Report to:	Health and Wellbeing Board		
Date:			
Report of:	David Herne, Interim Director of Public Health	**Report No:**	
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Report Title: **Oral Health and addition of fluoride to water supplies**

Confidential:

This report is exempt from publication by virtue of Paragraph (2) of Schedule 12A to the Local Government Act 1972

Purpose:

To:

- Provide further information and evidence about water fluoridation in the UK.
- Outline the current state of oral health in Bolton.
- To enable the Health and Wellbeing Board to understand the current situation with regards to water fluoridation in the UK to enable them to make a decision about whether or not to support the introduction of fluoride to the water.

Recommendations:

Health and Wellbeing Board members are recommended to:

- confirm support in principle for water fluoridation as one intervention to improve oral health;
- acknowledge that fluoridation is not an option that can be offered by Bolton alone and to therefore invite Public Health England and North West Directors of Public Health to undertake further work at a GM level;
- agree, in the meantime, to continue with local interventions.

Decision:

Background Doc(s):	Public Health England. Water Fluoridation: health monitoring report for England 2014. March 2014. World Health Organization Expert Committee on Oral Health Status and Fluoride Use. 1994.

1. BACKGROUND

1.1. Tooth decay (dental caries) is a significant public health problem in England. Sizeable inequalities in the incidence of caries exist between affluent and deprived communities. Tooth decay is the most common oral disease affecting children and young people in England, yet it is largely preventable. Poor oral health impacts children and families' health and wellbeing.

1.2. Treatment usually involves repair of infected teeth, but depending of the level of decay extraction may be necessary. Tooth decay is one of the most common causes of hospital admission in children. Dental treatment is a significant cost, with the NHS in England spending £3.4 billion per year on dental care.

1.3. Key measures to reduce dental caries are:

- Improve diet and reduce sugar intake.
- Regular brushing of teeth with fluoride toothpaste.
- Increase exposure to fluoride, including application of fluoride varnish, and addition of fluoride to water supplies.
- Encourage preventive dental care.

1.4. In March 2014, Public Health England, on behalf of the Secretary of State for health, published a report (1) on the effects of water fluoridation schemes on health. This report provided reassurance that water fluoridation is a safe and effective public health measure to reduce dental caries and hospital admissions for extractions.

1.5. In addition the World Health Organization (2) has stated that: "Community water fluoridation is safe and cost-effective and should be introduced and maintained wherever it is socially acceptable and feasible."

2. ORAL HEALTH IN BOLTON

2.1. Members will be aware from previous presentations to the Board that oral health in children is an area in need of improvement both nationally and in Bolton.

2.2. Every four years a nationally co-ordinated survey of the oral health of five year-old children's teeth is carried out. Oral health specialists carry out an examination of children's teeth and record the number of decayed (d), missing (m) and filled (f) primary teeth making up the dmft index.

2.3. Bolton has the third highest rate of dmft in the North West and the seventh highest in England (2012 survey): 47% of five year olds in Bolton have decay experience. This is higher than the England (27.9%), North West (34.8%) and the Greater Manchester averages (36.6%) (3).

2.4. Rates of hospital episodes for extractions in Bolton are above the Greater Manchester and North West averages and more than double the England averages. Birmingham, an area with fluoridated water, has much lower rates of extractions.

3. FLUORIDATION

3.1. Fluoride is a naturally occurring mineral. It is present in some foods, and in water in varying amounts. The link between the presence of fluoride in drinking water and low levels of tooth decay was first identified in the early 20th century (1).

3.2. The first scheme in the UK to adjust the level of fluoride in the drinking water supply was introduced in Birmingham in 1964. Fluoride schemes now cover approximately six million people in England, predominantly in the West Midlands. In addition, some water supplies contain natural levels of fluoride similar to the levels in fluoridation schemes. These supplies cover approximately 300,000 people in the UK (1).

3.3. Several countries around the world have extensive coverage with fluoridation schemes, including Australia and the United States. The US had the first fluoridation scheme in 1945, and over 200 million people in the US now have a public water supply in which the level of fluoride is adjusted (1).

3.4. The Water Industry Act 1991 permits the adjustment of fluoride levels in drinking water supplies. Water companies closely monitor and publish details of the levels of fluoride in their supplies.

3.5. Recent analysis by Public Health England (1) shows that, when deprivation and ethnicity are taken into account, 28% fewer five year olds, and 21% fewer twelve year olds have tooth decay in fluoridated areas compared with non-fluoridated areas. In addition there are 45% fewer hospital admissions of children aged 1-4 years for dental caries in fluoridated areas compared to non-fluoridated areas.

3.6. Reduced levels of dental decay and increased levels of dental fluorosis are the only evidence-based dental effects of fluoridation. Fluorosis is a change in the appearance of the tooth's enamel (1). These changes can vary from

barely noticeable white spots in mild forms, to staining and pitting in the more severe forms. In mild forms of dental fluorosis, teeth have scattered white flecks, occasional white spots, frosty edges, or fine, lacy chalk-like lines. These changes are barely noticeable and difficult to see except by a dental health care professional.

3.7. A study of children in fluoridated Newcastle Upon Tyne and non-fluoridated Manchester, found that the proportion of 12 year-old children with moderate dental fluorosis or more is very low, at approximately 1% in Newcastle and 0.2% in Manchester (1).

3.8. Whilst many adverse health effects have been alleged to be associated with water fluoridation, no adverse health effects have ever been proven, despite the possible effects being extensively studied and reviewed over the last fifty years (1).

4. HEALTH INEQUALITIES

4.1. Analysis undertaken by Public Health England shows that in areas with water fluoridation a greater reduction in tooth decay is observed among children living in the most deprived areas than in the least deprived areas. This suggests that water fluoridation can play an important role in reducing health inequalities (1).

5. REQUIREMENTS FOR INTRODUCTION OF FLUORIDATED WATER SUPPLIES

5.1. In 2007 the North West Strategic Health Authority undertook a review of the option to fluoridate water supplies on behalf of the then 24 North West Primary Care Trusts. A comprehensive report was produced by the North West Fluoridation Evaluation Group (NWFEG), including evidence of effectiveness, safety, technical feasibility and costs (4).

5.2. The review found the issue to be complex, due to the integrated nature of water supplies and need to balance economies of scale, water flows and prevalence of poor dental health. Possible schemes cover large geographical areas (ie Greater Manchester and Merseyside).

Costs

5.3 Indicative costs to establish a North West fluoridation scheme are high (£35 million start-up costs, 2007 prices) and the time span for implementation estimated at five years. Annual running costs have been estimated at

approximately £2 million per annum (2007 prices) with the costs to be borne by the Local Authorities supporting the water fluoridation scheme.

5.4 Subject to public consultation more precise design work and estimates for potential schemes would need to be developed, also at significant cost.

Technical feasibility

5.5 Due to the integrated nature of the water supply system, it would be technically difficult and maybe impossible to develop schemes solely for small, discrete areas of Greater Manchester. Water is supplied on the basis of available reserves and gravity, rather than Local Authority boundaries. Neighbouring areas outside the Greater Manchester border in Merseyside and Cheshire would be affected.

5.6 At a minimum, a scheme covering Greater Manchester and Merseyside would need to be considered. It would not be technically feasible for United Utilities to provide fluoridated water to the population of Bolton only; a joint scheme with neighbouring areas would be needed.

Legal requirements

5.7 The legal requirements regarding consultation on proposed water fluoridation schemes are clearly specified and comprehensive, incorporating several stages. Steps include:

- an initial scoping exercise;
- a feasibility study;
- a formal proposal to the Secretary of State for Water Fluoridation;
- a more detailed feasibility study;
- consultation with other affected Local Authorities;
- public consultation for a minimum of three months;
- establishment of a joint Local Authority Committee to manage the consultation process and outcome.

5.8 If a unanimous decision is not reached by the affected Local Authorities then then a minimum of 67% of affected Local Authorities must agree to implementation of the proposal. The Secretary of State must then agree with the water company to implement the water fluoridation proposal.

Organisational ownership and commitment

5.9 Development of a water fluoridation scheme proposal would be a lengthy process and agreement would be needed on a lead party and resources required for the initial feasibility study and public consultation.

5.10 Initial agreement would be needed between the majority of Greater Manchester and Merseyside Local Authority's to consider being part of a joint water fluoridation scheme.

6. COST EFFECTIVENESS

6.1. The cost effectiveness of fluoridating water supplies is affected by the size of the population served by the fluoridated water supply, the level of tooth decay in the population, the age and condition of the water works and the type of fluoride used. Fluoridating water supplies is more cost effective when there is a larger population with a higher level of caries and a low level of fluoride intake (4).

6.2. A study of economic evaluations of water fluoridation undertaken by University of York (5) concluded that: "Studies comparing the cost-effectiveness of water fluoridation compared with other strategies for reducing caries always conclude that water fluoridation is the most cost-effective approach." In addition this study highlighted that water fluoridation has the added benefit of it not requiring any behavioural changes from its recipients, unlike other possible strategies. Its potential costs and benefits are therefore much easier to predict and model.

6.3. Economic modelling undertaken to inform the proposed introduction of water fluoridation in Southampton and Hampshire estimated that if dental decay among children were to be reduced by 25% this would save £1.48 million over twenty years. The cost of water fluoridation for each case of tooth decay avoided would be 32p. This may be a conservative estimate of the cost effectiveness of fluoridation as it does not include the potential savings of improvements in adult dental health (6).

7. OTHER ACTIVITY TO IMPROVE ORAL HEALTH

7.1. Adding fluoride to water supplies is an important, but not the sole measure, needed to improve the oral health of the population.

7.2. Bolton has a strong record of partnership working to deliver evidence-based strategies to improve health and address inequalities. Current initiatives are targeted at improving diet and reducing sugar intake and to increase twice daily tooth brushing with family strength fluoride toothpaste, starting from the eruption of the first tooth.

7.3. Bolton has an Oral Health Improvement Plan that is co-ordinated by the Bolton Council Public Health Team but is delivered through a range of key partners. The main strands of the improvement plan are:

- Commissioning effective services to decrease tooth decay
- Reducing bottle feeding and increasing breastfeeding
- Increasing access to fluoride (ie buddy practice scheme, Brush Bus, Brushing for Life, fluoride varnish)
- Reducing exposure to sugar
- Communication of key messages (eg Healthy Living Pharmacies)
- Work with local dentists
- Improving oral health in care homes.

7.4. In 2013, the public health department undertook an analysis of the evidence around milk fluoridation as an option to be considered within the oral health improvement plan. The evidence to support introduction of fluoride milk was inconclusive and was labelled as having limited value in the recent PHE document 'local authorities improving oral health: commissioning better oral health for children'.

7.5. Access to fluoride varnish has a more robust evidence base and has been prioritised within the oral health improvement plan. A pilot project with dental practices and local schools starts in 2016.

8. LEARNING FROM OTHER AREAS

8.1 Development of options for a North West fluoridation scheme were put on hold pending the outcome of a judicial review into Southampton's public consultation into water fluoridation. Whilst plans in Southampton were upheld as legally defensible, further progress was halted. Re-organisation of the Health Service subsequently changed the statutory responsibility for oral health improvement programmes which now sits with Local Authorities.

8.2 A recent proposal by Hull County Council to undertake a scoping exercise into water fluoridation has attracted much media attention, public debate and the formation of anti-fluoridation protest groups.

9. RECOMMENDATIONS

7.1 Health and Wellbeing Board members are recommended to:

- confirm support in principle for water fluoridation as one intervention to improve oral health;
- acknowledge that fluoridation is not an option that can be offered by Bolton alone and to therefore invite Public Health England and North West Directors of Public Health to undertake further work at a GM level;
- agree, in the meantime, to continue with local interventions.

REFERENCES:

1. **Public Health England.** Water Fluoridation: health monitoring report for England 2014. [Online] March 2014. https://www.gov.uk/government/publications/water-fluoridation-health-monitoring-report-for-england-2014.

2. **World Health Organization Expert Committee on Oral Health Status and Fluoride Use.** Fluorides and Oral Health. *WHO Technical Report Series No. 846.* [Online] 1994. http://whqlibdoc.who.int/trs/WHO_TRS_846.pdf.

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6. **Abacus International.** Economic implications of the fluoridation of water supplies in Hampshire and Southampton City PCT. Report prepared for South Central Strategic Health Authority. *Referenced in: British Fluoridation Society 'Cost and cost-effectiveness of water fluoridation'.* [Online] 2008. http://www.bfsweb.org/onemillion/13%20One%20in%20a%20Million%20-%20The%20Cost%20and%20Cost-Effectiveness%20of%20Water%20Fluoridation.pdf.