

**Answers from Irish Expert Body on Fluorides and Health to Members of the  
Environment and Engineering Strategic Policy Committee, Dublin City Council**

**Councillor Deirdre Heney**

**Q: Is fluoridated water safe when used in conjunction with infants' milk formula?**

Yes. The concerns around this issue related to the possibility of developing dental fluorosis, not for any health related concerns. Dental fluorosis is a cosmetic condition, usually resulting in a slight whitening of the teeth but which in a small proportion of cases can result in a brownish staining of the surface of the enamel. This can be easily and simply removed by a type of polishing technique, which is painless, inexpensive, quick and which does not require any dental anaesthetic.

A risk assessment of this issue was carried out by the Food Safety Authority and published in a peer reviewed journal in 2004. This found that the risk of developing dental fluorosis made up with fluoridated water was very low. It stated:

*"Dental fluorosis may be considered to be the only risk at these low doses and from our work it is estimated that there is a very low risk of moderate dental fluorosis of the permanent dentition in infants exposed to fluoride at these levels."*

This assessment was carried out at a time when the maximum allowable level of fluoride in Irish water schemes was 1.0ppm. Since then, the maximum allowable limit has been lowered by 20% to 0.8ppm, reducing the already low risk of moderate dental fluorosis further.

### **Q: Can Skeletal Fluorosis occur (in water fluoridation schemes)?**

No. Skeletal fluorosis has been reported in persons who have resided for many years, typically for decades, in areas with naturally fluoridated water with many times the concentration of fluoride found in Ireland. The majority of such reports come from India, where water supplies in some of the regions can be more than 10 times the level found in Irish water supplies. There have never been any cases of skeletal fluorosis reported in Ireland. Skeletal fluorosis is unknown in the general population anywhere in Europe. It has never been associated with water fluoridation schemes.

International data suggests that the prevalence of general skeletal and musculoskeletal problems is low in Ireland compared to the rest of Europe (EUROMUSC Report, see official EU report at [http://www.eumusc.net/workpackages\\_wp4.cfm](http://www.eumusc.net/workpackages_wp4.cfm)).

The Scientific Committee on Health and Environmental Risks, an official EU body, published a report on water fluoridation in 2011. On skeletal fluorosis it stated the following:

*“Skeletal fluorosis is a pathological condition resulting from long-term exposure to high levels of fluoride. Skeletal fluorosis, in some cases with severe crippling, has been reported in individuals residing in India, China and Africa, where the fluoride intake is exceptionally high, e.g. due to high concentration of fluoride in drinking water and indoor burning of fluoride-rich coal resulting in a high indoor fluoride air concentration. In Europe, skeletal fluorosis has only been reported in workers in the aluminium industry, fluorospar processing and superphosphate manufacturing”*

### **Councillor Michael O'Sullivan**

#### **Q: Seeks scientific evidence for / against Walter Graham's map slides.**

Walter Graham's slides were selected from a large number of maps published by the National Cancer Registry of Ireland, which has issued the following statement in relation to the misuse of these maps by persons opposing fluoridation:.

*"Some maps contained in an All-Ireland Cancer Atlas published recently by the N. Ireland Cancer Registry and the National Cancer Registry have been used erroneously by anti-fluoridation groups to suggest a link between water fluoridation and cancer. The atlas in which these maps were published (and some previous reports) has analysed the differences in cancer risk between the two countries. [HC1] We do not consider that water fluoridation is a plausible explanation for the patterns shown. We have reached this conclusion for a number of reasons:*

*"1. There is no good evidence to link fluoride levels in water, whether natural or added, to cancer risk. The International Agency for Research on Cancer has concluded 'The relationship between cancer mortality or incidence and both natural and artificial fluoride in drinking-water has been investigated in a large number of descriptive epidemiological studies of population aggregates, carried out in Australia, Canada, New Zealand, Norway, the United Kingdom and the United States. None of the studies provided any evidence that an increased level of fluoride in water was associated with an increase in cancer mortality'.*

*" 2. The maps do not show a clear difference between Northern Ireland and the Republic of Ireland, but for a small number of cancers there is a smooth gradient in cancer risk from the north-east to the south-west of Ireland, increasing right across the island. There is no evidence of a change in this gradient at the border except for prostate cancer for which differences in PSA testing rates are the obvious and accepted explanation.*

*“3. Although the bulk of the population in the Republic of Ireland lives in cities and large towns, where the water is fluoridated, most of the area shown on the map is sparsely populated and without fluoridated water supplies, so water fluoridation cannot be suggested as an explanation for the patterns seen.*

*“There are many possible explanations for the variety of geographical cancer patterns which we have observed, and these are discussed in detail in the atlas, which is available on line at [http://www.ncri.ie/atlas/atlas\\_contents.shtml](http://www.ncri.ie/atlas/atlas_contents.shtml) and <http://www.qub.ac.uk/researchcentres/nicr/Publications/AllIrelandReports/#Anchor1>*

*“In fact most of the map patterns cannot be explained by any of these factors”*

In summary, neither existing international research nor the information on these maps support a link between water fluoridation and cancer.

### **Councillor Pat Dunne**

**Q: Is seeking clarity the fluoridation does not adverse health risks and if Mr. Graham's assertions must be scientifically refuted the expert body should do so.**

The Expert Body on Fluorides and Health and its sub-committees have broad representation from areas such as dentistry, biochemistry, toxicology, environmental health and public health medicine. The sub-committees of the Expert Body may also co-opt members as the need arises and seeks the advice of experts in other specific fields when required.

The Expert Body considers new evidence and keeps the effects of fluoridation on health and related matters under constant review. It is satisfied that water fluoridation, at its optimal level, causes no ill effects to the health of adults or children. In evaluating on-going research, the Expert Body accepts the fundamental scientific tenet that any single piece of scientific evidence by itself remains hypothetical unless

it can be repeated or confirmed by other scientists. Therefore, it considers scientific evidence that has been submitted to examination by other scientists, usually by publication in recognised peer reviewed scientific journals, after such publication has been approved by independent referees. This ensures that the advice provided by the Expert Body is impartial and evidence-based.

It is clear from his presentation that Mr Graham has not applied the same scientific rigour in his approach. Some of the slides used by Mr Graham were selected from a large number of maps published by the National Cancer Registry of Ireland (NCRI). The NCRI has stated that neither existing internal research nor the information on these maps support a link between water fluoridation and cancer. He has ignored the vast bulk of scientific research on this matter and has offered as evidence old material (Moolenberg, Burke et al from the 1970s) and other books (e.g. Bryson) which lack original research, misquote or misunderstand scientific articles and confuse opinion with fact.

**Deputy Luke "Ming" Flanagan, T.D.**

**Q: Has a random clinical trial been conducted demonstrating the fluoridation of water is safe?**

The reliance on randomised clinical trials is inappropriate in many situations, and nowhere more so than investigating adverse effects – or safety - of an intervention. A prominent epidemiologist has stated that “The view is widely held that experimental methods (randomised control trials) are the gold standard for evaluation and that observational methods (cohort and case control studies) have little or no value. This ignores the limitations of randomised trials which may prove unnecessary, inappropriate, impossible, or inadequate (Black 1996)”. The harmful effect of tobacco on health was demonstrated - not by randomised controlled trials - which would have required half of the study participants to smoke while the control group did not smoke – but by a longitudinal observational study where a cohort of smokers and non-smokers were followed prospectively and the outcomes of interest measured over time.

With water fluoridation, where the dental health benefits have been demonstrated, the most appropriate study design for monitoring safety is ongoing observational studies. Many such primary studies have been conducted in other countries and summarised in systematic reviews. No known adverse health effects have been identified with water fluoridation at the levels that pertain in Ireland. Enamel fluorosis, which is a known side effect of water fluoridation, is monitored in Ireland through cross sectional studies of randomly selected representative samples of the population.

The key distinguishing feature of the randomised clinical trial is that study subjects are randomly allocated to receive one or other of the alternative treatments under study before the intervention to be studied begins. For fluoridation, half of the randomly selected group would be forced to live in, and not leave, a fluoridated area for 5 to 10 years while the other half could never enter a fluoridated area for this time period, regardless of where they live before the study begins.

Following these observations the STROBE initiative was promulgated (Downer 2007, von Elm et al 2008) to deal with these limitations and to emphasise the essential role of observational studies in developing the evidence base of many public health initiatives.

**Q: Dr. John Doole, Toxicologist chaired the National Academy of Sciences (U.S.A.) which conducted a review of fluoridation which found that it is an endocrine disruptor. Deputy Flanagan would like a comment from the expert body on this matter**

This review, published in 2006, was conducted in relation to deriving an appropriate standard for naturally occurring fluoride in drinking water. The current EU maximum limit is 1.5mg/l fluoride, while in the United States there are two standards, an absolute standard set at 4mg/l fluoride and a secondary desirable standard of 2mg/l fluoride.

None of the studies cited by the 2006 report relate to community water fluoridation. They all concern persons exposed to very high doses of fluoride, many times higher than anyone living on a water fluoridation scheme would be exposed to. The majority

of the reports concern persons living in areas of very high naturally occurring fluoride and many of the studies have significant limitations. The report itself states:

*“The available studies of the effects of fluoride exposure on endocrine function have several limitations. In particular, many studies did not measure actual hormone concentrations, several studies did not report nutritional status (e.g., iodine or calcium intake), and, for thyroid function, other possible goitrogenic factors have not been ruled out. Most studies have too few exposure groups, with, for example, the “high”-fluoride group in one study having lower concentrations of fluoride in drinking water than the “normal” fluoride group in another study. In general, the human exposures are not well characterized.”*

The final conclusion of this report was that there was no requirement to lower the standard for fluoride in water below 2ppm in the USA. This is 2.5 times the maximum limit allowed in Irish fluoridation schemes. Clearly, if the report considered that fluoride was a health risk at such levels, this recommendation would not have been passed.

The Expert Body reviewed the data in the 2006 report and concluded that they were not of relevance to water fluoridation which involves much lower concentrations of fluoride in water.

The European Food Safety Authority toxicological review panel which examined the same data and also published their report in 2006 did not consider fluoride to be an endocrine disruptor.

The SCHER report of 2011, reviewing the same data, states:

*“Increases in serum thyroxine levels without significant changes in T3 or thyroid stimulating hormone levels were observed in residents of regions in India and China, with high levels of fluoride in drinking water, but these data are inconclusive due to the absence of adequate control for confounding factors. Thus, fluoride is not considered to be an endocrine disruptor”*



**Q: Why 98% of Europe do not fluoridate water.**

Many countries have water fluoridation schemes, including the United States, Canada, the United Kingdom, Spain, Australia and New Zealand. Water fluoridation is less common in Europe. However, fluoride is an essential part of oral health policy in all countries in Europe. In countries which do not fluoride water this can mean fluoridation of salt or provision of community fluoridation through other means, such as fluoride tablets, fluoride vanishes or fluoride mouth rinses.

**Q: Are there any health issues relating to fluoride entering the dairy food chain specifically in cheese**

No. The Expert Body is concerned that some opponents of fluoridation are attempting to link Irish food produce with the same false health claims they make concerning fluoridated water. The Expert Body has no concerns about the safety of Irish dairy foods. The Food Safety Authority's Total Diet study 2011 shows that all dairy products contribute less than 1% of the average dietary fluoride intake in Ireland.



## **Questions concerning Water Fluoridation DCC Eng. and Envir. SPC 16<sup>th</sup> May .**

Please note that as well as these questions below which were submitted in advance there will be an opportunity for other questions on the day. The Questions and Answers session will follow the presentation.

### **Questions submitted by Cllr Anthony Connaghan**

**Question 1: Bearing in mind the WHO say that adding fluoride to water should only occur where the intake is known, How is it possible to tell a persons daily fluoride intake when you dont know a persons health history or if a person has an impaired immune system? If you do not know the dietary intake and health condition of a person, how can you say that it is safe to increase someones intake by adding it to water?**

The WHO, quoted in the question above, is an active supporter of water fluoridation.

No negative health effects have been determined for populations served by naturally fluoridated water at around 1ppm and artificially fluoridated at the same level. Acute fluoridation toxicity is impossible at 1ppm, so the only concern is with regard to long term chronic exposure. Studies of populations exposed to fluoridated water at 1ppm have not demonstrated any negative health effects.

Water fluoridation is the adjustment of the natural concentration of fluoride in drinking water to the optimal recommended level for the prevention of dental caries (tooth decay). The only known side effect of optimal levels of fluoride in water is enamel fluorosis, and this has been known since the 1930s. A number of other claims have been made in various media in relation to water fluoridation and potential health issues but none of these claims have been substantiated.

Safety is determined from the available scientific evidence. This evidence has been examined in detail by panels of experts from many diverse fields of science including

medicine, dentistry, biochemistry, toxicology, environmental sciences and engineering.

Comprehensive and systematic reviews have been conducted in many countries. Of particular note are the Forum on Fluoridation report (2002), the York Review (2002), the review by the Medical Research Council (2005), the Australian review (2007), the Canadian review (2010) and most recently the European Union's SCHER review (2011). None of these reports has established any basis for considering that artificially fluoridated water poses any systemic health risks. Also, the WHO have a statement on Water Fluoridation indicating their support for the measure.

**Question 2: The U.S National academy of sciences and medicine in 2006 identified over 60 medical toxicological and clinical studies to evaluate the toxicity of fluoride on human health including low level exposure. What case controlled epidemiological or clinical studies have you undertaken or have been undertaken in the past 50 years in Ireland to demonstrate that ingesting fluoride is safe for general health (not dental health) for all sectors of society?**

The Expert Body does not have funding for, and is not responsible for funding or directing research. However, research has been undertaken in Ireland regarding the relationship between bone cancer and fluoridation, which showed no relationship.

The only known side effect of water fluoridation is enamel fluorosis, which is a cosmetic or aesthetic condition which refers to the way teeth look; it is not considered to be an adverse health effect.

Regarding general health, the Department of Health considers evidence on all health effects in relation to all health issues from across the globe. For example, the evidence that smoking is harmful is accepted, even when none of the studies linking smoking to ill health effects were conducted in Ireland. It is not necessary to repeat these studies here in order to establish that smoking is harmful for people living in Ireland.

The same is true in the case of water fluoridation, which is one of the most widely studied public health policy initiatives in the world. The Department of Health uses information from across the globe in order to assess the health impact of water fluoridation. Public health workers in Ireland make use of official statistics published regularly by the World Health Organisation, the OECD, the European Union and others in order to monitor health trends.

In Ireland, there was a study into cross-border rates of osteosarcoma (Comber et al, 2011) as a result of concerns raised in the United States regarding the plausibility of a link between this condition and fluoride exposure. This study did not show any difference in disease rates between fluoridated and non-fluoridated communities. Since the Comber et al study was published, definitive results from two major studies in the United States has shown no association between fluoride exposure and osteosarcoma (Kim et al 2011, and Levy et al 2012).

**Question 3: It is accepted that Fluoride forms complexes with other elements such as aluminium that are now known to both neurotoxin. The US academy of Sciences and Medicine found that Fluorides increase the production of free radicals in the brain that act to increase the risk of developing Alzheimer's disease. There is a 23% higher incidence of dementia in the population age group 65-69yrs in Southern Ireland compared to non fluoridated NI. A recent report on Ireland's National Dementia Strategy by Trinity College Dublin and on Northern Ireland by Kings College identified that the incidence of early onset dementia in the age group 30-59 yrs of age in Southern Ireland is 450% higher than in non fluoridated NI. What studies have you undertaken to prove that increased fluoride exposure in southern Ireland is not a contributory factor to this alarming difference. Can you say with absolute certainty that increased fluoride exposure of the Irish population is not contributing to this epidemic. Are their any neuroscientists on the Expert Body, if so please provide their details?**

The figures quoted are incorrect.

The incidence of dementia in the Republic is not higher than in the North. The incidence of early onset of dementia is almost identical in Northern Ireland and the Republic of Ireland.

No-one can state “with absolute certainty” that the presence, or absence, of any substance does not contribute to any disease.

Reports carried out by the Institute of Public Health, and from WHO and EU statistics do not bear out the allegations. For instance OECD report 2012, Ireland has low levels of all forms of dementia by European standards.

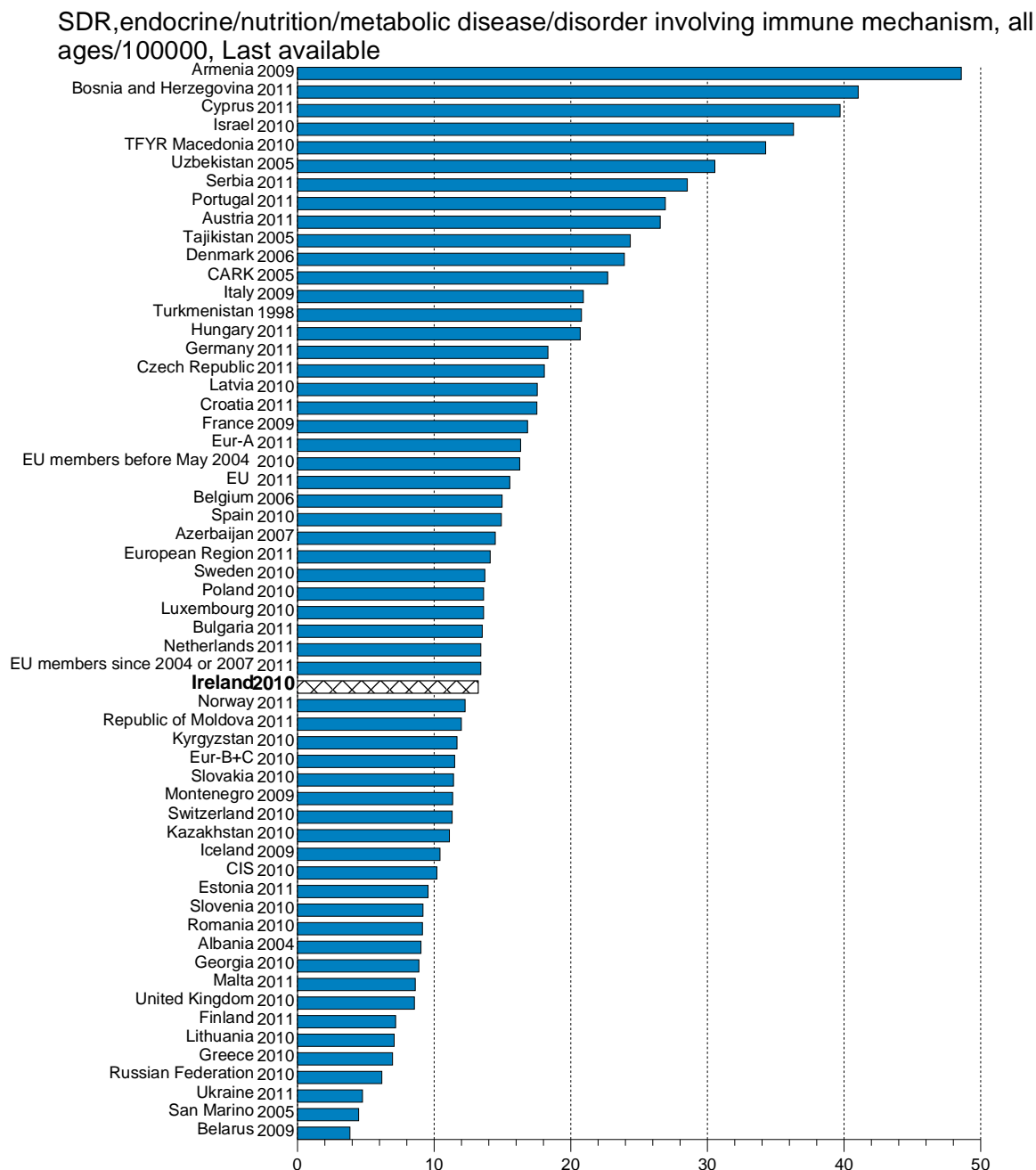
The relevant discipline for investigating these population health relationships is epidemiology. There are several epidemiologists on the Expert Body.

It should be noted that the report of the US Academy of Sciences and Medicine quoted above concerned limits for naturally occurring fluoride, and was not a review of community water fluoridation. The Report did not recommend a standard for fluoride in American waters below 2ppm, which is more than double the level of fluoride in Irish water fluoridation schemes.

**Question 4: The U.S National academy of sciences and medicine said that “there is no question that fluoride can affect the cells involved in providing immune responses” They further stated “that not a single study has investigated whether fluoride in drinking water is associated with changes in immune function, nor has any study examined whether a person with an immunodeficiency disease can tolerate fluoride ingestion from drinking water.” According to the WHO Ireland has the highest deaths from severe immunodeficiency in Europe, what studies have you conducted to prove that fluoride exposure is not contributing to increased mortality. Is there any experts in allergies and Immunology on the expert body that have examined this, if so please provide their details?**

It is not true that Ireland has a high level of deaths from immunodeficiency in Europe. The prevalence of primary immunodeficiency in Ireland is similar to that of the United

Kingdom, but roughly half of the prevalence for France. The following graph gives the standardized death rate for immunodeficiencies in Europe. As can be seen, Ireland has a death rate from immunodisease that is lower than the EU or European region averages.



(Source: WHO database 2013)

The American report quoted above was not a review of water fluoridation, but a report to advise on a maximum limit for naturally occurring fluoride in water. The final conclusion of the report did not recommend that the limits for naturally occurring fluoride in water should be reduced below 2ppm. Irish water fluoridation schemes operate to a maximum concentration of 0.8ppm.

**Question 5: THE European Union Scientific committee which examined fluoridation of drinking in 2010 water stated “that the upper tolerable intake level was exceeded in children who drink fluoridated water and used fluoride toothpaste.” “that independent of the fluoridation policies across European countries, there has been a consistent decline over time in tooth decay in 12 years old children from the mid-seventies, regardless of whether drinking water, milk or salt are fluoridated.” “the caries preventive effect of water fluoridation treatment is rather poor and it plays a minor role in improved dental health “The benefits of fluoridation to adult and elderly populations are limited” and “the continued systemic exposure of fluoride from whatever source is questionable once the permanent teeth have erupted, (after 8yrs of age). They concluded that “the efficacy of population-based policies such as water fluoridation as regards the reduction of oral-health social disparities, remains insufficiently substantiated.” That means after reviewing all the available data including data from Ireland which you submitted they concluded that the effectiveness of water fluoridation was not proven. What is your response to this?**

It is simplistic to say that the major benefit of fluoride is “topical” rather than “systemic”. The fluoride ion in saliva may act topically on the erupted tooth, but the availability of that fluoride ion is from systemic sources. In addition, there is a substantial pre-eruptive protective effect from fluoride (Grunewald et al 1990).

The situation is complicated by the site of the caries lesion on the tooth. Post-eruptive fluoride may have its greatest effect on the smooth enamel surfaces. Commenting on the effects on the biting tooth surfaces, on which the majority of early caries develops in young people, Singh et al (2007) stated the following:

“In conclusion a high exposure at crown completion was important for caries prevention irrespective of the effect of exposure at maturation and post-eruption. The strongest caries-preventive effect was produced by a high exposure at crown completion supplemented by a high exposure at maturation and/or post-eruption, but the latter two phases could not produce a significant caries-preventive effect on their own. Since most of the caries occurred on pit and fissure surfaces, the findings relate to this class of lesion”.

It is noteworthy that the SCHER opinion simply states that various forms of fluoride may be equally as effective as water fluoridation in reducing dental decay levels. There is no suggestion from them that fluoride itself is problematic in oral health policies in the various EU states.

The opinion that the topical delivery of fluoride is more efficient than water fluoridation is not accepted by the European Association of Dental Public Health. The Irish Expert Body on Fluorides and Health takes a similar view.

**Question 6. The EU scientific committee which examined the evidence and published a report on this in 2010 concluded that the effectiveness of water fluoridation in improving oral health remains to be proven while using fluoride toothpaste is proven to be effective. How much money has been spent since 1967 on installing water fluoridation systems across this country in every town and city and on adding fluoridation chemicals to our water for the past 45 years? Based on current figures for chemical use and labour alone, its about €200million, that does not include the costs of equipment and installation costs which are considerable, probable in the hundreds of millions or the occasional audit costs which are €million extra every few years. It is reasonable to assume that we have spent well over half a billion of taxpayers money on a system that remains unproven in its effectiveness and with likely significant long term health impacts on the Irish population that have not even been properly examined by the authorities. Can you care to comment on this.**



The EU Scientific Committee cited above state the following:

*“The available evidence suggests that fluoridation of drinking water reduces caries prevalence, both as measured by the proportion of children who are caries free and by the mean change in dmft/DMFT score”*

and

*“The effect of water fluoridation tends to be maximized among children from the lower socio-economic groups, so that this section of the population may be the prime beneficiary.”*

(SCHER 2011 page 30)

Water fluoridation is known to decrease dental decay substantially, of the order of 40% in children according to Irish health statistics. The lifetime cost per person, at around €1 per annum, is roughly the cost of a single filling for that person.

SCHER further remarks:

*“In a study of students (16-year olds) living on the border between the Republic of Ireland (fluoridated water) and Northern Ireland (non-fluoridated water) it was found that some of the variance in decay experience among the adolescents was explained by parental employment status. The higher decay experience in lower socio-economic groups was more evident within the non-fluoridated group, suggesting that water fluoridation had reduced oral health disparities (CAWT 2008). Similarly, Truman et al. (2002) and Parnell et al. (2009) concluded that water fluoridation is effective in reducing the cumulative experience of dental caries within communities, and that the effect of water fluoridation tends to be maximized among children from the lower socio-economic groups. Furthermore water fluoridation offers additional benefits over alternative topical methods because its effect does not depend on individual compliance.”*

In its conclusions, SCHER states:

*“Water fluoridation as well as topical fluoride applications (e.g. fluoridated toothpaste or varnish) appears to prevent caries, primarily on permanent dentition.”*

**Question 7: What affect does the boiling of water have on the concentration of fluoride? I would safely assume that there is a large percentage of the population who drink either tea or coffee and regularly boil a kettle to make it. Has there been any studies to assess the intake of tea drinkers considering that tea already contains fluoride? Has there been any studies to assess the fluoride intake of infants whose parents need to use boiled water to make up formula to feed their infants?**

The idea of water fluoridation was derived from natural observational studies on populations who are served with a water supply of around 1mg/l of fluoride, and who used that water not only for drinking, but for cooking and making hot beverages (tea, coffee etc), which requires water to be boiled. It was not derived through randomized control trials on populations who were served with beverages that contained exactly 1mg/l fluoride.

The issue of boiling water is irrelevant insofar as the effects of this are already accounted for in the observational studies simply because people do boil water and use it for food or drink from time to time.

If the water in a kettle is boiled, it will typically evaporate off a very small percentage of the water. The final concentration of fluoride will be the original concentration multiplied by the original weight of the water and divided by the final weight of the water. So, if 0.5% of the weight was lost, an original concentration of 0.8ppm will result in a final concentration of 0.804ppm, which is to all intents and purposes, unchanged.

**Question 8: What is the percentage of the EU that have fluoridated their water supplies? How do cavity rates compare with non fluoridated countries and fluoridated countries?**

Many countries have water fluoridation schemes, including the United States, Canada, the United Kingdom, Spain, Australia and New Zealand. Water fluoridation is less common in Europe. However, fluoride is an essential part of oral health policy in all countries in Europe. In countries which do not fluoridate water this can mean fluoridation of salt or provision of community fluoridation through other means, such as fluoride tablets, fluoride vanishes or fluoride toothpastes or mouth rinses. Therefore, there are no truly “non-fluoridated” countries in Europe.

In order to evaluate the effectiveness of water fluoridation it is necessary to consider confounding factors in order to compare populations whose risk of developing dental caries is similar. In the Republic of Ireland and Northern Ireland more sugary foods are consumed than in most other European countries. However the decay levels are considerably lower in the lifetime residents of fluoridated areas in the Republic of Ireland than residents of Northern Ireland, which does not have fluoridated water.

**Question 9: What health studies have been carried out on fluoridation of water supply in Ireland and What Environmental Impact Studies have been carried out?**

The Department of Health, in addition to monitoring the impact of water fluoridation on dental decay, has also rigorously monitored enamel fluorosis and responded to evidence of change in fluorosis levels. In the National Survey of Children’s Oral Health (1984) it was found that lifetime residents of fluoridated communities had substantially lower levels of dental decay than lifetime residents of non-fluoridated areas. The levels of fluorosis found were at levels predicted on the basis of the initial studies in the United States in the 1940s on communities served by naturally fluoridated water. Some 18 years later in the 2002 study on Children’s Oral Health, again it was found that levels of dental decay were substantially lower in lifetime

residents of fluoridated communities, but there had been an increase in the levels of enamel fluorosis. Since the levels of fluoride in water had not changed over this period, the most likely explanation for this change was the increased use of fluoridated toothpaste which had been introduced to Ireland in the early 1970s and became widely used in Ireland by the 1980s. The EU FLINT study, which involved seven European research groups, had reported that parents tended to commence tooth-brushing of children at too young an age, that too much toothpaste was being placed on the toothbrush, and that young children had a tendency to swallow the toothpaste. As a result of these findings, The Forum on Fluoridation recommended two strategies which were introduced to minimise fluorosis. The first of these was in relation to the appropriate use of fluoride toothpaste, and the second was to lower the level of fluoride in water from the previous range of 0.8 to 1.0 parts per million (mg/l), with a target of 0.9ppm, to a range of 0.6 to 0.8ppm with a target of 0.7ppm, in order to account for the extra availability of fluoride to the population. This second approach was consistent with evidence from Canada following research by Locker et al.

Regarding general health, the Department of Health considers evidence on all health effects from across the globe. For example, the evidence that smoking is harmful is accepted even when none of the studies linking smoking to ill health effects were conducted in Ireland. It is not necessary to repeat these studies here in order to establish that smoking is harmful for people living in Ireland.

The same is true in the case of water fluoridation, which is one of the most widely studied public health policy initiatives in the world. The Department of Health uses information from across the globe in order to assess the health impact of water fluoridation. Public health workers in Ireland make use of official statistics published regularly by the World Health Organisation, the OECD, the European Union and others in order to monitor health trends.

In Ireland, there was a study into cross-border rates of osteosarcoma (Comber et al, 2011) as a result of concerns raised in the United States regarding the plausibility of a link between this condition and fluoride exposure. This study did not show any difference in disease rates between fluoridated and non-fluoridated communities.

Since the Comber et al study was published, definitive results from two major studies in the United States has shown no association between fluoride exposure and osteosarcoma (Kim et al 2011, and Levy et al 2012).

In relation to environmental impact of water fluoridation, it should be noted that fluoride is already widely available in the environment; soil contains fluoride, and the oceans of the world are fluoridated, having twice the concentration of fluoride as has fluoridated drinking water. In addition, the question of wider environmental effects of fluoridation was considered by SCHER in 2011. It found that fluoridation of water supplies does not

pose an unacceptable risk to the wider environment, indicating that:

*“Exposure of environmental organisms to the levels of fluoride used for water fluoridation of drinking water is not expected to lead to unacceptable risks for the environment”.*

The EU Environmental Objectives (Surface water) Regulations (S.I. 272 of 2009) sets a mean maximum limit value of 500 µg/l (i.e. 0.5ppm) for fluoride for an inland receiving water in order to protect the aquatic environment. With dilution factors involved from rain and other water in the environment, where fluoridated urban wastewater is discharged to a body of water there is no prospect of this limit being breached in Ireland.

**Question 10: Can the Expert Panel confirm that Fluoride is best used topically and can it explain why ingesting fluoride is seen as the best way to administer it to the population?**

There is a very significant benefit from ingesting fluoridated water. There are four possibilities, of which three are significant: (a) topical effects from topical application, (b) systemic effects from systemic application; (c) topical effects from systemic application and (d) systemic effects from topical application.

In the case of (a), we have well-known effects from materials applied directly to the tooth surface, such as toothpastes and mouth rinses. In the case of (b), we have the protective effects of fluoridated water on the occlusal surfaces of unerupted posterior teeth. In the case of (c), we have the topical effect of salivary fluoride, which originates with swallowed fluoridated water. In the case of (d), there is no issue, as purely topical applications to erupted teeth should not, in theory, affect unerupted teeth unless a portion of the topically applied product is ingested.

### **Questions Submitted by Claire Wheeler, Environmental Pillar Representative**

**Q1: Do you agree that the way that any possible beneficial dental effects from fluoridation of water arise from its use topically, ie, by coming into physical contact with the teeth, like a mouthwash, and that there is no benefit to swallowing or ingesting fluoride, whether in water or any other product, and that, in fact, it is classed as a poison because of its medical effects? What evidence is there that the decrease in dental caries could be attributed to water fluoridation rather than to an increase in brushing with toothpaste or other factors?**

The Expert Body does not agree with this statement.

There are four possibilities, of which three are significant: (a) topical effects from topical application, (b) systemic effects from systemic application; (c) topical effects from systemic application and (d) systemic effects from topical application.

In the case of (a), we have well-known effects from materials applied directly to the tooth surface, such as toothpastes and mouth rinses. In the case of (b), we have the protective effects of fluoridated water on the occlusal surfaces of unerupted posterior teeth. In the case of (c), we have the topical effect of salivary fluoride, which originates with swallowed fluoridated water. In the case of (d), there is no issue, as purely topical applications to erupted teeth should not, in theory, affect unerupted teeth unless a portion of the topically applied product is ingested.

Secondly, fluoridated water is not classed as a poison.

Thirdly, there are literally hundreds of studies which compare populations which have been supplied with fluoridated water against those which are not. These studies show a clear benefit to persons who receive fluoridated water. These effects were reported decades before the widespread availability of other fluoridated products such as toothpastes. There have been many hundreds of peer-reviewed studies showing the benefits of water fluoridation. Examples of Irish studies include the 1984 Survey of Childrens Dental Health, the 2002 All-Island Survey of Childrens Dental Health, the CAWT study of 16 year olds in a border region in 2005, and the survey on the dental health of Adults in 2002, all of which have been published in peer-reviewed journals. Other recent studies include Slade et al (2013) on the impact of fluoridation on adults in Australia. The list is far too numerous to mention all. That is why reviews are useful – there is a superabundance of studies which can benefit from meta-analysis.

**Q2: Do you agree that roughly 50% of ingested fluoride is excreted and that the other 50% accumulates in calcified tissue, ie bones and teeth, where it is liable to cause dental flourosis (a permanent brown discolouration of teeth), skeletal flourosis, and osteo-arthritis and possible other health problems?**

The Expert Body does not agree with this statement.

The Expert Body agrees that the fluoride which is not excreted is retained in bone, but this fluoride is not known to cause any harmful effects at the levels that pertain in water in Ireland.

The Expert Body is aware of the incidence of fluorosis, the only known unwanted effect of fluoridation. Dental fluorosis is a cosmetic or aesthetic condition which refers to the way teeth look; it is not considered to be an adverse health effect. At the levels at which fluoride is present in Ireland's water supplies (0.6 – 0.8 parts per million (ppm)) any occurrence of dental fluorosis is very mild or mild and in most cases only



detectable by a dentist as faint white flecks on the surface of teeth. Not all enamel defects are caused by drinking fluoridated water. In the majority of cases dental fluorosis generally does not require any treatment but anyone who has any concerns in this regard should consult their dentist. Treatment, where required, involves a simple, painless and inexpensive polishing technique which does not require any form of local or general anaesthesia.

This must be contrasted with the treatment of tooth decay which may on occasion involve the use of general anaesthesia and hospitalisation. Furthermore, non-treatment of dental fluorosis has no health consequences, whereas non-treatment of tooth decay can lead to pain, trauma, disfigurement, loss of teeth and function, problems with nutrition and growth, work/school absenteeism and significant financial and social cost.

Skeletal fluorosis has been reported in persons who have resided for many years, typically for decades, on naturally fluoridated water with many times the concentration of fluoride as we have in Ireland. The majority of such reports come from India, where water supplies in some of the regions can be more than 10 times the level found in Irish water supplies. There have never been any cases of skeletal fluorosis reported in Ireland. Arthritis-type conditions that might mimic the earliest signs of skeletal fluorosis are low in Ireland compared to the rest of Europe (EUROMUSC Report).

**Q3: Do you agree that individuals have differing sensitivities to fluoride? (a) What is the maximum dose of fluoride considered safe for young babies fed only on infant formula made up with fluoridated tapwater? (b) What is the maximum amount of fluoridated tapwater that can be consumed by high-consumption individuals such as lactating mothers, athletes and certain manual workers and what was the margin of safety used? (c) What research have you looked at to examine the medical impact of this amount of fluoride on these people, and was the research continued into their latter years?**

There is no evidence that any of the above groups are exposed to any health risks from fluoridated water. In the case of babies, the concern is that too much fluoride could lead to discoloration of the dental enamel, a cosmetic and easily treated condition at the levels surveyed in Ireland.

The maximum fluoride consumption (e.g. the Upper Level recommended by the European Food Safety Authority for subgroups of the population (EFSA, 2006)) is the same for “high consumption” individuals as it is for the general population. Indeed, high consumption “worst case” scenarios are used in the toxicological risk modelling that determines safety limits for various substances.

The possibility that fluoride is associated with general health effects has been investigated in relation to many conditions and in many different age groups. No ill health effects have been associated with any artificial fluoridated water scheme.

**Q4: Please comment on the incidence of Fluoridation in European Countries as listed below (taken from [www.flouridefreewater.ie](http://www.flouridefreewater.ie), click on ‘Why Europe says no’). What research can you cite that levels of dental caries are any different in these countries because of non-fluoridation? Have you compared the medical effects of fluoridation between countries that fluoridate and those that do not?**

Many countries have water fluoridation schemes, including the United States, Canada, the United Kingdom, Spain, Australia and New Zealand. Water fluoridation is less common in Europe. However, fluoride is an essential part of oral health policy in all countries in Europe. In countries which do not fluoridate water this can mean fluoridation of salt or provision of community fluoridation through other means, such as fluoride tablets, fluoride vanishes or fluoride mouth rinses.

In order to evaluate the effectiveness of water fluoridation it is necessary to compare populations whose dietary intake of sugar is similar. In the Republic of Ireland and Northern Ireland more sugary foods are consumed than in most other European countries. However the decay levels are considerably lower in the lifetime residents

of fluoridated areas in the Republic of Ireland than residents of Northern Ireland, which does not have fluoridated water.

International health statistics are available which, while they must be interpreted with caution, do not seem to indicate that Ireland has any noteworthy health concerns in comparison with non-fluoridated countries. A number of such reports are readily available online, such as: the following:

**OECD Report for 2012 "Health At A Glance"** – This report indicates good life expectancy for Ireland, that Ireland has had the greatest improvement in mortality rates in EU in past decade, it has the best self-reported health for Ireland in EU, and has relatively low to average returns for most conditions. This report shows Ireland is at the higher end for cancer but worse than non-fluoridating Denmark, (prostate figures for Irish men distort overall prevalence rates). Ireland has an average incidence of cardiovascular disease, and below average prevalence of all forms of dementia.

<http://www.oecd.org/health/healthataglanceeurope.htm>

**OECD Report for 2010 "Health At A Glance"** – This report shows similar data to the more recent 2012 report, but also shows Ireland has 5th lowest diabetes rate in EU (Diabetes rate for Ireland is not included in 2012 report)

[http://www.oecd-ilibrary.org/social-issues-migration-health/health-at-a-glance-europe-2010\\_health\\_glance-2010-en](http://www.oecd-ilibrary.org/social-issues-migration-health/health-at-a-glance-europe-2010_health_glance-2010-en)

**GLOBOCAN report 2008** (WHO comparative cancer rates) – This report indicates that France, Denmark, Norway, none of which fluoridate, have higher cancer rates for men than Ireland. Prostate highest for Ireland but higher rate of PSA testing in Ireland explain much of this. For women, Ireland is below Denmark, Norway and the Netherlands, none of which fluoridate.

<http://globocan.iarc.fr/factsheets/cancers/all.asp>

In addition, there is the **Statement from the Irish Cancer Registry** that antifluoride groups are misusing the published Cancer Registry reports and a

statement that fluoridation is not a plausible explanation for differences in cancer rates, including prostate cancer (comments re PSA testing).

<http://www.ncri.ie/pubs/water%20fluoridation-6.shtml>

**EURMUSC report on Musculoskeletal diseases** – this reports shows that Ireland has very low rates of musculoskeletal diseases including osteoarthritis and osteoporosis. Rheumatoid arthritis is close to the EU average.

[http://www.eumusc.net/workpackages\\_wp4.cfm](http://www.eumusc.net/workpackages_wp4.cfm)

**Making Chronic Conditions Count 2010** – These is a series of cross-border reports by the Institute of Public Health which compares the prevalence of a number of chronic conditions in Ireland such as stroke, chronic heart disease, hypertension, bronchitis and diabetes. It finds the prevalence of all these conditions is lower in the Republic than in (non-fluoridating) Northern Ireland.

[www.publichealth.ie](http://www.publichealth.ie)

**Q5: Please comment on the following article, taken from [www.voiceireland.org](http://www.voiceireland.org)**

The article cited is a commentary on the decision of the city council of Calgary, in Canada, to remove fluoride from the city's water.

The fact that a city in Canada decides not to fluoridate is of no relevance to the situation in Ireland. Neither would a commentary on the many decisions of other North American cities which have decided to proceed with fluoridation.

**Q6: Please comment on the stance taken by prominent US scientists and judges as quoted below (taken from [www.NoFlouride.com](http://www.NoFlouride.com)). What epidemiological studies or other research have you examined about the possible medical effects of Flouridation, particularly in relation to Arthritis, Osteoporosis, and Thyroid function?**

The Expert Body has examined a great number of primary research papers on various aspects of general health and water fluoridation. The Expert Body also notes that a number of official scientific bodies have also reviewed water fluoridation and

these have also published conclusions that water fluoridation is not known to pose a health risk. A small number of individual scientists oppose fluoridation, a much larger group are in favour. The American Medical Association, the Canadian Medical Association and other organizations cited in the question actually support fluoridation.