

Dear Taoiseach, Minister for Health and distinguished Cabinet Ministers

This communication addresses the second and substantive point put forward as evidence to support water fluoridation by Minister For Health, Dr. James Reilly T.D. in response to representations on my behalf by Minister for Arts, Heritage and Gaeltacht Affairs, Mr. Jimmy Deenihan T.D. In itself the reply is quite specific as the Minister provides certain scientific facts that are clearly inaccurate, misleading and miss-informed. The Minister for Health in his letter of reply addresses one of the more critical issues regarding water fluoridation, that is dietary exposure of the population to fluoride.

In reply, what this letter outlines is that the most sensitive sector of Irish society, namely newborn babies, are grossly over-exposed to fluoride, at levels twice the maximum tolerable upper limit set for adults, when they are bottle fed formula milk made up with fluoridated water. It further outlines that while an upper safety limit exists for adults, no safety standard exists to protect babies from the toxic effects of fluoride at this most sensitive time in their development. This letter details how large sectors of society exceed the Maximum Tolerable Upper Limit for fluoride on a daily basis and it also illustrates how artificial fluoridation of drinking water is a significant contributor to a rising health concern. The final part of the letter is perhaps the most important and concerns the fact that the toxicological profile of hexafluorosilicic acid remains unknown and that consumers, particularly babies, are being exposed to a dangerous chemical, an industrial chemical that has been banned for use as a biocidal product in the EU and which may be directly linked to Attention Deficit Hyperactivity Disorder in children and adults as well as a range of other psychiatric disorders in the population. Other health concerns that may be directly or indirectly linked to fluoride exposure are addressed in my report, to which I have not received an adequate response.

The Minister for Health states that the average exposure of Irish consumers to fluoride from food represents 7.5% of the safe Upper Limit (UL) for **FLUORIDE** as established by the **European Food Safety Authority**. The Minister goes on to clarify that if exposure to fluoride from drinking water is included (representing the total fluoride dietary intake from food and water combined) it represents 23.9% of the UL on average. **These statements are entirely incorrect.**

The Minister refers to the fact that the EFSA have established a safe Maximum Tolerable Upper Limit for fluoride intake from all food sources, including water, for adults. This has been established as 120ug per kilogram of body weight per day equal to a level of 7mg of fluoride per day. The Minister is no doubt aware that the World Health Organisation (WHO) have set a recommended daily intake¹ for fluoride of 3mg/day for adults while the U.S. Institute Of Medicine has established a Tolerable Upper Level intake limit for children from 6 months to 8years from 0.9 to 2.2mg/day. Avoiding intakes of fluoride at levels that could cause adverse effects is as important to public health as providing adequate fluoride for dental health.

¹ WHO Values for recommended daily fluoride intake (WHO 2004)

The EFSA opinion regarding the maximum Tolerable Upper Limit for adults for all dietary sources has been established to reduce the risk of non-vertebral bone fractures in postmenopausal women who have been found to a high risk group to long term exposure to fluoride. It does not take into account the possibility of an individual being intolerant or hypersensitive to fluoride nor does it apply any safety standards for sensitive subgroups of the population such as individuals with diabetes or thyroid disorders.

It follows from the Ministers calculations that the total dietary intake for fluoride for adults is on average 1.65 mg per day from all dietary sources. **This statement is clearly incorrect as I will demonstrate below.**

This level of fluoride would be the same as what an individual would consume in a single cup of tea made with fluoridated water and not consuming anything else in the day. In any population, dietary intakes and food choices change from day to day. Each person's daily fluoride exposure will be influenced by what they eat each day and how they brush their teeth. Many people will consistently be exposed to higher levels of each fluoride-containing medium others will consistently be exposed to lower levels than depicted. For example Irish people are the worlds largest consumers of tea, drinking on average between 3 and 6 cups of tea per day. There are some that drink more than this. The dietary intake from tea (made with fluoridated water) for a large sector of the population as a beverage on its own would be in the region of 5 mg of fluoride per day. It is important to be aware that no one is average on a continuous basis.

The U.S EPA have calculated that the average fluoride intake for children aged 6-11 and 12 - 19 years of age living in fluoridated community (with a fluoride level of 0.8-1.2mg/L) from beverages alone was up to 2.45mg.²

For both food and beverages the EPA estimated that the fluoride intake was 4.16mg/day for 6-11 year olds and 4.75mg/day for 12-19 year olds. These estimates did not include the contribution from fluoride mouthwash, fluoride toothpaste or fluoride medication.

In support of the Minister views he makes reference to a study published by the EFSA and another by the Food Safety Authority of Ireland (FSAI).

It is important to highlight that the EFSA document referenced by the Minister stated the following regarding fluoride; “There is no convincing evidence that health and development of humans depend on the intake of fluoride”.

Importantly in regard to establishing upper dietary limits for the most sensitive sector of society the EFSA did not establish an UL for infants.

Furthermore, **the EFSA did not include nor examine the dietary sources of fluoride** from fluoride containing drugs. Yet remarkable the EFSA stated **“that their potential contribution to the total daily intake, however, has to be taken into account in the risk assessment of fluoride. This contribution can amount up to 70% of the**

² Fluoride: Exposure and Relative Source Contribution Analysis, Health and Ecological Criteria Division Office of Water, U.S. Environmental Protection Agency, December 2010

estimated reasonable maximum dietary exposure value in both infants and young children.”

The EFSA considered that the upper limit (UL) for fluoride is 0.1 mg fluoride/kg/day in children aged 1-8 years. This is equivalent to 1.5 and 2.5 mg fluoride per day in children aged 1-3 years and 4-8 years, respectively.³ According to research published for dietary exposure in fluoridated communities in North America these values may regularly be exceeded from consuming beverages alone.

As already noted the EFSA did not establish an UL for infants but critically observed that infants who consume powdered formula milk **will exceed the maximum limit set for infant formula established by the EU Scientific Committee on Food** if water containing more than 0.7 mg/L is used for its preparation.

In Ireland it is estimated that up to 97% of infants consume powdered formula at 6 months of age, as a significant majority of mothers in Ireland do not breast-feed.

The Minister is aware that the upper limit for fluoridated drinking water in Ireland is 0.8mg/L.

The EU Scientific Committee on Food has recommended a **maximum fluoride** level of 0.6-0.7 mg/L in infant formula and follow on formula, equivalent to an intake of about 0.1 mg/kg body weight per day in infants during the first six months of life (body weight 5 kg).

At current fluoride levels in drinking water in Ireland all bottle fed babies will exceed the maximum upper recommended fluoride level when fluoridated tap water is used to constitute the formula. It is a scientific fact that boiling water increases the concentration of fluoride, contributing to further exceedances of the safety standard.

Importantly the EFSA noted that with regard to the fluoride content of drinking water, that if formulas were prepared with water containing **0.3 mg fluoride/L** and a 5-kg infant drinks 800 mL, fluoride intakes of **60 µ g fluoride/kg body weight/day** would result. Alarmingly the EFSA highlight that the use of fluoridated drinking water would considerably increase the fluoride intake **threefold**. This means that the fluoride intake would be approximately **180 µ g fluoride/kg body weight/day**. The maximum upper limit for adults is 120 µ g fluoride/kg body weight/day.

The EFSA have noted that in infants up to 90% of consumed fluoride is retained in the body of infants within the bone, calcified ligaments and organs such as the pineal gland. The EFSA reported that healthy adults retain 50% of dietary fluoride intake. The UL for adults is based on this medical fact, CONSEQUENTLY for infants the actual exposure to fluoride and its toxic actions on biological systems would be in the region of twice the maximum UL

³ Opinion of the Scientific Panel on Dietetic Products, Nutrition and Allergies (NDA) on a request from the Commission related to the Tolerable Upper Intake Level of Fluoride, EFSA Journal doi:10.2903/j.efsa.2005.192

established as safe for adults. The long term implications of this have yet to be properly investigated.

As a consequence of water fluoridation the vast majority of babies in Ireland are now exposed to prolonged intake of fluoride from formula at levels above the maximum tolerable level set for adults. This is clearly unsafe and **significantly in excess of the maximum limit as set for adults in the population. To allow and tolerate such an unsafe practice to occur should not be tolerated in any circumstances especially when infant babies kidneys and organs are not yet fully developed and most of the fluoride is retained in their developing bodies and organs.**

There are clearly serious immediate and long-term safety concerns for public health that the fluoride upper tolerable intake level, a value established in Europe is exceeded for all babies by exposure to fluoridated water with formula milk.

Given these basic and undeniably facts it is extremely worrying that the Minister for Health would suggest that the fluoride dietary intake of Irish consumers is just 7% of the safe upper limit. This is particularly so when the EFSA have documented that bottle fed infants will be exposed to fluoride at levels in excess of **33% above the maximum upper limit set for adults.**

This has serious implications also for the Food Safety Authority of Ireland (FSAI) who are legally obliged to base their opinions on scientific grounds and to develop food standards on the basis of the best, most up-to-date scientific advice available for the protection of all consumers.

Considering that this information is readily available, published on the European Commissions website and noting that this information was previously provided to the Minister, the Government of Ireland and its scientific and medical authorities in my comprehensive report dated February 2012, the lack of any progress in establishing appropriate safety standards to protect the most vulnerable in our society to fluoride overexposure is a cause of great concern.

The maximum upper tolerable intake levels of fluoride established in Europe amounts to 1.5 mg/day for 1– 3 year old children, 2.5 mg/day for 4–8 year old children, 5 mg/day for 9–15 year old children and 7 mg/day for adults (≥ 15 year old).

As previously noted the maximum limit for adults for all dietary sources has been established to reduce the risk of non-vertebral bone fractures in postmenopausal women who have been found to a high risk group to long term exposure to fluoride. It does not take into account the possibility of an individual being intolerant or hypersensitive to fluoride nor does it apply any safety standards for sensitive subgroups of the population such as individuals with diabetes or thyroid disorders. The EFSA in itself noted that severe clinical symptoms were observed in 22% of children on acute single dose ingestion of fluoride amounts of about one mg fluoride/kg body weight. This may suggest that a significant proportion of Irish infants may have medical ailments that relate directly to overexposure exposure to fluoride.

The UL for fluoride can readily and easily be exceeded especially in communities where drinking water is artificially fluoridated (as well as in non fluoridated communities) when one considers the potential total fluoride exposure for all dietary sources.

For example the EFSA found that for children under 4 years of age fluoride from toothpaste alone without any other dietary sources was found to contribute up to one third to one half of total daily fluoride intakes. This figure may be much higher for children with Autism or Downs syndrome who tend to eat toothpaste due to problems swallowing.

The EFSA also noted that fluoride containing drugs can amount up to 70% of the estimated reasonable maximum dietary exposure value in both infants and young children from this singly source alone.

The EFSA further documented that if fluoridated water was drunk and used for the preparation of food and tea (1-2 L of water/day; 500 mL of tea (2 cups) with a fluoride concentration of 5 mg/L) 3.5 to 4.0 mg fluoride would be added to the daily dietary intake.

This level exceeds the maximum recommended limit for fluoride as recommended by the WHO.

To put this in context 2 cups of tea per day made from fluoridated water would amount to half the total daily maximum Tolerable Upper Level for an adult. It would also exceed the limit established for children under 8 years of age. However it is important to remember that the UL for fluoride applies to intake from water, beverages, foodstuffs, dental health products and fluoride tablets for caries prevention as well as for fluoride based medication.

Examples of other dietary sources of fluoride include alcoholic drinks such as Guinness brewed in Ireland which contains the same level of fluoride as drinking water. This has been confirmed in writing by Diageo Ireland. Guinness may therefore contain 0.8 mg/L fluoride. Beer brewed in F water may contain to 1.2Mmg/L, wine may contain 1-12mg/L, coffee 1.08mg/L, juice drinks 0.8mg/L, soups 1.06 mg/L, rice 2mg/kg, fruits and fruit juices up to 2.34mg/kg and tea can contain in excess of 5 mg/L depending on if its loose tea or packaged tea and how long it is brewed, refined sugar contains up to 13mg/kg fluoride while processed chicken and chicken broth may contain 6 mg/L. Other major sources of fluoride include fish and tobacco.

While all foodstuffs will likely have some level of fluoride, fluoride also accumulates in foodstuffs through the use of fluoridated fertilisers, pesticides and herbicides as well as land-spreading of sewage sludge bio-solids. **What is important to note however, is that the EFSA determined that use of fluoridated water to cook food will increase the fluoride content of all food by at least 0.5 mg/kg.**

This clearly shows that artificial fluoridation of drinking water significantly contributes to increasing the risk of overexposure of the population to fluoride, and that through fluoridating water and as a consequence foodstuffs, the maximum dietary Upper Limit for fluoride cannot be controlled for large sectors of the population, this is especially so for those dependent on medication or with specific medical or nutritional needs. For many in society by continuing with artificial fluoridation extreme fluoride exposure scenarios are possible and not completely unrealistic. On that point the EFSA noted that in addition to the risk of dental or skeletal fluorosis gastrointestinal symptoms like nausea, vomiting, anorexia and

diarrhoea may occur with excessive fluoride intakes as well as increased risk of bone fractures.

Finally and perhaps the most important of all is the matter concerning the toxicological profile of Hexafluorosilicic acid, the product used for water fluoridation. As a matter of public health it is extremely concerning that both the U.S. National Research Council (NRC 2006) and the EU Commission (SCHER 2010) have highlighted that the toxicological profile of Hexafluorosilicic acid remains unknown. SCHER found that this chemical may be present in the human body in low pH environments after consumption of artificially fluoridated drinking water, examples being the stomach and bladder environments. The long term effects of this on biological systems are entirely unknown.

As I have previously highlighted both in my own report on water fluoridation and subsequent communications I have provided to the Government of Ireland from Professor Masters, Research Professor of Government & Nelson A. Rockefeller Professor Emeritus, President of the Foundation for Neuroscience and Society, in addition to reports from Dr. Kathleen Treissen and correspondence from Dr. Harry Limeback both members of the U.S. NRC scientific committee which examined the toxicity of fluoride (NRC 2006), it is now known that silicofluoride chemicals are extremely toxic and that they have never been tested for safety as a means of adding fluoride to a water supply. Despite the absence of detailed chemical studies providing sound evidence of whether and not silicofluorides, even at low concentrations, would have harmful effects on humans such research has not been conducted. I have previously highlighted in correspondence that no toxicological data is available from the manufacturers, suppliers or promoters of Hexafluorosilicic acid, nor is any available from the Department of Environment, Environmental Protection Agency or the Food Safety Authority of Ireland. Furthermore I have highlighted that no comprehensive scientific studies have been undertaken on Hexafluorosilicic acid products used for water fluoridation and no environmental impact assessment has ever fully examined the ecological impact of fluoride emissions from waste water treatment facilities on the environment in Ireland. Considering that Hexafluorosilicic acid is an industrial chemical it is extremely alarming in the absence of any information on developmental toxicity, carcinogenic effects, mutagenic effects, teratogenic effects, ecotoxicity, toxicity to animals, chronic long term effects on humans and biodegradation, that it is being added for consumption to public water supplies and subsequently discharged into the environment.

It is equally disturbing the uncertainty that exists regarding what the actual composition of silicofluoride compounds will be when added to drinking water. The U.S EPA recently examined this and found *“There is considerable debate over the composition and even the existence of some homo- and heteroleptic aquo-, fluoro-, and hydroxo complexes of silicon-(IV), which makes it impossible to predict what species might be found in real potable water supplies that are fluoridated or those that naturally contain fluoride and silicates as background ions.”*

Even if the actual compounds were known, alarmingly, the EPA reported *“It is not clear if current analytical techniques are capable of detecting whatever species exist under actual drinking water conditions, and such knowledge is critical for the formulation of sound policy and regulation.”*⁴

⁴ Fate of Fluorosilicate Drinking Water Additives Chem. Rev., 2002, 102 (8), pp 2837–2854 Edward Todd Urbansky, United States Environmental Protection Agency, Office of Research and

What is equally disturbing is that a study by Finney et al⁵ confirms that silicafluoride (SiF) compounds present in artificially fluoridated water act as acetylcholinesterase inhibitors.

The primary toxic effect of **Acetylcholinesterase inhibitors** is to block the normal breakdown of the neurotransmitter, **acetylcholine** which is critical for concentration and learning functions of the brain. Research into Attention Deficit Hyperactivity Disorder (ADHD) in children undertaken by the Experimental Neuropsychiatric Research Group of Örebro University Sweden, found that children with ADHD had dramatically reduced levels of acetylcholine which could lead to problems with concentration and learning.^{6,7}

The possibility that SiF compounds from water fluoridation chemicals may act to increase the risk of children developing ADHD, or may contribute to the existing disability in children or adults cannot be overlooked. What is known for certain however is that the prevalence of the disability has increased significantly in the recent past. It is currently estimated to affect around 60,000 children under 18 years of age. According to consultant child and adolescent psychiatrist, Dr Keith Holmes, more than half of young people diagnosed with the condition will be prescribed medication. The cost for ADHD drugs for children paid for by the state in 2009 was in excess of €3.2 million. A further 120,000 adults in Ireland are now also believed to be living with this disability.

Low levels of serotonin are also implicated in ADHD while disturbance to dopamine is linked to other psychiatric disorders, such as schizophrenia, bipolar disorder and autism. The pineal gland produces a variety of hormones including serotonin and dopamine. While the effect of fluoride on the pineal gland remains to be fully examined, research has found that the pineal gland may sequester fluoride from the bloodstream. It is now known that the human pineal gland contains the highest concentration of fluoride in the body.^{8,9}

If the pineal accumulates fluoride at an earlier age than in previous decades, which is exactly the case with water fluoridation especially for infants bottle fed formula milk constituted with fluoridated water, one would therefore anticipate that a high local concentration of fluoride within the pineal would affect the functions of the pineal, i.e., the synthesis of hormonal products, specifically melatonin, serotonin and dopamine. It is clear that the long

Development, National Risk Management Research Laboratory, Water Supply and Water Resources Division.

⁵ Finney WF et al. (2006) Re-examination of Hexafluorosilicate Hydrolysis by Fluoride NMR and pH Measurement. *Environmental Science & Technology* 40 (8): 2572–77

⁶ New Biochemical Changes Found in Children With ADHD, Science Daily, Dec. 6, 2011

⁷ Johansson, J. et al. Altered tryptophan and alanine transport in fibroblasts from boys with attention-deficit/hyperactivity disorder (ADHD): an in vitro study. *Behavioral and Brain Functions*, September 24 2011, doi:10.1186/1744-9081-7-40

⁸ Luke J. (2001). Fluoride deposition in the aged human pineal gland. *Caries Res.* 35(2):125-128.

⁹ Luke J. Ph.D Dissertation, School of Biological Sciences, University of Surrey, UK. 1997.

term effect of fluoride on the pineal gland and its implications for human health require urgent investigation.

All of these facts and concerns noted herein and elsewhere in my earlier report and subsequent communications clearly demonstrate that the Government must abide by the 'precautionary principle' and end the policy of artificial fluoridation of public water supplies immediately.

It is clear that failure to do so will ultimately result in litigation at a future date against the State for negligence and failure to protect its citizens from unnecessary harm.

Yours sincerely

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