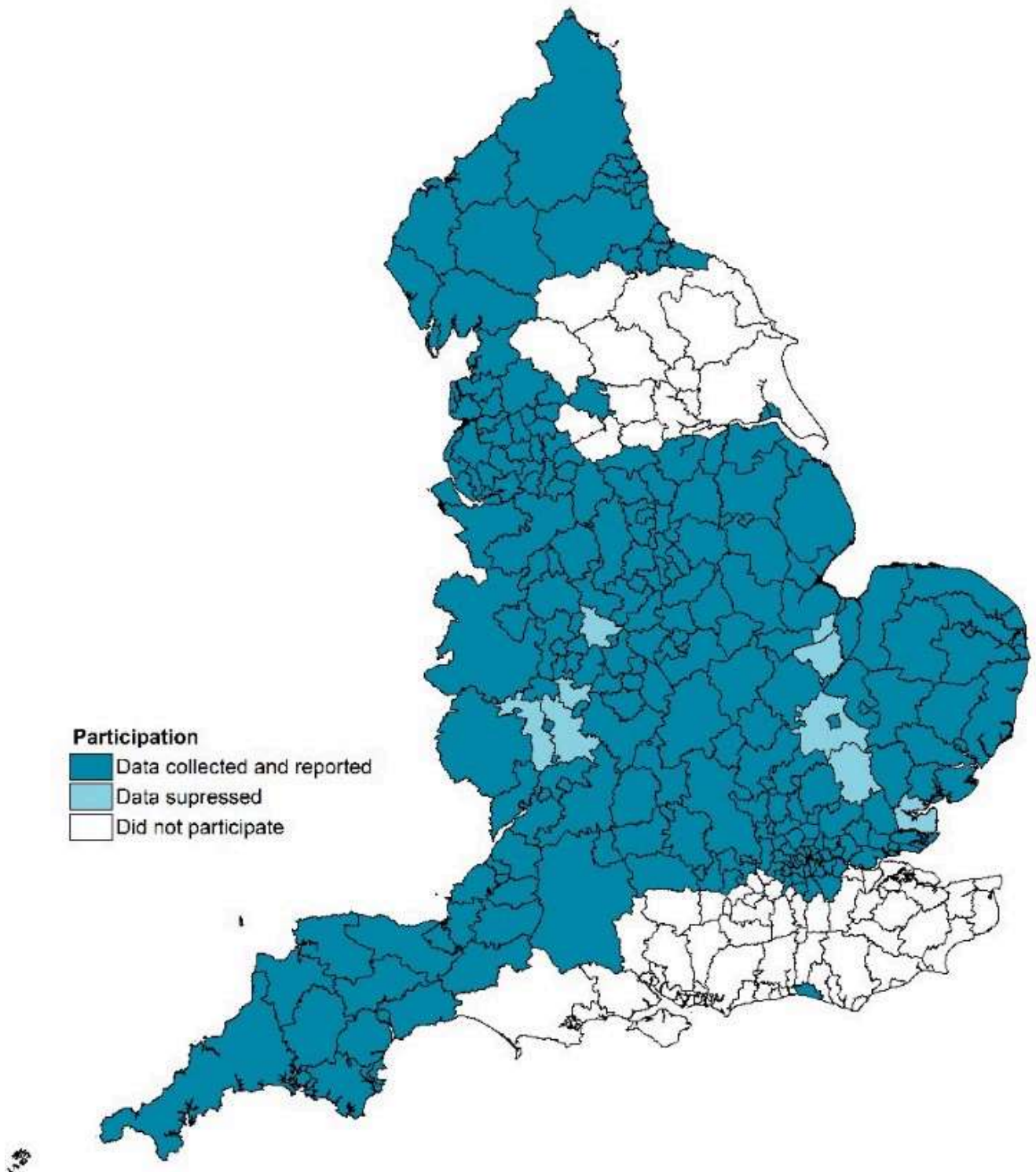
Participation in the survey

In total, 134 out of 152 upper-tier local authorities commissioned the survey. Those that did not commission the survey did so for a variety of reasons including an inability to procure a provider to undertake the fieldwork. Within the

participating local authorities, 2 upper-tier and 10 lower-tier local authorities did not reach the minimum sample size of 30 participants for results to be reported. This meant estimates were available for 132 upper-tier and 234 out of 309 lower-tier local authorities (see Map 1 below). Just under 50% of upper tier local authorities achieved the minimum sample size of 250 children and the results should be interpreted with caution, particularly when making comparisons with other surveys.

It should be noted that the South East (9 out of 18) and Yorkshire and the Humber (8 out of 15) regional estimates included data for approximately half of their upper-tier local authorities hence their regional level findings should be interpreted with this in mind. Additionally the South West was also affected with 2 of the 15 upper-tier local authorities not participating.

Map 1: Overview of participation in the 5 year old survey in England by lower-tier local authority, 2022



A total of 62,649 participants were linked to geographical areas and included in the final analysis, which represented 9.1% of the England population of this age

cohort. This was a decrease from the sample size in the previous survey in 2019, when 78,767 children (11.4% of the population) were examined.

In the areas where there was at least one examination, the proportion of children examined, for whom parental agreement was sought, was 61.2%, ranging from 52.4% in Yorkshire and the Humber to 67.5% in the South East. It is likely that non-response bias applies and should be considered when drawing conclusions.

Approximately 0.9% of children with parental agreement to participate refused to take part on the day of examination. Absenteeism accounted for a further loss of approximately 5.0% of children with parental agreement to participate.

Of the children examined, 71.9% were from the white ethnic group, 12.1% from an Asian or Asian British background, 5.8% from the mixed ethnic group, 4.4% from a black, black British, Caribbean or African background, 2.0% from the other ethnic group and 3.8% the ethnic group was unknown. These proportions were similar to those of the general population of 5 year olds in England.

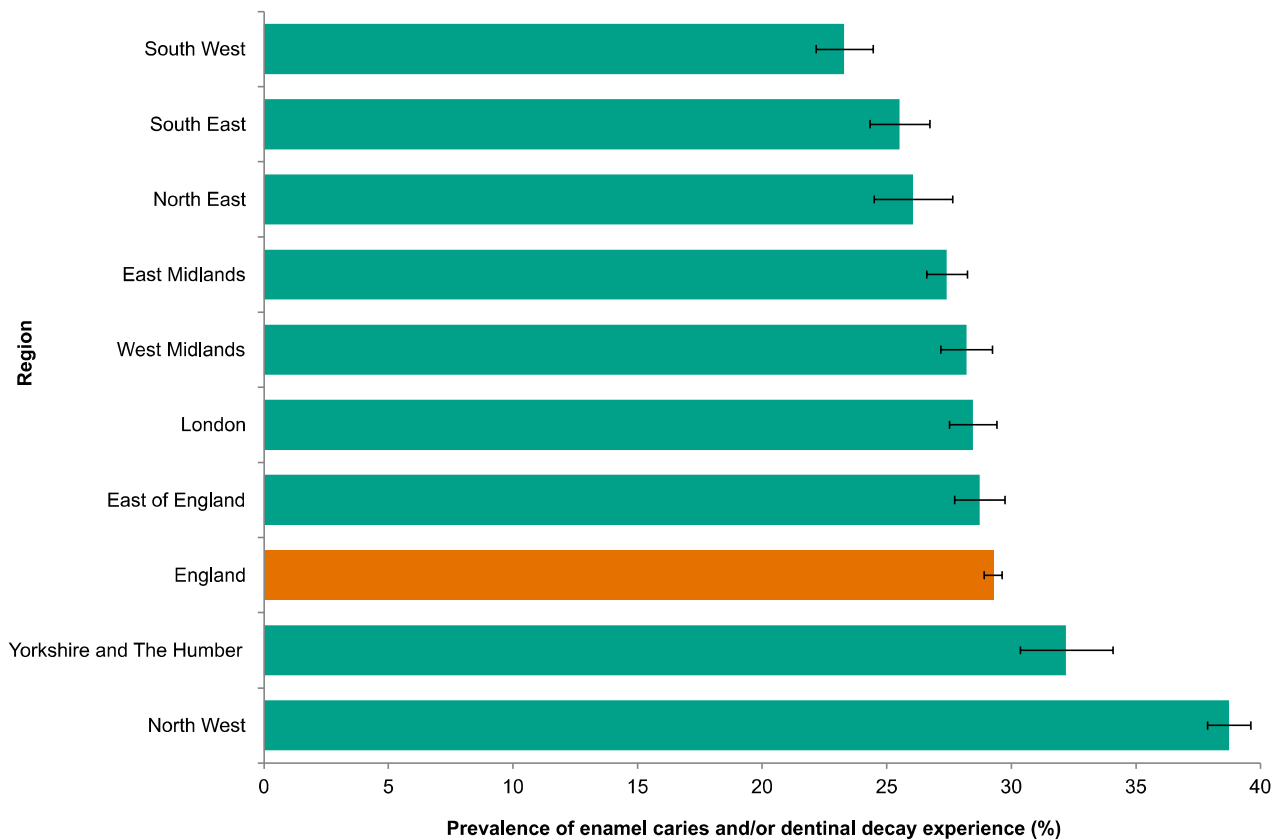
The deprivation profile of the survey participants was also similar to the general population of 5 year olds in England.

Prevalence of enamel and dentinal decay

The prevalence of enamel decay is being reported for the first time in the National Dental Epidemiology Programme. It is important to look at enamel decay as it is possible to implement preventive measures to help halt the progression of enamel decay to dentinal decay and prevent these children from needing invasive dentistry to restore loss of tooth structure in the future. It is especially important to determine the proportion of children with enamel decay who do not yet have dentinal decay, as in the past such children were often regarded erroneously as 'free of decay'.

Taking into account children with any visually obvious decay (enamel or dentinal), a third of children were found to have experience of decay (29.3%) in England and this varied by region. The South West (23.3%) had the lowest prevalence and the North West had the highest prevalence (38.7%) (see Figure 1 below).

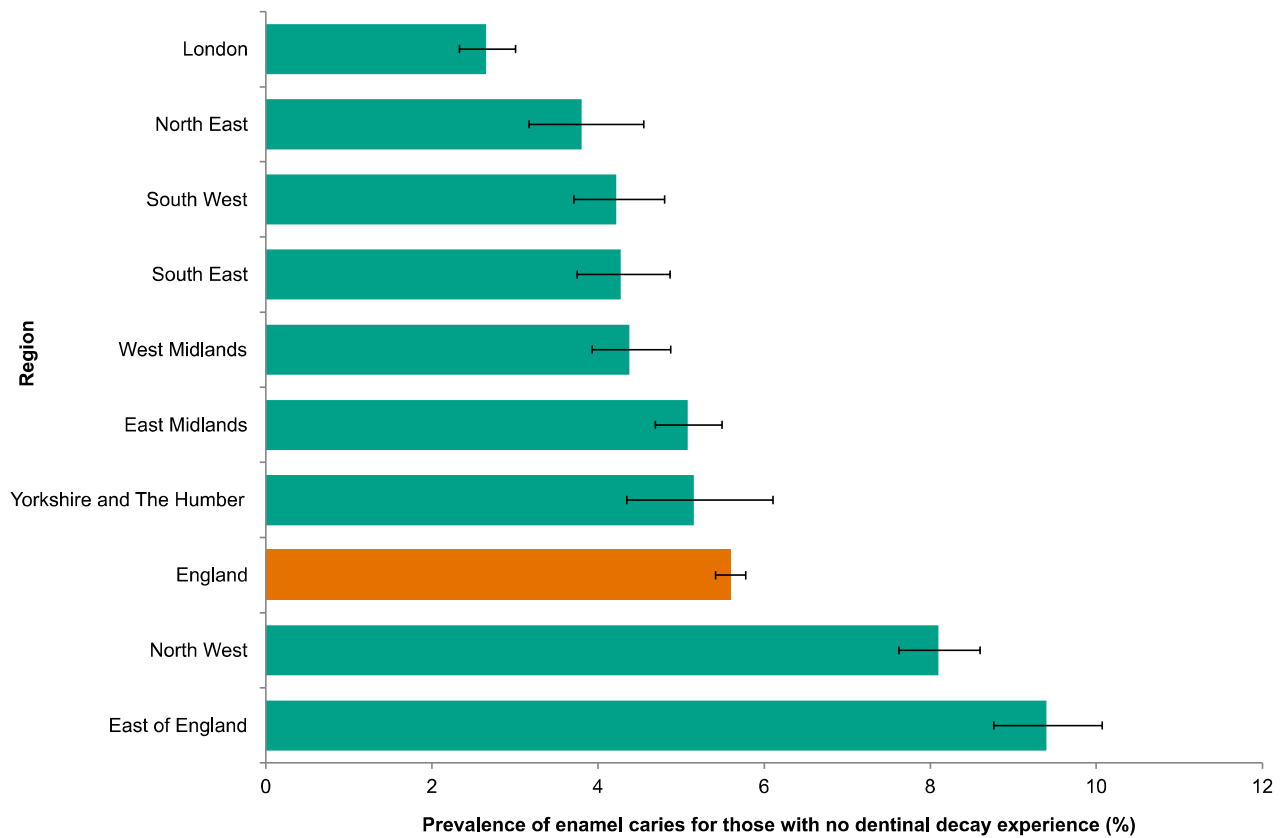
Figure 1: Children with any obvious decay: prevalence of enamel decay and/or dentinal decay experience in 5 year olds in England by region, 2022



Note: data not available for half of the local authority areas in the South East and Yorkshire and Humber regions; error bars represent 95% confidence limits.

In previous surveys, only data for dentinal decay was presented. Children without obvious dentinal decay experience were considered to be free of decay at this threshold. The introduction of recording obvious enamel decay allows for a consideration of what proportion of 5 year old children have obvious decay restricted to an earlier stage where preventive management is indicated. When considering such children with no obvious signs of dentinal decay experience, the prevalence of enamel decay only was 5.6% in England. There was variation across the regions and London had the lowest prevalence (2.6%) and the east of England had the highest prevalence (9.4%) (see Figure 2 below).

Figure 2: Prevalence of enamel decay in 5 year olds with no dentinal decay experience in England by region, 2022

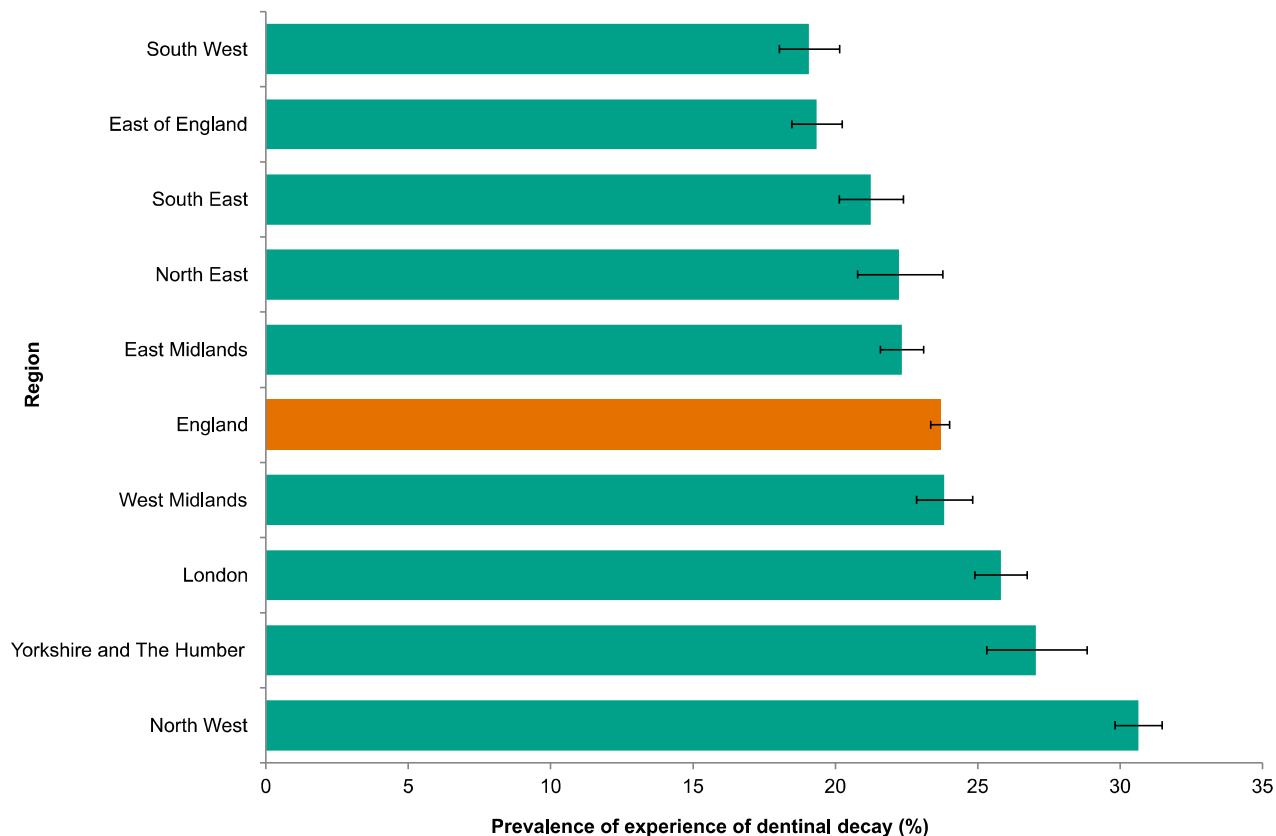


Note: data not available for half of the local authority areas in the South East and Yorkshire and Humber regions; error bars represent 95% confidence limits.

Prevalence of experience of dentinal decay

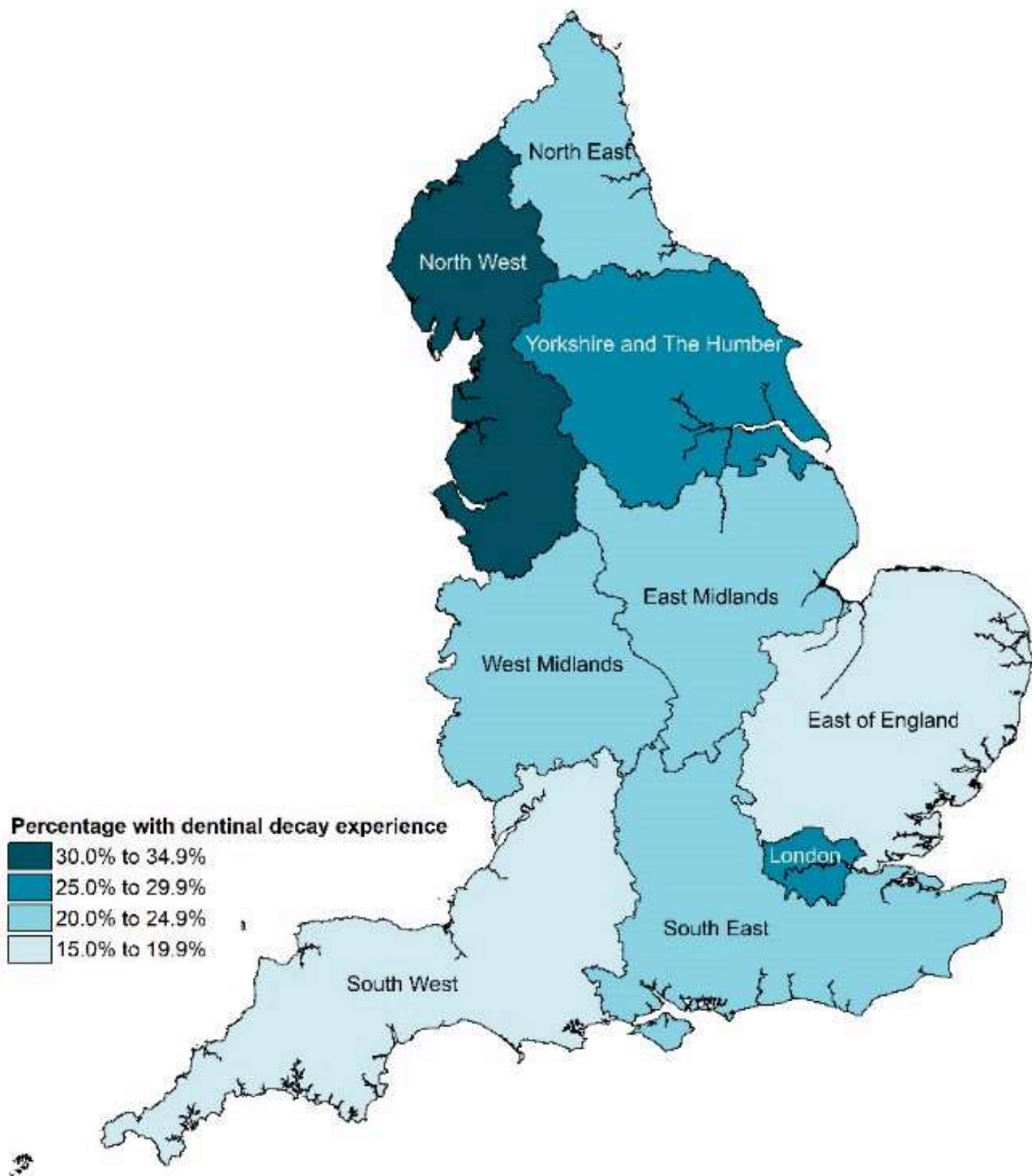
In England, 23.7% of 5 year old children surveyed had experience of dentinal decay. There was no difference in prevalence between girls and boys. Prevalence varied across the regions from 19.1% in the South West to 30.6% in the North West (see Figure 3 and Map 2 below).

Figure 3: Prevalence of experience of dentinal decay in 5 year olds in England by region, 2022



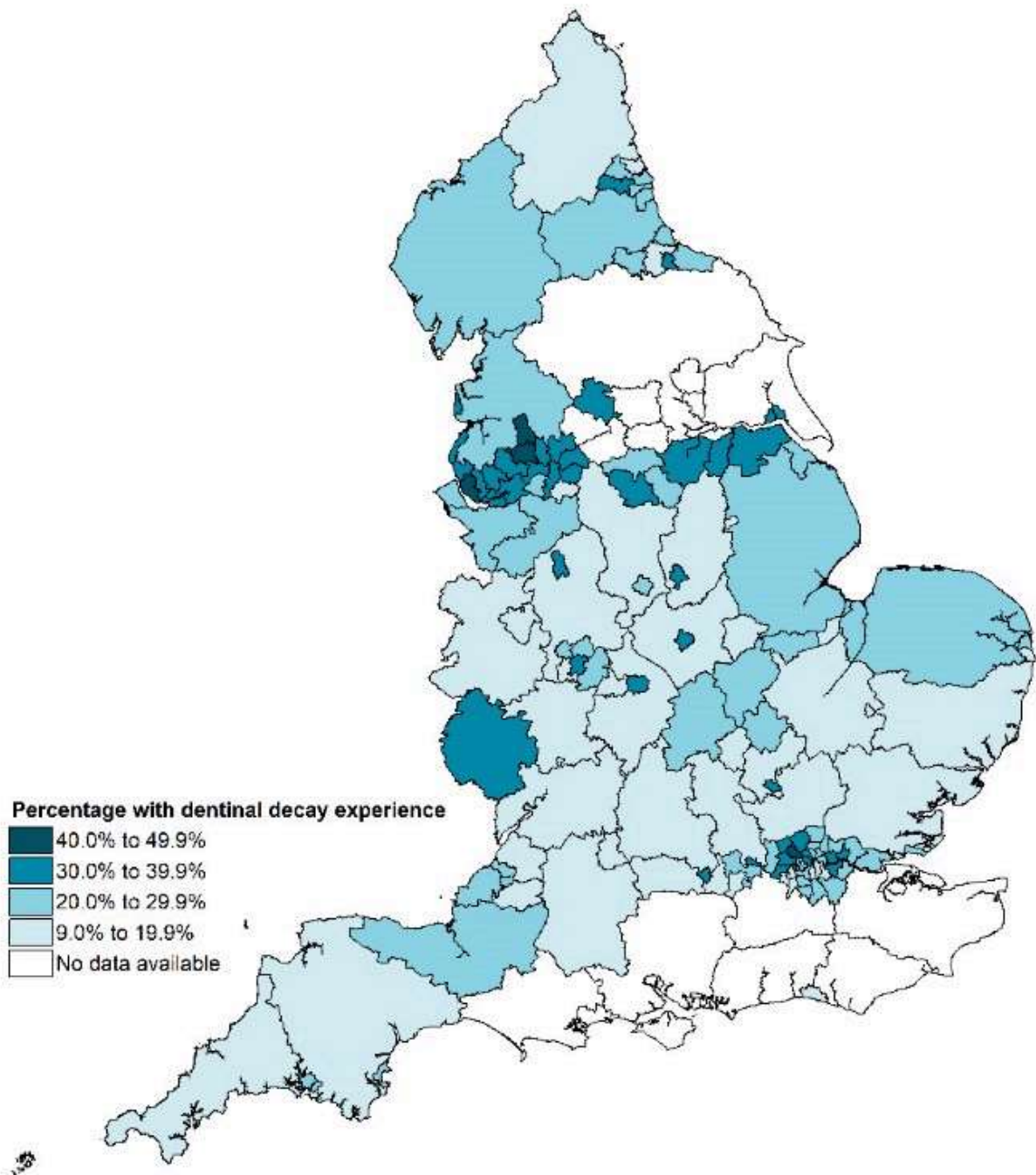
Note: data missing for half of the local authority areas in the South East and Yorkshire and Humber regions; error bars represent 95% confidence limits.

Map 2: Prevalence of experience of dentinal decay in 5 year olds in England by region, 2022



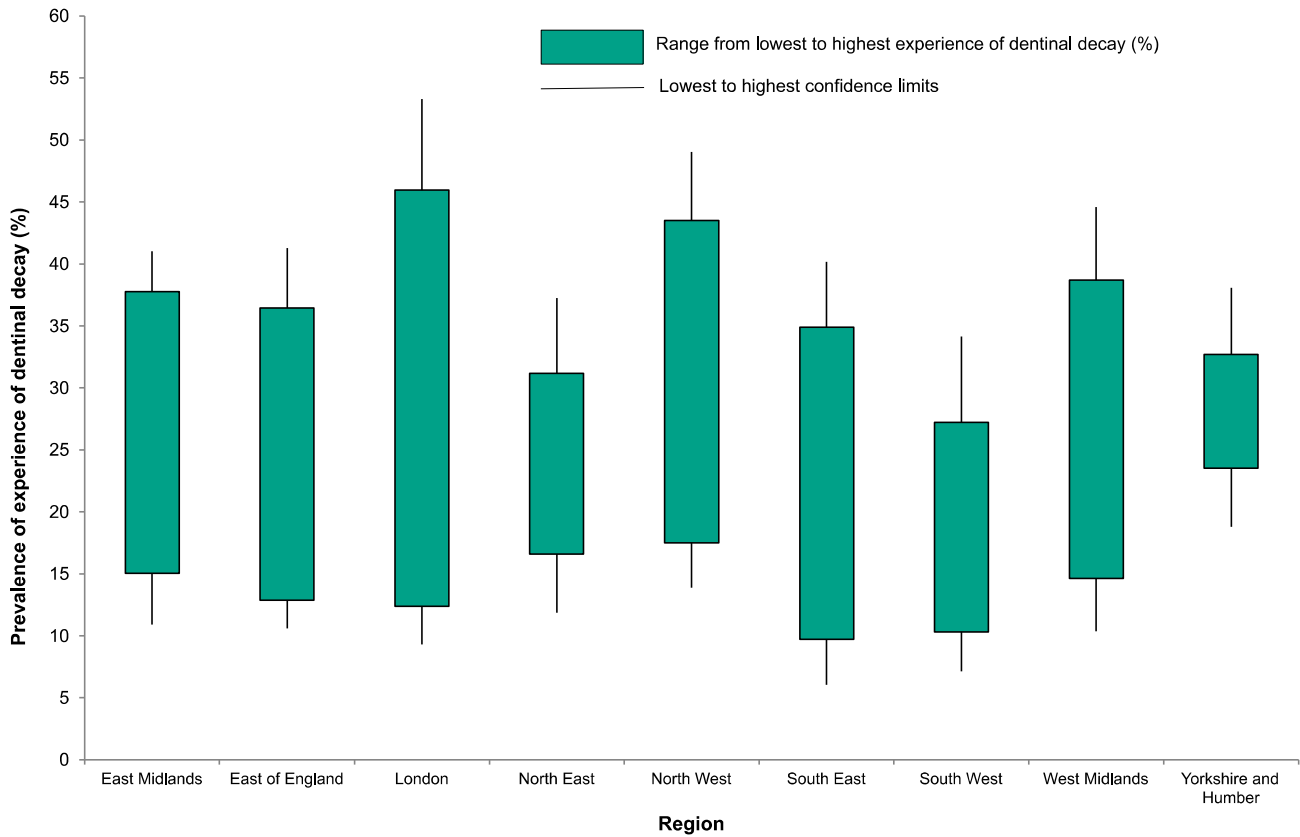
At upper-tier local authority level prevalence of experience of dentinal decay ranged from 46.0% in Brent to 9.7% in Brighton and Hove (see Map 3).

Map 3: Prevalence of experience of dentinal decay in 5 year olds in England by upper-tier local authority, 2022



Within regions there was variation in the prevalence of experience of dental decay in 5 year olds by upper-tier local authority area (see Figure 4 below). The greatest variation was in London, where the lowest prevalence was 12.4% and the highest was 46.0%.

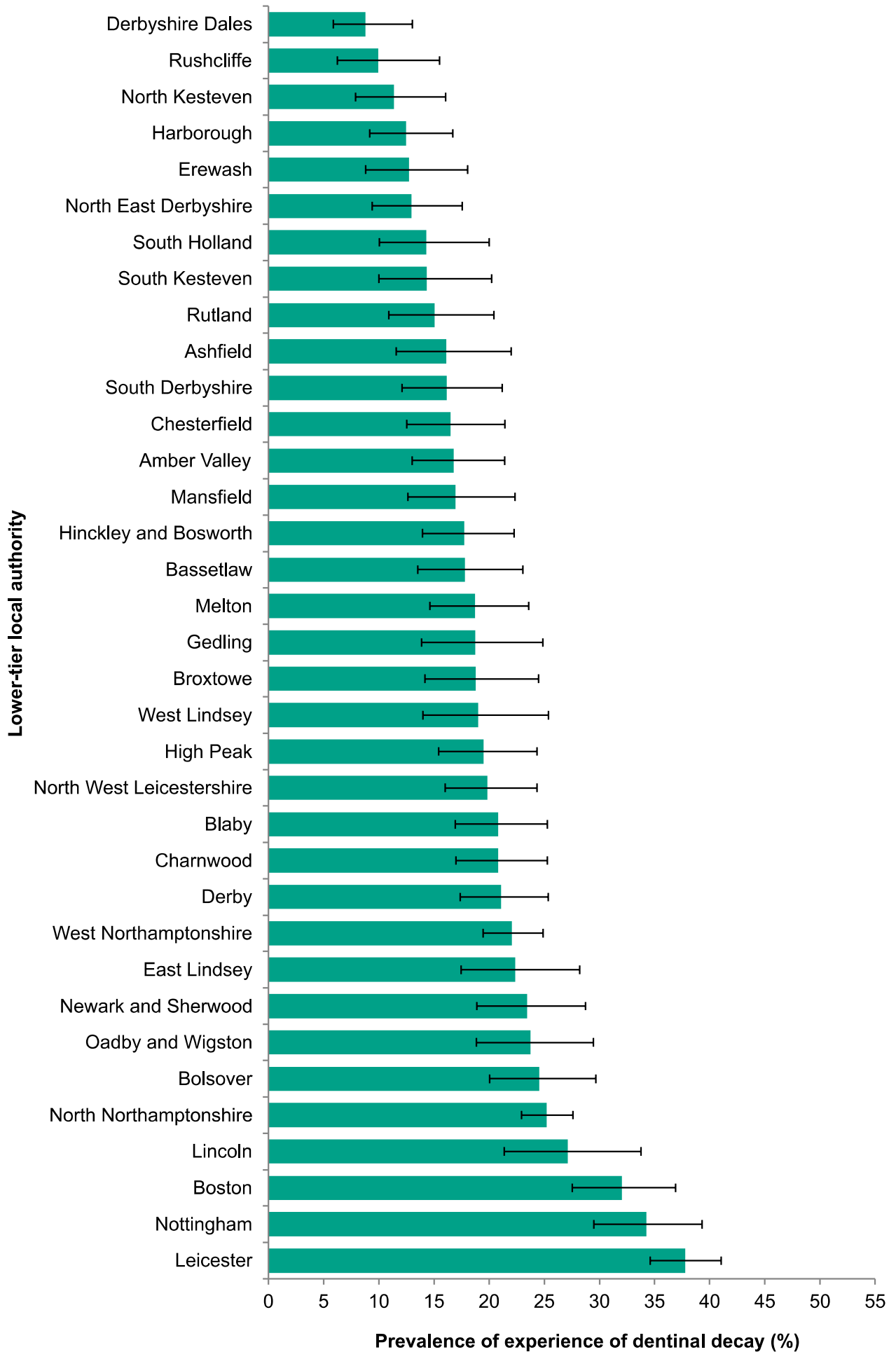
Figure 4: Range of experience of dental decay in upper-tier local authority areas among 5 year olds in England by region, 2022



Note: data not available for half of the local authority areas in the South East and Yorkshire and Humber regions.

The variations in prevalence of experience of dental decay between lower-tier local authority areas within each region are shown below (see Figures 5 to 13 below). Data could not be reported in some local authority areas where the number of children examined was too small to be included in the analyses. This is reflected in the charts below as 'data not available'.

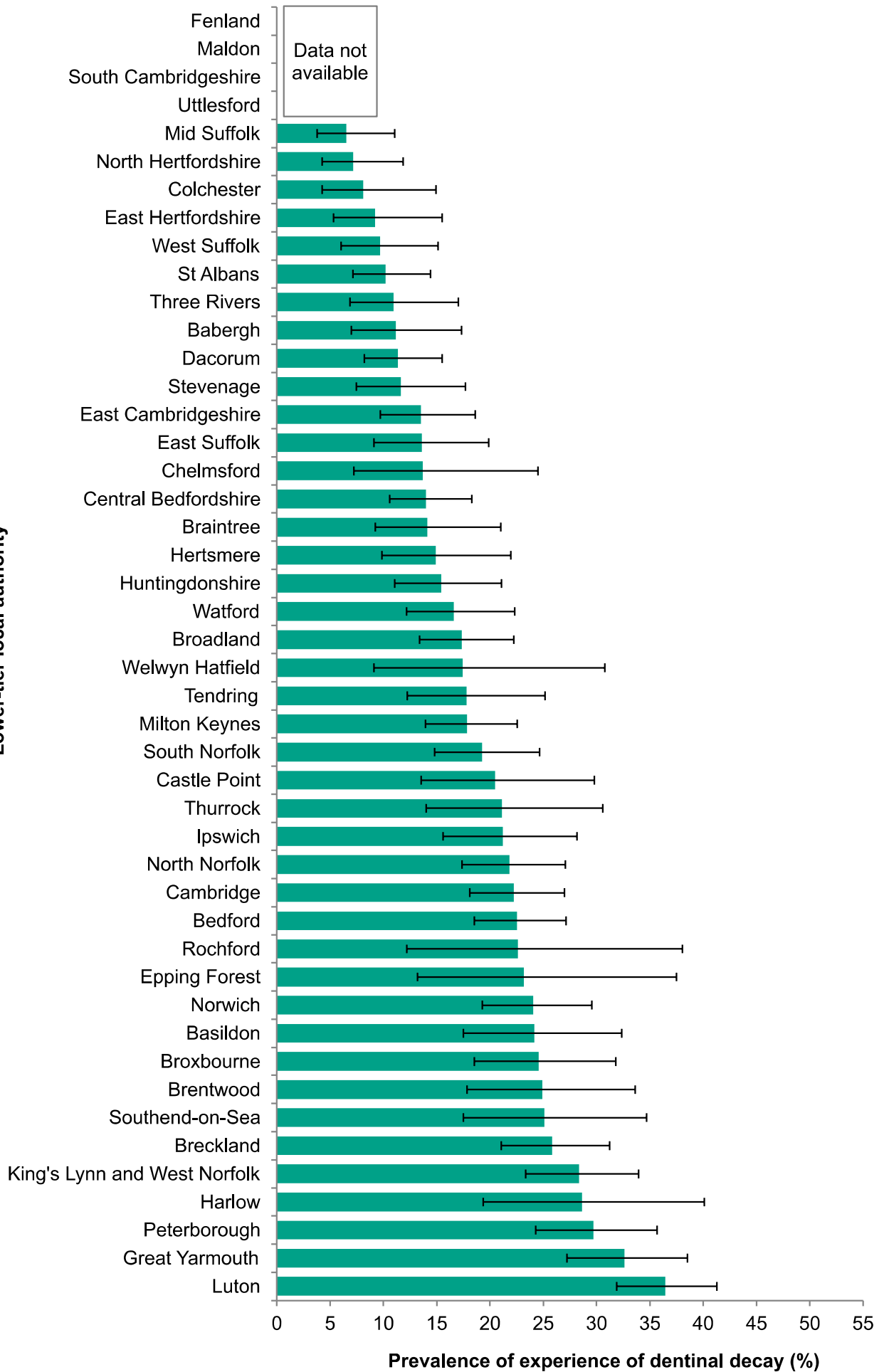
Figure 5: Prevalence of experience of dental decay in 5 year olds in the East Midlands by lower-tier local authority area, 2022



Note: error bars represent 95% confidence limits.

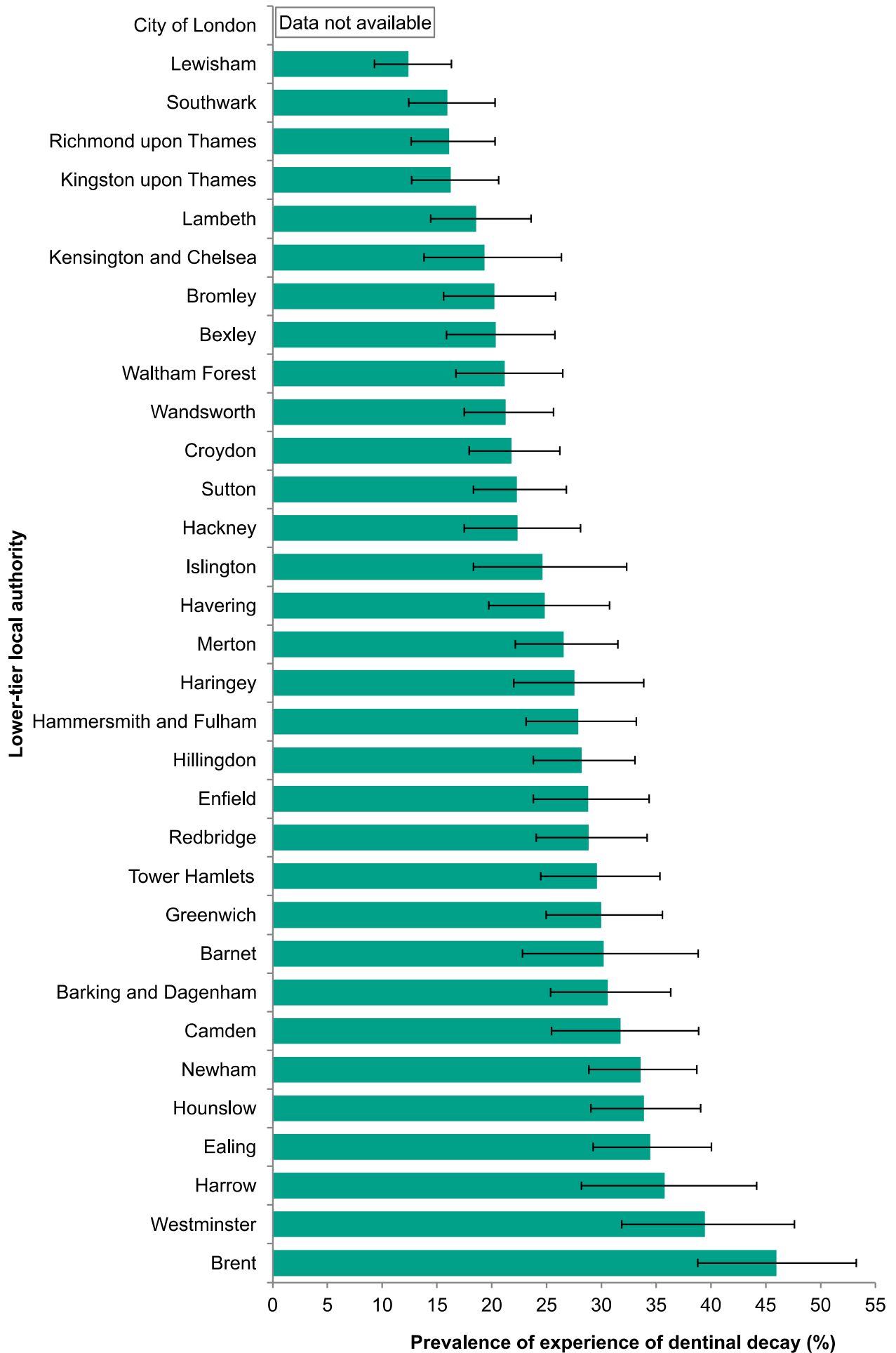
Figure 6: Prevalence of experience of dentinal decay in 5 year olds in the East of England by lower-tier local authority area, 2022

Lower-tier local authority



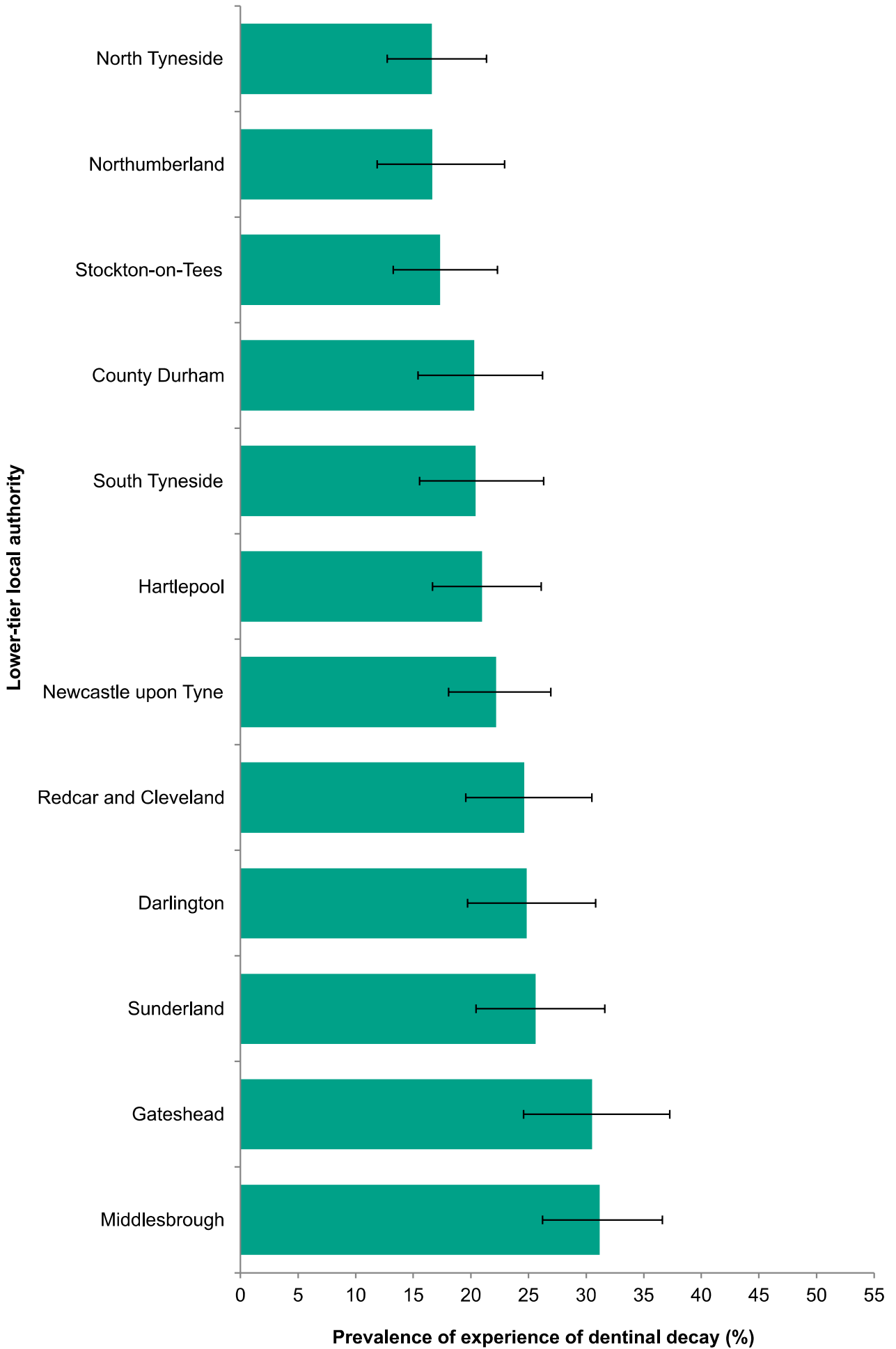
Note: error bars represent 95% confidence limits.

Figure 7: Prevalence of experience of dentinal decay in 5 year olds in London by lower-tier local authority area, 2022



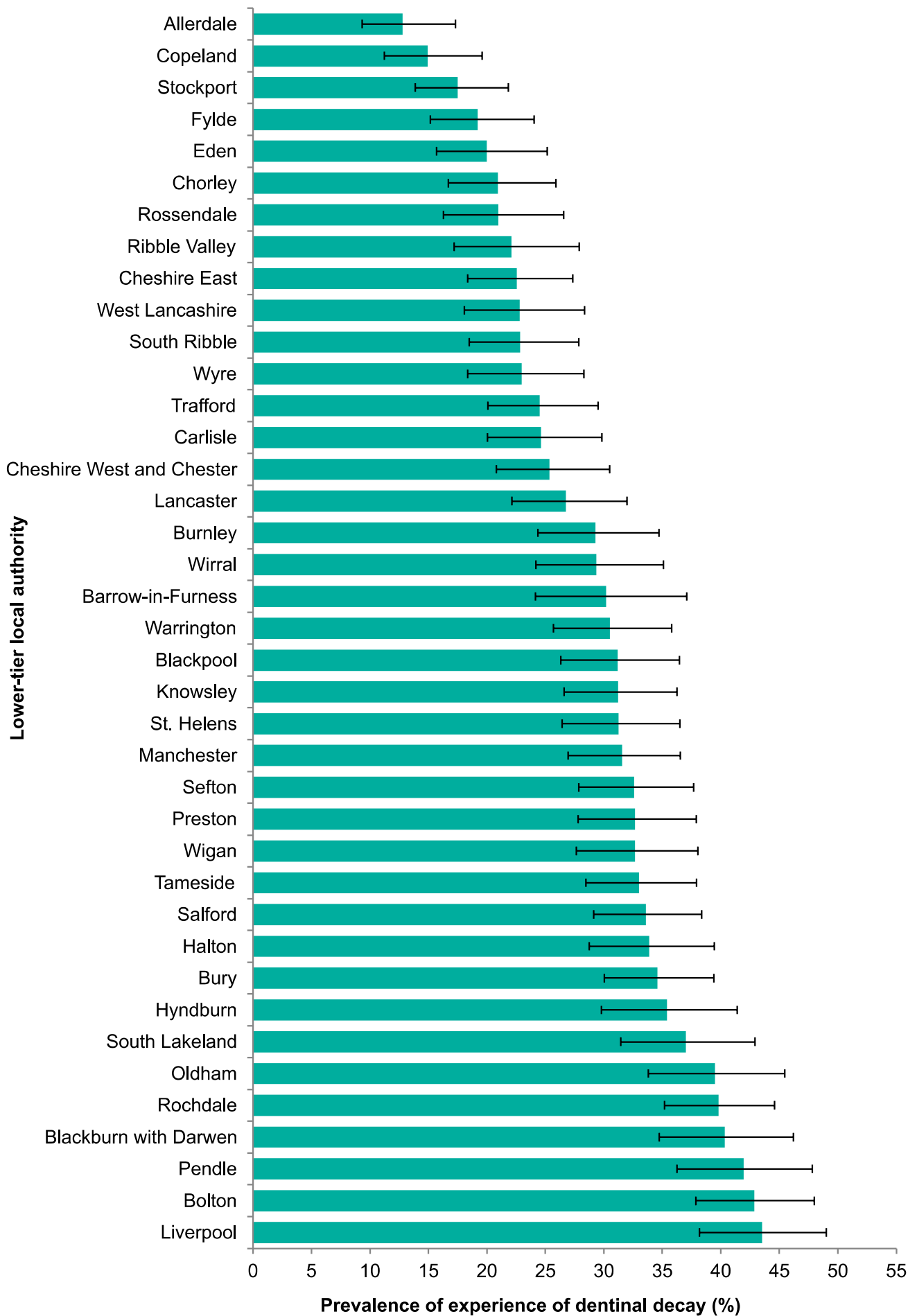
Note: error bars represent 95% confidence limits.

Figure 8: Prevalence of experience of dentinal decay in 5 year olds in the North East by lower-tier local authority area, 2022



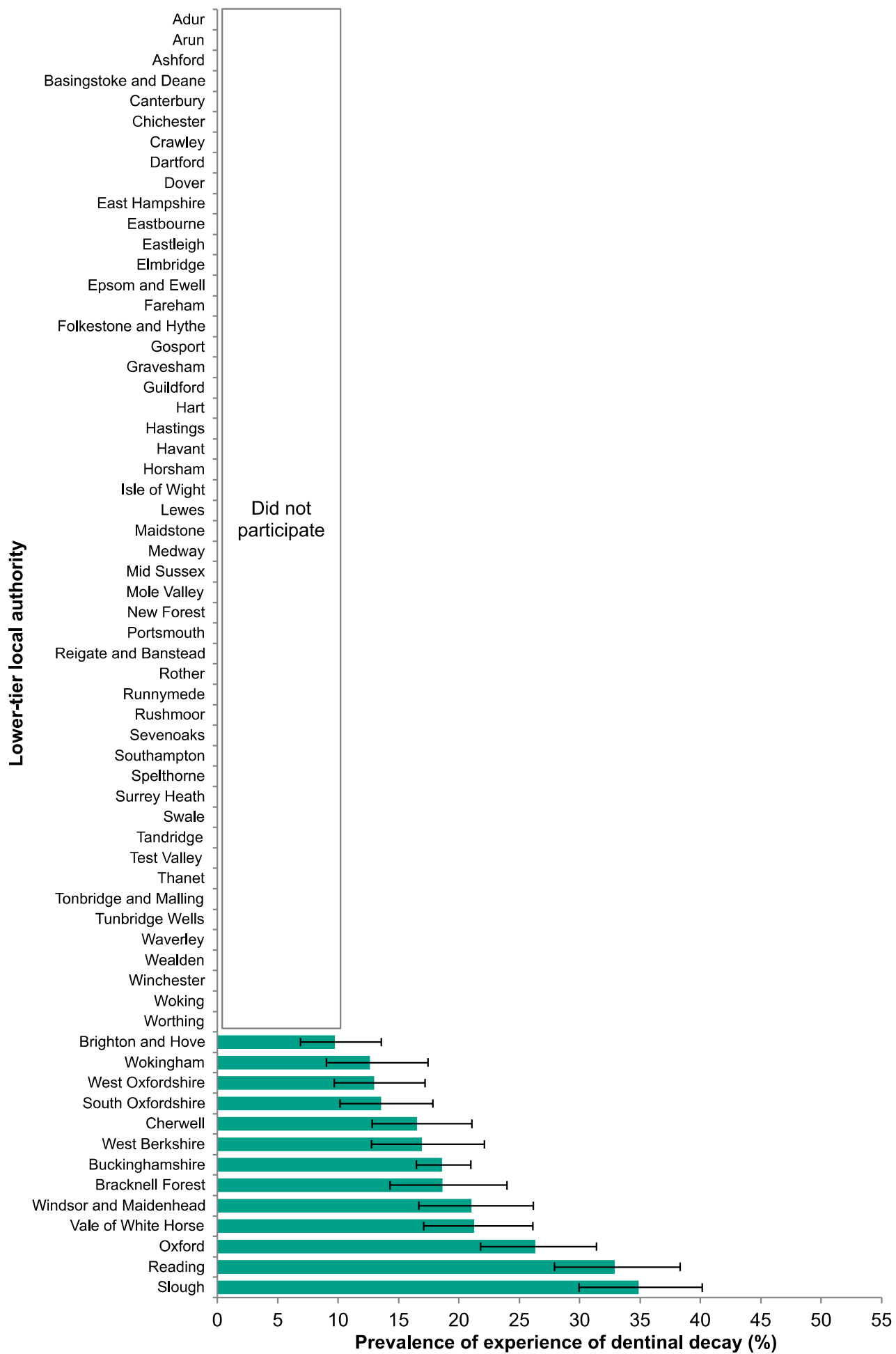
Note: error bars represent 95% confidence limits.

Figure 9: Prevalence of experience of dentinal decay in 5 year olds in the North West by lower-tier local authority area, 2022



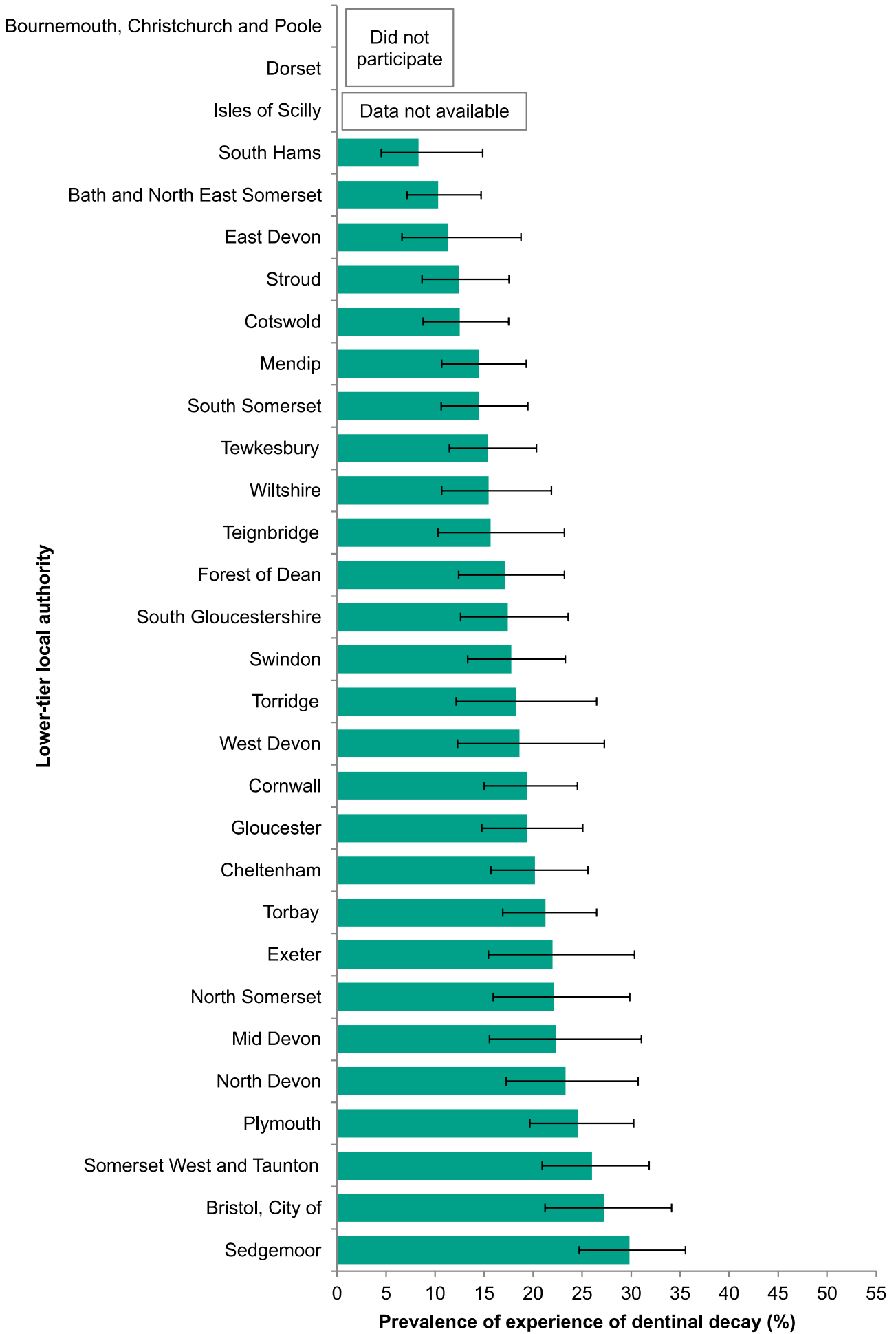
Note: error bars represent 95% confidence limits.

Figure 10: Prevalence of experience of dentinal decay in 5 year olds in the South East by lower-tier local authority area, 2022



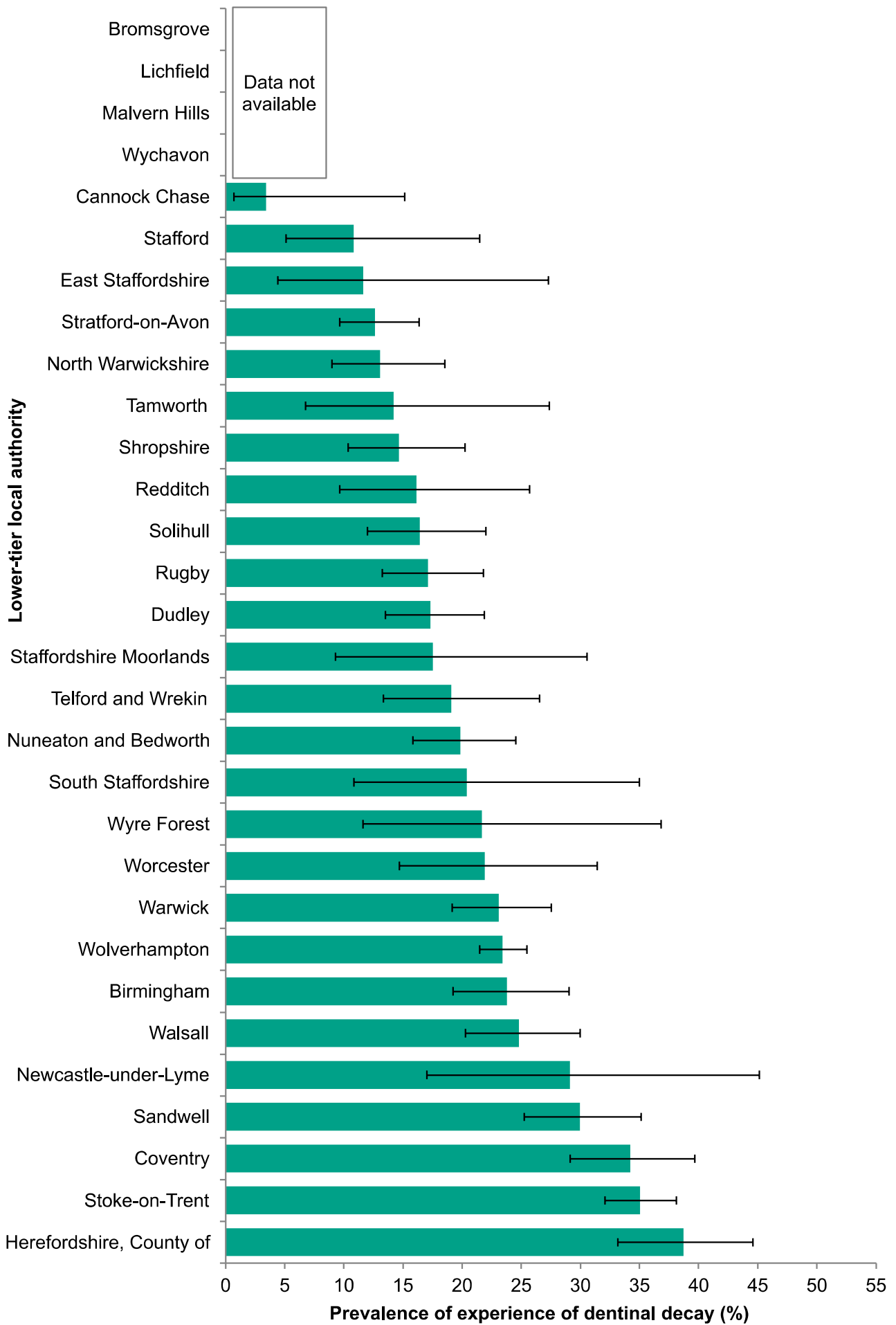
Note: error bars represent 95% confidence limits.

Figure 11: Prevalence of experience of dentinal decay in 5 year olds in the South West by lower-tier local authority area, 2022



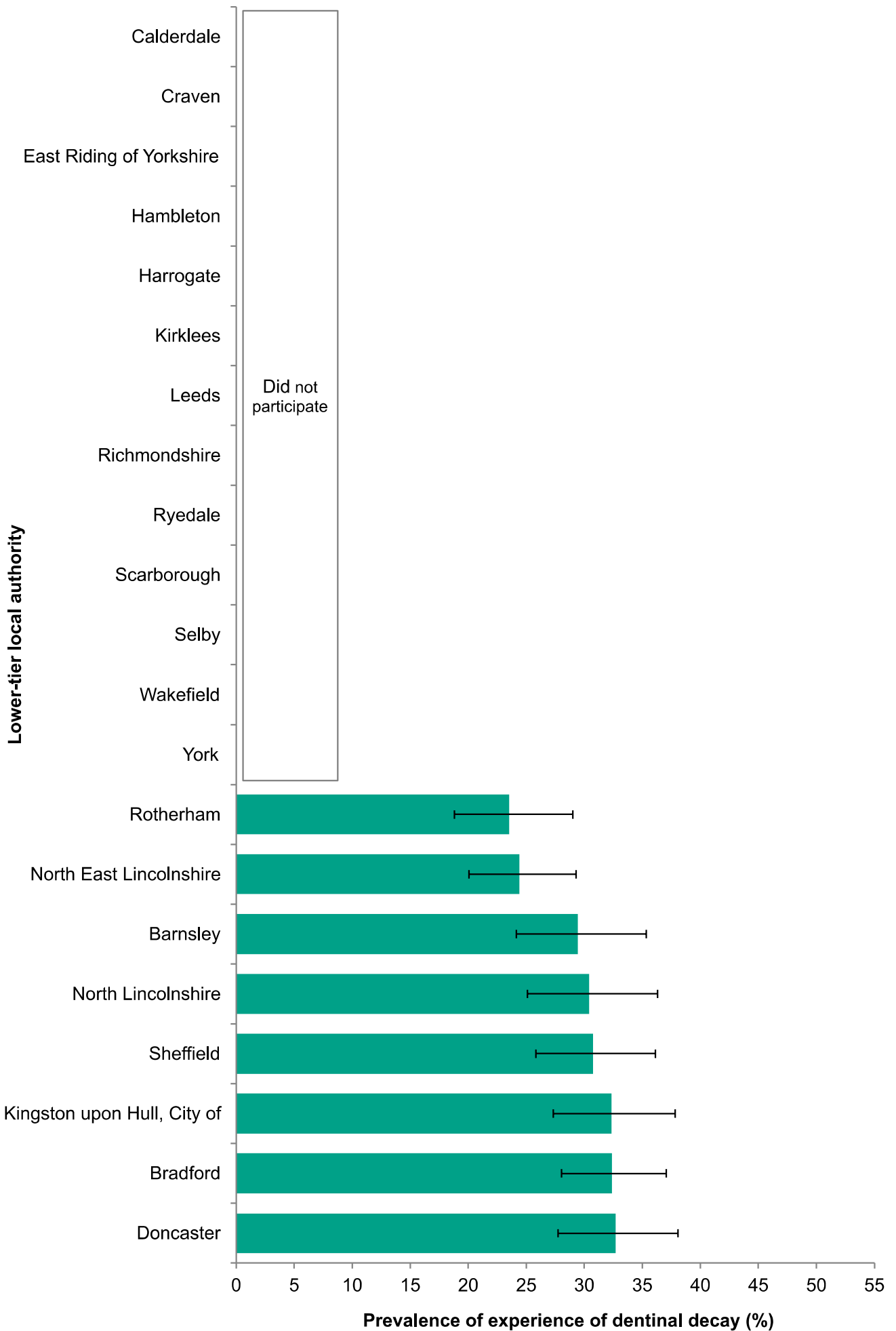
Note: error bars represent 95% confidence limits.

Figure 12: Prevalence of experience of dentinal decay in 5 year olds in the West Midlands by lower-tier local authority area, 2022



Note: error bars represent 95% confidence limits.

Figure 13: Prevalence of experience of dentinal decay in 5 year olds in Yorkshire and Humber by lower-tier local authority area, 2022.



Note: error bars represent 95% confidence limits.

Severity of experience of dentinal decay

The mean number of teeth with experience of decay in all children examined was 0.8 (confidence interval 0.82 to 0.86). The median number of teeth with experience of dentinal decay was 0 (inter quartile range 0, 0 to 0), which was to be expected, as 76.3% of children surveyed had no experience of dentinal decay. There was no difference in severity between girls and boys.

There was little variation in the severity of experience of dentinal decay between the regions (see Table 1).

Table 1: Mean and median number of teeth with experience of dentinal decay in 5 year olds in England, by region 2022

Region name	Mean number of teeth with experience of dentinal decay in all examined children (95% confidence intervals)	Mean number of teeth with experience of dentinal decay in children with experience (95% confidence intervals)	Median number of teeth with experience of dentinal decay in children with experience	Inter quartile range (quarter 1 to quarter 3)
North East	0.8 (0.72 to 0.86)	3.6 (3.33 to 3.78)	2	4 (1 to 5)
North West	1.2 (1.11 to 1.20)	3.8 (3.67 to 3.88)	3	4 (1 to 5)
Yorkshire and The Humber	1.0 (0.92 to 1.10)	3.7 (3.51 to 3.96)	3	4 (1 to 5)
East Midlands	0.8 (0.74 to 0.82)	3.5 (3.38 to 3.61)	2	4 (1 to 5)
West Midlands	0.8 (0.75 to 0.84)	3.4 (3.22 to 3.49)	2	3 (1 to 4)
East of England	0.7 (0.62 to 0.70)	3.4 (3.27 to 3.57)	2	4 (1 to 5)
London	1.0 (0.91 to 1.0)	3.7 (3.58 to 3.83)	3	4 (1 to 5)

Region name	Mean number of teeth with experience of dentinal decay in all examined children (95% confidence intervals)	Mean number of teeth with experience of dentinal decay in children with decay experience (95% confidence intervals)	Median number of teeth with experience of dentinal decay in children with decay experience	Inter quartile range (quarter 1 to quarter 3)
South East	0.7 (0.66 to 0.77)	3.4 (3.19 to 3.55)	2	4 (1 to 5)
South West	0.6 (0.58 to 0.67)	3.3 (3.09 to 3.45)	2	3 (1 to 4)
England	0.8 (0.82 to 0.86)	3.5 (3.50 to 3.59)	2	4 (1 to 5)

Note: data not available for half of the local authority areas in the South East and Yorkshire and Humber regions.

There was variation in the severity of experience of dentinal decay at upper-tier local authority level, ranging from 0.2 (confidence interval 0.11 to 0.28) in Brighton and Hove to 2.1 (confidence interval 1.73 to 2.48) in Liverpool (Table 6 of the full survey results held on the [oral health collections page](http://www.gov.uk/government/collections/oral-health) (<http://www.gov.uk/government/collections/oral-health>)).

There was also similar variation in the severity of experience of dentinal decay at lower-tier local authority level (Table 7 of the full survey results held on the [oral health collections page](http://www.gov.uk/government/collections/oral-health) (<http://www.gov.uk/government/collections/oral-health>)).

As the majority of children had no experience of dentinal decay it is important to look at the severity of disease in only those children who have experienced dentinal decay. Among these children, the mean number of teeth with experience of dentinal decay was 3.5 (confidence interval 3.50 to 3.59). The median number of teeth with experience of dentinal decay among these children was 2 (inter quartile range 4, 1 to 5) (see Table 1).

At a regional level there was little variation in severity of experience of dentinal decay among 5 year old children with any decay experience (see Table 1).

At upper-tier local authority level the variation was greater, ranging from 2.0 (confidence interval 1.42 to 2.59) teeth in Brighton and Hove to 5.3 (confidence interval 4.31 to 6.25) in Westminster (Table 6 of the full survey results held on

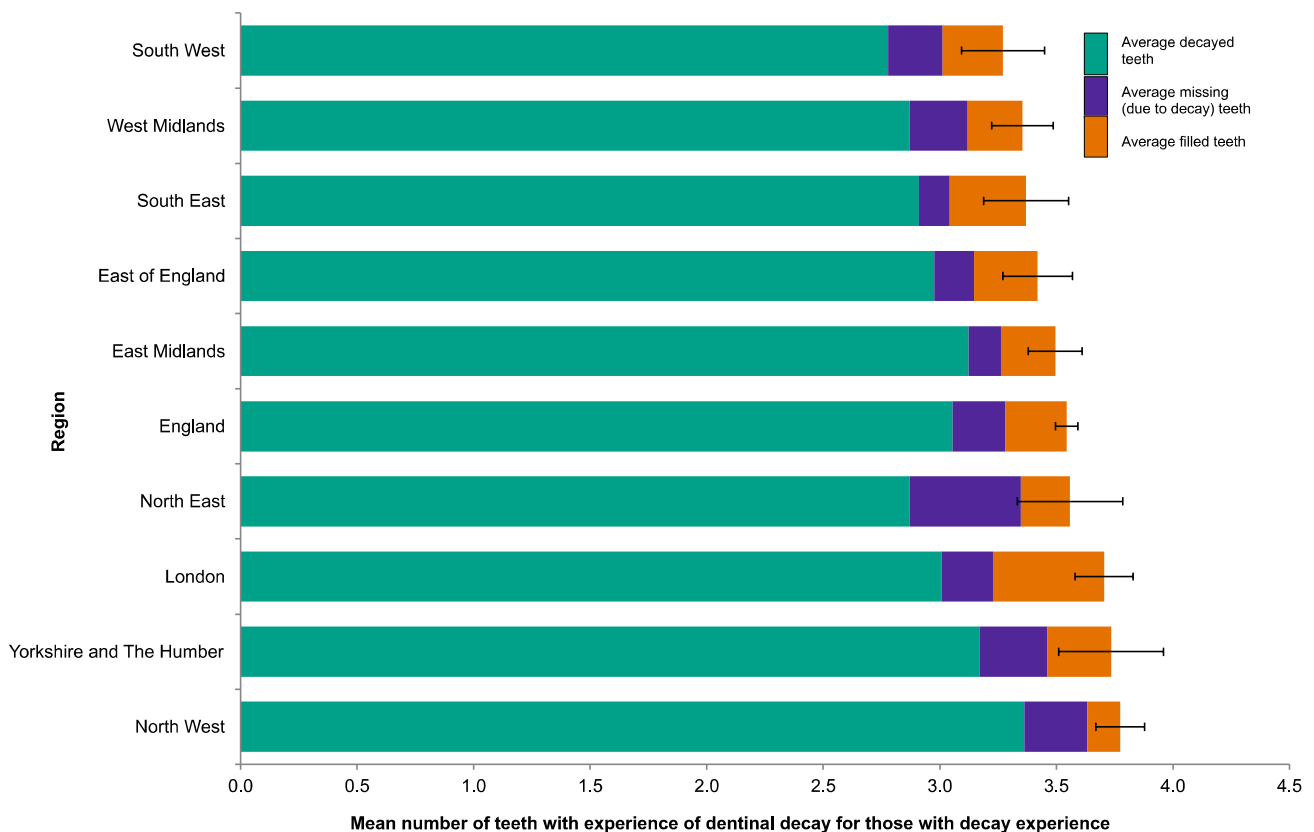
the [oral health collections page \(http://www.gov.uk/government/collections/oral-health\)](http://www.gov.uk/government/collections/oral-health)).

There was also similar variation in the severity of experience of dentinal decay among 5 year old children with any decay experience at lower-tier local authority level (Table 7 of the full survey results held on the [oral health collections page \(http://www.gov.uk/government/collections/oral-health\)](http://www.gov.uk/government/collections/oral-health)).

Untreated dentinal decay

The majority of experience of dentinal decay in this age group was obvious, untreated dentinal decay. On average, 5 year old children with experience of dentinal decay had 3.1 (confidence interval 3.01 to 3.10) teeth with untreated decay into dentine. At regional level the average number of decayed teeth ranged from 2.8 (confidence interval 2.60 to 2.95) in the South West to 3.4 (confidence interval 3.26 to 3.46) in the North West (see Figure 14). The number of teeth with untreated dentinal decay ranged from 1 to 20 and the median was 2 (inter quartile range 3, 1 to 4).

Figure 14: Mean number of teeth with experience of dentinal decay among 5 year olds with any decay experience in England by region, 2022



Note: data not available for half of the local authority areas in the South East and Yorkshire and Humber regions; error bars represent 95% confidence limits

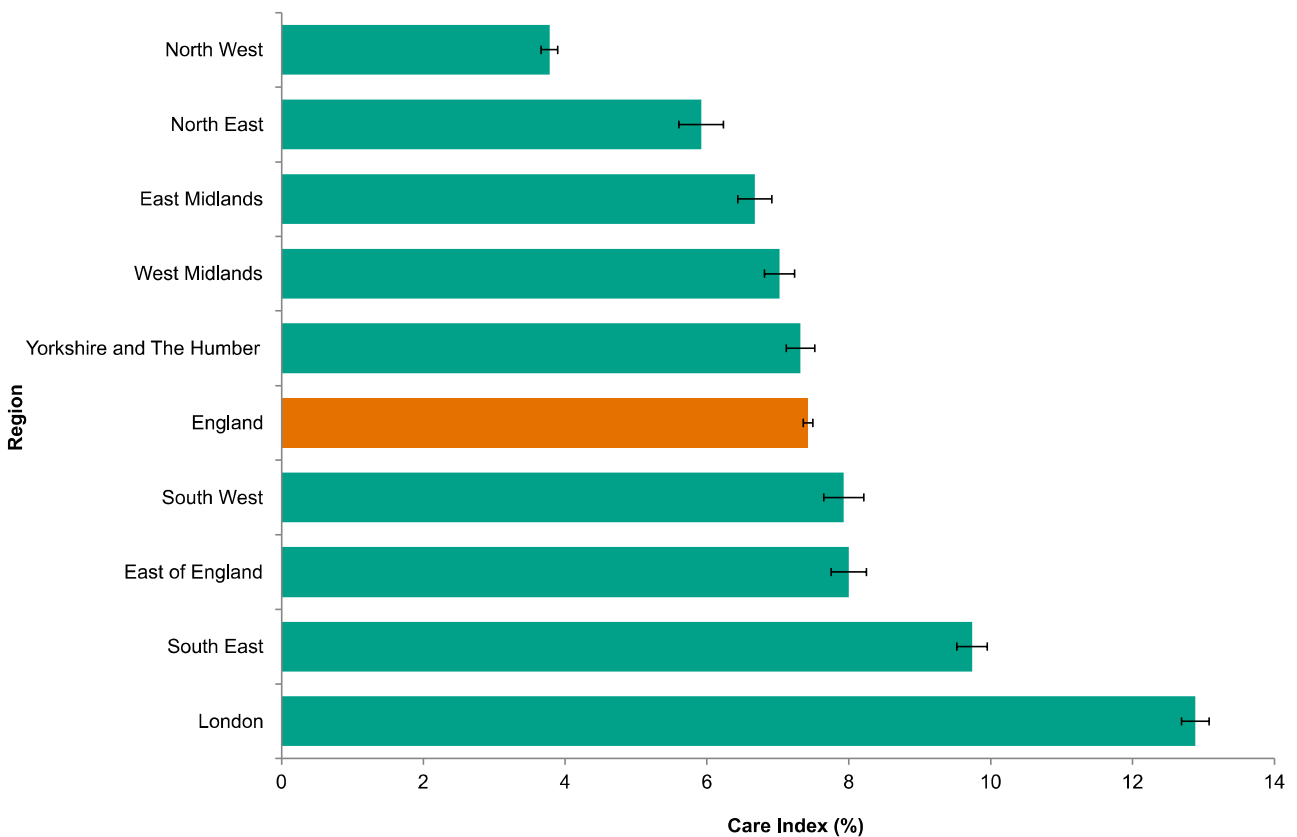
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The care index

The care index is the proportion of teeth with experience of dentinal decay that have been treated by filling. Caution should be taken in making assumptions about the extent or the quality of clinical care available when using this index.

The proportion of teeth with experience of dentinal decay that were filled was 7.4% across England. This varied regionally from 3.8% in the North West to 12.9% in London (see Figure 15 below).

Figure 15: Care index in 5 year olds in England by region, 2022

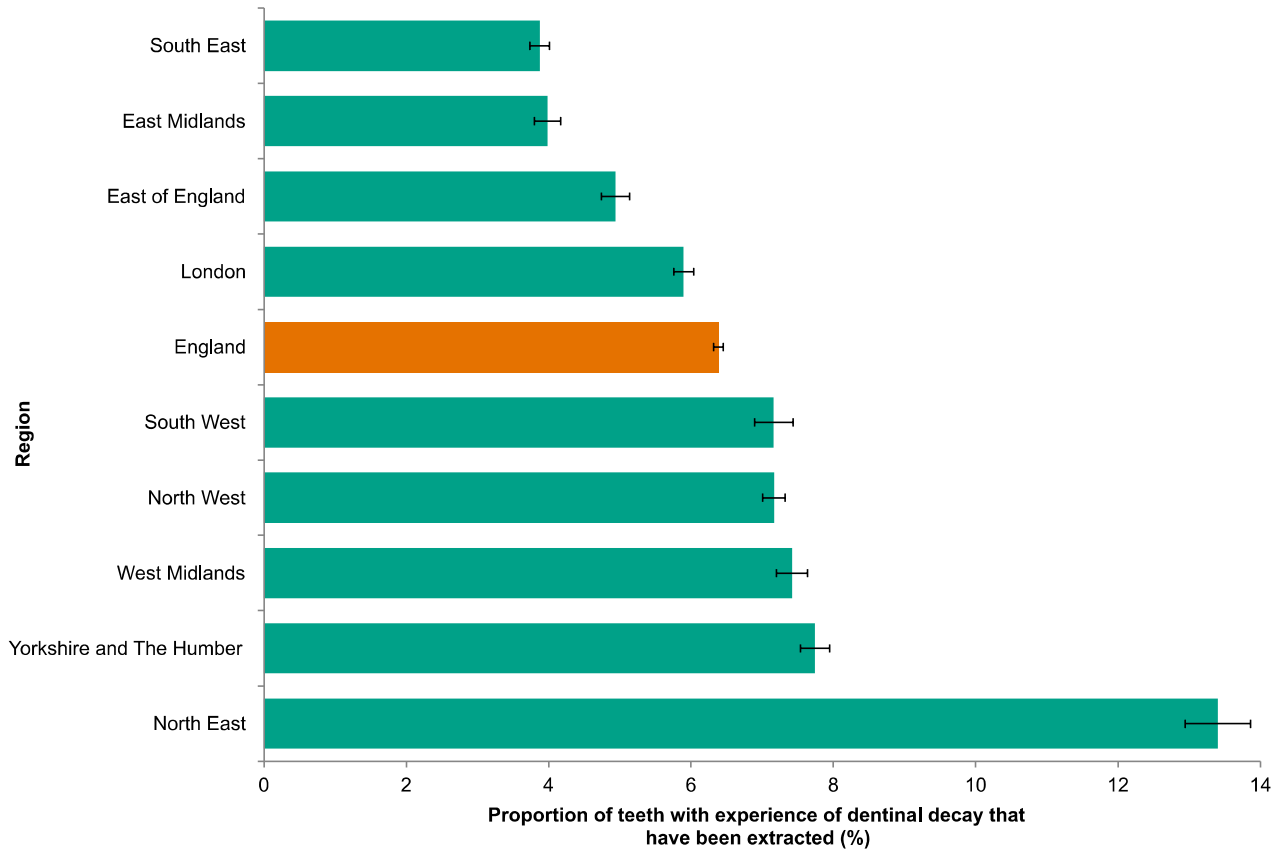


Note: data not available for half of the local authority areas in the South East and Yorkshire and Humber regions; error bars represent 95% confidence limits.

The proportion of teeth with experience of dentinal decay that have been extracted in 5 year olds

Extraction of teeth in young children usually involves admission to hospital and a general anaesthetic. The proportion of teeth with experience of dentinal decay that had been extracted in 5 year olds across England was 6.4%. At regional level this ranged from 3.9% in the South East to 13.4% in the North East (see Figure 16 below).

Figure 16: Proportion of teeth with experience of dentinal decay that have been extracted in 5 year olds in England by region, 2022

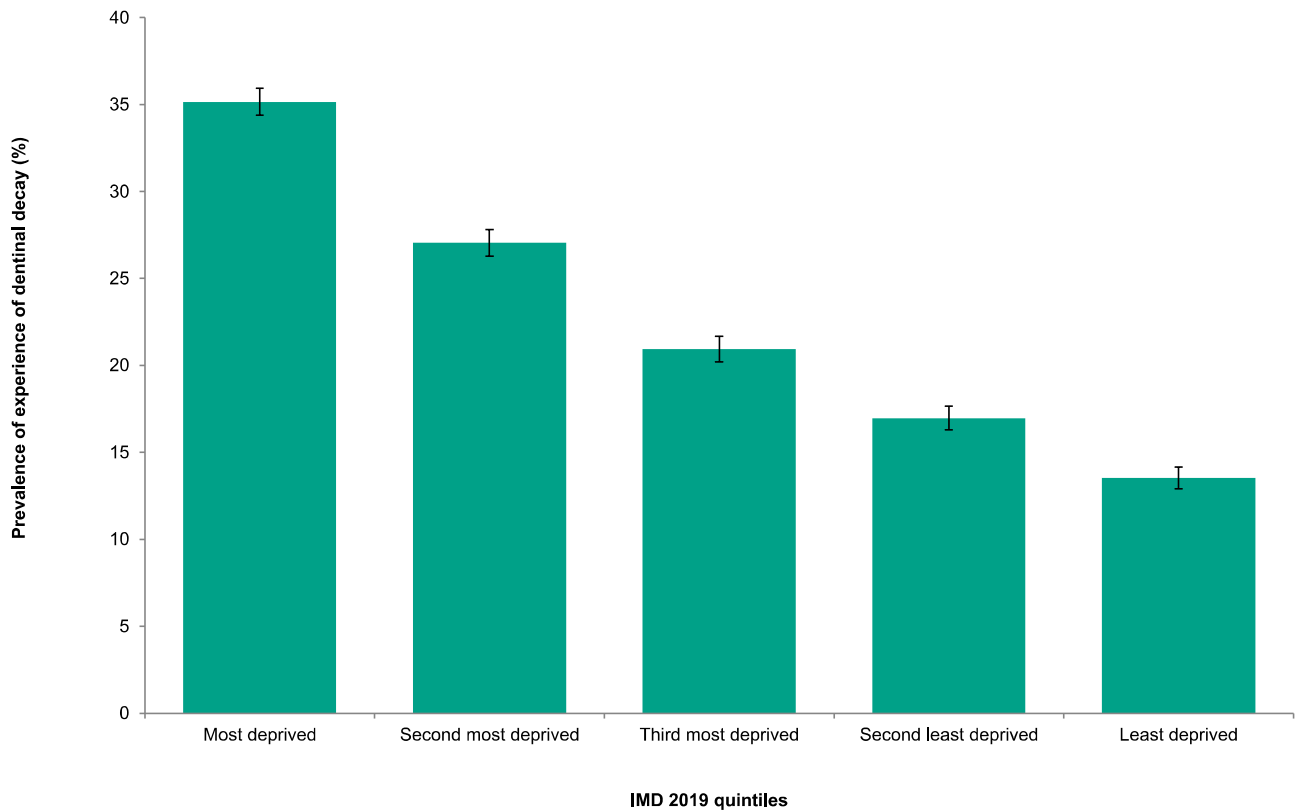


Note: data not available for half of the local authority areas in the South East and Yorkshire and Humber regions; error bars represent 95% confidence limits.

Experience of dentinal decay by level of deprivation

Oral health inequalities have previously been highlighted as a public health problem (see [Inequalities in oral health in England](https://www.gov.uk/government/publications/inequalities-in-oral-health-in-england) (<https://www.gov.uk/government/publications/inequalities-in-oral-health-in-england>)). In 2021 to 2022 5 year olds in the most deprived 20% of areas of the country (35.1%) were 2.5 times as likely to have experience of dentinal decay as those in the least deprived 20% of areas (13.5%) (see Figure 17 below).

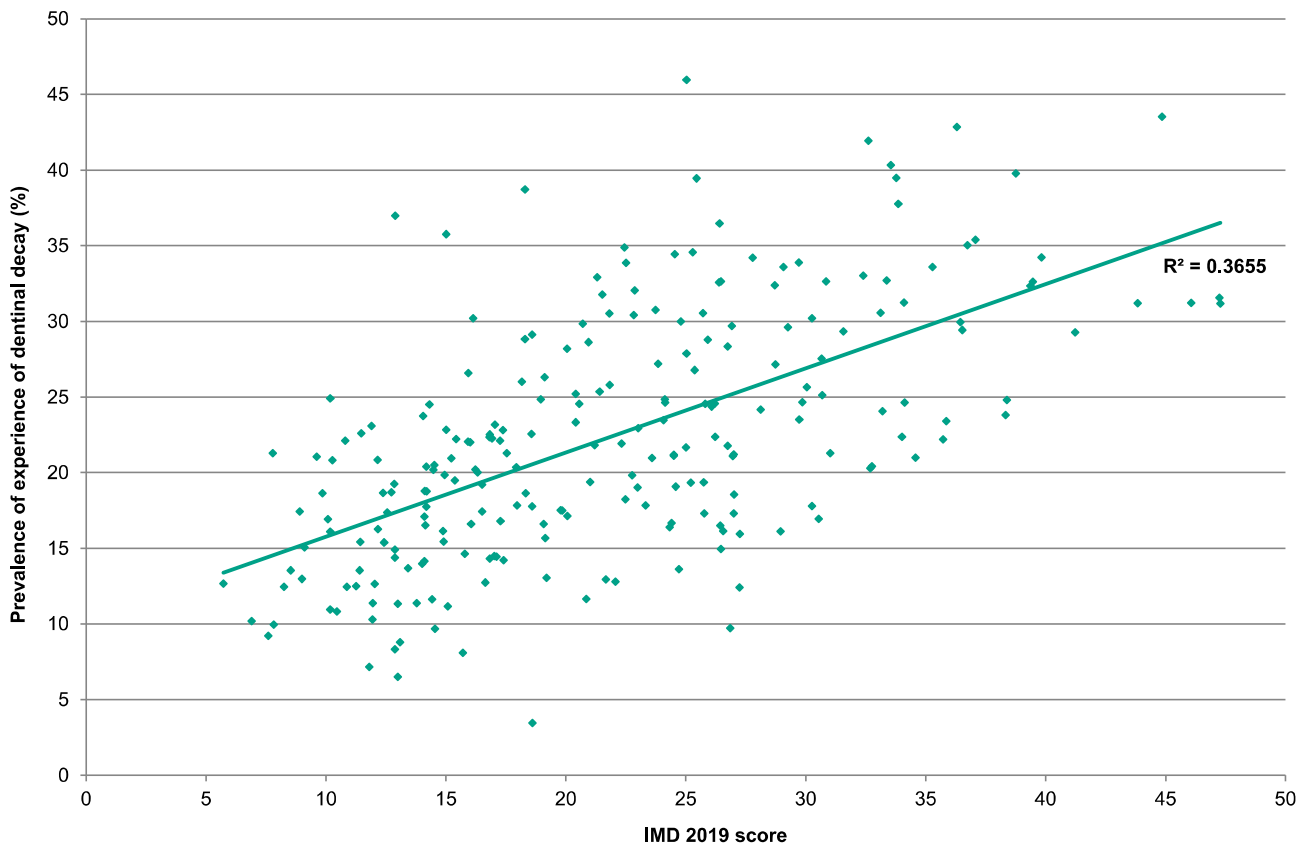
Figure 17: Prevalence of experience of dentinal decay in 5 year olds in England, 2022 by national IMD 2019 quintiles.



Note: error bars represent 95% confidence limits.

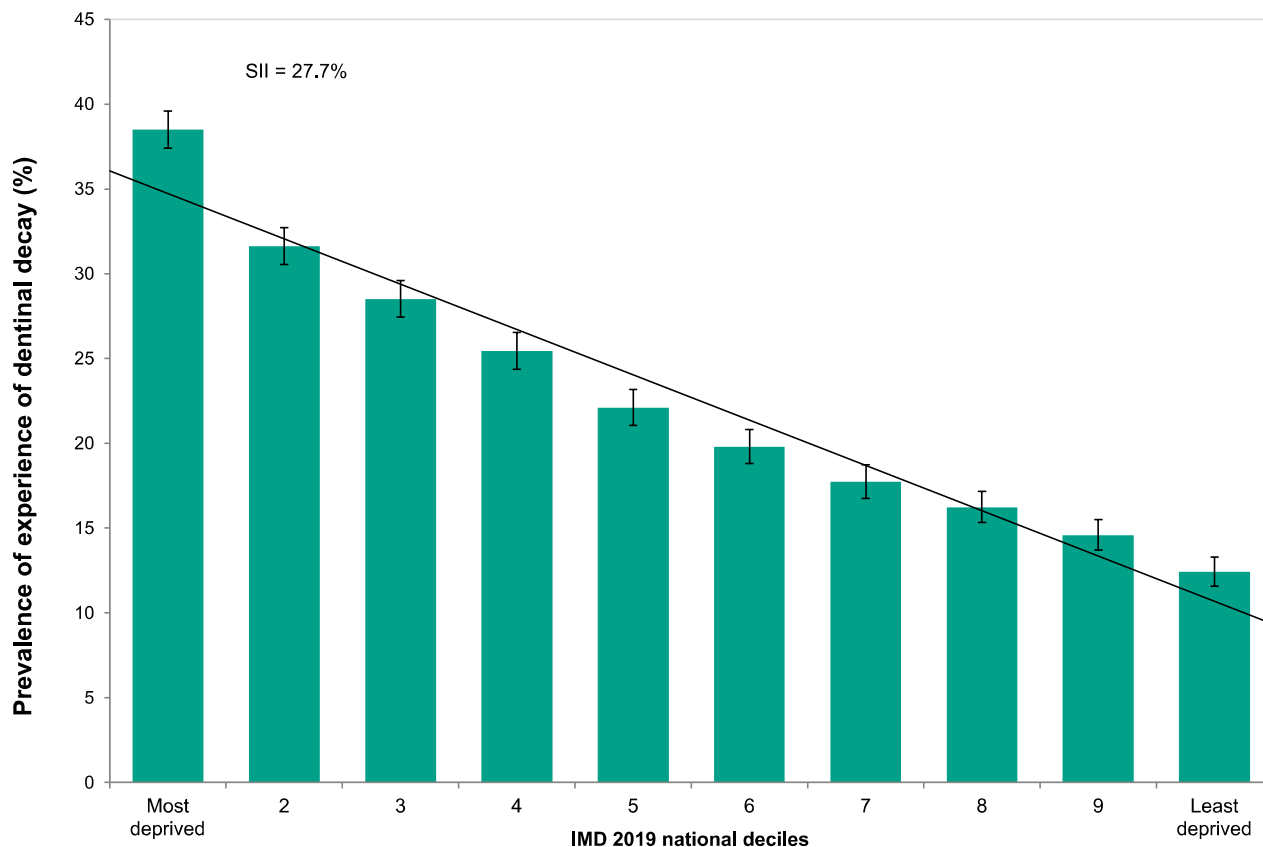
When the prevalence of experience of dental decay in 5 year olds in England in 2022 was correlated against mean IMD 2019 scores for lower-tier local authority areas, deprivation explained 36.6% of the variation (see Figure 18 below). To explain this further, the direction of the slope in Figure 19 illustrates that there is a positive association between decay experience and deprivation, as deprivation increases so does decay experience. However, the scatter of points above and below the line in Figure 19 shows that decay experience is not perfectly correlated with (or explained by) deprivation alone. The value of R squared = 0.3655 ($p = 0.15$) suggests a positive but relatively weak relationship between the two.

Figure 18: Correlation between prevalence of experience of dental decay in 5 year olds and IMD 2019 score by lower-tier local authority areas in England, 2022



The gradient in the difference of prevalence of a disease or condition across people living in the most deprived and the least deprived areas of the country is called the slope index of inequality and is a measure of absolute inequalities. In 2022 the slope index of inequality for the prevalence of experience of dentinal decay in 5 year olds was 27.7% (see Figure 19). This was similar to the previous survey in 2019, when the slope index was 26.8%.

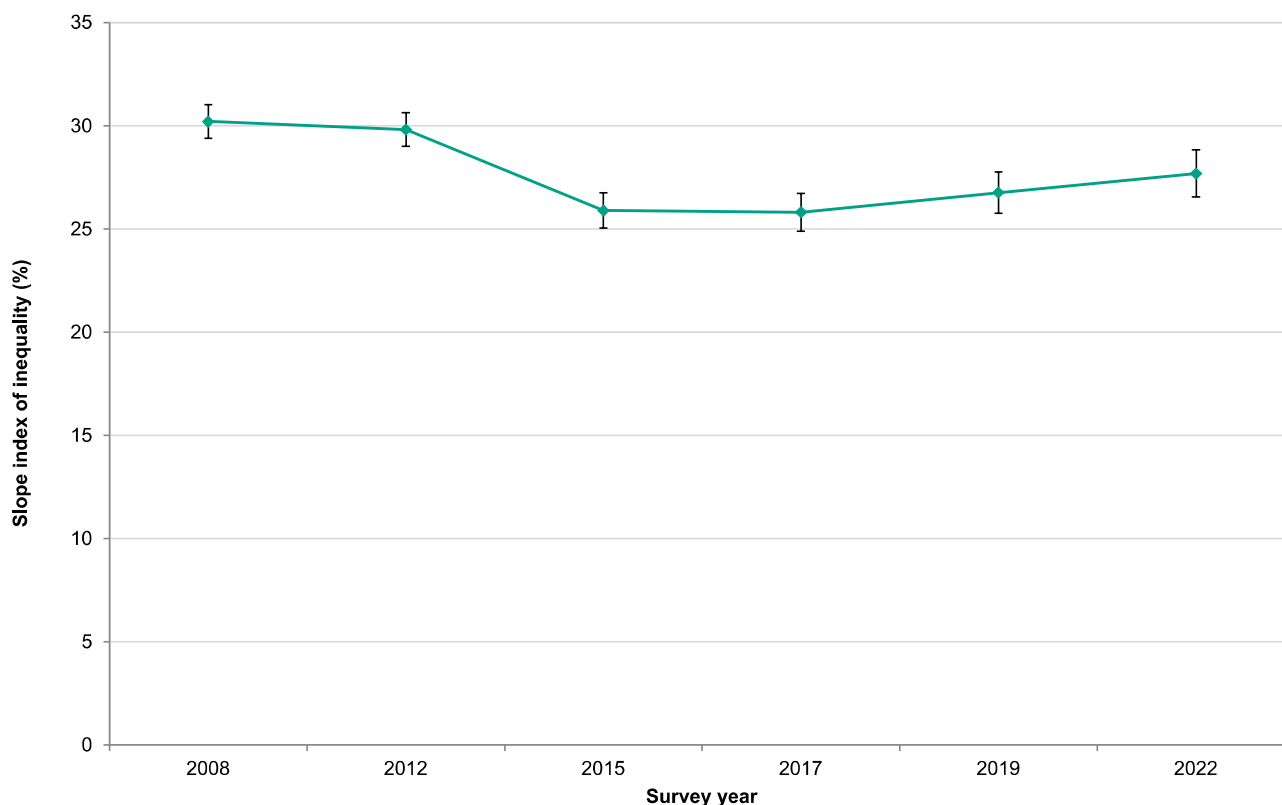
Figure 19: Slope index of inequality in the prevalence of experience of dentinal decay in 5 year olds in England, 2022



Note: error bars represent 95% confidence limits.

The slope index of inequality can also be used to describe changes in inequalities over time. Using this measure, absolute inequalities in dentinal decay prevalence in 5 year olds have reduced from 2008 to 2015 but there have been no further reductions in inequalities since then (see Figure 20).

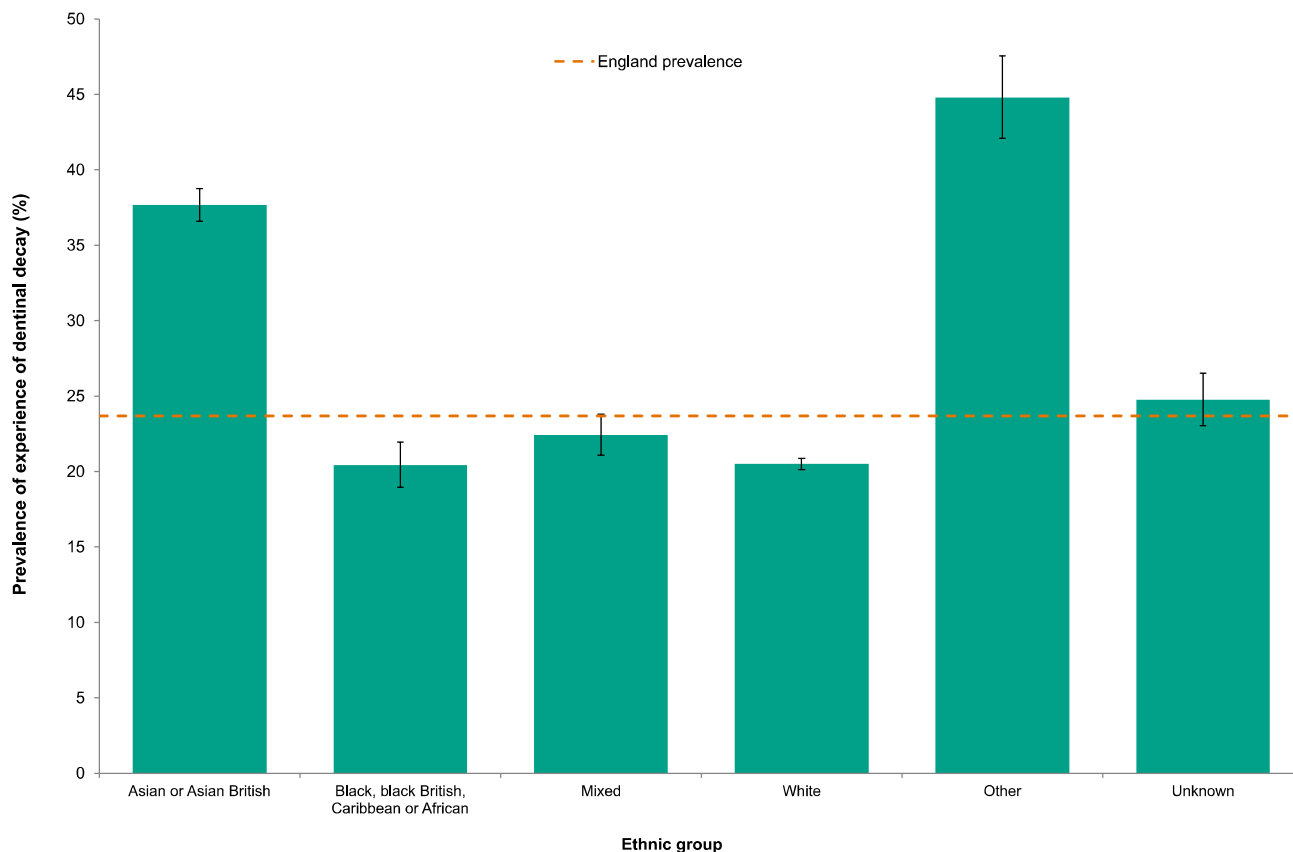
Figure 20: Slope index of inequality in the prevalence of experience of dentinal decay in 5 year olds in England, 2008 to 2022



Prevalence and severity of experience of dentinal decay by ethnic group

The prevalence of experience of dentinal decay in 5 year olds varied by ethnic group and was significantly higher in the other ethnic group (44.8%) and the Asian or Asian British ethnic group (37.7%) than for other groups (see Figure 21 below).

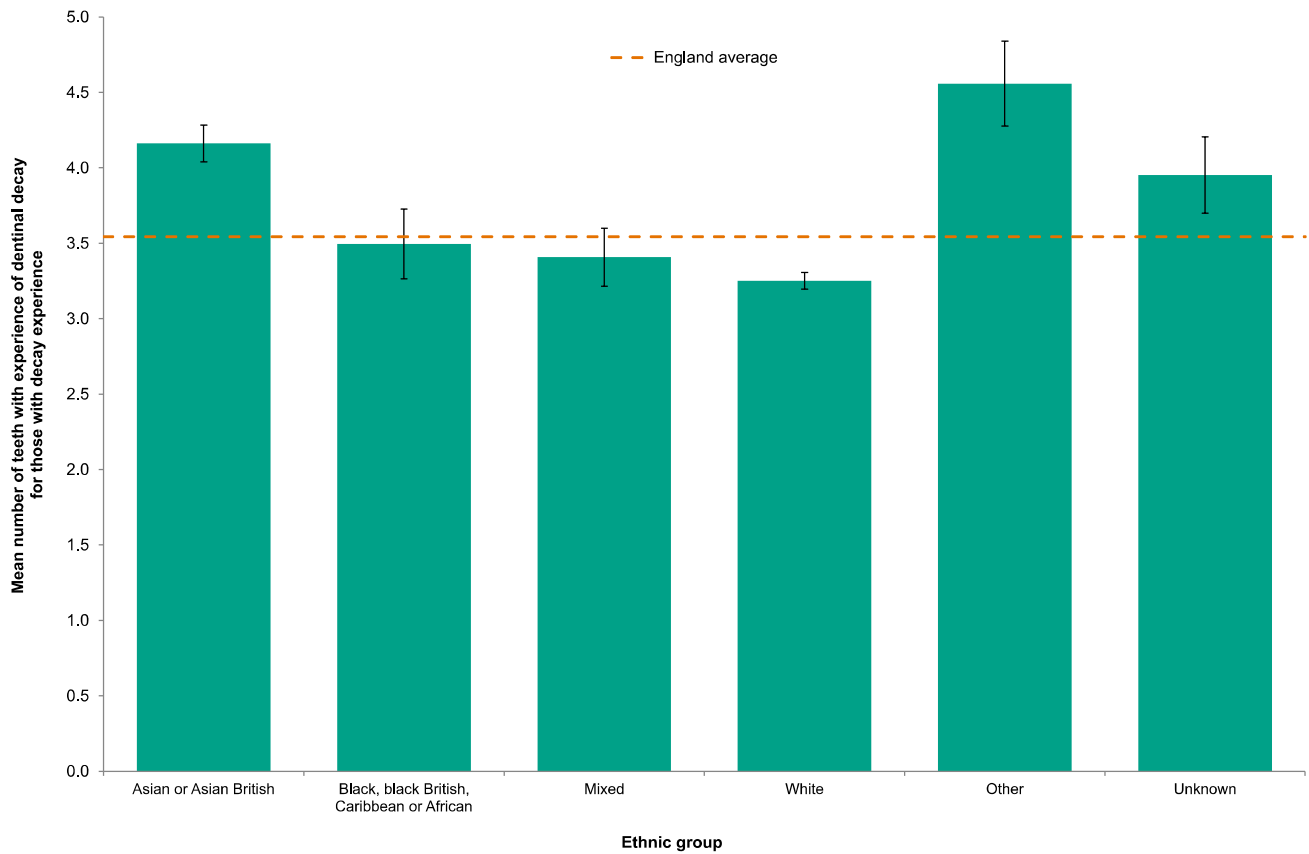
Figure 21: Prevalence of experience of dentinal decay in 5 year olds in England by ethnic group, 2022



Note: error bars represent 95% confidence limits.

Among children with any experience of dentinal decay, children from the other ethnic group had on average more teeth with decay experience (4.6 teeth) than children from any of the other ethnic groups (see Figure 22 below).

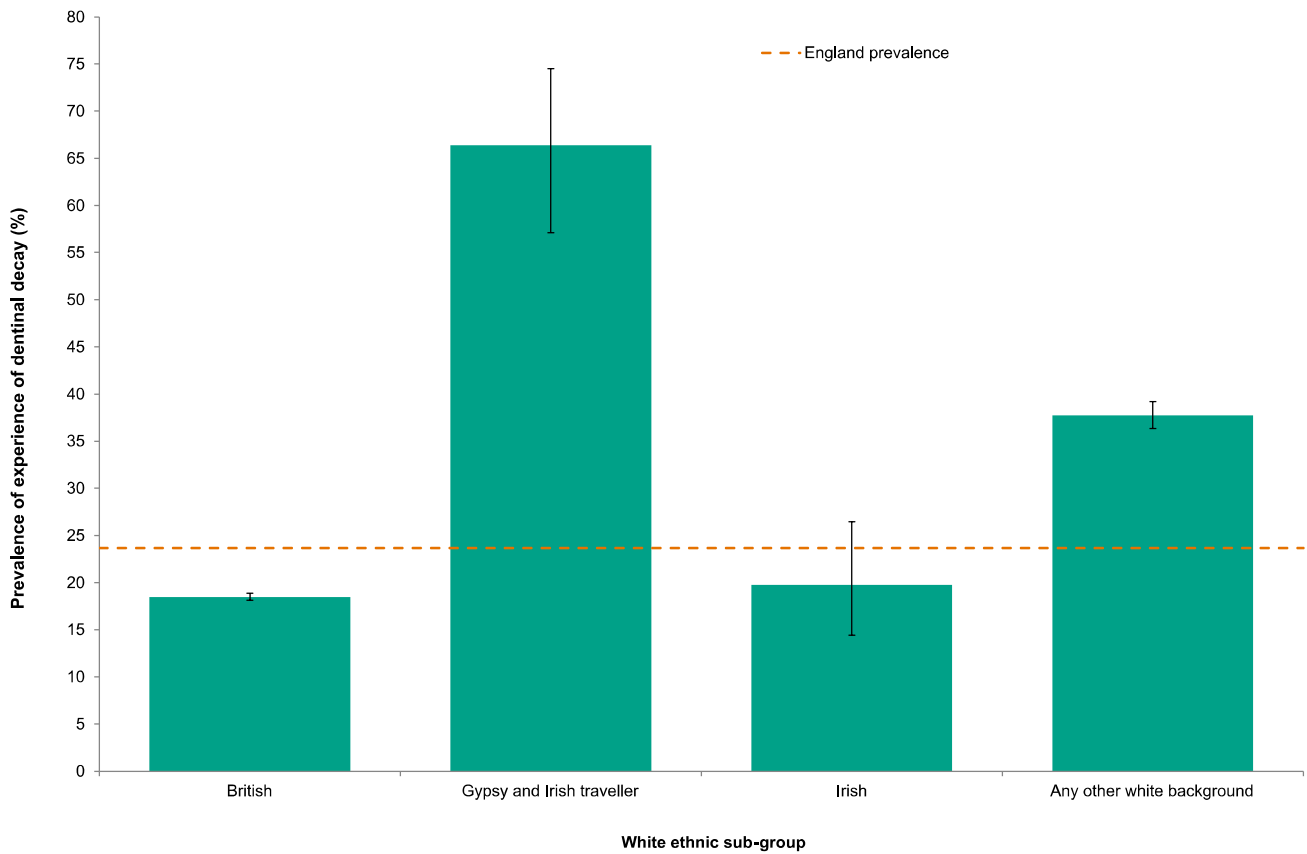
Figure 22: Mean number of teeth with experience of dentinal decay among 5 year olds with any experience of dentinal decay in England by ethnic group, 2022



Note: error bars represent 95% confidence limits.

Within ethnic groups, in the white ethnic group, children from the Gypsy and Irish traveller ethnic group (66.4%) and any other white background (37.8%) had a greater prevalence of experience of dentinal decay than children from the white British ethnic group (18.5%) (see Figure 23 below).

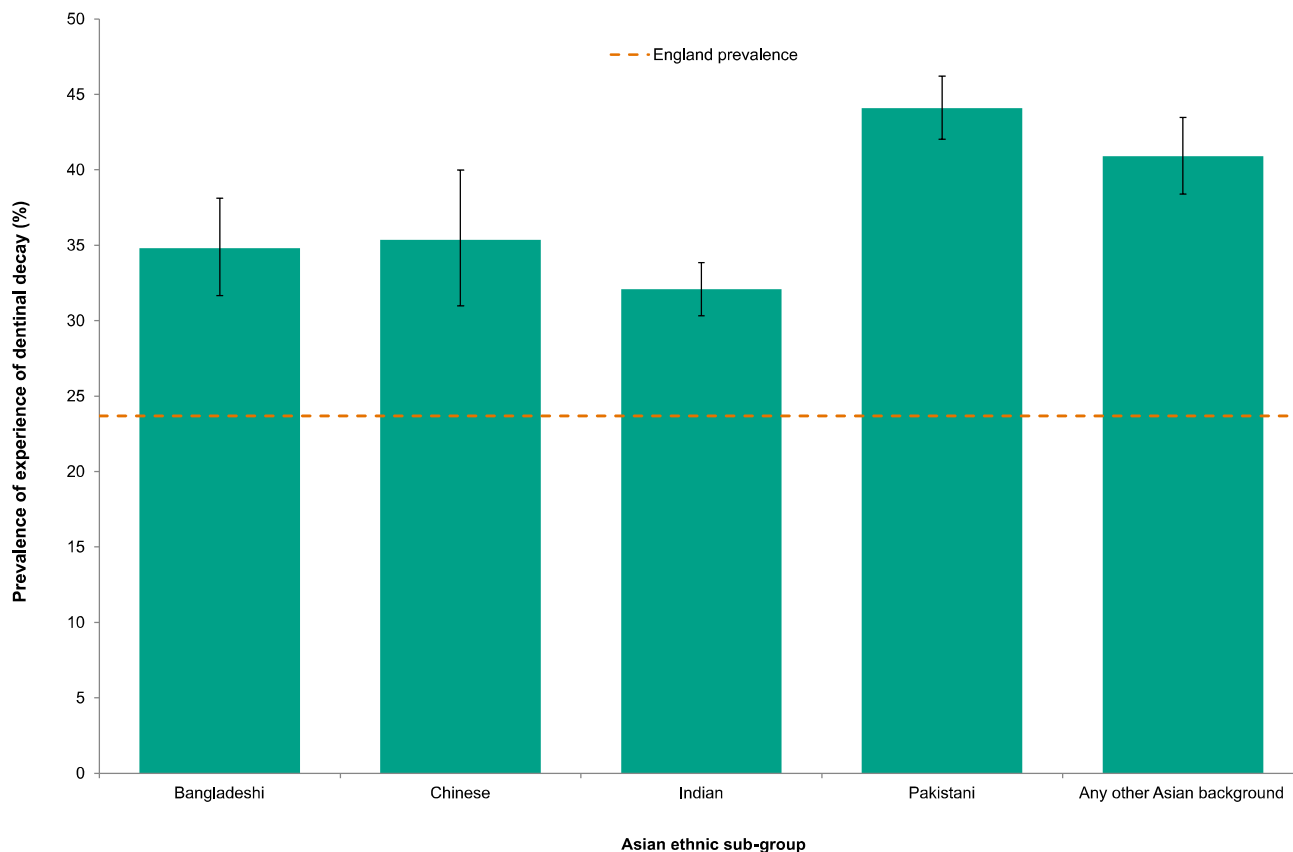
Figure 23: Prevalence of experience of dentinal decay in 5 year olds in England within the white ethnic group, 2022



Note: error bars represent 95% confidence limits.

In the Asian or Asian British ethnic group, children from the Pakistani ethnic group (44.1%) had a greater prevalence of experience of dentinal decay than children from the Indian ethnic group (32.1%) (see Figure 24 below).

Figure 24: Prevalence of experience of dentinal decay in 5 year olds in England within the Asian or Asian British ethnic group, 2022



Note: error bars represent 95% confidence limits.

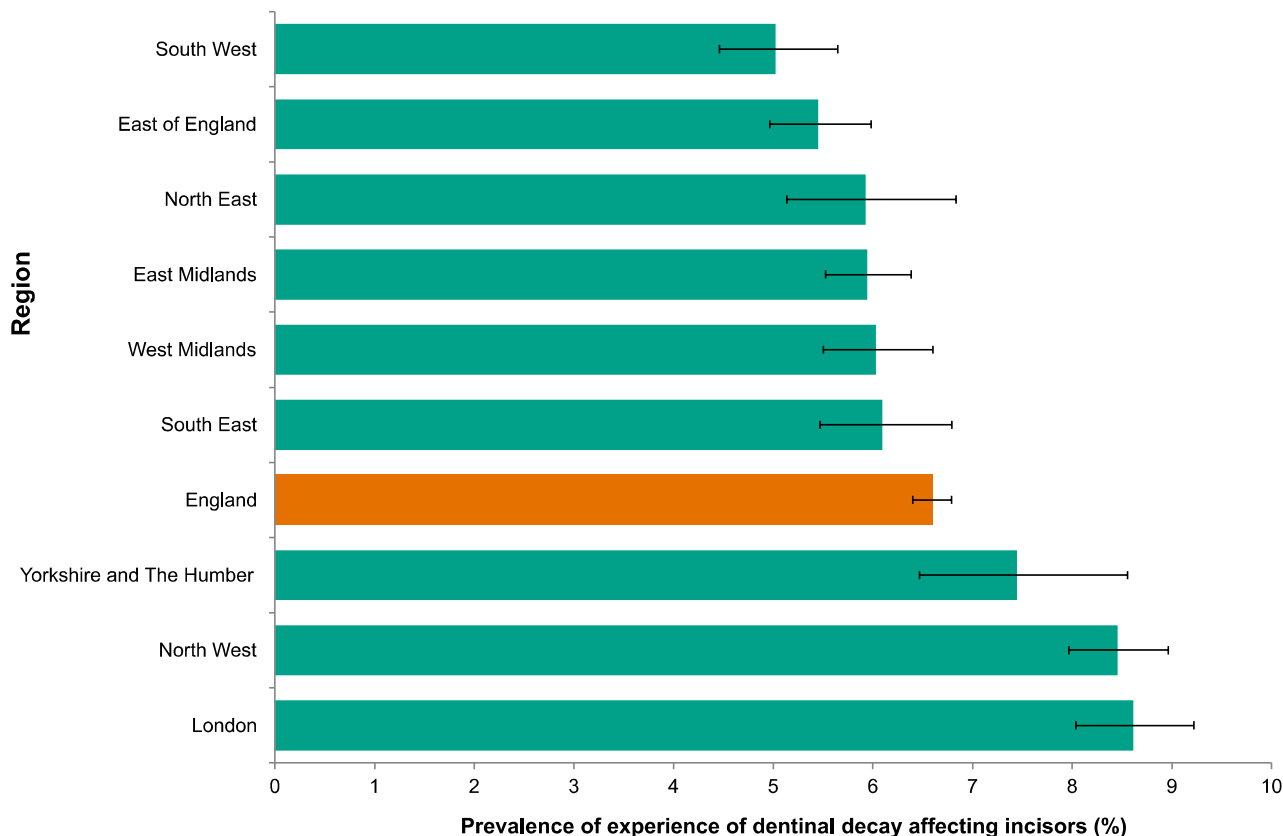
There were no significant variations in prevalence of experience of dentinal decay within the black, black British, Caribbean or African ethnic group, the mixed ethnic group and the other ethnic group.

Prevalence of experience of dentinal decay of incisor teeth

Decay affecting one or more incisor (front) teeth is usually associated with long term bottle use with sugar-sweetened drinks, especially when these are given overnight or for long periods during the day (see [Feeding in the first year of life \(https://www.gov.uk/government/publications/feeding-in-the-first-year-of-life-sacn-report\)](https://www.gov.uk/government/publications/feeding-in-the-first-year-of-life-sacn-report)).

The prevalence of experience of dentinal decay of incisor teeth was 6.6% in England and varied by region. The South West (5.0%) had the lowest prevalence and London had the highest prevalence (8.6%) (see Figure 25 below).

Figure 25: Prevalence of experience of dentinal decay affecting incisor teeth in 5 year olds in England by region, 2022

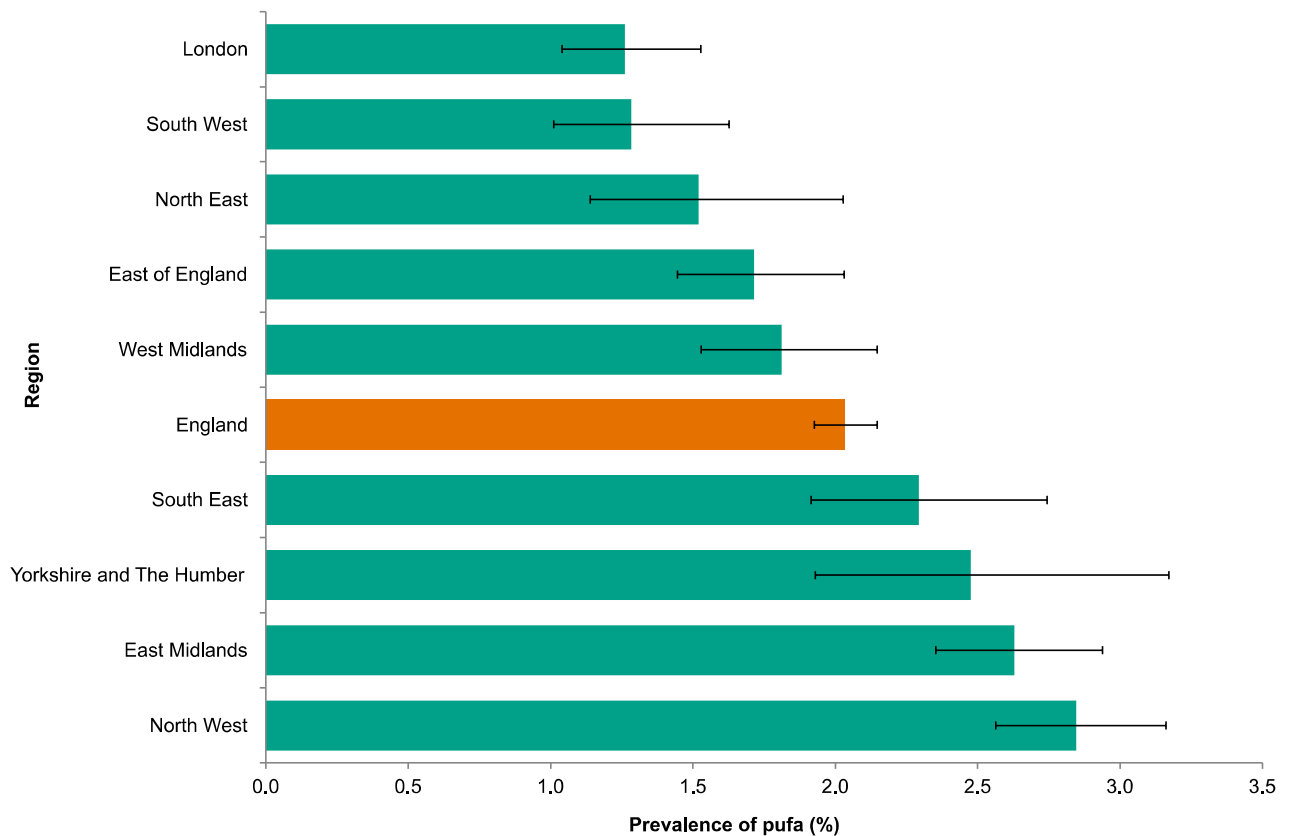


Note: data not available for half of the local authority areas in the South East and Yorkshire and Humber regions; error bars represent 95% confidence limits.

Prevalence of pufa signs

The pufa index measures the clinical consequences of advanced decay. In the survey 2.0% of 5 year olds had one or more pufa signs. There was little variation across the regions (see Figure 26 below).

Figure 26: Prevalence of one or more pufa signs in 5 year olds in England by region, 2022



Note: data not available for half of the local authority areas in the South East and Yorkshire and Humber regions; error bars represent 95% confidence limits.

Prevalence of dental plaque in 5 year olds

The presence of dental plaque is a consequence of poor oral hygiene and provides a proxy measure of children whose teeth are brushed poorly or rarely. Plaque was recorded at 3 different levels:

- plaque covering not more than one third of the exposed labial tooth surfaces of the upper anterior sextant
- plaque covering more than one third but not more than two-thirds of the exposed labial tooth surfaces of the upper anterior sextant
- plaque covering more than two-thirds of the exposed labial tooth surfaces of the upper anterior sextant

One in 5 (21.2%) children had some dental plaque. Plaque covering more than one-third of the exposed labial tooth surfaces of the upper anterior sextant was recorded for 3.2% of all children.

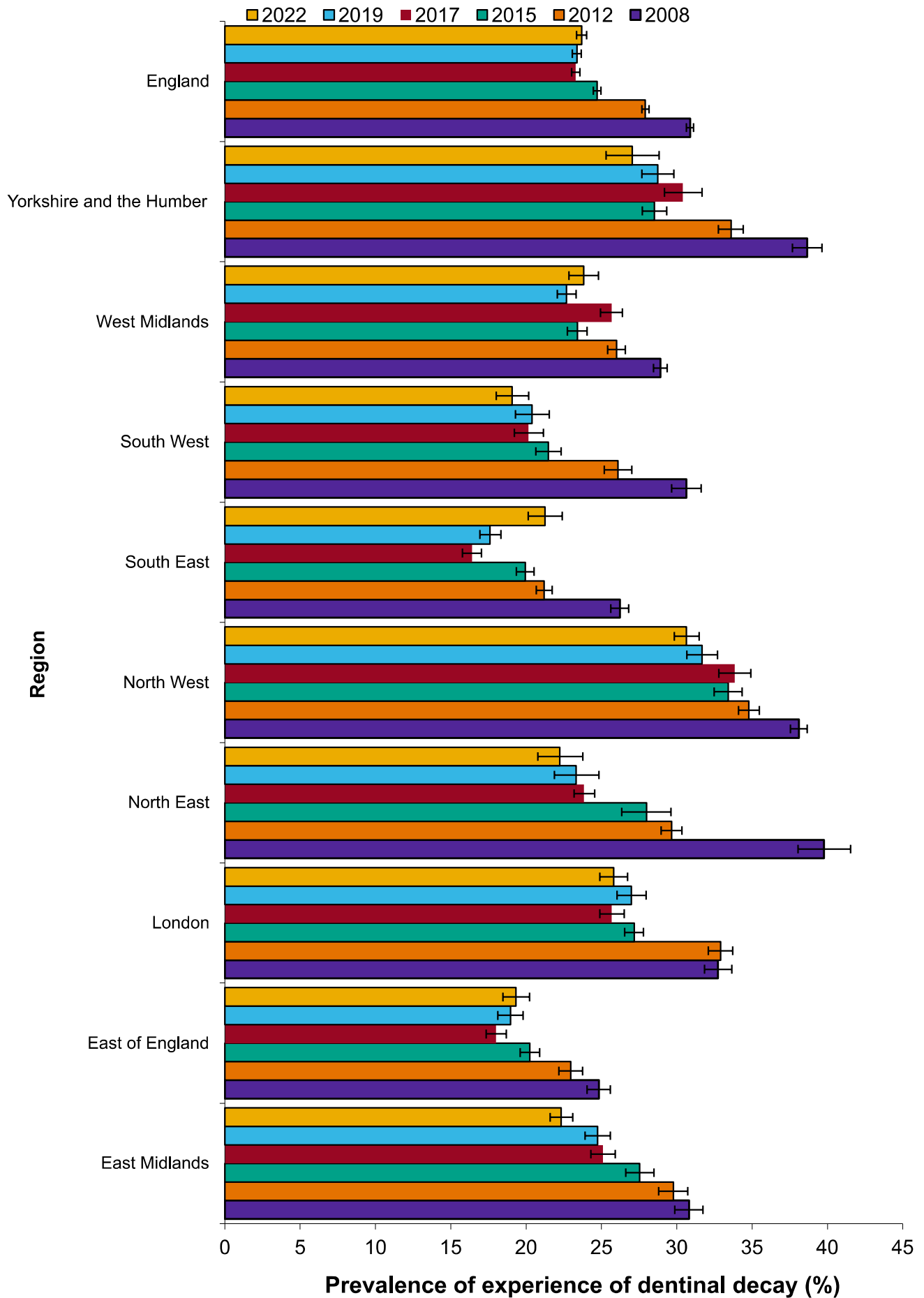
Trends in experience of dentinal decay

The same methods for agreement to participate in the surveys and application of weighting to the data have been used in the surveys since 2008. Similar approximate response rates were found in the first 3 surveys, 66.8% in 2008, 65.2% in 2012 and 66.5% in 2015 and the latter 3 surveys, 58.9% in 2017, 61.3% in 2019 and 61.2% in 2022. It is likely that non-response bias applies in all 6 surveys and reference should be made to the response levels when making comparisons, particularly when the sample sizes are small and response levels are low. At a national level the data was broadly representative in terms of deprivation and ethnicity and of a large sample size which gives more confidence to national comparisons.

The oral health of 5 year olds did not change significantly from 2019 to 2022 in terms of prevalence (23.4% and 23.7% respectively), severity of experience of dentinal decay in all children (0.8 and 0.8) and severity of experience of dentinal decay in those children with any decay experience (3.4 and 3.5 teeth). The prevalence of experience of dentinal decay of incisor teeth was also similar across the 2 surveys (5.2% and 6.6%) as was the severity of untreated dentinal decay in those children with any decay experience (2.7 and 3.3 teeth). The slope index of inequality was also similar across the 2 surveys (26.8% and 27.7%). The care index had worsened from 10.3% to 7.4%.

From 2008 to 2017 there was a clear trend of significant improvement in prevalence of experience of dentinal decay in 5 year olds in England. The prevalence of experience of dentinal decay decreased from 30.9% in 2008 to 23.3% in 2017. Nationally there have been no further significant changes in oral health since 2017. At regional level there was a significant improvement in the East Midlands in 2022 compared to 2019 (see Figure 27 below).

Figure 27: Prevalence of experience of dentinal decay in 5 year olds in England by region, 2008, 2012, 2015, 2017, 2019 and 2022



Note: error bars represent 95% confidence limits.

Implications of results

Inequalities in the levels of experience of dental decay in 5 year olds living in different parts of the country and in different life circumstances persist. The cause of dental decay is well understood and is related to the frequent exposure of teeth to fermentable carbohydrates, most commonly through eating and drinking sugary snacks and drinks [\[footnote 5\]](#). High frequency 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.

Limitations of the survey

This is the sixth survey of 5 year olds across England. The numbers of children examined were markedly lower than in 2019, possibly due to the impacts from the COVID-19 pandemic and 12% of upper-tier local authorities opting not to commission the survey. While the survey had over 62,000 participants, there were both geographical gaps in the data and 46% of lower-tier local authority areas did not achieve the minimum sample size. As previously mentioned, approximately half of the upper tier local authorities in the South East and Yorkshire and The Humber did not participate in the survey and regional estimates for these areas should be interpreted with this in mind. However, nationally the sample was largely reflective of the 5 year old population in terms of deprivation and ethnicity.

A further limitation was that the survey did not recruit from the entire population of 5 year olds, for example children attending private schools were not included in the survey. The likelihood of bias from this is acknowledged but cannot be measured.

As with other National Dental Epidemiology Programme surveys, this survey required written parental agreement for children to participate. This has been shown to adversely affect participation rates and agreement rates may be lower for those children with higher levels of dental decay experience and those living in more deprived areas. Both factors could contribute to underestimation of severity and prevalence of dental decay experience. However, it is difficult to model the data to control for the effect of positive agreement [\[footnote 6\]](#).

Inequalities and trends

As with other age groups (see the [Oral health survey of 3 year old children 2020](https://www.gov.uk/government/statistics/oral-health-survey-of-3-year-old-2020) ([https://www.gov.uk/government/statistics/oral-health-survey-of-3-year-old-](https://www.gov.uk/government/statistics/oral-health-survey-of-3-year-old-2020)

[children-2020](#))), there was inequitable distribution of experience of dentinal decay, and 5 year olds living in the most deprived areas of the country were 2.5 times as likely to have experienced decay as those living in the least deprived areas. Five year olds in the most deprived areas were also more likely to have more severe decay.

It is noteworthy that across England, experience of dentinal decay was already apparent in more than 1 in 4 children by the age of 5 years and almost 1 in 2 children in some areas. Those children with experience of decay had on average between 3 and 4 affected teeth.

This is the sixth survey to be carried out in 5 year olds since methodological changes, including the requirement to seek explicit parental agreement to participation in the survey were implemented in 2007. The first 3 surveys showed a clear trend for lowering levels of prevalence of experience of dentinal decay in this age group and a reduction in oral health inequalities from 2007 to 2015. The surveys in 2017, 2019 and this survey have not demonstrated any further improvements in prevalence of experience of dentinal decay or inequalities.

Putting this information to use

Good oral health is fundamental to ensure good general health and wellbeing. Poorer oral health in young children can result in pain and infection and lead to difficulties with eating, sleeping, playing and socialising. There are also significant costs on society associated with oral diseases, not least the costs of hospital admissions for tooth extractions. Dental decay is one of the most common causes of hospital admission in young children. These impacts and costs are mostly avoidable as dental decay is a preventable disease.

Of the 5 year olds participating in the survey, 23.7% had experience of dentinal decay. Of these children 6.8% had one or more teeth extracted. Removal of decayed teeth, usually due to pain, will often require hospital admission and general anaesthesia. Longer term consequences are that children who have decay at an early age are likely to go on to develop decay in their permanent teeth and to enter a lifetime cycle of repair, which may lead to eventual tooth loss [\[footnote 7\]](#). A further study has shown that 40% of children with dentinal decay went on to experience tooth ache and infection (see [Best-practice prevention alone or with conventional or biological caries management for 3 to 7-year-olds: the FiCTION three-arm RCT](#) (<https://pubmed.ncbi.nlm.nih.gov/31928611/>)). The strong link between dental decay and deprivation is well established.

Data from this survey will be used to update the dental indicator (percentage of 5 year olds with visually obvious dentinal decay) in the Public Health Outcomes Framework.

Local authorities, which have a responsibility to improve oral health, may use this information to develop joint strategic needs assessments to plan and commission oral health improvement interventions to address the needs of their populations. OHID and NICE have published documents to support local authorities in these activities.

NHS England may use this information in oral health needs assessments to inform the commissioning of oral healthcare services.

Local authorities may also wish to seek dental public health advice about commissioning of specific surveys or larger samples using this method to evaluate their interventions and gain more detailed information about the oral health of their populations.

Accessing further data

Cleaned and verified copies of the raw, anonymised data will be available to local authority and NHS England personnel, who can apply to become a 'super user' and access the raw, anonymised data for specific purposes following the steps below.

1. Requestor to send an email to DentalPHIntelligence@dhsc.gov.uk providing the following information:
 - name of individual to be allocated as super user
 - geographical area for which data required
 - contact details
2. The nominated super user will be contacted by a member of the national dental public health team who will send a data sharing agreement for signing.
3. Once the signed agreement has been received and authorised, the super user will be sent their (anonymised) data along with a set of analysis guidance notes.

For any other data requests that are for national data or complex queries email: DentalPHIntelligence@dhsc.gov.uk

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(<https://www.gov.uk/government/publications/delivering-better-oral-health-an-evidence-based-toolkit-for-prevention>)
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(<https://pubmed.ncbi.nlm.nih.gov/31928611/>) Journal of Dental Research 96 (7):762 to 767]

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