The Fluoride Debate

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Notwithstanding the authoritative media statements on fluoridation benefits that the "science is settled" (referring to the benefits/risks of fluoridation) some disturbing and dissonant facts are apparent.

Government appointed bodies have raised concerns at the lack of any safety data for fluoridation of water supplies: starting with the US Agency for Toxic Substances and Disease Register (ATSDR) in 1993 and 2003; the "York Report", a British National Health Service investigation in 2000 (McDonagh et al.); the National Research Council (NRC-USA) in 2006; and the Scientific Committee on Health and Environmental Research (SCHER-EU) in 2011.

To quote from the ATSDR: "very limited human and animal data were located to evaluate the immunological effects of fluoride." And a further quote from the NRC report: "The existing data base does not permit a complete assessment of the immunotoxic potential for fluoride." These quoted organisations all requested that definitive research had to be done into the potential for adverse health effects. However, public health policy makers in these fluoridated countries (America, Australia, New Zealand and the Republic of Ireland) have persistently ignored these requests whilst apparently reassuring successive regulators and Ministers for Health that water fluoridation was both effective and safe. This lack of due diligence spanning decades has successfully maintained the *status quo* also essentially based on a legal fiction that fluoridated water does not constitute medication.

Research data improved in February 2013 with the presentation to the Government in Ireland of a "Public Health Investigation of Epidemiological data on Disease and Mortality in Ireland related to Water Fluoridation and Fluoride Exposure". This presentation compared the incidences of 28 diseases in the Republic of Ireland (RoI) with both unfluoridated Northern Ireland (NI) and the EU. (Waugh D. available at: www.enviro.ie). Notably, the RoI has had mandatory water fluoridation for 50 years. Whilst it is acknowledged that epidemiological studies cannot prove cause and effect, they do reveal statistical correlation.

1. Comparing RoI with NI the incidence of Type 2 diabetes was 60 per cent higher in RoI. New Zealand is also experiencing an epidemic of diabetes currently according to Government statistics (2009) exceeding 270,000 diagnosed cases (compared to 81,000 in 1996). A similar pattern is seen in both the USA with 7 percent population incidence of diabetes and Australia with concurrent increased obesity. Notably, Pacific Islander and Maori populations reportedly have three times higher rates than Caucasians.
2. Endocrine/metabolic disorders including hypothyroidism and blood/immunological disorders were all markedly elevated in the RoI compared with NI.

3. Admission rates for Chronic Obstructive Pulmonary Disease (COPD) were highest for the RoI at 364 per100,000 with NZ close behind at 319 followed by Australia at 312 compared to <200 per100,000 for the EU (OECD 2012).
4. Asthma rates in the RoI were double those seen in NI and, according to the ISAAC study (1998), the RoI incidence was the highest in the EU. Notably, on a worldwide comparison, all the fluoridating countries share equally elevated rates (Masoli 2004).
5. 1:5 of the RoI population has arthritis.
6. Deaths in males from ischaemic heart disease were highest in the USA with NZ next followed by Canada and then the RoI (WHO 2011).
7. NZ leads the world for SIDS per100,000 followed by the USA, Argentina, Australia and the RoI.
8. The RoI was the leading country in the world for deaths from congenital abnormalities followed by NZ and the USA (WHO 2011).
9. At 6 months < 10% of infants in the RoI are still breast-fed vs. > 40% in the EU. RoI infants would therefore have significantly greater fluoride exposure and increased risks of neurotoxicity and lowered I.Q. - a well-documented adverse effect of fluoridated water (Choi et al 2012). The US EPA website includes fluoride in the 100 chemicals having "substantial" evidence of developmental neurotoxicity.
10. The RoI has the highest rates in the EU for prostate, ovarian, colo-rectal and pancreas cancers and Non-Hodgkin's lymphoma (all of which are notably of concern in NZ). A statistically significant increase in uterine cancer was also detected following water fluoridation during the American occupation of Okinawa, Japan, between 1945 and 1972 (Tohyama 1996).

In all four of the long-term fluoridating countries, compared with the rest of the world, osteosarcoma rates are also significantly elevated. Significantly, the NRC scientific committee highlighted the carcinogenic potential of fluoride and unanimously concluded that fluoride appeared to have the potential to initiate and promote cancers including: "Osteosarcoma presents the greatest *a priori* plausibility as a potential cancer target site, the NTP animal study findings of borderline increased osteosarcomas in male rats, and the known mitogenic effect of fluoride on bone cells in culture (NRC (2006) p275)." Notably, Bassin's landmark study showing >500 per cent increased risk of osteosarcoma in boys if exposed to fluoridated water during the mid-childhood growth spurt occurring between age 6 and 8 years has not been refuted (Bassin 2006).A recent paper has also confirmed elevated serum fluoride levels in patients with osteosarcoma compared to healthy controls (Kharb 2013).

The elevated rate of bone cancers that are mainly osteosarcoma occurs in two peaks: one in young men (where it is frequently fatal); and another peak in the elderly where the comparative increased incidence is even more marked at treble the rates seen in non-fluoridated populations of the mainland Europe. Age specific rates for NZ confirmed this pattern with peaks reaching 3 per 100,000 in both 'teenagers and the 65-85 age cohort (NZ Health Department statistics accessed 2013) with the latter exceeding the latest Australian rates at 1.8 per 100,000 compared to 0.4 per 100,000 for the EU (Mirabello 2009) and possibly due to our lower selenium levels.

From all of the above one must reasonably come to the conclusion that there is a common denominator linking these four countries with what appears to be markedly increased multi-system disease incidences in the presence of water fluoridation. Fluoride is a known endocrine disrupter (*State of the Science of Endocrine Disrupting Chemicals*, UNEP / WHO report 2012) and from the NRC (2006) "an endocrine disruptor in the broad sense of altering normal endocrine function." Notably, American adults ingest daily an average of 3mg of fluoride and a 1-3 year old (under 14kg) over 1.5mg/day or double an amount that would alter thyroid function (EPA 2010).

Water fluoridation uses hexafluorosilicic acid (H_2SiF_6) and its sodium salt (Na SiF) almost exclusively. These are not pure, but recovered in crude form by scrubbing the gaseous emissions from the treatment of phosphate ores with sulphuric acid. These HazChem Class 7 chemicals are contaminated with variable amounts of lead, arsenic, beryllium, vanadium, cadmium, and mercury. Because of this, old studies based on the use of natural calcium fluoride are irrelevant as calcium is a natural fluoride antagonist. Disposal of the highly toxic and corrosive silicofluoride wastes from the superphosphate fertiliser chimneys was a major problem until approval was orchestrated in the USA to permit dilution into municipal water supplies in the 1940-50 decades (Kauffman 2005). Ironically, the cost of fertiliser could well significantly increase if this waste product dispersal into the municipal water were to be banned.

These silico-fluorides have never been tested for safety yet they have, by definition, been used for a therapeutic purpose (Section 4 Medicines Act 1981) to purportedly reduce dental decay for the past decades in the USA, Australia, New Zealand and the RoI - with the latter having had 50 years of mandated water fluoridation. The RoI population at 4.5million is comparable to New Zealand. Both countries also generally have soft water supplies with low calcium levels that increase fluoride sensitivities and potential toxicity. Because fluoride has also been extensively used by both the pharmaceutical and chemical industries to increase the potential activity of other substances, the potential for synergistic effects with the known contaminants appears logical and plausible.

It is therefore a moot point whether these reported adverse health effects are due to sodium fluoride, silicofluoride compounds (such as aluminofluoride) or in addition, an enhanced deleterious effect of fluoride when combined with arsenic, a confirmed carcinogen. The deliberate addition of arsenic to water supplies however diluted would not normally be tolerated. However, chronic exposures to even sodium fluoride may cause damage to kidneys, lungs, the nervous system, heart, gastrointestinal tract, cardiovascular system, bones and teeth **(**2008 MSDS Sodium fluoride NaF 100% - sciencelab.com Texas, accessed July 2013).

Fluoride is the lightest and most bioactive of the halogens (fluorine, chlorine, bromine and iodine) and as such will adversely compete with iodine uptake. As the majority of our population is already iodine (and selenium) deficient, further depletion will have potentially serious adverse health effects not only on the thyroid but also on the breasts with subsequent risks of fibrocystic breast disease (FBD) and cancer. Notably, daily high dose iodine supplementation is an effective treatment for FBD.

A physiological review of fluoridation was recently published that, whilst also demolishing the purported benefit theory, revealed widespread adverse effects including serious cardiovascular adverse events due to fluoride-induced hypocalcaemia. Support for adverse cardiovascular effects also appeared in a 2012 paper that concluded, "An increased fluoride uptake in coronary arteries may be associated with an increased cardiovascular risk" (Li et al.2012).

According to Sauerheber, industrial fluoride at blood levels typically found in residents of fluoridated cities is recognized as a neurotoxin, a non-physiologic mitogen, a general enzyme inhibitor, and a permanent bone perturbant during chronic consumption (Sauerheber 2013).

In contrast to these potential adverse effects, the much claimed and impressive 25 percent reduction in dental decay from fluoride is, in real terms, a reduction of less than one dental surface of a child's 128 dental surfaces. This fact has been repeatedly shown in American and Australian dental research aimed at confirming fluoride benefits (Brunelle and Carlos 1990 (0.6 surface), Spencer AJ and Slade 1996 (0.3 surface) and Armfield and Spencer 2004 (1.5 surfaces)). Furthermore, the latest findings (Slade and Spencer 2013) on lifelong (45 years) exposure in Australia had a maximum benefit of 1 tooth saved with reportedly questionable statistical relevance. Notwithstanding these miniscule reductions, a percentage is used to give the impression of sufficient benefit. This method misleads well-intentioned dental authorities, health policy makers and the public.

During the 1950-60s Ralph Steinman, Professor of Dentistry at Loma Linda University, California, published over 20 primary animal research papers. He was the co-discoverer of the hypothalamic-parotid endocrine axis that controls the rate of fluid movement through the dentine (Steinman and Leonora 1968). Steinman proved that dental caries mainly resulted from chronically elevated levels of sugars in the blood. Systemic sucrose resulted in the normal caries-protective retrograde dentinal fluid movement ceasing and even reversing. This reversal facilitated bacterial invasion of the several kilometres of dentinal tubules per tooth. Physiological failure therefore preceded structural failure that Steinman also showed occurring in the dentine prior to enamel breakdown (Steinman 1971). The dental "fluoride bomb" where much of the underlying tooth has already decayed by the time a pinhole appears in the fluoride-hardened enamel is entirely consistent with Steinman's research. This delayed caries detection occurs in the young adult at a time when the unexpected and significant financial costs are even more burdensome.

Dental caries therefore appears to be a systemic disease that is eminently controllable by diet and not a fluoride-deficiency condition. Notably, the Maori population on their ancestral diet and drinking "fluoride-deficient" waters had less than 1:1000 teeth showing any decay until adopting foods of commerce based on white flour and sugar. The caries incidence then increased to 40 per cent within a generation (Price 2010). A 1.5L bottle of cola in a supermarket that some children drink on a daily basis is cheaper than bottled water but contains 162 grams or about 40 teaspoons of sugar.

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June 2014

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