

RESPONSE TO APPRAISAL BY  
IRISH EXPERT BODY ON FLUORIDE AND HEALTH  
ON THE REPORT  
TITLED  
**HUMAN TOXICITY, ENVIRONMENTAL IMPACT AND  
LEGAL IMPLICATIONS OF WATER FLUORIDATION**  
THOROUGHLY REFUTING THEIR CLAIMS  
AND  
PROVIDING FACTUAL EVIDENCE  
DEMONSTRATING  
THEIR  
MISREPRESENTATION OF SCIENTIFIC FACTS

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Misrepresentation of Scientific Facts and Current Scientific Knowledge on  
Silicofluorides and Fluoride by the Irish Expert Body on Fluoride and Health

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## Executive Summary

The Department of Health in Ireland established the Irish Expert Body on Fluorides and Health which is funded by the taxpayer who provide €400,000 in public money annually for secretarial services for the organisation. The objective of the organisation is to advise the Department and Minister for Health and Children on all matters relating to water fluoridation to include risk management, adverse health effects and protection of public health. The administration and secretarial services for the Expert Body are provided by the Dental Health Foundation, whose members largely represent the Expert Body itself. To my knowledge there are no medical doctors, immunologists, cardiologists, endocrinologists, epidemiologists, gastroenterologists, oncologists, haematologists, nephrologists, neurologists, pathologists, paediatricians, pharmacologists, radiologists, rheumatologists, toxicologists, urologists or biologists, ecologists, environmental scientists, soil scientists, inland fisheries experts or veterinary specialists on the Expert Body. The review by the Expert Body of the report titled *Human Toxicity, Environmental Impact and Legal Implication of Water fluoridation* was undertaken by one individual Dr. Joe Mullen, a public health dentist and representative of the Health Boards on the Expert Body. Dr. Mullen was previously a member of the Forum for Fluoridation who published a report on water fluoridation in 2002. It should be noted that this report was severely criticised by a group of international scientists<sup>1</sup> for producing what they claimed was a blatantly false report in which they stated that the aim of the authors of the report was not to study the scientific evidence, but to find ways to get around it. In comparison to the comprehensive review by Waugh examining human toxicity to silicofluoride and fluoride compounds, the report of which Dr Mullen's was a senior contributor devoted only two pages to an independent analysis of specific health studies.

Dr. Mullen himself has publicly claimed that the effectiveness of water fluoridation is beyond dispute and that it is his duty and responsibility to support water fluoridation.<sup>2</sup> In the July 17<sup>th</sup> 2001 issue of the Irish Medical News Dr. Andrew Rynne, who testified before Dr. Mullen, expressed his concerns about the bias of the members of this Forum. Given their record to date it is to be expected that with such a long history of promoting fluoridation by members of the Expert Body, that such an organisation will not in any way undertake a fair and impartial assessment of a report which questions the very core of their beliefs. This should be of some concern to the Government of Ireland, public representatives and taxpayers who fund this organisation and in particular to consumers in Ireland who are left with no choice but to drink fluoridated water or eat fluoridated food. Clearly the objective of such a body should be first and foremost to be independent and from this position of independence provide unbiased, impartial and truly independent advice. The evidence presented here will conclusively demonstrate in just a few examples how the Irish Expert Body on Fluorides and Health have distorted and misrepresented current scientific knowledge including Waugh's report, to suit their beliefs in a manner that is more like propaganda than fact, in order to support the continuation of water fluoridation in Ireland at whatever cost.

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<sup>1</sup> Dr Hardy Limeback, Head of Preventative Medicine at the University of Toronto in Canada; Dr C. Vyvyan Howard of the Department of Human Anatomy and cell biology at the University of Liverpool in Britain and Dr A K Susheela, Executive Director of the Fluorosis Research and Rural Development Foundation in Dehli, India.

<sup>2</sup> Sligo Champion and Irish Medical Journal.

## INTRODUCTION

It is perhaps worth noting at the beginning some of the alarming health statistics relevant for Ireland. Fluoride is now known to be a risk factor in developing many of the most serious health problems prevalent in the population of Ireland today. This includes neurological and cardiovascular disease, type ii diabetes, osteoporosis, hypercalcemia, hypothyroidism, dental fluorosis, skeletal muscular disorders and chronic pain. The incidence of these diseases in Ireland is far above the global average and continues to rise.

It has been medically documented that at a minimum 1% of the population may be hypersensitive to exposure to fluoride. Documented reactions under clinical observation include some of the following symptoms: gastrointestinal upsets, skin rashes, mouth sores, migraine like headaches, arthritic-like pains, dryness of the throat, excessive water consumption, frequent need to urinate, chronic fatigue, depression, nervousness and respiratory difficulties. This latter observation means that in Ireland, around 46,000 people at a minimum may evidence some sensitivity or ill-health in one way or another to drinking fluoridated water or consuming tainted foodstuffs contaminated with fluoridated water in the processing or cooking of foodstuffs. The ill-health may be representative in any of the conditions listed above.

The symptoms may include for example depression, which was one of the clinically observed reactions to exposure to fluoride. It should be noted that it is now estimated that in the region of 400,000 people in Ireland currently suffer from depression. These figures do not reflect however the enormous prevalence of general ill-health as documented for Ireland. According to the World Health Organisation the global average for neurological disease is 6.3 percent of the population, yet according to the Department of Health's own statistics the prevalence of neurological disease in Ireland is now at 17.3 per cent of the population. That represents a truly astonishing 770,000 people who have been diagnosed with some form of neurological illness in Ireland.

Astonishingly the health consequences of ingesting fluoride have never been examined in Ireland, this is truly remarkable given that Ireland is perhaps the most fluoridated country in the world. This fact itself is astounding, especially when you look at the health statistics for Ireland compared to any other country in the world. Apart from neurological illness Ireland also has twice the level of osteoporosis found in other countries including northern Ireland and the UK. Ireland also has one of the highest levels in the world of epilepsy, as well as certain type of cancers associated with the digestive tract, including cancer of the liver, kidney, stomach, bowel and intestinal cancer. On top of this the number of adults under 65 years of age with cardiovascular disease has increased dramatically (due in part to calcification of arteries to which Fluoride is now known to be a major contributor and risk factor). In addition Ireland has one of the highest levels of cardiovascular disease overall in the world. Add to this the fact that some 400,000 people in Ireland are now estimated to be diabetic and noting in particular that the WHO have identified such sensitive subgroups as having a lower margin of safety to fluoride than normal individuals.

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This is extremely alarming given that the World Health Organisation (WHO) itself has warned that patients with kidney dysfunction may be particularly susceptible to fluoride toxicity in the body.<sup>3</sup>

According to the World Health organisation<sup>4</sup> *"It is known that persons suffering from certain forms of renal impairment have a lower margin of safety for the effects of fluoride than the average person."*

Yet incomprehensively, the safety margins for high risk subgroups of the population is the same in Ireland as that for normal healthy individuals.

In addition to diabetics, it is now known that a further 300,000 people in Ireland over the age of 50 have osteoporosis. The recently published Irish Longitudinal Study of Ageing, by Trinity College Dublin, found that musculoskeletal pain involving bones, muscles, ligaments, tendons, and nerves was the most widely reported condition amongst the wider Irish population with a prevalence of 40%. Remarkably, it is estimated that there are approximately 585,000 people in Ireland who suffer from chronic pain representing 36% of all households in Ireland. Musculoskeletal pain is one of the most easily recognisable symptoms of overexposure to fluoride brought on from excessive quantities of fluoride deposited in the skeleton and soft tissues.

This is particularly disturbing for future generations as it is now known that 1 in 3 children have dental fluorosis exhibiting a visible sign of chronic overexposure to fluoride in their bodies at an early stage in life. It is now known as reported by the European Food Safety Authority that 90% of fluoride in babies and infants is absorbed into bone. Even more worrying is the fact that all bottle fed infants in Ireland fed infant formula with fluoridated water exceed the maximum recommended daily tolerable intake for fluoride with long-term medical consequences for their health.

All of this has grave implications for public health, society and the economy as the younger generation ages in future decades.

What is particularly disturbing is that the appraisal by the Expert Body actually did was to totally ignore all of this information which clearly as a matter of urgency should be examined urgently by such an organisation and the HSE in general. In regard to international studies noted in the report by Waugh the Expert Body ignored completely the most recent study by Valdez-Jimenez, et al.<sup>5</sup> published in the Journal Neurologia, which reported that "the prolonged ingestion of fluoride may cause significant damage to health and particularly to the nervous system". This study observed that chronic exposure to, and ingestion of, the synthetic fluoride chemicals added to water supplies can cause serious brain and neurological damage.

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<sup>3</sup> International Programme on Chemical Safety. (1984). Environmental Health Criteria 36: Fluorine and Fluorides. Geneva, Switzerland: World Health Organization.

<sup>4</sup> WHO Fluoride in Drinking Water 2004

<sup>5</sup> Valdez-Jiménez L, Soria Fregozo C, Miranda Beltrán ML, Gutiérrez Coronado O, Pérez Vega MI. Neurologia 2011 Jun;26(5):297-300. Epub 2011 Jan 20. Effects of the fluoride on the central nervous system,

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The fact that the Expert Body also chose to ignore the significant finding by Mehali et al. and Liu et al. which found that fluoride inhibits AdoHydrae and homocysteine metabolism, when it is now known that elevated homocysteine levels are linked to cardiovascular disease, atherosclerotic disease, congenital heart defects, Down Syndrome, neurodegenerative disorders including depression, schizophrenia, bi-polar disorder, epilepsy and behavioural disorders, as well as many other medical conditions, is equally disturbing.

This also applies to the most recent research by Li Y et al. published in the journal Nuclear Medicine Communications, which found that fluoride may be associated with an increased cardiovascular risk as it causes hardening of your arteries. The significance of this finding cannot be overstated given that it is the leading lethal disease in Ireland. A disease that has seen a fourfold increase in primary care for cardiovascular conditions in recent years.

What is perhaps most interesting overall however, is that the Expert Body have also declined to comment on the evidence presented in the Waugh report examining the known geographic disease hotspots in Ireland and the correlation of disease incidence for certain cancers, cardiovascular disease, hypothyroidism and neurological illness, with geographic areas where the fluoridated drinking water is very soft.

It is truly astonishing that the Expert Body failed to even mention these established facts in their review. The Irish Expert Body has not commented on any of these statistics, perhaps because many come from the HSE itself. So what exactly was noted in their report and what was the objective and aim of the 'appraisal' by the Expert Body?

From the evidence presented in their appraisal of the Waugh report it is obvious that the review clearly had one task, which was to discredit the research and the author rather than objectively research any of the information provided. In their review the Expert Body have demonstrated their own ability to misread scientific research, which will be conclusively demonstrated with illustrated examples in this rebuttal. Overall the Expert Body have sought to undermine in a disturbingly inadequate & disproportionate response the quality of research undertaken and information presented by the Author of the report titled Human Toxicity, Environmental Impacts and Legal Implications of Water fluoridation, a report which represents the most comprehensive study and research on water fluoridation ever undertaken in the history of the State. A study that was undertaken voluntarily by the Author.

When one looks at the huge amount of scientific information presented in the review examining over 1200 peer reviewed studies many highlighting the associated risk of silicofluorides and fluoride to illhealth and environmental harm, it is no wonder that the Ministries for Health in every other European Country have followed the precautionary approach to preventative healthcare and avoided implementing or ended water fluoridation altogether.

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As noted in the report *Human Toxicity, Environmental impact and Legal Implications of Water Fluoridation*, It is clearly time for Irish citizens to have the same standard of care and legal protection as other European citizens. To this end, the Government must urgently adopt a precautionary approach to risk prevention and in doing so harmonise its public health and water management policies with those of all other EU Member States by ending its policy of water fluoridation immediately.

### **HIDING THE FACTS**

There are a number of examples where the Irish Expert Body appear to have deliberately ignored published peer reviewed scientific findings or intentionally misrepresented scientific facts in general to support their stated position and biased beliefs in artificial fluoridation of drinking water. In doing so, as a publicly funded organisation they have induced the Government of Ireland to continue with a policy that is based on a representation of science that is clearly untrue. Whilst there are a number of specific examples that may be drawn upon to illustrate this behaviour, perhaps the most important examples are examined herein, which clearly demonstrates the mindset that exists within the Irish Expert Body on Fluoride and Health and which clearly demonstrates a lack of credibility that reflects poorly on the nature and quality of governance within the organisation.

Probably the most significant finding is that the Irish Expert Body have consistently and repeatedly stated that hydrofluorosilicic acid (HFSA) poses no risk to consumers based solely on their unqualified opinion that the chemical dissociates completely in drinking water into harmless fluoride ions and that consumers never come in contact with silicofluorides or any other potentially toxic metal silicofluoride complexes. For this sole reason, the Irish Expert Body have determined, in their wisdom, that there is no need for the Government of Ireland to undertake toxicological testing on the synthetic chemicals used for artificial fluoridation. Such testing that would ensure the health and wellbeing of Irish citizens as well as protect its natural heritage and biodiversity.

The Information presented herein will show how the Irish Expert Body have deliberately misrepresented scientific facts to support their personal pro-fluoridation beliefs and in doing so have misplaced the trust placed in them to protect the health and welfare of Irish citizens. Rather than ensuring that decisions are based on valid and scientifically sound facts I will demonstrate how they are instead based on a clear misrepresentation of scientific facts.

Following publication of the report titled *Human Toxicity, Environmental impact and Legal Implications of Water Fluoridation* and subsequent to numerous written questions to the Minister for Health by elected public representatives, seeking clarification on various matters raised in the aforementioned report,<sup>6</sup> it has now come to light that the Irish Expert Body on Fluorides and Health have repeatedly and deliberately misinformed the Minister for Health & Children and the Irish public on critical matters relating to

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<sup>6</sup> Appendix 1. Parliamentary Questions on Fluoridation

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public safety. In doing so they have created a false and misleading impression of the safety of chemical compounds used for artificial fluoridation of drinking water in Ireland.

This is nothing short of deliberate media and government misinformation by a body that has been entrusted to protect public interest and raises serious questions regarding the motivation, professional judgement and abilities of the body to undertake its work in the interests of consumers and public health in a transparent and objective manner.

In response to parliamentary questions raised by Deputies Maureen O Sullivan T.D. and Catherine Murphy T.D as well as other Oireachtas members seeking evidence to demonstrate that the silicofluoride compounds used for water fluoridation have been tested for human safety and environmental toxicity, the Expert Body has falsely stated that when hydrofluorosilicic acid (HFSA) is added to water a complete reaction occurs producing only hydrogen ions, silica (sand) and fluoride ions to which consumers would only be exposed.

Furthermore the Expert Body falsely stated that since consumers do not come into contact with HFSA as water from the tap contains fluoride, not HFSA or fluorosilicates, there is no need for the State to demonstrate the safety of the chemical for human consumption. The Expert Body believe, incorrectly and in violation of a European Court ruling, that it is unnecessary for the State to undertake toxicological testing, as would be required legally for any such chemical compound variants in structure consumed by the public for the purpose of medical intervention.

The evidence to support such a position by the Expert Body was established in correspondence by The Irish Expert Body to Dr Kevin Kelleher, Asst National Director- ISD-Health Protection, Health Service Executive regarding their appraisal of the main themes of the report titled *Human Toxicity, Environmental impact and Legal Implications of Water Fluoridation* in which Dr Joe Mullen, Chair of the New and Emerging Issues Sub Committee of the Irish Expert Body on Fluorides alleged how the scientific evidence contained in the report, is in the opinion of the Irish Expert Body both unreliable and unscientific.

Given such grave allegations it is necessary to examine in detail the evidence provided by the Expert Body.

Prior to doing so it is however important to put the quality of the review into context, the review was undertaken by one individual. To counter balance Dr. Mullen's opinion, Appendix 4 provides additional third party comments from International Academics in science, medicine and chemistry in support of the report.



## Contradictory Statements of Fact: Part 1

### NRC AND YORK REPORTS

The Expert Body claim that Waugh has misreported scientific literature by misquoting the York review and referencing the NRC study which they claim is not relevant to Ireland.

The Expert Body repeatedly claim that the York Review found water fluoridation to be safe and effective for all ages. This is an entirely false and untrue statement and a gross misrepresentation of scientific facts. Professor Sheldon the Chair of the NHS York Review published a public letter<sup>7</sup> in 2001 stating that the results of the review have been widely misrepresented by certain bodies in support of water fluoridation. Prof Sheldon stated categorically that:

“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 “ the review did not show water fluoridation to be safe”.

It is clearly evident therefore that the Irish Expert Body have inaccurately interpreted and continue to deliberately misrepresent scientific facts to suit their own goals in support of water fluoridation.

In regard to the Expert Body allegation that the author misrepresented the NRC Report. The NRC report did not have the objective of evaluating water fluoridation *per se* and did not have the original intent of examining data published on safety and effectiveness, or lack thereof, for water fluoridation levels at the widely used concentration of 1 ppm compared to lower levels.

However, it is false to claim the analysis and data reviewed only apply to persons exposed to concentrations far higher than used in water fluoridation. Much of the data in the NRC report published since 1993 were reviewed relevant to fluoridation, at 1 ppm, as controls to compare effects found at 2–4 ppm and higher.

It is also incorrect to claim that the NRC report only applied to natural fluoride in drinking water. Both natural and artificial fluoride in water were thoroughly investigated (NRC, 2006, pp. 14-15).

The committee intention was to mainly evaluate whether the EPA primary and secondary Maximum Contaminant Level interim assignments from 1984 were achieving their stated purpose in the U.S. NRC concluded

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<sup>7</sup> Professor Trevor A. Sheldon Head of Department Of Health Studies, York University, Chairman of the York Review. Appendix 2

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UNANIMOUSLY, that the MCL and SMCL must be lowered because current allowed levels are not protective of human health.

This is because of the widely and conclusively documented adverse pathology in those exposed to 2 and 4 ppm fluoride in water, compared to lower levels (NRC, 2006, p. 6). Vast data in the scientific literature, some reviewed in the NRC Report, prove that fluoride consumed long-term in humans at 1 ppm causes pathology.

In full agreement with the NRC committee consensus, the U.S. Health and Human Services recommended in January, 2012 that water fluoride levels not exceed 0.7 ppm fluoride as a temporary measure until official regulations can be established. The limit for Ireland is 0.8ppm.

The motivation for this change is the glaring fact that as of 2004, 41% of U.S. children aged 12-15 (similar to Ireland) have permanent abnormal tooth fluorosis. Further information is kindly provided in Appendix 3 by Dr. Richard Sauerheber (*B.A. Biology, Ph.D. Chemistry, University of California, San Diego, CA*) in his personal response to the Irish Expert Body's review of the Waugh Report.

Therefore it is clear once again that the Irish Expert Body have falsely accused the author of deliberately misrepresented scientific facts in this regard.

## **Contradictory Statements of Fact: Part 2**

### **Misrepresentation of WHO**

The Irish Expert Body on Fluorides and Health have stated in their appraisal of my report that the Author had made several misrepresentation of the views of the World Health Organisation.

It is important to note that there were in total over 1200 peer reviewed studies noted in the report. Despite the extensive reference by the author to WHO information in the Expert Body's appraisal of my report they were only able to provide two examples to support such a claim, both of these examples are addressed in detail here and demonstrate clearly that the Author did not misrepresent the WHO as was alleged by the Expert Body.

The Expert Body make reference to the report by the World health Organisation (WHO) titled Calcium and Magnesium in Drinking Water; Public Health Significance dated 2009 which was noted extensively in the report.

The goal of this report as stated by the WHO in the preface was to:

*“elucidate the role of drinking-water as a contributor to total daily intake of calcium and magnesium and to determine whether there is a plausible case that drinking-water could be an important health factor, especially for cardiovascular disease mortality, at least for people whose dietary intake is deficient in either of those nutrients.”*

The WHO continues in the preface of the report would that the goal was to:

*“provide background information on the scientific, nutritional and technological issues that were discussed by the meeting of experts and the symposium participants and that contributed to the report of the meeting of experts. Among the numerous issues addressed were the concentrations and distributions of minerals in drinking-water worldwide, nutritional requirements, biochemical and biomedical aspects of minerals in the body, technologies such as water softening and desalination that significantly alter the mineral composition of drinking-water, the desirability and feasibility of remineralization for stabilization and potential benefits, and the availability of information on water composition so that the public can make informed judgements with respect to their options for bottled water, softened water and naturally soft water.”*

The Introduction to the Expert Consensus of the report<sup>8</sup> begins with the following statement:

*“Both calcium and magnesium are essential to human health. Inadequate intake of either nutrient can impair health”.*

The WHO goes on to say that:

*“Individuals vary considerably in their needs for and consumption of these Elements. Available evidence suggests that, because of food habits, many people in most countries fail to obtain from their diets the recommended intakes of one or both of these nutrients.”*

The WHO continues<sup>9</sup> with:

*“while the concentrations of calcium and magnesium in drinking-water vary markedly from one supply to another” and note in particular how “water treatment processes can affect mineral concentrations and, hence, the total intake of calcium and magnesium for some individuals”*

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<sup>8</sup> World Health Organisation (WHO) document titled Calcium and magnesium in Drinking Water; Public Health significance 2009.

<sup>9</sup> Calcium and Magnesium in Drinking Water, Public Health Significance, World Health Organisation, 2009, Pages 1-2.

In section 1.2 of the report the WHO reports the following:

*“Over 99% of total body calcium is found in bones and teeth, where it functions as a key structural element. The remaining body calcium functions in metabolism, serving as a signal for vital physiological processes, including vascular contraction, blood clotting, muscle contraction and nerve transmission. Inadequate intakes of calcium have been associated with increased risks of osteoporosis, nephrolithiasis (kidney stones), colorectal cancer, hypertension and stroke, coronary artery disease, insulin resistance and obesity.”*

In Section 1.3 of the report the WHO report the following regarding Magnesium.

*“Magnesium is a cofactor for some 350 cellular enzymes, many of which are involved in energy metabolism. It is also involved in protein and nucleic acid synthesis and is needed for normal vascular tone and insulin sensitivity. **Low magnesium levels are associated with endothelial dysfunction, increased vascular reactions, elevated circulating levels of Creactive protein and decreased insulin sensitivity. Low magnesium status has been implicated in hypertension, coronary heart disease, type 2 diabetes mellitus and metabolic syndrome.**”*

And Section 8.1 the WHO report that

*“Calcium and magnesium play important roles in bone structure, muscle contraction, nerve impulse transmission, blood clotting and cell signalling.” And “It is clear that very large numbers of people consume levels of magnesium and calcium that are insufficient to support even the most conservative estimates of their physiological needs.”*

The WHO continues in Section 3.8 of the report by reporting:

*“**In some geographical areas, the magnesium and calcium contents of drinking waters (including tap and bottled waters) are extremely low and may provide little supplementation towards a person’s daily requirement. Physiologically, waterborne minerals are in ionic form, which tend to be easily absorbed by the human gastrointestinal tract; thus, water can be an important source of mineral intake.**”*

The importance of these facts were examined in some detail in Waugh's Report (for the first time in Ireland) given that large geographic areas of the country and their respective populations who consume low calcium and magnesium waters such as found in Counties Cork, Kerry, Mayo and Donegal, where the calcium levels may be as low as <20mg/L in comparison to other geographic areas in the country such as in the Leinster, where the calcium level may be in excess of 300mg/l in drinking water. Representing a very significant difference in water chemistry that would influence fluoride bioavailability and toxicity.

The bioavailability of calcium and magnesium were addressed by the WHO in their report when they stated that:

*"The bioavailability of calcium from water is likely to be influenced by the same factors that affect calcium bioavailability from food, which has been reviewed. The presence of anions in certain waters can influence the bioavailability of calcium from either water or other sources in the diet."*

Current scientific knowledge clearly accepts that Fluoride can and does influence the bioavailability of calcium in drinking water. The WHO report however did not however examine any of these matters in any detail. It is clear that nowhere in my report have any of these scientific facts been in any way misrepresented as alleged by the Expert Body on Fluoride and Health

Nevertheless the Irish Expert Body allege that my reporting is unreliable and unscientific because Dr Mullen's of the Expert Body claims I misrepresent the WHO in not stating the following section from their report:

*"Treatment and stabilization practices should ensure that the overall process does not significantly reduce total intake of nutrients such as calcium, magnesium, fluoride and others below recommended values. Based on local circumstances, water suppliers and public health authorities may wish to further modify final drinking-water composition in light of overall mineral nutrition"<sup>10</sup>*

This statement was not included in my report as it is **clearly incorrect and not scientifically accurate**.

Calcium and Magnesium are essential nutrients however it must be noted that fluoride is not a nutrient. This has been clearly stated as a scientific fact by the European Food Safety Authority<sup>11</sup> or other bodies.<sup>12</sup>

The issue of fluoride in drinking water was not discussed at all within the main WHO report; the only reference noted was in section 1.6 FLUORIDE IN REMINERALIZED DRINKING-WATER where the following text is provided.

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<sup>10</sup> Calcium and Magnesium in Drinking Water, Public Health Significance, World Health Organisation, 2009, Page 9.

<sup>11</sup> European Food safety authority, Opinion of the Scientific Panel on Dietetic Products, Nutrition and Allergies on a request from the Commission related to the Tolerable Upper Intake Level of Fluoride, (Request N° EFSA-Q-2003-018), (adopted on 22 February 2005), The EFSA Journal (2005) 192, 1-65

<sup>12</sup> Opinion of the EU Scientific Panel on Dietetic Products, Nutrition and Allergies related to the Tolerable Upper Intake Level of Fluoride, 2005

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*“The recommended value for artificial fluoridation of water supplies is generally between 0.5 and 1.0 mg/l and depends upon the volume of drinking water consumed daily and the uptake of and exposure to fluoride from other sources. The WHO drinking-water guideline value for fluoride is 1.5 mg/l. Where dental caries risk is high or increasing, authorities may consider addition of fluoride to the demineralized public water supply to between 0.5 and 1.0 mg/l, but other factors should also be considered. **In countries where dental health awareness in the public is very high and alternative vehicles for fluoride (e.g. fluoridated toothpaste) are widely available and widely used, a decision to not fluoridate the water would likely be of little consequence.** On the other hand, in developing and developed countries where public dental health awareness in some population groups (e.g. lower income) might be much lower, drinking water containing fluoride at concentrations of 0.5–1.0 mg/l would be important for dental health.”*

In examining this statement it is also important to note that the WHO have consistently and correctly stated in their *Drinking Water Guidelines* that

*“in the assessment of the safety of a water supply with respect to the fluoride concentration, the total daily fluoride intake by the individual must be considered.”*

The WHO Guidelines for Drinking Water similarly recommend that:

*“when setting national standards for fluoride that it is particularly important to consider volume of water intake and intake of fluoride from other sources.”*

Unfortunately as noted in the Authors main report these recommendation were not applied by the Health Authority or the Expert Body in Ireland when considering water fluoridation in Ireland.

Without following the WHO guidelines and recommendations the Expert Body continue to misrepresent the WHO recommendations by stating that the WHO have found fluoridation of drinking water to be safe in Ireland, without acknowledging that the WHO also clearly state that this cannot be found as fact unless the total daily fluoride intake by the individual is first considered.

The Irish Expert Body or HSE do not know what the total fluoride intake is of consumers in Ireland and have never undertaken a comprehensive dietary survey of foods, medication or beverages in this country.

The Expert Body have further failed to acknowledge the findings of both the WHO which found that subgroups of the population remain susceptible to the toxic effects of fluoride, even at relatively low concentrations.

What is at issue however, is that the Expert Body have alleged that by the Author referencing this document, with regard to the importance of calcium and magnesium in drinking water and its implications for human health, that he misrepresented the findings of the WHO. This WHO document was clearly not about fluoride at all and the only reference to fluoride was in regard to FLUORIDE IN REMINERALIZED DRINKING-WATER. Therefore it can be clearly seen that the allegation by the Expert Body is entirely false and misleading.

The WHO have elsewhere highlighted<sup>13</sup> that in countries where public dental awareness is very high and alternative vehicles for fluoride (e.g. fluoridated toothpaste) are widely available and widely used, public authorities do not fluoridate drinking water.

In Ireland fluoride intake is from **BOTH** water fluoridation and the use of fluoridated toothpaste, which were introduced into Ireland in the late 1960's after water fluoridation began.

What my report attempted to highlight was that through pursuing both public health policies, the HSE and Expert Body is placing a wide sector of society at risk from over-exposure to fluoride.

The Expert Body further alleged that I have misrepresented the WHO by referencing this statement.

*“Where the risk for skeletal and dental fluorosis is high as a consequence of excess fluoride intake from drinking water, fluoride levels in drinking-water should be reduced to safe levels, or a lower - fluoride source used, especially for young children.”*

This is in fact **a direct quotation** from the WHO report.<sup>14</sup> It does not in any way misrepresent what the WHO stated.

My contention was that given that dental fluorosis had now reached endemic proportions in Ireland with approximately forty percent of children now presenting with dental fluorosis and given that citizens in Ireland are exposed to fluoride systemically from fluoridated water in addition to fluoride based toothpastes and other dietary sources with high fluoride content such

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<sup>13</sup> Nutrients in Drinking Water, Water, Sanitation and Health Protection and the Human Environment World Health Organization, Geneva, 2005.

<sup>14</sup> Nutrients In Drinking Water, Potential Health Consequences Of Long-Term Consumption Of Demineralized, Remineralized And Altered Mineral Content Drinking Water, Expert Consensus, Meeting Group Report, WHO. Page 9.  
[http://www.who.int/water\\_sanitation\\_health/dwq/nutrientschap1.pdf](http://www.who.int/water_sanitation_health/dwq/nutrientschap1.pdf)

as teas, and the lack of available information on total fluoride dietary intakes in Ireland that it was time to reconsider the issue of water fluoridation.

How these facts can be presented by the Expert Body as a deliberate misrepresentation of scientific facts is clearly not factual or correct and without any basis.

It is important to note however this report<sup>15</sup> also noted that

*“Formula-fed infants are also a group at **risk** for excess intake of potentially toxic elements in **drinking water**.”*

It is a scientific fact that silicofluorides and fluoride are toxic substances. Fluoride has been shown to be toxic, not only to the skeletal tissues, but also to the non-skeletal tissues such as the brain, liver, pancreas, endocrines and the kidney.<sup>16,17</sup>

Fluoride is a neurotoxin and it makes a serious adverse impact on the developing brain.<sup>18,19</sup> Fluoride exerts its toxic effects on the brain by multiple mechanisms; the primary phenomenon which is involved in the neurotoxicity of fluoride appears to be oxidative stress.<sup>20</sup>

Importantly the report also stated<sup>21</sup> that

*“Consumption of moderately hard **water** containing typical amounts of calcium and magnesium may provide an important incremental percentage of the daily dietary requirement. Inadequate total dietary intakes of calcium and magnesium are common worldwide, therefore, an incremental contribution from **drinking water** can be an important supplement to approach more ideal total daily intakes. If low mineralized water were used for food and beverage production, reduced levels of Ca, Mg, and other essential elements would also occur in those products. Low intakes would*

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<sup>15</sup> Nutrients In Drinking Water, Potential Health Consequences Of Long-Term Consumption Of Demineralized, Remineralized And Altered Mineral Content Drinking Water, Expert Consensus, Meeting Group Report, WHO. Page 6.

[http://www.who.int/water\\_sanitation\\_health/dwq/nutrientschap1.pdf](http://www.who.int/water_sanitation_health/dwq/nutrientschap1.pdf)

<sup>16</sup> WHO. Fluorides and oral health. Technical Report Series-846. WHO, Geneva 1984.

<sup>17</sup> Zhavoronkov AA. Non-skeletal forms of fluorosis. Arch Pathol 1977; 39: 83-91.

<sup>18</sup> Spittle B. 2011. Neurotoxic effects of fluoride. Fluoride 44(3):117-124.

<sup>19</sup> P Grandjean, PJ Landrigan, Developmental neurotoxicity of industrial chemicals, The Lancet, Volume 368 November 8, 2006

<sup>20</sup> Shivarajashankara Y.M., Shivashankara A.R.. Neurotoxic Effects Of Fluoride In Endemic Skeletal Fluorosis And In Experimental Chronic Fluoride Toxicity. Journal of Clinical and Diagnostic Research [serial online] 2012 May [cited: 2012 Jun 13 ]; 6:740-744.

<sup>21</sup> Nutrients In Drinking Water, Potential Health Consequences Of Long-Term Consumption Of Demineralized, Remineralized And Altered Mineral Content Drinking Water, Expert Consensus, Meeting Group Report, WHO. Page 8.

[http://www.who.int/water\\_sanitation\\_health/dwq/nutrientschap1.pdf](http://www.who.int/water_sanitation_health/dwq/nutrientschap1.pdf)



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*occur not only because of the lower contribution of these minerals from water used in beverages, but also possibly because of higher losses of the minerals from food products (e.g., vegetables, cereals, potatoes or meat) into water during cooking”*

The report attempted to address some of these important issues and the interaction and bioavailability of fluoride in soft water given the large numbers of consumers who are provided with very low calcium and magnesium drinking water in Ireland. All of these matters have been dealt with scientifically and accurately within the report by the Author and in no way misrepresent scientific facts. Furthermore it should be noted that peer reviewed sources have been provided to support any claims within the report.

It is important to note the following information from the WHO which the Irish Expert Body has declined to acknowledge regarding the safety of Fluoride for all sectors of society, including sensitive subgroups of the population.

The WHO have clearly stated<sup>22</sup> that

*“Patients with kidney dysfunction may be particularly susceptible to fluoride toxicity.”*

And further the WHO has stated<sup>23</sup> that:

*“It is known that persons suffering from certain forms of renal impairment have a lower margin of safety for the effects of fluoride than the average person.”*

**Alarming there is no safety margin provided for the estimated 400,000 people in Ireland who suffer from diabetes within the population.**

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<sup>22</sup> International Programme on Chemical Safety. (1984). Environmental Health Criteria 36: Fluorine and Fluorides. Geneva, Switzerland: World Health Organization.

<sup>23</sup> WHO Fluoride in Drinking Water 2004

### Contradictory Statements of Fact: Part 3

#### SILICOFLUORIDE DISSOCIATION

As noted under the heading Alleged Toxicity of the Fluoridating Agent HFSA, Dr Mullen stated the following:

“The author (Waugh) repeatedly makes the point that the fluoridating agent hydrofluorosilicic acid (HFSA) has never been tested for toxicological effects on humans. He goes on to contend that there is a complex chemistry involved in the addition of HFSA to water and that this results in the creation of toxic by-products.

**We now know from the definite work on this carried out initially by Urbansky and Schock (2000) and developed by Finnelly (2006) that this theory has no balance. There is complete and rapid reaction between HFSA and water. The consumer is presented at the tap with fluoride, not with HFSA or other fluorosilicates. The Toxicology of HFSA is clearly not an issue of concern for the consumer as they do not come in contact with it.”**

This statement is entirely false and misleading. The 'definite' work of Urbansky and Schock described by Dr Mullen is not a peer reviewed scientific paper.

**If the Irish Expert body on Fluorides undertook their responsibilities properly and objectively they would have referenced the correct and only peer reviewed and 'definite' scientific paper by Urbansky on silicofluorides which was published in 2002.**

**This latter scientific paper correctly represents the official scientific position of the U.S EPA. It is obvious that Irish Expert Body on Fluorides did not reference this 'definite' peer reviewed scientific study as it entirely contradicts everything that the Irish Expert Body on Fluorides have stated, a fact that will be dealt with in greater detail later.** Why the Irish Expert body on Fluoride choose to ignore this particular study as well as many other credible scientific peer reviewed research studies raises the most serious questions of accountability for such a publicly funded body.

It represents the systematic and abject failure of the organisation to report science objectively and accurately and seriously jeopardises their scientific credibility.

**The report by Urbansky and Schock (2000) is a “work product” produced by the U.S. EPA detailing why the fluorosilicic acid (SiF) used for water fluoridation “almost completely” dissociates at 1 ppm F-. Why the Irish Expert Body on Fluoride and Health would refer to this as the definite work on fluoride is entirely incomprehensible. It is interesting to note, though not reported by the**

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Irish Expert Body, that in this report Urbansky and Schock found **that consumers are actually presented with “concentrations of hexafluorosilicic acid present in the gastrointestinal tract after consumption of fluoridated drinking water”**.

This fact was also noted<sup>24</sup> by the EU Scientific Committee on Health and Environmental Risks (SCHER), when it published its 'Opinion on critical review of any new evidence on the hazard profile, health effects, and human exposure to fluoride and the fluoridating agents of drinking water' – 16 May 2011.

This entirely contradicts what the Irish Expert Body have advised the HSE, Minister for Health and Elected Public Representatives and the public in general.

Following completion of this initial work in 2001, U.S. EPA research managers concluded it was necessary to clarify SiF dissociation. This was outlined in a letter<sup>25</sup> from the Director of the EPA Water Supply and Water Resources Division dated March 15, 2001 summarizing the position of the highest scientific authorities of the EPA reached in January 2001 which noted the following:

*“Several fluoride chemistry related research needs were identified including; (1) accurate and precise values for the stability constants of mixed fluorohydroxo complexes [read “silicofluoride dissociation residues”] with aluminum (III), iron (III) and other metal cations likely to be found under drinking water conditions and (2) a kinetic model for the dissociation and hydrolysis of fluosilicates and stepwise equilibrium constants for the partial hydrolysis products.”*

In this communication the EPA senior management admitted that they were not satisfied with assurances given by their own technical staff of the health and safety of SiFs on two counts:

- possible formation of toxic complexes with aluminium, iron and other cations commonly present in water plant water and
- potential toxic effects from SiF dissociation residues in municipal drinking water that may be present despite predictions made by EPA and others for SiF dissociation.

Following this in 2002, the U.S. EPA issued a “Request for Assistance,” (RFA) inviting research proposals on methods to detect and measure SiF dissociation products. For the benefit of prospective bidders Urbansky wrote

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<sup>24</sup> Scientific Committee on Health and Environmental Risks, SCHER, Critical review of any new evidence on the hazard profile, health effects, and human exposure to fluoride and the fluoridating agents of drinking water. May 2011, Page 11

<sup>25</sup> Letter dated March 15, 2001 from Sally C. Gutierrez, Director, Water Supply and Water Resources Division, US EPA National Risk Management Laboratory, to Roger D. Masters, Dartmouth College.

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an extensive peer reviewed published scientific paper of SiF dissociation studies (Urbansky 2002).<sup>26</sup>

In this extensive study Urbansky concluded that hydroxo-fluoro SiF derivatives could survive in drinking water, entirely contradicting what the Irish Expert body on Fluorides have advised the HSE and Minister for Health.

Urbansky wrote that *“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.”*

Importantly Urbansky further stated the following recommending that scientific authorities should cease using certain qualified expressions that remarkable the Irish Expert body On Fluoride still continue to use a decade later.:

*“it is probably best to **STOP** using qualified expressions such as ‘virtually complete’ or ‘essentially complete’ in favor of more rigorous and quantitative descriptions [of SiF dissociation] even if that hinders communication with the lay public.”*

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<sup>26</sup> Edward Todd Urbansky, Fate of Fluorosilicate Drinking Water Additives United States Environmental Protection Agency, Office of Research and Development, National Risk Management Research Laboratory, Water Supply and Water Resources Division, Received January 29, 2002, Chem. Rev. 2002, 102, 2837-2854.

Once again this entirely contradicts what the Irish Expert Body on Fluorides have advised the HSE and Minister for Health and Children where they continue to claim **complete** dissociation of hexafluorosilicic acid when added to drinking water.

Urbansky also raised concerns regarding the ability of current scientific instrumentation to accurately measure the presence of

*“fluorosilicates compounds that may be present in drinking water when he stated “Whether residual fluorosilicates or fluorosilicon(IV) complexes will be detectable with current instrumentation is debatable. Accordingly, there is a need for further study of heteroleptic fluoride complexes (especially with the common anions in drinking water) of aluminum(III) and possibly other metal cations.”*

Urbansky went on to say:

*“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. Table 6 lists species that may exist in fluoridated water systems.”*

**Table 6. Homoleptic and Heteroleptic Aquo-, Hydroxo-, Oxo-, and Fluorosilicate Species Proposed in, Reported in, or Inferred from the Literature (Gas Phase, Nonaqueous/Aqueous Liquid Phase, and/or Solid Phase)**

coordination number of the Si <sup>IV</sup> center	fluorosilicates	aquo/hydroxo /oxosilicates	aquo/hydroxo/ oxo/fluorosilicates
6	SiF <sub>6</sub> <sup>2-</sup> HSiF <sub>6</sub> <sup>-</sup>	Si(OH) <sub>4</sub> (H <sub>2</sub> O) <sub>2</sub>	SiF <sub>5</sub> (H <sub>2</sub> O) <sup>-</sup> SiF <sub>5</sub> (OH) <sup>2-</sup> SiF <sub>4</sub> (OH) <sub>2</sub> <sup>2-</sup> SiF <sub>4</sub> (H <sub>2</sub> O) <sub>2</sub> SiF(OH) <sub>2</sub> (H <sub>2</sub> O) <sub>3</sub> <sup>+</sup> SiF <sub>4</sub> (OH) <sup>-</sup>
5	SiF <sub>5</sub> <sup>-</sup> HSiF <sub>5</sub>	Si(OH) <sub>5</sub> <sup>-</sup>	
4	SiF <sub>4</sub>	Si(OH) <sub>4</sub> SiO(OH) <sub>3</sub> <sup>-</sup> SiO <sub>2</sub> (OH) <sub>2</sub> <sup>2-</sup>	SiF <sub>3</sub> (OH) SiF <sub>2</sub> (OH) <sub>2</sub> SiF(OH) <sub>3</sub>
3	none	SiO(OH) <sub>2</sub> SiO <sub>2</sub> (OH) <sup>-</sup>	Si(OH) <sub>2</sub> F <sup>+</sup>

Source: Fate of Fluorosilicate Drinking Water Additives, Chemical Reviews, 2002, Vol. 102, No. 8

The scientific facts regarding incomplete dissociation as noted by Urbansky are further supported by published peer reviewed research by Crosby (1969)<sup>27</sup>, Westendorf (1975)<sup>28</sup>, Busey et al (1980)<sup>29</sup> and Rajković et al (2007).<sup>30</sup> It

<sup>27</sup> Crosby NT; "Equilibria of Fluosilicate Solutions with Special Reference to The Fluoridation of Public Water Supplies"; *J Appl Chem*; v19; pp 100-102, 1969.

is evident that the Irish Expert Body does not acknowledge or accept the findings of any of this peer reviewed and published scientific research as it contradicts their stated opinions.

In regard to measuring such chemical species in drinking water Urbansky added:

*“Ideally, we would like to be able to measure or at least calculate the concentrations of those species that do exist and rule out those that do not. Accomplishing this will be no small task, **When metal cations are thrown into the mix (as would be the case in a real drinking water matrix), the problem becomes even more difficult.** In the meantime, we must try to make the best use of the information available to us and focus on the consistencies as well as what is unequivocally established as chemical fact.”*

Clearly the Irish Expert body on Fluoride do not agree and prefer to accept conjecture and untruths rather than established chemical and scientific facts.

Urbansky further noted that:

*“The kinetics of the dissociation and hydrolysis of hexafluorosilicate are poorly understood from a mechanistic or fundamental perspective. Most of the studies have been rather crude, simply adding a certain amount of the material to water (deionized) and waiting a set time. The analytical tools applied have not necessarily been chosen for their optimal performance on such a task. The stability of silicon tetrafluoride in water, the formation of aquo (or other) adducts, and the rate of SiF<sub>4</sub> hydrolysis have been studied in a very cursory fashion and barely at all. Accelerative effects expected from various metal cations or hydrogen ion have not been fully probed.”*

Finally Urbansky noted that:

*“natural waters contain a number of metallic cations that can be ligated by fluoride. **Fluoride binds to** trivalent metal cations, such as iron(III) and aluminum, as well as divalent metal cations, such as **calcium and magnesium.**”*

The interaction of fluoride with calcium was examined in some detail within the report *Human toxicity, Environmental Impact and Legal implications of Water fluoridation.*

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<sup>28</sup> Westendorf J, The Kinetics of Acetylcholinesterase Inhibition and the Influence of Fluoride and Fluoride Complexes on the Permeability of Erythrocyte Membranes, Dissertation to receive Ph.D. in Chemistry from the University of Hamburg, 1975.

<sup>29</sup> Busey RH et al; "Fluosilicate Equilibria in Sodium Chloride Solutions from 0 to 60 ° C"; Inorg. Chem V 19; pp 758-761, 1980.

<sup>30</sup> M. B. Rajković and Ivana D. Novaković. Determination Of Fluoride Content In Drinking Water And Tea Infusions Using Fluoride Ion Selective Electrode. Journal of Agricultural Sciences Vol. 52, No 2, 2007, Pages 155-168

**Astonishingly the Irish Expert Body without providing any scientific evidence or published scientific studies, have stated that any such 'theories' on fluorides effect on calcium are, in their opinion, 'conjecture and untruths'.** This is a very serious accusation and requires a detailed response which will be addressed later in this report.

The interaction of fluoride with aluminium is also examined with in some detail within this report. It is now well documented that toxicity of aluminium is potentiated by fluoride which promotes its absorption in the gastrointestinal tract and accumulation in bone.<sup>31</sup>

In regard to fluoride complexes present in drinking water Urbansky (2002) noted that in artificially fluoridated drinking water:

*“much of the fluoride is in fact present as metal complexes, depending on the concentrations of the metal cations, the fluoride anion, and the hydrogen ion.”*

This is important as such complexes would not show up in current standard laboratory measurements where Ion chromatography is used for the measurement of fluoride levels in treated drinking water. Current Ion chromatography methods used for the measurement of fluoride in drinking water do not measure total fluoride levels but rather measure free fluoride levels in water, the measured fluoride level could therefore significantly underestimate the true concentration of fluoride that consumers are exposed to when they consume artificially fluoridated water.

Current scientific knowledge clearly shows that Fluorosilicates are emphatically not identical to 'fluorides' yet this argument continues to be used to mislead the public into believing that fluorosilicates are chemically interchangeable with true fluorides, and that adding fluorosilicate to drinking water is merely a 'topping up' process to augment fluoride concentrations below the 'optimal' level for preventing tooth decay.<sup>32</sup>

The dissociation, bioavailability and potential toxicity of silicofluoride and fluoride compounds must be examined not just in light of normal pH of water. At the acidity of the human stomach - pH 2 to 3 the proportion of fluorine atoms that are present as fluoride ions changes dramatically<sup>33</sup>, at pH 3, 50% of fluoride is in the form of Hydrofluoric acid, the remainder being free fluoride or fluoride complexes.

**Urbansky himself reported in his study<sup>34</sup> that the hexafluorosilicate anion is most stable around pH 2.6, the acidity level found in the human stomach.**

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<sup>31</sup> Dai GY, Gai OH, Zhou LY, Wei ZD, Zhang H. Experimental study of combined effect with fluoride and aluminium. Proceedings of the XXth Conference of the International Society for Fluoride Research; 1994; Beijing, China.

<sup>32</sup> R.D.Masters, M,J,Coplan, B.T.Hone, J.E. Dykes, Association of silicofluoride treated water with elevated blood lead. Neurotoxicology 21 (6) 1091-1100, 2000.

<sup>33</sup> R.D.Masters, M,J,Coplan, B.T.Hone, J.E. Dykes, Association of silicofluoride treated water with elevated blood lead. Neurotoxicology 21 (6) 1091-1100, 2000.

<sup>34</sup> Edward Todd Urbansky, Fate of Fluorosilicate Drinking Water Additives 2002, Chem. Rev. 2002, 102, 2837-2854.

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It is also now hypothesized that incomplete dissociated SiF residues may re-associate both at intra-gastric pH around 2.0<sup>35</sup> (thereby exposing the consumer to toxic harm) and during food preparation (low pH soft drinks) producing SiF species including silicon tetrafluoride, (SiF<sub>4</sub>), a known toxin.<sup>36,37,38,39,40,41</sup> It is also believed that commercial SiFs are likely to be contaminated with fluosiloxanes.<sup>42</sup>

Both Urbansky (2002) and Morris (2004)<sup>43</sup> indicate that at pH < 5, silicofluoride (SiF<sub>6</sub><sup>2-</sup>) would be present, so it seems reasonable to expect that some SiF<sub>6</sub><sup>2-</sup> would be present in acidic beverages such as soft drinks (i.e. Coke, Pepsi and 7Up have a pH < 3; most fruit drinks have a pH < 4).

As noted by the National Research Council<sup>44</sup> of the Academy of Sciences, Medicine and Engineering of the United States of America, consumption rates of these beverages are high for many people, and therefore the possibility of biological effects of SiF<sub>6</sub><sup>2-</sup>, as opposed to free fluoride ion, should be examined.

However as noted in the report by Waugh in his report no toxicological studies have ever been undertaken to examine the toxicity of silicofluorides on human health.

What has been presented herein are the established facts and current worldwide knowledge regarding silicofluorides and drinking water. There is a very obvious gap in knowledge between the established science and what the Irish Expert Body on Fluorides present to the Department of Health, the Government of Ireland, elected public representatives and the public at large.

<sup>35</sup> Ciavatta L, et al; "Fluorosilicate Equilibria in Acid Solution"; Polyhedron Vol 7 (18);1773-79;1988

<sup>36</sup> Gabovich RD; "Fluorine in Stomatology and Hygiene"; translated from the original Russian and published in Kazan (USSR); printed by the US Govt Printing Office on behalf of the Dept of Health Education and Welfare. US Public Health Service, National Institute of Dental Health; DHEW pub no (NIH) 78-785, 1977.

<sup>37</sup> Roholm K; "Fluorine Intoxication; A Clinical-Hygiene Study"; H. K. Lewis & Co. Ltd, London; 1937.

<sup>38</sup> Lewis RJ, jr.; "Hazardous Chemicals Desk Reference": Van Nostrand Reinhold; Fourth Edition.

<sup>39</sup> Matheson Gas Products; 30 Seaview Drive, Secaucus, NJ; "Effects of Exposure to Toxic Gases" and MSDS for CAS # 7783-61-1; created 1/24/89.

<sup>40</sup> Voltaix, Inc.; Material Safety Data Sheet for Silicon Tetrafluoride (SiF<sub>4</sub>).

<sup>41</sup> Romyantseva GI et al; "Experimental Investigation of The Toxic Properties of Silicon Tetrafluoride"; *Gig Sanit* ;(5):31-33, 1991.

<sup>42</sup> Ricks GM et al; "The Possible Formation of Hydrogen Fluoride from the Reaction of Silicon Tetrafluoride with Humid Air"; *Am. Ind. Hyg. Assoc. J.* (54); 272-276, 1993.

<sup>43</sup> Morris, M.D. 2004. The Chemistry of Fluorosilicate Hydrolysis in Municipal Water Supplies. A Review of the Literature and a Summary of University of Michigan Studies. Report to the National Academy of Science, by M.D. Morris, University of Michigan, Ann Arbor, MI. January 23, 2004.

<sup>44</sup> USA National Research Council, Fluoride in Drinking Water: A Scientific Review of EPA's Standards, Committee on Fluoride in Drinking Water, (2006), Page 53.



## Contradictory Statements of Fact: Part 3 Continued

### SILICOFLUORIDE DISSOCIATION

In regard to the second report referenced as Finney 2006<sup>45</sup> and noted by the Irish Expert Body as 'definite work' disproving the theory of complex silicofluoride reactions in drinking water, this work was funded pursuant to the EPA 2002 RFA cited previously. The aim was to find better ways to quantify SiF dissociation end-products and possibly to challenge Westendorf<sup>46</sup> results which showed incomplete dissociation (67%) of silicofluoride acids in water and furthermore to attempt to disprove his findings that SiF residues caused inhibition of the enzyme acetylcholinesterase (AChE).

The EPA contracted for work to be performed in the laboratory of an expert in Raman spectroscopy, but the published report does not mention the use of Raman spectroscopy. Instead, <sup>19</sup>F NMR spectroscopy was employed, but this methodology could not detect SiF hydrolysis intermediates because SA oligomers formed and interfered with the measurement.

Finney reported that

*“while our results at low pH values (<3.5) are in good agreement with previous studies and **confirm the presence of a hydrolysis intermediate consistent with the pentafluorosilicate ion**, very different results were obtained from investigation of solutions at pH 4 or higher.”*

What the Irish Expert Body have not reported or acknowledged is that Finney's limited and incomplete research found an intermediate silicofluoride ion present in water, a fact that contradicts the very foundation of their argument.

Finney/Morris had an easier way to refute Westendorf.<sup>47</sup> As reported by Masters et al. they could have tried his way of measuring F<sup>-</sup> released by [SiF<sub>6</sub>]<sup>2-</sup> without the use of TISAB to see whether 67% dissociation was correct or not. They didn't, but in the course of their NMR experiments, they had

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<sup>45</sup> Finney WF, Wilson E, Callender A, Morris MD, Beck LW. 2006 Reexamination of hexafluorosilicate hydrolysis by <sup>19</sup>F NMR and pH measurement. Environmental science & technology ;40:2572-7.

<sup>46</sup> Westendorf, J. 1975. The Kinetics of Acetylcholinesterase Inhibition and the Influence of Fluoride and Fluoride Complexes on the Permeability of Erythrocyte Membranes [in German]. Ph.D. Thesis, University of Hamburg, Hamburg, Germany (as cited in Masters et al. 2000).

<sup>47</sup> Coplan J, Masters R, Patch S, Bachman M, Confirmation of And Explanations for Elevated Blood Lead And Other Disorders in Children Exposed to Water Disinfection and Fluoridation Chemicals, NeuroToxicology 28 (2007) 1032–1042

inadvertently confirmed the formation of SA oligomers during  $[\text{SiF}_6]^{2-}$  dissociation. In presenting their results Finney

- (a) miss-interpreted Westendorf's experimental results;
- (b) didn't try to measure free  $\text{F}^-$  by ISE without TISAB to break up fluoride complexes, as Westendorf did;
- (c) didn't measure SiF derivatives by Raman spectroscopy;
- (d) tried NMR spectroscopy without success; and
- (e) measured pH as a secondary attribute of SiF dissociation, producing data that do not support their claims about AChE inhibition.

Despite the evidence to the contrary, the Irish Expert Body have somehow presented this work as conclusively demonstrating that there are no complex reactions in the dissociation of silicofluoride acid in drinking water and no intermediate compounds that humans could come in contact with. This itself as has been demonstrated here is a grossly inaccurate representation of scientific facts.

## Contradictory Statements of Fact: Part 4

### FLUORIDE INTERACTION WITH CALCIUM

**The Irish Expert Body on Fluorides, have stated that any 'theories' presented by Waugh in his report examining fluoride and its effect on calcium are in their opinion conjecture and untruths. They have provided no evidence or scientific studies to support such claims. Accordingly I have referenced and quoted here some of the scientific published facts demonstrating the effect of fluoride on calcium in humans. I challenge the Irish Expert body on Fluoride to dispute these published findings.**

It has been well documented by the most authoritative peer reviewed scientists<sup>48</sup> that:

*“Fluoride clearly has the effect of decreasing serum calcium and increasing the calcium requirement in some or many exposed persons.”*

For the Expert Body to suggest that the injection of silicofluorides into soft water with a calcium level of < 20ppm will have the same bioavailability and effect on humans as that for hard water with a calcium level of 250-350ppm is profoundly inaccurate and unscientific. This matter was discussed in some detail in the Waugh report. No studies have ever been undertaken in Ireland to examine the bioavailability of fluoride in natural waters of various hardness.

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<sup>48</sup> USA National Research Council, Fluoride in Drinking Water: A Scientific Review of EPA's Standards, Committee on Fluoride in Drinking Water, (2006), Page 251

Fluoride interaction with calcium was noted by Masters et al<sup>49</sup> when they reported that

*“apart from the possibility of direct toxicity the dissociated fluoride ions is known to bind calcium. If diets are low in calcium the products of silicofluoride dissociation can exacerbate the competition between calcium and lead for bone and soft tissue sites.”*

It is widely known that dietary calcium severely restricts fluoride assimilation from the GI tract into the bloodstream.<sup>50,51</sup> That is to say diets high in calcium lower blood plasma fluoride levels from drinking fluoride water. In the same manner it is now known that diets low in calcium enhances the effects of fluoride on total plasma calcium.<sup>52,53,54,55</sup>

Teotia et al.<sup>56</sup> reported that fluoride appears to exaggerate the metabolic effects of calcium deficiency on bone.

The work of Tiwari et al.<sup>57</sup> provides an initial description of a mechanism by which fluoride exposure in the presence of a calcium deficiency further increases the dietary requirement for calcium, namely by altering the expression of genes necessary for calcium absorption from the gastrointestinal tract.

The indirect action of fluoride induces a net increase in bone formation<sup>58</sup> and also decreases calcium absorption from the gastrointestinal tract<sup>59,60,61</sup> both of

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<sup>49</sup> R.D.Masters, M.J.Coplan, B.T.Hone, J.E. Dykes, Association of silicofluoride treated water with elevated blood lead. *Neurotoxicology* 21(6) 1091-1100, 2000.

<sup>50</sup> USA National Research Council, Fluoride in Drinking Water: A Scientific Review of EPA's Standards, Committee on Fluoride in Drinking Water, (2006)

<sup>51</sup> Whitford. G.M, Effects of plasma fluoride and dietary calcium concentrations. *Calcified Tissue International*, Volume 54, Number 5 (1994), 421-425,

<sup>52</sup> M. Joost Larsen, A. Richards and O. Fejerskov, *Calcified Tissue International* Volume 33, Number 1 (1981), 541-544, DOI: 10.1007/BF02409486

<sup>53</sup> Teotia, M., S.P. Teotia, and K.P. Singh. 1998. Endemic chronic fluoride toxicity and dietary calcium deficiency interaction syndromes of metabolic bone disease and deformities in India: Year 2000. *Indian J. Pediatr.* 65(3):371-381.

<sup>54</sup> Gupta, S.K., T.I. Khan, R.C. Gupta, A.B. Gupta, K.C. Gupta, P. Jain, and A. Gupta. 2001. Compensatory hyperparathyroidism following high fluoride ingestion—a clinico-Biochemical correlation. *Indian Pediatr.* 38(2):139-146.

<sup>55</sup> Krishnamachari, K.A. 1986. Skeletal fluorosis in humans: A review of recent progress in the understanding of the disease. *Prog. Food Nutr. Sci.* 10(3-4):279-314.

<sup>56</sup> Rosenquist, J.B., P.R. Lorentzon, and L.L. Boquist. 1983. Effect of fluoride on parathyroid activity of normal and calcium-deficient rats. *Calcif. Tissue Int.* 35(4-5):533-537.

<sup>57</sup> Tiwari, S., S.K. Gupta, K. Kumar, R. Trivedi, and M.M. Godbole. 2004. Simultaneous exposure of excess fluoride and calcium deficiency alters VDR, CaR, and Calbindin D 9 k mRNA levels in rat duodenal mucosa. *Calcif. Tissue Int.* 75(4):313-320.

<sup>58</sup> Chavassieux, P., P. Pastoureaux, G. Boivin, M.C. Chapuy, P.D. Delmas, and P.J. Meunier. 1991. Dose effects on ewe bone remodeling of short-term sodium fluoride administration—a histomorphometric and biochemical study. *Bone* 12(6):421-427.

<sup>59</sup> Krishnamachari, K.A. 1986. Skeletal fluorosis in humans: A review of recent progress in the understanding of the disease. *Prog. Food Nutr. Sci.* 10(3-4):279-314.

<sup>60</sup> Stamp, T.C., M.V. Jenkins, N. Loveridge, P.W. Saphier, M. Katakity, and S.E.

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these effects lead to an increase in the body's calcium requirement.<sup>62, 63</sup> If dietary calcium is inadequate to support the increased requirement, the response is an increase in secondary hyperparathyroidism.<sup>64</sup> This view is supported by Krishnamachari in his review<sup>65</sup> when he found that In the presence of inadequate calcium, fluoride directly or indirectly stimulates the parathyroid glands, causing secondary hyperparathyroidism leading to bone loss.

It is also now known that secondary hyperparathyroidism in response to calcium deficiency may contribute to a number of diseases, including osteoporosis, hypertension, arteriosclerosis, degenerative neurological diseases, diabetes mellitus, some forms of muscular dystrophy, and colorectal carcinoma.<sup>66</sup>

It is also further known that calcium deficiency induced or exacerbated by fluoride exposure may contribute to other adverse health effects.<sup>67</sup> For example, Goyer<sup>68</sup> indicates that low dietary calcium increases the concentration of lead in critical organs and the consequent toxicity.

A recent increase in the number of cases of nutritional rickets in the United States appears to suggest the possibility that fluoride exposure, together with increasingly calcium-deficient diets, could have an adverse impact on the health of some individuals.<sup>69</sup>

Fluoride has been implicated in disturbing the functionality of calcium, both directly<sup>70</sup> and indirectly in interaction with Vitamin D.<sup>71</sup> Ahmad and

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MacArthur. 1988. Fluoride therapy in osteoporosis: Acute effects on parathyroid and mineral homeostasis. *Clin. Sci.* 75(2):143-146.

<sup>61</sup> Ekambaram, P., and V. Paul. 2001. Calcium preventing locomotor behavioral and dental toxicities of fluoride by decreasing serum fluoride level in rats. *Environ. Toxicol. Pharmacol.* 9(4):141-146

<sup>62</sup> Pettifor, J.M., C.M. Schnitzler, F.P. Ross, and G.P. Moodley. 1989. Endemic skeletal fluorosis in children: Hypocalcemia and the presence of renal resistance to parathyroid hormone. *Bone Miner.* 7(3):275-288.

<sup>63</sup> Ekambaram, P., and V. Paul. 2001. Calcium preventing locomotor behavioral and dental toxicities of fluoride by decreasing serum fluoride level in rats. *Environ. Toxicol. Pharmacol.* 9(4):141-146

<sup>64</sup> USA National Research Council, Fluoride in Drinking Water: A Scientific Review of EPA's Standards, Committee on Fluoride in Drinking Water, (2006), Page 250

<sup>65</sup> Krishnamachari, K.A. 1986. Skeletal fluorosis in humans: A review of recent progress in the understanding of the disease. *Prog. Food Nutr. Sci.* 10(3-4):279-314.

<sup>66</sup> Fujita, T., and G.M. Palmieri. 2000. Calcium paradox disease: Calcium deficiency prompting secondary hyperparathyroidism and cellular calcium overload. *J. Bone Miner. Metab.* 18(3):109-125.

<sup>67</sup> USA National Research Council, Fluoride in Drinking Water: A Scientific Review of EPA's Standards, Committee on Fluoride in Drinking Water, (2006), Page 251

<sup>68</sup> Goyer, R.A. 1995. Nutrition and metal toxicity. *Am. J. Clin. Nutr.* 61(3 Suppl.):646S

<sup>69</sup> DeLucia, M.C., M.E. Mitnick, and T.O. Carpenter. 2003. Nutritional rickets with normal circulating 25-hydroxyvitamin D: A call for reexamining the role of dietary calcium intake in North American infants. *J. Clin. Endocrinol. Metab.* 88(8):3539-3545.

<sup>70</sup> ATSDR, Toxicological Profile for fluorides, Hydrogen Fluoride, and Fluorine (F) Wastington: US. Department of Health and Human Services (TP-91/17), 1993

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Hammond<sup>72</sup> found that any cause of hypocalcemia or vitamin D deficiency can lead to secondary hyperparathyroidism (elevated PTH) in an attempt by the body to maintain calcium homeostasis.

It is apparent however that the Irish Expert Body on Fluoride refuse to even acknowledge that any of this peer reviewed research exists and instead remarkably believe that the effect of fluorides on calcium are based on conjecture and untruths. Clearly this is both incorrect and a complete misrepresentation of scientific facts.

As noted in the report titled *Human Toxicity, Environmental Impact and Legal Implications of Water Fluoridation* the interaction of fluoride and calcium is matter of some concern to the British Medical Research Council who believe that:

*“the question of the bioavailability of ingested fluoride is important, especially with respect to the possible influence of water hardness on uptake and differences between naturally fluoridated and artificially fluoridated water.”*<sup>73</sup>

The British Medical Research Council has also stated that:

*“a major area of uncertainty concerns the bioavailability of fluoride. This is particularly important with respect to the possible differential absorption of fluoride from naturally and artificially fluoridated water and the role of water hardness (calcium levels).”*<sup>74</sup>

The British Medical Research Council has further stated<sup>75</sup> in this regard that:

*“If the bioavailability of ingested fluoride can vary significantly, this might need to be taken into account in the interpretation of epidemiological studies.”*

As noted in the report titled *Human Toxicity, Environmental Impact and Legal Implications of Water Fluoridation* no such studies have ever taken place in Ireland. However a recently published study<sup>76</sup> found that the prevalence of hypothyroidism in women was twice the national average in one geographic

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<sup>71</sup> Bayley TA, Harrison JE, Murra VM, Josse RG, Sturtridge w, Pritzker KP, Strauss a, Vieth R, Goodwin s. Fluoride-induced fractures: Relation to osteogenic effect: J Bone Miner Res. 1990 Mar; 5 Suppl 1:S217-22.

<sup>72</sup> Ahmad, R., and J.M. Hammond. 2004. Primary, secondary, and tertiary hyperparathyroidism. Otolaryngol. Clin. N. Am. 37(4):701-713.

<sup>73</sup> UK Medical Research Council Working Group Report: Water Fluoridation and Health, September 2002, Page 11.

<sup>74</sup> UK Medical Research Council Working Group Report: Water Fluoridation and Health, September 2002, Page 15.

<sup>75</sup> UK Medical Research Council Working Group Report: Water Fluoridation and Health, September 2002, Page 11.

<sup>76</sup> Bonar BD, McColgan B, Smith DF, Darke C, Guttridge MG, Williams H, Smyth PP. Hypothyroidism and aging: the Rosses' survey. Thyroid. 2000 Sep;10(9):821-7.

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area in Ireland where the drinking water is soft with low calcium concentrations and artificially fluoridated, thereby increasing the bioavailability and toxicity of fluoride compounds in consumers.

The potential of silicofluoride and fluoride compounds to influence subclinical hypothyroidism cannot be overestimated. In humans, effects on thyroid function were associated with fluoride exposures of 0.05-0.13 mg/kg/day when iodine intake was adequate and 0.01-0.03 mg/kg/day when iodine intake was inadequate.<sup>77</sup> These ranges are well within the exposure levels experienced by the general public in Ireland. Therefore it is a scientific fact that fluoride exposure of sensitive subgroups of the population will clearly impact on the thyroid function of some consumers.

Subclinical hypothyroidism is considered a strong risk factor for later development of overt hypothyroidism<sup>78, 79, 80</sup> associate subclinical thyroid dysfunction with changes in cardiac function and corresponding increased risks of heart disease. Subclinical hyperthyroidism can cause bone demineralization, especially in postmenopausal women, while subclinical hypothyroidism is associated with increased cholesterol concentrations increased incidence of depression, diminished response to standard psychiatric treatment, cognitive dysfunction, and, in pregnant women, decreased IQ of their offspring<sup>81, 82</sup> Furthermore Klein et al. <sup>83</sup>reported an inverse correlation between severity of maternal hypothyroidism (subclinical or asymptomatic) and the IQ of the offspring.

Numerous scientists including Hinrichs (1966)<sup>84</sup>; Silverman (1971)<sup>85</sup> Biggerstaff and Rose (1979)<sup>86</sup>; Noren and Alm (1983)<sup>87</sup>; Loevy et al. (1987)<sup>88</sup>; Bhat and

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<sup>77</sup> USA National Research Council, Fluoride in Drinking Water: A Scientific Review of EPA's Standards, Committee on Fluoride in Drinking Water, (2006), Page 263

<sup>78</sup> Weetman, A.P. 1997. Hypothyroidism: Screening and subclinical disease. *Br. Med. J.* 314(7088): 1175-1178.

<sup>79</sup> Helfand, M. 2004. Screening for subclinical thyroid dysfunction in nonpregnant adults: A summary of the evidence for the U.S. Preventive Services Task Force. *Ann. Intern. Med.* 140(2):128-141.

<sup>80</sup> Biondi, B., E.A. Palmieri, G. Lombardi, and S. Fazio. 2002. Effects of subclinical thyroid dysfunction on the heart. *Ann. Intern. Med.* 137(11):904-914.

<sup>81</sup> Gold, M.S., A.L. Pottash, and I. Extein. 1981. Hypothyroidism and depression. Evidence from complete thyroid function evaluation. *JAMA* 245(19):1919-1922.

<sup>82</sup> Brucker-Davis, F., K. Thayer, and T. Colborn. 2001. Significant effects of mild endogenous hormonal changes in humans: Considerations for low-dose testing. *Environ. Health Perspect.* 109(Suppl. 1):21-26.

<sup>83</sup> Klein, R.Z., J.D. Sargent, P.R. Larsen, S.E. Waisbren, J.E. Haddow, and M.L. Mitchell. 2001. Relation of severity of maternal hypothyroidism to cognitive development of offspring. *J. Med. Screen.* 8(1):18-20.

<sup>84</sup> Hinrichs, E.H., Jr. 1966. Dental changes in juvenile hypothyroidism. *J. Dent. Child.* 33(3): 167-173.

<sup>85</sup> Silverman, S., Jr. 1971. Oral changes in metabolic diseases. *Postgrad. Med.* 49(1):106-110.

<sup>86</sup> Biggerstaff, R.H., and J.C. Rose. 1979. The effects of induced prenatal hypothyroidism on lamb mandibular third primary molars. *Am. J. Phys. Anthropol.* 50(3):357-362.

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Nelson (1989)<sup>89</sup>; Mg'ang'a and Chindia (1990)<sup>90</sup>; Pirinen (1995)<sup>91</sup>; Larsen and Davies (2002)<sup>92</sup>; Hirayama et al. (2003)<sup>93</sup>; Ionescu et al. (2004)<sup>94</sup>. have reported delayed eruption of teeth, enamel defects, or both, in cases of congenital or juvenile hypothyroidism.

The effect of fluoride on the delayed eruption of teeth is a well established fact, simply put, the teeth of babies who are bottle fed with formula made up with fluoride erupt later than normal breast fed babies.

This was scientifically reported as far back as 1961 by Dr. Feltman in the *Journal of Dental Medicine*<sup>95</sup> who noted that the delay in the eruption of teeth in babies may be due to hypothyroidism.

While all of this information noted above is from peer reviewed scientific publications and is reported accurately, the Irish Expert Body chose to ignore this science entirely as if it actually doesn't exist or were never published.

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<sup>87</sup> Noren, J.G., and J. Alm. 1983. Congenital hypothyroidism and changes in the enamel of deciduous teeth. *Acta Paediatr. Scand.* 72(4):485-489.

<sup>88</sup> Loevy, H.T., H. Aduss, and I.M. Rosenthal. 1987. Tooth eruption and craniofacial development in congenital hypothyroidism: Report of case. *J. Am. Dent. Assoc.* 115(3):429-431.

<sup>89</sup> Bhat, M., and K.B. Nelson. 1989. Developmental enamel defects in primary teeth in children with cerebral palsy, mental retardation, or hearing defects: A review. *Adv. Dent. Res.* 3(2):132-142.

<sup>90</sup> Mg'ang'a, P.M., and M.L. Chindia. 1990. Dental and skeletal changes in juvenile hypothyroidism following treatment: Case report. *Odontostomatol. Trop.* 13(1):25-27.

<sup>91</sup> Pirinen, S. 1995. Endocrine regulation of craniofacial growth. *Acta Odontol. Scand.* 53(3): 179-185.

<sup>92</sup> Larsen, P.R., and T.F. Davies. 2002. Hypothyroidism and thyroiditis. Pp. 423-455 in *Williams Textbook of Endocrinology*, 10th Ed., P.R. Larsen, H.M. Kronenberg, S. Melmed, and K.S. Polonsky, eds. Philadelphia, PA: Saunders.

<sup>93</sup> Hirayama, T., K. Niho, O. Fujino, and M. Murakami. 2003. The longitudinal course of two cases with cretinism diagnosed after adolescence. *J. Nippon Med. Sch.* 70(2):175-178.

<sup>94</sup> Ionescu, O., E. Sonnet, N. Roudaut, F. PreÅldine-Hug, and V. Kerlan. 2004. Oral manifestations of endocrine dysfunction [in French]. *Ann. Endocrinol. (Paris)* 65(5):459-465.

<sup>95</sup> Feltman R, Kosel G. (1961). Prenatal and postnatal ingestion of fluorides - Fourteen years of investigation - Final report. *Journal of Dental Medicine* 16: 190-99.

## Contradictory Statements of Fact: Part 5

### RISK TO BABIES

The Irish Expert Body on Fluorides and Health states that there is no evidence to show a health risk to babies of any age from consumption of fluoride in infant formula, water or foods at the levels of fluoride observed in Ireland. Thus, all intake levels of fluoride consumed by infants in Ireland are considered safe.

Yet the conclusion of a Food Safety Authority of Ireland risk assessment, published in 2002, which was accepted by Irish Expert body specifically noted the risk of risk dental fluorosis in formula-fed infants aged 0-4 months from consumption of formula milk constituted with fluoridated water.

In this regard it is astonishing that the Irish Expert Body on Fluoride has failed to act to protect the most vulnerable in our society, newborn babies.

Ireland has the lowest prevalence of breast feeding in the World with approximately 35% of mothers breastfeeding compared to 95% in Singapore or 75% in most mainland European countries. Less than 25% of mothers in Ireland still breastfeed their babies beyond 3 months of age. In comparison in Norway, for instance, the prevalence of breastfeeding at 3 months rose from only 25–30% in 1969 to around 80% in 1985).<sup>96</sup>

This represents one of the greatest failures of the Irish Health care system. It also represents an abject failure of any preventative health policy to reduce dental fluorosis, childhood obesity, diabetes and other diseases which are now at epidemic levels in Ireland and are all linked to formula fed infant food. For infants, not being breastfed is associated with an increased incidence of infectious morbidity, as well as elevated risks of childhood obesity, type 1 and type 2 diabetes, leukaemia, and sudden infant death syndrome.<sup>97,98,99,100</sup>

Since no neurological or toxicological studies have been undertaken on the effect of overexposure of infants to silicofluorides and fluoride compounds in the early and most critical development stage of their life there is no evidence to demonstrate effectively that fluoride exposure is not contributing to the incidence of such disease or mortality noted above. Rather the lack of scientific study and available evidence is presented by the Irish Expert Body on Fluorides as demonstrating the safety of water fluoridation for infants.

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<sup>96</sup> HEIBERG ENDERSEN, E. & HELSING, E. Changes in breastfeeding practices in Norwegian maternity wards: national surveys 1973, 1982 and 1991. *Acta paediatrica*, 84: 719–724 (1995).

<sup>97</sup> Ip S, Chung M, Raman G, et al. Breastfeeding and maternal and infant health outcomes in developed countries. *Evid Rep Technol Assess (Full Rep)* 2007;153:1–186.

<sup>98</sup> Horta BL, Bahl R, Martinés JC, et al. Evidence on the long-term effects of breastfeeding: systematic review and meta-analyses. Geneva: World Health Organization; 2007. pp. 1–57.

<sup>99</sup> Harder T, Bergmann R, Kallischnigg G, et al. Duration of breastfeeding and risk of overweight: a meta-analysis. *Am J Epidemiol.* 2005;162:397–403

<sup>100</sup> Alison Stuebe, MD, The Risks of Not Breastfeeding for Mothers and Infants, *Rev Obstet Gynecol.* 2009 Fall; 2(4): 222–231.



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In examining the limited evidence available demonstrating harm to infants from overexposure to fluorides the Irish Expert body on Fluoride and health have failed to acknowledge or report the published concerns of the:

- American Dental Association (ADA),
- Canadian Dental Association (CDA),
- United States Centre for Disease Control (CDC),
- United States Academy of General Dentistry (AGD),
- American Academy of Paediatrics (AAP) and the
- Canadian Paediatrics Society (CPS)

who have all advised the public and parents that fluoridated water should not be mixed with concentrated formula or foods intended for babies. This advice was also provided by the Scientific Committee of the Food Safety Authority of Ireland 2001 when they recommended that infant formula should not be re-constituted with fluoridated tap water.

The risk to babies from overexposure to fluoride has also been reported by the European Food Safety Authority, the European Commission's Scientific Committee on Cosmetic Products and Non-Food Products (SCCNFP) and the European Commission Directorate General for Health and Consumers (SCHER), the United Kingdom's Expert Group on Vitamins and Minerals and the U.S Department Of Health And Human Services Public Health Service Agency for Toxic Substances and Disease Registry.

The Irish Expert Body have clearly not accepted the concerns raised by all of these international bodies nor have they accepted or acknowledged that many other medical organisations such as the International Academy of Oral Medicine and Toxicology, the International Doctors for the Environment or the Irish Doctors Environmental Association amongst others, find that water fluoridation delivers no discernible health benefit, causes a higher incidence of adverse health effects and impacts negatively on the environment.

In contrast the Irish Expert Body have claimed that the balance of scientific evidence worldwide supports water fluoridation; when in reality the vast majority of developed countries including all mainland European countries have either ended or never commenced the practice of water fluoridation due to health, legal or ethical considerations.

The Irish Expert Body have further failed acknowledge that the Food and Nutrition Board (FNB) of the Institute of Medicine, in North America have established dietary fluoride intakes levels for infants 0-6months at 0.01mg/L. Similarly they have failed to acknowledge that the Canadian Paediatrics Society (less than 40% of public water supplies are now fluoridated in Canada) have recommended a level of fluoride exposure of zero for babies up to six months of age. Both these levels are exceeded by multiples every day by tens of thousands of babies in Ireland. Instead of objectively presenting these undisputed facts, the Irish Expert Body have repeatedly stated that water fluoridation has proven to be effective and safe for all sectors of society. This is inaccurate and a total misrepresentation of the scientific facts.

## **Contradictory Statements of Fact: Part 6**

### **Legal Interpretation on Water Fluoridation**

The Irish Expert body have alleged that my interpretation of the legal issues pertaining to water fluoridation are untrue.

The European Court of Justice, in a landmark case dealing with the classification and regulation of 'functional drinks' in member states of the European Community have ruled that Fluoridated water must be treated as a medicine, and cannot be used to prepare foods.<sup>101</sup>

The Court found that any foodstuffs or beverages such as fluoridated water, with the aim of treating or preventing disease in human beings or of modify physiological functions in human beings must be regulated as a drug. The Court found that it may not be used in the preparation of any food or beverage, nor may such food or beverage made with fluoridated water be exported to the European Union until it undergoes proper pharmaceutical scrutiny and is regulated as a medicinal product in the European Union.

Legally any company making a consumable product using fluoridated water in its preparation or as an ingredient cannot now export that product to any other state in the EC, even if their product is permitted in their home state.

These matters were addressed in some detail in the legal review of water fluoridation. The findings of the European court have not been challenged.

It is alarming that the Expert body appear either unaware of this European Court ruling or alternatively they have chosen to pretend it doesn't exist.

It is also clear that the Irish Expert Body refuse to acknowledge the Legal findings<sup>102</sup> of Lord Jauncey who found that fluoridated water is defined as a medicinal product. In 1983, the judge ruled that fluoridated water fell within the Medicines Act 1968, "*Section 130 defines 'medicinal product' and I am satisfied that fluoride in whatever form it is ultimately purchased by the respondents falls within that definition.*"

This legal view has been supported by the British Medical Journal<sup>103</sup> as well as Medical Law International.<sup>104</sup>

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<sup>101</sup> Warenvertirebs-Orthica vs Germany: European Court Justice Ruling (HLH Warenvertirebs and Orthica Cases C-211/03, C-299/03, C-316/03 and C-318/03, 9 June 2005)

<sup>102</sup> Lord Jauncey. Opinion of Lord Jauncey in cause Mrs Catherine McColl (A.P) against Strathclyde Regional Council. The Court of Session, Edinburgh, 1983.

<sup>103</sup> Cheng KK, Chalmer I, Sheldon TA 2007 British Medical J October 6, 335:699-702.

<sup>104</sup> Shaw. D. Weeping and wailing and gnashing of teeth: The Legal Fiction of Water Fluoridation, Medical Law International 00(0) 1–17, 2011

## **Contradictory Statements of Fact: Part 7**

### **Environmental Impact**

The Irish Expert Body alleges that Fluoride does not accumulate in the environment and is not harmful to biodiversity. The Irish Expert Body allege that the view expressed by the author that there is a build up of fluoride in the environment is unfounded and not supported by evidence and that water fluoridation causes no risk to the wider environment.

The Irish Expert Body was unable to provide a single Irish study to substantiate their claim. This is because no environmental study has ever been undertaken in Ireland to examine the environmental impact of anthropogenic fluoride emissions from water fluoridation on the environment. What is a scientific fact however is that over 78,400,000kgs of fluoride have been discharged into the environment in Ireland directly from water fluoridation.

Fluoride is a List ii substance under the Council Directive 80/68/EEC relating to the prevention of discharges of certain toxic, persistent and bioaccumulable substances into groundwater. Fluoride is listed as an undesirable substance in Annex 1 of Directive 80/778/EEC relating to the quality of water intended for human consumption. Fluoride is a List ii substance under Council Directive 2006/11/EC. Under this Directive it is necessary to reduce water pollution by the substances within List ii and the discharge of these substances into the environment.

The only reference that the Irish Expert Body use to demonstrate that water fluoridation of water supplies does not cause an unacceptable risk to the wider environment is the SCHER 2011 review. The SCHER review itself noted the study's own limitations by stating that 'the environmental review was simplistic' and was similarly based on just one published paper.<sup>105</sup>

This paper, contrary to the stated opinions of the Irish Expert Body, clearly demonstrated that fluoride at concentrations of 0.2ppm may have lethal effects of sensitive freshwater fisheries, especially in soft water rivers, similar to many salmonid river systems found in Ireland. The natural background level of fluoride in surface waters in Ireland is < 0.1ppm. The concentration of fluoride emitted from waste water treatment plants in Ireland may be 800% higher than the natural background level as fluoride is not effectively removed in the water treatment process. In addition within a single water catchment area or river there will invariable be multiple point source emissions from urban waste water treatment plants all discharging into the same river at different locations along a river. The combined cumulative effect of this on sensitive ecosystems and protected species has also been investigated in Ireland.

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<sup>105</sup> Camargo, J, A., Fluoride toxicity to aquatic organisms: A Review. Chemosphere 50 (2003) 251-264

The Report on the *Human Toxicity Environmental Impact and Legal Implications* examined and presented in some detail evidence from over 70 international published peer reviewed scientific studies on the impact of fluorides on the environment. As a chartered water and environmental manager I find the allegation and evidence provided by the Irish Expert Body to be in this regard of such poor standard as to be lacking any credibility or understanding of environmental chemistry or environmental science in general.

This references provided in the Waugh review are not exhaustive and further studies are available that clearly show how anthropogenic emissions of fluoride from water fluoridation impact on surface water quality and the environment in general. The Irish Expert Body should be aware for example that the WHO has stated that effluents from wastewater treatment plants that treat fluoridated water will impact on surface water quality.<sup>106</sup>

In the WHO report titled Fluoride and Fluorides the WHO reference a study by Singer and Amstrong<sup>107</sup> which found 3 times the fluoride level in rivers receiving fluoridated effluents (at 1ppm) compared to non fluoridated surface waters.

Numerous Studies have shown that elevated concentrations in fresh water receiving fluoridated effluent may persist for some distance. Although dilution reduces concentration over distance, the amount of fluoride in effluent is either deposited in sediment locally or is carried to the estuary where it may persist indefinitely.

A review of literature and documentation suggests that concentrations of fluoride above 0.2 mg/L have lethal (LD50) effects on and inhibit migration of "endangered" salmon species whose stocks are now in serious decline" in Ireland and the US NorthWest. Warrington in a study<sup>108</sup> for the British Columbia Ministry of Environment also identified 0.2 mg/ L fluoride as a "critical level" for fresh water species. While the Government of Canada Environmental Protection Act<sup>109</sup> - estimated adverse effect thresholds (lethal, growth impairment and egg production) are 0.28 mg/L fluoride for fresh water species and 0.5 mg/L fluoride for marine species. The impact of Fluoride on surface water was also accepted by the U.S. Agency for Toxic Substances and Disease Registry<sup>110</sup> when they found that fluorides from water

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<sup>106</sup> International Programme on Chemical Safety. (1984). Environmental Health Criteria 36: Fluorine and Fluorides. Geneva, Switzerland: World Health Organization.

<sup>107</sup> Singer L, Armstrong WD. 1977 Fluoride in Treated Sewage and in Rain and Snow. Archives of Environmental Health Jan/Feb P 21-23.

<sup>108</sup> Warrington, PD, Ambient Water Quality Criteria for Fluoride. Technical Appendix 1990, British Columbia Ministry of Environment

<sup>109</sup> Government of Canada 1993, Inorganic Fluorides, Canadian Environmental Protection Act (Priority Substances List Assessment Report).

<sup>110</sup> Toxicological Profile For Fluorides, Hydrogen Fluoride, And Fluorine, U.S. Department Of Health And Human Services Public Health Service Agency for Toxic Substances and Disease Registry, September 2003.

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fluoridation will contribute to surface water directly and will deposit into sediment, where they are strongly attached to sediment particles. The Agency reported how Fluoride forms stable complexes with calcium and magnesium in natural waters and how Fluorine cannot be destroyed in the environment it can only change its form.

The agency noted that when deposited on land, fluorides are strongly retained by soil, forming strong associations with soil components and found that leaching removes only a small amount about 0.5-6% of fluorides from soils.

The agency reported how Fluorides may be taken up from soil and accumulate in plants and that animals that eat fluoride-containing plants may accumulate fluoride. The U.S EPA has similarly reported how urban waste water bio-solids accumulate fluoride in soils.

Interestingly the Irish EPA has also documented that fluoride binds strongly to sediment and bioaccumulates in the environment.<sup>111</sup>

Furthermore the EPA in Ireland have acknowledged that in Ireland potential waters at risk from fluoride pollutant include receiving waters located downstream of drinking- and wastewater treatment plants and areas where there is significant leakage from the drinking water distribution system.<sup>112</sup>

In the same report the EPA have furthermore reported a number of exceedances of the standard for fluoride in surface waters associated with the infiltration of drinking water and discharges from urban wastewater treatment plants.

It is clear therefore that the views and personal opinions of the Irish Expert Body on this allegation are entirely unbelievable and grossly misrepresent the known scientific facts on the environmental fate and impact of fluorides on the environment.

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<sup>111</sup> McCarthy, T., Duggan, S., McCarthy J., Lambe, A. Regulatory Impact Analysis of the proposed Surface Water Classification Systems including Environmental Quality Standards Final Report, Environmental Protection Agency December 2007

<sup>112</sup> Clenaghan, C., O'Neill N, Page, D., Dangerous Substances Regulations National Implementation Report, 2005 Under the Water Quality (Dangerous Substances) Regulations, 2001 (S.I. No. 12 of 2001), Environmental Protection Agency, 2006.

## Contradictory Statements of Fact: Part 8

### FLUORIDE AND BONE CANCER/OSTEOSARCOMA

The Expert Body have stated that the Author has misreported scientific facts in regard to Osteosarcoma, a rare bone cancer. The Expert Body allege that the Harvard study by Dr. Bassin presented by Waugh in his report which they claim only suggests a link between fluoridation and this disease is a misrepresentation of the facts, furthermore they allege that this research was disproven by what the Expert Body claim was a later 'definite' study by Dr. Douglass which showed no link to the disease.

There are in fact three parts to this accusation, there is the original study<sup>113</sup> a PhD Dissertation (Bassin 2001) **by** the Harvard School of Dental Medicine **which Found** a very strong, statistically-significant relationship between consumption of fluoridated water during the mid-childhood growth spurt (ages 6-8) and osteosarcoma among boys less than 20 years old.

To quote the author Dr. Bassin found

**"Among males, exposure to fluoride at or above the target level was associated with an increased risk of developing osteosarcoma. The association was most apparent between ages 5-10 with a peak at six to eight years of age. [T]he results continue to demonstrate an effect after adjusting by zipcode, county population, ever use of bottled or well water, age, and any use of self-administered fluoride products. For males, the odds ratio for the high exposure group was 7.20 at 7 years of age with a 95 percent confidence interval of 1.73 to 30.01... All of our models are remarkably robust in showing this effect during the mid-childhood growth spurt, which, for boys, occurs at ages seven and eight years. Our results are consistent with findings from the National Toxicology Program animal study which found 'equivocal evidence' for an association between fluoride and osteosarcoma .and from two ecological studies that found an association for males less than twenty years old (Hoover et al., 1991; Cohn 1992)."**

In the 1990's, two further population based studies found increases in the incidence of bone and joint cancer or osteosarcoma among males under the age of 20 living in areas with fluoridated water. Hoover et al.<sup>114,115</sup> found 47 and 79% increases in the incidences of bone and joint cancer and osteosarcoma, respectively among males and females living in fluoridated

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<sup>113</sup> Bassin EB. (2001). *Association Between Fluoride in Drinking Water During Growth and Development and the Incidence of Osteosarcoma for Children and Adolescents*. Doctoral Thesis, Harvard School of Dental Medicine

<sup>114</sup> Hoover RN, Devessa SS, Cantor KP, et al. 1991a. Review of Fluoride Benefits and Risks. Fluoridation of Drinking Water and Subsequent Cancer Incidence and Mortality. National Cancer Institute, public health Service, Bethesda MD: Department of health and Human Services.

<sup>115</sup> Hoover RN, Devessa SS, Cantor KP, et al. 1991b. Review of fluoride benefits and risks. Time trends for bone and joint cancers and osteosarcomas in the surveillance, epidemiology and end results programme. National Cancer Institute, public health Service, Bethesda MD: Department of health and Human Services.

Misrepresentation of Scientific Facts and Current Scientific Knowledge on Silicofluorides and Fluoride by the Irish Expert Body on Fluoride and Health

areas. In contrast, 34 and 4% declines in bone and joint cancer and osteosarcoma, respectively were found in non fluoridated areas.

In the Cohn study<sup>116</sup> significant increases in the osteosarcoma incidence risk ratios were found among males under the age of 20 years living in areas with fluoridated water. However the investigator did caution that these results were based on a small number of cases.

The second part of this controversy involved Dr. Douglas who supervised the research for Bassin's 2001 Doctoral thesis (1992-1999), which concluded that boys exposed to fluoridated water at a young age were more likely to get the cancer.

In 2005 when the U.S National Research Council were undertaking their review of fluoride Professor Douglas told federal officials Harvard found no significant correlation between fluoridated water and osteosarcoma. This itself was astonishing when he was aware as Bassin's thesis supervisor that her research did in fact find a connection between fluoride in tap water and bone cancer.

Subsequently the National Institute of Environmental Health Sciences (NIEHS), which funded Chester Douglass's \$1.3 million study and Harvard University officials questioned why the Harvard professor appear to bury the research and failed to inform the NRC of the findings of the research, which he himself supervised and signed off on.

This was particularly remarkable given the final report abstract stated that:

"The study is expected to provide the nation with the best information to date regarding a possible relationship between fluoride in the diet and the risk of Osteosarcoma."

It was claimed that Douglass, first hid from the NRC and then misrepresented, his graduate student's PhD thesis to the NRC, which found a "robust" association between fluoridated water and an increased risk of osteosarcoma in young boys, a frequently fatal disease. A subsequent investigation exposed the Douglas actively promoted fluoridation and had strong financial ties with fluoride industries, which could be exposed to huge liabilities if fluoride is shown to cause cancer.

In 2006 a team of Harvard University scientists, led by Dr. Elise Bassin, published a study<sup>117</sup> in a peer reviewed cancer research journal reporting **a five-fold increased risk of developing osteosarcoma among teenage boys exposed to fluoridated water at ages 6, 7, and 8.**

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<sup>116</sup> Cohn PD. 1992. An epidemiologic report on drinking water and fluoridation. Environmental Health Service. New Jersey Department of Health.

<sup>117</sup> Bassin EB, Wypij D, Davis RB, Mittleman MA. (2006). Age-specific Fluoride Exposure in Drinking Water and Osteosarcoma (United States). *Cancer Causes and Control* 17: 421-8.

## Misrepresentation of Scientific Facts and Current Scientific Knowledge on Silicofluorides and Fluoride by the Irish Expert Body on Fluoride and Health

The study was an extension of an analysis first completed by Bassin as a Harvard PhD thesis in 2001. Remember her thesis adviser, Dr. Chester Douglass (a consultant to Colgate), was charged in 2005 by the Environmental Working Group of deliberately withholding and misrepresenting these findings to the public and scientific community.

According to Bassin the 2006 study found:

"We observed that for males diagnosed before the age of 20 years, fluoride level in drinking water during growth was associated with an increased risk of osteosarcoma, demonstrating a peak in the odds ratios from 6 to 8 years of age. All of our models were remarkably robust in showing this effect, which coincides with the mid-childhood growth spurt."

**In stark contrast to the comprehensive study by Dr. Bassin which was published in a peer reviewed cancer journal (Cancer Causes and Control), the much smaller case control study by Dr. Douglass study<sup>118</sup> was not published in a reputable cancer research journal but a dental journal** which has a long history of promoting water fluoridation (*Journal of Dental Research*).

The Journal of Dental Research is not an appropriate or reputable journal for publishing bone cancer research.

This paper in the Journal of Dental Research claims to show no association between fluoride bone levels and osteosarcoma, a form of bone cancer. However, contrary to the accolades of the Irish Expert Body on Fluoride and Health this study had major flaws and was incapable of refuting the previous findings of Bassin which remain scientifically valid.

Bassin found a 500% to 600% increased risk for young boys, **exposed to fluoride in their 6th to 8th years**, of later developing osteosarcoma. Douglass' study does not address exposure during this critical period because it measured the level of fluoride in bone, which accumulates fluoride over a lifetime. These bone levels provide no information about when the person was exposed to fluoride. Not only does Douglass' study fail to refute Bassin's main finding, it suffers from other serious weaknesses:

1) Douglass' study was much smaller and weaker than Bassin's. **It had only 20 control subjects under age 30, a fifth of Bassin's. For this key age group, Douglass' study was so small it could provide no reliable conclusions.** Even Douglass accepted this serious limitation in his study.

2) Douglass' choice of comparison group is suspect. Douglass compared the bone fluoride level of patients with osteosarcoma to "controls" with other forms of bone cancer. If fluoride also causes these other bone cancer types, then one would not expect to find any difference in bone fluoride between these groups. It is biologically plausible that fluoride could cause other bone cancers because it reaches such high concentrations in bone. One of the only studies of fluoride and non-osteosarcoma bone cancers did find a link, but this evidence was never mentioned by Douglass.

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<sup>118</sup> Kim FM, Hayes C, Williams PL, Whitford GM, Joshipura KJ, Hoover RN, Douglass CW. 2011. An assessment of bone fluoride and osteosarcoma. *J Dent Res* 90(10):1171-6.



3) The controls were severely mismatched to the cases. Controls were much older (median 41 yrs) than the cases (18 yrs). **The risk of osteosarcoma is highly age-dependent.** Also, fluoride builds up in bone with age. Given Douglass' small sample size, it is unlikely he could have adequately compensated for the gross mismatch in age, especially because of these two simultaneous age dependencies. **The groups were also mismatched on sex ratio, and osteosarcoma risk is well known to be sex dependent.** Properly adjusting for sex and age would be virtually impossible.

By disregarding all these basic scientific facts and by disputing the previous scientific findings of the U.S. National Toxicology Program<sup>119</sup> which found 'equivocal evidence' for an association between fluoride and osteosarcoma; the Irish Expert Body contend that there is in their opinion no link between osteosarcoma and fluoridated water, and that Waugh has misrepresented the literature in not supporting their invalid claims.

How the Irish Expert Body can claim that Waugh misreported the scientific literature on this subject is beyond reason, such accusations are entirely unfounded.

## Conclusion

The scientific evidence as presented here and in answers to parliamentary questions by the Department of Health, provided in appendices, raises very serious questions of objectivity, transparency, ethics and governance for those concerned, especially when peer reviewed scientific information is deliberately misrepresented by a scientific body funded by the taxpayer with responsibility to protect public health.

The evidence presented here demonstrates in just a few examples how the Irish Expert Body on Fluorides have distorted and misrepresented current scientific knowledge to suit their benefit rather than public benefit in a manner that is more like propaganda than fact in order to support the continuation of water fluoridation.

More importantly however, this raises valid concerns regarding the ability of the Irish Expert Body on Fluoride to honestly and accurately review, in the interest of public they are required to protect, any scientific information in a fair and objective manner. This is perhaps best demonstrated when all scientific evidence of the past decade clearly demonstrates that it is the topical application of fluoride by toothpaste and improved diet, not the ingestion of fluoride into the body via drinking fluoridated water, that is the most effective method to reduce dental caries.

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<sup>119</sup> National Toxicology Program [NTP] (1990). *Toxicology and Carcinogenesis Studies of Sodium Fluoride in F344/N Rats and B6C3f1 Mice*. Technical report Series No. 393. NIH Publ. No 91-2848. National Institute of Environmental Health Sciences, Research Triangle Park, N.C.

## Misrepresentation of Scientific Facts and Current Scientific Knowledge on Silicofluorides and Fluoride by the Irish Expert Body on Fluoride and Health

It is utterly inexcusable for any public health body or official entrusted to protect the health and welfare of the citizens of this country that they would so clearly ignore the findings of peer reviewed studies and at the same time deliberately misrepresent the value or weight of any scientific evidence and do so only to support their stated opinion and their express beliefs in largely unproven, unsubstantiated and inaccurate facts. Furthermore it is evident that the Irish Expert Body on Fluoride have deliberately misrepresented scientific facts to protect their interest in supporting fluoridation of drinking water, at whatever cost, including potentially grave implications for public health.

In summing up the Expert Body has sought to undermine in a disturbingly inadequate & disproportionate response the quality of research undertaken and information presented by the Author of the report titled Human Toxicity, Environmental Impacts and Legal Implications of Water fluoridation.

When one looks at the huge amount of scientific information now available which highlights the associated risk of silicofluorides and fluoride to illhealth it is no wonder that the Ministries for Health in every other European Country have followed the precautionary approach to preventative healthcare and avoided implementing or ended water fluoridation. In the UK, the only other EU country that supports water fluoridation less than 10% of the population drink fluoridated water and their legal courts have found the practice to be in violation of EU law. In Europe the European Courts of Justice have ruled that fluoridated water may not be used in the preparation of any food or beverage, nor may such food or beverage made with fluoridated water be exported to the European Union until it undergoes proper pharmaceutical scrutiny and is regulated as a medicinal product in the European Union.

It is evident that the Irish Expert Body has failed to produce any significant evidence of scientific misrepresentation or untruths by the Author of this report. They have failed to communicate in any reasonable manner with the author and only acted to discredit him in the press and in recent communications to local authorities and public representatives by questioning his ability as a scientist and researcher.

In their review the Expert Body has demonstrated their own ability to misread scientific research, which has been clearly demonstrated with illustrated examples in this rebuttal. It is obvious from the detailed evidence based on current scientific knowledge presented in the report by Waugh more accurately represents the reality of the complex chemistry involved in the addition of hexafluorosilicate acid to drinking water and the potential health risks associated with this practice for the public in Ireland, in comparison to those presented by the Expert Body. There is a clear danger that the groupthink mentality that appears to exist within the Expert body presents a very real risk for the health and welfare of the citizens of Ireland. History has demonstrated that such organisations can become narrow minded and close their minds entirely to alternative viewpoints or information and thereby show themselves to be reluctant to change. The fact that this organisation remains alone within European Nation States in continuing to support such an unnecessary policy is perhaps reflective of this overall intolerance to change.

## Deputy Maureen O Sullivan T.D.

DÁIL QUESTION 1282 addressed to the Minister of State at the Department of Health (Ms. Shortall) by Deputy Maureen O'Sullivan for WRITTEN ANSWER on 18/04/2012.

Question:

To ask the Minister for Health if he will cease the fluoridation of drinking water until the Department of Health can provide evidence to demonstrate that the silica fluoride compounds used for water fluoridation have been tested for human safety and environmental toxicity in accordance with international and EU law; and if he will make a statement on the matter.

REPLY.

The Health (Fluoridation of Water Supplies) Act, 1960 provides for the fluoridation of public piped water supplies. This is achieved through the addition of hydrofluorosilicic acid (HFSA) to the water. **The complete and rapid reaction between HFSA and water produces hydrogen ions** (which are removed through a process called buffering), **silica** (sand) **and fluoride ions. Consumers do not come into contact with HFSA as water from the tap contains fluoride, not HFSA or fluorosilicates.** The balance of scientific evidence worldwide confirms that water fluoridation, at the optimal level, does not cause any ill effects and continues to be safe and effective in protecting the oral health of all age groups. There are no plans to discontinue the policy of fluoridation of public water supplies, which continues to make an effective contribution to oral health in Ireland.

## Deputy Catherine Murphy T.D

DÁIL QUESTIONS 194 and 195 addressed to the Minister of State at the Department of Health (Ms. Shortall) by Deputy Catherine Murphy TD. for WRITTEN ANSWER on 23/05/2012.

Question

To ask the Minister for Health if he will confirm if the fluoridation chemicals administered in drinking water has been tested to determine if they meet the requirements of EU legislation for the protection of public health and the environment; and if he will make a statement on the matter.

Reply

The Health (Fluoridation of Water Supplies) Act, 1960 provides for the fluoridation of public piped water supplies. **This is achieved through the addition of hydrofluorosilicic acid (HFSA) to the water. The complete and rapid reaction between HFSA and water produces hydrogen ions** (which are removed through a process called buffering), **silica** (sand) **and fluoride ions. Consumers do not come into contact with HFSA as water from the tap contains fluoride, not HFSA or fluorosilicates.**

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3/1/2001

**In my capacity of chair of the Advisory Group for the systematic review on the effects of water fluoridation** recently conducted by the NHS Centre for Reviews and Dissemination the University of York and as its founding director, **I am concerned that the results of the review have been widely misrepresented.** The review was exceptional in this field in that it was conducted by an independent group to the highest international scientific standards and a summary has been published in the British Medical Journal. **It is particularly worrying then that statements which mislead the public about the review's findings have been made in press releases and briefings by the British Dental Association, the British Medical Association, the National Alliance for Equity in Dental Health and the British Fluoridation Society. I should like to correct some of these errors.**

1. Whilst there is evidence that water fluoridation is effective at reducing caries, the quality of the studies was generally moderate and the size of the estimated benefit, only of the order of 15%, is far from "massive".
2. **The review found water fluoridation to be significantly associated with high levels of dental fluorosis which was not characterised as "just a cosmetic issue".**
3. **The review did not show water fluoridation to be safe.** The quality of the research was too poor to establish with confidence whether or not there are potentially important adverse effects in addition to the high levels of fluorosis. The report recommended that more research was needed.
4. **There was little evidence to show that water fluoridation has reduced social inequalities in dental health.**
5. The review could come to no conclusion as to the cost-effectiveness of water fluoridation or whether there are different effects between natural or artificial fluoridation.
6. Probably because of the rigour with which this review was conducted, these findings are more cautious and less conclusive than in most previous reviews.
7. The review team was surprised that in spite of the large number of studies carried out over several decades there is a dearth of reliable evidence with which to inform policy. Until high quality studies are undertaken providing more definite evidence, there will continue to be legitimate scientific controversy over the likely effects and costs of water fluoridation.

(Signed) T.A. Sheldon,

Professor Trevor Sheldon, MSc, MSc, DSc, FMedSci.

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June 6, 2012

Response in Support of  
**Human Toxicity, Environmental Impact, and Legal Implications of Water  
Fluoridation**

Declan Waugh, Enviro Management Services, 2012

First, it must be made clear that ingested fluoride ion does not decrease dental caries systemically. This has been amply demonstrated in the dental literature and the scientific literature

Hellwig and Lennon, **Caries Research** 38: 258, 2004; <http://fluoride-class-action.com/wp-content/uploads/caries-research-systemic-versus-topical-fluoride.pdf>; Zero, 1992; Rolla and Ekstrand, 1996; Featherstone, 1999; Limeback, 1999; Clarkson and McLoughlin, 2000 as reviewed in the 2006 National Research Council Report, [http://www.nap.edu/openbook.php?record\\_id=11571&page=16](http://www.nap.edu/openbook.php?record_id=11571&page=16)

and in conclusions published by the U.S. Centers for Disease Control that systemic fluoride does not benefit teeth (**Morbidity and Mortality Weekly Report**, August, 2001). Moreover, not only does ingested fluoride not decrease caries, ingested fluoride cannot decrease caries, even topically, because fluoride that filters into saliva from the bloodstream (which averages 0.21 ppm in residents of 1 ppm fluoride water cities) is only approximately 0.02 ppm (NRC, 2006, p. 71), unable to influence teeth surfaces as can fluoride in pastes (1,500 ppm) and highly concentrated gels. This demonstrates that the process referred to was 'water fluoridation' to treat dental caries by taking fluoride ion internally through ingestion in humans squanders public funds.

Although many presume otherwise, the EPA does not regulate or promote the infusion of fluoride compounds into public water supplies (NRC, 2006, p.18; personal letter from U.S. EPA, Office of Drinking Water, 2012). Instead, fluoride is correctly regarded by EPA as a contaminant in water that must be kept below levels estimated interim to help minimize the known pathologic effects of long-term ingestion of fluoride. Further, the U.S. Food and Drug Administration correctly ruled in 1963 that fluoride is not a mineral nutrient and when added into water is an uncontrolled use of an unapproved drug. Synthetic industrial fluoride compounds lacking calcium are all listed toxics in poisons registries with an LD50 in mammals of 125 mg/kg single oral dose (Merck Index, Rahway, N.J., 1976), while natural calcium fluoride is not a listed toxic, where calcium minimizes assimilation of fluoride from the GI tract and is the antidote to fluoride poisoning.

Ingested fluoride is now known to incorporate into the bloodstream by virtue of first forming the membrane lipid soluble agent hydrofluoric acid HF in the acidic stomach. HF is freely permeable across cells membranes, while the fluoride charged ion is not. After assimilation, at the alkaline pH of blood and interstitial fluid, HF largely re-dissociates to the free fluoride ion. The trace levels of HF that remain in blood can be calculated with the Henderson Hasselbach equation for an aqueous solution buffered at physiologic pH 7.4, an average blood fluoride level of 0.21 ppm, and the dissociation constant for the weak acid HF of  $6 \times 10^{-4}$ , and is approximately 0.2 ppb HF. Although 1,000 times less concentrated than the free fluoride ion in blood, HF, being 1 million times more lipid soluble than fluoride ion, is the form by which fluoride enters intracellular fluid (Buzalaf, MA; Whitford, GM, *Fluoride metabolism, Monographs in oral science* 2011;22:20-36).

Fluoride indeed is known from biochemical measurements to incorporate into brain and other cells in man and animals and to alter intracellular structural components. In brain cells this was a chief concern to the NRC committee because brain functional alterations can be subtle and can go undetectable for long periods and are difficult to assess by experimental measurement. In fact, human controlled clinical drug testing trials, required by the Food Drug and Cosmetic Act for any chemical proposed to be used as an ingestible to be taken internally the US., do not evaluate brain impairment in data submitted to the FDA for drug approval. It is necessary thus to state clearly that there are no 'robust' studies on any ingestible fluoride compound in humans to this date.

We now have data unknown at the time water 'fluoridation' began. Fluoride incorporation into bone is permanent and irreversible, accumulating during lifetime consumption typically to levels that weaken bone, rendering bone more subject to fracture, where bone concentrations of 4,000 mg/kg lifetime in a 1 ppm treated city are more subject to fracture than at lower fluoride intake levels. Most disturbing, published only months ago at the Veterans Administration Health Care Center, Los Angeles, CA, PET scan direct observations proved that systemic fluoride incorporates into atherosclerotic plaque in coronary arteries of cardiovascular disease patients, the leading lethal disease entity in the U.S. (Yuxin, et.al., **Nuclear Medicine Communications**, January, 2012).

Yes, the NRC Report did not have the objective of evaluating water fluoridation *per se* and did not have the original intent of examining data published on safety and effectiveness, or lack thereof, for water fluoridation levels at the widely used concentration of 1 ppm compared to lower levels. However, it is false to claim the analysis and data reviewed only apply to persons exposed to concentrations far higher than used in water fluoridation. Much data published since 1993 were reviewed relevant to fluoridation, at 1 ppm, as controls to compare effects found at 2–4 ppm and higher. It is also incorrect to claim that the NRC report only applied to natural fluoride in drinking water. Both natural and artificial fluoride in water were thoroughly investigated (NRC, 2006, pp. 14-15). The committee intention was to mainly evaluate whether the EPA primary and secondary Maximum Contaminant Level interim assignments from 1984 were achieving their stated purpose in the U.S. NRC concluded UNANIMOUSLY, yes unanimously, that the MCL and SMCL must be lowered because current allowed levels are not protective of human health. This is because of the widely and conclusively documented adverse pathology in those exposed to 2 and 4 ppm fluoride in water, compared to lower levels (NRC, 2006, p. 6). Vast data in the scientific literature, some reviewed in the NRC Report, prove that fluoride consumed long-term in humans at 1 ppm causes pathology.

In full agreement with the NRC committee consensus, the U.S. Health and Human Services recommended January, 2012 that water fluoride levels not exceed 0.7 ppm fluoride as a temporary measure until official regulations can be established. The motivation for this change is the glaring fact that as of 2004, 41% of U.S. children aged 12-15 have permanent abnormal tooth fluorosis, with its enamel hypoplasia that is difficult and expensive to restore.

It is false to claim that calcium present in water with fluoride has no effect on fluoride toxicology. In fact, calcium fluoride is not a toxic compound and has a safe high LD50 of 3-5,000 mg/kg (Merck Index, 1976), while all fluoride compounds lacking calcium are listed toxics. As far as interest to human dental caries, the largest study we have is international and very long-term in scope that demonstrated well that highest caries incidence occurs in populations with calcium deficiency and high fluoride intake, while lowest caries incidence occurs in regions with sufficient dietary calcium and low fluoride intake (SPS Teotia and M Teotia, *Dental Caries: A Disorder of High Fluoride and Low Dietary Calcium Interactions (30 Years of Personal Research)*, **Fluoride** 1994; 27(2): 59-66). It is widely known that dietary calcium severely restricts fluoride assimilation from the GI tract into the bloodstream (NRC, 2006). Dental journals routinely publish that high calcium diets cause 4 fold lower plasma fluoride levels from drinking fluoride water, compared to diets low in calcium. For this reason, calcium is the antidote to synthetic industrial fluoride poisoning. Calcium fluoride

is less soluble in water than the industrial synthetic fluoride compounds sodium fluoride and fluorosilicic acid and can produce only about 8-10 ppm fluoride maximum, too low to induce acute poisoning as can synthetic fluorides used as insecticides and rodenticides.

Levels of fluoride required to precipitate calcium ion from water depend on the prevailing calcium concentration. Low levels of fluoride precipitate calcium at high concentrations, where the solubility product constant for calcium fluoride is  $5 \times 10^{-11}$ . 5 ppm fluoride in blood is always lethal where the calcium concentration is about 80 ppm. Actual precipitates of calcium fluoride however are not found in cases of human acute lethal fluoride poisoning from water fluoridation overfeeds (Gessner, **New England Journal of Medicine**, 330, 1994). Calcium uptake into heart tissue is blocked at this fluoride concentration that prevents heart function because of calcium ion sequestration. The decreased mobility of the calcium ion is an activity effect and does not require physical precipitation of the cation to be severely pathologic. In the same way, fluoride tends to remain in aqueous solutions containing calcium more than in solutions absent calcium, an effect that does not require precipitation of calcium. This is consistent with the citation that calcium in water causes dissociation of fluorosilicic acid far more quickly, in a minute, compared to the time required in the absence of calcium. And yes, fluoride water would not cause calcium deficiency when dietary calcium is plentiful.

The idea that dental fluorosis with its associated enamel hypoplasia is an acceptable alternative to tooth decay is a false choice. First, fresh clean drinking water does not contain either fluoride, sodium, or silicic acid. Fluoridation of water supplies with fluorosilicic acid caustic soda mixtures typically produces about 1 ppm fluoride, 1 ppm silicic acid and 2-4 ppm sodium, again none of which belong in pristine fresh drinking water. Fresh normal drinking water contains no sugar and does not cause teeth caries. Second, as above, ingested fluoride systemically or topically does not interfere with caries, which are caused by sugary foods that are not brushed which are substrates for bacterial acid production. Fluorosis is thus unnecessary to induce, to fight and repair caries.

It is appropriate now to grade the effectiveness and usefulness of the EPA regulations imposed in 1984 on the fluoride contaminant in drinking water. The MCL was set at 4 ppm to help minimize development of severe toxic effects in those exposed lifetime. The idea was to minimize severe bone fluorosis, a bizarre painful condition that causes a person to be unable to walk. The NRC reported that severe debilitating skeletal fluorosis cases in the U.S. are extremely rare and this particular adverse pathologic effect caused by fluoride was basically achieved. However, we now know that 4 ppm fluoride in water lifetime leads to 10,000-12,000 mg/kg fluoride levels in bone, severely weakening bone making bone more subject to fracture compared to consumption of water at lower fluoride levels. Because the U.S. now has 1/3 million cases of hip fractures in the U.S. elderly, it is appropriate that the NRC Committee request the MCL be lowered.

The failing grade for the MCL is also given due to the fact that severe dental fluorosis occurs in significant abundance in children exposed to 4 ppm fluoride in water. The severe form of dental fluorosis is a permanent toxic poisoning effect on the damaged teeth. The MCL, at the time of the NRC review, appeared to prevent the incidence in excess of the intended 15% amount, but this now may be a too low estimate of this condition in the U.S. Also, moderate fluorosis afflicts an enormous number of U.S. children currently, and it is necessary to understand that the NRC reviewed studies proving that this condition is not merely cosmetic, but harmful. Moderate fluorosis on front teeth is detrimental to one's appearance and can affect one's overall sense of well-being and likelihood of employability and is now known to be associated with systemic pathology. 50% of all ingested fluoride is retained permanently in bone lifetime, independent of water concentration consumed, and there is no concentration low enough at which tooth fluorosis from systemic fluoride can exist without concurrent massive accumulation of fluoride in bone. The vastly increased incidence of 'moderate' fluorosis with enamel hypoplasia (estimated in 2006 at 15% even at 2 ppm and far higher at 4 ppm) is itself an effect that should be restricted according to the original intent of the EPA MCL under auspices of the Safe Drinking Water Act.

Detailed well-controlled human clinical trials proved an elevated risk of nonvertebral fractures after only 4 years of exposure to drinking water with the MCL fluoride level of 4 ppm. Also there was consensus that fluoride can weaken bone and increase fracture risk in animals and man. The effect of fluoride on bone density observed in animal studies is fully consistent with the human evidence (p. 7). Thus the MCLG, which technically was intended to prevent any significant toxic effect in the exposed population, was never adequately low. The current MCL does not protect U.S. citizens from the substantial occurrence of fluoride-induced bone weakening and fracture or from permanent abnormal tooth fluorosis with its enamel hypoplasia, where the function of normal (non-fluoridated enamel hydroxyapatite) is to protect underlying dentin and pulp from cavitation and infection.

The SMCL was set by EPA decades ago at 2 ppm for the purpose of minimizing, not just severe toxicity, but any significant adverse effect on human health. In regards to the fluoride contaminant, a provisional effect chosen for this purpose was severe dental enamel fluorosis, to be maintained under 15% of the exposed population. Although this might have been achieved if fluoride exposures were limited to water intake alone, or might have been successful for healthy persons, this SMCL has failed. Fluoride in the U.S. from sources other than water account for 30% of total fluoride found in blood and add to the burden from fluoride in water, which is the major but not the only source. Also, many persons consume far more water than the National average, those who work outdoors in heavy labor such as field work, and athletes, and those with diabetes who consume twice as much water as normal. As a result, existing fluoride water levels have led to the endemic of enamel fluorosis of all forms that we now have in U.S. children. And as above, moderate fluorosis is a significant adverse effect and is in fact defined as the first visible sign of systemic fluoride poisoning, is a more appropriate SMCL endpoint.

Taken together the NRC could have been more adamant in requesting water fluoridation be halted. Abnormal permanent tooth fluorosis, objectionable, unsightly and costly to restore, increases in incidence in every city from fluoridation, without exception. But the NRC made it clear their stated purpose was not to evaluate fluoridation at levels less than 2 ppm because the actual purpose was to determine whether 2 ppm was an adequate level for the fluoride contaminant to prevent significant adverse pathology, so no request on water fluoridation was made. The NRC however is fully justified in concluding that the EPA standards must be lowered because the health of American citizens is now compromised by taking fluoride internally through ingestion, mostly from public water supplies, natural or by intentional infusion of industrial synthetic fluoride compounds. Since water fluoridation leads to 57-90% of the total fluoride concentration in the bloodstream, depending on the health of the consumer and on water hardness and other factors, many on the NRC committee have chosen to oppose fluoridation of public water supplies (personal communication, NRC committee member).

The claim that aluminum fluoride interaction studies have published contradictory findings is false. The presence of low level fluoride ion in water that also contains low levels of aluminum ion causes enhanced assimilation of aluminum. There is no doubt about this effect of fluoride on the uptake of aluminum which causes consistent, widely observed accumulation of aluminum in brain tissue with dramatic alterations in the structure of cellular components in brain:

Varner, 1998 <http://www.actionpa.org/fluoride/aluminum.html> ; Miu, 2003; Bhatnager, 2002; Shivarajashankara, 2002 as reviewed in NRC, 2006, p. 218).

Because aluminum in the stomach at acidic pH competes with hydrogen ion for binding with fluoride, and because the association constant for aluminum fluoride is far greater than that for HF (also discussed in NRC, 2006, p. 211), aluminum fluoride complexes form, which, being uncharged, are assimilated well. Free aluminum ion, not complexed with fluoride, is not assimilated significantly after ingestion. (In fact for this reason many cities infuse aluminum as an inexpensive method to clarify water supplies). Fluoridation of water that



contains aluminum is a contraindication because of assimilation of aluminum that fluoride causes.

At the same time fluoride enhances aluminum uptake, aluminum itself also inhibits assimilation of fluoride. Aluminum lowers the free fluoride concentration in the gut, due to complexation, which interferes greatly with formation of HF. Normally at stomach pH, 50% of ingested fluoride ion is converted to HF (Sauerheber, submitted to Journal of Toxicology and Pharmacology, 2012), in agreement with data at a pH below and above this pH (NRC, 2006, p. 268), and HF is then freely assimilated. HF, not charged fluoride, freely permeates cell membranes (Buzalaf, 2011) and is the form by which fluoride gains entry into the blood. Charged fluoride ion is eliminated out the GI tract well. In the presence of aluminum found infused into public water supplies, little fluoride is converted to HF and the fluoride that is assimilated is mostly that complexed with aluminum. Most all fluoride would be assimilated, as HF, if aluminum is absent. So it is correct to state that fluoride enhances aluminum uptake (from zero) and that aluminum decreases fluoride assimilation (less than 100%), all at the same time. The presence of aluminum helps keep fluoride as the charge ion rather than HF, the assimilated form, while fluoride complexes significant aluminum, raising its assimilation from otherwise essentially zero. The effects are relative, and both are observed. There is no 'contradictory' data set.

The claims that the fluoride-induced salmon collapse in the Columbia River have never been confirmed is ludicrous. It is unethical to dump toxic industrial synthetic fluorides into fresh waters in the U.S. to re-test whether the salmon will again collapse in the Columbia. The University of Oregon performed more than sufficient experiments that confirmed the phenomenon, that prompted the Oregon State legislature to revoke mandatory fluoridation of public water supplies in the State of Oregon (see Youtube video by Brent Foster). Indeed, fluoride at 1 ppm in the ocean is not toxic to salmon due to the presence of thousands of ppm magnesium and calcium in the water. On the contrary, fluoride at only 0.3 ppm in fresh soft water lacking appreciable calcium narcotizes salmon brain.

All epidemiologic studies in which correlations are made in an attempt to promote the notion that fluoride when ingested can affect caries are weak for many reasons. First, calcium levels in the water that affect fluoride assimilation are not measured. Second, random variables among humans in a population are vast that cannot be controlled except in clinical studies with volunteers. The original suggestion by T. Dean and Gerald Heard ascribed to fluoride what calcium can do, that is calcium helps build strong teeth made of normal hydroxyapatite, fluoride only alters enamel to an abnormal structure. The original weak epidemiologic correlations have been extensively analyzed with more thorough data published by Zeigelbecker (reviewed in Connert, The Case Against Fluoride, 2010), demonstrating the wide scatter in the original Southwest cities and the complete absence of reduced caries as a function of wide variation in fluoride concentration in water supplies. Moreover, the original fluoride treatments in the test cities Newburgh, N.Y. and Grand Rapids, MI are known to have caused delayed teeth eruption in children. There is no difference in caries incidence when the age of the teeth is used in the analysis, rather than the age of the child. Sadly, exuberant promoters of fluoridation labeled absence of teeth (due to delayed eruption) as absence of cavities. Controlled clinical trials data have not been done with volunteer human subjects who agree to control diet and other confounding variables, that cannot be done in observational or epidemiologic studies that have little place in the discussion of whether a city or country should mandate fluoridation of public water supplies or not. Indeed, we agree with the FDA that mass fluoridation of all water supplies where dosage cannot be regulated is unacceptable when we now know that citizens, when educated about what causes caries (sugary sodas, etc), are fully able to care for their own teeth to effectively minimize tooth decay. The Waugh report includes data indicating that non-fluoridated European countries compare favorably in caries incidence reduction to any fluoridated country in the world.

Richard Sauerheber, Ph.D.

Note: That tooth fluorosis is abnormal enamel and not a benefit is abundantly clear. Normal teeth enamel is a crystalline glass-like hard substance but only forms when systemic fluoride in the blood is very low. Fluoride in blood can produce abnormal enamel, as discussed recently by dentists who have banned industrial fluoride from their practices long ago. Below is an interesting discussion.

[http://www.identalhub.com/article\\_enamel-hypoplasia-370.aspx](http://www.identalhub.com/article_enamel-hypoplasia-370.aspx)

**Hypocalcaemia** is a specific cause of tooth enamel hypoplasia. Recently evidence has suggested that the etiology of enamel hypoplasia is highly specific. Enamel hypoplasia is seen in children having disorders of calcium homeostasis. Low calcium level in serum is one of the major causes of enamel hypoplasia.

**Enamel Hypoplasia and Caries.** Enamel hypoplasia is clinically significant not only because it is disfiguring and the restorative treatment costly, but because it may affect caries susceptibility. There was a strong correlation between hypoplasia in the teeth of British schoolchildren and caries susceptibility. Out of a collection of 1,500 extracted teeth, 74% of very hypoplastic teeth were carious, whereas 80% of the nonhypoplastic teeth were caries-free. Caries has also been associated with hypoplasia in many parts of the Third World. There is no information about the chemical composition of hypoplasia enamel so the exact reason for its greater proneness to caries is uncertain, but it is possible that its irregularity and pits may favor the development of more plaque compared with smooth well-formed enamel.

Enamel hypoplasia is due to many causes. It can be due to high fluoride level or due to some medicines or if the child becomes ill when the teeth which are affected by enamel hypoplasia are being formed. The treatment depends on degree of hypoplasia. Initially the composite restorations are done and if it is more (i.e. whole of enamel is hypoplastic) then veneers or crowns are indicated in later age when the teeth are fully formed.

## Independent Reviews of Report

**Dr. Richard Sauerheber**

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*June 6, 2012*

### **Human Toxicity, Environmental Impact, and Legal Implications of Water Fluoridation**

Declan Waugh, Enviro Management Services, 2012

What I find important is that the U.S. National Research Council (NRC) review of about 1,000 fluoride studies, the Case Against Fluoride by Dr. Paul Connett review of 1,154 studies and the Waugh review of 1,216 studies each have their own particular strengths. For example, the Connett text best delineates why ingested fluoride does not decrease dental caries, with its good description of the detailed Ziegelbecker statistical analyses.

The Waugh review to me reveals the important concept that has been known to some for so long but is denied by others, a point made in dramatic fashion, that genetic or other variations in a particular population play an important part in determining the toxic effects caused by chronic fluoride ingestion. The correlation of fluoridation in soft water sections of Ireland with one of the worlds-leading incidence in epilepsy is particularly disturbing. To fluoridation advocates, this merely justifies in their own mind that fluoride intake is 'not harmful' because all fluoridated people in the world in their view should be leading the world in epilepsy cases if fluoride actually induces or worsens the condition. What these advocates fail to grasp is that genetic differences can pre-arrange for a particular organ system to be more susceptible to fluoride in one person or a population group, while in another group a different organ system may be affected with first clinical symptoms.

Fluoride, being ubiquitous throughout an organism after ingestion, and continuously altering the normal structure of water by forming abnormal hydrogen bonding throughout an aqueous solution, can be toxic to every physiologic process known depending on concentration, duration and the genetic, anatomic and physiologic makeup of the particular individual. African and Hispanic people are more susceptible to Alzheimer's incidence and it may be that Irish and other peoples could be more susceptible to fluoride-induced epilepsy. The very frightening problem this all represents is made far worse by the fact that this biologic variability provides a cover-up for fluoride advocates who argue that unless fluoride does a particular toxic effect in all subjects of a population, then in their mind it is nothing but a false correlation.

The studies in Fluoride on the Justus horses and on alligators and the various species Spittle identified with differing fluoride susceptibility come to mind. And I don't know how to counter this widely held attitude, that unless all animals in a species are affected the same way then what you are looking at is being caused by 'something else' besides fluoride. These studies were well controlled and rigorously done, as also for example were the original Waldbott studies revealing fluoride allergy in 1% of people. Advocates don't care about this because they perceive it's either mistaken or accidentally caused, not by fluoride, or else the % would be higher. We somehow have to get across the truth about individual susceptibility and biologic variability even within a particular species, but I don't know how, other than what the Waugh review already does, simply presenting the true data and making judgments about it.

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24th May 2012

Dear Mr. Waugh

I welcome your identification of hydrofluorosilicic acid (and the silicofluorides) as highly dangerous compounds now widely added in public water supplies in the U.S. and the Republic of Ireland even though they have never been adequately studied for their toxic effects.

In the U.S. senior EPA personnel have found no evidence Silicofluoride (SiF) was ever tested for adverse health effects.<sup>120, 121</sup> (Fox 1999, Thurnau 2000). This was confirmed by the formal decision on this part by the US National Toxicology Program in 2002, nominating SiF's for toxicological studies on animals because information on this topic was not sufficiently established.

No data is yet available on the results of the toxicological study and as of 2007 no testing had as yet begun despite the formal decision to proceed in 2002.

The NRC report, "Fluoride in Drinking Water...A Scientific Review of EPA's Standards" (NRC 2006) emphasizes the importance of such testing with questions about incompletely dissociated [SiF<sub>6</sub>]<sup>2-</sup> end-products in human diets. It recommends study of silicofluoride treated water (SiFW) of different hardness, mineral content, and silica native to the water, taking into account the reversible equilibrium aspects of [SiF<sub>6</sub>]<sup>2-</sup> dissociation.

The most important finding we have on SiF when added to water; is that the biological effects of ingesting water treated with these compounds are that lead from ANY environmental source (industrial pollution, lead paint in old housing, lead in water, lead leached from brass water fixtures) is ENHANCED by the residues from SiF's.

Some of the neurotoxic and related effects associated with chronic ingestion of SiFW that have heretofore escaped attention are discussed in the attached report I have included for your attentions.

Roger Masters PhD  
Research Professor of Government & Nelson A. Rockefeller Professor  
Department of Government  
Dartmouth College

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<sup>120</sup> Fox JC 1999 Letter from EPA Assistant Administrator, May 10, 1999 to Representative Ken Calvert acknowledging EPA was not aware of any tests for toxicity of SiF treated water  
<sup>121</sup> Thurnau RC Letter from Chief of Treatment Technology Evaluation Branch of the Water Supply and Water Resources Division of the EPA National Risk Management Laboratory to RD Masters admitting EPA and National Environmental Effects Research Laboratory were unable to find information on effects of silicofluorides on health and behavior. Nov 2000

28<sup>th</sup> April 2012

Mr. Declan Waugh's unbiased report has done what government has not. His report identifies the narrow fallacy about decay prevention versus widespread impacts to national ecosystems, economics and health care costs. In simple terms and clear language he proves it. Drinking water fluoridation has been re-framed in terms of the triple bottom line and due diligence. To any politician or sitting councillor facing spending decisions about real threats to the public's health, this work is the defacto primer about ceasing water fluoridation. Well done, Mr. Declan Waugh for the courage to follow the science and acting for humanity!

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April 28, 2012

I understand that you are engaged in an evaluation of fluoridation of public water supplies as a matter of policy. Let me urge you to consider thoroughly the scientific evidence that has been published in the past two decades. In particular the meticulously researched and comprehensive report of Mr. Declan Waugh deserves your careful attention.

I am a physician and biophysicist who has studied fluoridation for the last twelve years or so. I have found much of the early scientific literature on effectiveness of fluoridation in prevention of dental caries to be so faulty as to be misleading. And the appropriate toxicological studies are simply lacking, while evidence of particular adverse effects of fluoride and hexafluorosilicic acid continues to surface.

The report of Mr. Waugh, "Human Toxicity, Environmental Impact and Legal Implications of Water Fluoridation", is a supreme effort that succeeds in presenting a massive amount of evidence of adverse effects of fluoride at exposures comparable to those encountered by persons using fluoridated water. No responsible evaluation of fluoridation can fail to give it careful attention.

Aside from the scientific and legal issues—aside from the conclusions that ingestion of fluoride is not substantially effective and that exposure to fluoridated water carries unacceptable risks—it must be said that fluoridation is unethical. It violates the requirements of informed consent, monitoring of effects and option for the individual to stop their exposure. In addition, given the existence of accessible and safe alternatives for preventing cavities, it does not pass the test of the precautionary principle.

Respectfully,  
James S. Beck, M.D., Ph.D.  
Professor Emeritus of Medical Biophysics  
University of Calgary

**29<sup>th</sup> April 2012**

**Fluoridation is illegal, unethical, unscientific and toxic**

As coauthors of Fluoridation: Autopsy of a Scientific Error, Edition Berger, 2010, and experts on the fluoridation issue, we have been impressed by the scientific quality of the report of Mr Declan Waugh: Human Health Toxicity and the Environmental Impact of Water Fluoridation. Dr Pierre Jean Morin, Ph.D. was one of the coauthors of the report prepared by the Environmental Consultative Committee of the Quebec Environment Ministry that have put a drastic end in 1979 to the Mandatory Fluoridation Act in Quebec: Fluoride, Fluoridation and the Quality of the Environment, English version 1980. We have obtained proofs that fluoridation is using untested, unapproved, uncontrolled and unsanitary industrial chemicals to treat populations against a disease, this is illegal and unethical.

Gilles Parent, ND.A. and  
Pierre Jean Morin, Ph.D. in experimental medicine, former Research Director, Laval  
Hospital,  
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Dr Morin is a renown scientist, you could find is curriculum in Who's in the World