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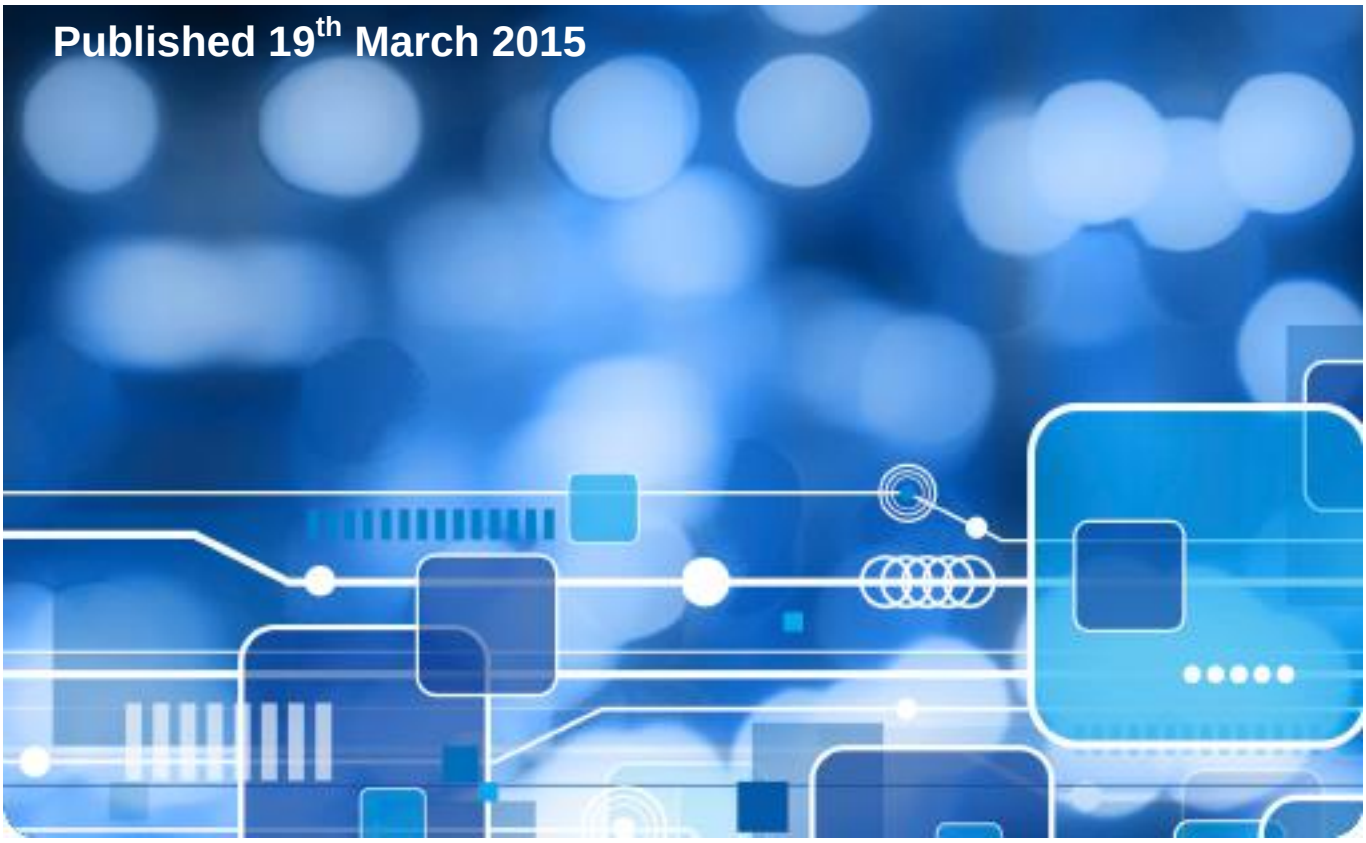
Children's Dental Health Survey 2013

Technical Report

England, Wales and Northern Ireland



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This report may be of interest to members of the public, health policy officials, Consultants in Dental Public Health and other members of the dental profession, epidemiologists and other academics interested in children's health.

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Contents

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Tom Anderson

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1 Introduction

The 2013 Children's Dental Health survey (CDH) is the fifth in a series of national surveys of children's dental health that have been carried out every 10 years since 1973. Since its inception, the survey has provided important information to underpin the development and monitoring of dental health care for children.

The aims of the survey include:

- Providing statistics that establish the state of dental health in children in 2013
- Exploring relationships between oral health, experiences, attitudes and behaviour
- Monitoring changes in children's dental health and related behaviour over time

The 1973 survey established baseline information on the state of the dental health of children in England and Wales. The survey coverage was then extended in 1983 to include Scotland and Northern Ireland. The 2013 survey covers England, Wales and Northern Ireland.

The 2013 survey was commissioned by the Health and Social Care Information Centre (HSCIC), on behalf of Public Health England, the Department of Health in England, the Department of Health, Social Services and Public Safety Northern Ireland and the Health and Social Care Department in the Welsh Government.

The survey was carried out by a consortium led by the Office for National Statistics (ONS), also comprising:

- The National Centre for Social Research (NatCen)
- The Northern Ireland Statistics and Research Agency (Nisra)
- The University of Birmingham School of Dentistry
- Cardiff University School of Dentistry
- Kings College London Dental Institute
- Newcastle University School of Dental Sciences
- University College London Dental Public Health Group

The design and delivery of CDH survey in 2013 has been made as consistent as possible with the 2003 survey. However, changes and innovations have been made where necessary to ensure the continued relevance of the survey statistics. Reasons for making changes include: new standards to harmonise to; practices and policy in relation to the dental health of the population have changed; the behaviours of the population in relation to their oral health are thought to have changed; and where the change would add analytical or policy value for users of the statistics.

This technical report provides information to assist in interpreting the findings of the 2013 survey. Topics covered include:

- The sampling and weighting procedures
- The examination criteria, questionnaire content and their development
- Details of training, fieldwork procedures and response rates obtained
- Details of the data processing carried out

The potential users of the survey statistics are varied, and include:

- Central government policy makers
- Consultants in Dental Public Health
- Commissioners of dental treatment services
- Epidemiologists and other academics interested in children's (dental) health

The CDH survey series has long complemented a wider programme of NHS research and statistics on dental public health. These include:

- NHS dental epidemiology programme for England (see http://www.nwph.net/dentalhealth/)
- NHS epidemiology programme for Wales (see http://www.cardiff.ac.uk/dentl/research/themes/appliedclinicalresearch/epidemiology/oralhealth/index.html)
- Scottish National Dental Inspection programme (NDIP, see *http://www.isdscotland.org/Health-Topics/Dental-Care/National-Dental-Inspection-Programme/* and *http://www.ndip.scottishdental.org/about/*
- Administrative statistics on NHS dentistry produced by each country:
  - In England: See http://www.hscic.gov.uk/catalogue/PUB14738
  - In Wales: See http://wales.gov.uk/statistics-and-research/nhs-dental-services/?lang=en
  - In Northern Ireland: See http://www.northernireland.gov.uk/index/media-centre/news-departments/news-dhssps/news-dhssps-october-2014.htm

The strength of the wider dental epidemiology programme of research is in the large number of cases, which allows for statistics to be produced for lower levels of geography (e.g. for Local Authorities in England).

The CDH is designed to produce statistics on the dental health of 5, 8, 12 and 15 year olds in England, Wales and Northern Ireland. The strength of the survey is the coverage of four age groups in the same fieldwork period, the collection of comparable data across countries and the depth of data collected on the children that take part, which allows for more in-depth analysis of the relationships between oral health, demographic characteristics, attitudes, experiences and behaviour than is possible from the other sources above.

This technical report should be referenced in relation to a series of publications arising from the 2013 CDH survey, which are published on the same page on the HSCIC website[1].

As is common practice with national social surveys in the United Kingdom, a non-disclosive survey dataset will be published for research use on the UK Data Service at the following website: http://ukdataservice.ac.uk/ . This dataset is expected to be available by the end of May 2015.

[1] http://www.hscic.gov.uk/pubs/ChildDentalHealth

2 Survey Methodology

2.1 Summary of the survey methodology

The target population was 5, 8, 12 and 15 year olds being educated in mainstream state and independent schools in England, Wales and Northern Ireland.

Pupils in Wales and Northern Ireland were oversampled relative to the population sizes of those countries, to allow for statistics to be produced for those countries.

Pupils in more deprived schools, defined by the percentage of children in the school eligible for free school meals[2], were oversampled, so that approximately a third of the set sample would come from 'deprived' schools. This was designed to allow for analysis of oral health by measures of relative deprivation.

The survey included three data collection instruments:

- A **dental examination** of all participating children carried out by a qualified dentist and nurse – the content of the examination varied by age, with 12 and 15 year olds receiving a longer examination than 5 and 8 year olds (approximately 10 minutes for the older children and 5 minutes for the younger children). The data was recorded on a paper form by the nurse.
- A **paper self-completion questionnaire completed by the 12 and 15 year olds** – this was a new addition for the 2013 survey, and was completed at the same appointment as the dental examination.
- A **self-completion questionnaire completed by a parent** – the parent or guardian most responsible for the dental health of the participating child was invited to complete this questionnaire (this report will refer to 'parents' throughout for the sake of brevity). The option of paper or internet completion was offered concurrently (the internet option was new for the 2013 survey). A questionnaire was sent in all cases where a child took part in the dental examination.

In previous surveys in this series, negative (opt out) parental consent was obtained for the dental examination. Since 2006 the Department of Health required positive written consent from parents for the dental examination of young children in epidemiological surveys. Consequently, the consent procedures for the 2013 survey were as follows:

- For dental examinations with 5 and 8 year olds – written positive (opt-in) consent was collected from parents, and the children could opt out on the day.
- For dental examinations with 12 and 15 year olds – negative (opt-out) consent was sought from parents, and positive (verbal) consent was collected on the day from the children by the examining team.

[2] In 2013 when this survey took place, a free school meal was a statutory benefit available **only** to school aged children from families who received other qualifying benefits (such as Income Support)

2.2 Target population and sample design

The target population, sample design and sampling procedures were based on those used in the latest round of the survey in 2003, with minor refinements and enhancements.

2.2.1 Target population

The target population was 5, 8, 12 and 15 year old age cohorts being educated in mainstream state and independent schools in England, Wales and Northern Ireland. This population is consistent with that covered in the 2003 survey.

Surveys in this series prior to 2003 covered all age cohorts between 5 and 15 and reported on them separately. Four age cohorts were chosen for the 2003 survey (and subsequently for the 2013 survey) because the dentition (and dental health) found at those ages can reasonably be expected to differ. Table 1, which reports the weighted mean average number of primary and permanent teeth present in the mouths of children in each cohort in the 2013 survey, demonstrates this. More than 90% of teeth in 5 year olds are primary teeth, and the average number of teeth in the mouth just exceeds twenty (which is the number of primary teeth typically found in the mouth before the permanent teeth begin to erupt). By 8 years old, about half of the teeth present in the mouth will be permanent (adult teeth), and the average total number of teeth present is increasing. Those primary teeth that are still present may have a greater incidence of oral disease by virtue of having been in the mouth for a longer period of time. By 12 years old, about 90 per cent of teeth are permanent, and by 15 nearly all teeth are permanent. Both of these cohorts have around 27 teeth in the mouth on average, just short of the twenty eight permanent teeth that typically would be expected in an adult mouth (excluding wisdom teeth). Again, the permanent teeth present in 15 year olds are likely to have been present for longer on average than permanent teeth present in the mouths of 12 year olds. The 15 year old cohort represents a group transitioning into adulthood.

Table 1 Mean number of teeth present in the mouth at each age

				Means
	5 years	8 years	12 years	15 years
Primary teeth	18.8	11.1	0.9	N/A
Permanent teeth	1.7	12.1	25.5	27.3
All teeth	20.5	23.2	26.5	27.3
Unweighted bases	*2,549*	*2,367*	*2,532*	*2,418*

Children being home-schooled, or attending special schools, pupil referral units and similar institutions were excluded from the target population. This is consistent with previous surveys in this series.

In England, the ongoing Public Health England, Dental Public Health Intelligence programme has run a parallel survey in 2013/14 to cover 5 and 12 year old children attending special support schools. The results of this survey will be published at the following website during March 2015: http://www.nwph.info/dentalhealth/ .

People in private households aged 16 and over are included in the target population of the Adult Dental Health Survey. That survey is also conducted every ten years, with the last survey taking place in 2009. The results of the survey can be found on the HSCIC website[3].

2.2.2 Sample size

The size of the 2013 sample needed to allow for separate analysis for each sampled age cohort within England, Northern Ireland and Wales. Children in Wales and Northern Ireland were therefore oversampled relative to England.

The sample also needed to be geographically distributed so that travelling time for the dental examiners was minimised and their workload (e.g. the sample size and the number of schools to be visited) was manageable. The sample was therefore clustered in England and Wales.

The sample was divided between children aged 5, 8, 12 and 15 on 31 August 2013 so that approximately 2,500 dental examinations would be achieved in each age cohort (and therefore 10,000 in total). The 31 August cut off ensured that the children were of a comparable age to those involved in the previous rounds of the survey in 1973, 1983, 1993 and 2003. Concentrating the sample in these four age groups provides an increased sample in each age cohort, compared to covering all age cohorts between 5 and 15.

Schools with more than 30% of children eligible for free school meals were defined as 'deprived'. 'Deprived' schools were oversampled relative to those that were classified as not 'deprived', so that children in deprived schools would make up approximately a third (33%) of the overall sample of children. This was to ensure that there was a sufficient sample size for analysis by measures of relative deprivation. The proportion of children eligible for free school meals is a school-level indicator that has been shown to be very highly correlated with the socio-economic status of the children and their parents[4].

Table 2 shows the intended set sample sizes of schools and pupils broken down by age and country. The design was expected to realise a set sample of 20,922 pupils to achieve approximately 10,000 dental examinations. It was assumed that school response would be higher in primary schools compared to secondary schools, and higher in Wales and Northern Ireland compared to England. It was assumed that pupil response rates in participating schools would be lower in the younger cohorts due to the introduction of the positive written parental consent procedure, and lower in 15 year olds than 12 year olds, primarily because the age cohort definition meant that this cohort would be primarily drawn from the GCSE year group (it was assumed that this would impact negatively on that cohort's propensity to respond).

[3] http://www.hscic.gov.uk/pubs/dentalsurveyfullreport09
[4] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/222172/DCSF-RTP-09-01.pdf

Table 2 Set Sample sizes for England, Wales and Northern Ireland

	England	Wales	Northern Ireland
Number of primary schools to select	502	208	94
Number of 5 year olds to select	3,110	1,075	884
Number of 8 year olds to select	3,110	1,075	884
Number of secondary schools to select	146	39	34
Number of 12 year olds to select	3,399	938	723
Number of 15 year olds to select	3,836	1,022	866

2.3 Sampling frames

2.3.1 Schools

A list of maintained and independent schools, showing the number of children in each age group at the school and the proportion of children at the school that are eligible for free school meals, was obtained from the relevant Education Departments in England, Wales and Northern Ireland.

The relevant Education Authorities were written to for permission to approach the maintained schools about taking part in the survey. No schools were excluded from the sample at this stage.

2.3.2 Children

Within participating schools, interviewers and school staff involved in the sampling process were instructed to obtain a list of all the pupils currently in the school who were of the relevant age, using date of birth ranges to define eligibility for the survey. The eligible dates of birth were:

5 year olds: Date of birth from 1st September 2007 to 31st August 2008

8 year olds: Date of birth from 1st September 2004 to 31st August 2005

12 year olds: Date of birth from 1st September 2000 to 31st August 2001

15 year olds: Date of birth from 1st September 1997 to 31st August 1998

2.4 Sampling methods in England and Wales

2.4.1 Sampling regions and local authorities

In England and Wales, [formerly Government Office] Region was used as an explicit stratifier. Eighty one (81) Local Authority Districts (LADs)[5] in England and Twenty seven (27) Unitary Authorities (UAs) in Wales were selected with probability proportional to size (i.e. the number of pupils in the eligible age cohorts). There were no regional exclusions, but Isles of Scilly was included with Cornwall. In addition, City of London schools were included with Islington. For convenience, when discussing the sample across England and Wales, the acronym 'LAs' will be used to refer to the LADs and UAs throughout the report.

The English sample was stratified by the nine regions, and a compromise between an even split across the nine regions (9 LADs selected from each region, approximately 11%) and a probability proportional to population size strategy was used to allocate the sample. Table 3 shows the number of LADs selected within each region:

Table 3 Number of Local Authority Districts selected in England, by region

Region	Local Authorities	Percentages
North East	8	9.9
North West	9	11.1
Yorkshire and the Humber	8	9.9
East Midlands	8	9.9
West Midlands	9	11.1
East of England	9	11.1
London	10	12.3
South East	12	14.8
South West	8	9.9
England	**81**	**100.0**

The sample for Wales was stratified by the three regions, and the number of UAs to select within region was determined with probability proportional to population size. The following number of UAs were selected within each region:

Table 4 Number of Unitary Authorities selected in Wales, by region

Region	Unitary Authorities	Percentages
North Wales	6	22.2
South East Wales	12	44.4
South West Wales	9	33.3
Wales	**27**	**100.0**

[5] Local Authority Districts in England include metropolitan boroughs, London boroughs, non-metropolitan districts, unitary authorities, the City of London and the Scilly Isles. See http://www.ons.gov.uk/ons/guide-method/geography/beginner-s-guide/administrative/england/index.html

Schools with more than 30% of children eligible for free school meals were weighted so that LAs with more 'deprived' schools were oversampled. The oversampling process is detailed in Section 2.6.

2.4.2 Sampling school groups

Using Geographical Information Systems (GIS) software, primary school groups and secondary school groups (or clusters) were created separately to be nested within LAs. Schools with similar free school meal eligibility rates were, where possible, grouped together in the same school group. The number of times that LAs were selected at the first stage represents the number of primary and secondary groups to select from that area. For fieldwork efficiency and to reduce the cost of travelling between schools, LAs were selected first so that primary and secondary school group groups may be selected from the same area. LAs were therefore the main group or 'ultimate cluster' for the survey, with an extra layer of grouping beneath Local Authorities at the school group level. Selection of primary school groups and secondary school groups were carried out separately.

School groups were selected by random sampling (without replacement) with probability proportional to size. As with local authority districts, the size measure used was a compromise between the number of pupils in the eligible age cohorts and a factor to allow for the oversampling of deprived schools – for more details, see section 2.6.

Table 5 shows the total number of primary and secondary school groups available for selection for the survey in England and Wales by region.

Table 5 Total number of school groups available for selection, by region

	Primary		Secondary	
	Number	Percentage	Number	Percentage
North East	101	11	69	9
North West	110	12	97	12
Yorkshire and The Humber	151	16	111	14
East Midlands	66	7	59	7
West Midlands	122	13	122	15
East of England	61	7	72	9
London	115	12	104	13
South East	97	10	82	10
South West	105	11	74	9
North Wales	52	26	32	24
South East Wales	74	38	50	38
South West Wales	71	36	49	37
Totals				
England	*928*	*100*	*790*	*100*
Wales	*197*	*100*	*131*	*100*

Eighty one (81) primary school groups and eighty one (81) secondary school groups were selected from the sampled LAs in England. Twenty seven (27) primary school groups and twenty seven (27) secondary school groups were selected from the sampled UAs in Wales.

Then, a substitute school group for each school group was also selected. These substitute groups were selected to replace the school groups in the event of non-response, with the aim of reducing non-response bias resulting from schools refusing to take part in the survey. It was assumed that this would only be required for secondary schools, although substitute primary school groups were also selected as a contingency against higher than expected non-response. In order to select a substitute group the secondary and primary school groups were ordered by area, deprivation status (i.e. whether the school had more than 30% of children eligible for free school meals) and size respectively. This ensured that that the substitute school groups were a close match to the initially sampled school group. The substitute school group was taken from the next school group in the frame after the primary and secondary school groups were sampled. If the primary or secondary school group sampled was the last in the deprived stratum, the primary or secondary school group preceding it was selected as the substitute. If there was only one primary or secondary school group in that stratum, then the first primary or secondary school in that LA was selected.

2.4.3 Sampling schools within school groups

Schools were selected within each school group by simple random sampling. To demonstrate how the set sample sizes for England and Wales in Table 2 were achieved, Tables 6 and 7 show the average number of schools and pupils selected per primary and secondary school group.

Table 6 England school and pupil sample sizes per group

	Primary Schools	Secondary Schools
No of schools selected	502	146
Average no. schools per group	6	2
Average no. pupils selected per group	76	89
Average no. pupils selected per school	12	49
Average no. 5 year olds selected per group	38	N/A
Average no. 8 year olds selected per group	38	N/A
Average no. 12 year olds selected per group	N/A	42
Average no. 15 year olds selected per group	N/A	47

Table 7 Wales school and pupil sample sizes per group

	Primary Schools	Secondary Schools
No of schools selected	179	39
Average no. schools per group	7	1
Average no. pupils selected per group	80	73
Average no. pupils selected per school	12	49
Average no. 5 year olds selected per group	40	N/A
Average no. 8 year olds selected per group	40	N/A
Average no. 12 year olds selected per group	N/A	35
Average no. 15 year olds selected per group	N/A	38

The distribution of Welsh primary groups were such that the groups created by the GIS software contained fewer schools on average than originally anticipated, so it was not possible to select the intended set sample size of 208 schools from any 27 selected groups. After selecting 27 groups via probability proportional to size sampling, 179 schools were available for selection, so all primary schools in the chosen groups were selected (that is the 179 schools). The set sample of pupils was distributed amongst these 179 schools.

2.4.4 Sampling children within schools

A separate sampling frame was constructed for each cohort within each school. Sequential random sampling was used for each age cohort. For details, see Annex B of this document for more information on the method used.

The sampled children were allocated a unique serial number. All parents of children that were examined by the survey dentist were selected to receive a questionnaire.

2.5 Sampling methods in Northern Ireland

2.5.1 Sampling schools in Northern Ireland

Geographical grouping was not required in Northern Ireland due to the smaller spread of schools. Therefore a simple random sample of schools in Northern Ireland was taken. This was manageable for the dental teams and a more efficient sample design than the one required for England and Wales. Primary schools were sampled separately from secondary schools. Schools were sampled from a complete list of all Northern Ireland schools sorted by free school meal indicator, type, area and Measure of Size (MOS). The only explicit strata used were the division of whether a school was primary or secondary.
Children at schools with more than 30% of children eligible for free school meals were oversampled and all schools were sampled without replacement.

For every school sampled, a substitute school was also required for both primary and secondary schools in order to replace the originally sampled schools in the event of non-response. The list of schools was ordered by deprivation status, area, size and school type (i.e. state or private school). The substitute school was the school next in the frame after the actual school selected to participate. If the sampled school was the last school on the list then the school preceding it was selected as the substitute.

Table 8 Northern Ireland school sample sizes

	Primary Schools	Secondary Schools
No of schools selected	94	34
No of pupils selected	1768	1589
5 year olds selected	884 (average 9 per school)	N/A
8 year olds selected	884 (average 9 per school)	N/A
12 year olds selected	N/A	723 (average 21 per school)
15 year olds selected	N/A	866 (average 25 per school)

Ninety four primary schools were sampled (and 94 substitutes). Approximately 18 pupils were required from each of these, or 9 per age group. Thirty four secondary schools were sampled (and 34 substitutes) and approximately 46 pupils were sampled from each of these.

2.5.2 Sampling children in Northern Ireland

The same method for sampling children was used in Northern Ireland as for England and Wales.

2.6 Sampling with probability proportional to size and oversampling factors

Most stages of the sampling were done with probability proportional to size, meaning that, for example, larger local authorities had a larger probability of selection. This section describes the method used to calculate the 'measure of size' used in the probability proportional to size sampling.

The size variable chosen for the probability proportional to size sampling was a compromise between the number of pupils in the relevant age groups and the desire to over sample children in deprived schools (schools with more than 30% children eligible for free school meals).

2.6.1 Calculating oversampling factors at the country level

The percentage of deprived pupils by school type within each country was calculated first. These figures were used to determine oversampling factors to use to boost the sample sizes within the 'deprived' subset (see Table 9).

Table 9 Calculating oversampling factors at the country level for England, Wales and Northern Ireland

Row	Variable	England	Wales	Northern Ireland
A	Observed % deprived in Primary School Frame	16.5	18.6	42
B	Observed % NOT deprived in Primary School Frame	83.5	81.4	58
C	Observed % deprived in Secondary School Frame	8.9	8.7	20.8
D	Observed % NOT deprived in Secondary School Frame	91.1	91.3	79.2
E	Target % deprived = 1/3*100%	33.3	33.3	33.3
F	Target % NOT deprived = 2/3*100%	66.7	66.7	66.7
G	Target ratio of (deprived) : (not deprived) = E/F	0.5	0.5	0.5
H	Primary Schools observed ratio of (deprived) : (not deprived) = A/B	0.2	0.2	0.7
I	Secondary Schools observed ratio of (deprived) : (not deprived) = C/D	0.1	0.1	0.3
J	**Oversampling Factor for Selecting Deprived Primary Schools = G/H**	2.5	2.2	0.7*****
K	**Oversampling Factor for Selecting Deprived Secondary Schools = G/I**	5.1	5.2	1.9

Due to the high proportion of deprived schools in Northern Ireland 'oversampling' involved reducing the probability of selecting 'deprived' primary schools.

Country Oversampling factor for primary schools:

$$\mathrm{M_P} = \frac{\text{Observed \% not deprived in the Primary school}}{\text{Observed \% deprived in the Primary school}} \times 0.5 \qquad (1)$$

Country Oversampling factor for secondary schools:

$$\mathrm{M_S} = \frac{\text{Observed \% not deprived in the Secondary school}}{\text{Observed \% deprived in the Secondary school}} \times 0.5 \qquad (2)$$

As there is no grouping used in Northern Ireland sampling, it is possible to use these oversampling factors directly to select the Northern Ireland schools.

Measure of size for primary schools in Northern Ireland:

$$\mathrm{MOS_P} = \begin{cases} \mathrm{M_P} \text{ if 'deprived' school} \\ 1 \text{ otherwise} \end{cases} \qquad (3)$$

Measure of size for secondary schools in Northern Ireland:

$$\mathrm{MOS_S} = \begin{cases} \mathrm{M_S} \text{ if 'deprived' school} \\ 1 \text{ otherwise} \end{cases} \qquad (4)$$

For England and Wales this was not the case.

2.6.2 Calculating oversampling factors at the Local Authority level for England and Wales

At the LA selection stage the oversampling factors for primary and secondary were combined in such a manner to meet the deprivation targets within each LA.

Measure of size (Primary school part) in England and Wales:

$$MOS_{LAP} = \frac{\text{Observed \% pupils deprived in all Primary Schools within UA/LA}}{\text{Observed \% pupils deprived in all Primary Schools within Country}} \times M_P + \frac{\text{Observed \% pupils not deprived in all Primary Schools within UA/LA}}{\text{Observed \% pupils not deprived in all Primary Schools within Country}} \quad (5)$$

Measure of size (Secondary school part) in England and Wales:

$$MOS_{LAS} = \frac{\text{Observed \% pupils deprived in all Secondary Schools within UA/LA}}{\text{Observed \% pupils deprived in all Secondary Schools within Country}} \times M_S + \frac{\text{Observed \% pupils not deprived in all Secondary Schools within UA/LA}}{\text{Observed \% pupils not deprived in all Secondary Schools within Country}} \quad (6)$$

Measure of size (whole LA) for England and Wales was calculated as followed:

$$\mathrm{MOS_{LA}} = 0.5\left(\frac{\mathrm{MOS_{LAP}}}{1+\mathrm{M_P}} + \frac{\mathrm{MOS_{LAS}}}{1+\mathrm{M_S}}\right) \quad (7)$$

Therefore each LA has a unique measure of size that is used when selecting the Local Authorities. The sum of $\mathrm{MOS_{LA}}$ across the whole country is equal to one.

2.6.3 Calculating oversampling factors at the School Group level for England and Wales

After the LAs were selected, the observed deprivation rates in all schools in the selected LAs were calculated in a similar manner to section 2.6.2 (but this time looking at all sampled LAs rather than all LAs across the country). The new country oversampling factors (shown in Table 10) were used to calculate the MOS for primary and secondary school groups and applied directly in selecting school groups.

Table 10 Calculating oversampling factors for Schools after selecting the sample of Unitary Authorities/Local Authority Districts for England and Wales

Row	Variable (for all Sampled UA/LAs combined)	England	Wales
A	Observed % deprived in all Primary Schools within Sampled UA/LAs	26.4	18.8
B	Observed % NOT in all Primary Schools within Sampled UA/LAs	73.6	81.2
C	Observed % deprived in all Secondary Schools within Sampled UA/LAs	18.6	9.1
D	Observed % NOT deprived in all Secondary Schools within Sampled UA/LAs	81.4	90.9
E	Target %deprived = 1/3*100%	33.3	33.3
F	Target % NOT deprived = 2/3*100%	66.7	66.7
G	Target ratio of (deprived) : (not deprived) = E/F	0.5	0.5
H	Primary Schools observed ratio of (deprived) : (not deprived) = A/B	0.4	0.2
I	Secondary Schools observed ratio of (deprived) : (not deprived) = C/D	0.2	0.1
J	**Oversampling Factor for Selecting Deprived Primary Schools within UA/LA = G/H**	1.4	2.2
K	**Oversampling Factor for Selecting Deprived Secondary Schools within UA/LA = G/I**	2.2	5

Oversampling factor for primary schools in England and Wales:

$$\mathrm{M_{SP}} = \frac{\text{Observed \% pupils not deprived in all Primary Schools within all Sampled UA/LAs}}{\text{Observed \% pupils deprived in all Primary Schools within all Sampled UA/LAs}} \times 0.5 \qquad (8)$$

Oversampling factor for secondary schools in England and Wales:

$$\mathrm{M_{SS}} = \frac{\text{Observed \% pupils not deprived in all Secondary Schools within all Sampled UA/LAs}}{\text{Observed \% pupils deprived in all Secondary Schools within all Sampled UA/LAs}} \times 0.5 \qquad (9)$$

Measure of size for the primary school groups:

$$MOS_{SGP} = \frac{\text{Observed \% pupils deprived in all Primary Schools within SG}}{\text{Observed \% pupils deprived in all Primary Schools within all Sampled LAs/UAs}} \times M_{SP} + \frac{\text{Observed \% pupils not deprived in all Primary Schools within SG}}{\text{Observed \% pupils not deprived in all Primary Schools within all Sampled LAs/UAs}} \qquad (10)$$

Measure of size for the secondary school groups:

$$MOS_{SGS} = \frac{\text{Observed \% pupils deprived in all Secondary Schools within SG}}{\text{Observed \% pupils deprived in all Secondary Schools within all Sampled LAs/UAs}} \times M_{SS} + \frac{\text{Observed \% pupils not deprived in all Secondary Schools within SG}}{\text{Observed \% pupils not deprived in all Secondary Schools within all Sampled LAs/UAs}} \qquad (11)$$

These MOS for primary and secondary school groups were used to select the sample. The percentage of deprived schools selected in the sample is shown in table 11, by country.

Table 11 Number and percentage of deprived schools in the sample, by country

Selected Sample (before fieldwork)	England	Wales	Northern Ireland
Total Number of Primary Schools Sampled	502	179	94
Total Number of Secondary Schools Sampled	146	39	34
Total Number of Deprived Primary Schools Sampled	170	58	33
Total Number of Deprived Secondary Schools Sampled	44	14	11
Percentage of deprived in Primary Schools in the sample	**33.9%**	**32.4%**	**35.1%**
Percentage of deprived in Secondary Schools in the sample	**30.1%**	**35.9%**	**32.4%**

Table 11 shows that the oversampling method worked well in achieving deprivation rates of approximately 33 percent. The proportion of pupils in the sample selected from deprived schools by age cohort is shown in table 12.

Table 12 Number and percentage of pupils to sample from deprived schools in the CDH sample, by country

Pupil Counts in the Set Sample (pupil sampling to be carried out within the schools)	England	Wales	Northern Ireland
Total Number of Age 5 Primary cohort to sample (All Schools)	3,110	1,075	884
Total Number of Age 8 Primary cohort to sample (All Schools)	3,110	1,075	884
Total Number of Primary School pupils to sample (All Schools)	6,220	2,150	1,768
Total Number of Age 12 Secondary cohort to sample (All Schools)	3,399	938	723
Total Number of Age 15 Secondary cohort to sample (All Schools)	3,836	1,022	866
Total Number of Secondary School pupils to sample (All Schools)	7,235	1,960	1,589
Total Number of Age 5 Primary cohort to sample counting Deprived Schools only	1,075	345	320
Total Number of Age 8 Primary cohort to sample counting Deprived Schools only	1,104	346	324
Total Number of Primary School pupils to sample counting Deprived Schools only	2,179	691	644
Total Number of Age 12 Secondary cohort to sample counting Deprived Schools only	1,146	293	245
Total Number of Age 15 Secondary cohort to sample counting Deprived Schools only	1,351	331	295
Total Number of Secondary School pupils to sample counting Deprived Schools only	2,497	624	540
Set sample percentage of deprived Age 5 Primary Cohort	34.6%	32.1%	36.2%
Set sample percentage of deprived Age 8 Primary Cohort	35.5%	32.2%	36.7%
Set sample percentage of Primary pupils in deprived schools	35.0%	32.1%	36.4%
Set sample percentage of deprived Age 12 Secondary Cohort	33.7%	31.2%	33.9%
Set sample percentage of deprived Age 15 Secondary Cohort	35.2%	32.4%	34.1%
Set sample percentage of Secondary pupils in deprived schools	34.5%	31.8%	34.0%

Table 12 shows that the oversampling method was very stable in terms of selecting roughly 1/3 deprived schools and 1/3 pupils from these schools for each age cohort. However, tables 11 and 12 show the set samples before fieldwork. Consequently, they reflect neither variation in the actual random sampling of pupils or non-response from schools or pupils.

2.7 School recruitment

School recruitment was designed as a multi-stage process which is described in section 2.7.1 below. The Office for National Statistics recruited schools in England and Wales, with the Northern Ireland Statistics and Research Agency performing a similar function in Northern Ireland.

2.7.1 The stages of school recruitment

Stage 1: Immediately prior to commencing recruitment, a courtesy letter was sent to the Director of Education at all Local Educational Authorities advising them of the survey and the schools in their area that had been sampled (including independent schools and academies and substitute schools as well as Local Authority maintained schools).

Stage 2: Selected schools were then written to, informing them that they had been selected to take part. All correspondence was addressed to the Head teacher, who, in most cases, was a named individual from the sample frame. Included with this initial approach letter (**Annex D**) was an information leaflet (example in **Annex E**) which provided further details of the survey process. The letters advised them that ONS would be phoning to get their agreement for their school to participate. The information provided was tailored according to whether it was a primary or secondary school, not least because the content of the survey and the survey process (e.g. the consent process) differed for the younger and older age cohorts. The letter and leaflet were also tailored to the country in which the school was located (for example, the leaflet included a supportive quote from the Chief Dental Officer in each country).

Stage 3: Following on from the initial mail out, each school was then contacted by telephone. For England and Wales, this was done by a trained member of the ONS Survey Enquiry Line. In Northern Ireland, this was done centrally by the research team. The aim was to speak to the Head teacher to get their personal decision. For many schools this worked well though for some, particularly secondary schools, there were difficulties getting past PAs or receptionists. There were also some schools which had to be called a number of times because the Head teacher (or named contact) were not available and/or did not return phone calls when promised.

Stage 4: Where agreement to take part was recorded, this was then followed up by a letter to the Head teacher which confirmed their agreement to take part. Where agreement was not obtained, these schools were allocated to a Refusal Group. Sometimes schools were unwilling to commit to participation until the start of the 2013/14 school year. Such schools were allocated to a 'maybe' group for re-contact by telephone in September and October 2014.

Stage 5: Schools that refused to participate were written to by senior researchers within the CDH team. Not all cases were followed up; the decision whether to or not was determined by the reason given for not taking part at the initial contact stage. For example, schools that were in the midst of an Office for Standards in Education, Children's Services and Skills (OFSTED) inspection (or equivalent in Wales) were usually omitted from this refusal conversion process. In some cases, letters were sent to heads and/or chairs of governors or other known contacts. A number of follow up emails and phone calls were also made.

The process was similar for substitute secondary schools issued for recruitment, except that there was no 'maybe' outcome (as a definite decision on participation was required at that stage).

2.7.2 School recruitment progress

The telephoning of schools commenced at the start of June. This stage continued until the 10th July, close to the end of the 2012/13 school year.

To spread the workload the sample was split into 4 batches – English primaries, Welsh primaries, English secondaries and Welsh secondaries - with the mailing and phoning

staggered over the period. Telephone recruitment of secondary schools commenced as the GCSE examination period drew to a close.

Recruitment of the 'maybe' schools resumed in September with a further exercise in November to recruit substitute schools in England.

In October, an attempt to convert schools that had initially declined to take part was made. Fifty five (mainly secondary) schools that had refused at the telephone recruitment stage were contacted, with a result that five agreed to take part.

In December, ten substitute secondary schools in Northern Ireland were issued for recruitment, with three agreeing to participate.

Finally, in February ten Welsh substitute secondary schools were issued for recruitment, with eight agreeing to take part.

The following table shows the numbers that agreed in principle to take part in the survey.

Table 13 Number of schools recruited prior to being issued to field

		Issued	Agreed	Percentages
England	Primary	497	375	75
	Secondary	183	89	49
	All	680	461	68
Wales	Primary	179	143	80
	Secondary	49	38	78
	All	228	181	79
Northern Ireland	Primary	94	76	81
	Secondary	37	25	68
	All	131	101	77
All	Primary	770	594	77
	Secondary	269	153	57
	All	1039	743	72

Key issues from the recruitment exercise:

- The clash with exam periods in May and June 2013 meant some schools were unwilling to even consider cooperating with a survey in the 2013/14 school year.
- When schools that had agreed to the survey were subsequently approached by field representatives from late September 2013, a number of schools denied knowledge of agreeing to cooperate. This could be due to change of staff over the summer, or the lapse in time meant that agreement to participate in the survey had been forgotten.
- The low success rate with refusal conversion and low school drop-out rate during fieldwork implies that the initial telephone recruitment exercise was an efficient method for identifying schools that would cooperate with the survey.

2.8 Fieldwork

Once a school had been recruited to take part, the next stage was to allocate these schools to a field representative (hereafter referred to as 'field reps'). These usually consisted of experienced social survey interviewers from ONS and Nisra.

Initial allocation of work was done in early July which was prior to the initial ONS telephone school recruitment exercise being completed. As a result, work was allocated on the basis of selected areas and estimated numbers of schools agreeing to take part.

Around 100 field reps were initially allocated and trained to work on the study. A typical allocation of work was 1 secondary and 6 primary schools, although in practice there was considerable variation due to differential school non-response and school group sizes and resource availability. A small number of field reps took responsibility for more than one Local Authority.

2.8.1 Briefings

All of the field reps were briefed on the study before commencing work. Ten briefings, lasting half a day, were held in various locations from early to mid September 2013. The ONS and Nisra field reps were trained separately but using the same materials. All field representatives were trained prior to completion of the examiner/nurse training events.

Prior to the briefing, each field rep was sent a document outlining the study which they were expected to read prior to attending the briefing event. They also received an exercise on drawing a random sample of pupils from a list to complete prior to the briefing. The exercise was reviewed as part of the training. The briefing covered:

- The survey background
- Procedures and materials for collecting informed consent and maximising parental consent rates
- Working with schools and school staff
- The roles and responsibilities of field reps and examining teams
- The first (sampling) visit to the school and pupil sampling procedures
- Arranging the dental examining session(s) and liaison with the examining teams
- Preparation of materials including questionnaires and examination forms, sample management and serialisation

2.8.2 Survey materials

The number of schools allocated to each field rep varied to such an extent that it was decided that it would be better to provide each one with a tailored pack of materials – this would also minimise wastage.

Wherever possible, materials were distributed to interviewers at the briefings. In addition to the letters, leaflets etc. that they required, they received details of their schools and the examining team(s) who were allocated to work with them.

For Welsh schools, all materials for schools, pupils and parents were provided in English and Welsh.

2.8.3 Preparation for school sampling visits

Following the briefings, the field reps made contact with their allocated dentist(s) to clarify their availability and contacted their allocated schools to arrange appointments.

Prior to visiting each school the field reps also needed to prepare their materials – for each pupil's parent they prepared an envelope with a letter (Annex L) and information leaflet (example in Annex E); primary school parents also received a consent form (Annex K) to complete and return in the return business reply envelope provided.

Field reps were encouraged to make an early start on the secondary schools - their dental visits could be arranged sooner as they only needed to allow a reasonable period of time for parents to opt their children out of the study whereas it was anticipated that a month would be required to maximise the parental consent rate in primary schools. In practice, most field reps started with their primary schools, as the smaller sample numbers made it easier to practice the survey procedures and primary schools were easier to deal with.

2.8.4 Sampling visit

On an agreed day, the field reps attended their schools to undertake the pupil sampling exercise. There, they obtained from the school a suitable list of pupils to construct a sampling frame and then drew the sample of pupils to be examined (see Annex B for methodology).

Once the pupils to be examined had been selected, a 2 part 'Sample and Outcomes Sheet' was completed (Annex J) which listed all the pupils names and certain other key information about them. One part of the form (which contained names) was left at the school; the other part was taken away by the Field Rep to be keyed into an electronic form (details below). The 'sample and outcomes' form was also used to record consent and examination outcomes – see consent and examination sections below for details.

For each sampled pupil, the pre prepared envelopes were addressed - either with labels or by hand, depending on what each school had available. In most cases these were then left with the school to put them in the pupil's book bag (in primary schools) or the post (in secondary schools).

For primary pupils, a second set of envelopes were also addressed and left with the school to post to all parents. These contained letters/leaflets/forms reminding all parents to send in the consent form, if they had not already done so. The letter asked parents who had returned the form to ignore the reminder.

2.8.5 Electronic form

For each sampled school, the Field Rep keyed in information from the sample and outcomes sheet for all sampled pupils into an electronic form. The form was programmed using Blaise which is the international standard CAPI software for Official Statistics[6].

This included each pupil's sex, ethnicity, birth date month and year, home postcode and free school meal eligibility. The interviewer also recorded how many children in each relevant age cohort were present in the school from which to draw the sample. The program was also used to capture details about the date(s) agreed for dental examinations at each school.

[6] More information about Blaise is available from the developers, Statistics Netherlands, and from the Blaise User Group
http://www.cbs.nl/en-GB/menu/informatie/onderzoekers/blaise-software/default.htm
www.blaiseusers.org

2.8.6 Informed consent

Primary schools

For primary school children, positive written consent was needed from the sampled child's parent. Parents were sent an explanatory letter/leaflet and form, as described in 2.8.3 (Annex K + L) to complete and return to ONS. Forms were received by the ONS Survey Enquiry Line and booked in to an electronic system.

Secondary schools

For secondary school children, parents and pupils were sent a letter and information leaflet (se Annex M for the leaflet). Parents/pupils were made aware participation was voluntary and they were provided with contact details to enable them to opt-out of the survey. Refusals were received by the ONS Survey Enquiry Line and booked in to an electronic system.

Managing school consent

Around 250 refusals (by phone or letter) were received and recorded by ONS Survey Enquiry Line in the course of managing the consent process.

For the vast majority of cases the process worked well. Only minor problems were encountered; for example, in a small number of cases the pupil id sticker was not affixed to the consent form.

Quality assurance procedures were implemented to assure the keying-in of the consent forms. Initially, checks were made against a random number of cases. While the error rate was small, it was decided to introduce a more rigorous checking process where the keying of all refusals was double checked. This was in addition to the random checking of positive consents.

At the end of every day, each Field Rep received an electronic report which identified the pupils where consent had been given or refused. They were also able to phone in to the office on the morning of an exam to pick up any last minute consents that had been sent in, this was mainly done for schools where response was low. In some cases, parents had responded directly to the school office and so interviewers/dentists would also check with them on the day.

In response to multiple requests from dentists to also receive these electronic reports, this was instigated from early December 2013, with information identifying the survey and school removed from the report for data security reasons.

2.8.7 Examination sessions

The field reps were required to get agreement from the schools for the date(s) on which a dentist would attend to carry out examinations. This was difficult in some cases as it involved managing the sometimes conflicting needs of the school and the dentist. This was further complicated where a dentist was paired with more than one Field Rep.

The original plan was for the Field Rep to attend all examination sessions in secondary schools but to only attend the first primary school examination session. As the primary school involved the examination of fewer students, it was thought that their attendance would not be required other than on the first school, which was used as an opportunity to make sure the nurse/dentist knew what they had to do with all the forms etc. In practice field reps did attend more than one primary school examination session. This was because, in some cases the dentist/nurse were not comfortable with the survey administrative work, but more

generally it was found to be helpful as the Field Rep had built up a working relationship with staff in the school.

The arrangements for how and when pupils would attend for their examination were agreed with each school. There were a variety of approaches – some used an appointment system whilst smaller schools brought all the pupils to the exam room/area at once and some waited while each was examined.

In secondary schools, the pupils were also asked to complete a short questionnaire (Annex F). Arrangements for this varied, but it was usually done whilst they were waiting for their examination; sometimes individually and sometimes in groups.

For each pupil the nurses completed a detailed examination form, based on the dentists findings, and then at the end of each exam they also completed one of the four feedback letters for the parents. The different letters were for different degrees of dental health problems identified during the examination. The four letters are summarised below and can be found in Annex N.

Feedback letter A

Informed parents that their child's teeth appeared healthy at point of examination and recommended that their child visits the dentist for a check at least once a year.

Feedback letter B

Informed parents that their child's teeth required no urgent attention, but their child would benefit from a check in the next couple of months.

Feedback letter C

Informed parents that some of their child's teeth would benefit from closer inspection and recommended that their visited a dentist within a couple of weeks.

Feedback letter C2

Informed parents that some of their child's teeth would benefit from closer inspection and that their child also reported experiencing pain. Recommended that their child visited a dentist within a couple of weeks.

These letters were sealed in envelopes then placed in larger ones which contained a questionnaire and covering letter for the parents. These were then passed to the school to go in the examined pupil's book bag or for posting directly to the parent.

At the end of the session the completed pupil questionnaires were boxed up with the examination forms and left with the school office for courier collection and delivery to data capture.

Parent questionnaires

As mentioned above, all parents of all examined pupils were sent a questionnaire to complete (Annex G). In anticipation of non-response, reminder letters and a questionnaire were also prepared and left with the school to be despatched to all parents a week after the exam session. The letter asked parents that had already completed and returned a questionnaire to ignore the reminder.

Field reps were also instructed to make further contact with the schools after two weeks to ask the school to contact parents to remind them to return forms using by whatever method was available to the school. This process had mixed success and was not always clearly

understood. Another factor for the mixed success was some schools being unwilling to do blanket chasing but instead wanting to know specific parents who had not responded. This latter point was addressed in January 2014 when the field rep's daily report had additional information added which would identify specific pupil serial numbers to be chased. However, by the time this information was sent out, many schools had discarded their forms which identified the pupil names for serial numbers, therefore limiting the impact this change had on improving response to the parent questionnaire.

3 Survey Development

The development period for the content of the 2013 survey ran from December 2012 to August 2013, and incorporated a number of stages, which are listed and then summarised below:

A consultation exercise

Expert review

Cognitive testing

A pilot study

Ethical review

3.1 Consultation

An early stage of the development work was a stakeholder consultation exercise. A similar exercise was undertaken for the first time in the 2009 Adult Dental Health Survey. Building on the experience of that consultation, a similar exercise was run for the CDH 2013. This detailed and comprehensive consultation process aimed to sample views of the different stakeholders in relation to the:

- Procedures and format of the CDH 2013
- Collection of relevant and appropriate information, including the clinical dental examination, the questionnaire for the parents of all participants, and the questionnaire for the older children.

The consultation took place between January and early March 2013 and it involved different methodologies (structured consultation meeting, informal discussions, and email consultations of relevant scientific and professional groups).

A diverse range of participants took part including dental professionals (such as consultants and specialists in Dental Public Health, consultants in Paediatric Dentistry, consultants in Orthodontics, consultants in Periodontology, clinical directors from salaried dental services, members of the Department of Health, the British Dental Association, and the Dental Observatory), school teachers and staff, parents and older children.

More specifically, the views of stakeholders were sampled as follows:

- Consultation focus group meetings were held in Cardiff, London, Sheffield, and Belfast with selected dental professionals. There were 12-14 participants in each of these meetings from a diverse range of dental specialities and with different roles in NHS and academia.

- Further discussions were held with 8 dental professionals that were not able to attend the consultation meetings but expressed interest in contributing to the exercise.
- In addition, different scientific groups relevant to the CDH 2013 were invited to provide their feedback. Feedback was received from the Royal College of Surgeons, the British Association for the Study of Community Dentistry, the British Society of Paediatric Dentistry, the British Orthodontic Society, and the Faculty of General Dental Practice.

Consultation focus group meetings were also held with: a) teachers and administration staff from a primary school; b) teachers and administration staff from a secondary school; c) 15 year old students from a secondary school; d) the parents association from a secondary school. These meetings were all held in Birmingham.

Participants provided informed consent for their participation in these meetings and discussions were recorded after permission from all participants.

A detailed note of the consultation findings was produced and presented to the Steering Group. The main conclusions to be drawn from this exercise were as follows.

In general, it was felt that the clinical examination should be primarily guided by the necessity to have continuity with previous surveys in order to allow for comparisons and the establishment of trends in oral diseases. One notable and absolute agreement for innovation refers to the suggested use of the Pulp-ulcer-fistula-abscess (PUFA) index[7] for the measurement of excessive disease and symptoms. The main issues for debate related to the measurement of enamel caries, the potential assessment of pocket depth among 15 year olds, and the measurement of Molar Incisor Hypermineralisation (MIH).

On the other hand, the parental and older children' questionnaires were seen as the main vehicles for the innovation in the CDH 2013 and there were many suggestions put forward in terms of areas of interest. They predominantly included the assessment of issues around dental attendance and access to services, dental anxiety, subjective perceptions of oral health and quality of life, and dental health related behaviours.

The engagements also provided useful tips in terms of the links with schools and the processes that would facilitate good rates of school recruitment and participation from older children and their parents. For example, there was general agreement among children that in order to get honest responses, the questionnaire needed to be filled in individually and with some privacy and children wanted to be reassured that their responses remained confidential. In addition, parents felt they would be more likely to respond to their questionnaire if their child's school had endorsed the survey.

The full summary of findings from user consultations is included as Annex C.

3.2 Expert review

Two subgroups of the consortium that included both dentists and survey experts were convened to review the dental examination and parent questionnaire in light of the input from the user consultation, the Steering Group and the cognitive testing and piloting. These

[7] The PUFA index records the presence of severely decayed teeth with visible pulpal involvement (P), ulceration caused by dislocated tooth fragments (U), fistula (F) and abscess (A).

groups worked up proposals for the 2013 survey content that were agreed with the Steering Group.

3.3 Cognitive testing

3.3.1 Scope of the testing

Cognitive interviewing methods were used on a sample of parents and older children to explore the parent questionnaire in terms of understanding of key terms within the questions as well as willingness and ability to respond. Cognitive interviewers spent time at the start of the interviews exploring the response process: From receiving the invitation and supporting documents in the post, through to whether or not they would return the questionnaire and consent for their child to be involved.

As this was the first time the questionnaire for pupils would be used on the study, cognitive interviewing methods were also used to explore fully the entire pupil questionnaire. The interest here was in whether certain questions, which had been adapted from equivalent adult items, were understood and whether older children felt willing and were able to answer them. Interviewers also explored the advance information materials about the survey with older children at the start of the interview.

3.3.2 Sampling and recruitment

Respondents were recruited via doorstep screening (whereby interviewers knock on doors and used a screening questionnaire to identify eligible recruits). Interviews were conducted in the following areas: London; York; Penrith, Cumbria; Lancashire; and Surrey.

Within each area, where possible, interviews were conducted with a mixture of people living in urban and rural areas, in both wealthy areas and more deprived areas as well as some somewhere between.

Interviews were carried out by members of NatCen's core team of cognitive interviewers. The cognitive core team consists of dedicated field interviewers who are trained and experienced in using cognitive interviewing methods. Respondents were interviewed at home and interviews recorded with respondent consent. In some cases, interviewers interviewed both the parent and the older child (aged 12 and 15 only) however often interviews took place with parents and older children who were not related. All respondents were given a £20.00 high street voucher as a thank you for their time and help.

Respondents gave verbal informed consent before an interview was arranged and the consent process for older children (aged 12 and 15) was two staged. First interviewers gained the verbal parental consent and next they gained verbal consent from the older children themselves. Information leaflets designed for both parents and older children were used during the recruitment phase.

Thirty one interviews were conducted in total. Interviews took place with four sample groups:

1. Parents of children aged 5 or 8 (12 in total)
2. Parents of older children aged 12 or 15 (9 in total)
3. Children aged 12 (6 in total)
4. Children aged 15 (4 in total).

The table below shows the composition of the cognitive interviewing sample. In addition to the characteristics shown here, parents varied in age: some were under 35 and some were over 35. We also achieved interviews with a mix of parents (and older children) in terms of the frequency they attended the dentist and type of school the children attended.

Table 14 Characteristics of the sample for cognitive interviewing

Characteristics		Number with characteristic
Gender of parent	Male (fathers)	4
	Female (mothers)	17
Sample group	Parent of a 5-8 year old	12
	Parent of a 12-15 year old	9
Ethnicity	White British	17
	Other ethnicity	4
Gender of pupil	Male	4
	Female	6
Sample group	Age 12	6
	Age 15	4
Ethnicity	White British	7
	Other ethnicity	3

Following the cognitive testing exercise, the research team made modifications to the wording, ordering and layout of the survey instruments. A number of questions were also identified for possible exclusion from the parental questionnaire. These recommendations were largely agreed upon and taken forward in parallel with changes made as a result of the pilot.

3.4 The pilot

The school sample was purposively selected based around the location of the available examiners, with a sample size specified for a reasonable test of important processes. There were three groups of schools selected in England, one in North Wales and one in Northern Ireland (in Belfast). The pilot sample was selected from schools that had not been selected for the main survey. In England, the sample was selected in Local Authorities which did not contain the main survey sample. The school sample contained a range of school types, including primary and secondary schools (and within secondary schools, there were independent schools, academies and state maintained schools).

Pilot examiners and nurses attended a three and a half day residential training event from the 20th-23rd May, 2013. Pilot examining started on the 10th June and ran for a month until the 12th July. Pilot examiners were then used to train the examining teams for the main stage of data collection, as well as for examining on the main survey.

In total, 29 schools agreed to participate from the 45 selected, which was in line with original expectations. Over three quarters of primary schools selected in England and Wales agreed to participate, which was higher than the rate achieved in Northern Ireland (Table 14). In secondary schools, response also varied by country. Secondary school response was higher in Northern Ireland than in Wales and England. The most common reason given for refusing to take part was that the school was too busy with exams.

One primary school and one secondary school (both in England) initially agreed to take part and subsequently withdrew.

Table 15 School response, by school type and country

	England		Wales		Northern Ireland	
	Number	Percentage	Number	Percentage	Number	Percentage
Primary						
Took part	15	75	6	86	4	57
Head not available in time	1	5	1	14	0	0
Refused	4	20	0	0	3	43
Total	20	100	7	100	7	100
Secondary						
Took part	1	17	1	50	2	67
Head not available in time	0	0	0	0	0	0
Refused	5	83	1	50	1	33
Total	6	100	2	100	3	100

The pilot was used to evaluate the likely impact of the introduction of opt-in consent, particularly the written parental opt-in process for dental examinations with 5 and 8 year olds. Opt-in consent for the 5 and 8 year old participants involved the sampled schools sending out the provided parent letters and a pilot version of the consent forms to parents. Parents were asked to return the opt-in consent forms in the pre-paid addressed envelopes. Following this, the interviewer contacted the school seven days later to remind them to post the reminder letters, leaflets and forms. This letter was sent to all parents, regardless of whether they had already returned the consent form. Schools were then asked to contact parents to follow up the reminder letter in a way convenient to the school, such as email, text or telephone.

Across the three countries, the average consent rate of 60% was achieved which highlighted a need to make improvements to the materials and processes around collecting the opt-in consent from parents.

A telephone follow up exercise was conducted with six of the primary schools with the lowest parent opt-in rates. This identified a number of improvements which were included in the final design, for example it was suggested that it would be helpful if we could make the process more fun for children (e.g. provision of stickers, providing information/activities on teeth beforehand).

A total of 170 primary school children and 107 secondary school pupils were examined. Pupil refusal rates on the examination day were low with the only significant category being secondary students who were unavailable on the day.

The parent questionnaire was posted out after the pupil had completed the dental examination. There was a reminder process to maximise response. The response rate to the parental questionnaire was 47%; 130 were returned – 91 from primary school parents and 39 from secondary school parents.

3.5 Examination data and criteria

The examination criteria for 2013 was similar to that used successfully in 2003, ensuring an examination of approximately similar length (5 minutes on average for 5 and 8 year olds, 10 minutes on average for 12 and 15 year olds) but also adopting changes compatible with current clinical practice. The criteria used within the pilot comprised of 11 sections, of which seven were unchanged from 2003, these were:

- Developmental defects in enamel;
- Periodontal I (observed gingivae, plaque, calculus);
- Trauma (permanent teeth only);
- Tooth surface loss (toothwear);
- Simplified Index of Orthodontic Treatment Need (IOTN)[8] – Aesthetic Component;
- Presence of orthodontic appliances (when in orthodontic treatment only); and
- Anomalies (where present, e.g. cleft lip/palate).

Three sections of the criteria were amended, these were:

- Tooth condition (decay), where changes were made to reflect developments in modern dental practice, including adding the measurement of initial stage (enamel) caries
- Simplified IOTN Dental Health Component, where an overjet measurement dropped in 2003 was reintroduced to allow associations between trauma and overjet to be captured; and
- Modified Basic Periodontal Examination (BPE), which replaced the second part of the 2003 periodontal examination. The internationally recognised modified BPE measure allows the capture of pocket data but bleeding was also measured to allow comparison to 2003.

One new section was added, this was:

- FDI Pulp-ulcer-fistula-abscess (PUFA) index, which captures data on infection associated with severe dental caries.

Very few problems were raised by examiners following the pilot exercise, resulting in only very minor changes being made to the criteria, for example including an 'assessment cannot be made' option for the symmetry of diffuse enamel defects variable.

The full examination criteria are documented in Annex H, and the examination form in Annex I.

[8] *Brook PH, Shaw WC. The development of an index of orthodontic treatment priority. European Journal* of Orthodontics, 1989; 11: 309-320

3.6 Parent questionnaire

The starting point for the 2013 parent questionnaire was the questionnaire used in the 2003 survey. We aimed to combine continuity over time with recognition of changes in policy focus. Also, because of the decline in response rates to other surveys from the public we aimed to produce a shorter, more attractive and accessible document that parents would find easy to complete. The draft questionnaires used in the cognitive testing and the pilot covered the following topics:

- Dental visits and treatment received
- Access to and use of NHS services
- Child's dental anxiety
- Tooth brushing
- Demand for and access to orthodontic treatment
- Recent dental problems
- Impact of child's oral health on other family members
- Pattern of dental visits by parent and child
- Child's ethnicity
- Parent's educational qualifications
- The respondent's partner
- Occupation of family reference person
- Home postcode (to help with matching area classifications to the data)

There are a small number of differences between the 2003 parent questionnaire and the final 2013 questionnaire (Annex G). For example, the 2013 questionnaire asked for only one parent of the child taking part in the dental examination to complete the questionnaire, to make the approach less burdensome on the family unit. In 2003 a large range of demographic questions were asked to capture socio-economic status from the parent respondent and any partner in the family. To enable us to rebalance the questionnaire towards dental questions, it was decided to collect data about the socio-economic status about one parent only (the parent with major responsibility for the child's dental hygiene and care).

Other changes included removing attitudinal questions such as those on attitudes to tooth decay and bad teeth; removing highly subjective questions on marks on teeth; and the question on who accompanied the child to the dentist.

The initial 2013 questionnaire was reviewed, taking into account feedback from the HSCIC and the Steering Group, the findings of the cognitive testing, the outcome of the pilot (based on an examination of data and the completed scripts), and input from the consortium. In general, the questionnaires that were returned were completed in full, with relatively few errors (e.g. in following routing) or missing items. However, with no means of evaluating the reasons for non-response, and only an indicative parent questionnaire response rate from the pilot, it was difficult to assess whether the questionnaire design, including its format and length, deterred parents from responding.

Concerns about the length of the questionnaire were reinforced by parents who took part in the consultation meeting and the cognitive testing. For this reason, the review considered the relative value of individual questions, with the aim of identifying those that did not meet a clear information need and that could therefore be deleted. This resulted in 15 of the original questions either being deleted or substantially amended.

Changes that were made included:

Collecting the ethnicity of pupils at the sampling stage from the school rather than on the questionnaire. The pilot included the 2011 census question, which had 18 categories and took up almost a whole page[9]. Schools are required to collect this data as part of their school census submission. This should deliver more comprehensive information, both on pupils who are sampled but do not take part in the survey, and of pupils whose parents do not return the questionnaire.

The pilot questionnaire included the full Family Impact Scale[10], which measures the impact of the child's oral health on the family within a reference period of 3 months prior to completion of the questionnaire. The full scale includes 13 items. There were significant concerns in terms of the length of this question and the relevance of some of the items. A decision was taken to retain 7 items from the scale to be used as stand-alone questions in the report. The reference period was revised to six months to be in line with the rest of the questionnaire. The items retained were as follows:

'Have you or the other parent taken time off work?'

'Has your child's dental treatment caused financial difficulties for your family?'

'Has your child required more attention from you or the other parent?'

'Has your sleep or that of the other parent been disrupted?'

'Have your normal family activities been interrupted?'

'Have you or the other parent felt guilty?'

'Have you or the other parent felt stressed or anxious?'.

Dental anxiety is a topic of great interest. The pilot questionnaire used the Modified Dental Anxiety Scale (MDAS)[11] to collect a proxy measure of anxiety experienced by the child. After evaluating the pilot data and results of the cognitive testing, this was regarded as unsatisfactory. The scale is not validated for proxy use, and parents commented that they did not know how their child would feel in some situations. The 'don't know' option, added for the pilot, was used frequently enough to prevent the calculation of a score (the purpose of the scale) for a significant proportion of respondents. In the absence of an appropriate validated question or scale, a simple question was added to evaluate the parent's view of the child's anxiety:

'How anxious does your child get when they visit the dentist?' with a scale from 1 to 10, labelled at the extremes 'Not at all anxious' (1) and 'Extremely anxious' (10).

The question included a tick box option for 'My child has never been to the dentist'.

[9] http://www.ons.gov.uk/ons/guide-method/census/2011/how-our-census-works/how-we-took-the-2011-census/how-we-collected-the-information/questionnaires--delivery--completion-and-return/2011-census-questions/index.html

[10] Locker D, Jokovic A, Stephens M, Kenny D, Tompson B, Guyatt G. Family impact of child oral and oro-facial conditions. Community Dent Oral Epidemiol. 2002;30: 438-48.

[11] http://www.st-andrews.ac.uk/dentalanxiety

3.7 Pupil Questionnaire

The introduction of a new self-completion questionnaire for 12 and 15 year olds is an important innovation for the 2013 survey. The objective was to collect data from pupils where it was felt that they would be more reliable sources than their parents (for example about what they ate or drank) or where their perspective was considered key (for example opinions about their own dental health). It was intended to be no more than 10 minutes long. To maximise response, it was presented alongside the dental examination (usually completed just prior to the dental examination) and covered the following topics:

- Self-rated dental and general health, including dental problems
- Satisfaction with appearance of teeth
- Impact of dental health on oral functioning
- Tooth brushing behaviour
- Visits to the dentist, and dental anxiety
- Daily frequency of consumption of some food and drink categories
- Smoking and drinking behaviour
- Sources of helpful information about dental health.

The full pupil questionnaire is documented in Annex F.

The questionnaire was cognitively tested and piloted and in general, the questionnaires were completed in full, with relatively few missing items. No major changes were made to the questionnaire following the pilot, with changes generally focused on minor rewording of questions, or reordering of answer options. The MDAS scale removed from the parent questionnaire was retained on the pupil questionnaire.

3.8 Ethical approval

The survey was subject to ethical review by the University ethics committee at University College London (Project ID 2000/003). Approval was gained for the materials and procedures used on the pilot study. An amendment was submitted and approved for the changes to materials and procedures arising from the pilot and cognitive testing for the main stage survey.

4 Survey outcomes

4.1 Examiner Calibration

An examiner calibration exercise was conducted at the end of each residential training event to allow formal measurement of coding agreement between examiners. Pupils were recruited from primary and secondary schools local to the training events, once agreement had been obtained from the Head Teacher. Written consent was obtained for the children to be examined as part of the training course. A letter was sent (via the school) to parents of the children and positive consent obtained for their participation. Children taking part in the

calibration had been screened to ensure that relevant oral conditions were present in their mouths.

The calibration took place within the school environment to mimic the survey environment as closely as possible. Examiners were placed in teams of 9 or 10, with each member of the team independently examining the same 8 pupils (with a mix of ages). In total 75 examiners were calibrated in 8 groups. Data was recorded on the survey dental examination form by a nurse.

Table 16 Examiner calibration groups

Date	Group	Number of examiners	Total number of pupils	Aged 5[a]	Aged 8	Aged 12	Aged 15
19/09/2013							
	Group A	9	8	3	1	3	1
	Group B	9	8	1	3	3	1
	Group C	9	8	2	2	4	-
	Group D	9	8	2	2	2	2
03/10/2013							
	Group E	9	8	-	4	3	1
	Group F	10	8	-	4	1	3
	Group G	10	8	-	4	1	3
	Group H	10	8	-	4	3	1

The calibration model restricts the number of elements of the examination that can be calibrated, and which elements are reasonable to calibrate on, as it is necessary to manage the burden on the children taking part in repeat examinations.

The aim was to identify any true "outlier" examiner who was systematically coding very differently to other examiners. Should they have been identified options included retraining them or removing them from the study.

The tooth condition (tooth decay) element of the examination was the main focus of the calibration for evaluating coding reliability. This was because this element of the examination was regarded as particularly important for the survey outputs and because experienced dental examiners should code tooth decay reliably.

Upper and lower right mouths were examined. At the calibration on 19/09/2013, seven teeth in each jaw were coded. On 02/10/2013, for reasons of time, the lower right incisors and premolars were excluded from the examination, and a total of 11 teeth were coded (seven in the upper jaw, four in the lower jaw).

Examiner calibration was measured by calculating a kappa score for each pair of examiners in each group. The group scores and pair scores were assessed for evidence of low agreement.

The kappa statistic (ƙ) is derived by comparing the observed levels of agreement between two coders (Pr (a)) with the hypothetical probability of agreement due to chance (Pr (e)). Mathematically, it is defined as:

$$ƙ = \frac{\Pr(a) - \Pr(e)}{1 - \Pr(e)}$$

In terms of interpreting the Kappa statistic, a value of 0 indicates no more agreement than could be expected by chance; a value of 1 indicates perfect agreement. The generally accepted categories for kappa scores are:

0.00 – 0.20: slight

0.21 – 0.40: fair

0.41 – 0.60: moderate

0.61 – 0.80: substantial

0.81 – 1.00: almost perfect. [12]

Codes for individual tooth surfaces were combined into a single code to summarise the condition of the tooth, with the following possible values:

0 = sound,

1 = enamel caries,

2 = caries into dentine,

5 = restored, otherwise sound,

6 = extracted due to caries,

8 = missing for another reason (unerupted, missing due to trauma, orthodontic extraction). [13]

As measurement of enamel caries was added to the tooth condition section for the 2013 survey, the data were calibrated using alternative coding systems: First, counting enamel caries as sound; second, grouping enamel caries with caries into dentine.

Mean kappa scores for each examining group are shown below.

[12] Cohen JA (1960). *A coefficient for agreement of nominal scales.* Educ Psychol Measurement 20, 37-46.
[13] Teeth were scored by ranking surface scores according to the following hierarchy: 6 or 8, 2, 5, 1, 0.

Enamel caries treated as sound

Group A: average kappa = 0.890

Group B: average kappa = 0.846

Group C: average kappa = 0.928

Group D: average kappa = 0.859

Group E: average kappa = 0.823

Group F: average kappa = 0.814

Group G: average kappa = 0.824

Group H: average kappa = 0.887

(Range 0.814 to 0.928)

These scores indicate very good (almost perfect) agreement between examiners.

Enamel caries grouped with caries into dentine

Group A: average kappa = 0.818

Group B: average kappa = 0.678

Group C: average kappa = 0.856

Group D: average kappa = 0.660

Group E: average kappa = 0.737

Group F: average kappa = 0.684

Group G: average kappa = 0.739

Group H: average kappa = 0.592

(Range 0.592 to 0.856)

The introduction of enamel caries into decay reduced the levels of agreement between examiners, although in most cases there was still substantial or almost perfect agreement. Group H was at the bottom end of the range, counting as moderate agreement

The Kappa scores for each pair of examiners in Group H can be examined (Table 16). The moderate group level agreement seems related to general variability in agreement across the pairs in the group.

Table 17 Paired examiner kappa scores for group H (enamel caries grouped with decay into dentine)

	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10
H1	-	0.47	0.56	0.58	0.56	0.71	0.75	0.69	0.51	0.52
H2	0.47	-	0.67	0.6	0.46	0.6	0.62	0.65	0.34	0.67
H3	0.56	0.67	-	0.69	0.46	0.73	0.72	0.62	0.41	0.84
H4	0.58	0.6	0.69	-	0.56	0.77	0.64	0.66	0.47	0.66
H5	0.56	0.46	0.46	0.56	-	0.64	0.53	0.47	0.4	0.51
H6	0.71	0.6	0.73	0.77	0.64	-	0.72	0.7	0.49	0.65
H7	0.75	0.62	0.72	0.64	0.53	0.72	-	0.69	0.54	0.72
H8	0.69	0.65	0.62	0.66	0.47	0.7	0.69	-	0.51	0.66
H9	0.51	0.34	0.41	0.47	0.4	0.49	0.54	0.51	-	0.45
H10	0.52	0.67	0.84	0.66	0.51	0.65	0.72	0.66	0.45	-
Mean	*0.59*	*0.56*	*0.63*	*0.62*	*0.51*	*0.67*	*0.66*	*0.63*	*0.46*	*0.63*

Although tooth condition was the focus of the calibration, data was also collected on presence of plaque, orthodontic measures and tooth surface loss.

The results for plaque showed slight or fair levels of agreement between examiners, although in the repeat examination format of a calibration this assessment could be affected by the previous dental examinations conducted on the child.

Tooth surface loss

Six tooth surfaces were examined for surface loss (wear): UR6 occlusal, UR2 buccal and lingual, UR1 buccal and lingual, LR6 occlusal. In each case the surfaces were coded separately for area and depth of surface loss, with three codes indicating different levels of impact. The calibration analysis looked at whether the any surface loss was recorded. The data were coded as 0 = no surface loss or 1 = some surface loss.[14]

[14] Surfaces that the examiner was unable to code were recoded as 'no surface loss'.

The group average kappa scores were as follows:

Group A: average kappa = 0.220

Group B: average kappa = 0.246

Group C: average kappa = 0.334

Group D: average kappa = 0.393

Group E: average kappa = 0.306

Group F: average kappa = 0.294

Group G: average kappa = 0.163

Group H: average kappa = 0.229

The range from 0.163 to 0.393 indicates slight or fair levels of agreement between examiners.

Orthodontic measures

The training and calibration of the orthodontic elements of the examination were carried out using models. All examiners coded the same nine models and the calibration thus compares all 72 examiners[15].

There were three elements of the orthodontic examination, based on the simplified Index of Orthodontic Treatment Need (IOTN).

The first element was an aesthetic score on a scale from 1 to 10. For the purposes of calibration, this was recoded using a score of 6 as the threshold for potential treatment need, i.e. scores of 1 to 5 were coded 0, scores of 6 to 10 coded 1. The mean kappa using this threshold was 0.530.

The dental health component was coded using a binary score: 0 indicating no need for treatment, 1 indicating a need for treatment. The mean kappa score for this element was 0.671.

Overjet, part of the dental health component was separately scored: a score of 0 indicated overjet of 6mm or less, a score of 1 indicated overjet of more than 6mm. The mean kappa score for this part of the examination was 0.623.

These scores indicate moderate levels of agreement.

The calibration results provide one indication of the likely relative levels of accuracy, in the form of reliability across dental examiners, in the survey data. Assessments of more severe diseases and conditions, such as tooth decay into dentine or orthodontic treatment need on dental health grounds, are likely to be the most reliable. This is because they are easier for examiners to identify and assess outside of a clinical environment. Assessment of risk factors such as presence of tooth surface loss, tooth decay into enamel and presence of plaque are more affected by the environment in which the survey is conducted. However, in most cases moderate agreement is still achieved.

[15] As with other parts of the calibration, examiners were calibrated against each other. An alternative approach would be have been to calibrate examiners against a definitive standard.

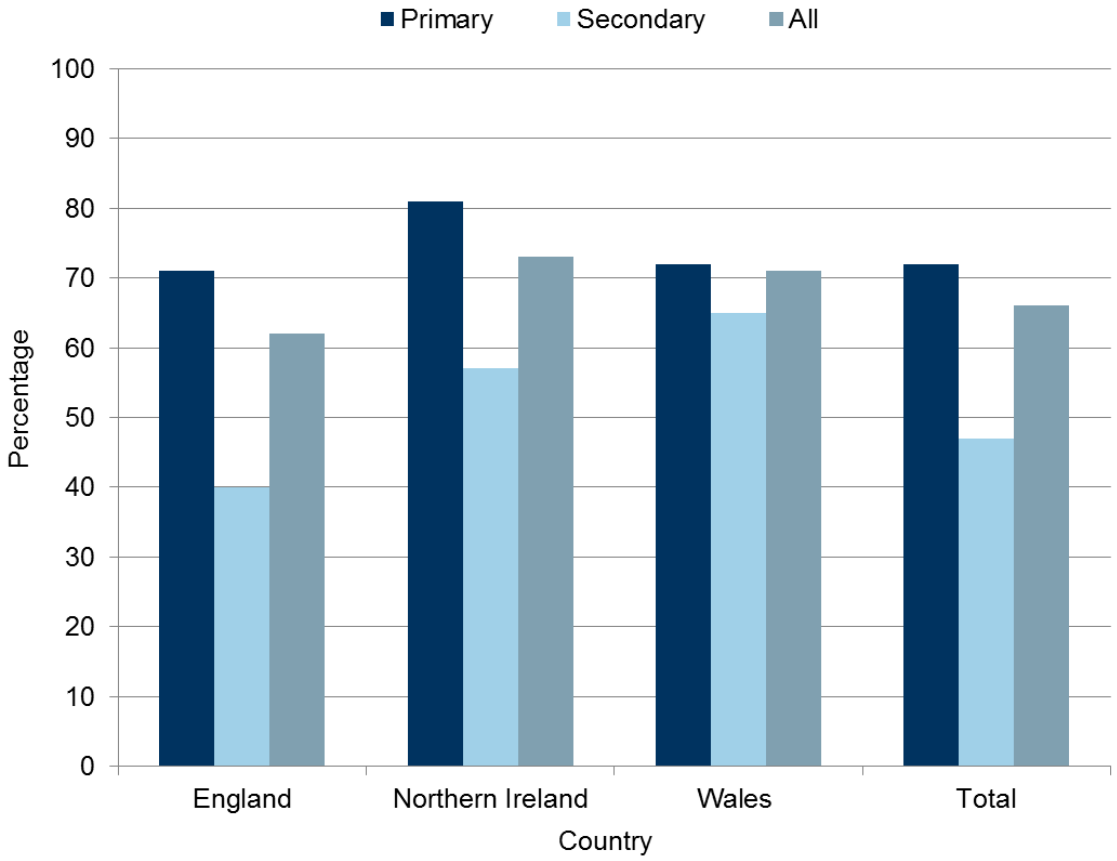
4.2 Response rates

This was a schools based survey requiring the involvement of schools, school staff, pupils and parents and non-response might occur at each stage. This section summarises the various response rates of interest.

4.2.1 School response

Firstly, the consent of individual schools to involve their students was required. Figure 1 summarises the final school response rates by Country. Table 18 describes the final school response rates for the survey in more detail.

Figure 1 School response after secondary school substitution, by country, 2013



The figure above shows that overall primary schools were more likely to respond than secondary schools. Overall 72 per cent of the primary schools originally selected took part in the survey, with primary schools in Northern Ireland more likely to take part than in England and Wales. The overall primary school response rate was equivalent to that achieved in the 2003 survey. Although response in English primary schools was lowest overall in 2013 at 71 per cent, this was three per cent higher than the equivalent response rate in 2003. Response rates in primary schools in Wales and Northern Ireland reduced slightly compared to 2003.

Looking back further in the survey series, response from primary schools in the United Kingdom was 96 per cent in 1993 showing that response from primary schools has been in long term decline. However, 2013 response exceeded initial planning expectations overall, and no substitution for refusing secondaries or refusal conversion activities were attempted.

Response rates from secondary schools were lower overall and more variable across country. Out of the secondary schools originally selected for the survey, 50 per cent took part although response rates in English secondaries were substantially lower than in Wales and Northern Ireland. This is consistent with the experience on other UK Government surveys, which have also experienced a long term drop in response from English secondary schools to similar levels[16].

In addition seven secondary schools in England and Wales refused to allow the 15 year old cohort to participate in the survey, as they were unwilling to commit the GCSE year group to survey activities. The survey was allowed to proceed in these schools, given that the samples of 12 and 15 year olds were to be analysed separately.

[16] See for example the Survey of Smoking, Drinking and Drug Use Among Young People in England http://www.natcen.ac.uk/taking-part/studies-in-field/survey-of-smoking,-drinking-and-drug-use-among-young-people-in-england/survey-of-smoking,-drinking-and-drug-use-among-young-people-in-england/

Table 18 School response, by country

		England		Northern Ireland		Wales		All Countries	
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Primary	Sampled	502	100	94	100	179	100	775	100
	Ineligible	2	0	0	0	1	1	3	0
	Unproductive	146	29	18	19	49	27	213	27
	Productive	**354**	**71**	**76**	**81**	**129**	**72**	**559**	**72**
Secondary	Sampled	146	100	34	100	39	100	219	100
	Ineligible	5	3	1	3	3	8	9	4
	Unproductive	80	55	11	32	10	26	101	46
	Productive	**61**	**42**	**22**	**65**	**26**	**67**	**109**	**50**
	Substitutes sampled	37	100	10	100	10	100	57	100
	Ineligible	1	3	0	0	0	0	1	2
	Unproductive	24	65	7	70	4	40	35	61
	Productive	**12**	**32**	**3**	**30**	**6**	**60**	**21**	**37**
	Total secondaries sampled	183	100	44	100	49	100	276	100
	Total productive	**73**	**40**	**25**	**57**	**32**	**65**	**130**	**47**
All	Sampled	648	100	128	100	218	100	994	100
	Ineligible	7	1	1	1	4	2	12	1
	Unproductive	226	35	29	23	59	27	314	32
	Productive	**415**	**64**	**98**	**77**	**155**	**71**	**668**	**67**
	Substitute sampled	37		10		10		57	
	All sampled	685	100	138	100	228	100	1051	100
	Total productive	**427**	**62**	**101**	**73**	**161**	**71**	**689**	**66**

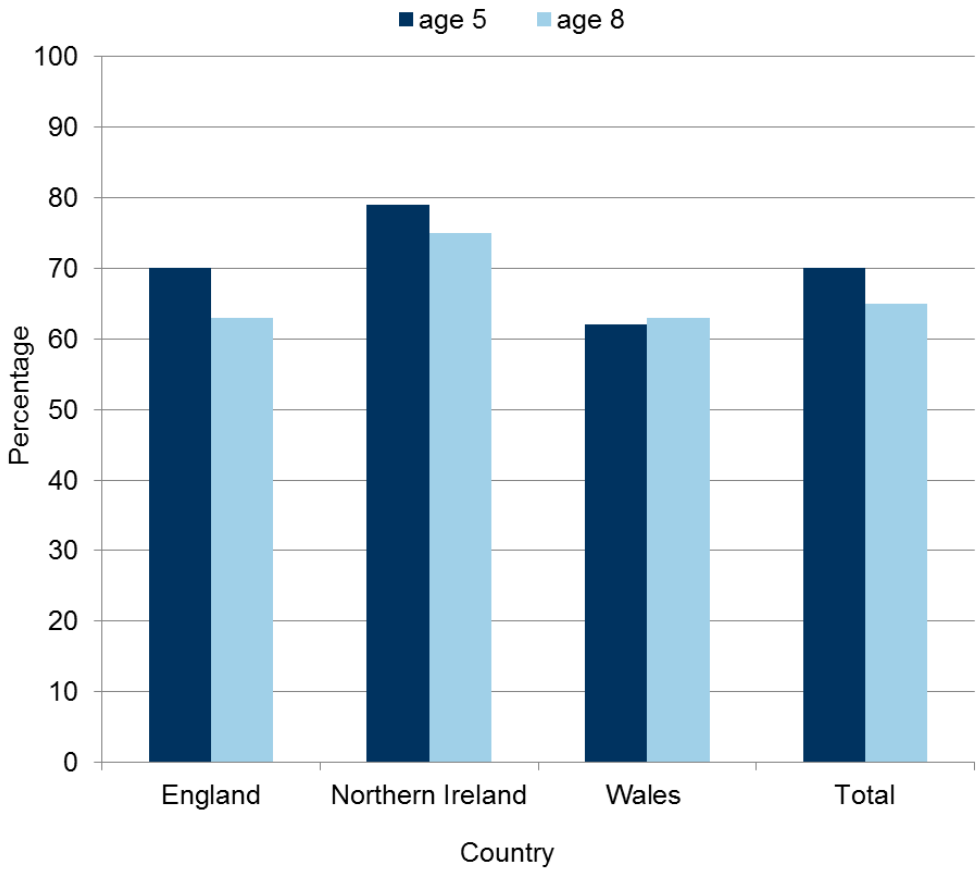
Five independent schools in England were sampled as both primary and secondary schools. These schools are included in both the primary and secondary categories and twice under the All section. This is because the primary and secondary parts of schools often act separately

Table 18 above looks at response in more detail. It shows that some of the available substitute schools were issued for recruitment in England, Wales and Northern Ireland. The response rate was lower from these schools than for the main sample schools, and this reduced the overall response rate from all secondary schools issued for recruitment to 47 per cent. The lower response rate from substitute secondary schools was partially due to the strategy for selecting the schools. These schools were selected to try and correct for bias in the main sample group response – that is, they were typically located in regions or deprived/non-deprived groups that were under-represented in the responding schools from the original sample. It was also because these schools were issued during the 2013/14 school year and so they had less advance notice and it was more difficult to persuade schools to include the survey in their schedules. There was also no time to conduct refusal conversion activities with substitute schools.

4.2.2 Dental examination response in 5 and 8 year olds

Figure 2 provides a summary of dental examination response rates for 5 and 8 year olds by country. Tables 19 and 20 provide further detail about the response rates to the dental examination for the 5 and 8 year olds cohorts.

Figure 2 Dental examination response for 5 and 8 year olds, by country, 2013



In participating schools, 70 per cent of eligible sampled 5 year olds and 65 per cent of 8 year olds took part in the dental examination.

Just over a quarter of the total set sample in these age cohorts was lost due to school non-response (27 per cent of 5 year olds and 28 per cent of 8 year olds).

Table 19 Dental examination response from 5 year olds, by country

	England			Northern Ireland			Wales			Total		
5 year olds	Number	Percentage A*	Percentage B**	Number	Percentage A*	Percentage B**	Number	Percentage A*	Percentage B**	Number	Percentage A*	Percentage B**
Total set sample	3,108	100		850	100		1,073	100		5,031	100	
Pupils lost (unproductive schools)	913	29		176	21		272	25		1,361	27	
Pupils actually sampled	2,195	71		674	79		801	75		3,670	73	
Ineligible	2	-		-	-		1	-		3	-	
Total eligible pupils	2,193	71	100	674	79	100	800	75	100	3,667	73	100
Total pupils examined	**1,526**	**49**	**70**	**530**	**62**	**79**	**493**	**46**	**62**	**2,549**	**51**	**70**
Total unproductive	667	21	30	144	17	21	307	29	38	1,118	22	30
Of which												
Reasons for non-examination:												
Parent did not consent	572	18	26	101	12	15	235	22	29	908	18	25
Pupil refused	8	-	-	6	1	1	5	-	1	19	-	1
Absent	52	2	2	25	3	4	33	3	4	110	2	3
Other	35	1	2	12	1	2	34	3	4	81	2	2

**%A is based on the total set sample of pupils in productive and unproductive schools*
**%B is based on the total number of eligible pupils selected in participating schools*

Table 20 Dental examination response from 8 year olds, by country

	England			Northern Ireland			Wales			Total		
8 year olds	Number	Percentage A*	Percentage B**	Number	Percentage A*	Percentage B**	Number	Percentage A*	Percentage B**	Number	Percentage A*	Percentage B**
Total set sample	3,094	100		846	100		1,076	100		5,016	100	
Pupils lost (unproductive schools)	927	30		171	20		286	27		1,384	28	
Pupils actually sampled	2,167	70		675	80		790	73		3,632	72	
Ineligible	2	-		-	-		6	1		8	-	
Total eligible pupils	2,165	70	100	675	80	100	784	73	100	3,624	72	100
Total pupils examined	**1,369**	**44**	**63**	**508**	**60**	**75**	**490**	**46**	**63**	**2,367**	**47**	**65**
Total unproductive	796	26	37	167	20	25	294	27	38	1,257	25	35
Of which												
Reasons for non examination:												
Parent did not consent	709	23	33	139	16	21	236	22	30	1,084	22	30
Pupil refused	3	-	-	1	-	-	3	-	-	7	-	-
Absent	46	1	2	15	2	2	24	2	3	85	2	2
Other	38	1	2	12	1	2	31	3	4	81	2	2

**%A is based on the total set sample of pupils in productive and unproductive schools*
**%B is based on the total number of eligible pupils selected in participating schools*

Response in both age cohorts was higher in Northern Ireland than in England and Wales. The most common reason for non-response was parents refusing to provide consent for their children to participate – with 25 per cent of eligible 5 year olds and 30 per cent of eligible 8 year olds lost that way. The category includes both positive refusals (e.g. telephoning or writing to refuse consent) and failure to confirm either way. In the majority of these cases, no contact was received from the parent.

Relatively small percentages of children were lost due to refusal or absenteeism on the examining day. In the 2003 survey, 87 per cent of 5 year olds and 89 per cent of 8 year olds were examined. The percentage of children lost to the 2013 survey through refusals, absenteeism and other reasons on the examining day was lower than the 2003 survey, but the change in the consent procedure towards positive written parental consent has driven the overall substantial reduction in response (17 percentage points for 5 year olds and 24 percentage points for 8 year olds).

Once all reasons for pupil non-response are taken into account (including school non-response), 51 per cent of the eligible pupils of 5 year olds was examined and 47 per cent of 8 year olds.

The written parental opt in consent rate was 75 per cent for 5 year olds and 70 per cent for 8 year olds. This represented a substantial increase from the pilot parental consent rate of 60 per cent. This increase is likely to have been predominantly driven by two factors. Firstly, for the main survey, consent forms were distributed towards the start of the school year (compared to the summer term for the pilot), and it is likely that parents are more engaged with the school communications early in the year. Secondly, the strategy of distributing all consent materials (first pack and reminders) via the book bag system, which was adopted as the default for the main survey, is likely to have ensured that many parents received and read the letter. A number of other changes made after the pilot may also have contributed to the improvement, for example simplifying the wording of the consent form (whilst retaining the legal meaning) and introducing an unconditional incentive of a survey branded sticker and fridge magnet within the consent pack.

The response rates and parental consent rates for 5 year olds in England and Wales are similar to those achieved in the latest NHS surveys of 5 year olds in the NHS dental epidemiology programme in each country. These surveys also use positive written parental consent procedures). So, the 70 per cent response rate for 5 year olds in England on the CDH compares to a 67 per cent response rate achieved on the 2007/08 NHS survey and a 65 per cent response rate achieved on the 2011/12 NHS survey[17]. The parental consent rate of 75 per cent is also about five percentage points higher than on the 2011/12 survey in England. The response rate of 62 per cent of 5 year olds in Wales compares to a response rate of about 67 per cent in the 2011/12 survey of 5 year olds in Wales[18].

4.2.3 Dental examination response in 12 and 15 year olds

Tables 21 and 22 provide response rates to the dental examination for the 12 and 15 year old cohorts. Successfully substituted schools have been linked to the outcome of the school they substituted.

[17] See http://www.nwph.net/dentalhealth/survey-results5.aspx?id=1 for the report "National Dental Epidemiology Programme for England; oral health survey of five year old children 2012. A report on the prevalence and severity of dental decay", pg 15.

[18] See the data report for the 2011/12 survey at http://www.cardiff.ac.uk/dentl/research/themes/appliedclinicalresearch/epidemiology/oralhealth/index.html

As more secondary schools refused to take part than primary schools, the percentage of the total set sample in these age cohorts lost due to school non-response was larger than for the 5 and 8 year olds (nearly four in ten compared to just over a quarter). However, this was driven by response in secondary schools in England, where a half of the total set sample of pupils was lost due to school non-response.

Table 21 Dental examination response from 12 year olds, by country

	England			Northern Ireland			Wales			All Countries		
12 year olds	Number	Percentage A*	Percentage B	Number	Percentage A*	Percentage B	Number	Percentage A*	Percentage B	Number	Percentage A*	Percentage B
Total set sample	3,432	100		630	100		885	100		4,947	100	
Pupils lost (unproductive schools)	1,719	50		73	12		116	13		1,908	39	
Pupils actually sampled	1,713	50		557	88		769	87		3,039	61	
Ineligible	-	-		-	-		1	-		1	-	
Total eligible pupils	1,713	50	100	557	88	100	768	87	100	3,038	61	100
Total pupils examined	**1,434**	**42**	**84**	**484**	**77**	**87**	**614**	**69**	**80**	**2,532**	**51**	**83**
Total unproductive	279	8	16	73	12	13	154	17	20	506	10	17
Of which												
Reasons for non examination:												
Parent refused	80	2	5	19	3	3	21	2	3	120	2	4
Pupil refused	65	2	4	12	2	2	28	3	4	105	2	3
Absent	59	2	3	37	6	7	44	5	6	140	3	5
Other	75	2	4	5	1	1	61	7	8	141	3	5

**%A is based on the total set sample of pupils in productive and unproductive schools*
**%B is based on the total number of eligible pupils selected in participating schools*

Table 22 Dental examination response from 15 year olds, by country

	England			Northern Ireland			Wales			All Countries		
15 year olds	Number	Percentage A*	Percentage B**	Number	Percentage A*	Percentage B**	Number	Percentage A*	Percentage B**	Number	Percentage A*	Percentage B**
Total set sample	3,773	100		759	100		969	100		5,501	100	
Pupils lost (unproductive schools)	1,944	52		113	15		157	16		2,214	40	
Pupils actually sampled	1,829	48		646	85		812	84		3,287	60	
Ineligible	1	-		-	-		5	1		6	-	
Total eligible pupils	1,828	48	100	646	85	100	807	83	100	3,281	60	100
Total pupils examined	**1,313**	**35**	**72**	**551**	**73**	**85**	**554**	**57**	**69**	**2,418**	**44**	**74**
Total unproductive	515	14	28	95	13	15	253	26	31	863	16	26
Of which												
Reasons for non examination:												
Parent refused	74	2	4	14	2	2	39	4	5	127	2	4
Pupil refused	161	4	9	14	2	2	69	7	9	244	4	7
Absent	107	3	6	55	7	9	63	7	8	225	4	7
Other	173	5	9	12	2	2	82	8	10	267	5	8

**%A is based on the total set sample of pupils in productive and unproductive schools*
**%B is based on the total number of eligible pupils selected in participating schools*

In participating schools, 83 per cent of the eligible 12 year olds were examined and 74 per cent of 15 year olds were examined. Response was highest in Northern Ireland, and this was more marked for 15 year olds than for 12 year olds. There were a number of reasons for this, including lower rates of parental and pupil refusal, and fewer pupils not being examined for 'other' reasons in Northern Ireland. Interviewers reported that many schools in England and Wales were reluctant to remove GCSE year pupils from particular lessons to take part in the survey. It was also the case that some pupils in the older cohorts were receiving individual interventions of one sort or another, including assessments. These factors acted as a constraint on the response rate for 15 year olds.

It is clear that the use of positive consent with the older children on the examining day had a smaller impact on response than the written positive consent procedure for parents of 5 and 8 year olds. It is worth noting that despite parents of the 12 and 15 year olds not being required to submit positive written consent, they were still able to refuse participation in advance. Seven per cent of 12 year olds and 11 per cent of 15 year olds in participating schools were lost to parental or pupil refusal, compared to 26 per cent of 5 year olds and 30 per cent of 8 year olds. The percentage of children lost in the older cohorts to parental or pupil refusal was similar to the 2003 survey, when seven per cent of children were lost this way. The greater impact on response for the younger cohorts increases the risk of a non-response bias being introduced with respect to survey measures for those cohorts.

4.2.4 Pupil questionnaire response

Table 23 shows that the model of 12 and 15 year olds completing their questionnaire at the same appointment as the dental examination produced near total response in both age cohorts and across countries.

Table 23 Pupil questionnaire response from 12 and 15 year olds, by country

	England		Northern Ireland		Wales		All	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
12 year olds								
Total pupils receiving forms	1,434	100	484	100	614	100	2,532	100
Responded	1,430	99.7	484	100	612	99.7	2,526	99.8
Refused	4	0.3	0	0	2	0.3	6	0.2
15 year olds								
Total pupils receiving forms	1,313	100	551	100	554	100	2,418	100
Responded	1,307	99.5	550	99.8	549	99.1	2,406	99.5
Refused	6	0.5	1	0.2	5	0.9	12	0.5
All								
Total pupils receiving forms	2,747	100	1,035	100	1,168	100	4,950	100
Responded	2,737	99.6	1,034	99.9	1,161	99.4	4,932	99.6
Refused	10	0.4	1	0.1	7	0.6	18	0.4

4.2.5 Parent questionnaire response

Table 24 describes response to the parent questionnaire. This questionnaire was distributed for all cases where a child was examined (in the 2003 survey, the questionnaire was only distributed in 50 per cent of examined cases).

9,866 cases were sampled and 4,214 productive questionnaires were returned, a response rate of 43 per cent. This compared to an overall response rate of 61 per cent in the 2003 survey. However, the response rate of 52 per cent in Northern Ireland was actually higher than in 2003, when 45 per cent of sampled parents responded.

Response was higher from parents of primary school age cohorts than secondary school age cohorts. This was thought to be partially because primary school aged parents are more engaged with the school than secondary school parents, and partly because the primary school parents had already provided written parental consent for the dental examination (and so the remaining parents were probably more likely to respond to the questionnaire).

Response was also higher from parents in Northern Ireland compared to England and Wales in each age cohort.

Response to the web option was very low compared to the paper questionnaire option. Overall 98 per cent of those that responded did so via a returned paper questionnaire. This may be partly due to offering the web survey concurrently with the paper questionnaire. Sequential mixed mode designs, (in this case offering the web survey first and a paper questionnaire later to non-responders) are thought to lead to higher web survey response[19]. It may also be related to parents being more used to completing and returning paper forms from schools.

[19] Millar, Morgan M., and Don A. Dillman 2011. "Improving Response to Web and Mixed-Mode Surveys". *Public Opinion Quarterly* 75:249–269.

Table 24 Parent questionnaire response, by age and country

	England		Northern Ireland		Wales		All	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
5 year olds								
Sampled	1,526	100	530	100	493	100	2,549	100
Productive, of which:	689	45	321	61	242	49	1,252	49
On paper	673	98	316	98	241	100	1,230	98
On web	16	2	5	2	1	0	22	2
Unproductive	837	55	209	39	251	51	1,297	51
8 year olds								
Sampled	1,369	100	508	100	490	100	2,367	100
Productive, of which:	623	46	303	60	245	50	1,171	49
On paper	612	98	300	99	243	99	1,155	99
On web	11	2	3	1	2	1	16	1
Unproductive	746	54	205	40	245	50	1,196	51
12 year olds								
Sampled	1,434	100	484	100	614	100	2,532	100
Productive, of which:	510	36	223	46	242	39	975	39
On paper	497	97	218	98	233	96	948	97
On web	13	3	5	2	9	4	27	3
Unproductive	924	64	261	54	372	61	1,557	61
15 year olds								
Sampled	1,313	100	551	100	554	100	2,418	100
Productive, of which:	408	31	235	43	173	31	816	34
On paper	400	98	231	98	172	99	803	98
On web	8	2	4	2	1	1	13	2
Unproductive	905	69	316	57	381	69	1,602	66
All								
Sampled	5,642	100	2,073	100	2,151	100	9,866	100
Productive, of which:	2,230	40	1,082	52	902	42	4,214	43
On paper	2,182	98	1,065	98	889	99	4,136	98
On web	48	2	17	2	13	1	78	2
Unproductive	3,412	60	991	48	1,249	58	5,652	57

5 Data processing

5.1 Data capture, editing and validation

Data capture, editing and validation were carried out by NatCen's Data and Research departments. Different procedures were followed for the questionnaire and examination data.

5.1.2 Examination data

The examination forms were keyed manually by a specialist agency. Each form was keyed twice and any anomalies checked. Keyers were instructed to enter only valid codes; missing or invalid codes were keyed as missing. An SPSS data set was created from the raw data.

A small number of examinations were not completed, either because the pupil requested that the examination be terminated or because of time pressures. Examinations were included in the final data set if the tooth condition section was completed.

The research team checked the SPSS data using frequencies and cross-tabulations to identify problems. Any missing or inconsistent data (e.g. a tooth coded missing in one place and present in another) was investigated by referring to the original forms. Where possible, missing data were imputed following rules consistent with the examination protocols (for example, coding missing teeth as permanent). Any queries were resolved by the clinical academics within the consortium. Missing data were coded as 'not applicable' or 'not coded', as appropriate.

In addition, a random sample of forms was selected and checked against the data as captured. No problems were found.

5.1.3 Questionnaire data

Paper questionnaires (parent and pupil)

The paper questionnaire data (parent and pupil) were captured by scanning. The questionnaire data were edited by trained coders using a bespoke editing programme based on Quantum. Routing was checked and answers to open-ended questions back-coded as appropriate. Other anomalies (for example, multiple answers to a single-response question) were edited following a protocol agreed in advance by the consortium. Queries were referred to the Research team.

Checks were carried out on the coders' work by NatCen's Data team; 100% at first, until it was clear that the coder thoroughly understood and applied the protocols; via spot checks thereafter.

Web questionnaire (parent)

Many of the checks carried out in the edit of paper questionnaires were programmed into the Web data collection instrument. Additional checks and edits were carried out by the research team within the SPSS data set following the same protocols as used by the coders of the paper questionnaire.

Occupational coding

Parents' occupational data from both types of questionnaire was coded using CASCOT specialist software to produce the National Statistics Socio-economic Classification (NS-SEC) using the reduced method http://www.ons.gov.uk/ons/guide-method/classifications/current-standard-classifications/soc2010/soc2010-volume-3-ns-sec--rebased-on-soc2010--user-manual/index.html}. This was based on the SOC 2010

occupational classification { http://www.ons.gov.uk/ons/guide-method/classifications/current-standard-classifications/soc2010/index.html}.

5.2 Derived variables

Derived variables were created, following specifications agreed by the consortium. Where possible, these were created to be consistent with the 2003 survey data. Within the clinical data there was one significant difference from the 2003 protocols; the inclusion of enamel caries in the coding of tooth condition. Alternate variables were therefore created: counting enamel caries as sound (following the 2003 criteria) or counting it as a distinct category.

Derived variables were created by the NatCen researchers using SPSS syntax. This was checked using frequencies and cross-tabulations. Further checks were independently carried out by ONS researchers. All derived variables and the associated syntax will be archived with the final survey data sets.

5.3 Item non-response

5.3.1 Examination data

The examination data were captured by the teams of dental examiner and nurse. Because the data were recorded on paper, items could be recorded using invalid codes or missed altogether. Most of these errors were identified and corrected during the data cleaning process (see above). Once this was complete there were varying levels of missing data across the examination, generally below 1% of eligible cases. Item non-response was highest in the record of trauma to permanent teeth, which ranged from 1.0% to 2.1% of cases.

5.3.2 Questionnaire data

Item non-response was generally low in both the pupil and parent questionnaire, and it seems probable that this was linked more to questionnaire format than to problems with individual questions.

The pupil questionnaire did not involve routing: pupils were asked to answer every question. For straightforward question formats, item non-response was below 2%. Questions using a yes/no grid format (pupil questions 3, 17, 18, 19, 22 and 23) had the highest item non-response, up to 12% for questions where pupils had to answer yes or no for each item on a list (pupil questions 3, 22 and 23). As the majority of this non-response represented failure to tick the 'no' codes relevant to the individual, it was assumed that this was the case in the production of the derived variables associated with these questions.

In addition to different question formats, the parent questionnaire had several sections that parents were asked to complete, depending on their answers to earlier questions. Within the web questionnaire, parents were routed automatically, but those completing the paper questionnaire had to notice and understand the instructions. In general the routing did not seem to cause problems and item non-response was below 2%. The format that was most problematic for pupils was similarly problematic for parents. In question 3, which asked about dental products used to clean the child's teeth, it varied between 4% and 44%. Response improved to later questions using this format: questions 9 had non-response of less than 20% per item and question 26 less than 10% per item.

NS-SEC coding was possible for 93% of responding parents. Usable home postcode data was available for 95% of cases.

5.3.3 Area classifications

For around 95% of cases, a number of area classifications were added to the CDH data using the postcode of the home address of the child. For the remaining cases, the area classifications were imputed using the school postcode. In the CDH analysis, only the classifications linked using the home postcode were used, as it was unclear how robust the imputation was, particularly for secondary schools where pupils could live in a wider range of area types than in the smaller catchments of primary schools. The classifications were linked at the lowest level of available geography, usually the Lower Level Super Output Area (LSOA).

The ONS 2011 Output Area Classification was added to the CDH dataset[20]. The OAC groups together similar geographic areas according to key characteristics common to the population in that grouping. These groupings are called clusters and are derived using census data. The area classifications are hierarchical classifications, consisting of three tiers: supergroups, groups and subgroups. The OAC supergroups were used in the survey non-response models as outlined in section 6.

The Index of Multiple Deprivation (IMD) relevant to each country was also linked at Lower Super Output Area (LSOA) level. Each index scores and then ranks areas based on a number of indicators of distinct dimensions of deprivation. People may be counted as being deprived in one or more of the domains, depending on the number of types of deprivation that they experience[21]. The country indices are not comparable as they use a different set of indicators, and assign different weights to those indicators, in order to produce the overall score. The latest index for each country was used at the time of linking, which was the 2010 Index for England[22], the 2011 index for Wales[23] and the 2010 Northern Ireland Multiple Deprivation Measure[24].

The urban/rural classification for England and Wales[25] and the Northern Ireland Urban-Rural classification[26] were also added.

Finally, the HMRC Children in Low Income Families measure was linked[27]. This measure gives LSOA figures for the proportion of children aged under 16 living in families in receipt of out-of-work (means-tested) benefits or in receipt of tax credits where their reported income is less than 60 per cent of UK median income. It is a proxy for child poverty and for relative (income based) deprivation across areas that are comparable across England, Wales and Northern Ireland.

[20] http://www.ons.gov.uk/ons/guide-method/geography/products/area-classifications/national-statistics-area-classifications/national-statistics-2011-area-classifications/index.html
[21] http://census.ukdataservice.ac.uk/get-data/related/deprivation.aspx
[22] https://www.gov.uk/government/statistics/english-indices-of-deprivation-2010
[23] http://wales.gov.uk/statistics-and-research/welsh-index-multiple-deprivation/?lang=en#/statistics-and-research/welsh-index-multiple-deprivation/?tab=previous&lang=en
[24] http://www.nisra.gov.uk/deprivation/nimdm_2010.htm
[25] http://www.ons.gov.uk/ons/guide-method/geography/products/area-classifications/2011-rural-urban/index.html
[26] http://www.nisra.gov.uk/geography/UrbanRural.htm
[27] https://www.gov.uk/government/statistics/personal-tax-credits-children-in-low-income-families-local-measure

6 Weighting

Wales and Northern Ireland were oversampled relative to England within the United Kingdom. Response within each age group also differed between the countries. In order that the sample estimates should be representative of England, Wales and Northern Ireland the data were therefore weighted back to population proportions within age groups for each country.

The final dental examination weight was produced in three stages: a) design weighting b) Non-response adjustment and c) calibration to population totals.

6.1 Design weights

'Design' weights to adjust for unequal selection probabilities can be computed as the reciprocals of the probabilities of selection for the sample. In the equations below, the acronym 'GOR' is used as shorthand for the English regions, Wales and Northern Ireland.

6.1.1 Probability of selection in England and Wales

For England and Wales the sampling probabilities are:

$$\mathrm{P}(\text{select any school}) = \mathrm{P}(\mathrm{GOR})\mathrm{P}(\mathrm{LA}|\mathrm{GOR})\mathrm{P}(\mathrm{SG}|\mathrm{LA})\mathrm{P}(\mathrm{Sch}|\mathrm{SG}) \quad (12)$$

$$\mathrm{P}(\text{select any pupil in age group}) = \mathrm{P}(\mathrm{GOR})\mathrm{P}(\mathrm{LA}|\mathrm{GOR})\mathrm{P}(\mathrm{SG}|\mathrm{LA})\mathrm{P}(\mathrm{Sch}|\mathrm{SG})\mathrm{P}(\mathrm{Pup}|\mathrm{Sch}) \quad (13)$$

Where,
P(GOR)= Probability that GOR is sampled=1 (as GOR are explicit strata)
P(LAD|GOR)= Probability that the LA is sampled from GOR
P(SG|LA)=probability that the school group is sampled from the LA
P(Sch|SG)=probability that the school is sampled from the school group
P(Pup|Sch)=probability that a pupil in an age group is sampled from a school

The oversampling factors at the LA selection stage for secondary and primary were combined in such a manner to meet the deprivation targets within each LA (detailed in section 3.5.2). The probability of a Local Authority being selected is:

$$\mathrm{P}(\mathrm{LA}) = \frac{\mathrm{MOS}_{\mathrm{LA}}}{\mathrm{MOS}_{\mathrm{GOR}}} \times \mathrm{n\_la} \quad (14)$$

Where,
$\mathrm{MOS}_{\mathrm{LA}}$ = measure of size of LA (see equation 7)
$\mathrm{MOS}_{\mathrm{GOR}}$ = measure of size of GOR (sum of the $\mathrm{MOS}_{\mathrm{LA}}$ of every LA in the GOR)
n_la = number of LAs sampled from GOR

Once the LAs/UAs are selected the primary and secondary school groups are selected independently. For a primary school group the probability of selection is as follows:

$$\mathrm{P}(\mathrm{SG_P}|\mathrm{LA}) = \frac{\mathrm{MOS}_{\mathrm{SGP}}}{\mathrm{MOS}_{\mathrm{LA(SGP)}}} \times \mathrm{n\_sgp} \quad (15)$$

$$P(Sch_P|SG_P) = \frac{n\_schp}{N_{SGP(School)}} \quad (16)$$

$$P(Pup_P|Sch_P) = \frac{n\_pup_{Pset(age)}}{N_{SCPACT(age)}} \quad (17)$$

MOS_{SGP} = measure of size of the primary School Group (see equation 10)
$MOS_{LA(SGP)}$= sum of the MOS_{SGP} of every primary school group in the selected LA
n_sgp = number of primary school groups sampled from LA = 1
n_schp = number of primary schools sampled from primary school group
$N_{SGP(School)}$ = number of schools in primary school group
$n\_pup_{Pset(age)}$= number of pupils sampled in each age group in primary school
$N_{SCPACT(age)}$= actual number of pupils found in each age group in primary school

The overall probability of selection for primary schools is:

$$P(\text{select any primary school}) = \left(\frac{MOS_{LA}}{MOS_{GOR}} * n\_la\right) \times \left(\frac{MOS_{SGP}}{MOS_{LA(SGP)}} * n\_sgp\right) \times \left(\frac{n\_schp}{N_{SGP(School)}}\right) \quad (18)$$

The overall probability of selection for pupils in primary schools (aged 5 and 8) is:

$$P(\text{select any pupil in age group}) = \left(P(\text{select any primary school})\right) \times \left(\frac{n\_pup_{Pset(age)}}{N_{SCPACT(age)}}\right) \quad (19)$$

For a secondary school group the probability of selection is as follows:

$$P(SG_S|LA) = \frac{MOS_{SGS}}{MOS_{LA(SGS)}} \times n\_sgs \quad (20)$$

$$P(Sch_S|SG_S) = \frac{n\_schs}{N_{SGS(School)}} \quad (21)$$

$$P(Pup_S|Sch_S) = \frac{n\_pup_{Sset(age)}}{N_{SCSACT(age)}} \quad (22)$$

Where,
MOS_{SGS} = measure of size of the secondary School Group (see equation 11)
$MOS_{LA(SGS)}$= sum of the MOS_{SGS} of every secondary school group in the selected LA
n_sgs = number of secondary school groups sampled from LA = 1
n_schs = number of secondary schools sampled from secondary school group
$N_{SGS(School)}$ = number of schools in secondary school group
$n\_pup_{Sset(age)}$= number of pupils sampled in each age group in secondary school
$N_{SCSACT(age)}$= actual number of pupils found in each age group in secondary school

The overall probability of secondary schools is:

$$\text{P(select any secondary school)}=\left(\frac{\text{MOS}_{\text{LA}}}{\text{MOS}_{\text{GOR}}}*\text{n\_la}\right)\times\left(\frac{\text{MOS}_{\text{SGS}}}{\text{MOS}_{LA(SGS)}}*\text{n\_sgs}\right)\times\left(\frac{n\_schs}{N_{SGS(School)}}\right) \quad (23)$$

The overall probability of selection for pupils in secondary schools (aged 12 and 15) is:

$$\text{P(select any pupil in age group)}=\left(\text{P(select any secondary school)}\right)\times\left(\frac{n\_pup_{Sset(age)}}{N_{SCSACT(age)}}\right) \quad (24)$$

6.1.2 Probability of selection in Northern Ireland

In Northern Ireland a simple random sample of schools was taken, with no geographical grouping. This means that in Northern Ireland the sampling probabilities were:

$$\text{P(select any school)} = \text{P(Sch)} \quad (25)$$

$$\text{P(select any pupil in age group)} = \text{P(Sch)P(Pup|Sch)} \quad (26)$$

Where,

P(Sch)=probability that the school is sampled.
P(Pup|Sch)=probability that a pupil in an age group is sampled from a school

Primary and secondary schools were used as explicit strata.

For primary schools the probability of selection is as follows:

$$\text{P}(\text{Sch}_{\text{P}}) = \frac{\text{MOS}_{\text{SchP}}}{\text{MOS}_{\text{Pcountry}}} * \text{n\_schp} \quad (27)$$

$$\text{P}(\text{Pup}_{\text{P}}|\text{Sch}_{\text{P}}) = \frac{\text{n\_pup}_{\text{Pset(age)}}}{\text{N}_{\text{SCPACT(age)}}} \quad (28)$$

Where,
MOS_{SchP} = measure of size of primary school

$$\begin{cases} 0.691, \text{'deprived' primary school (equation (1))} \\ 1, \text{non} - \text{'deprived' primary schools} \end{cases}$$

$\text{MOS}_{\text{Pcountry}}$ = measure of size of country (sum of the MOS_{SchP} of all the primary schools in the country)
n_schp = number of primary schools sampled=94
$\text{n\_pup}_{\text{Pset(age)}}$= number of pupils sampled in each age group (aged 5 and 8) in primary school
$\text{N}_{\text{SCPACT(age)}}$= actual number of pupils found in each age group (aged 5 and 8) in primary schools

The overall probability of selection for primary schools is:

$$\text{P(select any primary school)} = \left(\frac{\text{MOS}_{\text{SchP}}}{\text{MOS}_{\text{Pcountry}}} * \text{n\_schp}\right) \quad (29)$$

The overall probability of selection for pupils in primary schools (aged 5 and 8) is:

$$\mathrm{P(select\ any\ pupil\ in\ age\ group)} = \left(\mathrm{P(select\ any\ primary\ school)}\right) \times \left(\frac{\mathrm{n\_pup_{Pset(age)}}}{\mathrm{N_{SCPACT(age)}}}\right) \quad (30)$$

For secondary schools the probability of selection is as follows:

$$\mathrm{P(Sch_S)} = \frac{\mathrm{MOS_{SchS}}}{\mathrm{MOS_{Scountry}}} * \mathrm{n\_schs} \quad (31)$$

$$\mathrm{P(Pup_S|Sch_S)} = \frac{\mathrm{n\_pup_{Sset(age)}}}{\mathrm{N_{SCSACT(age)}}} \quad (32)$$

Where,
$\mathrm{MOS_{SchS}}$ = measure of size of secondary school

$$\begin{cases} 1.909, 'deprived' \text{ secondary school (equation (2))} \\ 1, \text{non} - 'deprived' \text{ primary schools} \end{cases}$$

$\mathrm{MOS_{Scountry}}$ = measure of size of country (sum of the MOS of all the secondary schools in the country)
n_schs = number of secondary schools sampled=34
$\mathrm{n\_pup_{Sset(age)}}$= number of pupils sampled in each age group (aged 12 and 15) in secondary school
$\mathrm{N_{SCSACT(age)}}$= actual number of pupils found in each age group (aged 12 and 15) in secondary school

The overall probability of selection for secondary schools is:

$$\mathrm{P(select\ any\ secondary\ school)} = \left(\frac{\mathrm{MOS_{SchS}}}{\mathrm{MOS_{Scountry}}} * \mathrm{n\_schs}\right) \quad (33)$$

The overall probability of selection for pupils in secondary schools (aged 12 and 15) is:

$$\mathrm{P(select\ any\ pupil\ in\ age\ group)} = \left(\mathrm{P(select\ any\ secondary\ school)}\right) \times \left(\frac{\mathrm{n\_pup_{Sset(age)}}}{\mathrm{N_{SCSACT(age)}}}\right) \quad (34)$$

6.1.2 Calculation of the design weight

The school design weight is calculated as

$$\mathrm{Design\ weight} = \frac{1}{\mathrm{P(select\ any\ school)}} \quad (35)$$

The calculations of $\mathrm{P(select\ any\ school)}$ for primary and secondary schools in England and Wales are shown in equation 18 and 23 respectively and equations 29 and 33 for Northern Ireland.

The design weights defined above account for differential probabilities of selection, but not for differential probabilities of response. In an attempt to reduce non-response bias, therefore

the design weights were amended using estimated response propensities. Sections 6.2-6.3 detail the process of estimating these propensities.

6.2 School non-response model

The probability of school-level response was modelled using multivariate logistic regression, weighted using the school-level design weight. The variables included in the school non-response model are:

- Region Income Deprivation Affecting Children Index (IDACI) Score
- Sizeband (6 bands based on the number of pupils in the school)
- The indicator of whether greater than 30% of pupils within a school are eligible for free school meals.
- The type of school (Independent, Primary (LA controlled), Secondary (LA controlled), Academy or Free School (England))

The information above was available on the sampling frame for every school selected. Therefore all schools were included in the logistic regression model.

This model is used to give the school-level probability of response. The reciprocal of this is the school non-response weight, and the initial school design weight is multiplied by this school non-response weight to produce the adjusted school design weight (shown in equations 36 and 37) below.

$$\text{School non} - \text{response weight} = \frac{1}{\text{response propensity}} \quad (36)$$

$$\text{School adjusted weight} = \text{school design weight} * \text{School non} - \text{response weight} \quad (37)$$

Results from the model are given below in Table 25. Parameters positively associated with response are shaded in light blue; parameters negatively associated indicated with a -ve sign.

Table 25 School non-response model, dependent variable response=1

Independent Variable	Parameter Estimate	P value
North East	-0.2889	0.0042
North West	0.4959	<.0001
Yorkshire and The Humber	-0.4667	<.0001
East Midlands	-0.7085	<.0001
West Midlands	-0.4445	<.0001
East of England	-0.5864	<.0001
London	-0.7799	<.0001
South East	-0.8716	<.0001
South West	-0.2373	0.0039
Northern Ireland	-0.0676	0.4957
Wales	Reference group	
IDACI_SCORE	-0.1869	0.1338
School size <100	0.7371	<.0001
School size 100-199	1.2083	<.0001
School size 200-299	0.7529	<.0001
School size 300-499	0.5584	<.0001
School size 500-999	0.307	<.0001
School size 1000+	Reference group	
Free school meals >30%	-0.0972	0.0593
Free school meals <=30%	Reference group	
Independent	-0.9958	<.0001
Primary	0.597	<.0001
Secondary	0.3879	<.0001
Academy or Free School (England)	Reference group	

Key points are that response varied substantially by region; higher free-school meals and IDACI score were associated with non-response, and larger and independent schools were less likely to respond.

6.3 Pupil non-response model to the dental examination

Similarly to the school non-response weights, the probability of pupil response was modelled using multivariate logistic regression, weighted using the pupil-level design weight adjusted for the school-level response propensities described in 4.2.

$$\text{Pupil} - \text{level design weight} = \text{school adjusted design weight} * \text{P(pupil selected from school)} \quad (38)$$

The variables included in the pupil non-response model are:

- Age of pupil
- Gender of pupil
- Ethnicity of pupil (White, Mixed, Asian, Black or Other)
- 2011 ONS Output Area Classification supergroups

'Output area classification' has been obtained via matching the postcode of the parent's address to the area classification, and therefore gives an indication of the socio-economic status of the child's family.
Ethnicity was missing on the sampling frame for 8% of responding pupils, meaning imputation of this variable was required for the purposes of the non-response model. The mode (i.e. the most frequent) ethnic group was calculated at the school level and were imputed for pupils with missing data where the mode (at the school level) was not missing. If the mode was missing at the school level then the mode of the Local Authority was imputed for the pupils with missing data. Similarly if the mode at the Local Authority geography was missing the mode of the Region was imputed for the pupils with missing data.

This model is used to give the pupil-level probability of response. The reciprocal of this is the pupil non-response weight.

$$\text{Pupil} - \text{level non} - \text{response weight} = \frac{1}{\text{response propensity}} \quad (39)$$

$$\text{Pupil} - \text{level adjusted weight} = (\text{pupil} - \text{level design weight}) * (\text{pupil} - \text{level non} - \text{response weight}) \quad (40)$$

Results from the model are given below; again, Parameters positively associated with response are shaded in light blue; parameters negatively associated indicated with a -ve sign.

Table 26 Pupil non-response model, dependent variable response=1

Parameter	Estimate	P value
Age 5	0.0925	<.0001
Age 8	-0.2588	<.0001
Age 12	0.8667	<.0001
Age 15	Reference group	
Male	0.0658	<.0001
Female	Reference group	
North East	0.5011	<.0001
North West	0.1765	<.0001
Yorkshire and The Humber	0.2977	<.0001
East Midlands	0.5361	<.0001
West Midlands	0.0859	<.0001
East of England	-0.1393	<.0001
London	0.2267	<.0001
South East	-0.0029	0.6931
South West	0.1866	<.0001
Northern Ireland	0.5251	<.0001
Wales	Reference group	
White	-0.5499	<.0001
Mixed	-0.4221	<.0001
Asian	0.0498	0.0019
Black	-0.1291	<.0001
Other	Reference group	
Rural Residents	0.6681	<.0001
Cosmopolitans	0.5052	<.0001
Ethnicity Central	-0.0326	0.002
Multicultural Metropolitans	-0.0338	<.0001
Urbanities	0.3212	<.0001
Suburbanites	0.5485	<.0001
Constrained City Dwellers	0.0968	<.0001
Hard-Pressed Living	Reference group	

Similarly to the school non-response model, response varied substantially by region. Output area classification appeared to be a strong predictor of response, with families in less prosperous areas in general being less likely to respond. Children aged 8 years, girls and white children were also less likely to respond, holding other parameters equal.

6.4 Calibration Weighting

The 2013/14 School Census for Wales was published on the 24th of July, which was after the required completion date for the examination weights and therefore it was not possible to use these data for the weighting. For consistency the 2012/13 School Census was used across England Wales and Northern Ireland.

'Calibration' refers to the process of ensuring that final weights sum to a set of known population totals while still remaining as close as possible to the design weights (in our case, the design weights after the adjustment for non-response described in 4.2 and 4.3). The examination weight was calibrated at the Region level by age and gender, meaning that the final weights would sum to 2012/13 population totals from the school censuses for each age group and sex within each Region. Table 27 shows a comparison of the pupil design weights, pupil adjusted weights and populations totals by country and age group.

Table 27 Comparison of the sum of pupil design weight, sum of pupil adjusted weight and population totals, by country and age group

		Sum of pupil design weight	Sum of pupil adjusted weight	Population totals
England				
	Age 5	385,317	537,412	641,330
	Age 8	328,326	513,738	599,792
	Age 12	439,469	521,686	578,910
	Age 15	418,802	594,137	611,570
Wales				
	Age 5	19,386	28,540	34,375
	Age 8	17,590	28,992	32,440
	Age 12	27,855	34,140	32,841
	Age 15	22,175	33,470	36,173
Northern Ireland				
	Age 5	15,673	19,655	23,732
	Age 8	14,851	20,118	21,913
	Age 12	19,645	21,975	22,072
	Age 15	18,353	23,621	24,338

6.5 Pupil questionnaire weight

The pupil questionnaire was administered only to the 12 and 15 age cohorts who had agreed to participate in the examination. The questionnaire was given to the pupils whilst they waited for the dental exam and so the response rate was 99.6%. Therefore the calibrated dental examination weight of the pupil who responded to the questionnaire will be scaled to the population totals from the school censuses to produce the pupil questionnaire weight.

6.6 Parent questionnaire weight

The response rate for the parent questionnaire was 42.7%. Non-response adjustment is required to reduce non-response bias by giving a greater weight to those with characteristics which are known to have low response rates.

The probability of parent-questionnaire-level response was modelled using logistic regression, weighted using the examination weight of the pupil. The variables included in the school non-response model are:

- Region
- Age of pupil
- Gender of pupil
- Ethnicity of pupil (White, Mixed, Asian, Black or Other)
- Output area classification
- The type of school (Independent, Primary, Secondary, Academy or Free School (England))
- Number of decayed teeth (banded 0, 1-3, 4-6, 7-10, 10+)
- Calculus

Similarly to the pupil non-response model, ethnicity, gender and calculus were not available on the sampling frame for every pupil selected. The mode ethnic group or gender were calculated at the school level and were imputed for pupils with missing data where the mode (at the school level) was not missing. If the mode was missing at the school level then the mode of the Local Authority was imputed for the pupils with missing data. Similarly if the mode at the Local Authority geography was missing the mode of the Region was imputed for the pupils with missing data.

This model is used to give the parent-questionnaire-level probability of response. The reciprocal of this is the parent-questionnaire non-response weight adjustment. The parent-questionnaire weight is then calculated as:

$$\text{Parent} - \text{questionnaire non} - \text{response weight} = \frac{1}{\text{response propensity}} \quad (41)$$

$$\text{Parent weight} = (\text{examination weight}) * (\text{Parent} - \text{questionnaire non} - \text{response weight}) \quad (42)$$

Results from the model are given below in Table 28. Parameters positively associated with response are shaded in light blue; parameters negatively associated indicated with a -ve sign.

Table 28 Parent questionnaire non-response model, dependent variable response=1

Parameter	Estimate	P value
Age 5	0.6738	<.0001
Age 8	0.8326	<.0001
Age 12	0.2163	<.0001
Age 15	Reference group	
Male	0.0385	<.0001
Female	Reference group	
North East	-0.2836	<.0001
North West	-0.3442	<.0001
Yorkshire and The Humber	0.1529	<.0001
East Midlands	-0.1269	<.0001
West Midlands	-0.3373	<.0001
East of England	0.0037	0.6125
London	0.2446	<.0001
South East	0.2341	<.0001
South West	0.1377	<.0001
Northern Ireland	0.2398	<.0001
Wales	Reference group	
White	0.485	<.0001
Mixed	0.4304	<.0001
Asian	0.377	<.0001
Black	0.2878	<.0001
Other	Reference group	
Rural Residents	0.6998	<.0001
Cosmopolitans	0.0991	<.0001
Ethnicity Central	-0.4524	<.0001
Multicultural Metropolitans	-0.088	<.0001
Urbanities	0.3962	<.0001
Suburbanites	0.905	<.0001
Constrained City Dwellers	-0.1931	<.0001
Hard-Pressed Living	Reference group	
School size <100	0.8048	<.0001
School size 100-199	0.0398	<.0001
School size 200-299	-0.0383	<.0001
School size 300-499	Reference group	
Decayed teeth band 0	1.7735	<.0001
Decayed teeth band 1-3	1.3063	<.0001
Decayed teeth band 4-6	1.2673	<.0001
Decayed teeth band 7-10	1.1838	<.0001
Decayed teeth band 10+	Reference group	
Calculus present	-0.0482	<.0001
No calculus present	Reference group	

Similarly to the school and pupil non-response model, response varies substantially by region. Like the pupil non-response model, output area classification appears to be a strong predictor of response, with families in less prosperous areas in general being less likely to respond. Parents of children with calculus present are also less likely to respond.

7 Analysis and reporting

This section provides information on the approach to analysis and reporting for the main reports, including the approach to estimating sampling error and testing for statistical significance.

Like all estimates about a population based on a sample from that population, the results of the 2013 Children's Dental Health Survey are subject to error. The total error associated with any survey estimate is the difference between the estimate derived from the data collected and the true value for the population. The total error can be divided into two main types: random error and systematic error.

Random error, or 'sampling error', occurs because survey estimates are based not on the whole population but only on a sample of it. There may be chance variations between such a sample and the whole population. If a large number of repeats of the same survey were carried out, this error would average to zero. The size of the sample and the sample design influence the magnitude of these variations due to sampling.

Systematic error is often referred to as bias. Bias can arise because the sampling frame is incomplete, because of variation in the way the dental examination was carried out, or because non-respondents to the survey have different characteristics to respondents. When designing this survey considerable effort was made to minimise systematic error; this included training dental examiners and nurses to reduce variability between them. Nonetheless, some systematic error is likely to have remained, particularly from potential non-response bias and measurement error, and the data were weighted to reduce any potential non-response bias (as outlined in section 6).

A further discussion of bias in the survey data and limitations on trend analysis can be found in section 7.2.

7.1 Sampling error

The design of the Child Dental Health survey involved a number of features which will impact on the sampling error of estimates. Details of the survey design are given in sections 2.2-2.5, but the essential features were that in England and Wales, local authorities were sampled within each government office region, school groups were sampled within selected local authorities, and schools were sampled within selected school groups.

This meant that in England and Wales, the sample was stratified with Government Office Region as the 'major' strata, as separate samples were taken within each Government Office Region. Since local authorities were selected systematically and with probability proportional to size, an additional 'layer' of stratification was also implicit in the design, reflecting the fact that systematic probability proportional to size sampling ensures a reasonable 'spread' across the sample frame. The sample was also clustered with local authority as the Primary Sampling Unit, since local authorities were the first level of 'clusters' selected. In Northern

Ireland, schools were sampled directly without the selection of local authorities or school groups first, meaning that schools were the Primary Sampling Units.

In general, the use of stratified designs will reduce the sampling error of estimates compared to a simple random sample, and the use of cluster designs (where a sample of primary sampling units is taken first, and additional sampling takes place within primary sampling units) will increase the sampling error of estimates. In the case of the Child Dental Health survey, the impact of clustering will outweigh the impact of stratification, meaning that the sample will be less accurate than a simple random sample would have been. In addition, many of the stages of the sampling used non-equal probabilities of selection, mostly in order to facilitate the oversampling of deprived pupils. The weighting method used on the survey, detailed in section 6, will 'undo' this non-equal probability of selection via the use of design weights, but this will further increase the sampling error of most estimates. These design features were necessary since a simple random sample of pupils would have been prohibitively expensive and posed severe practical difficulties, and providing estimates for deprived pupils was a key aim of the survey.

The indicators of sampling error published for the Children's Dental Health Survey, including standard errors and confidence intervals, can be found in the Annex A of each main report. A brief discussion of these indicators follows below.

7.1.1 Standard errors

A statistical estimate of the sampling error, the standard error, can be produced from the sample, and provides a measure of the statistical precision of the survey estimate. This allows for a confidence interval to be calculated around the sample estimate which gives an indication of the range in which the true population value is likely to fall.

For results based on simple random samples, without clustering or stratification, the estimation of standard errors is straightforward. The standard error (se) of mean *($\bar{X}$)*, based on a simple random sample of size *n,* is calculated by the formula,

$$se\left(\bar{X}\right)_{srs} = \sqrt{s^2/n} \qquad \textit{(under sampling with replacement)}$$

where s^2 = sample variance, srs=simple random sample.

However, the sample design of the Children's Dental Health Survey was not a simple random sample and therefore a more complex design calculation is needed which takes account of the stratification and clustering in the sample design. Accounting for stratification in this calculation tends to reduce the standard error, while accounting for clustering tends to increase it. In a complex sample design, the size of the standard error depends on how the characteristic of interest is spread within and between the primary sampling units, and this is reflected in the way the data are grouped in order to calculate the standard error.

The CDH standard errors have been calculated accounting for the impact of clustering and stratification using standard variance estimation methods in the software package Stata. In England and Wales, the Local Authority was treated as Primary Sampling Unit and a 'strata' variable was created to account for both the 'major' strata and implicit stratification caused by

systematic probability proportional to size sampling. The calculations were made using the relevant examination, pupil questionnaire or parent questionnaire weight.

7.1.2 Confidence intervals

The standard error allows the calculation of confidence intervals around survey estimates that indicate the range of random variation.
The confidence interval generally used in survey research is the 95% confidence interval. For each estimate, this is calculated at 1.96 times the standard error on either side of the estimated percentage or mean since, under a normal distribution, 95% of values lie within 1.96 standard errors of the mean value. If it were possible to repeat the survey under the same conditions many times, 95% of these confidence intervals would contain the population values.

7.1.3 Design factors

The design factor, or deft, is the ratio of the standard error associated with an estimate to the standard error that would have resulted had the survey design been a simple random sample of the same size.

$$deft\left(\overline{X}\right) = se\left(\overline{X}\right) / se_{srs}\left(\overline{X}\right)$$

The size of the design factor varies between survey variables according to the degree to which a characteristic is clustered within PSUs, or is distributed between strata, and the impact of the weighting and non-equal probabilities of selection. For a single variable, the size of the factor also varies according to the size of the subgroup on which the estimate is based and on the distribution of the subgroup between PSUs and strata. Design factors below 1.0 show that the standard errors associated with the complex sample design are lower than those associated with the simple random sample, probably due to the benefits of stratification. Design factors greater than 1.0 show less reliable estimates than might be gained from a simple random sample, due to the effects of clustering and weighting.

7.1.4 Significance testing

Statistical significance testing indicates the probability with which we are confident that the difference between the estimates under examination did not occur by chance. Unless stated, all significance referred to in the CDH reports is at the 95% level. This means the probability that the difference happened by chance is low (1 in 20).

Logistic regression models were used to test for statistically significant differences in estimates representing groups in the population in 2013.

In report 2, variables comprising counts of the number of teeth in the mouth in particular conditions were analysed to see, for example, whether the mean number of teeth with obvious decay experience at a particular age varied by country. Simple negative binomial regression (non-zero inflated) models were used to test for significant differences between groups in relation to these variables. This is partially because these variables are not continuous, but also because the data are typically not normally distributed. The concentration of disease in a small proportion of the population and the relative good health

of a large proportion of children in 2013 means that the distributions of these count variables are skewed and are over-dispersed (the variance is considerably larger than the mean).

Where trends over time were reported, significance testing was completed by calculating the whether the variance of the difference in estimates from time Y (e.g. the 2003 survey) and time Z (e.g. the 2013 survey) was significantly different from zero[28].

7.2 Bias and analysis constraints

Systematic error, or bias, covers those sources of error which will not average to zero over repeats of the survey. Bias may occur, for example, if a certain section of the population is excluded from the sampling frame, because non-respondents to the survey have different characteristics to respondents, or if dental examiners systematically influence the data collected in one way or another. Substantial efforts were made to avoid systematic errors and ameliorate them through the weighting described in section 6. This section examines the evidence for remaining bias and how this has impacted on the analysis approach and statistics. It provides a steer for the users of the statistics on their relative strength and weaknesses.

7.2.1 Examiner error

It is worth noting that estimates of a disease or condition from dental epidemiology surveys will usually underestimate the true levels in the population. This is because the assessment is less accurate than in a clinical environment, and the examiners are trained to 'code low' if they are in doubt about the assessment.

The CDH dental examination data was collected by approximately 75 examining teams. With only a small number of examiners operating within Wales and Northern Ireland there is a particular risk of examiners in those countries affecting the results from the dental examination.

Whilst it is impossible to disentangle examiner effects from genuine variation in the areas covered by the examiners, the results of the examiner calibration exercise reported in section 4.1 provide an indication of the relative accuracy of different parts of the survey dental examination, and therefore where bias may be more likely to occur when collecting data in a school environment. The calibration outcomes for more serious diseases and conditions ranged from moderate to very good, with agreement on the more progressed forms of tooth decay being particularly strong. We would expect the risk of systematic examiner coding error to be low.

The calibration results indicated that early stage or precursor (risk) conditions, such as tooth surface loss in the enamel layer of the teeth or the presence of plaque, might be less reliably coded by examiners.

Further evidence of the relative accuracy of the data can be seen in the standard errors and DEFTs reported for dental examination data in Annex A of report 2. Usually these indicators only provide an indication of the sampling error associated with survey statistics. However, because the primary sampling units used to adjust the standard errors for the complex design corresponded with areas typically covered by a single dental examiner, larger DEFTs

[28] As the samples in each survey in the series are independent, only the variance of the estimates at the time points is relevant (there is no covariance).

could show a) genuine clustering of the disease or condition in the population at the level of the PSUs, b) an examiner effect influencing the variation in the data or c) both. It is not possible to disentangle these effects. However, the DEFTs reported, produced on cases from the same primary sampling units and strata, are variable and it is notable that the parts of the dental examination that did not calibrate also typically have larger DEFTs.

In the analysis, emphasis has been placed on the most reliable data. So, for example, the indicator of poor health used in chapter 4 is based on presence of severe or extensive decay.

7.2.2 Constraints on trend analysis

Comparisons over time, or trends, are more difficult for CDH relative to a continuous survey because of the ten-year gap in data collection. Although this does not make it impossible to compare over time, the lack of data between surveys means there is little information about how the trend has developed in the intervening period, and changes in the data over time become more difficult to explain because of the numerous factors that could have influenced the change.

Three other factors have influenced the scope of the trend analysis included in the reports.

1. Change in survey coverage

The 2013 covers England, Wales and Northern Ireland whereas the 1983, 1993 and 2003 surveys covered the United Kingdom, and trends were usually reported at the UK level. The 2003-2013 trends for England, Wales and Northern Ireland have been produced by creating the 2003 England, Wales and Northern Ireland estimates from the 2003 data.

2. Impact of the change in consent methodology
For the 2013 survey, the survey consent methodology was changed from negative (opt-out) parental consent for the dental examination to:

- For 5 and 8 year old examinations: positive (opt-in) parental consent was collected (with the children being allowed to opt-out on the examining day)
- For 12 and 15 year old examinations: positive (opt-in) consent was collected from the older children on the examining day (with parents being allowed to opt-out their children in advance)

When comparing the 2013 results with the previous surveys, substantial changes in methodology of this nature must be taken into account, as they can lead to systematic changes (bias) in the data collected. In this case, bias could be introduced if the changes in consent methodology changed the composition of the children taking part with respect to their oral health, for example if parents of younger children with tooth decay were less likely to opt their children into the survey. Information to fully adjust for this non-response bias in the weighting would not be available, as information about the oral health of non-participants is unknown.

Any assessment of the likelihood of bias is complicated for these results by the ten year gap between surveys as the survey is designed in the first place to pick up generational improvement or deterioration in children's oral health (which involve large changes between the 2003 and 2013 survey estimates).

In deciding what trends should be presented in this report, the following evidence was considered:

- The change in methodology led to an approximate 20% reduction in response from 5 and 8 year olds (in participating schools) compared to the 2003 survey; response from 12 and 15 year olds was broadly similar to the 2003 survey. The risk of non-response bias being introduced for the younger age groups could therefore be considered substantial
- Between 1993 and 2003, the percentage of 5 and 8 year olds estimated to be suffering from obvious decay experience (based on cavities into dentine) in primary teeth was broadly stable. The 2013 data showed large changes in prevalence equivalent to a reduction of 30-40% in the proportion of children affected by such decay compared to 2003
- Between 1993 and 2003, the percentage of 12 and 15 year olds suffering from obvious decay experience (cavities into dentine) reduced substantially - the 2013 data shows a further but smaller reduction in the percentage of children affected
- When the same methodological changes were made on the surveys within the NHS dental epidemiology programme for England and Wales similar changes in the data associated with primary teeth were observed. The extent of the change was not regarded as credible due to improvements in public health alone, and results were not compared over time. The same did not happen for 12 year olds, and the results for this age group were considered comparable
- The estimates for obvious decay experience in primary teeth from the 2013 CDHS are similar to those produced for 5 year olds in the latest NHS surveys of 5 year olds in England and Wales, which also used positive opt-in parental consent

Although it is possible that some of the reduction in obvious decay experience in 5 and 8 year olds between 2003 and 2013 represents real improvement in the population, the extent of the change and the different pattern observed between 1993 and 2003 mean that it is unlikely that all of it is. It is also not possible to differentiate genuine change from systematic bias. For this reason, trends in oral health in the primary dentition for 5 and 8 year olds are not presented in report 2. Trends for permanent teeth in 8, 12 and 15 year olds are presented, although typically the commentary focuses on 12 and 15 year olds. It should be kept in mind that the change in methodology could also have impacted on the data for 12 and 15 year olds, although this is regarded as less likely.

3. Reduction in the parent questionnaire response rate

In line with reductions in response to postal surveys, this response rate has reduced from 84% in 1993, to 61% in 2003 (on a subsample of 50% of dental examinations) to 43% in 2013. Substantial reductions in response of this nature increase the risk of bias associated with non-response. The proportions of 5 and 15 year olds classified as having poor oral health (using the indicator used in report 4) are shown below. The analysis is run unweighted, examination weighted (with and without parent questionnaire non-responders) and parent questionnaire weighted.

Table 29 Effect of the survey examination and parent questionnaire weights on the percentage of 5 and 15 year olds classified as having severe or extensive tooth decay

	% of 5 year olds with severe or extensive decay	% of 15 year olds with severe or extensive decay
Unweighted (all examination responders)	17.3	25.3
Examination Weight (all examination responders)	13.3	14.8
Examination Weight (parent responders only)	9.1	7.9
Parent Interview Weight (parent responders only)	13.3	9.6

- If we compare the percentages in the first row, we may be seeing an effect of the change in consent methodology with a lower proportion of 5 year olds in the sample classified as being in poor health compared to 15 year olds
- If we compare the first row with the second row, the examination weights reduce and equivalise the percentage of children with poor health. This will mostly be due to the 'undoing' of the deprivation oversampling in the design weighting
- Comparing the second row with the third row, there is a substantial effect whereby parents of children with poor health are less likely to respond to the parent questionnaire
- Comparing the second row with the final row - the parent questionnaire weight removes all of this effect for 5 year olds, and some of the effect for 15 year olds

This implies that there is probably an effect whereby parents of children with poor health are less likely to respond. The parent questionnaire weight appears to fix some of this effect, but doesn't do so precisely. This is a general feature of weighting - it is impossible to use a single weight to replicate the distributions of things which effect non-response.

Some trends based on parent questionnaire data have been included in report 1, including for 5 and 8 year olds, because of the relative stability of the estimates between 2003 and 2013, which is in marked contrast to the large changes in evidence in the examination data. Nevertheless, it is possible that bias exists in the parent questionnaire data in 2003 and 2013 and the trends presented should be interpreted with caution as a result. If a bias in the parent questionnaire data, it is likely that it is in the direction of overestimating desirable behaviours such as tooth brushing frequency and attendance at the dentist for a check-up.

7.3 Logistic regression modelling

Reports 3 and 4 contain the results of multivariate logistic regression models examining the factors associated with 15 year old children being in good and bad oral health (the latter indicated by the presence of severe or extensive tooth decay), after adjusting for other factors.

The models included a variety of explanatory (or independent) variables relating to individual characteristics (e.g., sex, country of residence, family deprivation) and behaviour (e.g. tooth brushing, consumption of sugary drinks).

Models were constructed initially including a range of potential explanatory variables. An iterative process was used to identify variables that were significantly associated with the outcome variable.

The explanatory variables are either categorical variables, which group cases into a number of discrete categories, or continuous variables, which present a continuous range of values.

Missing values for explanatory variables were included in the model. For categorical variables, they were coded as a single category, though not reported on. For continuous variables, they were set as the mean value of the range[29].

The results of the regression analyses are presented in tables showing odds ratios for the final models, together with the probability that each association is statistically significant. The explanatory variable is significantly associated with the outcome variable if $p<0.05$. (The p-values shown for each variable exclude missing values.)

The models show the relative odds of the outcome of interest (e.g. good oral health) for each category of the explanatory variable (e.g. being a boy or a girl). For categorical variables, odds are expressed relative to a reference category, which has a given value of 1. Odds ratios greater than 1 indicate higher odds (increased likelihood), and odds ratios less than 1 indicate lower odds (reduced likelihood). The 95% confidence intervals for the odds ratios are shown. Where the interval does not cover 1, this category is significantly different from the reference category. For continuous variables, there is a single p-value. Continuous variables do not have a reference category; the odds ratio represents the change in odds associated with each additional point in the range. Again, the 95% confidence interval is shown, and the odds ratio is significant if the interval does not cover 1.

[29] Excluding missing values for explanatory variables tends to cause significant sample attrition, since cases are lost if they have a missing value for any one of the relevant variables. This reduces precision of estimates and may introduce bias.

Annex A Glossary

Acid etch composite A method used to repair fracture to the mesial or distal surfaces of the tooth. Acid etch composite tips are applied to preserve the contact point with the adjacent tooth.

Advanced restoration/crown: A surface which has been permanently crowned or which has received permanent items of advanced restorative care in the form of a veneer or a restoration constituting a bridge abutment. This is irrespective of the materials employed (and should include stainless steel crowns) or of the reasons leading to the placement of the crown/veneer/bridge.

Anterior: Situated in the front of the mouth, a term commonly used to denote incisors and canine teeth.

BPE: Basic Periodontal Examination. Since the last survey, the modified Basic Periodontal Index (BPE)[30] has been recommended as the appropriate tool to assess periodontal health in children over the age of 12. The 2013 survey therefore used the modified BPE to record periodontal health, as it includes an assessment of periodontal pocketing which was not recorded in 2003.

Buccal surface: The surface of tooth adjacent to the cheek.

Calculus: A hard substance that forms both above and below that gum line. Calculus occurs when plaque is left on the teeth untreated. Calculus harbours bacteria, which produce toxins and can cause the gums to become inflamed (gingivitis).

Canines: The teeth located just to the left and right of the lateral incisors, four in total.

Caries: See dental caries.

CASCOT: A computer program designed to make the coding of text information to standard classifications simpler, quicker and more reliable.

CDH: Children's Dental Health Survey

Central incisors: The first four front teeth, two located on the top and two on the bottom of the mouth.

Cleft lip/palate: A cleft lip is a condition that creates an opening in the upper lip between the mouth and nose. It looks as though there is a split in the lip. It can range from a slight notch in the coloured portion of the lip to complete separation in one or both sides of the lip extending up and into the nose.

Cleft palate: A cleft palate occurs when the roof of the mouth has not joined completely. The result can range from just an opening at the back of the soft palate to a nearly complete separation of the roof of the mouth (soft and hard palate).

[30] See 'Guidelines for periodontal screening and management of children and adolescents under 18 years of age.' Clerehugh V, Kindelan S. British Society of Periodontology and The British Society of Paediatric Dentistry, 2012

Clinical decay experience: A term used in the survey reports to refer to evidence of tooth decay in the enamel, dentine or pulpal layers of the crown of the tooth. All teeth with cavitated or visual dentine caries, restorations with cavitated or visual dentine caries, teeth with filled decay (otherwise sound), teeth extracted due to caries and teeth with visual or cavitated enamel caries would be included. This is the survey equivalent of the assessment of decay typically undertaken in a clinical environment.

Craniofacial anomalies: Included under this heading are a rather large number of conditions that can affect the shape of a child's head and face.

Crossbite: A malocclusion where the upper teeth bite inside the lower teeth.

Crowding: A malocclusion caused by insufficient space for the teeth.

Crown: The crown is the part of the tooth which, on a natural sound tooth, is covered in dental enamel.

Decay into dentine (D3c): All teeth with cavities into dentine and teeth that had restorations with cavitated dentine caries. Excludes teeth with visual dentine caries or enamel caries present. Permanent teeth with cavities into dentine are assumed to be those that are currently in need of operative treatment. (In primary teeth the decision as to whether to fill, review or extract such teeth would be taken in the knowledge that they will exfoliate naturally at some point in the future.)

Decay into dentine (D3cv): All teeth with cavitated or visual dentine caries present and teeth that had restorations with visual and cavitated dentine caries. Excludes teeth with enamel caries present.

DEFT: The ratio of the standard error associated with an estimate to the standard error that would have resulted had the survey design been a simple random sample of the same size.

Demarcated opacity: A non-carious defect involving an alteration in the translucency of the enamel, variable in degree. The defective enamel is of normal thickness with a smooth surface. It has a distinct and clear boundary with the adjacent normal enamel and can be white, cream, yellow or brown in colour. The lesions vary in extent, position on the tooth surface, and distribution in the mouth. Some maintain a surface translucency while others are dull in appearance.

Dentine: The hard inner layer of the tooth.

Diffuse opacity: Also a non-carious defect involving an alteration in the translucency of the enamel, variable in degree. The defective enamel is normal thickness and at eruption has a relatively smooth surface and is white in colour. It can have a linear, patchy or confluent distribution but there is no clear boundary with the adjacent normal enamel.

Discoloration: Any change in the hue, colour, or translucency of a tooth.

Displacement of contact points: Crowding of permanent teeth, determined if any adjacent contact points are greater than 4mm apart.

Distal surface: The surface of the tooth away from the mid-line.

Ectopic teeth: Ectopic eruption happens when permanent teeth erupt through gum tissue behind or in front of deciduous teeth.

Enamel: The hard calcified tissue which covers the dentine of the crown portion of a tooth. Enamel is the hardest tissue in the human body.

Enamel caries: Tooth decay into the enamel layer of the tooth. This can be either visual, involving visual changes in the enamel of the tooth, or cavitated.

Enamel opacities: A non-carious defect involving an alteration in the translucency of the enamel.

Filled, otherwise sound, teeth: Teeth with amalgam, or other, fillings that had no cavitated or visual dentine caries present (pre 2003 criteria exclude visual caries).

Fissure sealant: A material, usually a resin, which has been placed in the pits and fissures of teeth to protect against the development of caries. Sealants are also used in conjunction with filling materials.

Fluoride: A chemical substance that can strengthen tooth enamel and make teeth less susceptible to decay. Fluoride can make its way to teeth by ingestion through food or water, or by topical application made directly to the surface of the teeth by the dentist.

GCSE: General Certificate of Secondary Education.

Gingivitis: Stage one of early periodontal disease characterized by inflammation, swollen, reddish gum tissue which may bleed easily when touched or brushed. Untreated, gingivitis can lead to chronic periodontal disease.

GIS: Geographic Information Systems (GIS) are computer-based systems for managing, analysing and presenting geographically referenced data.

HSCIC: Health and Social Care Information Centre.

Hypoplasia: A non-carious defect involving the surface of the enamel and associated with a reduced localised thickness of enamel. It can occur in the form of (a) pits – single or multiple, shallow or deep, scattered or in rows of pits arranged horizontally across the tooth surface; (b) grooves – single or multiple, narrow or wide (max 2mm), or partial or complete absence of enamel over a considerable area of dentine. The enamel of reduced thickness may be translucent or opaque.

IDACI: The Income Deprivation Affecting Children Index (IDACI) is an index of deprivation used in the United Kingdom.

IOTN: The Index of Orthodontic Treatment Need.

LA: Local authority (LA) is a generic term for any level of local government in the UK. In geographic terms LAs therefore include English counties, non-metropolitan districts, metropolitan districts, unitary authorities and London boroughs; Welsh unitary authorities;

Scottish council areas; and Northern Irish district council areas. 'LA's is used as shorthand in this report to cover the English Local Authority Districts (LADs) and Welsh Unitary Authorities (UA's) sampled as ultimate clusters for CDH

LADS: This is an generic term used to cover London Boroughs, Metropolitan Districts, Unitary Authorities and Non-Metropolitan Districts in England, Unitary Authorities in Wales, Council Areas in Scotland and District Council Areas in Northern Ireland.

Lateral incisors: The teeth located just to the left and right of the central incisors, four in total.

Lingual surface: The surface of tooth adjacent to the tongue.

Malocclusion: Abnormal occlusion of the teeth or jaws.

Mandible: The lower jaw.

Maxilla: The upper jaw.

Mesial Surface: The surface of the tooth towards the mid-line of the tooth.

MIH: Condition affecting the enamel of permanent teeth. Most commonly the first permanent molars and incisors are affected. Normally, tooth enamel is white and very hard but in cases of MIH the enamel can be creamy or have a yellow/brown colour. The texture is often rough and tends to chip away very easily. These teeth are often sensitive to cold and the child may be reluctant to brush them. They are also at a higher risk of developing dental caries (decay).

Missing due to decay: Teeth that had been extracted due to caries.

Missing teeth: Teeth which were not present or visible in the mouth at the time of the examination. Missing teeth includes those which had been extracted and those which were unerupted.

MDAS: Modified Dental Anxiety Scale, used to measure dental anxiety.

Modified BPE: Modified Basic Periodontal Examination - A simple and rapid screening tool that is used to indicate the level of any further examination needed with respect to potential periodontal disease and provides basic guidance on treatment need. Periodontal screening for children and adolescents assesses six index teeth (UR6, UR1, UL6, LL6, LL1 and LR6) using a simplified examination to avoid the problem of false pocketing.

Molars: The class of teeth found in the back of the mouth, characterised as having multiple biting surfaces.

MOS: Measure of size used in probability proportional to size sampling.

NatCen: National Centre for Social Research.

NHS: National Health Service

Nisra: Northern Ireland Statistics and Research Agency

NS-Sec: The National Statistics Socio-economic Classification (often abbreviated to NS-SEC) is the primary social classification in the United Kingdom. The classification replaced two previous social classifications: Socio-economic Groups and Social Class based on Occupation. The full version of NS-SEC has 17 main categories and is collapsible down to three categories. Only the three-category version is intended to represent any form of hierarchy. The version intended for most users (the analytic version) has eight categories.

Obvious decay experience (D3cvMFT): All teeth with cavitated or visual dentine caries, restorations with cavitated or visual dentine caries, teeth with filled decay (otherwise sound) and teeth extracted due to caries. Excludes teeth with enamel caries present. The term obvious decay experience relates to teeth with dentinal cavities, missing teeth and filled teeth in the DMFT dental decay index.

Obvious decay experience (DcMFT): All teeth with cavitated dentine caries, restorations with cavitated dentine caries, teeth with filled decay (otherwise sound) and teeth extracted due to caries. Excludes teeth with visual dentine caries or enamel caries present. The term obvious decay experience relates to teeth with dentinal cavities, missing teeth and filled teeth in the DMFT dental decay index.

Obviously sealed surface: The surface contains obvious evidence of a sealant (including cases with partial loss of sealant), is otherwise sound and does not also contain an amalgam or other filling.

Occlusal surface: The biting surface of posterior teeth.

Occlusion: The meeting together of the upper and lower teeth and jaws.

OFSTED: Office for Standards of Education.

ONS: Office for National Statistics.

Orthodontic appliance: An appliance such as a brace used to help straighten teeth

Overbite: The vertical overlap of the upper over the lower teeth.

Overjet: The horizontal overlap of the upper teeth over the lower teeth.

Plaque: A sticky fairly transparent film that forms on the teeth or cracks of the teeth primarily composed of undigested food particles mixed with saliva and bacteria. Plaque left alone eventually turns into tartar or calculus.

Pocketing: Gaps, or pockets, can develop between the tooth and gum as a result of Periodontitis. If left untreated, the tooth may slowly loosen and eventually fall out.

Posterior: Situated at the back of the mouth, refers to the premolar and molar teeth.

Premolars: Transitional teeth located between the canine and molar teeth, two per quadrant identified as first and second premolars.

PUFA: The PUFA index is a recently developed index of clinical consequences of untreated dental caries. It provides a measure of badly diseased and broken down teeth which have been attacked by dental decay and are causing significant problems in need of early attention.

Pulp: The internal part of the tooth that contains nerves and blood vessels.

Restoration: The material end result of operative procedures that restore the form, function and appearance of a tooth. A tooth restoration is any artificial substance or structure that replaces missing teeth or part of a tooth in order to protect the mouth's ability to eat, chew, and speak.

Restorations: Include fillings, inlays, crowns, bridges, partial and complete dentures, and dental implants.

SENCO: Special Educational Needs Coordinator. A SENCO is responsible for the day-to-day operation of the school's SEN policy. All mainstream schools must appoint a teacher to be their SENCO.

Simplified IOTN: The Simplified Index of Orthodontic Treatment Need consists of two separate components:

- The aesthetic component: Determines the level of need for orthodontic treatment on aesthetic grounds, i.e. how teeth look or appear
- The dental health component: Determines the level of need for orthodontic treatment on dental health grounds

SOC: The Standard Occupational Classification (SOC) is a common classification of occupational information for the United Kingdom. Within the context of the classification jobs are classified in terms of their skill level and skill content.

Sound and untreated teeth: This term is used for all surfaces that are present and have no caries experience. A surface is recorded as "sound" if it shows no evidence of treated or untreated dental caries in dentine.

Tooth surface loss (tooth wear): Loss of tooth surface that is not due to dental decay. May be caused by erosion, abrasion, attrition or stress lesions.

Trauma: An injury to the teeth or jaws.

Traumatised surface: Surfaces affected by trauma, including those that are restored, are in this category.

Unerupted teeth: Teeth that have not yet erupted through the gum, and no tooth is present

Welsh UA: Welsh Unitary Authorities

Annex B Selecting pupils

A process for selecting pupils within participating schools was designed. Social Survey interviewers were trained to take responsibility for selecting the pupil sample, working with school staff.

Interviewers were given a pupil sampling sheet for each school in their quota. On the pupil sampling sheet, the following information was provided:

- The number of children in each age cohort that we want to sample from the school (i.e. the sample size for each cohort within the school)
- A randomly generated start point for sampling for each cohort
- Number of children in the school in each age cohort (based on 2012 Schools Census)
- Sampling interval for each age cohort (calculated based on 2012 schools census data)

The interviewers obtained lists of all pupils currently in the school of the relevant age. The interviewers then:

- Updated the number of children in the school in each age cohort (based on pupils currently in the school within each age cohort)
- Updated the sampling interval for each age cohort (based on pupils currently in the school)

Like the 2003 method, the pupil sampling was carried out separately for each cohort based on sequential random sampling from an ordered list. The actual sampling process used

- the updated pupil counts for each cohort,
- the updated sampling interval,
- the original random start given on sampling sheet and
- the original sample size to select from each cohort given on sampling sheet.

Where schools drew the sample electronically on behalf of the interviewer, interviewers were required to do the following:

- Check that the sample was being drawn from the frame constructed
- Check that the correct random start and sampling interval was being used
- Be present when the process is conducted to ensure that pupils were not hand-picked but were selected at random

The details of selected pupils was transferred onto a sheet known as the Sample and Outcomes sheet. When the sheet had been completed, and to ensure respondent confidentiality, the part of the sheet containing the names of the sampled pupils was kept within the school. The sampled children were allocated a unique serial number. Interviewers were required to place the section with the childrens' names in the folder provided and leave it with their school contact for safekeeping and make it clear that it will be needed by the dental team on the day the dentist visited. Sample information returned to ONS head quarters/head office were the lists of sampled pupils with unique serial numbers and some characteristics of the selected sample.

Interviewers were required to check with the school whether they had any concerns about the sampled pupils and prompt them to inform the Special Educational Needs Coordinator (SENCO) of any children that have been sampled who receive one-to-one support in the classroom.

Instructions for sampling pupils on CDH – England, Wales and Northern Ireland

1) Each year group from each school should be treated as a separate sampling frame. Each one of these frames will have its own sampling interval and random start.
2) Sort each frame by Sex (Male/Female) and then Date of Birth (oldest to youngest). The lists are likely to come from the school registers. Ideally we need the list to be sorted using date of birth (from the lowest to the highest) for each age group. This makes sure that the selected pupils will come from across the range of ages within the age group. In order to minimise the burden on schools, if you cannot sort the list and it's only available on paper in alphabetical order, we will accept this.
3) Number each pupil from 1 to N, where N is the total number of pupils in the school year group (and on your frame).
4) You have been supplied with an interval and random start. The random start identifies the first pupil in the school year group who you should sample. If you only need to sample one pupil stop there. If you need to sample more add the sampling interval to the random start. This figure gives you the next pupil to sample. Add the interval to this figure to give your next pupil and keep going until the required number of pupils has been sampled. You may find that you have reached the end of the list before you have your required number. We are treating each sampling frame as circular. That means that if adding the interval gives you a number higher than the number in the school year group before all required pupils are sampled, you should continue sampling from the start as if it was continuing the list from the end.
5) It's possible that due to rounding of intervals to integers the final sampled pupil is the same as the first sampled pupil. If this occurs sample the next pupil in the list as the final pupil.
6) Give the pupil numbers serial numbers in the order that they are sampled – this is important for sampling error calculation.

Annex C Summary of findings from consultation events

A. Consultations with Dental Health Professionals and Scientific Groups

1. Clinical Dental Examination

- There should be three important priorities in designing the clinical exam: a) Measurement of important public health issues; b) Comparability to previous years / trends is essential; c) Maintain the same examination length (in terms of time allocated) as in CDH 2003. Despite the necessity to consider innovation, this was limited by the necessity to maintain continuity of the data collection and comparability with previous years and the aforementioned time constraints.

Caries

- Lively debate on the usefulness of potential innovations and which data are relevant for a national epidemiological survey such as CDH 2013.
- Mixed views on the importance of introducing measurement of enamel caries, such as that provided by ICDAS.
- Broad agreement that caries measures should be kept simple and practical.
- Some participants argued that early (enamel) caries may be important to capture for prevention as they are often missed when only established caries into dentine are measured. This was a clear majority view in one of the meetings and was also the majority view in another meeting. The arguments in favour of such an approach were that it gives a better picture when planning service delivery. The ICDAS epidemiology version was suggested as a reasonable alternative for the recording of enamel caries (with one code), as there is evidence that it takes no more time and is as reliable as the full version. And it will also be relevant for international comparisons. However, there were also opposite views and they reflected the majority in two of the meetings. The argument against is that measuring enamel caries adds an additional complexity to the exam, while its reliable diagnosis in field conditions was questioned. There were also concerns that signs of pre-cavitation are not good predictors of future progression to cavitation, increase examination time (which may mean other data are sacrificed) and do not lead to an increase in information (from a statistical point of view). Reproducibility of recordings is also unsatisfactory.

Tooth Surface Loss

- There were mixed views but the majority considered that measurement of tooth surface loss is important for monitoring trends across time.

- However, there were also concerns raised in relation to CDH potentially not being appropriate for tooth surface loss measurement, as it is not a great public health concern and the risk groups are already well established. It is also difficult to collect and not very reliable.

Enamel Defects

- Strong back-up for suggestion to include measurement of molar incisor hypomineralisation (MIH).
- Both enamel defects and MIH were considered important at a patient-level for planning treatment. They provide useful information on the need/prevalence, although in the future may sit more comfortably in a research study rather than the CDH. In addition, there was also critique that enamel defects/lesions are a more subjective measure that lack depth.
- MIH would be more relevant to collect in 8 year olds.

Dental Trauma

- Measurement of trauma should remain in the survey as it is a public health issue. It was also discussed that its prevalence has not changed considerably between surveys.

Periodontal diseases

- There were clearly mixed views and a lively debate in some of the meetings about the potential inclusion of probing pocket depth in the older age group.
- The arguments in favour of enhanced periodontal measurement suggested that the CDH is a good opportunity to record periodontal diseases as they are becoming more prominent and epidemiological studies have shown increase in their prevalence. Also, the revised Basic Periodontal Examination (BPE) is a quick and simple measure.
- However, there were also considerable concerns. The main arguments against related to the difficulty calibrating and poor examiner reliability for the periodontal data, as also seen in the 2009 Adult Dental Health Survey. In addition to the feasibility concerns, there were also issues raised about the relevance of collecting pocket depth information among young people, as well as ethical issues in terms of explicitly mentioning probing during the consent process. Furthermore, this is the more intrusive and uncomfortable for the patient part of the examination, therefore it can have potential negative effect on response rates. However, the assessment used in 2003 required probing of gingival sulcus to determine if bleeding was present, without resulting in children withdrawing from the examination.
- The nature of the periodontal probing implies that it will be important to gain relevant informed consent at the time of the exam. From a practical point of view, if pocket depth is included it would be better to have this measurement at the end of the exam to reduce participant withdrawal.

Malocclusion and orthodontic needs

- Suggestion by orthodontists to consider separate recording of overjet and crowding with the rationale that it provides important service related information and it could also be linked to the dental trauma prevalence.
- However, there were also concerns in relation to measurement of malocclusion on the following grounds: malocclusion is not a disease, more a deviation from a social norm about acceptable occlusion; its prevalence is stable across surveys and more or less known; this isn't really a public health problem, though it is recognised that it represents a big share of the whole dental budget.
- A simplified index of orthodontic treatment need (IOTN) that shows cut-offs at the appropriate levels (NHS threshold of 4 and above) may be relevant in assessing level of need. It would be important to be able to differentiate between young people with IOTN scores of 4 from those with OTN scores of 5; scores lower than 4 are not indicative of need for most cases.
- It is essential to record whether children are wearing orthodontic appliances. This was also done for the CDH 2003. Furthermore, there were some views expressed that it is worth considering the inclusion in orthodontic measurement of children wearing orthodontic appliances, but there were also views to the contrary as such measurement cannot accurately provide need levels before treatment.
- Measurement of malocclusion is important for the 15-year-old participants and provides a good estimate of unmet needs. There were some concerns about the relevance of such information for 12-year-olds, as the level of treatment need is relatively stable at this age.

Further measurements

- PUFA index (Pulpal involvement, Ulceration caused by dislocated tooth fragments, Fistula, and Abscess): There was absolute agreement for the inclusion of PUFA in the clinical examination, with the rationale that it provides useful epidemiological information for dental services and it is a practical, easy and quick measure. This should be an area of innovation in the clinical examination.
- Weight and Height: Some participants suggested collection of non-dental data in terms of weight and height measurement. This is important in order to see whether there is a link between BMI/obesity and dental caries as well as the consumption of sugary foods/drinks. That may assist the focus on prevention through diet modification. However, there was also some hesitation in relation to the importance of such data, as such innovation may not be feasible in CDH and it also reflects more a research rather than a NHS practice concern.

2. Self-administered Questionnaires

- In contrast to the respective discussion about the clinical dental examination, participants in the consultation exercise generally indicated that there was much more room for innovation in designing the questionnaires for parents and for 12 and 15-year-olds. While clinical dental examination should be guided mostly by the need of comparability across CDH series, the questionnaires present an opportunity to ask about important and relevant information that may have not been covered in CDH 2003. It was acknowledged that there have been important developments in terms of self-reported questionnaires and measures in the last decade.

Questionnaire for parents of all participants

- The parent questionnaire is too long, which may have an impact on response rate. A number of questions need to be deleted, reworded or modified.
- Suggestions for key data themes that may be relevant for the parent questionnaire:
    - Dental attendance patterns – visiting the dentist
    - Barriers and issues around access to services
    - Use of NHS services and treatment / type of care
    - Deprivation and –more broadly- socioeconomic status
    - Perceptions about oral health and quality of life; emphasis on the impact of the child's oral health on the family
    - Dental anxiety for both child and parents. It is preferable to assess anxiety directly from young people through self-reports, but this may not always be feasible (e.g. there are no self-administered questionnaires for 5- and 8-year-olds; only parent questionnaires for this part of the sample).
    - Oral health behaviours, including tooth brushing, fluoride use, smoking and dietary patterns. For tooth brushing, it is worth asking for the frequency of brushing and the type (brand) of toothpaste used.
- Minority of participants supported the following data collection via the parent questionnaire:
    - Information on tooth brushing and other health promotion programmes in school setting
    - parental perception of child's decay
    - views on fluoridation
    - Parent's attitudes to oral health and caries experience and how they may have affected the child
- Issues around access were considered at length; emphasis placed on the following:

  - Need to reflect on the changes to the NHS General Dental Services contracts in 2006. Assess whether they have changed a dental practice since then and how long they have attended their current practice for.
  - Waiting time for treatment in emergency and the same for routine care; frequency of dental check-ups, in light of more recent National Institute for Health and Clinical Excellence (NICE) guidelines.
  - Experience of dental extractions / treatment under general anaesthetic.
  - Continuity of care and referrals: whether seen the same or different dentist in consecutive visits, referrals for specialist advice or to dental therapist.
- Quite a few questions from the CDH 2003 questionnaire could easily be removed without loss of important information. Examples of questionnaire themes that could be removed are:
  - partner's oral health questions 61-66 in 2003). It is not central to the CDH to collect information from both parents in relation to their dental attendance pattern, as there will be relevant information from one parent and (for 12- and 15-year-olds) directly from the young participants. Furthermore, the questions about taking time off for the dental visits are going to be covered under the family impact section on oral health and quality of life of the family.
  - questions about tooth decay and bad breath (questions 22-26 in 2003). These are questions about attitudes to treatment that have not been used in any report or publication. While there were relevant and important when first introduced in the questionnaire, they are not considered relevant anymore as they are "saturated" with lack of variation in the responses (e.g. almost all preferred to have a tooth filled rather than taken out).
- There were concerns (from only a few participants) that questions on socioeconomic status (SES) may be intrusive/sensitive and maybe also unnecessary as relevant SES information could be captured through postcode, free school meals data, school deprivation levels, parental level of education or a self-rated scale of affluence instead. However, the majority view was to follow established questions from other surveys that enquire about the SES of the parent.

Questionnaire for young people (aged 12 and 15 years)

- Priorities for the children's questionnaire are:
  - Health behaviours including oral hygiene, diet, smoking and alcohol use.
  - Dental anxiety (questions relevant for young people)
    - Prevalence of high dental anxiety levels (dental phobia) is essential information for planning services
    - 8-year-olds would be able to respond to the dental anxiety questions. However, there is no self-administered questionnaire for that age group.

        - Possibility of using the modified dental anxiety scale for children.
    - Subjective perceptions about oral health and quality of life. Such information is relevant for assessing population oral health needs, and therefore linked to services planning. It also indicates the value placed on oral health. Unlike for the CDH 2003, there are now available measures for the assessment of oral health related quality of life through self-reports of children and adolescents. At least two questionnaires are validated for use in the U.K, one used also in the NHS Dental Epidemiology Programme Survey of 12-year-olds.
    - Sources of oral health information (e.g. TV, social media).
    - Self-efficacy / perceived responsibility over own oral health
    - Preventive advice received and views on how to keep the mouth clean
    - Satisfaction with (or worries about) appearance of the teeth, demand for orthodontic treatment, and perceived success of treatment
- Questions about Diet
    - Carbonated (fizzy) drinks, sports drinks and frequent consumption of fruit juice are damaging teeth. Important for caries and erosion.
    - Need to separate them from consumption of sugar-free drinks, natural fruit juices, fruits and milk. In addition, sugary snacks should be asked separately from sugary fizzy drinks.
    - Consider including some dietary questions from 2010 Scottish Children's Survey to confirm association of obesity and caries nationally and provide support for common risk factor approach.
- Prevention
    - Information on preventative advice (including fluoride supplements or varnishes, diet advice, tooth brushing and flossing); who provided it and how was the advice given.
    - Consider issues around prevention covered by the 3rd edition of Delivering Better Oral Health Toolkit. These could include questions about whether the child has ever had fluoride coatings applied to their teeth, fissure sealants (plastic coatings), as well as whether they have received advice from their dentist about healthy eating, visiting the dentist and tooth brushing. Some of these questions were included in the 2009 Adult Dental Health Survey.

3. Setting and implementing the Survey

Methodological issues

- Potential sources of bias: a) Differences in consent procedures over years may cause bias in estimates of disease trends. b) Parental knowledge of their child's tooth decay

and opting-out are linked, with subsequent potential underrepresentation of lower SES groups; this will affect the representativeness of the analytical sample.

- It would be useful to design the sampling method so that regional estimates can be made – this will support commissioning, policy development and in understanding local needs.
- Data linkage of the CDH with data sets from other surveys (sources) is useful, particularly for research purposes. However, there are also related consent issues and this may reduce the response rate, unless there is a clear opt-out option from the data-linkage.
- Regional specific considerations for Northern Ireland: a) possibly lengthier examination times due to poorer levels of oral health, b) differences in school term dates, c) potential for regions to opt-out from parts of the survey.

Engagement with dental professionals

- It is important to engage with dental commissioners and involve/update them regularly about progress.
- It may be difficult to recruit examiners from the Community Dental Services as recent NHS reforms have led to Consultants in Dental Public Health not being anymore in a position to drive this forward locally.
- There needs to be greater consideration of regional variances. There were suggestions that the survey information needs to be available in Welsh and Irish and also relevant to these settings in terms of NHS terminology etc.
- Press releases need to be carefully considered to avoid over-emphasis on regional or national issues as this may have considerable local repercussions. This implies that the stakeholders should be kept informed.

Engagement with schools, parents and young people

- Steps for successful school recruitment: a) access key staff including the deputy head, group leaders, classroom staff and teachers, and provide a convincing rationale for the survey; b) avoid clashing with other surveys e.g. Young Person's Behaviour and Attitudes Survey, dental calibration research trial.
- Questionnaire response rates – suggestions for success: a) personal requests to parents from the school head; b) utilise existing school-based communication systems such as the newsletter and email systems; c) also have available a web-based option.

B. Consultations with school staff, parents, and young people

As we consulted staff, parents and young people from two purposively selected schools (both religious in nature), we acknowledge the need for careful interpretation and inference of the findings. However, a number of important and relevant issues could be highlighted from these very useful consultations.

1. Parents

- Response rates: Parents felt they would be more likely to respond if the school had endorsed the survey. Also, the NHS logo in the letter would work positively in that respect. Clear and concise information is essential, with a short response time and additional ways of providing more information about the survey, e.g. through a website.
- Incentives to schools and participants: Parents might be more willing to fill out the questionnaire if their child receives an incentive of some sort.
- Clinical exam procedures and collected information: Overall parents were comfortable with the procedures. They also felt strongly that personal and timely feedback is paramount in case of any problems.
- Parents had no real concerns about potentially sensitive questions in the self-administered questionnaire on 12- and 15-year-olds (e.g. smoking and drinking alcohol). Such questions are expected and do not seem to be excessively controversial. But confidentiality was seen as paramount in terms of collecting valid answers from their children, particularly on the aforementioned behaviours.
- Data sharing (linkage) and access to personal information (e.g. medical records) was a contentious issue; a few supported it, but the majority felt uneasy about it and indicated that it may put them off from responding. Data linkage goes beyond what they would expect and they would not support it unless there was a very specific indication about what information would be linked and what it would be used for.

2. School staff

- Access to schools: The survey has a moral purpose and this is an incentive for schools to take part. This stance may be partly influenced by the religious nature of the selected schools, while other schools might use a more pragmatic cost/benefit approach when deciding whether to take part or not. The study will get noticed due to its topic (dental health) and national character. Initial letter to schools should be brief (1 page) and concise, explaining why it is important and how young people and parents can benefit. It will be easier supported if it does require minimal effort from schools. Getting through to the head teacher is best via an initial email followed up by a phone call (if email is not replied). It is important to use appropriate language; mention that it is a survey by the 'government' and done for the NHS (use NHS logo).
- Achieving a good response rate: a) general message should be sent by the school to all parents to explain the study procedures; b) this message could be sent through existing

text messaging processes that schools have to communicate with parents; there is no extra cost to the school; c) highlight the "heritage" of the survey (since 1973) and the improvement of oral health over time; d) a time period of 4-7 days for parents to opt in (for the participation of 5- and 8-year-olds) seems appropriate.

- What can act as incentive for schools to participate? Ease of organisation to school, moral purpose and monetary incentives work. Career or education advice (e.g. a dental student presenting on careers in dentistry) might help. A badge or certificate for the school indicating that it participated in the CDH will be helpful. Such certificates could be displayed in the head teacher's office or in the classrooms of participating pupils. In addition, links to podcasts about the survey or with the main results could be used by the school head and teachers for education purposes.
- What can act as incentive for young people? Missing a lesson may be appealing; a small gift (e.g. magnet, tooth brush, furry bug) could also work. However, there were also some concerns about potential conflicts between students if those that were randomly selected to take part (but not their classmates) were given a gift.
- In case of parental non-response, an e-mail reminder and paper reminder would be useful including another copy of the questionnaire. Web option would also be useful.
- Would be good for the school to have a say in the week the survey is conducted; need to make sure it doesn't coincide with other major commitments. Therefore, the research team should get in touch early with possible dates.
- Removing students from the class in order to participate in the CDH is not a worry, as schools can use standard processes that are in place for other purposes.
- Young people questionnaire: a self-complete questionnaire should be no issue for 12- and 15-year-olds. They like giving their opinions and therefore will enjoy it. It is feasible to have them complete it individually and in some privacy.

3. Young people

- Response rates: General agreement that in order to get honest responses, the questionnaire needed to be filled in individually and with some privacy. Also, re-assurance about confidentiality is important; they need to be convinced that neither their parents nor the school will have access to their replies to the questionnaire.
- Incentives: a) most indicated that money or vouchers are appropriate, or a draw with some smaller prizes and one large prize; b) they need to be well informed, one incentive is knowing what is good for your health; c) being able to have a say and feel they are being listened to makes a difference.
- Importance of oral health: Young people mentioned that their teeth are important to them, linking them to appearance / attractiveness and to some degree to their general health. Generally, they consider that teeth are an important part of the body. However, people tend to not think about teeth that much until there is an in issue (pain, braces).

- Experience of dentists / dental care: Mixed feelings with a few stating that they are anxious ("scared") about dental visits, including the dental equipment. They do not want to be treated like children. They would rather have visual check-ups with minimal equipment, and would like to avoid having the dental check-up for the CDH in front of others as they would not want others hearing negative findings from the exam (privacy).
- Views about oral health responsibilities: the majority said that they trust the dentist to look after their teeth, but they also feel they have responsibility for their oral health, therefore would like to be better informed about their health.
- Health behaviours: Awareness about how to maintain teeth and bodies, though good health behaviours not universally practiced. They don't always consider the effect of diet on their teeth, but become more aware about it if they have braces.
- Sources of information on oral health: TV adverts were the obvious source for many, though they were also critical (e.g. teeth featured in the adverts are 'too perfect').

Annex D Letter to Head Teacher

www.ons.gov.uk/about

[Insert date]

Dear Head Teacher,

2013 Dental Health Survey of Children and Young People

To allow the NHS to plan dental services and understand how the oral health of each generation of children is changing, it is necessary to conduct a country-wide dental survey. The **Dental Health Survey of Children and Young People** has been conducted every 10 years since 1973 with the fifth in the series taking place during the autumn term, 2013. [Name of school] has been selected to take part.

The survey is designed to complement both the ongoing NHS programme of schools-based dental research on the oral health of children, and other sources of data available to planners and commissioners of dental services. The survey is essential for the future planning of dental care services.

The study is being carried out on behalf of the NHS by the Office for National Statistics (ONS) in partnership with the National Centre for Social Research (NatCen), Northern Ireland Statistics and Research Agency (NISRA) and dental health experts from five University Dental Schools (Birmingham, Cardiff, Newcastle, University College London and King's College London).

Participation in the study is voluntary, however I hope your school will be able to take part.

As with all surveys carried out by ONS, the information collected from individuals will be strictly confidential. The findings will be reported in such a way that neither individual pupils nor schools will be identifiable.

I am including a leaflet to provide more detailed information about this important study, what it involves and how we propose to work with schools to ensure they are supported throughout their involvement.

A member of the ONS survey team will be in telephone contact soon to talk about taking part.

Yours faithfully

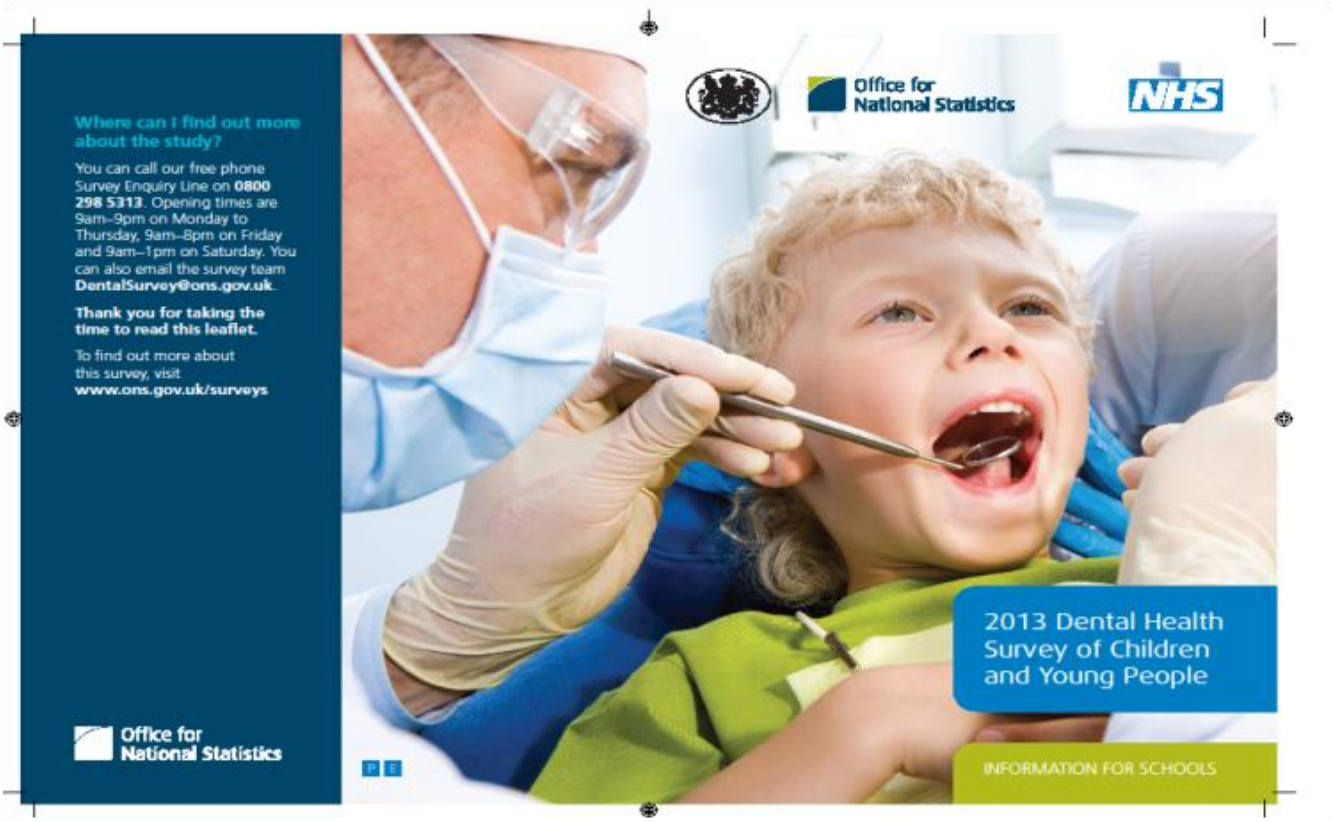
Tom Anderson
Principal Research Officer
Dental Health Survey of Children and Young People
Office for National Statistics

Everything you tell us is strictly confidential and will only be used to produce official statistics.

The Office for National Statistics is not linked to any political parties.

Office for National Statistics | Segensworth Road | Titchfield | Fareham | PO15 5RR

Annex E Example Primary School Information Leaflet (England)



treatment the child would normally have. Afterwards, parents/guardians will receive some basic feedback from the check-up.

If the dentist discovers any suspected serious condition during the check-up, they will contact a member of the survey team who is a Consultant in Paediatric Dentistry. They will follow a set procedure to inform the child's parent or guardian, without causing alarm, and make arrangements for the child to be seen by their GP. It is important to stress that such an eventuality is highly unlikely.

Will the school be sent results?

No. However all schools will be sent a summary of the main findings in their area.

Who are we?

The Office for National Statistics (ONS) is the Government's largest producer of statistics.

We compile independent information about the UK's society and economy which provides evidence for policy and decision making, and for directing resources to where they are needed most. The ten-yearly census, measures of inflation, the National Accounts, and population and migration statistics are some of our highest-profile outputs.

The 2013 Dental Health Survey of Children and Young People is being carried out by the Office for National Statistics (ONS) in collaboration with the National Centre for Social Research (NATCEN), Northern Ireland Statistics and Research Agency (NISRA) and the Dental Schools of the University of Birmingham, Cardiff University School of Dentistry, Newcastle University School of Dental Sciences, the University College London Dental Public Health Group and King's College London Dental Institute.

The Health and Social Care Information Centre, which

How does the survey work?

To conduct the survey we first sample schools, and then within schools we sample children who will be examined by a dentist. The check-up lasts between 5 and 10 minutes with a dentist and a dental nurse visiting the school on a convenient day that is pre-arranged. Only a small number of children are selected and this will vary according to the size of school. For primary schools, children are selected from two age groups: 5 and 8 year olds. Before doing the check-ups, we write to the parents of the children to get their agreement to take part.

How many children from my school will be involved?

The number of children asked to take part in the survey will depend on the size of the school, but will range from 5 to 15 in each of the two age groups being studied.

How are the children selected?

A member of our survey team will visit the school prior to the check-up day. Working with the school, they will identify a list of students who will be aged 5 or 8 on 31 August 2013. The survey team will then assist in randomly selecting children from each age group.

In what format should the school supply the lists of children in each age group?

The list can be in any format that is convenient to the school. We just need to make sure that it contains all children at the school in the eligible age groups. Whatever the format it is in, the list will not be taken out of the school.

Who will inform a selected child's parent/guardian about the study?

The survey team will provide schools with explanatory letters and leaflets in stamped envelopes, to be addressed and sent out to the parents/guardians of the selected children. The letters will request written consent from parents/guardians for their child to take part in the study.

All documents are available in a range of formats and languages on request.

How will the school know if parents/guardians have not provided consent for their child to take part in the study?

Parents/guardians who have not provided consent within two weeks of receiving their letter will be issued a reminder letter. Following this, we will assume that consent has not been provided for their child to participate in the study. The survey team will let the school know which parents/guardians have not provided consent to the study.

Who will carry out the dental check-ups?

The check-ups will be carried out by a specially trained dentist. A dental nurse will record the results of the check-up.

How long will the dentist be in the school?

The length of time the dentist will be in the school will depend on the number of children in the eligible age groups. In general, the dental team will need to be in the school for about half a day.

Where and when will the dental check-ups take place?

The survey team will contact each school to arrange a convenient time for the dentist and dental nurse to visit. Schools will be asked to provide a room in which the check-ups can take place and to assist in bringing the children to be examined. The check-up can take place in any room. No specialist equipment is required.

Before the visit, the school will be contacted via post to confirm the arrangements.

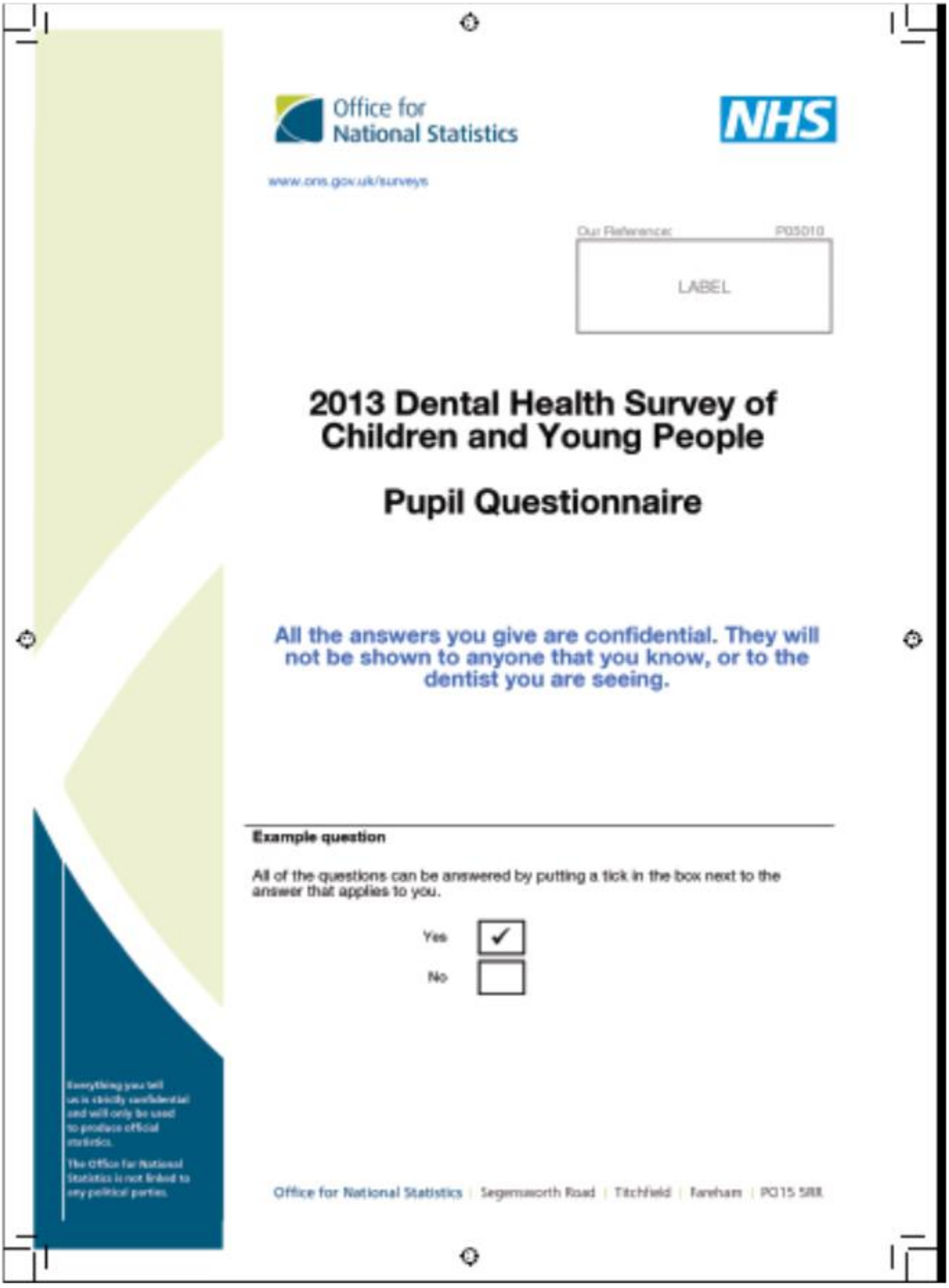
Are the parents/guardians involved in the check-up?

No. However after the dental check-up, parents/guardians of the participating children will be sent a postal questionnaire about their child's dental care. The survey team will provide schools with questionnaires in stamped envelopes, to be addressed and sent out to the selected parents/guardians.

Will parents/guardians be sent the results of their child's dental check-up?

No. The check-up is designed to provide an overall picture of children's dental health rather than to make recommendations for the treatment of individual children. It should not replace any dental check-up or

Annex F Pupil Questionnaire



Office for National Statistics

NHS

www.ons.gov.uk/surveys

Our Reference: P05010

LABEL

2013 Dental Health Survey of Children and Young People

Pupil Questionnaire

All the answers you give are confidential. They will not be shown to anyone that you know, or to the dentist you are seeing.

Example question

All of the questions can be answered by putting a tick in the box next to the answer that applies to you.

Yes ☑

No ☐

Everything you tell us is strictly confidential and will only be used to produce official statistics.

The Office for National Statistics is not linked to any political parties.

Office for National Statistics | Segensworth Road | Titchfield | Fareham | PO15 5RR

These first questions are about your teeth, and whether they cause you any problems. The dentist you are seeing will **not** see your answers, and neither will your parents or teachers.

Q1 Overall, would you say that your dental health (that is the health of your teeth and mouth) is…

	Tick one answer only
Very good	☐
Good	☐
Fair	☐
Poor	☐
Very poor	☐

Q2 Overall, would you say that your general health is…

	Tick one answer only
Very good	☐
Good	☐
Fair	☐
Poor	☐
Very poor	☐

Q3 In the last three months, have you had...

	Tick one box on each row	
	Yes	No
Toothache	☐	☐
A sensitive tooth	☐	☐
Bleeding or swollen gums	☐	☐
A broken tooth	☐	☐
Mouth ulcers	☐	☐
Bad breath	☐	☐

Q4 How satisfied are you with the appearance of your teeth?

Tick one answer only

- Very satisfied ☐
- Satisfied ☐
- Neither satisfied nor dissatisfied ☐
- Dissatisfied ☐
- Very dissatisfied ☐

Q5 At the moment, do you think that your teeth are all right as they are or would you prefer to have them straightened?

Tick one answer only

- My teeth are all right ☐
- I would prefer them straightened ☐
- I am already having orthodontic treatment (e.g. wearing a brace) ☐
- Don't know ☐

Q6 In the last three months have you had difficulty **eating** because of problems with your teeth and mouth?

Tick one answer only

- Not at all ☐
- A little ☐
- A fair amount ☐
- A lot ☐

Q7 In the last three months have you had difficulty **speaking clearly** because of problems with your teeth and mouth?

Tick one answer only

- Not at all ☐
- A little ☐
- A fair amount ☐
- A lot ☐

Q8 In the last three months have you had difficulty **cleaning your teeth** because of problems with your teeth and mouth?

Tick one answer only

- Not at all ☐
- A little ☐
- A fair amount ☐
- A lot ☐

Q9 In the last three months have you had difficulty **relaxing (including sleeping)** because of problems with your teeth and mouth?

Tick one answer only

- Not at all ☐
- A little ☐
- A fair amount ☐
- A lot ☐

Q10 In the last three months have you **felt different** (for example being more impatient, irritated, easily upset) because of problems with your teeth and mouth?

Tick one answer only

- Not at all ☐
- A little ☐
- A fair amount ☐
- A lot ☐

Q11 In the last three months have you had difficulty **smiling, laughing and showing your teeth without being embarrassed** because of problems with your teeth and mouth?

Tick one answer only

- Not at all ☐
- A little ☐
- A fair amount ☐
- A lot ☐

Q12 In the last three months have you had difficulty **doing your schoolwork** (for example going to school, learning in class, doing homework) because of problems with your teeth and mouth?

Tick one answer only

- Not at all ☐
- A little ☐
- A fair amount ☐
- A lot ☐

Q13 In the last three months have you had difficulty **enjoying being with people** (for example going out, visiting friends) because of problems with your teeth and mouth?

Tick one answer only

- Not at all ☐
- A little ☐
- A fair amount ☐
- A lot ☐

Q14 In the last three months how much did the condition of your teeth and mouth affect your **everyday life**?

Tick one answer only

- Not at all ☐
- A little ☐
- Somewhat ☐
- A fair amount ☐
- A great deal ☐

These questions are about cleaning your teeth and seeing the dentist.

Remember that the dentist you are seeing will NOT see your answers, and neither will your parents or teachers.

Q15 How often do you usually brush your teeth?

Tick one answer only

- More than three times a day ☐
- Three times a day ☐
- Twice a day ☐
- Once a day ☐
- Less than once a day ☐
- Never ☐

Q16 Do you usually go to the dentist…

	Tick one answer only
…for a check-up	☐
…only when I have trouble with my teeth	☐
I have never been to the dentist	☐

Q17 We would like you to say if you usually get anxious or worried about the dentist and what happens at the dentist.

Tick one box on each row

	Not anxious	Slightly anxious	Fairly anxious	Very anxious	Extremely anxious
If you went to your dentist for treatment tomorrow, how would you feel?	☐	☐	☐	☐	☐
If you were sitting in the waiting room (waiting for treatment), how would you feel?	☐	☐	☐	☐	☐
If you were about to have a tooth drilled, how would you feel?	☐	☐	☐	☐	☐
If you were about to have your teeth scaled and polished, how would you feel?	☐	☐	☐	☐	☐
If you were about to have a local anaesthetic injection in your gum, above an upper back tooth, how would you feel?	☐	☐	☐	☐	☐

These questions are about what you eat and drink. We also ask you if you have ever smoked cigarettes or drunk alcohol.

Your answers will NOT be shown to anyone you know, or to the dentist you are seeing

Q18 How many times a day do you usually eat…

Tick one box on each row

	Four or more times a day	Three times a day	Two times a day	Once a day	Less than once a day	Rarely or never
Fruit (fresh, tinned, dried and frozen)	☐	☐	☐	☐	☐	☐
Cakes or biscuits	☐	☐	☐	☐	☐	☐
Sweets (candy or chocolate)	☐	☐	☐	☐	☐	☐

+

Q19 How many times a day do you usually drink...

Tick one box on each row

	Four or more times a day	Three times a day	Two times a day	Once a day	Less than once a day	Rarely or never
Diet coke or other non-sugar drinks	☐	☐	☐	☐	☐	☐
Coke or other soft drinks or squash that contain sugar	☐	☐	☐	☐	☐	☐
Energy (sports) drinks (e.g. Powerade, Lucozade)	☐	☐	☐	☐	☐	☐
Water (tap or bottled)	☐	☐	☐	☐	☐	☐
Fruit juice and smoothies	☐	☐	☐	☐	☐	☐

Q20 This question is about smoking. Please read the following sentences carefully and choose the one that best describes you.

Think about times you may have had a puff or two as well as smoking whole cigarettes.

Tick one answer only

- I have never tried smoking cigarettes ☐
- I have smoked cigarettes only once or twice ☐
- I used to smoke cigarettes but I don't now ☐
- I sometimes smoke cigarettes, but don't smoke every week ☐
- I smoke cigarettes regularly, once a week or more ☐

Remember that your answers will not be shown to anyone you know, or to the dentist you are about to see

Q21 This question is about alcohol. Please read the following sentences carefully and choose the one that best describes you.

Think about whole drinks (not just sips) when answering this question.

Tick one answer only

- I have never drunk alcohol ☐
- I have drunk alcohol only once or twice ☐
- I used to drink alcohol but don't now ☐
- I sometimes drink alcohol, but don't drink alcohol every week ☐
- I drink alcohol regularly, once a week or more ☐

Q22 Have you received helpful information about how to keep your teeth and mouth healthy from any of these people?

Tick one box on each row

	Yes	No
Parents or guardians	☐	☐
Brothers or sisters	☐	☐
Other adult relatives	☐	☐
Friends	☐	☐
A dentist, hygienist or dental nurse	☐	☐
Teachers	☐	☐
Other adults at school (e.g. a school nurse)	☐	☐
Other adults that I know	☐	☐

Q23 Have you received helpful information about how to keep your teeth and mouth healthy from any of these places?

Tick one box on each row

	Yes	No
Adverts	☐	☐
TV programmes	☐	☐
Radio	☐	☐
Newspapers or magazines	☐	☐
The internet	☐	☐
Social media (e.g. Facebook, Twitter)	☐	☐

Q24 Finally, is there anything else you'd like to say about your dental health, or about dentists in general?

Thank you very much for your help.

Annex G Parent Questionnaire

2013 Dental Health Survey of Children and Young People

QUESTIONNAIRE FOR PARENTS AND GUARDIANS

Complete this survey online:
www.natcen-survey.co.uk/dental

Your personal internet access code is (the big code in bold):

OR fill in this paper questionnaire and post it back using the pre-paid envelope supplied

Thank you for your help in completing this questionnaire.

You are sometimes told to skip over some questions in this survey. When this happens you will see an arrow with a note that tells you what question to answer next:

Yes, once	☐	→ ***Go to Q7***
Yes, two or three times	☐	→ ***Go to Q7***
Yes, more than three times	☐	→ ***Go to Q7***
No, never	☐	→ ***Go to Q17***

Please answer the questions by ticking a box or writing in text as requested.

Your information will be treated in the strictest confidence.

NHS

NatCen Social Research that works for society

Office for National Statistics

www.ons.gov.uk/surveys

LOOKING AFTER YOUR CHILD'S TEETH

Q1 **How old was your child when they started brushing their teeth or having them brushed for them?**

Tick one answer only

- Under 6 months of age ☐ → *Go to Q2*
- Between 6 months and 1 year of age ☐ → *Go to Q2*
- Between 1 and 2 years of age ☐ → *Go to Q2*
- Between 2 and 4 years of age ☐ → *Go to Q2*
- Between 4 and 6 years of age ☐ → *Go to Q2*
- 6 years of age or older ☐ → *Go to Q2*
- My child does not brush their teeth or have them brushed for them ☐ → *Go to Q6*

Q2 **Who usually brushes your child's teeth nowadays?**

Tick one answer only

- Your child ☐
- An adult ☐
- An adult and your child together ☐

Q3 **How often does your child usually brush their teeth (or have them brushed for them)**

Tick one answer only

- More than three times a day ☐
- Three times a day ☐
- Twice a day ☐
- Once a day ☐
- Less than once a day ☐
- Never ☐

Q4 **Over the last year has your child regularly used any of the following products to look after their teeth or mouth?**

Tick one box on each row

	Yes	No
Toothbrush (non-electric)	☐	☐
Electric/battery operated toothbrush	☐	☐
Toothpaste	☐	☐
Fluoride drops or tablets (usually taken each day)	☐	☐
Mouthwash	☐	☐
Dental floss	☐	☐
Dental disclosing (plaque revealing) tablets	☐	☐
Sugar free or dental chewing gum	☐	☐
Other, write below	☐	☐

☐

Q5 **What is the name of the toothpaste your child is currently using?**

Please write the full name of toothpaste (including both brand and type) below (e.g. Colgate Total Care, Tesco Steps Toothpaste 6+, Green People Organic Children Mandarin and Aloe Vera, Boots Fluoride Free).

☐

VISITING THE DENTIST

Q6 **Has your child ever been to a dentist's surgery or clinic, either for a check-up, for treatment or just to get used to going?**

Tick one answer only

Yes, once	☐	→ *Go to Q7*
Yes, two or three times	☐	→ *Go to Q7*
Yes, more than three times	☐	→ *Go to Q7*
No, never	☐	→ *Go to Q18*

Q7 **How old was your child when they first went to the dentist?**

Please write the answer in years. If they were less than one year old please write in 0.

☐ years

Q8 **Does your child usually go to the dentist ...**

Tick one answer only

... for a check-up ☐

... only when they have trouble with their teeth ☐

Q9 **Has your child ever had any of the following treatments?**

Tick one box on each row

	Yes	No
Filling of a permanent tooth	☐	☐
Permanent tooth taken out	☐	☐
Filling of a milk (baby) tooth	☐	☐
Milk (baby) tooth taken out	☐	☐
A general anaesthetic before dental treatment (child is unconscious)	☐	☐
Sedation before dental treatment (child remains conscious)	☐	☐
A brace fitted or adjusted	☐	☐
Repair of damage to teeth after a fall or other injury	☐	☐
Scale and polish (teeth cleaned)	☐	☐
Preventive treatment to stop teeth decaying or going bad e.g. by painting and/or sealing the teeth	☐	☐
Advice on how to look after their teeth (diet or tooth brushing advice)	☐	☐
Other treatment, write in below:	☐	☐

☐

Q10 **On a scale of 1-10 how anxious does your child get when they visit the dentist?**

Not at all anxious — Extremely anxious

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10

My child never goes to the dentist ☐

Q11 **National Health Service (NHS) dental care is mainly available from family or local dentists and also through school dentists (sometimes known as the Community Dental Service). It is free to children.**

Has your child ever had a check-up or treatment from any of these NHS dental services?

Do not count the examination done as part of this study.

Tick all that apply

- Yes, from a family or local dentist ☐
- Yes, from a school dentist or the Community Dental Service ☐
- Yes, from a hospital ☐
- Yes, from an NHS orthodontist ☐
- No, my child has never had a check-up or treatment from any of these NHS dental services ☐

YOUR CHILD'S LAST TRIP TO THE DENTIST

Q12 **When was the last time your child went to a dentist?**
(Please do not include any visits to an orthodontist)

Tick one answer only

- In the last six months ☐
- In the last year ☐
- In the last two years ☐
- Longer than two years ago ☐

Q13 **The last time your child went to the dentist, was it for one visit, or did they have to go back to complete treatment?**

Tick one answer only

- Only one visit ☐
- More than one visit ☐

Q14 **The last time your child went to a dentist was this free NHS treatment (including check-ups) or did you pay?**

Tick one answer only

- It was free (on the NHS) ☐
- I paid for it ☐
- Some was free, some was paid for ☐
- The cost was covered by family dental insurance ☐

5

Q15 Thinking about the dental practice you took your child to last time, how would you rate that practice in terms of each of the following?

Please do not include visits to the orthodontist.

Tick one box on each row

	Very good	Good	Fair	Poor	Very poor	Not applicable
Length of wait to get a routine appointment	☐	☐	☐	☐	☐	☐
Length of wait to get an urgent appointment	☐	☐	☐	☐	☐	☐
The standard and quality of your child's dental care	☐	☐	☐	☐	☐	☐
Child friendly nature of dental practice	☐	☐	☐	☐	☐	☐
Provision of advice about how to look after your child's teeth	☐	☐	☐	☐	☐	☐
Communication skills of dental team	☐	☐	☐	☐	☐	☐

Q16 Overall, how would you describe your child's experience of that dental practice?

Tick one answer only

- Very good ☐
- Good ☐
- Fair ☐
- Poor ☐
- Very poor ☐

Q17 Would you recommend that dental practice to a friend or neighbour who wanted to find a dentist to treat their child?

Tick one answer only

- Yes, would definitely recommend ☐
- Yes, would probably recommend ☐
- No, would probably not recommend ☐
- No, would definitely not recommend ☐
- Not sure ☐

Q18 Have you ever had any difficulty finding a dentist willing to treat your child on the NHS?

Tick one answer only

- Yes ☐ → *Go to Q19*
- No ☐ → *Go to Q21*
- I haven't tried to find a dentist to treat my child on the NHS ☐ → *Go to Q21*

Q19 Was this because...

Tick all that apply

- ...the family dentists in my area are not taking on any more NHS patients ☐
- ...the family dentists where I live will only treat children under the NHS if their parents go to them for private treatment ☐
- ...there is no School or Community Dental Service for children where I live ☐
- Something else, write in below: ☐

☐

Q20 When did you have this difficulty in finding an NHS dentist?

Tick one answer only

- Currently having the problem ☐
- In the last two years ☐
- Over two years ago ☐

ABOUT YOUR CHILD'S TEETH, MOUTH AND GUMS

Q21 Some children's teeth do not have enough room to grow and become crooked or protruding. At this stage of growing up, are any of your child's teeth crooked and/or protruding at all?

Tick one answer only

- Yes ☐
- No ☐

Q22 Is your child having, or has your child ever had, treatment for crooked or protruding teeth?

If they have been assessed for treatment please count this as having treatment.

Tick one answer only

Yes, having treatment now	☐	→ *Go to Q24*
Yes, has had treatment in the past	☐	→ *Go to Q23*
No, no treatment	☐	→ *Go to Q23*

Q23 Has your child been referred to an orthodontist or are they on an orthodontist's waiting list?

Tick one answer only

Yes, they have been referred to an orthodontist	☐	→ *Go to Q24*
Yes, they are on an orthodontist's waiting list	☐	→ *Go to Q25*
No	☐	→ *Go to Q25*

Q24 The last time your child went to an orthodontist was this free NHS treatment (including check-ups) or did you pay?

Tick one answer only

It was free (on the NHS)	☐
I paid for it	☐
Some was free, some was paid for	☐
The cost was covered by family dental insurance	☐

Q25 At the moment, do you think your child's teeth are all right as they are or would you prefer them to have them straightened?

Tick one answer only

Their teeth are all right	☐
I would prefer them straightened	☐

Q26 Over the last 6 months, has your child had any of the following problems with their teeth, gums or mouth?

Include any problems with their teeth, mouth or gums, whether or not your child has seen a dentist about them.

Tick one box on each row

	Yes	No
Toothache	☐	☐
Any other pain in their mouth (including painful mouth ulcers or mouth infections)	☐	☐
Bleeding or swollen gums	☐	☐
A broken tooth	☐	☐
Bad breath	☐	☐
Problems with the appearance of their teeth or mouth	☐	☐
Problems caused by dental treatment they have had	☐	☐
Other problems, write in below:	☐	☐

☐

Q27 We would now like to know more about the ways in which your child's teeth and mouth may have affected your family life. Please place a tick in the box that best describes the situation.

In relation to your child's dental health, how often in the past six months…

Tick one box on each row

	Never	Once or twice	Sometimes	Often	Every day or almost every day
…have you or the other parent taken time off work?	☐	☐	☐	☐	☐
…has your child's dental health caused financial difficulties for your family?	☐	☐	☐	☐	☐
…has your child required more attention from you or the other parent?	☐	☐	☐	☐	☐
…has your sleep or that of the other parent been disrupted?	☐	☐	☐	☐	☐
…have your normal family activities been interrupted?	☐	☐	☐	☐	☐
…have you or the other parent felt guilty?	☐	☐	☐	☐	☐
…have you or the other parent felt stressed or anxious?	☐	☐	☐	☐	☐

ABOUT YOU AND YOUR CHILD

Q28 Do you take your child to the dentist?

Tick one answer only

- Yes, I take my child every time they go ☐
- Yes, I take my child some of the times they go ☐
- No, someone else takes my child to the dentist ☐
- My child never goes to the dentist ☐

Q29 Now thinking about your own visits to the dentist, do you generally go to the dentist for...

Tick one answer only

- ... a regular check-up ☐
- ... an occasional check-up ☐
- ... only when I have trouble with my teeth ☐
- I don't go to the dentist ☐

Q30 Who filled in questions 1 to 29?

Tick one answer only

- Parent/guardian ☐
- Child ☐
- Parent and child together ☐

SOME QUESTIONS ABOUT YOU

Q31 So far we have asked you about your child. However, your family's health can be affected by your household circumstances. To help us understand more about your child's dental health, and your use of dental services, we would like to know some further information about your family. We would also like to know a little about you, the parent or guardian.

Are you male or female?

Tick one answer only

- Male ☐
- Female ☐

Q32 What was your age last birthday? Use numbers rather than words.

☐ years

Q33 Are you this child's...

Tick one answer only

- Mother/Father ☐
- Step-mother/Step-father ☐
- Foster-mother/Foster-father ☐
- Legal guardian ☐
- Other, please write in ☐

☐

Q34 What is your highest educational qualification? This means any educational, professional, vocational or other work-related qualifications for which you received a certificate?

Tick one answer only

- Degree level or above ☐
- Another type of qualification ☐
- No qualifications ☐

Q35 Do you have a partner who lives with you at this address?

Tick one answer only

- Yes ☐ → ***Go to Q36***
- No ☐ → ***Go to Q42 and answer questions about yourself***

SOME QUESTIONS ABOUT YOUR PARTNER

Q36 What was your partner's age last birthday? Use numbers rather than words.

☐ years

Q37 What is your partner's relationship to your child?

Tick one answer only

- Mother/Father ☐
- Step-mother/Step-father ☐
- Foster-mother/Foster-father ☐
- Legal guardian ☐
- Other, please write in ☐

☐

Q38 What is your partner's highest educational qualification? This means any educational, professional, vocational or other work-related qualifications for which they received a certificate?

Tick one answer only

- Degree level or above ☐
- Another type of qualification ☐
- No qualifications ☐

Q39 In whose name is your home owned or rented? (If you live rent-free, who is responsible for your accommodation?)

Tick one answer only

- Myself ☐ → ***GO TO Q41 – answer about yourself***
- My partner ☐ → ***GO TO Q41– answer about your partner***
- My partner and myself equally ☐ → ***GO TO Q40***
- Someone else ☐ → ***GO TO Q40***

Q40 Which of you has the higher income (from earnings, benefits, pensions and any other sources), you or your partner?

Tick one answer only

- Myself ☐ → ***GO TO Q41 – answer about yourself***
- My partner ☐ → ***GO TO Q41– answer about your partner***
- Our incomes are both about the same ☐ → ***GO TO Q41 – answer about yourself***
- I don't know/I prefer not to say ☐ → ***GO TO Q41 – answer about yourself***

Q41 The next few questions are about work. Based on your responses to 39 and 40 above, who will you answer about?

Tick one answer only

- Myself ☐
- My partner ☐

SOME QUESTIONS ABOUT WORK

Q42 At the moment are you (your partner) doing any paid work, either full or part time?

Tick one answer only

- Yes, full time ☐ → *Go to Q44*
- Yes, part time ☐ → *Go to Q44*
- No ☐ → *Go to Q43*

Q43 Have you (has your partner) ever done any paid work?

Tick one answer only

- Yes ☐ → *Go to Q44*
- No, I (they) have never worked ☐ → *Go to Q49*

Q44 Do you (does your partner) work as an employee or are you (they) self-employed? If not working at the moment, this refers to the last job you (they) did.

Tick one answer only

- Employee ☐
- Self-employed with employees ☐
- Self-employed or freelance without employees ☐

Q45 What is (was) your (your partner's) full and specific job title?

For example, PRIMARY SCHOOL TEACHER, CAR MECHANIC, DISTRICT NURSE, STRUCTURAL ENGINEER. Do not state your grade or pay band.

.....

.....

Q46 Please briefly describe what you (your partner) do (or did) in your main job.

.....

.....

Q47 Do you (your partner) supervise any other employees? (A supervisor or foreman is responsible for overseeing the work of other employees on a day-to-day basis.)

Tick one answer only

- Yes ☐
- No ☐

Q48 **At your (your partner's) workplace what is (was) the main activity of your (your partner's) employer or business?**

For example, PRIMARY EDUCATION, REPAIRING CARS, CONTRACT CATERING, COMPUTER SERVICING
If you (your partner) are (were) a civil servant, write GOVERNMENT
If you (your partner) are (were) a local government officer, write LOCAL GOVERNMENT and give the name of your department within the local authority

.....

.....

Q49 **It is useful to be able to compare dental health and care in different areas of the UK. Your postcode can be used to allow us to do this. This information will be held in strict confidence and will be used for statistical purposes only.**

What is your full postcode? [ ]

Q50 **Finally, is there anything else you would like to say about your child's dental health or dentistry in general?**

.....

.....

.....

.....

.....

.....

.....

THANK YOU VERY MUCH FOR TAKING THE TIME TO COMPLETE THE SURVEY

Please return it to us by putting it in the prepaid envelope and sending it to us in the post. Alternatively you can return it to your child's school and they will be able to pass it back to us.

1

Annex H The Clinical Criteria

INTRODUCTION

These criteria are written for the use of the dental examiner prior to and during training and for consultation purposes during the fieldwork.

The aim in setting these criteria has been to maintain comparability with the 1983/1993/2003 surveys of child dental health in the UK, whilst also incorporating new conventions based on research findings and current epidemiological practice.

As in the last national Child Dental Health Survey, data will be entered on to paper by the dental nurse.

The criteria which follow should be studied in conjunction with the examination forms supplied and the training package on the CD-ROM. Each page of the forms shows several of the grids which the dental nurse will complete.

PROCEDURE BEFORE THE EXAMINATION

Medical Screening

Guidance in 2008 from the National Institute for Clinical Excellence (NICE) now clearly states from a review of best evidence that a dental examination, including periodontal probing, does not pose a risk to patients with a previous history of Rheumatic Fever or other cardiac disorders. Specific questions are no longer required to identify these patients. If subjects or their parents raise the issue of not probing because of pre-existing medical conditions the following statement may be helpful: "In the past our policy was not to examine the gums of some patients as this was the part of the examination where there was a possible risk. The National Institute for Clinical Excellence has recently reviewed the evidence in this area and concluded that there is no significant risk from the examination of teeth and gums, our policy is in line with this, BUT if you prefer us not to complete the gum examination please let us know".

Equipment set-up and seating the participant

A fully reclining chair will be used for the examination unless local arrangements are in place to use a table for younger age groups. Assessment of the reclining chair should be made to ensure the safety of it for both examiner and volunteer.

To ensure standardisation no mobile surgeries or equivalent should be used.

An inspection light (Daray X100 with Clamp Number 2 or Brandon Medical MT608BASCD are suitable if a replacement is needed) yielding approximately 4000 lux at 1 metre will be used for illumination. This requires that the Daray Versatile is set to the brighter of the two settings. A spare bulb will be carried in case of failure. (Please note if using the DARAY NviroLED X100 examination light the supplied 3.7W LED bulb is too bright 6000 lux, the correct bulb for this unit is LB7016DarayMiniflex 12v 20w).

The instruments required for the caries examination will include No.4 or No 5 plain mouth mirrors, ball ended CPITN probes or blunt or ball ended probes WHO ball ended probe (0.5mm), black band 3.5-5.5mm. Mirror heads will be replaced when they become scratched or otherwise damaged.

The instrument required for assessing the Dental Health Component of the modified Index of Orthodontic Treatment Need will be a disposable orthodontic ruler (Ortho Care UK), and a set of the ten IOTN colour photographs will be used to gauge the Aesthetic Component.

Local PCT policies and arrangements will be applied to prevent cross-infection and avoidance of allergic reactions to latex and glove powder. Masks are not required for an epidemiological examination and may also be off-putting for children. Glasses or goggles suitable for children should be used.

Cotton wool rolls, cotton buds, or pledgets of cotton wool will be used to clear teeth of debris and moisture where necessary.

Cross infection control

Each examiner will carry sufficient sets of sterile instruments to ensure that there are sterile instruments for every examination. A fresh set of autoclaved instruments and a new pair of examination gloves will be used for each subject. Following the examination these will be placed in a sealed container for transport back to the examiners home clinic where the instruments will be autoclaved.

Examiners will wear a clean pair of latex free gloves for the examination of each participant. These will be disposed of into a standard yellow bag with any tissues and wipes after the exam. This will be disposed of on return to the clinic along with normal clinical waste.

Taking informed consent

It is a requirement for the 2013 survey that positive consent is provided for all dental examinations. However, the process for collecting informed consent differs by age. It is the responsibility of the nurse in the dental team to ensure that consent has been collected prior to examining.

5 and 8 year olds

A parent must have provided positive (opt-in) consent for children aged 5 and 8 to take part in the examination. You will be informed prior to examining of the consents that have been received. However, you should also double check with the school on the day to see if any late consent forms have been received.

Please do not examine any child unless you are certain that positive parental consent has been provided.

If a child decides to opt out of the survey examination on the day, this should be respected as a withdrawal from the survey.

12 and 15 year olds

Parents of pupils aged 12 and 15 have been given a chance to opt their children out of the survey. You should be informed of opt outs prior to the examining day, but you should check with the school on arrival for any late opt outs.

You must collect the positive verbal consent of 12 and 15 year olds to take part in the survey before the examination takes place. It is part of the role of the examining team to collect this consent. An example script for collecting the consent has been provided separately.

Self completion questionnaires (12 and 15 year olds)

Before taking part in the clinical dental examination, participants aged 12 and 15 years will be asked to complete a brief self-administered questionnaire referring to their perceptions about oral health, health related behaviours, and views about dental treatment. This brief questionnaire will be completed by participants individually (i.e. not in groups) and with respect to their privacy. No teachers or other school staff and no members of the research team will record the answers. Upon completion, participants will place their questionnaires on a previously provided envelope and seal it in order to guarantee confidentiality of responses. The sealed envelope will be handed in to the research team members present. Following this, the clinical dental examination will commence.

This procedure will not apply to 5- and 8-year-olds, who will undertake the clinical examination without answering a questionnaire.

THE EXAMINATION

This document describes in detail, the criteria for the conduct of the clinical examination in the 2013 Dental Health Survey of Children and Young People. It should be remembered that some assessments apply only to particular age groups. The sequence of the examination is as follows:

Order	Component	Age cohorts included	Status (compared to 2003)
1	Developmental Defects of Enamel (natural light)	12	Unchanged
2	Simplified IOTN - Aesthetic Component	12,15	Unchanged
3	Perio I – Gingivae, plaque, calculus	5,8,12,15	Unchanged
4	Tooth Condition	5,8,12,15	**Amended**
5	PUFA Index (Pulp, Ulceration, Fistula, Abscess)	5,8,12,15	**New**
6	Trauma (adult teeth only)	(5),8,12,15	Unchanged
7	Tooth surface loss/toothwear	5,8,12,15	Unchanged
8	Simplified IOTN - Dental Health Component	12,15	**Amended**
9	Orthodontic appliances (when in orthodontic treatment only)	(12), (15)	Unchanged
10	Anomalies (where present)	(5), (8), (12),(15)	Unchanged
11	Perio II – Modified BPE	15	**Amended**
12	Asterisk/Comments		

Prior to commencing the examination, examiners should confirm that the child's age conforms with the age categories qualifying for inclusion in the survey, i.e. age 5, 8 12 or 15 years at the reference date (31st August 2013 before the start of the 2013/14 school year).

Therefore children born between the following dates are eligible for inclusion:

5 year olds date of birth from 1st September 2007 to 31st August 2008

8 year olds date of birth from 1st September 2004 to 31st August 2005

12 year olds date of birth from 1st September 2000 to 31st August 2001

15 year olds date of birth from 1st September 1997 to 31st August 1998

1. ENAMEL OPACITIES (12-YEAR OLDS ONLY)

Subjects should be examined from in front and in natural daylight, if possible. Any gross deposits should be wiped away from the teeth which should be examined wet. Delay in diagnosis allows further minute changes to take place through the drying of the tooth surface. The examination will be carried out on 12 year old children on the following teeth:

4321|1234

Teeth should be identified first and then coded. On anterior teeth the labial surfaces will be examined. On premolars the buccal surfaces (starting in the middle of the mesial surface and extending to the middle of the distal surface) will be examined. A mouth mirror will aid the diagnosis of upper premolar teeth. The sequence of examinations is from upper left to upper right. Tooth surfaces should be inspected visually for defects and if in doubt areas such as hypoplastic defects should be explored with a probe to confirm a diagnosis. Movement of the examiner's line of vision helps to provide different examining positions in order to see defects.

Any single defect less than 1mm in diameter should not be recorded. White spot decay can usually be recognised by experienced clinicians from its location and the condition in the mouth. White cuspal and marginal ridges on premolar teeth and similar ridges on lateral incisors can be mistaken for diffuse opacities. If in any doubt about the presence of a defect the tooth surface should be scored normal. Any enamel defect which cannot be readily classified into the three basic types of defects Demarcated, Diffuse Opacities or Hypoplasia should be scored "Other".

Type of defect

Demarcated opacity

A defect involving an alteration in the translucency of the enamel, variable in degree. The defective enamel is of normal thickness with a smooth surface. It has a distinct and clear boundary with the adjacent normal enamel and can be white, cream, yellow or brown in colour. The lesions vary in extent, position on the tooth surface, and distribution in the mouth. Some maintain a surface translucency while others are dull in appearance.

Diffuse opacity

Also a defect involving an alteration in the translucency of the enamel, variable in degree. The defective enamel is normal thickness and at eruption has a relatively smooth surface and is white in colour. It can have a linear, patchy or confluent distribution but there is no clear boundary with the adjacent normal enamel.

Lines: Distinctive white lines of opacity which follow the lines of development of the teeth. Confluence of adjacent lines may occur.

Patchy: Irregular, cloudy areas of opacity lacking well defined margins.

Confluent: Diffuse patchiness has merged into a chalky white area extending from mesial to distal margins which can cover the entire surface or be confined to a localised area of the tooth surface.

Hypoplasia

A defect involving the surface of the enamel and associated with a reduced localised thickness of enamel. It can occur in the form of (a) pits – single or multiple, shallow or deep, scattered or in rows of pits arranged horizontally across the tooth surface; (b) grooves – single or multiple, narrow or wide (max 2mm), or partial or complete absence of enamel over a considerable area of dentine.

The enamel of reduced thickness may be translucent or opaque.

Extent of defect

The extent of a surface area covered by a defect is derived by visually condensing all the areas affected by a defect and then relating the total area affected to that of the total visible surface area, and coded as occupying less than one third, one third to two thirds or two thirds or more of the surface.

Type of defect

Code 0 Normal

Code 1 Demarcated Opacity

Code 2 Diffuse Opacity

Code 3 Hypoplasia

Code 4 Demarcated + Diffuse

Code 5 Demarcated + Hypoplasia

Code 6 Diffuse + Hypoplasia

Code 7 All three defects

Code 8 Other Defects

Code 9 Assessment cannot be made

Extent of defect

Code 0 Normal

Code 1 Less than one third

Code 2 One third to less than two thirds

Code 3 Two thirds or greater

Code 9 Assessment cannot be made

If more than two thirds of a tooth surface is heavily restored, badly decayed or fractured then it should not be examined. Similarly teeth with fixed orthodontic appliances should not be examined. Such teeth are coded as 9 assessment cannot be made. When a defect has been classified as to its type then the extent of the defect is recorded. If two different types of defect are present then the extent will relate to the combined size of the two defects.

Symmetry of diffuse enamel defects

When the type and extent of the defect has been recorded, if diffuse defects (either diffuse alone or in combination with demarcated or hypoplastic defects) are present then a record should be made as to whether they are symmetrically distributed about the midline.

Code 0 = No diffuse defects

Code 1 = Diffuse defects (either alone or in combination with demarcated or hypoplastic defects) but not symmetrically distributed about the midline

Code 2 = Diffuse defects (either alone or in combination with demarcated or hypoplastic defects) symmetrically distributed about the midline

Code 9 = Assessment cannot be made

Photographic assessment of impact score for diffuse defects

An assessment of the severity of diffuse defects should be made by comparing the teeth to the provided standard reference photograph.

Select the most severe diffuse defect and compare it to the photograph.

Code 0	No diffuse defects
Code 1	Non-symmetrical diffuse defects
Code 2	Diffuse defect – similar to or less severe than photograph
Code 3	Diffuse defect – more severe than the photograph
Code 9	Assessment cannot be made

2. SIMPLIFIED IOTN –AESTHETIC COMPONENT

(12 and 15 yr olds only. Children wearing an orthodontic appliance are excluded from assessment).

The Simplified Index of Orthodontic Treatment Need (IOTN) consists of two separate components:

The Aesthetic Component

Determines the level of need for orthodontic treatment on aesthetic grounds.

The Dental Health Component

Determines the level of need for orthodontic treatment on dental health grounds.

Each component is assessed independently; the scores from each component are not added together. Some subjects may have a definite need for orthodontic treatment on aesthetic grounds but no need on dental health grounds. Similarly, some children may have a need for orthodontic treatment on dental health grounds, but not on aesthetic grounds. The aesthetic component is scored now. The dental health component is scored in Section 7.

The following section summarises how the IOTN score for the aesthetic component should be recorded. The approach outlined will enable the examiner to record the IOTN score for the vast majority of malocclusions.

The Aesthetic Component

(i) The anterior teeth should be rated on their dental attractiveness as seen. Stained teeth, enamel fractures and gingival inflammation should be ignored.

(ii) Ask the subject to close together on their back teeth. Then retract the lips to expose the anterior teeth. The dental attractiveness is then rated using the 10 point Aesthetic Component scale. Grades 8-10 represent a definite need for orthodontic treatment on aesthetic grounds.

(iii) When using the Aesthetic Component scale, a ranking is awarded for overall dental attractiveness rather than specific morphological similarity to the photographs.

Completing the form for Orthodontic Assessment

The Aesthetic Component Grades 1-10

Please write a single number in each box, so that Grade 1 is written as 01.

3. PERIO I

(Gingival health, plaque, calculus (all children))

For these assessments each jaw is divided into three segments, as follows:

The middle segment: extending forwards from the distal surface of the canine on one side around to the distal surface of the canine on the other side.

The left and right segments: extending backwards from the distal surfaces of the canines to the distal surfaces of the most posterior teeth present.

The examiner will look at each of these segments in the prescribed order (upper left, upper middle, upper right, lower right, lower middle, lower left) three times; once for the assessment of the gum condition, once for estimating the amount of plaque on the teeth and once to determine the presence or absence of calculus. The average condition of the gums or plaque in the segment should be recorded and not the worst area in that segment.

IT MUST BE STRESSED THAT WHEN THERE IS DOUBT ABOUT THE CLASSIFICATION OF ANY CONDITION, THE LOWER CATEGORY SHOULD BE RECORDED.

Gingival health

Each segment will be examined both buccally and lingually and its state recorded according to one of the following categories:

Code 0 The gingivae appear healthy. (No treatment is needed).

Code 1 The gingivae are not healthy.

Code 9 Assessment cannot be made.

(Code 1 includes both gingivitis that can be reversed by prophylaxis and improved oral hygiene and more severe redness and swelling of the gingivae).

Plaque

Each segment will be examined visually both buccally and lingually and its state coded according to one of the following categories:

Code 0 The teeth appear clean.

Code 1 Plaque visible without probing.

Code 9 Assessment cannot be made.

(A probe is not used for this part of the examination. Consider plaque only – ignore recent debris such as small pieces of crisp found in an otherwise clean mouth immediately following a school breaktime).

Calculus

Each segment will be examined visually and the presence of calculus recorded as follows:

Code 0 No calculus

Code 1 Calculus is present

Code 9 Assessment cannot be made

4. TOOTH CONDITION (all children)

Teeth **will be dried with cotton wool / gauze and** examined in the following order:

Upper left – upper right – lower right – lower left.

In the first instance the tooth will be identified and ringed. If the only tooth present is a primary tooth, ring and score it. If a primary tooth is missing, record the state of the permanent successor. In cases where both the primary tooth and its permanent successor are present further details will be recorded for the permanent tooth only. This applies to all missing primary teeth whatever the age of the child.

Permanent teeth may be **Absent** for a number of reasons in which case code all surfaces as follows:

Code 8 Unerupted (or congenitally missing)

Code 6 Extracted due to caries

Code 7 Extracted for orthodontic reasons

Code T Missing due to trauma

Note: these codes are used only for permanent teeth

In most cases the reason for the absence of a permanent tooth will be obvious and the appropriate code may be called and recorded at once. Sometimes questioning the child will be necessary, for example – "Did you have those teeth taken out to make room for the others?" "Was that front tooth knocked out?"

A tooth is deemed to be **Present** if any part of it is visible.

Tooth surfaces

If a tooth is present, each surface will be examined, coded and called in the following order:

Distal – occlusal – mesial – buccal – lingual.

(In the cases of anterior teeth 'occlusal' is, of course, omitted.)

Obscured surfaces (e.g. by an orthodontic band) will be assumed to be sound unless there is clear evidence to the contrary.

N.B. WHERE DOUBT EXISTS IN THE DIFFERENTIATION BETWEEN THE CATEGORIES, THE LESS SEVERE CATEGORY SHOULD ALWAYS BE CALLED.

The surface coding is as follows:

Code O **Present and "sound"**

Code O (Zero) is used for all surfaces that are present and have no caries experience. A surface is recorded as "sound" if it shows no evidence of treated or untreated dental caries. In the case of partly-erupted teeth, where some surfaces may not be visible, these will be considered as sound and recorded under this category. Surfaces with hypoplasia, fluorosis and other developmental defects are recorded as sound unless they are also affected by caries.

Code AV **Visual change in enamel**

The surface has caries present into enamel which is visible to the observer, but which does not appear to extend into dentine.

Code AC **Visual enamel change with cavitation**

Surface has caries present into enamel with localised enamel breakdown but no dentine visible.

Code 2V **Visual caries (non cavitated dentine caries)**

The surface has caries present into dentine which is visible to the observer, but which is not obviously cavitated. This usually manifests as shadowing under an occlusal surface or marginal ridge.

Code 2C **Cavitated dentine caries**

The surface has a carious lesion into dentine which has caused the lesion to cavitate. Record 2C only if there is a cavity (but not 3 below). (**Hard "arrested" caries** into dentine is included in this category.) Lesions or cavities containing a **temporary dressing**, or cavities from which a restoration has been **lost completely**, will be coded in the appropriate category of decayed.

Code 3 **Decay with pulpal involvement**

Surfaces are regarded as falling into this category if, in the opinion of the examiner, there is a carious cavity that involves the pulp, necessitating an extraction or pulp treatment.

Code 4V **Filled and recurrent decay (no visual cavitation)**

A surface that has a carious lesion and a restoration (whether or not the lesion is in physical association with the restoration) will fall into this category if there is visible dentine caries but no cavitation (similar to code 2V).

Code 4C **Filled and recurrent decay (cavitation present)**

A surface that has a carious lesion and a restoration (whether or not the lesion is in physical association with the restoration) will fall into this category if there is visible caries with cavitation to dentine (similar to code 2C). Unless the lesion is so extensive as to be classified as "decay with pulpal involvement", in which case the filling would be ignored and the surface classified Code 3.

Code 5 **Filled with no dentinal decay**

Surfaces containing a satisfactory permanent restoration (excluding crowns and bridge abutments) of any material will be coded under this category.

Code R **Filled, needs replacing (not carious into dentine)**

A filled surface is regarded as falling into this category if, in the opinion of the examiner after inspection, it is chipped or cracked and needs replacing, but there is no "caries into dentine" present on the same surface. Temporary crowns are included here.

Code t **Traumatized surface**

Surfaces affected by trauma, including those that are restored, will be coded in this category.

Code X **Obviously sealed surfaces**

The probe will be used to assist in the detection of sealants. (Care should be taken to differentiate sealed surfaces from those restored with tooth coloured filling materials used in prepared cavities which have defined margins. These should be regarded as fillings and are coded 4V, 4C, 5 or R.) Sealant codes should only be used if the surface contains obvious evidence of a sealant (including cases with partial loss of sealant), is otherwise sound and does not also contain an amalgam or other filling.

Code C **Crown/advanced restorative procedures**

This code is used for all surfaces which have been permanently crowned or which have received permanent items of advanced restorative care in the form of a veneer or a restoration constituting a bridge abutment. This is irrespective of the materials employed (and should include stainless steel crowns) or of the reasons leading to the placement of the crown/veneer/bridge. (Note: missing teeth replaced by a bridge are coded T, 6 or 8 as for other absent teeth (congenitally missing teeth are coded 8)).

5. PUFA Index (Pulp, Ulceration, Fistula, Abscess) (All groups)

This section only relates to pain and problems related to dental caries.

Examiners will ask the patient the following question:

Do you have any problem or pain in your mouth at the moment?

If they respond "No" record 0 (zero) and move to the next step.

If they respond "Yes" enquire:

Do you think that there is pain related to your teeth?

If they respond "No" record 0 (zero) and move to the next step.

If they respond "Yes" then code as 1.

Problem or Pain codes

0 = No problem or pain

1 = Yes problem and/or pain

Examiners will then record the number of lesions present in the patient's mouth for each of 4 forms of sepsis. The mouth should be examined in the same order as before (upper right, upper left, lower left, lower right), ensuring that the lips or cheeks are gently retracted to allow the soft tissues to be examined. A single code (0, 1 or 2) will be called for each of the four conditions examined. The descriptors for each condition are identical.

Description of conditions to be recorded in PUFA

P = open pulp in primary or permanent dentition

U = obvious ulceration

F = fistula in primary or permanent dentition

A= abscess in primary or permanent dentition

Codes and criteria: PUFA

0 = No lesions evident

1 = A single lesion present

2 = 2 or more lesions present

6. TRAUMA OF PERMANENT INCISORS (5, 8, 12 and 15 year olds)

Examine and code each incisor according to the following categories:

Code 0	No trauma
Code 1	Discolouration
Code 2	Fracture involving enamel
Code 3	Fracture involving enamel and dentine
Code 4	Fracture involving enamel, dentine and pulp
Code 5	Missing due to trauma
Code 6	Acid-etch composite restoration
Code 7	Permanent replacement including crown, denture, bridge pontic

Code 8 Temporary restorations

Code 9 Assessment cannot be made

Note: A traumatised tooth may have one or more codes.

7. TOOTH SURFACE LOSS / TOOTHWEAR OF INCISORS AND FIRST PERMANENT MOLARS

The buccal and lingual surfaces of primary and permanent maxillary incisor teeth and the occlusal surfaces of the first permanent molar teeth will be assessed for loss of surface enamel characteristics, and/or exposure of dentine or pulp.

DO NOT consider the incisal edge.

Assess the **Depth** and **Area** of loss of tooth tissue for each surface using the following criteria:

Depth:

Code 0 Normal

Code 1 Enamel Only – loss of surface characterization

Code 2 Enamel and Dentine – loss of enamel, exposing dentine

Code 3 Enamel into Pulp – loss of enamel and dentine resulting in pulpal exposure

Code 9 Assessment cannot be made

Area:

For each affected surface assess by area:

Code 0 Normal

Code 1 Less than one third of surface involved

Code 2 One third to less than two thirds of surface involved

Code 3 Two thirds or greater of surface involved

Code 9 Assessment cannot be made

8. SIMPLIFIED IOTN – DENTAL HEALTH COMPONENT

(12 and 15 yr olds only. Children wearing an orthodontic appliance are excluded from assessment)

The Dental Health Component

Determines the level of need for orthodontic treatment on dental health grounds. This is assessed with the aid of metal ruler which has two lines inscribed – a white line at 4mm and a red line at 6mm.

Each component is assessed independently, the scores from each component are not added together. Some subjects may have a definite need for orthodontic treatment on aesthetic grounds but no need on dental health grounds. Similarly, some children may have a need for orthodontic treatment on dental health grounds, but not on aesthetic grounds.

The following section summarises how the IOTN scores for the dental health component should be recorded. The approach outlined will enable the examiner to record the IOTN score for the vast majority of malocclusions.

The Dental Health Component normally comprises a 5-point scale:

Grades 1-3 represent no need or borderline need for orthodontic treatment on dental health grounds.

Grades 4 and 5 represent a definite need for orthodontic treatment on dental health grounds.

The Dental Health Component of IOTN has been simplified for use in screening surveys such as those undertaken by BASCD. Essentially, IOTN Grades 1-3 are coded as 0 and Grades 4 and 5 coded as 1. Therefore, only definite need for treatment is recorded and borderline need is incorporated into the no need categories.

Grades 1 - 3 (no definite treatment need) Code 0

Grades 4 and 5 (definite treatment need) Code 1

A small metal ruler/rod is used to measure overjets, crowding and open bites.

Examine each subject is a systematic manner for the following 5 occlusal traits:

Missing teeth (ectopic canines, congenital absence).

1 **Overjet**(both increased and reverse overjets).
2 **Crossbite.**
3 **Displacement of contact points** (crowding).
4 **Overbite** (both increased overbite and open bite).

The acronym 'MOCDO' can be constructed from the first letter of each category. This may be used to remember the scale of occlusal traits. During the examination, if any malocclusion is present according to the criteria, a Code 1 is recorded. Once a Code 1 is recorded, the examination is complete and no further categories need to be examined for on the MOCDO scale.

The exception to this is the overjet which will be recorded for all subjects

Missing teeth

Congenital absence/traumatic loss

The examiner must first decide if orthodontic treatment is required to either open space for a prosthesis or to close the space completely.

If orthodontic treatment is required, then the subject is recorded as being in the definite need category of the Dental Health Component and Code 1 = malocclusion present is recorded.

Ectopic teeth

Ectopic upper canines are most often recorded in this section. If an upper canine is not present in the arch (and there is no history of extraction) the examiner should examine/palpate the buccal sulcus for normal canine position, i.e. a 'canine bulge' should be palpable. If no canine bulge is palpable, then the canine is assumed to be palatally ectopic and a definite need for orthodontic care is recorded, Code 1.

Impacted teeth

Third molars are not included in this assessment.

No part of the tooth should be visible in the mouth.

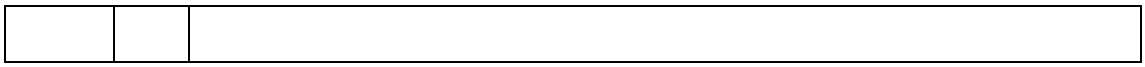
This section usually applies to impacted canines or second premolars. An impacted tooth is recorded in IOTN when there is **4 mm or less** space between adjacent erupted teeth (Code 1 = malocclusion present).

During the survey radiographs are not available, therefore it can sometimes be difficult to determine if a tooth is congenitally missing or impacted. Congenital absence of permanent canines is rare. Congenital absence of second premolars is more common. Careful clinical examination/palpation of the alveolus may help to confirm the presence of an unerupted second premolar.

Positive overjets

(i) Use the end of the metal ruler which has two lines.

→



*

6mm

(ii) Hold the metal ruler parallel to the occlusal plane.

(iii) Measure to the labial aspect of the *most prominent incisor*. On some occasions, the lateral incisor may be the most prominent incisor.

(iv) A definite need for orthodontic treatment (code 1 = malocclusion present) is recorded if the overjet extends *beyond* the second line (6 mm, red line).

(v) If the overjet falls exactly on the line, do not record in the definite need category and score Code 0 = malocclusion absent.

Reverse overjets

(i) Use the first line of the metal ruler to measure reverse overjets (4 mm, white line).

→

*

4mm

(ii) A reverse overjet is defined as *all four upper incisors* in lingual occlusion.

(iii) Unlike positive overjet, if the reverse overjet falls exactly on the 4 mm line, then record in the definite need for treatment category, code 1 = malocclusion present.

(iv) A definite need for orthodontic treatment (Code 1) is also recorded if the subject reports eating or speaking difficulties associated and their reverse overjet is greater than one millimetre.

Size of overjet

In addition to the overall assessment a separate code for the overjet will also be recorded, :

Please record either 0 = overjet 6mm or less (includes reverse overjet)

1 = overjet greater than 6mm

Crossbites

(i) Can be anterior or posterior

(ii) The IOTN Dental Health Component need for treatment depends on the amount of transverse or antero-posterior displacement that occurs on closure.

Definite Need for Treatment = > 2mm displacement

(Code 1 = malocclusion present)

Displacement of contact points (crowding)

(i) Measure between the anatomical contact points of the two most crowded teeth.

(ii) Using the metal ruler, determine if any adjacent contact points are greater than 4mm apart. The first line (4mm, white of the metal ruler) is used in this assessment. If contact points of permanent teeth are further than 4mm apart, then a definite need for treatment is recorded (Code 1 = malocclusion present).

(iii) *Only measure crowding between permanent teeth*. Do not measure between deciduous teeth or between deciduous teeth and permanent teeth.

(iv) Rotations of premolar and molar teeth are not included in this section. Hold the ruler parallel to the occlusal plane when making these measurements.

Deep overbite

(i) A definite need for treatment is recorded (Code 1) if there is evidence of trauma to the gingival margin, either on the palatal aspect of the upper incisors or the buccal aspect of the lower incisors.

Open bite (anterior or posterior)

(i) Only record 'true' open bites, do not include developmental open bites.

(ii) Determine if the open bite is greater than the first line (4 mm, white) – Definite Need for Treatment, Code I.P.

Other points

(i) Generalised spacing is not recorded by the Dental Health Component.

Completing the form for Orthodontic Assessment

The Dental Health Component

Please write either 0 = malocclusion absent, or

1 = malocclusion present

in the single box.

9. ORTHODONTIC APPLIANCES

If the child is wearing an orthodontic appliance specify the type of appliance that is being worn. Consider each arch separately. Use the following categories:

Upper Arch Lower Arch

Code 0 No appliance

Code 1 Fixed orthodontic appliance

Code 2 Removable orthodontic appliance

Code 3 Other. In this case describe the type of appliance in the section reserved for comments.

If the child is not wearing an appliance then ask whether or not he/she has worn one in the past. If the child has worn an appliance then ask whether they have finished wearing it.

Code 0 Never worn.

Code 1 The child has worn a fixed appliance in the past and has finished wearing it.

Code 2 The child has worn a removable appliance in the past and has finished wearing it.

Code 3 The child has worn an appliance in the past and is still wearing it.

10. SPECIFIC ANOMALIES

Does the child have any defects of cleft lip and/or palate or any other craniofacial anomalies?

Code O None

Code 1 Present – please specify in comments section

Has the child extensive hypodontia?

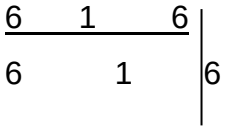
Code O None

Code 1 Extensive Hypodontia with restorative implications. (Please specify in the Comments section which teeth are missing.)

11. Perio II (15 year olds)

Modified BPE (15 year olds only)

The assessment will be made on the following permanent teeth:



If one, or more of the first molars are missing then the second molar(s) should be examined instead. If the upper right central incisor is missing, examine the upper left central incisor. If the lower left central incisor is absent examine the lower right central incisor. If both upper central incisors, or both lower central incisors, or one of the substituted second molars are missing, the assessment should be abandoned for that particular segment, and a score of 9 recorded.

The examination should be carried out in the same sequence as before (upper left, upper middle, upper right, lower right, lower middle and lower left). A new sterile periodontal probe will be used in all children if needed as part of the examination. The periodontal probe should be gently inserted into the sulcus or pocket on the distal of each designated tooth and run around the buccal sulcus of the upper tooth, and the lingual sulcus of the lower tooth, to the mesial surface, using light (25G) pressure.

On each index tooth two codes will be recorded BPE code followed by a bleeding code.

For upper index teeth the probe will be gently moved from disto-buccal to mesiobuccal side of the tooth. In the lower arch the probe will be moved from the disto lingual to mesio-lingual side of the tooth.

The gingivae in relation to the index teeth will then be examined for any evidence of bleeding recorded as:

Codes and criteria: modified BPE

Code 0 Healthy, no bleeding after probing

Code 1 Bleeding after probing, no plaque retentive factors, no pocketing > 3.5mm
(Black band remains completely visible)

Code 2 Plaque retentive factors present, no pocketing > 3.5mm
(Black band remains completely visible)

Code 3 Shallow pocket > 3.5mm but <5.5mm in depth
(Black band remains partly visible)

Code 4 Deep pocket > 5.5 mm in depth
(Black band disappears)

Codes and criteria: bleeding

Each index tooth, after calling the BPE code, examine to determine if there is bleeding from the gingivae of the index tooth and record a single bleeding code:

0 = No visible bleeding

1 = Evidence of bleeding

NO PROBE WILL BE USED ON A SECOND CHILD WITHOUT SATISFACTORY STERILISATION

12. ASTERISK/COMMENTS

At any time during the examination if the dentist wishes to make comments he will call 'asterisk' to the recorder who will mark the form at that point.

On completion of the examination, if there are no asterisks marked, ask if the dentist wishes to make a comment. If there are any asterisks and/or the dentist does wish to make comments, hand the examination form to the dentist to record comments on the back.

DEBRIEF, QUESTIONS, FEEDBACK AND REPORTING PATHOLOGY

In previous surveys the dental examiners did not make any comment about what they saw during the examination. This time in line with current ethical practice feedback will be given in the form of a written letter for their parents. The feedback letters place each participant into one of three general categories. At the end of each examination the child / adolescent should be thanked for taking part using the appropriate debriefing guidance and the appropriate feedback letter will need to be postedto the parent by the school; in addition, as secondary school pupils have provided positive consent for the examination, they should also be asked if they would like to see the letter.

De-briefing primary school children

Thank you. That's the end of the examination.
Was it OK? (If No: What didn't you like?)
Was it what you expected? (Yes/No) (If No: What was not as you expected?)
Do you have any questions you would like to ask?
Is there anything else you'd like to say before you leave?
Thank you. You have been very helpful today.

De-briefing secondary school children

Thank you. That's the end of the examination.
Was it OK? (If No: What didn't you like?)
Was it what you expected? (Yes/No) (If No: What was not as you expected?)
As you were told earlier, we will be writing to your parents to let them know how it went, would you like to see the letter?
Yes/No
Yes – Provide relevant feedback from FEEDBACK FORMS A B C1 or C2
Do you have any questions you would like to ask?
Is there anything else you'd like to say before you leave?
Thank you. You have been very helpful today.
If the subject asks about their dental treatment need, the response will be that the survey is not designed to collect the sort of information on which a treatment can be planned, and that visiting a general dental practitioner is the best way of ensuring a thorough dental check-up. This is not only a way of deflecting potentially difficult questions, it is also absolutely true. You can give an indication of whether there is room for improvement in terms of the general oral hygiene/ cleanliness and use the statements below to generally categorise the subject's dental needs. In the case of older pupils the feedback letter can be shared with them. Guidance on how to allocate the feedback letters is suggested but examiners should used their clinical judgement as well. For example a pulp involved primary molar in a 5 year old would receive letter C1 but in an otherwise disease free 12 year old letter A would be appropriate.

Feedback letters

Category A No obvious oral problems

I recently examined ……..'s teeth as part of the 2013 Dental Health Survey of Children and Young People. I am able to give you some feedback.

It is important to understand that **this was not a full dental check-up**. The survey is not designed to collect information on which dental treatment can be planned. The examination is not the same as visiting a high street dentist, which is the best way of ensuring a thorough check-up. We cannot check the teeth as thoroughly as a dentist in a surgery and we cannot take X-rays.

Having looked at your child's mouth, it does appear overall to be healthy, and there are no teeth that obviously require urgent attention.

However, current evidence-based guidance suggests that they should see a dentist for a complete check-up at least once every twelve months. If they have not seen a dentist within the last year, you should arrange for them to do so in the coming months.

We would like to thank you again for your co-operation with this survey. By completing and returning the enclosed list of questions, you are providing important information on your child's dental care that will help plan better dental care services for the future.

Category B Minor issues requiring a dental check up

Anyone with disease requiring investigation / treatment (e.g dentine caries)

I recently examined ……'s teeth as part of the 2013 Dental Health Survey of Children and Young People. I am able to give you some feedback.

It is important to understand that **this was not a full dental check-up**. The survey is not designed to collect information on which dental treatment can be planned. The examination is not the same as visiting a high street dentist, which is the best way of ensuring a thorough check-up. We cannot check the teeth as thoroughly as a dentist in a surgery and we cannot take X-rays.

Having looked at your child's mouth today, there are no teeth that require urgent attention, but I think they would benefit from a thorough check-up. If your child is not already receiving treatment, I would recommend that you organise an appointment with a dentist within the next couple of months.

We would like to thank you again for your co-operation with this survey. By completing and returning the enclosed list of questions you are providing important information on your child's dental care that will help plan better dental care services for the future.

Category C Obvious or progressive oral disease requiring a check up within 1 month

Category C Anyone who scored 1 on the PUFA boxes or caries into pulp

I recently examined ……'s teeth as part of the 2013 Dental Health Survey of Children and Young People. I am able to give you some feedback.

It is important to understand that **this was not a full dental check-up**. The survey is not designed to collect information on which dental treatment can be planned. The examination is not the same as visiting a high street dentist, which is the best way of ensuring a thorough check-up. We cannot check the teeth as thoroughly as a dentist in a surgery and we cannot take X-rays.

Having looked at your child's mouth, there are some teeth that would benefit from a closer inspection. If your child is not already receiving treatment, I would recommend that you make them an appointment to see a dentist in the next couple of weeks.

We would like to thank you again for your co-operation with this survey. By completing and returning the enclosed list of questions, you are providing important information on your child's dental care that will help plan better dental services for the future.

C2 Anyone who reported pain, as opposed to other problems on the PUFA question

I recently examined ……'s teeth as part of the 2013 Dental Health Survey of Children and Young People. I am able to give you some feedback.

It is important to understand that **this was not a full dental check-up**. The survey is not designed to collect information on which dental treatment can be planned. The examination is not the same as visiting a high street dentist, which is the best way of ensuring a thorough check-up. We cannot check the teeth as thoroughly as a dentist in a surgery and we cannot take X-rays.

Having looked at your child's mouth, there are some teeth that would benefit from a closer inspection. During the examination, they also reported having pain in their mouth, so if your child is not already receiving treatment, I would recommend that you make them an appointment to see a dentist in the next couple of weeks.

We would like to thank you again for your co-operation with this survey. By completing and returning the enclosed list of questions, you are providing important information on your child's dental care that will help plan better dental care services for the future.

Procedure in the event of serious pathology being suspected

In the course of the survey or the training, you may encounter suspected serious pathology (e.g. malignancy). This is very unlikely as the prevalence of such potentially serious pathology is low. The examination is not a screening exercise and does not involve examination of the oral soft tissues. However, it is possible that you may notice such a lesion and, as the implications are serious, we have a protocol to deal with this.

If you notice such a lesion, you should try not to alarm the child. You should note the child's name, date of birth and school and contact Barbara Chadwick, Consultant in Paediatric Dentistry (see 'Contacts' for Barbara's contact details). Barbara will liaise with you to obtain parental contact details and will then contact them by telephone and arrange for the child to be seen by their general medical practitioner. A follow-up letter will be sent to the parents and the child's medical practitioner.

In order to protect the confidentiality of the children in the study, you should not inform anyone at the school about this. If the school needs to be informed Barbara Chadwick will do this.

Annex I Examination Form

DENTAL HEALTH SURVEY OF CHILDREN AND YOUNG PEOPLE 2013
Dental Examination Form

IN CONFIDENCE

Serial Number

IF PUPIL AGED 12 OR 15 — Tick if yes

Please confirm that the pupil has provided their consent to take part in the survey

Sex of pupil (ring code)

Male 1
Female 2

Date of birth of pupil — Month / Year

Age group* (ring code)

5 year olds: date of birth from 1st September 2007 to 31st August 2008	5
8 year olds: date of birth from 1st September 2004 to 31st August 2005	8
12 year olds: date of birth from 1st September 2000 to 31st August 2001	12
15 year olds: date of birth from 1st September 1997 to 31st August 1998	15

*NOTE: ELIGIBILITY IS DETERMINED BY DATE OF BIRTH, NOT ACTUAL AGE ON THE EXAMINATION DATE

Dentist name **Dentist no.**

Date of examination — Day / Month

Record outcome of examination (ring code)

Examination carried out (in full or part)	1
No examination, pupil absent from school	2
No examination, parent did not consent	3
No examination, pupil refused	4
No examination, other reason (write below)	5

Age of Child: | | |

1. ENAMEL OPACITIES
APPLIES IF AGED 12

Not aged 12 ring code ➔ 9 **➔ Go to section 2**

CRITERIA	
Type	
Normal	0
Demarcated	1
Diffuse	2
Hypoplasia	3
Demarcated & diffuse	4
Demarcated & hypoplasia	5
Diffuse & hypoplasia	6
All three defects	7
Other defects	8
Assessment cannot be made	9
Extent	
Normal	0
Less than 1/3 surface	1
1/3, less than 2/3 surface	2
2/3 surface or more	3
Assessment cannot be made	9

UPPER

	Right				Left			
	4	3	2	1	1	2	3	4
Type								
Extent								

Symmetry of diffuse enamel defects	
No diffuse defects	0
Diffuse defects not symmetrically distributed	1
Diffuse defects symmetrically distributed	2
Assessment cannot be made	9

Symmetry of diffuse Enamel defects | |

Photographic assessment of impact score for diffuse defects	
Comparison with photograph	
No diffuse defects	0
Non-symmetrical diffuse defects	1
Diffuse defect – similar to or less severe than photo	2
Diffuse defect – more severe than photo	3
Assessment cannot be made	9

Photographic Impact score | |

Age of Child: ☐☐

2. SIMPLIFIED IOTN – AESTHETIC COMPONENT

APPLIES IF AGED 12 OR 15

Not aged 12 or 15 ring code ➔ 9 ➔ Go to section 3

If wearing orthodontic appliance ring code ➔ 9 ➔ Go to section 3

Aesthetic Component — Grades 01 - 10 ☐☐

Age of Child: ☐☐

3. PERIO I

APPLIES TO ALL CHILDREN

CRITERIA	
Gingivae	
Healthy (no treatment)	0
Not healthy	1
Assessment cannot be made	9
Plaque	
None visible	0
Plaque visible	1
Assessment cannot be made	9
Calculus	
No calculus	0
Calculus present	1
Assessment cannot be made	9

Ring code

	UPPER								
	Right			Middle			Left		
Gingivae	0	1	9	0	1	9	0	1	9
Plaque	0	1	9	0	1	9	0	1	9
Calculus	0	1	9	0	1	9	0	1	9

Ring code

	LOWER								
	Right			Middle			Left		
Gingivae	0	1	9	0	1	9	0	1	9
Plaque	0	1	9	0	1	9	0	1	9
Calculus	0	1	9	0	1	9	0	1	9

Age of Child: [ ][ ]

4. TOOTH CONDITION

APPLIES TO ALL CHILDREN

CRITERIA

Tooth codes		Surface codes			
Unerupted	8	Sound	0	Filled, recurrent (cavitation)	4c
Extracted (caries)	6	Enamel caries (non cavitated)	Av	Filled (no decay)	5
Extracted (ortho)	7	Enamel caries (cavitated)	Ac	Filling needs replacing (no decay)	R
Missing trauma	T	Visual caries (non cavitated)	2v	Obviously sealed surface	X
		Cavitated caries	2c	Traumatised surface	t
		Decayed (pupal involvement)	3	Crown/advanced restoration	c
		Filled, recurrent (no visual cav)	4v		

UPPER
(ring tooth type)

Tooth surface	Right 8	7	6	e 5	d 4	c 3	b 2	a 1	a 1	b 2	c 3	d 4	e 5	6	7	Left 8
D	8															8
O	8					■	■	■	■	■	■					8
M	8															8
B	8															8
L	8															8

LOWER
(ring tooth type)

Tooth surface	Right 8	7	6	e 5	d 4	c 3	b 2	A 1	-	a 1	b 2	c 3	d 4	e 5	6	7	Left 8
D	8																8
O	8					■	■	■		■	■	■					8
M	8																8
B	8																8
L	8																8

5. PUFA

APPLIES TO ALL CHILDREN

Any pain or problem in mouth

0 = No pain or problem
1 = Yes, pain or problem [ ]

PUFA

0 = No lesion
1 = Single lesion
2 = Two or more lesions

Pulp [ ]
Ulcer [ ]
Fistula [ ]
Abscess [ ]

Age of Child: [ ][ ]

6. TRAUMA TO PERMANENT INCISORS

APPLIES TO ALL CHILDREN

No permanent incisors ring code → [9] → Go to section 7

CRITERIA (ring all that apply)	
No trauma	0
Discolouration	1
#Enamel	2
#Enamel and dentine	3
#Enamel, dentine, pulp	4
Missing due to trauma	5
Acid etch composite	6
Permanent replacement	7
Temporary restoration	8
Assessment cannot be made	9

Ring if permanent incisor is present

LOWER				UPPER			
Right		Left		Right		Left	
2	1	1	2	2	1	1	2
0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9

7. TOOTH SURFACE LOSS (TOOTH WEAR) OF INCISORS AND FIRST PERMANENT MOLARS

APPLIES TO ALL CHILDREN

CRITERIA	
Depth	
Normal	0
Enamel only	1
Enamel & Dentine	2
Enamel, Dentine & Pulp	3
Assessment cannot be made	9
Area	
Normal	0
Less than 1/3 surface	1
1/3, less than 2/3 surface	2
2/3 surface or more	3
Assessment cannot be made	9

UPPER RIGHT — Ring tooth type

	6	2 b		1 a	
	O	B	L	B	L
Depth					
Area					

UPPER LEFT — Ring tooth type

	1 a		2 b		6
	B	L	B	L	O
Depth					
Area					

LOWER RIGHT

	6
	O
Depth	
Area	

LOWER LEFT

6
O

Age of Child: | | |

8a. SIMPLIFIED IOTN – DENTAL HEALTH COMPONENT

APPLIES IF AGED 12 OR 15

Not aged 12 or 15, ring code → 9 → **Go to section 10**

If wearing orthodontic appliance, ring code → 9 → **Go to section 9**

Examine using 'MOCDO' Convention
If any of these present code 1

Missing teeth
Overjet
Crossbite
Displacement of contact points
Overbite

0 = Malocclusion Absent

1 = Malocclusion Present

N.B. Once a Code 1 is recorded, this part of the examination is complete. **But you need to record overjet in Section 8b.**

8b. OVERJET

0 = overjet less than 6mm

1 = overjet 6mm or more

9. ORTHODONTIC APPLIANCES

a) Upper arch (code one answer only)

Appliance worn at time of examination

No appliance	0
Fixed appliance	1
Removal appliance	2
Other appliance	3

Comments

b) Lower arch (code one answer only) Appliance worn at time of examination

No appliance	0
Fixed appliance	1
Removal appliance	2
Other appliance	3

Comments

CHILDREN NOT WEARING APPLIANCE

Never worn	0
Worn fixed appliance in past and finished wearing it	1
Worn removable appliance in past and finished wearing it	2
Worn appliance in past and still wearing it	3

Comments

10. SPECIFIC ANOMALIES (Ring code)

APPLIES TO ALL CHILDREN

Cleft Lip/palate

None	0
Present	1

Hypodontia with restorative implications

None	0
Present	1

Please specify in the comments section (end of form) in the case of hypodontia, and indicate any missing teeth.

Age of Child: | | |

11. PERIO II MODIFIED BPE & BLEEDING

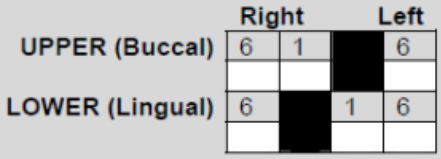
APPLIES IF AGED 15

Not aged 15 exam complete

BPE

Modified BPE CRITERIA

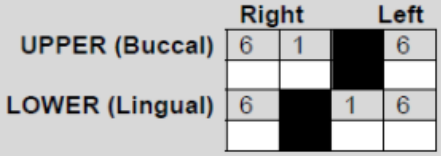
No bleeding	0
Bleeding, no retentive factor	1
Bleeding, retentive factor	2
Shallow pocket (black part visible)	3
Deep pocket (black band disappears)	4
Assessment cannot be made	9



Bleeding

BLEEDING CRITERIA

No bleeding	0
Bleeding	1
Assessment cannot be made	9



DENTIST'S COMMENTS

Feedback letter: Applies to all (tick relevant version)

A	B	C	C2

Annex J Sample and Outcomes Sheet

Ref number: /

School..... Ref number: /

Sample & Outcomes sheet											
Information to return to ONS								To be kept in school			
Pupil No	Sex (M/F)	E code	Date of birth (MM/YY)	Home Postcode	M (Y/N)	Consent given (Y/N)	Exam outcome	Pupil No	Name	Yr	Class

Annex K Primary Parent Consent form

Dental Health Survey of Children and Young People

Consent for Dental Check-Up

To be completed by parent/guardian. Please use capital letters and write in ink.

1. I confirm that I have read and understood the information in the enclosed letter and information leaflet for the above study.

2. I consent to a qualified dentist carrying out a dental check-up of my child.

3. I understand that my child's participation is voluntary and that I am free to withdraw consent to the dental check-up at any time before it is completed.

Child's Name_____

[WRITE IN CAPITALS]

Your Name _____

[WRITE IN CAPITALS]

Signed_____ **Date**_____

(To be signed by parent/guardian of the child named above)

Please return this form to ONS within the next 7 days in the pre-paid envelope provided.

Thank you for your help

Annex L Primary Parent Letter

Please help us to plan better dental services for children

Every 10 years we look at the teeth of 5 and 8 year olds to see if the dental health of children has improved. This important survey helps the NHS plan dental healthcare. We are inviting you to have your say about your child's dental health and the dental health services in your community.

Barry Cockcroft CBE, the Chief Dental Officer for England, said,

'Support from dentists, schools, parents and children is vital to the success of this survey. It helps measure changes in oral health and provides information to policy-makers on how best to plan dental services in the future.'

Why was my child chosen to take part in the survey?

More than 1,000 primary and secondary schools were chosen at random to represent schools throughout England, Wales and Northern Ireland. Your child's school has agreed to take part, and your child has been chosen at random to help us. **Your child is very important to this survey**. By taking part they will help us provide an accurate picture of children's dental health in 2013.

What does taking part involve for my child?

Taking part involves a 5 minute dental check-up with a specially trained dentist. A dental nurse will record the results. The check-up will take place at your child's school during the school day.

Does my child have to take part?

You decide if your child takes part in the survey. If you are happy for your child to be included, **please fill in and return the enclosed consent form** in the pre-paid envelope provided within the next 7 days.

I have more than one child. Which child has been selected to take part?

The name of the child who has been chosen to take part in the survey is detailed in the letter that you received with this leaflet.

Will my child be given any dental treatment as part of the study?

No. The dentist will just look at your child's teeth. The check-up is designed to provide an overall picture of children's dental health rather than to make recommendations for the treatment of individual children. It should not replace any dental check-up or treatment your child would usually have and will not affect or interfere with any dental treatment or care your child is currently having.

Will I receive feedback on my child's dental health?

After the check-up, we will send you some feedback on your child's oral health. If the dentist thinks there might be a serious condition during the check-up, they will contact a member of the survey team who is a Consultant in Child Dentistry. They will follow a set procedure to inform you, and with your agreement make arrangements for your child to be seen by their doctor. This is very unlikely to happen.

What does taking part involve for me as a parent or guardian?

Following your child's dental check-up, you will receive a questionnaire. This is your chance to have a say about your child's dental treatment and care, including your experience of the dental care they receive.

Will the school see the results of the survey?

All schools that are in the survey will be sent a summary of the main findings in their area. We will make sure that no-one can be identified from the summary results we publish.

Are the results of the survey confidential?

Yes, the information you give us will be treated as strictly confidential as directed by the Code of Practice for Official Statistics. It will be used to produce statistics that will not identify your child's school, your child, or anyone in your household. Survey information is also provided to other approved organisations for statistical purposes only. All such statistics produced are subject to the Code and the same standards of protection are applied to your information at all times.

Who are we?

The Office for National Statistics is the Government's largest producer of statistics. We collect independent information about the UK's society and economy which provides evidence for policy and decision making, and for directing resources to where they are needed most. The ten-yearly census, measures of inflation, the National Accounts, and population and migration statistics are some of our highest-profile outputs.

The 2013 Dental Health Survey of Children and Young People is being carried out by the

Office for National Statistics in partnership with the National Centre for Social Research, Northern Ireland Statistics and Research Agency and the Dental School of the University of Birmingham, Cardiff University School of Dentistry, Newcastle University School of Dental Sciences, the University College London Dental Public Health Group and King's College London Dental Institute.

Where will the survey results be published?

The Health and Social Care Information Centre will publish the survey findings on their website: www.hscic.gov.uk.

Where can I find out more about the study?

You can contact our free phone Survey Enquiry Line on **0800 298 5313**. Opening times are 9am–9pm on Monday to Thursday, 9am–8pm on Friday and 9am–1pm on Saturday. You can also email the survey team **DentalSurvey@ons.gov.uk.**

Thank you for taking the time to read this leaflet.

To find out more about this survey, visit
www.ons.gov.uk/surveys

Annex M Secondary school parent leaflet

Please help us to plan better dental services for children

Every 10 years we look at the teeth of 12 and 15 year olds to see if the dental health of children has improved. This important survey helps the NHS plan dental healthcare. We are inviting you to have your say about your child's dental health and the dental health services in your community.

David Thomas, the Chief Dental Officer for Wales, said, 'Support from dentists, schools, parents and children is vital to the success of this survey. It helps measure changes in oral health and provides information to policy-makers on how best to plan dental services in the future.'

Why was my child chosen to take part in the survey?

More than 1,000 primary and secondary schools were chosen at random to represent schools throughout England, Wales and Northern Ireland. Your child's school has agreed to take part, and your child has been chosen at random to help us. **Your child is very important to this survey**. By taking part they will help us provide an accurate picture of children's dental health in 2013.

'Support from dentists, schools, parents and children is vital to the success of this survey. It helps measure changes in oral health and provides information to policy-makers on how best to plan dental services in the future.'

David Thomas, the Chief Dental Officer for Wales

Who are we?

The Office for National Statistics is a government department and is the Government's largest producer of statistics. We collect independent information about the UK's society and economy which provides evidence for policy and decision making, and for directing resources to where they are needed most. The ten-yearly census, measures of inflation, the National Accounts, and population and migration statistics are some of our highest-profile outputs.

The 2013 Dental Health Survey of Children and Young People is being carried out by the Office for National Statistics in partnership with the National Centre for Social Research, Northern Ireland Statistics and Research Agency and the Dental School of the University of Birmingham, Cardiff University School of Dentistry, Newcastle University School of Dental Sciences, the University College London Dental Public Health Group and King's College London Dental Institute.

Where will the survey results be published?

The Health and Social Care Information Centre, will publish the survey findings on their website: www.hscic.gov.uk

What does taking part involve for me as a parent or guardian?

Following your child's dental check-up, you will receive a questionnaire. This is your chance to have a say about your child's dental treatment and care, including your experience of the dental care they receive.

Will the school see the results of the survey?

All schools who are in the survey will be sent a summary of the main findings in their area. We will make sure that no-one can be identified from the summary results we publish.

Are the results of the survey confidential?

Yes, the information you give us will be treated as strictly confidential as directed by the Code of Practice for Official Statistics. It will be used to produce statistics that will not identify your child's school, your child, or anyone in your household. Survey information is also provided to other approved organisations for statistical purposes only. All such statistics produced are subject to the Code and the same standards of protection are applied to your information at all times.

What does taking part involve for my child?

Taking part involves a 10 minute dental check-up with a specially trained dentist. A dental nurse will record the results.

Your child will also be asked to complete a short questionnaire. The dental check-up and completion of the questionnaire will take place at your child's school during the school day.

Does my child have to take part?

Participation is voluntary and if you decide to withdraw your child from the survey their dental care will not be affected in any way. If you do not want your child to take part, please phone us free of charge on **0800 298 5313** to let us know.

I have more than one child. Which child has been selected to take part?

The name of the child who has been chosen to take part in the survey is detailed in the letter that you received with this leaflet.

Will my child be given any dental treatment as part of the study?

No. The dentist will not carry out any treatment but will just look at your child's teeth. The check-up is designed to provide an overall picture of children's dental health rather than to make recommendations for the treatment of individual children. It should not replace any dental check-up or treatment your child would usually have and will not affect or interfere with any dental treatment or care your child is currently having.

Will I receive feedback on my child's dental health?

After the check-up, we will send you some feedback on your child's oral health. If the dentist thinks there might be a serious condition during the check-up, they will contact a member of the survey team who is a Consultant in Child Dentistry. They will follow a set procedure to inform you, and with your agreement make arrangements for your child to be seen by their doctor. This is very unlikely to happen.

Annex N Feedback Letters

A

Date:

Our Ref:

Dear Parent / Guardian

I recently examined ……..'s teeth as part of the 2013 Dental Health Survey of Children and Young People. I am able to give you some feedback.

It is important to understand that **this was not a full dental check-up**. The survey is not designed to collect information on which dental treatment can be planned. The examination is not the same as visiting a high street dentist, which is the best way of ensuring a thorough check-up. We cannot check the teeth as thoroughly as a dentist in a surgery and we cannot take X-rays.

Having looked at your child's mouth, it does appear overall to be healthy, and there are no teeth that obviously require urgent attention.

However, current evidence-based guidance suggests that they should see a dentist for a complete check-up at least once every twelve months. If they have not seen a dentist within the last year, you should arrange for them to do so in the coming months.

We would like to thank you again for your co-operation with this survey. By completing and returning the enclosed list of questions, you are providing important information on your child's dental care that will help plan better dental care services for the future.

Yours Sincerely,

Survey Dentist

Office for National Statistics

B

Date:

Our Ref:

Dear Parent / Guardian

I recently examined ……'s teeth as part of the 2013 Dental Health Survey of Children and Young People. I am able to give you some feedback.

It is important to understand that **this was not a full dental check-up**. The survey is not designed to collect information on which dental treatment can be planned. The examination is not the same as visiting a high street dentist, which is the best way of ensuring a thorough check-up. We cannot check the teeth as thoroughly as a dentist in a surgery and we cannot take X-rays.

Having looked at your child's mouth today, there are no teeth that require urgent attention, but I think they would benefit from a thorough check-up. If your child is not already receiving treatment, I would recommend that you organise an appointment with a dentist within the next couple of months.

We would like to thank you again for your co-operation with this survey. By completing and returning the enclosed list of questions you are providing important information on your child's dental care that will help plan better dental care services for the future.

Yours sincerely,

Survey Dentist

C

Date:

Our Ref:

Dear Parent / Guardian

I recently examined ……'s teeth as part of the 2013 Dental Health Survey of Children and Young People. I am able to give you some feedback.

It is important to understand that **this was not a full dental check-up**. The survey is not designed to collect information on which dental treatment can be planned. The examination is not the same as visiting a high street dentist, which is the best way of ensuring a thorough check-up. We cannot check the teeth as thoroughly as a dentist in a surgery and we cannot take X-rays.

Having looked at your child's mouth, there are some teeth that would benefit from a closer inspection. If your child is not already receiving treatment, I would recommend that you make them an appointment to see a dentist in the next couple of weeks.

We would like to thank you again for your co-operation with this survey. By completing and returning the enclosed list of questions, you are providing important information on your child's dental care that will help plan better dental services for the future.

Yours sincerely,

Survey Dentist

Office for National Statistics

C2

Date:

Our Ref:

Dear Parent / Guardian

I recently examined ……'s teeth as part of the 2013 Dental Health Survey of Children and Young People. I am able to give you some feedback.

It is important to understand that **this was not a full dental check-up**. The survey is not designed to collect information on which dental treatment can be planned. The examination is not the same as visiting a high street dentist, which is the best way of ensuring a thorough check-up. We cannot check the teeth as thoroughly as a dentist in a surgery and we cannot take X-rays.

Having looked at your child's mouth, there are some teeth that would benefit from a closer inspection. During the examination, they also reported having pain in their mouth, so if your child is not already receiving treatment, I would recommend that you make them an appointment to see a dentist in the next couple of weeks.

We would like to thank you again for your co-operation with this survey. By completing and returning the enclosed list of questions, you are providing important information on your child's dental care that will help plan better dental care services for the future.

Yours sincerely,

Survey Dentist

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