Office for Health Improvement & Disparities

National Dental Epidemiology Programme

Training and calibration guide for oral health surveys of children

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1. Overview of survey training and calibration

Accessible alternative text is below the flowchart.

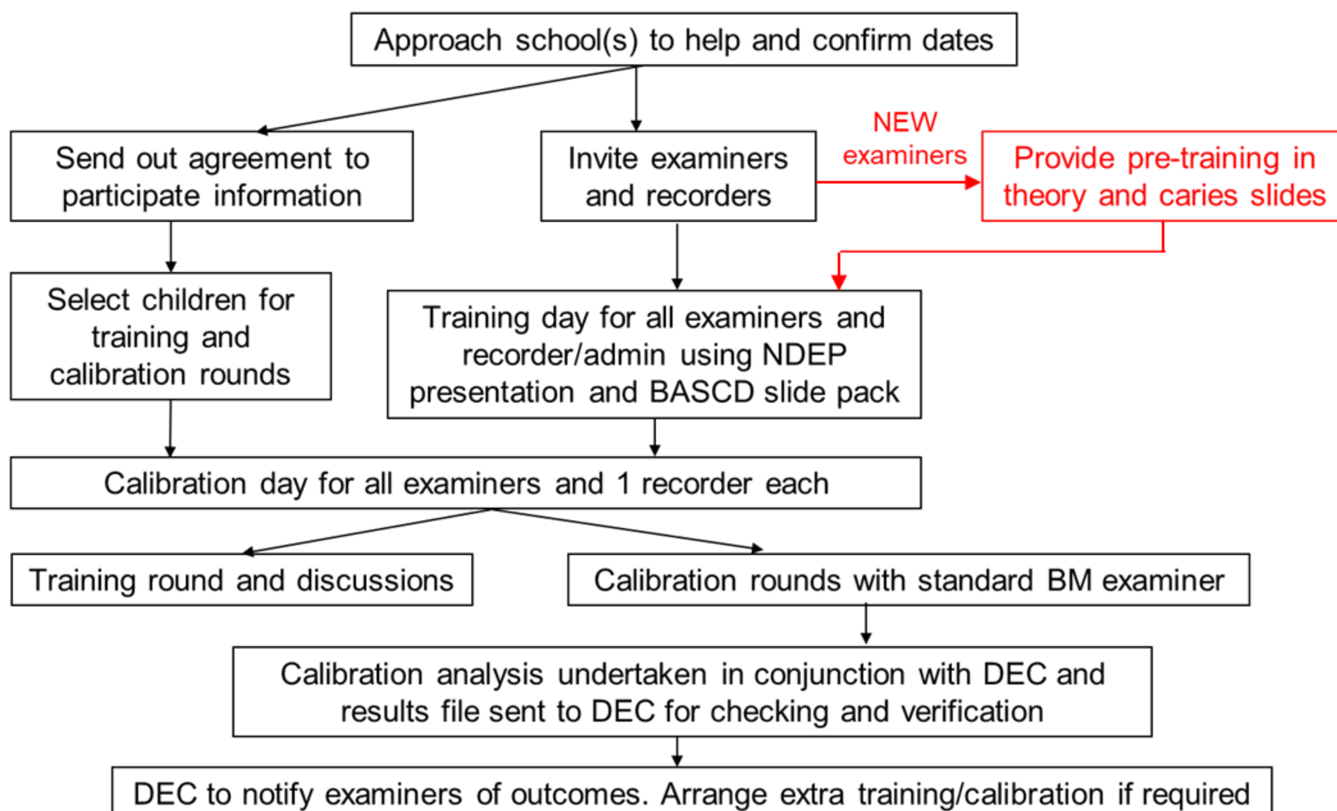


Figure 1: training and calibration flow-chart

This flowchart gives an overview of the steps in running a training and calibration event as part of a dental survey.

1. Approach local schools where the training and calibration event can be held and agree dates with the schools for the events.

2. Send out agreement to participate information to parents and people with parental responsibility of children of the required age.

3. Go into the school and select children suitable for the training and calibration event.

4. Send out details of the training and calibration event to local fieldwork teams who will be undertaking the survey.

5. If there are any new examiners, provide pre-training on the theory and the dental caries (decay) training slide pack.

6. Hold the training event for all examiners and recorders using the national training slide sets.

7. Hold the calibration event for all examiners and their recorders, to include training rounds and the calibration rounds.

8. Analyse the data from the calibration rounds with the local dental epidemiology co-ordinator and send the results to the dental epidemiology co-ordinator to check and confirm these.

The local dental epidemiology co-ordinator will then inform the examiners of the outcomes of the calibration exercise. Additional training and calibration may need to be arranged if anyone fails to calibrate.

2. Planning and running a local training event

1. Set a date ensuring the dental epidemiology co-ordinator (DEC) and regional trainers are available to attend.

2. Invite examiners, recorders and any administrative staff who undertake survey admin. If it is an online event send the link to join the meeting, if it is a face-to-face event send details of the venue and timings.

3. Ask attendees to download and read the protocol for the forthcoming survey from the oral health collections website before the training event.

4. Hold a pre-training session for any new examiners, working through the protocol, coding conventions and British Association for the Study of Community Dentistry (BASCD) training slides to ensure they fully understand everything before the regional training event.

5. Tailor the National Dental Epidemiology Programme (NDEP) regional PowerPoint presentation (available to download from the 'DEC Information' Microsoft Teams channel) to suit the local event with regards to speakers, timings and past local authority survey errors.

6. Hold an on-line or face-to-face training day delivering the tailored NDEP regional PowerPoint presentation and the revised BASCD caries training pack slides.

3. Planning a local calibration event

1. Select a school. It is a good idea to approach a school in a deprived area as they will be interested in the benefit of screening the children and information about local dental services. When selecting a school consider:

    - the size of the school
    - disease levels
    - accessibility
    - co-operation
    - size of room allocated and the possible need to hold 2 calibration days for the number of examiners
    - plug sockets

2. Set a date ensuring there are no school trips planned on that date and the DEC and regional trainers are available to attend.

3. Invite survey examiners and limit the invite to include one recorder per examiner. This ensures there is no overcrowding around a child and in the room. The recorder should preferably be an experienced recorder who has undertaken the survey previously. This is a calibration event not a 'training the recorder' event. Examiners may be stressed under calibration conditions and using inexperienced recorders may lead to errors in transcribing codes onto the data collection sheets. If any survey recorders need training or time to practice, then this should be done at the clinic.

4. Send the calibration date to the national dental public health team administrator with details of any capacity available to accommodate extra examiners from other areas.

5. Check the school's requirement for Disclosure Barring Service (DBS) certificates and whether they require basic or enhanced certificates. Also check the school's safeguarding policies. Share a calibration risk assessment with the school if requested.

6. Send out agreement to participate letters to children to include the screening selection day and the calibration day (Appendix 1).

7. Consider a suitable amount of money to give the school as a thank you gift for allowing you to use their school. This may vary depending on how many days you are at the school.

8. Consider suitable thank you gifts for the children taking part in the screening and calibration days, for example ‘goodie bags’ including a toothbrush.

4. Undertaking screening

The screening can either be done with the child lying supine and completion of a full data collection sheet or standing up with a quick look in their mouth, making notes to the suitability of the child. The latter is simpler and quicker as you do not need a full examination chart to select appropriate children, you just need to know if they have any decay experience or not and to what extent. Feedback should be given to parents or persons with parental responsibility as necessary.

Equipment required for screening:

- DBS certificate
- personal protective equipment (PPE)
- viricidal wipes, barrier coverings
- probes, mirrors, cotton rolls, gloves
- Daray lamp, extension lead, sunglasses
- wipeable mat, for example exercise mat or padded table cover
- goodie bags

Selection of children

If undertaking a deciduous dentition calibration (for example for a survey of 5-year-old children) select children from Reception, Year 1, Year 2 and Year 3. If undertaking a mixed dentition calibration (for example for a survey of children in Year 6) select children from Year 4, Year 5 and Year 6. If undertaking a permanent dentition calibration (for example for a survey of 12 or 14-year-old children) select children from Year 7 and Year 8 or Year 9 and Year 10.

Selection of children for the training round

When selecting children for the training round consider their age and how co-operative they are. Select children with one or more teeth that have lesions to illustrate correct levels of caries recording. For the training round the children could have many carious teeth that would be good for discussion although they should be free of anything that would make repeat examinations uncomfortable for example diffuse buccal swelling.

Selection of children for the calibration rounds

When selecting children for the calibration rounds consider their age and how co-operative they are. Any child that is too nervous or unsure would not be suitable as they may decide they want to leave before all the examiners have had an opportunity to examine them. This would then result in having to remove the child's previous examinations from the analysis.

Select at least 10 children who have one or more teeth with caries experience and some children who appear caries free. They should not have too many teeth with caries experience or any lesion that is too complicated for a decision to be made as the calibration round needs to keep flowing smoothly, with each child examined for a similar amount of time. Consider using a child with extensive decay experience, stipulating that only one arch is to be examined and recorded during the calibration. This ensures that examining this child would not take too long. The children should be free of anything that would make repeat examinations uncomfortable, for example diffuse buccal swelling.

5. Running a calibration event

Information to send to fieldwork teams

A letter should be sent to all attendees clearly stating the venue, date and arrival time to set up (Appendix 2). It should include the address, postcode and a map of the venue with any advice with regards to parking facilities and the school entrance to be used. The letter should request all attendees have up-to-date DBS certificates, as most schools prefer these to be no more than 3 years old, and clearly state what type the school requires, that is basic or enhanced.

Also include a list of equipment the teams are required to bring:

- PPE: gloves, face masks (FRSM)
- Daray lamp, extension lead, mat (wipeable)
- sunglasses, clipboard, pencil, eraser
- stickers for the children

Equipment required for calibration

Equipment required for calibration includes:

- viricidal wipes, for example Clinell wipes, IC barriers
- probes, mirrors, cotton rolls, trays
- hazard tape, clinical waste bags, sharps boxes
- table numbers and labels for children
- bell and timer
- data collection forms for both training and calibration rounds (Appendix 4)
- paper data collection grids (Appendix 5)
- goodie bags
- refreshment arrangements for fieldwork teams

Layout of the room

The room should be laid out ideally in a circle, with examiners' lights and chairs at the circle centre end of the table, so the children's legs are facing outwards towards the wall when they are lying on the table. This provides more privacy for the children and helps examiners and recorders to avoid extension cords and other potential hazards. Hazard tape must be stuck over trailing extension and light leads to help avoid any trip hazards. If room space dictates that tables need to be in rows rather than a circle, then make sure all the children are facing the same way. Remember there will be one empty workstation in the training round as the benchmark will not be examining in this round, but it needs to be set up ready for the calibration rounds.

Numbers can be stuck onto tables, lights or backs of chairs, but will need to be changed for each calibration round to avoid repetition of numbers for different children. An alternative would be to not label the workstation but to label the child with their name and number before they proceed to a table. Have spare labels available in case any lose their stickiness or substitute children are needed.

An extra couple of tables with chairs should be set out either in the centre of the circle or at one end of the room. These tables can be used for spare equipment and paperwork but are mainly used by the members of staff who are undertaking the data collection sheet calculations, completing the data collection grids and overseeing the timings of rounds.

Good practice

It is good practice to have one child per examiner per round. This ensures that no children are without an examiner and there is no need for extra staff to look after those children. Never leave children unattended. If you do not have enough children for one child per examiner per round, then set up spare chairs or stations in between the children for the examiners to sit at while waiting to move on. Make sure the spare stations are evenly spread and not altogether.

Have a member of staff acting as a runner. Once the recorder has completed the data collection sheet, ask them to hold the sheet in the air so the runner can collect them and hand them into the 'top table' after each examination. This then ensures only one person is walking back and forth from the 'top table'.

At the 'top table', have one member of staff adding up the number of teeth on the data collection sheets and another member of staff transferring the counts onto the data collection grid. Between them they can keep a track of timings and ring the bell when it is time for the examiners to move to the next child.

Only when the bell has rung should the examiners move to the next child, in a clockwise direction. This avoids any children being left unattended and stops any examiners 'table jumping'. Children must remain at their table with their instruments and the examiners move around the room.

Training round

There should be one training round used as a practice round to enable examiners to become 'stable' decision makers using the diagnostic criteria. Examiners can consult the national protocol during the training round if they require. The regional benchmark should not undertake this round but should be available to discuss any queries an examiner may have. They should help ensure examiners go through the decision-making process so that they reach a decision themselves, for example get them to talk through what they see. The benchmark should circulate round the room and always approach those who do not ask for assistance as well as those who do. There may be some examiners who are unsure but do not want to make it obvious they require some help.

Ensure examiners use the 'If in doubt score low' recommendation.

The training round could start with 4 minutes per exam, reducing the time as the examiners become more experienced. The runner should collect completed data collection sheets from the recorders after each examination and the 'top table' members of staff should calculate the tooth counts on the sheets (Appendix 3) and transfer the counts onto the data collection grid (Appendix 4). They should keep an eye out for any outliers and inform the regional benchmark if they feel there is a need for any examiner to be approached with guidance over decisions or for clarity on decisions. It is better to address any issues or concerns in the training round than let it carry on into the calibration rounds and risk an examiner failing to calibrate.

Use discussion time between the training and calibration rounds to flag up any issues. If there is a particular diagnosis to discuss with the group, avoid crowding round one child.

Calibration rounds

There should be at least 2 calibration rounds with an overall total of at least 10 children with decay experience, plus some who are caries free. The regional benchmark is required to undertake these rounds for examiner comparability. Calibration exams should be approximately 2 to 3 minutes per child. The runner should collect completed data collection sheets from the recorders after each examination and the 'top table' members of staff should calculate the tooth counts on the sheets (Appendix 3) and transfer the counts onto the data collection grid (Appendix 4).

6. Data calculation and analysis

Data calculation at the calibration event

If there is a mixture of coding on a single tooth, then decay (codes 1 to 4) takes precedence over filled (codes 5,R,C,N) or sealed ($) when deciding how to count the teeth:

1. On the data collection sheets, add up the total number of teeth that are:

    - dt/DT: decayed (codes 1 to 4)
    - mt/MT: missing due to decay (code 6)
    - ft/FT: filled (codes 5,R,C,N)
    - Present T/t: count the number of teeth present for deciduous or mixed dentition
    - $T: sealed (code $) for permanent dentition

2. Transfer the counts onto the paper data collection grid for every examination and have one grid for the training round and one grid for the calibration rounds.

Calibration analysis

This can be completed by either the DEC or the regional trainer in conjunction with the DEC. If completed by the regional trainer it must be checked and verified by the DEC:

3. Input the data on the data collection grid for the calibration rounds into the Excel template. This is available to download from the 'DEC Information' Microsoft Teams channel (Appendix 4).

4. On the data sheet tab complete the yellow boxes. Enter the number of children examined and the number of examiners excluding the benchmark (Appendix 5).

5. The template then automatically calculates the examiner averages, the deviation from the benchmark and the deviation from the group mean. It also plots the results onto a chart with confidence limit bars (Appendix 6).

6. Using the BASCD guidance below decide if any examiners did not calibrate successfully:

- the examiner mean should be no more than 0.5 dmft/DMFT away from the benchmark mean (Appendix 5)

- the examiner mean should lie between the group mean 95% confidence limits on the chart (Appendix 6)

7. If there are any outliers first check for data input errors against the data collection forms.

8. For outliers calculate the sensitivity and specificity and/or the Kappa score according to the BASCD guidance below:

   - deciduous/mixed dentition, sensitivity compared with benchmark dft greater than or equal to 0.75

   - deciduous/mixed dentition, specificity compared with benchmark dft greater than or equal to 0.90

   - permanent dentition, sensitivity compared with benchmark DFT greater than or equal to 0.80

   - permanent dentition, specificity compared with benchmark DFT greater than or equal to 0.90

7. Feeding back results

Results should not be given at the calibration event as the calibration Excel file has to be checked and verified by the DEC. Once the results have been verified the DEC should inform the successful examiners as soon as possible that they have calibrated. Any examiners considered to be unsuccessful should be offered suitable remedial action.

Suitable remedial action for unsuccessful examiners could include:

- looking at areas of disagreement
- checking the use of codes
- re-training with BASCD slides training pack
- looking at cases together with the trainer or benchmark examiner
- re-calibrating at the national re-calibration event or in a different area from their local event
- running a mini-calibration with the benchmark examiner to recalculate the level of agreement
- consider using an alternative examiner as a last course of action

8. Acknowledgements

Thanks to Paddy Evans, Kent Community Health Trust.

9. Appendices

Appendix 1: calibration agreement to participate (editable pdf to print)

This appendix is a screening and calibration agreement to participate letter for parents or persons with parental responsibility and is available to download and print from the oral health survey guidance section of the oral health collections website.

Appendix 2: example of letter to attendees

Training and calibration exercise for the primary dentition for the National Dental Epidemiology Programme

Monday 5 July and Thursday 8 July 2022

Hosted by Kent Community Health NHS Trust

Quality standards provided by British Association for the Study of Community Dentistry (BASCD)

Programme

Monday 5 July 2022 – Online training via Microsoft Teams

For fieldwork teams and survey administrative staff.

Time	Item	Presenter
10:00	Welcome	Paddy Evans – UK BASCD Standard Examiner
10:10	Update on the programme	Kate Jones, OHID
10:20	Data quality in recent surveys	Janet Neville, OHID
10.25	Feedback on recent surveys	Gail Douglas, University of Leeds
10:35	Oral health website	David Wilcox, OHID
10:50	Break	
11:05	Procedures for the survey of 5-year-old children 2021 to 2022	All
12:35	Training pack for recorders	Colum Durkan, NHSE
12:50	Lunch	

Time	Item	Presenter
13:30	For standard examiner teams and any DECs who wish to participate: Procedure at the school for clinical training and calibration BASCD training presentation for caries prevalence studies Questions	Paddy Evans
15:30	Final comments	

Thursday 8 July 2021 – calibration at Argyle Primary School, Tonbridge Street, London WC1H 9EG

For examiners and one recorder each – clinical training and calibration for the primary dentition (times approximate).

Time	Item
08:30	Arrive at school and set up
09:10	Training examinations for caries assessments
10:10	Discussion and clarification of points from training
10:30	Calibration session 1
12:00	Lunch will be provided at the school
13:15	Calibration session 2
15.00	Calibration finish, pack away
15:30	Teams depart for home

Equipment list

Teams are not required to bring a uniform but to wear professional dress that can comply with infection control (bare below the elbow).

The teams will need to bring a purpose-built light yielding approximately 4,000 lux at one metre, the standard lamp for the survey is the Daray model X100E, with an up-to-date PAT testing certificate.

They will also need to bring:

- spare bulb, Philips screwdriver to change the bulb
- extension lead with an up to date PAT testing certificate
- mat for children to lie on and tape to secure to a table or a fully reclining chair
- latex-free gloves (1 box) for examiner
- face visor for examiner
- sunglasses for children aged 4 to 7 years old
- clip board, pencils, erasers
- stickers to give to children

Kent Community Health NHS Trust will provide:

- all mirrors and CPITN probes
- sharps boxes and clinical waste bags
- cotton wool rolls, gauze squares
- Clinell wipes
- alcohol gel
- barrier covers
- fluid resistant surgical masks
- disposable kidney dishes
- data sheets
- map of the school (see below)

Argyle Primary School, Tonbridge Street, WC1H 9EG, location map shown below.

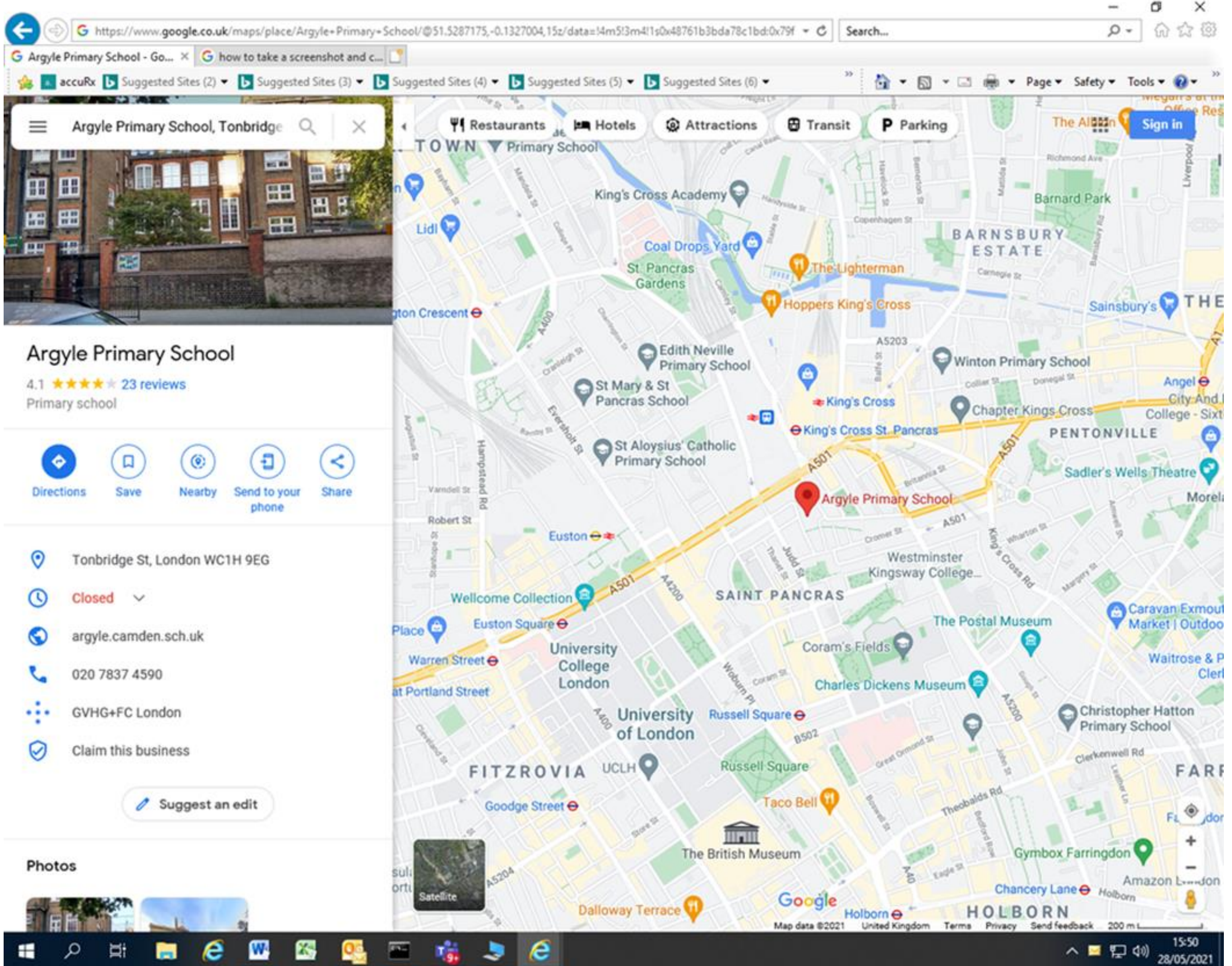
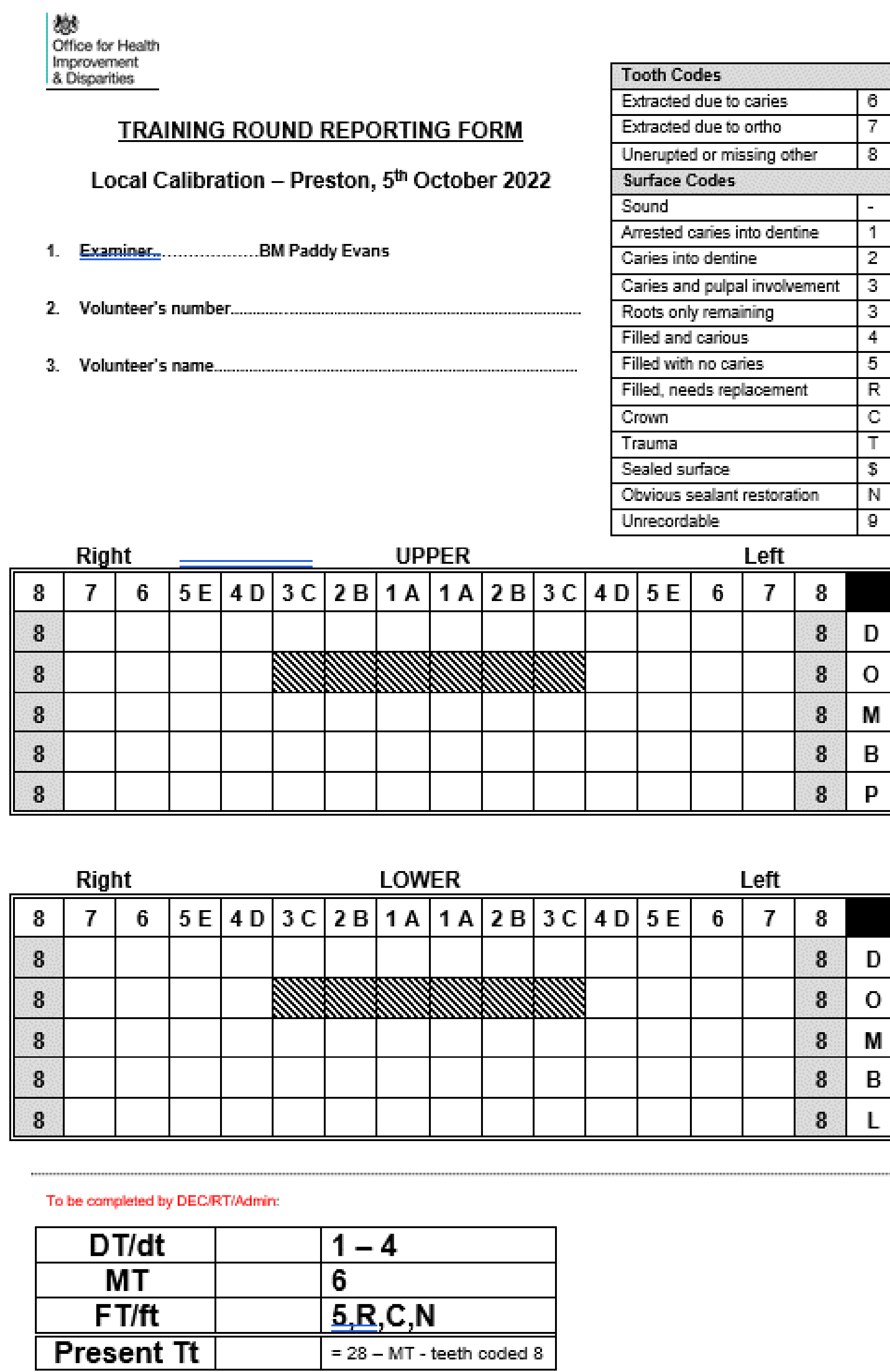


Figure 2: example of location map

Appendix 3: data collection forms for training and calibrations rounds

These deciduous forms along with mixed and permanent dentition versions are all available from the national dental public health team via your local dental epidemiology co-ordinator. An illustration of the training data collection form is shown below.



Office for Health Improvement & Disparities

TRAINING ROUND REPORTING FORM

Local Calibration – Preston, 5th October 2022

1. Examiner.....................BM Paddy Evans

2. Volunteer's number...

3. Volunteer's name...

Tooth Codes	
Extracted due to caries	6
Extracted due to ortho	7
Unerupted or missing other	8
Surface Codes	
Sound	-
Arrested caries into dentine	1
Caries into dentine	2
Caries and pulpal involvement	3
Roots only remaining	3
Filled and carious	4
Filled with no caries	5
Filled, needs replacement	R
Crown	C
Trauma	T
Sealed surface	S
Obvious sealant restoration	N
Unrecordable	9

Right UPPER Left

8	7	6	5 E	4 D	3 C	2 B	1 A	1 A	2 B	3 C	4 D	5 E	6	7	8	
8															8	D
8															8	O
8															8	M
8															8	B
8															8	P

Right LOWER Left

8	7	6	5 E	4 D	3 C	2 B	1 A	1 A	2 B	3 C	4 D	5 E	6	7	8	
8															8	D
8															8	O
8															8	M
8															8	B
8															8	L

To be completed by DEC/RT/Admin:

DT/dt		1 – 4
MT		6
FT/ft		5,R,C,N
Present Tt		= 28 – MT - teeth coded 8

Figure 3: training round reporting form

An illustration of the calibration data collection form is shown below.

Tooth Codes	
Extracted due to caries	6
Extracted due to ortho	7
Unerupted or missing other	8
Surface Codes	
Sound	-
Arrested caries into dentine	1
Caries into dentine	2
Caries and pulpal involvement	3
Roots only remaining	3
Filled and carious	4
Filled with no caries	5
Filled, needs replacement	R
Crown	C
Trauma	T
Sealed surface	$
Obvious sealant restoration	N
Unrecordable	9

CALIBRATION REPORTING FORM

Local Calibration – Preston, 5th October 2022

1. Examiner.....................BM Paddy Evans
2. Volunteer's number...
3. Volunteer's name...

Right UPPER Left

8	7	6	5 E	4 D	3 C	2 B	1 A	1 A	2 B	3 C	4 D	5 E	6	7	8	
8															8	D
8															8	O
8															8	M
8															8	B
8															8	P

Right LOWER Left

8	7	6	5 E	4 D	3 C	2 B	1 A	1 A	2 B	3 C	4 D	5 E	6	7	8	
8															8	D
8															8	O
8															8	M
8															8	B
8															8	L

To be completed by DEC/RT/Admin:

DT/dt		1 – 4
MT		6
FT/ft		5,R,C,N
Present Tt		= 28 – MT - teeth coded 8

Figure 4: calibration round reporting form

Appendix 4: data collection grid

The data collection grid can be printed on A3 paper for completion during the training and calibration rounds. There is also an electronic grid to be completed within the calibration Excel template. The deciduous, mixed and permanent dentition versions are all available from the national dental public health team via your local dental epidemiology co-ordinator. An illustration of the electronic data collection grid is shown below.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
1																								
2	d		m																					
3		f		CHILDREN																				
4			t		16			17			18			19			20			21			22	
5				13		0	0		0	5		0	2		0	0		0	0		0	0		0
6	BM				0			0			0			0			0			0			0	
7						20			20			20			20			20			20			20
8				10		0	0		0	5		0	3		0	0		0	0		0	0		0
9	2				0			0			0			1			0			0			0	
10						20			20			20			20			20			20			20
11				5		0	0		0	4		0	2		0	0		0	0		0	0		0
12	3				1			0			0			0			0			0			0	
13						20			20			20			20			20			20			20
14				12		0	0		0	5		0	2		0	0		0	0		0	0		0
15	4				0			0			0			0			0			0			0	
16						20			20			20			20			20			20			20

Figure 5: example of calibration Excel data collection grid

Appendix 5: calibration Excel template, results sheet

The deciduous, mixed and permanent dentition versions are all available from the national dental public health team via your local dental epidemiology co-ordinator. An illustration of the template results sheet is shown below.

Row										
16										
17	Number of children examined	28		Number of examiners (excluding Benchmark)		15				
18										
19	Examiner	dmft	dt	mt	ft	Present t	Deviation from Benchmark	Deviation from Group mean	Sensitivity	Specificity
20	BM	3.32	3.25	0.00	0.07	27.32	-	0.05		
21	1	3.29	3.21	0.00	0.07	27.32	-0.03	0.01		
22	2	2.46	2.25	0.00	0.21	27.32	-0.86	-0.81		
23	3	3.14	3.11	0.00	0.04	27.32	-0.18	-0.13		
42	Group Mean Excl. BM	3.28	3.20	0.00	0.08	27.32	-0.05	-	-	-

Row		dmft	dt	mt	ft	Present t
45	Group mean =	3.28	3.20	0.00	0.08	27.32
46	SD =	0.41	0.46	0.00	0.08	0.01
47	n =	15	15	15	15	15
48	df =	14	14	14	14	14
49	t =	2.145	2.145	2.145	2.145	2.145
50	Confidence Interval =	0.88	0.99	0.00	0.17	0.02
51	Confidence Limit =	4.16	4.19	0.00	0.25	27.34
52	Confidence Limit =	2.40	2.21	0.00	-0.09	27.30

Row		
53		
54	NB.	Guidelines for the limits of agreement stated in BASCD guidance for calibration of examiners
55		The deviation from the benchmark should ideally not be greater than 0.50
56		Individual means (DMFT/dmft) should lie within 95% confidence limits of group mean
57		Sensitivity of at least 0.75 when comparing dft with benchmark
58		Specificity of at least 0.90 when comparing dft with benchmark

Figure 6: example of calibration Excel results sheet

Appendix 6: calibration Excel template, results chart

The deciduous, mixed and permanent dentition versions are all available from the national dental public health team via your local dental epidemiology co-ordinator. An illustration of the template results chart is shown below.

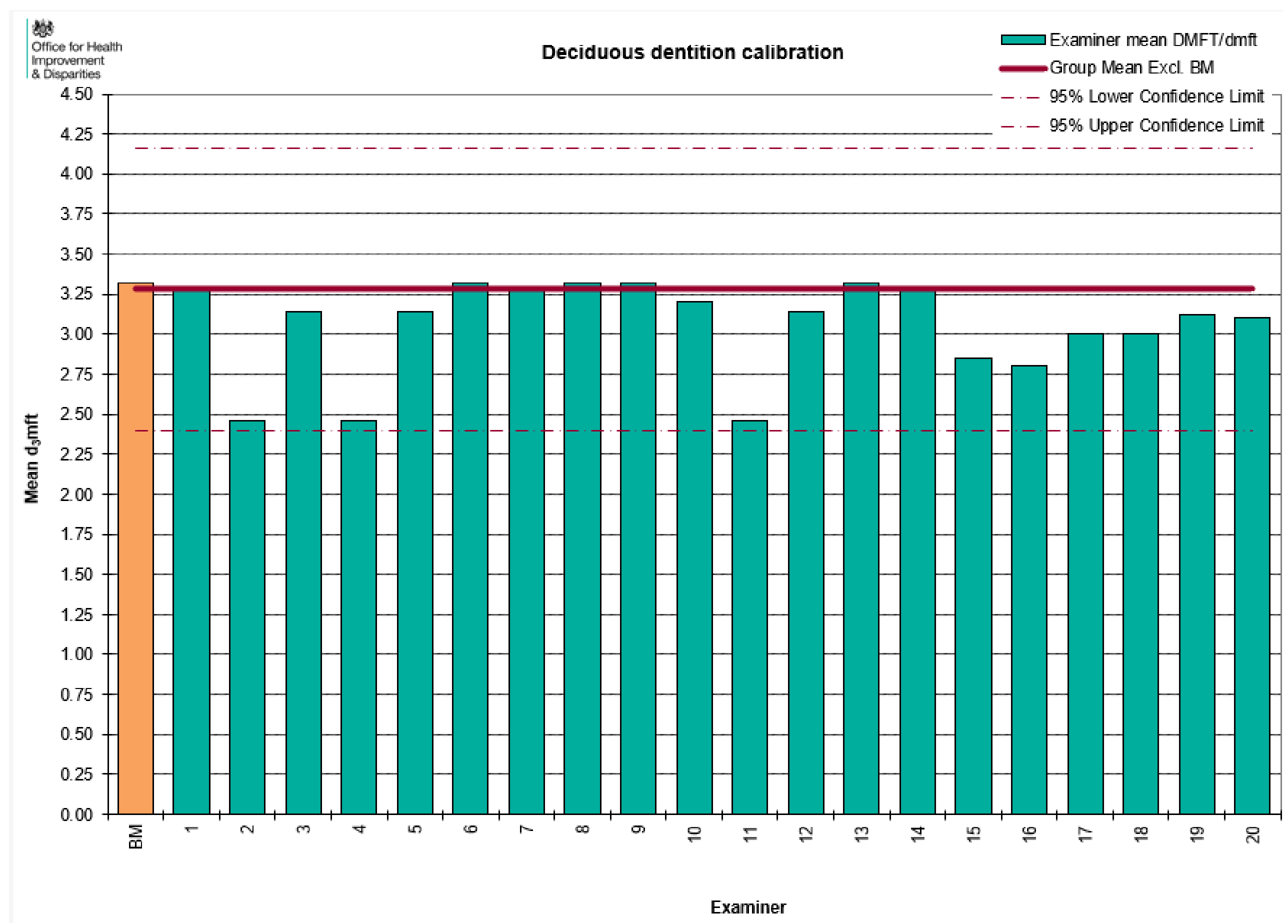


Figure 7: example of calibration Excel results chart

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