

# Fluoride application in paediatric patients attending general anaesthetic in Carlisle and Eden

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## INTRODUCTION

The 2019 National Epidemiological Survey indicated that 23.4% of 5-year-olds in England had an experience of dental decay.<sup>1</sup> Between 40% and 45% of these visibly decayed teeth in high-risk children will develop pain and infection regardless of the treatment plan.<sup>2</sup> Treatment in children is challenging and, in some cases, impossible without general anaesthesia (GA).

In North Cumbria, children attend for exodontia under GA on lists planned and staffed by the Community Dental Services (CDS). In this area, there is no specialist nor consultant in paediatric dentistry; therefore, treatment planning support is provided by colleagues in orthodontics, in special care dentistry and from out of the county. Extraction under GA is usually indicated due to unrestorable caries but, in some cases, due to symptomatic hypomineralisation, malpositioned or supernumerary teeth.

This audit was undertaken in a relatively remote CDS serving Carlisle and Eden, where the national epidemiological surveys point to 25.5% and 23.3%, respectively, of 5-year-olds with visible dental decay, which is above the national average.<sup>1</sup> Prevention for children who are classed as high caries risk is important and forms the foundation for treatment planning.<sup>3-5</sup> Fluoride varnish is a well-accepted, affordable and effective method for preventing dental caries.

## AIM

To assess whether paediatric patients undergoing a GA at the Cumberland Infirmary were given the appropriate

preventive fluoride treatment in line with Delivering Better Oral Health (DBOH) guidance.<sup>4</sup>

## STANDARDS

1. Fluoride varnish (2.26% NaF) should be applied in 100% of children (>2 years old) undergoing exodontia under GA. This may be applied at the GA or in the dental clinic.
2. Fluoride prescription toothpaste for 100% of children (2800 ppm age > 10, 5000 ppm age > 165 000 ppm) who are considered to be at high caries risk.

These interventions should be documented in the patient's clinical notes within the 'course of treatment' that is open at the time of the GA. If these are contraindicated or recently completed, this should also be documented in the patient's clinical notes.

## METHOD

This audit was registered with the North Cumbria Integrated Care Trust. The sample population was children undergoing Community Dental GA in September, October and November 2019 at the Cumberland Infirmary, Carlisle. This was repeated in the same months in 2020. Data collection was completed retrospectively via a search of the written records and electronic Software of Excellence. Where a patient was continuing their care at the CDS, rather than having been referred for one course

of treatment, the information was taken with reference to the course of treatment that included GA.

## RESULTS

The records of 76 children were reviewed in Cycle 1. The results can be seen in [Table 1](#).

Initial results were disappointing. There were assumptions that patients may have been receiving preventive care from their general dental practitioner (GDP), and so this was not prioritised in treatment plans. It was, however, found that there was no evidence to suggest that the children were receiving preventive fluoride varnish in general dental practice, although the previous history of applications was not always discussed.

The following changes were implemented prior to the second cycle of the audit.

### Nurse-led fluoride clinics

Two approaches were trialled:

- fluoride application placed at the assessment appointment by a nurse with additional qualification in fluoride application; and
- introduction of a dedicated prevention clinic at a separate time to the assessment appointment.

### Remote video/telephone hygiene contact

This was trialled as COVID-19 restrictions affected the ability to see patients face-to-face. At the time, remote prescriptions were being accepted by local pharmacies. This enabled a preventive telephone or video contact by a registered dental hygienist to be followed up by a prescription

for fluoride toothpaste to be written by the assessing clinician if necessary and indicated.

### Introduction of the 'delivering better oral health' custom screen

This was added to all new patient assessments to act as an aide-memoire at assessment and ensure that prevention was included in all treatment plans.

The records of 54 children were reviewed in Cycle 2. This was less than that in Cycle 1 due to COVID-19 restrictions on recovery capacity and theatre lists. The results are shown in [Table 2](#).

## DISCUSSION

Overall, there has been a significant improvement in compliance levels, with 100% of children receiving prescription fluoride toothpaste when indicated and 75.9% having fluoride varnish applied. In order to achieve 100% compliance in fluoride varnish administration, it must be ensured that fluoride varnish is available in theatre, and is included in the consent taken prior to GA.

Some brands of fluoride varnish are known to contain colophony. Contraindications include children who have been hospitalised with asthma or severe allergy in the last 12 months, and those allergic to sticking plasters.<sup>5</sup> Availability and acceptability of colophony-free alternatives are a limiting factor in achieving 100% compliance and are being investigated further.

The availability of a high-strength fluoride toothpaste that is flavourless would be of great benefit as it should be noted that there are issues with acceptability of the mint flavour of 2800 ppm or 5000 ppm sodium fluoride toothpaste in patients with certain sensory needs.

**TABLE 1** Cycle 1: Results of Fluoride Interventions

Intervention	Number of children eligible for intervention	Intervention provided, n (%)
Fluoride varnish application	74	34 (47.2)
Fluoride toothpaste prescription	13	5 (38.5)

*Note:* Two children had a stated contraindication for fluoride varnish and so were not considered suitable for the receipt of this intervention.

**TABLE 2** Cycle 2: Results of Fluoride Interventions

Intervention	Number of children eligible for intervention	Intervention provided, n (%)
Fluoride varnish application	54	41 (75.9)
Fluoride toothpaste prescription	10	10 (100)

Further interventions to improve the prescription of fluoride mouthwash and application of fissure sealants in this high-risk group were also implemented although they were not included in this audit. It was decided at the point of data collection that including fluoride mouthwash was complex as with several patients, families had bought it themselves over-the-counter. This is something that could be addressed in future audits.

This audit classified all children receiving extractions under GA as being high caries risk, though it is noted that in reality, there may have been some exceptions to this, such as those attending for removal of teeth due to hypomineralisation or hyperdontia. Nonetheless, it is likely that those children would also have received some benefit from this intervention, whether they were high caries risk or otherwise.

## ACTION PLAN

This audit will be repeated annually with an aim to continue to improve compliance. The results of this audit will be shared with other locations, initially within the North Cumbria Integrated Care Trust, and further to this over other CDS. This audit was discussed at team meetings, and a further action plan has been made.

## Nurse-led fluoride clinics

Dental nurse-led fluoride clinics have been trialed in different forms, and it remains beneficial for this to continue. It was found that bringing the patient and guardian in for a further preventive appointment was unpopular and resulted in some patients not being brought due to concerns about missed school, especially following school closures due to the pandemic. Cost of travel to attend and guardians not being able to take time from work were considered. It was preferable to utilise a nurse-led prevention clinic immediately after the assessment appointment. This reduced the content of the initial assessment, hopefully allowing better comprehension of discussion regarding treatment options. Further user experience input is required when designing these clinics.

## Remote video/telephone hygiene contact

Following the initial period of service disruption due to COVID-19, local pharmacies stopped offering remote prescriptions. Returning to face-to-face clinics has also reduced the utilisation of remote contact by hygienists. This has potentially affected compliance and may be evident in subsequent audit results.

## DBOH custom screen

This has been a successful addition to clinical records. Covering these core preventive areas with a checklist is useful and reproducible with different operators.

## AUTHOR CONTRIBUTIONS

Francesca Gaunt completed the audit and led on intervention. Francesca Gaunt prepared the manuscript with support from the authors. Laura Brough contributed to data collection and final proof of the manuscript.

## ACKNOWLEDGEMENT

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