**To:** **Barking & Dagenham Health Scrutiny Committee**

**From:** **Nick Kendall, Consultant in Dental Public Health**

**Date:** **27 May 2004**

**Subject:** **Water fluoridation in North East London - a briefing paper for information concerning:**

**(i) recent changes in legislation to enable the NHS to promote fluoridation**

**(ii) N E London Strategic Health Authority Board decision**

**(iii) Possible implications for Barking & Dagenham**

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**Purpose of the report**

The recent amendment to the Water Act includes provisions for the NHS to take the lead in consulting on fluoridation of water supplies and requesting water companies to increase the concentration of fluoride in their water where the local population is in favour.

There are significant inequalities in dental health (and in access to dental services) within NorthEast London. This change in legislation provides a potential fresh approach to tackle the inequalities.

# WATER FLUORIDATION IN NORTH EAST LONDON

## 1.0 Summary

1.1 Water fluoridation is a safe and effective community measure to reduce inequalities in oral health. Recent amendments to the Water Act enable the provision of water fluoridation in communities who have approved this through appropriate local consultation.

There are significant inequalities in oral health in NorthEast London (and across London as a whole) which could be addressed through water fluoridation. The presence of the London Thames Water 'ring main' together with supplies from a number of other water companies would necessitate a co-ordinated pan London and wider approach, supported by a detailed feasibility study.

This is an **information** paper, briefing members:

- highlighting inequalities in oral health locally
- concerning the current political and legislative situation
- providing evidence concerning effectiveness of water fluoridation

## 2.0 Background and introduction

2.1 Fluoride is naturally found in water, in the United Kingdom the levels are typically less than the optimum for dental health of 1 part per million. The benefits to teeth of fluoride in drinking water were discovered as the result of natural observational studies in the USA during the early 1900s.

2.2 The responsibility for water fluoridation lies with Strategic Health Authorities. The Water (Fluoridation) Act 1985 required District Health Authorities to consult widely in determining either initiation or cessation of water fluoridation. There have been many formal consultations carried out by Health Authorities since the 1985 legislation, but all formal requests for new schemes have been refused by the pre- and post-privatisation water industry as the Act (1985) gave the water companies the discretion to refuse.

2.3 The main legislative change in the amendment to the Water Act in 2003 is to require water companies to accede to requests from Strategic Health Authorities to increase the concentration of fluoride in their water where the local population is in favour. Water companies will no longer have the right of veto.

## 3.0 Inequalities in oral health in North East London

3.1 Dental decay is strongly associated with socio-economic deprivation. The inequalities that exist throughout England and across different ethnic groups show that there is no single cause of poor oral health but a range of associated factors including unemployment, poverty, social deprivation and lifestyle.

In children, approximately 80% of the disease is found in 20% of the children, the children most affected coming from the lower socio-economic groups. Many children in disadvantaged communities continue to carry the avoidable burden of pain, distress and disfigurement associated with severe tooth decay and its treatment.

3.2 If prevention has failed, the only treatments are fillings and extractions. Young children in particular find dental treatment difficult to tolerate and for many the solution involves a general anaesthetic in a hospital setting with multiple teeth being taken out. Dental decay is also a problem for adults. In 1998, 46% of adults in England had active tooth decay and 6% had six or more decayed or unsound teeth [(1)]. Although there has been a marked reduction in the extent of dental decay in the population over the last 30 years, the reduction in tooth decay has now stopped and it seems that further improvement is unlikely without additional preventive action.

3.4 A study of 5-year-old children in North East London [(2)] in 2001/02 showed that -

- 41% had experience of decay in their deciduous teeth (range 28-57%)
- 37% had active untreated decay (range 26-54%)
- those children with decay had very high levels
- there were marked inequalities in dental health of children across the sector

3.4 Table 1 and Chart 1 provide information concerning the average number of decayed, missing and filled (dmf) teeth in 5 year old children across North East London by Primary Care Trust, with comparisons to London and England.

The inner London population in particular has some of the worst levels of dental decay in England and Wales, with mean dmf values greater than 1.5. Nationally, after significant dramatic improvements in the late 70s and 80s, the level of dental caries has worsened recently [(3)].

The national target for oral health is that by 2003, 5 year old children should have an average of no more than one decayed, missing or filled primary tooth and that 70% of 5 year olds should have no experience of tooth decay [(4)]. Only two PCTs in London have reached this target, Havering and Lewisham. Barking & Dagenham will need to make some improvement to attain the target. However, it must be noted that any 'global Borough' figure does mask local inequalities where children in identifiable areas do suffer much poorer oral health.

3.5 Evidence from the 'York Review' - '*A systematic review of public water fluoridation'* [(5)] (see Appendix) showed that fluoridation is effective in reducing tooth decay and that there is no evidence of harm. This is in line with the findings of all other authoritative reviews. In terms of reducing tooth decay, the main finding was a mean reduction of 2.25 decayed, missing or filled teeth and an increase of 15% of children decay free.

The York Review also confirmed that water fluoridation significantly narrows the gap between young children living in poverty and their peers. It is also effective in improving the oral health of adults. Since the 1950s, studies have consistently shown that adults drinking optimally fluoridated water suffer less tooth decay.

3.6 Because oral and dental disorders are only infrequently life threatening, it is easy to assume that dental health contributes little to overall individual and societal welfare. However, dental and oral disorders have significant social, psychological and economic consequences and a significant impact on the quality of life.

3.7 The prevalence of dental decay is high (34% of 5 year olds in Barking & Dagenham affected) and the consequences of it in terms of pain and discomfort has a significant impact. Studies of dental pain have estimated 200 million days of pain for the UK as a whole. The consequences of such pain can involve time off from work, sleep disturbance, alteration of diet, and avoidance of social interaction. The cost of treatment for dental decay is high both to the individual and to society. Dental decay is a preventable disease.

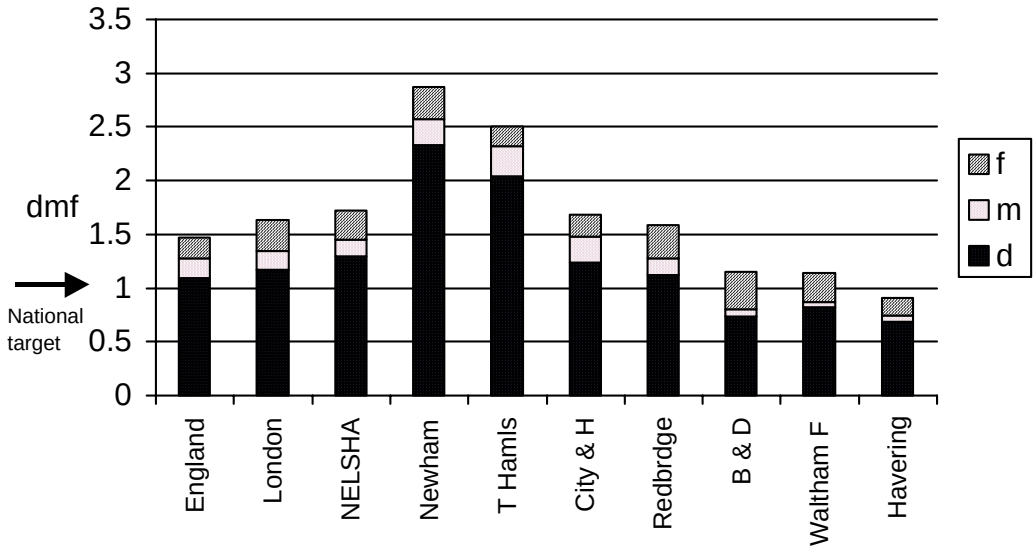


Chart 1. Decayed, missing and filled teeth by PCT area.

| PCT | dt | mt | ft | dmft | Care Index | dt>0 % | dmft>0 % |
|---|---|---|---|---|---|---|---|
| **B & D** | **0.73** | **0.07** | **0.35** | **1.15** | **30%** | **26.8%** | **34.0%** |
| City & Hckny | 1.24 | 0.24 | 0.20 | 1.68 | 12% | 34.7% | 39.6% |
| Havering | 0.69 | 0.05 | 0.17 | 0.91 | 19% | 25.6% | 28.2% |
| Newham | 2.33 | 0.24 | 0.30 | 2.87 | 10% | 53.9% | 56.6% |
| Redbridge | 1.12 | 0.16 | 0.31 | 1.58 | 20% | 34.3% | 37.9% |
| T Hamlets | 2.04 | 0.28 | 0.18 | 2.50 | 7% | 51.0% | 53.8% |
| Wlth Forest | 0.82 | 0.05 | 0.27 | 1.15 | 23% | 28.5% | 33.3% |
| NELSHA | 1.30 | 0.15 | 0.27 | 1.72 | 16% | 36.8% | 41.0% |
| London | 1.17 | 0.17 | 0.29 | 1.63 | 18% | 34.9% | 39.7% |
| England | 1.09 | 0.19 | 0.19 | 1.47 | 13% | 34.2% | 38.8% |
| Target 2003 | | | | <1.0 | | | <30% |

Table 1. Dental health of 5 year olds by PCT area in 2001/02

**4.0 Feasibility of water fluoridation in London**

4.1 An initial feasibility study of fluoridating the water supply of the Inner London Health Agencies was undertaken in 1996. The presence of the London 'Ring main' means that most of London's water supply is, in practice, a single supply covering approximately 9 million people. To achieve fluoridation of London it will be necessary to fluoridate the entire ring main system. This means that in addition to London fluoridation would extend to parts of Hertfordshire, Essex, Kent and Surrey. A further complication is that Thames Water, although the major supplier to London is not the only water supplier. A number of other companies supply on both a regular and emergency basis.

4.2 Estimated costs were £11.2 million capital and £2.62 million revenue, at 1996/97 prices. If fluoridation of London's water is to be undertaken an up to date and feasibility study will be required.

**5.0 Water supply in Barking & Dagenham**

5.1 The public water supply in Barking & Dagenham is from Essex and Suffolk Water Company. The domestic supply has no artificial fluoride added the natural fluoride content is very low around 0.2 – 0.3 ppm.

5.2 Due to the distribution of the supply of water by Essex and Suffolk Water Company, the cluster of PCTs for Barking & Dagenham to engage with in joint consultation may include:

- Redbridge and Havering in N E London SHA, and also
- PCTs across Essex SHA (particularly S Essex, Chelmsford, Malden and Witham areas).
- pan-London with PCTs supplied by the 'London ring main' of Thames Water

**6.0 Further action being taken currently by the Department of Health**

6.1 Regulations will have to be made concerning indemnities and consultations. The DoH is committed to consulting a wide-range of bodies on the consultation arrangements - Electoral Reform Society, LGA etc. Ministers have already indicated that they expect to see a basket of indicators used to assess local opinion rather than reliance on a referendum.

As well as the regulations the DoH will be

- Publishing the research on bio-availability of fluoride (currently at peer review stage)
- Finalising CMO/CDO 's advice to Ministers on the implications of the MRC report '*Water Fluoridation and Health'* (see Appendix)
- Developing model agreements between SHAs and water undertakers
- Working with DEFRA and the Drinking Water Inspectorate to update the Technical Code of Practice on water fluoridation
- Preparation of administrative guidance on implementation of legislative changes including consultations and the duty to monitor health

6.2 It is estimated that it will take at least six months (may be up to two years) to complete these tasks. The relevant sections of the Act will not be commenced until the regulations have been approved by both Houses of Parliament, which is unlikely before summer of 2004. Guidance to the NHS can then follow. Until SHAs have this information they will not know how to arrange a consultation, even if it is considered locally that a proposal for water fluoridation should be included among the options for improving oral health.

6.3 DoH anticipates that an initial proposal to consider water fluoridation as an option for addressing serious oral health problems would, in most cases, emerge from one or more Primary Care Trusts. PCTs have a responsibility for monitoring of the oral health needs of their local populations and assessing the options for addressing these needs.

6.4 If PCTs and the SHA conclude that the option merited more detailed exploration, it would then be necessary to check issues of technical feasibility and cost with the water company in order to inform decisions as to whether fluoridation was technically practicable and affordable.

6.5 Any need for discussions with other SHAs would also emerge from analysis of water supply arrangements and related technical issues. For example Essex and N E London for Havering. Discussions with the relevant Local Authorities Overview and Scrutiny Committees would also be needed prior to any public consultation.

6.6 The responsibility for conducting any public consultation lies with SHAs. SHAs will need to ensure throughout that their public stance on fluoridation is fully compatible with their responsibility to conduct a thorough, objective consultation process and draw the appropriate conclusions thereafter as to the extent of public support.

**7.0 Position of N E London Strategic Health Authority**

7.1 At the N E London SHA public Board meeting on 27 November 2003 a paper concerning 'Water fluoridation in London' (written by Sue Gregory, Regional Dental Adviser for London) was discussed. The SHA Board agreed to the following recommendations: (that) London Strategic Health Authorities should :

- Agree to a pan London approach on water fluoridation, taking into account any recommendations from the forthcoming CMO/CDO report and the outcome of the amendments to the Water Act
- Support the establishment of a London Water Fluoridation Working Group, to include representatives from the range of NHS organisations, partners, and the public
- Ensure consideration of water fluoridation by each PCT Board
- Commission the updating of the 1996/97 technical feasibility study for fluoridating London, including costs of implementation.

At the time of writing this paper the views of the remaining four London SHA Boards towards these recommendations was unknown

**8.0 Recommendations to members *at this stage***

- Recognise that inequalities exist in oral health across N E London and across the PCT
- Re-affirm Barking & Dagenham PCTs responsibilities towards improving oral health of the local population.
- Recognise that water fluoridation is an option to improve oral health and reduce inequalities
- Be aware of N E London SHA policy and responsibilities concerning water fluoridation and await decisions from the remaining London SHAs
- Keep in touch with progress of legislation and subsequent guidance from Department of Health
- Be aware of the process of exploring water fluoridation as an option - particularly organisational responsibilities, who to involve and how, clusters and boundaries of organisations involved geographically.

## 1.0 National and international experience of fluoridation

1.1 Five million people in the UK now receive water in which the fluoride content has been artificially increased to a level of 1 part fluoride per million parts of water. In addition, about 500,000 people in this country receive water which naturally contains fluoride at a lower level, but which still confers some dental benefits. This translates to 10% of the total population of the UK.

1.2 Worldwide, around 360m people drink water-containing fluoride. 317m people in 39 countries benefit from artificially fluoridated and an additional 40m benefit from water supplies which are naturally fluoridated. In the United States, since the mid 1990s, several large metropolitan areas have started fluoridation including Los Angeles, and Las Vegas. Many other US cities have been fluoridated for years New York, Chicago, Dallas etc. Forty-seven of the US's 50 largest cities are now fluoridated (66% of the population). 66% of the population of Australia drink fluoridated water, and 56% of New Zealand.

## 2.0 Some of the available evidence

2.1 The practice of fluoridating water has been endorsed by the World Health Organisation, the British Medical Association, the Faculty of Public Health, the British Dental Association, and, in the USA, by the Surgeon General, the American Medical Association and the American Dental Association. These endorsements were made in the light of evidence from the many studies conducted world-wide over a period of at least 50 years that fluoridated drinking water reduces tooth decay and has no adverse effects.

2.2 The World Health Organisation Expert Committee report on '*Oral Health Status and Fluoride Use'* [(6)] stated:

- *" There is clear evidence that regular low-level exposure of a population to fluoride can reduce caries prevalence".*
- *" Community water fluoridation is safe and cost-effective and should be introduced and maintained wherever it is socially acceptable and feasible".*

2.3 The 'York Review'

A comprehensive review evaluating the safety and efficacy of fluoridation was commissioned by the Government from the NHS Centre for Reviews and Dissemination and published in October 2000 [(5)] '*A systematic review of public water fluoridation'* found that fluoridation is effective in reducing tooth decay and that there is no evidence of harm, which is in line with the findings of all other authoritative reviews. It should be noted that this review took the position that the burden of proof should be greater for something of benefit compared to something that might be harmful. In terms of reducing tooth decay, the main finding was a mean reduction of 2.25 decayed, missing or filled teeth and an increase of 15% of children decay free.

The review provided researchers and commissioners of research with an overview of the methodological limitations of previous research conducted in this area, i.e. because of the long history of fluoridation some of the evidence is old and was not conducted to current standards of research. The Government therefore commissioned the Medical Research Council to investigate the research required strengthening the evidence base on fluoridation.

3.4 The Medical Research Council Report '*Water fluoridation and health' was* published on 5 September 2002 [(7).] This report provides further reassurance about the safety and

effectiveness of fluoridating water supplies to improve dental health. Their main messages were as follows:

- No evidence for significant health effects on immune system, reproductive system, child development, the kidneys, or the gastro-intestinal tract
- No evidence for significant health effects related to chemicals added in the fluoridation process, or for indirect effects such as increased leaching of lead from pipes and aluminium cooking utensils or altered uptake or toxicity of these substances
- No link between either cancer in general or any specific cancer type
- No evidence of increased risk of hip fracture, but cannot rule out small percentage change in either direction
- Support for findings that it helps to reduce dental decay
- Evidence that it can reduce inequalities in dental decay between social groups
- Recognises the balance between the benefits and risks of water fluoridation (essentially dental fluorosis) and makes research recommendations.

3.4 The WHO Environmental Health Task Group which reviewed the world-wide experience of fluoride in 2002 [8] concluded:

- No consistent evidence of association with morbidity or mortality due to cancer
- No evidence of association with spontaneous abortions/ congenital malformations
- Other conclusions similar to those of the Medical Research Council Report.

3.5 The association between dental fluorosis and drinking water has been recognised for over 100 years. Dental fluorosis is a cosmetic problem. There are also many other causes of dental mottling which may be difficult to differentiate form fluorosis clinically. The York Review estimated that 48% of the population in fluoridated areas will have *some degree* of dental fluorosis.

Unsightly dental fluorosis will affect a much smaller percentage of people. Most people with mild dental fluorosis do not know that they have it, and because it gives the teeth a pearly white appearance at this level, such teeth are often considered more attractive. It has been suggested that the York estimate is far too high for the UK as it is based largely on United States data. The MRC suggested further work on this but said the UK prevalence of fluorosis likely to be of aesthetic concern is 3% in fluoridated areas and 1% in non-fluoridated areas.

Whilst undesirable, dental fluorosis is not a health threat, nor is it as disfiguring as severe tooth decay.

3.6 A joint Chief Medical Officer/Chief Dental Officer Advisory Group is currently working through the recommendations of the MRC Report. The biochemical research on bioavailability of fluoride from natural and artificial sources should also be published this autumn, plus information on fluoride intake in children from the fluoride in urine analysis within the National Diet and Nutrition Survey.

3.7 The 'York Review' further confirms that water fluoridation significantly narrows the gap between young children living in poverty and their peers. It is also effective in improving the oral health of adults. Since the 1950s, studies have consistently shown that adults drinking optimally fluoridated water suffer less tooth decay. In Ireland 70% of the population drink fluoridated water and the national dental survey of adults shows that adults across all age groups living in fluoridated communities experience much less root surface decay than those living in non-fluoridated communities [9].

**4.0 Government policy**

4.1 In "*Saving Lives: Our Healthier Nation*" (Department of Health 1999) [10], the Government indicated that they agreed in principle to extend fluoridation, but announced it was commissioning a systematic review of evidence relating to the safety and effectiveness of water fluoridation (York Review).

4.2 The All-Party Parliamentary Group on Primary Care and Public Health published their Inquiry into Water Fluoridation in March 2003 [11]. This report was supportive of water fluoridation and made the following recommendations:

- As a matter of public dental health policy, targeted water fluoridation be instated as a legitimate and effective means of tackling dental health inequalities
- Current legislation be amended to allow the responsible health body, who consider that the matters in recommendation 1 are relevant to their area, to require water companies to fluoridate as directed
- Health bodies in carrying out their function and in recommending fluoridation must fully consult the relevant population in an open, effective and transparent manner
- The Department of Health to agree a protocol/code of practice with the water utilities concerning matters such as costs and indemnities and if necessary legislate appropriately.

4.3 In Parliament amendments have been made to the Water Act to resolve the tension between the wish of Health Authorities to fluoridate water, and the fact that this is the responsibility not of the NHS but of Water Companies. Decisions on water fluoridation would continue to be made at a local level subsequent to local consultation, led by Strategic Health Authorities.

**5.0 Political and public opinion**

5.1 Tessa Jowell, when Minister for Public Health, endorsed fluoridation: *"The public health benefits of fluoridation are clear. The overwhelming evidence is that fluoridation is safe and effective. Recent opinion surveys have shown that more than two thirds of the public are in support, but as I willingly acknowledged, there are those who hold alternative views"* (Hansard, 6 May 1998).

5.2 The Water Bill with clause 58 (fluoridation of water supplies) gained Royal Assent in November 2003.

5.3 70% of MPs support fluoridation, a similar percentage to that demonstrated in public opinion polls.

5.4 Four Gallup/NOP polls carried out over the past 18 years demonstrate overwhelming support for fluoridation. Four out of ten people think their water is already fluoridated, although only 10% actually are.

5.5 This is endorsed by an ethical opinion:
*"The right to fluoride free water is not a basic civil right. ... It is not a right which affects the ability of individuals to make autonomous choices ...*
*In considering the ethics of fluoridation ... we should ask not are we entitled to impose fluoridation on unwilling people, but are the unwilling people entitled to impose the risks, damage and costs of failure to fluoridate on the community at large."* (12)

**6.0 Cost effectiveness of fluoridation**

6.1 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. One of the greatest strengths of water fluoridation is that it does not require any behavioural changes from its recipients, unlike other possible preventive strategies such as campaigns encouraging people to improve their oral hygiene and/or visit their dentist regularly. The impact of these campaigns cannot be predicted, and they may be ignored by those who would benefit most from them. It is, however, possible to predict costs and benefits associated with water fluoridation, and to be confident that those people likely to benefit most from it will do so.

6.2 The cost effectiveness of water fluoridation depends on the number of high-risk individuals that the water reaches. In general, urban populations, and particularly those living in deprived inner-city areas, tend to have high proportions of high-risk individuals and offer the biggest potential for reduction in caries.

6.3 The Health Economics Consortium of the University of York (13) have undertaken some modelling and suggest that for a population with very poor oral status (e.g. 50% or more of children in the high risk category) water fluoridation would produce a "benefit" per person per year of at least 50p if preventing decay, a filling or an extraction is valued at £20 per problem avoided. If the capital costs of fluoridating a treatment works serving a population of 250,000 people are £300,000, and the annual revenue costs are £50,000 (these cost estimates are relatively high), the equivalent cost per person (for each of the 14 years of the life of the installation) would be 33p. In such a situation the annual benefits per person exceed the annual costs by at least 17p (or by at least £42,500 per annum for the population served). These calculations consider the benefits to people born after the fluoridation of the water supply. Those born prior to fluoridation will also benefit, although to a lesser extent.

**7.0 Possible alternative approaches to community based fluoride delivery**

7.1 There are alternatives to water fluoridation. Fluoride can be added to milk, salt, and flour or given directly via tablets or topical gels. The public has also had the benefit of fluoride toothpaste since the 1970s.

However, the most effective way to reach those people in greatest need is through the water supply.

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