

# North East Water Fluoridation Briefing

## 1. Background

A number of local authorities in the North East have already explored the potential for extending community water fluoridation programmes as a public health response to improving oral health and reducing health inequalities, including those in Tees Valley, County Durham, Sunderland, South Tyneside and parts of non-fluoridated Northumberland. The Government's proposal to extend water fluoridation is consistent with local oral health strategies.

Water fluoridation has the benefit of successfully reducing caries prevalence in all sectors of society irrespective of age, and, importantly does not require sustained behavioural change at the individual level. As a community based oral health intervention, it benefits individuals from deprived backgrounds the most thereby reducing inequalities. Water fluoridation alone, will not eliminate dental decay, but will as part of a suite of prevention strategies (i.e. supervised tooth brushing programmes) reduce decay levels and the impact of dental disease in the North East.

As, the North East already benefits from water fluoridation, local epidemiology data analysis is available that demonstrates the reduced decay levels in fluoridated communities. Comparisons in oral health data between from fluoridated Hartlepool and non-fluoridated Middlesbrough will be presented to demonstrate this beneficial effect.

## 2. UK and International Evidence: Dental Benefits of Water Fluoridation

We agree with the evidence base summarised by the Department of Health and Social Care consultation pack and would highlight the below UK and International studies which outline the dental benefits of water fluoridation.

Studies conducted in the UK and internationally over many years have reported:

- strong evidence that water fluoridation is associated with **less dental caries**
  - an **increase in the number of individuals with no caries**
  - an increase in caries prevalence when fluoridation schemes are discontinued.
- A UK [review in 2000](#) found evidence that water fluoridation reduced caries prevalence by a median of **2.25 decayed missing and filled teeth (dmft)/DMFT** and also increased the number of caries-free children by **14.6%**.

- A 2013 update to the UK review by the [Community Preventative Services Task Force](#) in the US showed a median decrease of 15.2% in caries after community water fluoridation began and **an increase in caries when water fluoridation schemes were terminated**
- A 2014 review undertaken by the [Royal Society of New Zealand](#) found that 12-13-year-olds from non-fluoridated areas were less likely to be caries-free than their counterparts in fluoridated areas (45.1% vs 56.2%) and more likely to have higher DMFT scores (1.7 vs 1.2).
- A 2015 [Cochrane review](#) found a reduction in caries prevalence in children by a median of 1.81 dmft and DMFT 1.16 (a **35 and 26% reduction compared to the median control group mean values**), and with a **roughly 15% increase in the number of caries free children and adults**.
- The [National Health and Medical Research Council](#) (2016) review in Australia found that water fluoridation **reduces the incidence of dental caries in primary teeth by approximately 35% compared to un-fluoridated water and increases the proportion of children who have no dental caries by approximately 15%**.
- The 2023 CATFISH study (Cumbrian Assessment of Teeth a Fluoride Intervention Study for Health) reported reductions in the prevalence of dental decay by **4% in the birth cohort when compared to a control group (17.4% versus 21.4% of children had decay into dentine)**. However, there was no significant difference in older children. It also concluded that water fluoridation was likely to be a cost-effective intervention. **It should be noted there was a cessation of water fluoridation of 1 year for half the children in the intervention group.**
  - [Evaluation of water fluoridation scheme in Cumbria: the CATFISH prospective longitudinal cohort study \(nihr.ac.uk\)](#)
  - [Comments on recent community water fluoridation studies | British Dental Journal \(nature.com\)](#)
- The 2022 OHID water fluoridation monitoring report for England [\\*Water fluoridation health monitoring report 2022 \(publishing.service.gov.uk\)](#) reported the following benefits:
  - Overall, five-year-olds in areas with higher fluoride concentrations **were less likely to experience dental caries, and less likely to experience severe dental caries**, than in areas with low fluoride concentrations:
  - The prevalence of dental decay in 3 and 5 year olds **reduced by 4% and 5% in fluoridated areas**.
  - Overall, the relative reductions of dental decay in 3 and 5 year old children are **35% and 19%** respectively (given an increase in fluoride concentration from 0.1mg to >0.7mg fluoride).
  - Children and young people in the most deprived areas benefited the most from fluoridation.
  - In the most deprived 20% of areas, the odds of experiencing caries was **25%** lower in areas with a fluoridation scheme than in areas without.

- **56%** of general anaesthetics rates in the most deprived 20% of areas with fluoride concentrations < 0.2mg/l would be prevented if these areas received fluoridated water.

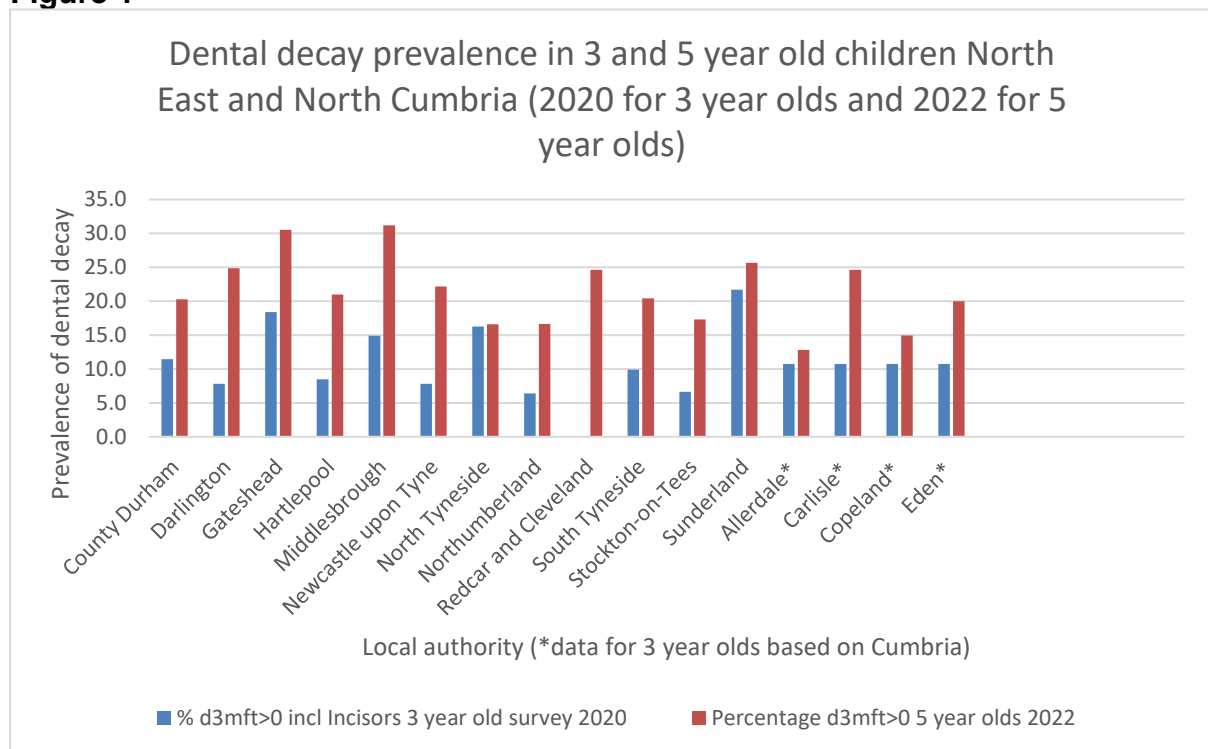
### 3. Local epidemiology data: benefits of water fluoridation

The following local epidemiology data provides an additional local authority level of evidence to the national and regional evidence provided in the consultation pack.

#### 3.1. Prevalence and impact of dental caries: fluoridated versus non-fluoridated areas

**Figure 1** shows the prevalence of dental caries across the North East and North Cumbria in three (2020) and five- year-olds (2022). It can be seen that in general, fluoridated areas of the North East have a lower caries prevalence than non-fluoridated areas.

**Figure 1**



Two areas within the North East: fluoridated Hartlepool and non-fluoridated Middlesbrough highlight stark differences in oral health. These areas have been chosen because they are statistical neighbours (with comparator characteristics), with the lowest local authority rankings for the Index of Multiple Deprivation (IMD), thereby controlling for the effects of deprivation (**Table 1**).

**Key points to note are:**

- In 3-year-old-children: **the prevalence of dental caries** is **6% less** in fluoridated Hartlepool (8.5%) v non-fluoridated Middlesbrough (14.9%).
- In 5-year-old children: **the prevalence of dental caries** is **10% less** in fluoridated Hartlepool (21%) v non-fluoridated Middlesbrough (31%).
- Fluoridation benefits are greater in more deprived population groups: Middlesbrough and Hartlepool are in the top 10 of most deprived Las based on their IMD score.
- In 5-year-old children: **the proportion of children with experience of extractions** is **3 times less** in fluoridated Hartlepool (1.8%) v non-fluoridated Middlesbrough (5.8%). Extractions for children in this age group will usually involve either a general anaesthetic or sedation. Both procedures will have significant morbidity and are preventable.
- **Lower sedation rates** in Hartlepool demonstrate children need less complex treatments to treat their dental disease. Treatment under sedation for children is usually undertaken for anxious children requiring a high volume of treatment e.g. extractions that cannot be undertaken with local anaesthetic alone.

**Table 1** shows the health impact of dental caries between fluoridated Hartlepool and non- fluoridated Middlesbrough in 2022/23.

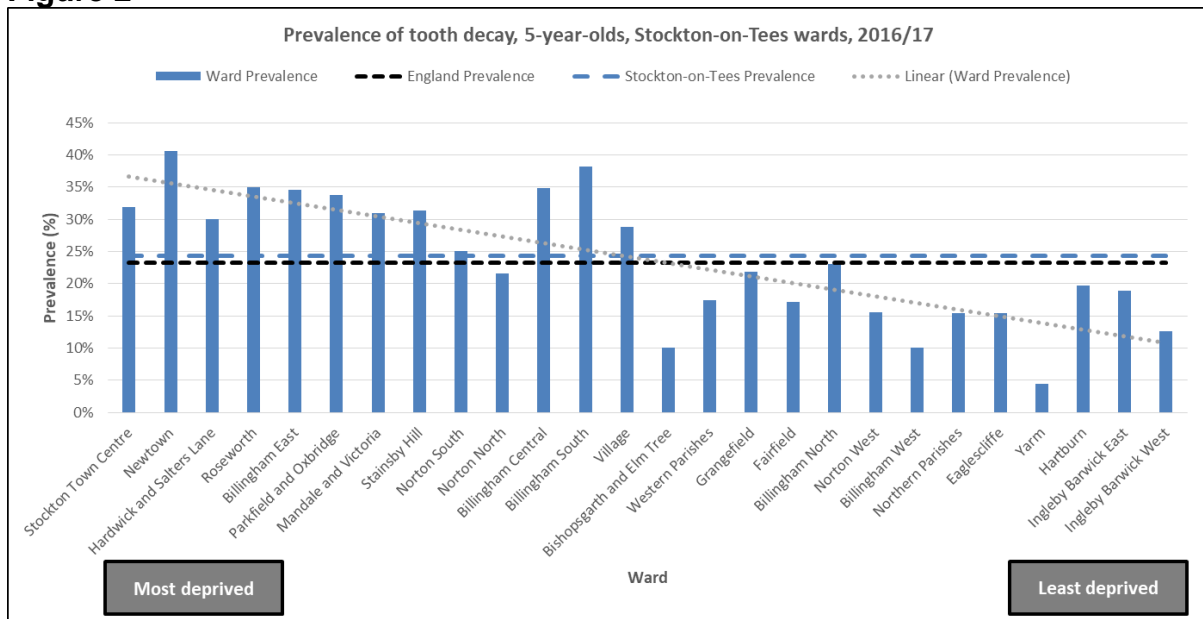
Category	Hartlepool Fluoridated	Middlesbrough Non-fluoridated
Local Authority deprivation ranking based on score (IMD 2019)	10/317	5/317
Prevalence of dental decay 3-year-olds (2020)	8.5%	14.9%
Prevalence of dental decay 5-year-olds (2022)	21%	31%
Proportion of 5-year-olds with experience of tooth extractions (2022)	1.8%	5.8%
Sedation rates* per 1,000 (22/23)	14.5	21.5

Sources: \*Business Services Authority data request  
[Oral health – GOV.UK \(www.gov.uk\)](https://www.gov.uk)

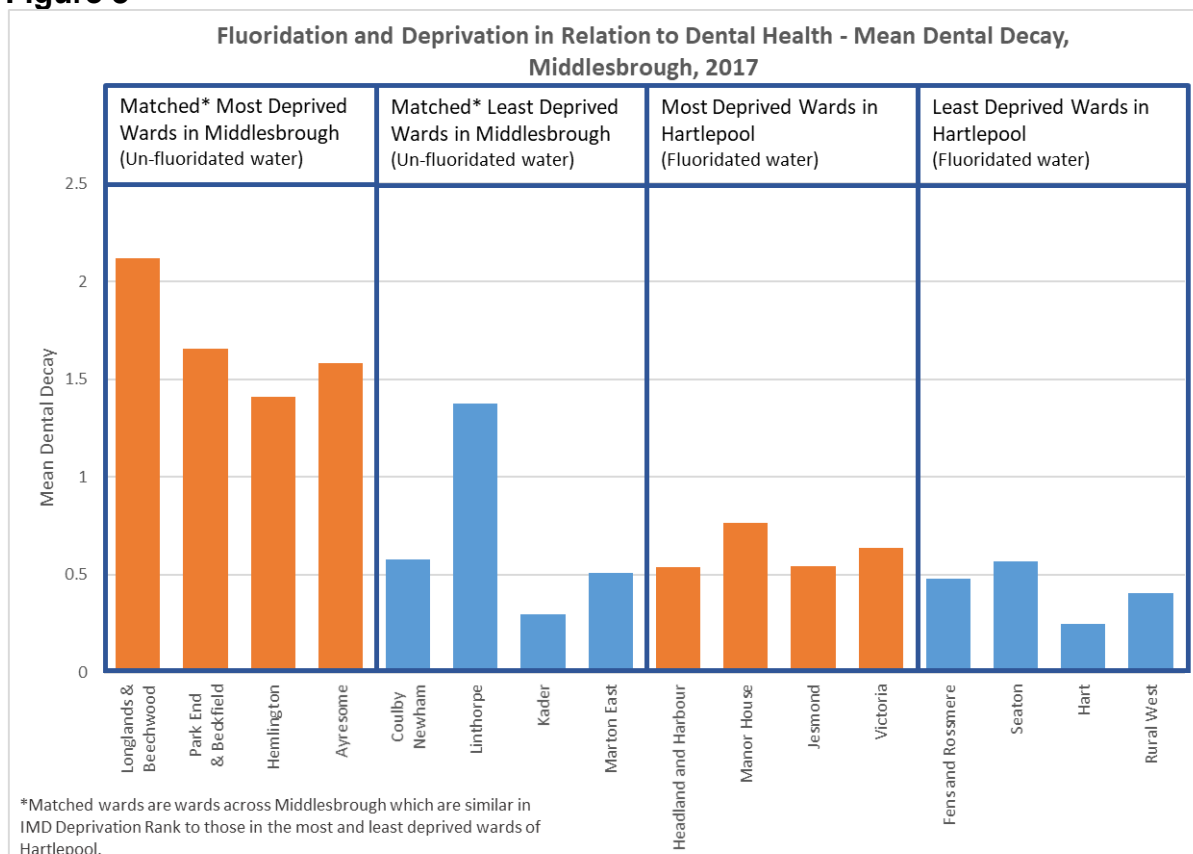
### 3.2. Reduction in inequalities

- The most recent dental survey of 5-year-old children (2022) [Oral health - GOV.UK \(www.gov.uk\)](https://www.gov.uk) shows that there is a **5 fold difference** in the prevalence of dental decay between the most and least deprived children **across the North East**.
- **Figure 2** shows that even in non-fluoridated Stockton where the average dental health of 5-year-old-children was better than the England average in 2022 there is a **ten-fold difference in prevalence of dental decay across wards associated with deprivation**.
- Reducing inequalities in oral health is a priority for the NHS and Local Authorities. **Table 1** clearly shows that despite Hartlepool children living in the most deprived areas of England, there is a significant improvement in oral health compared to Middlesbrough.
- **Figure 3** shows fluoridation reduces the severity of dental decay (decayed, filled and missing teeth, dmft rates) across all wards in Hartlepool compared to Middlesbrough, but more importantly **reduces the gap in oral health between the most and least deprived wards**.

**Figure 2**



**Figure 3**



### 3.3. General anaesthetic (GA): rates and health impact

Tooth decay is still the most common reason for hospital admission in children aged between 5 and 9 years. **Every general anaesthetic poses a health risk to children, therefore, if dental decay rates can be reduced, we could prevent some hospital admissions.**

- **Table 2** shows in 2022/23, the North East (397 per 100,000) had the second highest rates of GA (0-19 year olds) which are almost twice the national average (237 per 100,000) [Hospital tooth extractions in 0 to 19 year olds: short statistical commentary 2023 - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/statistics/hospital-tooth-extractions-in-0-to-19-year-olds-short-statistical-commentary-2023).
- The decay-related tooth extraction episode rate for **children and young people living in the most deprived communities was nearly 3 and a half times** that of those living in the most affluent communities.
- **Table 3** shows **Middlesbrough has 3 times the rate of GA compared to Hartlepool** although they both have similar deprivation levels and service provision.

**Table 2:** Decayed tooth extraction episode rate per 100,000 population of 0 to 19 year olds by region for the financial year 2022 to 2023

Region	Decayed tooth extraction episode rate per 100,000 population, 0 to 19 year olds, (22-23)
Yorkshire and the Humber	405
North East	397
North West	341
London	333
South West	240
ENGLAND	236
West Midlands	178
South East	112
East of England	99
East Midlands	80

Source: [Hospital tooth extractions in 0 to 19 year olds: 2023 - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/statistics/hospital-tooth-extractions-in-0-to-19-year-olds-2023)

**Table 3:** Decayed tooth extraction episode rate per 100,000 population of 0 to 19-year-olds in Hartlepool and Middlesbrough 2022/23

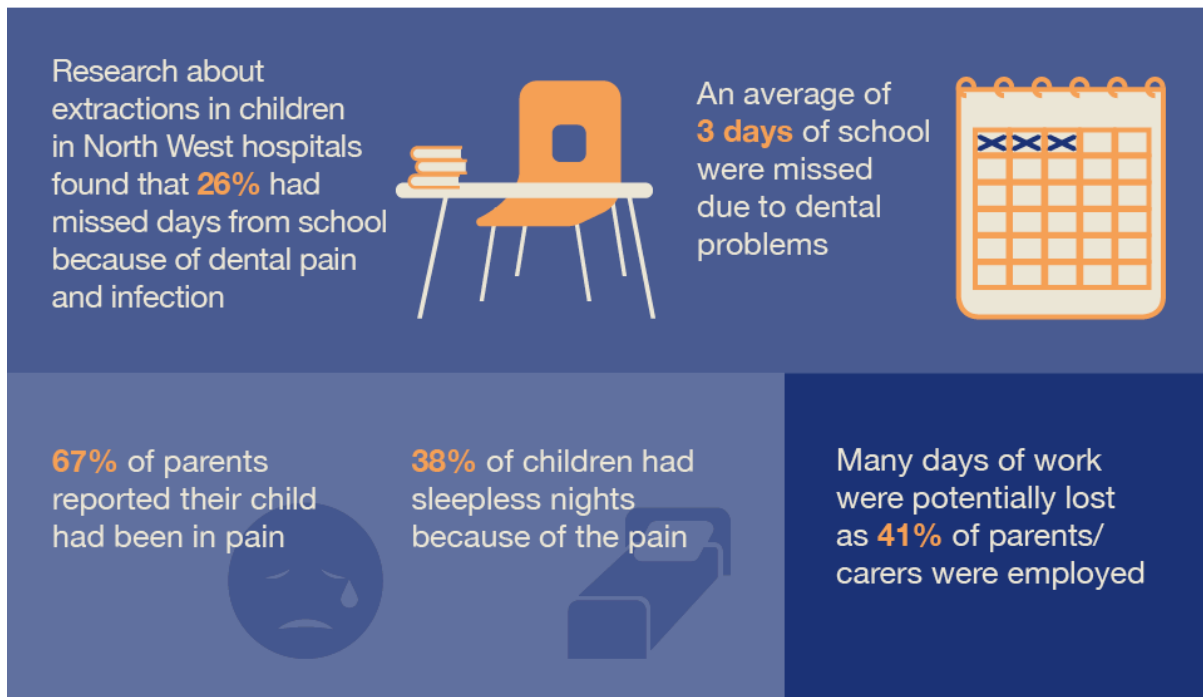
Local Authority	GA activity 0-19 year-old-children (22/23)	GA rates per 100,000 0-19 year-old-children (22/23)
Hartlepool (Fluoridated)	30	135
Middlesbrough (Non-fluoridated)	120	319

Source: [Hospital teeth extractions 0-19Y 2022-2023.ods \(live.com\)](https://www.live.com/hospital-teeth-extractions-0-19y-2022-2023)

### 3.4. Impact of General Anaesthetics for children

Not only does GA pose a health risk to children, but there are wider health impacts for children with severe dental decay. Research about GA hospital extractions in children in the North West report:

- 26% had missed days from school
- 3 days of school were missed due to dental problems
- 67% of parents reported their child had been in pain
- 38% had sleepless nights because of pain



Source: [Health matters: child dental health - GOV.UK \(www.gov.uk\)](https://www.gov.uk/health-matters/child-dental-health)

### 3.5. Reduction in dental disease in adults

- Austin et al. (2022) [CDH | Community Dental Health Journal \(cdhjournal.org\)](https://cdhjournal.org/) concluded adults living in local authorities with fluoridation schemes had better dental health supporting the continued use of the intervention as a dental public health measure
- [The LOTUS Study: Fluoridation for Adults | The University of Manchester](#) (2023) reported over 10 years, people receiving optimally fluoridated water experienced 3% less NHS invasive dental treatments such as fillings and extractions, and had 2% fewer decayed, missing, and filled teeth, compared to those who received non-optimally fluoridated water.

## 4. Adverse Health Effects

The findings of the 2022 health monitoring report (OHID 2022) are consistent with the view that water fluoridation at levels within the UK regulatory limit (<1.5mg/l) is an effective, safe, and equitable public health intervention to reduce the prevalence, severity, and consequences of dental caries, without any convincing evidence of adverse health outcomes. This report finds the same as many international studies and reviews with regards to adverse health outcomes.



### Key point to note:

“Taken alongside the existing wider research, our results do not provide convincing evidence of higher rates of hip fracture, Down’s syndrome, kidney stones, bladder cancer, or osteosarcoma (a cancer of the bone) due to fluoridation schemes” [\\*Water Fluoridation \(publishing.service.gov.uk\)](https://www.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/100000/water-fluoridation.pdf)

## 4.1. Adverse Dental Effects

Fluorosis is a dental side effect of water fluoridation. In mild cases it appears as white flecks on teeth. Fluorosis of aesthetic concern is generally associated with the appearance of anterior teeth. In the UK because the levels of fluoride are regulated, and closely monitored the effects of fluorosis generally only cause mild aesthetic concern. In a study of 4 English cities (2 fluoridated and 2 non-fluoridated) [Prevalence and severity of dental fluorosis in four English cities - PubMed \(nih.gov\)](https://pubmed.ncbi.nlm.nih.gov/26511111/) the below key points are note-worthy.

### Key points to note are:

- Fluorosis is greater in the fluoridated cities (Newcastle and Birmingham 61%) compared to the non-fluoridated cities (Manchester and Liverpool, 37%)
- The rate of fluorosis causing at least mild aesthetic concern in 11-12 year olds was 10.3% in the 2 fluoridated cities and 2.2% in the non-fluoridated cities. However, when children were asked to score their appearance there was no significant difference in the mean aesthetic score between respondents from fluoridated and non-fluoridated cities (p=0.572), and it is therefore unlikely that there would be a difference in treatment sought for correction of fluorosis.
- **The risks of fluorosis need to be balanced against the health risks of severe dental decay: pain causing loss of sleep in young children, acute infections sometimes needing antibiotics, and increased GA rates.**

## 5. Cost Effectiveness

A return on investment tool, commissioned from the York Health Economics Consortium in 2016 and developed in partnership with PHE, estimated the economic benefits associated with reducing dental caries in five-year-old children. The **estimated return for £1 investment into a water fluoridation scheme would be £12.71 after 5 years and £21.98 after 10 years.** In areas of high deprivation where dmft is greater than the average for England, the return on investment will be greater.

The 2023 **LOTUS study** by the University of Manchester reported between 2010 and 2020, optimal water fluoridation had a cost of £10.30 per person, NHS treatment costs were £22.26 lower per person (5.5%), and patients paid £7.64 less (2%) in dental charges. It estimated that if 62% of the adults and teenagers in England attended NHS dental services at least twice within 10 years, the total return on

investment would have been £16.9 million between 2010 and 2020. This meant that the costs of water fluoridation would be recovered, and £16.8 million saved on top as a result of lower NHS dental treatment costs. [The LOTUS Study: Fluoridation for Adults | The University of Manchester](#)

## 5.1. General Anaesthetic Potential Cost savings to the local NHS

**Each episode of GA costs £1387.** Reducing rates of GA can generate cost savings to the local health economy which could be invested in prevention initiatives to further reduce decay levels. **Table 4** shows the potential to generate cost savings if the rate of GAs in fluoridated Hartlepool (GAs per 100,000 in 0-19 child population) is replicated in non- fluoridated areas of the North East. A potential of **£731,200** could be saved. To be noted: Sunderland has a lower rate of GA than Hartlepool, therefore no cost savings can be generated.

**Table 4** General anaesthetic rates and potential cost savings to the NHS

Locality	Rate of general anaesthetics (GA) per 100,000 population (22/23)	Finished Consultant episodes with caries as the primary diagnosis (22/23)	Potential Cost Savings* to the NHS based on Hartlepool's GA rate per 100,000
Hartlepool (Baseline)	135	30	Baseline
Middlesbrough	319	120	£96,013
Redcar and Cleveland	284	85	£62,036
Stockton	241	115	£70,234
Darlington	366	90	£78,874
County Durham	348	400	£339,858
South Tyneside	319	105	£84,185
Sunderland	106	65	-£23,971
<b>Total NHS Cost Savings</b>			<b>£731,200</b>

Source: [Hospital teeth extractions 0-19Y 2022-2023.ods \(live.com\)](#) \* based on NHS reference costs 2020/21 for multiple extractions for under 18s at £1387

## 6. North East Oral Health Improvement Programmes

Reviews of evidence by NICE (PH55) and PHE (Commissioning Better Oral Health for Children and Young People 2014) have found that in addition to water fluoridation the following targeted programmes reduce dental decay in 5-year-old children: supervised toothbrush, fluoride varnish, and provision of dental packs by post or by Health Visitors. North East Local Authorities and the NHS have invested heavily in

these community based oral health programmes, **however, despite reductions in dental decay rates associated with these prevention initiatives, dental disease remains persistently high in deprived non-fluoridated areas.** Table 5 shows the oral health improvement programmes already implemented across non-fluoridated areas of the North East.

**Table 5** Oral Health Improvement programmes in non-fluoridated areas of the North East

Local Authority	Supervised Toothbrushing Programmes	Fluoride Varnish programmes	Provision of toothbrush and toothpaste packs
South Tyneside	No	No	No
Sunderland	Targeted schools	No	No
County Durham	Targeted pre-schools and schools	No	No
Darlington	Universal schools	No	No
Stockton-on-Tees	Universal pre-schools and schools	Paused due to COVID	Yes universal
Middlesbrough	Universal pre-schools and schools	Paused due to COVID	Yes universal
Redcar and Cleveland	Universal pre-schools and schools	Paused due to COVID	Yes universal

## 7. Sustainability

All community level prevention programmes have an environmental cost but water fluoridation has the least impact on environmental sustainability.

<https://www.nature.com/articles/s41415-022-4251-5>

## 8. Public Opinion

In England, a [recent study published in June 2021](#) assessed public attitudes in five areas in the North East of England, and found that **60% of respondents were in favour of adding fluoride to the water supply** to prevent dental decay, while 16% were opposed.

## 9. Local Support for Water Fluoridation

**As an Integrated Care System, there is unanimous support for the extension of water fluoridation. The Regional North East Local Dental Committee, the Integrated Care Board and the Association of Directors of Public Health North East have expressed their support for the Government’s proposal to extend fluoridation.** Health and Wellbeing Boards and/or Health Scrutiny Committees have recognised the clinical impact water fluoridation can have to improve oral health and wellbeing.

The following are quotes from local system leaders in support of water fluoridation:

**David Gallagher, executive area director with the North East and North Cumbria Integrated Care Board said:**

*"There is strong clinical evidence that fluoridation can have significant benefits in tackling dental disease. As an ICB we are fully supportive of proposals to expand the fluoridation of water across the North East, in line with our ambitions to help address long standing health inequalities and improve oral health"*

**Dr Alexandra Kent, a local GP and medical director with NHS North East and North Cumbria Integrated Care Board said:**

*"Fluoridation is a safe and effective intervention and has the potential to have a positive impact on so many people across the North East. Tooth decay is still the most common reason for hospital admission in children aged between 5 and 9 years. There is good evidence that fluoridation helps to reduce this risk."*

**Professor Chris Vernazza, Head of School of Dental Sciences, Newcastle University, Professor of Oral Health Services and Honorary Consultant in Paediatric Dentistry said:**

*"In my clinical work, I see the devastating impact of dental decay on children and their families and every time I remove multiple teeth from a child under general anaesthetic, I am deeply saddened. There is good evidence for the benefits and safety of water fluoridation and the economic arguments stack up too. I fully support implementation of fluoridation in our region as a key part of the package required to prevent this widespread disease".*

**Tom Robson and Simon Taylor, Local Dental Network Chairs in the North East said:**

*"Dental decay causes misery pain and suffering to all those who experience it. Seeing children in particular suffering from an avoidable disease is particularly tragic. For those of us clinicians that work across the locality the obvious benefit of optimal fluoride levels in the public water supply is striking. As a society we have an obligation to protect those who are most vulnerable and community water fluoridation schemes that are both safe and effective do just that".*

**Kamini Shah, David Landes, Martin Ramsdale, Consultants in Dental Public Health in the North East said:**

*“Preventing children from suffering unnecessary pain, sleepless nights and missing time off schools due to dental decay, should be a priority. Despite investment in prevention programmes, there are parts of the North East that continue to persistently have some of the worst dental disease rates in the country. Evidence shows water fluoridation could change this, it is safe and effective and makes the biggest difference to those who need it the most”.*

**Sir Liam Donaldson, Chair of the North East and North Cumbria Integrated Care Board (ICB) said:**

*“Oral health is a vital part of achieving good health, well-being and freedom from pain. Water fluoridation, the process of adjusting the amount of naturally occurring fluoride to a level to prevent tooth decay, is a long-standing goal of public health programmes around the world.*

*“This is so important as children grow and develop. It is a vital part of tackling inequalities, as children in poorer areas of our region suffer most from the painful and disfiguring impact of dental decay.*

*“Worldwide fluoride coverage is estimated to benefit 400 million people. As an Integrated Care Board, we are right behind the effort to extend the benefit of community water fluoridation to the North East. In so doing we will be making history by introducing what has been called 'One of the top 10 public health achievements of the 20th century,' along with tobacco control, vaccination and safer healthier foods.”*

**Amanda Healy, Chair of the Association of Directors of Public Health North East said:**

*“Oral health is an integral part of overall good health and wellbeing that allows our residents to eat, speak, smile, and socialise. Tooth decay is the most common oral disease affecting our children and young people, and although largely preventable, a significant proportion of our residents still have tooth decay. Across the North East, water fluoridation is the most effective way of improving the oral health of all communities as everyone drinks water. We are responsible for oral health promotion and while water fluoridation alone, will not eliminate tooth decay, it is a key part of wider oral health programmes that when combined will reduce decay levels and the impact of dental disease for our residents.”*

**Jennifer Owen, Chair of the Regional Local Dental Committee said:**

*“Fluoride makes enamel stronger and more stable, making it less susceptible to tooth decay. As a dentist we will always actively encourage brushing twice a day and reducing sugary foods and drinks, but, by making our enamel stronger, and reducing the ability of bacteria to produce tooth decay we are benefiting the whole population. How can we ethically deny this huge health benefit to so many, when we have the means and infrastructure to provide it?”*

**Dr Kamini Shah, Consultant in Dental Public Health, NHS England**

**Professor Chris Vernazza, Head of School of Dental Sciences, Newcastle University, Professor of Oral Health Services and Honorary Consultant in Paediatric Dentistry**

**13.3.2024**

Association of Directors of Public Health North East

North East and North Cumbria NHS Integrated Care Board

North East Regional Local Dental Committee

## Joint Position Statement on North East Water Fluoridation

Oral health is an integral part of overall good health and wellbeing and allows people to eat, speak, smile, and socialise with confidence. The impact of severe tooth decay has wide implications for children and families: pain and distress, preventable hospital admissions, sleepless nights and missed days from school.

Tooth decay is the most common oral disease affecting our children and young people with lifelong impacts. Although largely preventable, a significant proportion of our residents still experience poor oral health. Ensuring drinking water contains the recommended level of fluoride is an effective way to help prevent tooth decay. Some areas of the North East already have tap water which contains fluoride at these recommended levels and this has been very effective at reducing dental decay for the population living in these areas.

As an Integrated Care System, there is unanimous support for the extension of water fluoridation across the North East. The Association of Directors Public Health North East (ADPHNE), the North East and North Cumbria NHS Integrated Care Board (NENCICB) and the regional Local Dental Committee have expressed their full support for the Government's proposal to extend water fluoridation, recognising that:

- **Tooth decay is largely preventable but remains a serious public health problem in the North East:** Tooth decay causes significant pain, discomfort and distress. It is the leading cause of hospital admissions in children aged 5 to 9 years and is also the cause of most dental treatments (including root canal therapies, crowns, implants and dentures). Preventing tooth decay reduces pain, distress and the need for complex dental treatments.
- **Water fluoridation is an effective and safe public health measure:** The safety of water fluoridation has been widely monitored and researched and there is no convincing scientific evidence of harm to general health from water containing fluoride within regulatory limits. Many areas across the country, including in the North East, already have fluoridated water.
- **Water fluoridation can reduce the prevalence, severity and impact of tooth decay:** In the North East, 5-year-old children living in non-fluoridated areas are up to 3 times more likely to have tooth extractions compared to children living in fluoridated areas.
- **Water fluoridation reduces health inequalities, and the greatest reductions in tooth decay are seen in areas with high levels of deprivation:** In 5-year-old children there is a 10% reduction in the prevalence of tooth decay between fluoridated and non-fluoridated areas with similar deprivation rates.
- **Water fluoridation significantly reduces hospital admissions for tooth extractions:** In the North East 2 out of 3 hospital admissions could be avoided in non-fluoridated areas compared to fluoridated areas.
- **Water fluoridation is a very cost-effective public health intervention:** An estimated £731,200 per year could be saved by extending water fluoridation across the North East.

We are urging partners to support and respond to the Department for Health and Social Care (DHSC) consultation on expanding water fluoridation in the North East.