



Response to Cortland Questions

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The main point to understand is that water fluoridation is nothing more than the simple adjustment of the level of an existing mineral in drinking water to that level at which maximum benefit will be obtained from that mineral which we ingest in our water anyway, fluoridated or not. It is also the strict maintenance of that existing level at a consistent point, well below the threshold of adverse effects. The uncontrolled systems are those that are not fluoridated and do not have the strict controls which maintain the fluoride at that consistent level. Non-fluoridated systems are bound only by the EPA maximum allowable level of 4.0 mg/liter fluoride in that water. Fluoridated systems are strictly controlled and maintained at the concentration of 0.7 mg/liter, one sixth the level to which non-fluoridated systems are bound.

Optimal level fluoride in drinking water is not "medication", requires no "informed consent", and infringes upon no one's "personal rights". The courts have been crystal clear on this through the decades. No court of last resort has ever affirmed the "forced medication" ploy, in spite of repeated efforts by antifluoridationists to entice them to do so. That argument has no merit.

It should be understood that antifluoridationists will present studies such as Peckham hypothyroid, Malin ADHD, and Grandjean/Choi IQ, as evidence to support their claims of adverse effects. These studies have no merit and have been widely discredited in the scientific literature. I will gladly provide the peer-reviewed critiques which clearly debunk these studies. When I note that there is no valid, peer-reviewed scientific evidence for a given claim, I take into consideration those invalid studies which antis present, and am prepared to defend my statement by explaining the fallacies of those studies.

It should also be understood that, as nothing is ingested as a result of fluoridation that does not already exist in water naturally, it is not the responsibility of anyone to disprove unsubstantiated claims by antifluoridationists. In order to credibly demand "tests" and other such "proof" that a problem does not exist, there must first be valid evidence that one does exist. Unsubstantiated speculation and personal opinions do not constitute valid evidence of anything.

In regard to the questions:

FLUORIDE BENEFITS:

1. Question: What is the dosage of fluoride in drinking water that has been shown to be effective in promoting dental health?

Answer:

While antifluoridationists seek to confuse the issue of fluoridation with claims about "dosage" versus "concentration", water fluoridation is not about "dosage" of fluoride. It is simply about the concentration level of a naturally occurring mineral in drinking water, and adjustment of that level to provide maximum benefit with no adverse effects.

Fluoride has always existed in water. During the early part of the last century it was observed by researchers that, in areas with high naturally occurring fluoride in their water, the populations demonstrated a significant resistance to dental decay. Along with this resistance, however, was noted brown stains and mottling of the teeth. Once researchers determined that the fluoride in the water of that region was responsible for both the benefit and the adverse effect they set out to determine at what concentration of fluoride would be sufficient to provide the dental decay resistance yet low enough to avoid the staining and mottling. After several years of observing the effects on populations in areas of different fluoride levels, it was determined that the concentration of 1.0 mg/liter provided maximum dental decay resistance, while causing none of the staining and mottling of the teeth that had been observed in areas of high levels of fluoride in water. This level was ultimately termed the "optimal" level, and is now an official recommendation of the US Department of Health and Human Services. The current officially recommended optimal level of fluoride in drinking water is 0.7 mg/liter (mg/liter = parts per million).

2. Question: How does this relate to the dosage of fluoride from other sources (e.g., toothpaste, supplements, dental sealants)?

Answer:

The "dosage" of fluoride ingested from optimally fluoridated water is 0.7 mg per every one liter of fluoridated water consumed. The average daily water consumption for adults is 2-3 liters. Thus, the average fluoride ingested from fluoridated water is 1.4 mg - 2.1 mg.

The US CDC has estimated that of the total daily fluoride intake from all sources, including dental products, 75% is from water and beverages. Thus, the average water drinker who

obtains 1.4 mg - 2.1 mg fluoride from water will ingest a total of 1.9 mg - 2.8 mg daily fluoride intake from all sources. (1)

The US Institute of Medicine has established the daily upper limit of fluoride intake from all sources before adverse effects may occur....to be 10 mg. Thus, the average adult water drinker will not even ingest one third the daily upper limit for fluoride. A simple math equation demonstrates that even excessive water drinkers will not be in danger of exceeding that daily upper limit. The difference between the amount of fluoride ingested from optimally fluoridated water in combination with that from all other normal sources of fluoride.... and the daily upper limit is so broad that "dose" is not an issue with fluoridated water. Before the daily upper limit could be attained, water toxicity would be the concern, not fluoride.

The daily upper limit for infants and children age 0-8 years is considerably less, but only due to risk of mild to very mild dental fluorosis during the teeth developing years of 0-8. No other reason. After age 8, the teeth have developed, dental fluorosis is no longer possible, and the daily upper limit jumps to 10 mg thereafter. (2)

Mild dental fluorosis is a barely detectable effect which causes no adverse effect on cosmetics, form, function, or health of teeth. As peer-reviewed science has demonstrated mildly fluorosed teeth to be more decay resistant, many consider this effect to not even be undesirable, much less adverse. (3)

3. Question: Discuss the evidence for benefits of 0.7 ppm fluoride in drinking water. Specify the types and duration of studies, the fluoride concentration, and the populations studied.

Answer:

Countless, peer-reviewed scientific studies have clearly demonstrated the effectiveness of optimally fluoridated water in the prevention of dental decay in entire populations. A list of 10 such studies is included at the end of this document, many from within the past 5 years.

Relationship Between Dental Caries and Fluorosis at Varying Water Fluoridation Concentrations

From the US Public Health Service:

The 1986-1987 Oral Health of United States Children survey has been the only national survey that assessed the child's water fluoride exposure, thus allowing linkage of that exposure to measures of caries and fluorosis (USDHHS, 1989). An additional analysis of data from this survey examined the relationship between dental caries and fluorosis at varying water fluoride concentrations for children and adolescents (Heller KE, et al., 1997). Findings indicate that there was a gradual decline in dental caries as fluoride content in water increased from negligible to 0.7 mg/L. Reductions plateaued at concentrations from 0.7-1.2 mg/L. In contrast, the percentage of children with at least very mild dental fluorosis increased from 13.5% (standard error [SE] = 1.9) to 41.4% (SE = 4.4) as fluoride concentrations in water increased from <0.3 mg/L to >1.2 mg/L.

In Hong Kong, a small decrease of about 0.2 mg/L in the mean fluoride concentration in drinking water in 1978 (from 0.82 mg/L to 0.64 mg/L) was associated with a detectable reduction in fluorosis prevalence by the mid-1980s, from 64% (SE = 4.1) to 47% (SE = 4.5), based on the upper right central incisor only. Across all age groups, more than 90 percent of fluorosis cases were very mild or mild (Evans RW and Stamm JW, 1991). The study did not include measures of fluoride intake. Concurrently, dental caries prevalence did not increase (Lo ECM, et al., 1990). Although not fully generalizable to the current U.S. context, these findings, along with findings from the 1986-1987 survey of U.S. schoolchildren, suggest that the risk of fluorosis can be reduced and caries prevention maintained toward the lower end (i.e., 0.7 mg/L) of the 1962 PHS recommendations for community water fluoridation.

Several unique comments said that 0.7mg/L is too low to offer adequate protection against tooth decay. Evidence, however, does suggest that 0.7 mg/L will maintain caries preventive benefits. Analysis of data from the 1986-1987 Oral Health of United States Children survey found that reductions in dental caries plateaued between 0.7-1.2 mg/L of fluoride (Heller KE et al., 1997). In addition, fluoride in drinking water is only one of several available fluoride sources, such as toothpaste, mouth rinses, and professionally applied fluoride compounds.

Summary and Conclusions

PHS acknowledges the concerns of commenters and appreciates the efforts of all who submitted responses to the Federal Register notice describing its recommendation to lower the fluoride concentration in drinking water for the prevention of dental caries. The full Federal Panel considered these responses in the context of best available science but did not alter its recommendation that the optimal fluoride concentration in drinking water for prevention of dental caries in the United States should be reduced to 0.7 mg/L, from the previous range of 0.7-1.2 mg/L, based on the following information:

- Community water fluoridation remains an effective public health strategy for delivering fluoride to prevent tooth decay and is the most feasible and cost-effective strategy for reaching entire communities.
- In addition to drinking water, other sources of fluoride exposure have contributed to the prevention of dental caries and an increase in dental fluorosis prevalence.
- Caries preventive benefits can be achieved and the risk of dental fluorosis reduced at a fluoride concentration of 0.7 mg/L.
- Recent data do not show a convincing relationship between water intake and outdoor air temperature. Thus, recommendations for water fluoride concentrations that differ based on outdoor temperature are unnecessary.

Surveillance of dental caries, dental fluorosis, and fluoride intake will monitor changes that might occur, following implementation of the recommendation. (4)

4. Question: Discuss any data on specific population groups (e.g., infants, children, pregnant women, elderly, people with renal or thyroid disorders).

Answer:

There is no valid, peer-reviewed scientific evidence of any adverse effects of optimally fluoridated water on "infants, children, pregnant women, elderly, people with renal or thyroid disorders", or on anyone else, of any age group. It is the responsibility of no one to disprove the constant flow of unsubstantiated claims of antifluoridationists. Nonetheless, several studies are included at the end of this document which debunk claims of disorders.

5. Question: What is the dosage of fluoride in drinking water that has been shown to produce toxic effects?

Answer: There is no "dose" of fluoride in drinking water. There is a concentration level of 0.7 mg/liter in optimally fluoridated water. For every one liter of optimally fluoridated water consumed, 0.7 mg of fluoride is ingested. The US Institute of Medicine has established 10 mg to be the daily upper limit of fluoride ingestion before adverse effects may occur. One would have to consume 14 liters of optimally fluoridated water, in a day's time, for there to be any adverse effects from the fluoride. Obviously, water toxicity would be the concern, not fluoride.
(2)

6. Question: Specify the evidence for toxicity at 0.7 ppm vs higher concentrations. Specify the types and duration of studies, the fluoride concentration, and the populations studied. Discuss any data on specific population groups (e.g., infants, children, pregnant women, elderly, people with renal or thyroid disorders) and organ systems (e.g., teeth, bone).

Answer:

A. There is no valid, peer-reviewed scientific evidence of fluoride toxicity at the level of 0.7 ppm. Any who disagree will need to provide such evidence, properly cited from original sources.

B. There is no valid, peer-reviewed scientific evidence of any adverse effects of optimal level fluoride on "(infants, children, pregnant women, elderly, people with renal or thyroid disorders) and organ systems (e.g., teeth, bone)". Any who disagrees will need to provide such evidence, properly cited to original sources. Bear in mind that mild dental fluorosis is not an adverse effect.

7. Question: Identify sensitive populations. Discuss the variation in response and the margin between therapeutic and toxic concentrations.

Answer:

A. There is no valid, peer-reviewed scientific evidence of any "sensitive populations" to optimal level fluoride. Any who disagree will need to provide such evidence, properly cited to original sources.

B. Fluoride is a naturally occurring mineral in water. It has been ingested in that water by humans since the beginning of time. Fluoridation is the simple adjustment of the concentration

level of that existing mineral to that at which maximum benefit will be obtained, while strictly maintaining the level of this existing mineral well below the threshold of adverse effects. The "margin between therapeutic and toxic concentrations" with toxic being defined as adverse effect, is the difference between the optimal level of 0.7 mg/liter and the EPA primary MCL for fluoride, 4.0 mg/liter.

Given the fact that during the entire 71 year history of fluoridation, with hundreds of millions of individuals having ingested optimally fluoridated water, there have been no proven adverse effects, it is clearly evident that the margin between therapeutic and toxicity of fluoride has been entirely adequate. There is no stronger evidence of this fact than a 71 year history of human consumption of optimally fluoridated water with no adverse effects.

RISK OF CONTAMINANTS:

3. Question: What sources of fluoride are acceptable for use in U.S. municipal drinking water? How are these sources regulated and tested? What other toxins might be present (e.g., lead, cadmium, arsenic, mercury)? What, if any, procedures would protect against exposure to contaminants?

Answer

- The sources of fluoride used in fluoridation are irrelevant
- All water at the tap must meet the stringent, EPA mandated quality certification requirements under Standard 60 of the independent international testing organization, NSF International., regardless of what is in the water prior to the tap.
- Standard 60 requires that no contaminant be present in water at the tap in excess of 10% of the US EPA maximum allowable level (MCL) for that contaminant.
- If drinking water at the tap does not meet all of Standard 60 requirements, it is prohibited by law.
- Under rigid NSF testing, fluoridated water at the tap easily meets all Standard 60 requirements. A complete list of the contents of fluoridated water, including precise amounts of any detected contaminants, and the EPA mandated maximum allowable levels for each, may be found on the "Fact Sheet on Fluoridation Chemicals" located on the website of the National Sanitary Foundation:

<http://www.nsf.org/newsroom/nsf-fact-sheet-on-fluoridation-chemicals>

- Any contaminants detected in fluoridated water at the tap are in barely detectable amounts far below EPA mandated maximum allowable levels of safety. There are therefore no procedures necessary to protect against exposure to contaminants in fluoridated water at the tap.

Answer:

A. All water at the tap must meet the stringent, EPA mandated quality certification requirements under Standard 60 of the National Sanitary Foundation, regardless of what is in the water prior to the tap. This certainly includes fluoridated water. Standard 60 requires that no contaminant be present in water at the tap in excess of 10% of the EPA maximum allowable level of safety (MCL) for that contaminant. Fluoridated water easily meets all of these requirements. It therefore makes no difference, whatsoever, as to the sources of fluoride ions in drinking water, how these sources are regulated, or tested. If water at the tap does not meet all of the Standard 60 quality certification requirements, it is not allowed. Period.

B. The only contaminants in fluoridated water at the tap are in such barely detectable minuscule amounts, so far below EPA mandated maximum allowable levels of safety, that it is not even a certainty that the ones detected aren't those that already exist in water naturally. In order to even detect any contaminants whatsoever in fluoridated water, it takes 10 X the manufacturer recommended single use amount of fluoridation substance.

A complete list of the contents of fluoridated water at the tap, including precise amounts of any detected contaminants, and the EPA mandated maximum allowable levels for each, may be found on the "Fact Sheet on Fluoridation Chemicals" located on the website of the National Sanitary Foundation:

<http://www.nsf.org/newsroom/nsf-fact-sheet-on-fluoridation-chemicals>

RISK OF CONTAMINANTS:

9. Does fluoridation, such as the addition of hydrofluorosilicic acid, affect the structure and quality of municipal water systems (e.g., pipe corrosion)?

Answer:

No. This is simply a transparent and reprehensible attempt to exploit the unfortunate situation in Flint, MI, as antifluoridationists are attempting to do all over the internet. In actuality, there is no valid, peer-reviewed scientific evidence that fluoridation substances in any manner "affect the structure and quality of municipal water systems". The peer-reviewed science is clear. There is no lead leaching in pipes resultant of fluoridation substances. The situation in Flint had absolutely nothing to do with water fluoridation.

From Urbansky/Schock 2000:

"Overall we conclude that no credible evidence exists to show that water fluoridation has any quantifiable effects on the solubility, bioavailability, bioaccumulation or reactivity of lead (0) or lead (II) compounds. The governing factors are the concentrations of a number of other species such as (bi)carbonate, hydroxide, or chloride, whose effects far exceed those of fluoride or fluorosilicates under drinking water conditions." (5)

From Macek in 2006:

"Our analysis does not offer support for the hypothesis that silicofluorides in community water systems increase PbB concentrations in children. On the other hand, given the limitations of our data, our analyses cannot refute a possible link between water fluoridation method and lead uptake in children, particularly among those who live in older dwellings. Although other ecologic studies might allow another opportunity to test the relation between water fluoridation method and PbB concentrations in U.S. children, such analyses are likely to have similar limitations. Ultimately, the hypothesis that one or more fluoride compounds is associated with enhanced lead leaching or increased lead absorption is best addressed via systematic study of lead concentrations in drinking water, experimental chemical investigations, and studies of animal toxicology. Efforts to decrease exposure to lead among children by targeting prevention efforts at high-risk communities and/or populations as well as efforts to prevent dental caries via the use of fluoridated drinking water should continue unless a causal impact of certain fluoridation methods on PbB concentration is demonstrated by additional research." (6)

References

(1) Recommendations for Using Fluoride to Prevent and Control Dental Caries in the United States

US CDC MMWR

Recommendations and Reports

August 17, 2001/50(RR14); 1-42

(2) Dietary reference intakes (DRIs): tolerable upper intake levels, vitamin - Institute of Medicine - National Academies

<http://iom.nationalacademies.org/Activities/Nutrition/SummaryDRIs/~//media/Files/Activity%20Files/Nutrition/DRIs/ULs%20for%20Vitamins%20and%20Elements.pdf>

(3) The Association Between Enamel Fluorosis and Dental Caries in U.S. Schoolchildren

Hiroko Iida, DDS, MPH and Jayanth V. Kumar, DDS, MPH

<http://jada.ada.org/content/140/7/855.long>

(4) Public Health Service Recommendation for Fluoride Concentration in Drinking Water for Prevention of Dental Caries

A Notice by the Health and Human Services Department on 05/01/2015

Federal Register- The Daily Journal of the United States Government

(5) Can Fluoridation Affect Lead (II) In Potable Water? Hexafluorosilicate and Fluoride Equilibria In Aqueous Solution

Urbansky, E.T., Schocks, M.R. Intern. J . Environ. Studies, 2000, Voi. 57. pp. 597-637

(6) Blood Lead Concentrations in Children and Method of Water Fluoridation in the United States, 1988-1994

Environ Health Perspec. 2006 January; 114 (1): 130-134

Mark D. Macek, Thomas D. Matte, Thomas Sinks, and Delores M. Malvitz

Effectiveness Studies

1) 2015

Results

In the 3 areas the proportion of children who received a dental examination varied; 77.5% (n= 825) for the fluoridated area, 80.1% (n=781) for the pre-fluoridated area and 55.3% (n=523) for the non-fluoridated area. The mean dmft was 1.40 for the fluoridated area, 2.02 for the pre-fluoridated area and 2.09 for the non-fluoridated area. These differences were statistically significant ($p < 0.01$). Differences were also noted in the proportion of children who were caries free, 62.6% fluoridated area, 50.8% for the pre-fluoride area and 48.6% for the non-fluoride location.

Conclusion

The children living in the well-established fluoridated area had less dental caries and a higher proportion free from disease when compared with the other two areas which were not

fluoridated. Fluoridation demonstrated a clear benefit in terms of better oral health for young children.

---The Dental Health of primary school children living in fluoridated, pre-fluoridated and non-fluoridated communities in New South Wales, Australia

Anthony S Blinkhorn, Roy Byun, George Johnson, Pathik Metha, Meredith Kay, and Peter Lewis
BMC Oral Health 2015, 15:9 doi:10.1186/1472-6831-15-9<http://www.biomedcentral.com/1472-6831/15/9>

2) RESULTS:

The prevalence of dental caries was inversely related and the prevalence of fluorosis was directly related to the concentration of fluoride in the drinking water. The mean DMFS in the communities with 0.8 to 1.4 ppm fluoride was 53.9 percent to 62.4 percent lower than that in communities with negligible amounts of fluoride. Multivariate analysis showed that water fluoride level was the strongest factor influencing DMFS scores. The prevalence of fluorosis ranged from 1.7 percent to 15.4 percent, and the increase in fluorosis with increasing fluoride exposure was limited entirely to the milder forms.

----J Public Health Dent. 2000 Summer;60(3):147-53.

The prevalence of dental caries and fluorosis in Japanese communities with up to 1.4 ppm of naturally occurring fluoride.

Tsutsui A, Yagi M, Horowitz AM.

Department of Preventive Dentistry, Fukuoka Dental College, Fukuoka, Japan.
tutuia@college.fdcnet.ac.jp

<http://www.ncbi.nlm.nih.gov/pubmed/11109211>

3) 2000

CONCLUSIONS:

Caries levels are lower among children with fluoridated domestic water supplies. Decay levels are much lower in 2002 than they were in 1984 and in the 1960s. The oral health of the less well-off is worse than that of the rest of the population. The prevalence of dental fluorosis is higher amongst children and adolescents with fluoridated water supplies. Comparisons with 1984 data show an increase in the prevalence of fluorosis since that time.

---Community Dent Health. 2004 Mar;21(1):37-44.

Dental caries and enamel fluorosis among the fluoridated and non-fluoridated populations in the Republic of Ireland in 2002.

Whelton H, Crowley E, O'Mullane D, Donaldson M, Kelleher V, Cronin M.

Source

Oral Health Services Research Centre, University Dental School and Hospital, Wilton, Cork, Ireland.

4) <http://www.ncbi.nlm.nih.gov/pubmed/7643331>

CONCLUSIONS:

The ingestion of water containing 1 ppm or less fluoride during the time of tooth development may result in dental fluorosis, albeit in its milder forms. However, in these times of numerous products containing fluoride being available, children ingesting water containing 1 ppm fluoride continue to derive caries protection compared to children ingesting water with negligible amounts of fluoride. Thus, the potential for developing a relatively minor unesthetic condition must be weighed against the potential for reducing dental disease.

-----J Public Health Dent. 1995 Spring;55(2):79-84.

Dental fluorosis and caries prevalence in children residing in communities with different levels of fluoride in the water.

Jackson RD, Kelly SA, Katz BP, Hull JR, Stookey GK.

Source

Oral Health Research Institute, Indianapolis, IN 46202-2876, USA.

<http://www.ncbi.nlm.nih.gov/pubmed/15074871>

5) 2004

Conclusions:

The results of this study support existing work suggesting water fluoridation together with the use of fluoridated dentifrice provides improved caries prevention over the use of fluoridated dentifrice alone. The social gradient between caries and deprivation appears to be lower in the fluoridated population compared to the non-fluoridated population, particularly when considering caries into dentine, demonstrating a reduction in inequalities of oral health for the most deprived individuals in the population.

----The association between social deprivation and the prevalence and severity of dental caries and fluorosis in populations with and without water fluoridation

Michael G McGrady, Roger P Ellwood, [...], and Iain A Pretty

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3543717/>

6) 2012

CONCLUSIONS:

Fewer studies have been published recently. More of these have investigated effect at the multi-community, state or even national level. The dmf/DMF index remains the most widely used measure of effect. % CR were lower in recent studies, and the 'halo' effect was discussed frequently. Nevertheless, reductions were still substantial. Statistical control for confounding factors is now routine, although the effect on per cent reductions tended to be small. Further thought is needed about the purpose of evaluation and whether measures of effect and study design are appropriate for that purpose.

-----Community Dent Oral Epidemiol. 2012 Oct;40 Suppl 2:55-64. doi: 10.1111/j.1600-0528.2012.00721.x.

Effectiveness of water fluoridation in caries prevention.

Rugg-Gunn AJ, Do L.

Source

Newcastle University, UK. andrew@rugg-gunn.net

<http://www.ncbi.nlm.nih.gov/pubmed/22998306>

7) 2012

CONCLUSIONS:

Data showed a significant decrease in dental caries across the entire country, with an average reduction of 25% occurring every 5 years. General trends indicated that a reduction in DMFT index values occurred over time, that a further reduction in DMFT index values occurred when a municipality fluoridated its water supply, and mean DMFT index values were lower in larger than in smaller municipalities.

----Int Dent J. 2012 Dec;62(6):308-14. doi: 10.1111/j.1875-595x.2012.00124.x.

Decline in dental caries among 12-year-old children in Brazil, 1980-2005.

Lauris JR, da Silva Bastos R, de Magalhaes Bastos JR.

Source

Department of Paediatric Dentistry, University of São Paulo, Bauru, São Paulo, Brazil.
jrlauris@fob.usp.br

<http://www.ncbi.nlm.nih.gov/pubmed/23252588>

8). 2012

Abstract

The effectiveness of fluoridation has been documented by observational and interventional studies for over 50 years. Data are available from 113 studies in 23 countries. The modal reduction in DMFT values for primary teeth was 40-49% and 50-59% for permanent teeth. The pattern of caries now occurring in fluoride and low-fluoride areas in 15- to 16-year-old children illustrates the impact of water fluoridation on first and second molars.

----Caries Res. 1993;27 Suppl 1:2-8.

Efficacy of preventive agents for dental caries. Systemic fluorides: water fluoridation.

Murray JJ.

Source

Department of Child Dental Health, Dental School, University of Newcastle upon Tyne, UK.

<http://www.ncbi.nlm.nih.gov/pubmed/8500120>

9) 1993

CONCLUSIONS:

The survey provides further evidence of the effectiveness in reducing dental caries experience up to 16 years of age. The extra intricacies involved in using the Percentage Lifetime Exposure method did not provide much more information when compared to the simpler Estimated Fluoridation Status method.

-----Community Dent Health. 2012 Dec;29(4):293-6.
Caries status in 16 year-olds with varying exposure to water fluoridation in Ireland.
Mullen J, McGaffin J, Farvardin N, Brightman S, Haire C, Freeman R.
Source
Health Service Executive, Sligo, Republic of Ireland. joej.mullen@hse.ie

<http://www.ncbi.nlm.nih.gov/pubmed/23488212>

10). 2012

CONCLUSIONS:

Children with severe dental caries had statistically significantly lower numbers of lesions if they lived in a fluoridated area. The lower treatment need in such high-risk children has important implications for publicly-funded dental care.

-----Community Dent Health. 2013 Mar;30(1):15-8.
Fluoridation and dental caries severity in young children treated under general anaesthesia: an analysis of treatment records in a 10-year case series.
Kamel MS, Thomson WM, Drummond BK.
Source
Department of Oral Sciences, Sir John Walsh Research Institute, School of Dentistry, The University of Otago, Dunedin, New Zealand.

Research Design: Consecutive clinical case series: clinical details (diagnoses and the treatments provided) were recorded for children who had received comprehensive dental care under GA between 2000 and 2009. Age, gender, ethnicity, socio-economic status and fluoridation status (determined from the residential address) were also recorded.
<http://www.ncbi.nlm.nih.gov/pubmed/23550501>

Claims of Disorders

1. Cancer? No.

There is overwhelming consensus that there is no valid evidence linking water fluoridation to ANY cancer.

A review of worldwide studies by The International Agency for Research on Cancer (IARC) concluded there was no evidence of an increase in cancer rates associated with fluoride in drinking water.

-----International Agency for Research on Cancer, IARC Monographs on the Evaluation of Carcinogenic Risks of Chemicals to Humans, Volume 27. 1982

- The San Francisco Department of Public Health Occupational Health and Environmental Health Section states that within a search of relevant peer reviewed medical literature to September 2005, a total of seven (7) epidemiological studies were discovered, none of which showed a relationship between fluoride exposure and osteosarcoma

----- (Moss et al. 1995, Gelberg et al. 1995, Freni and Gaylor 1992, Grandjean et al. 1992, McGuire et al. 1991, Mahoney et al. 1991, Hrudey et al. 1990).

-----San Francisco Department of Public Health, Current Scientific Evidence: Water Fluoridation is not associated with osteosarcoma. 2005,

Three small case control studies of osteosarcoma (McGuire et al 1995, Gelberg et al 1995, Moss et al 1995) have been reviewed by the Australian National Health and Medical Research Council in 1999. None of these studies found any evidence of fluoride increasing the risk of osteosarcoma.

-----Ahokas, J., et al., Review of water fluoridation and fluoride intake from discretionary fluoride supplements: review for NHMRC. 1999. Royal Melbourne Institute of Technology and Monash University: Melbourne.

The York Review (2000), a systematic review of 214 studies of varying quality, found no clear association between fluoridation of water and osteosarcoma.

-----McDonagh M S, et al., Systemic review of water fluoridation. BMJ, 2000. 321.

A study by Hoover et al found no relationship between osteosarcoma and fluoridation. This study is important because of the large numbers involved (125,000 incident cancers, and 2.3 million cancer deaths).

-----Medical Research Council Working Group, Water fluoridation and health. 2002, Medical Research Council: United Kingdom.

In 2002 the British Medical Research Council agreed that overall, evidence does not suggest that artificially fluoridated water increase the risk of cancer.

-----Medical Research Council Working Group, Water fluoridation and health. 2002, Medical Research Council: United Kingdom.

A review of fluoride by the Scientific Panel on Dietetic Products, Nutrition and Allergies published by the European Food Safety Authority in 2005, found no increased risk of cancer from drinking fluoridated water.

-----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. The EFSA Journal, 2005. 192: p. 1-65.

2. Kidney? No

"Because the kidneys are constantly exposed to various fluoride concentrations, any health effects caused by fluoride would likely manifest themselves in kidney cells. However, several large community-based studies of people with long-term exposure to drinking water with fluoride concentrations up to 8 ppm have failed to show an increase in kidney disease."

-----https://www.kidney.org/atoz/pdf/Fluoride_Intake_in_CKD.pdf

"People exposed to optimally fluoridated water will consume 1.5mg of fluoride per day. Available studies found no difference in kidney function between people drinking optimally fluoridated and non-fluoridated water. There is discrepant information in studies relating to the potential negative effects of consuming water with greater than 2.0ppm of fluoride."

"Available literature indicated that impaired kidney function results in changes in fluoride retention and distribution in the body. People with kidney impairment showed a decreased urine fluoride and increased serum and bone fluoride correlated with degree of impairment; however, there was no consistent evidence that the retention of fluoride in people with stage four or stage five CKD, consuming optimally fluoridated water, resulted in negative health consequences."

-----Ludlow M, Luxton G, Mathew T. Effects of fluoridation of community water supplies for people with chronic kidney disease. *Nephrol Dial Transplant* 2007; 22:2763-2767

3. IQ Reduction? No

Results.

No significant differences in IQ because of fluoride exposure were noted. These findings held after adjusting for potential confounding variables, including sex, socioeconomic status, breastfeeding, and birth weight (as well as educational attainment for adult IQ outcomes).

Conclusions.

These findings do not support the assertion that fluoride in the context of CWF programs is neurotoxic. Associations between very high fluoride exposure and low IQ reported in previous studies may have been affected by confounding, particularly by urban or rural status.

---Community Water Fluoridation and Intelligence:

Prospective Study in New Zealand

Jonathan M. Broadbent, PhD, W. Murray Thomson, BSc, PhD, Sandhya Ramrakha, PhD, Terrie E. Moffitt, PhD, Jiaxu Zeng, PhD, Lyndie A. Foster Page, BSc, PhD, and Richie Poulton, PhD (Am J Public Health. Published online ahead of print May 15, 2014: e1–e5. doi:10.2105/AJPH.2013.301857

(4) Thyroid? No.

BRITISH FLUORIDATION SOCIETY STATEMENT (January 2006) on the absence of an association between water fluoridation and thyroid disorders.

This statement has been reviewed and endorsed by the British Thyroid Association (BTA); however, the BTA would recommend that appropriate monitoring of thyroid status should be considered in areas where fluoridation is introduced to enable an ongoing epidemiological evidence base for thyroid status with fluoridation to be created.

The available medical and scientific evidence suggests an absence of an association between water fluoridation and thyroid disorders.

Many major reviews of the relevant scientific literature around the world support this conclusion. Of particular importance are:

an exhaustive review conducted in 1976 by an expert scientific committee of the Royal College of Physicians of England;

a systematic review in 2000 by the NHS Centre for Reviews and Dissemination at the University of York; and,

a 2002 review by an international group of experts for the International Programme on Chemical Safety (IPCS), under the joint sponsorship of the World Health Organisation (WHO), the United Nations Environment Programme (UNEP), and the International Labour Organisation (ILO).

None has found any credible evidence of an association between water fluoridation and any disorder of the thyroid.

Report of Royal College of Physicians:

A scientific committee was established by the Royal College of Physicians to review whether, and to what extent, water fluoridation benefited people's teeth and whether there were any harmful effects to general human health. As well as confirming that water fluoridation reduces levels of tooth decay, the review also found that it was safe.

Specifically, the report concluded that "there is no evidence that fluoride is responsible for any disorder of the thyroid". It also confirmed that iodine deficiency was the root cause of goitre, and that fluoride does not significantly influence the thyroid's uptake of iodine.

The University of York Review:

Published in 2000, the York Systematic review identified over three thousand references in total. However, they found no scientific studies of an acceptable scientific standard that would support suggestions of an association between water fluoridation and thyroid disorders, including goiter, in the populations drinking fluoridated water.

When the Medical Research Council subsequently used the York report as a basis for determining whether further research on any aspect of water fluoridation was needed, it concluded on the basis of the evidence already available that new research on fluoride and thyroid disorders should be regarded as a low priority.

Review by the International Programme on Chemical Safety (IPCS):

The IPCS review of fluoride was one of several published by the World Health Organisation intended to “provide critical reviews on the effects on human health and the environment of chemicals and of combinations of chemicals ...”, and to “assist national and international authorities in making risk assessments and subsequent risk management decisions.” As such, it examined evidence on fluoride relevant to all aspects of human health.

The review, which included 788 original studies from the worldwide scientific literature – both published and unpublished - identified no evidence of an association between fluoride and thyroid dysfunction in humans.

Experience in the UK’s most extensively fluoridated region:

The conclusions of these authoritative reviews are mirrored by the experience of specialist doctors diagnosing and treating thyroid disorders in hospitals in the West Midlands, which has had fluoridation schemes in operation since the mid-1960s and which is today the most extensively fluoridated region of the United Kingdom. Around seven out of ten people in the West Midlands now drink water whose natural fluoride content has been topped up to the optimum for dental health of one part of fluoride per million parts of water.

Dr. Andy Toogood, a consultant endocrinologist in the Department of Medicine at the Queen Elizabeth Hospital in Birmingham, says that he and his colleagues have seen nothing to suggest a rise in thyroid disorder cases resulting from water fluoridation.

Nor have public health officials who monitor trends in disease across the West Midlands detected any impact on the health of local populations drinking fluoridated water - other than a reduction in tooth decay levels which puts children living in the West Midlands among the best in the country for dental health.

Notes

Sources of fluoride

All drinking water and virtually all foodstuffs contain measurable amounts of fluoride; tea leaves are particularly rich in fluoride, as is fish. We are all, therefore, exposed to fluoride from natural sources on a daily basis.

Furthermore, around 400 million people worldwide drink fluoridated water – including 150 million in the US. Water supplies for many communities have been fluoridated for over 60 years. If fluoridation caused any adverse effects – including thyroid disorders - it is inconceivable that the reviews to date would have missed them.

Water fluoridation: Fluoride occurs naturally in all water supplies. In many parts of the world – for example Hartlepool in the North East of England, and many parts of East Anglia and Essex - the level is around the optimal for dental health (one part of fluoride per million parts of water – 1ppm). However many communities lack sufficient natural fluoride in their drinking water to prevent tooth decay, and because of the significant health benefits of the right amount of fluoride, the World Health Organisation recommends water fluoridation.

Water fluoridation takes place at the water treatment works. It is the controlled adjustment of the naturally occurring fluoride in the water to a level known to be safe, and to benefit dental health (1ppm).

References:

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