

AD HOC SCRUTINY REVIEW INTO FLUORIDATION

NOVEMBER 2008

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1.0 EXECUTIVE SUMMARY

- 1.1 Although there has been significant improvement in oral health over the last 30 years, the Ad Hoc Scrutiny Panel looking into Fluoridation was presented with information which showed that in some areas of Kirklees, tooth decay in 5 year olds which requires treatments such as fillings and extractions, often under general anaesthesia, remains exceptionally high.
- 1.2 Expert witnesses giving evidence to the Scrutiny Review stated that a contributory factor to the high incidence of poor oral health is social deprivation; and there is a greater incidence of decayed, missing and filled teeth (dmft) in the most deprived wards of Kirklees. The introduction of dental health improvement strategies by the Primary Care Trust, such as fluoride varnish and optimising fluoride through toothpaste, has gone some way to addressing the issue; however, the success of these strategies largely depends on individual action, and the response rate to some schemes, targeted in specific areas has been poor.
- 1.3 One of the options being encouraged by the Department of Health as a way of tackling tooth decay and reducing health inequalities is fluoridation. Organisations such as the British Dental Association and the British Fluoridation Society have long advocated fluoridation on the grounds of its safety, equity, and effectiveness in reducing dental caries. There is however, a counter argument from the opponents of fluoridation. Organisations like the National Pure Water Association claim that far from being safe or effective in reducing dental disease, fluoridation equates to mass medication and poison; and if introduced would cause untold damage to the health of the individuals who ingest it.
- 1.4 The Ad Hoc Scrutiny Panel was mindful that there is an urgent need to improve the dental health of children across Kirklees however, it recognised that the arguments about fluoridation are longstanding and are both complex and emotive. The panel's aim was to ensure that the review was well balanced and based on conclusive scientific and medical evidence.
- 1.5 The panel also felt that it was important to emphasise that the role of scrutiny in conducting this review was not to make the decision about whether fluoridation should be introduced in Kirklees, but to present the findings of the scrutiny review to help facilitate a debate at Full Council.

2.0 BACKGROUND AND CONTEXT FOR THE REVIEW

- 2.1 In February 2008, Alan Johnson, Secretary of State for Health made a statement calling for fluoride to be added to England's water supplies as a key means of tackling tooth decay. The Secretary of State for Health expects Strategic Health Authorities (SHA) to set out their policy regarding fluoridation; and to use their powers to compel water companies to add the chemical to water supplies.
- 2.2 Local Strategic Health Authorities have the powers to decide whether fluoride should be added to the water supplies consumed by their populations. If formal consultation demonstrates that there is local support for fluoridation then the SHA may then request the relevant water supplier to make the necessary technical arrangements, and the water company will be obliged to do so. The Government has earmarked £42 million to support this over the next three years.
- 2.3 Strategic Health Authorities are being asked to seek the views of the Primary Care Trusts in their region to inform the response to the Secretary of State. Primary Care Trusts (PCT) in liaison with the SHA are being asked to consider water fluoridation, especially in areas where dental health is poor.
- 2.4 Following a meeting between Mike Potts, Chief Executive of NHS Kirklees and Councillor Walton, Chair of Kirklees' Overview and Scrutiny Management Committee, it was agreed that it would be helpful for the PCT to have a view not only from Scrutiny but an updated position from Kirklees Council on the issue of fluoridation.
- 2.5 A formal request made to the Overview and Scrutiny Management Committee, on 9 September 2008, resulted in a separate Ad Hoc Scrutiny Panel being set up to look into the issue of water fluoridation. It had also been determined that there is now considerable new evidence available since the earlier debates of the 80s and 90s and it was suggested that the Ad Hoc Scrutiny Panel consider the updated information to form a view.
- 2.6 The report of the Ad Hoc Review Panel will be presented to Full Council on 10 December 2008, to inform a Full Council debate on the issue.

3.0 TERMS OF REFERENCE AND METHODOLOGY

3.1 The panel members were:

- Councillor Molly Walton (Lead Member)
- Councillor Rochelle Parchment
- Councillor Tony Brice
- Mohammed Munir Daji and Ashraf Ali (Voluntary Co-optees)

3.2 The panel was supported by Scrutiny Officers Jenny Bryce-Chan and Beth Hewitt.

3.3 The terms of reference for the review were as follows:-

- ***To investigate the advantages and disadvantages of the addition of fluoride to household water supplies.***
- ***To recommend a position regarding the fluoridation of water to be debated at Full Council.***

3.4 The review was carried out between October and November 2008 and included perusing relevant documentation and interviewing expert witnesses.

3.5 Documents

- York Review – A Systematic Review of Public Water Fluoridation
- Water Fluoridation Review – Rotherham Metropolitan Council
- Water Fluoridation and Health – Medical Research Council 2002
- Community Dental Health 1992 – Ian Booth
- A Systematic Review of the Efficacy and Safety of Fluoride – Australian Government – (National Health and Medical Research Council)
- Nuffield Council of Bioethics – Public Health Ethical Issues
- Fluoride in Drinking Water – World Health Organisation

3.6 Witness Interviews

Three meetings were held in public during October and November 2008, to receive information and evidence from a range of individuals and organisations.

| DATE | WITNESS |
|------------------|--|
| 14 October 2008 | Mike Potts - Chief Executive NHS Kirklees Dr Jini D’Cruz , - Consultant in Dental Public Health |
| 30 October 2008 | Dr John Beal MBE – Consultant in Dental Public Health Yorkshire and Humber Strategic Health Authority Professor MA Lennon OBE – Department of Oral Health and Development School of Clinical Dentistry University of Sheffield, Chair of the British Fluoridation Society John Haley – Water Quality Compliance Manager, Yorkshire Water Elizabeth McDonagh – Chair of the National Pure Water Association Clive Thompson – Chief Scientist, Alcontrol Laboratories (written submission to the panel) |
| 19 November 2008 | Dr Peter Clemenson – Senior Lecturer in Chemical and Biological Sciences, Huddersfield University |

- 3.7 Members of the general public had an opportunity to contribute to the review by submitting comments through the Kirklees website, in writing or by telephone. The review panel wish to emphasise that asking for public comment, was intended to gauge the public’s opinion on fluoridation and should in no way be considered public consultation.
- 3.8 Should a policy decision in support of water fluoridation be taken by the Primary Care Trust, then an approach would be made to the Strategic Health Authority, who would conduct a more wide spread public consultation exercise in accordance with the Water Fluoridation (Consultation) (England) Regulations 2005.
- 3.9 The panel also noted the comments made by the public in the letters page of the local press. All comments were considered by the panel as part of the evidence gathering process.

4.0 BACKGROUND INFORMATION

Fluoridation in Kirklees - Historical Context

- 4.1 Fluoridation started in Huddersfield in August 1970, and according to a report entitled Community Dental Health the electoral wards of Dalton, Newsome and Holme Valley North received fluoridated water continuously from Digley reservoir until 1989¹.
- 4.2 In August 1989, the Director of Health and Housing submitted a report to the Environment Committee on recent developments relating to the issue of fluoridation of public water supplies. The report explained that certain areas in Kirklees received fluoridated water supplies, but that Yorkshire Water Authority had given the necessary six months statutory notification that from 1 November 1989, fluoridation operations in Huddersfield would cease.
- 4.3 The report gave details of arguments for and against fluoridation and set out the options that were available to the Committee in this matter. The Committee resolved that the matter would be deferred pending a seminar about fluoridation being presented to council members.
- 4.4 In November 1989, the Policy and Resources Committee received a presentation from Dr J F Beal, a specialist in Community Dental Health in support of water fluoridation. This was followed by a presentation to the Committee in December 1989, from Mrs M Cooper on behalf of the National Pure Water Association on the case against the fluoridation of water supplies.
- 4.5 On 21 March 1990, the Environmental Regeneration Manager submitted a report to the Policy and Resources Committee summarising the arguments both for and against fluoridation. The report explained that the Council did not have a current policy with regard to fluoridation.
- 4.6 The Policy and Resources Committee resolved that:-
- *the Council adopts a policy in support of fluoridation of public water supplies in Kirklees.*
 - *a joint working party be established between the Council and the Huddersfield and Dewsbury Area Health Authority with a view to determining the most appropriate course of action to secure the fluoridation of water supplies for residents of Kirklees, following the taking into consideration of all medical and environmental factors regarding the issue.*
- 4.7 In November 1992, a report to the Policy and Resources Committee advised the Committee of consultation documents which had been

¹Community Dental Health Journal (1992), A comparison between the dental health of 3 year old children living in fluoridated Huddersfield and non-fluoridated Dewsbury in 1989, I.M. Booth et al

issued by the Dewsbury and Huddersfield Health Authorities relating to "Prevention of Dental Caries by the Fluoridation of Water Supplies". Both Health Authorities had considered the poor level of dental health within the district and had agreed, in principle, to make applications to fluoridate all the district's water supplies.

- 4.8 The Policy and Resources Committee resolved that:-
- *This Council welcomes the proposals of the two District Health Authorities which it believes will be of benefit to the whole of the population of Kirklees.*
- 4.9 The review panel has been unable to determine the outcome of any consultation undertaken by Dewsbury and Huddersfield Health Authorities in relation to fluoridation of the district's water supplies.
- 4.10 Further information obtained as part of the evidence gathering process revealed that Kirklees Council was a member of 'The National Alliance for Equity in Dental Health'. This was an informal coalition of organisations who supported water fluoridation as a means of improving dental health. The Alliance was set up in 1996 to campaign for action by Government to ensure that water suppliers fluoridate supplies when asked to do so by communities and their health authorities.

Current Position – Local

- 4.11 Since fluoridation ceased in Huddersfield in 1989, no area of Kirklees has received fluoridated water. It would seem that following the Council discussions which took place in the early 1990s, when the Council was in favour of adopting a policy in support of fluoridation, there has been no further Council debate on the subject.
- 4.12 In the Yorkshire and Humber region, few local authorities have made policy decision with regard to fluoridation. Bradford decided in 2003, to reject fluoridation and in 2007, Rotherham MBC reaffirmed their opposition to fluoridation.

Current Position – National

- 4.13 Fluoridation schemes have existed in Birmingham, Solihull and Newcastle since the 1960s and in Britain 5.5 million people currently receive fluoridated water, of which 3.8 million are in the West Midlands. People in the North East, East Midlands, Cheshire, Cumbria, Lincolnshire and Bedfordshire also drink fluoridated water.
- 4.14 South Central Strategic Health Authority has recently launched a public consultation on proposals to introduce a water fluoridation scheme in South West Hampshire and Southampton to tackle high levels of tooth decay. The consultation runs from 8 September – 19 December 2008.

Map showing Fluoridation schemes in England (Defra)



5.0 LEGISLATIVE CONTEXT

- 5.1 The Water (Fluoridation) Act 1985 covers all existing fluoridation schemes prior to 1985 and was consolidated by the introduction of the Water Industry Act 1991 which was intended to regularise the legislative framework. The 1991 Act proved to be ineffective largely because water companies could not be compelled to fluoridate, and no new fluoridation schemes were started in the UK under this legislation.
- 5.2 The Water Industry Act 1991 states that “*where a District Health Authority have applied in writing to a water undertaker for the water supplied within an area specified in the application to be fluoridated, that undertaker **may**, while the application remains in force, increase the fluoride content of the water supplied by the undertaker within that area*”.
- 5.3 Dr John Beal, Consultant in Dental Public Health informed the panel that between 1985 and 2001, 60 Strategic Health Authorities consulted and asked water undertakers to fluoridate, however, none were implemented. The Judicial Review confirmed that ‘**may**’ within the Act implied discretion.
- 5.4 The Water Act 2003 amends the Water Industry Act 1991, and consolidates the provisions of the Water (Fluoridation) Act 1985. The Water Act 2003 now gives Strategic Health Authorities (SHA) the responsibility of deciding locally the need for fluoridation, and the duty of informing the public and consulting local authorities about any proposals to fluoridate local water supplies.
- 5.5 Section 87 of the Water Act 2003 states “*If requested in writing to do so by a relevant authority, a water undertaker **shall** enter into arrangements with the relevant authority to increase the fluoride content of the water supplied by that undertaker to premises within the area specified in the arrangements*”. This Act removes the discretion from the water undertaker.
- 5.6 The review panel sought to clarify the decision taken by Yorkshire Water to cease fluoridation in Kirklees. The panel were of the opinion that in 1989, prior to being privatised, Yorkshire Water had attempted to get total indemnity from the government against individuals who may submit a claim, stating that they had been harmed by fluoride. Unable to get total indemnity, Yorkshire Water ceased the fluoridation scheme.
- 5.7 The evidence provided by various witnesses showed that the indemnity that was being sought by water undertakers at that time was intended to protect them not only against claims from individuals stating that their health had been affected by fluoride; but also criminal damage. The water companies were concerned that if, for whatever reason, they were prosecuted in the criminal courts but found not guilty they should not have to pay the costs of fighting that prosecution.

- 5.8 The decision to cease fluoridation in Kirklees had nothing to do with claims that it had caused ill health, although, the panel was unable to find evidence regarding the types of illnesses that were recorded during the 19 years that the water supplies in certain areas of Kirklees were fluoridated.
- 5.9 The panel was informed that the issue of indemnity was a major concern for water undertakers, however, arrangements to address this have been written into the Water Act 2003.

“The Secretary of state may also, with the consent of the Treasury agree to indemnify any licensed water supplier in respect of liabilities which it may incur –

(a) In supplying water to which fluoride has been added by a water undertaker by virtue of any such arrangements”.

6.0 SYSTEMATIC REVIEWS / STUDIES

- 6.1 The findings of a number of systematic reviews have been used by both the proponents and opponents of fluoridation to substantiate their arguments. The following reviews were the most widely quoted during the scrutiny review.

6.2 A Systematic Review of Public Water Fluoridation (The York Review)

In 1999, the Department of Health commissioned the NHS Centre for Reviews and Dissemination, York University to carry out an up-to-date expert scientific review of fluoride and health. The overall aim was to assess the evidence on the positive and negative effects of population wide drinking-water fluoridation strategies to prevent dental caries. To achieve its aim five objectives were identified. The Advisory Committee to the review was chaired by Professor Trevor Sheldon. The review team concluded that in spite of the large number of studies carried out over several decades there was a dearth of reliable evidence with which to inform policy.

6.3 Water Fluoridation and Health (Medical Research Council)

In response to the conclusion and recommendations of the York Review, the Department of Health approached the Medical Research Council to consider what further research might be required to improve the evidence base in the area of fluoride and health. A working group was established in 2002 to identify where the existing knowledge base and public health policy might benefit from further research, and how this evidence might be obtained.

6.4 A Systematic Review of the Efficacy and Safety of Fluoridation 2007 (Australian Review)

This review was commissioned in December 2006, to evaluate the scientific literature relating to the health effects of fluoride and fluoridation. This report is primarily concerned with the caries-reducing

benefits and associated health risks of providing fluoride systematically (via addition to water, milk and salt) and the use of topical fluoride agents (such as toothpaste gel, varnish and mouth rinse). Whilst the review summarises the recent evidence, it does not constitute health policy or clinical practice recommendations.

7.0 EVIDENCE AND FINDINGS

Oral Health in Kirklees

- 7.1 The panel was presented with evidence which showed that the dental health of children in Kirklees has been monitored regularly for more than twenty years; and has one of the highest levels of tooth decay in the Strategic Health Authority Area. There has been little reduction in the number of children suffering from tooth decay. In 2006, 44% of 5 year old children had tooth decay with an average of 4 or 5 teeth that had decayed.
- 7.2 A contributory factor to the high incidence of poor oral health is social deprivation; and there is a greater incidence of decayed, missing and filled teeth (dmft) in the most deprived wards of Kirklees. The mean dmft in five year old children classified by Strategic Health Authority for West Yorkshire was 2.51, which is well above the target of 1.5 mean dmft for England. The mean dmft of five year olds when classified in Yorkshire and Humber PCTs shows that North Kirklees is the worst regionally with 69.9% of five year old children experiencing dental caries.
- 7.3 Concerns were expressed by the expert witnesses, who were also dental health professionals that many of these children suffer from toothache and dental abscesses and need to go to hospital to have teeth extracted under general anaesthesia. There are risks associated with general anaesthesia and also recorded instances where dental abscesses have been known to be life threatening. Currently, West Yorkshire carries out a much higher number of general anaesthetics procedures for extractions than fluoridated Birmingham.



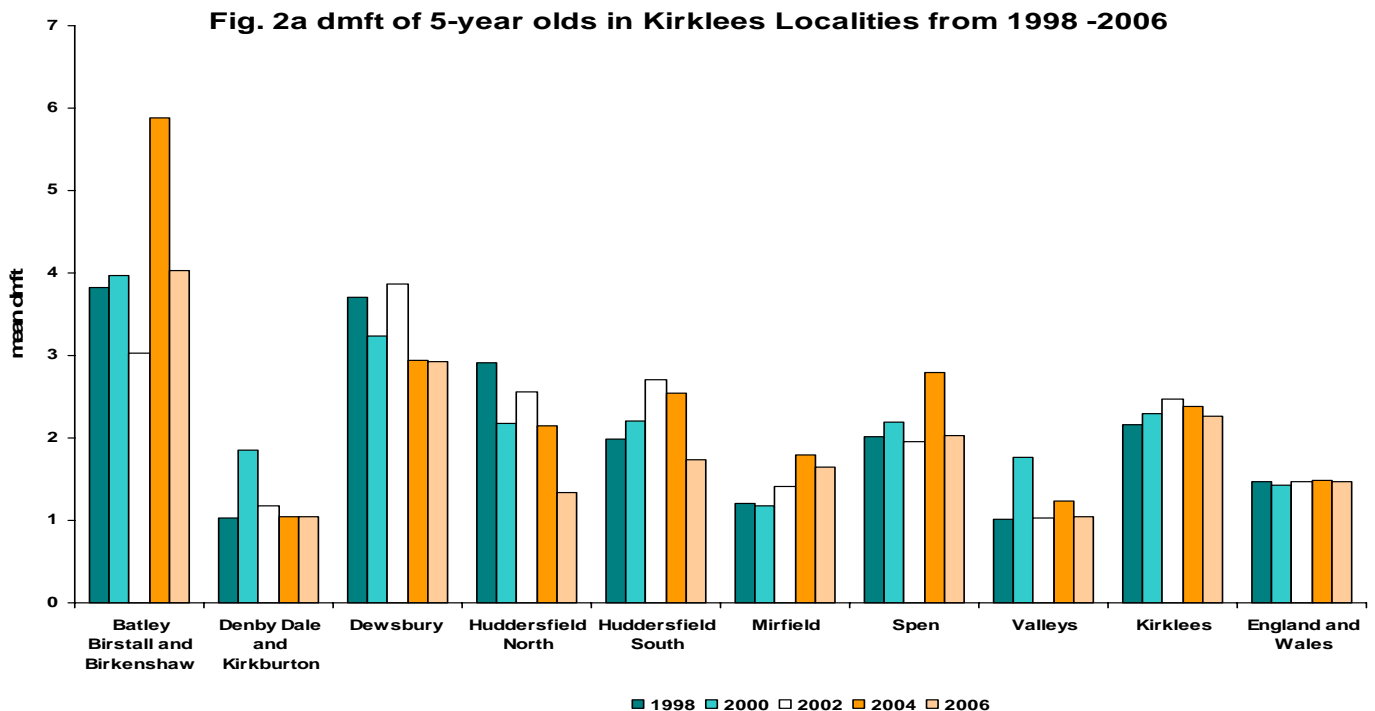
**Severe tooth decay
in young children**

- 7.4 Dental health for 12 year olds in Kirklees is much better, which reflects the national trend, with the UK having the lowest level of tooth decay in 12 year olds across Europe. This improvement is in part, attributed to the benefits of toothpaste, fluoridation and promotional efforts by the PCTs. There are however, the potential risks of erosion from acidic soft drinks.
- 7.5 Dr Jini D'Cruz, Consultant in Dental Public Health informed the panel that large parts of South Kirklees have good levels of oral health, while large parts of North Kirklees have very poor levels of dental health in 5 year old children. One of the main concerns is that not many young children attend the dentist regularly. By the time they are five years old

only about 25% go to the dentist and they tend to be the ones whose parents have a regular habit of going.

7.6 The panel asked what preventative and educational measures were being taken by the dental and health practitioners.

7.7 The panel was informed that attempts have been made by the Primary Care Trust to improve oral health across Kirklees, by introducing a number of strategies and initiatives. Some of these initiatives have included optimising fluoride through toothpaste, such as '*Brushing for Fun*'; a scheme where nurses go into reception and nursery classes to encourage the brushing of teeth as part of the daily routine. '*Brushing for Life*' is delivered by health visitors across the whole of Kirklees and a pack containing information, toothpaste and a toothbrush is given to the parents at the 7 month developmental check (as the first baby tooth comes through at the age of 6 months.) In addition, attempts have also been made to raise awareness and knowledge about correct diet, lifestyle and choosing the right toothpaste. Dental health is linked to good general health.



Source: CKCDC and BASCD.

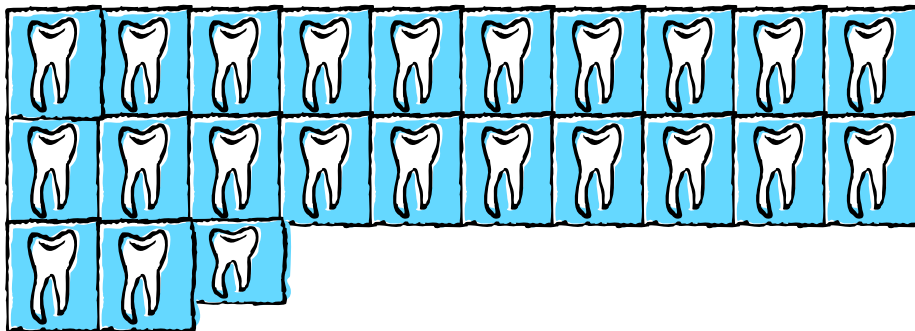
7.8 The panel heard that while these strategies have had some positive outcomes, a primary concern, is that they require individual actions and unfortunately, the response rate for some of these initiatives have been poor. For example, a pilot scheme in Batley where certain dental practices agreed to apply fluoride varnish to the surface of the teeth of 3 year olds attracted only 25% of those invited.

7.9 Professor Lennon, from the School of Clinical Dentistry, University of Sheffield and Chair of the British Fluoridation Society, stated that

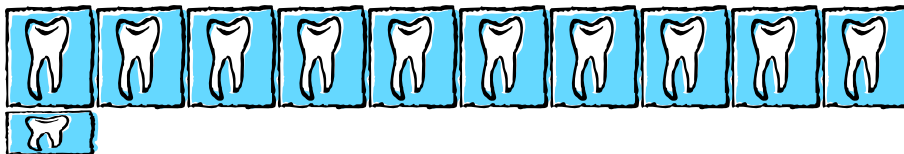
children in non-fluoridated Kirklees and many other parts of Yorkshire have more than twice as many decayed missing and filled teeth (dmft) than children in fluoridated Birmingham and West Midlands. Studies show that children in deprived areas, who use fluoridated water, have a reduction in tooth decay which is on the same level as children in the more affluent areas.

Average number of teeth decayed, missing and filled per 100 five year olds 2005/6 study.

Kirklees - 227 teeth affected per 100 children



Birmingham 104 teeth affected per 100 children



7.10 The panel learned that the benefits of fluoridation can not only be seen in children but also in older people who consume fluoridated water. Fluoride has a protective effect on the part of the tooth where the gum might have shrunk back so there are less caries at the neck of the tooth. Adults in fluoridated areas keep more of their own teeth for longer. In, Eire which has had mandatory fluoridation for some years, a comparison was made of fluoridated and non fluoridated areas. It found that adults living in fluoridated areas keep their teeth for far longer than people who live in non-fluoridated areas.

7.11 In 1992, a study was undertaken to compare the prevalence of dental caries and developmental defects of enamel between 3-year-old children who were lifelong residents of fluoridated areas of Huddersfield (1ppm F) and non-fluoridated Dewsbury (less than 0.3 ppm F). An interview was conducted with the parents of the children to provide information regarding previous dental experiences. The mean dmft was 0.30 in Huddersfield and 0.74 in Dewsbury. The percentage of children who had experienced dental caries and the percentage with carious teeth were significantly lower in the fluoridated area. The children from Dewsbury had suffered more toothache. The study concluded that the decision to cease water fluoridation in Huddersfield should be reversed

as soon as possible.²

7.12 The panel was presented with an alternative viewpoint from Elizabeth McDonagh a representative from the National Pure Water Association (NPWA). The claim was that there is a dental decay crisis among deprived children in the US, in areas that have been fluoridated for over forty years. The panel was also told that Dr Barry Cockcroft, Chief Dental Officer had stated during a BBC Radio 4 programme in September 2007, that *“there has been a massive improvement in oral health over the last 30 years and we now have the lowest rates of dental decay in our children in Europe and low disease rates across all age-groups”*.

7.13 In order to improve oral health, Primary Care Trusts in liaison with Strategic Health Authorities are being asked to consider water fluoridation, especially in areas where dental health is poor. Mike Potts, Chief Executive of NHS Kirklees, informed the panel that the PCT had not yet made a decision as to whether it will support fluoridation but was hoping to have made the decision by December 2008.

PANEL CONCLUSIONS

Having heard the evidence about the state of oral health in Kirklees, particularly amongst 5 year olds, the review panel was in no doubt that improving the dental health of children in the borough must remain a priority. The panel acknowledges that whilst there has been some improvement in dental health over the last 30 years, the evidence clearly highlights that much more needs to be done and the PCT must consider all options available to it to improve oral health.

The panel accepted that there is a clear link between poor dental health and deprivation. For that reason the panel concludes that tackling deprivation is intrinsically linked to reducing dental health inequalities in the longer term.

The panel was presented with clear evidence to show that fluoride is effective in reducing dental caries. The benefit of fluoride is that it washes the teeth thereby reducing the need to floss. However, while it is acknowledged that fluoride is an effective measure it should be supported by a diet that is low in sugar and regular brushing and flossing of the teeth.

The panel was of the view that while, the Department of Health and many health professionals advocate fluoridation as one of the solutions to improving poor oral health; from the correspondence submitted by the public as part of the review, it would seem that the public are less than convinced about fluoridation. (Appendix 1) Much more effort needs to be put into addressing the public's apprehensions about fluoridation.

² Community Dental Health Journal (1992), A comparison between the dental health of 3 year old children living in fluoridated Huddersfield and non-fluoridated Dewsbury in 1989, I.M. Booth et al

8.0 EVIDENCE ON FLUORIDE

The History of Fluoridation

- 8.1 The panel was given a brief history of fluoridation dating back to the 1930s when studies were first carried out in America in areas with high levels of fluoride occurring naturally in the water course. These studies revealed that those living in such areas had less tooth decay when compared with those in non-fluoridated areas.
- 8.2 A Trendley Dean Study conducted in the Grand Rapids area of the USA revealed similar benefits to dental health when compared to non-fluoridated areas. This study prompted similar trials to be undertaken in England during the 1950s and Birmingham introduced fluoridation in 1964.

8.1 What is Fluoride?

- 8.1.1 The panel recognised that many people's views on fluoride and fluoridation is often entrenched and can in some instances be based on misinformation. The panel felt that it was important to establish the facts about fluoride and its potential benefits and risks, in order to inform itself and the general public.
- 8.1.2 Clive Thompson, Chief Scientist from ALcontrol Laboratories provided written evidence in response to specific Panel questions on fluoride. (see appendix 2) Dr Peter Clemenson, Senior Lecturer in Chemical and Biological Sciences, Huddersfield University also gave evidence to the review panel on fluoride.
- 8.1.3 The panel learned that fluorine is a pale yellow-green gas with a sharp odour of the halogen family that is related to chlorine, bromine and iodine. In its elemental or basic form fluorine is a toxic gas, described as the '*tyrannosaurus rex*' of elements because it reacts violently with metal, sulphur, and glass. When combined with other elements it can form compounds that are completely inert such as Teflon® used in cooking pans and Gore-Tex® used in clothing. When it is chemically reacted with tin, it takes on cavity fighting uses. Fluoride cannot exist without a counter cation e.g. sodium.
- 8.1.4 Fluoride is found in rocks and in all water at different levels in different parts of the world. For example, the typical level of fluoride naturally present in water, in the Yorkshire area, is approximately 0.1mg/litre; while the typical level of fluoride which is naturally present in Hartlepool is approximately 1mg/litre.
- 8.1.5 The panel questioned the toxicity of fluoride and was informed that fluoride is toxic in concentrations above about 3 mg/litre, but less toxic than arsenic or lead on a mass for mass basis. It is however, a cumulative poison. "*Fluoride occurs naturally in soil, water, plants and*

animals in trace quantities. In groundwater, natural fluoride concentrations range from trace quantities to over 25mg/litre.³

- 8.1.6 **The prescribed concentration allowable in drinking water for maximum benefit is 1ppm which is 1 part fluoride to a million parts water. The World Health Organisation (WHO) states that 1.5ppm is the level which it recommends should not be exceeded in drinking water. In the United States most areas have public water fluoridation with a maximum allowable limit set at 4 ppm and a guideline level of 2ppm.**
- 8.1.7 In countries such as India, China and Africa where the natural levels of fluoride in water is known to be exceptionally high, well above the recommended levels, it has been attributed to health problems such as severe skeletal and dental fluorosis. *“Crippling skeletal fluorosis is a significant cause of morbidity in a number of regions of the world. Fluoride is known to occur at elevated concentrations in a number of parts of the world and in such circumstances can have, and often has, a significant adverse impact on public health and well-being”.* (World Health Organisation)⁴
- 8.1.8 One of the issues consistently raised by members of the public to the review panel was that adding fluoride to public water supplies “equates to mass medication” of whole communities. The panel sought to clarify with the expert witnesses, whether fluoride was a medicine and if it was used for any medicinal purpose.
- 8.1.9 The panel was informed that fluoride is not considered a medicine and is not used for any other purpose other than reducing dental caries. However, a contrary argument put forward by the National Pure Water Association (NPWA) is that under Directive 2004/27/EC, a definition of a medicinal product for human use is:-
- (a) any substance or combination of substances presented as having properties for treating or preventing disease in human beings. (31 March 2004)*
- 8.1.10 The NPWA claim that as fluoride/fluoridated water is presented by Health Authorities as having properties to treat and prevent disease in human beings i.e dental disease, by the definition given under the EC directive it is a medicine. The panel was also informed that in the 1920s sodium fluoride was taken orally and in baths to treat hyperthyroidism, however patients became hypothyroid and the treatments were abandoned.
- 8.1.11 Having heard the evidence, the panel questioned the notion of fluoride being considered a medicine when it is a naturally occurring element found in the water; and is no longer used for any medicinal purpose.

8.2 How fluoride works to improve dental health

³ Medical Research Council – Water Fluoridation and Health 2002

⁴ Fluoride in Drinking Water – World Health Organisation

8.2.1 There are three primary factors that contribute to dental caries (tooth decay): a susceptible site on a tooth, an infective strain of bacteria (*Streptococcus mutans*), and sugars or other nutrients that stimulate the bacteria's growth. As these bacteria grow, they produce an acidic by-product that can dissolve the minerals in the enamel (outer layer) and eventually destroy the tooth.

8.2.2 The fluoride help can be both by topical effect, that is water or anything containing fluoride going across the surface of the teeth or; systemically, by swallowing fluoridated water. The systemic effect of fluoride occurs during the development of the tooth. Fluoride works by strengthening the enamel to resist acid attacks and promoting re-mineralisation of tooth enamel.

8.3 Other sources of fluoride

8.3.1 The panel enquired, that if, fluoridation was not considered as an option for Kirklees, what alternative ways could fluoride be administered in order to improve oral health. The panel learned that it is possible to administer fluoride by alternative methods, however, because these methods require individual action they are not always effective.

8.3.2 **Fluoride toothpaste** – Introduced in the 1970s, toothpaste has contributed significantly in improving dental health. Many brands of toothpaste contain fluoride; however the level can be extremely high up to 1500ppm. If a child swallowed a tube of toothpaste it would immediately be sick, therefore, the advice from the medical professionals is that only a small pea size amount is required and it should not be swallowed. Children under the age of six generally tend to swallow things that go in their mouths, it should however, now be well known that younger children using toothpaste should be supervised.

8.3.3 **Fluoride varnish** – is a highly concentrated form of fluoride which is applied by dentists to the tooth's surface and appears to stop bacterial activity and reduce dental plaque. This preventative measure is best carried out at the age of 3 when the back milk teeth are painted which can reduce the need for fillings at 5 years of age. However, not all parents take up this offer.

8.3.4 **Fluoridised Salt** - is most commonly fluoridated at 250 parts per million (ppm) (*range 200 - 350ppm*) which means 2,5 mg of fluoride for every 10 grams of salt. Fluoridated salt is commonly used in some European countries, however, in the UK the message to the public is to reduce salt intake.

8.3.5 **Fluoride milk** - Fluoridated milk schemes have been tried out in a few areas including Rotherham, Barnsley and some areas of Lancashire. However, milk is only available in term time and ceases to be provided beyond primary school age, thereby reducing its effectiveness. Generally however, it is a proven preventative measure.

8.3.6 In addition, there are fluoride supplements available, in the form of tablets, drops and also mouth rinses.

8.4 Fluoride in food

8.4.1 The panel was surprised to learn that all food contains trace levels of fluoride (as per natural waters), but in the vast majority of instances, the level is very low, typically less than 0.3 mg/kg DM (0.5 ppm). Tea however, contains relatively high levels of fluoride with the highest concentrations found in mature or fallen tea leaves.⁵ Vegetables and fruits normally have low levels of fluoride, with higher levels of fluoride being found in barley and rice. In general the levels of fluoride found in meat and fish are relatively low. (WHO)

| Amount of fluoride found in food and beverages | | |
|--|-------------------|---|
| Product | ppm | Reference |
| Tea – Highest concentrations of fluoride found in mature and fallen tea leaves. | 0.1-4.2 | Australian Review Fluoride Action Network |
| Green/Black Tea | 1.1-5.2 | Fluoride Action Network |
| Cola | 0.3-0.4 | Clemenson 2008 |
| Wine | 0.4-1.0 | Clemenson 2008 |
| Beer | 0.4-1.0 | Clemenson 2008 |
| Fish | 0.6-1.7(mg kg) | Whitford (1996) |
| Fruit and Vegetable | 0.01-0.58 (mg kg) | Dabeka and McKenzie (1995) |

8.4.2 The panel was concerned that should fluoridation be introduced in Kirklees, would it be possible for individuals to monitor how much fluoride they were ingesting; particularly if they were consuming fluoride from a number of sources i.e. food, as well as drinking water. The panel expressed concern about the cumulative effect of ingesting fluoride.

8.4.3 Dr Clemenson informed the panel that fluoride dissipates in the body very quickly because it has a biological half life of between 2-9 hours, and as it is excreted there would be a lessening effect. Individuals would have to have a continuous intake for it to have a damaging effect. However, any fluoride that does remain in the body has a predisposition towards calcium, and therefore, it stores in the bones and teeth. In addition, Dr Clemenson said prior to conducting research on behalf of the scrutiny review panel he had been opposed to fluoridation, but had since changed his opinion as he could clearly see the benefits of fluoride.

⁵ A Systematic Review of the Efficacy and Safety of Fluoride – Australian Government – National Health and Medical Research Council 2007

- 8.4.4 Elizabeth McDonagh from the National Pure Water Association stated that fluoridation gives no control on dose because intake of fluoride from sources other than water is not considered and may even be greater than from water. In addition, some people drink more than others e.g. diabetics, manual workers, and athletes. A report by the World Health Organisation suggests that the total daily fluoride exposure can vary markedly from one region to another.

8.5 Fluoride and the environment

- 8.5.1 Fluorides are released into the environment through a combination of natural and human processes. Natural processes include rock weathering and volcanic emissions while human activities include phosphate rock mining and aluminium manufacturing. These processes result in the dispersion, accumulation and ubiquitous prevalence of fluoride at various concentrations in all surface and groundwater reserves. Mostly as fluoride ions or combined with aluminium in the air as gases or particulates; in soils mainly combined with calcium or aluminium; and in living organisms. (Australian Review⁵)
- 8.5.2 In surface waters, such as rivers, the fluoride levels depend on the proximity to human or natural emission sources, and generally range from 0.01 to 0.3mg/litre. In seawater, fluoride concentrations are higher, ranging between 1.2 to 1.5mg/litre.

8.6 Fluoride on Health

- 8.6.1 The panel recognised that one of the most controversial areas in the fluoridation debate is how fluoride affects people's health. There have been claims that fluoride causes a range of health problems which include dental and skeletal fluorosis, bone fracture, cancer, irritable bowel syndrome, chronic fatigue and thyroid problems. In addition, there have been claims of allergic reactions to fluoride.
- 8.6.2 The expert witnesses were asked by the panel, to provide where possible, irrefutable evidence to show either the beneficial or adverse health effects caused by fluoride.
- 8.6.3 Dr John Beal, Professor Lennon and Dr Jini D'Cruz, who are all supporters of fluoridation, stated that there is significant evidence to support the claim that fluoride at 1ppm has proven benefits in reducing tooth decay and strengthening tooth enamel. They maintain that while the benefits of fluoride are clear and supported by scientific and medical evidence, there is no evidence to substantiate any of the assertions that fluoride at the prescribed concentration level of 1ppm, causes cancer bone fracture, or any other adverse health concerns. In order to support their assertions the review panel was referred to the findings of the York Review.

⁵ A Systematic Review of the Efficacy and Safety of Fluoride – Australian Government – National Health and Medical Research Council 2007

- 8.6.4 The York Review concluded that *“no association between water fluoridation and other adverse effects such as cancer, bone fracture and Down’s Syndrome was found. However, the review team felt that not enough was known because the quality of evidence was again poor”*.
- 8.6.5 The panel was informed that areas such as Birmingham and Newcastle have been receiving fluoridated water for many years and any adverse health effects would have shown up in the public health morbidity and mortality statistics looked at by the Medical Research Council.
- 8.6.6 Experts explained that the cumulative effect of fluoride, in areas such as Hartlepool where the water is naturally fluoridated at 1ppm, has shown no evidence of adverse effects. The panel heard that there are no specific allergies related to fluoride, although certain hyper-sensitive individuals may be susceptible. Whenever such claims are made, GPs would refer individuals to dermatologists who would be able to carry out a full range of tests.
- 8.6.7 These witnesses did however, concur that fluoride even at the prescribed level can cause dental fluorosis, which they described as mild cosmetic scarring on the surface of the teeth.
- 8.6.8 Elizabeth McDonagh, representative from the National Pure Water Association (NPWA) drew the panel’s attention to an open letter from Professor Trevor Sheldon, Chair of the Advisory Committee to the Review in which he states, *“I am concerned that the results of this review have been widely misrepresented”*. (See Appendix 3)
- 8.6.9 Asserting that rather than dental fluorosis being just mild cosmetic scarring, the panel were again referred to the York Review in which it states *“The review found water fluoridation to be significantly associated with high levels of dental fluorosis which was not characterised as just a cosmetic issue”, and;*
- “In fluoridated areas there is likely to be an estimated “48% prevalence of dental fluorosis, although the prevalence of fluorosis of significant aesthetic concern is likely to be 12%”. (York Review 2000)⁶.*
- 8.6.10 The NPWA claimed that fluoride is a cumulative poison and presented evidence on skeletal fluorosis and other health concerns which they attributed to fluoride consumption. However, much of the evidence presented related to countries such as India, where people consume fluoridated waters over a long period of time with levels as high as 11ppm.
- 8.6.11 A report by the World Health Organisations states that *“fluoride has beneficial effect on teeth at low concentrations, in drinking water but excessive exposure to fluoride in drinking water or; in combination with exposure to fluoride from other sources can give rise to a number of adverse effects”*.

⁶ A Systematic Review of Water Fluoridation (York Review 2000)

8.6.12 The NPWA informed the panel that as there are currently no medical tests carried out to specifically monitor the effects of fluoride on health, it is not possible to determine with any certainty that fluoride at 1ppm does not cause harm to health. In addition, the problems caused by fluoride can often mimic the symptoms of other illnesses such as irritable bowel syndrome and anaemia.

8.7 The Fluoridation Process

8.7.1 Evidence presented to the panel suggests that fluoridation is simply 'topping up' the levels of fluoride that is already naturally present in water, bringing it up to the optimum 1ppm level. For instance, as the current level of fluoride which occurs naturally in Yorkshire Water is 0.1mg/litre, an additional 0.9mg/litre of fluoride would be required to bring it up to the optimum level.

8.7.2 In order to do this, it would require the Primary Care Trust to make an initial application to the Strategic Health Authority to undertake a feasibility study to ascertain whether fluoridation would be viable. Once it has been deemed feasible, then a wide scale public consultation exercise would be undertaken to seek the public's view.

8.7.3 John Haley, Water Quality Compliance Manager, Yorkshire Water was asked to provide the panel with the technical aspects of the fluoridation process; in particular how it would be possible to safeguard against too much fluoride going into the water supplies.

8.7.4 The panel was informed that the Code of Practice which governs the fluoridation process is far more stringent than when dealing with other chemicals. Section 87C(2) of the Water Act 2003, permits the use of two chemical compounds to increase the fluoride content of water. These compounds are:-

- Disodium Hexafluorosilicate (Na_2SiF_6) – which is a solid powder
- Hexafluorosilicic Acid (H_2SiF_6) – a liquid

8.7.5 The above two compounds are included on the Drinking Water Inspectorate's list of approved substances and achieve the desired concentration of fluoride (1 part per million) reliably and safely; they must also meet the Department of Environment purity specifications.

8.7.6 To meet the Department of Environment purity specifications chemicals used for water fluoridation have to be specifically manufactured to an exact standard. There is much debate around whether the chemicals used for water fluoridation are co-products or by-products (by-products are considered a waste product by opponents of water fluoridation.)

8.7.7 A co-product is something that is produced jointly with another product. In water fluoridation the chemicals are important co-products of the manufacture of phosphate fertilisers, it would be equally valid to describe phosphate fertiliser as a co-product of the manufacture of fluoride compound, since both are considered valuable products.

- 8.7.8 Arguments raised by opponents of fluoridation will state that fluoride is a by-product, the definition of a by-product is a secondary or incidental product, which would occur in the process of manufacture.
- 8.7.9 These chemicals are said to be identical to the fluoride that occurs naturally in water. According to the National Pure Water Association however, these chemicals are never found in natural waters.
- 8.7.10 The panel heard that fluoride dosing differs from many other chemicals in that a 2 tank system is imposed, one tank is where the material is delivered into and that would typically hold 14 – 30 days storage of the chemical. On a daily basis or twice daily the material is transported into a day tank where sufficient is stored for 12 to 24 hours.
- 8.7.11 All the storage tanks have level alarms so that the tanks are not being overfilled. The intention is that if the dosing equipment failed there is a limitation on how much fluoride can actually be added to the water supply at any particular period.
- 8.7.12 As additional safeguards there are system alarms in the event of pump failure or leaks on the system. There are monitors and instruments which determine the amount of fluoride in the water leaving the site. The equipment is designed to add the required amount of fluoride to the water as it passes through the treatment process. As a back up, there is a monitor to measure the amount of fluoride that has been added; and if something goes wrong i.e too much dosing, the process would shut down.

PANEL CONCLUSIONS

Having heard the evidence about fluoride the panel believed that fluoride at a level of no more than 1.5ppm does not appear to cause any detrimental effects to health. All the evidence shows that fluoride at this level has proven benefits in reducing dental caries and strengthening tooth enamel.

The panel was concerned that many parents, particularly of young children, may not be aware of the levels of fluoride in toothpaste, and that children under the age of 6 should be supervised when using toothpaste which contains fluoride to brush their teeth.

The panel recognised that fluoride at 1ppm is the recommended level but was concerned about how individuals could monitor how much they were ingesting, particularly as fluoride is in so many products that are being consumed. Although the panel heard evidence that fluoride dissipates in the body quickly thereby reducing the cumulative effect.

8.8 Public Water Supplies

- 8.8.1 The panel was of the opinion that while adding fluoride to water supplies is a genuine concern for many people, water consumed routinely by the public contains other chemicals. The panel asked whether there is such a thing as pure water. John Haley was asked to clarify what other chemicals are currently added to water supplies and why.

- 8.8.2 The process from receiving raw water from the Pennine reservoirs is that Pennine Water is typically very highly coloured, therefore the coloured organic materials have to be removed, and that is done by a process called coagulation. A material called **ferric sulphate** is added and causes that material to coagulate and can therefore be removed from the water.
- 8.8.3 **Lime** is added because the ferric sulphate is highly acidic and it needs an alkaline to balance the pH effects. Further into the process more lime is added to adjust the pH as it goes through the water treatment works to remove other materials from the raw water such as the natural aluminium.
- 8.8.4 **Chlorine** is added to remove melamine which is present in the water coming off the moors. More lime is added if the pH needs adjusting to the correct level before going out into the supply; and also more chlorine for disinfection, the main chemical treatment for killing bacteria before the water leaves.
- 8.8.5 The final material that is added is a **phosphate** contained compound. The water dissolves the lead from lead pipes, mainly within older properties which often have lead pipes. The phosphate forms a stable coating on the internal surfaces of the lead pipe, and while it does not eliminate the dissolving of lead entirely it greatly reduces it.

8.9 The Ethics and Human Rights of Water Fluoridation

- 8.9.1 The panel heard evidence on the ethics and human rights of fluoridation from different viewpoints. Professor Lennon presented the panel with the argument that there is a strong ethical basis for fluoridation of the water supplies on the grounds of preventing disease, pain, and suffering and anxiety.
- 8.9.2 This was stressed more so in relation to reducing the suffering of children who may have toothache and who may be required to be anaesthetised to carry out tooth extractions. Professor Lennon also spoke about John Harris who is professor at the University of Manchester who said:
- “Since dental decay itself may be responsible for a small number of deaths each year from anaesthetics it could be unethical not to fluoridate water supplies, where it is practical to do so.”*
- 8.9.3 Professor Harris argues that fluoridation is ethical because it is a safe process which protects teeth from decay which is one of the most common diseases. He does not believe that fluoridation conflicts with our basic human rights because there is no right to drink fluoride-free water there is only a personal preference to do so.
- 8.9.4 This view was supported by Professor Lennon and Dr Beal who stated that no one has a right to a water supply with a specific level of fluoride. In Huddersfield the water which comes out of the tap has round 0.1ppm, it is not a right to have a specific level it is not covered in the human rights legislation in any way.

- 8.9.5 There are clearly a number of view points on the ethics of Fluoridation. For example, the National Pure Water Association state that as fluoride is being presented as a treatment for dental disease, it therefore makes it a medicinal product as defined by the Directive 2004/27/EC.
- 8.9.6 The NPWA therefore conclude that fluoride in water is medication of the population and is in fact a breach of the requirements of the European Convention on Human Rights and Biomedicine in that consent should be obtained for any medical intervention.
- 8.9.7 Some campaigners argue that fluoridation breaches Article 8 and Article 3 of the Human Rights Act.

Article 8 states that:

"Everyone has the right to respect for his private and family life, his home and his correspondence. There shall be no interference by a public authority with the exercise of this right except such as is in accordance with the law and is necessary in a democratic society in the interests of national security, public safety or the economic well-being of the country, for the prevention of disorder or crime, for the protection of health and morals, or for the protection of the rights and freedoms of others."

- 8.9.8 The British Government claims that the Human Rights Act in relation to fluoridation has already been challenged and rejected by the European Court of Justice (ECJ) in the test case of *Jehl Doberer v Austria*. The petitioner Doberer stated that fluoridation of the water supplies was a violation of his basic human right to privacy under article 8 of the convention. The ECJ ruled that rights in Article 8 were only relative rights and not absolute rights. Therefore, the other considerations such as benefits to public health would counter the argument to a right to privacy and not to have fluoride added as a form of medical intervention.

Article 3 of the Human Right Act states:

"No one shall be subjected to inhuman or degrading treatment or punishment".

- 8.9.9 Campaigners using Article 3 would have a much stronger argument as this is an absolute right from which there can be no 'derogation' (exemption). The article could be used to cover compulsory medication but the threshold at which a violation of article 3 would be triggered has been set extremely high by the courts. Doug Cross (2008) states that if there was a development of widespread fluorosis in a fluoridated area, even to a level where there was a need for restorative cosmetic dentistry this would not trigger a violation of article 3.
- 8.9.10 The Nuffield Council of Bioethics' report entitled *Public Health, Ethical Issues*, states that there are three main principles that may justify fluoridation these include, reducing the risks of ill-health, protecting the vulnerable and reducing inequalities. The report also identifies three further principles that might refer to opposition including, not coercing

people to live healthy lives, respecting important personal values and the requirement of consent.

- 8.9.11 The Nuffield Council of Bioethics study concluded that the principles of avoiding coercive intervention and minimising interventions in personal life could be used to argue against any addition of a substance to water supplies (not just fluoride). However, they did not accept that the benefit of adding a potentially beneficial substance to water supplies should always be prohibited. Instead they stated they would seek to identify the situations in which this may be appropriate action.

8.10 Proponents of Fluoridation

- 8.10.1 The evidence presented to the panel by the proponents of fluoridation showed that many organisations such as the Royal College of Physicians, and the British Medical Association, have long been supporters of water fluoridation on the grounds of efficacy and safety in reducing dental decay. They maintain that there is significant medical and scientific evidence to show that introducing fluoride into the water supplies at 1ppm has the positive effect of reducing the dmft in children, as in the case of fluoridated Birmingham.

- 8.10.2 They recognise that fluoride toothpaste and other strategies have helped to reduce tooth decay levels, however, maintain that there still exists inequalities in dental health, particularly in deprived communities. They advocate that one of the ways to address this is to consider fluoridation as part of any oral health strategy, not the overall strategy, but targeted to areas where there is the greatest need.

The Nuffield Council on Bioethics 2007, states that *“fluoridation gives priority to measures that will address health inequalities and protect the health of children and other vulnerable groups”*.

- 8.10.3 Further evidence was presented to the review panel which attempted to refute the claims that links fluoride to cancer, bone fractures and other adverse health effects. Extracts from the York Review 2000, the Australian National Health and Medical Research Council (2007) was quoted. *“There is no clear association between water fluoridation and overall cancer incidence or mortality. This was also true for osteosarcoma and bone/joint cancers”*.⁷

The Lord Bishop of Newcastle, stated that *“I cannot think of another measure that could be introduced so economically and yet produce such a health gain for so many”*.

- 8.10.4 The British Fluoridation Society commissions a national opinion poll approximately every 5 years which samples around 2000 people who are asked a series of questions. One of the questions is, should fluoride be added to water supplies if it can reduce tooth decay. Around 70% of people agree, 20% disagree and 10% don't know. The support was fairly consistent across gender, age and geographical areas. As many

⁷ A Systematic Review of Public Water Fluoridation (York Review) 2000

as 42% of people believe their water is already fluoridated when actually only 10% of people in England have fluoridated water.

8.11 Opponents of Fluoridation

- 8.11.1 The evidence presented by the National Pure Water Association (NPWA) showed that organisations such as UK against Fluoridation and Friends of the Earth are strongly opposed to fluoridation. They informed the review panel that both pro and anti fluoride campaigners claim the York Review supports their arguments specifically quoting the open letter from Professor Trevor Sheldon, which expresses his concern “*that the results of the York Review have been widely misrepresented*”. (Appendix 3)
- 8.11.2 The NPWA whilst acknowledging that the York scientists carried out the review to very high scientific standards, believe that they were limited by their terms of reference to look at human studies at 1ppm fluoride. The NPWA reported that the York Review team was surprised that the studies that they were asked to evaluate were mostly poor to moderate quality, they lacked statistical moderation, disregarded confounding factors and generally did not meet modern standards of scientific enquiry.
- 8.11.3 Opponents of fluoride believe fluoride is a medicine as defined by the Directive 2004/27/EC which states that “*any substance or combination of substances presented as having properties for treating or preventing disease in human beings*”. Given that dental caries is considered a disease, they believe the health authorities are presenting fluoridated water as having properties for treating and preventing that disease, thereby making fluoridated water a medicinal product.
- 8.11.4 Under European Law all medicines have to be tested for efficacy and safety and hold a medicinal products licence and must not be prescribed without a recipient giving informed consent. They argue that fluoridation means that people are unable to give individual informed consent.
- 8.11.5 The view of anti fluoridation campaigners is that fluoridation equates to state medication of the population via the public water supply, using a substance which has not been tested as a medicine and has no medicinal product licence. They argue that the Council of Europe’s convention on Human Rights and Biomedicine and The European Union’s Charter of Fundamental Human Rights both confirm the individual has a Human Right to consent to, withhold, or withdraw consent to medical intervention.
- 8.11.6 The NPWA highlighted that fluoride has been used for other medicinal purposes including in the treatment of hyperthyroidism with sodium fluoride either orally or added to baths, albeit in the 1920s. This treatment was abandoned when patients became hypothyroid, needing thyroxin for life. Relatively high doses of fluoride combined with calcium have been used to counter osteoporosis and bone fractures; however

there were severe gastro-intestinal side effects.

- 8.11.7 Opponents argue that there is a problem with the cumulative effect of fluoride in the body. Fluoride can be found in a range of sources including; the atmosphere, water, foods, beverages, pharmaceuticals, toiletries, anaesthetics and pesticides and is stored mainly in the teeth and the bones. There are concerns that fluoride intake is difficult to measure and would also depend on an individuals lifestyle and diet. Skeletal fluorosis which is an arthritic bone disease and fluorosis of the teeth are considered evidence of the cumulative effect of fluoride particularly at levels higher than 1ppm.
- 8.11.8 There are concerns that certain vulnerable groups in society such as people with defective kidneys are unable to clear fluoride fast enough and diabetics tend to drink more than others, therefore consuming and retaining a larger amount of fluoride. The NPWA also include bottle-fed babies on their vulnerable group list stating that “bottle fed babies may receive inappropriately high doses of fluoride”.

9.0 Term of Reference 1

To investigate the advantages and disadvantages of adding fluoride to household water supplies.

- 9.1 Based purely on the evidence it received during the Ad Hoc Scrutiny Review, the panel was able to summarise the advantages and disadvantages of adding fluoride to household water supplies.

9.2 Advantages

- 9.2.1 Fluoride reduces the number of dmft in children by strengthening the tooth enamel to resist acid attacks and the bacteria produced from food that is consumed by promoting the re-mineralisation of teeth. It is of benefit to anyone who has their own teeth regardless of age and social class and the benefits are life-long.
- 9.2.2 Children from deprived communities living in fluoridated areas have teeth as good as affluent children living in non-fluoridated areas.
- 9.2.3 Fluoride in water would reduce the need for individual action which will ultimately lead to less toothache, fewer extractions and fillings and reduce the need for general anaesthetics to be carried out. Fluoride will also reduce the incidence of dental caries and potentially life threatening tooth abscesses.
- 9.2.4 As only 25% of 5 years old children visit the dentist, fluoride in the water supplies will be of benefit to those children who do not attend the dentist on a regular basis.
- 9.2.5 Fluoride has been known to be of benefit to older people as their gums start to shrink, and the root of the tooth becomes more exposed and

more liable to tooth decay. Exposure to fluoride would therefore assist older people retain their teeth longer.

- 9.2.6 Twelve year olds generally have better dental health but risk erosion from sugary drinks. Sugar thins the enamel making the teeth prone to erosion and sensitivity. Fluoride would strengthen the enamel and beat acid attacks.
- 9.2.7 Fluoridation is cost effective with little cost being borne by households. The Government has set aside £42 million pounds for the next 3 years to cover the capital costs, while the PCT will cover the revenue costs.
- 9.2.8 Systematic studies including evidence from the York Review have concurred that adding fluoride to the water at the prescribed concentration level of 1ppm, has proven health benefits in that it reduced dental caries and health inequalities and that there would be a reduction of dmft of between 40-50%. The York Review also stated that there was no clear association with water fluoridation and the incidence of cancer and bone fractures.

9.3 Disadvantages

- 9.3.1 Concerns still remain with members of the review panel in that they are not entirely convinced that it is possible to effectively monitor how much fluoride individuals would be ingesting from water, food and various other sources.
- 9.3.2 There are concerns about the cumulative effect of fluoride particularly as it is recognised that fluoride is stored in the bones and the teeth of humans and animals and the long term effects are not fully known. Although the evidence provided did suggest that fluoride dissipates in the body very quickly, there was a lack of substantive medical or scientific evidence to enable the panel to make a conclusive decision.
- 9.3.3 There are areas in Kirklees where poor dental health is still a major concern. While the panel welcomed the comments of the Dental Health Professionals the panel was of the view that fluoridation should be part of the oral health strategy and not the strategy.
- 9.3.4 Water supply boundaries would mean that it may not be possible to target just specific problem areas with fluoridation and it may reach areas outside an agreed targeted area. Additionally, in times of drought water supplies would have to be acquired from elsewhere.
- 9.3.5 From the limited correspondence received from the public, it is evident that the public are less than convinced about fluoridation and view it with some suspicion.
- 9.3.6 Although, the panel heard evidence from the expert witnesses which said that the message was being clearly spelt out that children under the age of 6 should be supervised when using toothpaste; the panel felt that many people may not be fully aware of the dangers of children ingesting toothpaste in large quantities.

- 9.3.7 There is a lack of medical and scientific evidence about the effects of fluoride on people with chronic illnesses and people with medical conditions that require them to consume large quantities of water. Although, there is no evidence of ill effect on those people in fluoridated areas who may have been consuming large quantities of water for years.
- 9.3.8 Once fluoride is in the water it is difficult to filter out, simple activated carbon jugs do not remove fluoride, reverse osmosis equipment or distillation equipment would be necessary. However, these are relatively expensive to purchase and maintain.
- 9.3.9 There is evidence to show fluoride at 1ppm can cause dental fluorosis to occur. "In fluoridated areas there is likely to be an estimated "48% prevalence of dental fluorosis, although the prevalence of fluorosis of significant aesthetic concern is likely to be 12%". (York Review 2000).

10.0 Term of Reference 2

To recommend a position regarding the fluoridation of water to be debated at Full Council.

- 10.1 The Ad Hoc Scrutiny Review Panel, putting aside the individual personal opinions of panel members, concluded that significant evidence has been presented to show that fluoride at a level of 1 part per million has clear benefits to dental health.
- 10.2 The panel concluded that the fluoridation of the water supply should not be seen as the ultimate solution to tackling poor dental health in Kirklees; it should be coupled with other on going strategies, including targeted education programmes, and awareness raising. This was also the view of some of the expert witnesses.
- 10.3 There is a clear link between poor dental health and deprivation. Therefore, the panel concludes that tackling deprivation is intrinsically linked to reducing dental health inequalities in the longer term. One of the clear benefits of fluoridation is that it benefits deprived as well as more affluent communities.
- 10.4 Historically, fluoridation in Kirklees was not applied across the borough. The panel feels as part of any next step investigation into fluoridation, consideration should be given as to whether it is possible to target specific areas where poor dental health is a significant issue.
- 10.5 The panel welcomed the evidence from the PCT in terms of the 'common risk factor' approach which sees the oral health message as part of general health promotion; as it is recognised that sugar is harmful for a variety of things e.g. diabetes, tooth decay, and obesity.

GLOSSARY OF TERMS

| | |
|------------------------|---|
| Bromine | An element that is a dark-reddish, fuming, toxic liquid and a member of the halogen family: obtained from natural brines and ocean water, and used chiefly in the manufacture of gasoline antiknock compounds, pharmaceuticals, and dyes. |
| By-product | A secondary or incidental product, as in a process of manufacture the result of another action, often unforeseen or unintended. |
| Caries | Decay of bone or tooth |
| Chlorine | A halogen element, a heavy, greenish-yellow, incombustible, water-soluble, poisonous gas used for water purification, in the making of bleaching powder. |
| Co-product | A product produced together with another product. |
| Dmft | Tooth decay is measured in terms of DMFT for adult teeth and dmft for baby teeth and stands for Decayed Missing and Filled Teeth. |
| Enamel | The hard glossy outer coating of the teeth |
| Fluoridation | The addition of fluorides to the public water supply to reduce the incidence of tooth decay. |
| Fluoride | A salt of hydrofluoric acid consisting of two elements, one of which is fluorine, as sodium fluoride, NaF. A binary compound of fluorine with another element. |
| Fluorine | A pale-yellow, highly corrosive, poisonous, gaseous halogen element, the most electronegative and most reactive of all the elements, used in a wide variety of industrially important compounds. |
| Hyperthyroidism | The condition resulting from excessive activity of the thyroid gland. |
| Hypothyroid | Deficient activity of the thyroid gland |
| Iodine | Grayish-black, corrosive, poisonous halogen element having radioactive isotopes, especially as a medical tracer and in thyroid disease diagnosis and therapy. Iodine compounds are used as germicides, antiseptics, and dyes. |
| Ions | An atom or a group of atoms that has an electric charge. Positive ions, or cations, are formed by the loss of electrons; negative ions, or anions, are formed by the gain of electrons. |
| NPWA | National Pure Water Association. |
| PCT | Primary Care Trust also known as NHS Kirklees |
| Phosphate | A salt or (ester) or phosphoric acid. Phosphate are important in metabolism and frequently used in fertilisers. |
| SHA | Strategic Health Authority |

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Dr Jini D’Cruz – Consultant in Dental Public Health

Dr John Beal MBE – Consultant in Dental Public Health, Yorkshire and Humber Strategic Health Authority

Professor MA Lennon OBE – Department of Oral Health and Development School of Clinical Dentistry University of Sheffield Chairman, of the British Fluoridation Society

John Haley Water Compliance Manager – Yorkshire Water

Clive Thompson Chief Scientist - ALcontrol

Elizabeth McDonagh – Chair of the National Pure Water Association

Ian Packington – Vice Chair National Pure Water Association

Dr Peter Clemenson – Senior Lecturer Dept of Chemical and Biological Sciences Huddersfield University.

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Full information provided to the panel as part of the review is available from the scrutiny office upon request.

APPENDIX 1

Between the 14 October and 14 November 2008, members of the public were able to submit their views on fluoridation via the Kirklees Council website, or by contacting the Scrutiny Officer by letter or telephone. The panel also noted the comments made by the public in the letters page of the local press. Whilst the responses rate from the public was low, the panel was able gauge the public's perspective on water fluoridation

| Medium | No of submissions |
|---------|-------------------|
| Website | 15 |
| Letters | 4 |
| Phone | 4 |

Of the 23 submissions received by the panel:

22 people were against fluoridation for the following reasons:

- Dental health problems only relate to a small section of the community people/children not brushing their teeth.
- Fluoridation equates to mass medication.
- Education should be the key to tackling poor dental health
- Toxic in large quantities
- Felt there was better targeting ways to tackle poor dental health
- Remove freedom of choice and is an infringement of Human Rights
- People are allergic to it
- Supporting scientific evidence on the benefits of fluoride is not credible or conclusive.
- Significant cost to the tax payer
- Hazardous to health and the environment

1 person was for fluoridation for the following reasons

- Kirklees has the worst dental health
- It is good for children teeth and gives them a better chance.
- Current research has indicated strong links between poor dental health and heart disease.

APPENDIX 2

KEY LINES OF ENQUIRY – P CLEMENSON (HUDDERSFIELD UNIVERSITY)

- Can you give a brief explanation of your role?
- What is fluoride as a chemical – what are its constituent parts, what does it contain? (if possible not too technical)
- It has been suggested that the toxicity of fluoride lies somewhere between lead and arsenic and like lead and arsenic it is a cumulative poison. Is there any evidence to either support or discount this argument?
- How close in make up would fluoride be to the fluoride that occurs naturally in water?
- Does fluoride have any impact on the environment, including wild life?
- Is fluoride found in any other food stuff than water whether naturally occurring or added?
- Is fluoride a medicine, and are you aware if it is used for any other purpose other than reducing dental caries?
- Would you have a list what other chemicals are currently added to water supplies and why?
- Are you aware of the effect fluoride may have on humans or animals?

KEY LINES OF ENQUIRY – CLIVE THOMPSON

(ALcontrol)

- Can you give a brief explanation of your role and a bit of background about ALcontrol?
- What is fluoride as a chemical – what are its constituent parts, what does it contain? (if possible not too technical)
- It has been suggested that the toxicity of fluoride lies somewhere between lead and arsenic and like lead and arsenic it is a cumulative poison. Is there any evidence to either support or discount this argument
- How close in make up would fluoride be to the fluoride that occurs naturally in water?
- Does fluoride have any impact on the environment?
- Is fluoride a medicine, and are you aware if it is used for any other purpose?
- Is fluoride found in any other food stuff than water whether naturally occurring or added?
- Is fluoride a medicine, and are you aware if it is used for any other purpose other than reducing dental caries?
- Would you have a list what other chemicals are currently added to water supplies and why?

KEY LINES OF ENQUIRY – DR JOHN BEAL
(STRATEGIC HEALTH AUTHORITY)

- Can you briefly explain your role and the role of the Strategic Health Authority in the fluoridation process, including any government timescale and planned feasibility study?
- Can you briefly explain the consultation process outlining who would be consulted, timescales and how the results of the consultation would feed into the final decision?
- Does the SHA have its own policy or view on fluoridation or does this depend on the recommendations from the PCTs?
- One of the major concerns being raised is that fluoridation equates to mass medication therefore can fluoridation be justified when there are other forms of equally effective methods of reducing dental decay that does not remove freedom of choice?
- Is there any clear evidence to show that fluoridation is effective in reducing dental decay?
- If fluoride is added to the water supply how effective is it likely to be for those children with an unhealthy diet and/or lifestyle?
- What are the long-term effects of water fluoridation on the population's health; and is there any firm evidence from areas that currently receive fluoridated water on either the adverse or beneficial effects on health?
- What consideration has been given to the possible effects of fluoride on people with chronic and acute health conditions including people with allergies and intolerances?
- It is recognised that the body retains fluoride in the bones and teeth and it has been suggested that it causes cancers and bone fractures is there any firm evidence to counter this?
- How can people control the level of fluoride they consume, based on their total intake from the all products they may ingest that contains fluoride?
- Is fluoride found in any other food source other than water, (whether naturally or added)?
- Has any analysis been done to weigh up how cost-effective it would be to provide fluoride to an SHA area as oppose to targeting the communities where poor oral health is an issue?

- Have there been any studies into the effects of fluoride on the environment?
- Is fluoride a medicine, and are you aware if it is used for any other purpose other than reducing dental caries?

KEY LINES OF ENQUIRY – ELIZABETH McDONAGH
(NATIONAL PURE WATER ASSOCIATION)

- Can you give a brief explanation of your role and a bit of background into the National Pure Water Association?
- One of the major concerns being raised is that fluoridation equates to mass medication, what other effective methods of reducing dental decay would you advocate apart from fluoridation?
- Is fluoride a medicine, and are you aware if it is used for any other purpose other than reducing dental caries?
- What are the long-term effects of water fluoridation on the population's health; and is there any firm evidence from areas that currently receive fluoridated water on either the adverse or beneficial effects on health?
- What consideration has been given to the possible effects on people with chronic and acute health conditions including people with allergies and intolerances?
- It is recognised that the body retains fluoride in the bones and teeth and it has been suggested that it causes cancers and bone fractures is there any firm evidence to support this?
- Is fluoride found in any other food source other than water, (whether naturally or otherwise)?
- How can people control the level of fluoride they consume based on their total intake from all the products they may ingest that contains fluoride?
- Are you aware of any impact that fluoride may have on the environment?

KEY LINES OF ENQUIRY - JOHN HALEY
(YORKSHIRE WATER)

- Some areas of Kirklees received fluoridated water from 1977 to 1989, would you have any background information on how and why it was introduced and why it ceased; and which areas of Kirklees?
- If it is decided that the water in Yorkshire and Humber should be fluoridated, what process would Yorkshire Water have to go through and would there be any cost to householders?
- What equipment would be required and is this already in place?
- How would Yorkshire water obtain the chemical, and in what form would it be supplied?
- Is it possible to measure the current level of naturally occurring fluoride in the Kirklees water supply? If so what is it?
- What training would staff be given to undertake this process?
- Is it possible to list what other chemicals are currently added to water supplies?
- What mechanisms will be put in place to safeguard against too much fluoride being added to the water supplies?
- What happens if the dose is too high?
- In terms of its chemical make up how does the artificial fluoride added to water, compare with the water that contains natural fluoride?
- What level of public indemnity would the water company be required to have, before fluoridating water and who would pay for this?

KEY LINES OF ENQUIRY – PROFESSOR LENNON
(DEPARTMENT OF ORAL HEALTH AND SCHOOL OF CLINICAL DENTISTRY
– UNIVERSITY OF SHEFFIELD. CHAIR OF BRITISH FLUORIDATION
SOCIETY)

- Can you give a brief explanation of your role and a bit of background about the British Fluoridation Society?
- One of the major concerns being raised is that fluoridation equates to mass medication, can fluoridation be justified when there are other forms of equally effective methods of reducing dental decay that does not remove freedom of choice?
- What evidence is there to show that fluoridation is effective in reducing dental decay?
- Is fluoride added to the water supply still likely to be effective for children with an unhealthy diet and/or lifestyle?
- What are the long-term effects of water fluoridation on the population's health; and is there any firm evidence from areas that currently receive fluoridated water on either the adverse or beneficial effects on health?
- What consideration has been given to the possible effects on people with chronic and acute health conditions including people with allergies and intolerances?
- It is recognised that the body retains fluoride in the bones and teeth and it has been suggested that it causes cancers and bone fractures is there any firm evidence to counter this?
- How can people control the level of fluoride they consume, based on their total intake from the all products they may ingest that contains fluoride?
- Is fluoride found in any other food source other than water (whether naturally or added)?
- Has any analysis been done to weigh up how cost-effective it would be to provide fluoride to an area as oppose to targeting the communities where poor oral health is an issue.
- Have there been any studies into the effects of fluoride on the environment?
- Is fluoride a medicine, and are you aware if it is used for any other purpose other than reducing dental caries?

